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July 9, 2008

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**Subject: Final Report  
Results of Subsurface Investigation and Laboratory Testing  
STP COL Project Units 3 & 4  
South Texas Project Electric Generating Station  
Bechtel Subcontracts 25425-800-HC4-CY00-00001 and  
25293-401-HC4-CY00-00002  
MACTEC Project No. 5050-06-0496  
(Also includes 6234-07-4257 and 6234-08-4632)**

Dear Mr. Dilodare:

MACTEC Engineering and Consulting, Inc. (MACTEC) is pleased to submit the final report for the subsurface investigation and laboratory testing scope of work that was performed for the STP COL Project located at the South Texas Project Electric Generating Station (STPEGS) in Matagorda County, Texas.

It has been a pleasure to perform the work described in the attached report. If you have any questions, or if we may be of further service, please contact us at your convenience.

Very truly yours,

MACTEC ENGINEERING AND CONSULTING, INC.

Michael D. Sufnarski  
Project Manager

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Principal Geotechnical Engineer  
Registered TX 81590

DCN-STP-768

**DATA REPORT**

**RESULTS OF SUBSURFACE INVESTIGATION AND  
LABORATORY TESTING**

**SOUTH TEXAS PROJECT UNITS 3 AND 4**

Matagorda County, Texas

July 2, 2008

Prepared By:

**MACTEC ENGINEERING AND CONSULTING, INC.**

**CHARLOTTE, NORTH CAROLINA**

**MACTEC PROJECT NUMBER 5050-06-0496  
(Also Includes 6234-07-4257/6234-08-4632)**

Submitted To:

**BECHTEL POWER CORPORATION**

Frederick, MD

**BECHTEL SUBCONTRACTS 25293-401-HC4-CY00-00002  
(2006) AND 25425-800-HC4-CY00-00001 (2008)**



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A	Survey Data and Test Locations	April 3, 2007
B	Geotechnical Boring Logs (Soil Logs), Geotechnical Test Pit Logs, and SPT Energy Ratio Measurements	May 14, 2007
C	Observation Well Logs, Development Records, and Slug Test Data	April 30, 2008
D	Cone Penetrometer Test Results	April 3, 2007
E	Geophysical Test Data (Downhole) and Field Electrical Resistivity	April 3, 2007
F	Laboratory Testing Data (Geotechnical)	April 3, 2007
G	Field and Laboratory Testing Data (Groundwater)	April 3, 2007
H	Laboratory Testing Data ( $K_d$ , Distribution Coefficient)	April 30, 2008
I	Resonant Column Torsional Shear (RCTS) Test Data (Fugro/UTexas)	June 25, 2008
J	Addendum to the Subsurface Investigation and Laboratory Testing Data Report Summary	July 2, 2008

### LIST OF ACRONYMS, SYMBOLS AND TERMINOLOGY

ASTM	American Society for Testing and Materials
B	Boring
B-value	Poor Pressure Parameter CU Tests
Bechtel	Bechtel Power Corporation
bpf	blows per foot
c	total cohesion
c'	effective cohesion
C'	bearing capacity index
C <sub>c</sub>	compression index
C <sub>e</sub>	SPT Energy Ratio to ER=60%
CD	consolidated-drained triaxial compression test
cf	cubic feet
CH	fat clay, high plasticity
CL	sandy lean clay, low plasticity
C <sub>n</sub>	vertical effective stress correction factor for SPT-N
COC	Chain of Custody
COL	Combined Operating License
CONC	Top of well pad, observation well
CPT	cone penetration test sounding (used in lieu of SCPTU or CPTU where distinction is not important)
CPTU	piezocone penetration test sounding
C <sub>r</sub>	recompression index
CU	consolidated-undrained triaxial compression test
C <sub>v</sub>	coefficient of consolidation
D <sub>10</sub>	grain diameter corresponding to 10% passing
D <sub>30</sub>	grain diameter corresponding to 30% passing
D <sub>60</sub>	grain diameter corresponding to 60% passing
DCC	Document Control Center
DPT	Direct Push Technology (Geoprobe)
DH	Downhole

DOE	Department of Energy
$D_r$	relative density
EFV	Energy of FV
EPA	Environmental Protection Agency
ER	Energy Ratio for Standard Penetration Test
ETR	Theoretical Potential Energy
$e_o$	initial void ratio
fps	feet per second
fr or FR	CPT friction ratio
$f_s$	CPT sleeve stress (also called sleeve friction)
FS	factor of safety
ft	foot or feet
g	acceleration due to gravity
G	shear modulus
$G_s$	specific gravity
GPS	Global Positioning System
gINT	Geotechnical Data presentation Software provided by gINT, Inc.
$G_{max}$	low strain shear modulus
GW	ground water table or depth
H	layer thickness
HASP	Health and Safety Plan
HSA	Hollow stem auger
ID	inside diameter
IP	in progress
K	soil permeability coefficient (hydraulic conductivity)
$K_a$	active earth pressure coefficient
$K_d$	distribution coefficient
$K_o$	at-rest earth pressure coefficient
$K_p$	passive earth pressure coefficient
kip	1,000 pounds
km	kilometer
ksf	kips per square foot
L	lower, pertaining to observation wells

LL	liquid limit
LL	Live Load, force or pressure
m/sec	meters per second
MACTEC	MACTEC Engineering and Consulting, Inc.
MH	high plasticity silt
ML	low plasticity silt
mm	millimeter
MSL	mean sea level in feet
M&TE	Measuring and Test Equipment
N-value	Sum of second and third set of recorded blows from the SPT
N <sub>60</sub> , N <sub>60</sub>	SPT N-value corrected to 60 percent energy ratio (ER)
N <sub>1</sub>	SPT N-value normalized to 1 tsf
(N <sub>1</sub> ) <sub>60</sub>	SPT N-value normalized to 1 tsf and 60% max. hammer energy ratio (also modified to account for room for liner but no sample liner used for Project)
N <sub>kt</sub>	CPT Cone Factor
NIST	National Institute of Standards and Technology
NRC	Nuclear Regulatory Commission
NTU	Nephelometric Turbidity Units
NV	Non Viscous
MDD	maximum dry density, pcf (laboratory compaction test)
OCR	overconsolidation ratio
OD	outside diameter
OMC	optimum moisture content, percent (%) (laboratory compaction test)
OW	observation well
P	P-wave, compressional seismic wave
p - q	total stress path strength parameters
p' - q'	effective stress path strength parameters
pH	Index of acidity
p <sub>c</sub> or P <sub>c</sub>	preconsolidation pressure (also called $\sigma_c'$ )
p <sub>o</sub> or P <sub>o</sub>	existing vertical effective stress (also called $\sigma_o'$ )
pcf	pounds per cubic foot
pci	pounds per cubic inch

PDA	Pile Driving Analyzer
PI	plasticity index
PL	plastic limit
Pitcher	Pitcher Sampler (Undisturbed (UD) soil sampling, also see ST)
psf	pounds per square foot
psi	pounds per square inch
PVC	Polyvinyl Chloride
QA	quality assurance
QAPD	Quality Assurance Project Document
QAR	Quality Assurance Representative
$Q_a$	allowable bearing pressure
$q_c$ or $Q_c$	measured CPT tip resistance
$Q_t$ , $q_{NT}$	normalized CPT tip resistance $Q_t = (q_t - \sigma_{vo}) / \sigma'_{vo}$
$q_t$ , $qT$	CPTU tip stress corrected for unequal area effects
$(q_c)_1$	CPT tip resistance normalized to 1 ton per square foot
QC	quality control
RC	Relative Compaction
RCTS	Resonant Column Torsional Shear (Laboratory Test)
REC	Recovery (SPT Samples and UD Samples)
RTK-GPS	Real Time Kinematic-Global Positioning Satellite
$r_u$	pore water pressure ratio = $\Delta u / \sigma'_0$
SC	clayey sand
SCPTU	seismic piezocone penetration test sounding
slickenside surface	parting surface in sample with particles oriented parallel to surface, giving shiney appearance
SM	silty sand
SP	poorly graded sand
SPT	Standard Penetration Test
Specification	Bechtel Technical Specification 25293-401-3PS-CY00-00001, Rev. 001, Issued 1/10/07 Subsurface Investigation and Laboratory Testing.
SRP	Standard Review Plan
SS	split spoon sample
SSA	solid stem auger

ST	Shelby tube (undisturbed (UD) soil sampling)
STD	standard
STDEV	standard deviation
STPEGS	South Texas Project Electric Generating Station
STL	Severn Trent Laboratory
STPNOC	South Texas Project Nuclear Operating Company
$S_u$	undrained shear strength
t	time
TN	top of notch, observation wells
TP	test pit
tsf	tons per square foot
TX	triaxial
U	upper, pertaining to observation wells
UD	undisturbed soil sampling: ST (Shelby Tube Sample), pushed or Pitcher (Pitcher Tube Sample), drilled
UNC	Unconfined Compression Test
US	United States
USCS	Unified Soil Classification System (e.g. SM, SC, etc.)
USNRC	U. S. Nuclear Regulatory Commission
UU	unconsolidated-undrained triaxial compression test
$v_s$	S-wave velocity (shear wave velocity)
$(v_s)_1$	S-wave velocity normalized to 1 ton per square foot
WI	Work Instruction
WC or W	water content (moisture content)
$\alpha$	total stress path angle
$\alpha'$	effective stress path angle
$\varepsilon$ or $\gamma$	shear strain
$\varepsilon_r$ or $\gamma_r$	reference strain
$\phi$	total stress friction angle
$\phi'$	effective stress friction angle
$\gamma$	unit weight of soil
$\gamma_s$	saturated unit weight of soil



$\gamma'$	effective or buoyant unit weight of soil, $\gamma_s - \gamma_w$
$\gamma_w$	unit weight of water
$\rho$	mass density of the soil
$\sigma_1, \sigma_3$	principal normal stresses
$\sigma_c'$	preconsolidation pressure
$\sigma_o'$	initial effective vertical stress
$\sigma_v'$	effective vertical stress
$\sigma_{vo}$	initial total vertical stress
$\tau$	shear stress
$\nu$	Poisson's ratio

## SECTION 1 OVERVIEW

### 1.1 INTRODUCTION

MACTEC Engineering and Consulting, Inc. (MACTEC) was retained by Bechtel Power Corporation (Bechtel) to conduct the subsurface investigation and laboratory testing program for the South Texas Project proposed ABWR Units 3 and 4 at the South Texas Project Electric Generating Station (STPEGS) in Matagorda County, Texas. MACTEC's services were completed as part of the Combined Operating License (COL) application for the South Texas Project Nuclear Operating Company (STPNOC) and were executed in accordance with Bechtel Subcontract 25293-401-HC4-CY00-00002.

Initial field work commenced in October 2006 and was completed in January 2007. Supplemental field work associated with the second radiation waste building and associated piping was completed in July 2007. Partial data reports were submitted in April 2007 and October 2007, respectively.

The Scope of Work was defined in Exhibit "D" of Bechtel Subcontract 25293-401-HC4-CY00-00002 and the technical requirements were defined in Bechtel Engineering Specifications 25293-401-3PS-CY00-00001, Rev. 002, dated 04/20/07 and 25293-401-3PS-CY00-00002, Rev 001 dated 4/20/07. The scope of work is briefly described below:

- Prepare and submit a quality plan (Quality Assurance Project Document).
- Prepare and submit a Health and Safety Plan (HASP).
- Prepare and submit a Geotechnical Work Plan.
- Provide quality assurance inspectors (surveillance) of the field and laboratory work activities.
- Locate exploration points by GPS and survey methods using coordinates contained in the specifications.
- Coordinate and clear overhead and underground utilities with plant personnel prior to advancing any exploratory activities (borings or test pits).
- Drill geotechnical borings and observation wells at locations specified by Bechtel, boring locations adjusted as necessary and as approved by Bechtel's representatives to accommodate access and utility conflicts.
- Conduct Standard Penetration Testing (SPT) and obtain disturbed and undisturbed soil samples as directed by Bechtel field representatives.
- Complete drilling of geotechnical borings for Bechtel's planning of the installation of water level observations wells.
- Prepare field logs for all drilling and sampling.
- Transfer all samples to a secure, on-site sample storage facility, provided by STPNOC.
- Seal all borings by grouting, except for locations where observation (monitoring) wells were installed.
- Develop the observation wells and conduct field permeability testing using slug testing methods.
- Install locking well covers and concrete well pads at observation well locations.
- Collect ground water samples and analyze for water quality.
- Perform electronic cone penetrometer tests (CPT).
- Perform down-hole seismic tests in 5 locations.
- Perform pore pressure dissipation tests at locations selected by Bechtel.
- Perform down-hole geophysical logging, suspension P-S velocity logging, and acoustic televiewer (deviation) logging.

- Perform field electrical resistivity tests along four arrays.
- Excavate test pits at six locations determined by Bechtel. Obtain bulk samples of the excavated material as directed by the Bechtel field representative.
- Conduct laboratory testing on soil and groundwater samples as assigned by Bechtel.

The work was completed under a Quality Assurance Program meeting the Code of Federal Regulations 10CFR50, Appendix B and conforming to the provisions of ASME NQA -1-1983.

This Data Report generally describes the field and laboratory testing methods and presents the laboratory testing results. Revision 000 of the Data Report presented field and laboratory testing results through May 2007. Revision 001 (Bechtel Subcontract 25425-800-HC4-CY00-00001) presented the complete set of field information and laboratory testing results defined by Bechtel Subcontract 25293-401-HC4-CY00-00002. Revision 002 incorporates additional editorial changes to the report.

## 1.2 PERSONNEL

Field work was performed by MACTEC personnel and/or qualified subcontractors with the assistance of the STPNOC who provided on-site office space and a sample storage facility. Prior to conducting any field activities, project personnel were qualified per the MACTEC QAPD and trained in quality assurance, 10CFR21, and safety procedures. Additionally, any field personnel who worked at the site for two weeks or more completed drug and alcohol screening. Key MACTEC personnel and their responsibilities are shown below:

- Michael D. Sufnarski, Project Manager/Site Manager
- Kathryn A. White, P.E., Project Principal Engineer
- Jay Cerceo, Site Coordinator/Assistant Site Safety Officer
- Lorri Johnson, Site Coordinator/Assistant Site Safety Officer
- Andy Kottenstette, Quality Assurance Representative (QAR)
- John Lynch, Quality Assurance Manager
- Edward Littell, Surveillant
- Matt Cook, Site Coordinator/Site Safety Officer (Additional Field Work)

### Rig Geologist/Geotechnical Engineers:

- Chris Bruce, P.G.
- Rodney Clark
- Matt Fraychineaud, P.G.
- Greg Geras
- Daniel Haug, P.G.
- Mary Helen Niemann, P.G.
- David Heslep, P.G.
- James Howard
- Shaun Lehman
- Wayne Miller, P.G.
- Ammi Osorio, P.E.
- Daniel Tibbals

In addition to MACTEC personnel, Bechtel provided a full time on-site representative for duration of field activities. These personnel included:

- Garrett Day
- Allen Shaw
- Chirayus Viyanant
- Hazen Sarhan
- Jerry Lefevre
- Reda Moulai

The organizations that performed on-site work or laboratory testing of samples as part of this effort are listed in Table 1.

### **1.3 ORGANIZATION OF REPORT**

This report and its attachments are organized in the following sequence; transmittal letter; table of contents; list of tables; list of figures; list of attachments; list of acronyms, symbols and terminology; text; tables; and figures. The attachments are provided in separate volumes and are listed as follows:

<b><u>Attachment</u></b>	<b><u>Contains</u></b>
A	Survey Data and Test Locations
B	Geotechnical Boring Logs (Soil), Geotechnical Test Pit Logs, and SPT Energy Ratio Measurements
C	Observation Well Logs, Well Development Records, and Slug Test Data
D	Cone Penetrometer Test Results
E	Geophysical Test Data (Downhole) and Field Electrical Resistivity Test Results
F	Laboratory Testing Data (Geotechnical)
G	Field and Laboratory Testing Data (Groundwater)
H	Laboratory Testing Data ( $K_d$ , Distribution Coefficient)
I	Resonant Column Torsional Shear (RCTS) Test Data
J	Addendum to Subsurface Investigation and Laboratory Testing Data Report Summary

### **1.4 QUALITY ASSURANCE**

Quality related activities performed by MACTEC and its subcontractor organizations that provided equipment and personnel during the completion of this COL project were in accordance with the MACTEC Quality Assurance (QA) Manual and the MACTEC Quality Assurance Project Document.

The MACTEC QA program complies with NQA-1-1994 Subpart 2.20 and to the requirements of 10CFR50 Appendix B.

## SECTION 2 TEST METHODS

### 2.1 SURVEYING

The surveying for this project was conducted in two phases. The initial phase was preliminary staking of planned boring locations in accordance with Bechtel's boring location plan. Preliminary staking was completed by MACTEC personnel using a Trimble-GeoXT hand held unit. (Staking for the supplement subsurface investigation was completed by Survcon, Inc.). Stakes were driven in-place to mark the surveyed locations. Relocation of several borings was required due to site access and/or underground utility concerns.

The final "as-built" survey of all test locations was performed under MACTEC's Quality Assurance program by Survcon, Inc. Horizontal and vertical datums were based on South Texas Plant control points. Horizontal datum of NAD27 and vertical datum of NAD29 were used for this survey. Horizontal coordinates achieved third-order accuracy (1:5,000) and vertical elevation was detailed to the nearest 0.1-foot. As-built locations from the survey are contained in Table 2A. Full details are contained in Attachment A. Survey data from the supplemental investigation is included in Attachment J.

### 2.2 UTILITY LOCATION

Prior to the execution of drilling activities, MACTEC personnel conducted an electromagnetic (EM) survey of a 10-ft radius around each proposed boring. The intent was to locate any metallic underground utilities that would pose a risk to drilling personnel. Several underground water lines leading to fire hydrants were identified and marked.

In addition to the EM survey, "as-built" drawings provided by STPNOC were used to identify potential underground utility hazards. Final release for the commencement of drilling activities was provided by STPNOC only after the "as-built" records were checked against the EM survey findings.

Aside from underground utilities, there were overhead power lines on the site. The following pre-drilling activities were accomplished to avoid encounters with power lines:

1. Each pole associated with the overhead power lines in the area where borings were planned was inspected for lines leading underground. STPNOC was consulted and checked whether any lines thus located are energized;
2. Energized underground lines indicated in step (1) were traced for short distances and marked with paint and flagged on the ground surface so they could be avoided. If there were indications an underground line may pass near a boring, the lines within a 10 ft radius of the planned boring were marked.

### 2.3 DRILLING EQUIPMENT/METHODS

Drilling equipment mobilized to the site included the following:

Serial ID	Owner	Drill Rig	Driller	SPT	Pitcher
502	Best	Failing 1500	Alfredo Palacios	Y	N
263048	Environmental Exploration	CME 750 ATV	David Nalls	Y	N
B6731-152	Gregg	Fraste Track	Bill Poole Joe Smith	Y	N
03	Gregg	CME 55	Brian Giesecke	Y	N
165447	JEDI	CME 75	Oscar Garcia	Y	N
216265-45	Lewis	Mobile B57 ATV/ Mobile B61	Danny Gonzalez	Y	N
01	MACTEC	D-50 ATV	Gary Skoglund	Y	N
299709	Miller	CME 750 ATV	Glenn Bilbrey	Y	Y
04	MACTEC	CME 45	Donnie Rhodes Floyd Cox	Y	N
701088	Gregg	Morooka CPT Rig	Ruperto Aguilar	N	N

In addition, rubber-tired highway-type water tanker trucks were utilized to haul water from a STPNOC provided water source.

The general site clearing was completed by STPNOC and included mowing brush with a tractor-mounted mower. A Caterpillar D-8 bulldozer was used to clear the location for one boring. A rubber-tired backhoe was used to excavate and then to backfill the shallow test pits use for soil sampling purposes. The backfilled soil was loosely compacted and the surface smoothed to surround ground level.

Borings for geotechnical purposes were advanced in soil using solid stem augers (SSA) drilling techniques until water was initially encountered. Hollow stem auger (HSA) drilling technique was utilized at selected boring locations as identified in the boring logs provided in Attachments B and J. Following the collection of a water depth measurement, the boring was advanced using mud rotary methods to a predetermined termination depth.

At selected locations and following review of the adjacent geotechnical boring by MACTEC and Bechtel, typically two observation wells were installed by mud rotary drilling methods. The borings were performed in accordance with the Bechtel Specification. Details of the observation wells are provided in Attachment C. The wells consist of PVC screen and riser pipe, sand filter pack, bentonite chips or pellets and cement bentonite grout. Protective steel well covers and concrete pads were placed at the surface. Specific equipment used at each boring is included on the boring logs included in Attachments B and J.

The borings and the CPT probe locations were filled using a cement-bentonite grout prior to demobilizing from the site. The borings were grouted from the bottom of the boring by pumping the grout through a tremie pipe. The grout mixture of approximately eight gallons of water and 2.5 pounds of bentonite per 94 pound sack of Portland cement was used per the Specification Section 5.12.

## **2.4 SPT ENERGY MEASUREMENTS**

SPT energy measurements were conducted for each of the drill rigs performing standard penetration testing (SPT). Energy measurements were recorded during SPT sampling at the depth intervals shown in Attachment B, Table B-1 and in Attachment J. The length of the drill rod string, including the instrumented drill rod insert for each sample was generally 4 feet longer than the depth of the sample being collected.

The energy measurements were performed with a Pile Driving Analyzer (PDA) model PAK and calibrated accelerometers and strain gages. A section of drill rod two feet long and the same size as the drill rod used to advance the boring and instrumented with dedicated strain gages, was inserted at the top of the drill rod string immediately below the SPT automatic hammer. The inserted rod was also instrumented with two piezoresistive accelerometers that were bolted to the outside of the rod.

The work was conducted in general accordance with ASTM D 4633-05. The strain and acceleration signals were converted to force and velocity by the PDA, and the data was interpreted by the PDA according to the Case Method equation. The EFV method of energy calculation is recommended in ASTM Standard D 4633-05. The maximum energy transmitted to the drill rod string (as measured at the location of the strain gages and accelerometers) was calculated by the PDA using the EFV method equation, as shown below:

$$EFV = \int F(t) * V(t) * dt$$

Where: EFV = Transferred energy (EFV equation), or Energy of FV

F(t) = Calculated force at time t

V(t) = Calculated velocity at time t

The EFV equation, integrated over the complete wave event, measures the total energy content of the event using both force and velocity measurements. The EFV values associated with each blow analyzed were tabulated and averaged to obtain the average measured energy at each depth tested. The ratio of the average measured energy to the theoretical potential energy of the SPT system (140 lb weight with the specified 30 inch fall) is the ETR.

The average ETR measured for the automatic hammers used at the site ranged from 72.3% to 94.5% of the theoretical potential energy. These ETR values are within the range of typical values for automatic hammers. The ETR values (as percent of the theoretical value) are shown in Attachment B, Table B-1.

## **2.5 SAMPLING IN GEOTECHNICAL BORINGS**

### **2.5.1 Standard Penetration Test Sampling (SPT)**

SPT sampling in the geotechnical borings was generally conducted continuously from the ground surface to a depth of 15 feet. The SPT sampling interval below 15 feet was five feet to a depth of 100 feet. The SPT sampling interval from 100 feet to 200 feet was 10 feet. From 200 feet to 600 feet, the sampling interval was 20 feet. The equipment and methods are described in ASTM D 1586-05. Two of the borings, B-322C and B-422C were continuously sampled to 100 feet within the reactor unit boundaries. Automatic hammers were used to perform the SPT testing. The split barrel sampler was typically driven

18 inches in soil with blows recorded for each six-inch interval of penetration. The weight of the hammer ranged from 138.1 to 141.0 pounds, meeting the ASTM requirements. In very hard soils, driving was terminated after 50 blows were recorded for a six-inch, or less, interval and the actual penetration recorded, (e.g., 50 blows / 3 inches).

The split barrel sampler was opened at the drill site and the recovered materials were visually described, classified, and photographed by MACTEC's rig geologist or engineer. A selected portion of the sample (typically the lower portion of the sample) was placed in a glass sample jar with a moisture proof lid. Sample jars were labeled, placed in cardboard boxes, and transported to the on-site secure storage area at the end of each work day.

### **2.5.2 Undisturbed Soil Sampling**

Undisturbed soil samples were obtained as directed by Bechtel, using a 3-inch thin-walled Shelby tube sampler in accordance with ASTM D 1587-00. Undisturbed soil samples were collected from selected borings and the two 600-foot borings using a pitcher tube sampler.

When subsurface material was anticipated to be too dense or hard to allow satisfactory samples to be recovered by pushing the Shelby tube sampler into the material, a Pitcher tube sampler was used where requested by Bechtel. The Pitcher tube sampler is a rotary sampler that drills the 3-inch tube into the subsurface material. The undisturbed samples were sealed at the top and bottom against moisture loss, labeled, kept in an upright condition, and transported to the climate-controlled on-site storage area following ASTM D 4220-95(2000).

## **2.6 BORING LOGS**

The soil descriptions on the boring logs in Attachments B and J are based on the field descriptions (ASTM D 2488-06) by the rig geologist or engineer and modified according to ASTM D 2487-06 using laboratory test results are available. The depths on the boring logs are from observations during drilling. After encountering initial water levels, the water was allowed to stabilize for a short period of time and was then measured from the ground surface. Because the water level was measured after a short period of time, this measurement did not represent a true stabilized ground water table. Additionally, because water was later introduced during mud rotary drilling, the water depths on the boring logs could not be accurately determined. For stabilized water depths, the information in Attachment C, Table C-2 should be consulted. The boring logs in Attachments B and J were prepared using the computer program "gINT" (Version 7). Electronic files (in Excel format) with gINT data were previously provided to Bechtel.

## **2.7 SAMPLING IN GEOTECHNICAL TEST PITS**

Test pits were excavated at six locations identified by Bechtel (field-located). A rubber-tired backhoe was used to excavate the test pits. The Bechtel field representative selected the materials to be sampled and a MACTEC rig geologist collected the bulk samples. As approved by Bechtel, the bulk samples were placed in new 5-gallon plastic buckets with handles for carrying. Two buckets of each sampled material were obtained. Glass jar samples were obtained and sealed for moisture retention. The backhoe was used to backfill the test excavations using the excavated materials. The backfilled materials were tamped in-



place using the backhoe. The rig geologist placed a stake on the backfilled test pit for later surveying of the location.

The buckets and jar samples were labeled and transported to the on-site storage area. The rig geologist prepared a Geotechnical Test Pit Log based on visual description of the excavated materials according to ASTM D 2488-06. The Geotechnical Test Pit Logs are included in Attachments B and J. The surveyed locations of the test pits are included in Attachment A.

## **2.8 OBSERVATION WELLS**

### **2.8.1 Well Installation**

Twenty-eight observation wells of the thirty proposed observation wells were installed throughout the site as part of this project. Fifteen observation wells were screened in the first or upper aquifer (U designation) and thirteen observations wells were screened in the second or lower aquifer (L designation). The wells were installed per Section 6.3 of the specification. One replacement observation well (OW-332La) was installed after it was discovered that the original well (OW-332L) had collapsed at a depth of approximately six feet. Observation well OW-332L was abandoned on February 7, 2007, as documented in Attachment C.

Borings for installation of the observation wells were advanced using either solid stem augers or mud rotary drilling to make a nominal 8-inch diameter hole. The borings were advanced to depths specified by Bechtel's field representative. Upon reaching the designated depth, slotted PVC casing connected to solid riser sections was installed. A sand pack was then placed around the screened interval. A minimum, two-foot bentonite seal was then installed over the sand pack. The remainder of the annulus was grouted from the top of the bentonite seal to the ground surface in each of the borings. The grout mix used was specified in Section 5.12 of the Specification.

The depth of the screened interval, length of the screen, and general well configuration were designated by Bechtel for each well. Since the ground surface elevations at the observation well sites were not determined until after the well pads were installed, the top of the PVC casing elevation, less the casing stickup above ground surface as measured at the time of installation, was used to back-calculate the ground surface elevation shown on well installation records and the well boring logs. The ground water depth measurements are referenced to the top of the PVC casing. The elevation of the top of the casing was also used along with measurements of the well screen and riser to calculate elevations for the screened well monitoring interval. Well installation logs showing the details of the construction for the observation wells are included in Attachment C, Appendices C-1 and C-4. A summary table with pertinent observation well information is provided in Attachment C, Table C-1. The water depths shown on the logs are from observations obtained during drilling of the geotechnical boring (see Attachment B for logs). Because water was introduced during mud rotary drilling, the water depths on the well installation logs may not represent the stabilized water depths. For stabilized water depths at the OW locations, the information in Attachment C, Table C-3 should be consulted.

The wells were completed with removable well caps and a lockable steel well cover extending approximately two feet above grade. A concrete pad, approximately two feet square and six inches thick, was also placed around each well cover per the Specification.

### 2.8.2 Well Development

After well installation was completed, wells were developed by an air lift method. The development procedure agreed to, by MACTEC and Bechtel, was to first purge the observation well until the water showed minimal sediment. The well was then purged to remove at least 5 boring-volumes of water. The air lift tubing was moved up and down within the casing to create a surging effect. A well was considered developed when the pumped water appeared to be visibly clear of suspended sediment.

Well development records are in Attachment C, Appendix C-2. Each well was developed satisfactorily using the planned procedure.

### 2.8.3 Field Permeability Tests

Field permeability testing was conducted in each observation well using procedures described in Section 8 of ASTM D 4044. This procedure is commonly termed the slug test method. Slug testing involves establishing a static water level, lowering a solid cylinder into the well to cause an increase in the ground water level within the well, and then monitoring the time rate for the well water level to return to the pre-test static level. This method is commonly called the "slug-in" method. After stabilization, the slug is rapidly removed to create a lowering of the water level in the well. Then time and rate of ground water recovery to the pre-test static level is then recorded. This method is commonly called the "Slug-out" method. Electronic transducers and data loggers are used for measuring the water levels and times during the test.

The data logger output sheets, which are charts of water level versus time, are in Attachment C, Appendix C-3.

### 2.8.4 Water Level Measurements

On December 28, 2006, MACTEC representatives measured water levels in each of the observation wells installed at STP. Measurements were made using an electric water level meter and referenced to the notched top of the casing. Water levels recorded are shown in Table C-3 in Attachment C.

## 2.9 CONE PENETROMETER TESTING

Locations for 43 Cone Penetrometer Tests (CPT), (32 original plus 11 additional), were included in the original scope of work for this project. Specified probe depths were to refusal (the limit of the pushing capacity of the CPT rig), to a depth approved in the field by a Bechtel representative, and to a maximum depth of 100 feet.

CPT testing was completed by Gregg Insitu (Gregg), a subcontractor to MACTEC. Gregg utilized a 20-ton self-contained rig mounted on a tracked ATV carrier to complete the work. If needed, two water-filled water trucks were attached to the CPT rig to add weight to the rig. Seismic testing was completed in five of the CPTs at intervals of 5-foot. Pore pressure dissipation tests were performed in 19 of the CPTs. The testing was done in accordance with project Specifications and ASTM D 5778-95(2002). The CPT data are in Attachments D and J. Electronic files containing CPT data including calculated/interpreted undrained shear strength with assumed soil unit weight and cone factor ( $N_{kt}$ ) for cohesive soils is provided in an accompanying CD.

## **2.10 BORING GEOPHYSICAL LOGGING**

Downhole geophysical logging was performed in 10 borings as required by the Specifications. GEOVision, a MACTEC subcontractor, performed this work in accordance with ASTM D 5753-05. The results are found in Attachment E. The following downhole geophysical logs were performed in the selected borings.

### **2.10.1 Natural Gamma**

Gamma logs record the amount of natural gamma radiation emitted by the soil surrounding the boring.

### **2.10.2 Long and Short Normal Resistivity**

Normal resistivity logs record the electrical resistivity of the boring environment and surrounding soil and water as measured by variably spaced potential electrodes on the logging probe. Typical spacing for potential electrodes is 16 inches for short-normal resistivity and 64 inches for long-normal resistivity. Normal resistivity logs are affected by bed thickness, boring diameter, and boring fluid and can only be collected in water or mud filled open borings.

### **2.10.3 Three Arm Caliper**

Caliper logs record boring diameter. Changes in boring diameter are related to boring construction, such as casing or drilling bit size, and to fracturing or caving along the boring wall. Because boring diameter commonly affects log response, the caliper log may be useful in the analysis of other geophysical logs.

### **2.10.4 Boring Deviation Logging**

Boring deviation was measured using a High Resolution Acoustic Televiewer. Enclosed in the probe is a three-axis accelerometer that records boring inclination and deviation from vertical during logging measurements. Records from the logging are detailed in Attachment E.

### **2.10.5 Data**

Data was recorded in digital format and are contained in Attachment E. Also contained in Attachment E are printouts of the geophysical logs and the associated lithology.

## **2.11 SUSPENSION P-S VELOCITY LOGGING**

Suspension P-S velocity logging was performed in 10 borings as required by the Specifications. Compression (P) and shear (S) wave velocity measurements were made at 1.6-foot intervals. Attachment E contains the downhole logging results.

## **2.12 FIELD ELECTRICAL RESISTIVITY TESTING**

Field electrical resistivity testing was performed along 4 arrays in the proposed switch yard areas of the site. Electrical resistivity locations are summarized in Table 2C. The Wenner four electrode method was used to perform the tests in accordance with ASTM G 57-06. Electrode spacing ranging from 3 feet up to 300 feet was used in order to determine the soil resistivity at increasing depths. The resistivity data interpreted from the tests are contained in Attachment E.

### 2.13 TRITIUM SAMPLING

Prior to the initiation of the drilling program, 12 locations were identified to collect shallow ground water samples using direct-push technology (DPT or Geoprobe). The purpose was to identify shallow ground water tritium levels within the work areas. The depths of the probes ranged from approximately 16 to 28 feet below ground surface. Probe location data is contained in Table 2D. Once the probes were in place bailers or peristaltic pumps were used to obtain approximately 1-gallon of water per sample for analysis of the groundwater. STPNOC's Health Physics Department provided sample containers and was responsible for handling (sample custody), maintaining the integrity of the samples, and testing for tritium levels. At the completion of water sampling, probe borings were backfilled with bentonite to ground surface.

### SECTION 3 SAMPLE STORAGE

#### 3.1 ON-SITE SAMPLE STORAGE FACILITY

Consistent with MACTEC's QAPD Requirements, an on-site sample storage facility was established. The sample storage facility was provided by STPNOC by designating a lockable sample storage space. The space was accessible by one doorway from the warehouse's exterior. The space was bordered on 3 sides by an 8-foot high chain link fence and a warehouse wall. Ample shelves and undisturbed sample racks were provided and assembled by the STPNOC. This warehouse is conveniently located just south of the Unit 4 Power Block borings. The facility is insulated and climate controlled by the STPNOC.

Samples were transported daily from the field to the sample storage warehouse by the rig geologists/engineers. All samples were transported in accordance with ASTM D 4220-95(2000). SPT samples were transported as Group "A" samples in their compartmentalized cardboard boxes, each labeled to show the contents therein. The bulk test pit samples were sealed in 5-gallon plastic buckets and treated as Group "B" samples. The UD samples were treated as Group "C" samples.

A chain-of-custody form was completed for all samples removed from the facility.

## SECTION 4 LABORATORY TESTING - GEOTECHNICAL

Laboratory testing was performed on disturbed and undisturbed soil samples obtained during the subsurface investigation. Testing was performed in accordance with the current ASTM standards or other standards where applicable. Selection of the samples to be tested and the tests to be performed on the samples were done by Bechtel. Bechtel provided Geotechnical Laboratory Test Assignment Sheets dated November 16, 2006; December 7, 14, 19, 20, and 28, 2006; and January 2, 7, and 8, 2007. Revised Geotechnical Laboratory Test Assignment Sheets were dated December 18 and 21, 2006; and January 8, 2007.

The laboratory personnel determined that some of the assigned tests on soil samples could not be performed because of insufficient sample volume. Bechtel was provided lists of those samples/tests via email from the MACTEC Project Principal Engineer. Re-assigned tests were provided by Bechtel via return email.

Testing of soil samples, except for chemical tests and resonant column torsional shear (RCTS) testing, was done in MACTEC's laboratories in Charlotte, North Carolina; Phoenix, Arizona; and Atlanta, Georgia.

Chemical testing for pH, sulfates and chlorides in selected soil samples as assigned by Bechtel was done by Severn Trent Laboratory (STL), a subcontractor to MACTEC.

$K_d$  testing as assigned by Bechtel was done by Savannah River National Laboratories. These test results are reported as Attachment H.

RCTS testing of selected soil samples as assigned by Bechtel were done by the Fugro Consultants laboratory and the University of Texas at Austin under the technical direction of Dr. K.H. Stokoe, a subcontractor to MACTEC. These test results are reported as Attachment I.

The following tests were assigned and performed:

### **4.1 IDENTIFICATION TESTS**

- Moisture content - ASTM D 2216-05
- Unit weight of soil - ASTM D 5084-03
- Specific gravity of soil - ASTM D 854-06
- Sieve and hydrometer analysis - ASTM D 422-63(2002)e1 and ASTM D 6913-04e1
- Atterberg limits - ASTM D 4318-05
- Chemical analysis (pH, Chloride, Sulfate) - EPA 846 9045/9056-300.00/8056-300.00 and EPA SW-846 9045

### **4.2 COMPACTION AND STRENGTH TESTS**

- Moisture density - ASTM D 1557-02e1
- Unconsolidated - undrained triaxial compression - ASTM D 2850-03a
- Consolidated - undrained triaxial compression - ASTM D 4767-04
- Direct shear; soil - ASTM D 3080-04
- Unconfined Compression - ASTM D 2166-00e1
- California Bearing Ratio - ASTM D 1883-05

#### **4.3 COMPRESSIBILITY TESTS**

- Consolidation Tests; one dimensional - ASTM D 2435-04, Method B

#### **4.4 MODULUS and DAMPING TESTS**

- RCTS Tests ASTM D 4015-92(2000) and Test Procedures and Calibration Documentation Associated with the RCTS and URC Tests at the University of Texas at Austin, DCN: UTSD RCTS GR06-4, April 25, 2006, Geotechnical Engineering Center, University of Texas, Austin, Texas.

#### **4.5 REPORTING**

The geotechnical laboratory test reports, consisting of individual test data and results sheets as required by the testing standard, are contained in Attachment F, Table F-1. The test results for distribution coefficient,  $K_d$ , are found in Attachment H. The RCTS tests, including the data and report supervised or approved by Dr. K. H. Stokoe are found in Attachment I. The classification tests on the RCTS samples are found in Attachment I.

## SECTION 5 WATER SAMPLING, FIELD AND LABORATORY TESTING

Water sampling of the observation wells and field and laboratory testing was done as described in the project specification 25293-401-3PS-CY00-00001, Rev. 001.

### **5.1 WELL DEVELOPMENT**

Well development was described in Section 2.5.2 of this report, and the results are contained in Attachment C.

### **5.2 WELL PURGING AND WATER SAMPLING**

Water sampling was performed using a submersible pump placed approximately one-foot above the bottom of the well. The sampling method used was consistent with "sampling based on fixed volume combined with indicator parameter stabilization" as described in ASTM D 6452-99 (2005).

Well purging was performed until field-measured water quality indicator parameters stabilized and at least three well volumes were purged, as measured by MACTEC and agreed upon by Bechtel.

The field indicator parameters which were measured include temperature, pH, electrical conductivity (specific conductance), turbidity, oxidation-reduction potential (Eh or redox), and dissolved oxygen, in accordance with ASTM D 6452-99 (Reapproved 2005). Field measurement methods complied with appropriate standards for these parameters:

- Temperature – EPA Method 170.1
- pH – ASTM D 1293-99 (2005) (Method B), or EPA Method 150.2, or EPA Method 9040B or 9041A (SW 846)
- Electrical conductivity – ASTM D 1125-95(2005), or EPA Method 120.1, or EPA Method 9050A (SW 846)
- Turbidity - ASTM D 1889-00, or EPA Method 180.1
- Oxidation – reduction potential – ASTM D 1498-00
- Dissolved oxygen – ASTM D 888-05 (Method B), or EPA Method 360.1

Stabilization of field parameters was based on three consecutive measurements showing values with the criteria listed below, made at intervals not less than ½ well volume or 5 minutes, whichever is greater.

- pH ( $\pm 0.1$  pH units)
- Dissolved oxygen ( $\pm 0.3$  mg/liter)
- Electrical conductivity ( $\pm 3$  percent)
- Oxidation – reduction potential ( $\pm 10$  mv)
- Turbidity ( $\pm 1$  nephelometric turbidity unit, or  $\pm 10$  percent if greater than 10 NTUs)

Water sampling was performed using the submersible pump. The pumping rate during well sampling was kept low enough to minimize sample turbidity, sample aeration, bubble formation, and turbulent filling of sample containers.



### **5.3 SAMPLE CONTAINERS AND SHIPPING**

Sample containers obtained from the testing laboratory were used for collecting water samples. Each sample container was labeled with the laboratory analysis which is to be performed, and the preservative which was added to the container. Samples were shipped to the testing laboratory in coolers.

### **5.4 LABORATORY ANALYSES OF SAMPLES**

Laboratory testing for general water quality parameters was performed as assigned by Bechtel and included the following list:

- Total dissolved solids – EPA Method 160.1
- Cations (metals) – EPA Method 200.7
- Inorganic ions (bromide, chloride, fluoride, sulfide) – EPA Method 300.0
- Alkalinity (bicarbonate/carbonate) – EPA Method 310.1
- Ammonia – EPA Method 350.1
- Nitrate/nitrite – EPA Method 353.1
- Cation/anion balance – Laboratory standard procedures.

### **5.5 DECONTAMINATION AND CLEANING**

The equipment, accessories, tools and supplies used for measurement of field parameters were kept decontaminated in accordance with ASTM D 5088-02. The equipment and tools were decontaminated before work began, between each well, and at the completion of the work.

### **5.6 REPORTING**

Attachment G (Field and Laboratory Testing Data (Groundwater)) contains the results of the work described in this Chapter.

**SECTION 6**  
**K<sub>d</sub> TESTING OF SOIL AND ROCK**

Specialized testing for the distribution coefficient, K<sub>d</sub>, was performed at the Savannah River National Laboratory of the DOE at the Savannah River Site near Aiken, South Carolina. Dr. Dan Kaplan performed these tests as assigned by Bechtel. This work is presented in Attachment H to this report.

**SECTION 7**  
**SUPPLEMENTAL FIELD INVESTIGATION**

As stated in Section 1.1, a supplemental geotechnical field investigation associated with the radiation waste building and associated piping was completed in July 2007. The results of this field investigation are presented in Attachment J to this report and are not included in the following summary tables.

<b>Organization</b>	<b>Function</b>
MACTEC Engineering and Consulting, Inc.	SPT tests; Undisturbed Sampling; Bulk Sampling; Geotechnical Laboratory Testing for Soil samples; SPT Energy Measurement on Drill Rigs of MACTEC and Subcontractors; Slug Testing; installation of silt fencing where indicated by STP; Subsurface Utilities; Drilling.
Gregg In-Situ, Inc.	CPT Tests
Savannah River National Laboratory	K <sub>d</sub> Tests
Best Drilling Services, Inc.	Observation Well Installation
STL Laboratories	Laboratory Chemical Testing Soil & Water Samples
GEOVision	Downhole geophysical logging; natural gamma; short and long normal resistivity; 3 arm caliber; acoustic televiewer; p-s suspension logging; field electrical resistivity test arrays.
Survcon, Inc.	Surveying of borings, observation wells, CPTs, test pits and field electrical resistivity tests
University of Texas / Fugro Consultants	RCTS Tests
Jones Environment Drilling, Inc.	Drilling; Undisturbed Sampling
Lewis Environment Drilling, Inc.	Drilling; Undisturbed Sampling
Gregg Drilling & Testing, Inc.	Drilling; Undisturbed Sampling
Environmental Exploration, Inc.	Drilling; Undisturbed Sampling
Miller Drilling, Inc.	Drilling; Undisturbed Sampling

**TABLE 1 (Page 1 of 1)**  
**ORGANIZATIONS PERFORMING WORK AT THE SITE OR IN THE LABORATORY**

**TABLE 2A**  
**BORING LOCATION SUMMARY**  
**STP COL PROJECT**  
**MACTEC ENGINEERING AND CONSULTING, INC.**  
**PROJECT # 5050-06-0496**

Boring ID	Location/Remarks	Northing (ft) <sup>(1)</sup>	Easting (ft) <sup>(1)</sup>	Elevation (ft) <sup>(1)</sup>	Total Depth (ft, bgs)	Depth of Fill (ft, bgs)	Thickness of Fluvial-Marine Soil (ft, bgs)
B-301	REACTOR BUILDING	363000.83	2943271.38	28.1	200.0	0.0	200.0
B-302DH	REACTOR BUILDING	363000.73	2943364.78	30.0	220.0	1.0	219.0
B-303	REACTOR BUILDING	363001.22	2943456.08	26.6	200.0	0.0	200.0
B-304	REACTOR BUILDING	363095.40	2943288.83	28.2	200.0	0.0	200.0
B-305DH <sup>(2)</sup>	REACTOR BUILDING	363098.59	2943364.19	29.8	495.0	1.0	494.0
B-305DHa <sup>(2)</sup>	REACTOR BUILDING	363100.87	2943343.98	29.6	818.0	1.0	617.0
B-306	REACTOR BUILDING	363098.22	2943472.95	27.8	200.0	0.0	200.0
B-307	REACTOR BUILDING	363196.58	2943289.07	28.2	200.0	0.0	200.0
B-308DH	REACTOR BUILDING	363196.49	2943363.64	29.8	215.0	0.0	215.0
B-309	REACTOR BUILDING	363197.07	2943455.89	26.6	200.0	0.0	200.0
B-310	CONTROL BAY	363283.70	2943285.50	28.2	200.0	4.6	195.6
B-311	CONTROL BAY	363286.55	2943363.47	29.9	100.0	1.6	98.6
B-312	CONTROL BAY	363286.42	2943473.97	28.3	100.0	0.0	100.0
B-313	CONTROL BAY	363149.10	2943486.09	28.2	100.0	1.5	98.5
B-314	CONTROL BAY	363148.73	2943617.01	29.2	200.0	1.8	198.2
B-315	CONTROL BAY	363366.12	2943511.58	27.7	150.0	0.0	150.0
B-316	CONTROL BAY	363304.98	2943617.51	28.9	200.0	3.0	197.0
B-317	TURBINE BLDG	363364.01	2943235.44	28.5	150.0	1.5	148.5
B-318	TURBINE BLDG	363363.37	2943287.42	28.5	100.0	1.5	98.5
B-319DH	TURBINE BLDG	363364.17	2943407.90	28.4	215.0	0.0	215.0
B-320	HEAVY HAUL RD	362903.74	2943116.74	30.5	50.0	0.0	50.0
B-321	TURBINE BLDG	363483.05	2943231.24	29.2	150.0	0.0	150.0
B-322C	TURBINE BLDG	363483.40	2943406.69	30.1	100.0	0.0	100.0
B-323	TURBINE BLDG	363484.30	2943515.99	29.8	100.0	1.5	98.5
B-324	TURBINE BLDG	363570.87	2943233.90	29.5	100.0	0.0	100.0
B-325	TURBINE BLDG	363569.94	2943299.20	30.2	100.0	0.0	100.0
B-326	TURBINE BLDG	363572.01	2943519.56	30.4	150.0	1.5	148.5
B-327	TURBINE BLDG	363658.77	2943233.17	29.8	150.0	0.0	150.0
B-328DH	TURBINE BLDG	363660.26	2943296.12	29.9	218.0	0.0	218.0
B-329	TURBINE BLDG	363658.33	2943410.29	29.6	100.0	0.0	100.0
B-330	TURBINE BLDG	363660.32	2943518.07	29.5	150.0	0.0	150.0
B-331	POWER BLOCK	363665.24	2943541.59	29.8	100.0	0.0	100.0
B-332	POWER BLOCK	363738.50	2943601.33	30.3	150.0	0.0	150.0
B-333	SWITCH YARD	363744.16	2943360.57	30.5	100.0	0.0	100.0
B-334	SWITCH YARD	363751.04	2943254.47	30.5	100.0	0.0	100.0
B-335	MAINTENANCE SHOP	363735.38	2943042.50	31.2	75.0	0.0	75.0
B-336	MAINTENANCE SHOP	363680.97	2942936.21	31.1	75.0	0.0	75.0
B-337	MAINTENANCE SHOP	363680.83	2943151.07	30.3	75.0	0.0	75.0
B-338	MAINTENANCE SHOP	363791.50	2942935.72	32.1	75.0	0.0	75.0
B-339	MAINTENANCE SHOP	363790.00	2943148.53	30.8	75.0	0.0	75.0
B-340	CONDENSATION STORAGE TANK	363281.77	2943151.48	30.5	100.0	1.5	98.5
B-341	RAD WASTE BUILDING	363215.13	2943096.25	30.8	100.0	0.0	100.0
B-342	RAD WASTE BUILDING	363215.34	2943175.33	30.7	100.0	0.0	100.0
B-343	RAD WASTE BUILDING	363125.99	2943095.29	30.5	200.0	1.5	198.5
B-344	RAD WASTE BUILDING	363056.54	2943096.13	30.6	100.0	0.0	100.0
B-345	RAD WASTE BUILDING	363040.70	2943173.35	30.7	100.0	0.0	100.0
B-346	FIRE WATER TANK	362809.88	2943006.37	30.4	75.0	1.0	74.0
B-347	FIRE WATER PUMP HOUSE TANK	362746.63	2942885.26	31.2	75.0	1.0	74.0
B-348	FIRE WATER TANK	362683.87	2943004.72	30.0	125.0	0.0	125.0
B-349	HEAVY HAUL RD	362901.82	2943593.47	29.2	125.0	0.0	125.0
B-350	PLANT STACK	363539.30	2942960.25	30.8	100.0	0.0	100.0
B-401	REACTOR BUILDING	362999.23	2942370.55	31.1	200.0	1.5	198.5
B-402DH	REACTOR BUILDING	362998.09	2942462.29	30.9	215.0	0.0	215.0
B-403	REACTOR BUILDING	362998.59	2942555.20	31.5	200.0	3.0	197.0
B-404	REACTOR BUILDING	363097.53	2942369.54	31.0	200.0	0.5	199.5

**TABLE 2A**  
**BORING LOCATION SUMMARY**  
**STP COL PROJECT**  
**MACTEC ENGINEERING AND CONSULTING, INC.**  
**PROJECT # 5050-06-0496**

Boring ID	Location/Remarks	Northing (ft) <sup>(1)</sup>	Easting (ft) <sup>(1)</sup>	Elevation (ft) <sup>(1)</sup>	Total Depth (ft, bgs)	Depth of Fill (ft, bgs)	Thickness of Fluvial-Marine Soil (ft, bgs)
B-405DH	REACTOR BUILDING	363098.12	2942462.95	31.1	618.0	1.5	616.5
B-406	REACTOR BUILDING	363098.20	2942556.69	31.2	200.0	1.5	198.5
B-407	REACTOR BUILDING	363195.82	2942369.78	31.3	200.0	1.5	198.5
B-408DH	REACTOR BUILDING	363194.11	2942463.88	31.2	200.0	1.5	198.5
B-409	REACTOR BUILDING	363195.47	2942557.88	31.2	200.0	1.5	198.5
B-410	CONTROL BAY	363288.47	2942359.53	31.7	100.0	0.0	100.0
B-411	CONTROL BAY	363285.65	2942461.25	31.3	100.0	0.0	100.0
B-412	CONTROL BAY	363287.51	2942553.81	31.4	100.0	1.5	98.5
B-413	CONTROL BAY	363148.27	2942585.19	31.2	100.0	0.0	100.0
B-414	CONTROL BAY	363147.67	2942746.89	32.2	150.0	3.0	147.0
B-415	CONTROL BAY	363355.53	2942589.76	30.0	150.0	0.0	150.0
B-416	CONTROL BAY	363301.73	2942748.38	31.8	150.0	0.0	150.0
B-417	TURBINE BLDG	363351.95	2942331.19	29.6	150.0	0.0	150.0
B-418	TURBINE BLDG	363361.76	2942433.17	29.8	100.0	0.0	100.0
B-418DH	TURBINE BLDG	363362.12	2942506.69	29.7	215.0	0.0	215.0
B-420	HEAVY HAUL RD	362900.80	2942008.75	31.9	125.0	0.0	125.0
B-421	TURBINE BLDG	363483.06	2942328.30	30.3	100.0	0.0	100.0
B-422C	TURBINE BLDG	363483.67	2942510.68	31.2	100.0	0.0	100.0
B-423	TURBINE BLDG	363485.34	2942615.65	31.6	100.0	0.0	100.0
B-424	TURBINE BLDG	363571.98	2942328.67	30.3	100.0	0.0	100.0
B-425	TURBINE BLDG	363571.49	2942397.45	30.6	100.0	0.0	100.0
B-426	TURBINE BLDG	363571.71	2942815.14	31.4	100.0	0.0	100.0
B-427	TURBINE BLDG	363660.84	2942331.92	30.6	150.0	0.0	150.0
B-428DH	TURBINE BLDG	363660.05	2942398.55	30.9	218.0	0.0	218.0
B-428	TURBINE BLDG	363660.04	2942505.48	31.2	100.0	0.0	100.0
B-430	TURBINE BLDG	363624.24	2942617.30	30.9	150.0	0.0	150.0
B-431	POWER BLOCK	363634.57	2942641.92	31.1	75.0	0.0	75.0
B-432	POWER BLOCK	363739.83	2942701.18	31.2	150.0	0.0	150.0
B-433	SWITCH YARD	363747.31	2942458.80	31.6	100.0	0.0	100.0
B-434	SWITCH YARD	363752.88	2942354.31	31.1	100.0	0.0	100.0
B-435	MAINTENANCE SHOP	363736.38	2942141.62	28.9	75.0	0.0	75.0
B-436	MAINTENANCE SHOP	363681.44	2942034.98	30.3	75.0	0.0	75.0
B-437	MAINTENANCE SHOP	363679.95	2942247.72	28.2	75.0	0.0	75.0
B-438	MAINTENANCE SHOP	363791.36	2942033.39	30.2	125.0	0.0	125.0
B-439	MAINTENANCE SHOP	363790.82	2942250.03	28.7	125.0	0.0	125.0
B-440	CONDENSATION STORAGE TANK	363281.42	2942249.68	31.1	200.0	0.0	200.0
B-450	PLANT STACK	363539.57	2942057.93	28.8	100.0	0.0	100.0
B-901	UHS BASIN	363771.76	2941809.14	29.3	100.0	0.0	100.0
B-902	UHS BASIN	363495.08	2941927.00	29.1	100.0	0.0	100.0
B-903	UHS BASIN	363872.23	2941664.45	30.0	100.0	0.0	100.0
B-904	UHS BASIN	363485.07	2941727.16	29.8	100.0	0.0	100.0
B-905	UHS BASIN	363348.01	2941571.36	29.2	100.0	0.0	100.0
B-906	UHS BASIN	363574.46	2941430.55	29.5	100.0	0.0	100.0
B-907	UHS BASIN	363549.17	2941252.15	29.2	100.0	0.0	100.0
B-908	UHS BASIN	363273.09	2941356.36	29.6	100.0	0.0	100.0
B-909	UHS BASIN	363521.67	2941590.66	29.7	100.0	0.0	100.0
B-910	UHS BASIN	363362.31	2941257.10	30.4	125.0	0.0	125.0
B-911	RSW LINES	363254.68	2941663.52	30.8	50.0	0.0	50.0
B-912	RSW LINES	363253.49	2941860.53	31.0	100.0	1.5	98.5
B-913	RSW LINES	363253.07	2942031.18	30.6	50.0	0.5	49.5
B-914	RSW LINES	363218.30	2942181.90	28.2	100.0	0.0	100.0
B-915	RSW LINES	363357.95	2942118.79	29.0	50.0	0.0	50.0
B-916	RSW LINES	363599.37	2942120.70	27.8	50.0	4.5	45.5
B-917	RSW LINES	363694.58	2942832.71	31.1	50.0	0.0	50.0
B-918	SWITCH YARD	364814.60	2942764.10	30.9	100.0	0.0	100.0

TABLE 2A  
BORING LOCATION SUMMARY  
STP COL PROJECT  
MACTEC ENGINEERING AND CONSULTING, INC.  
PROJECT # 5050-06-0496

Boring ID	Location/Remarks	Northing (N) <sup>(1)</sup>	Easting (E) <sup>(1)</sup>	Elevation (R) <sup>(1)</sup>	Total Depth (ft, bgs)	Depth of Fill (ft, bgs)	Thickness of Fluvial-Marine Soil (ft, bgs)
B-919	SWITCH YARD	354814.59	2943088.48	31.9	100.0	0.0	100.0
B-920	HEAVY HAUL RD	352943.94	2943897.79	28.2	30.0	1.5	28.5
B-927	TRAINING CENTER BUILDING	352183.19	2949228.65	25.8	60.0	0.0	60.0
B-928	NW OF POWER BLOCK	354932.77	2840386.26	29.5	125.0	0.0	125.0
B-929	NW OF POWER BLOCK	354872.42	2945487.07	35.5	130.0	13.5	116.5
B-930	SE OF UNIT 1 & 2 ECR/ UHS	350212.06	2949516.47	25.6	120.0	0.0	120.0
B-931	SW OF POWER BLOCK	351984.41	2939511.72	29.9	125.0	0.0	125.0
B-932	SOUTH OF POWER BLOCK	351899.52	2942106.11	31.0	125.0	1.5	123.5
B-933	SOUTH OF POWER BLOCK	351895.26	2943504.02	28.7	125.0	1.5	123.5
B-934	NE OF UNIT 1 & 2 ECR/ UHS	352081.37	2948244.01	28.5	110.0	0.0	110.0

Notes:

- (1) From Attachment A
- (2) Boring abandoned due to obstruction created by drilling operations. Replacement boring is identified with preceding "a" suffix.

ft Feet  
bgs Below ground surface

Prepared By/Date

Checked By/Date

AG / 4/3/07  
KAW 4/3/07

TABLE 2B  
 CPT LOCATION SUMMARY  
 STP COL PROJECT  
 MACTEC ENGINEERING AND CONSULTING, INC.  
 PROJECT # 5050-06-0496

CPT ID	Location/Remarks	Northing (ft) <sup>(1)</sup>	Easting (ft) <sup>(1)</sup>	Elevation (ft) <sup>(1)</sup>	Termination Depth (ft, bgs)
C-301	POWER BLOCK	362772.55	2943448.74	27.4	50.0
C-302	POWER BLOCK	362824.38	2943502.25	28.7	36.1
C-303	POWER BLOCK	362823.77	2943190.19	30.2	50.0
C-304	POWER BLOCK	362910.77	2943394.73	29.4	100.1
C-305S	RAD WASTE BUILDING	363126.80	2943174.06	30.9	97.1
C-306S	TURBINE BLDG	363483.22	2943298.00	29.7	66.3
C-307S	TURBINE BLDG	363573.00	2943407.69	30.0	95.1
C-308	SWITCH YARD	363711.62	2943481.18	28.9	79.4
C-309	MACHINE SHOP	363880.96	2943037.71	30.7	100.1
C-310	MACHINE SHOP	363782.39	2943037.94	31.4	100.1
C-401	POWER BLOCK	362772.46	2942547.21	31.1	50.0
C-402	POWER BLOCK	362824.68	2942600.77	30.8	50.0
C-403	POWER BLOCK	362825.36	2942289.73	31.6	50.0
C-404	POWER BLOCK	362912.73	2942499.09	31.4	37.6
C-405S	TURBINE BLDG	363481.68	2942400.33	31.1	93.3
C-407S	TURBINE BLDG	363570.38	2942507.31	30.8	98.3
C-408	SWITCH YARD	363710.02	2942579.59	31.7	100.2
C-409	MACHINE SHOP	363878.81	2942142.10	27.9	82.0
C-410	MACHINE SHOP	363788.88	2942140.63	28.9	92.0
C-411	HEAVY HAUL RD	362902.74	2942803.77	31.1	50.0
C-901	UHS BASIN	363339.44	2941694.20	29.6	98.1
C-902	UHS BASIN	363448.19	2941623.82	28.8	90.1
C-903	UHS BASIN	363465.93	2941498.80	29.2	93.2
C-904	RSW LINES	363392.47	2941651.23	24.2	90.1
C-905	RSW LINES	363298.98	2941713.69	31.2	50.0
C-906	RSW LINES	363212.72	2941758.97	30.2	50.0
C-907	RSW LINES	363218.02	2941968.78	28.5	50.0
C-908	RSW LINES	363219.72	2942082.33	30.9	50.0
C-909	HEAVY HAUL RD	363464.25	2943948.29	30.2	40.0
C-916	RSW LINES	363217.32	2942280.50	31.4	39.0
C-917	RSW LINES	363281.30	2942122.51	30.7	50.0
C-918	RSW LINES	363484.09	2942118.30	25.4	50.0

Notes:

- (1) From Attachment A
- ft Feet
- bgs Below ground surface

Prepared By/Date AF / 4/13/07  
 Checked By/Date KAW 4/13/07

**TABLE 2C**  
**ELECTRICAL RESISTIVITY TEST LOCATION SUMMARY**  
**STP COL. PROJECT**  
**MACTEC ENGINEERING AND CONSULTING, INC.**  
**PROJECT # 5050-06-0496**

ER Test ID	Location/Remarks	Northing (ft) <sup>(1)</sup>	Easting (ft) <sup>(1)</sup>	Elevation (ft) <sup>(1)</sup>
ER-301	SWITCH YARD	353748.20	2943308.18	30.5
ER-401	SWITCH YARD	353753.46	2942407.42	31.5
ER-901	SWITCH YARD	354722.85	2942995.07	31.1
ER-902	SWITCH YARD	354722.85	2942995.07	31.1

Notes:

(1) From Attachment A

ft Feet

Prepared By/Date AD / 4/3/07  
 Checked By/Date KAW 4/3/07



TABLE 2D  
 GEOPROBE TEST LOCATION SUMMARY  
 STP COL PROJECT  
 MACTEC ENGINEERING AND CONSULTING, INC.  
 PROJECT # 5050-06-0496

Geoprobe ID	Location/Remarks	Northing (ft) <sup>(1)</sup>	Easting (ft) <sup>(1)</sup>	Elevation (ft) <sup>(1)</sup>	Total Depth (ft, bgs)
G-901	NW COR OF POWER BLOCK	363847.84	2942006.00	30.0	24.0
G-902	NE COR OF POWER BLOCK	363865.72	2943671.44	30.2	16.0
G-903	CENTER COR OF POWER BLOCK	363248.65	2942803.01	31.1	23.0
G-904	SW COR OF POWER BLOCK	362586.57	2942002.35	29.5	20.0
G-905	SE COR OF POWER BLOCK	362600.00	2943703.84	28.8	20.0
G-906	SOUTH OF POWER BLOCK	361396.01	2942004.82	30.9	28.0
G-907	SOUTH OF POWER BLOCK	361397.95	2943004.31	28.6	23.0
G-908	SOUTH OF POWER BLOCK	361384.14	2943715.37	28.6	24.0
G-909	SW OF POWER BLOCK	361972.57	2939508.92	30.0	20.0
G-910	SOUTH OF POWER BLOCK	361847.65	2942105.99	30.7	20.0
G-911	SOUTH OF POWER BLOCK	361847.72	2943504.12	28.7	23.0
G-912	SE OF UNIT 1 & 2 ECR/ UHS	360202.76	2949521.12	25.3	19.0

Notes:

- (1) From Attachment A
- ft Feet
- bgs Below ground surface

Prepared By/Date AS / 4/3/07  
 Checked By/Date KAW 4/3/07

**TABLE 2E**  
**OBSERVATION WELL LOCATION SUMMARY**  
**STP COL PROJECT**  
**MACTEC ENGINEERING AND CONSULTING, INC.**  
**PROJECT # 5050-06-0496**

Well ID	Location/Remarks	Northing (ft) <sup>(1)</sup>	Easting (ft) <sup>(1)</sup>	Concrete Pad Elevation (ft) <sup>(1)</sup>	Top of Notch Elevation (ft) <sup>(1)</sup>	Total Well Depth (ft, bgs)	Adjacent Boring	Depth of Adjacent Boring (ft, bgs)
OW-308L	REACTOR BUILDING	383198.43	2943374.36	29.87	31.78	97.1	B-308DH	215.0
OW-308U	POWER BLOCK	383195.64	2943354.04	29.88	31.80	47.1	B-308DH	215.0
OW-332L <sup>(2)</sup>	POWER BLOCK	383739.87	2943610.91	30.24	31.85	103.2	B-332	150.0
OW-332La <sup>(2)</sup>	POWER BLOCK	383729.96	2943608.74	30.01	32.08	103.1	B-332	150.0
OW-332U	POWER BLOCK	383739.21	2943591.02	30.24	32.10	46.1	B-332	150.0
OW-348L	FIRE WATER TANK	382685.92	2943014.48	30.08	31.86	79.1	B-348	125.0
OW-348U	FIRE WATER TANK	382685.23	2942994.44	30.51	32.28	39.1	B-348	125.0
OW-349L	HEAVY HAUL RD	382901.84	2943802.87	29.41	31.03	61.1	B-349	125.0
OW-349U	HEAVY HAUL RD	382902.40	2943582.28	29.40	31.29	46.1	B-349	125.0
OW-408L	REACTOR BUILDING	383196.18	2942472.54	31.73	33.76	81.3	B-408DH	200.0
OW-408U	REACTOR BUILDING	383194.01	2942456.01	31.50	33.57	43.1	B-408DH	200.0
OW-420U	HEAVY HAUL RD	382802.15	2942018.94	32.25	33.79	49.1	B-420	125.0
OW-438L	MAINTENANCE SHOP	383780.77	2942045.09	30.11	31.57	104.1	B-438	125.0
OW-438U	MAINTENANCE SHOP	383792.04	2942025.17	30.53	32.18	41.0	B-438	125.0
OW-910L	UHS BASIN	383363.45	2941266.45	30.75	32.48	92.1	B-910	125.0
OW-910U	UHS BASIN	383362.02	2941246.57	30.89	32.32	36.1	B-910	125.0
OW-928L	NW OF POWER BLOCK	384932.30	2940376.21	29.81	31.56	121.1	B-928	125.0
OW-928U	NW OF POWER BLOCK	384933.86	2940356.48	30.02	31.69	39.6	B-928	125.0
OW-929L	NE OF POWER BLOCK	384671.50	2945497.78	36.93	38.63	98.1	B-929	130.0
OW-929U	NE OF POWER BLOCK	384672.34	2945477.68	36.91	38.71	60.1	B-929	130.0
OW-930L	SE OF UNIT 1 & 2 ECR/ UHS	380214.45	2949525.96	26.21	27.98	106.5	B-930	120.0
OW-930U	SE OF UNIT 1 & 2 ECR/ UHS	380209.72	2949506.58	25.62	27.33	36.1	B-930	120.0
OW-931U	SW OF POWER BLOCK	381979.42	2939520.36	30.53	32.10	36.0	B-931	125.0
OW-932L	SOUTH OF POWER BLOCK	381899.37	2942116.80	31.09	32.79	79.6	B-932	125.0
OW-932U	SOUTH OF POWER BLOCK	381898.53	2942097.29	31.35	32.83	39.6	B-932	125.0
OW-933L	SOUTH OF POWER BLOCK	381868.06	2943515.01	28.74	30.45	87.1	B-933	125.0
OW-933U	SOUTH OF POWER BLOCK	381897.85	2943494.66	28.87	30.62	37.1	B-933	125.0
OW-934L	NE OF UNIT 1 & 2 ECR/ UHS	382062.08	2948254.12	29.04	30.94	100.0	B-934	110.0
OW-934U	NE OF UNIT 1 & 2 ECR/ UHS	382079.87	2948234.20	26.54	30.38	41.1	B-934	110.0

Notes:

- (1) From Attachment A.
- (2) Observation Well was found to be collapsed. Replacement observation well is identified with preceding "a" suffix.

ft Feet  
bgs Below ground surface

Prepared By/Date AK / 4/3/07  
Checked By/Date KAW 4/3/07

SOIL ZONE	DESCRIPTION
FILL	<p>Man-placed materials or fill soils dredged or hauled to create a raised level site for use as a construction lay-down yard during the construction of Reactor Units 1 and 2 of the South Texas Project.</p>
FLUVIAL - MARINE	<p>The materials below the surface and fill soils the project site consist of the Beaumont Formation, which is Quaternary Pleistocene in age. The Quaternary is locally divided into three separately mapped areas: dominantly sand (Qbs); dominantly clay (Qbc); and with barrier island and beach deposits (Qbb). The STP project area is underlain primarily by an area of dominantly clay and mud of low permeability, high water holding capacity, high compressibility, high to very high shrink-swell potential, poor drainage, level to depressed relief, low shear strength, and high plasticity.</p> <p>This geologic unit includes; interdistributary muds, abandoned channel-fill muds, and fluvial over bank muds. The Beaumont Formation consists mostly of clay, silt, sand, and gravel. The formation includes; mainly stream channels, point bars, natural levees, and backswamp deposits. To a lesser extent the formation includes; coastal marshes, mud flats, lagoonal deposits, new and older lake deposits, clay dunes, and sand dune deposits. Concretions, massive amounts of calcium carbonate (caliche), concretions of iron oxide and iron-manganese oxides occur within the zone of weathering. The land surface is almost featureless in the vicinity of the STP facility. This area has poorly defined meanderbelt ridges that are separated by smooth featureless backswamp deposits. The total thickness of the Beaumont Formation is approximately 500 to 600 feet.</p> <p>Another formation present that directly underlies the Beaumont Formation is the Lissie Formation, which is Quaternary Pleistocene in age. The Lissie Formation is very similar to the Beaumont Formation and may or may not have been penetrated by the two deep borings at the project site. The Lissie formation consists of sand, silt, clay, and a minor amount of gravel. Iron oxide and iron-manganese nodules are common in the zone of weathering. The upper portion of the formation is locally calcareous and has concretions of calcium carbonate. This geologic unit includes meanderbelt, levee, crevasse splay, and distributary sands and flood basin muds over meanderbelt sands. The total thickness of the Lissie Formation is approximately 500 to 600 feet.</p>

**TABLE 3 (Page 1 of 1)**  
**Soil Zones**

MAJOR DIVISIONS		GROUP SYMBOLS	TYPICAL NAMES
<b>COARSE GRAINED SOILS</b>  (More than 50% retained on No. 200 sieve)	<b>GRAVELS</b>  (More than 50% of coarse fraction retained on No. 4 sieve)	<b>CLEAN GRAVELS</b> (Less than 5% fines)	GW Well-graded gravel
		<b>GRAVELS WITH FINES</b> (More than 12% fines)	GP Poorly graded gravel
			GM Silty gravel
		<b>SANDS</b>  (50% or more of coarse fraction passes No. 4 sieve)	<b>CLEAN SANDS</b> (Less than 5% fines)
	SW Well-graded sand		
	<b>SANDS WITH FINES</b> (More than 12% fines)		SP Poorly graded sand
			SM Silty sand
	<b>FINE GRAINED SOILS</b>  (50% or more pass the No. 200 sieve)	<b>SILTS AND CLAYS</b>  (Liquid limit less than 50)	SC Clayey sand
CL Lean clay			
ML Silt			
<b>SILTS AND CLAYS</b>  (Liquid limit 50 or more)		OL Organic clay, Organic silt	
		CH Fat clay	
		MH Elastic clay	
<b>HIGHLY ORGANIC SOILS</b>	Primarily organic matter, dark in color, and organic odor	OH Organic clay, Organic silt	
		PT Peat	

**BOUNDARY CLASSIFICATIONS:** Soils possessing characteristics of two groups are designated by combinations of group symbols. (Reference: ASTM D 2487-06)





**TABLE 4 (Page 1 of 2)**  
**TERMS USED FOR SOIL DESCRIPTIONS ON BORING LOGS**  
**IN ATTACHMENT B**

<b>Correlation of Penetration Resistance with Relative Density and Consistency</b>			
<b>SAND &amp; GRAVEL</b>		<b>SILT &amp; CLAY</b>	
<b>No. of Blows</b>	<b>Relative Density</b>	<b>No. of Blows</b>	<b>Consistency</b>
0 - 4	Very Loose	0 - 1	Very Soft
5 - 10	Loose	2 - 4	Soft
11 - 20	Firm	5 - 8	Firm
21 - 30	Very Firm	9 - 15	Stiff
31 - 50	Dense	16 - 30	Very Stiff
Over 50	Very Dense	Over 31	Hard

<b>MOISTURE CONDITION:</b>	Dry	Absence of moisture, dusty, dry to the touch.
	Damp	Slight moisture content, difficult to mold fines into ball.
	Moist	Moisture evident but no visible water, fines can be molded into ball.
	Wet	Visible free water, soil is usually below water table.

**TABLE 4 (2 of 2)  
TERMS USED FOR SOIL DESCRIPTIONS ON BORING LOGS  
IN ATTACHMENT B**

TABLE 5 (Page 1 of 1)  
KEY TO SYMBOLS AND DESCRIPTIONS ON BORING LOGS  
IN ATTACHMENT B

MAJOR DIVISIONS		GROUP SYMBOLS	TYPICAL NAMES	Undisturbed Sample	Auger Cuttings																														
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.	Split Spoon Sample	Bulk Sample																														
			GP Poorly graded gravels or gravel - sand mixtures, little or no fines.			Rock Core	Crandall Sampler																												
		GRAVELS WITH FINES (Appreciable amount of fines)	GM Silty gravels, gravel - sand - silt mixtures.	Dilatometer	Pressure Meter																														
			GC Clayey gravels, gravel - sand - clay mixtures.	Packer	No Recovery																														
	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, well graded sands with gravel.	Water Table at time of drilling	Water Table after 24 hours																														
			SP Poorly graded sands, poorly graded sands with gravel.	Caved Depth	WOH = Weight of Hammer																														
		SANDS WITH FINES (Appreciable amount of fines)	SM Silty sands.	Monitoring Well Explanation  Cement  Bentonite  Sand Filter  Screen																															
			SC Clayey sands.																																
			FINE GRAINED SOILS (More than 50% of material is SMALLER than No. 200 sieve size)				CORRELATION OF PENETRATION RESISTANCE with Relative Density and Consistency																												
			SILTS AND CLAYS (Liquid limit LESS than 50)				<table border="1"> <thead> <tr> <th colspan="2">SAND &amp; GRAVEL</th> <th colspan="2">SILT &amp; CLAY</th> </tr> <tr> <th>No. of Blows</th> <th>Relative Density</th> <th>No. of Blows</th> <th>Consistency</th> </tr> </thead> <tbody> <tr> <td>0 - 4</td> <td>Very Loose</td> <td>0 - 1</td> <td>Very Soft</td> </tr> <tr> <td>5 - 10</td> <td>Loose</td> <td>2 - 4</td> <td>Soft</td> </tr> <tr> <td>11 - 20</td> <td>Firm</td> <td>5 - 8</td> <td>Firm</td> </tr> <tr> <td>21 - 30</td> <td>Very Firm</td> <td>9 - 15</td> <td>Stiff</td> </tr> <tr> <td>31 - 50</td> <td>Dense</td> <td>16 - 30</td> <td>Very Stiff</td> </tr> <tr> <td>Over 50</td> <td>Very Dense</td> <td>Over 30</td> <td>Hard</td> </tr> </tbody> </table>		SAND & GRAVEL		SILT & CLAY		No. of Blows	Relative Density	No. of Blows	Consistency	0 - 4	Very Loose	0 - 1	Very Soft	5 - 10	Loose	2 - 4	Soft	11 - 20	Firm	5 - 8	Firm	21 - 30	Very Firm	9 - 15	Stiff	31 - 50	Dense	16 - 30
SAND & GRAVEL		SILT & CLAY																																	
No. of Blows	Relative Density	No. of Blows	Consistency																																
0 - 4	Very Loose	0 - 1	Very Soft																																
5 - 10	Loose	2 - 4	Soft																																
11 - 20	Firm	5 - 8	Firm																																
21 - 30	Very Firm	9 - 15	Stiff																																
31 - 50	Dense	16 - 30	Very Stiff																																
Over 50	Very Dense	Over 30	Hard																																
SILTS AND CLAYS (Liquid limit GREATER than 50)		MH Inorganic silts, elastic silts.																																	
		CH Inorganic clays of high plasticity, fat clays																																	
		OH Organic clays of high plasticity, organic silts.																																	
CORED ROCK		RK Rock																																	
<b>BOUNDARY CLASSIFICATIONS:</b> Soils possessing characteristics of two groups are designated by combinations of group symbols.																																			
<table border="1"> <thead> <tr> <th rowspan="2">SILT OR CLAY</th> <th colspan="3">SAND</th> <th colspan="2">GRAVEL</th> <th rowspan="2">Cobbles</th> <th rowspan="2">Boulders</th> </tr> <tr> <th>Fine</th> <th>Medium</th> <th>Coarse</th> <th>Fine</th> <th>Coarse</th> </tr> </thead> <tbody> <tr> <td></td> <td>No.200</td> <td>No.40</td> <td>No.10 No.4</td> <td>3/4"</td> <td>3"</td> <td></td> <td>12"</td> </tr> </tbody> </table> <p style="text-align: center;">U.S. STANDARD SIEVE SIZE</p>						SILT OR CLAY	SAND			GRAVEL		Cobbles	Boulders	Fine	Medium	Coarse	Fine	Coarse		No.200	No.40	No.10 No.4	3/4"	3"		12"									
SILT OR CLAY	SAND			GRAVEL			Cobbles	Boulders																											
	Fine	Medium	Coarse	Fine	Coarse																														
	No.200	No.40	No.10 No.4	3/4"	3"		12"																												
<b>KEY TO SYMBOLS AND DESCRIPTIONS</b>																																			
<b>MACTEC Engineering and Consulting, Inc.</b>																																			

Reference: "Classification of Soils for Engineering Purposes" (Unified Soil Classification System) ASTM D 2487, and/or "Description and Identification of Soils" (Visual-Manual Procedure), ASTM D 2488.





















TABLE 6  
LABORATORY TESTING SUMMARY  
STP COL PROJECT  
MACTEC ENGINEERING AND CONSULTING, INC.  
PROJECT # 6150-06-0498

SAMPLE INFORMATION				PHYSICAL PROPERTIES																				Chemical Analysis	Compaction																
				Grain Size (Passing %)		Natural Moisture Content (%) at $e_w$			Atterberg Limits			Dry Density (pcf) at $e_w$			Yield Ratio			Triaxial Tests					Consolidation			Direct Shear															
Boring Number	Sample Number	Sample Top Depth, feet	Sample Bottom Depth, feet	UCCS Symbol	UCCS Interval Description	Gravel	Sand	ER	Clay	Fines	Physical Properties			Consolidation			Average	Liquid Limit, LL	Plastic Limit, PL	Shrinkage Index, I <sub>s</sub>	Specific Gravity, G <sub>s</sub>			Triaxial, Direct Shear, or Unconfined			Consolidation			Average	Yield Ratio	Triaxial Tests					Consolidation			Direct Shear	
											1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2		
B-27	89-7	0	18.5	CH	Fat Clay						24.0						24.0	65	21	47																					
B-27	88-8	61.5	12																																						8.1
B-27	89-12	23.0	25	SM	Clay Sand	0.0	84.4			40.8	23.8						23.8																								
B-27	89-14	30.8	38	SP-CL	Poorly Graded Sand of SS	0.0	92.2			7.8	24.6						24.6																								
B-27	89-17	46.5	80	CH	Fat Clay						43.8						43.8	74	23	62																					
B-27	89-19	62.8	60	CL	Lean Clay						18.8						18.8	29	16	23																					
B-27	89-21	68.8	78	SP-CL	Poorly Graded Sand of SS	0.0	98.9				8.1	23.3					23.3																								
B-27	89-44	81.5	85	CL	Lean Clay						18.9						18.9	37	13	24																					
B-27	89-28	92.8	85	SM	Silty Sand	0.0	88.9			13.1	21.8						21.8																								
B-27	89-29	109.5	110								18.7						18.7																								
B-27	89-29	119.5	128	CH	Fat Clay						21.0						21.0	69	21	26																					
B-27	89-30	128.5	130	CH	Fat Clay						18.8						18.8	63	20	43																					
B-27	89-31	138.5	140	CL	Lean Clay						18.7						18.7	45	18	27																					
B-27	89-32	148.5	150	ML	Dusty SS	0.0	68.5			53.9	23.9						23.9																								
B-29-01	10-4	115	118	CH	Fat Clay	0.9	8.9	22.8	68.8	91.4	27.2						27.2	82	21	41	1.80	85.5																			
B-29-01	89-25	108.8	119	SP-CL	Poorly Graded Sand of SS	4.8	87.8				7.7	13.8					13.8																								
B-30	10-3	130	130								32.8	24.1					24.1																								
B-32	89-2	1.8	3																																				8.4		
B-32	10-1	3	6	CH	Fat Clay	0.9	8.9	42.2	48.2	90.4	20.7						20.7	22.8	21.0	65	23	-2	2.74	101.7																	
B-32	89-4	8.5	8								22.5						22.5																						7.8		
B-32	89-6	8	8.8								22.5						22.5																						8.7		
B-32	89-7	11	12.5																																				8.7		
B-32	89-8	12.8	14	CL	Lean Clay						21.4						21.4	44	19	28																					
B-32	10-2	16	17	CL	Lean Clay	0.9	0.4	80.1	19.8	88.0	23.2						23.2	24.8	24.0	61	29	11	3.70	96.0																	
B-32	89-9	16.8	20																																						
B-32	89-10	23.8	25	SM	Silty Sand	0.0	83.8				20.1	20.4					20.4																						8.9		
B-32	10-3	25	27	SM	Silty Sand						17.8						17.8	14	14	14																			8.9		
B-32	89-11	28.8	30																																						
B-32	89-12	32.8	33	SM	Silty Sand	0.0	80.0				20.0	24.2					24.2																								
B-32	89-15	48.8	60	CH	Fat Clay						20.8						20.8	61	21	38																					
B-32	89-16	62.8	68								23.4						23.4																								

MDS  
4/3/06













# SITE LOCATION MAP



Figure 1 – STP/COL Site Location Plan

Rev. 000

Prepared By: ADJ, 2/20/2007

Reviewed By: KAW, 2/26/2007





# SITE VICINITY MAP



**Figure 2 – Site Vicinity Map**

Rev. 000

Prepared By: ADJ, 2/20/2007

Reviewed By: KAW, 2/26/2007



**ATTACHMENT A**

**Survey Data and Test Locations**

**Volume 1 of 1**



ATTACHMENT A

Table of Contents

Survey Report for As-Built Locations by Survcon, Inc..... Page 1

**SURVEY REPORT FOR AS-BUILT  
GEOTECHNICAL BORINGS AT THE SOUTH  
TEXAS PROJECT UNITS 3 & 4 MATAGORDA  
COUNTY, TEXAS**

**COMPILED BY SURVCON INC.  
HOUSTON, TEXAS  
FEBRUARY 26, 2007  
revised: March 29, 2007**

**ADAM SALAZAR III, RPLS  
PROJECT SURVEYOR**

**Introduction**

SURVON INC. performed an as-built survey for the geospatial locations of all geotechnical borings specified by MACTEC Engineering and Consulting Inc. at the South Texas Project Nuclear Power Generating Plant (STP) in Matagorda County, Texas, over a period between: December 19, 2006 to February 9, 2007. SURVON INC. established horizontal coordinates and vertical elevations for the center point of each well. In addition, SURVON INC. established elevations for the tops of concrete pads and top notches of PVC riser casings for observation wells. The methodologies and horizontal and vertical datums adhered to are as follows.

**Horizontal and Vertical Control**

Horizontal and vertical control for the as-built geo-spatial locations of the borings and other field exploration points are referenced to the (previously established by others) STP site coordinate system. Positional data for three independent STP site horizontal monuments and the three independent STP site vertical monuments were released to SURVON INC. from Mike Svetlik of STPNOC Maintenance Engineering Department. The STP site coordinate system is based on the North American Datum of 1927 (NAD27) for horizontal coordinates and the National Geodetic Vertical Datum of 1929 (NGVD29) for vertical elevations. All six monuments were located in the field. A differential level loop between all monuments and GPS rapid static observations between the horizontal monuments were performed in order to establish the internal accuracy of the STP site coordinate system. One it was determined that STP site coordinate system was within the specifications outlined by MACTEC, in the *Engineering Specification for Subsurface Investigation and Laboratory Testing for South Texas Project Units 3 & 4 Matagorda County, Texas*, published by Bechtel Corporation 2006, the monuments were used to perform a site calibration with the GPS equipment. The site calibration enabled data to be collected relative to the STP site coordinate system. The control coordinates for the horizontal and vertical STP coordinate system are as follows:

**Horizontal Control:**

Description	Northing NAD27 US Feet	Easting NAD27 US Feet	Elevation NGVD29 US Feet
HN	364,000.23	2,944,759.94	27.25
HL	364,000.23	2,945,360.08	26.75
HE-1	361,564.92	2,941,664.84	31.88

**Vertical Control**

Description	Northing NAD27 US Feet	Easting NAD27 US Feet	Elevation NGVD29 US Feet
HF-VERT	361,564.92	2,943,999.89	28.04
VP-VERT	363,899.79	2,942,899.50	38.78
VE-1 VERT	361,574.65	2,941,665.86	32.09

### **Methodology**

Accuracy standards specified in the *Engineering Specification for Subsurface Investigation and Laboratory Testing for South Texas Project Units 3 & 4 Matagorda County, Texas*, published by Bechtel Corporation 2006, were achieved by collecting spatial data using Real Time Kinematic-Global Positioning Satellite (RTK-GPS) techniques. The Leica GPS System 1200 was used to collect all field data and observations, and Leica Geomatics Office Version 2.0 was used to process all GPS data. As stated in requirement 2.2 of aforementioned publication, all data collected for the spatial locations of geo-technical borings were done so in a manner to achieve accuracy in the horizontal component to met or exceeded a third order accuracy of 1:5,000 and all data collected for the spatial locations of geotechnical borings in the vertical component met or exceeded an accuracy of 0.1 feet.

Two observations were made on each geo-technical spatial location using RTK-GPS over a period between December 19, 2006 and January 12, 2007. The RTK-GPS observations were made at different time periods and different days to ensure independent satellite geometry for each respective boring. The independent observations were then processed through Leica Geomatics Office and a least squares adjustment and error analysis were performed in order to check the accuracy of the collected geospatial locations of the geotechnical borings.

The processed coordinates for the geo-technical borings and their standard deviations are as follows:

Point No.	Northing A (NAD27) US Feet	Easting A (NAD27) US Feet	Elevation A (NGVD29) US Feet	Northing B (NAD27) US Feet	Easting B (NAD27) US Feet	Elevation B (NAD27) US Feet	Avg. Northing (NAD27) US Feet	Avg. Easting NAD27 US Feet	Avg. Elev. NGVD29 US Feet	SD N. (+/-) US Feet	SD E. (+/-) US Feet	SD ELEV. (+/-) US Feet
1000	363196.52	2943374.38	29.87	363196.52	2943374.41	29.93	363196.52	2943374.40	29.90	0.00	0.02	0.03
1001	363196.44	2943374.39	31.74	363196.48	2943374.39	31.85	363196.46	2943374.39	31.80	0.02	0.00	0.05
1002	363195.78	2943354.04	29.86	363195.83	2943354.01	29.95	363195.81	2943354.03	29.91	0.02	0.02	0.04
1003	363195.69	2943354.02	31.80	363195.70	2943354.01	31.76	363195.70	2943354.02	31.78	0.01	0.00	0.02
1004	363286.55	2943363.42	29.88	363286.58	2943363.41	29.88	363286.57	2943363.42	29.88	0.02	0.00	0.00
1005	363364.18	2943407.88	28.36	363364.22	2943407.93	28.35	363364.20	2943407.91	28.36	0.02	0.02	0.00
1006	362901.92	2943602.96	29.38	362901.93	2943602.96	29.34	362901.93	2943602.96	29.36	0.01	0.00	0.02
1007	362901.84	2943603.00	30.97	362901.83	2943603.03	30.99	362901.84	2943603.02	30.98	0.01	0.02	0.01
1008	362902.36	2943582.28	31.34	362902.39	2943582.29	31.32	362902.38	2943582.29	31.33	0.02	0.00	0.01
1009	362902.61	2943582.27	29.43	362902.58	2943582.29	29.40	362902.60	2943582.28	29.42	0.01	0.01	0.02
1010	362824.40	2943502.24	28.70	362824.35	2943502.22	28.69	362824.38	2943502.23	28.70	0.03	0.01	0.00
1011	362772.62	2943448.73	27.34	362772.58	2943448.73	27.37	362772.60	2943448.73	27.36	0.02	0.00	0.02
1012	362910.81	2943394.66	29.30	362910.79	2943394.63	29.32	362910.80	2943394.65	29.31	0.01	0.02	0.01
1013	363001.17	2943456.06	26.68	363001.16	2943456.09	26.73	363001.17	2943456.08	26.71	0.01	0.01	0.03
1014	363149.15	2943486.16	28.25	363149.12	2943486.13	28.22	363149.14	2943486.15	28.24	0.02	0.02	0.02
1015	363286.39	2943473.97	28.32	363286.40	2943473.95	28.28	363286.40	2943473.96	28.30	0.01	0.01	0.02
1016	363363.30	2943297.43	28.53	363363.24	2943297.43	28.50	363363.27	2943297.43	28.52	0.03	0.00	0.02
1017	363364.05	2943235.44	28.54	363363.99	2943235.46	28.53	363364.02	2943235.45	28.54	0.03	0.01	0.00
1018	363283.65	2943265.50	28.21	363283.70	2943265.50	28.23	363283.68	2943265.50	28.22	0.02	0.00	0.01
1019	363196.59	2943269.04	28.16	363196.62	2943269.04	28.18	363196.61	2943269.04	28.17	0.02	0.00	0.01
1020	363095.34	2943268.85	28.14	363095.35	2943268.81	28.21	363095.35	2943268.83	28.18	0.01	0.02	0.04
1021	363000.88	2943271.37	27.93	363000.84	2943271.39	28.00	363000.86	2943271.38	27.97	0.02	0.01	0.04
1022	362823.71	2943190.29	30.13	362823.73	2943190.25	30.21	362823.72	2943190.27	30.17	0.01	0.02	0.04
1023	363040.71	2943173.34	30.76	363040.73	2943173.33	30.81	363040.72	2943173.34	30.79	0.01	0.00	0.02
1024	363056.44	2943096.07	30.60	363056.55	2943096.19	30.61	363056.50	2943096.13	30.61	0.05	0.06	0.00
1025	362903.74	2943116.71	30.51	362903.76	2943116.72	30.49	362903.75	2943116.72	30.50	0.01	0.01	0.01
1026	362686.08	2943014.45	30.08	362686.12	2943014.42	30.11	362686.10	2943014.44	30.10	0.02	0.02	0.02
1027	362685.88	2943014.44	31.86	362685.93	2943014.40	31.79	362685.91	2943014.42	31.83	0.02	0.02	0.04
1028	362683.82	2943004.75	30.03	362683.79	2943004.72	30.00	362683.81	2943004.74	30.02	0.02	0.02	0.02
1029	362685.15	2942994.43	32.27	362685.20	2942994.39	32.22	362685.18	2942994.41	32.25	0.02	0.02	0.03
1030	362685.31	2942994.43	30.49	362685.35	2942994.40	30.51	362685.33	2942994.42	30.50	0.02	0.02	0.01
1031	362809.90	2943006.37	30.50	362809.96	2943006.34	30.54	362809.93	2943006.36	30.52	0.03	0.02	0.02
1032	362746.61	2942985.18	31.24	362746.64	2942985.28	31.26	362746.63	2942985.23	31.25	0.02	0.05	0.01
1033	363126.80	2943174.06	30.83	363126.80	2943173.98	30.79	363126.80	2943174.02	30.81	0.00	0.04	0.02
1034	363196.52	2943363.87	29.82	363196.51	2943363.82	29.84	363196.52	2943363.85	29.83	0.01	0.02	0.01
1035	363215.36	2943175.26	30.72	363215.27	2943175.30	30.67	363215.32	2943175.28	30.70	0.04	0.02	0.02
1036	363215.12	2943096.30	30.52	363215.16	2943096.28	30.57	363215.14	2943096.29	30.55	0.02	0.01	0.02

Point No.	Northing A (NAD27) US Feet	Easting A (NAD27) US Feet	Elevation A (NGVD29) US Feet	Northing B (NAD27) US Feet	Easting B (NAD27) US Feet	Elevation B (NAD27) US Feet	Avg. Northing (NAD27) US Feet	Avg. Easting NAD27 US Feet	Avg. Elev. NGVD29 US Feet	SD N. (+/-) US Feet	SD E. (+/-) US Feet	SD ELEV. (+/-) US Feet
1037	363281.76	2943151.40	30.51	363281.73	2943151.38	30.47	363281.75	2943151.39	30.49	0.02	0.01	0.02
1050	363484.30	2943515.92	29.75	363484.36	2943515.95	29.73	363484.33	2943515.94	29.74	0.03	0.02	0.01
1051	363483.36	2943406.64	30.10	363483.30	2943406.70	30.09	363483.33	2943406.67	30.10	0.03	0.03	0.00
1052	363483.22	2943296.04	29.65	363483.22	2943295.99	29.62	363483.22	2943296.02	29.64	0.00	0.02	0.01
1053	363483.02	2943231.16	29.22	363483.01	2943231.17	29.27	363483.02	2943231.17	29.25	0.01	0.00	0.03
1054	363570.86	2943233.90	29.46	363570.84	2943233.87	29.46	363570.85	2943233.89	29.46	0.01	0.01	0.00
1055	363569.93	2943299.19	30.17	363570.00	2943299.20	30.14	363569.97	2943299.20	30.16	0.04	0.00	0.02
1056	363572.97	2943407.67	29.94	363572.98	2943407.66	29.95	363572.98	2943407.67	29.95	0.01	0.00	0.00
1057	363572.03	2943519.63	30.42	363572.05	2943519.60	30.40	363572.04	2943519.62	30.41	0.01	0.02	0.01
1058	363635.22	2943541.58	29.72	363635.20	2943541.56	29.76	363635.21	2943541.57	29.74	0.01	0.01	0.02
1059	363660.38	2943518.08	29.53	363660.37	2943518.10	29.56	363660.38	2943518.09	29.55	0.01	0.01	0.01
1060	363739.47	2943590.96	30.17	363739.48	2943590.96	30.18	363739.48	2943590.96	30.18	0.01	0.00	0.00
1061	363739.24	2943591.00	32.06	363739.20	2943591.01	32.09	363739.22	2943591.01	32.08	0.02	0.00	0.02
1062	363739.88	2943610.91	31.87	363739.86	2943610.91	31.83	363739.87	2943610.91	31.85	0.01	0.00	0.02
1063	363740.15	2943610.90	30.19	363740.16	2943610.91	30.29	363740.16	2943610.91	30.24	0.00	0.00	0.05
1064	363738.49	2943601.36	30.19	363738.48	2943601.37	30.22	363738.49	2943601.37	30.21	0.01	0.00	0.02
1065	363865.74	2943671.46	30.19	363865.72	2943671.43	30.19	363865.73	2943671.45	30.19	0.01	0.02	0.00
1066	363711.63	2943481.11	29.88	363711.65	2943481.13	29.92	363711.64	2943481.12	29.90	0.01	0.01	0.02
1067	363658.37	2943410.27	29.58	363658.34	2943410.34	29.56	363658.36	2943410.31	29.57	0.01	0.04	0.01
1068	363744.17	2943360.50	30.52	363744.16	2943360.56	30.44	363744.17	2943360.53	30.48	0.01	0.03	0.04
1069	363748.17	2943308.18	30.59	363748.14	2943308.20	30.60	363748.16	2943308.19	30.60	0.02	0.01	0.01
1070	363751.07	2943254.48	30.51	363751.05	2943254.49	30.53	363751.06	2943254.49	30.52	0.01	0.00	0.01
1071	363658.80	2943233.17	29.72	363658.82	2943233.21	29.79	363658.81	2943233.19	29.76	0.01	0.02	0.04
1072	363660.35	2943298.11	29.94	363660.28	2943298.08	29.89	363660.32	2943298.10	29.92	0.03	0.01	0.02
1073	363680.84	2943151.04	30.30	363680.84	2943151.03	30.26	363680.84	2943151.04	30.28	0.00	0.01	0.02
1074	363790.08	2943148.49	30.91	363790.05	2943148.50	30.87	363790.07	2943148.50	30.89	0.02	0.00	0.02
1075	363792.35	2943037.93	31.36	363792.40	2943037.90	31.31	363792.38	2943037.92	31.34	0.03	0.02	0.03
1076	363735.33	2943042.49	31.15	363735.34	2943042.49	31.16	363735.34	2943042.49	31.16	0.01	0.00	0.00
1077	363680.96	2943037.66	30.66	363680.99	2943037.69	30.70	363680.98	2943037.68	30.68	0.02	0.02	0.02
1078	363539.29	2942960.28	30.67	363539.23	2942960.27	30.77	363539.26	2942960.28	30.72	0.03	0.00	0.05
1079	363680.98	2942936.22	31.15	363680.99	2942936.25	31.17	363680.99	2942936.24	31.16	0.01	0.01	0.01
1080	363694.64	2942832.74	30.97	363694.66	2942832.70	31.01	363694.65	2942832.72	30.99	0.01	0.02	0.02
1081	363791.50	2942935.77	32.00	363791.50	2942935.74	31.99	363791.50	2942935.76	32.00	0.00	0.01	0.00
1100	363485.34	2942615.69	31.46	363485.31	2942615.74	31.54	363485.33	2942615.72	31.50	0.02	0.03	0.04
1101	363571.63	2942615.16	31.39	363571.70	2942615.19	31.39	363571.67	2942615.18	31.39	0.03	0.02	0.00
1102	363623.67	2942616.90	30.77	363623.65	2942616.89	30.71	363623.66	2942616.90	30.74	0.01	0.00	0.03
1103	363634.58	2942641.91	31.11	363634.61	2942641.91	31.06	363634.60	2942641.91	31.09	0.02	0.00	0.03

Point No.	Northing A (NAD27) US Feet	Easting A (NAD27) US Feet	Elevation A (NGVD29) US Feet	Northing B (NAD27) US Feet	Easting B (NAD27) US Feet	Elevation B (NAD27) US Feet	Avg. Northing (NAD27) US Feet	Avg. Easting NAD27 US Feet	Avg. Elev. NGVD29 US Feet	SD N. (+/-) US Feet	SD E. (+/-) US Feet	SD ELEV. (+/-) US Feet
1104	363739.96	2942701.18	31.12	363739.93	2942701.20	31.15	363739.95	2942701.19	31.14	0.02	0.01	0.02
1105	363710.02	2942579.63	31.65	363710.03	2942579.62	31.69	363710.03	2942579.63	31.67	0.01	0.00	0.02
1106	363659.98	2942505.50	31.17	363660.02	2942505.43	31.23	363660.00	2942505.47	31.20	0.02	0.03	0.03
1107	363536.11	2942507.57	31.31	363536.09	2942507.56	31.31	363536.10	2942507.57	31.31	0.01	0.00	0.00
1108	363483.63	2942510.69	31.23	363483.62	2942510.70	31.24	363483.63	2942510.70	31.24	0.01	0.00	0.00
1109	363484.71	2942395.51	31.08	363484.76	2942395.49	31.03	363484.74	2942395.50	31.06	0.03	0.01	0.02
1110	363571.56	2942397.45	30.52	363571.50	2942397.44	30.46	363571.53	2942397.45	30.49	0.03	0.01	0.03
1111	363659.97	2942398.55	30.81	363660.02	2942398.56	30.84	363660.00	2942398.56	30.83	0.03	0.01	0.02
1112	363753.45	2942407.41	31.53	363753.47	2942407.42	31.49	363753.46	2942407.42	31.51	0.01	0.00	0.02
1113	363747.26	2942458.81	31.68	363747.33	2942458.83	31.58	363747.30	2942458.82	31.63	0.03	0.01	0.05
1114	363752.99	2942354.32	31.10	363752.97	2942354.31	31.08	363752.98	2942354.32	31.09	0.01	0.00	0.01
1115	363660.88	2942331.89	30.47	363660.87	2942331.87	30.52	363660.88	2942331.88	30.50	0.01	0.01	0.03
1116	363572.09	2942329.47	30.26	363572.07	2942329.49	30.35	363572.08	2942329.48	30.31	0.01	0.01	0.05
1117	363483.06	2942328.24	30.27	363483.08	2942328.24	30.25	363483.07	2942328.24	30.26	0.01	0.00	0.01
1118	363679.96	2942247.71	28.18	363679.94	2942247.71	28.17	363679.95	2942247.71	28.18	0.01	0.00	0.00
1119	363790.86	2942250.13	28.70	363790.77	2942250.06	28.67	363790.82	2942250.10	28.69	0.04	0.03	0.02
1120	363788.89	2942140.60	28.96	363788.91	2942140.60	28.96	363788.90	2942140.60	28.96	0.01	0.00	0.00
1121	363736.24	2942141.56	28.90	363736.56	2942141.75	28.90	363736.40	2942141.66	28.90	0.16	0.09	0.00
1122	363678.82	2942142.12	28.04	363678.75	2942142.11	28.02	363678.79	2942142.12	28.03	0.04	0.01	0.01
1123	363599.27	2942120.68	27.82	363599.44	2942120.74	27.83	363599.36	2942120.71	27.83	0.09	0.03	0.00
1124	363484.02	2942118.32	25.37	363484.10	2942118.31	25.42	363484.06	2942118.32	25.40	0.04	0.00	0.02
1125	363539.57	2942057.97	28.90	363539.62	2942057.98	28.86	363539.60	2942057.98	28.88	0.03	0.00	0.02
1126	363495.93	2941926.98	29.05	363496.21	2941926.93	29.14	363496.07	2941926.96	29.10	0.14	0.02	0.05
1127	363681.39	2942035.03	30.20	363681.41	2942034.99	30.23	363681.40	2942035.01	30.22	0.01	0.02	0.02
1128	363791.32	2942033.45	30.15	363791.32	2942033.38	30.21	363791.32	2942033.42	30.18	0.00	0.04	0.03
1129	363791.02	2942045.13	30.01	363791.03	2942045.08	30.08	363791.03	2942045.11	30.05	0.01	0.02	0.03
1130	363790.76	2942045.07	31.47	363790.76	2942045.09	31.54	363790.76	2942045.08	31.51	0.00	0.01	0.04
1131	363792.00	2942025.16	32.12	363792.00	2942025.14	32.16	363792.00	2942025.15	32.14	0.00	0.01	0.02
1132	363792.23	2942025.24	30.45	363792.21	2942025.25	30.47	363792.22	2942025.25	30.46	0.01	0.00	0.01
1133	363848.42	2942005.22	29.97	363848.51	2942005.21	30.01	363848.47	2942005.22	29.99	0.05	0.00	0.02
1134	363771.80	2941809.12	29.17	363771.82	2941809.15	29.18	363771.81	2941809.14	29.18	0.01	0.02	0.00
1135	363672.27	2941664.46	29.95	363672.21	2941664.44	29.92	363672.24	2941664.45	29.94	0.03	0.01	0.02
1136	363539.41	2941694.21	29.58	363539.38	2941694.19	29.58	363539.40	2941694.20	29.58	0.02	0.01	0.00
1137	363485.08	2941727.20	29.82	363485.06	2941727.22	29.82	363485.07	2941727.21	29.82	0.01	0.01	0.00
1138	363448.15	2941623.85	28.94	363448.22	2941623.85	28.90	363448.19	2941623.85	28.92	0.03	0.00	0.02
1139	363521.68	2941590.69	29.68	363521.65	2941590.66	29.68	363521.67	2941590.68	29.68	0.02	0.01	0.00
1140	363467.00	2941498.82	29.37	363466.97	2941498.83	29.31	363466.99	2941498.83	29.34	0.02	0.00	0.03

Point No.	Northing A (NAD27) US Feet	Easting A (NAD27) US Feet	Elevation A (NGVD29) US Feet	Northing B (NAD27) US Feet	Easting B (NAD27) US Feet	Elevation B (NAD27) US Feet	Avg. Northing (NAD27) US Feet	Avg. Easting NAD27 US Feet	Avg. Elev. NGVD29 US Feet	SD N. (+/-) US Feet	SD E. (+/-) US Feet	SD ELEV. (+/-) US Feet
1141	363574.52	2941430.50	29.56	363574.49	2941430.51	29.63	363574.51	2941430.51	29.60	0.02	0.00	0.04
1142	363362.38	2941257.08	30.40	363362.35	2941257.11	30.33	363362.37	2941257.10	30.37	0.02	0.02	0.04
1143	363552.41	2941254.30	28.95	363552.42	2941254.32	28.95	363552.42	2941254.31	28.95	0.01	0.01	0.00
1150	363273.06	2941356.43	29.56	363273.09	2941356.32	29.56	363273.08	2941356.38	29.56	0.02	0.06	0.00
1151	363347.99	2941571.35	29.27	363347.99	2941571.38	29.23	363347.99	2941571.37	29.25	0.00	0.01	0.02
1152	363392.53	2941651.23	24.15	363392.40	2941651.22	24.18	363392.47	2941651.23	24.17	0.07	0.00	0.02
1153	363298.92	2941713.73	31.18	363298.91	2941713.75	31.17	363298.92	2941713.74	31.18	0.01	0.01	0.00
1154	363254.70	2941663.54	30.77	363254.74	2941663.48	30.76	363254.72	2941663.51	30.77	0.02	0.03	0.00
1155	363212.76	2941758.99	30.16	363212.73	2941758.95	30.19	363212.75	2941758.97	30.18	0.02	0.02	0.02
1156	363253.39	2941860.52	30.94	363253.47	2941860.50	31.00	363253.43	2941860.51	30.97	0.04	0.01	0.03
1157	363219.49	2941960.37	28.03	363219.52	2941960.36	27.98	363219.51	2941960.37	28.01	0.02	0.01	0.03
1158	363253.09	2942031.16	30.60	363253.06	2942031.16	30.51	363253.08	2942031.16	30.56	0.02	0.00	0.04
1159	363219.82	2942082.33	30.92	363219.76	2942082.32	30.96	363219.79	2942082.33	30.94	0.03	0.01	0.02
1160	363357.86	2942118.79	28.97	363357.91	2942118.65	28.99	363357.89	2942118.72	28.98	0.02	0.07	0.01
1161	363281.29	2942122.52	30.60	363281.31	2942122.52	30.62	363281.30	2942122.52	30.61	0.01	0.00	0.01
1162	362902.33	2942018.95	32.24	362902.31	2942019.02	32.15	362902.32	2942018.99	32.20	0.01	0.03	0.05
1163	362902.10	2942018.92	33.77	362902.10	2942018.99	33.71	362902.10	2942018.96	33.74	0.00	0.04	0.03
1164	362900.75	2942008.80	31.93	362900.82	2942008.74	31.92	362900.79	2942008.77	31.93	0.03	0.03	0.00
1165	362586.58	2942002.34	29.51	362586.56	2942002.36	29.51	362586.57	2942002.35	29.51	0.01	0.01	0.00
1166	363218.27	2942181.86	28.15	363218.31	2942181.87	28.13	363218.29	2942181.87	28.14	0.02	0.00	0.01
1167	363217.38	2942280.57	31.43	363217.32	2942280.60	31.37	363217.35	2942280.59	31.40	0.03	0.02	0.03
1168	362825.49	2942289.80	31.60	362825.39	2942289.68	31.56	362825.44	2942289.74	31.58	0.05	0.06	0.02
1169	362904.54	2942498.89	31.44	362904.62	2942498.97	31.38	362904.58	2942498.93	31.41	0.04	0.04	0.03
1170	362772.45	2942547.18	31.04	362772.40	2942547.21	31.12	362772.43	2942547.20	31.08	0.03	0.01	0.04
1171	362824.69	2942600.73	30.84	362824.63	2942600.80	30.93	362824.66	2942600.77	30.89	0.03	0.04	0.05
1172	363248.58	2942803.05	31.11	363248.59	2942803.00	31.07	363248.59	2942803.03	31.09	0.01	0.02	0.02
1173	363301.75	2942746.40	31.85	363301.74	2942746.37	31.84	363301.75	2942746.39	31.85	0.01	0.01	0.00
1174	362902.72	2942803.82	31.07	362902.67	2942803.72	31.13	362902.70	2942803.77	31.10	0.02	0.05	0.03
1175	362998.13	2942462.25	30.92	362998.13	2942462.27	30.85	362998.13	2942462.26	30.89	0.00	0.01	0.04
1176	363098.12	2942462.95	31.07	363098.05	2942462.90	31.07	363098.09	2942462.93	31.07	0.03	0.02	0.00
1177	363098.12	2942556.71	31.24	363098.14	2942556.68	31.20	363098.13	2942556.70	31.22	0.01	0.02	0.02
1178	363148.29	2942585.26	31.14	363148.17	2942585.30	31.14	363148.23	2942585.28	31.14	0.06	0.02	0.00
1179	363195.49	2942557.98	31.24	363195.48	2942557.97	31.17	363195.49	2942557.98	31.21	0.01	0.00	0.03
1180	363287.52	2942553.81	31.46	363287.52	2942553.80	31.42	363287.52	2942553.81	31.44	0.00	0.00	0.02
1181	363362.07	2942506.60	29.72	363362.12	2942506.70	29.71	363362.10	2942506.65	29.72	0.03	0.05	0.00
1182	363361.77	2942433.20	29.75	363361.83	2942433.15	29.66	363361.80	2942433.18	29.71	0.03	0.02	0.04
1183	363285.64	2942461.20	31.33	363285.69	2942461.20	31.24	363285.67	2942461.20	31.29	0.02	0.00	0.04



Point No.	Northing A (NAD27) US Feet	Easting A (NAD27) US Feet	Elevation A (NGVD29) US Feet	Northing B (NAD27) US Feet	Easting B (NAD27) US Feet	Elevation B (NAD27) US Feet	Avg. Northing (NAD27) US Feet	Avg. Easting NAD27 US Feet	Avg. Elev. NGVD29 US Feet	SD N. (+/-) US Feet	SD E. (+/-) US Feet	SD ELEV. (+/-) US Feet
1184	363194.12	2942463.82	31.22	363194.15	2942463.84	31.09	363194.14	2942463.83	31.16	0.02	0.01	0.07
1185	363196.31	2942472.60	31.75	363196.29	2942472.63	31.62	363196.30	2942472.62	31.69	0.01	0.01	0.07
1186	363196.15	2942472.51	33.78	363196.18	2942472.55	33.87	363196.17	2942472.53	33.83	0.01	0.02	0.04
1187	363194.05	2942456.08	33.54	363194.06	2942456.09	33.60	363194.06	2942456.09	33.57	0.01	0.00	0.03
1188	363194.08	2942455.97	31.54	363194.13	2942456.01	31.59	363194.11	2942455.99	31.57	0.03	0.02	0.03
1189	363195.79	2942369.76	31.30	363195.78	2942369.75	31.43	363195.79	2942369.76	31.37	0.01	0.00	0.06
1190	363286.45	2942369.55	31.70	363286.49	2942369.55	31.86	363286.47	2942369.55	31.78	0.02	0.00	0.08
1191	363361.93	2942331.19	29.63	363361.92	2942331.19	29.53	363361.93	2942331.19	29.58	0.01	0.00	0.05
1192	362999.21	2942370.54	31.08	362999.22	2942370.55	31.11	362999.22	2942370.55	31.10	0.01	0.00	0.02
1200	363363.66	2941266.50	30.76	363363.64	2941266.45	30.71	363363.65	2941266.47	30.73	0.01	0.02	0.03
1201	363363.43	2941266.46	32.45	363363.42	2941266.43	32.42	363363.43	2941266.44	32.44	0.01	0.02	0.02
1202	363362.04	2941246.55	32.31	363362.02	2941246.55	32.24	363362.03	2941246.55	32.27	0.01	0.00	0.03
1203	363362.25	2941246.56	30.65	363362.20	2941246.54	30.68	363362.23	2941246.55	30.67	0.03	0.01	0.01
1204	363147.69	2942746.88	32.23	363147.70	2942746.91	32.22	363147.69	2942746.90	32.23	0.00	0.01	0.00
1205	363097.50	2942369.46	31.01	363097.50	2942369.47	30.96	363097.50	2942369.47	30.98	0.00	0.00	0.02
1206	363281.43	2942249.68	31.07	363281.40	2942249.71	31.08	363281.41	2942249.69	31.07	0.01	0.02	0.01
1207	362998.56	2942555.19	31.49	362998.59	2942555.21	31.47	362998.57	2942555.20	31.48	0.01	0.01	0.01
1208	363125.96	2943095.24	30.44	363125.97	2943095.30	30.50	363125.97	2943095.27	30.47	0.00	0.03	0.03
1209	363000.73	2943364.74	29.94	363000.73	2943364.75	29.95	363000.73	2943364.75	29.95	0.00	0.00	0.00
1210	363099.59	2943364.18	29.83	363099.59	2943364.21	29.81	363099.59	2943364.19	29.82	0.00	0.01	0.01
1211	363098.19	2943472.88	27.80	363098.24	2943472.94	27.75	363098.21	2943472.91	27.78	0.02	0.03	0.02
1212	363194.03	2943475.13	28.00	363194.06	2943475.10	27.96	363194.04	2943475.11	27.98	0.02	0.01	0.02
1213	363366.10	2943511.54	27.81	363366.14	2943511.58	27.77	363366.12	2943511.56	27.79	0.02	0.02	0.02
1214	363305.01	2943617.48	28.88	363305.05	2943617.49	28.90	363305.03	2943617.48	28.89	0.02	0.01	0.01
1215	363148.73	2943616.97	29.22	363148.72	2943617.00	29.20	363148.73	2943616.98	29.21	0.00	0.02	0.01
1216	362901.90	2943593.42	29.16	362901.93	2943593.44	29.15	362901.92	2943593.43	29.15	0.02	0.01	0.01
1217	362600.01	2943703.86	28.80	362600.04	2943703.83	28.81	362600.03	2943703.85	28.81	0.02	0.01	0.00
1218	363355.56	2942599.80	29.94	363355.55	2942599.81	29.91	363355.56	2942599.80	29.93	0.01	0.00	0.02
1219	361895.27	2943504.07	28.65	361895.29	2943504.06	28.62	361895.28	2943504.06	28.63	0.01	0.00	0.02
1220	361898.18	2943515.05	28.71	361898.18	2943515.00	28.80	361898.18	2943515.03	28.75	0.00	0.03	0.04
1221	361898.05	2943515.04	30.42	361898.08	2943514.97	30.41	361898.06	2943515.01	30.42	0.02	0.03	0.01
1222	361897.67	2943494.68	30.62	361897.66	2943494.64	30.64	361897.66	2943494.66	30.63	0.00	0.02	0.01
1223	361897.73	2943494.67	28.83	361897.76	2943494.64	28.91	361897.74	2943494.66	28.87	0.02	0.02	0.04
1224	361847.71	2943504.10	28.68	361847.71	2943504.12	28.69	361847.71	2943504.11	28.68	0.00	0.01	0.01
1225	362943.97	2943897.74	28.20	362943.96	2943897.77	28.18	362943.96	2943897.76	28.19	0.01	0.01	0.01
1226	361899.52	2942106.07	30.99	361899.55	2942106.08	31.05	361899.54	2942106.07	31.02	0.02	0.00	0.03
1227	361899.61	2942115.92	31.04	361899.69	2942115.90	31.09	361899.65	2942115.91	31.06	0.04	0.01	0.02

Point No.	Northing A (NAD27) US Feet	Easting A (NAD27) US Feet	Elevation A (NGVD29) US Feet	Northing B (NAD27) US Feet	Easting B (NAD27) US Feet	Elevation B (NAD27) US Feet	Avg. Northing (NAD27) US Feet	Avg. Easting NAD27 US Feet	Avg. Elev. NGVD29 US Feet	SD N. (+/-) US Feet	SD E. (+/-) US Feet	SD ELEV. (+/-) US Feet
1228	361899.38	2942115.91	32.78	361899.38	2942115.92	32.80	361899.38	2942115.92	32.79	0.00	0.00	0.01
1229	361898.56	2942097.29	32.81	361898.56	2942097.32	32.80	361898.56	2942097.30	32.80	0.00	0.01	0.01
1230	361898.79	2942097.31	31.32	361898.80	2942097.29	31.37	361898.79	2942097.30	31.35	0.00	0.01	0.02
1231	361888.07	2942104.76	30.75	361888.04	2942104.77	30.82	361888.06	2942104.76	30.79	0.02	0.00	0.03
1232	361395.98	2942004.85	30.85	361396.00	2942004.84	30.91	361395.99	2942004.85	30.88	0.01	0.00	0.03
1233	361397.98	2943004.32	28.67	361397.96	2943004.33	28.62	361397.97	2943004.32	28.64	0.01	0.00	0.03
1234	361384.15	2943715.39	28.56	361384.16	2943715.40	28.52	361384.16	2943715.40	28.54	0.01	0.01	0.02
1240	361979.72	2939520.49	30.47	361979.72	2939520.49	30.53	361979.72	2939520.49	30.50	0.00	0.00	0.03
1241	361979.44	2939520.36	32.14	361979.46	2939520.38	32.16	361979.45	2939520.37	32.15	0.01	0.01	0.01
1242	361984.43	2939511.77	29.92	361984.45	2939511.80	29.98	361984.44	2939511.78	29.95	0.01	0.01	0.03
1243	361972.51	2939508.96	29.90	361972.57	2939508.84	29.96	361972.54	2939508.90	29.93	0.03	0.06	0.03
1244	364932.79	2940366.22	29.57	364932.79	2940366.21	29.54	364932.79	2940366.21	29.56	0.00	0.00	0.01
1245	364932.43	2940376.23	29.83	364932.47	2940376.29	29.83	364932.45	2940376.26	29.83	0.02	0.03	0.00
1246	364932.33	2940376.24	31.54	364932.35	2940376.23	31.54	364932.34	2940376.23	31.54	0.01	0.01	0.00
1247	364933.87	2940356.48	31.66	364933.89	2940356.46	31.70	364933.88	2940356.47	31.68	0.01	0.01	0.02
1248	364934.03	2940356.51	29.99	364934.01	2940356.53	30.05	364934.02	2940356.52	30.02	0.01	0.01	0.03
1249	364672.46	2945487.07	36.49	364672.47	2945487.08	36.52	364672.46	2945487.08	36.51	0.00	0.01	0.02
1250	364671.66	2945497.77	36.93	364671.68	2945497.79	36.96	364671.67	2945497.78	36.95	0.01	0.01	0.02
1251	364671.51	2945497.79	38.64	364671.52	2945497.80	38.68	364671.52	2945497.80	38.66	0.00	0.00	0.02
1252	364672.37	2945477.61	38.73	364672.37	2945477.61	38.79	364672.37	2945477.61	38.76	0.00	0.00	0.03
1253	364672.55	2945477.57	36.88	364672.66	2945477.58	36.86	364672.60	2945477.58	36.87	0.06	0.00	0.01
1254	364814.64	2943088.44	31.86	364814.63	2943088.45	31.83	364814.64	2943088.44	31.84	0.01	0.01	0.01
1255	364722.91	2942995.16	31.06	364722.91	2942995.04	31.04	364722.91	2942995.10	31.05	0.00	0.06	0.01
1256	364814.64	2942764.09	30.86	364814.63	2942764.09	30.83	364814.64	2942764.09	30.85	0.01	0.00	0.01
1257	363464.29	2943948.31	30.22	363464.20	2943948.28	30.23	363464.25	2943948.30	30.23	0.05	0.01	0.00
1258	362081.47	2948244.02	28.54	362081.44	2948244.05	28.60	362081.46	2948244.03	28.57	0.02	0.02	0.03
1259	362082.20	2948254.01	29.00	362082.26	2948254.04	28.95	362082.23	2948254.02	28.97	0.03	0.01	0.03
1260	362082.06	2948254.12	30.95	362082.08	2948254.16	30.94	362082.07	2948254.14	30.95	0.01	0.02	0.01
1261	362079.91	2948234.20	30.35	362079.89	2948234.22	30.33	362079.90	2948234.21	30.34	0.01	0.01	0.01
1262	362080.01	2948234.09	28.52	362080.00	2948234.06	28.54	362080.01	2948234.08	28.53	0.01	0.02	0.01
1263	360202.81	2949521.11	25.28	360202.80	2949521.13	25.20	360202.81	2949521.12	25.24	0.00	0.01	0.04
1264	360212.13	2949516.51	25.60	360212.10	2949516.54	25.56	360212.11	2949516.52	25.58	0.01	0.02	0.02
1265	360214.63	2949525.99	26.23	360214.60	2949526.01	26.14	360214.61	2949526.00	26.18	0.02	0.01	0.04
1266	360214.46	2949525.98	28.01	360214.45	2949525.99	27.92	360214.46	2949525.99	27.97	0.00	0.00	0.05
1267	360209.71	2949506.59	27.39	360209.69	2949506.59	27.35	360209.70	2949506.59	27.37	0.01	0.00	0.02
1268	360209.82	2949506.60	25.64	360209.83	2949506.66	25.56	360209.83	2949506.63	25.60	0.01	0.03	0.04

Lastly, a third independent observation on all of the geotechnical borings was made between February 7-9, 2007 with a MACTEC geotechnical engineer to ensure all observations were made on true boring locations. The third independent checks revealed that the previous two observations on the geotechnical boreholes were made within tolerance of the third order horizontal and 0.1 feet vertical expectancies. There were four borings whose locations were determined differently by the MACTEC geotechnical engineer and tied with RTK-GPS at the alternate location. Those locations along with all other determined geospatial locations for all borings are reflected in the final coordinates as follows:

Point No.	Northing NAD27 US Feet	Easting NAD27 US Feet	Elevation NGVD29 US Feet	Description
1452	363000.83	2943271.38	28.06	B-301 NG
1439	363000.73	2943364.78	30.01	B-302 DH NG
1435	363001.22	2943456.09	26.64	B-303 NG
1451	363095.40	2943268.83	28.24	B-304 NG
1210	363099.59	2943364.19	29.82	B-305DH
1274	363100.87	2943343.98	29.75	B-305DHA NG
1434	363098.22	2943472.95	27.78	B-306 NG
1450	363196.58	2943269.07	28.22	B-307 NG
1440	363196.49	2943363.84	29.80	B-308 DH NG
1432	363197.07	2943455.89	26.62	B-309 NG
1449	363283.70	2943265.50	28.23	B-310 NG
1445	363286.55	2943363.47	29.86	B-311 NG
1431	363286.42	2943473.97	28.25	B-312 NG
1433	363149.10	2943486.09	28.15	B-313 NG
1428	363148.73	2943617.01	29.18	B-314 NG
1430	363366.12	2943511.58	27.72	B-315 NG
1429	363304.98	2943617.51	28.90	B-316 NG
1448	363364.01	2943235.44	28.49	B-317 NG
1447	363363.37	2943297.42	28.46	B-318 NG
1446	363364.17	2943407.90	28.39	B-319 DH NG
1454	362903.74	2943116.74	30.54	B-320 NG
1373	363483.05	2943231.24	29.23	B-321 NG
1375	363483.40	2943406.69	30.07	B-322 C NG
1376	363484.30	2943515.99	29.79	B-323 NG
1359	363570.87	2943233.90	29.45	B-324 NG
1358	363569.94	2943299.20	30.15	B-325 NG
1356	363572.01	2943519.56	30.44	B-326 NG
1351	363658.77	2943233.17	29.80	B-327 NG
1352	363660.26	2943298.12	29.92	B-328 DH NG
1353	363658.33	2943410.29	29.55	B-329 NG
1354	363660.32	2943518.07	29.54	B-330 NG
1355	363635.24	2943541.59	29.82	B-331 NG
1303	363738.50	2943601.33	30.26	B-332 NG
1306	363744.16	2943360.57	30.48	B-333 NG
1308	363751.04	2943254.47	30.48	B-334 NG

1516	363735.38	2943042.50	31.15	B-335 NG
1348	363680.97	2942936.21	31.10	B-336 NG
1350	363680.83	2943151.07	30.34	B-337 NG
1311	363791.50	2942935.72	32.05	B-338 NG
1309	363790.00	2943148.53	30.83	B-339 NG
1460	363281.77	2943151.48	30.47	B-340 NG
1461	363215.13	2943096.25	30.55	B-341 NG
1459	363215.34	2943175.33	30.72	B-342 NG
1457	363125.99	2943095.29	30.46	B-343 NG
1456	363056.54	2943096.13	30.58	B-344 NG
1455	363040.70	2943173.35	30.71	B-345 NG
1462	362809.88	2943006.37	30.44	B-346 NG
1463	362746.63	2942985.26	31.24	B-347 NG
1464	362683.87	2943004.72	30.00	B-348 NG
1423	362901.92	2943593.47	29.21	B-349 NG
1360	363539.30	2942960.25	30.75	B-350 NG
1493	362999.23	2942370.55	31.13	B-401 NG
1487	362998.09	2942462.29	30.89	B-402 DH NG
1488	362998.59	2942555.20	31.47	B-403 NG
1494	363097.53	2942369.54	30.98	B-404 NG
1486	363098.12	2942462.95	31.06	B-405 DH NG
1485	363098.20	2942556.69	31.24	B-406 NG
1495	363195.82	2942369.78	31.33	B-407 NG
1478	363194.11	2942463.86	31.17	B-408 DH NG
1483	363195.47	2942557.98	31.19	B-409 NG
1496	363286.47	2942369.53	31.73	B-410 NG
1477	363285.65	2942461.25	31.27	B-411 NG
1474	363287.51	2942553.81	31.41	B-412 NG
1484	363148.27	2942585.19	31.16	B-413 NG
1470	363147.67	2942746.89	32.18	B-414 NG
1473	363355.53	2942599.76	29.95	B-415 NG
1472	363301.73	2942746.36	31.84	B-416 NG
1497	363361.95	2942331.19	29.57	B-417 NG
1476	363361.76	2942433.17	29.77	B-418 NG
1475	363362.12	2942506.69	29.73	B-419 DH NG
1513	362900.80	2942008.75	31.94	B-420 NG
1368	363483.06	2942328.30	30.27	B-421 NG
1371	363483.67	2942510.68	31.24	B-422 C NG
1372	363485.34	2942615.65	31.57	B-423 NG
1363	363571.98	2942329.57	30.29	B-424 NG
1362	363571.49	2942397.45	30.49	B-425 NG
1361	363571.71	2942615.14	31.38	B-426 NG
1343	363660.84	2942331.92	30.56	B-427 NG
1344	363660.05	2942398.55	30.90	B-428 DH NG
1345	363660.04	2942505.46	31.16	B-429 NG
1271	363624.24	2942617.30	30.92	B-430 NG
1346	363634.57	2942641.92	31.06	B-431 NG
1312	363739.93	2942701.18	31.20	B-432 NG

1314	363747.31	2942458.80	31.61	B-433 NG
1316	363752.98	2942354.31	31.10	B-434 NG
1340	363736.38	2942141.62	28.87	B-435 NG
1339	363681.44	2942034.98	30.25	B-436 NG
1342	363679.95	2942247.72	28.18	B-437 NG
1319	363791.36	2942033.39	30.19	B-438 NG
1317	363790.82	2942250.03	28.70	B-439 NG
1498	363281.42	2942249.68	31.13	B-440 NG
1365	363539.57	2942057.93	28.84	B-450 NG
1325	363771.76	2941809.14	29.26	B-901 NG
1338	363496.08	2941927.00	29.10	B-902 NG
1326	363672.23	2941664.45	30.02	B-903 NG
1337	363485.07	2941727.16	29.84	B-904 NG
1510	363348.01	2941571.36	29.24	B-905 NG
1327	363574.46	2941430.55	29.50	B-906 NG
1328	363549.17	2941252.15	29.20	B-907 NG
1511	363273.09	2941356.36	29.56	B-908 NG
1335	363521.67	2941590.66	29.72	B-909 NG
1329	363362.31	2941257.10	30.36	B-910 NG
1509	363254.68	2941663.52	30.81	B-911 NG
1506	363253.49	2941860.53	30.97	B-912 NG
1504	363253.07	2942031.18	30.57	B-913 NG
1500	363218.30	2942181.90	28.17	B-914 NG
1502	363357.95	2942118.79	28.96	B-915 NG
1364	363599.37	2942120.70	27.80	B-916 NG
1347	363694.58	2942832.71	31.06	B-917 NG
1384	364814.60	2942764.10	30.90	B-918 NG
1382	364814.59	2943088.48	31.91	B-919 NG
1421	362943.94	2943897.79	28.21	B-920 NG
1270	362183.19	2949228.65	26.79	B-927 NG
1377	364932.77	2940366.26	29.56	B-928 NG
1385	364672.42	2945487.07	36.56	B-929 NG
1390	360212.08	2949516.47	25.58	B-930 NG
1403	361984.41	2939511.72	29.92	B-931 NG
1405	361899.52	2942106.11	31.04	B-932 NG
1410	361895.26	2943504.02	28.65	B-933 NG
1396	362081.37	2948244.01	28.59	B-934 NG
1437	362772.55	2943448.74	27.37	C-301 NG
1436	362824.38	2943502.25	28.72	C-302 NG
1453	362823.77	2943190.19	30.19	C-303 NG
1438	362910.77	2943394.73	29.39	C-304 NG
1458	363126.80	2943174.06	30.88	C-305 S NG
1374	363483.22	2943296.00	29.68	C-306 S NG
1357	363573.00	2943407.68	30.02	C-307 S NG
1517	363711.62	2943481.16	29.89	C-308 NG
1349	363680.96	2943037.71	30.69	C-309 NG
1310	363792.39	2943037.94	31.38	C-310 NG
1491	362772.46	2942547.21	31.08	C-401 NG

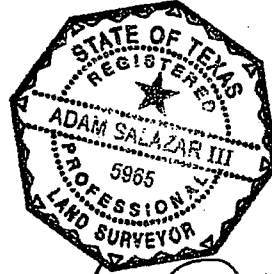
1489	362824.68	2942600.77	30.82	C-402 NG
1492	362825.36	2942289.73	31.59	C-403 NG
1490	362912.73	2942499.09	31.38	C-404 NG
1369	363481.68	2942400.33	31.05	C-406 S NG
1370	363570.38	2942507.31	30.79	C-407 S NG
1313	363710.02	2942579.59	31.70	C-408 NG
1341	363678.81	2942142.10	27.93	C-409 NG
1318	363788.88	2942140.63	28.93	C-410 NG
1469	362902.74	2942803.77	31.10	C-411 NG
1336	363539.44	2941694.20	29.57	C-901 NG
1512	363448.19	2941623.82	28.94	C-902 NG
1334	363466.93	2941498.80	29.22	C-903 NG
1152	363392.47	2941651.23	24.17	C-904 NG
1508	363298.98	2941713.69	31.21	C-905 NG
1507	363212.72	2941758.97	30.19	C-906 NG
1505	363219.02	2941968.73	28.53	C-907 NG
1503	363219.72	2942082.33	30.89	C-908 NG
1420	363464.25	2943948.29	30.22	C-909 NG
1499	363217.32	2942280.50	31.41	C-916 NG
1501	363281.30	2942122.51	30.65	C-917 NG
1367	363484.09	2942118.30	25.36	C-918 NG
1307	363748.20	2943308.16	30.53	ER-301 NG
1315	363753.46	2942407.42	31.52	ER-401 NG
1383	364722.85	2942995.07	31.06	ER-901 NG
1324	363847.84	2942006.00	29.98	G-901 NG
1300	363865.72	2943671.44	30.16	G-902 NG
1471	363248.65	2942803.01	31.11	G-903 NG
1165	362586.57	2942002.35	29.51	G-904 NG
1422	362600.00	2943703.84	28.81	G-905 NG
1418	361396.01	2942004.82	30.93	G-906 NG
1417	361397.95	2943004.31	28.59	G-907 NG
1416	361384.14	2943715.37	28.58	G-908 NG
1404	361972.57	2939508.92	29.96	G-909 NG
1419	361847.65	2942105.99	30.66	G-910 NG
1415	361847.72	2943504.12	28.73	G-911 NG
1395	360202.76	2949521.12	25.28	G-912 NG
1441	363196.49	2943374.39	29.87	OW-308L CONC
1442	363196.43	2943374.36	31.78	OW-308L TN
1444	363195.77	2943354.04	29.88	OW-308U CONC
1443	363195.64	2943354.04	31.80	OW-308U TN
1275	363729.59	2943608.73	30.01	OW-332La CONC
1305	363729.36	2943608.74	32.08	OW-332La TN
1301	363739.45	2943590.95	30.24	OW-332U CONC
1302	363739.21	2943591.02	32.10	OW-332U TN
1465	362686.09	2943014.50	30.08	OW-348L CONC
1466	362685.92	2943014.48	31.86	OW-348L TN
1468	362685.33	2942994.40	30.51	OW-348U CONC
1467	362685.23	2942994.44	32.28	OW-348U TN

1424	362901.98	2943602.98	29.41	OW-349L CONC
1425	362901.84	2943602.97	31.03	OW-349L TN
1427	362902.52	2943582.27	29.40	OW-349U CONC
1426	362902.40	2943582.28	31.29	OW-349U TN
1479	363196.34	2942472.61	31.73	OW-408L CONC
1480	363196.18	2942472.54	33.76	OW-408L TN
1482	363194.12	2942455.93	31.50	OW-408U CONC
1481	363194.01	2942456.01	33.57	OW-408U TN
1514	362902.35	2942018.99	32.25	OW-420U CONC
1515	362902.15	2942018.94	33.79	OW-420U TN
1320	363791.02	2942045.15	30.11	OW-438L CONC
1321	363790.77	2942045.09	31.57	OW-438L TN
1323	363792.25	2942025.28	30.53	OW-438U CONC
1322	363792.04	2942025.17	32.18	OW-438U TN
1330	363363.64	2941266.44	30.75	OW-910L CONC
1331	363363.45	2941266.45	32.48	OW-910L TN
1333	363362.23	2941246.55	30.69	OW-910U CONC
1332	363362.02	2941246.57	32.32	OW-910U TN
1378	364932.43	2940376.26	29.81	OW-928L CONC
1379	364932.30	2940376.21	31.56	OW-928L TN
1381	364934.02	2940356.55	30.02	OW-928U CONC
1380	364933.86	2940356.48	31.69	OW-928U TN
1386	364671.66	2945497.76	36.93	OW-929L CONC
1387	364671.50	2945497.78	38.63	OW-929L TN
1389	364672.62	2945477.62	36.91	OW-929U CONC
1388	364672.34	2945477.58	38.71	OW-929U TN
1391	360214.66	2949525.97	26.21	OW-930L CONC
1392	360214.45	2949525.96	27.98	OW-930L TN
1394	360209.84	2949506.63	25.62	OW-930U CONC
1393	360209.72	2949506.58	27.33	OW-930U TN
1401	361979.69	2939520.45	30.53	OW-931U CONC
1402	361979.42	2939520.36	32.10	OW-931U TN
1406	361899.68	2942115.90	31.09	OW-932L CONC
1407	361899.37	2942115.90	32.79	OW-932L TN
1409	361898.75	2942097.36	31.35	OW-932U CONC
1408	361898.53	2942097.29	32.83	OW-932U TN
1411	361898.22	2943515.08	28.74	OW-933L CONC
1412	361898.05	2943515.01	30.45	OW-933L TN
1414	361897.77	2943494.71	28.87	OW-933U CONC
1413	361897.65	2943494.66	30.62	OW-933U TN
1397	362082.17	2948253.99	29.04	OW-934L CONC
1398	362082.08	2948254.12	30.94	OW-934L TN
1400	362080.01	2948234.08	28.54	OW-934U CONC
1399	362079.87	2948234.20	30.39	OW-934U TN

**Conclusion**

The geospatial locations for all geo-technical borings on the STP site as defined by MACTEC Inc. were as-built located within accuracies as defined by the *Engineering Specification for Subsurface Investigation and Laboratory Testing for South Texas Project Units 3 & 4 Matagorda County, Texas.*

Compiled by Adam Salazar III, RPLS  
Project Surveyor  
SURVCON INC.  
Houston, Texas  
February 26, 2007



*Adam Salazar III*  
*3/29/2007*



## **ATTACHMENT B**

**Geotechnical Boring Logs (Soil Logs)**

**Geotechnical Test Pits Logs**

**SPT Energy Ratio Measurements**

**Volume 1 of 1**

ATTACHMENT B

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Appendix B-2 Geotechnical Test Pits

Appendix B-3 SPT Energy Ratio Measurements

**Appendix B-1**  
**Geotechnical Boring Logs (Soil Logs)**

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-301</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 4 inch		Boring Location Unit #3 Reactor Building N 363000.83 E 2943271.38		Total Depth 200 feet	
Drilling Contractor and Rig JEDI Drilling Contractor / CME 75		Elevation at boring 28.06 feet		Ground Water Depth 8.5 feet	
Sampling Method Split Spoon		Sample Driving Hammer/Drop 138.1 lbs / 30 inches		No. of Samples 37	
		Borehole Inclination 0		Logged by A. Osorio	
				Date Started 11/18/06	
				Date Completed 11/18/06	

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0										Surface grass	
1	X	SS 1	4	18				CL	CL	BEAUMONT; black (2.5Y 2.5/1); sand; CLAY (CL); moist; firm; with organics (roots)	
2	X	SS 2	13	18				CH	CH	BEAUMONT; black (2.5Y 2.5/1); CLAY (CH); moist; firm; high plasticity	
3	X	SS 3	19.5	18				CH	CH	BEAUMONT; black (2.5Y 2.5/1); silt; CLAY (CH); moist; firm; high plasticity	
4	X	SS 4	20	18				CH	CH	BEAUMONT; dark brown (7.5YR 3/4) and black (2.5Y 2.5/1); CLAY (CH); moist; firm; organics at 4.5 feet bgs	
5	X	SS 5	18	18				CL	CL	BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CL); moist; firm	
6	X	SS 6	20	18				CL	CL	BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CL); moist; firm; increase moisture about 8.5 feet bgs	Water level at 8.5 feet BGS
7	X	SS 7	24	18				CH	CH	BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CL); moist; stiff	
8	X	SS 8	24	18				CH	CH	BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); wet; stiff	
9	X	SS 9	24	18				CL	CL	BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); wet; stiff	
10	X	SS 10	25	18				ML	ML	BEAUMONT; strong brown (7.5YR 4/6); gravel; silt; CLAY (CL); wet; stiff; strong reaction with HCl; calcareous nodules; trace gravel	
11								ML	ML	BEAUMONT; strong brown (7.5YR 4/6); clay; SILT (ML); moist; stiff; trace of clay	
12								ML	ML	BEAUMONT; strong brown (7.5YR 4/6); clay; SILT (ML); wet; firm	
13	X	SS 11	25	18				SM	SM	BEAUMONT; strong brown (7.5YR 4/6); clay; SILT (ML); wet; firm	Switch to Mud Rotary drilling at 20 feet BGS
14								SM	SM	BEAUMONT; strong brown (7.5YR 4/6); silt; SAND (SM); wet; loose; fine sand	
15								SM	SM	BEAUMONT; strong brown (7.5YR 4/6); silt; SAND (SM); wet; loose; fine sand	
16								SM	SM	BEAUMONT; strong brown (7.5YR 4/6); silt; SAND (SM); wet; loose; fine sand	
17								SM	SM	BEAUMONT; strong brown (7.5YR 4/6); silt; SAND (SM); wet; loose; fine sand	
18								SM	SM	BEAUMONT; strong brown (7.5YR 4/6); silt; SAND (SM); wet; loose; fine sand	
19	X	SS 12	3	13				SP-SM	SP-SM	BEAUMONT; brown (7.5YR 4/4); silt; SAND (SP-SM); moist; firm; fine sand; some silt; poorly graded	
20								SP-SM	SP-SM	BEAUMONT; brown (7.5YR 4/4); silt; SAND (SP-SM); moist; firm; fine sand; some silt; poorly graded	
21								SP-SM	SP-SM	BEAUMONT; brown (7.5YR 4/4); silt; SAND (SP-SM); moist; firm; fine sand; some silt; poorly graded	
22								SP-SM	SP-SM	BEAUMONT; brown (7.5YR 4/4); silt; SAND (SP-SM); moist; firm; fine sand; some silt; poorly graded	
23								SP-SM	SP-SM	BEAUMONT; brown (7.5YR 4/4); silt; SAND (SP-SM); moist; firm; fine sand; some silt; poorly graded	
24	X	SS 13	6	14				SP-SM	SP-SM	BEAUMONT; brown (7.5YR 4/4); silt; SAND (SP-SM); moist; firm; fine sand; some silt; poorly graded	
25								SP-SM	SP-SM	BEAUMONT; brown (7.5YR 4/4); silt; SAND (SP-SM); moist; firm; fine sand; some silt; poorly graded	
26								SP-SM	SP-SM	BEAUMONT; brown (7.5YR 4/4); silt; SAND (SP-SM); moist; firm; fine sand; some silt; poorly graded	
27								SP-SM	SP-SM	BEAUMONT; brown (7.5YR 4/4); silt; SAND (SP-SM); moist; firm; fine sand; some silt; poorly graded	
28								SP-SM	SP-SM	BEAUMONT; brown (7.5YR 4/4); silt; SAND (SP-SM); moist; firm; fine sand; some silt; poorly graded	
29	X	SS 14	8	13				SP-SM	SP-SM	BEAUMONT; brown (7.5YR 4/4); silt; SAND (SP-SM); moist; very firm; fine sand; some silt; poorly graded; some clay about 34.5 feet	
30								SP-SM	SP-SM	BEAUMONT; brown (7.5YR 4/4); silt; SAND (SP-SM); moist; very firm; fine sand; some silt; poorly graded; some clay about 34.5 feet	
31								SP-SM	SP-SM	BEAUMONT; brown (7.5YR 4/4); silt; SAND (SP-SM); moist; very firm; fine sand; some silt; poorly graded; some clay about 34.5 feet	
32								SP-SM	SP-SM	BEAUMONT; brown (7.5YR 4/4); silt; SAND (SP-SM); moist; very firm; fine sand; some silt; poorly graded; some clay about 34.5 feet	
33								SP-SM	SP-SM	BEAUMONT; brown (7.5YR 4/4); silt; SAND (SP-SM); moist; very firm; fine sand; some silt; poorly graded; some clay about 34.5 feet	
34	X	SS 15	14	16				SM	SM	BEAUMONT; brown (7.5YR 4/4); silt; SAND (SM); moist; dense	
35								SM	SM	BEAUMONT; brown (7.5YR 4/4); silt; SAND (SM); moist; dense	
36								SM	SM	BEAUMONT; brown (7.5YR 4/4); silt; SAND (SM); moist; dense	
37								SM	SM	BEAUMONT; brown (7.5YR 4/4); silt; SAND (SM); moist; dense	
38								SM	SM	BEAUMONT; brown (7.5YR 4/4); silt; SAND (SM); moist; dense	
39	X	SS 15	14	16				SM	SM	BEAUMONT; brown (7.5YR 4/4); silt; SAND (SM); moist; dense	
40								SM	SM	BEAUMONT; brown (7.5YR 4/4); silt; SAND (SM); moist; dense	

Project Name : Job Number <div style="text-align: center;"> <b>MACTEC</b></div> STP COL : 5050-06-0496	<h2 style="margin: 0;">SOIL LOG - Boring No. B-301</h2>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (Inches)	Water Content	Grain Size	Alterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 16	27 25	14 18						BEAUMONT; brown (7.5YR 4/4); silt; SAND (SM); moist; dense; fine sand; low plasticity	
45											
46											
47											
48											
49	X	SS 17	27 20	27 18					CH	BEAUMONT; mottled greenish gray (GLEYS 1 5/1) and yellowish brown (10YR 5/6); gravel; CLAY (CH); moist; stiff; trace gravel	
50											
51											
52											
53											
54	X	SS 18	8 11	22 18						BEAUMONT; mottled dark yellowish brown (10YR 4/6) and greenish gray (GLEYS 1 5/1); sand; CLAY (CH); moist; very stiff; trace sand	
55											
56											
57											
58											
59	X	SS 19	5 12	21 18						BEAUMONT; dark brown (7.5YR 3/4); silt; CLAY (CH); moist; very stiff; strong reaction with HCl; calcareous nodules	
60											
61											
62											
63											
64	X	SS 20	6 11	15.5 18					SM	BEAUMONT; dark brown (7.5YR 3/4); silt; SAND (SM); moist; very firm; fine grained sand; low plasticity; trace clay about 64.5 feet bgs	
65											
66											
67											
68											
69	X	SS 21	6 11	16 18						BEAUMONT; dark brown (7.5YR 3/4); silt; SAND (SM); moist; very firm; fine grained sand; low plasticity	
70											
71											
72											
73											
74	X	SS 22	12 20	18 24						BEAUMONT; dark yellowish brown (10YR 3/6); silt; SAND (SM); moist; dense; low plasticity; fine grained sand	
75											
76											
77											
78											
79	X	SS 23	16 24	12 18						BEAUMONT; dark yellowish brown (10YR 3/6); silt; SAND (SM); moist; dense; low plasticity; fine	
80											

Project Name : Job Number



SOIL LOG - Boring No. B-301

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
80									SM	grained sand
81										
82										
83										
84	X	SS 24	6 10 14	21 18					CH	BEAUMONT; dark brown (7.5YR 3/3); silt; CLAY (CH); moist; very stiff
85										
86										
87										
88										
89	X	SS 25	9 12 15	23.5 18						BEAUMONT; dark brown (7.5YR 3/3); silt; CLAY (CH); moist; very stiff
90										
91										
92										
93										
94	X	SS 26	10 to 4	22 18						BEAUMONT; mottled dark greenish gray (GLEY 1 4/1) and yellowish brown (10YR 5/8); silt; CLAY (CH); moist; very stiff
95										
96										
97										
98										
99	X	SS 27	6 36 50/4.5	25.5 18					SP-SM	BEAUMONT; grayish brown (10YR 5/2) with black mottling; silt; CLAY (CH); moist; hard; roots intermixed with CH materials; increased silt at 99 feet bgs
100										
101										
102										
103										
104										
105										
106										
107										
108									SM	BEAUMONT; dark grayish brown (10YR 4/2); silt; SAND (SM); moist; very firm
109	X	SS 28	17 17 12	19 18					SW-SM CH	BEAUMONT; dark yellowish brown (10YR 4/6); gravel; silt; SAND (SW-SM); moist; very firm; well-graded; some gravel
110										
111										
112										
113										
114										
115										
116										
117										
118										
119	X	SS 29	6 10 14	18.5 18						BEAUMONT; greenish gray (GLEY 1 6/1) with yellowish brown (10YR 5/8) mottling; silt; CLAY
120										

Project Name : Job Number STP COL : 5050-06-0496	<b>MACTEC</b> <b>SOIL LOG - Boring No. B-301</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows(8 inches)	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
120									CH	(CH); dry; very stiff
121										
122										
123										
124										
125										
126										
127										
128										
129	X	SS 30	13 16	25 18						BEAUMONT; strong brown (7.5YR 4/6) with greenish gray (GLEY 1 5/1) mottling; silt; CLAY (CH); dry; hard; strong reaction with HCl; calcareous nodules
130										
131										
132										
133										
134										
135										
136										
137										
138										
139	X	SS 31	11 10	19 18						BEAUMONT; strong brown (7.5YR 4/6) with greenish gray (GLEY 1 5/1) mottling; silt; CLAY (CH); dry; hard; strong reaction with HCl; calcareous nodules; black roots at 139 feet bgs
140										
141										
142										
143										
144										
145										
146										
147										
148										
149	X	SS 32	11 10	23 18						BEAUMONT; strong brown (7.5YR 4/6) with greenish gray (GLEY 1 5/1) mottling; silt; CLAY (CH); dry; hard; strong reaction with HCl; calcareous nodules
150										
151										
152										
153										
154										
155										
156										
157										
158										
159	X	SS 33	14 19	21 18						BEAUMONT; strong brown (7.5YR 4/6) with greenish gray (GLEY 1 5/1) mottling; silt; CLAY
160										

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-301</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
160									CH	(CH); moist; hard; strong reaction with HCl; calcareous nodules	
161											
162											
163											
164											
165											
166											
167											
168											
169	X	SS 34	26 40 50/6"	17 18	IP	IP	IP		SM	BEAUMONT; dark brown (7.5YR 3/4); silt; SAND (SM); moist; very dense; low plasticity; mostly fine sand, some silt	
170											
171											
172											
173											
174											
175											
176											
177											
178											
179	X	SS 35	21 29 45	16 18						BEAUMONT; yellowish brown (10YR 5/8); silt; SAND (SM); wet; very dense (from 178.5 to 179.5 feet bgs); trace clay mixed with SM from 179.5 to 179.75 feet bgs; change color to yellowish red (5YR 4/6); silt; SAND (SM); moist; very dense; starting at 179.5 feet bgs	
180											
181											
182											
183											
184											
185											
186											
187											
188											
189	X	SS 36	7 13 13	18					CH	BEAUMONT; dark reddish brown (5YR 3/4) with greenish gray (GLEYS 1 5/1) mottling; silt; CLAY (CH); moist; very stiff	
190											
191											
192											
193											
194											
195											
196											
197											
198											
199	X	SS 37	36 50/5"	11 18					SM	BEAUMONT; dark reddish brown (5YR 3/4) with greenish gray (GLEYS 1 5/1) mottling; silt; CLAY	
200											



Project Name : Job Number STP COL : 5050-06-0496	<b>MACTEC</b> <b>SOIL LOG - Boring No. B-301</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/ft Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
200										(CH); moist; hard BEAUMONT; dark grayish brown (2.5Y 4/2); silt; SAND (SM); moist; very dense; low plasticity; fine grained sand Boring Terminated at 200 feet
201										
202										
203										
204										
205										
206										
207										
208										
209										
210										
211										
212										
213										
214										
215										
216										
217										
218										
219										
220										
221										
222										
223										
224										
225										
226										
227										
228										
229										
230										
231										
232										
233										
234										
235										
236										
237										
238										
239										
240										

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-302-DH</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 4 inch	Boring Location Unit 3 - Reactor Building N 363000.73 E 2943364.78	Total Depth 220 feet	
Drilling Contractor and Rig Miller / CME 750	Elevation at boring 30.01 feet	Ground Water Depth 11.5 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 138.2 lbs / 30 inches	No. of Samples 37	Date Started 11/16/06
	Borehole Inclination 0	Logged by D. Haug	Date Completed 11/18/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0										4.5 inches Portland Cement Concrete Pavement (PCCP)	Concrete at surface
1	X	SS 1	14	18					CL	BEAUMONT; dark greenish gray (Gley1 5G 4/1); silt; CLAY (CL); moist; firm; some silt BEAUMONT; dark gray (5Y 4/1); CLAY (CH); moist; firm; mottled BEAUMONT; black (10YR 2/1); CLAY (CH); moist; firm BEAUMONT; very dark gray (10YR 3/1); CLAY (CH); moist; firm; few calcium carbonate nodules BEAUMONT; gray (10YR 5/1); CLAY (CH); moist; firm BEAUMONT; gray (10YR 5/1); CLAY (CH); moist; firm BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CL); moist; firm; some silt BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CL); moist; soft; mottled; some silt BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CL); wet at 11.5-feet; soft; some silt BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CL); wet; firm; ferrous staining; black organic staining; some silt BEAUMONT; yellowish red (5YR 5/6); CLAY (CH); moist; firm; some calcium carbonate nodules	
2	X	SS 2	15	18					CH		
3	X	SS 3	14.5	18							
4	X	SS 4	15	18							
5	X	SS 5	16.5	18							
6	X	SS 6	18	18							
7	X	SS 7	13	18					CL		
8	X	SS 8	20	18							
9	X	SS 9	20	18							
10	X	SS 10	19	18					CH		
11										Water level at 11.5 feet BGS	
12											
13											
14											
15											
16											
17											
18											
19	X	SS 11	19	18					CL	BEAUMONT; strong brown (7.5YR 5/6); CLAY (CH); moist; firm	
20											Switch to Mud Rotary Drilling at 20 feet
21											
22											
23											
24	X	SS 12	19	5					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; very firm; fine; little silt	
25			11	14							
26											
27											
28											
29	X	SS 13	13	12	21.5	39.9				BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; fine; little silt; quartz sand	
30											
31											
32											
33											
34	X	SS 14	7	4					SP-SM	BEAUMONT; yellowish brown; (10YR 5/4); silt; SAND (SP-SM); wet; firm; fine; little silt	
35			6	11							
36											
37											
38											
39	X	SS 15	12	11.5						BEAUMONT; yellowish brown; (10YR 5/4); silt; SAND (SP-SM); wet; dense; fine; few silt	
40			15	17							

Project Name : Job Number



SOIL LOG - Boring No. B-302-DH

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SP-SM	BEAUMONT; yellowish brown; (10YR 5/4); silt; SAND (SP-SM); wet; firm; fine; little silt (Continued from previous page)	
41											
42											
43											
44	X	SS 16	14 26	15 30						BEAUMONT; yellowish brown; (10YR 6/4); silt; SAND (SP-SM); wet; very dense; fine; little silt	
45											
46											
47											
48											
49	X	SS 17	16 25	0 22	0 18					BEAUMONT; silt; SAND (SP-SM)	No Recovery in sample SS-17
50											
51											
52											
53											
54	X	SS 18	6 10	4 18	23 18				CH	BEAUMONT; light greenish gray (Gley1 10Y 7/1); CLAY (CH); moist; stiff; some ferrous staining; few calcium carbonate nodules	
55											
56											
57											
58											
59	X	SS 19	6 10	11 18	21 18					BEAUMONT; yellowish red (5YR 4/6); CLAY (CH); moist; very stiff; mottled; calcium carbonate nodules	
60											
61											
62											
63											
64	X	SS 20	6 10	4 18	18 18				CL	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CL); wet; stiff; little silt	
65											
66											
67											
68											
69	X	SS 21	10 13	12 13	12 18				SP-SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SP-SM); wet; very firm; fine; some silt	
70											
71											
72											
73											
74	X	SS 22	16 31	18 38	21 18					BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SP-SM); wet; very dense; trace silt	
75											
76											
77											
78											
79	X	SS 23	12 14	12 14	12 18					BEAUMONT; light yellowish brown (10YR 6/4); silt; SAND (SP-SM); wet; very firm; fine; little silt; quartz sand	
80											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-302-DH</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SP-SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SP-SM); wet; very firm; fine; some silt <i>(Continued from previous page)</i>	
81											
82											
83											
84	X	SS 24	6 10	23 18					CH	BEAUMONT; brown (7.5YR 5/4); CLAY (CH); moist; very stiff	
85											
86											
87											
88											
89	X	SS 25	8 11 13	19 18						BEAUMONT; brown (7.5YR 5/4); CLAY (CH); moist; very stiff; minor ferrous staining	
90											
91											
92											
93											
94	X	SS 26	8 10 12	24 18					SP-SM CH	BEAUMONT; brownish yellow (10YR 6/6); gravel; silt; SAND (SP-SM); wet; very firm; little silt; trace of gravel BEAUMONT; yellowish brown (10YR 5/4); CLAY (CH); moist; very stiff	
95											
96											
97											
98											
99	X	SS 27	10 10 10	18 18						BEAUMONT; greenish gray (Gley1 10GY 6/1); CLAY (CH); moist; stiff; mottled; color change along micro fractures	
100											
101											
102											
103											
104											
105											
106											
107											
108											
109	X	SS 28	12 12 15	0 18					SP-SM	BEAUMONT; SAND (SM)	No Recovery in sample SS-28
110											
111											
112											
113											
114											
115											
116											
117											
118											
119	X	SS 29	15 17 16	7.5 18						BEAUMONT; brown (10YR 5/3); silt; SAND (SP-SM); wet; dense; coarse; little silt; mostly	
120											

Project Name : Job Number



SOIL LOG - Boring No. B-302-DH

STP COL : 5050-06-0495

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									CH	quartz sand	
121									CH	BEAUMONT; reddish brown (5YR 5/4); CLAY (CH); moist; hard; mottled	
122											
123											
124											
125											
126											
127											
128											
129	X	SS 30	6 12	17.5 18						BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; very stiff; few silt; mottled	
130											
131											
132											
133											
134											
135											
136											
137											
138											
139	X	SS 31	16 17	0 18						BEAUMONT; pale yellow (2.5Y 7/3); CLAY (CH); moist; hard; some calcareous cementation	No Recovery on Sample SS-31
140											
141											
142											Hard drilling at 142 feet
143											
144											
145											
146											
147											
148											
149	X	SS 32	15 20	0 18						BEAUMONT; reddish yellow (7.5YR 7/6); CLAY (CH); moist; hard; mottled; calcareous cementation	No Recovery on Sample SS-32
150			16								
151											
152											
153											
154											
155											
156											
157											
158											
159	X	SS 33	8 11	21.5 18						BEAUMONT; yellowish red (5YR 5/6) mottled with light greenish gray (GLEYS 1 10Y 7/1); CLAY (CH);	
160			14								

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-302-DH</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
160									CH	moist; very stiff; high plasticity; high toughness	
161											
162											
163											
164											
165											
166											
167											
168											
169	X	SS 34	24 27 31	4.5 18					ML	BEAUMONT; yellowish red (5YR 5/6); sand; clay; SILT (ML); moist; hard; few clay; little sand	
170											
171											
172											
173											
174											
175											
176											
177											
178											
179	X	SS 35	31 53 60	13 18					SP-SM	BEAUMONT; reddish yellow (7.5YR 6/6); silt; SAND (SP-SM); wet; very dense; fine; little silt	
180											
181											
182											
183											
184											
185											
186											
187											
188											
189	X	SS 36	17 22 22	19 18					CH	188.5 to 189.25 feet: BEAUMONT; strong brown (7.5 YR 5/6); sand; silt; gravel; CLAY (CH); moist; hard; little silt; clay; and coarse sand and gravel; 189.25-feet to 190-feet: BEAUMONT; reddish brown (5 YR 4/4) CLAY (CH); moist; hard	
190											
191											
192											
193											
194											
195											
196											
197											
198											
199	X	SS 37	7 5	24 18						BEAUMONT; greenish gray (Gley1 10Y 5/1); CLAY (CH); moist; stiff; fine; high plasticity; high toughness; gastropod shells	
200											

Project Name : Job Number



**SOIL LOG - Boring No. B-302-DH**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
200									CH	Continued drilling to 220 feet for geophysical logging (no sampling)	Stopped geotechnical drilling and sampling at 200 feet
201											
202											
203											
204											
205											
206											
207											
208											
209											
210											
211											
212											
213											
214											
215											
216											
217											
218											
219											
220										Boring Terminated at 220-feet	
221											
222											
223											
224											
225											
226											
227											
228											
229											
230											
231											
232											
233											
234											
235											
236											
237											
238											
239											
240											

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-303</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 4 inch		Boring Location Reactor Bldg. Unit #3 N 363001.22 E 2943456.09		Total Depth 200 feet	
Drilling Contractor and Rig JEDI Drilling / CME 75		Elevation at boring 26.64 feet		Ground Water Depth 7.5 feet	
Sampling Method Split Spoon/UD		Sample Driving Hammer/Drop 138.1 lbs / 30 inches		No. of Samples 38	
		Borehole Inclination 0		Logged by A. Osorio	
				Date Started 11/28/06	
				Date Completed 12/1/06	

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0										4" Surface Grass	
1	X	SS 1	22	9					CH	BEAUMONT; black (5Y 2.5/1); silt; CLAY (CH); moist; soft; trace silt	Begin boring with Hollow Stem Auger
2	X	SS 2	22	18					CH	BEAUMONT; black (5Y 2.5/2); CLAY (CH); moist; firm	
3	X	SS 3	21.5	18					CH	BEAUMONT; black (5Y 2.5/2); gravel; CLAY (CH); moist; firm; little fine gravel	
4	X	SS 4	26	18					CH	BEAUMONT; reddish brown (5YR 4/4) with yellowish red (5YR 4/6) mottling; silt; CLAY (CH); moist; firm; some silt; black roots and pyrite; calcareous nodules at about 4 feet	
5	X	SS 5	26	18				CL-ML	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CL-ML); wet; soft; calcareous nodules		
6	X	SS 6	25	18				CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CL-ML); wet; firm; calcareous nodules		
7	X	SS 7	26.5	18				CH	BEAUMONT; yellowish red (5YR 4/6); CLAY (CH); moist; stiff; with calcareous nodules		
8	X	SS 8	23	18				CH	BEAUMONT; yellowish red (5YR 4/6); gravel; silt; CLAY (CL-ML); wet; stiff; little gravel		
9	X	SS 9	26	18				CH	BEAUMONT; yellowish red (5YR 5/6); gravel; silt; CLAY (CH); moist; stiff; little gravel; trace silt		
10	X	SS 10	19	18				SM	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; stiff; trace silt; calcareous nodules		
11										BEAUMONT; yellowish red (5YR 5/8); silt; SAND (SM); moist; loose	
12										BEAUMONT; yellowish red (5YR 5/8); CLAY (CH); moist; stiff	
13											
14											
15											
16											
17											
18											
19	X	SS 11	18.5	18					CH	BEAUMONT; yellowish red (5YR 5/8); silt; SAND (SM); moist; loose	No recovery
20											
21											
22											
23											
24	X	SS 12	11	0							
25											
26											
27											
28											
29	X	SS 13	7	15					SM	BEAUMONT; yellowish red (5YR 5/8); CLAY (CH); moist; very stiff	
30											
31											
32											
33											
34	X	SS 14	12	16							
35											
36											
37											
38											
39	X	SS 15	8	23.5					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; dense; trace silt	
40											



Project Name : Job Number 	<b>SOIL LOG - Boring No. B-303</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
40									SM	
41										
42										
43										
44	X	SS 16	19 21 15	17 18						BEAUMONT; brown (7.5YR 4/4); silt; SAND (SM); moist; dense
45										
46										
47										
48										
49	X	SS 17	4 7 8	23 18					CH	BEAUMONT; greenish gray (GLE Y 1 5/1) with yellowish brown mottling; CLAY (CH); moist; stiff; calcareous nodules
50										
51										
52										
53										
54	X	SS 18	7 9 11	23 18						BEAUMONT; strong brown (7.5YR 4/6) with trace greenish gray (GLE Y 1 5/1) mottling; CLAY (CH); moist; very stiff; presence of calcareous nodules
55										
56										
57										
58										
59	X	SS 19	4 9 9	23 18					ML	BEAUMONT; strong brown (7.5YR 4/6); clay; SILT (ML); moist; stiff
60									CH	BEAUMONT; strong brown (7.5YR 4/6) with trace greenish gray (GLE Y 1 5/1) mottling; CLAY (CH); moist; stiff; presence of calcareous nodules
61										
62										
63										
64		UD 1	N/A	22.5 24	25.5	18.3	NV/NP			BEAUMONT; strong brown (7.5YR 4/6) with trace greenish gray (GLE Y 1 5/1) mottling; CLAY (CH); moist
65									SM	BEAUMONT; brown (7.5YR 4/4); silt; SAND (SM); moist
66										
67										
68										
69	X	SS 20	10 20 25	15 18						BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; dense
70										
71										
72										
73										
74	X	SS 21	4 15 24	11 18						BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; dense
75										
76										
77										
78										
79	X	SS 22	12 16 21	16 18						BEAUMONT; brown (7.5YR 5/4) silt; clay; SAND (SM); moist; dense; some silt; little clay
80										

Project Name : Job Number



SOIL LOG - Boring No. B-303

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									CH		
81											
82											
83											
84	X	SS 23	9 10 14	25 18							BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); moist; very stiff; trace silt; presence of calcareous nodules
85											
86											
87											
88											
89		UD 2	N/A	23.5 24	24.5	99.4	57/39				BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); moist; trace silt
90											
91											
92											
93											
94	X	SS 24	4 6 7	23 18							BEAUMONT; greenish gray (GLEY 1 5/1) with brown (7.5YR 4/4) mottling; CLAY (CH); moist; stiff
95											
96											
97											
98											
99	X	SS 25	4 9 12	25 18					CL-ML SM		BEAUMONT; dark greenish gray (GLEY 1 4/1); silt; CLAY (CL-ML); moist; very stiff
100											BEAUMONT; dark greenish gray (GLEY 1 4/1); silt; SAND (SM); moist; very firm
101											
102											
103											
104											
105											
106											
107											
108											
109		UD 3	N/A	13 24	15.1						BEAUMONT; dark greenish gray (GLEY 1 4/1); gravel; silt; SAND (SM); moist; some gravel
110											
111											
112											
113											
114											
115											
116											
117											
118											
119	X	SS 26	10 13 16	19 18					CH		BEAUMONT; greenish gray (GLEY 1 5/1) with brown (7.5YR 4/4) mottling; CLAY (CH); dry; very
120											

Project Name : Job Number



SOIL LOG - Boring No. B-303

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									CH	stiff	
121											
122											
123											
124											
125											
126											
127											
128											
129	X	SS 27	8 10 11	20 18							BEAUMONT; brown (7.5YR 4/4) with greenish gray (GLE Y 1 5/1) mottling; CLAY (CH); dry; very stiff
130											
131											
132											
133											
134		UD 4	N/A	24 24	24.1	17.5	65/38				BEAUMONT; brown (7.5YR 4/4) with greenish gray (GLE Y 1 5/1) mottling; sand; CLAY (CH); dry; some calcareous cementation
135											
136											
137											
138											
139	X	SS 28	26 23 30	12 18							BEAUMONT; greenish gray (GLE Y 1 5/1) with brown (7.5YR 4/4) mottling; gravel; sand; CLAY (CH); moist; hard
140											
141											
142											
143											
144											
145											
146											
147											
148											
149	X	SS 29	27 41 50/6"	14 18					SM		BEAUMONT; brown (7.5YR 4/4); silt; gravel; SAND (SM); moist; very dense; some gravel
150											
151											
152											
153											
154											
155											
156											
157											
158											
159	X	SS 30	27 29 28	20 18					CH		BEAUMONT; brown (7.5YR 4/4); silt; SAND (SM); moist; very dense; some gravel
160											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-303</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
160									CH	BEAUMONT; greenish gray (GLEY 1 5/1) with yellowish brown (10YR 5/6) mottling; CLAY (CH); dry; hard; some calcareous nodules	
161											
162											
163											
164											
165											
166											
167											
168											
169		UD 5	N/A	16.5 24		37.1	INV/NP		SM		BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist
170											
171											
172											
173											
174											
175											
176											
177											
178											
179	X	SS 31	28 41 50/5"	12 18						BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very dense	
180											
181											
182											
183											
184											
185											
186											
187											
188											
189	X	SS 32	9 11 14	28 18					CH	BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); moist; very stiff; some silt; calcareous nodules; black roots	
190											
191											
192											
193											
194											
195											
196											
197											
198											
199	X	SS 33	4 6 10	26 18						BEAUMONT; very dark greenish gray (GLEY 1 3/1) with very dark bluish gray (GLEY 2 3/1) mottling;	
200											

Project Name : Job Number



**SOIL LOG - Boring No. B-303**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
200								silt; CLAY (CH); moist, very stiff, some silt		
201								Boring Terminated at 200- feet		
202										
203										
204										
205										
206										
207										
208										
209										
210										
211										
212										
213										
214										
215										
216										
217										
218										
219										
220										
221										
222										
223										
224										
225										
226										
227										
228										
229										
230										
231										
232										
233										
234										
235										
236										
237										
238										
239										
240										

Project Name : Job Number		<b>SOIL LOG - Boring No. B-304</b>	
STP COL : 5050-06-0496		<b>MACTEC</b>	
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 6 inch and 4 inch	Boring Location Unit 3 - Reactor Building N 363095.4 E 2943268.83	Total Depth 200 feet	
Drilling Contractor and Rig JEDI Drilling Contractor / CME 75	Elevation at boring 28.24 feet	Ground Water Depth 9.5 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 138.1 lbs / 30 Inches	No. of Samples 37	Date Started 11/19/06
	Borehole Inclination 0	Logged by A. Osorio	Date Completed 11/22/06

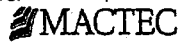
Reviewed by / Date LMN 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0										Surface Grass - top four inches	
1	X	SS 1	10	18					CH	BEAUMONT; black (2.5Y 2.5/1); silt; CLAY (CH); moist; firm; trace silt; trace organics	
2	X	SS 2	12	18					CH	BEAUMONT; black (2.5Y 2.5/1); silt; CLAY (CH); moist; firm; trace silt	
3	X	SS 3	16	18					CH	BEAUMONT; black (2.5Y 2.5/1); silt; CLAY (CH); moist; firm; some silt; contains yellowish brown mottling; contains some calcareous nodules	
4	X	SS 4	20.5	18					CH	BEAUMONT; dark grayish brown (10YR 4/2) with black (2.5Y 2.5/1) mottling; silt; CLAY (CH); moist; firm; contains black roots; some calcareous nodules starting at 5.5-feet BGS	
5	X	SS 5	12	18					CL	BEAUMONT; yellowish red (5YR 4/6) with black (2.5Y 2.5/1) mottling; silt; CLAY (CL); moist; firm; contains calcareous nodules; little silt	
6	X	SS 6	27	18					CH	BEAUMONT; yellowish red (5YR 4/6) with black (2.5Y 2.5/1) mottling; silt; CLAY (CL); moist; firm	
7	X	SS 7	28	18					CH	BEAUMONT; yellowish red (5YR 4/6) with black (2.5Y 2.5/1) mottling; silt; CLAY (CL); moist; firm	
8	X	SS 8	20	18					CH	BEAUMONT; yellowish red (5YR 5/6) with black (2.5Y 2.5/1) mottling; silt; CLAY (CH); wet; stiff; some silt; contains calcareous nodules; contains black roots	
9	X	SS 9	16.5	18					CL-ML	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; firm; contains calcareous nodules; some silt	
10	X	SS 10	25.5	18					SM	BEAUMONT; yellowish red (5YR 5/6); gravel; clay; SILT (CL-ML); wet; stiff; trace gravel; some clay	
11											
12											
13											
14											
15											
16											
17											
18											
19	X	SS 11	6	18					SP-SM	BEAUMONT; dark yellowish brown (10YR 3/6); silt; SAND (SM); wet; loose; low plasticity	
20											
21											
22											
23											
24	X	SS 12	4	15					SM	BEAUMONT; dark yellowish brown (10YR 3/6); silt; SAND (SP-SM); moist; firm; poorly graded	
25											
26											
27											
28											
29	X	SS 13	19	13					SM	BEAUMONT; dark yellowish brown (10YR 3/6); silt; gravel; SAND (SM); moist; very firm; some gravel and silt	
30			14	18							
31			10	18							
32											
33											
34	X	SS 14	14	18					CL SM	BEAUMONT; reddish brown (2.5YR 4/4); sand; silt; CLAY (CL); moist; hard; some silt and sand	
35			20	18							
36			20	18							
37											
38											
39	X	SS 15	9	16.5					SM	BEAUMONT; dark yellowish brown (10YR 3/6); silt; SAND (SM); moist; very firm	
40			12	18							

Water Level at 9.5 feet BGS

Change to rotary wash drilling at 25 feet

Project Name : Job Number



**SOIL LOG - Boring No. B-304**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 16	16 22 30	18						BEAUMONT; dark yellowish brown (10YR 3/6); silt; SAND (SM); moist; very dense	
45											
46											
47											
48											
49	X	SS 17	7 10	28 18					CH	BEAUMONT; greenish gray (Gley1 6/1) with yellowish brown (10YR 5/6) mottling; silt; CLAY (CH); moist; very stiff; few silt	
50											
51											
52											
53											
54	X	SS 18	8 12 18	23 18						BEAUMONT; yellowish brown (10YR 5/6) with greenish gray (Gley1 6/1) mottling; silt; gravel; CLAY (CH); moist; very stiff; trace silt and gravel; contains some calcareous nodules	
55											
56											
57											
58											
59	X	SS 19	9 11 15	24 18						BEAUMONT; yellowish red (5YR 4/6) with greenish gray (Gley1 6/1) mottling; silt; CLAY (CH); moist; very stiff; some silt; contains calcareous nodules	
60											
61											
62											
63											
64	X	SS 20	6 4 3	26 18					ML	BEAUMONT; yellowish red (5YR 4/6); gravel, clay; SILT (ML); moist; stiff; with few gravel	
65											
66											
67											
68											
69	X	SS 21	7 10 16	20 18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; very firm; contains some calcareous nodules	
70											
71											
72											
73											
74	X	SS 22	14 21 19	17 18						BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; dense	
75											
76											
77											
78											
79	X	SS 23	20 23 24	17 18						BEAUMONT; brown (7.5YR 4/4); silt; SAND (SM); moist; dense; coarse sand at about 79.5-feet BGS	
80											

Project Name : Job Number <div style="text-align: center;"> <b>MACTEC</b></div> STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-304</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
80									SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; very firm; contains some calcareous nodules <i>(Continued from previous page)</i>
81										
82										
83										
84	X	SS 24	10 14 16	21 18					CH	BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist; very stiff; some silt; contains trace of calcareous nodules
85										
86										
87										
88										
89	X	SS 25	9 11 13	25 18						BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist; very stiff; some silt; contains trace of calcareous nodules
90										
91										
92										
93										
94	X	SS 26	9 10 12	22 18						BEAUMONT; greenish gray (Gley1 5/1) mixed with strong brown (7.5YR 4/6); CLAY (CH); moist; very stiff; some calcareous nodules
95										
96										
97										
98										
99	X	SS 27	33 33 31	18 18					SM	BEAUMONT; dark greenish gray (Gley1 4/1); silt; SAND (SM); moist; very dense
100										
101										
102										
103										
104										
105										
106										
107										
108										
109	X	SS 28	9 18 19	18 18					CH	BEAUMONT; greenish gray (Gley1 5/1) mixed with strong brown (7.5YR 4/6); gravel; CLAY (CH); dry; hard; contains calcareous nodules; few gravel; few black roots
110										
111										
112										
113										
114										
115										
116										
117										
118										
119	X	SS 29	8 12 14	18						BEAUMONT; strong brown (7.5YR 4/6) mixed with greenish gray (Gley1 5/1); gravel; CLAY (CH); dry; very stiff; contains calcareous nodules; few gravel; few black roots
120										



Project Name : Job Number 	<b>SOIL LOG - Boring No. B-304</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
120									CH	
121										
122										
123										
124										
125										
126										
127										
128										
129	X	SS 30	8 12 14	22 18						BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist; very stiff; some silt
130										
131										
132										
133										
134										
135										
136										
137										
138										
139	X	SS 31	19 24 50/4"	26 18						BEAUMONT; brown (7.5YR 4/4); silt; cobbles; CLAY (CH); dry; hard; some silt; with few cobbles; calcareous cementation starting from 139-foot BGS; strong reaction with HCl; trace of black roots
140										
141										
142										
143										
144										
145										
146										
147										
148										
149	X	SS 32	40 50/6"	12 18					SM	BEAUMONT; brown (7.5YR 4/4); silt; SAND (SM); moist; very dense
150										
151										
152										
153										
154										
155										
156										
157										
158										
159	X	SS 33	1 1.5 1.5	26.5 18					CH	BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist; hard; some silt; presence of some
160										

Project Name : Job Number



SOIL LOG - Boring No. B-304

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
160									CH	calcareous nodules	
161											
162											
163											
164											
165											
166											
167											
168											
169	X	SS 34	27 43 31	5 18					ML	BEAUMONT; brown (7.5YR 4/4); sand; SILT (ML); moist; hard	
170											
171											
172											
173											
174											
175											
176											
177											
178											
179	X	SS 35	12 19 20	25 18					CH	BEAUMONT; strong brown (7.5YR 4/6) with yellowish brown (10YR 5/8) and greenish gray (Gley1 5/1) mottling; silt; CLAY (CH); moist; hard; contains calcareous nodules; some silt	
180											
181											
182											
183											
184											
185											
186											
187											
188											
189	X	SS 36	10 13 16	23 18						BEAUMONT; strong brown (7.5YR 4/6) with yellowish brown (10YR 5/8) and mixed with greenish gray (Gley1 5/1) mottling; silt; CLAY (CH); moist; very stiff, contains calcareous nodules; some silt	
190											
191											
192											
193											
194											
195											
196											
197											
198											
199	X	SS 37	40 50/5"	11 18					SM	BEAUMONT; dark yellowish brown (10YR 3/6); silt; SAND (SM); moist; very dense, some calcareous	
200											

Project Name : Job Number



**SOIL LOG - Boring No. B-304**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
200											
201										nodules	
202										Boring Terminated at 200-feet	
203											
204											
205											
206											
207											
208											
209											
210											
211											
212											
213											
214											
215											
216											
217											
218											
219											
220											
221											
222											
223											
224											
225											
226											
227											
228											
229											
230											
231											
232											
233											
234											
235											
236											
237											
238											
239											
240											

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-305 DH</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 6 inch and 4 inch	Boring Location Unit #3 Reactor Building N 363099.59 E 2943364.19	Total Depth 495 feet	
Drilling Contractor and Rig MILLER / CME 750 ATV	Elevation at boring 29.8 feet	Ground Water Depth 11 feet	Depth to Bedrock
Sampling Method Split Spoon/UD	Sample Driving Hammer/Drop 138.2 lbs / 30 inches	No. of Samples 67	Date Started 11/18/06
	Borehole Inclination 0	Logged by D. Haug	Date Completed 12/7/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow/B inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0										FILL: Sand and Gravel	
1	X	SS 1	15	3.5	18				CL	BEAUMONT; dark greenish gray (GLEY 1 5GY 4/1); silt; CLAY (CL); moist; stiff	
2	X	SS 2	15	18	18				CH	BEAUMONT; black (7.5YR 2.5/1); CLAY (CH); moist; firm	
4		UD 1	N/A	24.5	24	22.5	89.6	62/43		BEAUMONT; black (7.5YR 2.5/1) and dark gray (7.5YR 4/1); sand; CLAY (CH); moist; little coarse sand	
7	X	SS 3	15	16	18					BEAUMONT; greenish gray (GLEY 1 10Y 6/1); CLAY (CH); moist; firm	
8	X	SS 4	15	15	18				CL	BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CL); wet; soft; little silt; few calcium carbonate nodules	
9	X	SS 5	15	14	18					BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CL); moist; firm; low plasticity; low toughness; strong reaction with HCl; trace calcareous nodules	
11	X	SS 6	15	17	18				CH	BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CL); moist; firm; little silt; trace fine gravel	Water level at 11 feet BGS
12	X	SS 7	15	18	18				CL	BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH); wet; firm	
14	X	SS 8	15	17	18	19.9		30/14		BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CL); wet; firm; little silt	
15										BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CL); wet; firm; little silt	
16										BEAUMONT; strong brown (7.5YR 5/6); silt; gravel; CLAY (CL); wet; soft; little silt; trace gravel	
17											
18											
19	X	SS 9	15	6.5	18	22.7	77.5	NP/NP	ML	BEAUMONT; brown (7.5YR 5/6); gravel; sand; SILT (ML); wet; firm; trace gravel; little sand	
20											
21											
22											
23											
24	X	SS 10	2	24	18				SP-SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SP-SM); wet; firm	
25										BEAUMONT; silt; SAND (SP-SM)	
26		UD 2	N/A	0	24						No recovery in sample UD-2
27	X	SS 11	4	24	18	24.0				BEAUMONT; strong brown (7.5YR 5/6); silt; gravel; SAND (SP-SM); wet; firm; fine sand; trace gravel	
28	X	SS 12	0	0	18					BEAUMONT; strong brown (7.5YR 5/6); silt; gravel; SAND (SP-SM); wet; very loose; fine sand; little silt; trace gravel	No recovery in sample SS-12
29											
30											
31											
32											
33											
34	X	SS 13	1	24	18					BEAUMONT; reddish yellow (7.5YR 6/6); silt; SAND (SP-SM); wet; very loose; fine sand	
35											
36											
37											
38											
39		UD 3	N/A	0	24					BEAUMONT; silt; SAND (SP-SM)	No recovery in sample UD-3
40											

Project Name : Job Number



**SOIL LOG - Boring No. B-305 DH**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40											
41		UD 3A	N/A	0					SP-SM	BEAUMONT; silt; SAND (SP-SM)	No recovery in sample UD-3A
42											
43											
44											
45											
46	X	SS 14	34	24					CH	BEAUMONT; light brown (7.5YR 6/3); silt; SAND (SP-SM); wet; firm; fine sand; little silt	
47										BEAUMONT; strong brown (7.5YR 5/6); gravel; sand; CLAY (CH); wet; stiff; little sand; few gravel	
48											
49	X	SS 15	47	21					SP-SC	BEAUMONT; strong brown (7.5YR 5/6); clay; SAND (SP-SC); wet; firm; mostly fine sand; trace clay	
50									CL	BEAUMONT; light greenish gray (GLEY 110Y 7/1); sand; CLAY (CL); moist; stiff; high plasticity; few sand; calcareous nodules	
51											
52											
53											
54		UD 4	N/A	23	22.4					BEAUMONT; light greenish gray (GLEY 1 10Y 7/1); sand; CLAY (CL); moist; high plasticity; high toughness; some black staining	Switch to mud rotary drilling at 53 feet bgs
55											
56											
57											
58											
59	X	SS 16	91	19	20.9		58/38		CH	BEAUMONT; mottled light red (2.5YR 6/6) and light greenish gray (GLEY 1 10Y 7/1); CLAY (CH); moist; very stiff; medium plasticity; high toughness; calcareous nodules	
60											
61											
62											
63											
64	X	SS 17	44	18.5						BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH); moist; stiff; high plasticity; little silt	
65											
66											
67											
68											
69	X	SS 18	24	17.5						BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; hard; high plasticity	
70									SP-SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SP-SM); wet; dense; fine; trace silt	
71											
72											
73											
74	X	SS 19	93	8.5	23.1	11.6				BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SP-SM); wet; very firm; fine; little silt	
75											
76											
77											
78											
79		UD 5	N/A	21	23.1	6.5	NV/NP			BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SP-SM); wet; fine; little silt	
80											

Project Name : Job Number STP COL : 5050-06-0496	<b>MACTEC</b>	<b>SOIL LOG - Boring No. B-305 DH</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Afterberg Limits	Lithology	Soil Type (USCS)	Remarks
80									SP-SM	
81										
82										
83										
84	X	SS 20	1.9	22.5					CH	BEAUMONT; brown (7.5YR 5/4); CLAY (CH); moist; very stiff; high plasticity; high toughness
85			3.1	18						
86										
87										
88										
89	X	SS 21	5.8	21.5	21.1	98.5	55/36			BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; some silt
90			10	18						
91										
92										
93										
94	X	SS 22	5.5	20.5	22.5		50/33			BEAUMONT; grayish brown (2.5Y 5/2); silt; CLAY (CH); moist; stiff; high plasticity; little silt; mottled
95			5.5	18						
96										
97										
98										
99	X	SS 23	4.8	17.5						BEAUMONT; grayish brown (10YR 5/2); CLAY (CH); moist; very stiff; high plasticity
100			14	18					SP-SM	BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SP-SM); wet; very firm; mostly fine sand; trace silt
101										
102										
103										
104		UD 6	N/A	4.5	24	94.8			CH	BEAUMONT; grayish brown (10YR 5/2); sand; CLAY (CH); few silt
105										
106										
107										
108										
109	X	SS 24	8.13	7.5	19.8	8.9			SP-SM	BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SP-SM); wet; very firm; mostly medium sand; trace silt
110			16	18						
111										
112										
113										
114										
115										
116										
117										
118										
119	X	SS 25	5.0	21.5	21.8		43/28		CL	BEAUMONT; strong brown (7.5YR 5/6); CLAY (CL); moist; very stiff; high plasticity; calcareous
120			12	18						

Project Name : Job Number



SOIL LOG - Boring No. B-305 DH

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									CL	nodules; mottled	
121											
122											
123											
124		UD 7	N/A	24.5/24	19.2				CH	BEAUMONT; yellowish red (5YR 5/6); CLAY (CH); moist; high plasticity; mottled	
125											
126											
127											
128											
129	X	SS 26	8/14/17	18.5/18					CL	BEAUMONT; reddish yellow (7.5YR 6/6); silt; CLAY (CL); moist; hard; medium plasticity; some silt	
130											
131											
132											
133											
134											
135											
136											
137											
138											
139		UD 8	N/A	24/24	18.1	84.1	32/18			BEAUMONT; light greenish gray (GLEYS 10Y 7/1); sand; CLAY (CL); moist; high plasticity; mottled	
140											
141											
142											
143											
144											
145											
146											
147											
148											
149	X	SS 27	5/10/11	20.5/18					CH	BEAUMONT; reddish yellow (7.5YR 6/6) with light greenish gray (GLEYS 10Y 7/1) mottling; CLAY (CH); moist; very stiff; high plasticity; high toughness; calcareous nodules	
150											
151											
152											
153											
154											
155											
156											
157											
158											
159		UD 9	N/A	14/24	16.4	91.8	56/36		ML	BEAUMONT; reddish yellow (7.5YR 6/6); sand; CLAY (CH); moist; few fine sand; mottled	
160											

Project Name : Job Number



SOIL LOG - Boring No. B-305 DH

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
160											
161											
162											
163											
164											
165											
166											
167											
168											
169	X	SS 28	17 30	0 18						BEAUMONT; SILT (ML)	No recovery in sample SS-28
170	X	SS 29	12 35	12 18	23.9	77.3				BEAUMONT; brown (7.5YR 5/4); sand; SILT (ML); moist; hard; little sand	
171											
172											
173											
174											
175											
176											
177											
178											
179	X	SS 30	8 15	17 18	21.7		48/33		CL	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CL); moist; very stiff; high plasticity; little silt	
180											
181											
182											
183											
184											
185											
186											
187											
188											
189											
190											
191											
192											
193											
194		UD 10	N/A	24 24			IP IP/IP		CH	BEAUMONT; strong brown (7.5YR 5/6); CLAY (CH); moist; high plasticity	Resonant Column Torsional Shear
195											
196	X	SS 31	9 11	24 18						BEAUMONT; strong brown (7.5YR 5/6) and greenish gray (10Y 6/1); CLAY (CH); moist; very stiff; high plasticity; mottled	
197											
198											
199	X	SS 32	1 7	23.5 18	26.1		57/40			BEAUMONT; greenish gray (GLE 1 10Y 5/1); CLAY (CH); moist; very stiff; high plasticity; black staining; shell fragments	
200											



Project Name : Job Number



**SOIL LOG - Boring No. B-305 DH**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow/6 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
200									CH	BEAUMONT; greenish gray (GLEY 1 10Y 5/1); CLAY (CH); moist; high plasticity	
201											
202											
203											
204											
205											
206											
207											
208											
209											
210											
211											
212											
213											
214		UD 11	N/A	22/24	20.9	74.8	45/31		CL	BEAUMONT; greenish gray (GLEY 1 10Y 6/1); sand; CLAY (CL); moist; stiff; medium plasticity; little sand	
215											
216											
217											
218											
219		SS 33	90/5	24/18	19.8		33/18			BEAUMONT; greenish gray (GLEY 1 10 Y 6/1); sand; CLAY (CL); moist; stiff; medium plasticity; little sand	
220											
221											
222											
223											
224											
225											
226											
227											
228											
229		UD 12	N/A	19/24	21.5	27	NV/NP		SM	BEAUMONT; greenish gray (GLEY 1 10Y 6/1); silt; SAND (SM); wet; fine; little silt	
230											
231											
232											
233											
234											
235											
236											
237											
238											
239		SS 34	42/50/5"	14/18					CH	BEAUMONT; greenish gray (GLEY 1 5GY 6/1); CLAY (CH); moist; hard; high plasticity	
240											

Project Name : Job Number <div style="text-align: center; font-weight: bold; font-size: 1.2em;"> <span style="font-size: 1.2em;">MACTEC</span> </div> STP COL : 5050-06-0496	SOIL LOG - Boring No. B-305 DH
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	
240									SP-SM	BEAUMONT; greenish gray (GLEY 1 10Y 7/1); silt; SAND (SP-SM); wet; very dense; mostly fine sand; little silt		
241												
242												
243												
244												
245												
246												
247												
248												
249												
250												
251												
252												
253												
254												
255												
256												
257												
258												
259	X	SS 35	6 11 13	20.5 18	29.6		74/52		CH	BEAUMONT; brown (7.5YR 5/4) with some light greenish gray (GLEY 1 7/1) mottling; sand; CLAY (CH); moist; very stiff; high plasticity; some fine sand; desiccation cracks; ferrous staining		
260												
261												
262												
263												
264		UD 13	N/A	23 30		IP	IP/IP		SP-SM		BEAUMONT; light olive brown (2.5Y 5/3); CLAY (CH); moist; high plasticity	Resonant Column Torsional Shear
265									SP-SM			
266												
267												
268												
269												
270												
271												
272												
273												
274												
275												
276												
277												
278												
279	X	SS 36	7 11 14	24 18	30.4		90/63		CH	BEAUMONT; greenish gray (GLEY 1 5G 5/1); CLAY (CH); moist; very stiff; high plasticity; shell		
280												

Project Name : Job Number



SOIL LOG - Boring No. B-305 DH

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
280									CH	fragments; black organic staining	
281											
282											
283											
284											
285											
286											
287											
288											
289		UD 14	N/A	25.5/30	37.7	90.8	84/58				
290											
291											
292											
293											
294											
295											
296											
297											
298											
299		SS 37	4/7/14	20.5/18							
300											
301											
302											
303											
304											
305											
306											
307											
308											
309											
310											
311											
312											
313											
314		UD 15	N/A	22/24	31.1						
315											
316											
317		UD 15A	N/A	16.5/24							
318											
319		SS 38	12/17/16	17/18							
320											

Difficult drilling from 285 to 288 feet bgs; possible gravel or shells

BEAUMONT; light greenish gray (GLEY 1 5GY 7/1); silt; gravel; CLAY (CH); wet; some gravel; little silt

BEAUMONT; brown (10YR 5/3); CLAY (CH); moist; very stiff; high plasticity; mottled

BEAUMONT; greenish gray (GLEY 1 10Y 6/1); CLAY (CH); moist; high plasticity; mottled

BEAUMONT; dark gray (2.5Y 4/1); CLAY (CH); moist; high plasticity

BEAUMONT; greenish gray (GLEY 1 5GY 6/1); CLAY (CH); moist; hard; high plasticity; few calcareous nodules; mottled

Project Name : Job Number



**SOIL LOG - Boring No. B-305 DH**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
320									CH		
321											
322											
323											
324											
325											
326											
327											
328											
329											
330											
331											
332											
333											
334											
335											
336											
337											
338											
339		UD 16	N/A	16		IP	IP/IP			BEAUMONT; dark greenish gray (GLEY 1 10GY 4/1); CLAY (CH); moist; high plasticity; calcareous nodules	Resonant Column Torsional Shear
340				30							
341											
342											
343											
344											
345											
346											
347											
348											
349											
350											Difficult drilling about 349.5 feet bgs; possible shells
351											
352											
353		UD 17	N/A	7.5					SP-SM	BEAUMONT; light yellowish brown (10YR 6/4); silt; SAND (SP-SM); wet; mostly fine sand; trace coarse sand	Attempted UD-17A sampling using Pitcher Tube method
354				6							Resonant Column Torsional Shear
355		UD 17A	N/A	13		IP	IP/IP				
356				30							
357											
358											
359		SS 39	11	22.5					CH	BEAUMONT; greenish gray (GLEY 1 10GY 6/1); CLAY (CH); moist; hard; high plasticity; calcareous	
360			21	18							

Project Name : Job Number



SOIL LOG - Boring No. B-305 DH

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
360									CH	nodules	
361											
362											
363											
364											
365											
366											
367											
368											
369											
370											
371											
372											
373											
374											
375											
376											
377											
378											
379	X	SS 40	40 17 3	14.5 18	25.7	10.2			SP-SM	BEAUMONT; olive gray (5Y 5/2); silt; SAND (SP-SM); wet; firm; little silt; mostly fine quartz sand	
380											
381											
382											
383											
384											
385											
386		UD 18	N/A	22.5 30		IP	IP/IP			BEAUMONT; olive gray (5Y 5/2); silt; SAND (SP-SM); wet; few silt; mostly fine quartz sand	Resonant Column Torsional Shear
387											
388											
389											
390											
391											
392											
393											
394											
395											
396											
397											
398											
399	X	SS 41	19 20 9	20.5 18	23.3	5.4				BEAUMONT; gray (5Y 5/1); silt; SAND (SP-SM); wet; very firm; poorly graded; abundant shell	
400											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-305 DH</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
400									SP	fragments	
401											
402											
403											
404											
405											
406											
407											
408											
409											
410											
411											
412											
413											
414											
415											
416											
417											
418											
419		UD 20	N/A	12/24		IP	IP/IP		SP-SM	BEAUMONT; light greenish gray (GLEY 1 10Y 7/1); silt; SAND (SP-SM); wet; fine sand; little silt	Resonant Column Torsional Shear
420											
421											
422											
423											
424											
425											
426											
427											
428											
429											
430											Difficult drilling at 429 feet bgs; possible shells
431											
432											
433											
434											
435											
436											
437											
438											
439	X	SS 42	7/18	17.5/18	29.7		86/59		CH	BEAUMONT; brown (7.5YR 4/3) with some light greenish gray (GLEY 1 10Y 7/1) mottling; CLAY	
440											

Project Name : Job Number



SOIL LOG - Boring No. B-305 DH

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
440									CH	(CH); moist; very stiff; high plasticity	
441											
442											
443											
444											
445											
446											
447											
448											
449											
450											
451											
452											
453		UD 21	N/A	4.5		IP	IP		SP-SM	BEAUMONT; light brownish gray (10YR 6/2); clay; silt; SAND (SP-SM); wet; mostly fine sand; some silt; some clay	Resonant Column Torsional Shear Attempted UD-21A sampling using Pitcher Tube method
454		UD 21A	N/A	2.5	22.0	11.8	NV/NP				
455				20.5							
456				30							
457											
458											
459		SS 43	18	8.5	23.3	28.6			SM	BEAUMONT; gray (7.5YR 6/1); silt; SAND (SM); wet; very dense; little silt	
460			50/3"	18							
461											
462											
463											
464											
465											
466											
467											
468											
469											
470											
471											
472											
473											
474											
475											
476											
477											
478											
479		SS 44	5	22.5	24.3		81/58		CH	BEAUMONT; light greenish gray (GLE 1 10Y 7/1) with light yellowish brown (10YR 6/4) mottling;	
480			13	18							

Project Name : Job Number



STP COL : 5050-06-0496

**SOIL LOG - Boring No. B-305 DH**

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
480									CH	CLAY (CH); moist; hard; high plasticity; some calcareous nodules; some black organic staining	
481											
482											
483											
484											
485											
486											
487											
488											
489											
490											
491											
492											
493											
494											
495											
496										Boring Terminated at 495 feet. See Soil Log - Boring No. B-305 DHA for subsurface lithology and sampling below 495 feet bgs	Boring terminated due to drill bit lost down hole. Soil boring B-305 DH abandoned. Subsurface exploration continued to planned 600 feet bgs termination depth in adjacent soil boring B-305 DHA.
497											
498											
499											
500											
501											
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520											



Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-305 DHA</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 6 inch and 4 inch	Boring Location Unit #3 Reactor Building N 363100.87 E 2943343.98	Total Depth 618 feet	
Drilling Contractor and Rig MILLER / CME 750 ATV	Elevation at boring 29.75 feet	Ground Water Depth	Depth to Bedrock
Sampling Method Split Spoon/UD	Sample Driving Hammer/Drop 138.2 lbs / 30 inches	No. of Samples 14	Date Started 12/8/06
	Borehole Inclination 0	Logged by D. Haug	Date Completed 12/18/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
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27											
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31											
32											
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36											
37											
38											
39											
40											

For Geotechnical description and material log from 0 feet below ground surface (bgs) to 450 feet bgs, refer to SOIL LOG - Boring B-305 DH

B-305 DHA located 20-feet west of B-305 DH  
 Soil boring B-305 DHA drilled to 450 feet below ground surface (bgs) without geotechnical logging or sampling

Project Name : Job Number <b>MACTEC</b> STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-305 DHA</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/ft Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40										For Geotechnical description and material log from 0 feet below ground surface (bgs) to 450 feet bgs, refer to SOIL LOG - Boring B-305 DH	Soil boring B-305 DHA drilled to 450 feet below ground surface (bgs) without geotechnical logging or sampling
41											
42											
43											
44											
45											
46											
47											
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77											
78											
79											
80											

Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-305 DHA</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Remarks
80									Soil boring B-305 DHA drilled to 450 feet below ground surface (bgs) without geotechnical logging or sampling
81									
82									
83									
84									
85									
86									
87									
88									
89									
90									
91									
92									
93									
94									
95									
96									
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110									
111									
112									
113									
114									
115									
116									
117									
118									
119									
120									

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-305 DHA</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120											
121										For Geotechnical description and material log from 0 feet below ground surface (bgs) to 450 feet bgs, refer to SOIL LOG - Boring B-305 DH	Soil boring B-305 DHA drilled to 450 feet below ground surface (bgs) without geotechnical logging or sampling
122											
123											
124											
125											
126											
127											
128											
129											
130											
131											
132											
133											
134											
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159											
160											

Project Name : Job Number <div style="display: flex; align-items: center;"> <span style="font-weight: bold; font-size: 1.2em;">MACTEC</span> </div> STP COL : 5050-06-0496	<h2 style="margin: 0;">SOIL LOG - Boring No. B-305 DHA</h2>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
160										For Geotechnical description and material log from 0 feet below ground surface (bgs) to 450 feet bgs, refer to SOIL LOG - Boring B-305 DH	Soil boring B-305 DHA drilled to 450 feet below ground surface (bgs) without geotechnical logging or sampling
161											
162											
163											
164											
165											
166											
167											
168											
169											
170											
171											
172											
173											
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178											
179											
180											
181											
182											
183											
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185											
186											
187											
188											
189											
190											
191											
192											
193											
194											
195											
196											
197											
198											
199											
200											

Project Name : Job Number



**SOIL LOG - Boring No. B-305 DHA**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
200										For Geotechnical description and material log from 0 feet below ground surface (bgs) to 450 feet bgs, refer to SOIL LOG - Boring B-305 DH	Soil boring B-305 DHA drilled to 450 feet below ground surface (bgs) without geotechnical logging or sampling
201											
202											
203											
204											
205											
206											
207											
208											
209											
210											
211											
212											
213											
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237											
238											
239											
240											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-305 DHA</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
240										For Geotechnical description and material log from 0 feet below ground surface (bgs) to 450 feet bgs, refer to SOIL LOG - Boring B-305 DH	Soil boring B-305 DHA drilled to 450 feet below ground surface (bgs) without geotechnical logging or sampling
241											
242											
243											
244											
245											
246											
247											
248											
249											
250											
251											
252											
253											
254											
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276											
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278											
279											
280											

Project Name : Job Number



**SOIL LOG - Boring No. B-305 DHA**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
280											
281										For Geotechnical description and material log from 0 feet below ground surface (bgs) to 450 feet bgs, refer to SOIL LOG - Boring B-305 DH	Soil boring B-305 DHA drilled to 450 feet below ground surface (bgs) without geotechnical logging or sampling
282											
283											
284											
285											
286											
287											
288											
289											
290											
291											
292											
293											
294											
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320											



Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-305 DHA</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
320										For Geotechnical description and material log from 0 feet below ground surface (bgs) to 450 feet bgs, refer to SOIL LOG - Boring B-305 DH	Soil boring B-305 DHA drilled to 450 feet below ground surface (bgs) without geotechnical logging or sampling
321											
322											
323											
324											
325											
326											
327											
328											
329											
330											
331											
332											
333											
334											
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356											
357											
358											
359											
360											

Project Name : Job Number



**SOIL LOG - Boring No. B-305 DHA**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
360											
361										For Geotechnical description and material log from 0 feet below ground surface (bgs) to 450 feet bgs, refer to SOIL LOG - Boring B-305 DH	Soil boring B-305 DHA drilled to 450 feet below ground surface (bgs) without geotechnical logging or sampling
362											
363											
364											
365											
366											
367											
368											
369											
370											
371											
372											
373											
374											
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400											

Project Name : Job Number <b>MACTEC</b>	<b>SOIL LOG - Boring No. B-305 DHA</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
400										For Geotechnical description and material log from 0 feet below ground surface (bgs) to 450 feet bgs, refer to SOIL LOG - Boring B-305 DH  Soil boring B-305 DHA drilled to 450 feet below ground surface (bgs) without geotechnical logging or sampling
401										
402										
403										
404										
405										
406										
407										
408										
409										
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411										
412										
413										
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436										
437										
438										
439										
440										

Project Name : Job Number



**SOIL LOG - Boring No. B-305 DHA**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
440											
441											Soil boring B-305 DHA drilled to 450 feet below ground surface (bgs) without geotechnical logging or sampling
442											
443											
444											
445											
446											
447											
448											
449											
450											
451									SP-SM		
452											
453											
454		UD 21	N/A	21.5 30		11.8	NV/NP			BEAUMONT; light brownish gray (10YR 6/2); silt; SAND (SP-SM); wet; mostly fine sand; some silt	UD-1 through UD-20 samples obtained in boring B-305DH Resonant Column Torsional Shear
455											
456											
457											
458											
459	X	SS 1	27 41 50	12 18						BEAUMONT; gray (10YR 6/1); silt; SAND (SP-SM); wet; very dense; mostly fine sand; few silt	
460											
461											
462											
463											
464											
465											
466											
467											
468											
469											
470											
471											
472											
473											
474											
475											
476											
477											
478											
479	X	SS 2	6 10 13	17.5 18					CH	BEAUMONT; light greenish gray (GLEYS 10Y 7/1); CLAY (CH); moist; very stiff; black organic staining;	
480											

Project Name : Job Number



SOIL LOG - Boring No. B-305 DHA

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
480									CH	few small calcium carbonate nodules	
481											
482											
483											
484											
485											
486											
487											
488											
489											
490											
491											
492											
493											
494											
495											
496											
497											
498											
499	X	SS 3	10 11 19	23 18							BEAUMONT; reddish brown (2.5YR 5/4); sand; CLAY (CH); moist; very stiff; some mottling
500											
501											
502											
503											
504											
505											
506											
507											
508											
509		UD 22	N/A	15 30							BEAUMONT; light greenish gray (GLEY 1 10Y 7/1); CLAY (CH); moist; mottled
510											
511											
512											
513											
514											
515											
516											
517											
518											
519	X	SS 4	11 12 20	18.5 18							BEAUMONT; grayish brown (10YR 5/2); CLAY (CH); moist; hard; some mottling; trace calcareous nodules
520											

Project Name : Job Number <div style="text-align: center;"> <b>MACTEC</b> </div> STP COL : 5050-06-0496	<h2 style="margin: 0;">SOIL LOG - Boring No. B-305 DHA</h2>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
520									CH		
521											
522											
523											
524											
525											
526											
527											
528											
529	X	SS 5	11 14 20	20 18						BEAUMONT; greenish gray (GLEY 1 5GY 6/1); CLAY (CH); moist; hard	UD-23; sample not taken
530											
531											
532											
533											
534											
535											
536											
537											
538											
539	X	SS 6	8 11 16	21.5 18						BEAUMONT; dark greenish gray (GLEY 1 10Y 4/1); CLAY (CH); moist; very stiff; few black organic stains	Difficult drilling from about 540 to 541.5 feet bgs; possible shells or gravel
540											
541											
542											
543											
544											
545											Very difficult drilling from about 544 to 545 feet bgs; possible shells or gravel
546											
547											
548											
549											
550											
551											
552											
553											
554		UD 24	N/A	17.5 30						BEAUMONT; greenish gray (GLEY 1 10Y 6/1); CLAY (CH); moist	UD-24 sampled using Pitcher Tube sampler method
555											
556											
557											
558											
559	X	SS 7	9 16 20	19 18						BEAUMONT; greenish gray (GLEY 1 10Y 5/1); CLAY (CH); moist; hard; few calcareous nodules; trace ferrous staining; high plasticity; high	
560											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-305 DHA</b>
STP COL : 505D-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
560								CH	CH	toughness	
561								CH			
562								CH			
563								CH			
564								CH			
565								CH			
566								CH			
567								CH			
568								CH			
569								CH			
570								CH			
571								CH			
572								CH			
573								CH			
574								CH			
575								CH			
576								CH			
577								CH			
578								CH			
579	×	SS 8	3 9 18	22 18				CH		BEAUMONT; light yellowish brown (2.5Y 6/3); silt; CLAY (CH); moist; very stiff; some silt; some mottling	
580								CH			
581								CH			
582								CH			
583								CH			
584								CH			
585								CH			
586								CH			
587								CH			
588								CH			
589		UD 25	N/A	29 30		IP	IP/IP	CH		BEAUMONT; greenish gray (GLE Y 1 10Y 6/1); CLAY (CH); moist; mottled	Resonant Column-Torsional Shear
590								CH			
591								CH			
592								CH			
593								CH			
594								CH			
595								CH			
596								CH			
597								CH			
598								CH			
599	×	SS 9	9 15 22	17 18				CH		BEAUMONT; light greenish gray (GLE Y 1 10Y 7/1); CLAY (CH); moist; hard; mottled; few calcareous nodules	
600								CH			

Project Name : Job Number



**SOIL LOG - Boring No. B-305 DHA**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/18 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
600											Continued drilling from 600 to 618 feet bgs for Geophysical logging of B-305 DHA (No sampling from 600 to 618 feet bgs)
601											
602											
603											
604											
605											
606											
607											
608											
609											
610											
611											
612											
613											
614											
615											
616											
617											
618											Boring Terminated at 618 feet
619											
620											
621											
622											
623											
624											
625											
626											
627											
628											
629											
630											
631											
632											
633											
634											
635											
636											
637											
638											
639											
640											



Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-306</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 6 inch	Boring Location Unit 3 - Reactor Building N 363098.22 E 2943472.95	Total Depth 200 feet	
Drilling Contractor and Rig Miller / CME 750 ATV	Elevation at boring 27.78 feet	Ground Water Depth 18.5 feet	Depth to Bedrock
Sampling Method Split Spoon/UD	Sample Driving Hammer/Drop 138.2 lbs / 30 inches	No. of Samples 43	Date Started 12/27/06
	Borehole Inclination 0	Logged by G. Geras	Date Completed 12/31/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Alterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	11	18					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; sand; gravel; CLAY (CH); dry; firm; little silt; few gravel; few fine sand; mostly clay	
2	X	SS 2	7.5	18					CH	BEAUMONT; very dark gray (GLEY 1 3/N); silt; sand; gravel; CLAY (CH); dry; firm; little silt; trace fine sand; trace gravel; mostly clay	
3	X	SS 3	12	18					CH	BEAUMONT; very dark gray (GLEY 1 3/N); silt; CLAY (CH); dry; firm; little silt; mostly clay	
4	X	SS 4	13	18					CH	BEAUMONT; very dark gray (GLEY 1 3/N) with strong brown (7.5YR 5/6) mottling; silt; CLAY (CH); dry; firm; little silt; mostly clay	
5	X	SS 5	11	18					CH	BEAUMONT; very dark gray (GLEY 1 3/N) mottled with strong brown (7.5YR 5/6) and transitioning into only strong brown (7.5YR 5/6); silt; CLAY (CH); dry; stiff; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
6	X	SS 6	9	18					ML	BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); moist; firm; some clay; mostly silt; trace calcareous nodules; strong reaction with HCl	
7	X	SS 7	18	18					CH	BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); moist; firm; some clay; mostly silt	
8	X	SS 8	14	18					CH	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); dry; firm; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
9	X	SS 9	17	18					ML	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); dry; stiff; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
10	X	SS 10	18	18					ML	BEAUMONT; yellowish red (5YR 5/6) with slight light greenish gray (GLEY 1 10Y 7/1) mottling; clay; SILT (ML); moist; firm; some clay; mostly silt	
11											
12											
13											
14											
15											
16											
17											
18											
19	X	SS 11	4 10	11 18					SM	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); dry; firm; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	Water level at 18.5 feet BGS Switch to mud rotary drilling at 20 feet BGS
20											
21											
22											
23											
24	X	SS 12	6 11	9 18					SM	BEAUMONT; yellowish red (5YR 5/6); silt; SAND (SM); wet; very firm; some silt; mostly fine sand	
25											
26											
27											
28											
29	X	SS 13	2 12	13 18					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; gravel; SAND (SM); wet; firm; little silt; mostly fine sand; trace gravel	
30											
31											
32											
33											
34	X	SS 14	3 7	15 18					SP-SM	BEAUMONT; yellowish brown (10YR 5/4); silt; clay; gravel; SAND (SP-SM); wet; firm; few silt; mostly fine sand; trace gravel; trace clay in pockets	
35											
36											
37											
38											
39		UD 1	N/A	3 24					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM)	
40											

Project Name : Job Number 	SOIL LOG - Boring No. B-306
STP COL : 5050-06-0495	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow/8 inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM)	
41		UD 1A	N/A	4/24							
42											
43											
44	X	SS 15	7/11	12/18						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; firm; little silt; mostly fine sand	
45											
46											
47											
48											
49	X	SS 16	2/10	18/18					CH	BEAUMONT; greenish gray (GLE Y 1 10Y 6/1) with yellowish brown (10YR 5/4) mottling; sand; CLAY (CH); dry; stiff; some fine sand; mostly clay; trace calcareous nodules; strong reaction with HCl	
50											
51											
52											
53											
54	X	SS 17	1/10	18/18						BEAUMONT; yellowish red (5YR 5/6) with greenish gray (GLE Y 1 10Y 6/1) mottling; silt; sand; CLAY (CH); dry; stiff; few fine sand; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
55											
56											
57											
58											
59	X	SS 18	5/10	18/18						BEAUMONT; yellowish red (5YR 5/6) with slightly greenish gray (GLE Y 1 10Y 6/1) mottling; silt; sand; CLAY (CH); dry; very stiff; few fine sand; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
60											
61											
62											
63											
64		UD 2	N/A	28/24	23.8	49.5	20/2		SM	BEAUMONT; silt; SAND (SM)	
65											
66											
67											
68											
69	X	SS 19	4/15	18/18					SC	BEAUMONT; yellowish brown (10 YR 5/4); clay; SAND (SC); moist; very firm; some clay; few silt; mostly fine sand	
70											
71											
72											
73											
74		UD 3	N/A	24/24		IP	IP/IP			BEAUMONT; clay; SAND (SC)	
75											Resonant Column Torsional Shear
76											
77											
78											
79	X	SS 20	12/18	18/18					SP-SM	BEAUMONT; yellowish brown (10 YR 5/4); silt; SAND (SP-SM); moist; very firm; few silt; mostly	
80											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-306</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SP	fine sand	
81											
82											
83											
84	X	SS 21	6 13	18 18					CH	BEAUMONT; brown (7.5YR 4/4); silt; sand; CLAY (CH); dry; very stiff; few silt; few sand; mostly clay; trace calcareous nodules; strong reaction with HCl	
85											
86											
87											
88											
89		UD 4	N/A	24 24	22.7	98.6	57/38			BEAUMONT; sand; CLAY (CH)	
90											
91											
92											
93											
94	X	SS 22	5 12	18 18						BEAUMONT; dark grayish brown (10YR 4/2); silt; sand; CLAY (CH); dry; very stiff; trace fine sand; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
95											
96											
97											
98											
99		UD 5	N/A	12 24	24.4	6.0	NV/NP		SP-SM	BEAUMONT; silt; SAND (SP-SM)	
100											
101											
102											
103											
104		UD 6	N/A	23 24			IP/IP			BEAUMONT; silt; SAND (SP-SM)	Resonant Column Torsional Shear
105											
106											
107											
108											
109	X	SS 23	13 17 20	12 18						BEAUMONT; yellowish brown (10YR 5/4); silt; gravel; SAND (SP-SM); wet; dense; few silt; mostly sand; fine to medium sand; trace gravel	
110											
111											
112											
113											
114											
115											
116											
117											
118											
119		UD 7	N/A	28 24	25.2	99.4	54/33		GW	BEAUMONT; sand; GRAVEL (GW)	
120									CH	BEAUMONT; silt; CLAY (CH)	

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-306</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									CH		
121									CH		
122									CH		
123									CH		
124									CH		
125									CH		
126									CH		
127									CH		
128									CH		
129	X	SS 24	8 11	18 18					CH		
130									ML		BEAUMONT; strong brown (7.5YR 5/6); silt; sand; CLAY (CH); dry; very stiff; few fine sand; some silt; mostly clay
131									ML		BEAUMONT; strong brown (7.5YR 5/6); clay; sand; SILT (ML); wet; very stiff; little fine sand; little clay; mostly silt
132									ML		
133									ML		
134									ML		
135									ML		
136									ML		
137									ML		
138									ML		
139	X	SS 25	8 10 12	17 18					CH		BEAUMONT; light greenish gray (GLEYS 1 10Y 7/1) with yellowish red (5YR 5/6) mottling; silt; sand; CLAY (CH); dry; very stiff; few sand; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl
140									CH		BEAUMONT; silt; CLAY (CH)
141									CH		
142		UD 8	N/A	14 24					CH		
143									CH		
144									CH		
145									CH		
146									CH		
147									CH		
148									CH		
149	X	SS 26	8 13 20	18 18					CH		BEAUMONT; strong brown (7.5YR 5/6) with light greenish gray (GLEYS 1 10Y 7/1) mottling; sand; silt; CLAY (CH); dry; hard; little sand; few silt; mostly clay; trace calcareous nodules; strong reaction with HCl
150									CH		BEAUMONT; silt; CLAY (CH)
151									CH		
152		UD 9	N/A	9 24					CH		BEAUMONT; silt; CLAY (CH)
153									CH		
154		UD 9A	N/A	24 24					CH		BEAUMONT; silt; CLAY (CH)
155									ML		BEAUMONT; clay; SILT (ML)
156									ML		
157									ML		
158									ML		
159	X	SS 27	29 46 43	13 18					SM		BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); moist; very dense; little silt; mostly
160									SM		

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-306</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
160									SM	fine sand	
161											
162											
163											
164											
165											
166											
167											
168											
169	X	SS 28	21 29 28	12 18					ML		BEAUMONT; brown (7.5YR 5/4); sand; clay; SILT (ML); moist; hard; few clay; little fine sand; mostly silt
170											
171											
172											
173											
174											
175											
176											
177											
178											
179	X	SS 29	16 40 41	12 18							BEAUMONT; brown (7.5YR 5/2); sand; clay; SILT (ML); moist; hard; few clay; some fine sand; mostly silt
180											
181											
182											
183											
184											
185											
186											
187											
188											
189	X	SS 30	12 14 18	18 18					CH		BEAUMONT; brown (7.5YR 5/3); silt; sand; CLAY (CH); dry; hard; trace sand; little silt; mostly clay
190											
191											
192		UD 10	N/A	24							BEAUMONT; silt; CLAY (CH)
193											
194											
195											
196											
197											
198											
199	X	SS 31	6 10 9	18 18							BEAUMONT; olive gray (5Y 4/2) with greenish gray (GLE 1 5G 5/1) mottling; silt; CLAY (CH); dry;
200											

Project Name : Job Number <b>MACTEC</b> STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-306</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
200										very stiff; few silt; mostly clay Boring Terminated at 200-feet	
201											
202											
203											
204											
205											
206											
207											
208											
209											
210											
211											
212											
213											
214											
215											
216											
217											
218											
219											
220											
221											
222											
223											
224											
225											
226											
227											
228											
229											
230											
231											
232											
233											
234											
235											
236											
237											
238											
239											
240											

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-307</b>	
STP COL : 5050-06-0496		Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 4 inch		Boring Location Reactor Bldg. Unit #3 N 363196.58 E 2943269.07	Total Depth 200 feet
Drilling Contractor and Rig JEDI Drilling Contractor / CME 75		Elevation at boring 28.22 feet	Ground Water Depth 8 feet	Depth to Bedrock	
Sampling Method Split Spoon/JD		Sample Driving Hammer/Drop 138.1 lbs / 30 inches	No. of Samples 38	Date Started 12/13/06	
		Borehole Inclination 0	Logged by A. Osorio	Date Completed 12/15/06	

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0										Surface Grass (4")	
1	X	SS 1	10	7	18				CH	BEAUMONT; black (5Y 2.5/1); CLAY (CH); moist; stiff; high plasticity; with organics	
2	X	SS 2	10	10	18				CH	BEAUMONT; black (5Y 2.5/1); CLAY (CH); moist; firm; high plasticity; high toughness	
3	X	SS 3	17	17	18				CH	BEAUMONT; black (5Y 2.5/1) to brown (7.5YR 4/4); gravel; CLAY (CH); moist; stiff; high plasticity; fine gravel; calcareous nodules	
4	X	SS 4	19	19	18				CH	BEAUMONT; brown (7.5YR 4/3) with dark greenish gray (GLEYS 1 4/1) mottling; silt; CLAY (CH); moist; firm; some calcareous nodules	
5	X	SS 5	13	13	18				CL	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CL); moist; soft; fine gravel; medium plasticity; medium toughness	
6	X	SS 6	20.5	20.5	18				CL-ML	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CL); moist; soft; fine gravel; medium plasticity; medium toughness	Water level at 8 feet BGS
7	X	SS 7	16	16	18				CH	BEAUMONT; yellowish red (5YR 5/6); clay; SILT (CL-ML); moist; firm; medium plasticity; medium toughness	
8	X	SS 8	19	19	18				CH	BEAUMONT; yellowish red (5YR 5/6); CLAY (CH); moist; firm; high plasticity; high toughness	
9	X	SS 9	9	9	18				CH	BEAUMONT; yellowish red (5YR 5/6); CLAY (CH); moist; stiff; high plasticity; medium toughness; presence of some calcareous nodules	
10	X	SS 10	15.5	15.5	18				CH	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; firm; presence of some calcareous nodules	Switch to Rotary Wash drilling at 15 feet BGS
11											
12											
13											
14											
15											
16											
17											
18											
19	X	SS 11	14	14	18				SM	BEAUMONT; brown (7.5YR 4/3); silt; SAND (SM); moist; firm; low plasticity	
20											
21											
22											
23											
24	X	SS 12	8	8	18				SM	BEAUMONT; brown (7.5YR 4/3); silt; SAND (SM); moist; firm; low plasticity	
25											
26											
27											
28											
29	X	SS 13	14	14	18				SM	BEAUMONT; brown (7.5YR 4/3) with yellowish red (5YR 4/6) mottling; clay; silt; SAND (SM); moist; very firm	
30											
31											
32											
33											
34	X	SS 14	15	15	18				SM	BEAUMONT; brown (7.5YR 4/3); silt; SAND (SM); moist; dense	
35											
36											
37											
38											
39	X	SS 15	12	12	18				SM	BEAUMONT; brown (7.5YR 4/3); silt; SAND (SM); moist; very firm	
40											

Project Name : Job Number



**SOIL LOG - Boring No. B-307**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/B Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 16	20 15 21	15 18						BEAUMONT; brown (7.5YR 4/3); silt; SAND (SM); moist; dense	
45											
46											
47											
48											
49	X	SS 17	8 11 12	24 18					CH	BEAUMONT; greenish gray (GLEY 1, 6/1) with yellowish brown (10YR 5/8) mottling; CLAY (CH); moist; very stiff	
50											
51											
52											
53											
54	X	SS 18	8 10 12	24 18						BEAUMONT; greenish gray (GLEY 1, 6/1) with yellowish brown (10YR 5/8) mottling; sand; CLAY (CH); moist; very stiff; some sand; calcareous nodules; black roots	
55											
56											
57											
58											
59	X	SS 19	7 11 14	21 18						BEAUMONT; yellowish red (5YR 4/6) with greenish gray (GLEY 1 6/1) mottling; gravel; silt; CLAY (CH); moist; very stiff; few fine gravel; trace silt; calcareous nodules; black roots	
60											
61											
62											
63											
64	X	SS 20	7 10 11	21 18						BEAUMONT; strong brown (7.5YR 4/6) with greenish gray (GLEY 1 6/1) mottling; silt; CLAY (CH); moist; very stiff; trace silt; calcareous nodules	
65											
66											
67											
68											
69	X	SS 21	9 12 16	14 18					SM	BEAUMONT; dark yellowish brown (10YR 4/6); silt; SAND (SM); moist; very firm; low plasticity	
70											
71											
72											
73											
74	X	SS 22	16 17 20	12 18						BEAUMONT; dark yellowish brown (10YR 4/6); silt; SAND (SM); moist; dense; low plasticity	
75											
76											
77											
78											
79	X	SS 23	23 29 21	13 18						BEAUMONT; dark yellowish brown (10YR 4/6); silt; SAND (SM); moist; dense; low plasticity	
80											



Project Name : Job Number <div style="text-align: center;"> <b>MACTEC</b></div> STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-307</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SM		
81											
82											
83											
84	X	SS 24	17 27	12 18						BEAUMONT; brown (7.5YR 4/3); silt; SAND (SM); moist; very dense; trace of silt; non-plastic	
85			25								
86											
87											
88											
89	X	SS 25	7 11	18 18					CH	BEAUMONT; dark grayish brown (10YR 4/2); silt; CLAY (CH); moist; very stiff; trace of silt; high plasticity; high toughness	
90			13								
91											
92											
93											
94	X	SS 26	38 50/6"	12 18					SM	BEAUMONT; dark grayish brown (10YR 4/2); silt; SAND (SM); moist; very dense; non-plastic	
95											
96											
97											
98											
99	X	SS 27	40 45	12 18						BEAUMONT; dark grayish brown (10YR 4/2); silt; SAND (SM); moist; very dense; non-plastic	
100			39								
101											
102											
103											
104											
105											
106											
107											
108											
109	X	SS 28	20 25	10 18						BEAUMONT; dark grayish brown (10YR 4/2); silt; SAND (SM); moist; very dense; trace silt; non-plastic	
110			36								
111											
112											
113											
114											
115											
116											
117											
118											
119		UD 1	N/A	20.5 24					CH	BEAUMONT; dark grayish brown (10YR 4/2); CLAY (CH); moist; high plasticity	
120											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-307</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									CH		
121											
122											
123											
124											
125											
126											
127											
128											
129	X	SS 29	7 9 12	24 18							
130										BEAUMONT; yellowish red (5YR 5/6) with greenish gray (GLEY 1 6/1) mottling; silt; CLAY (CH); moist; very stiff; trace of silt; high plasticity; high toughness	
131											
132											
133											
134											
135											
136											
137											
138											
139	X	SS 30	12 14 16	18.5 18							
140										BEAUMONT; greenish gray (GLEY 1 6/1) with yellowish brown (10YR 5/8) mottling; CLAY (CH); dry; hard; calcareous nodules	
141											
142											
143											
144											
145											
146											
147											
148											
149	X	SS 31	23 50/5*	12 18					SM	BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SM); moist; very dense; low plasticity	
150											
151											
152											
153											
154		UD 2	N/A	9.5 24						BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SM); moist	
155											
156											
157											
158											
159	X	SS 32	21 26 32	17 18					ML	BEAUMONT; brown (7.5YR 4/4); gravel; clay; sand; SILT (ML); moist; hard; some gravel; trace	
160											

Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-307</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/ft inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
160									ML	clay	
161											
162											
163											
164											
165											
166											
167											
168											
169	X	SS 33	13 14 18	23.5 18					CH	BEAUMONT; yellowish red (5YR 4/6); CLAY (CH); moist; hard; high plasticity; high toughness; calcareous nodules	
170											
171											
172											
173											
174											
175											
176											
177											
178											
179	X	SS 34	11 15 16	25 18						BEAUMONT; strong brown (7.5YR 4/6) with greenish gray (GLY 1 6/1) mottling; CLAY (CH); moist; hard; high plasticity; high toughness; calcareous nodules	
180											
181											
182											
183											
184											
185											
186											
187											
188											
189		UD 3	N/A	24 24	21.9		49/30			BEAUMONT; strong brown (7.5YR 4/6) with greenish gray (GLY 1 6/1) mottling; silt; CLAY (CH) ; moist; some silt; high plasticity; high toughness; some silt	
190											
191											
192											
193											
194											
195											
196											
197											
198											
199	X	SS 35	13 16 28	17 18					SM	BEAUMONT; light brownish gray (2.5Y 6/2); silt; SAND (SM); moist; very dense; low plasticity; at	
200											

Project Name : Job Number



**SOIL LOG - Boring No. B-307**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
200											
201										the shoe, presence of greenish gray (GLEY 1 6/1), CLAY (CH)	
202										Boring Terminated at 200-feet	
203											
204											
205											
206											
207											
208											
209											
210											
211											
212											
213											
214											
215											
216											
217											
218											
219											
220											
221											
222											
223											
224											
225											
226											
227											
228											
229											
230											
231											
232											
233											
234											
235											
236											
237											
238											
239											
240											

Project Name : Job Number		<b>SOIL LOG - Boring No. B-308DH</b>	
STP COL : 5050-06-0496		<b>MACTEC</b>	
Type and Diameter of Boring Rotary Wash / 6 inch	Boring Location Unit 3 - Reactor Building N 363196.49 E 2943363.84	Total Depth 215 feet	
Drilling Contractor and Rig JEDI Drilling / CME 75	Elevation at boring 29.8 feet	Ground Water Depth 11 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 138.1 lbs / 30 inches	No. of Samples 37	Date Started 11/3/06
	Borehole Inclination 0	Logged by A. Osorio	Date Completed 11/8/06

Reviewed by / Date KAW 4/3/07

Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	12	18					CL	BEAUMONT; greenish black (GLEY 1 2.5/1); silt; CLAY(CL); moist; firm; medium plasticity; some silt	
2	X	SS 2	20	18					CH	BEAUMONT; greenish black (GLEY 1 2.5/1); silt; CLAY(CH); moist; stiff; medium plasticity; some silt	
3	X	SS 3	16.5	18					CL	BEAUMONT; greenish black (GLEY 1 2.5/1); silt; CLAY(CH); moist; stiff; medium plasticity; some silt	
4	X	SS 4	15.5	18					CL	BEAUMONT; greenish black (GLEY 1 2.5/1); silt; CLAY(CL); moist; stiff; medium plasticity; some silt	
5	X	SS 5	18	18					CL-ML	BEAUMONT; brown (10YR 4/3); silt; CLAY(CL-ML); moist; firm; medium plasticity; fine gravel	
6	X	SS 6	18	18					CL-ML	BEAUMONT; dark yellowish brown (10YR 4/6); gravel; silt; CLAY(CL-ML); moist; firm; medium plasticity	
7	X	SS 7	18	18					CL-ML	BEAUMONT; brown (7.5YR 4/4); silt; CLAY(CL-ML); wet; firm; medium plasticity; fine gravel	
8	X	SS 8	18	18					CL-ML	BEAUMONT; brown (7.5YR 4/4); silt; gravel; CLAY(CL-ML); wet; stiff; medium plasticity; trace fine gravel	
9	X	SS 9	15	18					ML	BEAUMONT; brown (7.5YR 4/4); silt; CLAY(CL-ML); wet; firm; medium plasticity	
10	X	SS 10	17	18					ML	BEAUMONT; brown (7.5YR 4/4); silt; CLAY(CL-ML); wet; soft; medium plasticity	
11	X	SS 11	14	18					SP-SM	BEAUMONT; strong brown (7.5YR 5/6); SILT (ML); wet; stiff; low plasticity	Water level at 11 feet BGS
12	X	SS 12	14	18					SP-SM	BEAUMONT; reddish yellow (7.5YR 6/6); SAND (SP-SM); wet; firm; non-plastic; poorly graded	
13	X	SS 13	11	17.5					SP-SM	BEAUMONT; reddish yellow (7.5YR 6/6); SAND (SP-SM); wet; very firm; non-plastic; poorly graded	
14	X	SS 14	12	16.5					SP-SM	BEAUMONT; yellowish red (5YR 4/6); SAND (SP-SM); moist; very dense; non-plastic; poorly graded	
15	X	SS 15	15	18					SP-SM	BEAUMONT; yellowish brown (10YR 5/8); SAND (SP-SM); wet; dense; non-plastic; poorly graded	

Project Name : Job Number



**SOIL LOG - Boring No. B-308DH**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SP-SM		
41											
42											
43											
44	X	SS 16	10.6	16.5	18					BEAUMONT; dark yellowish brown (10YR 4/6); SAND (SP-SM); moist; dense; non-plastic; poorly graded	
45											
46											
47											
48											
49	X	SS 17	13.9	12.5	18				CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; very stiff; medium plasticity	
50											
51											
52											
53											
54	X	SS 18	7.8	22	18					BEAUMONT; predominantly dark grayish brown (10YR 4/2) mixed with yellowish red (5YR 4/6); silt; CLAY (CH); moist; very stiff; medium plasticity	
55											
56											
57											
58											
59	X	SS 19	8.1	20.5	18					BEAUMONT; yellowish red (5YR 4/6) mixed with dark grayish brown (10YR 4/2); silt; CLAY (CH); moist to dry; very stiff; medium to high plasticity	
60											
61											
62											
63											
64	X	SS 20	6.9	21.5	18					BEAUMONT; dark yellowish brown (10YR 4/6); silt; CLAY (CH); moist; very stiff; medium plasticity; some calcareous nodules	
65											
66											
67											
68											
69	X	SS 21	8.1	12	18				SP-SM	BEAUMONT; dark yellowish brown (10YR 4/6); silt; CLAY (CH); moist; hard; medium plasticity; some calcareous nodules	
70										BEAUMONT; dark yellowish brown (10YR 4/6); SAND (SP-SM); moist; dense; non-plastic; poorly graded	
71											
72											
73											
74	X	SS 22	14	13.5	18					BEAUMONT; brownish yellow (10YR 6/6); SAND (SP-SM); moist; very firm; non-plastic; poorly graded	
75											
76											
77											
78											
79	X	SS 23	12	11	18					BEAUMONT; brown (10YR 4/3); SAND (SP-SM); moist; dense; non-plastic; poorly graded	
80											

Project Name : Job Number <div style="text-align: center; font-weight: bold; font-size: 1.2em;"> </div>	SOIL LOG - Boring No. B-308DH
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/ft Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
80										
81									SP-SM	
82										
83										
84	X	SS 24	19 34 42	15 18						BEAUMONT; brown (10YR 4/3); SAND (SP-SM); moist; very dense; non-plastic; poorly graded
85										
86										
87										
88										
89	X	SS 25	19 24 18	13 18						BEAUMONT; brown (10YR 4/3); SAND (SP-SM); moist; dense; non-plastic; poorly graded
90										
91										
92										
93										
94	X	SS 26	9 12 19	11 18					SP-SM	BEAUMONT; dark grayish brown (10YR 4/2); silt; gravel; SAND (SP-SM); moist; dense; no to low plasticity; poorly graded sand; trace silt; some fine gravel
95										
96										
97										
98										
99	X	SS 27	21 26 22	13.5 18						BEAUMONT; dark grayish brown (10YR 4/2); SAND (SP-SM); moist; dense; non-plastic; poorly graded sand
100										
101										
102										
103										
104										
105										
106										
107										
108										
109	X	SS 28	21 22 26	10.5 18						BEAUMONT; yellowish brown (10YR 5/6); SAND (SP-SM); moist; dense; non-plastic; medium grained; poorly graded
110										
111										
112										
113										
114										
115										
116										
117										
118										Slightly difficult drilling at 117 feet BGS
119	X	SS 29	8 13 14	18					CH	BEAUMONT; dark grayish brown (10YR 4/2) mixed with yellowish red (5YR 4/6); CLAY (CH); moist;
120										

Project Name : Job Number



**SOIL LOG - Boring No. B-308DH**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									CH	very stiff, medium plasticity	
121											
122											
123											
124											
125											
126											
127											
128											
129	X	SS 30	23 35 48	15 18					ML	BEAUMONT; dark yellowish brown (10YR 4/6); sand; SILT (ML); moist; hard; low plasticity; some fine sand	
130											
131											
132											
133											
134											
135											
136											
137											
138											
139	X	SS 31	12 16 23	18.5 18					CL	BEAUMONT; predominantly light greenish gray (GLEY 1 6/1) intermixed with yellowish red (5YR 4/6); silt; CLAY (CL); moist; hard; medium plasticity	
140											
141											
142											
143											
144											
145											
146											
147											
148											
149	X	SS 32	20 26 46	13 18					SP	BEAUMONT; brown (7.5YR 4/4) to gray (7.5YR 5/1); silt; gravel; SAND (SP); moist; very dense; no to low plasticity; poorly graded; fine sand; trace gravel; trace silt	
150											
151											
152											
153											
154											
155											
156											
157											
158											
159	X	SS 33	11 21 31	24 18					CL	BEAUMONT; dark yellowish brown (10YR 4/6) and greenish gray (GLEY 1 6/1); silt; CLAY (CL); moist;	
160											



Project Name : Job Number 	<b>SOIL LOG - Boring No. B-308DH</b>
STP.COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
160								CL	CL	hard; medium to high plasticity; calcareous nodules
161								CL		
162								CL		
163								CL		
164								CL		
165								CL		
166								CL		
167								CL		
168								CL		
169	X	SS 34	16	0				CL		No Recovery in Sample SS-34
170			16	18				CL	BEAUMONT; dark yellowish brown (10YR 4/6); silt; CLAY (CL); moist; very stiff; medium plasticity	
171								CL		
172								CL		
173								CL		
174								CL		
175								CL		
176								CL		
177								CL		
178								CL		
179	X	SS 35	9	0				CL		No Recovery in Sample SS-35
180			10	18				CL	BEAUMONT; dark yellowish brown (10YR 4/6); silt; CLAY (CL); moist; hard; medium plasticity	
181								CL		
182								CL		
183								CL		
184								CL		
185								CL		
186								CL		
187								CL		
188								CL		
189	X	SS 36	6	24				CH		BEAUMONT; dark brown (7.5YR 3/4); CLAY (CH); moist; very stiff; medium plasticity
190			10	18				CH		
191								CH		
192								CH		
193								CH		
194								CH		
195								CH		
196								CH		
197								CH		
198								CH		
199	X	SS 37	7	24				CH		BEAUMONT; dark greenish gray (GLE Y 1 4/1); CLAY (CH); moist; very stiff; medium plasticity
200			11	18				CH		

Project Name : Job Number



**SOIL LOG - Boring No. B-308DH**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/ft Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
200											
201										Continued drilling to 215 feet bgs for Geophysical logging of the hole	End SPT sampling at 200 feet bgs
202											
203											
204											
205											
206											
207											
208											
209											
210											
211										Boring Terminated at 215 feet	
212											
213											
214											
215											
216											
217											
218											
219											
220											
221											
222											
223											
224											
225											
226											
227											
228											
229											
230											
231											
232											
233											
234											
235											
236											
237											
238											
239											
240											


Project Name : Job Number		<b>SOIL LOG - Boring No. B-309</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 4 inch		Boring Location Unit 3 - Reactor Building N 363197.07 E 2943455.89	Total Depth 200 feet
Drilling Contractor and Rig JEDI Drilling / CME 75		Elevation at boring 26.62 feet	Ground Water Depth 7 feet
Sampling Method Split Spoon		Sample Driving Hammer/Drop 138.1 lbs / 30 Inches	No. of Samples 37
		Borshole Inclination 0	Logged by A. Osorio
			Date Started 11/13/06
			Date Completed 11/15/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	15	18					CH	BEAUMONT; dark greenish gray (GLEY 1 4/1) silt; CLAY (CH); moist; firm; medium plasticity; mostly clay	
2	X	SS 2	21	18	28.0	95.4	61/44		CH	BEAUMONT; dark greenish black (GLEY 1 2.5/1) silt; sand; CLAY (CH); moist; firm; medium plasticity; trace sand	
3	X	SS 3	23	18					CH	BEAUMONT; dark greenish black (GLEY 1 2.5/1); silt; CLAY (CH); moist; stiff; medium plasticity	
4	X	SS 4	22	18					CL	BEAUMONT; dark greenish black (GLEY 1 2.5/1); silt; CLAY (CH); moist; stiff; medium plasticity	
5	X	SS 5	22	18	27.2	97.3	43/26		CL	BEAUMONT; reddish brown (5YR 4/4); CLAY (CL); moist; stiff; medium plasticity; calcareous nodules	Water level at 7 feet BGS
6	X	SS 6	25	18					CL	BEAUMONT; reddish brown (5YR 4/4); sand; CLAY (CL); wet; firm; medium plasticity; trace sand	
7	X	SS 7	26	18					CL	BEAUMONT; reddish brown (5YR 4/4); CLAY (CL); wet; stiff; medium plasticity	
8	X	SS 8	21	18	27.0	99.8	75/53		CH	BEAUMONT; reddish brown (5YR 4/4); CLAY (CL); wet; stiff; medium plasticity	
9	X	SS 9	27	18					CL	BEAUMONT; reddish brown (5YR 4/4); CLAY (CH); wet; stiff; high plasticity	
10	X	SS 10	24	18	23.6	71.6			ML	BEAUMONT; reddish brown (5YR 4/4) with greenish gray mottling; CLAY (CL); wet; firm; medium plasticity	
11									ML	BEAUMONT; reddish brown (5YR 4/4) with greenish gray mottling; CLAY (CL); wet; firm; medium plasticity	
12									ML	BEAUMONT; brown (5YR 4/4); sand; SILT (ML); wet; firm; low plasticity	
13	X	SS 11	22	18	22.6	24.3			SM	BEAUMONT; brown (5YR 4/4); sand; SILT (ML); wet; firm; low plasticity	Switch to mud rotary drilling at 20 feet BGS
14									SM	BEAUMONT; strong brown (7.5YR 4/6); silt; SAND (SM); wet; firm; non-plastic; poorly graded	
15	X	SS 12	4.5	18					SM	BEAUMONT; strong brown (7.5YR 4/6); gravel; SAND (SM); wet; firm; non-plastic; poorly graded	
16									SM		
17									SM		
18									SM		
19	X	SS 13	13	18	24.8	8.6			SP-SM	BEAUMONT; strong brown (7.5YR 4/6); silt; SAND (SP-SM); wet; dense; non-plastic; poorly graded; few silt	
20									SP-SM		
21									SP-SM		
22									SP-SM		
23									SP-SM		
24	X	SS 14	16	18	13.5				SP-SM	BEAUMONT; strong brown (7.5YR 4/6); gravel; SAND (SP-SM); wet; dense; non-plastic; poorly graded	
25									SP-SM		
26									SP-SM		
27									SP-SM		
28									SP-SM		
29	X	SS 15	10	18	23.3	8.6			SP-SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SP-SM); wet; dense; non-plastic; poorly graded	
30									SP-SM		
31									SP-SM		
32									SP-SM		
33									SP-SM		
34									SP-SM		
35									SP-SM		
36									SP-SM		
37									SP-SM		
38									SP-SM		
39	X	SS 15	10	18	23.3	8.6			SP-SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SP-SM); wet; dense; non-plastic; poorly graded	
40									SP-SM		

Project Name : Job Number <div style="text-align: center; font-weight: bold; font-size: 1.2em;">                      MACTEC                 </div> STP COL : 5050-06-0496	SOIL LOG - Boring No. B-309
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow/ft inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40											
41									SP-SM		
42											
43											
44	X	SS 16	22 28 17	16 18	24.8	8.9					BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SP-SM); wet; dense; non-plastic; poorly graded; few silt
45											
46											
47											
48											
49	X	SS 17	7 9 11	23.5 18					CL		BEAUMONT; greenish gray (GLEYS 1, 5/1); sand; CLAY (CL); moist; very stiff; medium plasticity; strong reaction with HCl
50											
51											
52											
53											
54	X	SS 18	7 14 14	21 18	20.7	91.4	55/41		CH		BEAUMONT; yellowish brown (10YR 5/6); sand; CLAY (CH); moist; very stiff; high plasticity; strong reaction with HCl; calcareous nodules
55											
56											
57											
58											
59	X	SS 19	6 7 7	25.5 18					CL		BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CL); moist; stiff; medium plasticity
60											
61											
62											
63											
64	X	SS 20	9 15 13	9 18	23.4	39.2			SM		BEAUMONT; brown (7.5YR 4/4); silt; SAND (SM); wet; very firm; low plasticity; some silt
65											
66											
67											
68											
69	X	SS 21	26 41 43	15 18					SP		BEAUMONT; brown (7.5YR 4/4); SAND (SP); wet; very dense; non-plastic; poorly graded sand
70											
71											
72											
73											
74	X	SS 22	14 18 22	12.5 18	24.2	12.1			SM		BEAUMONT; dark yellowish brown (10YR 4/4); silt; SAND (SM); wet; dense; low plasticity; little silt
75											
76											
77											
78											
79	X	SS 23	22 28 35	14 18	20.6	8.1			SP-SM		BEAUMONT; brown (10YR 4/3); few; SAND (SP-SM); wet; very dense; non-plastic; poorly
80											

Project Name : Job Number  
  
 STP COL : 5050-06-0496

**SOIL LOG - Boring No. B-309**

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blowers Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SP-SM	graded sand; few silt	
81											
82											
83											
84	X	SS 24	30 30	16 18							BEAUMONT; brown (10YR 4/3); SAND (SP-SM); wet; very dense; non-plastic; poorly graded sand
85											
86											
87											
88											
89	X	SS 25	19 45 34	12 18	21.5	20.6			SM		BEAUMONT; brown (10YR 4/3); silt; SAND (SM); wet; very dense; non-plastic; poorly graded sand; little silt
90											
91											
92											
93											
94	X	SS 26	15 20 27	13.5 18					SP		BEAUMONT; dark grayish brown (10YR 4/2); silt; SAND (SP); moist; dense; non-plastic; mostly fine sand; some coarse sand; poorly graded sand; trace silt
95											
96											
97											
98											
99	X	SS 27	31 34 30	13.5 18	23.6	8.6			SP-SM		BEAUMONT; grayish brown (10YR 5/2) silt; SAND (SP-SM); moist; very dense; few silt
100											
101											
102											
103											
104											
105											
106											
107											
108											
109	X	SS 28	14 14 17	13 18	17.6	7.3					BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SP-SM); wet; dense; non-plastic; poorly graded sand; few silt
110											
111											
112											
113											
114											
115											
116											
117											
118											
119	X	SS 29	8 11 18	20 18	27.1	99.0	80/58		CH		BEAUMONT; yellowish red (5YR 4/6) and greenish gray (LEY 1 6/1); CLAY (CH); ; dry; very stiff;
120											

Project Name : Job Number



SOIL LOG - Boring No. B-309

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									CH	strong reaction with HCl; calcareous nodules	
121											
122											
123											
124											
125											
126											
127											
128											
129	X	SS 30	14 16 15	20 18	27.0				CL	BEAUMONT; strong brown (7.5YR 4/6); CLAY (CL); dry; hard; medium plasticity, calcareous nodules	
130											
131											
132											
133											
134											
135											
136											
137											
138											
139	X	SS 31	11 12 13	21 18	21.7	47/30			CL	BEAUMONT; greenish gray (GLEYS 1 6/1) and strong brown (7.5YR 5/6); sand; CLAY (CL); moist; very stiff; medium to high plasticity; trace sand	
140											
141											
142											
143											
144											
145											
146											
147											
148											
149	X	SS 32	10 14 16	22 18	23.3	66/46			CH	BEAUMONT; strong brown (7.5YR 5/6) and greenish gray (GLEYS 1 6/1); silt; CLAY (CH); moist; very stiff; high plasticity	
150											
151											
152											
153											
154											
155											
156											
157											
158											
159	X	SS 33	15 16 17	21 18	23.9 96.9	37/21			CL	BEAUMONT; strong brown (7.5YR 4/6) sand; silt; CLAY (CL); moist; hard; medium plasticity; trace	
160											

Project Name : Job Number



SOIL LOG - Boring No. B-309

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
160									CL	sand; mostly clay, some silt	
161											
162											
163											
164											
165											
166											
167											
168											
169	X	SS 34	10 15 16	26 18	25.7				CH	BEAUMONT; dark reddish brown (5YR 3/4) silt; CLAY (CH); dry; hard; high plasticity; mostly clay; trace silt; some calcareous nodules	
170											
171											
172											
173											
174											
175											
176											
177											
178											
179	X	SS 35	10 11 15	25 18	24.6	99.0	64/43			BEAUMONT; dark reddish brown (5YR 3/4) intermixed with greenish gray (GLEYS 1 6/1); silt; CLAY (CH); moist; very stiff; medium plasticity	
180											
181										BEAUMONT; dark reddish brown (5YR 3/4); silt; CLAY (CH); moist; very stiff; high plasticity; mostly clay, trace silt; strong reaction with HCl; calcareous nodules	
182											
183											
184											
185											
186											
187											
188											
189	X	SS 36	9 15 15	18	26.1		72/50			BEAUMONT; dark brown (7.5YR 3/4) silt; CLAY (CH); moist; very stiff; high plasticity	
190											
191											
192											
193											
194											
195											
196											
197											
198											
199	X	SS 37	10 11 14	18	31.8		68/49			BEAUMONT; dark greenish gray (GLEYS 1 4/1) silt; CLAY (CH); moist; very stiff; high plasticity	
200											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-309</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
200										Boring Terminated at 200 feet
201										
202										
203										
204										
205										
206										
207										
208										
209										
210										
211										
212										
213										
214										
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220										
221										
222										
223										
224										
225										
226										
227										
228										
229										
230										
231										
232										
233										
234										
235										
236										
237										
238										
239										
240										



Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-310</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 6 inch		Boring Location N 363283.7 E 2943265.5		Control Bay 200 feet	
Drilling Contractor and Rig JEDI Drilling Contractor / CME 75		Elevation at boring 28.23 feet		Ground Water Depth 6 feet	
Sampling Method Split Spoon		Sample Driving Hammer/Drop 138.1 lbs / 30 inches		No. of Samples 37	
		Borehole Inclination 0		Logged by A. Osorio	
				Date Started 12/15/06	
				Date Completed 12/17/06	

Reviewed by / Date kmw 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0										Surface grass	
1	X	SS 1	6	18						FILL: black (5Y 2.5/1); gravel; CLAY (CH); moist; stiff; roots; fine gravel	
2	X	SS 2	6.5	18						FILL: black (5Y 2.5/2); gravel; CLAY (CH); moist; firm; roots; fine gravel	
3	X	SS 3	18	18						FILL: dark gray (2.5Y 4/1); CLAY (CH); moist; stiff; calcareous nodules	
4	X	SS 4	17	18					CH	BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist; firm; high plasticity; trace silt; calcareous nodules; roots	
5	X	SS 5	4	18					CL-ML	BEAUMONT; strong brown (7.5YR 4/6); CLAY-SILT (CL-ML); wet; firm; medium plasticity; calcareous nodules	Water level at 6 feet BGS
6	X	SS 6	18	18						BEAUMONT; strong brown (7.5YR 4/6); gravel; CLAY-SILT (CL-ML); moist; stiff; fine gravel; medium toughness; calcareous nodules	
7	X	SS 7	18	18						BEAUMONT; strong brown (7.5YR 4/6); gravel; CLAY-SILT (CL-ML); moist; stiff; fine gravel; medium toughness; calcareous nodules	
8	X	SS 8	16.5	18					CH	BEAUMONT; strong brown (7.5YR 4/6); gravel; CLAY-SILT (CL-ML); moist; stiff; fine gravel; medium toughness; calcareous nodules	
9	X	SS 9	4	14.5						BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; trace silt; high toughness; calcareous nodules; roots	
10	X	SS 10	5	18					ML	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; trace silt; high toughness; calcareous nodules; roots	
11										BEAUMONT; strong brown (7.5YR 4/6); sand; SILT (ML); moist; firm; low plasticity; few calcareous nodules	Switched to rotary wash drilling at 15 feet bgs
12										BEAUMONT; strong brown (7.5YR 4/6); sand; SILT (ML); moist; firm; low plasticity; few calcareous nodules	
13	X	SS 11	4	14					SM	BEAUMONT; strong brown (7.5YR 4/6); silt; SAND (SM); moist; firm; low plasticity	
14										BEAUMONT; strong brown (7.5YR 4/6); silt; SAND (SM); moist; dense; low plasticity	
15										BEAUMONT; strong brown (7.5YR 4/6); silt; SAND (SM); moist; dense; low plasticity	
16										BEAUMONT; strong brown (7.5YR 4/6); silt; SAND (SM); moist; dense; low plasticity	
17										BEAUMONT; strong brown (7.5YR 4/6); silt; SAND (SM); moist; dense; low plasticity	
18										BEAUMONT; strong brown (7.5YR 4/6); silt; SAND (SM); moist; dense; low plasticity	
19										BEAUMONT; strong brown (7.5YR 4/6); silt; SAND (SM); moist; dense; low plasticity	
20										BEAUMONT; strong brown (7.5YR 4/6); silt; SAND (SM); moist; dense; low plasticity	
21										BEAUMONT; strong brown (7.5YR 4/6); silt; SAND (SM); moist; dense; low plasticity	
22										BEAUMONT; strong brown (7.5YR 4/6); silt; SAND (SM); moist; dense; low plasticity	
23										BEAUMONT; strong brown (7.5YR 4/6); silt; SAND (SM); moist; dense; low plasticity	
24	X	SS 12	4	14						BEAUMONT; strong brown (7.5YR 4/6); silt; SAND (SM); moist; dense; low plasticity	
25										BEAUMONT; strong brown (7.5YR 4/6); silt; SAND (SM); moist; dense; low plasticity	
26										BEAUMONT; strong brown (7.5YR 4/6); silt; SAND (SM); moist; dense; low plasticity	
27										BEAUMONT; strong brown (7.5YR 4/6); silt; SAND (SM); moist; dense; low plasticity	
28										BEAUMONT; strong brown (7.5YR 4/6); silt; SAND (SM); moist; dense; low plasticity	
29	X	SS 13	15	14.5						BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; dense; non-plastic	
30										BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; dense; non-plastic	
31										BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; dense; non-plastic	
32										BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; dense; non-plastic	
33										BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; dense; non-plastic	
34	X	SS 14	8	13.5						BEAUMONT; yellowish brown (10YR 5/6); silt; clay; SAND (SM); moist; dense; non-plastic; trace clay	
35										BEAUMONT; yellowish brown (10YR 5/6); silt; clay; SAND (SM); moist; dense; non-plastic; trace clay	
36										BEAUMONT; yellowish brown (10YR 5/6); silt; clay; SAND (SM); moist; dense; non-plastic; trace clay	
37										BEAUMONT; yellowish brown (10YR 5/6); silt; clay; SAND (SM); moist; dense; non-plastic; trace clay	
38										BEAUMONT; yellowish brown (10YR 5/6); silt; clay; SAND (SM); moist; dense; non-plastic; trace clay	
39	X	SS 15	12	18						BEAUMONT; brown (10YR 5/3); silt; SAND (SM); moist; dense; non-plastic	
40										BEAUMONT; brown (10YR 5/3); silt; SAND (SM); moist; dense; non-plastic	

Project Name : Job Number



**SOIL LOG - Boring No. B-310**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 16	8 10 12	23 18					CH	BEAUMONT; strong brown (7.5YR 4/6); gravel; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; some fine gravel; calcareous nodules	
45											
46											
47											
48											
49	X	SS 17	7 10	24.5 18						BEAUMONT; greenish gray (GLEYS 1 6/1) with yellowish brown mottling; CLAY (CH); dry; very stiff; high plasticity; calcareous nodules	
50											
51											
52											
53											
54	X	SS 18	7 8 11	26.5 18						BEAUMONT; strong brown (7.5YR 5/6) with greenish gray (GLEYS 1 6/1) mottling; gravel; sand; CLAY (CH); moist; very stiff; high plasticity; some sand; some fine gravel; calcareous nodules	
55											
56											
57											
58											
59	X	SS 19	11 11 14	24 18						BEAUMONT; strong brown (7.5YR 5/6); gravel; sand; CLAY (CH); moist; very stiff; high plasticity; some sand; some fine gravel; calcareous nodules; organics	
60											
61											
62											
63											
64	X	SS 20	6 8 10	22 18						BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH); moist; very stiff; high plasticity; calcareous nodules; few black roots	
65											
66											
67											
68											
69	X	SS 21	6 11 20	16.5 18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; dense; low plasticity	
70											
71											
72											
73											
74	X	SS 22	10 16 17	14 18						BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; dense; low plasticity	
75											
76											
77											
78											
79	X	SS 23	13 13 20	14.5 18						BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very dense; low plasticity	
80											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-310</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
80									SM	
81										
82										
83										
84	X	SS 24	15 18 25	10 18						BEAUMONT; brown (7.5YR 4/2); silt; SAND (SM); moist; dense; low plasticity
85										
86										
87										
88										
89	X	SS 25	33 45 29	15 18						BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SM); moist; very dense; non-plastic; trace silt
90										
91										
92										
93										
94	X	SS 26	7 15 21	12 18						BEAUMONT; grayish brown (10YR 5/2); clay; gravel; silt; SAND (SM); moist; dense; low plasticity; trace silt; trace clay; some gravel
95										
96										
97										
98										
99	X	SS 27	23 34 36	8.5 18						BEAUMONT; grayish brown (10YR 5/2); gravel; cobbles; silt; SAND (SM); moist; very dense; low plasticity; some silt; few gravel
100										
101										
102										
103										
104										
105										
106										
107										
108										
109	X	SS 28	11 17 17	10 18					SW-SM	BEAUMONT; brown (7.5YR 5/2); gravel; cobbles; silt; SAND (SW-SM); moist; dense; low plasticity; some fine gravel; few cobbles; trace silt
110										
111										
112										
113										
114										
115										
116										
117										
118										
119	X	SS 29	5 16	20.5 18					CH	BEAUMONT; light greenish gray (GLEYS 1 7/1); CLAY (CH); dry; very stiff; high plasticity; high
120										

Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-310</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									CH	toughness; calcareous nodules; organics	
121											
122											
123											
124											
125											
126											
127											
128											
129	X	SS 30	9.0 13	23.5 18						BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; some silt; calcareous nodules	
130											
131											
132											
133											
134											
135											
136											
137											
138											
139	X	SS 31	9 14 15	21 18						BEAUMONT; light greenish gray (GLE Y 1 7/1) with yellowish brown mottling; CLAY (CH); dry; very stiff; high plasticity; high toughness; calcareous nodules	
140											
141											
142											
143											
144											
145											
146											
147											
148											
149	X	SS 32	21 22 31	13 18					SM	BEAUMONT; light greenish gray (GLE Y 1 7/1) with yellowish brown mottling; CLAY (CH); dry; hard; high plasticity; high toughness; calcareous nodules	
150										BEAUMONT; greenish gray (GLE Y 1 6/1); clay; silt; SAND (SM); moist; very dense; low plasticity; trace clay	
151											
152											
153											
154											
155											
156											
157											
158											
159	X	SS 33	23 43 41	15.5 18						BEAUMONT; brown (10YR 5/3); clay; silt; SAND (SM); moist; very dense; low plasticity; trace clay	
160											

Project Name : Job Number



SOIL LOG - Boring No. B-310

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
160									SM		
161											
162											
163											
164											
165											
166											
167											
168											
169	X	SS 34	11 14 18	13 18					CH	BEAUMONT; brown (10YR 5/3); clay; silt SAND (SM); moist; dense; low plasticity; trace clay	
170										BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist; hard; high plasticity; high toughness; some silt	
171											
172											
173											
174											
175											
176											
177											
178											
179	X	SS 35	8 14 17	23 18						BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); moist; hard; high plasticity; high toughness; some silt; calcareous nodules; organics	
180											
181											
182											
183											
184											
185											
186											
187											
188											
189	X	SS 36	7 13 14	24 18						BEAUMONT; brown (7.5YR 5/4); gravel; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; trace fine gravel; some calcareous nodules	
190											
191											
192											
193											
194											
195											
196											
197											
198											
199	X	SS 37	10 10 11	16.5 18						BEAUMONT; greenish gray (GLEY 1 6/1) with some yellowish brown mottling; sand; CLAY (CH);	
200											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-310</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
200										moist; very stiff, high plasticity, high toughness; some calcareous nodules Boring Terminated at 200 feet
201										
202										
203										
204										
205										
206										
207										
208										
209										
210										
211										
212										
213										
214										
215										
216										
217										
218										
219										
220										
221										
222										
223										
224										
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226										
227										
228										
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230										
231										
232										
233										
234										
235										
236										
237										
238										
239										
240										

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-311</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Rotary Wash / 4 inch	Boring Location N 363286.55 E 2943363.47	Control Bay	Total Depth 100 feet
Drilling Contractor and Rig Lewis Drilling / Mobile B 57	Elevation at boring 29.86 feet	Ground Water Depth 18.5 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 139.58 lbs / 30 inches	No. of Samples 27	Date Started 12/11/06
	Borehole Inclination 0	Logged by G. Geras	Date Completed 12/12/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	3	8					SW	FILL; light yellowish brown (10YR 6/4); gravel; SAND (SW); dry; loose; some gravel; mostly fine sand; trace calcareous nodules; strong reaction with HCl	
2	X	SS 2	4	6					CH	BEAUMONT; black (GLEY 1 2.5/N) with light yellowish brown (10YR 6/4) mottling; gravel; CLAY (CH); dry; firm; little gravel; little sand; mostly clay	
3	X	SS 3	4	13						BEAUMONT; black (GLEY 1 2.5/N); gravel; silt; CLAY (CH); dry; firm; few gravel; few silt; mostly clay	
4	X	SS 4	4	14						BEAUMONT; black (GLEY 1 2.5/N) transitioning into yellowish brown (10YR 5/4); gravel; silt; CLAY (CH); dry; firm; few silt; few gravel; mostly clay	
5	X	SS 5	4	12						BEAUMONT; yellowish brown (10YR 5/6); gravel; silt; CLAY (CH); dry; firm; some silt; trace gravel; mostly clay	
6	X	SS 6	4	18					ML	BEAUMONT; yellowish brown (10YR 5/6); clay; gravel; SILT (ML); moist; soft; some clay; mostly silt; trace gravel	
7	X	SS 7	4	18						BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); moist; soft; some clay; mostly silt; trace calcareous nodules; strong reaction with HCl	
8	X	SS 8	4	17						BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); wet; firm; little clay; mostly silt	
9	X	SS 9	4	18					CH	BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH); dry; firm; some silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
10	X	SS 10	4	18						BEAUMONT; strong brown (7.5YR 5/6); sand; SILT (ML); wet; firm; little fine sand; mostly silt	
11	X	SS 11	4	18					ML	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; some silt; mostly fine sand	
12	X	SS 12	4	12					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; very firm; little silt; mostly fine sand	
13	X	SS 13	4	11						BEAUMONT; brown (7.5YR 5/4); clay; SAND (SC); moist; very firm; some clay; mostly fine sand	
14	X	SS 14	4	10							
15	X	SS 15	4	15					SC		

Water level at 18.5 feet BGS  
 Switch to mud rotary drilling at 25 feet BGS

Project Name : Job Number



**SOIL LOG - Boring No. B-311**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SC		
41											
42											
43											
44	X	SS 16	10	18					CH	BEAUMONT; yellowish red (5YR 4/6); sand; silt; CLAY (CH); dry; stiff; few fine sand; little silt; mostly clay	
45											
46											
47											
48											
49	X	SS 17	4	15						BEAUMONT; brown (10YR 5/3); sand; silt; CLAY (CH); dry; firm; few fine sand; little silt; mostly clay	
50											
51											
52											
53											
54	X	SS 18	6	18						BEAUMONT; greenish gray (GLEYS 1 5GY 6/1) with yellowish brown (10YR 5/4) mottling; sand; silt; CLAY (CH); dry; stiff; few fine sand; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
55											
56											
57											
58											
59	X	SS 19	5	15						BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; very stiff; few silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
60											
61											
62											
63											
64	X	SS 20	3	18						BEAUMONT; reddish brown (5YR 4/4) with greenish gray (GLEYS 1 10Y 6/1) mottling; silt; CLAY (CH); dry; stiff; some silt; mostly clay	
65											
66											
67											
68											
69	X	SS 21	7	15					SM	BEAUMONT; yellowish brown (10YR 5/4); clay; silt; SAND (SM); wet; very firm; few clay; some silt; mostly fine sand	
70											
71											
72											
73											
74	X	SS 22	16	12						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; little silt; mostly fine sand	
75											
76											
77											
78											
79	X	SS 23	8	12						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; little silt; mostly fine	
80											



Project Name : Job Number



SOIL LOG - Boring No. B-311

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SM	sand	
81											
82											
83											
84	X	SS 24	6 14 14	10 18					SP- SM		BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SP-SM); wet; very firm; few silt; mostly fine sand
85											
86											
87											
88											
89	X	SS 25	10 18 30	13 18							BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SP-SM); wet; dense; few silt; mostly fine sand
90											
91											
92											
93											
94	X	SS 26	11 11 12	13 18					SM		BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; little silt; mostly fine sand
95											
96											
97											
98											
99	X	SS 27	20 22 28	17 18							BEAUMONT; dark grayish brown (10YR 4/2); silt; SAND (SM); wet; dense; little silt; mostly fine sand
100											Boring Terminated at 100-feet
101											
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-312</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 4 inch		Boring Location N 363286.42 E 2943473.97		Control Bay	
Drilling Contractor and Rig MACTEC / RALEIGH / CME 45C		Elevation at boring 28.25 feet		Ground Water Depth 4.5 feet	
Sampling Method Split Spoon		Sample Driving Hammer/Drop 139.62 lbs / 30 inches		No. of Samples 27	
		Borehole Inclination 0		Logged by D. Tibbals	
		Reviewed by / Date <u>KAW 4/3/07</u>		Date Started 12/11/06	
		Reviewed by / Date <u>KAW 4/3/07</u>		Date Completed 12/11/06	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Alterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0	X	SS 1	4	8					CH	BEAUMONT; light gray (GLEY 1 7/N) and black (GLEY 1 2.5/N); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt; some roots and topsoil	
1	X	SS 2	4	15					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt; roots	
2	X	SS 3	4	13					CH	BEAUMONT; dark gray (GLEY 1 4/N); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	
3	X	SS 4	4	6					CH	BEAUMONT; greenish gray (GLEY 1 6/10Y); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; some silt	
4	X	SS 5	4	19					CH	BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; some silt	
5	X	SS 6	4	6					ML	BEAUMONT; red (2.5YR 4/6); clay; ; SILT (ML); wet; firm; high plasticity; low toughness; mostly silt; little clay	
6	X	SS 7	4	22					ML	BEAUMONT; red (2.5YR 4/6); clay; ; SILT (ML); wet; firm; high plasticity; low toughness; mostly silt; little clay	
7	X	SS 8	4	18					CH	BEAUMONT; reddish brown (2.5YR 4/4); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; some silt	
8	X	SS 9	4	24					CH	BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
9	X	SS 10	4	22					CH	BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
10											
11											
12											
13											
14											
15											
16											
17											
18											
19	X	SS 11	5	24					CH	BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	Water level at 4.5 feet BGS
20											
21											
22											
23											
24	X	SS 12	5	5					CH	BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; soft; high plasticity; high toughness; mostly clay; little silt	
25											
26											
27											
28											
29	X	SS 13	5	15					SM	BEAUMONT; red (2.5YR 4/6); silt; SAND (SM); wet; firm; mostly fine sand; some silt; poorly graded	
30											
31											
32											
33											
34	X	SS 14	7	10					SM	BEAUMONT; light reddish brown (2.5YR 6/4); silt; SAND (SM); wet; firm; mostly fine sand; some silt; poorly graded	
35											
36											
37											
38											
39	X	SS 15	8	17					SM	BEAUMONT; light brown (7.5YR 6/4); silt; SAND (SM); wet; very firm; mostly fine sand; little silt; poorly graded	
40											

Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-312</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 16	9 17	14 20							BEAUMONT; light brown (7.5YR 6/4); silt; SAND (SM); wet; dense; mostly fine sand; little silt; poorly graded
45											
46											
47											
48											
49	X	SS 17	4 9	24 18					CH		BEAUMONT; red (2.5YR 5/8); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt
50											
51											
52											
53											
54	X	SS 18	5 5	19 18					SM CH		BEAUMONT; light brown (7.5YR 6/3); silt; SAND (SM); wet; loose; mostly fine sand; little silt; poorly graded
55											BEAUMONT; light brown (7.5YR 6/3); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt
56											
57											
58											
59	X	SS 19	4 6	24 18							BEAUMONT; light brown (7.5YR 6/3); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt
60											
61											
62											
63											
64	X	SS 20	6 6	18 18					SC		BEAUMONT; light brown (7.5YR 6/3); clay; SAND (SC); wet; firm; mostly fine sand; little clay; poorly graded
65											
66											
67											
68											
69	X	SS 21	4 6	22 18					CH		BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt
70											
71											
72											
73											
74	X	SS 22	20 33 44	18 18					SP		BEAUMONT; light brown (7.5YR 6/3); silt; SAND (SP); wet; very dense; mostly fine sand; trace silt; poorly graded
75											
76											
77											
78											
79	X	SS 23	10 13 23	19 18							BEAUMONT; light brown (7.5YR 6/3); silt; SAND (SP); wet; dense; mostly fine sand; few silt; poorly graded
80											

Project Name : Job Number



**SOIL LOG - Boring No. B-312**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SP		
81											
82											
83											
84	X	SS 24	20 15/6	11 18							BEAUMONT; light brown (7.5YR 6/3); silt; SAND (SP); wet; very firm; mostly fine sand; few silt; poorly graded
85											
86											
87											
88											
89	X	SS 25	9 8/11	14 18							BEAUMONT; light brown (7.5YR 6/3); silt; SAND (SP); wet; firm; mostly fine sand; few silt; poorly graded
90											
91											
92											
93											
94	X	SS 26	9 8/6	19 18					SM		BEAUMONT; reddish gray (5YR 5/2); silt; SAND (SM); wet; firm; mostly fine sand; little silt; poorly graded
95											
96											
97											
98											
99	X	SS 27	18 14/26	15 18					SP		BEAUMONT; light brown (7.5YR 6/3); silt; SAND (SP); wet; very dense; mostly fine sand; trace silt; poorly graded
100											Boring Terminated at 100 feet
101											
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-313</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 3 inch	Boring Location N 363149.1 E 2943486.09	Control Bay 2943486.09	Total Depth 100 feet
Drilling Contractor and Rig MACTEC / Raleigh / CME 45C	Elevation at boring 28.15 feet	Ground Water Depth 12 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 139.62 lbs / 30 inches	No. of Samples 27	Date Started 11/17/06
	Borehole Inclination 0	Logged by D. Tibbals	Date Completed 11/18/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Alterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0									SC	FILL; strong brown (7.5YR 5/6); SAND (SC); moist; very loose; non-plastic; trace medium sand	
1	X	SS 1	3	8					CH	BEAUMONT; greenish black (GLEY 1 2.5/10Y); silt; CLAY (CH) moist; firm; high plasticity; high toughness; roots; organics	
2	X	SS 2	3	12					CH	BEAUMONT; greenish black (GLEY 1 2.5/10Y) with trace light brown mottling; silt; CLAY (CH) moist; firm; high plasticity; high toughness;	
3	X	SS 3	3	18					CH	BEAUMONT; greenish black (GLEY 1 2.5/1) with trace black mottling; silt; CLAY (CH) moist; stiff; high plasticity; high toughness; ferrous and calcareous nodules	
4	X	SS 4	3	18					CH	BEAUMONT; greenish black (GLEY 1 2.5/1) gradual change to olive gray (5Y 5/2) with black mottling; silt; CLAY (CH) moist; stiff; high plasticity; high toughness; ferrous nodules	
5	X	SS 5	3	19					CH	BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; iron nodules	
6	X	SS 6	3	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness	
7	X	SS 7	3	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness	
8	X	SS 8	3	18					CH	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); wet; stiff; high plasticity; high toughness; increase silt between 12 and 13 feet	
9	X	SS 9	3	25					CH	BEAUMONT; yellowish red (5YR 5/6) with gray mottling; silt; CLAY (CH); wet; stiff; high plasticity; high toughness; trace calcareous nodules	
10	X	SS 10	3	18					CH	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; non-plastic; fine sand; poorly graded	
11											
12											Water level at 12 feet BGS
13											
14											
15											Switch to Mud Rotary drilling at 15 feet BGS
16											
17											
18											
19	X	SS 11	3	0					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; non-plastic; mostly fine sand; little silt; trace medium sand; thin silt (ML) lens about 34.5 feet bgs	18.5 feet bgs- no recovery. soil sample SS-11
20											
21											
22											
23											
24	X	SS 12	3	15					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; non-plastic; mostly fine sand; little silt; trace medium sand; thin silt (ML) lens about 34.5 feet bgs	
25											
26											
27											
28											
29	X	SS 13	3	11					CH	BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH); wet; hard; high plasticity; high toughness	
30											
31											
32											
33											
34	X	SS 14	4	14					CH	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; non-plastic; mostly fine sand; little silt; trace medium sand; thin silt (ML) lens about 34.5 feet bgs	
35											
36											
37											
38											
39	X	SS 15	4	14					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; non-plastic; mostly fine sand; little	
40											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-313</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
40									SM	silt; poorly graded
41										
42										
43										
44	X	SS 16	18 24 22	17 18						BEAUMONT; light brown (7.5YR 6/3); silt; SAND (SM); dense; non-plastic; mostly fine sand; little silt; poorly graded
45										
46										
47										
48										
49	X	SS 17	2 4 6	23 18					CH	BEAUMONT; light greenish gray (GLEYS 1 7/1); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; calcareous nodules
50										
51										
52										
53										
54	X	SS 18	6 7 7	24 18						BEAUMONT; light greenish gray (GLEYS 1 7/1); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; calcareous nodules
55										
56										
57										
58										
59	X	SS 19	7 8 7	24 18						BEAUMONT; yellowish red (5YR 5/6) with light greenish gray mottling; silt; CLAY (CH); moist; stiff; high plasticity; high toughness; calcareous nodules
60										
61										
62										
63										
64	X	SS 20	5 10 6	24 18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); very stiff; high plasticity; high toughness; mostly clay; little sand
65										
66										
67										
68										
69	X	SS 21	4 10 15	17 18					CL	BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CL); wet; very stiff; low plasticity; medium toughness; mostly clay; little sand
70										
71										
72										
73										
74	X	SS 22	7 16 17	14 18					SM	BEAUMONT; yellowish red (5YR 5/6); silt; SAND (SM); moist; dense; non-plastic; mostly fine sand; trace medium sand
75										
76										
77										
78										
79	X	SS 23	4 11 17	12 18					SP	BEAUMONT; brown (7.5YR 5/2); silt; SAND (SP); moist; very firm; non-plastic; mostly fine sand; trace
80										

Project Name : Job Number



**SOIL LOG - Boring No. B-313**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SP	silt; trace medium sand; poorly graded	
81											
82											
83											
84	X	SS 24	4 15	12 18							
85										BEAUMONT; brown (7.5YR 5/2); silt; SAND (SP); moist; very firm; non-plastic; mostly fine sand; trace silt; trace medium sand; poorly graded	
86											
87											
88											
89	X	SS 25	4 9	20 18					CH		
90										BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
91											
92											
93											
94	X	SS 26	15 34	19 18					SM		
95										BEAUMONT; brown (7.5YR 4/4); silt; SAND (SM); moist; very dense; fine sand; mostly sand; little silt; poorly graded	
96											
97											
98											
99	X	SS 27	7 16	11 18							
100										BEAUMONT; brown (7.5YR 4/4); silt; SAND (SM); moist; dense; non-plastic; mostly fine sand; little silt; poorly graded	
101										Boring Terminated at 100 feet	
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-314</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Rotary Wash / 6 inch			Boring Location N 363148.73 E 2943617.01		Control Bay 200 feet
Drilling Contractor and Rig Miller / CME 750 ATV			Elevation at boring 29.18 feet	Ground Water Depth 18.5 feet	Depth to Bedrock
Sampling Method Split Spoon/UD			Sample Driving Hammer/Drop 138.2 lbs / 30 inches	No. of Samples 43	Date Started 12/31/06
			Borehole Inclination 0	Logged by G. Geras	Date Completed 1/4/07

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0									CL	FILL: yellowish red (5YR 5/6); silt; CLAY (CL); moist; stiff, low to medium plasticity; low toughness; some silt; mostly clay; few fine to coarse sand	
1	X	SS 1	13	18					CH	BEAUMONT; black (GLEY 1 2.5/N) with yellowish red (5YR 5/6) and greenish gray (GLEY 1 10Y 6/1) mottling; silt; CLAY (CH); dry, firm; few silt; mostly clay	
2	X	SS 2	14	18							
3	X	SS 3	14	18							
4	X	SS 4	13	18							
5	X	SS 4	13	18							
6	X	SS 5	10	18							
7	X	SS 5	10	18							
8	X	SS 6	12	18							
9	X	SS 6	12	18							
10	X	SS 7	13	18							
11	X	SS 8	14	18							
12	X	SS 8	14	18							
13	X	SS 9	16	18							
14	X	SS 9	16	18							
15	X	SS 10	17	18							
16											
17											
18											
19	X	SS 11	18	18					SM	BEAUMONT; yellowish red (5YR 4/6) with very slight light greenish gray (GLEY 1 10Y 7/1) mottling; silt; CLAY (CH); dry, stiff; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	Water level at 18.5 feet BGS Switch to mud rotary drilling at 20 feet BGS
20											
21											
22											
23											
24	X	SS 12	6 13 17	15 18							
25											
26											
27											
28											
29	X	SS 13	5 10 19	12 18							
30											
31											
32											
33											
34	X	SS 14	8 13 12	17 18							
35											
36											
37											
38											
39	X	SS 15	8 10	18 18					CH SM	BEAUMONT; strong brown (7.5YR 5/6); silt; sand; CLAY (CH); dry, very stiff, some fine sand; few silt;	
40											



Project Name : Job Number



SOIL LOG - Boring No. B-314

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM	mostly clay	
41									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; firm; little silt; mostly fine sand	
42									SM		
43									SM		
44	X	SS 16	10 15	18 18					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; little silt; mostly fine sand	
45									SM		
46									SM		
47									SM		
48									SM		
49	X	SS 17	10 10	18 18					CH	BEAUMONT; yellowish red (5YR 5/6) with greenish gray (GLEYS 10Y 6/1) and yellowish brown (10YR 5/4) mottling; silt; CLAY (CH); dry; stiff; little silt; mostly clay	
50									CH		
51									CH		
52									CH		
53									CH		
54	X	SS 18	8 10	18 18					CH	BEAUMONT; light greenish gray (GLEYS 1 5GY 7/1) with strong brown (7.5YR 5/6) mottling; silt; sand; CLAY (CH); dry; stiff; few sand; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
55									CH		
56									CH		
57									CH		
58									CH		
59	X	SS 19	8 10	18 18					CH	BEAUMONT; yellowish red (5YR 5/6) with light greenish gray (GLEYS 1 5GY 7/1) mottling; silt; sand; CLAY (CH); dry; very stiff; trace sand; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
60									CH		
61									CH		
62									CH		
63									CH		
64	X	SS 20	8 11 8	18 18					CH	BEAUMONT; strong brown (7.5YR 4/6) with light greenish gray (GLEYS 1 5GY 7/1) mottling; silt; CLAY (CH); dry; very stiff; some silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
65									CH		
66									CH		
67									CH		
68									CH		
69	X	SS 21	12 8 10	15 18					SM	BEAUMONT; dark yellowish brown (10YR 4/6); silt; SAND (SM); wet; firm; little silt; mostly fine sand	
70									SM		
71									SM		
72									SM		
73									SM		
74	X	SS 22	11 11 15	17 18					SM	BEAUMONT; dark yellowish brown (10YR 4/6); silt; SAND (SM); wet; very firm; little silt; mostly fine sand	
75									SM		
76									SM		
77									SM		
78									SM		
79	X	SS 23	9 10 9	14 18					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; firm; little silt; mostly fine sand	
80									SM		

Project Name : Job Number <div style="text-align: center;"> <b>MACTEC</b></div> STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-314</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SM		
81											
82											
83											
84		UD 1	N/A	14/24	20.9	4.4	NV/NP		SP	BEAUMONT: silt; SAND (SP)	
85											
86											
87											
88											
89	X	SS 24	9 13 19	13 18					SP-SM	BEAUMONT: yellowish brown (10YR 5/4); silt; SAND (SP-SM); wet; dense; few silt; mostly fine sand	
90											
91											
92											
93											
94	X	SS 25	11 11 15	14 18					SM CH	BEAUMONT: yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; little silt; mostly fine sand	
95											
96										BEAUMONT; dark grayish brown (10YR 4/2); sand; CLAY (CH); dry; very stiff; little fine sand; mostly clay	
97											
98											
99	X	SS 26	16 22 17	14 18					SM	BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SM); moist; dense; little silt; mostly fine sand	
100											
101											
102											
103											
104											
105											
106											
107											
108											
109	X	SS 27	16 25 24	12 18					SP	BEAUMONT; brown (10YR 5/3); silt; SAND (SP); moist; dense; trace silt; mostly fine to medium sand	
110											
111											
112											
113											
114		UD 2	N/A	17/24	20.0	96.9	38/13		CL	BEAUMONT; sand; CLAY (CL)	
115											
116											
117											
118											
119	X	SS 28	7 10 11	16.5 18					CH	BEAUMONT; light greenish gray (GLEYS 1 5GY 8/1) with yellowish red (5YR 5/6) mottling; silt; sand;	
120											

Project Name : Job Number <div style="text-align: center;"> <b>MACTEC</b></div> STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-314</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									CH	CLAY (CH); dry; very stiff; few fine sand; little silt; mostly clay	
121											
122		UD 3	N/A	25 24	19.5					BEAUMONT; silt; CLAY (CH)	
123											
124											
125											
126											
127											
128											
129	X	SS 29	22 19 36 39	12 18					ML	BEAUMONT; light greenish gray (GLEYS 1 10Y 7/1) with strong brown (7.5YR 5/6) mottling; clay; SILT. (ML); dry; hard; some clay; mostly silt; trace calcareous nodules; strong reaction with HCl	
130											
131											
132											
133											
134											
135											
136											
137											
138											
139	X	SS 30	10 10	16 18					CH	BEAUMONT; light greenish gray (GLEYS 1 10Y 7/1); sand; silt; CLAY (CH); dry; very stiff; few silt; little fine sand; mostly clay	
140											
141											
142		UD 4	N/A	26 24	24.2	27.5	46/31		SC CL	BEAUMONT; clay; SAND (SC) BEAUMONT; silt; CLAY (CL)	
143											
144											
145											
146											
147											
148											
149	X	SS 31	13 25 36	11 18					SM	BEAUMONT; light greenish gray (GLEYS 1 5GY 7/1) with yellowish brown (10YR 5/4) mottling; silt; clay; SAND (SM); moist; very dense; few clay; some silt; mostly fine sand	
150											
151											
152											
153											
154											
155											
156											
157											
158											
159	X	SS 32	48 44 45	14 18						BEAUMONT; light yellowish brown (10YR 6/4); silt; SAND (SM); wet; very dense; little silt; mostly fine	
160											

Project Name : Job Number



SOIL LOG - Boring No. B-314

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
160									SM	sand	
161											
162											
163											
164											
165											
166											
167											
168											
169	X	SS 33	9 16	16 14	18 18				CL	BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY(CL); dry; very stiff; medium plasticity; some silt; mostly clay; interbedded laminae of silt and clay	
170											
171											
172											
173											
174											
175											
176											
177											
178											
179	X	SS 34	10 11	18 13	18 18				CH	BEAUMONT; brown (7.5YR 5/4); silt; sand; CLAY (CH); dry; very stiff; few fine sand; some silt; mostly clay	
180											
181											
182		UD 5	N/A		0 24						
183											
184		UD 5A	N/A		26 24	20.3	98.7	72/48		BEAUMONT; silt; CLAY (CH)	
185											
186											
187											
188											
189	X	SS 35	9 10	18 12	18 18					BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); dry; very stiff; few silt; mostly clay	
190											
191											
192		UD 6	N/A		27 24	26.5	93.4	64/40		BEAUMONT; silt; CLAY (CH)	
193											
194											
195											
196											
197											
198											
199	X	SS 36	10 10	18 18	18 18					BEAUMONT; dark greenish gray (GLEY 1 5GY 4/1) transitioning to very dark gray (GLEY 1 3/N);	
200											

Project Name : Job Number STP COL : 5050-06-0496	<b>MACTEC</b> <b>SOIL LOG - Boring No. B-314</b>
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Depth (feet)	Sample	Sample Type & No.	Unconnected Blows/8 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Remarks
200									silt; CLAY (CH); dry; very stiff; few silt; mostly clay; trace gastropods Boring Terminated at 200-feet
201									
202									
203									
204									
205									
206									
207									
208									
209									
210									
211									
212									
213									
214									
215									
216									
217									
218									
219									
220									
221									
222									
223									
224									
225									
226									
227									
228									
229									
230									
231									
232									
233									
234									
235									
236									
237									
238									
239									
240									

Project Name : Job Number		<b>SOIL LOG - Boring No. B-315</b>	
STP COL : 5050-06-0496		<b>MACTEC</b>	
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 4 inch	Boring Location N 363366.12 E 2943511.58	Control Bay	Total Depth 150 feet
Drilling Contractor and Rig JEDI Drilling Contractor / CME 75	Elevation at boring 27.72 feet	Ground Water Depth 9.5 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 138.1lbs / 30 inches	No. of Samples 32	Date Started 1/6/07
	Borehole Inclination 0	Logged by A. Osorio	Date Completed 1/7/07

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0										Surface Grass	
1	X	SS 1	22.5	18					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); moist; firm; high plasticity; high toughness	
2	X	SS 2	16	18					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; presence of some roots	
3	X	SS 3	18	18					CH	BEAUMONT; greenish black (GLEY 1 2.5/1); silt; CLAY (CH); moist; stiff; high plasticity; high toughness	
4	X	SS 4	18	18					CH	BEAUMONT; greenish black (GLEY 1 2.5/1) transitioning into yellowish brown (10YR 5/8); silt; gravel; CLAY (CH); moist; stiff; presence of fine gravel; roots	
5	X	SS 5	18	18					CH	BEAUMONT; dark yellowish brown (10YR 5/8) with greenish black mottling; silt; gravel; CLAY (CH); moist; firm; high plasticity; high toughness; presence of gravel	
6	X	SS 6	14	18					ML	BEAUMONT; yellowish red (5YR 4/6); sand; SILT (ML); moist; firm; low plasticity; presence of some calcareous nodules	
7	X	SS 7	18	18					CH	BEAUMONT; yellowish red (5YR 4/6); sand; SILT (ML); wet; firm; low plasticity	
8	X	SS 8	18	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); wet; firm; high plasticity; high toughness	
9	X	SS 9	13.5	18					CH	BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; presence of calcareous nodules	
10	X	SS 10	18	18					CH	BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; presence of calcareous nodules; black roots	
11	X	SS 11	17	18					SM	BEAUMONT; reddish brown (5YR 4/4) with greenish gray (GLEY 1 6/1) mottling; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; presence of calcareous nodules; black roots	
12	X	SS 12	10	12					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; firm; non-plastic; some silt; few calcareous nodules	
13	X	SS 13	14	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; non-plastic; some silt; few calcareous nodules	
14	X	SS 14	16	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; non-plastic; some silt; few calcareous nodules	
15	X	SS 15	10	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; non-plastic; some silt	
16	X	SS 16	17	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; non-plastic; some silt	
17	X	SS 17	11	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; non-plastic; some silt	
18	X	SS 18	12	15					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; non-plastic; some silt	
19	X	SS 19	13	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; non-plastic; some silt	
20	X	SS 20	16	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; non-plastic; some silt	
21	X	SS 21	12	15					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; non-plastic; some silt	
22	X	SS 22	13	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; non-plastic; some silt	
23	X	SS 23	16	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; non-plastic; some silt	
24	X	SS 24	10	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; non-plastic; some silt	
25	X	SS 25	17	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; non-plastic; some silt	
26	X	SS 26	11	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; non-plastic; some silt	
27	X	SS 27	12	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; non-plastic; some silt	
28	X	SS 28	13	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; non-plastic; some silt	
29	X	SS 29	16	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; non-plastic; some silt	
30	X	SS 30	10	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; non-plastic; some silt	
31	X	SS 31	17	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; non-plastic; some silt	
32	X	SS 32	11	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; non-plastic; some silt	
33	X	SS 33	12	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; non-plastic; some silt	
34	X	SS 34	13	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; non-plastic; some silt	
35	X	SS 35	16	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; non-plastic; some silt	
36	X	SS 36	10	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; non-plastic; some silt	
37	X	SS 37	17	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; non-plastic; some silt	
38	X	SS 38	11	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; non-plastic; some silt	
39	X	SS 39	12	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; non-plastic; some silt	
40	X	SS 40	7	23					CH	BEAUMONT; reddish brown (5YR 5/4); silt; sand; CLAY (CH); moist; very stiff; high plasticity; high	

Water level at 9.5 feet BGS  
 Switch to mud rotary drilling at 15 feet BGS

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-315</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Alterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									CH	toughness; sand; some silt	
41											
42											
43											
44	X	SS 16	13	16					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; firm; non-plastic; some silt	
45											
46											
47											
48											
49	X	SS 17	6 10	27 18					CH	BEAUMONT; greenish gray (GLEYS 1 5/1); silt; gravel; CLAY (CH); moist; very stiff; high plasticity; high toughness; calcareous nodules; few fine gravel	
50											
51											
52											
53											
54	X	SS 18	6 10	23.5 18						BEAUMONT; greenish gray (GLEYS 1 5/1) with reddish brown (5YR 5/4) mottling; silt; gravel; CLAY (CH); moist; very stiff; high plasticity; high toughness; calcareous nodules; few fine gravel	
55											
56											
57											
58											
59	X	SS 19	5 6	23 18						BEAUMONT; strong brown (7.5YR 4/6); silt; sand; CLAY (CH); moist; stiff; high plasticity; high toughness; some calcareous nodules; pockets/mixed of silt and sand; some silt	
60											
61											
62											
63											
64	X	SS 20	7 15	16.5 18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; non-plastic; some silt	
65											
66											
67											
68											
69	X	SS 21	13 27	19 18						BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; dense; non-plastic; some silt	
70											
71											
72											
73											
74	X	SS 22	15 10	14 18						BEAUMONT; brown (7.5YR 5/4) transitioning into grayish brown; silt; SAND (SM); moist; very firm; non-plastic; some silt	
75											
76											
77											
78											
79	X	SS 23	10 16	16 18						BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; non-plastic; some silt	
80											

Project Name : Job Number



**SOIL LOG - Boring No. B-315**

STP COL : 5050-05-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
80									SM	
81										
82										
83										
84	X	SS 24	11 16 28	14 18						BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; dense; non-plastic; few silt
85										
86										
87										
88										
89	X	SS 25	17 22 22	14 18						BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; dense; non-plastic; few silt
90										
91										
92										
93										
94	X	SS 26	10 14 18	18 18						BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SM); moist; dense; non-plastic; some silt
95										
96										
97										
98										
99	X	SS 27	7 8 10	22.5 18					CH	BEAUMONT; brown (10YR 5/2); silt; sand; gravel; CLAY (CH); moist; very stiff; high plasticity; high toughness; trace of sand; gravel; calcareous nodules
100										
101										
102										
103										
104										
105										
106										
107										
108										
109	X	SS 28	11 26 34	11 18					SP	BEAUMONT; brown (7.5YR 5/2); silt; SAND (SP); moist; very dense; non-plastic; trace silt; poorly graded sand; few calcareous nodules
110										
111										
112										
113										
114										
115										
116										
117										
118										
119	X	SS 29	9 13 17	22.5 18					CH	BEAUMONT; yellowish red (5YR 5/6) with greenish gray (GLEYS 1 6/1) mottling; silt; CLAY (CH); moist;
120										



Project Name : Job Number 	<b>SOIL LOG - Boring No. B-315</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									CH	very stiff, few calcareous nodules; black roots	
121											
122											
123											
124											
125											
126											
127											
128											
129	X	SS 30	17 19 22	16 18						BEAUMONT; yellowish red (5YR 5/6) with greenish gray (GLEYS 1 6/1) mottling; silt; CLAY (CH); moist; hard; high plasticity; high toughness	
130											
131											
132											
133											
134											
135											
136											
137											
138											
139	X	SS 31	11 13 22	21 18						BEAUMONT; greenish gray (GLEYS 1 6/1) with yellowish brown mottling; silt; CLAY (CH); moist; hard; high plasticity; high toughness; trace silt	
140											
141											
142											
143											
144											
145											
146											
147											
148											
149	X	SS 32	24 23 22	15.5 18					SM	BEAUMONT; brown (7.5YR 5/2); silt; SAND (SM); moist; very dense; non-plastic; some silt	
150										Boring Terminated at 150-feet	
151											
152											
153											
154											
155											
156											
157											
158											
159											
160											

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-316</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Rotary Wash / 6 inch		Boring Location N 363304.98 E 2943617.51		Control Bay Total Depth 200 feet	
Drilling Contractor and Rig Miller / CME 750 ATV		Elevation at boring 28.9 feet		Ground Water Depth 23.5 feet	
Sampling Method Split Spoon		Sample Driving Hammer/Drop 138.2 lbs / 30 inches		No. of Samples 37	
		Borehole Inclination 0		Date Started 1/5/07	
		Logged by G. Geras		Date Completed 1/8/07	

Reviewed by / Date Wm 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/B inches	Recovery (inches)	Water Content	Grain Size	Alterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0									SW	FILL: light yellowish brown (10YR 6/4); gravel; SAND (SW); moist; loose; trace organics; some gravel; mostly fine to medium sand	
1	X	SS 1	10	5	18				CH	FILL: black (GLEYS 1 2.5/N); silt; CLAY (CH); dry; firm; little silt; mostly clay	
2	X	SS 2	10	11	18				CH	BEAUMONT; black (GLEYS 1 2.5/N); silt; CLAY (CH); dry; stiff; mostly clay; little silt	
3	X	SS 3	10	13	18				CH	BEAUMONT; dark gray (GLEYS 1 4/N) with light yellowish brown (10YR 6/4) mottling; silt; gravel; CLAY (CH); dry; very stiff; little silt; mostly clay; trace gravel; trace ferrous nodules	
4	X	SS 4	10	12	18				CH	BEAUMONT; gray (GLEYS 1 6/N) with yellowish brown (10YR 5/4) mottling; silt; gravel; CLAY (CH); dry; firm; little silt; mostly clay; trace gravel; trace organics (roots)	
5	X	SS 5	10	15	18				ML	BEAUMONT; brown (10YR 5/3); silt; gravel; CLAY (CH); dry; stiff; some silt; mostly clay; trace gravel	
6	X	SS 6	10	16	18				CH	BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CH); dry; soft; some silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
7	X	SS 7	10	16	18				CH	BEAUMONT; brown (7.5YR 5/4); clay; SILT (ML); dry; soft; some clay; mostly silt; trace calcareous nodules; strong reaction with HCl	
8	X	SS 8	10	16	18				CH	BEAUMONT; brown (7.5YR 5/4); clay; SILT (ML); wet; firm; some clay; mostly silt	
9	X	SS 9	10	16	18				CH	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); dry; firm; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
10	X	SS 10	10	11	18				ML	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); dry; very stiff; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
11	X	SS 11	10	18	18				ML	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); dry; stiff; little silt; mostly clay	
12	X	SS 12	10	15	18				SM	BEAUMONT; yellowish red (5YR 5/6) with very slight mottling of light greenish gray (GLEYS 1 10Y 7/1); clay; SILT (ML); moist; stiff; some clay; mostly silt	Water level at 23.5 feet BGS Switch to mud rotary drilling at 25 feet BGS
13	X	SS 13	10	14	18				SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; loose; little silt; mostly fine sand	
14	X	SS 14	10	14	18				SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); moist; firm; few clay; little silt; mostly sand	
15	X	SS 15	10	8.5	18				SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; little silt; mostly sand	

Project Name : Job Number STP COL : 5050-06-0495	<b>SOIL LOG - Boring No. B-316</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/ft Inches	Recovery (inches)	Water Content	Grain Size	Alterberg Limits	Lithology	Soil Type (USCS)	Remarks
40									SM	
41										
42										
43										
44	X	SS 16	5 15	18 18					CH	BEAUMONT; yellowish red (5YR 5/6); silt; sand; CLAY (CH); dry; very stiff; few fine sand; some silt; mostly clay
45									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; little silt; mostly fine sand
46										
47										
48										
49	X	SS 17	2 4 5	18 18					CH	BEAUMONT; yellowish red (5YR 5/6) transitioning into greenish gray (GLEY 1 10Y 7/1) mottling with yellowish brown (10YR 5/6); silt; sand; CLAY (CH); dry; stiff; few fine sand; little silt; mostly clay
50										
51										
52										
53										
54	X	SS 18	5 10	18 18						BEAUMONT; light greenish gray (GLEY 1 10Y 7/1) with yellowish brown (10YR 5/6) mottling; silt; sand; CLAY (CH); dry; very stiff; few fine sand; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl
55										
56										
57										
58										
59	X	SS 19	6 10 13	18 18						BEAUMONT; yellowish red (5YR 5/6) with greenish gray (GLEY 1 10Y 7/1) mottling; silt; CLAY (CH); dry; very stiff; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl
60										
61										
62										
63										
64	X	SS 20	6 10	18 18						BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); dry; very stiff; little silt; mostly clay
65										
66										
67										
68										
69	X	SS 21	6 10 14	17 18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; some silt; mostly fine sand
70										
71										
72										
73										
74	X	SS 22	6 20 14	18						BEAUMONT; yellowish brown (10YR 5/4) silt; SAND (SM); wet; dense; little silt; mostly fine sand
75										
76										
77										
78										
79	X	SS 23	6 10 14	15.5 18					SP-SM	BEAUMONT; yellowish brown (10YR 5/4) silt; SAND (SP-SM); wet; firm; few silt; mostly fine sand
80										

Project Name : Job Number



**SOIL LOG - Boring No. B-316**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SP-SM		
81									SP-SM		
82									SP-SM		
83									SP-SM		
84	X	SS 24	6	18					CH	BEAUMONT; yellowish brown (10YR 5/4) silt; SAND (SP-SM); wet; firm; few silt; mostly fine sand	
85								SP			
86									SP	BEAUMONT; yellowish brown (10YR 5/4) sand; CLAY (CH); dry; very stiff; some fine sand; mostly clay	
87									SP	BEAUMONT; yellowish brown (10YR 5/4) silt; SAND (SP); wet; firm; few silt; mostly fine to medium sand; trace of calcareous nodules	
88									SM	BEAUMONT; yellowish brown (10YR 5/4) silt; SAND (SM); wet; firm; little silt; mostly fine sand	
89	X	SS 25	6	18					SM	BEAUMONT; yellowish brown (10YR 5/4) silt; SAND (SM); wet; firm; little silt; mostly fine sand	
90			11								
91									SM	BEAUMONT; dark grayish brown (10YR 4/2); silt; SAND (SM); wet; very firm; little silt; mostly fine sand	
92											
93									SM	BEAUMONT; dark grayish brown (10YR 4/2); silt; SAND (SM); wet; very firm; little silt; mostly fine sand	
94	X	SS 26	8	18							
95			13						SM	BEAUMONT; dark grayish brown (10YR 4/2); silt; SAND (SM); wet; very firm; little silt; mostly fine sand	
96											
97									SM	BEAUMONT; dark grayish brown (10YR 4/2); silt; SAND (SM); wet; very firm; little silt; mostly fine sand	
98											
99	X	SS 27	7	18					SP-SM	BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SP-SM); wet; very firm; few silt; mostly fine sand	
100			16								
101									SP-SM	BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SP-SM); wet; very firm; few silt; mostly fine sand	
102											
103									SP-SM	BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SP-SM); wet; very firm; few silt; mostly fine sand	
104											
105									SP-SM	BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SP-SM); wet; very firm; few silt; mostly fine sand	
106											
107									SP-SM	BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SP-SM); wet; very firm; few silt; mostly fine sand	
108											
109	X	SS 28	11	15					SP	BEAUMONT; yellowish brown (10YR 5/4) silt; SAND (SP); wet; very firm; few silt; mostly medium grained sand	
110			15	18							
111									GP	BEAUMONT; yellowish brown (10YR 5/4) sand; clay; GRAVEL (GP); wet; very firm; few clay; some medium sand; mostly gravel	
112											
113									GP	BEAUMONT; yellowish brown (10YR 5/4) sand; clay; GRAVEL (GP); wet; very firm; few clay; some medium sand; mostly gravel	
114											
115									GP	BEAUMONT; yellowish brown (10YR 5/4) sand; clay; GRAVEL (GP); wet; very firm; few clay; some medium sand; mostly gravel	
116											
117									GP	BEAUMONT; yellowish brown (10YR 5/4) sand; clay; GRAVEL (GP); wet; very firm; few clay; some medium sand; mostly gravel	
118											
119	X	SS 29	8	18					CH	BEAUMONT; greenish gray (GLY 1 10Y 6/1) with yellowish red (5YR 4/5) mottling; silt; CLAY (CH);	
120			11	18							

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-316</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									CH	dry; very stiff, little silt, mostly clay	
121											
122											
123											
124											
125											
126											
127											
128											
129	X	SS 30	13	18						BEAUMONT; yellowish red (5YR 4/6) with greenish gray (GLE Y 1 10Y 6/1) mottling; silt; CLAY (CH); dry; very stiff, little silt, mostly clay	
130			14	18							
131											
132											
133											
134											
135											
136											
137											
138											
139	X	SS 31	12	17						BEAUMONT; light greenish gray (GLE Y 1 10Y 7/1) with brownish yellow (10YR 6/6) mottling; sand; CLAY (CH); dry; hard; few fine sand; mostly clay; trace calcareous nodules; strong reaction with HCl	
140			13	18							
141											
142											
143											
144											
145											
146											
147											
148											
149	X	SS 32	20	13					SM	BEAUMONT; light greenish gray (GLE Y 1 10Y 7/1) with brownish yellow (10YR 6/6) mottling; silt; SAND (SM); wet; very dense; little silt; mostly fine sand	
150			20	18							
151											
152											
153											
154											
155											
156											
157											
158											
159	X	SS 33	20	15						BEAUMONT; yellowish brown (10YR 5/4) silt; SAND (SM); wet; dense; little silt; mostly fine sand	
160			20	18							

Project Name : Job Number



SOIL LOG - Boring No. B-316

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
160									SM	
161										
162										
163										
164										
165										
166										
167										
168										
169	X	SS 34	7 9 10	18 18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; very stiff; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl
170										
171										
172										
173										
174										
175										
176										
177										
178										
179	X	SS 35	7 13 16	18 18						BEAUMONT; yellowish red (5YR 4/6); silt; sand; CLAY (CH); dry; very stiff; little silt; trace sand; mostly clay
180										
181										
182										
183										
184										
185										
186										
187										
188										
189	X	SS 36	10 13 17	18 18						BEAUMONT; brown (7.5YR 4/4); silt; sand; CLAY (CH); dry; very stiff; few silt; trace fine sand; mostly clay
190										
191										
192										
193										
194										
195										
196										
197										
198										
199	X	SS 37	26 49 41	15 18					SM	BEAUMONT; olive brown (2.5Y 4/3) with gray (GLEYS 1 5/N) mottling; wet; very dense; little silt;
200										

Project Name : Job Number



SOIL LOG - Boring No. B-316

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
200										mostly fine sand; trace calcareous nodules; strong reaction with HCl Boring Terminated at 200-feet
201										
202										
203										
204										
205										
206										
207										
208										
209										
210										
211										
212										
213										
214										
215										
216										
217										
218										
219										
220										
221										
222										
223										
224										
225										
226										
227										
228										
229										
230										
231										
232										
233										
234										
235										
236										
237										
238										
239										
240										

Project Name : Job Number		<b>SOIL LOG - Boring No. B-317</b>	
STP COL : 5050-06-0496		MACTEC	
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 3 inch	Boring Location N 363364.01 E 2943235.44	Turbine Building Total Depth 150 feet	
Drilling Contractor and Rig EEI / CME 750 ATV	Elevation at boring 28.49 feet	Ground Water Depth 11 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 138 lbs / 30 inches	No. of Samples 32	Date Started 12/11/06
	Borehole Inclination 0	Logged by J. Howard	Date Completed 12/12/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	18	13						FILL: black (10YR 2/1); sand; CLAY (CH); dry; firm; medium plasticity; trace organics	
2	X	SS 2	18	14					CH	BEAUMONT; very dark grayish brown (10YR 3/2); sand; CLAY (CH); dry; stiff, medium plasticity	
3	X	SS 3	18	18						BEAUMONT; very dark grayish brown (10YR 3/2); sand; CLAY (CH); dry; firm; medium plasticity	
4	X	SS 4	18	15						BEAUMONT; strong brown (7.5YR 5/8); sand; CLAY (CH); moist; stiff, high plasticity	
5	X	SS 5	18	18						BEAUMONT; strong brown (7.5YR 5/8); sand; CLAY (CH); moist; firm; high plasticity	
6	X	SS 6	18	9						BEAUMONT; strong brown (7.5YR 5/8); sand; CLAY (CH); moist; soft, high plasticity	
7	X	SS 7	18	18						BEAUMONT; strong brown (7.5YR 5/8); sand; CLAY (CH); moist; soft, high plasticity	
8	X	SS 8	18	17					∇	BEAUMONT; strong brown (7.5YR 5/6); sand; CLAY (CH); moist; firm; high plasticity	Water level at 11 feet BGS
9	X	SS 9	18	18						BEAUMONT; strong brown (7.5YR 5/6); sand; CLAY (CH); moist; stiff, high plasticity	
10	X	SS 10	18	12					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm	
11											
12											
13											
14	X	SS 11	18	18						BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; loose; medium to fine sand	Switched to rotary wash drilling at 18.5 feet bgs
15											
16											
17											
18											
19	X	SS 12	18	13						BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; very firm; medium to fine sand	
20											
21											
22											
23											
24	X	SS 13	18	18						BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; medium to fine sand	
25											
26											
27											
28											
29	X	SS 14	18	15					SP	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SP); wet; dense; medium to fine sand	
30											
31											
32											
33											
34	X	SS 15	18	15					SM	BEAUMONT; yellowish red (5YR 5/6); silt; SAND (SM); wet; firm; medium to fine sand	
35											
36											
37											
38											
39	X	SS 15	18	15							
40											



Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-317</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
40									SM	
41										
42										
43										
44	X	SS 16	4 5 7	.18 18					CH	BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; stiff; medium plasticity
45										
46										
47										
48										
49	X	SS 17	4 4 7	14 18						BEAUMONT; light greenish gray (GLEYS 2 7/1); sand; CLAY (CH); moist; stiff; medium plasticity
50										
51										
52										
53										
54	X	SS 18	6 6 12	18 18						BEAUMONT; light greenish gray (GLEYS 2 7/1); sand; CLAY (CH); moist; very stiff; medium plasticity; medium to coarse sand
55										
56										
57										
58										
59	X	SS 19	6 6 6	18 18						BEAUMONT; yellowish red (5YR 5/6) with gray mottling; sand; CLAY (CH); moist; stiff; medium plasticity
60										
61										
62										
63										
64	X	SS 20	7 10 12	18 18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff; medium plasticity
65										
66										
67										
68										
69	X	SS 21	6 7	18 18					SM	BEAUMONT; yellowish red (5YR 5/6); silt; SAND (SM); wet; firm; medium to fine sand
70										
71										
72										
73										
74	X	SS 22	6 6 11	17 18					SP	BEAUMONT; strong brown (7.5YR 5/6); SAND (SP); wet; firm; medium to fine sand
75										
76										
77										
78										
79	X	SS 23	19 19 20	11 18						BEAUMONT; strong brown (7.5YR 5/6); SAND (SP); wet; dense; medium to fine sand
80										

Project Name : Job Number



**SOIL LOG - Boring No. B-317**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SP		
81											
82											
83											
84	X	SS 24	14 25	15 41							BEAUMONT; pale brown (10YR 6/3); SAND (SP); wet; very dense; medium to fine sand
85											
86											
87											
88											
89	X	SS 25	27 35	26 50	18						BEAUMONT; pale brown (10YR 6/3); SAND (SP); wet; very dense; medium to fine sand
90											
91											
92											
93											
94	X	SS 26	10 10	18 7	18				CH		BEAUMONT; brown (7.5YR 5/2); sand; CLAY (CH); moist; stiff; high plasticity
95											
96											
97											
98											
99	X	SS 27	27 30	20 20	15 18				SM		BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SM); wet; dense; mostly fine sand
100											
101											
102											
103											
104											
105											
106											
107											
108											
109	X	SS 28	15 20	17 17	9 18				SP		BEAUMONT; grayish brown (10YR 5/2); SAND (SP); wet; dense; medium to coarse sand
110											
111											
112											
113											
114											
115											
116											
117											
118											
119	X	SS 29	9 10	14 14	18 18				CH		BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff; medium plasticity
120											


Project Name : Job Number



**SOIL LOG - Boring No. B-317**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Unconnected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									CH		
121											
122											
123											
124											
125											
126											
127											
128											
129	X	SS 30	20 14 20	18 18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; hard; medium plasticity	
130											
131											
132											
133											
134											
135											
136											
137											
138											
139	X	SS 31	20 14 20	15 18						BEAUMONT; light greenish gray (GLE 2 7/1); sand; CLAY (CH); moist; hard; high plasticity	
140											
141											
142											
143											
144											
145											
146											
147											
148											
149	X	SS 32	20 26 33	12 18					SP	BEAUMONT; gray (7.5YR 6/1); SAND (SP); wet; very dense; medium to fine sand	
150										Boring Terminated at 150 feet	
151											
152											
153											
154											
155											
156											
157											
158											
159											
160											

Project Name : Job Number		<b>SOIL LOG - Boring No. B-318</b>	
			
STP COL : 5050-06-0496			
Type and Diameter of Boring Rotary Wash / 4 inch		Boring Location Turbine Building N 363363.37 E 2943297.42	Total Depth 100 feet
Drilling Contractor and Rig EEI / CME 750 ATV		Elevation at boring 28.46 feet	Ground Water Depth 8 feet
Sampling Method Split Spoon		Sample Driving Hammer/Drop 138 lbs / 30 inches	No. of Samples 27
		Borehole Inclination 0	Date Started 12/2/06
		Logged by J. Howard	Date Completed 12/2/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07


Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	4	14				K	CH	Fill: very dark gray (5YR 3/1); sand; CLAY (CH); moist; firm; trace organics	
2	X	SS 2	4	8			CH		BEAUMONT; dark yellowish brown (10YR 4/6); sand; CLAY (CH); moist; stiff		
3	X	SS 3	4	18			CH		BEAUMONT; dark yellowish brown (10YR 4/6); sand; CLAY (CH); moist; firm; medium plasticity		
4	X	SS 4	5	18			CH		BEAUMONT; dark yellowish brown (10YR 4/6); sand; CLAY (CH); moist; stiff; medium to high plasticity		
5	X	SS 5	4	18			CH		BEAUMONT; dark yellowish brown (10YR 4/6); sand; CLAY (CH); wet; firm; high plasticity		
6	X	SS 6	4	18			CH		BEAUMONT; dark yellowish brown (10YR 4/6); sand; CLAY (CH); wet; firm; high plasticity	Water level at 8 feet BGS	
7	X	SS 7	4	18			CH		BEAUMONT; strong brown (7.5YR 5/8); sand; CLAY (CH); wet; firm; high plasticity		
8	X	SS 8	4	18			CH		BEAUMONT; strong brown (7.5YR 5/8); sand; CLAY (CH); wet; stiff; high plasticity		
9	X	SS 9	4	18			CH		BEAUMONT; strong brown (7.5YR 5/8); sand; CLAY (CH); wet; stiff; high plasticity		
10	X	SS 10	4	18			CH		BEAUMONT; strong brown (7.5YR 5/8); sand; CLAY (CH); wet; stiff; high plasticity		
11											
12											
13											
14											
15											
16											
17											
18											
19	X	SS 11	5	18				SC	BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); wet; firm; high plasticity	Switch to mud rotary drilling at 18.5 feet BGS	
20											
21											
22											
23											
24	X	SS 12	12	12				SM	BEAUMONT; yellowish red (5YR 5/6); SAND (SM); wet; firm; medium to fine sand		
25			10	18							
26											
27											
28											
29	X	SS 13	14	18					BEAUMONT; yellowish red (5YR 5/6); SAND (SM); wet; dense; medium to fine sand		
30			14	18							
31			17	18							
32											
33											
34	X	SS 14	18	18					BEAUMONT; yellowish red (5YR 5/6); SAND (SM); wet; dense; medium to fine sand		
35			18	18							
36			14	18							
37											
38											
39	X	SS 15	5	14				SC	BEAUMONT; yellowish red (5YR 5/6); clay; SAND (SC); wet; loose		
40											

Project Name : Job Number <div style="text-align: center;"> <b>MACTEC</b></div>	<b>SOIL LOG - Boring No. B-318</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
40									SC	
41										
42										
43										
44	X	SS 16	4 4 6	18 18					CH	BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; stiff, medium to high plasticity
45										
46										
47										
48										
49	X	SS 17	4 4 7	18 18						BEAUMONT; light greenish gray (GLEYS 2.7/1); sand; CLAY (CH); moist; stiff, medium to high plasticity
50										
51										
52										
53										
54	X	SS 18	10 10 10	18 18						BEAUMONT; light greenish gray (GLEYS 2.7/1); sand; CLAY (CH); moist; stiff, medium to high plasticity
55										
56										
57										
58										
59	X	SS 19	10 10 5	18 18						BEAUMONT; reddish brown (2.5YR 4/4); sand; CLAY (CH); moist; stiff, medium to high plasticity
60										
61										
62										
63										
64	X	SS 20	10 10 4	18 18						BEAUMONT; reddish brown (2.5YR 4/4); sand; CLAY (CH); moist; stiff, medium to high plasticity
65										
66										
67										
68										
69	X	SS 21	6 6 10	12 18					SP	BEAUMONT; dark yellowish brown (10YR 4/6); SAND (SP); wet; firm; medium to fine sand
70										
71										
72										
73										
74	X	SS 22	10 10 10	11 18					SC	BEAUMONT; dark yellowish brown (10YR 4/6); clay; SAND (SC); moist to wet; firm
75										
76										
77										
78										
79	X	SS 23	13 23 23	11 18					SP-SM	BEAUMONT; dark yellowish brown (10YR 4/6); SAND (SP-SM); moist to wet; dense; medium to
80										

Project Name : Job Number <div style="text-align: center; font-weight: bold; font-size: 1.2em;">                      MACTEC                 </div> STP COL : 5050-06-0496	SOIL LOG - Boring No. B-318
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SP-SM	fine sand	
81											
82											
83											
84	X	SS 24	14 12 16	14 18						BEAUMONT; dark yellowish brown (10YR 4/6); SAND (SP-SM); moist to wet; dense; medium to fine sand	
85											
86											
87											
88											
89	X	SS 25	20 15 21	14 18						BEAUMONT; dark yellowish brown (10YR 4/6); SAND (SP-SM); moist to wet; dense; medium to fine sand	
90											
91											
92											
93											
94	X	SS 26	5 7 10	14 18						BEAUMONT; gray (5YR 5/1); SAND (SP-SM); wet; firm; medium to fine sand	
95											
96											
97											
98											
99	X	SS 27	7 10 10	14 18						BEAUMONT; gray (5YR 5/1); SAND (SP-SM); wet; firm; medium to fine sand	
100										Boring Terminated at 100-feet	
101											
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											

Project Name : Job Number		<b>SOIL LOG - Boring No. B-319 DH</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 4 inch	Boring Location Proposed Turbine Building N 363364.17 E 2943407.9	Total Depth 215 feet	
Drilling Contractor and Rig JEDI Drilling / CME-75	Elevation at boring 28.39 feet	Ground Water Depth 12 feet	Depth to Bedrock
Sampling Method Split Spoon/UD	Sample Driving Hammer/Drop 138.1 lbs / 30 inches	No. of Samples 39	Date Started 12/1/06
	Borehole Inclination 0	Logged by A. Osorio	Date Completed 12/6/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0										Surface Grass - 4"	
1	X	SS 1	19	18					CH	BEAUMONT; black; (5Y 2.5/1); gravel; CLAY (CH); moist; stiff; high plasticity; some gravel	Begin boring with Hollow Stem Auger
2	X	SS 2	19	18					CH	BEAUMONT; black; (5Y 2.5/1); gravel; CLAY (CH); moist; stiff; high plasticity; some gravel	
3	X	SS 3	15	18					CH	BEAUMONT; black; (5Y 2.5/1); CLAY (CH); moist; stiff; high plasticity; some gravel	
4	X	SS 4	15.5	18					CL	BEAUMONT; brown (7.5YR, 4/4); gravel; CLAY (CL); moist; firm; some gravel; medium plasticity	
5	X	SS 5	20	18					CL	BEAUMONT; brown (7.5YR, 4/4); gravel; silt; CLAY (CL); moist; firm; medium plasticity	
6	X	SS 6	21	18					CL-ML	BEAUMONT; brown (7.5YR, 4/4); gravel; silt; clay; SILT (CL-ML); moist; firm; medium plasticity; some gravel; calcareous nodules	
7	X	SS 7	26	18					CL-ML	BEAUMONT; brown (7.5YR, 4/4); gravel; clay; SILT (CL-ML); moist; firm; medium plasticity; calcareous nodules	
8	X	SS 8	28.5	18					CH	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; stiff; high plasticity; trace silt; calcareous nodules	
9	X	SS 9	26	18					CL-ML	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); wet; firm; high plasticity; trace silt; calcareous nodules	
10	X	SS 10	26	18					CL-ML	BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CL-ML); moist; firm; medium plasticity; calcareous nodules	
11											
12											Water level at 12 feet bgs
13											
14											
15											Switch to mud rotary drilling at 15 feet BGS
16											
17											
18											
19	X	SS 11	4	15					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; firm; low plasticity	
20											
21											
22											
23											
24	X	SS 12	4	12.5						BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; firm; low plasticity; trace calcareous nodules	
25											
26											
27											
28											
29	X	SS 13	8	18.5						BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; low plasticity	
30											
31											
32											
33											
34	X	SS 14	9	15.5						BEAUMONT; brown (7.5YR 5/4); silt; gravel; SAND (SM); moist; very firm; low plasticity; trace of gravel	
35											
36											
37											
38											
39	X	SS 15	11	17						BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; low plasticity	
40											

Project Name : Job Number



SOIL LOG - Boring No. B-319 DH

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
40									SM	
41										
42										
43										
44	X	SS 16	7 12	26 18					CH	BEAUMONT; brown (7.5YR 4/4); CLAY (CH); moist; very stiff; calcareous nodules
45										
46										
47										
48										
49	X	SS 17	6 11	27 18						BEAUMONT; greenish gray (GLEYS 1 5/1); CLAY (CH); moist; very stiff; high plasticity; calcareous nodules
50										
51										
52										
53										
54	X	SS 18	7 15	25 18						BEAUMONT; brown (7.5YR 4/4) with greenish gray (GLEYS 1 5/1) mottling; gravel; sand; CLAY (CH); moist; very stiff; high plasticity; some fine gravel; trace sand; calcareous nodules
55										
56										
57										
58										
59	X	SS 19	10 15	24 18						BEAUMONT; brown (7.5YR 4/4) with greenish gray (GLEYS 1 5/1) mottling; sand; CLAY (CH); moist; very stiff; high plasticity; trace sand; calcareous nodules
60										
61										
62										
63										
64	X	SS 20	4 10	20 18					CL	BEAUMONT; brown (7.5YR 4/4) with greenish gray (GLEYS 1 5/1) mottling; sand; CLAY (CH); moist; very stiff; high plasticity; trace sand; calcareous nodules;
65										BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CL); moist; very stiff; medium plasticity; calcareous nodules
66										
67										
68										
69	X	SS 21	10 10	14.5 18					SM	BEAUMONT; brown (7.5YR 4/3); silt; SAND (SM); moist; firm; low plasticity; weak reaction with HCl; few calcareous nodules
70										
71										
72										
73										
74	X	SS 22	9 14	10.5 18						BEAUMONT; brown (7.5YR 4/3); silt; SAND (SM); moist; very firm; low plasticity; weak reaction with HCl; few calcareous nodules
75										
76										
77										
78										
79	X	SS 23	14 10	15 18						BEAUMONT; brown (7.5YR 4/4); silt; SAND (SM); moist; very firm; non-plastic
80										



Project Name : Job Number



**SOIL LOG - Boring No. B-319 DH**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Alterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SM		
81											
82											
83											
84	X	SS 24	12 20	16 18							BEAUMONT; brown (10YR 5/3); silt; SAND (SM); moist; dense; non-plastic
85											
86											
87											
88											
89	X	SS 25	13 23	15 18					SP-SM		BEAUMONT; brown (10YR 5/3); silt; SAND (SP-SM); moist; very dense; non-plastic; trace silt; poorly graded sand
90											
91											
92											
93											
94	X	SS 26	26 32	15.5 18							BEAUMONT; grayish brown (2.5Y 5/2); silt; SAND (SP-SM); moist; very dense; non-plastic; trace silt; poorly graded sand
95											
96											
97											
98											
99	X	SS 27	25 30	17.5 18							BEAUMONT; grayish brown (2.5Y 5/2); silt; SAND (SP-SM); moist; dense; non-plastic; trace silt; poorly graded
100									CH		BEAUMONT; brown (7.5YR 4/3); sand; silt; CLAY (CH); moist; hard; trace silt; some fine sand about 99.8 feet bgs
101											
102											
103											
104											
105											
106											
107											
108											
109	X	SS 28	11 12	9 18					SW		BEAUMONT; gray (7.5YR 5/1); gravel; SAND (SW); moist; very firm; cemented gravel; well-graded coarse sand
110											
111											
112											
113											
114											
115											
116											
117											
118											
119	X	SS 29	10 14	18.5 18					CH		BEAUMONT; yellowish red (5YR 4/6) with greenish gray (GLEYS 1 5/1) mottling; CLAY (CH); moist
120											

Project Name : Job Number <div style="text-align: center; font-weight: bold; font-size: 1.2em;"> </div> STP COL : 5050-06-0496	SOIL LOG - Boring No. B-319 DH
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
120									CH	hard; strong reaction with HCl; black roots; some calcareous nodules
121										
122										
123										
124										
125										
126										
127										
128										
129		UD 1	N/A	19.5 24	21.0	97.4	70/45			BEAUMONT; greenish gray (GLEY 1 5/1) with yellowish red (5YR 4/6); CLAY (CH); moist
130										
131										
132										
133										
134										
135										
136										
137										
138										
139		SS 30	10 13 16	20.5 18						BEAUMONT; greenish gray (GLEY 1 6/1) with yellowish brown (10YR 5/8) mottling; CLAY (CH); dry; very stiff; calcite deposits
140										
141										
142										
143										
144		UD 2	N/A	13 24	18.7				SM	BEAUMONT; greenish gray (GLEY 1 6/1); silt; SAND (SM); moist
145										
146										
147										
148										
149		SS 31	20 28 30	13 18						BEAUMONT; brown (7.5YR 5/2); silt; SAND (SM); moist; very dense
150										
151										
152										
153										
154										
155										
156										
157										
158										
159		UD 3	N/A	10.5 24						BEAUMONT; brown (7.5YR 5/2); silt; SAND (SM); moist
160										

Project Name : Job Number



SOIL LOG - Boring No. B-319 DH

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
160									SM		
161											
162											
163											
164											
165											
166											
167											
168											
169	X	SS 32	14 16 16	24.5 18					CH	BEAUMONT; brown (7.5YR 5/4) with greenish gray (GLEY 1 6/1); silt; CLAY (CH); moist; hard; medium plasticity; medium toughness; calcareous nodules	
170											
171											
172											
173											
174		UD 4	N/A	24 24	99.7	65/43				BEAUMONT; yellowish red (5YR 5/6); CLAY (CH); moist	
175											
176											
177											
178											
179	X	SS 33	21 18 20	19 18					ML	BEAUMONT; brown (7.5YR 5/4); clay; sand; SILT (ML); moist; hard; medium toughness; mostly silt; trace clay	
180											
181											
182											
183											
184											
185											
186											
187											
188											
189		UD 5	N/A	24.5 24	23.9	98.3	62/41		CH	BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist	
190											
191											
192											
193											
194											
195											
196											
197											
198											
199	X	SS 34	8 11 14	23.5 18						BEAUMONT; light olive brown (2.5Y 5/4); sand; CLAY (CH); moist; very stiff; light greenish gray	
200											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-319 DH</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
200											
201										fine sand fill along former desiccation cracks- fracture Continued drilling to 215 feet for geophysical logging (no sampling)	Stopped geotechnical drilling and sampling at 200 feet bgs
202											
203											
204											
205											
206											
207											
208											
209											
210											
211											
212											
213											
214											
215											
216										Boring Terminated at 215- feet	
217											
218											
219											
220											
221											
222											
223											
224											
225											
226											
227											
228											
229											
230											
231											
232											
233											
234											
235											
236											
237											
238											
239											
240											

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-320</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 3 inch		Boring Location Heavy Haul Road N 362903.74 E 2943116.74		Total Depth 50 feet	
Drilling Contractor and Rig EEI / CME 750 ATV		Elevation at boring 30.54 feet		Ground Water Depth 12 feet	
Sampling Method Split Spoon		Sample Driving Hammer/Drop 138 lbs / 30 inches		No. of Samples 17	
		Borehole Inclination 0		Logged by S. Lehman	
				Date Started 11/13/06	
				Date Completed 11/13/06	

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0										Grass - Topsoil	
1	X	SS 1	14	18					ML	BEAUMONT; strong brown (7.5YR 5/8); clay; sand;	
2	X	SS 2	12	18					CH	SILT (ML); moist; firm; non-plastic	
3	X	SS 3	12	18					CL	BEAUMONT; very dark grayish brown (2.5Y 3/2); CLAY (CH); moist; firm; high plasticity	
4	X	SS 4	12	18					CH	BEAUMONT; dark yellowish brown (10YR 4/6); CLAY (CH); moist; stiff; high plasticity	
5	X	SS 5	16	18					CH	BEAUMONT; black (10YR 2/1); silt; CLAY (CL); dry; stiff; medium plasticity	
6	X	SS 6	16	18					CH	BEAUMONT; black (10YR 2/1); silt; CLAY (CL); dry; stiff; medium plasticity	
7	X	SS 7	9	18					ML	BEAUMONT; very dark grayish brown (10YR 3/2); CLAY (CH); moist; firm; high plasticity	
8	X	SS 8	12	18					ML	BEAUMONT; light olive brown (2.5Y 5/3); CLAY (CH); moist; stiff; high plasticity	
9	X	SS 9	13	18					ML	BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist; stiff; medium to high plasticity with fine gravel - coarse sand size concretions; strong reaction with HCl	
10	X	SS 10	14	18					CL	BEAUMONT; dark yellowish brown (10YR 4/6); clay; sand; SILT (ML); moist; firm; low-plasticity; trace sand	Water level at 12 feet BGS
11	X	SS 11	13	18					CH	BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); moist; stiff; non-plastic	Switch to Mud Rotary drilling at 15 feet BGS
12									CH	BEAUMONT; strong brown (7.5YR 4/6); clay; SILT (ML); moist; stiff; low plasticity; gravel size concretions; strong reaction with HCl	
13									ML	BEAUMONT; strong brown (7.5YR 4/6); clay; SILT (ML); wet; soft	
14	X	SS 12	15	18					SM	BEAUMONT; strong brown (7.5YR 4/6) with light greenish gray (Gley1 7/5GY); silt; CLAY (CL); moist; soft; medium plasticity	
15	X	SS 13	15	18					SM	BEAUMONT; yellowish red (5YR 4/6) with greenish gray (Gley1 7/5GY); CLAY (CH); moist; stiff; high plasticity	
16									SM	BEAUMONT; strong brown (7.5YR 5/6); sand; SILT (ML); wet; firm; non-plastic; some fine grained sand	
17									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; fine grained	
18									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; fine grained; little silt	
19									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; fine grained; trace silt	
20									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; fine grained; trace silt	
21									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; fine grained; trace silt	
22									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; fine grained; trace silt	
23									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; fine grained; trace silt	
24	X	SS 14	14	18					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; fine grained; trace silt	
25									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; fine grained; trace silt	
26									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; fine grained; trace silt	
27									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; fine grained; trace silt	
28									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; fine grained; trace silt	
29	X	SS 15	13	18					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; fine grained; trace silt	
30									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; fine grained; trace silt	
31									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; fine grained; trace silt	
32									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; fine grained; trace silt	
33									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; fine grained; trace silt	
34	X	SS 15	13	18					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; fine grained; trace silt	
35									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; fine grained; trace silt	
36									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; fine grained; trace silt	
37									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; fine grained; trace silt	
38									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; fine grained; trace silt	
39	X	SS 15	13	18					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; fine grained; trace silt	
40									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; fine grained; trace silt	

Project Name : Job Number



**SOIL LOG - Boring No. B-320**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 16	25 44	18 18							
45			40								BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very dense; fine grained; trace silt
46											
47											
48											
49	X	SS 17	5 16	18 18					CH		
50											BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist; hard; high plasticity; interbedded with yellowish brown (10YR 5/4); SAND (SP); wet; dense; mostly fine grained; some medium grains
51											Boring Terminated at 50-feet
52											
53											
54											
55											
56											
57											
58											
59											
60											
61											
62											
63											
64											
65											
66											
67											
68											
69											
70											
71											
72											
73											
74											
75											
76											
77											
78											
79											
80											

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-321</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Rotary Wash / 4 inch		Boring Location Turbine Building N 363483.05 E 2943231.24		Total Depth 150 feet	
Drilling Contractor and Rig Gregg #1 / FRASTE MDXL		Elevation at boring 29.23 feet		Ground Water Depth Depth to Bedrock	
Sampling Method Split Spoon/UD		Sample Driving Hammer/Drop 140 lbs / 30 inches		No. of Samples 32	
		Borehole Inclination 0		Date Started 12/16/06	
		Logged by W. Miller		Date Completed 12/17/06	

Reviewed by / Date WML 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	20	18					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); moist; firm; high plasticity; high toughness; trace roots and organics	
2	X	SS 2	13	18						BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); moist; firm; high plasticity; high toughness; trace roots	
3	X	SS 3	17	18						BEAUMONT; black (GLEY 1 2.5/N) to yellowish brown (10YR 5/4); silt; CLAY (CH); moist; firm; high plasticity; high toughness	
4	X	SS 4	14	18						BEAUMONT; yellowish brown (10YR 5/4) to yellowish red (5YR 5/6); silt; CLAY (CH); moist; firm; high plasticity; medium toughness	
5	X	SS 5	17	18					CL	BEAUMONT; yellowish red (5YR 5/6) with trace greenish gray (GLEY 1 6/1) mottling; silt; CLAY (CL); moist; stiff; medium plasticity; medium toughness	
6	X	SS 6	13	18						BEAUMONT; yellowish red (5YR 5/6) with trace greenish gray (GLEY 1 6/1) mottling; silt; CLAY (CL); moist; stiff; medium plasticity; low toughness	
7	X	SS 7	17	18						BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CL); moist; stiff; medium plasticity; low toughness	
8	X	SS 8	16	18					ML	BEAUMONT; yellowish red (5YR 5/6); SILT (ML); moist; stiff; low plasticity; low toughness	
9	X	SS 9	13	18					CH	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness	
10	X	SS 10	15	18						BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness	
11											
12											
13											
14											
15											
16											
17											
18											
19	X	SS 11	2	16					ML	BEAUMONT; yellowish red (5YR 5/6) trace greenish gray (GLEY 1 6/1); silt; CLAY (CH); moist; stiff; high plasticity; high toughness	Water level at 18.5 feet BGS
20											
21											
22											
23											
24	X	SS 12	4	15						BEAUMONT; yellowish red (5YR 5/6); clay; sand; SILT (ML); wet; soft; low plasticity; low toughness; little clay; little fine sand	
25											
26											
27											
28											
29	X	SS 13	6	16					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; very firm; non-plastic; mostly fine sand; some silt	
30											
31											
32											
33											
34	X	SS 14	13	15						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; non-plastic; mostly fine sand; some silt	
35											
36											
37											
38											
39	X	SS 15	9	16						BEAUMONT; yellowish brown (10YR 5/4); clay; silt; SAND (SM); wet; very firm; non-plastic; mostly fine sand; some silt; trace clay	
40											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-321</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
40									SM	
41										
42										
43										
44		UD 1	N/A	23.5 24					CH	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; high plasticity; high toughness
45										
46										
47										
48										
49	X	SS 16	2 24.6	24 18						BEAUMONT; greenish gray (GLEY 1 6/1) with trace yellowish red (5YR 4/6) mottling; silt; CLAY (CH); moist; stiff; high plasticity; high toughness
50										
51										
52										
53										
54	X	SS 17	6 10.6	20 18						BEAUMONT; light greenish gray (GLEY 1 7/1); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; strong reaction with HCl; some <1/4" dia calcareous nodules
55										
56										
57										
58										
59	X	SS 18	7 8	19 18						BEAUMONT; yellowish red (5YR 4/6) with trace light greenish gray (GLEY 1 7/1) mottling; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; strong reaction with HCl; trace <1/8" dia calcareous nodules
60										
61										
62										
63										
64	X	SS 19	4 10.4	20 18					CL	BEAUMONT; brown (7.5YR 5/4) with trace light greenish gray (GLEY 1 7/1) mottling; silt; CLAY (CL); moist; stiff; medium to low plasticity; medium toughness; little to some silt
65										
66										
67										
68										
69	X	SS 20	11 13 15	16 18					SM	BEAUMONT; dark yellowish brown (10YR 4/6); silt; SAND (SM); wet; very firm; non-plastic; mostly fine sand; some silt
70										
71										
72										
73										
74	X	SS 21	17 21 24	16 18						BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; dense; non-plastic; mostly fine sand; some silt
75										
76										
77										
78										
79	X	SS 22	16 20 15	16 18						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; non-plastic; mostly fine sand; some silt
80										



Project Name : Job Number



SOIL LOG - Boring No. B-321

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SM		
81											
82											
83											
84	X	SS 23	10	16							
85				18						BEAUMONT; grayish brown (10YR 5/2); clay; silt; SAND (SM); wet; firm; non-plastic; mostly fine sand; some silt; trace clay	
86											
87											
88											
89	X	SS 24	4	22							
90			13	18						BEAUMONT; dark grayish brown (10YR 4/2); clay; silt; SAND (SM); wet; firm; non-plastic; mostly fine sand; some silt; trace clay	
91											
92											
93											
94	X	SS 25	15	16							
95			28	18						BEAUMONT; light brownish gray (10YR 6/2); silt; SAND (SM); wet; very dense; non-plastic; mostly fine sand; some silt; trace medium sand	
96			30								
97											
98											
99	X	SS 26	17	16							
100			20	18						BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SM); wet; dense; non-plastic; mostly fine sand; some silt; trace medium and coarse sand	
101			23								
102											
103											
104											
105											
106											
107											
108											
109	X	SS 27	11	15							
110			12	18						BEAUMONT; brown (10YR 5/3); silt; SAND (SM); wet; very firm; non-plastic; mostly fine sand; some silt; little medium sand; trace coarse sand	
111			13								
112											
113											
114											
115											
116											
117											
118											
119		UD 2	N/A	22					CH	BEAUMONT; yellowish red (5YR 4/6) with greenish gray (GLEY 1 6/1) mottling; silt; CLAY (CH); moist; high plasticity; high toughness	
120			24								

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-321</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									CH		
121											
122											
123											
124											
125											
126											
127											
128											
129	X	SS 28	26 37	18 18					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; very dense; non-plastic; mostly fine sand; some silt	
130											
131											
132											
133											
134											
135											
136											
137											
138											
139		LD 3	N/A	22 24	20.0		46/25		CL	BEAUMONT; yellowish red (5YR 4/6) with greenish gray (LEY 1 6/1) mottling; silt; CLAY (CL); moist; high plasticity; high toughness	
140											
141											
142											
143											
144											
145											
146											
147											
148											
149	X	SS 29	19 25	16 18					SM	BEAUMONT; light greenish gray (LEY 1 7/1); silt; SAND (SM); wet; dense; non-plastic; mostly fine sand; some silt	
150											
151										Boring Terminated at 150 feet	
152											
153											
154											
155											
156											
157											
158											
159											
160											

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-322C</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow stem / Rotary Wash / 4 inch	Boring Location Turbine Building N 363483.4 E 2943406.69	Total Depth 100 feet	
Drilling Contractor and Rig MACTEC / RALEIGH / CME 45C	Elevation at boring 30.07 feet	Ground Water Depth	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 139.62 lbs / 30 inches	No. of Samples 44	Date Started 12/4/06
	Borehole Inclination 0	Logged by G. Geras	Date Completed 12/5/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	18	9					CH	BEAUMONT; black (GLEY 1 2.5/N) with yellowish brown (10YR 5/6) mottling; gravel; sand; CLAY (CH); dry; stiff; some gravel; little fine sand; mostly clay; trace organics (topsoil); grass	
2	X	SS 2	18	14.5							
3	X	SS 3	18	0							
4	X	SS 3	18	0							SS-3 No recovery
5	X	SS 4	18	9.5							
6	X	SS 4	18	12							
7	X	SS 5	18	18							
8	X	SS 6	18	8							
9	X	SS 6	18	18							
10	X	SS 7	18	18							
11	X	SS 8	18	15					ML	BEAUMONT; very dark gray (2.5Y 3/1) transitioning into light olive green (2.5Y 5/3) and into strong brown (7.5YR 5/6); silt; CLAY (CH); dry; firm; some silt; mostly clay	
12	X	SS 9	18	18							
13	X	SS 9	18	18							
14	X	SS 10	18	18					CH	BEAUMONT; strong brown (7.5YR 5/6) with slight greenish gray (GLEY 1 10Y 6/1) mottling; clay; SILT (ML); moist; firm; some clay; mostly silt; trace calcareous nodules; strong reaction with HCl	
15	X	SS 10	18	18							
16	X	SS 11	18	18					ML	BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); moist; firm; little clay; mostly silt	
17	X	SS 11	18	18							
18	X	SS 12	18	18					SM	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; stiff; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	Switch to mud rotary drilling at 17.5 feet BGS
19	X	SS 12	18	18							
20	X	SS 13	18	14							
21	X	SS 13	18	18							
22	X	SS 14	18	11							
23	X	SS 14	18	18							
24	X	SS 15	18	11							
25	X	SS 15	18	18							
26	X	SS 16	18	18							
27	X	SS 16	18	18							
28	X	SS 17	18	15							
29	X	SS 17	18	18							
30	X	SS 18	18	18							
31	X	SS 18	18	18							
32	X	SS 19	18	18					SP-SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; little silt; mostly fine sand	
33	X	SS 19	18	18							
34	X	SS 20	18	18							
35	X	SS 20	18	18							
36	X	SS 20	18	18							
37	X	SS 20	18	18							
38	X	SS 20	18	18							
39	X	SS 20	18	18							
40	X	SS 20	18	18							

Project Name : Job Number <div style="text-align: center;"> <b>MACTEC</b></div>	<b>SOIL LOG - Boring No. B-322C</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41	X	SS 21	6	18						BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; very dense; few silt; mostly fine sand	
42			20	18							
43											
44	X	SS 22	10	18					CH	BEAUMONT; yellowish red (5YR 4/6) with yellowish brown (10YR 5/6) laminae; silt; sand; CLAY (CH); dry; stiff; little fine sand; little silt; mostly clay	
45			7	18							
46	X	SS 23	10	18						BEAUMONT; yellowish red (5YR 4/6); silt; sand; CLAY (CH); dry; stiff; little fine sand; little silt; mostly clay	
47			7	18							
48											
49	X	SS 24	10	15						BEAUMONT; yellowish red (5YR 4/6) with slightly greenish gray (GLEYS 1 5GY 6/1) and yellowish brown (10YR 5/6) mottling; silt; sand; CLAY (CH); dry; stiff; little fine sand; few silt; mostly clay	
50			7	18							
51											
52	X	SS 25	10	18						BEAUMONT; yellowish brown (10YR 5/4) with greenish gray (GLEYS 1 5GY 6/1) mottling; silt; sand; CLAY (CH); dry; stiff; few fine sand; few silt; mostly clay	
53			7	18							
54	X	SS 26	10	18						BEAUMONT; greenish gray (GLEYS 1 5GY 6/1) with yellowish brown (10YR 5/4) mottling; silt; sand; CLAY (CH); dry; stiff; few fine sand; few silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
55			8	18							
56	X	SS 27	5	18						BEAUMONT; greenish gray (GLEYS 1 5GY 6/1) with yellowish brown (10YR 5/4) mottling; silt; sand; CLAY (CH); dry; stiff; little fine sand; few silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
57			8	18							
58											
59	X	SS 28	9	18						BEAUMONT; greenish gray (GLEYS 1 5GY 6/1) with reddish brown (5YR 4/4) and yellowish brown (10YR 5/4) mottling; sand; silt; CLAY (CH); dry; very stiff; little fine sand; few silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
60			11	18							
61	X	SS 29	5	18						BEAUMONT; yellowish red (5YR 4/6) with greenish gray (GLEYS 1 5GY 6/1) mottling; sand; silt; CLAY (CH); dry; very stiff; few sand; few silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
62			10	18							
63											
64	X	SS 30	9	17						BEAUMONT; yellowish red (5YR 4/6) with greenish gray (GLEYS 1 5GY 6/1) mottling; sand; silt; CLAY (CH); dry; very stiff; few sand; few silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
65			13	18							
66	X	SS 31	5	9						BEAUMONT; yellowish red (5YR 4/6) with greenish gray (GLEYS 1 5GY 6/1) mottling; sand; silt; CLAY (CH); dry; very stiff; little fine sand; few silt; mostly clay; few calcareous nodules; strong reaction with HCl	
67			8	18							
68											
69	X	SS 32	5	18					SM	BEAUMONT; yellowish red (5YR 4/6) with greenish gray (GLEYS 1 5GY 6/1) mottling; sand; silt; CLAY (CH); dry; very stiff; few sand; few silt; mostly clay	
70			12	18							
71	X	SS 33	15	15						BEAUMONT; brown (7.5YR 4/4); clay; silt; SAND (SM); moist; firm; few clay; some silt; mostly fine sand	
72			19	18							
73											
74	X	SS 34	18	17						BEAUMONT; dark yellowish brown (10YR 4/4); silt; SAND (SM); wet; dense; little silt; mostly fine sand	
75			23	18							
76											
77	X	SS 35	10	15						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; little silt; mostly fine sand	
78			20	18							
79	X	SS 36	35	17					SP-SM	BEAUMONT; brown (10YR 5/3); silt; SAND (SP-SM); moist; very dense; few silt; mostly fine	
80			44	18							

Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-322C</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80											
81	X	SS 37	21 33	12 18					SP-SM	sand	
82										BEAUMONT; brown (10YR 5/3); silt; SAND (SP-SM); moist; very dense; few silt; mostly fine sand	
83											
84	X	SS 38	7 15	13 18							
85										BEAUMONT; dark yellowish brown (10YR 4/6); silt; SAND (SP-SM); moist; dense; few silt; mostly fine sand	
86											
87	X	SS 39	8 12 13	11 18					SC		
88										BEAUMONT; dark yellowish brown (10YR 4/6); silt; clay; SAND (SC); wet; very firm; little clay; little silt; mostly sand; small pockets of clay intermixed with sand	
89	X	SS 40	10 13 15	15 18					SM		
90										BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; little silt; mostly fine sand	
91											
92	X	SS 41	10 20 14	10 18							
93										BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; little silt; mostly fine sand	
94	X	SS 42	15 19 11	15 18							
95										BEAUMONT; pale brown (10YR 6/3); silt; SAND (SM); wet; very firm; little silt; mostly fine sand	
96											
97	X	SS 43	5 10 10	18 18					CH		
98										BEAUMONT; dark grayish brown (10YR 4/2); sand; silt; CLAY (CH); dry; very stiff; little sand; few silt; mostly clay	
99	X	SS 44	7 14 15	18 18					SM		
100										BEAUMONT; dark grayish brown (10YR 4/2); clay; silt; SAND (SC); wet; firm; little clay; few silt; mostly fine sand	
101										BEAUMONT; brown (10YR 5/3); silt; SAND (SM); wet; very firm; little silt; mostly fine sand	
102										Boring Terminated at 100-feet	
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-323</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 4 inch		Boring Location Turbine Building N 363484.3 E 2943515.99		Total Depth 100 feet	
Drilling Contractor and Rig MACTEC / Raleigh / CME 45C		Elevation at boring 29.79 feet		Ground Water Depth 11 feet	
Sampling Method Split Spoon		Sample Driving Hammer/Drop 139.62 lbs / 30 inches		No. of Samples 27	
		Borehole Inclination 0		Logged by D. Tibbals	
				Date Started 12/3/06	
				Date Completed 12/4/06	

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Alterberg Limbs	Lithology	Soil Type (USCS)	Lithology	Remarks
0									GP	FILL; white (GLEY 1 8/N); sand; GRAVEL (GP); dry; loose; mostly angular gravel; few sand; poorly graded	
1	X	SS 1	4	2	5.1				CH	BEAUMONT; light reddish brown (2.5YR 6/4) and black (5YR 2.5/1); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
2	X	SS 2	4	14					CH	BEAUMONT; light reddish brown (2.5YR 6/4) and black (5YR 2.5/1); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
3	X	SS 3	4	15					CH	BEAUMONT; light reddish brown (2.5YR 6/4) and black (5YR 2.5/1); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
4	X	SS 4	4	18					CH	BEAUMONT; black (5YR 2.5/1); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
5	X	SS 5	4	20			50/33		CH	BEAUMONT; very dark greenish gray (GLEY 1 3/10Y); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	
6	X	SS 6	4	20					CH	BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
7	X	SS 7	4	13					CH	BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
8	X	SS 8	4	14					ML	BEAUMONT; black (7.5YR 2.5/1) with brown (7.5YR 4/4) mottling; silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
9	X	SS 9	4	19					CH	BEAUMONT; red (2.5YR 4/8); silt; CLAY (CH); wet; firm; high plasticity; high toughness; mostly clay; little silt	
10	X	SS 10	4	19					CH	BEAUMONT; red (2.5YR 4/8); silt; CLAY (CH); wet; firm; high plasticity; high toughness; mostly clay; little silt	
11	X	SS 11	4	18					SM	BEAUMONT; reddish brown (2.5YR 5/4); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	Water level at 11 feet BGS
12	X	SS 12	4	18					ML	BEAUMONT; reddish brown (2.5YR 5/4); clay; sand; SILT (ML); wet; stiff; non-plastic; low toughness; mostly silt; some sand; little clay	
13	X	SS 13	4	14					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; mostly fine sand; some silt; poorly graded sand	
14	X	SS 14	4	12					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; mostly fine sand; some silt; poorly graded sand	
15	X	SS 15	4	16					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; mostly fine sand; some silt; poorly graded sand	
16	X	SS 16	4	12					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; mostly fine sand; some silt; poorly graded sand	
17	X	SS 17	4	12					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; mostly fine sand; some silt; poorly graded sand	
18	X	SS 18	4	12					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; mostly fine sand; some silt; poorly graded sand	
19	X	SS 19	4	12					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; mostly fine sand; some silt; poorly graded sand	
20	X	SS 20	4	12					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; mostly fine sand; some silt; poorly graded sand	
21	X	SS 21	4	12					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; mostly fine sand; some silt; poorly graded sand	
22	X	SS 22	4	12					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; mostly fine sand; some silt; poorly graded sand	
23	X	SS 23	4	12					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; mostly fine sand; some silt; poorly graded sand	
24	X	SS 24	4	12					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; mostly fine sand; some silt; poorly graded sand	
25	X	SS 25	4	12					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; mostly fine sand; some silt; poorly graded sand	
26	X	SS 26	4	12					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; mostly fine sand; some silt; poorly graded sand	
27	X	SS 27	4	12					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; mostly fine sand; some silt; poorly graded sand	
28	X	SS 28	4	12					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; mostly fine sand; some silt; poorly graded sand	
29	X	SS 29	4	12					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; mostly fine sand; some silt; poorly graded sand	
30	X	SS 30	4	12					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; mostly fine sand; some silt; poorly graded sand	
31	X	SS 31	4	12					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; mostly fine sand; some silt; poorly graded sand	
32	X	SS 32	4	12					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; mostly fine sand; some silt; poorly graded sand	
33	X	SS 33	4	12					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; mostly fine sand; some silt; poorly graded sand	
34	X	SS 34	4	12					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; mostly fine sand; some silt; poorly graded sand	
35	X	SS 35	4	12					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; mostly fine sand; some silt; poorly graded sand	
36	X	SS 36	4	12					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; mostly fine sand; some silt; poorly graded sand	
37	X	SS 37	4	12					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; mostly fine sand; some silt; poorly graded sand	
38	X	SS 38	4	12					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; mostly fine sand; some silt; poorly graded sand	
39	X	SS 39	4	12					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; mostly fine sand; some silt; poorly graded sand	
40	X	SS 40	4	12					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; mostly fine sand; some silt; poorly graded sand	

Project Name : Job Number



SOIL LOG - Boring No. B-323

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM	poorly graded sand	
41											
42											
43											
44	X	SS 16	10 11	20 18	20.5		29/10		CL	BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CL); moist; very stiff; medium plasticity; high toughness; mostly clay; little silt	
45											
46											
47											
48											
49	X	SS 17	10 5 7	20 18	32.1				CH	BEAUMONT; reddish gray (5YR 5/2); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
50											
51											
52											
53											
54	X	SS 18	4 8	11 18	18.1		47/31		CL	BEAUMONT; greenish gray (GLE 1 6/10Y); silt; CLAY (CL); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
55											
56											
57											
58											
59	X	SS 19	4 6 10	18 18	19.5				CH	BEAUMONT; gray (5YR 6/1); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
60											
61											
62											
63											
64	X	SS 20	6 13 13	19 18					SM CH	BEAUMONT; reddish brown (5YR 4/3); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt BEAUMONT; reddish brown (5YR 4/3); silt; SAND (SM); moist; very firm; mostly fine sand; little silt; poorly graded sand	
65											
66											
67											
68											
69	X	SS 21	5 6 19	17 18	23.2		NV/NP		ML	BEAUMONT; reddish brown (5YR 4/3); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt BEAUMONT; brown (7.5 YR 5/4); sand; SILT (ML); wet; very stiff; non-plastic; high toughness; mostly silt; some sand	
70											
71											
72											
73											
74	X	SS 22	17 17 17	13 18	20.0	11.9			SP-SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SP-SM); wet; dense; mostly fine sand; few/little silt; poorly graded sand	
75											
76											
77											
78											
79	X	SS 23	7 9	14 18	20.4					BEAUMONT; light yellowish brown (10YR 6/4); silt; SAND (SP-SM); wet; firm; mostly fine sand; little	
80											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-323</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80										silt; poorly graded sand	
81											
82											
83											
84	X	SS 24	12 10	13 18	18.3	7.9				BEAUMONT; light brown (7.5YR 6/3); silt; SAND (SP-SM); wet; firm; mostly fine sand; few silt; trace medium sand; poorly graded sand	
85											
86											
87											
88											
89	X	SS 25	8 10 12	11 18	22.0	10.4				BEAUMONT; light brown (7.5YR 6/3); silt; SAND (SP-SM); wet; very firm; mostly sand; few to little silt; trace medium sand; poorly graded sand	
90											
91											
92											
93											
94	X	SS 26	8 13 28	15 18	17.8	20.0			SM	BEAUMONT; reddish brown (5YR 5/3); silt; SAND (SM); wet; dense; mostly fine sand; little silt; poorly graded sand	
95											
96											
97											
98											
99	X	SS 27	3 5 14	18	22.4	49.5			SC	BEAUMONT; gray (5YR 5/1); clay; SAND (SC); wet; firm; mostly fine sand; some clay; poorly graded sand	
100											
101										Boring Terminated at 100 feet bgs	
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											



Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-324</b>	
STP COL : 5050-06-0496		Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 4 inch		Boring Location Unit 3 - Turbine Building N 363570.87 E 2943233.9	Total Depth 100 feet
Drilling Contractor and Rig Lewis Drilling / Mobile B 57		Elevation at boring 29.45 feet	Ground Water Depth 18.5 feet		Depth to Bedrock
Sampling Method Split Spoon		Sample Driving Hammer/Drop 139.58 lbs / 30 inches	No. of Samples 27	Date Started 11/28/06	
		Borehole Inclination 0	Logged by G. Geras	Date Completed 11/29/06	

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	1	8					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; gravel; CLAY (CH); dry; firm; some silt; mostly clay; trace gravel	
2	X	SS 2	2	7					CH	BEAUMONT; black (GLEY 1 2.5/N) with strong brown (7.5YR 4/6) slight mottling; silt; gravel; CLAY (CH); dry; soft; trace gravel; some silt; mostly clay	
3	X	SS 3	3	12.5					CH	BEAUMONT; black (GLEY 1 2.5/N) with strong brown (7.5YR 4/6) slight mottling; silt; CLAY (CH); dry; firm; little silt; mostly clay	
4	X	SS 4	4	15					CH	BEAUMONT; black (GLEY 1 2.5/N) transitioning into yellowish brown (10YR 5/4); silt; CLAY (CH); dry; firm; little silt; mostly clay; trace calcareous nodules; strong HCl reaction	
5	X	SS 5	5	16					CH	BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); dry; firm; some silt; mostly clay; trace calcareous nodules; strong HCl reaction	
6	X	SS 6	6	16					ML	BEAUMONT; strong brown (7.5YR 4/6); clay; SILT (ML); dry; soft; some clay; mostly silt	
7	X	SS 7	7	15					CH	BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); moist; soft; little clay; mostly silt; trace calcareous nodules; strong HCl reaction	
8	X	SS 8	8	18					CH	BEAUMONT; strong brown (7.5YR 5/6); clay SILT (ML); wet; soft; some clay; mostly silt	
9	X	SS 9	9	16					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; firm; some silt; mostly clay	
10	X	SS 10	10	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; firm; some silt; mostly clay	
11	X	SS 11	11	17					ML	BEAUMONT; strong brown (7.5YR 5/6); sand; clay; SILT (ML); wet; soft; trace clay; little fine sand; mostly silt	Water level at 18.5 feet BGS
12											
13	X	SS 12	12	14					CH ML	BEAUMONT; strong brown (7.5YR 5/6); sand; silt; CLAY (CH); dry; stiff; few silt; some fine sand; mostly clay BEAUMONT; strong brown (7.5YR 5/6); sand; SILT (ML); wet; stiff; some fine sand; mostly silt	
14											
15	X	SS 13	13	18					SM	BEAUMONT; brown (7.5YR 4/4); silt; SAND (SM); wet; very firm; some silt; mostly fine sand	Switch to mud rotary drilling at 30 feet BGS
16											
17											
18	X	SS 14	14	15					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; little silt; mostly fine sand; trace cemented sand nodules	
19											
20											
21											
22											
23											
24	X	SS 15	15	17.5					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; gravel; SAND (SM); wet; very dense; little silt; mostly sand; trace gravel	
25											
26											
27											
28											
29											
30											
31											
32											
33											
34											
35											
36											
37											
38											
39											
40											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-324</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/9 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 16	91.4	11 18					CH	BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CH); dry; firm; some silt; mostly clay	
45											
46											
47											
48											
49	X	SS 17	91.6	18 18						BEAUMONT; brown (10YR 4/3); silt; CLAY (CH); dry; stiff; little silt; mostly clay	
50										BEAUMONT; olive (5Y 5/3) with greenish gray (GLEY 1 6/1) mottling; sand; CLAY (CH); dry; stiff; some sand; little silt; mostly clay; trace shells in bottom inch of sample	
51											
52											
53											
54	X	SS 18	91.4	18 18						BEAUMONT; greenish gray (GLEY 1 5/1); silt; CLAY (CH); dry stiff; few sand; little silt; mostly clay; trace calcareous nodules; strong HCl reaction	
55											
56											
57											
58											
59	X	SS 19	100.0	16 18						BEAUMONT; yellowish red (5YR 4/6); with strong brown (7.5YR 4/6) mottling; sand; CLAY (CH); moist; stiff; some sand; few silt; mostly clay; trace calcareous nodules; strong HCl reaction	
60											
61											
62											
63											
64	X	SS 20	7 10	0 18					SM	BEAUMONT; silt; SAND (SM).	No Recovery in Sample SS-20
65											
66											
67											
68											
69	X	SS 21	100.0	15 18						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; firm; some silt; mostly fine sand	
70											
71											
72											
73											
74	X	SS 22	14 19	14 18						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; little silt; mostly fine sand	
75											
76											
77											
78											
79	X	SS 23	100.0	12 18						BEAUMONT; dark yellowish brown (10YR 4/4); silt; SAND (SM); wet; very firm; little silt; mostly fine sand	
80											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-324</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
80									SM	
81										
82										
83										
84	X	SS 24	11 19 21	11 18						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; few silt; mostly fine sand.
85										
86										
87										
88										
89	X	SS 25	10 13 17	11 18						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; few silt; mostly fine sand
90										
91										
92										
93										
94	X	SS 26	12 15 18	14 18						BEAUMONT; light olive brown (2.5Y 5/4) transitioning to grayish brown (10YR 5/2); silt; SAND (SM); wet; dense; few silt; mostly fine sand
95										
96										
97										
98										
99	X	SS 27	10 13 25	14 18						BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SM); wet; dense; few silt; mostly fine sand
100										Boring Terminated at 100-feet
101										
102										
103										
104										
105										
106										
107										
108										
109										
110										
111										
112										
113										
114										
115										
116										
117										
118										
119										
120										

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-325</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Rotary Wash / 4 inch	Boring Location N 363569.94 E 2943299.2	Total Depth 100 feet	
Drilling Contractor and Rig Lewis Drilling / Mobile B 57	Elevation at boring 30.15 feet	Ground Water Depth 10.5 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 139.58 lbs / 30 inches	No. of Samples 27	Date Started 11/29/06
	Borehole Inclination 0	Logged by G. Geras	Date Completed 12/2/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/ft	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0									CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); dry; soft; little silt; mostly clay	
1	X	SS 1	4	18					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; gravel; CLAY (CH); dry; firm; little silt; mostly clay; trace gravel	
2	X	SS 2	5	18					CH	BEAUMONT; very dark gray (GLEY 1 3/N); silt; CLAY (CH); dry; firm; little silt; mostly clay	
3	X	SS 3	13	18					CH	BEAUMONT; very dark gray (GLEY 1 3/N) to grayish brown (10YR 5/2); silt; CLAY (CH); dry; firm; little silt; mostly clay	
4	X	SS 4	10	18					CH	BEAUMONT; very dark gray (GLEY 1 3/N) to strong brown (7.5YR 4/6); silt; CLAY (CH); dry; firm; some silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
5	X	SS 5	18	18					CH	BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); dry; firm; some silt; mostly clay	
6	X	SS 6	18	18					CH	BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); dry; soft; some silt; mostly clay	
7	X	SS 7	16	18					CH	BEAUMONT; strong brown (7.5YR 4/6); clay; SILT (ML); dry; soft; some clay; mostly silt; trace calcareous nodules	
8	X	SS 8	18	18					ML	BEAUMONT; strong brown (7.5YR 4/6); clay; SILT (ML); wet; soft; little clay; mostly silt; strong reaction with HCl; trace calcareous nodules	Water level at 10.5 feet BGS
9	X	SS 9	18	18					CH	BEAUMONT; strong brown (7.5YR 4/6); clay; SILT (ML); wet; stiff; some clay; mostly silt	
10	X	SS 10	12	18					CH	BEAUMONT; strong brown (7.5YR 4/6) with greenish gray (GLEY 1 6/1) mottling; silt; CLAY (CH); dry; stiff; some silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
11	X	SS 11	17	18					ML	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; stiff; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
12	X	SS 12	3	18					CH	BEAUMONT; strong brown (7.5YR 5/6) with greenish gray (GLEY 1 6/1) mottling; clay; SILT (ML); moist; soft; some clay; mostly silt	
13	X	SS 13	15	18					SM	BEAUMONT; strong brown (7.5YR 5/6); sand; SILT (ML); wet; stiff; little sand; mostly silt	Switch to mud rotary drilling at 27 feet BGS
14	X	SS 14	15	18					SM	BEAUMONT; strong brown (7.5YR 5/6); sand; SILT (ML); wet; stiff; little sand; mostly silt	
15	X	SS 15	8	18					SM	BEAUMONT; dark yellowish brown (10YR 4/6); silt; SAND (SM); moist; dense; little silt; mostly sand	
16	X	SS 16	15	18					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; little silt; mostly fine sand	
17	X	SS 17	11	18					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; some silt; mostly fine sand	

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-325</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
40									SM	
41										
42										
43										
44	X	SS 16	13 13	14 18						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; little silt; mostly fine sand
45										
46										
47										
48										
49	X	SS 17	3 6	18 18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; stiff; little silt; mostly clay
50										
51										
52										
53										
54	X	SS 18	4 4 8	18 18						BEAUMONT; greenish gray (GLEYS 1 6/1); silt; sand; CLAY (CH); dry; stiff; few silt; little fine sand; mostly clay; strong reaction with HCl; trace calcareous nodules
55										
56										
57										
58										
59	X	SS 19	5 8 10	17 18						BEAUMONT; yellowish red (5YR 4/6); silt; sand; CLAY (CH); dry; very stiff; few silt; little fine sand; mostly clay; strong reaction with HCl; trace calcareous nodules
60										
61										
62										
63										
64	X	SS 20	7 10 11	8 18						BEAUMONT; strong brown (7.5YR 4/6); silt; sand; CLAY (CH); dry; very stiff; few silt; mostly clay; strong reaction with HCl; calcareous nodules
65										
66										
67										
68										
69	X	SS 21	8 12 20	11 18					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; some silt; mostly fine sand
70										
71										
72										
73										
74	X	SS 22	6 11 13	12 18					SP	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SP); wet; very firm; little silt; mostly fine sand
75										
76										
77										
78										
79	X	SS 23	13 14 13	12 18					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; little silt; mostly fine sand
80										

Project Name : Job Number STP COL : 5050-06-0496	<b>MACTEC</b> <b>SOIL LOG - Boring No. B-325</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SM		
81											
82											
83											
84	X	SS 24	17 25 21	7.5 18						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; little silt; mostly fine sand	
85											
86											
87											
88											
89	X	SS 25	15 14 20	13 18						BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SM); wet; dense; few silt; mostly fine sand	
90											
91											
92											
93											
94	X	SS 26	9 12 12	5 18						BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SM); wet; very firm; few silt; mostly fine sand	
95											
96											
97											
98											
99	X	SS 27	12 16 27	12 18						BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SM); wet; dense; few silt; mostly fine sand	
100										Boring Terminated at 100 feet	
101											
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											

Project Name : Job Number		<b>SOIL LOG - Boring No. B-326</b>	
<b>MACTEC</b>			
STP COL : 5050-06-0496			
Type and Diameter of Boring Rotary Wash / 4 inch		Boring Location Turbine Bldg Unit 3 N 363572.01 E 2943519.56	Total Depth 150 feet
Drilling Contractor and Rig Gregg #1 / FRASTE MDXL		Elevation at boring 30.44 feet	Ground Water Depth 11.5 feet
Sampling Method Split Spoon		Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 32
		Borehole Inclination 0	Logged by W. Miller
		Reviewed by / Date <i>KM 4/3/07</i>	Date Started 12/14/06
		Reviewed by / Date <i>KAW 4/3/07</i>	Date Completed 12/15/06

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	0	18					CH	FILL; black (GLEY 1 2.5/N); gravel silt; CLAY (CH); moist; stiff; high plasticity; medium toughness; some roots and organics (0-1'); trace limestone gravel	
2	X	SS 2	6	18					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); moist; firm; high plasticity; high toughness	
3	X	SS 3	12	18					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); moist; stiff; high plasticity; medium toughness	
4	X	SS 4	12	18					CH	BEAUMONT; dark gray brown (2.5Y 4/2); silt; CLAY (CH); moist; stiff; high plasticity; high toughness	
5	X	SS 5	18	18					CH	BEAUMONT; olive brown (2.5Y 4/3) with yellow red (5YR 4/6) mottling; silt; CLAY (CH); moist; stiff; high plasticity; high toughness; strong reaction with HCl; trace calcareous nodules (<1/4" diameter dia); trace ferrous nodules (<1/8" dia)	
6	X	SS 6	18	18					CL	BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CL); moist; stiff; low plasticity; low toughness	
7	X	SS 7	14	18					CL	BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CL); moist; stiff; low plasticity; low toughness; strong reaction with HCl; trace (<1/8" dia) calcareous nodules	
8	X	SS 8	12	18	24.5				CH	BEAUMONT; strong brown (7.5YR 4/6) and greenish gray (GLEY 1 6/1); silt; CLAY (CL); moist to wet; firm; low plasticity; low toughness	Water level at 11.5 feet BGS
9	X	SS 9	18	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; strong reaction with HCl; trace (<1/4" dia) calcareous nodules	
10	X	SS 10	8	18					ML	BEAUMONT; greenish gray (GLEY 1 5/1); SILT (ML) moist; firm; low plasticity; low toughness	
11	X	SS 11	2	16	22.289.5				SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; very loose; non-plastic; mostly fine sand; some silt; slight increase in silt (19.5 to 20 feet);	
12	X	SS 12	9	17					CH	BEAUMONT; yellowish red (5YR 4/6) and greenish gray (GLEY 1 6/1); silt; CLAY (CH); moist; hard; high plasticity; high toughness	Switch to mud rotary drilling at feet BGS
13	X	SS 13	13	15	21.337.2				SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; dense; non-plastic; mostly fine sand; some silt	
14	X	SS 14	10	14					SM	BEAUMONT; light yellowish brown (10YR 6/4); silt; SAND (SM); wet; very firm; non-plastic; mostly fine sand; some silt; few medium sand;	
15	X	SS 15	8	16	23.2 7.7				SP-SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SP-SM); wet; very firm; non-plastic; mostly fine	

Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-326</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM	sand; poorly graded	
41											
42											
43											
44	X	SS 16	10 10	12 18							BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; non-plastic; mostly fine sand; some silt
45											
46											
47											
48											
49	X	SS 17	10 5	18 18					CH		BEAUMONT; greenish gray (GLE Y 1 6/1) and yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; trace (<1/8" dia) ferrous nodules
50											
51											
52											
53											
54	X	SS 18	7 10	22 18							BEAUMONT; greenish gray (GLE Y 1 6/1); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; trace (<1/4" dia) calcareous nodules; strong reaction with HCl
55											
56											
57											
58											
59	X	SS 19	7 11	17 18							BEAUMONT; brown (7.5YR 5/4) and trace greenish gray (GLE Y 1 6/1) mottling; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; trace (<1/8" dia) calcareous nodules; strong reaction with HCl; trace (<1/8" dia) ferrous nodules
60											
61											
62											
63											
64	X	SS 20	6 7	21 18							BEAUMONT; mottled brown (7.5YR 5/4) and greenish gray (GLE Y 1 6/1); silt; CLAY (CH); moist; stiff; strong reaction with HCl; few < 1/8" dia. calcareous nodules
65											
66											
67											
68											
69	X	SS 21	10 10	22 18							BEAUMONT; brown (7.5YR 5/4) and greenish gray (GLE Y 1 6/1); silt; CLAY (CH); moist; very stiff; slight gradual increase in silt and fine sand from 69 to 69.3 feet and 69.8 to 69.9 feet
70											
71											
72											
73											
74	X	SS 22	16 21 21	15 18					SM		BEAUMONT; light yellow brown (2.5Y 6/4); silt; SAND (SM); wet; dense; non-plastic; mostly fine sand; few medium sand; some silt
75											
76											
77											
78											
79	X	SS 23	10 11	14 18							BEAUMONT; yellow brown (10YR 5/4); silt; SAND (SM); wet; firm; non-plastic; mostly fine sand; some
80											



Project Name : Job Number 	<b>SOIL LOG - Boring No. B-326</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
80									SM	silt
81										
82										
83										
84	X	SS 24	10 10	17 18						BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; dense; non-plastic; mostly fine sand; little medium sand; some silt
85										
86										
87										
88										
89	X	SS 25	13 17	18 18						BEAUMONT; brown (10YR 5/3); silt; SAND (SM); wet; dense; non-plastic; mostly fine sand; some silt
90										
91										
92										
93										
94	X	SS 26	10 34	14 18						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very dense; non-plastic; mostly fine sand; little medium sand; some silt
95										
96										
97										
98										
99	X	SS 27	23 24	18 18						BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SM); wet; dense; non-plastic; mostly fine sand; some silt
100										
101										
102										
103										
104										
105										
106										
107										
108										
109	X	SS 28	16 13	13 18					SP	BEAUMONT; brown (10YR 5/3); gravel; silt; SAND (SP); wet; very firm; non-plastic; some medium sand; some fine sand; little coarse sand; trace silt; trace fine gravel
110										
111										
112										
113										
114										
115										
116										
117										
118										
119	X	SS 29	11 13	22 18						BEAUMONT; mottled yellowish red (5YR 4/6) and greenish gray (GLEY 1 6/1); silt; CLAY (CH); moist
120										

Project Name : Job Number



SOIL LOG - Boring No. B-326

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120											
121									CH	very stiff, high plasticity; strong reaction with HCl; high toughness; trace <1/8" dia calcareous nodules	
122											
123											
124											
125											
126											
127											
128											
129	X	SS 30	11 13 15	24 18							
130											BEAUMONT; mottled yellowish red (5YR 4/6) and light greenish gray (GLEY 1 7/1); silt; CLAY (CH); moist, very stiff, high plasticity; high toughness
131											
132											
133											
134											
135											
136											
137											
138											
139	X	SS 31	11 13 15	22 18							
140											BEAUMONT; mottled greenish gray (GLEY 1 6/1) and strong brown (7.5YR 5/8); silt; CLAY (CH); moist; hard; high plasticity; high toughness
141											
142											
143											
144											
145											
146											
147											
148											
149	X	SS 32	16 16 16	18 18					SM		
150											BEAUMONT; strong brown (7.5YR 5/8); clay; silt; SAND (SM); wet; dense; non-plastic to low plasticity; mostly fine sand; some silt; little clay. Transitional sequence with gradual increase in fines between 149.0 to 149.3 feet and then increase in coarse materials (decrease fines) from 149.3 to 150 feet bgs. - Note: 149.0 to 149.2 feet - brown (7.5YR 5/4); SILT; moist; hard; low toughness; low plasticity
151											
152											
153											
154											
155											149.2 to 149.3 feet - yellowish red (5YR 4/6); CLAY moist; hard; low plasticity; low toughness
156											Boring Terminated at 150 feet.
157											
158											
159											
160											

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-327</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Rotary Wash / 4 inch			Boring Location Unit 3 - Turbine Building N 363658.77 E 2943233.17		Total Depth 150 feet
Drilling Contractor and Rig Gregg #1 / FRASTE MDXL			Elevation at boring 29.8 feet	Ground Water Depth 23.5 feet	Depth to Bedrock
Sampling Method Split Spoon			Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 32	Date Started 12/2/06
			Borehole Inclination 0	Logged by W. Miller	Date Completed 12/3/06

Reviewed by / Date W 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	12	18					CH	BEAUMONT; black (GLE Y 1 2.5/N); silt; CLAY (CH); moist; firm; high plasticity; high toughness	
2	X	SS 2	18	18					CH	BEAUMONT; black (GLE Y 1 2.5/N); silt; CLAY (CH); moist; soft; high plasticity; high toughness	
3	X	SS 3	19	18					CH	BEAUMONT; black (GLE Y 1 2.5/1) to very dark gray (5Y 3/1) silt; CLAY (CH); moist; firm; high plasticity; high toughness	
4	X	SS 4	22	18					CH	BEAUMONT; olive (5Y 5/3) grading to yellow red (5YR 4/6); silt; CLAY (CH), moist; firm; high plasticity; high toughness; no reaction with HCl; trace gypsum crystals	
5	X	SS 5	22	18					CH	BEAUMONT; yellow red (5YR 4/6) with trace of black streaks; silt; CLAY (CH), moist; firm; high plasticity; medium toughness; strong reaction with HCl; trace calcareous nodules <1/8" dia.	
6	X	SS 6	19	18					CH	BEAUMONT; yellow red (5YR 4/6); silt; CLAY (CH), moist; firm; high plasticity; medium toughness	
7	X	SS 7	24	18					CL	BEAUMONT; yellow red (5YR 4/6); silt; CLAY (CL), moist; firm; low to medium plasticity; low toughness; strong reaction with HCl; trace <1/8" dia. calcareous nodules	
8	X	SS 8	18	18					CH	BEAUMONT; yellow red (5YR 4/6); silt; CLAY (CL), moist; firm; low to medium plasticity; low toughness; strong reaction with HCl; trace <1/8" dia. calcareous nodules	
9	X	SS 9	18	18					CH	BEAUMONT; yellow red (5YR 4/6); silt; CLAY (CL), moist; firm; low to medium plasticity; low toughness; strong reaction with HCl; trace <1/8" dia. calcareous nodules	
10	X	SS 10	12	18					CH	BEAUMONT; yellow red (5YR 4/6); silt; CLAY (CL), moist; firm; low to medium plasticity; low toughness; strong reaction with HCl; trace <1/8" dia. calcareous nodules	
11											
12											
13											
14											
15											
16											
17											
18											
19	X	SS 11	9	18					ML	BEAUMONT; yellow red (5YR 4/6); silt; CLAY (CH), moist; firm; high plasticity; high toughness	
20											
21											
22											
23											
24	X	SS 12	4	6					SM	BEAUMONT; yellow red (5YR 4/6); silt; SAND (SM); wet; loose; non-plastic; mostly fine sand; some silt	Water encountered at approximately 23.5 feet BGS
25											
26											
27											
28											
29	X	SS 13	11	16						BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; dense; non-plastic; mostly fine sand; little silt	
30											
31											
32											
33											
34	X	SS 14	16	15						BEAUMONT; dark yellow brown (10YR 4/6); silt; SAND (SM); wet; very dense; non-plastic; mostly fine sand; little silt	
35											
36											
37											
38											
39	X	SS 15	30	15						BEAUMONT; dark yellow brown (10YR 4/6); silt; SAND (SM); wet; very dense; non-plastic; mostly fine sand; little silt	
40											

Project Name : Job Number



SOIL LOG - Boring No. B-327

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 16	20	21/18					CH	BEAUMONT; yellow red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness	
45											
46											
47											
48											
49	X	SS 17	5/7	24/18						BEAUMONT; yellow red (5YR 4/6) to light olive brown (2.5Y 5/3) with light greenish gray (GLE Y 1 8/1) mottling; silt; CLAY (CH); moist; stiff; high plasticity; high toughness; strong reaction with HCl; trace <1/8" dia calcareous nodules; trace ferrous nodules	
50											
51											
52											
53											
54	X	SS 18	5/10	22/18						BEAUMONT; light olive gray (5Y 6/2) with black mottling; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; strong reaction with HCl; few calcareous nodules; trace ferrous nodules	
55											
56											
57											
58											
59	X	SS 19	6/10	22/18						BEAUMONT; mottled red brown (5YR 5/4) and light greenish gray (GLE Y 1 6/1) with black (GLE Y 1 2.5/N) staining; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; strong reaction with HCl; trace calcareous nodules; trace ferrous nodules	
60											
61											
62											
63											
64	X	SS 20	5/9	21/18						BEAUMONT; brown (7.5YR 5/4) and greenish gray (GLE Y 1 6/1); silt; sand; CLAY (CH); moist; very stiff; high plasticity; high toughness; trace medium sand; strong reaction with HCl; some calcareous nodules	
65											
66											
67											
68											
69	X	SS 21	13/13	10/18					SM	BEAUMONT; brown (7.5YR 5/4) and some greenish gray (GLE Y 1 6/1); silt; clay; SAND (SM); wet; very firm; non-plastic; mostly fine sand; some silt; trace medium sand; trace clay	
70											
71											
72											
73											
74	X	SS 22	12/18	14/18						BEAUMONT; yellow brown (10YR 5/4); silt; SAND (SM); wet; dense; non-plastic; mostly fine sand; some silt	
75											
76											
77											
78											
79	X	SS 23	10/11	14/18						BEAUMONT; dark yellow brown (10YR 4/6); silt; SAND (SM); wet; very firm; non-plastic; mostly fine	
80											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-327</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SM	sand; some silt	
81											
82											
83											
84	X	SS 24	13 24	14 18							
85										BEAUMONT; yellow brown (10YR 5/4); silt; SAND (SM); wet; dense; non-plastic; mostly fine sand; some silt	
86											
87											
88											
89	X	SS 25	11 14	12 18							
90										BEAUMONT; dark yellow brown (10YR 4/4); silt; SAND (SM); wet; very firm; mostly fine sand; little to some silt; trace medium sand	
91											
92											
93											
94	X	SS 26	15 19	18 18							
95									CH	BEAUMONT; brown (10YR 5/3); silt; SAND (SM); wet; dense; non-plastic; mostly fine sand; some silt	
96										BEAUMONT; dark gray brown (10YR 4/2); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness	
97											
98											
99	X	SS 27	17 23	16 18					SM		
100										BEAUMONT; brown (10YR 5/3); silt; SAND (SM); wet; very dense; non-plastic; mostly fine sand; little silt; few medium sand	
101											
102											
103											
104											
105											
106											
107											
108											
109	X	SS 28	22 20	15 18					SP		
110										BEAUMONT; brown (10YR 5/3); silt; SAND (SP); wet; dense; non-plastic; mostly fine and medium sand; trace silt; trace coarse sand	
111											
112											
113											
114											
115											
116											
117											
118											
119	X	SS 29	10 12	23 18					CH		
120										BEAUMONT; light greenish gray (GLEYS 1 7/1) and yellow red (5YR 4/6); silt; CLAY (CH); moist; very	

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-327</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
120								Lithology		
121								Lithology	CH	stiff; high plasticity; high toughness
122								Lithology		
123								Lithology		
124								Lithology		
125								Lithology		
126								Lithology		
127								Lithology		
128								Lithology		
129	X	SS 30	18 39	18 18				Lithology	SM	BEAUMONT; red yellow (7.5YR 6/8) silt; SAND (SM); wet; very dense; non-plastic; mostly fine sand; some silt
130								Lithology		
131								Lithology		
132								Lithology		
133								Lithology		
134								Lithology		
135								Lithology		
136								Lithology		
137								Lithology		
138								Lithology		
139	X	SS 31	11 14	22 18				Lithology	CH	BEAUMONT; red yellow (7.5YR 6/8) with light greenish gray (GLEYS 1 6/1) mottling; silt; CLAY (CH); moist; hard; high plasticity; high toughness; strong reaction with HCl; some <1/8-inch dia. calcareous nodules
140								Lithology		
141								Lithology		
142								Lithology		
143								Lithology		
144								Lithology		
145								Lithology		
146								Lithology		
147								Lithology		
148								Lithology		
149	X	SS 32	17 23	13 18				Lithology	SM	BEAUMONT; yellow brown (10YR 5/4); silt; SAND (SM); wet; dense; non-plastic; mostly fine sand; some silt
150								Lithology		Boring Terminated at 150 feet
151								Lithology		
152								Lithology		
153								Lithology		
154								Lithology		
155								Lithology		
156								Lithology		
157								Lithology		
158								Lithology		
159								Lithology		
160								Lithology		

Project Name : Job Number		<b>SOIL LOG - Boring No. B-328 DH</b>	
STP COL : 5050-06-0496		<b>MACTEC</b>	
Type and Diameter of Boring Rotary Wash /4 inch	Boring Location Unit 3 - Turbine Building N 363660.26 E 2943298.12	Total Depth 218 feet	
Drilling Contractor and Rig Gregg #1 / FRASTE MDXL	Elevation at boring 29.92 feet	Ground Water Depth 38.5 feet	Depth to Bedrock
Sampling Method Split Spoon/UD	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 37	Date Started 10/25/06
	Borehole Inclination 0	Logged by R. Clark/W. Miller	Date Completed 11/7/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/18 Inches	Recovery (inches)	Water Content	Grain Size	Alterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	18	18					CH	BEAUMONT; very dark grayish brown (10YR 3/2); silt; CLAY (CH); moist; soft; high plasticity; weak reaction with HCl; roots	
2	X	SS 2	17	18					CH	BEAUMONT; very dark grayish brown (10YR 3/2) to dark yellowish brown (10YR 4/4); silt; sand; CLAY (CH); moist; stiff; high plasticity; mostly clay; trace coarse grained sand; weak reaction with HCl	
3	X	SS 3	18	18					CH	BEAUMONT; very dark gray (10YR 3/1); silt; CLAY (CH); moist; firm; medium plasticity; little silt; mostly clay	
4	X	SS 4	18	18	22.2		53/36		CH	BEAUMONT; dark grayish brown (10YR 4/2); CLAY (CH); moist; stiff; medium plasticity; weak reaction with HCl	
5	X	SS 5	12	18					CH	BEAUMONT; reddish yellow (7.5YR 6/6); silt; CLAY (CH); moist; firm; medium plasticity; little silt; weak reaction with HCl	
6	X	SS 6	18	18					CH	BEAUMONT; reddish yellow (7.5YR 6/6); silt; CLAY (CH); moist; firm; high plasticity; little silt; weak reaction with HCl	
7	X	SS 7	18	18					CH	BEAUMONT; yellowish red (5YR 5/8); silt; CLAY (CL); moist; firm; low plasticity; some silt; weak reaction with HCl	
8	X	SS 8	18	18	24.1		32/14		CH	BEAUMONT; yellowish red (5YR 5/8); silt; sand; CLAY (CL); moist; soft; low plasticity; few fine sand; some silt; weak reaction with HCl	
9		UD 1	N/A	10					CL	BEAUMONT; yellowish red (5YR 5/8); silt; sand; CLAY (CL); moist; low plasticity; few fine sand; some silt; weak reaction with HCl	
10									CL	BEAUMONT; yellowish red (5YR 5/8); silt; sand; CLAY (CL); moist; low plasticity; few fine sand; some silt; weak reaction with HCl	
11	X	SS 9	4	18	25.0		NV/NP		ML	BEAUMONT; strong brown (7.5YR 5/8); clay; SILT (ML); moist; firm; non-plastic; some clay	
12									ML	BEAUMONT; strong brown (7.5YR 5/8); sand; clay; SILT (ML); moist; very stiff; low plasticity; trace clay; some fine sand	
13									ML	BEAUMONT; strong brown (7.5YR 5/8); sand; clay; SILT (ML); moist; very stiff; low plasticity; trace clay; some fine sand	
14	X	SS 10	17	18	22.1	178.2			ML	BEAUMONT; strong brown (7.5YR 5/8); sand; clay; SILT (ML); moist; very stiff; low plasticity; trace clay; some fine sand	
15									ML	BEAUMONT; strong brown (7.5YR 5/8); sand; clay; SILT (ML); moist; very stiff; low plasticity; trace clay; some fine sand	
16									ML	BEAUMONT; strong brown (7.5YR 5/8); sand; clay; SILT (ML); moist; very stiff; low plasticity; trace clay; some fine sand	
17									ML	BEAUMONT; strong brown (7.5YR 5/8); sand; clay; SILT (ML); moist; very stiff; low plasticity; trace clay; some fine sand	
18									ML	BEAUMONT; strong brown (7.5YR 5/8); sand; clay; SILT (ML); moist; very stiff; low plasticity; trace clay; some fine sand	
19	X	SS 11	17	18					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); moist; dense; non-plastic; some silt; mostly fine sand	
20									SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); moist; dense; non-plastic; some silt; mostly fine sand	
21									SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); moist; dense; non-plastic; some silt; mostly fine sand	
22									SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); moist; dense; non-plastic; some silt; mostly fine sand	
23									SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); moist; dense; non-plastic; some silt; mostly fine sand	
24									SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); moist; dense; non-plastic; some silt; mostly fine sand	
25									SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); moist; dense; non-plastic; some silt; mostly fine sand	
26									SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); moist; dense; non-plastic; some silt; mostly fine sand	
27									SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); moist; dense; non-plastic; some silt; mostly fine sand	
28									SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); moist; dense; non-plastic; some silt; mostly fine sand	
29									SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); moist; dense; non-plastic; some silt; mostly fine sand	
30									SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); moist; dense; non-plastic; some silt; mostly fine sand	
31									SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); moist; dense; non-plastic; some silt; mostly fine sand	
32									SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); moist; dense; non-plastic; some silt; mostly fine sand	
33									SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); moist; dense; non-plastic; some silt; mostly fine sand	
34									SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); moist; dense; non-plastic; some silt; mostly fine sand	
35									SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); moist; dense; non-plastic; some silt; mostly fine sand	
36									SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); moist; dense; non-plastic; some silt; mostly fine sand	
37									SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); moist; dense; non-plastic; some silt; mostly fine sand	
38									SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); moist; dense; non-plastic; some silt; mostly fine sand	
39	X	SS 12	15	16	23.2	6.5			SP-SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SP-SM); wet; dense; non plastic; few silt;	Water level at 38.5 feet BGS
40									SP-SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SP-SM); wet; dense; non plastic; few silt;	

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-328 DH</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SP-SM	mostly fine sand	
41											
42											
43											
44	X	SS 13	10	22 18	26.6		74/51		CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff, medium plasticity; some silt	
45											
46											
47											
48											
49	X	SS 14	5 7	25 18						BEAUMONT; brown (7.5YR 4/4) with some greenish gray (GLEY 1 6/1) mottling; silt; CLAY (CH); moist; stiff, high plasticity	
50											
51											
52											
53											
54		UD 3	N/A	24 24						BEAUMONT; greenish gray (GLEY 1 6/1) with some brown mottling; silt; CLAY (CH); moist; high plasticity	
55											
56											
57											
58											
59	X	SS 15	7 8 10	20 18	25.6		78/51			BEAUMONT; brown (7.5YR 4/4) with some grayish mottling; silt; CLAY (CH); moist; very stiff; high plasticity; trace calcareous nodules	
60											
61											
62											
63											
64	X	SS 16	6 10	19 18						BEAUMONT; brown (7.5YR 4/6) with trace to some gray mottling; silt; CLAY (CH); moist; very stiff; high plasticity; medium to high toughness	
65											
66											
67											
68											
69	X	SS 17	18 28 16	0 18					SM	BEAUMONT; strong brown (7.5YR 5/8); silt; SAND (SM); wet; dense; fine to medium sand	No recovery in soil sample SS-17
70											
71											
72											
73											
74		UD 4	N/A	10 24	25.8	IP				BEAUMONT; yellowish brown (10YR 5/8); silt; SAND (SM); wet; fine sand; non-plastic to low plasticity; mostly fine sand; some silt	
75											
76											
77											
78											
79	X	SS 18	7 15 15	13 18	21.4	11.4			SP-SM	BEAUMONT; dark yellowish brown (10YR 4/4); silt; SAND (SP-SM); wet; very firm; non-plastic; mostly	
80											



Project Name : Job Number



SOIL LOG - Boring No. B-328 DH

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SP-SM	fine sand; few to little silt	
81											
82											
83											
84		UD 5	N/A	0/24							No recovery in sample UD-5
85										BEAUMONT; dark yellowish brown (10YR 4/4); silt; SAND (SP-SM); wet; non-plastic; mostly fine sand; trace medium sand	
86											
87											
88											
89	X	SS 19	13 18 25	14 18	21.0	6.9				BEAUMONT; brown (10YR 5/3); silt; SAND (SP-SM); wet; dense; non-plastic; mostly fine sand; few silt	
90											
91											
92											
93											
94	X	SS 20	8 15 17	17 18						BEAUMONT; brown (10YR 5/3); silt; SAND (SP-SM); wet; dense; non-plastic; mostly fine sand; some silt	
95									CH	BEAUMONT; brown (10YR 4/3); silt; CLAY (CH); moist; hard; high plasticity; high toughness	
96											
97											
98											
99	X	SS 21	13 23 18	19 18	21.0	12.6			CL SM CL	BEAUMONT; brown (10YR 5/3); silt; sand; CLAY (CL); moist; hard; low plasticity; low toughness; little silt; little fine sand	
100											
101										BEAUMONT; dark grayish brown (10YR 4/2); silt; clay; gravel; SAND (SM); wet; dense; non plastic; mostly fine sand; little silt; trace clay; trace gravel; calcareous nodules	
102											
103											
104		UD 6	N/A	0/24					SM	BEAUMONT; brown (10YR 5/3); silt; CLAY (CL); moist; hard; low to medium plasticity	No recovery in sample UD-6
105										BEAUMONT; brown (10YR 4/3); silt; SAND (SM); wet; non-plastic; mostly fine sand; some silt	
106											
107											
108											
109	X	SS 22	13 16 19	12 18	14.6	7.5			SP-SM	BEAUMONT; pale brown (10YR 6/3); silt; SAND (SP-SM); wet; dense; non-plastic; mostly fine to medium sand; few silt; trace coarse sand	
110											
111											
112											
113											
114											
115											
116											
117											
118											
119	X	SS 23	6 8 10	19 18	22.0	9.1	34/18		CL	BEAUMONT; light greenish gray (GLEYS 1 7/1) with yellowish red (5YR 5/6); silt; sand; CLAY (CL);	
120											

Project Name : Job Number



SOIL LOG - Boring No. B-328 DH

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									CL		
121									CL	moist; very stiff; medium plasticity; medium toughness; some silt; trace fine sand	
122											
123											
124											
125											
126											
127											
128											
129	X	SS 24	42 31 46	15 18	21.0	51.3			SM	BEAUMONT; strong brown (7.5YR 4/6); silt; fine SAND (SM); wet; very dense; non-plastic; mostly fine sand; some silt	
130									CL		
131									SM	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CL); moist; hard; low plasticity	
132											
133											
134											
135											
136											
137											
138											
139	X	SS 25	7 11 14	12 18	18.3		50/34		CH	BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CH); moist; very stiff; high plasticity; medium toughness	
140											
141											
142											
143											
144											
145											
146											
147											
148											
149	X	SS 26	21 21 25	18	21.3	25.3			CL SM	BEAUMONT; light grayish green (GLEYS 1 7/1); silt; sand; CLAY (CL); moist; hard; low plasticity; low toughness; some silt; trace fine sand	
150											
151											
152											
153											
154											
155											
156											
157											
158											
159	X	SS 27	16 10 12	18 18	25.4		31/12		CL	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; very firm; non-plastic; mostly fine sand; some silt	
160											

Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-328 DH</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
160									CL	BEAUMONT; brown (7.5YR 5/4); silt; sand; CLAY (CL); moist; very stiff; medium plasticity; trace fine sand; mottled	
161											
162											
163											
164											
165											
166											
167											
168											
169	X	SS 28	9 11 16	23 18					CH		BEAUMONT; reddish brown (5YR 4/6); silt; CLAY (CH); moist; very stiff; high plasticity; medium toughness
170											
171											
172											
173											
174											
175											
176											
177											
178											
179	X	SS 29	10 13 14	23 18	23.6		62/42		CH	BEAUMONT; reddish brown (5YR 4/6); silt; CLAY (CH); moist; very stiff; high plasticity; medium toughness	
180											
181											
182											
183											
184											
185											
186											
187											
188											
189	X	SS 30	11 12 16	3 18	26.5				CH	BEAUMONT; reddish brown (5YR 4/6); silt; CLAY (CH); moist; very stiff; high plasticity; medium toughness	
190											
191											
192											
193											
194											
195											
196											
197											
198											
199	X	SS 31	10 21 34	25 18					SM CH	BEAUMONT; strong brown (7.5YR 5/6); silt; clay; SAND (SM); moist; very dense; non-plastic; mostly	
200											

Project Name : Job Number



**SOIL LOG - Boring No. B-328 DH**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
200											
201										fine sand; some silt; trace clay	End geotechnical drilling and sampling at 200 feet. Drilling continued to 218 feet for geophysical downhole tools and logging
202										BEAUMONT; greenish gray (GLEY 1 5/1); silt; sand; CLAY (CH); moist; hard; medium to high plasticity; medium toughness; trace fine sand; little silt	
203											
204											
205											
206											
207											
208											
209											
210											
211											
212											
213											
214											
215											
216											
217											
218											
219										Boring Terminated at 218 feet	
220											
221											
222											
223											
224											
225											
226											
227											
228											
229											
230											
231											
232											
233											
234											
235											
236											
237											
238											
239											
240											

Project Name: Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-329</b>	
STP COL: 5050-05-0495			
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 3-inch	Boring Location: Unit 3 - Turbine Building N 363658.33 E 2943410.29	Total Depth 100 feet	
Drilling Contractor and Rig MACTEC / RALEIGH / CME 45C	Elevation at boring 29.55 feet	Ground Water Depth 12 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 139.62 lbs / 30 inches	No. of Samples 27	Date Started 12/1/06
	Borehole inclination 0	Logged by D. Tibbals	Date Completed 12/2/06

Reviewed by / Date #IC 5/4/07  
Reviewed by / Date KAW 4/21/07

Depth (feet)	Sample No.	Sample Type & No.	Undisturbed Blows/6 Inches	Recovery (inches)	Water Content	Grain Size	Alteration Limits	Lithology	Soil Type (USCS)	Lithology		Remarks
										Soil Type (USCS)	Remarks	
1	1	SS	11	18					CH	BEAUMONT; dark reddish gray (2.5YR 3/1); silt; CLAY (CH); moist; soft; high plasticity; high toughness; mostly clay; little silt; roots		
2	2	SS	22	18					CH	BEAUMONT; black (5YR 2.5/1); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt; roots		
3	3	SS	17	18					CH	BEAUMONT; black (5YR 2.5/1); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt; roots		
4	4	SS	18	18					CH	BEAUMONT; black (5YR 2.5/1); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt		
5	5	SS	22	18					CH	BEAUMONT; black (5YR 2.5/1); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt		
6	6	SS	10	18					CL	BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt		
7	7	SS	9.5	18					CL	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CL); moist; stiff; low plasticity; low toughness; mostly clay; some silt		
8	8	SS	12	18					ML	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CL); moist; stiff; low plasticity; low toughness; mostly clay; some silt; some calcium carbonate nodules		
9	9	SS	16	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CL); moist; stiff; low plasticity; low toughness; mostly clay; some silt; small calcium carbonate nodules	Water level at 12 feet BGS	
10	10	SS	18	18					CH	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CL); wet; stiff; low plasticity; low toughness; mostly clay; some silt	Switch to mud rotary drilling at 20 feet BGS	
11	11	SS	12	18					ML	BEAUMONT; yellowish red (5YR 5/6); clay; SILT (ML); wet; stiff; high plasticity; mostly silt; some clay	Groundwater Table at 19 feet BGS	
12	12	SS	12	18					SM	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt		
13	13	SS	17	18					SM	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt; small calcium carbonate nodules		
14	14	SS	12	18					SM	BEAUMONT; yellowish red (5YR 5/6); clay; SILT (ML); wet; firm; high plasticity; low toughness; mostly silt; little clay		
15	15	SS	17	18					SM	BEAUMONT; pale brown (10YR 6/3); silt; SAND (SM); wet; dense; fine; poorly graded; mostly sand; trace silt		
16	16	SS	17	18					SM	BEAUMONT; reddish brown (5YR 5/4); silt; SAND (SM); wet; dense; fine; poorly graded; mostly sand; trace silt		
17	17	SS	17	18					SM	BEAUMONT; reddish brown (5YR 5/4); silt; SAND (SM); wet; dense; fine; poorly graded; mostly sand; trace silt		
18	18	SS	12	18					SM	BEAUMONT; brown (7.5YR 4/3); silt; SAND (SM); wet; firm; fine; poorly graded; mostly sand; trace silt		
19	19	SS	10	18					SM	BEAUMONT; brown (7.5YR 4/3); silt; SAND (SM); wet; dense; poorly graded; mostly sand; trace silt		

Project Name: Job Number <b>MACTEC</b> STP COL: 5050-06-0496	<b>SOIL LOG - Boring No. B-329</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blowback Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
40									SM	
41										
42										
43										
44	X	SS 16	16	22					CH	BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt
45										
46										
47										
48										
49	X	SS 17	16	24						BEAUMONT; reddish brown (2.5YR 4/3); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt
50										
51										
52										
53										
54	X	SS 18	15	24						BEAUMONT; greenish gray (Gley 1 6/10Y); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; few silt
55										
56										
57										
58										
59	X	SS 19	10	20						BEAUMONT; reddish brown (5YR 4/3); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
60										
61										
62										
63										
64	X	SS 20	10	23						BEAUMONT; greenish gray (Gley 1 5/10Y); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; few silt
65										
66										
67										
68										
69	X	SS 21	5	23						BEAUMONT; gray (7.5YR 5/1) and strong brown (7.5YR 4/6); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; few silt; calcium carbonate nodules
70										
71										
72										
73										
74	X	SS 22	5	23						BEAUMONT; gray (7.5YR 5/1); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; few silt
75										
76									SM	BEAUMONT; strong brown (7.5YR 5/6); clay; SAND (SM); wet; firm; poorly graded; mostly fine with trace of medium grained sand; few clay
77										
78										
79	X	SS 23	5	11						BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; poorly graded; mostly fine with trace of medium grained sand; few silt
80										

Project Name: Job Number STP-COL 5050-06-0496	<b>SOIL LOG - Boring No. B-329</b>
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Depth (feet)	Sample No.	Sample Type & No.	Uncorrected Blow & Inche	Recovery (Inches)	Water Content	Grain Size	Alterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SM		
81											
82											
83											
84	X	SS 24	5 15	12 18					SP-SM		BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SP-SM); wet, very firm; poorly graded; mostly fine with trace of medium grained sand; few silt
85											
86											
87											
88											
89	X	SS 25	15 20	11 18							BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SP-SM); wet, dense, poorly graded; mostly fine with trace of medium grained sand; few silt
90											
91											
92											
93											
94	X	SS 26	7 18	12 18							BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SP-SM); wet, dense, poorly graded; mostly fine with trace of medium grained sand; trace silt
95											
96											
97											
98											
99	X	SS 27	7 30	13 18							BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SP-SM); wet, firm; poorly graded; mostly fine with trace of medium grained sand; trace silt
100											Boring Terminated at 100 feet
101											
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-330</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Rotary Wash / 4 inch	Boring Location Turbine Bldg #3 N 363660.32 E 2943518.07	Total Depth 150 feet	
Drilling Contractor and Rig Gregg #1 / FRASTE MDXL	Elevation at boring 29.54 feet	Ground Water Depth 18.5 feet	Depth to Bedrock
Sampling Method Split Spoon/UD	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 34	Date Started 12/4/06
	Borehole Inclination 0	Logged by W. Miller	Date Completed 12/6/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	12	0					CH	BEAUMONT; black (5YR 2.5/1); silt; CLAY (CH); moist; soft; high plasticity; medium toughness	
2	X	SS 2	12	15					CH	BEAUMONT; black (5YR 2.5/1); silt; CLAY (CH); moist; soft; high plasticity; high toughness	
3	X	SS 3	12	21					CH	BEAUMONT; black (5YR 2.5/1); silt; CLAY (CH); moist; firm; high plasticity; high toughness	
4	X	SS 4	12	22					CH	BEAUMONT; black (5YR 2.5/1); silt; CLAY (CH); moist; firm; high plasticity; high toughness	
5	X	SS 5	12	18					CH	BEAUMONT; black (5YR 2.5/1); silt; CLAY (CH); moist; firm; high plasticity; medium toughness;	
6	X	SS 6	12	14					CL	slight moisture increase with depth; color changed to yellowish red (5YR 4/6) at approx. 7.4 feet bgs	
7	X	SS 7	12	8					CL	BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CL); moist; firm; low plasticity; medium toughness	
8	X	SS 8	12	15					CL	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CL); moist; stiff; low plasticity; medium toughness;	
9	X	SS 9	12	24					CH	strong reaction with HCl; trace up to 1/2" diameter (dia) calcareous nodules	
10	X	SS 10	12	18					CH	BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CL); moist; firm; low plasticity; low toughness	
11											
12											
13											
14											
15											
16											
17											
18											
19	X	SS 11	12	0					ML	BEAUMONT; yellowish brown (10YR 5/4); SILT (ML); wet; firm; low plasticity; low toughness	Water level at 18.5 feet BGS
20											
21											
22											
23											
24	X	SS 12	12	14					SM	trace gravel at approximately 23 to 23.5 feet bgs BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; loose; non-plastic; mostly fine sand; some silt	
25											
26											
27											
28											
29	X	SS 13	12	14						BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM); wet; dense; non-plastic; mostly fine sand; some silt	
30											
31											
32											
33											
34	X	SS 14	13	15						BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; dense; non-plastic; mostly fine sand; some silt	
35											
36											
37											
38											
39		UD 1A	N/A	0						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; non-plastic; mostly fine sand; some silt	No recovery UD-1A
40											



Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-330</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow(s) Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40											
41		UD 1B	N/A	0	24				SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; non-plastic; mostly fine sand; some silt	No recovery UD-1B
42											
43											
44		SS 15	11 12 13	15 18						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; non-plastic; very firm; mostly fine sand; some silt	
45											
46											
47											
48											
49		SS 16	8 8 8	15 18					CH	BEAUMONT; greenish gray (GLEY 1 6/1); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness	
50											
51											
52											
53											
54		UD 2	N/A	24	24					BEAUMONT; greenish gray (GLEY 1 6/1); silt; CLAY (CH); moist; high plasticity; high toughness	
55											
56											
57											
58											
59		SS 17	7 7 8	18 18						BEAUMONT; greenish gray (GLEY 1 6/1) and yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; low plasticity; low toughness; trace fine sand; some <1/8" dia calcareous nodules	
60											
61											
62											
63											
64		UD 3	N/A	19	24	25.2	3.5 NV/NP		SP	BEAUMONT; greenish gray (GLEY 1 6/1) with trace yellowish red (5YR 4/6) mottling; silt; SAND (SP); moist; low plasticity; low toughness	
65									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; non-plastic; mostly fine sand; some silt	
66											
67											
68											
69		SS 18	14 15 15	16 18						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; non-plastic; mostly fine sand; some silt	
70											
71											
72											
73											
74		SS 19	14 15 12	8 18						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; non-plastic mostly fine sand; trace medium sand at approx 74.4 to 75 feet; some silt	
75											
76											
77											
78											
79		SS 20	17 21 25	19 18						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; non-plastic; mostly fine	
80											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-330</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SM	sand; some silt	
81									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; non-plastic; mostly fine sand; some silt	
82									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; non-plastic; mostly fine sand; some silt	
83									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; non-plastic; mostly fine sand; some silt	
84	X	SS 21	13	14					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; non-plastic; mostly fine sand; some medium sand; little silt	
85									CL	BEAUMONT; grayish brown (10YR 5/2); silt; CLAY (CL); damp; hard; low plasticity; low toughness	
86									CL	BEAUMONT; grayish brown (10YR 5/2); silt; CLAY (CL); damp; hard; low plasticity; low toughness	
87									CL	BEAUMONT; grayish brown (10YR 5/2); silt; CLAY (CL); damp; hard; low plasticity; low toughness	
88									CL	BEAUMONT; grayish brown (10YR 5/2); silt; CLAY (CL); damp; hard; low plasticity; low toughness	
89	X	SS 22	17	18					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very dense; non-plastic; mostly fine sand; some silt	
90									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very dense; non-plastic; mostly fine sand; some silt	
91									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very dense; non-plastic; mostly fine sand; some silt	
92									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very dense; non-plastic; mostly fine sand; some silt	
93									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very dense; non-plastic; mostly fine sand; some silt	
94	X	SS 23	15	13					SM	BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SM); wet; dense; mostly fine sand; some silt	
95									SM	BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SM); wet; dense; mostly fine sand; some silt	
96									SM	BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SM); wet; dense; mostly fine sand; some silt	
97									SM	BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SM); wet; dense; mostly fine sand; some silt	
98									SM	BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SM); wet; dense; mostly fine sand; some silt	
99	X	SS 24	19	15					SM	BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SM); wet; very firm; mostly fine sand; some silt	
100									SM	BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SM); wet; very firm; mostly fine sand; some silt	
101									SM	BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SM); wet; very firm; mostly fine sand; some silt	
102									SM	BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SM); wet; very firm; mostly fine sand; some silt	
103									SM	BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SM); wet; very firm; mostly fine sand; some silt	
104									SM	BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SM); wet; very firm; mostly fine sand; some silt	
105									SM	BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SM); wet; very firm; mostly fine sand; some silt	
106									SM	BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SM); wet; very firm; mostly fine sand; some silt	
107									SM	BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SM); wet; very firm; mostly fine sand; some silt	
108									SM	BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SM); wet; very firm; mostly fine sand; some silt	
109	X	SS 25	8	19					CH	BEAUMONT; dark grayish brown (10YR 4/2); silt; CLAY (CH); moist; hard; high plasticity; high toughness; trace coarse sand at approx. 108.5 feet bgs	
110									SM	BEAUMONT; grayish brown (10YR 5/2); SAND (SM); wet; dense; mostly fine to medium sand; trace coarse sand; trace silt	
111									SM	BEAUMONT; grayish brown (10YR 5/2); SAND (SM); wet; dense; mostly fine to medium sand; trace coarse sand; trace silt	
112									SM	BEAUMONT; grayish brown (10YR 5/2); SAND (SM); wet; dense; mostly fine to medium sand; trace coarse sand; trace silt	
113									SM	BEAUMONT; grayish brown (10YR 5/2); SAND (SM); wet; dense; mostly fine to medium sand; trace coarse sand; trace silt	
114									SM	BEAUMONT; grayish brown (10YR 5/2); SAND (SM); wet; dense; mostly fine to medium sand; trace coarse sand; trace silt	
115									SM	BEAUMONT; grayish brown (10YR 5/2); SAND (SM); wet; dense; mostly fine to medium sand; trace coarse sand; trace silt	
116									SM	BEAUMONT; grayish brown (10YR 5/2); SAND (SM); wet; dense; mostly fine to medium sand; trace coarse sand; trace silt	
117									SM	BEAUMONT; grayish brown (10YR 5/2); SAND (SM); wet; dense; mostly fine to medium sand; trace coarse sand; trace silt	
118									SM	BEAUMONT; grayish brown (10YR 5/2); SAND (SM); wet; dense; mostly fine to medium sand; trace coarse sand; trace silt	
119		UD 4	N/A	0	24						UD-4; Shelby Tube lost downhole
120											

Project Name : Job Number



**SOIL LOG - Boring No. B-330**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
120									SM	
121									SM	
122									SM	
123									SM	
124		UD 4B	N/A	17 24					CH	BEAUMONT; yellowish red (5YR 4/6) with some light greenish gray (GLEY 1 8/1) mottling; silt; CLAY (CH); moist; high plasticity; high toughness
125									CH	
126									CH	
127									CH	
128									CH	
129	X	SS 26	26 26	18 18					ML	BEAUMONT; light brown (7.5YR 6/4); sand; clay; SILT (ML); moist; hard; low plasticity; low toughness; some fine sand, little clay
130									ML	
131									ML	
132									ML	
133									ML	
134									ML	
135									ML	
136									ML	
137									ML	
138									ML	
139	X	SS 27	11 13	16 18					CH	BEAUMONT; light greenish gray (GLEY 1 7/1) with little brownish yellow (10YR 6/8) mottling; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; strong reaction with HCl; trace <1/8" dia calcareous nodules
140									CH	
141									CH	
142									CH	
143									CH	
144									CH	
145									CH	
146									CH	
147									CH	
148									CH	
149	X	SS 28	8 12	15 18					SM	BEAUMONT; alternating 1/4" to 1" thick layers of greenish gray (GLEY 1 6/1) and light yellowish brown (10YR 6/4); silt; SAND (SM); wet; dense; non-plastic; mostly fine sand; some silt
150			20						SM	Boring terminated at 150 feet
151									SM	
152									SM	
153									SM	
154									SM	
155									SM	
156									SM	
157									SM	
158									SM	
159									SM	
160									SM	

Project Name: Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-331</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Rotary Wash / 4 inch	Boring Location N 363635 24 E 284354 1.59	Power Block 10 feet	Total Depth 100 feet
Drilling Contractor and Rig MACTEC / Raleigh / GME 45C	Elevation at boring 29.62 feet	Ground Water Depth 10 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 139.62 lbs / 30 inches	No. of Samples 21	Date Started 12/2/06
	Borehole Inclination 0°	Logged by D. Tibbats	Date Completed 12/3/06

Reviewed by / Date HLC 5/4/07  
 Reviewed by / Date KAW 4/27/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/inch	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
0										
1	X	SS 1	13	10					SP	BEAUMONT, light gray (5YR 7/1); gravel; silt; SAND (SP); dry; firm; mostly fine sand; trace silt; trace gravel; poorly graded sand; calcareous cementation; roots
2	X	SS 2	13	10					CH	BEAUMONT, black (5YR 2.5/1); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; few silt; roots; high organic top soil
3	X	SS 3	13	17					CH	BEAUMONT, black (5YR 2.5/1); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; few silt; roots; high organic top soil
4	X	SS 4	13	16					CH	BEAUMONT, black (5YR 2.5/1); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; few silt; roots; high organic top soil
5	X	SS 5	13	17					CH	BEAUMONT, black (5YR 2.5/1); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; few silt; roots; high organic top soil
6	X	SS 6	13	16					CH	BEAUMONT, black (5YR 2.5/1); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; few silt; roots; high organic top soil
7	X	SS 7	13	17					CH	BEAUMONT, black (5YR 2.5/1); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; few silt; roots; high organic top soil
8	X	SS 8	13	16					CH	BEAUMONT, black (5YR 2.5/1); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; few silt; roots; high organic top soil
9	X	SS 9	13	16					CH	BEAUMONT, black (5YR 2.5/1); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; few silt; roots; high organic top soil
10	X	SS 10	13	13					ML	BEAUMONT, brown (7.5YR 5/3); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt
11	X	SS 11	13	13					CH	BEAUMONT, strong brown (7.5YR 4/6); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt; calcareous cementation
12	X	SS 12	13	16					CH	BEAUMONT, yellowish red (5YR 4/6); clay; SILT (ML); wet; firm; high plasticity; medium toughness; mostly silt; little clay
13	X	SS 13	13	16					ML	BEAUMONT, yellowish red (5YR 4/6); clay; SILT (ML); wet; firm; high plasticity; medium toughness; mostly silt; little clay
14	X	SS 14	13	23					ML	BEAUMONT, yellowish red (5YR 4/6); clay; SILT (ML); wet; firm; high plasticity; medium toughness; mostly silt; little clay
15										
16										
17										
18										
19	X	SS 19	13	18					CH	BEAUMONT, red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt; calcareous nodules
20	X	SS 20	13	18					CH	BEAUMONT, yellowish red (5YR 4/6); clay; SILT (ML); wet; firm; high plasticity; medium toughness; mostly silt; little clay
21										
22										
23										
24	X	SS 24	17	12					SM	BEAUMONT, light brown (7.5YR 6/4); silt; SAND (SM); wet; dense; mostly fine sand; trace silt; poorly graded sand
25										
26										
27										
28										
29	X	SS 29	5	12						BEAUMONT, reddish yellow (7.5YR 7/6); silt; SAND (SM); wet; very firm; mostly fine sand; trace silt; poorly graded sand
30										
31										
32										
33										
34	X	SS 34	10	12						BEAUMONT, brown (7.5YR 5/2); silt; SAND (SM); wet; firm; mostly fine sand; trace silt; poorly graded sand
35										
36										
37										
38										
39	X	SS 39	10	18						BEAUMONT, brown (7.5YR 5/2); silt; SAND (SM); wet; firm; mostly fine sand; trace silt; poorly graded
40										

Water level at 10 feet BGS

Switch to mud rotary drilling at 23.5 feet BGS

Project Name : Job Number <b>MACTEC</b>	<b>SOIL LOG - Boring No. B-331</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow 6 inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM	sand	
41											
42											
43											
44	X	SS 16	7 10	13 18							BEAUMONT; brown (7.5YR 5/2); silt; SAND (SM); wet; firm; mostly fine sand; trace silt; poorly graded sand
45											
46											
47											
48											
49	X	SS 17	10 10	17 18							BEAUMONT; brown (7.5YR 5/2); silt; SAND (SM); wet; firm; mostly fine sand; trace silt; poorly graded sand
50											
51											
52											
53											
54	X	SS 18	10 10	22 18					CH		BEAUMONT; light greenish gray (GLE 1 7/10Y); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt; calcareous nodules
55											
56											
57											
58											
59	X	SS 19	10 13	22 18							BEAUMONT; greenish gray (GLE 1 6/5GY) with reddish yellow (5YR 6/8) mottling; silt; CLAY (CH); moist; very stiff; high toughness; mostly clay; little silt; calcareous nodules
60											
61											
62											
63											
64	X	SS 20	8 11	24 18							BEAUMONT; greenish gray (GLE 1 6/5GY) with light reddish brown (5YR 5/4) mottling; silt; CLAY (CH); moist; very stiff; high toughness; high plasticity; mostly clay; little silt
65											
66											
67											
68											
69	X	SS 21	7 17	14 18					SP-SM		BEAUMONT; brown (7.5YR 4/4); silt; SAND (SP-SM); wet; very firm; mostly fine sand; trace silt; poorly graded sand
70											
71											
72											
73											
74	X	SS 22	8 15	15 18							BEAUMONT; brown (7.5YR 4/4); silt; SAND (SP-SM); wet; very firm; mostly fine sand; trace silt; poorly graded sand
75											
76											
77											
78											
79	X	SS 23	10 11 12	17 18							BEAUMONT; brown (7.5YR 5/4); silt; SAND (SP-SM); wet; very firm; mostly fine sand; trace silt;
80											

Project Name: Job Number **MAGTEC** **SOIL LOG - Boring No. B-331**  
 STP:COL: 5050-06-0495

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow/ft Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SM	poorly graded	
81											
82											
83											
84	X	SS 24	6 13	13 18							
85										BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; very firm; mostly fine sand; trace silt; poorly graded sand	
86											
87											
88											
89	X	SS 25	6 8	21 18							
90									SC	BEAUMONT; brown (7.5YR 4/4); clay; SAND (SC); wet; firm; mostly fine sand; little clay; poorly graded sand	
91											
92											
93											
94	X	SS 26	11 15	16 18							
95									SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; very firm; mostly fine sand; trace clay; poorly graded sand	
96											
97											
98											
99	X	SS 27	18 28	17 18							
100										BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; very dense; mostly fine sand; trace silt; poorly graded	
101										Boring Terminated at 100 feet	
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-332</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Rotary Wash / 4 inch			Boring Location Unit 3 - Power Block N 363738.5 E 2943601.33		Total Depth 150 feet
Drilling Contractor and Rig Gregg #1 / FRASTE MDXL			Elevation at boring 30.26 feet	Ground Water Depth	Depth to Bedrock
Sampling Method Split Spoon/UD			Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 31	Date Started 10/21/06
			Borehole Inclination 0	Logged by R. Clark	Date Completed 10/24/06

Reviewed by / Date KAR 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	
0												
1	X	SS 1	13	5 18					CH	BEAUMONT; brown (10YR 5/3); silt; CLAY (CH), moist; firm; roots present	Start drilling with mud rotary	
2	X	SS 2	13	18 18						BEAUMONT; brown (10YR 5/3); silt; sand; CLAY (CH), wet; firm; roots present; trace coarse sand		
3		UD 1	N/A	26 24	23.1	93.4	70/45			BEAUMONT; brown (10YR 5/3); silt; sand; CLAY (CH), wet; trace coarse sand		
4												
5												
6												
7	X	SS 3	13	18 18					CL	BEAUMONT; brown (10YR 5/3); silt; sand; CLAY (CH), wet; firm; medium-high plasticity; trace silt; some fine sand; calcareous nodules		
8	X	SS 4	13	18 18					CL	BEAUMONT; reddish yellow (7.5R 6/6); silt; CLAY (CL), wet; firm; low-medium plasticity		
9	X	SS 5	13	18 18					CL	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CL), wet; soft; low plasticity		
10	X	SS 6	13	12 18					CH	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH), wet; firm; low plasticity		
11	X	SS 7	13	16 18					CL	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CL), wet; soft; low plasticity		
12	X	SS 8	13	18 18					CL	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CL), moist; stiff; low plasticity; medium toughness		
13												
14												
15												
16												
17												
18												
19	X	SS 9	4 7	18 18					ML	BEAUMONT; light reddish brown (5YR 6/4); clay; sand; SILT (ML); moist; stiff; low plasticity; some clay; trace fine sand		
20												
21												
22												
23												
24		UD 2	N/A	6 24						BEAUMONT; light reddish brown (5YR 6/4); SILT (ML); wet		
25												
26												
27												
28												
29	X	SS 10	4 6	18 18					SM	BEAUMONT; brownish yellow (10YR 6/6); silt; clay; SAND (SM); wet; firm; fine sand; some silt; trace clay		
30												
31												
32												
33												
34	X	SS 11	5 12	17 18						BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM); wet; firm; mostly fine sand; some silt		
35												
36												
37												
38												
39	X	SS 12	1 12	15 18						BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM); wet; very firm; mostly fine sand; some silt		
40												

Project Name : Job Number



**SOIL LOG - Boring No. B-332**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 13	12 14 16	18 18							BEAUMONT; reddish yellow (7.5YR 6/6); silt; SAND (SM); wet; very firm; mostly fine sand; some silt
45											
46											
47											
48											
49	X	SS 14	7 8 7	18 18							BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM); wet; firm; fine sand; some silt
50									CL		BEAUMONT; brownish yellow (10YR 6/6); sand; CLAY (CL); wet; stiff; low plasticity
51											
52											
53											
54	X	SS 15	6 7 9	18 18					CH		BEAUMONT; pale brown (2.5Y 8/4); sand; CLAY (CH); moist; very stiff; fine sand; some coarse calcareous nodules
55											
56											
57											
58											
59	X	SS 16	6 8 7	18 18					SM		BEAUMONT; reddish yellow (7.5YR 6/6); silt; SAND (SM); wet; firm; fine sand; little silt; strong reaction with HCl; some calcareous nodules
60											
61											
62											
63											
64	X	SS 17	8 11 12	18 18							BEAUMONT; reddish yellow (7.5YR 6/6); silt; SAND (SM); wet; very firm; mostly fine sand; little silt; strong reaction with HCl
65											
66											
67											
68											
69	X	SS 18	7 11 16	16 18					SP		BEAUMONT; light yellowish brown (10YR 6/4); silt; SAND (SP); wet; very firm; non-plastic; mostly fine sand; trace silt; poorly graded; strong reaction with HCl
70											
71											
72											
73											
74	X	SS 19	10 13 14	18 18					SM		BEAUMONT; light yellowish brown (10YR 6/4); silt; SAND (SM); wet; very firm; mostly fine sand; little silt; strong reaction with HCl
75											
76											
77											
78											
79	X	SS 20	8 19 19	17 18							BEAUMONT; light yellowish brown (10YR 6/4); silt; SAND (SM); wet; dense; mostly fine sand; little silt; strong reaction with HCl
80											



Project Name : Job Number 	<b>SOIL LOG - Boring No. B-332</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
80									SM	
81										
82										
83										
84	X	SS 21	12 17	18 18					SP	BEAUMONT; light yellowish brown (10YR 6/4); silt; SAND (SP); wet; dense; non-plastic; mostly fine sand; few silt; poorly graded; strong reaction with HCl
85										
86										
87										
88										
89	X	SS 22	11 10	18 18					SM	BEAUMONT; light yellowish brown (10YR 6/4); silt; SAND (SM); wet; dense; mostly fine sand; little silt; strong reaction with HCl
90										
91										
92										
93										
94	X	SS 23	10 12	16 18					SM	BEAUMONT; light yellowish brown (10YR 6/4); silt; SAND (SM); wet; very firm; mostly fine sand; trace silt; poorly graded; weak reaction with HCl
95										
96										
97										
98										
99	X	SS 24	9 15	14 18						BEAUMONT; light yellowish brown (10YR 6/4); silt; SAND (SM); wet; dense; non-plastic; mostly fine sand; trace silt; poorly graded; weak reaction with HCl
100										
101										
102										
103										
104										
105										
106										
107										
108										
109	X	SS 25	7 11	18 18					SW	BEAUMONT; light yellowish brown (10YR 6/4); silt; gravel; SAND (SW); wet; very firm; subangular to subrounded sand; little gravel; trace silt; weak reaction with HCl
110										
111										
112										
113										
114										
115										
116										
117										
118										
119	X	SS 26	10 11	18 18					ML	BEAUMONT; reddish yellow (5YR 6/6); clay; SILT (ML); moist; very stiff; mostly silt; some clay;
120										

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-332</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									ML	medium plasticity; weak reaction with HCl	
121											
122											
123											
124											
125											
126											
127											
128											
129	SS 27		15	9					SM	BEAUMONT; reddish yellow (7.5YR 6/6); silt; SAND (SM); wet; very dense; mostly fine sand; some silt; weak reaction with HCl	
130			50/6"	18							
131											
132											
133											
134											
135											
136											
137											
138											
139	SS 28		8	13	18				CL	BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CL); moist; hard; mostly clay; little silt; weak reaction with HCl	
140			13	21	18						
141											
142											
143											
144											
145											
146											
147											
148											
149	SS 29		10	7	0					BEAUMONT; CLAY (CL); hard	No recovery in sample SS-28
150			16	18						Boring Terminated at 150 feet	
151											
152											
153											
154											
155											
156											
157											
158											
159											
160											

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-333</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 4 inch		Boring Location N 363744.16 E 2943360.57		Switch Yard Total Depth 100 feet	
Drilling Contractor and Rig MACTEC / RALEIGH / CME 45L		Elevation at boring 30.48 feet		Ground Water Depth 8 feet	
Sampling Method Split Spoon/UD		Sample Driving Hammer/Drop 139.62 lbs / 30 inches		No. of Samples 26	
		Borehole Inclination 0		Date Started 11/29/06	
		Logged by D. Tibbals		Date Completed 12/1/06	

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	3	10					CH	BEAUMONT; brown (7.5YR 4/2); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt; roots	
2	X	SS 2	2	9					CH	BEAUMONT; black (7.5YR 2.5/1); silt; CLAY (CH); moist; soft; high plasticity; high toughness; mostly clay; little silt	
3	X	SS 3	5	20					CH	BEAUMONT; black (7.5YR 2.5/1); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
4	X	SS 4	1	15					CH	BEAUMONT; very dark gray (7.5YR 3/1); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
5	X	SS 5	9	9					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
6											
7											
8		UD 1	N/A	16	23.7	96.5	43/27		CL	BEAUMONT; yellowish red (5YR 5/8); silt; CLAY (CL); moist; high plasticity; high toughness; mostly clay; little silt	Water level at 8 feet BGS
9											
10											
11	X	SS 6	4	25					CL	BEAUMONT; yellowish red (5YR 5/8); silt; CLAY (CL); moist; firm; high plasticity; high toughness; mostly clay; little silt	
12	X	SS 7	4	15					CL	BEAUMONT; yellowish red (5YR 5/8); silt; CLAY (CL); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
13	X	SS 8	10	21					CL	BEAUMONT; yellowish red (5YR 5/8); silt; CLAY (CL); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
14											
15											
16											
17											
18											
19		UD 2	N/A	24	23	96.3	30/11		CL	BEAUMONT; yellowish red (5YR 5/8); silt; CLAY (CL); moist; high plasticity; high toughness; mostly clay; little silt	Switch to mud rotary drilling at 20 feet BGS
20											
21											
22											
23											
24	X	SS 9	unc	19					SM	BEAUMONT; yellowish red (5YR 5/6); silt; SAND (SM); wet; loose; mostly fine sand; trace silt; poorly sorted	
25											
26											
27											
28											
29	X	SS 10	7	14					SM	BEAUMONT; yellowish red (5YR 5/6); silt; SAND (SM); wet; very firm; mostly fine sand; poorly graded; trace silt	
30											
31											
32											
33											
34	X	SS 11	16	18					SM	BEAUMONT; yellowish red (5YR 5/6); silt; SAND (SM); wet; dense; mostly fine sand; trace silt; poorly graded	
35											
36											
37											
38											
39	X	SS 12	15	17					SM	BEAUMONT; yellowish red (5YR 5/6); silt; SAND (SM); wet; very dense; mostly fine sand; trace silt; poorly graded	
40											

Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-333</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 13	4 7 9	19 18					CH	BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
45											
46											
47											
48											
49	X	SS 14	4 7 7	18 18						BEAUMONT; olive (5Y 5/4) with gray mottling; silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
50											
51											
52											
53											
54	X	SS 15	10 11 9	20 18						BEAUMONT; gray (5Y 6/1); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; few silt; little calcareous nodules	
55											
56											
57											
58											
59	X	SS 16	7 9 8	20 18						BEAUMONT; yellowish red (5YR 5/8); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; few silt; little calcareous nodules	
60											
61											
62											
63											
64	X	SS 17	9 17 18	16 18					SP	BEAUMONT; reddish brown (5YR 5/4); silt; SAND (SP); wet; dense; mostly fine sand; trace silt; poorly graded	
65											
66											
67											
68											
69	X	SS 18	10 11 9	19 18					CH	BEAUMONT; reddish brown (5YR 5/4); silt; SAND (SP); wet; firm; mostly fine sand; trace silt; poorly graded	
70										BEAUMONT; gray (5Y 6/1); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; few silt	
71											
72											
73											
74	X	SS 19	12 12 15	16 18					SM	BEAUMONT; reddish brown (5YR 5/4); silt; SAND (SM); wet; very firm; mostly fine sand; trace silt; poorly graded	
75											
76											
77											
78											
79	X	SS 20	10 11 9	16 18						BEAUMONT; reddish brown (5YR 5/4); silt; SAND (SM); wet; firm; mostly fine sand; trace silt; poorly graded	
80											

Project Name : Job Number



**SOIL LOG - Boring No. B-333**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SM		
81											
82											
83											
84	X	SS 21	24	20							BEAUMONT; reddish gray (5YR 5/2); silt; SAND (SM); wet; loose; mostly fine sand; trace silt; poorly graded
85											
86											
87											
88											
89	X	SS 22	19	15							BEAUMONT; reddish gray (5YR 5/2); silt; SAND (SM); wet; firm; mostly fine sand; trace silt; poorly graded
90											
91											
92											
93											
94	X	SS 23	12	12							BEAUMONT; light brown (7.5YR 6/4); silt; SAND (SM); wet; dense; mostly fine sand; trace silt; poorly graded
95			23	20							
96											
97											
98											
99	X	SS 24	4	19							BEAUMONT; light brown (7.5YR 6/4); silt; SAND (SM); wet; firm; mostly fine sand; trace silt; poorly graded
100			5	18					CH		BEAUMONT; light brown (7.5YR 6/4); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt
101											Boring Terminated at 100 feet
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-334</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 3 inch	Boring Location N 363751.04 E 2943254.47	Switch Yard	Total Depth 100 feet
Drilling Contractor and Rig MACTEC / Raleigh / CME 45C	Elevation at boring 30.48 feet	Ground Water Depth 12 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 139.62 lbs / 30 inches	No. of Samples 27	Date Started 11/21/06
	Borehole Inclination 0	Logged by D. Tibbals	Date Completed 11/29/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/ft	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	14	10					CH	BEAUMONT; black (7.5YR 2.5/1); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt; roots	
2	X	SS 2	14	12					CH	BEAUMONT; black (7.5YR 2.5/1); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt; roots	
3	X	SS 3	14	17					CH	BEAUMONT; black (7.5YR 2.5/1); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
4	X	SS 4	14	17					CH	BEAUMONT; black (7.5YR 2.5/1); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
5	X	SS 5	14	22					CH	BEAUMONT; black (7.5YR 2.5/1); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
6	X	SS 6	14	18					CH	BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt; black stains	
7	X	SS 7	14	18					CH	BEAUMONT; reddish brown (5YR 4/3); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt; calcareous cementation; concretions	
8	X	SS 8	14	22					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
9	X	SS 9	14	23					CH	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt; calcareous nodules	
10	X	SS 10	14	18					CH	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); wet; firm; high plasticity; high toughness; mostly clay; little silt; wet at 12 to 12.5 feet; moist at 12.5 to 13.5 feet	
11	X	SS 11	22	19					SC	BEAUMONT; red (2.5YR 4/8); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	Water level at 12 feet BGS
12	X	SS 12	14	18					SC	BEAUMONT; red (2.5YR 4/8); silt; CLAY (CH); wet; soft; high plasticity; high toughness; mostly clay; little silt	Switch to Mud Rotary drilling at 15 feet BGS
13	X	SS 13	14	18					SM	BEAUMONT; red (2.5YR 4/8); clay; SAND (SC); wet; very loose; mostly fine sand; little clay; poorly graded	
14	X	SS 14	14	18					SM	BEAUMONT; red (2.5YR 4/8); clay; SAND (SC); wet; firm; mostly fine sand; little clay; poorly graded	
15	X	SS 15	14	18					SM	BEAUMONT; yellowish brown (10YR 5/4); clay; SAND (SM); wet; firm; mostly fine sand; trace clay; poorly graded	
16	X	SS 16	14	24					SM	BEAUMONT; yellowish brown (10YR 5/4); clay; SAND (SM); wet; very firm; mostly fine sand; trace clay; poorly graded	
17	X	SS 17	14	18					SM	BEAUMONT; light yellowish brown (10YR 6/4); silt; SAND (SM); wet; dense; mostly fine sand; trace	

Project Name : Job Number



**SOIL LOG - Boring No. B-334**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM	clay, poorly graded	
41											
42											
43											
44	X	SS 16	10	18					CH	BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
45											
46											
47											
48											
49	X	SS 17	10	20						BEAUMONT; greenish gray (GLEY 2 6/10BG); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
50											
51											
52											
53											
54	X	SS 18	10	27						BEAUMONT; greenish gray (GLEY 1 5/10Y); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt; little calcareous nodules; iron stains	
55											
56											
57											
58											
59	X	SS 19	6	20						BEAUMONT; greenish gray (GLEY 1 5/10Y); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt; little calcareous nodules; iron stains	
60											
61											
62											
63											
64	X	SS 20	6	23						BEAUMONT; greenish gray (GLEY 1 6/10Y); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt; calcareous nodules; black stains	
65											
66											
67											
68											
69	X	SS 21	4	12					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; very firm; mostly fine sand; trace silt; poorly graded	
70											
71											
72											
73											
74	X	SS 22	10	12						BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; very firm; mostly fine sand; trace silt; poorly graded	
75											
76											
77											
78											
79	X	SS 23	8	12						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; mostly fine sand; trace	
80											

Project Name : Job Number <div style="text-align: right; font-weight: bold; font-size: 1.2em;"> </div> STP COL : 5050-06-0496	SOIL LOG - Boring No. B-334
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
80									SM	silt; poorly graded
81										
82										
83										
84	X	SS 24	13 14	13 18						BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; very firm; mostly fine sand; trace silt; trace medium sand; poorly graded
85										
86										
87										
88										
89	X	SS 25	29 30	19 18						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very dense; mostly fine sand; trace silt; poorly graded
90										
91										
92										
93										
94	X	SS 26	8 13	18 18						BEAUMONT; dark brown (7.5YR 3/2); silt; SAND (SM); wet; very firm; mostly fine sand; trace silt; trace medium sand; poorly graded
95										
96										
97										
98										
99	X	SS 27	23 24	15 18						BEAUMONT; dark brown (7.5YR 3/2); silt; SAND (SM); wet; dense; mostly fine sand; trace silt; trace medium sand; poorly graded
100										Boring Terminated at 100 feet
101										
102										
103										
104										
105										
106										
107										
108										
109										
110										
111										
112										
113										
114										
115										
116										
117										
118										
119										
120										



Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-335</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 4 inch	Boring Location N 363735.38 E 2943042.5	Maintenance Shop	Total Depth 75 feet
Drilling Contractor and Rig Lewis Drilling / B 57	Elevation at boring 31.15 feet	Ground Water Depth 14.5 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 139.6 lbs / 30 inches	No. of Samples 22	Date Started 11/17/06
	Borehole Inclination 0	Logged by G. Geras	Date Completed 11/18/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	2	8.5					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); dry; soft; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
2	X	SS 2	2	13.5					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); dry; firm; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
3	X	SS 3	2	11					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); dry; stiff; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
4	X	SS 4	2	8					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); dry; stiff; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
5	X	SS 5	2	10					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); dry; stiff; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
6	X	SS 6	2	10					CH	BEAUMONT; black (GLEY 1 2.5/N) mottled yellowish red (5YR 4/6); silt; CLAY (CH); stiff; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
7	X	SS 7	2	16					CH	BEAUMONT; black (GLEY 1 2.5/N) mottled yellowish red (5YR 4/6); silt; CLAY (CH); stiff; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
8	X	SS 8	2	17					MH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; stiff; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
9	X	SS 9	2	16					MH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; stiff; some silt; mostly clay	
10	X	SS 10	2	18					MH	BEAUMONT; yellowish red (5YR 4/6); clay; SILT (MH); moist; firm; some clay; mostly silt	
11											
12											
13											
14											
15											Water level at 14.5 feet BGS
16											
17											
18											
19	X	SS 11	4	16					CH	BEAUMONT; yellowish red (5YR 4/6); clay; SILT (MH); moist; firm; little clay; mostly silt	
20											
21											
22											
23											
24	X	SS 12	5	16					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; some silt; mostly fine sand	
25											
26											
27											
28											
29	X	SS 13	2	15						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; loose; some silt; mostly fine sand	
30											
31											
32											
33											
34	X	SS 14	2	18						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very loose; some silt; mostly fine sand	Switch to Mud Rotary drilling at 35 feet BGS
35											
36											
37											
38											
39	X	SS 15	4	11						BEAUMONT; dark yellowish brown (10YR 4/6); silt; SAND (SM); wet; firm; little silt; mostly fine sand	
40											

Project Name : Job Number



SOIL LOG - Boring No. B-335

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 16	2000	12.5	18					BEAUMONT; dark yellowish brown (10YR 4/6); silt; SAND (SM); wet; firm; some silt; mostly fine sand	
45									CH	BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CH); dry; very stiff; some silt; mostly clay	
46											
47											
48											
49	X	SS 17	202	18	18					BEAUMONT; yellowish red (5YR 4/6) and brown (7.5YR 5/4); silt; sand; CLAY (CH); dry; firm; trace sand; some silt; mostly clay; alternating laminae of silt; clay; and sand	
50											
51											
52											
53											
54	X	SS 18	1010	18	18					BEAUMONT; greenish gray (GLEYS 1 5/1); sand; silt; CLAY (CH); dry; stiff; few sand; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
55											
56											
57											
58											
59	X	SS 19	5004	18	18					BEAUMONT; mottled greenish gray (GLEYS 1 6/1) and yellowish brown (10YR 5/4); silt; sand; CLAY (CH); dry; stiff; little sand; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
60											
61											
62											
63											
64	X	SS 20	574	18	18					BEAUMONT; mottled greenish gray (GLEYS 1 6/1) and yellowish brown (10YR 5/4); sand; silt; CLAY (CH); dry; stiff; few sand; some silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
65											
66											
67											
68											
69	X	SS 21	5005	18	18					BEAUMONT; mottled greenish gray (GLEYS 1 6/1) and yellowish red (5YR 4/6); silt; CLAY (CH); dry; stiff; some silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
70											
71											
72											
73											
74	X	SS 22	4204	14	18				SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; loose; little silt; mostly fine sand	
75										Boring Terminated at 75 feet	
76											
77											
78											
79											
80											

Project Name : Job Number		<b>SOIL LOG - Boring No. B-336</b>	
STP COL : 5050-06-0496		<b>MACTEC</b>	
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 4 inch	Boring Location N 363680.97 E 2942936.21	Maintenance Shop	Total Depth 75 feet
Drilling Contractor and Rig Lewis Drilling / B 57	Elevation at boring 31.1 feet	Ground Water Depth 4.8 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 139.58 lbs / 30 inches	No. of Samples 22	Date Started 11/15/06
	Borehole Inclination 0	Logged by G. Geras	Date Completed 11/16/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	14	18					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); dry; firm; little silt; mostly clay; trace organics	
2	X	SS 2	10	18					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); dry; firm; little silt; mostly clay; trace organics	
3	X	SS 3	11	18					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); dry; firm; little silt; mostly clay	
4	X	SS 4	9	18					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); dry; firm; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules	Water level at 4.8 feet BGS
5	X	SS 5	15	18					CH	BEAUMONT; dark gray (GLEY 1 4/N) to yellowish red (5YR 4/6); silt; CLAY (CH); dry; firm; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
6	X	SS 6	14	18					CH	BEAUMONT; dark gray (GLEY 1 4/N) to yellowish red (5YR 4/6); silt; CLAY (CH); dry; firm; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
7	X	SS 7	18	18					ML	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; firm; some silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
8	X	SS 8	18	18					ML	BEAUMONT; yellowish red (5YR 4/6); clay; SILT (ML); moist; soft; mostly silt; little clay	
9	X	SS 9	18	18					CH	BEAUMONT; yellowish red (5YR 4/6); clay; SILT (ML); moist; soft; mostly silt; little clay	
10	X	SS 10	15	18					ML	BEAUMONT; yellowish red (5YR 4/6); clay; SILT (ML); moist; soft; mostly silt; some clay	
11											
12											
13											
14											
15											
16											
17											
18											
19	X	SS 11	16	18					CH	BEAUMONT; yellowish red (5YR 5/6); clay; SILT (ML); moist; firm; mostly silt; some clay	
20											
21											
22											
23											
24	X	SS 12	10	15	18				SM	BEAUMONT; brown (7.5YR 5/3); silt; SAND (SM); moist; dense; some silt; mostly fine sand	
25											
26											
27											
28											
29	X	SS 13	17	18						BEAUMONT; brown (7.5YR 5/4); clay; silt; SAND (SM); wet; loose; few clay; some silt; mostly fine sand	
30											
31											
32											
33											
34	X	SS 14	13	18						BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; some silt; mostly fine sand	Switch to Mud Rotary drilling at 35 feet BGS
35											
36											
37											
38											
39	X	SS 15	6	14	18					BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; some silt; mostly sand	
40											

Project Name : Job Number



**SOIL LOG - Boring No. B-336**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 16	53	18					CH	BEAUMONT; strong brown (7.5YR 4/6); sand; silt; CLAY (CH); dry; firm; trace sand; little silt; mostly clay	
45											
46											
47											
48											
49	X	SS 17	57	16					ML	BEAUMONT; yellowish red (5YR 4/6) and yellowish brown (10YR 5/4); clay; SILT (ML); dry to moist; stiff; some clay; mostly silt	
50											
51											
52											
53											
54	X	SS 18	54	18					CH	BEAUMONT; greenish gray (GLEYS 1 5/1); sand; CLAY (CH); dry; stiff; little sand; mostly clay; strong reaction with HCl; trace calcareous nodules	
55											
56											
57											
58											
59	X	SS 19	50	18						BEAUMONT; brown (7.5YR 4/4) mottled (GLEYS 1 5/1); sand; silt; CLAY (CH); dry; very stiff; little sand; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
60											
61											
62											
63											
64	X	SS 20	50	18						BEAUMONT; mottled greenish gray (GLEYS 1 5/1) and dark yellowish brown (10YR 4/4); sand; CLAY (CH); dry; very stiff; little silt; little sand; mostly clay; strong reaction with HCl; trace calcareous nodules	
65											
66											
67											
68											
69	X	SS 21	43	11					SM	BEAUMONT; dark yellowish brown (10YR 4/6); silt; SAND (SM); wet; loose; little silt; mostly fine sand	
70											
71											
72											
73											
74	X	SS 22	16	12						BEAUMONT; dark yellowish brown (10YR 4/4); silt; SAND (SM); wet; dense; little silt; mostly fine sand	
75										Boring Terminated at 75 feet	
76											
77											
78											
79											
80											

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-337</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 4 inch		Boring Location Unit 3 - Maintenance Shop N 363680.83 E 2943151.07	Total Depth 75 feet
Drilling Contractor and Rig Lewis Drilling / Mobile B 57		Elevation at boring 30.34 feet	Ground Water Depth 10.5 feet
Sampling Method Split Spoon		Sample Driving Hammer/Drop 139.58 lbs / 30 inches	No. of Samples 22
		Borehole Inclination 0	Date Started 11/13/06
		Logged by G. Geras	Date Completed 11/14/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	6.5	18					CH	BEAUMONT; greenish black (Gley1 10Y 2.5/1); gravel; CLAY (CH); dry; firm; trace gravel; mostly clay	
2	X	SS 2	9	18					CH	BEAUMONT; dark gray (7.5YR 4/1); CLAY (CH); dry; stiff; trace calcareous nodules (1/8 - 3/4 inch); strong reaction with HCl	
3	X	SS 3	13	18					CH	BEAUMONT; dark gray (10YR 4/1) mottled with yellowish brown (10YR 5/4); CLAY (CH); dry; firm; trace calcareous nodules (1/8 - 1/4 inch); strong reaction with HCl	
4	X	SS 4	15	18					CH	BEAUMONT; gray (7.5YR 5/1) mottled with strong brown (7.5YR 5/6); CLAY (CH); dry; stiff; trace calcareous nodules (1/8 - 1/4 inch); strong reaction with HCl	
5	X	SS 5	15	18					CH	BEAUMONT; gray (7.5YR 5/1) mottled with strong brown (7.5YR 5/6); CLAY (CH); dry; stiff; trace calcareous nodules (1/8 - 1/4 inch); strong reaction with HCl	
6	X	SS 6	15	18					CH	BEAUMONT; gray (7.5YR 5/1) mottled with strong brown (7.5YR 5/6); CLAY (CH); dry; stiff; trace calcareous nodules (1/8 - 1/4 inch); strong reaction with HCl	
7	X	SS 7	18	18					CH	BEAUMONT; strong brown (7.5YR 4/6); CLAY (CH); dry; firm; trace calcareous nodules (1/16 - 1/8 inch); strong reaction with HCl	
8	X	SS 8	18	18					ML	BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); dry; firm; little silt; mostly clay	Water level at 10.5 feet BGS
9	X	SS 9	18	18					ML	BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); dry; soft; some silt; mostly clay	Switch to Mud Rotary drilling at feet BGS
10	X	SS 10	18	18					CH	BEAUMONT; strong brown (7.5YR 4/6); clay; SILT (ML); moist; soft; little clay; mostly silt	
11									CH	BEAUMONT; strong brown (7.5YR 4/6); clay; SILT (ML); wet; soft; little clay; mostly silt	
12									CH	BEAUMONT; strong brown (7.5YR 4/6); SILT (ML); wet; firm	
13									ML	BEAUMONT; strong brown (7.5YR 4/6); clay; SILT (ML); moist; stiff; some clay; mostly silt	
14	X	SS 11	1	18					ML	BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); dry; stiff; little silt; mostly clay	
15									ML	BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); moist; soft; some clay; mostly silt	
16									ML	BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); wet; soft; little clay; mostly silt	
17									ML	BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); wet; soft; little clay; mostly silt	
18									ML	BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); wet; soft; little clay; mostly silt	
19	X	SS 12	1	18					SP-SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SP-SM); wet; very loose; trace cemented nodules; trace silt; mostly fine sand; poorly graded	
20									SP-SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SP-SM); wet; very loose; trace cemented nodules; trace silt; mostly fine sand; poorly graded	
21									SP-SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SP-SM); wet; very loose; trace cemented nodules; trace silt; mostly fine sand; poorly graded	
22									SP-SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SP-SM); wet; very loose; trace cemented nodules; trace silt; mostly fine sand; poorly graded	
23									SP-SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SP-SM); wet; very loose; trace cemented nodules; trace silt; mostly fine sand; poorly graded	
24	X	SS 13	15	18					SP-SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SP-SM); wet; firm; trace silt; mostly sand; mostly fine grained; poorly graded	
25									SP-SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SP-SM); wet; firm; trace silt; mostly sand; mostly fine grained; poorly graded	
26									SP-SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SP-SM); wet; firm; trace silt; mostly sand; mostly fine grained; poorly graded	
27									SP-SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SP-SM); wet; firm; trace silt; mostly sand; mostly fine grained; poorly graded	
28									SP-SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SP-SM); wet; firm; trace silt; mostly sand; mostly fine grained; poorly graded	
29	X	SS 14	12	14	14				SP	BEAUMONT; brown (7.5YR 5/4); SAND (SP); wet; very firm; mostly fine grained; poorly graded	
30									SP	BEAUMONT; brown (7.5YR 5/4); SAND (SP); wet; very firm; mostly fine grained; poorly graded	
31									SP	BEAUMONT; brown (7.5YR 5/4); SAND (SP); wet; very firm; mostly fine grained; poorly graded	
32									SP	BEAUMONT; brown (7.5YR 5/4); SAND (SP); wet; very firm; mostly fine grained; poorly graded	
33									SP	BEAUMONT; brown (7.5YR 5/4); SAND (SP); wet; very firm; mostly fine grained; poorly graded	
34	X	SS 15	4	13.5	18				SP	BEAUMONT; strong brown (7.5YR 5/6); SAND (SP); wet; very firm; mostly fine grained; poorly graded	
35									SP	BEAUMONT; strong brown (7.5YR 5/6); SAND (SP); wet; very firm; mostly fine grained; poorly graded	
36									SP	BEAUMONT; strong brown (7.5YR 5/6); SAND (SP); wet; very firm; mostly fine grained; poorly graded	
37									SP	BEAUMONT; strong brown (7.5YR 5/6); SAND (SP); wet; very firm; mostly fine grained; poorly graded	
38									SP	BEAUMONT; strong brown (7.5YR 5/6); SAND (SP); wet; very firm; mostly fine grained; poorly graded	
39	X	SS 15	10	18					SP	BEAUMONT; strong brown (7.5YR 5/6); SAND (SP); wet; very firm; mostly fine grained; poorly graded	
40									SP	BEAUMONT; strong brown (7.5YR 5/6); SAND (SP); wet; very firm; mostly fine grained; poorly graded	

Project Name : Job Number



SOIL LOG - Boring No. B-337

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
40									SP	
41										
42										
43										
44	X	SS 16	50/4	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; sand; CLAY (CH); dry; stiff; trace sand; little silt; mostly clay; with fine sand pockets; poorly graded
45										
46										
47										
48										
49	X	SS 17	40/4	17						BEAUMONT; reddish brown (2.5YR 4/4); sand; CLAY (CH); dry; firm; trace sand; mostly clay; with sand laminae (1/54 - 1/16 inch majority, 1 layer 3/4 inch thick)
50										
51										
52										
53										
54	X	SS 18	60/4	18						BEAUMONT; greenish gray (GLEY 1 10Y 5/1); sand; CLAY (CH); dry; stiff; calcareous nodules; strong reaction with HCl; trace ferrous nodules.; trace sand; mostly clay
55										
56										
57										
58										
59	X	SS 19	60/10	17						BEAUMONT; strong brown (7.5YR 4/6) mottled with greenish gray (GLEY 1 10GY 5/1); sand; CLAY (CH); dry; very stiff; little calcareous nodules; strong reaction with HCl; trace ferrous nodules; trace sand; mostly clay
60										
61										
62										
63										
64	X	SS 20	60/5	18						BEAUMONT; greenish gray (GLEY 1 10Y 6/1) mottled with brown (7.5YR 5/4); CLAY (CH); dry; stiff; trace calcareous nodules
65										
66										
67										
68										
69	X	SS 21	50/4	12					SP	BEAUMONT; brown (7.5YR 5/4); SAND (SP); wet; very dense; mostly fine grained
70										
71										
72										
73										
74	X	SS 22	70/3	15					SC	BEAUMONT; brown (7.5YR 5/4) and yellowish red (5YR 4/6) mottled with greenish gray (GLEY 1 10Y 6/1); clay; SAND (SC); wet; firm; little clay; mostly sand
75										Boring Terminated at 75-feet
76										
77										
78										
79										
80										

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-338</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 4 inch	Boring Location N 363791.5 E 2942935.72	Maintenance Shop	Total Depth 75 feet
Drilling Contractor and Rig Lewis Drilling / B 57	Elevation at boring 32.05 feet	Ground Water Depth 15 feet	Depth to Bedrock
Sampling Method Split Spoon/UD	Sample Driving Hammer/Drop 139.58 lbs / 30 inches	No. of Samples 22	Date Started 11/16/06
	Borehole Inclination 0	Logged by G. Geras	Date Completed 11/17/06

Reviewed by / Date KAW 4/3/07

Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	11	10					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); dry; soft; little silt; mostly clay; strong reaction with HCl; trace organics; calcareous nodules	
2	X	SS 2	11	11					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); dry; firm; little silt; mostly clay; strong reaction with HCl; trace organics; trace calcareous nodules	
3	X	SS 3	10.5	10.5					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); dry; firm; little silt; mostly clay; strong reaction with HCl; trace organics; trace calcareous nodules	
4	X	SS 4	9	9					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); dry; firm; little silt; mostly clay; strong reaction with HCl; trace organics; trace calcareous nodules	
5	X	SS 5	11	11					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); dry; stiff; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
6	X	SS 6	8	8					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); dry; stiff; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
7	X	SS 7	16	16					CH	BEAUMONT; dark gray (GLEY 1 4/N) transitioning into yellowish red (5YR 4/6); silt; CLAY (CH); dry; stiff; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules and ferrous nodules	
8	X	SS 8	17.5	17.5					CH	BEAUMONT; dark gray (GLEY 1 4/N) transitioning into yellowish red (5YR 4/6); silt; CLAY (CH); dry; stiff; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules and ferrous nodules	
9	X	SS 9	18	18					ML	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; stiff; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules and ferrous nodules	
10	X	SS 10	18	18					ML	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; firm; some silt; mostly clay; strong reaction with HCl; trace calcareous nodules and ferrous nodules	
11											
12											
13											
14											
15											
16											Water level encountered at 15 feet BGS
17											
18											
19	X	SS 11	6	6					ML	BEAUMONT; yellowish red (5YR 4/6) with trace greenish gray (GLEY 1 5/1) mottling; clay; SILT (ML); moist; soft; some clay; mostly silt	
20											
21											
22											
23											
24	X	SS 12	18	18					ML	BEAUMONT; yellowish red (5YR 4/6); clay; SILT (ML); moist; stiff; some clay; strong reaction with HCl; mostly silt; trace calcareous nodules	
25											
26											
27											
28											
29		UD 1	N/A	21.5	24.1	18.2	NV/NP		SM	BEAUMONT silt; SAND (SM) top	
30										BEAUMONT silt; SAND (SM)	
31											
32											
33											
34	X	SS 13	18	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; loose; some silt; mostly fine sand	Switch to Mud Rotary drilling at 35 feet BGS
35											
36											
37											
38											
39	X	SS 14	13	13					SP-SC	BEAUMONT; strong brown (7.5YR 5/6); clay; silt; SAND (SP-SC); moist; very firm; some clay; little	
40											

Project Name : Job Number <div style="text-align: center;"> <b>MACTEC</b></div>	<b>SOIL LOG - Boring No. B-338</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow/6 inches	Recovery (inches)	Water Content	Grain Size	Alterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM	silt; mostly fine sand	
41									SP-SC	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; very firm; some silt; mostly fine sand	
42										BEAUMONT; strong brown (7.5YR 5/6); clay; silt; SAND (SP-SC); moist; very firm; little clay; little silt; mostly fine sand	
43											
44	X	SS 15	8 6 10	13.5 18					CL	BEAUMONT; strong brown (7.5YR 5/6); clay; silt; SAND (SP-SC); moist; firm; little clay; little silt; mostly fine sand	
45										BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CL); dry; very stiff; little silt; mostly clay	
46											
47											
48											
49		UD 2	N/A	25 24	26.1	98.2	44/26			BEAUMONT yellowish red (5YR 4/6); silt; CLAY (CL) top	
50										BEAUMONT yellowish red (5YR 4/6); silt; CLAY (CL)	
51											
52											
53											
54	X	SS 16	4 7	18 18					CH	BEAUMONT; greenish gray (GLEYS 1 5/1); silt; CLAY (CH); dry; stiff; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
55											
56											
57											
58											
59	X	SS 17	6 8 10	17 18						BEAUMONT; dark yellowish brown (10YR 4/4); mottled greenish gray (GLEYS 1 6/1); silt; CLAY (CH); dry; very stiff; some silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
60											
61											
62											
63											
64	X	SS 18	8 8 10	18 18						BEAUMONT; dark yellowish brown (10YR 4/4); mottled greenish gray (GLEYS 1 6/1); silt; CLAY (CH); dry; very stiff; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
65											
66											
67											
68											
69	X	SS 19	16 18 19	14 18					SM	BEAUMONT; brown (10YR 4/3); silt; SAND (SM); wet; dense; little silt; mostly fine sand	
70											
71											
72											
73											
74	X	SS 20	11 12 18	12 18						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; little silt; mostly fine sand	
75										Boring Terminated at 75- feet	
76											
77											
78											
79											
80											



Project Name : Job Number		<b>SOIL LOG - Boring No. B-339</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 4 inch		Boring Location Unit 3 - Maintenance Shop N 363790 E 2943148.53	Total Depth 75 feet
Drilling Contractor and Rig Lewis Drilling / Mobile B 57		Elevation at boring 30.83 feet	Ground Water Depth 10.5 feet
Sampling Method Split Spoon		Sample Driving Hammer/Drop 139.58 lbs / 30 inches	No. of Samples 22
		Borehole Inclination 0	Date Started 11/8/06
		Logged by G. Geras	Date Completed 11/8/06

Reviewed by / Date KAR 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	10	18					CH	BEAUMONT; black (5YR 2.5/1); gravel; CLAY (CH); dry; soft; few gravel; mostly clay	
2	X	SS 2	11	18					CH	BEAUMONT; black (10YR 2/1); CLAY (CH); dry; firm	
3	X	SS 3	16	18					CH	BEAUMONT; black (10YR 2/1); gravel; CLAY (CH); dry; firm; trace gravel; mostly clay	
4	X	SS 4	13	18					CH	BEAUMONT; brown (7.5YR 5/4) slightly mottled with black (10YR 2/1); CLAY (CH); dry; firm; trace calcareous nodules (1/8 - 1/4 inch in size); strong reaction with HCl	
5	X	SS 5	16	18					CH	BEAUMONT; reddish brown (5YR 4/4); CLAY (CH); dry; firm; trace calcareous nodules; strong reaction with HCl	
6	X	SS 6	15	18					CH	BEAUMONT; reddish brown (5YR 4/4); CLAY (CH); dry; firm	
7	X	SS 7	15	18					CH	BEAUMONT; reddish brown (5YR 4/4); CLAY (CH); dry; firm	
8	X	SS 8	18	18					ML	BEAUMONT; strong brown (7.5YR 4/6) slightly mottled with greenish gray (GLY 1 6/1); silt; CLAY (CH); dry; soft; some silt; mostly clay	Water level at 10.5 feet BGS
9	X	SS 9	18	18					ML	BEAUMONT; strong brown (7.5YR 4/6); clay; SILT (ML); moist; firm; little clay; mostly silt	Switch to Mud Rotary drilling at feet BGS
10	X	SS 10	18	18					CH	BEAUMONT; strong brown (7.5YR 4/6); SILT (ML); wet; soft	
11									CH	BEAUMONT; strong brown (7.5YR 4/6); SILT (ML); wet; stiff	
12									CH	BEAUMONT; strong brown (7.5YR 4/6); CLAY (CH); dry; stiff	
13									CH	BEAUMONT; strong brown (7.5YR 4/6); CLAY (CH); dry; stiff	
14	X	SS 11	18	18					ML	BEAUMONT; reddish brown (2.5YR 4/4); CLAY (CH); dry; soft	
15									ML	BEAUMONT; strong brown (7.5YR 5/6); SILT (ML); wet; soft; mostly fine grained	
16									ML	BEAUMONT; strong brown (7.5YR 5/6); SILT (ML); wet; soft; mostly fine grained	
17									ML	BEAUMONT; strong brown (7.5YR 5/6); SILT (ML); wet; soft; mostly fine grained	
18									ML	BEAUMONT; strong brown (7.5YR 5/6); SILT (ML); wet; soft; mostly fine grained	
19	X	SS 12	9	18					SM	BEAUMONT; strong brown (7.5YR 5/6); SAND (SM); wet; firm; poorly graded; mostly fine grained	
20									SM	BEAUMONT; strong brown (7.5YR 5/6); SAND (SM); wet; firm; poorly graded; mostly fine grained	
21									SM	BEAUMONT; strong brown (7.5YR 5/6); SAND (SM); wet; firm; poorly graded; mostly fine grained	
22									SM	BEAUMONT; strong brown (7.5YR 5/6); SAND (SM); wet; firm; poorly graded; mostly fine grained	
23									SM	BEAUMONT; strong brown (7.5YR 5/6); SAND (SM); wet; firm; poorly graded; mostly fine grained	
24	X	SS 13	17	18					SM	BEAUMONT; strong brown (7.5YR 5/6); SAND (SM); wet; very firm; poorly graded; mostly fine grained	
25									SM	BEAUMONT; strong brown (7.5YR 5/6); SAND (SM); wet; very firm; poorly graded; mostly fine grained	
26									SM	BEAUMONT; strong brown (7.5YR 5/6); SAND (SM); wet; very firm; poorly graded; mostly fine grained	
27									SM	BEAUMONT; strong brown (7.5YR 5/6); SAND (SM); wet; very firm; poorly graded; mostly fine grained	
28									SM	BEAUMONT; strong brown (7.5YR 5/6); SAND (SM); wet; very firm; poorly graded; mostly fine grained	
29	X	SS 14	10	18					SM	BEAUMONT; yellowish brown (10YR 5/6); SAND (SM); wet; firm; poorly graded; mostly fine grained	
30									SM	BEAUMONT; yellowish brown (10YR 5/6); SAND (SM); wet; firm; poorly graded; mostly fine grained	
31									SM	BEAUMONT; yellowish brown (10YR 5/6); SAND (SM); wet; firm; poorly graded; mostly fine grained	
32									SM	BEAUMONT; yellowish brown (10YR 5/6); SAND (SM); wet; firm; poorly graded; mostly fine grained	
33									SM	BEAUMONT; yellowish brown (10YR 5/6); SAND (SM); wet; firm; poorly graded; mostly fine grained	
34	X	SS 15	12	18					SM	BEAUMONT; yellowish brown (10YR 5/4); SAND (SM); wet; firm; poorly graded; mostly fine grained	
35									SM	BEAUMONT; yellowish brown (10YR 5/4); SAND (SM); wet; firm; poorly graded; mostly fine grained	
36									SM	BEAUMONT; yellowish brown (10YR 5/4); SAND (SM); wet; firm; poorly graded; mostly fine grained	
37									SM	BEAUMONT; yellowish brown (10YR 5/4); SAND (SM); wet; firm; poorly graded; mostly fine grained	
38									SM	BEAUMONT; yellowish brown (10YR 5/4); SAND (SM); wet; firm; poorly graded; mostly fine grained	
39	X	SS 15	12	18					SM	BEAUMONT; yellowish brown (10YR 5/4); SAND (SM); wet; firm; poorly graded; mostly fine grained	
40									SM	BEAUMONT; yellowish brown (10YR 5/4); SAND (SM); wet; firm; poorly graded; mostly fine grained	

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-339</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
40									SM	
41										
42										
43										
44	X	SS 16	10	18					CH	BEAUMONT; reddish brown (5YR 4/4); CLAY (CH); dry; stiff
45										
46										
47										
48										
49	X	SS 17	4	18						BEAUMONT; reddish brown (2.5YR 4/4) with very slight greenish gray (GLEY 1 5/1) mottling; CLAY (CH); dry; firm
50										
51										
52										
53										
54	X	SS 18	10	18						BEAUMONT; greenish gray (GLEY 1 5/1); CLAY (CH); dry; firm; calcareous nodules; strong reaction with HCl
55										
56										
57										
58										
59	X	SS 19	10	18						BEAUMONT; greenish gray (GLEY 1 5/1) mottled with reddish brown (2.5YR 4/4); CLAY (CH); dry; stiff; calcareous nodules (1/8 - 1 inch); strong reaction with HCl
60										
61										
62										
63										
64	X	SS 20	10	18					SP-SM	BEAUMONT; gray (GLEY 1 6/N) with slight yellowish red (5YR 5/6) mottling; SAND (SP-SM); wet; loose; poorly graded; mostly fine grained
65										
66										
67										
68										
69	X	SS 21	11 19	13 18						BEAUMONT; brown (7.5YR 5/4); SAND (SP-SM); wet; dense; poorly graded; mostly fine grained
70										
71										
72										
73										
74	X	SS 22	10 17	13 18						BEAUMONT; yellowish brown (10YR 5/4); SAND (SP-SM); wet; dense; poorly graded; mostly fine grained
75										Boring Terminated at 75-feet
76										
77										
78										
79										
80										

Project Name : Job Number		<b>SOIL LOG - Boring No. B-340</b>	
STP COL : 5050-06-0496		MACTEC	
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 4 inch	Boring Location N 363281.77 E 2943151.48	Condensate Storage Tank	Total Depth 100 feet
Drilling Contractor and Rig EEI / CME 750 ATV	Elevation at boring 30.47 feet	Ground Water Depth 7.5 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 138 lbs / 30 inches	No. of Samples 27	Date Started 12/3/06
	Borehole Inclination 0	Logged by J. Howard	Date Completed 12/3/06

Reviewed by / Date KAR 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	15	18					CH	FILL; dark brown (7.5YR 3/2); sand; CLAY (CH); moist; firm; medium plasticity; trace organics	
2	X	SS 2	13	18					CH	BEAUMONT; dark brown (7.5YR 3/2); sand; CLAY (CH); moist; stiff; medium to high plasticity	
3	X	SS 3	7	18					CH	BEAUMONT; dark brown (7.5YR 3/2); sand; CLAY (CH); moist; firm; medium to high plasticity	
4	X	SS 4	13	18					CH	BEAUMONT; yellowish red (5YR, 5/8); sand; CLAY (CH); moist; stiff; medium plasticity	
5	X	SS 5	18	18					CH	BEAUMONT; yellowish red (5YR, 5/8); sand; CLAY (CH); moist; stiff; medium plasticity	
6	X	SS 6	13	18					CH	BEAUMONT; yellowish red (5YR, 5/8); sand; CLAY (CH); wet; stiff; high plasticity; with sand lens	
7	X	SS 7	13	18					CH	BEAUMONT; yellowish red (5YR, 5/8); sand; CLAY (CH); wet; soft; high plasticity	Water level at 7.5 feet BGS
8	X	SS 8	18	18					SC	BEAUMONT; yellowish red (5YR 5/6); clay; SAND (SC); wet; very loose	
9	X	SS 9	18	18					CH	BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); wet; firm; high plasticity	
10	X	SS 10	18	18					CH	BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); wet; firm; high plasticity	
11	X	SS 11	18	18					SC	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); wet; stiff; high plasticity	
12	X	SS 12	18	18					SC	BEAUMONT; yellowish red (5YR 5/6); clay; SAND (SC); moist; firm; fine sand	
13	X	SS 13	18	18					SC	BEAUMONT; yellowish red (5YR 5/6); clay; SAND (SC); moist; firm; fine sand	
14	X	SS 14	18	18					SC	BEAUMONT; yellowish red (5YR 5/6); clay; SAND (SC); moist to wet; loose; fine sand	
15	X	SS 15	18	18					SC	BEAUMONT; yellowish red (5YR 5/6); clay; SAND (SC); moist to wet; loose; fine sand	
16											
17											
18											
19	X	SS 19	8	18					SM	BEAUMONT; reddish gray (5YR 5/2); SAND (SM); wet; very firm; medium to fine sand	
20	X	SS 20	10	18					SM	BEAUMONT; reddish gray (5YR 5/2); SAND (SM); wet; very firm; medium to fine sand	
21											
22											
23											
24	X	SS 24	15	17					SM	BEAUMONT; brownish yellow (10YR 6/8); SAND (SM); wet; very dense; medium to fine sand	
25	X	SS 25	27	18					SM	BEAUMONT; brownish yellow (10YR 6/8); SAND (SM); wet; very dense; medium to fine sand	
26											
27											
28											
29	X	SS 29	4	16					SM	BEAUMONT; yellowish red (5YR 5/6); SAND (SM); wet; firm; medium fine	
30	X	SS 30	7	18					SM	BEAUMONT; yellowish red (5YR 5/6); SAND (SM); wet; firm; medium fine	
31											
32											
33											
34	X	SS 34	15	17					SM	BEAUMONT; brownish yellow (10YR 6/8); SAND (SM); wet; very dense; medium to fine sand	
35	X	SS 35	27	18					SM	BEAUMONT; brownish yellow (10YR 6/8); SAND (SM); wet; very dense; medium to fine sand	
36											
37											
38											
39	X	SS 39	4	16					SM	BEAUMONT; yellowish red (5YR 5/6); SAND (SM); wet; firm; medium fine	
40	X	SS 40	7	18					SM	BEAUMONT; yellowish red (5YR 5/6); SAND (SM); wet; firm; medium fine	

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-340</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
40									SM	
41										
42										
43										
44	X	SS 16	4 4 5	18 18					CH	BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist to wet; stiff; high plasticity
45										
46										
47										
48										
49	X	SS 17	5 5 7	18 18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; stiff; high plasticity
50										
51										
52										
53										
54	X	SS 18	3 4 3	18 18						BEAUMONT; light bluish gray (GLEYS 2.7/1); sand; CLAY (CH); moist; stiff; high plasticity
55										
56										
57										
58										
59	X	SS 19	4 4 4	18 18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); wet; stiff; high plasticity; with sand lens
60										
61										
62										
63										
64	X	SS 20	11 11 16	13 18					SM	BEAUMONT; yellowish red (5YR 5/6); SAND (SM); wet; very firm; medium to fine sand
65										
66										
67										
68										
69	X	SS 21	16 30 20	16 18						BEAUMONT; yellowish brown (10YR 5/8); SAND (SM); wet; dense; medium to fine sand
70										
71										
72										
73										
74	X	SS 22	14 14 10	18 18						BEAUMONT; yellowish brown (10YR 5/8); SAND (SM); wet; very firm; medium to fine sand
75										
76										
77										
78										
79	X	SS 23	11 13 11	13 18					CH	BEAUMONT; yellowish brown (10YR 5/4); sand; CLAY (CH); wet; very stiff; high plasticity
80										

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-340</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Afterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									CH		
81											
82											
83											
84	X	SS 24	30 13 18	14 18					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very dense; medium to fine sand	
85											
86											
87											
88											
89	X	SS 25	18 19 12	17 18						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; medium to fine sand	
90											
91											
92											
93											
94	X	SS 26	10 10 10	13 18						BEAUMONT; brown (7.5YR 4/3); silt; SAND (SM); wet; very firm; medium to fine sand	
95											
96											
97											
98											
99	X	SS 27	5 7 8	12 18					SC	BEAUMONT; brown (7.5YR 4/3); clay; SAND (SC); wet; firm	
100										Boring Terminated at 100-feet	
101											
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											

Project Name : Job Number		<b>SOIL LOG - Boring No. B-341</b>	
STP COL : 5050-06-0496		<b>MACTEC</b>	
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 3 inch		Boring Location Radiation Waste Building N 363215.13 E 2943096.25	Total Depth 100 feet
Drilling Contractor and Rig EEI / CME 750 ATV		Elevation at boring 30.55 feet	Ground Water Depth 8.5 feet
Sampling Method Split Spoon		Sample Driving Hammer/Drop 138 lbs / 30 inches	No. of Samples 27
		Borehole Inclination 0	Date Started 11/17/06
		Logged by S. Lehman	Date Completed 11/18/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0										Topsoil and organics	
1	X	SS 1	10	18					CH	BEAUMONT; dark grayish brown (2.5Y 4/2) with yellowish red (5YR 5/6); CLAY (CH); moist; soft; high plasticity	
2	X	SS 2	10	18					CH	BEAUMONT; dark grayish brown (2.5Y 4/2) with yellowish red (5YR 5/6); CLAY (CH); moist; soft; high plasticity	
3	X	SS 3	10	18					CL	BEAUMONT; black (2.5Y 2.5/1); CLAY (CH); moist; stiff; high plasticity; ferrous nodules	
4	X	SS 4	10	18					CH	BEAUMONT; black (2.5Y 2.5/1); silt; CLAY (CL); moist; very stiff; medium plasticity; ferrous nodules	
5	X	SS 5	10	18					CH	BEAUMONT; very dark gray (5YR 3/1); CLAY (CH); moist; stiff; high plasticity; ferrous nodules	
6	X	SS 6	10	18					ML	BEAUMONT; very dark gray (5YR 3/1); silt; CLAY (CH); moist; firm; high plasticity; ferrous nodules	
7	X	SS 7	10	18					ML	BEAUMONT; yellowish red (5YR 5/4); clay; SILT (ML); moist; firm; non-plastic; wet at 8.5 feet	Water level at 8.5 feet BGS
8	X	SS 8	10	18					CL	BEAUMONT; yellowish red (5YR 5/6); clay; SILT (ML); moist; firm; non-plastic	
9	X	SS 9	10	18					CL	BEAUMONT; brown (7.5YR 5/4); CLAY (CL) interbedded with SILT (ML); wet; very soft; low plasticity	10.5 to 12 feet bgs - sampler advanced under weight of hammer
10	X	SS 10	10	18					ML	BEAUMONT; strong brown (7.5YR 5/6); CLAY (CL); interbedded with SILT (ML); wet; soft; non-plastic	
11	X	SS 11	10	18					CL	BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); wet; stiff; non-plastic	
12	X	SS 12	10	18					CL	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CL); moist; stiff; medium plasticity	
13	X	SS 13	10	18					ML	BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); wet; soft; low plasticity	
14	X	SS 14	10	18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; firm; fine-grained	
15	X	SS 15	10	18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; very firm; fine-grained	
16	X	SS 16	10	18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; very firm; fine-grained	
17	X	SS 17	10	18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; very firm; fine-grained	
18	X	SS 18	10	18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; very firm; fine-grained	
19	X	SS 19	10	18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; very firm; fine-grained	
20	X	SS 20	10	18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; very firm; fine-grained	
21	X	SS 21	10	18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; very firm; fine-grained	
22	X	SS 22	10	18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; very firm; fine-grained	
23	X	SS 23	10	18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; very firm; fine-grained	
24	X	SS 24	10	18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; very firm; fine-grained	
25	X	SS 25	10	18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; very firm; fine-grained	
26	X	SS 26	10	18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; very firm; fine-grained	
27	X	SS 27	10	18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; very firm; fine-grained	
28	X	SS 28	10	18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; very firm; fine-grained	
29	X	SS 29	10	18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; very firm; fine-grained	
30	X	SS 30	10	18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; very firm; fine-grained	
31	X	SS 31	10	18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; very firm; fine-grained	
32	X	SS 32	10	18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; very firm; fine-grained	
33	X	SS 33	10	18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; very firm; fine-grained	
34	X	SS 34	10	18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; very firm; fine-grained	
35	X	SS 35	10	18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; very firm; fine-grained	
36	X	SS 36	10	18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; very firm; fine-grained	
37	X	SS 37	10	18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; very firm; fine-grained	
38	X	SS 38	10	18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; very firm; fine-grained	
39	X	SS 39	10	18					SP	BEAUMONT; yellowish brown (10YR 5/6); SAND (SP); wet; dense; fine grained; trace to few fines;	
40	X	SS 40	10	18					SP	BEAUMONT; yellowish brown (10YR 5/6); SAND (SP); wet; dense; fine grained; trace to few fines;	

Project Name : Job Number <div style="text-align: center;"> <b>MACTEC</b></div> STP COL : 5050-06-0496	<h2 style="margin: 0;">SOIL LOG - Boring No. B-341</h2>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
40									SP	slightly coarse than sand above
41										
42										
43										
44	X	SS 16	10	18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; firm; fine grained; slightly finer than SS-15 sample
45									CH	BEAUMONT; yellowish red (5YR 5/6); CLAY (CH); moist; very stiff; high plasticity
46										
47										
48										
49	X	SS 17	4	18						BEAUMONT; brown (7.5YR 5/4); CLAY (CH); moist; firm; high plasticity; interbedded with yellowish brown (10YR 5/4); clay; SILT (ML); moist; firm; non-plastic; trace of sand
50										
51										
52										
53										
54	X	SS 18	4	18					CL	BEAUMONT; light greenish gray (GLEYS 1 7/10Y); silt; CLAY (CL); moist; stiff; medium plasticity; trace of sand
55										
56										
57										
58										
59	X	SS 19	4	18						BEAUMONT; light greenish gray (GLEYS 1 7/10Y); sand; CLAY (CL); moist; stiff; non-plastic; mostly clay; some sand
60										
61										
62										
63										
64	X	SS 20	13	16					SP	BEAUMONT; yellowish brown (10YR 5/6) SAND (SP); wet; very firm; fine grained; few medium grains; trace of fines
65										
66										
67										
68										
69	X	SS 21	15	15					SM	BEAUMONT; light olive brown (2.5Y 5/6); silt; SAND (SM); wet; dense; fine grained
70										
71										
72										
73										
74	X	SS 22	15	13						BEAUMONT; light olive brown (2.5Y 5/6); silt; SAND (SM); wet; dense; fine grained
75										
76										
77										
78										
79	X	SS 23	14	18					SP	BEAUMONT; yellowish brown (10YR 5/4); SAND (SP); wet; very firm; fine grained; few medium
80										

Project Name : Job Number



**SOIL LOG - Boring No. B-341**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									CH	grains; trace of fines	
81									CH	BEAUMONT; brown (7.5YR 5/4); CLAY (CH); moist; very stiff; high plasticity interbedded with yellowish brown (10YR 5/4); SAND (SP); wet; very firm; fine sand	
82											
83											
84	X	SS 24	12 14 27	12 18					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; fine sand	
85											
86											
87											
88											
89	X	SS 25	9 11	18 18					CH	BEAUMONT; brown (7.5YR 4/4); CLAY (CH); moist; very stiff; high plasticity	
90											
91											
92											
93											
94	X	SS 26	7 9	18 18						BEAUMONT; brown (7.5YR 4/4); CLAY (CH); moist; very stiff; high plasticity	
95											
96											
97											
98											
99	X	SS 27	3 12 16	13 18					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; fine sand	
100										Boring Terminated at 100 feet	
101											
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											



Project Name : Job Number		<b>SOIL LOG - Boring No. B-342</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 3 inch		Boring Location Radiation Waste Building N 363215.34 E 2943175.33	Total Depth 100 feet
Drilling Contractor and Rig EEI / CME 750 ATV		Elevation at boring 30.72 feet	Ground Water Depth 11.5 feet
Sampling Method Split Spoon		Sample Driving Hammer/Drop 138 lbs / 30 inches	No. of Samples 27
		Borehole Inclination 0	Date Started 11/16/06
		Logged by S. Lehman	Date Completed 11/16/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0										Grass - Topsoil	
1	X	SS 1	17	18					SM	BEAUMONT; strong brown (7.5YR 5/6); gravel; silt; SAND (SW-SM); dry; loose; little gravel	
2	X	SS 2	12	18					SW-SM		
3	X	SS 3	13	18					CH	BEAUMONT; dark gray (7.5YR 4/1) to brown (7.5YR 4/4); CLAY (CH); moist; firm high plasticity	
4	X	SS 4	4	18						BEAUMONT; black (2.5Y 2.5/1); CLAY (CH); moist; stiff; high plasticity	
5	X	SS 4	4	18						BEAUMONT; dark gray (2.5Y 4/1); silt; CLAY (CH); moist; stiff; high plasticity; ferrous nodules	
6	X	SS 5	14	18						BEAUMONT; dark gray (2.5Y 4/1); silt; CLAY (CH); moist; firm; high plasticity	
7	X	SS 5	4	18						BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CH); moist; stiff; medium plasticity; sand-sized concretions and ferrous nodules	
8	X	SS 6	9	18					ML		
9	X	SS 7	11	18						BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); moist; firm; non-plastic	
10	X	SS 8	18	18						BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); moist; firm; non-plastic	
11	X	SS 9	18	18						BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); moist; soft; non-plastic	
12	X	SS 9	18	18						BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); moist; firm; low plasticity	Water level at 11.5 feet BGS
13	X	SS 10	18	18					CH	BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); wet; soft; non-plastic	
14	X	SS 10	18	18						BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); moist; firm; high plasticity	
15	X	SS 10	18	18						BEAUMONT; yellowish red (5YR 4/6); CLAY (CH); moist; stiff; high plasticity	
16	X	SS 11	18	18						BEAUMONT; yellowish red (5YR 4/6); CLAY (CH); moist; firm; high plasticity	
17	X	SS 11	18	18					ML	BEAUMONT; strong brown (7.5YR 4/6); SILT (ML); wet; stiff; non-plastic; trace sand	
18	X	SS 11	18	18							
19	X	SS 11	18	18							
20	X	SS 12	4	18					CH	BEAUMONT; yellowish red (5YR 4/6); CLAY (CH); moist; stiff; high plasticity	
21	X	SS 12	7	18					ML	BEAUMONT; strong brown (7.5YR 4/6); clay; SILT (ML); moist; stiff; low plasticity	Switch to mud rotary drilling at 24.6 feet BGS
22	X	SS 12	14	18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; firm; mostly fine sand; some silt	
23	X	SS 12	14	18							
24	X	SS 12	14	18							
25	X	SS 13	6	18						BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; firm; fine sand	
26	X	SS 13	6	18							
27	X	SS 13	6	18							
28	X	SS 13	6	18							
29	X	SS 13	6	18							
30	X	SS 13	6	18							
31	X	SS 14	17	18						BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; very dense; fine sand	
32	X	SS 14	26	18							
33	X	SS 14	29	18							
34	X	SS 14	29	18							
35	X	SS 14	29	18							
36	X	SS 15	15	18						BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; firm; fine sand	
37	X	SS 15	8	18							
38	X	SS 15	8	18							
39	X	SS 15	8	18							
40	X	SS 15	8	18					CL		

Project Name : Job Number <div style="text-align: center; font-weight: bold; font-size: 1.2em;"> </div> STP COL : 5050-06-0496	SOIL LOG - Boring No. B-342
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Alterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									CL	BEAUMONT; brown (7.5YR 5/4) silt; CLAY (CL); moist; very stiff; medium plasticity; interbedded with strong brown (7.5YR 5/6); silt; SAND (SM); moist; firm; fine sand	
41											
42											
43											
44	X	SS 16	12 10 16	9 18					SM	BEAUMONT; light yellowish brown (10YR 6/4); silt; SAND (SM); wet; very firm; fine grained sand; black, silt laminations at sample bottom	
45											
46											
47											
48											
49	X	SS 17	4 5	18 18					ML	BEAUMONT; yellowish brown (10YR 5/6); sand; clay; SILT (ML); wet; stiff; non-plastic	
50									CH	BEAUMONT; brown (7.5YR 5/4); CLAY (CH); moist; stiff; high plasticity	
51											
52											
53											
54	X	SS 18	6 5	18 18						BEAUMONT; greenish gray (GLE Y 1.6/10Y); silt; CLAY (CH); moist; stiff; medium plasticity; strong reaction with HCl; calcareous concretions	
55											
56											
57											
58											
59	X	SS 19	2 3	18 18					ML	BEAUMONT; brown (7.5YR 5/4) with greenish gray (GLE Y 1.6/10Y); clay; SILT (ML); moist; firm; non-plastic	
60											
61											
62											
63											
64	X	SS 20	12 12 13	16 18					SP	BEAUMONT; yellowish brown (10YR 5/6); SAND (SP); wet; very firm; fine sand; little silt	
65											
66											
67											
68											
69	X	SS 21	11 12 10	13 18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; very firm; fine sand	
70											
71											
72											
73											
74	X	SS 22	10 16 17	13 18						BEAUMONT; light olive brown (2.5Y 5/6); silt; SAND (SM); wet; dense; fine sand	
75											
76											
77											
78											
79	X	SS 23	13 16 27	15 18					SP	BEAUMONT; yellowish brown (10YR 5/4); SAND (SP); wet; dense; mostly fine to medium sand	
80											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-342</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Unconnected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SP		
81											
82											
83											
84	X	SS 24	7 8	15 18					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; fine sand	
85											
86											
87											
88											
89	X	SS 25	5 9	18 18					CH	BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity	
90											
91											
92											
93											
94	X	SS 26	10 10	18 18						BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CH); moist; stiff; high plasticity	
95											
96											
97											
98											
99	X	SS 27	0 0	0 18							No recovery in soil sample SS-27
100										Boring Terminated at 100 feet	
101											
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-343</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 5 inch		Boring Location Rad Waste Building N 363125.99 E 2943095.29		Total Depth 200 feet	
Drilling Contractor and Rig JEDI Drilling Contractor / CME 75		Elevation at boring 30.46 feet		Ground Water Depth 10 feet	
Sampling Method Split Spoon/UD		Sample Driving Hammer/Drop 138.1 lbs / 30 inches		No. of Samples 40	
		Borehole Inclination 0		Logged by A. Osorio	
				Date Started 12/17/06	
				Date Completed 12/19/06	

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Alterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0										surface grass	
1	X	SS 1	4	10					CL	FILL; dark brown (7.5YR 3/4); sand; gravel; CLAY (CL); dry; firm; presence of gravel; organics (roots)	
2	X	SS 2	4	15.5					CH	BEAUMONT; black (5Y 2.5/5); CLAY (CH); moist; firm; high plasticity; high toughness; presence of some roots	
3	X	SS 3	4	14						BEAUMONT; black (5YR 2.5/5); CLAY (CH); moist; stiff; high plasticity; high toughness; presence of some roots	
4	X	SS 4	4	13						BEAUMONT; black (5Y 2.5/5); gravel; CLAY (CH); moist; stiff; high plasticity; high toughness; presence of some roots	
5	X	SS 5	4	20						BEAUMONT; black (5Y 2.5/5); gravel; CLAY (CH); moist; stiff; high plasticity; high toughness; presence of some roots; some gravel	
6	X	SS 6	4	18						BEAUMONT; dark olive gray (5Y 3/2); gravel; CLAY (CH); moist; firm; high plasticity; high toughness; presence of calcareous nodules; fine gravel	
7	X	SS 7	4	26					CL-ML		Water level at 10 feet BGS
8	X	SS 8	4	18					ML	BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); moist; firm; high plasticity; high toughness; presence of calcareous nodules	
9	X	SS 9	4	21					CH	BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CL-ML); wet; soft; medium plasticity; medium toughness; presence of calcareous nodules	
10	X	SS 10	4	14						BEAUMONT; brown (7.5YR 4/4); clay; SILT (ML); wet; soft; medium plasticity; medium toughness	Switch to mud rotary drilling at 15 feet BGS
11										BEAUMONT; yellowish red (5YR 5/6); CLAY (CH); moist; stiff; high plasticity; high toughness; presence of calcareous nodules; presence of black organics (roots)	
12	X	SS 11	2	14					SM	BEAUMONT; yellowish red (5YR 5/6); CLAY (CH); moist; very stiff; high plasticity; high toughness; presence of calcareous nodules; presence of black organics (roots)	
13										BEAUMONT; yellowish red (5YR 4/6); silt; SAND (SM); moist; very loose; low plasticity; some silt; some calcareous nodules	
14		UD 1	N/A	24	24				CH	BEAUMONT; brown (7.5YR 4/4); CLAY (CH); moist; high plasticity; high toughness	
15									SM	BEAUMONT; yellowish red (5YR 4/6); silt; SAND (SM); moist	
16											
17											
18											
19	X	SS 12	8	14	18					BEAUMONT; reddish yellow (7.5YR 6/6); silt; SAND (SM); moist; very firm; low plasticity	
20											
21											
22											
23	X	SS 13	11	16	18					BEAUMONT; reddish yellow (7.5YR 6/6); silt; SAND (SM); moist; dense; low plasticity	
24											
25											
26											
27											
28											
29	X	SS 14	9	15.5	18					BEAUMONT; yellowish red (5YR 4/6); silt; SAND (SM); moist; very firm; low plasticity	
30											
31											
32											
33											
34											
35											
36											
37											
38											
39	X	SS 14	9	15.5	18					BEAUMONT; yellowish red (5YR 4/6); silt; SAND (SM); moist; very firm; low plasticity	
40											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-343</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 15	15 9	17 18						BEAUMONT; yellowish red (5YR 4/6); silt; SAND (SM); moist; firm	
45			10						CH	BEAUMONT; reddish brown (5YR 5/4); CLAY (CH); moist; very stiff	
46											
47											
48											
49		UD 2	N/A	24					SM	BEAUMONT; reddish yellow (7.5YR 6/6); silt; SAND (SM); moist; low plasticity	
50									CH	BEAUMONT; brown (7.5YR 4/4); CLAY (CH); moist; high plasticity; high toughness	
51											
52											
53											
54	X	SS 16	16 9	23 18						BEAUMONT; greenish gray (GLEYS 1 6/1); CLAY (CH); moist; very stiff; high plasticity; high toughness; presence of calcareous nodules	
55											
56											
57											
58											
59		UD 3	N/A	24					SM	BEAUMONT; greenish gray (GLEYS 1 6/1); CLAY (CH); moist; high plasticity; high toughness	
60										BEAUMONT; dark yellowish brown (10YR 4/4); silt; SAND (SM); moist	
61											
62											
63											
64	X	SS 17	13 11	19 18						BEAUMONT; dark yellowish brown (10YR 4/4); silt; SAND (SM); moist; very firm; low plasticity	
65			14								
66											
67											
68											
69		UD 4	N/A	0							No recovery UD-4
70				24							
71		UD 4A	N/A	12	23.6	96.2			CH	BEAUMONT; yellowish brown (10YR 5/4); silt; sand; CLAY (CH); moist	
72				24							
73											
74	X	SS 18	9 11	13 18					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); moist; very firm; low plasticity	
75			18								
76											
77											
78											
79	X	SS 19	17 16	12 18						BEAUMONT; yellowish brown (10YR 5/4); silt; clay; SAND (SM); moist; dense; non-plastic; some clay	
80			29								

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-343</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SM		
81											
82											
83											
84	X	SS 20	13	16.5						BEAUMONT; gray (7.5YR 6/1); silt; clay; SAND (SM); moist; very dense; non-plastic; fine to medium grained sand; some clay	
85			18								
86											
87											
88											
89	X	SS 21	10	23.5					CH	BEAUMONT; brown (7.5YR 4/2); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; presence of calcareous nodules; some silt	
90			12	18							
91											
92											
93											
94	X	SS 22	6	21.5						BEAUMONT; brown (7.5YR 4/2); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; presence of calcareous nodules; some silt	
95			11	18							
96											
97											
98											
99	X	SS 23	17						SM	BEAUMONT; brown (7.5YR 4/2); silt; CLAY (CH); moist; hard; high plasticity; high toughness; presence of calcareous nodules; some silt	
100			44	18							
101			50/5.5							BEAUMONT; gray (7.5YR 5/1); silt; SAND (SM); moist; very dense; non-plastic	
102											
103											
104											
105											
106											
107											
108											
109	X	SS 24	14						SP-SM	BEAUMONT; gray (7.5YR 5/1); silt; SAND (SM); moist; very dense; non-plastic	
110			19	12							
111			20	18						BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SP-SM); moist; dense; non-plastic; trace silt; medium grained sand; poorly graded	
112											
113											
114											
115											
116											
117											
118											
119	X	SS 25	7						CH	BEAUMONT; greenish gray (GLEYS 1 6/1) with yellowish brown mottling; gravel; CLAY (CH); dry;	
120			10	22							

Project Name : Job Number



SOIL LOG - Boring No. B-343

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									CH	very stiff; high plasticity; high toughness; some calcareous nodules; some fine gravel	
121											
122											
123											
124		UD 5	N/A	4 24					SM	BEAUMONT; brown (7.5YR 5/2); silt; SAND (SM); moist; low plasticity; some silt	
125											
126											
127											
128											
129	X	SS 26	11 13 17	22 18					CH	BEAUMONT; reddish brown (2.5YR 5/4) with greenish gray mottling; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; presence of some calcareous nodules	
130											
131											
132											
133											
134											
135											
136											
137											
138											
139	X	SS 27	9 19 22	16 18						BEAUMONT; greenish gray (GLEYS 1 6/1) with yellowish brown mottling; silt; sand; CLAY (CH); moist; hard; high plasticity; high toughness; trace silt; presence of black organics (roots); trace of fine sand	
140											
141											
142											
143											
144											
145											
146											
147											
148											
149		UD 6	N/A	4 24					SM	BEAUMONT; brown (7.5YR 4/2); silt; SAND (SM); moist; low plasticity	
150											
151											
152											
153											
154											
155											
156											
157											
158											
159	X	SS 28	28 36 50/6	14.5 18						BEAUMONT; brown (7.5YR 5/2); silt; SAND (SM); moist; very dense; low plasticity	
160											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-343</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
160									SM	
161										
162										
163										
164										
165										
166										
167										
168										
169	X	SS 29	20 23 20	13.5 18						BEAUMONT; brown (7.5YR 5/2); silt; SAND (SM); moist; dense; low plasticity; very silty
170									CL-ML	BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CL-ML); moist; hard; medium plasticity; medium toughness; some silt
171										
172										
173										
174		UD 7	N/A	24 24	16.9		31/17		CL	BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CL); moist; high plasticity; high toughness
175										
176										
177										
178										
179	X	SS 30	11 14 18	22.5 18					CH	BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; hard; high plasticity; high toughness; presence of calcareous nodules
180										
181										
182										
183										
184										
185										
186										
187										
188										
189	X	SS 31	8 12 12	24 18						BEAUMONT; reddish brown (5YR 5/4) with greenish gray mottling; silt; sand; CLAY (CH); moist; very stiff; high plasticity; high toughness; presence of calcareous nodules; some silt; some sand
190										
191										
192										
193										
194										
195										
196										
197										
198										
199		UD 8		10 24						BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); moist; low plasticity
200										



Project Name : Job Number 	<b>SOIL LOG - Boring No. B-343</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
200										Boring Terminated at 200-feet
201										
202										
203										
204										
205										
206										
207										
208										
209										
210										
211										
212										
213										
214										
215										
216										
217										
218										
219										
220										
221										
222										
223										
224										
225										
226										
227										
228										
229										
230										
231										
232										
233										
234										
235										
236										
237										
238										
239										
240										

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-344</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 4 inch			Boring Location    Radiation Waste Bldg N 363056.54 E 2943096.13		Total Depth 100 feet
Drilling Contractor and Rig EEI / CME 750 ATV			Elevation at boring 30.58 feet	Ground Water Depth 12 feet	Depth to Bedrock
Sampling Method Split Spoon			Sample Driving Hammer/Drop 138 lbs / 30 inches	No. of Samples 27	Date Started 11/15/06
			Borehole Inclination 0	Logged by S. Lehman	Date Completed 11/15/06

Reviewed by / Date KLW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0										Topsoil/Grass	
1	X	SS 1	15	18					ML	BEAUMONT; brown (10YR 4/3); clay; sand; SILT (ML); moist; soft; trace sand	
2	X	SS 2	18	18					CH	BEAUMONT; black (2.5Y 2.5/1); silt; CLAY (CH); moist; firm; high plasticity	
3	X	SS 3	18	18	24.0		60/41			BEAUMONT; black (2.5Y 2.5/1); silt; CLAY (CH); moist; stiff; high plasticity	
4	X	SS 4	13	18						BEAUMONT; very dark gray (2.5Y 3/1); silt; CLAY (CH); moist; firm; high plasticity	
5	X	SS 5	10	18						BEAUMONT; dark gray (5Y 4/1); silt; CLAY (CH); moist; firm; high plasticity	
6	X	SS 6	13	18					ML-CL	BEAUMONT; strong brown (7.5YR 5/6); SILT; CLAY (ML-CL); moist; firm; low plasticity	
7	X	SS 7	18	18	24.6		34/14		CL	BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CL); wet; firm; low plasticity	
8	X	SS 8	2	18					CL-ML	BEAUMONT; strong brown (7.5YR 4/6); SILT; CLAY (CL-ML); wet; soft; low plasticity	
9	X	SS 9	18	18						BEAUMONT; yellowish red (5YR 5/6); SILT; CLAY (CL-ML); moist; firm; no to low plasticity	Water level at 12 feet BGS
10	X	SS 10	18	18						BEAUMONT; yellowish red (5YR 5/6); SILT; CLAY (CL-ML); dry; stiff; medium plasticity; strong reaction with HCl	Switch to mud rotary wash at 15 feet BGS
11											
12											
13											
14	X	SS 11	18	18						BEAUMONT; yellowish red (5YR 5/6); SILT; CLAY (CL-ML); moist to wet; stiff; low plasticity	
15											
16											
17											
18											
19	X	SS 12	13	18	25.9	14.0			SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; firm; mostly fine sand; few to little silt	
20											
21											
22											
23											
24	X	SS 13	9	18						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; firm; fine sand	
25											
26											
27											
28											
29	X	SS 14	11	18						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; firm; fine sand	
30											
31											
32											
33											
34	X	SS 15	17	18	21.8	7.4			SP-SM	BEAUMONT; yellowish brown (10YR 5/4); SAND (SP-SM); wet; dense; mostly fine sand; few silt	
35											
36											
37											
38											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-344</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
40									SP-SM	
41									SP-SM	
42									SP-SM	
43									SP-SM	
44	X	SS 16	6 10	14 18					SP	BEAUMONT; yellowish brown (10YR 5/4); SAND (SP); wet; firm; fine sand
45									CH	BEAUMONT; yellowish red (5YR 5/6); CLAY (CH); moist; very stiff; high plasticity
46									CH	BEAUMONT; yellowish red (5YR 5/6); CLAY (CH); moist; very stiff; high plasticity
47									CH	BEAUMONT; yellowish red (5YR 5/6); CLAY (CH); moist; very stiff; high plasticity
48									CH	BEAUMONT; yellowish red (5YR 5/6); CLAY (CH); moist; very stiff; high plasticity
49	X	SS 17	9 9	18 18	27.7	86.8	38/23		ML	BEAUMONT; yellowish brown (10YR 5/4); sand; SILT (ML); moist; very stiff; non-plastic
50									CL	BEAUMONT; yellowish red (5YR 5/6); CLAY (CL); moist; very stiff; high plasticity
51									CL	BEAUMONT; yellowish red (5YR 5/6); CLAY (CL); moist; very stiff; high plasticity
52									CL	BEAUMONT; yellowish red (5YR 5/6); CLAY (CL); moist; very stiff; high plasticity
53									CL	BEAUMONT; yellowish red (5YR 5/6); CLAY (CL); moist; very stiff; high plasticity
54	X	SS 18	4 4	18 18						BEAUMONT; light greenish gray (GLEYS 1 5GY 7/1); silt; CLAY (CL); dry; stiff; low plasticity
55										BEAUMONT; light greenish gray (GLEYS 1 5GY 7/1); silt; CLAY (CL); dry; stiff; low plasticity
56										BEAUMONT; light greenish gray (GLEYS 1 5GY 7/1); silt; CLAY (CL); dry; stiff; low plasticity
57										BEAUMONT; light greenish gray (GLEYS 1 5GY 7/1); silt; CLAY (CL); dry; stiff; low plasticity
58										BEAUMONT; light greenish gray (GLEYS 1 5GY 7/1); silt; CLAY (CL); dry; stiff; low plasticity
59	X	SS 19	4 8	18 18	18.6	54.8	30/15		ML	BEAUMONT; light greenish gray (GLEYS 1 5GY 7/1); silt; CLAY (CL); dry; very stiff; low plasticity
60									ML	BEAUMONT; brown (7.5YR 5/4) with light greenish gray (GLEYS 1 5GY 7/1); sand; SILT (ML); moist; very stiff; low plasticity; strong reaction with HCl; calcareous nodules
61									ML	BEAUMONT; brown (7.5YR 5/4) with light greenish gray (GLEYS 1 5GY 7/1); sand; SILT (ML); moist; very stiff; low plasticity; strong reaction with HCl; calcareous nodules
62									ML	BEAUMONT; brown (7.5YR 5/4) with light greenish gray (GLEYS 1 5GY 7/1); sand; SILT (ML); moist; very stiff; low plasticity; strong reaction with HCl; calcareous nodules
63									ML	BEAUMONT; brown (7.5YR 5/4) with light greenish gray (GLEYS 1 5GY 7/1); sand; SILT (ML); moist; very stiff; low plasticity; strong reaction with HCl; calcareous nodules
64	X	SS 20	10 10	18 18					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; fine sand; some silt
65									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; fine sand; some silt
66									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; fine sand; some silt
67									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; fine sand; some silt
68									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; fine sand; some silt
69	X	SS 21	12 14	16 18	21.9	9.5			SP-SM	BEAUMONT; dark yellowish brown (10YR 4/6); silt; SAND (SP-SM); wet; dense; mostly fine sand; few silt
70									SP-SM	BEAUMONT; dark yellowish brown (10YR 4/6); silt; SAND (SP-SM); wet; dense; mostly fine sand; few silt
71									SP-SM	BEAUMONT; dark yellowish brown (10YR 4/6); silt; SAND (SP-SM); wet; dense; mostly fine sand; few silt
72									SP-SM	BEAUMONT; dark yellowish brown (10YR 4/6); silt; SAND (SP-SM); wet; dense; mostly fine sand; few silt
73									SP-SM	BEAUMONT; dark yellowish brown (10YR 4/6); silt; SAND (SP-SM); wet; dense; mostly fine sand; few silt
74	X	SS 22	14 15	14 18						BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SP-SM); wet; dense; fine sand; trace silt
75										BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SP-SM); wet; dense; fine sand; trace silt
76										BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SP-SM); wet; dense; fine sand; trace silt
77										BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SP-SM); wet; dense; fine sand; trace silt
78										BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SP-SM); wet; dense; fine sand; trace silt
79	X	SS 23	7 12	14 18	20.3	7.4				BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SP-SM); wet; very firm; mostly fine sand; few silt
80										BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SP-SM); wet; very firm; mostly fine sand; few silt

Project Name : Job Number



**SOIL LOG - Boring No. B-344**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SP-SM		
81											
82											
83											
84	X	SS 24	10 17 20	13 18					SP	BEAUMONT; brownish yellow (10YR 6/4); silt; SAND (SP); wet; dense; mostly fine to medium sand; few fines	
85											
86											
87											
88											
89	X	SS 25	5 7 9	18 18	22.7		53/36		CH	BEAUMONT; dark yellowish brown (10YR 4/4); CLAY (CH); moist; very stiff; high plasticity	
90											
91											
92											
93											
94	X	SS 26	7 7 11	18 18	20.7		44/28		CL	BEAUMONT; brown (10YR 4/3); CLAY (CL); moist; very stiff; medium plasticity	
95											
96											
97											
98											
99	X	SS 27	5 7 8	18	29.3		62/42		CH	BEAUMONT; brown (10YR 4/3) with light greenish gray (GLEY 1 5GY 7/1); silt; CLAY (CH); moist; stiff; medium to high plasticity	
100											Boring Terminated at 100 feet bgs
101											
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											

Project Name : Job Number <div style="text-align: center;"><b>MACTEC</b></div>	<b>SOIL LOG - Boring No. B-345</b>
STP COL : 5050-06-0496	

Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 3 inch	Boring Location Radiation Waste Building N 363040.7 E 2943173.35	Total Depth 100 feet
Drilling Contractor and Rig EEI / CME 750 ATV	Elevation at boring 30.71 feet	Ground Water Depth 9 feet
Sampling Method Split Spoon	Sample Driving Hammer/Drop 138 lbs / 30 inches	No. of Samples 27
Borehole Inclination 0		Date Started 11/14/06
Logged by S. Lahman		Date Completed 11/14/06

Reviewed by / Date     KAW 4/3/07      
 Reviewed by / Date     KAW 4/3/07    

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0									ML	BEAUMONT; strong brown (7.5YR 5/6); sand; SILT (ML); dry; very stiff; non-plastic	
1	X	SS 1	100	17					CH	BEAUMONT; dark gray (2.5Y 4/1); CLAY (CH); moist; very stiff; high plasticity	
2	X	SS 2	44	14						BEAUMONT; dark greenish gray (GLEY 1 4/10Y) to black (2.5Y 2.5/1); CLAY (CH); moist; stiff; high plasticity	
3	X	SS 3	50	14						BEAUMONT; dark greenish gray (GLEY 1 4/10Y); CLAY (CH); moist; very stiff; high plasticity	
4	X	SS 4	50	14						BEAUMONT; dark greenish gray (GLEY 1 4/10Y); CLAY (CH); moist; very stiff; high plasticity	
5	X	SS 5	50	15						BEAUMONT; dark greenish gray (GLEY 1 4/10Y); CLAY (CH); moist; firm; high plasticity	Water level at 5.9 feet BGS
6	X	SS 6	50	18					CL	BEAUMONT; dark greenish gray (GLEY 1 4/10Y); CLAY (CH); moist; very stiff; high plasticity; strong reaction with HCl	
7	X	SS 7	50	18					ML	BEAUMONT; dark yellowish brown (10YR 4/4); silt; CLAY (CL); moist; very stiff; medium plasticity	
8	X	SS 8	50	18						BEAUMONT; dark yellowish brown (10YR 4/4); silt; CLAY (CL); moist; soft; medium plasticity	
9	X	SS 9	50	18					CL-ML	BEAUMONT; dark yellowish brown (10YR 4/4); clay, SILT (ML); moist; soft; low plasticity; strong reaction with HCl; cemented nodules up to gravel size	No recovery in sample SS-10
10	X	SS 10	50	10						BEAUMONT; dark yellowish brown (10YR 4/4); clay; SILT (ML); wet to moist; firm; low plasticity	
11										BEAUMONT; yellowish red (5YR 5/6); clay; SILT (ML); moist; firm; low plasticity; strong reaction with HCl; cemented nodules up to gravel size	
12										BEAUMONT; dark yellowish brown (10YR 4/4); clay; SILT (CL-ML); moist; firm; high plasticity; interbedded with silt; CLAY (CH)	
13	X	SS 11	34	4					ML	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; loose; fine sand	Switch to mud rotary drilling at feet BGS
14										BEAUMONT; yellowish brown (10YR 5/4); SILT (ML); wet; firm; non-plastic	
15	X	SS 12	45	13					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; firm; fine sand	
16											
17											
18											
19	X	SS 13	50	14						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; firm; fine sand	
20											
21											
22											
23											
24	X	SS 14	76	18						BEAUMONT; yellowish brown (10YR 5/4); SAND (SM); wet; firm; fine sand	
25											
26											
27											
28											
29	X	SS 15	19	18					SP-SM	BEAUMONT; yellowish brown (10YR 5/4); SAND (SP-SM); wet; dense; mostly fine sand; some	
30											
31											
32											
33											
34											
35											
36											
37											
38											
39											
40											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-345</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SP-SM	medium sand	
41											
42											
43											
44	X	SS 16	12 14 12	13 18						BEAUMONT; yellowish brown (10YR 5/4); SAND (SP-SM); wet; very firm; fine sand	
45											
46											
47											
48											
49	X	SS 17	40 21 15	15 18						BEAUMONT; yellowish brown (10YR 5/4); SAND (SP-SM); wet; dense; fine sand; few medium sand	
50											
51											
52											
53											
54	X	SS 18	5 3 4	18 18					CH	BEAUMONT; greenish gray (GLEYS 1 6/10Y); sand; silt; CLAY (CH); moist; firm; medium plasticity; trace sand	
55											
56											
57											
58											
59	X	SS 19	11 10 11	18 18					ML	BEAUMONT; strong brown (7.5YR 5/4) with greenish gray (GLEYS 1 6/10Y); sand; SILT (ML); moist; very stiff; non-plastic; sand- and gravel-sized concretions	
60											
61											
62											
63											
64	X	SS 20	8 10 13	18 18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; very firm; fine sand	
65											
66											
67											
68											
69	X	SS 21	15 16 21	14 18					SP-SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SP-SM); wet; dense; fine grained	
70											
71											
72											
73											
74	X	SS 22	17 17 24	14 18						BEAUMONT; light olive brown (2.5Y 5/6); silt; SAND (SP-SM); wet; dense; fine sand; trace fines	
75											
76											
77											
78											
79	X	SS 23	15 20 26	13 18						BEAUMONT; light olive brown (2.5Y 5/4); SAND (SP-SM); wet; very dense; fine sand; fine black silt	
80											

Project Name : Job Number



SOIL LOG - Boring No. B-345

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SP-SM	and sand laminations between 79.5 to 80 feet depth	
81											
82											
83											
84	X	SS 24	20	18					CL	BEAUMONT; brown (10YR 4/3); silt; CLAY (CL); moist; hard; medium plasticity	
85			37	18					SP	BEAUMONT; brown (10YR 5/3); silt; SAND (SP); wet; very dense; fine sand; trace fines	
86											
87											
88											
89	X	SS 25	9	18					CL	BEAUMONT; dark yellowish brown (10YR 4/4); silt; CLAY (CL); moist; very stiff; medium plasticity	
90			13	18							
91											
92											
93											
94	X	SS 26	9	18					CH	BEAUMONT; dark yellowish brown (10YR 4/4); silt; CLAY (CH); moist; very stiff; medium plasticity	
95			10	18							
96											
97											
98											
99	X	SS 27	4	18					CL	BEAUMONT; dark yellowish brown (10YR 4/4) to greenish gray (GLEY 1 6/10Y); silt; CLAY (CL); moist; stiff; medium plasticity	
100				18						Boring Terminated at 100 feet	
101											
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-346</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 4 inch	Boring Location N 362809.88 E 2943006.37	Fire Water Tank	Total Depth 75 feet
Drilling Contractor and Rig EEI / CME 750 ATV	Elevation at boring 30.44 feet	Ground Water Depth 19 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 138 lbs / 30 inches	No. of Samples 22	Date Started 11/7/06
	Borehole Inclination 0	Logged by S. Lehman	Date Completed 11/8/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0										FILL: sand; clay; GRAVEL	
1	X	SS 1	4	13					CH	BEAUMONT; black (2.5Y 2.5/1); CLAY (CH); moist; stiff; high plasticity	
2	X	SS 2	4	11					CH	BEAUMONT; black (2.5Y 2.5/1) to dark yellowish brown (10YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; little silt	
3	X	SS 3	4	9					CH	BEAUMONT; greenish gray (GLEY 1 10Y 5/1); silt; CLAY (CH); moist; firm; medium plasticity	
4	X	SS 4	4	11					CH	BEAUMONT; greenish gray (GLEY 1 10Y 5/1); silt; CLAY (CH); moist; stiff; medium plasticity	
5	X	SS 5	4	9					CH	BEAUMONT; greenish gray (GLEY 1 10Y 5/1); silt; CLAY (CH); moist; stiff; high plasticity	
6	X	SS 6	4	18					CL	BEAUMONT; dark yellowish brown (10YR 4/6); sand; silt; CLAY (CL); moist; firm; medium plasticity; trace sand	
7	X	SS 7	4	18					CL	BEAUMONT; dark yellowish brown (10YR 4/6); silt; CLAY (CL); moist; firm; medium plasticity; interbedded with silt	
8	X	SS 8	4	18					CH	BEAUMONT; dark yellowish brown (10YR 4/6); silt; CLAY (CL); moist; firm; low plasticity	
9	X	SS 9	4	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; firm; high plasticity	
10	X	SS 10	4	18					CH	BEAUMONT; yellowish red (5YR 4/6) with greenish gray (GLEY 1 5G 6/1); silt; CLAY (CH); moist; stiff; high plasticity	
11	X	SS 11	4	18					ML	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; firm; high plasticity	Water level at 19 feet BGS
12	X	SS 12	4	18					ML	BEAUMONT; strong brown (7.5YR 5/6); sand; clay; SILT (ML); wet; firm; non-plastic	Switch to mud rotary wash at 20 feet BGS
13	X	SS 13	6	16					SM	BEAUMONT; strong brown (7.5YR 5/6); sand; clay; SILT (ML); wet; stiff; non-plastic	
14	X	SS 14	12	15					SM	BEAUMONT; yellowish brown (10YR 5/6); SAND (SM); wet; firm; fine sand	
15	X	SS 15	21	13					SM	BEAUMONT; yellowish brown (10YR 5/6); SAND (SM); wet; dense; fine sand	



Project Name : Job Number



**SOIL LOG - Boring No. B-346**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 16	21 21 19	13 18						BEAUMONT; yellowish brown (10YR 5/6); SAND (SM); wet; dense; fine sand	
45											
46											
47											
48											
49	X	SS 17	5 4 4	18 18					CH	BEAUMONT; yellowish red (5YR 4/4); CLAY (CH); moist; firm; high plasticity	
50											
51											
52											
53											
54	X	SS 18	18 18	18 18						BEAUMONT; greenish gray (GLEY 1 5G 6/1); silt; CLAY (CH); moist; firm; high plasticity	
55											
56											
57											
58											
59	X	SS 19	6 6 6	18 18					ML	BEAUMONT; greenish gray (GLEY 1 5G 6/1); clay; SILT (ML); moist; stiff; non-plastic; mostly silt; some clay; calcareous concretions	
60											
61											
62											
63											
64	X	SS 20	4 4 7	17 18					SM	BEAUMONT; yellowish red (5YR 5/6), and greenish gray (GLEY 1 5G 6/1) interbedded with yellowish brown (10YR 5/6); silt; clay; SAND (SM); moist; firm; non-plastic; fine sand	
65											
66											
67											
68											
69	X	SS 21	8 13 17	15 18					SP-SM	BEAUMONT; yellowish brown (10YR 5/6); SAND (SP-SM); wet; very firm; mostly fine to medium sand	
70											
71											
72											
73											
74	X	SS 22	12 14 30	18						BEAUMONT; light olive brown (2.5Y 5/6); SAND (SP-SM); wet; dense; mostly fine to medium sand	
75										Boring Terminated at 75 feet	
76											
77											
78											
79											
80											

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-347</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 4 inch	Boring Location Fire Water Pump House N 362746.63 E 2942985.26	Total Depth 75 feet	
Drilling Contractor and Rig EEI / CME 750 ATV	Elevation at boring 31.24 feet	Ground Water Depth 13.5 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 138 lbs / 30 inches	No. of Samples 22	Date Started 11/19/06
	Borehole Inclination 0	Logged by S. Lehman	Date Completed 11/19/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	10	7	18				CH	FILL: yellowish brown (10YR 6/4); gravel; SAND (SW); dry; firm; well-graded; few fines	
2	X	SS 2	10	14	18				CH	BEAUMONT; dark grayish brown (2.5Y 4/2); CLAY (CH); moist; stiff, high plasticity	
3	X	SS 3	10	11	18				CH	BEAUMONT; black (2.5Y 2.5/1); CLAY (CH); moist; firm; high plasticity	
4	X	SS 4	10	4	18				CH	BEAUMONT; black (2.5Y 2.5/1); CLAY (CH); moist; firm; high plasticity; ferrous nodules	
5	X	SS 5	10	18	18				CH	BEAUMONT; black (2.5Y 2.5/1); CLAY (CH); moist; stiff, high plasticity	
6	X	SS 6	10	7	18				CH	BEAUMONT; black (2.5Y 2.5/1); CLAY (CH); moist; firm; high plasticity	
7	X	SS 7	10	15	18				CH	BEAUMONT; dark grayish brown (2.5Y 4/2); silt; CLAY (CL); moist; firm; medium plasticity	
8	X	SS 8	10	17	18				CH	BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CL); moist; stiff, medium plasticity	
9	X	SS 9	10	18	18				CH	BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); moist; soft, non-plastic	
10	X	SS 10	10	1	18				CH	BEAUMONT; yellowish red (5YR 5/6); clay; SILT (ML); moist; firm; non-plastic	
11									CH	BEAUMONT; yellowish red (5YR 5/6); clay; SILT (ML); moist; soft, non-plastic	
12									CH	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CL); moist; soft, medium plasticity	
13									CH	BEAUMONT; yellowish red (5YR 5/6); clay; SILT (ML); wet; firm; non-plastic	
14	X	SS 11	10	17	18				CH	BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); wet; firm; non-plastic	
15									CH		Water level at 13.5 feet BGS
16									CH		
17									CH		
18									CH		
19	X	SS 12	10	18	18				CH	BEAUMONT; yellowish red (5YR 5/6) and strong brown (7.5YR 5/6); silt; CLAY (CL); moist to wet; firm; low to medium plasticity	
20									CH	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; loose; fine sand	
21									CH		
22									CH		
23									CH		
24	X	SS 13	10	16	18				CH	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; firm; fine sand	
25									CH		
26									CH		
27									CH		
28									CH		
29	X	SS 14	10	14	18				CH	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; firm; fine sand	
30									CH		
31									CH		
32									CH		
33									CH		
34	X	SS 15	10	15	18				CH	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; fine sand	
35									CH		
36									CH		
37									CH		
38									CH		
39	X	SS 15	10	15	18				CH	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; fine sand	
40									CH		

Project Name : Job Number <div style="text-align: center;"><b>MACTEC</b></div> STP COL : 5050-06-0496	<h2 style="margin: 0;">SOIL LOG - Boring No. B-347</h2>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 16	11 13 17	18 18						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; fine sand	
45											
46											
47											
48											
49	X	SS 17	4 6 12	18 18					CL	BEAUMONT; brown (7.5YR 5/3); silt; CLAY (CL); moist; very stiff; no to low plasticity; some silt	
50									ML	BEAUMONT; yellowish brown (10YR 5/4); sand; SILT (ML); wet; very stiff; non-plastic; mostly silt; some sand	
51											
52											
53											
54	X	SS 18	4 4 7	18 18					CH	BEAUMONT; greenish gray (GLE Y1 5GY 6/1); silt; CLAY (CH); moist; stiff; high plasticity	
55											
56											
57											
58											
59	X	SS 19	6 0 7	18					CL	BEAUMONT; greenish gray (GLE Y1 5GY 6/1) and strong brown (7.5YR 5/8); silt; CLAY (CL); moist; stiff; medium plasticity; strong reaction with HCl; coarse sand-sized calcareous concretions	
60											
61											
62											
63											
64	X	SS 20	4 7 12	18 18					ML	BEAUMONT; greenish gray (GLE Y1 5GY 6/1) and strong brown (7.5YR 5/8); silt; CLAY (CL); moist; very stiff; medium plasticity	
65										BEAUMONT; strong brown (7.5YR 5/6); clay; sand; SILT (ML); moist; very stiff; non-plastic; trace sand	
66											
67											
68											
69	X	SS 21	6 0 18	15 18					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; fine sand	
70											
71											
72											
73											
74	X	SS 22	18 19 24	16 18						BEAUMONT; light olive brown (2.5Y 5/6); silt; SAND (SM); wet; dense; fine sand	
75										Boring Terminated at 75- feet bgs	
76											
77											
78											
79											
80											

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-348</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 4 inch		Boring Location N 362683.87 E 2943004.72	Fire Water Tank Total Depth 125 feet
Drilling Contractor and Rig JEDI Drilling Contractor / CME 75		Elevation at boring 30 feet	Ground Water Depth 11 feet Depth to Bedrock
Sampling Method Split Spoon/UD		Sample Driving Hammer/Drop 138.1 lbs / 30 inches	No. of Samples 28 Date Started 10/22/06
		Borehole Inclination 0	Logged by G. Geras Date Completed 10/23/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	3	13					CH	BEAUMONT; dark yellowish brown (10YR 4/4); gravelly; CLAY (CL); moist; firm; some well-graded gravel at surface; mostly clay	
2	X	SS 2	4	15					CH	BEAUMONT; black (10YR 2/1); CLAY (CH); dry; stiff; medium plasticity; mostly clay	
3	X	SS 2	4	17					CH	BEAUMONT; black (10YR 2/1); CLAY (CH); dry; stiff; medium plasticity; mostly clay	
4	X	SS 3	5	18					CH	BEAUMONT; black (10YR 2/1); CLAY (CH); dry; stiff; medium plasticity; mostly clay	
5											
6		UD 1	N/A	24					CL	BEAUMONT; black (10YR 2/1) on top, brown on bottom; CLAY (CL)	
7											
8	X	SS 4	2	18					CL	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CL); dry; stiff; some silt; mostly clay; calcareous concretions (1/4" to 1"); ferrous nodules	
9	X	SS 5	4	18					CL	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CL); moist; stiff; some silt; mostly clay; calcareous concretions throughout (1/16 to 1/4 inch)	
10	X	SS 5	4	18					CL	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CL); moist; stiff; some silt; mostly clay; calcareous concretions throughout (1/16 to 1/4 inch)	
11	X	SS 6	5	18					ML	BEAUMONT; strong brown (7.5YR 4/6); clay; SILT (ML); moist; stiff; some clay; mostly silt	Water level at 11 feet BGS
12										Appears to be silt	Switch to mud rotary drilling at 11 feet BGS
13										Appears to be clay	
14		UD 2	N/A	21					CL	Appears to be silt	
15										Appears to be clay	
16											
17											
18											
19		UD 3	N/A	24					ML	Appears to be silt on top	
20									SM	Appears to be fine-grained sand on bottom	
21											
22											
23											
24	X	SS 7	6	13						BEAUMONT; strong brown (7.5YR 5/8); SAND (SM); wet; dense; mostly fine	
25			12	18							
26			20								
27											
28											
29	X	SS 8	7	16						BEAUMONT; strong brown (7.5YR 5/8); SAND (SM); wet; firm; mostly fine	
30			8	18							
31			10								
32			14								
33			14								
34	X	SS 9	10	13						BEAUMONT; reddish yellow (7.5YR 6/6); SAND (SM); wet; very firm; mostly fine	
35			14	18							
36											
37											
38											
39	X	SS 10	11	14						BEAUMONT; reddish yellow (7.5YR 6/6); SAND (SM); wet; very dense; mostly fine sand	
40			30	18							
			42								

Project Name : Job Number



**SOIL LOG - Boring No. B-348**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 11	11 10	18 18					CL	BEAUMONT; reddish yellow (7.5YR 6/6); SAND (SM); wet; firm; mostly fine	
45										BEAUMONT; reddish brown(2.5YR 4/4); CLAY (CL); dry; very stiff; medium plasticity	
46											
47											
48											
49	X	SS 12	7 7	14.5 18						BEAUMONT; brown (7.5YR 4/4); CLAY (CL); dry; stiff; medium plasticity	
50											
51											
52											
53											
54	X	SS 13	6 10	16 18						BEAUMONT; greenish gray (GLE Y 1 5/1); CLAY (CL); dry; very stiff; strong reaction with HCl; calcareous nodules (1/8"-1/4")	
55											
56											
57											
58											
59	X	SS 14	7 14	15 18					ML	BEAUMONT; mottled greenish gray (GLE Y 1 6/1) and strong brown (7.5YR 4/6); clay; SILT (ML); moist; very stiff; little clay; mostly silt; calcareous nodules	
60											
61											
62											
63											
64	X	SS 15	8 12	13 18					SP-SM	BEAUMONT; strong brown (7.5YR 4/4); SAND (SP-SM); wet; very firm; mostly fine sand	
65											
66											
67											
68											
69	X	SS 16	10 13	13 18						BEAUMONT; yellowish brown (10YR 5/4); SAND (SP-SM); moist; very firm; mostly fine sand	
70											
71											
72											
73											
74	X	SS 17	12 20	13 18						BEAUMONT; yellowish brown (10YR 5/6); SAND (SP-SM); moist; very dense; mostly fine sand	
75			33								
76											
77											
78											
79	X	SS 18	14 24	10 18						BEAUMONT; brown (10YR 5/3); SAND (SP-SM); moist; very dense; mostly fine sand	
80			34								

Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-348</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
80									SP-SM	
81										
82										
83										
84	X	SS 19	8 11 12	17 18					SC	BEAUMONT; light yellowish brown (2.5Y 6/4); clay; SAND (SC); moist; very firm; some clay;
85									CL	mostly fine sand
86										BEAUMONT; reddish brown (5YR 4/3); sand; CLAY (CL); dry; very stiff; little fine sand; mostly clay
87										
88										
89	X	SS 20	8 11 20	15 18					SC	BEAUMONT; light olive brown (2.5Y 5/3); clay; SAND (SC); moist; dense; mostly fine sand; some clay; calcareous concretions (1/4" to 3/4")
90										
91										
92										
93										
94	X	SS 21	7 8 10	18 18					CL	BEAUMONT; yellowish brown (10YR 5/4); sand; silt; CLAY (CL); dry; very stiff; mostly clay; some sand; some silt; strong reaction with HCl; calcareous concretions (1/16" to 1/8"); increased fines (decrease sand) with depth; trace possible coal (peat or lignite), or petrified wood (1/4" thick) at base of sample
95										
96										
97										
98										
99	X	SS 22	8 11 12	17 18						BEAUMONT; mottled yellowish red (5YR 4/6) and greenish gray (GLEYS 1 6/1); CLAY (CL); dry; very stiff; strong reaction with HCl; calcareous concretions (1/16" to 1/4")
100										
101										
102										
103										
104										
105										
106										
107										
108										
109	X	SS 23	7 9 13	18 18					CH	BEAUMONT; mottled greenish gray (GLEYS 1 6/1) and yellowish brown (10YR 5/6); CLAY (CH); dry; very stiff; medium plasticity; strong reaction with HCl; trace calcareous concretions (1/8")
110										
111										
112										
113										
114										
115										
116										
117										
118										
119	X	SS 24	8 11 11	18 18						BEAUMONT; mottled greenish gray (GLEYS 1 6/1) and yellowish brown (10YR 5/6); CLAY (CH); dry;
120										

Project Name : Job Number <div style="text-align: center;"> <b>MACTEC</b></div> STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-348</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120											
121									CH	very stiff, medium plasticity; strong reaction with HCl; calcareous nodules (1/6" to 1/4")	
122											
123											
124	X	SS 25	8 14 16	17 18						BEAUMONT; mottled light gray (GLEY 1 7/N) and strong brown (7.5YR 5/6); sand; CLAY (CH); dry; very stiff, some fine sand; mostly clay	
125										Boring Terminated at 125 feet	
126											
127											
128											
129											
130											
131											
132											
133											
134											
135											
136											
137											
138											
139											
140											
141											
142											
143											
144											
145											
146											
147											
148											
149											
150											
151											
152											
153											
154											
155											
156											
157											
158											
159											
160											

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-349</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 4 inch	Boring Location Heavy Haul Road N 362901.92 E 2943593.47	Total Depth 125 feet	
Drilling Contractor and Rig JEDI Drilling Contractor / CME 75	Elevation at boring 29.21 feet	Ground Water Depth 16.5 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 138.1 lbs / 30 inches	No. of Samples 30	Date Started 10/24/06
	Borehole Inclination 0	Logged by G. Geras / A. Osorio	Date Completed 11/3/06

Reviewed by / Date KW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/ft inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	10	12					CH	BEAUMONT; dark gray (10YR 4/1) with strong brown (7.5YR 5/6) mottling throughout; gravel; CLAY (CH); moist; firm; mostly clay; trace gravel/rock	
2	X	SS 2	10	10					CH	BEAUMONT; very dark gray (GLEY 1 3/N); CLAY (CH); dry; firm	
3	X	SS 3	10	11					CH	BEAUMONT; very dark gray (GLEY 1 3/N); CLAY (CH); dry; firm	
4	X	SS 4	10	10					CH	BEAUMONT; dark gray (GLEY 1 4/N); gravel; CLAY (CH); dry; firm; trace gravel; mostly clay	
5	X	SS 5	10	14					CH	BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CH); dry; firm; some silt; mostly clay; calcareous nodules throughout; strong reaction with HCl	
6	X	SS 6	10	18					ML	BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CH); dry; firm; some silt; mostly clay; calcareous nodules throughout; strong reaction with HCl	
7	X	SS 7	10	18					CL	BEAUMONT; brown (7.5YR 5/4) with yellowish red (5YR 5/6) mottling; SILT (ML); moist to wet; firm	
8	X	SS 8	10	18					CL	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CL); dry; stiff; some silt; mostly clay	
9	X	SS 9	10	18					CL	BEAUMONT; yellowish red (5YR 5/6); CLAY (CL); dry; stiff; few calcareous nodules throughout; strong reaction with HCl	
10	X	SS 10	10	14					CL	BEAUMONT; yellowish red (5YR 5/6); CLAY (CL); dry; stiff; few calcareous nodules throughout; strong reaction with HCl	
11											
12											
13											
14											
15											
16											
17											Water level at 16.5 feet BGS
18											
19	X	SS 11	4 10	17 18					SM	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CL); dry; stiff; few calcareous nodules throughout; strong reaction with HCl; some silt; mostly clay	Switch to mud rotary drilling at 20 feet BGS
20											
21											
22											
23											
24	X	SS 12	10 10	11 18						BEAUMONT; strong brown (7.5YR 5/6); SAND (SM); wet; very firm; fine; trace cemented sand nodules	
25											
26											
27											
28											
29	X	SS 13	8 13	18 18						BEAUMONT; strong brown (7.5YR 5/6); SAND (SM); moist; dense; fine	
30											
31											
32											
33											
34	X	SS 14	8 11	13 18						BEAUMONT; strong brown (7.5YR 5/6); SAND (SM); moist; very firm; fine	
35											
36											
37											
38											
39	X	SS 15	25 21	13 18						BEAUMONT; yellowish brown (10YR 5/4); SAND (SM); moist; dense; fine	
40											



Project Name : Job Number 	<b>SOIL LOG - Boring No. B-349</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/ft Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 16	10 15 18	14 18						BEAUMONT; yellowish brown (10YR 5/4); SAND (SM); moist; dense; fine	
45											
46											
47											
48											
49	X	SS 17	4 5	18 18					CH	BEAUMONT; red (2.5YR 4/6); sand; CLAY (CH); dry; stiff; little sand; mostly clay	
50										BEAUMONT; greenish gray (GLE 1 6/1) with slight red (2.5YR 4/6) mottling; CLAY (CH); dry; stiff; calcareous nodules throughout; strong reaction with HCl	
51											
52											
53											
54	X	SS 18	6 7 10	16 18						BEAUMONT; red (2.5YR 5/6); CLAY (CH); dry; very stiff; few calcareous nodules (1/16 to 1/8 inch) throughout; strong reaction with HCl	
55											
56											
57											
58											
59	X	SS 19	7 8 10	18 18						BEAUMONT; reddish brown (5YR 5/4) with slight greenish gray (GLE 1 6/1) mottling throughout; CLAY (CH); dry; very stiff; few calcareous nodules throughout; strong reaction with HCl	
60											
61											
62											
63											
64	X	SS 20	6 7	18 18						BEAUMONT; yellowish red (5YR 4/6) with trace greenish gray (GLE 1 6/1) mottling throughout; silt; CLAY (CH); dry; stiff; some silt; mostly clay	
65											
66											
67											
68											
69	X	SS 21	12 12 14	16 18					SM	BEAUMONT; strong brown (7.5YR 5/6); SAND (SM); moist; very firm; fine	
70											
71											
72											
73											
74	X	SS 22	7 13	16 18					SC	BEAUMONT; strong brown (7.5YR 5/6); clay; SAND (SC); moist; firm; mostly fine sand; little clay	
75											
76											
77											
78											
79	X	SS 23	14 15 22	14 18					SM	BEAUMONT; brown (7.5YR 5/4); SAND (SM); moist; dense; fine	
80											

Project Name : Job Number



**SOIL LOG - Boring No. B-349**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SM		
81											
82											
83											
84	X	SS 24	7 8	18 13	18				CH	BEAUMONT; brown (7.5YR 4/3); CLAY (CH); dry; very stiff	
85											
86											
87											
88											
89	X	SS 25	9 10	18 15	18					BEAUMONT; brown (7.5YR 4/3); silt; CLAY (CH); moist; very stiff	
90											
91											
92											
93											
94	X	SS 26	9 11	18 14	18					BEAUMONT; brown (7.5YR 4/2); silt; CLAY (CH); moist; very stiff	
95											
96											
97											
98											
99	X	SS 27	6 10	18 11	18					BEAUMONT; dark grayish brown (10YR 4/2); silt; CLAY (CH); moist; very stiff	
100											
101											
102											
103											
104											
105											
106											
107											
108											
109	X	SS 28	16 25	13 32	18				SM	BEAUMONT; brown (7.5YR 4/4); SAND (SM); wet; very dense	
110											
111											
112											
113											
114											
115											
116											
117											
118											
119	X	SS 29	9 12	18 17	18				CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; very stiff	
120											

Project Name : Job Number



SOIL LOG - Boring No. B-349

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Unconnected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120											
121									CH		
122											
123											
124	X	SS 30	11 16 20	18 18						BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; hard	
125										Boring Terminated at 125-feet	
126											
127											
128											
129											
130											
131											
132											
133											
134											
135											
136											
137											
138											
139											
140											
141											
142											
143											
144											
145											
146											
147											
148											
149											
150											
151											
152											
153											
154											
155											
156											
157											
158											
159											
160											

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-350</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 4 inch		Boring Location N 363539.3 E 2942960.25		Plant stack 100 feet	
Drilling Contractor and Rig Lewis Drilling / B 57		Elevation at boring 30.75 feet		Ground Water Depth 10.5 feet	
Sampling Method Split Spoon		Sample Driving Hammer/Drop 139.58 lbs / 30 inches		No. of Samples 27	
		Borehole Inclination 0		Logged by G. Geras	
				Date Started 11/14/06	
				Date Completed 11/15/06	

Reviewed by / Date KW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0									CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); dry; firm; few silt; mostly clay; trace organics (grass)	
1	X	SS 1	13	18					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); dry; firm; few silt; mostly clay; trace organics (grass)	
2	X	SS 2	11	18					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); dry; firm; few silt; mostly clay; trace organics (grass)	
3	X	SS 3	11	18					CH	BEAUMONT; dark gray (GLEY 1 4/N); silt; CLAY (CH); dry; firm; few silt; mostly clay	
4	X	SS 4	18	18					CH	BEAUMONT; dark gray (GLEY 1 4/N) to reddish brown (5YR 4/4); silt; CLAY (CH); dry; firm; few silt; mostly clay; strong reaction with HCl; calcareous nodules	
5	X	SS 5	18	18					CH	BEAUMONT; reddish brown (5YR 4/4) mottled dark gray (GLEY 1 4/N); silt; CLAY (CH); dry; firm; few silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
6	X	SS 6	18	18					CH	BEAUMONT; reddish brown (5YR 4/4) mottled dark gray (GLEY 1 4/N); silt; CLAY (CH); dry; firm; few silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
7	X	SS 7	18	18					CH	BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CH); dry; firm; few silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
8	X	SS 8	18	18					ML	BEAUMONT; reddish brown (5YR 4/4); clay; SILT (ML); wet; firm; mostly silt; some clay	Water level at 10.5 feet BGS
9	X	SS 9	18	18					ML	BEAUMONT; reddish brown (5YR 4/4); clay; SILT (ML); wet; firm; mostly silt; some clay	
10	X	SS 10	14	18					CH	BEAUMONT; reddish brown (5YR 4/4); clay; SILT (ML); wet; firm; mostly silt; some clay	Switch to mud rotary drilling at 15 feet BGS
11									CH	BEAUMONT; reddish brown (5YR 4/4); clay; SILT (ML); wet; firm; mostly silt; some clay	
12									CH	BEAUMONT; reddish brown (5YR 4/4); clay; SILT (ML); wet; firm; mostly silt; some clay	
13									CH	BEAUMONT; reddish brown (5YR 4/4); clay; SILT (ML); wet; stiff; mostly silt; some clay	
14	X	SS 11	18	18					ML	BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CH); dry; stiff; few silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
15									ML	BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); wet; soft; few clay; mostly silt	
16									ML	BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); wet; soft; few clay; mostly silt	
17									ML	BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); wet; soft; few clay; mostly silt	
18									ML	BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); wet; soft; few clay; mostly silt	
19	X	SS 12	13	18					SP-SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SP-SM); wet; firm; little silt; mostly sand; poorly graded; trace cemented sand nodules	
20									SP-SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SP-SM); wet; firm; little silt; mostly sand; poorly graded; trace cemented sand nodules	
21									SP-SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SP-SM); wet; firm; little silt; mostly sand; poorly graded; trace cemented sand nodules	
22									SP-SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SP-SM); wet; firm; little silt; mostly sand; poorly graded; trace cemented sand nodules	
23									SP-SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SP-SM); wet; firm; little silt; mostly sand; poorly graded; trace cemented sand nodules	
24	X	SS 13	14.5	18					SP-SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SP-SM); wet; firm; little silt; mostly sand; poorly graded	
25									SP-SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SP-SM); wet; firm; little silt; mostly sand; poorly graded	
26									SP-SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SP-SM); wet; firm; little silt; mostly sand; poorly graded	
27									SP-SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SP-SM); wet; firm; little silt; mostly sand; poorly graded	
28									SP-SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SP-SM); wet; firm; little silt; mostly sand; poorly graded	
29	X	SS 14	8	13					SP	BEAUMONT; yellowish brown (10YR 5/4); SAND (SP); wet; dense; mostly fine sand	
30									SP	BEAUMONT; yellowish brown (10YR 5/4); SAND (SP); wet; dense; mostly fine sand	
31									SP	BEAUMONT; yellowish brown (10YR 5/4); SAND (SP); wet; dense; mostly fine sand	
32									SP	BEAUMONT; yellowish brown (10YR 5/4); SAND (SP); wet; dense; mostly fine sand	
33									SP	BEAUMONT; yellowish brown (10YR 5/4); SAND (SP); wet; dense; mostly fine sand	
34	X	SS 15	18	18					CH	BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CH); dry; stiff; little silt; mostly clay	
35									CH	BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CH); dry; stiff; little silt; mostly clay	
36									CH	BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CH); dry; stiff; little silt; mostly clay	
37									CH	BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CH); dry; stiff; little silt; mostly clay	
38									CH	BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CH); dry; stiff; little silt; mostly clay	
39	X	SS 15	18	18					CH	BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CH); dry; stiff; little silt; mostly clay	
40									CH	BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CH); dry; stiff; little silt; mostly clay	

Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-350</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM	Lithology	
41								SP	Lithology		BEAUMONT; dark yellowish brown (10YR 4/6); silt; SAND (SP-SM); moist; firm; some silt; mostly fine sand; poorly graded
42								SM			Lithology
43										Lithology	
44	X	SS 16	3-4-3	18					CH	Lithology	BEAUMONT; mottled reddish brown (5YR 4/4) and yellowish brown (10YR 5/4); sand; silt; CLAY (CH); dry; stiff; few sand; little silt; mostly clay; poorly graded
45										Lithology	
46										Lithology	
47										Lithology	
48										Lithology	
49	X	SS 17	0-0-0	18						Lithology	BEAUMONT; mottled yellowish red (5YR 4/6) and yellowish brown (10YR 5/4); sand; silt; CLAY (CH); dry; stiff; little fine sand; little silt; mostly clay; poorly graded
50										Lithology	
51										Lithology	
52										Lithology	
53										Lithology	
54	X	SS 18	4-0-0	18						Lithology	BEAUMONT; greenish gray (GLEY 1 6/1); sand; CLAY (CH); dry; stiff; little sand; mostly clay; strong reaction with HCl; trace calcareous nodules
55										Lithology	
56										Lithology	
57										Lithology	
58										Lithology	
59	X	SS 19	4-7	17					SP-SC	Lithology	BEAUMONT; strong brown (7.5YR 5/6); clay; SAND (SP-SC); moist; firm; some clay; mostly fine sand; poorly graded; strong reaction with HCl; trace calcareous nodules
60										Lithology	
61										Lithology	
62										Lithology	
63										Lithology	
64	X	SS 20	9-11-15	12					SM	Lithology	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; little silt; mostly fine sand
65										Lithology	
66										Lithology	
67										Lithology	
68										Lithology	
69	X	SS 21	6-20-22	15						Lithology	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; little silt; mostly fine sand
70										Lithology	
71										Lithology	
72										Lithology	
73										Lithology	
74	X	SS 22	8-9-12	13						Lithology	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; little silt; mostly fine sand
75										Lithology	
76										Lithology	
77										Lithology	
78										Lithology	
79	X	SS 23	10-16-19	11						Lithology	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; dense; few silt; mostly fine to
80										Lithology	

Project Name : Job Number <div style="text-align: center; font-weight: bold; font-size: 1.2em;"> </div> STP COL : 5050-06-0496	SOIL LOG - Boring No. B-350
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80											
81									SM	medium sand	
82											
83											
84	X	SS 24	10	10						BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; very firm; trace silt; mostly fine to medium sand	
85				18							
86											
87											
88											
89	X	SS 25	6	12					SP-SC	BEAUMONT; brown (7.5YR 4/4); clay; silt; SAND (SP-SC); moist; very firm; little clay; little silt; mostly fine sand	
90			10	18							
91											
92											
93											
94	X	SS 26	10	10					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; dense; some silt; mostly fine sand	
95			10	18							
96											
97											
98											
99	X	SS 27	6	16.5					CH	BEAUMONT; grayish brown (10YR 5/2); silt; sand; CLAY (CH); dry; very stiff; silt; little sand; mostly clay	
100			15	18				SM			
101										BEAUMONT; brown (7.5YR 4/2); silt; SAND (SM); moist; very firm; some silt; mostly sand; fine grained	
102											
103										Boring Terminated at 100 feet	
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-401</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 3 inch	Boring Location N 362999.23 E 2942370.55	Total Depth 200 feet	
Drilling Contractor and Rig EEI / CME 750 ATV	Elevation at boring 31.13 feet	Ground Water Depth 12.5 feet	Depth to Bedrock
Sampling Method Split Spoon/UD	Sample Driving Hammer/Drop 138 lbs / 30 inches	No. of Samples 39	Date Started 12/16/06
	Borehole Inclination 0	Logged by J. Howard	Date Completed 12/18/06

Reviewed by / Date KAW 4/3/07  
Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Alterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	18	7					SC	FILL; brownish yellow (10YR 6/6); gravel; clay; SAND (SC); dry; loose	
2	X	SS 2	18	12					CH	BEAUMONT; black (5YR 2.5/1); sand; CLAY (CH); moist; stiff; high plasticity	
3	X	SS 3	18	18						BEAUMONT; black (5YR 2.5/1); sand; CLAY (CH); moist; stiff; high plasticity	
4	X	SS 4	18	14						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; stiff; medium plasticity	
5	X	SS 5	18	15						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; firm; high plasticity	
6	X	SS 6	18	16						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff; high plasticity	
7	X	SS 7	18	14						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; soft; high plasticity	
8	X	SS 8	18	18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; stiff; high plasticity	
9	X	SS 9	18	18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); wet; firm; high plasticity	
10	X	SS 10	18	18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); wet; very stiff; high plasticity	
11											
12											
13											
14	X	SS 11	18	18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY(CH); moist; stiff; high plasticity	Water level at 12.5 feet BGS Switch to mud rotary drilling at 12.5 feet BGS
15											
16											
17											
18											
19	X	SS 12	18	17					SM	BEAUMONT; yellowish red (5YR 5/6); silt; SAND (SM); wet; firm; medium to fine sand	
20											
21											
22											
23											
24	X	SS 13	18	14						BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; medium to fine sand; calcareous nodules; cemented sand	
25											
26											
27											
28											
29	X	SS 14	18	13						BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; very firm; medium to fine sand	
30											
31											
32											
33											
34	X	SS 15	18	15						BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; very dense; medium to fine sand	
35											
36											
37											
38											
39	X	SS 15	18	15						BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; very dense; medium to fine sand	
40											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-401</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 16	3 10	18 18						BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; medium to fine sand	
45											
46											
47											
48											
49	X	SS 17	8 11	18 18					CH	BEAUMONT; yellow red (5YR 5/6); sand; CLAY (CH); moist; very stiff, high plasticity	
50											
51											
52											
53											
54	X	SS 18	4 7	18 18						BEAUMONT; greenish gray (GLE Y 2 5/1); sand; CLAY (CH); moist; stiff, high plasticity	
55											
56											
57											
58											
59		UD 1	N/A	26 24						BEAUMONT; yellowish red (5YR 5/6) with gray streak; sand; CLAY (CH); moist; high plasticity	
60											
61											
62											
63											
64	X	SS 19	8 10 10	18 18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff, high plasticity; sand lenses	
65											
66											
67											
68											
69	X	SS 20	14 14 15	14 18					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; very firm; medium to fine sand	
70											
71											
72											
73											
74	X	SS 21	19 15 21	14 18						BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; medium to fine sand	
75											
76											
77											
78											
79	X	SS 22	24 26 33	18 18						BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; very dense; medium to fine sand	
80											



Project Name : Job Number



**SOIL LOG - Boring No. B-401**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SM		
81											
82											
83											
84	X	SS 23	10 13	18 18					CH	BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff; high plasticity	
85											
86											
87											
88											
89		UD 2	N/A	26 24						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; high plasticity	
90											
91											
92											
93											
94	X	SS 24	10 13	18 18						BEAUMONT; brown (10YR 5/3); sand; CLAY (CH); moist; very stiff; high plasticity	
95											
96											
97											
98											
99	X	SS 25	7 13	18 18						BEAUMONT; brown (10YR 5/3); sand; CLAY (CH); moist; very stiff; high plasticity	
100											
101											
102											
103											
104											
105											
106											
107											
108											
109	X	SS 26	2 41	18 18						BEAUMONT; dark gray (5YR 4/1); sand; CLAY (CH); moist; hard; high plasticity	
110									SP-SM	BEAUMONT; dark gray (5YR 4/1); SAND (SP-SM); wet; very dense; medium to fine sand	
111											
112											
113											
114											
115											
116											
117											
118											
119		UD 3	N/A	24 24	19.8		47/25		CL	BEAUMONT; mottled dark gray (5YR 4/1) and yellowish red (5YR 5/6); silt; CLAY (CL); moist; high plasticity	
120											

Project Name : Job Number



**SOIL LOG - Boring No. B-401**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow#6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									CH		
121											
122											
123											
124											
125											
126											
127											
128											
129	X	SS 27	10 17	18 18						BEAUMONT; yellowish red (5YR 5/6) with gray; sand; CLAY (CH); moist; hard; high plasticity	
130											
131											
132											
133											
134											
135											
136											
137											
138											
139	X	SS 28	6 10	18 18						BEAUMONT; brownish yellow (10YR 6/6); sand; CLAY(CH); moist; very stiff; high plasticity	
140											
141											
142											
143											
144											
145											
146											
147											
148											
149	X	SS 29	13 20	15 18					SM	BEAUMONT; gray (10YR 5/1); silt; SAND (SM); wet; dense; medium to fine sand	
150											
151											
152											
153											
154		UD 4	N/A	15 24						BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; medium to fine sand	
155											Shelby tube refused at 154.4 feet bgs
156											
157											
158											
159	X	SS 30	8 10	18 14					CH	BEAUMONT; yellowish red (5YR 5/6) with gray mottling; sand; CLAY (CH); moist; very stiff; high	
160											

Project Name : Job Number



**SOIL LOG - Boring No. B-401**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
160									CH	plasticity
161										
162										
163										
164										
165										
166										
167										
168										
169	X	SS 31	16 16	18 21						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; hard; high plasticity
170										
171										
172										
173										
174										
175										
176										
177										
178										
179		UD 5	N/A	0 24						Shelby tube lost downhole. No recovery.
180										
181										
182										
183										
184										
185		UD 5A	N/A	16 24						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; high plasticity
186										
187										
188										
189	X	SS 32	10 6	18 18						BEAUMONT; brown (10YR 5/3); sand; CLAY (CH); moist; very stiff; high plasticity
190										
191										
192										
193										
194										
195										
196										
197										
198										
199	X	SS 33	13 11	18 18						BEAUMONT; strong brown (7.5YR 5/6); sand; CLAY (CH); moist; hard; high plasticity
200										

Project Name : Job Number



**SOIL LOG - Boring No. B-401**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
200										Boring Terminated at 200-feet	
201											
202											
203											
204											
205											
206											
207											
208											
209											
210											
211											
212											
213											
214											
215											
216											
217											
218											
219											
220											
221											
222											
223											
224											
225											
226											
227											
228											
229											
230											
231											
232											
233											
234											
235											
236											
237											
238											
239											
240											

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-402 DH</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Rotary Wash / 4 inch	Boring Location Reactor Building unit 4 N 362998.09 E 2942462.29	Total Depth 215 feet	
Drilling Contractor and Rig Best / Failing 1500	Elevation at boring 30.89 feet	Ground Water Depth 9.5 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 141 lbs / 30 inches	No. of Samples 37	Date Started 12/4/06
	Borehole Inclination 0	Logged by C. Bruce	Date Completed 12/6/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	4	2					SM	BEAUMONT; dark yellowish brown (10YR 4/6); gravel; silt; SAND (SM); dry; loose; trace angular gravel	
2	X	SS 2	4	3					SM	BEAUMONT; dark yellowish brown (10YR 4/6); gravel; silt; SAND (SM); dry; firm; trace angular gravel	
3	X	SS 3	10	12					CH	BEAUMONT; very dark greenish gray (GLEY 1 3/10Y); gravel; silt; CLAY (CH); moist; very stiff; trace angular calcareous gravel	
4	X	SS 4	10	16					CH	BEAUMONT; very dark greenish gray (GLEY 1 3/10Y) grades to a yellowish red (5YR 4/6); gravel; silt; CLAY (CH); moist; very stiff; trace angular gravel	
5	X	SS 5	10	15					CH	BEAUMONT; yellowish red (5YR 4/6); gravel; silt; CLAY (CH); moist; very stiff; trace gravel	
6	X	SS 6	10	17					CH	BEAUMONT; yellowish red (5YR 4/6); gravel; silt; CLAY (CH); moist; very stiff; trace angular gravel	
7	X	SS 7	10	14					CH	BEAUMONT; yellowish red (5YR 4/6); gravel; silt; CLAY (CH); moist; very stiff; trace gravel	
8	X	SS 8	10	20					CH	BEAUMONT; yellowish red (5YR 4/6); gravel; silt; CLAY (CH); moist; very stiff; trace gravel	
9	X	SS 9	7	11					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; very stiff	
10	X	SS 10	10	17					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; very stiff; trace calcareous nodules	
11											Water level at 9.5 feet BGS
12											
13											
14											
15											Switch to mud rotary drilling at 15 feet BGS
16											
17											
18											
19	X	SS 11	4	17					ML	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; firm	
20									ML	BEAUMONT; yellowish red (5YR 4/6); sand; SILT (ML); wet; firm	
21											
22											
23											
24	X	SS 12	10	12					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; loose	
25									ML	BEAUMONT; strong brown (7.5YR 5/6); sand; SILT (ML); wet; stiff	
26											
27											
28											
29	X	SS 13	9	9					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm	
30											
31											
32											
33											
34	X	SS 14	11	12						BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; very firm.	
35											
36											
37											
38											
39	X	SS 15	16	11						BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense	
40											

Project Name : Job Number



SOIL LOG - Boring No. B-402 DH

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 16	16 20 1.1	12 18							BEAUMONT; yellowish brown (10YR 5/8); silt; SAND (SM); wet; dense
45									CH		BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; hard
46											
47											
48											
49	X	SS 17	4 6 9	23 18							BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff
50											
51											
52											
53											
54	X	SS 18	6 7 7	24 18							BEAUMONT; greenish gray (GLEY 1 5/5G); silt; CLAY (CH); moist; stiff; trace calcareous nodules
55											
56											
57											
58											
59	X	SS 19	7 7 8	22 18							BEAUMONT; greenish gray (GLEY 1 5/5G); silt; CLAY (CH); moist; stiff; trace calcareous nodules
60											
61											
62											
63											
64	X	SS 20	11 11 20	14 18					CL		BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CL); wet; hard; trace fine sand
65									SM		BEAUMONT; strong brown (7.5YR 4/6); silt; SAND (SM); wet; dense
66											
67											
68											
69	X	SS 21	18 20 21	13 18							BEAUMONT; strong brown (7.5YR 4/6); silt; SAND (SM); wet; dense
70											
71											
72											
73											
74	X	SS 22	21 21 20	12 18							BEAUMONT; dark yellowish brown (10YR 4/6); silt; SAND (SM); wet; dense
75											
76											
77											
78											
79	X	SS 23	21 21 27	15 18							BEAUMONT; dark yellowish brown (10YR 4/6); silt; SAND (SM); wet; very dense
80											

Project Name : Job Number



SOIL LOG - Boring No. B-402 DH

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
80									SM	
81										
82										
83										
84	X	SS 24	8 12 15	19 18					CH	BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CH); moist; very stiff
85										
86										
87										
88										
89	X	SS 25	9 11 13	20 18						BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CH); moist; very stiff
90										
91										
92										
93										
94	X	SS 26	9 10 13	21 18						BEAUMONT; brown (7.5YR 4/3); silt; CLAY (CH); moist; very stiff; trace calcareous nodules
95										
96										
97										
98										
99	X	SS 27	10 10 12	24 18						BEAUMONT; brown (10YR 4/3); silt; CLAY (CH); moist; very stiff
100										
101										
102										
103										
104										
105										
106										
107										
108										
109	X	SS 28	50/4"	3 18					SM	BEAUMONT; very dark gray (7.5YR 3/1); silt; SAND (SM); wet; very dense
110										
111										
112										
113										
114										
115										
116										
117										
118										
119	X	SS 29	10 10 14	21 18					CH	BEAUMONT; greenish gray (GLEY 1 5/10GY) to a strong brown (7.5YR 4/6); silt; CLAY (CH); moist;
120										

Project Name : Job Number



**SOIL LOG - Boring No. B-402 DH**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									CH	very stiff	
121											
122											
123											
124											
125											
126											
127											
128											
129	X	SS 31	31	16					SC	BEAUMONT; strong brown (7.5YR 4/6); clay; SAND (SC); wet; very dense; trace silt	
130		30	41	18				CL			
131										BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CL); moist; hard; trace sand	
132											
133											
134											
135											
136											
137											
138											
139	X	SS 31	14	22					CH	BEAUMONT; greenish gray (GLEYS 1 5/5G); silt; CLAY (CH); moist; hard; trace calcareous nodules	
140		31	16	18							
141											
142											
143											
144											
145											
146											
147											
148											
149	X	SS 32	22	16					SM	BEAUMONT; greenish gray (GLEYS 1 5/5GY) grades to a light olive brown (2.5Y 5/6); silt; SAND (SM); wet; dense	
150		32	20	18							
151											
152											
153											
154											
155											
156											
157											
158											
159	X	SS 33	15	22					CH	BEAUMONT; greenish gray (GLEYS 1 6/5GY); silt; CLAY (CH); moist; hard	
160		33	14	18							



Project Name : Job Number <div style="text-align: center; font-weight: bold; font-size: 1.2em;">                      MACTEC                 </div> STP COL : 5050-06-0496	SOIL LOG - Boring No. B-402 DH
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Depth (feet)	Sample	Sample Type & No.	Unconnected Blows/8 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
160									SC	BEAUMONT; brown (7.5YR 5/4); clay; SAND (SC); moist; dense; trace silt
161								SC		
162										
163										
164										
165										
166										
167										
168										
169	X	SS 34	31 27	16 18					SM	BEAUMONT; strong brown (7.5YR 4/6); silt; SAND (SM); wet; dense
170										
171										
172										
173										
174										
175										
176										
177										
178										
179	X	SS 35	15 31	18 18					CH	BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist; hard
180								SM		
181								CH		
182										
183										
184										
185										
186										
187										
188										
189	X	SS 36	16 17	20 18						BEAUMONT; very dark grayish brown (2.5Y 3/2); silt; CLAY (CH); moist; hard; trace of calcium carbonate nodules
190										
191										
192										
193										
194										
195										
196										
197										
198										
199	X	SS 37	13 21	20 18						BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist; hard; thin sand and calcareous gravel
200										

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-402 DH</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
200										
201										Stopped geotechnical drilling and sampling at 200 feet bgs
202										
203										
204										
205										
206										
207										
208										
209										
210										
211										
212										
213										
214										
215										
216										Boring Terminated at 215 feet
217										
218										
219										
220										
221										
222										
223										
224										
225										
226										
227										
228										
229										
230										
231										
232										
233										
234										
235										
236										
237										
238										
239										
240										

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-403</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 4 inch			Boring Location Unit #4 Reactor Building N 362998.59 E 2942555.2		Total Depth 200 feet
Drilling Contractor and Rig EEI / CME 750 ATV			Elevation at boring 31.47 feet	Ground Water Depth 18 feet	Depth to Bedrock
Sampling Method Split Spoon			Sample Driving Hammer/Drop 138 lbs / 30 inches	No. of Samples 37	Date Started 12/28/06
			Borehole Inclination 0	Logged by D. Tibbals	Date Completed 12/30/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	10	10						FILL; white (2.5YR 8/1); gravel; silt; SAND (SM); dry; firm; poorly graded; mostly fine sand; little silt; gravel	
2	X	SS 2	10	3						FILL; very pale brown (10YR 7/4); gravel; silt; SAND (SM); dry; firm; mostly fine sand; little silt; little gravel.	
3	X	SS 3	10	5					CH	BEAUMONT; black (10YR 2/1); gravel; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt; gravel; organics	
4	X	SS 4	10	10						BEAUMONT; black (10YR 2/1); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt; organics	
5	X	SS 5	10	11						BEAUMONT; red (2.5YR 5/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; some silt; caliche	
6	X	SS 6	10	3						BEAUMONT; red (2.5YR 5/6); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; some silt	
7	X	SS 7	10	20						BEAUMONT; red (2.5YR 5/6); clay; SILT (ML); moist; very stiff; med. plasticity; low toughness; mostly silt; some clay	
8	X	SS 8	10	15					ML	BEAUMONT; red (2.5YR 5/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; some silt	
9	X	SS 9	10	11					CH	BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; some silt	
10	X	SS 10	10	10						BEAUMONT; red (2.5YR 5/6); clay; SILT (ML); moist; very stiff; med. plasticity; low toughness; mostly silt; some clay	
11										BEAUMONT; red (2.5YR 5/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; some silt	
12										BEAUMONT; red (2.5YR 5/6); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; some silt	
13										BEAUMONT; red (2.5YR 5/8); clay; SILT (ML); wet; firm; med. plasticity; low toughness; mostly silt; some clay	
14	X	SS 11	10	20					ML	BEAUMONT; red (2.5YR 5/6); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; some silt	Water level at 18 feet BGS
15										BEAUMONT; red (2.5YR 5/8); clay; SILT (ML); wet; firm; med. plasticity; low toughness; mostly silt; some clay	Switch to mud rotary drilling at 18.5 feet BGS
16											
17											
18											
19	X	SS 12	10	16					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; mostly fine sand; some silt; poorly graded	
20											
21											
22											
23											
24	X	SS 13	10	13						BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; loose; mostly fine sand; some silt; poorly graded	
25											
26											
27											
28											
29	X	SS 14	10	12						BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; very firm; mostly fine sand; little silt; poorly graded	
30											
31											
32											
33											
34	X	SS 15	10	16						BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; mostly fine sand; little silt; poorly graded	
35											
36											
37											
38											
39	X	SS 15	10	16						BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; mostly fine sand; little silt; poorly graded	
40											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-403</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
40									SM	
41										
42										
43										
44	X	SS 16	9 17 33	15 18					SP-SM	BEAUMONT; brown (7.5 YR 5/4); SILT-SAND (SP-SM); wet; dense; mostly fine sand; little silt; poorly graded
45										
46										
47										
48										
49	X	SS 17	4 7 13	22 18					CH	BEAUMONT; reddish brown (5YR 5/4); sand; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt; trace sand
50										
51										
52										
53										
54	X	SS 18	5 7 9	24 18						BEAUMONT; greenish gray (GLEYS 10GY 5/1); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
55										
56										
57										
58										
59	X	SS 19	6 8 10	20 18						BEAUMONT; greenish gray (GLEYS 10GY 5/1); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt; calcareous nodules
60										
61										
62										
63										
64	X	SS 20	6 8 12	15 18						BEAUMONT; reddish brown (2.5YR 4/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
65										
66										
67										
68										
69	X	SS 21	14 14 17	16 18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; dense; mostly fine sand; little silt; poorly graded
70										
71										
72										
73										
74	X	SS 22	15 22 21	12 18					SP-SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SP-SM); wet; dense; mostly fine sand; trace silt; poorly graded
75										
76										
77										
78										
79	X	SS 23	21 33 51	13 18						BEAUMONT; brown (7.5YR 5/4); silt; SAND (SP-SM); wet; very dense; mostly fine sand; trace silt; poorly graded
80										

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-403</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
80										
81									SP-SM	
82										
83										
84	X	SS 24	5 10	24 18					CH	BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
85										
86										
87										
88										
89	X	SS 25	11 11 12	22 18						BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
90										
91										
92										
93										
94	X	SS 26	8 13	24 18						BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
95										
96										
97										
98										
99	X	SS 27	6 10	23 18						BEAUMONT; light brownish gray (10YR 6/2); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
100										
101										
102										
103										
104										
105										
106										
107										
108										
109	X	SS 28	20 30 50	13 18					SP-SM	BEAUMONT; pinkish gray (7.5YR 6/2); silt; SAND (SP-SM); moist; very dense; mostly fine sand; trace silt; poorly graded
110										
111										
112										
113										
114										
115										
116										
117										
118										
119	X	SS 29	10 10	18 18					CH	BEAUMONT; reddish brown (2.5YR 5/4) greenish gray (GLE 2 10G 6/1); silt; CLAY (CH); moist;
120										

Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-403</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									CH	very stiff, high plasticity; high toughness; mostly clay; little silt	
121											
122											
123											
124											
125											
126											
127											
128											
129	X	SS 30	19 23 24	13 18					CL	BEAUMONT; reddish brown (2.5YR 5/4) with greenish gray (GLEYS 2 10G 6/1) mottling; sand; CLAY (CL); moist; hard; low plasticity; high toughness; mostly clay; some sand	
130											
131											
132											
133											
134											
135											
136											
137											
138											
139	X	SS 31	10 15 20	15 18					CH	BEAUMONT; light greenish gray (GLEYS 1 10Y 7/1); silt; CLAY (CH); moist; hard; high plasticity; high toughness; mostly clay; little silt; highly calcareous	
140											
141											
142											
143											
144											
145											
146											
147											
148											
149	X	SS 32	18 27 27	16 18					SM	BEAUMONT; light gray (GLEYS 1 7/N); silt; SAND (SM); wet; very dense; mostly fine sand; some silt; poorly graded	
150											
151											
152											
153											
154											
155											
156											
157											
158											
159	X	SS 33	8 14 16	15 18					CL	BEAUMONT; strong brown (7.5YR 5/6); sand; CLAY (CL); wet; very stiff; low plasticity; medium	
160											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-403</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/9 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
160									CL	toughness; mostly clay, some sand	
161											
162											
163											
164											
165											
166											
167											
168											
169	X	SS 34	23 33 43	5 18					CH	BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; hard; high plasticity; high toughness; mostly clay; little silt	
170											
171											
172											
173											
174											
175											
176											
177											
178											
179	X	SS 35	10 12 16	15 18						BEAUMONT; red (2.5YR 5/6); sand; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; trace sand; trace silt	
180											
181											
182											
183											
184											
185											
186											
187											
188											
189	X	SS 36	10 15 20	0 18					SM	BEAUMONT; gray (LEY 1 6/N); silt; SAND (SM); wet; dense; mostly sand; poorly graded; some silt	No recovery in soil sample SS-36
190											
191											
192											
193											
194											
195											
196											
197											
198											
199	X	SS 37	14 17	24 18					CH	BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; hard; high plasticity; high toughness;	
200											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-403</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
200										mostly clay; some silt Boring Terminated at 200 feet	
201											
202											
203											
204											
205											
206											
207											
208											
209											
210											
211											
212											
213											
214											
215											
216											
217											
218											
219											
220											
221											
222											
223											
224											
225											
226											
227											
228											
229											
230											
231											
232											
233											
234											
235											
236											
237											
238											
239											
240											



Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-404</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 4 inch	Boring Location Unit 4 - Reactor Building N 363097.53 E 2942369.54	Total Depth 200 feet	
Drilling Contractor and Rig JEDI Drilling Contractor / CME 75	Elevation at boring 30.98 feet	Ground Water Depth 20 feet	Depth to Bedrock
Sampling Method Split Spoon/UD	Sample Driving Hammer/Drop 138.1 lbs / 30 inches	No. of Samples 43	Date Started 12/28/06
	Borehole Inclination 0	Logged by W. Miller & A. Osorio	Date Completed 1/5/07

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Alterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0									SM	FILL: yellow (10YR 7/8); silt; gravel; SAND (SM); moist; very loose; mostly fine sand; trace medium to coarse sand; some silt; trace gravel	
1	X	SS 1	13	18					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); moist; soft; high plasticity; medium toughness	
2	X	SS 2	13	18						BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); moist; stiff; high plasticity; medium toughness	
3	X	SS 3	14	18						BEAUMONT; black (GLEY 1 2.5/N); silt; sand; CLAY (CH); moist; firm; high plasticity; medium toughness; trace coarse sand; trace calcareous nodules; strong reaction with HCl	
4	X	SS 4	15	18						BEAUMONT; dark olive gray (5Y 3/2); silt; CLAY (CH); moist; stiff; high plasticity; medium toughness; trace calcareous nodules; strong reaction with HCl	
5	X	SS 5	15	18						BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; firm; high plasticity; medium toughness	
6	X	SS 6	18	18						BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; medium toughness	
7	X	SS 7	17	18						BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; medium toughness	
8	X	SS 8	20	18						BEAUMONT; yellowish red (5YR 4/6) with trace of greenish gray (GLEY 1 6/1) mottling; silt; CLAY (CH); moist; stiff; high plasticity; high toughness	
9	X	SS 9	18	18						BEAUMONT; yellowish red (5YR 4/6) with trace of greenish gray (GLEY 1 6/1) mottling; silt; CLAY (CH); moist; stiff; high plasticity; high toughness; presence of some calcareous nodules; strong reaction with HCl	
10	X	SS 10	18	18						BEAUMONT; yellowish red (5YR 4/6) with some greenish gray (GLEY 1 6/1) mottling; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness	
11										BEAUMONT; brown (7.5YR 5/4); silt; clay; SAND (SM); wet; firm; non-plastic; mostly fine sand; some silt; trace clay	
12										BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; non-plastic; mostly fine sand; some silt	
13											
14											
15											
16											
17											
18											
19	X	SS 11	19	18							
20											Water level at 20 feet BGS Switch to mud rotary drilling at 20 feet BGS
21											
22											
23											
24	X	SS 12	10	18					SM	BEAUMONT; yellowish red (5YR 4/6) with some greenish gray (GLEY 1 6/1) mottling; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness	
25											
26											
27											
28											
29	X	SS 13	3	19							
30			4	18							
31											
32											
33											
34	X	SS 14	10	17							
35			12	18							
36											
37											
38											
39	X	SS 15	7	13							
40			9	18							

Project Name : Job Number



**SOIL LOG - Boring No. B-404**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM	sand; some silt	
41											
42											
43											
44	X	SS 16	4 16	14 18							BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; non-plastic; mostly fine sand; some silt
45											
46											
47											
48											
49	X	SS 17	4 7 8	24 18					CH		BEAUMONT; yellowish red (5YR 4/6) with trace of lenses of greenish gray (GLEY 1 6/1); silt; CLAY (CH); moist; stiff; high plasticity; high toughness
50											
51											
52											
53											
54	X	SS 18	4 6 7	21 18							BEAUMONT; greenish gray (GLEY 1 6/1); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; trace calcareous nodules; strong reaction with HCl
55											
56											
57											
58											
59	X	SS 19	8 12 12	16 18					CL		BEAUMONT; strong brown (7.5YR 5/6) with trace of greenish gray (GLEY 1 6/1) mottling; silt; CLAY (CH); moist; very stiff; medium plasticity; medium toughness; some calcareous nodules; strong reaction with HCl
60											
61											
62											
63											
64	X	SS 20	8 9 15	15 18					SM		BEAUMONT; brown (7.5YR 5/4) with trace of greenish gray (GLEY 1 6/1); silt; clay; SAND (SM); wet; very firm; non-plastic; mostly fine sand; some silt; trace clay
65											
66											
67											
68											
69	X	SS 21	9 17 20	17 18							BEAUMONT; brown (7.5YR 5/4); silt; clay; SAND (SM); wet; dense; non-plastic; mostly fine sand; some silt; trace clay
70											
71											
72											
73											
74	X	SS 22	14 21 24	15 18							BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; non-plastic; mostly fine sand; some silt
75											
76											
77											
78											
79	X	SS 23	15 20 23	14 18							BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; non-plastic; mostly fine
80											

Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-404</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
80									SM	sand; some silt
81										
82										
83										
84	X	SS 24	4 11	21 18					CH	BEAUMONT; brown (7.5YR 5/3) with trace of greenish gray (GLEY 1 6/1) mottling; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness
85										
86										
87										
88										
89		UD 1	N/A	25.75 24	21.8					BEAUMONT; brown (7.5YR 5/3) with trace of greenish gray (GLEY 1 6/1) mottling; silt; CLAY (CH); moist; high plasticity; high toughness
90										
91										
92										
93										
94	X	SS 25	6 11 15	17 18						BEAUMONT; brown (7.5YR 5/3); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness
95										
96										
97										
98										
99		UD 2	N/A	20.5 24	25.3	95	50/30			BEAUMONT; brown (7.5YR 4/3); silt; CLAY (CH); moist; high plasticity; high toughness
100										
101										
102										
103										
104										
105										
106										
107										
108										
109	X	SS 26	14 14 16	13 18					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; non-plastic; mostly fine sand; trace medium sand; some silt
110										
111										
112										
113										
114										
115										
116										
117										
118										
119	X	SS 27	6 11 15	22 18					CH	BEAUMONT; light greenish gray (GLEY 1 7/1) with yellowish red (5YR 4/6) mottling and trace of black
120										

Project Name : Job Number



**SOIL LOG - Boring No. B-404**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
120									CH	(GLEY 1 2.5/N) staining; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; little silt; trace calcareous nodules; trace Ferrous nodules; strong reaction with HCl
121										
122		UD 3	N/A	24.5/24	23.6	99.3	62/39			BEAUMONT; light greenish gray (GLEY 1 7/1) with yellowish red (5YR 4/6) mottling; silt; CLAY (CH); moist; high plasticity; high toughness
123										
124										
125										
126										
127										
128										
129	X	SS 28	14/16/17	18/18						BEAUMONT; yellowish red (5YR 5/6) with some light greenish gray (GLEY 1 7/1) mottling; silt; CLAY (CH); moist; hard; high plasticity; high toughness
130										
131										
132		UD 4	N/A	13/24	20.8	94.1	52/30			BEAUMONT; yellowish red (5YR 4/6) and greenish gray (GLEY 1 6/1) mottling; silt; CLAY (CH); moist; high plasticity; high toughness
133										
134										
135										
136										
137										
138										
139	X	SS 29	11/15/16	16/18					CL	BEAUMONT; light greenish gray (GLEY 1 7/1) with some yellow (10YR 7/8) mottling; silt; CLAY (CL); moist; hard; high plasticity; medium toughness; trace calcareous nodules; strong reaction with HCl
140										
141										
142		UD 5	N/A	18/24	18.0	66.6	30/12			BEAUMONT; light greenish gray (GLEY 1 7/1) and yellowish red (5YR 4/6) mottling; silt; sand; CLAY (CL); moist; high plasticity; medium toughness
143										
144										
145										
146										
147										
148										
149	X	SS 30	16/22/31	16/18					SM	BEAUMONT; light greenish gray (GLEY 1 7/1); silt; SAND (SM); wet; very dense; non-plastic; mostly fine sand; some silt
150										
151										
152										
153										
154										
155										
156										
157										
158										
159	X	SS 31	16/26/24	18/18					CH	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very dense; non-plastic; mostly
160										

Project Name : Job Number



SOIL LOG - Boring No. B-404

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
160									CH	fine sand; some silt
161									CL	BEAUMONT; yellowish red (5YR 4/6) and greenish gray (GLEY 1 6/1) mottling; silt; CLAY (CH); moist; hard; high plasticity; high toughness
162		UD 6	N/A	18.25 24	19.5	96.7	30/15			BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CL); moist; high plasticity; high toughness
163										
164										
165										
166										
167										
168										
169	X	SS 32	11 16 23	17 18						BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CL); moist; hard; high plasticity; high toughness; trace calcareous nodules; strong reaction with HCl
170									SM	BEAUMONT; yellowish red (5YR 4/6); silt; SAND (SM); wet; dense; no to low plasticity; mostly fine sand; some silt
171										
172										
173										
174										
175										
176										
177										
178										
179	X	SS 33	11 17 18	19 18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; sand; CLAY (CH); moist; hard; high plasticity; high toughness; intermixed with pockets of yellowish red (5YR 4/6); silt; SAND (SM); moist; non-plastic
180										
181										
182		UD 7	N/A	23.5 24						BEAUMONT; yellowish red (5YR 4/6); silt; sand; CLAY (CH); moist; high plasticity; high toughness; presence of pockets of yellowish red (5YR 4/6); silt; SAND (SM); moist; non-plastic
183										
184										
185										
186										
187										
188										
189	X	SS 34	8 10 16	2 18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; very stiff; high plasticity
190										
191										
192		UD 8	N/A	19.5 24						BEAUMONT; greenish gray (GLEY 1 6/1) with strong brown (7.5YR 4/6) mottling; silt; CLAY (CH); moist; high plasticity; high toughness; presence of calcite deposits
193										
194										
195										
196										
197										
198										
199	X	SS 35	8 10 18	19 18					CH	BEAUMONT; brown (7.5YR 4/4); silt; CLAY(CH); moist; very stiff; high plasticity; high toughness;
200										

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-404</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Remarks
200									contains calcareous nodules and black roots
201									Boring Terminated at 200-feet
202									
203									
204									
205									
206									
207									
208									
209									
210									
211									
212									
213									
214									
215									
216									
217									
218									
219									
220									
221									
222									
223									
224									
225									
226									
227									
228									
229									
230									
231									
232									
233									
234									
235									
236									
237									
238									
239									
240									

Project Name: Job Number <b>MAGTEC</b>		<b>SOIL LOG - Boring No. B-405 DH</b>	
STP:COL : 5050-05-0495			
Type and Diameter of Boring: Hollow Stem Auger & Rotary Wash 7/4 inch	Boring Location: Unit 4 Reactor Building N 363098 12 E 2942462 95	Total Depth: 618 feet	
Drilling Contractor and Rig MILLER / CME 750-ATV	Elevation at boring 31.05 feet	Ground Water Depth: 12.5 feet	Depth to Bedrock
Sampling Method Split Spoon/UD	Sample Driving Hammer/Drop 138.2 lbs / 30 inches	No. of Samples: 75	Date Started: 10/18/06
	Borehole Inclination: 0	Logged by: D. Haug	Date Completed: 11/6/06

Reviewed by / Date: HLC 5/1/07

Reviewed by / Date: KAW 4/12/10

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/18 Inches	Recovery (inches)	Water Content	Grain Size	Afterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0	X	SS 1	11	18					CL	BEAUMONT, (fill); reddish brown (5YR 5/4); CLAY (CL); moist; soft; low plasticity; low toughness; fine	
1	X	SS 2	11	18					CH	BEAUMONT; black (10YR 2/1); CLAY (CH); moist; firm; high plasticity; medium toughness; fine; few ferrous nodules	0 to 1.5 feet: Possible Fill
2	X	SS 3	11	18					CH	BEAUMONT; black (10YR 2/1); CLAY (CH); moist; firm; high plasticity; medium toughness; fine; few ferrous nodules	
3	X	SS 4	11	18	25.0		55/58		CH	BEAUMONT; black (10YR 2/1); CLAY (CH); moist; firm; high plasticity; medium toughness; fine; few ferrous nodules	
4	X	SS 5	11	18					CH	BEAUMONT; black (10YR 2/1); CLAY (CH); moist; firm; high plasticity; medium toughness; fine; few calcite deposits and ferrous nodules	
5	X	SS 6	11	18					CH	BEAUMONT; brown (7.5YR 5/4); CLAY (CH); moist; firm; high plasticity; medium toughness; fine	
6	X	SS 7	11	18	29.0				CH	BEAUMONT; weak red (10R 5/4); CLAY (CH); moist; firm; high plasticity; medium toughness; blocky; some mottling	
7	X	SS 8	11	18					CH	BEAUMONT; weak red (10R 5/4); CLAY (CH); moist; firm; high plasticity; medium toughness; fine; calcite nodules; mottling	Resonant Column Torsional Shear
8	X	SS 9	11	18	19.8				CH	BEAUMONT; weak red (10R 5/4); CLAY (CH); moist; stiff; high plasticity; medium toughness; mottling and few calcite nodules	
9	X	SS 10	11	18					CH	BEAUMONT; weak red (10R 4/4); CLAY (CH); moist; stiff; high plasticity; medium toughness; mottling; few calcium carbonate nodules	
10		UD 1	N/A	21			IP	IP/IP	CL	BEAUMONT; reddish brown (5YR 5/4); CLAY (CH); moist; stiff; high plasticity	
11	X	SS 7	11	18					CH	BEAUMONT; reddish brown (5YR 5/4); clay; SILT (ML); trace clay; wet; stiff; non-plastic; low toughness	Water level at 19.5 feet BGS
12	X	SS 8	11	18					CH	BEAUMONT; reddish brown (5YR 5/4); clay; SILT (ML); trace clay; wet; stiff; non-plastic; low toughness	
13	X	SS 9	11	18					CH	BEAUMONT; reddish brown (5YR 5/4); clay; SILT (ML); trace clay; wet; stiff; non-plastic; low toughness	
14	X	SS 10	11	18	27.6				SM	BEAUMONT; reddish yellow (7.5YR 6/6); sand; clay; SILT (ML); wet; stiff; fine sand; trace clay	
15											
16											
17											
18											
19	X	SS 9	11	18					CL	BEAUMONT; CLAY (CL)	UD-2 Shelby Tube inundated with water. Poor recovery
20											
21											
22											
23											
24	X	SS 11	11	18	25.0	23.1			SM	BEAUMONT; reddish yellow (7.5YR 6/6); silt; SAND (SM); wet; very firm; fine sand; little silt	
25											
26											
27											
28											
29											
30											
31											
32											
33											
34	X	SS 12	11	18					SP-SM	BEAUMONT; reddish yellow (7.5YR 6/6); silt; SAND (SP-SM); wet; firm; fine sand; little silt	
35											
36											
37											
38											
39	X	SS 12	11	18					SP-SM	BEAUMONT; reddish yellow (7.5YR 6/6); silt; SAND (SP-SM); wet; firm; fine sand; little silt	
40											

Project Name : Job Number <div style="text-align: center; font-weight: bold; font-size: 1.2em;"> </div> STP COL : 5050-06-0296	SOIL LOG - Boring No. B-405 DH
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blowback Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Ethology	Remarks
40											
41											
42											
43											
44	X	SS 13	10	16	26.9	95.9			CL	BEAUMONT; reddish yellow (7.5YR 6/6); silt; SAND (SP-SM); wet; firm; trace silt; fine sand; poorly graded	
45									SP-SM	BEAUMONT; strong brown (7.5YR 5/6); CLAY (CL); moist; very stiff; high plasticity; high toughness	
46											
47											
48											
49	X	SS 14	5	18					CL	BEAUMONT; reddish yellow (7.5YR 6/6); silt; clay; SAND (SP-SM); wet; firm; trace silt; trace clay; fine sand; poorly graded	
50											
51											
52											
53											
54	X	SS 15	5	19	27.9		68/45		CH	BEAUMONT; greenish gray (GLEY 1 6/1); CLAY (CH); moist; stiff; medium to high plasticity; minor iron staining	
55											
56											
57											
58											
59	X	SS 16	5	15.5					CL	BEAUMONT; strong brown (7.5YR 5/6); silt; sand; CLAY (CL); moist; firm; medium to high plasticity; trace silt; trace fine sand; some calcareous nodules; mottling	
60											
61											
62											
63											
64		UD 3	NA	24		24				BEAUMONT; CLAY	
65											
66											
67											
68											
69	X	SS 17	8	16	20.9	14.8			SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; dense; little silt; fine sand; poorly graded	
70											
71											
72											
73											
74	X	SS 18	14	12					SP-SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SP-SM); wet; very dense; trace silt; fine sand; poorly graded	
75			26	18							
76			30								
77											
78											
79	X	SS 19	3	13	21.0	7.9				BEAUMONT; light yellowish brown (10YR 6/4); silt; SAND (SP-SM); wet; dense; few silt; fine sand; trace mafic minerals	
80											



Project Name Job Number  
**MACTEC**  
 STP COL 5050-06-0496

**SOIL LOG - Boring No. B-405 DH**

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow/6 inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SP-SM		
81											
82											
83									CL	BEAUMONT; CLAY (CL); wet	
84		UD 4	N/A	25/24		1P	IP/IP				Resonant Column Torsional Shear
85											
86											
87											
88											
89	X	SS 20	10	17/18					CH	BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; some silt; shell fragments	
90											
91											
92											
93											
94	X	SS 21	10	16/18						BEAUMONT; light reddish brown (5YR 6/4); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; trace silt	Cased to 93 feet. Switch to mud rotary wash at 93 feet; BGS. Boring Collapsed at 30 feet. Steel casing installed to depth of 93 feet.
95											
96											
97											
98											
99	X	SS 22	10	16/18	27.3		70/51			BEAUMONT; brown (10YR 5/3); silt; CLAY (CH); wet; stiff; high plasticity; high toughness; trace silt; mottling; some root fragments	
100											
101											
102											
103											
104											
105											
106											
107											
108											
109	X	SS 23	36/40	12/18	19.7	9.0			SP-SM	BEAUMONT; pale brown (10YR 6/3); silt; SAND (SP-SM); wet; very dense; few silt; mostly fine sand	
110											
111											
112											
113											
114		UD 5	N/A	25/24	25.8		73/50		CH	BEAUMONT; yellowish brown (10YR 5/6); silt; CLAY (CH)	
115											
116											
117											
118											
119	X	SS 24	10	18/18	22.3	90.8				BEAUMONT; yellowish brown (10YR 5/6); sand; CLAY (CH); wet; very stiff	
120											

Project Name: Job Number <b>MACTEC</b>	<b>SOIL LOG - Boring No. B-405 DH</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	
120									SM	BEAUMONT; yellowish brown (10YR 5/5); silt; SAND (SM); wet; firm		
121								SM				
122												
123												
124												
125												
126		UD 6	N/A	25 25 24					CL	BEAUMONT; red (2.5YR 4/6); silt; sand; CLAY (CL); moist; trace silt; trace sand	Resonant Column Torsional Shear	
127												
128												
129	X	SS 25	10 12 13	18 18								
130												
131												
132												
133												
134												
135												
136												
137												
138												
139	X	SS 26	7 8 12	20 18	17.7		42/27			BEAUMONT; light greenish gray (GLEYS 1.7/1); sand; CLAY (CL); moist; very stiff; some fine sand; some mottling; some iron staining		
140												
141												
142												
143												
144												
145												
146												
147												
148												
149		UD 7	N/A	20 24	24.0	17.4	NV/NP		SM	BEAUMONT; SAND (SM)		
150												
151												
152												
153												
154												
155												
156												
157												
158												
159	X	SS 27	7 8	20 18	23.7		55/38		CH	BEAUMONT; brown (7.5YR 5/4); sand; CLAY (CH); moist; very stiff; trace sand; high plasticity;		
160												

Project Name: Job Number **MACTEC** SOIL LOG - Boring No. **B-405 DH**  
 STP COL: 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
160									CH	mottled; calcareous nodules
161										
162										
163										
164										
165										
166										
167										Possible sand or gravel (oyster bed) at 166 to 167 feet
168									CH	BEAUMONT; brown (7.5YR 5/4); CLAY (CH); moist; high plasticity
169	UD 8	N/A	18/24			TP	IP/IP		ML	BEAUMONT; strong brown (7.5YR 5/6); sand; SILT (ML); moist; few fine sand
170										Resonant Column Torsional Shear
171										
172										
173										
174										
175										
176										
177										
178										
179	SS 28	9/10/17	20/18	22.6			34/18		CL	BEAUMONT; brown (7.5YR 5/4); sand; CLAY (CL); moist; very stiff; little fine sand
180										
181										
182										
183										
184										
185										
186										
187										
188										
189	SS 29	7/12/16	21/18	16.7			38/24			BEAUMONT; light greenish gray (GLEYS 1 7/1); sand; CLAY (CL); moist; very stiff; little fine sand; mottled; trace calcareous nodules
190										
191										
192										
193										
194	UD 9	N/A	8/24			IP	66.6			BEAUMONT; light greenish gray (GLEYS 1 7/1); sand; CLAY (CL); wet; fine; loose sand in sample
195										
196										
197										
198										
199	SS 30	8/10/14	23/18	24.0			61/42		CH	BEAUMONT; brown (7.5YR 5/4) to light olive brown (2.5Y 5/4); sand; CLAY (CH); moist; very stiff; trace
200										

Project Name : Job Number



SOIL LOG - Boring No. B-405 DH

STP COL : 5050-06-0495

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
200									CH	fine sand; mottling; calcareous deposits	
201											
202											
203											
204											
205											
206											
207											
208											
209											
210											
211											
212											
213											
214											
215											
216											
217											
218											
219											Attempted to obtain undisturbed sample at 218 to 220 feet; No recovery upon retrieval
220											
221											
222											
223		UD 10A	N/A	26/24		IP	IP/IP			BEAUMONT, gray (7.5YR 5/1); CLAY (CH); moist	Resonant Column Torsional Shear
224											
225		SS 31	4/9	22/18						BEAUMONT, gray (7.5YR 5/1); CLAY (CH); moist; stiff; fine; high plasticity	
226											
227											
228											
229											
230											
231											
232											
233											
234		UD 11	N/A	14/24	16.8					BEAUMONT, greenish gray (GLE Y 1 6/1); CLAY (CH); moist	
235											
236											
237											
238											
239		SS 32	12/14/26	15/18	20.1/63.8					BEAUMONT, greenish gray (GLE Y 1 6/1); clay; sand; SILT (ML); wet; dense; some fine sand; trace	
240											

Project Name: Job Number <b>MACTEC</b>	<b>SOIL LOG - Boring No. B-405 DH</b>
STP COL 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncracked Blow (inches)	Penetration (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USGS)	Lithology	Remarks
240									ML	clay; few calcareous nodules	
241											
242											
243											
244											
245											
246											Possible shells or gravel intermittently between 245 to 258 feet bgs
247											
248											
249											
250											
251											
252											
253											
254											
255											
256											
257											
258											
259	X	SS 33	6 8 13	23 18	27.3		72/51		CH	BEAUMONT; weak red (10R 5/3); sand; CLAY (CH); moist; very stiff; high plasticity; fine sand	
260											
261											
262											
263											
264	X	UD 12	N/A	1 24					SP-SM	BEAUMONT; light greenish gray (GLEYS 1.7/1); silt; SAND (SP-SM); wet; fine sand; trace silt	
265											Difficult drilling 264 to 265 feet bgs; possible shells or gravel
266											
267											
268											
269											
270											
271											
272											
273											
274											
275											
276											
277											
278											
279	X	SS 34	30 13 16	22 18					CH	BEAUMONT; dark greenish gray (GLEYS 1.4/1); CLAY (CH); moist; very stiff; black staining;	
280											

Project Name: Job Number <b>MACTEC</b>	<b>SOIL LOG - Boring No. B-405 DH</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Remarks	
280								Lithology		
281									calcareous nodules	
282										
283										
284										
285										
286										
287										
288										
289										
290										
291										
292										
293										
294		UD 13	N/A	25 24		IP	IP/IP			BEAUMONT; dark greenish gray (GLEYS 1 4/1); CLAY (CH); moist
295										Resonant Column Torsional Shear
296										
297										
298										
299		SS 35	5 14	19 18						
300								BEAUMONT; dark yellowish brown (10YR 4/4) to greenish gray (GLEYS 1 5G 6/1); CLAY (CH); moist; very stiff		
301										
302										
303										
304										
305										
306										
307										
308										
309										
310										
311										
312										
313										
314										
315										
316										
317										
318										
319		UD 14	N/A	22 24	40.221.7		50/25		BEAUMONT; greenish gray (GLEYS 1 6/1); CLAY (CH); moist	
320									Possible shells at 304 feet	

Project Name: Job Number  
**MACTEC**  
 STP COL: 5050-06-0396

**SOIL LOG - Boring No. B-405 DH**

Depth (feet)	Sample No.	Sample Type	Uncorrected blow count	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
320											
321	36	SS	20	18					CH	BEAUMONT; greenish gray (GLEY 1.5/1); CLAY (CH); moist; hard; mottled; calcareous nodules	
322											
323											
324											
325											
326											
327											
328											
329											
330											
331											
332											
333											
334											
335											
336											
337											
338											
339	37	SS	18	22	16.7	49.2			SM	BEAUMONT; olive (5Y 5/3); silt; SAND (SM); moist; dense; fine; some silt; mottled; ferrous staining	
340											
341											
342											
343											
344	15	UD	N/A	15.7	20.9	4.7	NV/NP		SP	BEAUMONT; light olive brown (2.5Y 5/4); SAND (SP); moist; little fine sand	
345											
346											
347											
348											
349											
350											Possible sand and clay or shells at 349.5 feet
351											
352											
353											
354											
355											
356											
357											
358											
359	16	UD	N/A	22			IP	IP/IP	CH	BEAUMONT; greenish gray (GLEY 1.6/1); sand; CLAY (CH); moist; little fine sand; trace fine gravel and coarse sand	Resonant Column Torsional
360											

Project Name : Job Number STP.COL : 5950-06-0496	<b>SOIL LOG - Boring No. B-405 DH</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blowback Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (UCS)	Remarks
360	X	SS 38	10	18					CH	BEAUMONT; greenish gray (GLEY 1 5G/6/1); sand; CLAY (CH); moist; hard; fine sand; few calcareous nodules           Increased drilling resistance 375 to 377.5 feet bgs
361										
362										
363										
364										
365										
366										
367										
368										
369										
370										
371										
372										
373										
374										
375										
376										
377										
378										
379	X	SS 39	50/5	0					SP-SM	BEAUMONT; greenish gray (GLEY 1 6/1); silt; SAND (SP-SM); wet; very dense; little silt; mostly fine sand
380										
381										
382										
383										
384										
385										
386										
387										
388										
389		UD 17	N/A	1.5	28.0				SC	BEAUMONT; greenish gray (GLEY 1 6/1); clay; SAND (SC); wet; fine to coarse sand; little clay; shell fragments
390										
391										
392										
393										
394										
395										
396										
397										
398										
399	X	SS 40	20	20	17.1		48/31		CL	BEAUMONT; greenish gray (GLEY 1 6/1); sand; CLAY (CL); moist; hard; medium; trace fine sand;
400										



Project Name: Job Number



SOIL LOG - Boring No. B-405 DH

STP COL: 5850-06-0495

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow/6 Inches	Recovery (Inches)	Water Content	Grain Size	Aterberg Limits	Linology	Soil Type (USCS)	lithology	Remarks
400									CL	calcareous nodules; mottled; some ferrous staining	
401											
402											
403											
404											
405											
406											
407											
408											
409											
410											
411											
412											
413											
414											
415											
416											
417											
418											
419	UD	18	N/A	4.5 24		16.3			SP	BEAUMONT; light brownish gray (10YR 6/2); SAND (SP); wet; fine sand	
420											
421											
422											
423											
424	SS	41	11 19 22	22 18	25.3		78/55		CH	BEAUMONT; dark grayish brown (10YR 4/2); CLAY (CH); moist; hard; mottled; calcareous deposits in fractures/partings	
425											
426											
427											
428											
429											
430											
431											
432											
433											
434											
435											
436											
437											
438											
439	UD		N/A	25		IP	IP/IP			BEAUMONT; brown (7.5YR 5/2) to greenish gray (GLY 1 10Y 6/1); sand; CLAY (CH); moist; some fine sand; calcareous nodules	Resonant Column Torsional Shear
440											

Project Name / Job Number	<b>SOIL LOG - Boring No. B-405 DH</b>
MACTEC	
STP COL : 5050-06-0495	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow/6 inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
440		19		24					GH		
441	X	SS 43	15 18 24	20 18						BEAUMONT; greenish gray (GLEY 1 6/1); sand; CLAY (CH); moist; hard; some fine sand; calcareous nodules	
442											
443											
444											
445											
446											
447											
448											
449											
450											
451											
452											
453											
454											
455											
456											
457											
458											
459		UD 20	N/A	24 24	17.6					BEAUMONT; light greenish gray (GLEY 1 7/1) to light yellowish brown (10YR 6/4); sand; CLAY (CH); moist; trace fine sand; calcareous nodules; black staining	
460											
461	X	SS 43	15 18 24	20 18						BEAUMONT; light greenish gray (GLEY 1 7/1); CLAY (CH); moist; hard; calcareous nodules	
462											
463											
464											
465											
466											
467											
468											
469											
470											
471											
472											
473											
474											
475											
476											
477											
478											
479	X	SS 44	10 18 22	22 18						BEAUMONT; light greenish gray (GLEY 1 7/1); sand; CLAY (CH); moist; hard; trace fine sand; calcareous nodules; ferrous staining; black staining	
480											

Project Name: Job Number STP COL: 5050-06-0495	<b>SOIL LOG - Boring No. B-405 DH</b>
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Depth (feet)	Sample	Sample Type & No.	Undisturbed Blow/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
480								OH			
481								OH			
482								OH			
483								OH			
484								OH			
485								OH			
486								OH			
487								OH			
488								OH			
489		UD 21	N/A	24/24		IP	IP/PP	OH		BEAUMONT; greenish gray (GLEYS 1-6/1); sand; CLAY (CH); moist; trace fine sand; calcareous nodules; ferrous staining.	Resonant Column Torsional Shear
490								OH			
491								OH			
492								OH			
493								OH			
494								OH			
495								OH			
496								OH			
497								OH			
498								OH			
499		SS 45	15/20/26	24/18	21.8		59/40	OH		BEAUMONT; mottled red (2.5YR 5/6) to light greenish gray (GLEYS 1 10Y 7/1); sand; CLAY (CH); moist; hard; some fine sand; few calcareous nodules.	
500								OH			
501								OH			
502								OH			
503								OH			
504								OH			
505								OH			
506								OH			
507								OH			
508								OH			
509								OH			
510								OH			
511								OH			
512								OH			
513								OH			
514								OH			
515								OH			
516								OH			
517								OH			
518								OH			
519		UD 22	N/A	13.5/24		20.7	UV/NP	SM		BEAUMONT; light brownish gray (10YR 6/2); clay; SAND (SM); moist; fine sand; trace clay	Difficult drilling; possible sand shells or coarse sand
520								SM			

Project Name: Job Number **MACTEC** SOIL LOG - Boring No. B-405 DH  
 STP COL 5050-06-0496

Depth (feet)	Sample:	Sample Type & No.	Unclassified Blow/d Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
520									SM		
521											
522											
523											
524	X	SS 46	21 24	15 18	21.637.2						BEAUMONT; light olive brown (2.5Y 5/3); silt; SAND (SM); wet; very dense; fine sand; some silt
525											
526											
527											
528											
529											
530											
531											
532											
533											
534											
535											
536											
537											
538	X	UD 23	N/A 48	4 4	20.827.4						BEAUMONT; light brownish gray (10YR 6/2); silt; SAND (SM); wet; fine sand
539		SS 47	50/5"	10 18							BEAUMONT; light brownish gray (10YR 6/2); silt; SAND (SM); wet; very dense; fine to medium sand
540											
541											
542											
543											
544											
545											
546											
547											
548											
549											
550											
551											
552											
553											
554											
555											
556											
557											
558	X	SS 48	7 23	2 18					CH		BEAUMONT; gray (10YR 6/1); sand; CLAY (CH); moist; hard; some fine to coarse sand
560											

Project Name: Job Number



SOIL LOG - Boring No. B-405 DH

STP COL 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrelated Blows (6 inches)	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
560									CH	
561										
562										
563										
564										
565										
566										
567										
568										
569	UD-24	N/A	24	24		IP	IP/PP	BEAUMONT; greenish gray (10Y 6/1); CLAY (CH); moist; calcareous nodules; mottled		Resonant Column Torsional Shear
570										
571										
572										
573										
574										
575										
576										
577										
578										
579	SS-49		49	18	19.9	80.3	47.3	BEAUMONT; light greenish gray (10Y 7/1); sand; CLAY (CL); moist; soft; medium plasticity; calcareous nodules; little fine sand; black organic staining	CL	SS-49; Split Spoon dropped through second and third 6-inch intervals; drove sampler an additional 6 inches to obtain sample
580										
581										
582										
583										
584										
585										
586										
587										
588										
589										
590										
591										
592										
593										
594										
595										
596										
597										
598										
599	UD-25	N/A	25	24	18.4	89.2	45.2	BEAUMONT; light yellowish brown (10YR 6/4); sand; CLAY (CL); moist; fine sand; mottled	CL	
600										


Project Name: Job Number:



**SOIL LOG - Boring No. B-405 DH**

STP COL : 5050-06-0496

Depth (feet)	Sample Type & No.	Uncorrected Blotter Indices	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
600									BEAUMONT; light yellowish brown (10YR 6/4); sand; CLAY (CL); moist; fine sand; mottled (Continued from previous page). Geotechnical drilling and sampling completed at 600 feet bgs. Boring drilled to 618 feet for geophysical logging tools. No samples collected.	Geotechnical sampling completed at 600 feet bgs. Borehole completed to 618 feet bgs for geophysical logging tools.
601										
602										
603										
604										
605										
606										
607										
608										
609										
610										
611										
612										
613										
614										
615										
616										
617										
618									Boring Terminated at 618 feet	
619										
620										
621										
622										
623										
624										
625										
626										
627										
628										
629										
630										
631										
632										
633										
634										
635										
636										
637										
638										
639										
640										

Project Name : Job Number		<b>SOIL LOG - Boring No. B-406</b>	
			
STP COL : 5050-06-0496		Boring Location Unit 4 - Reactor Building N 363098.2 E 2942556.69	Total Depth 200 feet
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 4 inch		Elevation at boring 31.24 feet	Ground Water Depth 19 feet
Drilling Contractor and Rig Miller / CME 750		Sample Driving Hammer/Drop 138.2 lbs / 30 inches	No. of Samples 36
Sampling Method Split Spoon		Borehole Inclination 0	Date Started 11/13/06
		Logged by D. Haug	Date Completed 11/15/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	12	18					CL	Fill: yellow (10YR 7/6) to dark grayish brown (2.5Y 4/2); sand; gravel; CLAY (CL); moist; firm; medium; little sand; little gravel	
2	X	SS 2	10	18					CH	BEAUMONT; grayish brown (2.5Y 5/2); sand; CLAY (CH); moist; stiff; mottled; some coarse sand	
3	X	SS 3	12	18						BEAUMONT; gray (2.5Y 5/1); sand; CLAY (CH); moist; stiff; trace fine sand; few calcium carbonate nodules; mottled	
4	X	SS 4	16	18						BEAUMONT; gray (2.5Y 5/1); sand; CLAY (CH); moist; firm; few fine sand; some calcium carbonate nodules; bottom of shoe brown (7.5YR 5/3); sand; CLAY; moist; firm; few calcium carbonate nodules; few fine sand	
5											
6											
7											
8	X	SS 5	16	18						BEAUMONT; yellowish red (5YR 4/6); CLAY (CH); moist; firm; mottling along microfractures; some black organic staining	
9	X	SS 6	19	18						BEAUMONT; yellowish red (5YR 4/6); CLAY (CH); moist; stiff; mottling along microfractures some black organic staining	
10	X	SS 7	16	18					CL	BEAUMONT; yellowish red (5YR 4/6); CLAY (CH); moist; stiff; calcium carbonate nodules and a small layer with calcium carbonate nodules	
11	X	SS 8	16	18						BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CL); moist; firm; little silt	
12	X	SS 9	15	18						BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CL); moist; stiff; little silt; calcium carbonate nodules; mottling	
13											
14											
15											
16											
17											
18											
19	X	SS 10	11	18					ML	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CL); moist; stiff; some silt	Water level at 19 feet BGS
20											Switch to Mud Rotary drilling at 20 feet BGS
21											
22											
23											
24	X	SS 11	13.5	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; fine; little silt	
25											
26											
27											
28											
29	X	SS 12	10	18						BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; fine; little silt	
30											
31											
32											
33											
34	X	SS 13	13	18						BEAUMONT; light brown (7.5YR 6/4); silt; SAND (SM); wet; very firm; fine; little silt	
35											
36											
37											
38											
39	X	SS 14	12	18						BEAUMONT; reddish yellow (7.5YR 6/6); silt; SAND (SM); wet; firm; few silt; fine quartz sand	
40											

Project Name : Job Number



SOIL LOG - Boring No. B-406

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 15	9 14	13 18					CH SM	BEAUMONT; reddish yellow (7.5YR 6/6); CLAY (CH); moist; very stiff BEAUMONT; reddish yellow (7.5Y 6/6); silt; SAND (SM); wet; firm; few silt; fine quartz sand	
45											
46											
47											
48											
49	X	SS 16	4 5	19 18					CH	BEAUMONT; light brown (7.5YR 6/4); sand; silt; CLAY (CH); moist; stiff; few silt; trace sand; sand infilling fracture or dessication cracks; fine quartz sand	
50											
51											
52											
53											
54	X	SS 17	1 5	23 18					CL	BEAUMONT; greenish gray (GLEYS 10GY 6/1); silt; sand; CLAY (CL); moist; stiff; medium plasticity; little silt; little very fine grained quartz sand	
55											
56											
57											
58											
59	X	SS 18	9 10	23 18						BEAUMONT; brown (7.5YR 5/4); sand; CLAY (CL); moist; very stiff; some sand; mottled	
60											
61											
62											
63											
64	X	SS 19	6 6	18 18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; fine; little silt; few pebbles at 64.5-feet	
65											
66											
67											
68											
69	X	SS 20	11 20	2 18						BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; dense; fine; little silt; few pebbles	
70											
71											
72											
73											
74	X	SS 21	14 17	12 18					SP-SM	BEAUMONT; brown (7.5YR 5/4); SAND (SP-SM); wet; dense; fine	
75											
76											
77											
78											
79	X	SS 22	17 18	13 18						BEAUMONT; brown (7.5YR 5/4); SAND (SP-SM); wet; dense; fine	
80									CH		



Project Name : Job Number



**SOIL LOG - Boring No. B-406**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									CH	BEAUMONT; reddish brown (5YR 5/4); CLAY (CH); moist; hard; high plasticity	
81											
82											
83											
84	X	SS 23	9 11	18 18						BEAUMONT; reddish brown (5YR 5/3); CLAY (CH); moist; very stiff	
85											
86											
87											
88											
89	X	SS 24	5 10	16.5 18					CL	BEAUMONT; reddish brown (5YR 5/3); silt; CLAY (CL); moist; very stiff; few silt; few calcium carbonate nodules	
90											
91											
92											
93											
94	X	SS 25	7 12	22 18					CH	BEAUMONT; brown (7.5YR 4/4); CLAY (CH); moist; very stiff; light brownish staining along what may have been old root paths; trace of calcium carbonate nodules (small)	
95											
96											
97											
98											
99	X	SS 26	5 11	21 18						BEAUMONT; brown (7.5YR 5/3); CLAY (CH); moist; very stiff; high plasticity	
100											
101											
102											
103											
104											
105											
106											
107											
108											
109	X	SS 27	21 49	11 18					SP-SM	BEAUMONT; light brown (7.5YR 6/3); SAND (SP-SM); wet; very dense; fine	
110											
111											
112											
113											
114											
115											
116											
117											
118											
119	X	SS 28	10 11	4 18					CH	BEAUMONT; light greenish gray (GLEYS 1 10Y 7/1); CLAY (CH); moist; very stiff; high plasticity; few	
120											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-406</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/ft	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									CH	calcium carbonate nodules	
121											
122											
123											
124											
125											
126											
127											
128											
129	X	SS 29	12 14	19 18					CL	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CL); moist; very stiff; some silt	
130											
131											
132											
133											
134											
135											
136											
137											
138											
139	X	SS 30	8 14	16 18					CH	BEAUMONT; light greenish gray (GLEY 1 5GY 8/1); sand; CLAY (CH); moist; hard; some fine grained quartz sand; mottled	
140			25								
141											
142											
143											
144											
145											
146											
147											
148											
149	X	SS 31	19 50/5	12 18						BEAUMONT; light greenish gray (GLEY 1 5GY 8/1); sand; CLAY (CH); moist; hard; little sand; some calcareous cementation, two inch sand stringer	
150											
151											
152											
153											
154											
155											
156											
157											
158											
159	X	SS 32	8 13	19 18						BEAUMONT; light greenish gray (GLEY 1 5GY 7/1); sand; CLAY (CH); moist; hard; few sand; quartz sand; few calcium carbonate nodules; mottled	
160			27								


Difficult drilling from 143 to 145-feet; possible hard clay, shells or gravel

Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-406</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
160									CH	
161										
162										
163										
164										
165										
166										
167										
168										
169	X	SS 33	8 12 14	18 18					CL	BEAUMONT; yellowish red (5YR 4/6); silt; sand; CLAY (CL); moist; very stiff, some silt; silt partings
170										
171										
172										
173										
174										
175										
176										
177										
178										
179	X	SS 34	9 11 19	15.5 18					CL	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CL); moist; very stiff, some silt; silt partings
180										
181										
182										
183										
184										
185										
186										
187										
188										
189	X	SS 35	7 10	14.5 18					CH	BEAUMONT; light greenish gray (GLEY 1 5GY 7/1); sand CLAY (CH); moist; stiff; little sand; quartz sand; mottled; ferrous staining along microfractures
190										
191										
192										
193										
194										
195										
196										
197										
198										
199	X	SS 36	7 14 18	18					CH	BEAUMONT; strong brown (7.5YR 5/6); CLAY (CH); moist; hard; fine; mottled; few calcium
200										

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-406</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
200								carbonate nodules		
201								Boring Terminated at 200-feet		
202										
203										
204										
205										
206										
207										
208										
209										
210										
211										
212										
213										
214										
215										
216										
217										
218										
219										
220										
221										
222										
223										
224										
225										
226										
227										
228										
229										
230										
231										
232										
233										
234										
235										
236										
237										
238										
239										
240										

Project Name : Job Number		<b>SOIL LOG - Boring No. B-407</b>	
			
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 5 inch		Boring Location Unit #4 Reactor Building N 363195.82 E 2942369.78	Total Depth 200 feet
Drilling Contractor and Rig Gregg #2 / CME 55		Elevation at boring 31.33 feet	Ground Water Depth 23.5 feet
Sampling Method Split Spoon		Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 37
		Borehole Inclination 0	Logged by M. Fraychineaud
			Date Started 12/14/06
			Date Completed 12/16/06

Reviewed by / Date KW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	7	18						FILL: very pale brown (10YR 7/4); gravel; clay; SAND (SW); moist; loose; trace gravel; organic topsoil; roots and grass	
2	X	SS 2	12	18					CH	BEAUMONT; black (GLE Y 1 2.5/N); silt; CLAY (CH); moist; stiff; high plasticity; trace silt	
3	X	SS 3	10	18						BEAUMONT; black (GLE Y 1 2.5/N); silt; CLAY (CH); moist; firm; high plasticity; trace silt	
4	X	SS 4	7	18						BEAUMONT; black (5YR 2.5/1) to dark greenish gray (GLE Y 1 4/1); silt; CLAY (CH); moist; firm; high plasticity; trace silt	
5	X	SS 5	13	18						BEAUMONT; dark greenish gray (GLE Y 1 4/1) to yellowish red (5YR 4/6); silt; CLAY (CH); moist; firm; high plasticity; trace silt	
6	X	SS 6	13	18						BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; trace silt	
7	X	SS 7	18	18						BEAUMONT; red (2.5YR 4/8); silt; CLAY (CH); moist; very stiff; high plasticity; trace silt	
8	X	SS 8	18	18						BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; very stiff; high plasticity; trace silt; strong reaction with HCl; few calcareous nodules	
9	X	SS 9	15	18						BEAUMONT; red (2.5YR 4/8); silt; CLAY (CH); moist; hard; high plasticity	
10	X	SS 10	12	18						BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; very stiff; trace silt; strong reaction with HCl; few calcareous nodules and microfractures;	
11	X	SS 11	16	18					ML	BEAUMONT; yellowish red (5YR 5/6); clay; SILT (ML); moist; hard; low to medium plasticity; little clay	
12	X	SS 12	15	17	22.8	76.9	26/18		CL	BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CL); wet; hard; little fine sand	Water level at 23.5 feet BGS
13											Switch to mud rotary drilling at 25 feet BGS
14	X	SS 13	9	13					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; very firm; mostly fine sand; little silt	
15	X	SS 14	4	16						BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; mostly fine sand; little silt	
16											
17											
18											
19	X	SS 15	13	18					SP	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SP); wet; firm; fine; trace silt; trace mafic minerals	

Project Name : Job Number



SOIL LOG - Boring No. B-407

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SP		
41											
42											
43											
44	X	SS 16	12 11 6	16 18							
45									CH		BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SP); wet; firm; mostly fine sand; trace silt; trace mafic minerals
46											BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; very stiff; few silt
47											
48											
49	X	SS 17	4 4 6	24 18							BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CH); moist; stiff; some silt; numerous and multicolored silt layers up to approximately 3/4" thick
50											
51											
52											
53											
54	X	SS 18	4 6 7	24 18							BEAUMONT; light greenish gray (GLEYS 7/1); silt; CLAY (CH); moist; stiff; few silt; weak to strong reaction with HCl; few calcareous nodules
55											
56											
57											
58											
59	X	SS 19	8 10	22 18					ML		BEAUMONT; brown (7.5YR 5/4) with some light greenish gray (GLEYS 1 7/1) mottling; clay; SILT (ML); moist; very stiff; some clay; strong reaction with HCl; little calcareous nodules
60											
61											
62											
63											
64	X	SS 20	10 7	21 18					SM		BEAUMONT; brown (7.5YR 5/4); clay; silt; SAND (SM); moist; firm; few clay
65											BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; mostly fine sand; some silt
66											
67											
68											
69	X	SS 21	13 17 23	11 18					SP-SM		BEAUMONT; brown (7.5YR 5/4); silt; SAND (SP-SM); wet; dense; mostly fine sand; trace silt
70											
71											
72											
73											
74	X	SS 22	9 20 30	14 18							BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SP-SM); wet; very dense; mostly fine sand; trace silt; trace minor interbedded layers of clay
75											
76											
77											
78											
79	X	SS 23	10 14 21	10 18							BEAUMONT; brown (7.5YR 5/3); silt; SAND (SP-SM); wet; dense; mostly fine sand; trace silt; trace mafic minerals
80											

Project Name : Job Number



SOIL LOG - Boring No. B-407

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SP-SM		
81											
82											
83											
84	X	SS 24	5 12	19 18					CH	BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; few silt	
85											
86											
87											
88											
89	X	SS 25	7 12	19 18						BEAUMONT; brown (7.5YR 5/3); silt; CLAY (CH); moist; very stiff; high plasticity; few silt; strong reaction with HCl; trace calcareous nodules	
90											
91											
92											
93											
94	X	SS 26	8 13	24 18						BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); moist; very stiff; high plasticity; few silt; strong reaction with HCl; trace calcareous nodules	
95											
96											
97											
98											
99	X	SS 27	5 9	22 18						BEAUMONT; brown (7.5YR 5/3) with trace light greenish gray (GLEY 2 7/1) mottling; silt; CLAY (CH); moist; very stiff; high plasticity; few silt	
100											
101											
102											
103											
104											
105											
106											
107											
108											
109	X	SS 28	11 22 31	11 18					SP-SM	BEAUMONT; pale brown (10YR 6/3); silt; SAND (SP-SM); wet; very dense; medium; trace silt; trace mafic minerals	
110											
111											
112											
113											
114											
115											
116											
117											
118											
119	X	SS 29	6 13	20 18					CH	BEAUMONT; red (2.5YR 5/6) with light greenish gray (GLEY 2 8/1) mottling; silt; CLAY (CH); moist;	
120											

Project Name : Job Number



**SOIL LOG - Boring No. B-407**

STP COL : 5050-05-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									CH		
121									CH	very stiff, few silt; strong reaction with HCl on light greenish gray component	
122											
123											
124											
125											
126											
127											
128											
129	X	SS 30	9 10 16	20 18							
130										BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; very stiff, few silt; strong reaction with HCl; trace calcareous nodules; black organic material in microfractures in lower portion of sample	
131											
132											
133											
134											
135											
136											
137											
138											
139	X	SS 31	10 14 17	18 18					ML		
140									ML	BEAUMONT; light greenish gray (GLEYS 1 7/1) with occasional olive yellow (2.5Y 6/6) mottling; clay; SILT (ML); moist; hard; little clay; strong reaction with HCl; some calcareous nodules	
141											
142											
143											
144											
145											
146											
147											
148											
149	X	SS 32	19 25 24	15 18					SP		
150									ML	BEAUMONT; light greenish gray (GLEYS 1 7/1) with occasional olive yellow (2.5Y 6/6) mottling; clay; SILT (ML); moist; hard; strong reaction with HCl; some calcareous nodules	
151											
152											
153											
154											
155											
156											
157											
158											
159	X	SS 33	30 15 19	16 18					CH		
160									CH	BEAUMONT; red (2.5YR 5/6) and pale olive (5Y 6/4) marbled; silt; CLAY (CH); moist; hard; strong	



Project Name : Job Number



**SOIL LOG - Boring No. B-407**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
160									CH	reaction with HCl; trace calcareous nodules	
161											
162											
163											
164											
165											
166											
167											
168											
169	X	SS 34	8 11 14	23 18							BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; very stiff; high plasticity; trace silt; trace calcareous nodules
170											
171											
172											
173											
174											
175											
176											
177											
178											
179	X	SS 35	8 11 15	20 18							BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; very stiff; high plasticity; few silt; occasional thin silt layers throughout the sample
180											
181											
182											
183											
184											
185											
186											
187											
188											
189	X	SS 36	7 8 12	23 18							BEAUMONT; reddish brown (5YR 5/4) with trace light greenish gray (GLEYS 2 8/1) mottling; silt; CLAY (CH); moist; very stiff; high plasticity; trace silt; strong reaction with HCl; trace calcareous nodules
190											
191											
192											
193											
194											
195											
196											
197											
198											
199	X	SS 37	9 17 16	22 18							BEAUMONT; brown (7.5YR 4/4) to light olive brown (2.5Y 5/6) with light greenish gray (GLEYS 1
200											

Project Name : Job Number STP COL : 5050-06-0496	<b>MACTEC</b> <b>SOIL LOG - Boring No. B-407</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/ft Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
200										7/1) mottling; silt; sand; CLAY (CH); moist; hard; few silt; strong reaction with HCl; trace coarse sand/shells Boring Terminated at 200 feet
201										
202										
203										
204										
205										
206										
207										
208										
209										
210										
211										
212										
213										
214										
215										
216										
217										
218										
219										
220										
221										
222										
223										
224										
225										
226										
227										
228										
229										
230										
231										
232										
233										
234										
235										
236										
237										
238										
239										
240										

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-408 DH</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Rotary Wash / 4 inch		Boring Location Unit 4 - Reactor Building N 363194.11 E 2942463.86		Total Depth 200 feet	
Drilling Contractor and Rig JEDI Drilling Contractor / CME 75		Elevation at boring 31.17 feet		Ground Water Depth 18.5 feet	
Sampling Method Split Spoon		Sample Driving Hammer/Drop 138.1lbs / 30 inches		No. of Samples 37	
		Borehole Inclination 0		Logged by G. Geras	
				Date Started 10/18/06	
				Date Completed 10/21/06	

Reviewed by / Date KA/L 4/3/07  
 Reviewed by / Date KA W 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Alterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	14	6	18					FILL; pale brown (10YR 6/3); gravel; SAND (SP); moist; firm; poorly graded; mostly fine to medium sand; little gravel; subrounded and subangular	
2	X	SS 2	15	18	18				CH	BEAUMONT; brown; (10YR 2/1); CLAY (CH); dry; stiff; high plasticity	
3	X	SS 3	14	0	18					BEAUMONT; CLAY (CH); stiff	No recovery in soil sample SS-3
4	X	SS 4	14	5	18					BEAUMONT; black (10YR 2/1); CLAY (CH); dry; stiff; medium plasticity	
5	X	SS 5	14	18	18					BEAUMONT; red (2.5YR 4/6); CLAY (CH); dry; stiff; medium plasticity; iron nodules	
6	X	SS 6	14	17	18					BEAUMONT; red (2.5YR 4/6); CLAY (CL); dry; stiff; medium plasticity; iron nodules	
7	X	SS 7	14	21	18					BEAUMONT; red (2.5YR 4/6); CLAY (CH); dry; very stiff; medium plasticity; iron nodules	
8	X	SS 8	14	18	18					BEAUMONT; red (2.5YR 4/6); CLAY (CH); dry; stiff; medium plasticity	
9	X	SS 9	14	15	18					BEAUMONT; red (2.5YR 4/6); CLAY (CH); dry; stiff; medium plasticity	
10	X	SS 10	14	20	18					BEAUMONT; red (2.5YR 4/6); CLAY (CH); dry; very stiff; medium plasticity	
11											
12											
13											
14											
15											
16											
17											
18											
19	X	SS 11	3	24	18				ML	BEAUMONT; yellowish red (5YR 5/6); SILT (ML); wet; stiff; low plasticity; low toughness; calcareous nodules	Water level at 18.5 feet BGS
20											
21											
22											
23											
24	X	SS 12	2	19	18					BEAUMONT; yellowish red (5YR 5/6); SILT (ML); wet; hard; low plasticity; low toughness; calcareous nodules	
25			24								Switch to mud rotary wash at 25 feet BGS
26											
27											
28											
29	X	SS 13	2	13.5	18				SM	BEAUMONT; strong brown (7.5YR 5/6); SAND (SM); wet; loose; fine sand; trace mica	
30			6								
31											
32											
33											
34	X	SS 14	34	13	18					BEAUMONT; yellowish brown (10YR 5/6); SAND (SM); moist; dense; fine, weakly cemented sand clasts; mostly fine	
35			25								
36			14								
37											
38											
39	X	SS 15	16	16	18					BEAUMONT; yellowish brown (10YR 5/6); SAND (SM); moist; dense; fine	
40			20								

Project Name : Job Number



**SOIL LOG - Boring No. B-408 DH**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 16	15 9 12	14 18					CL	BEAUMONT; yellowish brown (10YR 5/6); SAND (SM); moist; very firm	
45									SP	BEAUMONT; yellowish red (5YR 4/6); CLAY (CL); dry; very stiff; medium plasticity	
46										BEAUMONT; yellowish red (10YR 4/6); SAND (SP); moist; very firm; fine sand	
47											
48											
49	X	SS 17	3 7 9	18 18					CH	BEAUMONT; yellowish red (5YR 4/6); CLAY (CH); dry; very stiff; medium plasticity	
50											
51											
52											
53											
54	X	SS 18	5 8 10	18 18						BEAUMONT; greenish gray (GLEY 1 6/1); CLAY (CH); dry; very stiff; medium plasticity	
55											
56											
57											
58											
59	X	SS 19	6 8 10	18 18						BEAUMONT; greenish gray (GLEY 1 6/1) with some yellowish red (10YR 5/6) mottling; CLAY (CH); dry; very stiff; medium plasticity; calcareous concretions	
60											
61											
62											
63											
64	X	SS 20	6 6 6	18 18					SC	BEAUMONT; yellowish brown (10YR 5/6); clay; SAND (SC); moist; firm; low plasticity; low toughness; some clay; mostly fine sand	
65											
66											
67											
68											
69	X	SS 21	11 20 26	13 18					SP-SM	BEAUMONT; yellowish brown (10YR 5/4); SAND (SP-SM); moist; dense; fine sand	
70											
71											
72											
73											
74	X	SS 22	14 20 26	13 18						BEAUMONT; yellowish brown (10YR 5/4); SAND (SP-SM); moist; dense; mostly fine sand	
75											
76											
77											
78											
79	X	SS 23	17 25 35	15 18						BEAUMONT; yellowish brown (10YR 5/4); SAND (SP-SM); moist; very dense; mostly fine sand	
80											

Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-408 DH</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
80										
81									SP-SM	
82										
83										
84	X	SS 24	7 14 16	18 18					CH	BEAUMONT; brown (7.5YR 4/3); CLAY (CH); dry; very stiff; medium to high plasticity
85										
86										
87										
88										
89	X	SS 25	9 13 22	18 18						BEAUMONT; brown (7.5YR 4/3); CLAY (CH); dry; hard; medium to high plasticity
90										
91										
92										
93										
94	X	SS 26	9 14 17	18 18						BEAUMONT; brown (7.5YR 4/3); CLAY (CH); dry; hard; medium to high plasticity
95										
96										
97										
98										
99	X	SS 27	7 11 13	18 18						BEAUMONT; brown (7.5YR 4/3); CLAY (CH); dry; very stiff; medium plasticity
100										
101										
102										
103										
104										
105										
106										
107										
108										
109	X	SS 28	18 24 30	13 18					SP-SM	BEAUMONT; dark yellowish brown (10YR 4/4); SAND (SP-SM); moist; very dense; fine grained
110										
111										
112										
113										
114										
115										
116										
117										
118										
119	X	SS 29	12 20 20	18 18					CH	BEAUMONT; light greenish gray (GLEYS 1 7/1); CLAY (CH); dry; hard; medium to high plasticity
120										

Project Name : Job Number  
 STP COL : 5050-06-0496



**SOIL LOG - Boring No. B-408 DH**

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									ML		
121											
122											
123											
124											
125											
126											
127											
128											
129	X	SS 30	12 24	18 18					CH		BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); dry; hard; silt laminae throughout sample
130											
131											
132											
133											
134											
135											
136											
137											
138											
139	X	SS 31	8 19 24	18 18					SC		BEAUMONT; light greenish gray (GLE Y 1 7/1) with brownish yellow (10YR 6/8) mottling; clay; SAND (SC); dry; dense; low plasticity; mostly fine sand; some clay; calcareous concretions
140											
141											
142											
143											
144											
145											
146											
147											
148											
149	X	SS 32	35 50/5"	9 18					SM		BEAUMONT; pale brown (10YR 6/3); SAND (SM); very dense; mostly fine grained; trace calcareous nodules
150											
151											
152											
153											
154											
155											
156											
157											
158											
159	X	SS 33	10 18 28	18 18					CH		BEAUMONT; reddish brown (2.5YR 5/4) with light greenish gray (GLE Y 1 7/1) mottling; silt; CLAY
160											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-408 DH</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
160									CH	(CH); dry; hard; medium plasticity; trace silt laminae; trace calcareous concretions	
161											
162											
163											
164											
165											
166											
167											
168											
169	X	SS 34	11 19 25	18 18						BEAUMONT;reddish brown (2.5YR 4/4); CLAY (CH); dry; hard	
170									SC	BEAUMONT; yellowish red (5YR 5/6); clay; SAND (SC); dry; dense; low plasticity; some clay; mostly fine sand	
171											
172											
173											
174											
175											
176											
177											
178											
179	X	SS 35	13 20 28	18 18						BEAUMONT; brownish yellow (10YR 6/8) with reddish brown (7.5YR 4/4) mottling; clay; SAND (SC); dry; dense; some clay; mostly fine sand	
180											
181											
182											
183											
184											
185											
186											
187											
188											
189	X	SS 36	10 18 33	18 18					CH	BEAUMONT; reddish brown (5YR 5/4); sand; CLAY (CH); dry; hard; little sand; mostly clay; calcareous concretions (1/8" to 1" dia.)	
190									SC	BEAUMONT; pale olive (5YR 6/3); clay; SAND (SC); dry; very dense; mostly fine sand; little clay	
191											
192											
193											
194											
195											
196											
197											
198											
199	X	SS 37	10 15 21	18 18						BEAUMONT; brown (7.5YR 4/3); clay; SAND (SC); dry; dense some clay; mostly sand; some calcareous concretions	
200											

Project Name : Job Number



**SOIL LOG - Boring No. B-408 DH**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
200										
201									CL	BEAUMONT; brown (7.5YR 4/3); sand; CLAY (CL); dry; hard; little sand
202										Boring Terminated at 200 feet
203										
204										
205										
206										
207										
208										
209										
210										
211										
212										
213										
214										
215										
216										
217										
218										
219										
220										
221										
222										
223										
224										
225										
226										
227										
228										
229										
230										
231										
232										
233										
234										
235										
236										
237										
238										
239										
240										



Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-409</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Wash Rotary / 5 inch		Boring Location Reactor Building Unit #4 N 363195.47 E 2942557.98		Total Depth 200 feet	
Drilling Contractor and Rig Gregg #2 / CME 55		Elevation at boring 31.19 feet		Ground Water Depth 20 feet	
Sampling Method Split Spoon/UD		Sample Driving Hammer/Drop 140 lbs / 30 inches		No. of Samples 40	
		Borehole Inclination 0		Logged by M. Fraychineaud	
				Date Started 11/19/06	
				Date Completed 12/2/06	

Reviewed by / Date KW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	10	2	18				SM	FILL Material: gravel; SAND (SM); firm; grass; roots	
2	X	SS 2	4	4	18				CH	BEAUMONT; black (GLEYS 1 2.5/N); silt; CLAY (CH); moist; firm	
3	X	SS 3	8	8	18					BEAUMONT; black (GLEYS 1 2.5/N); gravel; silt; CLAY (CH); moist; firm; trace gravel	
4	X	SS 4	18	18	18					BEAUMONT; black (GLEYS 1 2.5/N) and light brownish gray (2.5Y 6/2) mottled; silt; CLAY (CH); moist; firm; few gravel; calcareous nodules	
5	X	SS 5	10	10	18					BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; stiff; high plasticity	
6	X	SS 6	20	20	18					BEAUMONT; yellowish red (5YR 5/6) and light brownish gray (2.5Y 6/2) mottled; silt; CLAY (CH); moist; stiff	
7	X	SS 7	22	22	18					BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff	
8	X	SS 8	16	16	18					BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff	
9	X	SS 9	24	24	18					BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; few gravel; strong reaction with HCl; calcareous nodules	
10	X	SS 10	18	18	18					BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; few gravel; strong reaction with HCl; calcareous nodules	
11											
12											
13											
14											
15											
16											
17											
18											
19	X	SS 11	20	20	18					BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; strong reaction with HCl; calcareous deposits along microfractures; calcareous nodules;	Water level at 20 feet BGS
20									ML	BEAUMONT; yellowish red (5YR 5/6); sand; SILT (ML); wet; stiff; little fine sand	
21											
22											
23											
24	X	SS 12	4	14	18				SM	BEAUMONT; strong brown (7.5YR 4/6); silt; SAND (SM); wet; very firm; fine sand; few silt	
25											
26											
27											
28											
29	X	SS 13	18	15	18					BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; dense; fine sand; trace silt	
30											
31											
32											
33											
34	X	SS 14	10	12	18					BEAUMONT; light brown (7.5YR 6/4); silt; SAND (SM); wet; very firm; fine sand; trace silt; trace coarse sand.	
35											
36											
37											
38											
39	X	SS 15	15	16	18				SP	BEAUMONT; reddish yellow (7.5YR 6/6); silt; SAND (SP); wet; dense; fine sand; trace silt	
40											

Project Name : Job Number <div style="text-align: center;"> <b>MACTEC</b></div> STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-409</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SP		
41											
42											
43											
44	X	SS 16	11 14 17	10 18						BEAUMONT; light yellowish brown (10YR 6/4); silt; SAND (SP); wet; dense; fine sand; trace silt; trace mafic minerals	
45											
46											
47											
48											
49	X	SS 17	3 4 6	24 18					CH	BEAUMONT; brown (7.5YR 4/3); silt; CLAY (CH); moist; stiff; little silt; some interbedded fine sand	
50											
51											
52											
53											
54	X	SS 18	4 4 4	22 18					SM	BEAUMONT; greenish gray (GLEY 1 6/1); silt; SAND (SM); wet; loose; fine sand; some silt; few clay	
55											
56											
57											
58											
59	X	SS 19	8 10	21 18					ML	BEAUMONT; greenish gray (GLEY 1 5/1); clay; SILT (ML); moist; very stiff; little clay	
60											
61											
62											
63											
64	X	SS 20	10 13 16	12 18					SP-SM	BEAUMONT; light yellowish brown (10YR 6/4); silt; SAND (SP-SM); wet; very firm; few silt; trace mafic minerals	
65											
66											
67											
68											
69		UD 1	N/A	19 24	16.9	14.6	NV/NP		SM	BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM)	
70											
71											
72											
73											
74	X	SS 21	22 23 27	15 18					SP-SM	BEAUMONT; yellowish brown (10YR 5/4); SAND (SP-SM); wet; dense; fine to medium sand; trace mafic minerals	
75											
76											
77											
78											
79	X	SS 22	8 10 15	20 18					CH	BEAUMONT; reddish brown (5YR 4/3); silt; CLAY (CH); moist; very stiff; few silt	
80											

Project Name : Job Number STP COL : 5050-06-0495	<b>SOIL LOG - Boring No. B-409</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/ft inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									CH		
81											
82											
83											
84	X	SS 23	8 15	21 18						BEAUMONT; reddish brown (5YR 4/3); silt; CLAY (CH); moist; very stiff; few silt	
85											
86											
87											
88											
89	X	SS 24	10 10 15	22 18						BEAUMONT; reddish brown (5YR 4/3); silt; CLAY (CH); moist; very stiff; few silt; trace pebbles; strong reaction with HCl; calcareous nodules	
90											
91											
92											
93											
94		UD 2	N/A	0 24						BEAUMONT; brown (7.5YR 4/3); silt; CLAY (CH); moist; few silt	UD-2; Shelby tube damaged and soil sample disturbed
95		UD 2A	N/A	0 24							UD-2A; Sample 95 to 97 feet, Shelby tube damaged and soil sample disturbed
96											
97											
98											
99	X	SS 25	9 11	21 18						BEAUMONT; brown (7.5YR 4/2) with trace greenish gray (GLEYS 1 B/1) mottling; sand; silt; CLAY (CH); moist; very stiff; fine sand; silt lenses; strong reaction with HCl	
100											
101											
102											
103											
104											
105											
106											
107											
108											
109	X	SS 26	9 20 30	10 18					SP-SM	BEAUMONT; light yellowish brown (10YR 6/4); gravel; SAND (SP-SM); wet; dense; fine to medium sand; few gravel; strong reaction with HCl	
110											
111											
112											
113											
114											
115											
116											
117											
118											
119	X	SS 27	15 17	15 18					CL	BEAUMONT; red (2.5YR 5/6) with little light greenish gray (GLEYS 1 B/1) mottling; silt;	
120											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-409</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									CL	CLAY(CL); moist; hard; strong reaction with HCl	
121											
122											
123											
124											
125											
126											
127											
128											
129		UD 3	N/A	20 24					CH	BEAUMONT; yellowish red (5YR 5/6) with light greenish gray (GLE 1 8/1) mottling; silt; CLAY (CH); moist	
130											
131											
132											
133											
134											
135											
136											
137											
138											
139		SS 28	21 29	14 18					ML SM	BEAUMONT; yellowish brown (10YR 5/6); clay; SILT (ML); moist; hard; little clay; some carbonate mottling; strong reaction with HCl	
140										BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; dense; fine sand; trace silt	
141											
142											
143											
144											
145											
146											
147											
148											
149		SS 29	29 50 50/4"	13 18						BEAUMONT; light gray (2.5Y 7/2); silt; SAND (SM); wet; very dense; fine sand; trace silt	
150											
151											
152											
153											
154											
155											
156											
157											
158											
159		UD 4	N/A	0 24							
160											

Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-409</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
160									CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; few silt; high plasticity
161		UD 4A	N/A	28 24	19.6					
162										
163										
164										
165										
166										
167										
168										
169		SS 30	11 12 17	23 18						BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; very stiff; trace silt; high plasticity
170										
171										
172										
173										
174										
175										
176										
177										
178										
179		SS 31	10 11 16	23 18						BEAUMONT; reddish brown (5YR 4/4) with trace light greenish gray (GLEYS 1 8/1) mottling; silt; CLAY (CH); moist; very stiff; high plasticity; few silt
180										
181										
182										
183										
184										
185										
186										
187										
188										
189		UD 5	N/A	25 24	38.2	9.8	NV/NP		SP-SM	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; high plasticity; few silt
190										
191		SS 32	19 26 24	13 18					MH	BEAUMONT; brownish yellow (10YR 6/6) with light greenish gray (GLEYS 1 7/1) mottling; silt; SAND (SP-SM); moist; dense; fine sand; trace silt;
192										BEAUMONT; mottled brownish yellow (10YR 6/6) and light greenish gray (GLEYS 1 7/1); clay; SILT (MH); moist; hard; some clay; strong reaction with HCl; few calcareous nodules
193										
194										
195										
196										
197										
198										
199		UD 6	N/A	25 24	25.3				CH	BEAUMONT; reddish brown (2.5YR 5/4); silt; CLAY (CH); moist; trace silt; high plasticity
200										

Project Name : Job Number <b>MACTEC</b> STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-409</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Remarks
200									Boring Terminated at 200 feet
201									
202									
203									
204									
205									
206									
207									
208									
209									
210									
211									
212									
213									
214									
215									
216									
217									
218									
219									
220									
221									
222									
223									
224									
225									
226									
227									
228									
229									
230									
231									
232									
233									
234									
235									
236									
237									
238									
239									
240									

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-410</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Rotary Wash / 4 inch		Boring Location N 363286.47 E 2942369.53	Control Bay	Total Depth 100 feet	
Drilling Contractor and Rig Lewis Drilling / Mobile B 57		Elevation at boring 31.73 feet	Ground Water Depth 23.5 feet	Depth to Bedrock	
Sampling Method Split Spoon		Sample Driving Hammer/Drop 139.58 lbs / 30 inches	No. of Samples 27	Date Started 12/5/06	
		Borehole Inclination 0	Logged by G. Geras	Date Completed 12/6/06	

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	10	3					CH	BEAUMONT; yellowish brown (10YR 5/4); gravel; silt; sand; CLAY (CH); dry; firm; few sand; few silt; mostly clay; trace gravel; trace organics (grass)	
2	X	SS 2	10	13						BEAUMONT; black (GLEY 1 2.5/N); silt; sand; CLAY (CH); dry; stiff; mostly clay; little silt; trace fine sand	
3	X	SS 3	10	10						BEAUMONT; black (GLEY 1 2.5/N); silt; sand; gravel; CLAY (CH); dry; stiff; mostly clay; little silt; trace fine sand; trace gravel	
4	X	SS 4	10	5						BEAUMONT; black (GLEY 1 2.5/N); silt; sand; gravel; CLAY (CH); dry; firm; mostly clay; little silt; trace fine sand; trace gravel	
5	X	SS 5	10	9						BEAUMONT; black (GLEY 1 2.5/N); silt; sand; gravel; CLAY (CH); dry; firm; mostly clay; little silt; trace fine sand; trace gravel	
6	X	SS 6	10	12						BEAUMONT; black (GLEY 1 2.5/N) transitioning into grayish brown (10YR 5/2); silt; gravel; sand; CLAY (CH); dry; firm; mostly clay; little silt; trace gravel	
7	X	SS 7	10	15						BEAUMONT; grayish brown (10YR 5/2) transitioning into yellowish red (5YR 4/6); silt; CLAY (CH); dry; firm; mostly clay; little silt; trace calcareous nodules; strong reaction with HCl	
8	X	SS 8	10	14						BEAUMONT; yellowish red (5YR 4/6) with very slight light greenish gray (GLEY 1 10Y 7/1) mottling; silt; CLAY (CH); dry; firm; little silt; mostly clay	
9	X	SS 9	10	11						BEAUMONT; yellowish red (5YR 4/6) with very slight light greenish gray (GLEY 1 10Y 7/1) mottling; silt; CLAY (CH); dry; firm; little silt; mostly clay	
10	X	SS 10	10	15						BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; stiff; mostly clay; few calcareous nodules; strong reaction with HCl	
11	X	SS 11	10	18						BEAUMONT; yellowish red (5YR 4/6) with very slight light greenish gray (GLEY 1 10Y 7/1) mottling; silt; CLAY (CH); dry; stiff; little silt; mostly clay	
12	X	SS 12	10	18						BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; stiff; little silt; mostly clay	
13	X	SS 13	10	11					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; some silt; mostly fine sand	
14	X	SS 14	10	13						BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; some silt; mostly fine sand	
15	X	SS 15	10	12						BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; some silt; mostly fine sand	
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											
31											
32											
33											
34											
35											
36											
37											
38											
39											
40											

Water level at 23.5 feet BGS  
 Switch to mud rotary drilling at 25 feet BGS

Project Name : Job Number STP COL : 5050-06-0496	<h2 style="margin: 0;">SOIL LOG - Boring No. B-410</h2>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 16	10 1/4	15 1/8						BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; firm; little silt; mostly fine sand	
45											
46											
47											
48											
49	X	SS 17	4 3/4	18 1/8					CH	BEAUMONT; strong brown (7.5YR 4/6); silt; sand; CLAY (CH); dry; firm; few sand; little silt; mostly clay	
50											
51											
52											
53											
54	X	SS 18	6 3/4	18 1/8						BEAUMONT; greenish gray (GLEYS 2 5BG 5/1); silt; sand; CLAY (CH); dry; stiff; few sand; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
55											
56											
57											
58											
59	X	SS 19	3 3/4	17 1/8						BEAUMONT; greenish gray (GLEYS 2 5BG 5/1); silt; sand; CLAY (CH); dry; stiff; little sand; few silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
60											
61											
62											
63											
64	X	SS 20	5 1/2	18 1/8					ML	BEAUMONT; brown (7.5YR 5/4); clay; sand; SILT (ML); moist; firm; few fine sand; little clay; mostly silt	
65											
66											
67											
68											
69	X	SS 21	4 6/7	18 1/8						BEAUMONT; dark yellowish brown (10YR 4/6); sand; SILT (ML); wet; stiff; some fine sand; mostly silt	
70									CH	BEAUMONT; dark yellowish brown (10YR 4/6); sand; silt; CLAY (CH); dry; stiff; little fine sand; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
71											
72											
73											
74	X	SS 22	16 1/2	12 1/8					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; clay; SAND (SM); wet; dense; few clay; little silt; mostly fine sand	A 1.5 inch thick sand; CLAY layer in middle of SPT sample SS-22
75											
76											
77											
78											
79	X	SS 23	14 3/8	0 1/8						BEAUMONT; SAND (SM)	No Recovery of sample SS-23
80											



Project Name : Job Number 	<b>SOIL LOG - Boring No. B-410</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SM		
81											
82											
83											
84	X	SS 24	6 10 12	18 18					CH	BEAUMONT; brown (7.5YR 4/4); silt; sand; CLAY (CH); dry; very stiff; few fine sand; few silt; mostly clay	
85											
86											
87											
88											
89	X	SS 25	7 8 11	18 18						BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); dry; very stiff; few silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
90											
91											
92											
93											
94	X	SS 26	6 8 13	18 18						BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); dry; very stiff; few silt; mostly clay	
95											
96											
97											
98											
99	X	SS 27	8 10 11	18 18						BEAUMONT; brown (7.5YR 4/4); silt; sand; CLAY (CH); dry; very stiff; few fine sand; few silt; mostly clay	
100										Boring Terminated at 100-feet	
101											
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-411</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 3 inch		Boring Location Unit 4 - Control Bay N 363285.65 E 2942461.25		Total Depth 100 feet	
Drilling Contractor and Rig MACTEC / RALEIGH / CME 45C		Elevation at boring 31.27 feet		Ground Water Depth 23.5 feet	
Sampling Method Split Spoon		Sample Driving Hammer/Drop 139.62 lbs / 30 inches		No. of Samples 27	
		Borehole Inclination 0		Logged by D. Tibbals	
				Date Started 12/5/06	
				Date Completed 12/11/06	

Reviewed by / Date KM 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0									CH		
1	X	SS 1	10	4 1/8					CH	BEAUMONT; gray (7.5YR 6/1); silt; gravel; CLAY (CH); moist; stiff; mostly clay; little silt; few rocks; gravel; organic mater; topsoil	
2	X	SS 2	10	11 1/8					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; gravel; CLAY (CH); moist; stiff; mostly clay; some silt; few gravel	
3	X	SS 3	10	10 1/8					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; gravel; CLAY (CH); moist; firm; mostly clay; some silt; few gravel	
4	X	SS 4	10	14 1/8					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); moist; firm; mostly clay; some silt	
5	X	SS 5	10	17 1/8					CH	BEAUMONT; red (2.5YR 5/6); silt; CLAY (CH); moist; firm; mostly clay; little silt	
6	X	SS 6	10	17 1/8					CH	BEAUMONT; red (2.5YR 5/6); silt; CLAY (CH); moist; firm; mostly clay; little silt	
7	X	SS 7	10	18 1/8					CH	BEAUMONT; reddish brown (2.5YR 4/4); silt; CLAY (CH); moist; stiff; mostly clay; little silt	
8	X	SS 8	10	18 1/8					CH	BEAUMONT; red (2.5YR 5/6); silt; CLAY (CH); moist; stiff; mostly clay; little silt	
9	X	SS 9	10	25 1/8					CH	BEAUMONT; red (2.5YR 5/6); silt; CLAY (CH); moist; stiff; mostly clay; little silt	
10	X	SS 10	10	23 1/8					CH	BEAUMONT; red (2.5YR 5/6); silt; CLAY (CH); moist; stiff; mostly clay; some silt	
11											
12											
13											
14											
15											
16											
17											
18											
19	X	SS 11	10	16 1/8					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; mostly clay; little silt	
20											
21											
22											
23											
24	X	SS 12	3	18 1/8					ML	BEAUMONT; yellowish red (5YR 5/6); sand; SILT (ML); wet; firm; high pisticity; low toughness; mostly silt; little sand	Water level appears at 23.5 feet BGS based on sample visual
25											
26											
27											
28											
29	X	SS 13	2	22 1/8					ML	BEAUMONT; yellowish red (5YR 5/6); sand; SILT (ML); wet; soft; mostly silt; little sand	
30											
31											
32											
33											
34	X	SS 14	6	22 1/8					SM	BEAUMONT; yellowish red (5YR 4/6); silt; SAND (SM); wet; loose; mostly fine sand; some silt	
35											
36											
37											
38											
39	X	SS 15	0	13 1/8					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; mostly fine sand; little silt	
40											

Project Name : Job Number



SOIL LOG - Boring No. B-411

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/9 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
40									SM	
41										
42										
43										
44	X	SS 16	4 10 16	16 18						BEAUMONT; strong brown (7.5YR 4/6); silt; SAND (SM); wet; very firm; mostly sand; little silt
45										
46										
47										
48										
49	X	SS 17	3 4	20 18					CH	BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt; decomposed wood particles observed
50										
51										
52										
53										
54	X	SS 18	2 2	22 18						BEAUMONT; bluish gray (GLE Y 2 5B 6/1); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt; shell fragments observed
55										
56										
57										
58										
59	X	SS 19	2 2	22 18						BEAUMONT; light greenish gray (GLE Y 2 10BG 7/1); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt; cementation observed
60										
61										
62										
63										
64	X	SS 20	3 3	20 18					SC	BEAUMONT; light greenish gray (GLE Y 2 5BG 7/1); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
65										BEAUMONT; gray (5YR 6/1); clay; SAND (SC); moist; firm; mostly sand; little clay
66										
67										
68										
69	X	SS 21	9 12 14	15 18					SM	BEAUMONT; brown (7.5YR 4/4); silt; SAND (SM); moist; very firm; mostly fine sand; little silt
70										
71										
72										
73										
74	X	SS 22	13 18 21	24 18						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; mostly fine sand; little silt
75										
76										
77										
78										
79	X	SS 23	21 24 14	22 18						BEAUMONT; yellowish brown (10YR 5/8); silt; SAND (SM); wet; dense; mostly fine sand; little silt
80										

Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-411</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SM		
81											
82											
83											
84	X	SS 24	7 10	19 18					CH	BEAUMONT; reddish brown (2.5YR 4/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
85											
86											
87											
88											
89	X	SS 25	6 13	25 18						BEAUMONT; reddish brown (2.5YR 4/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
90											
91											
92											
93											
94	X	SS 26	10 10	25 18					SM CH	BEAUMONT; reddish brown (2.5YR 5/4); silt; SAND (SM); wet; very firm; poorly graded; mostly fine sand; little silt	
95										BEAUMONT; reddish brown (2.5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
96											
97											
98											
99	X	SS 27	7 12	26 18						BEAUMONT; dark reddish gray (2.5YR 3/1); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
100										Boring Terminated at 100-feet	
101											
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-412</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 4 inch	Boring Location Unit 4 - Control Bay N 363287.51 E 2942553.81	Total Depth 100 feet	
Drilling Contractor and Rig Gregg #2 / CME 55	Elevation at boring 31.41 feet	Ground Water Depth 24 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 27	Date Started 12/2/06
	Borehole Inclination 0	Logged by M: Fraychineaud	Date Completed 12/4/06

Reviewed by / Date KM 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/18 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0									SM	FILL; very pale brown (10YR 7/3) with dark olive brown (2.5Y 3/3) mottling; gravel; silt; SAND (SM); moist; loose; little gravel; few grass/roots	
1	X	SS 1	8	18					CH	BEAUMONT; very dark greenish gray (GLEYS 1 3/4); silt; CLAY (CH); moist; stiff; medium plasticity; little silt	
2	X	SS 2	12	18					CH	BEAUMONT; black (5Y 2.5/1); silt; CLAY (CH); moist; firm; little silt; few calcareous nodules; strong HCl reaction	
3	X	SS 3	7	18					CH	BEAUMONT; dark olive gray (5Y 3/2); silt; CLAY (CH); moist; stiff; medium plasticity; few calcareous nodules; strong HCl reaction	
4	X	SS 4	11	18					CH	BEAUMONT; dark olive gray (5Y 3/2); silt; CLAY (CH); moist; stiff; medium plasticity; few calcareous nodules; strong HCl reaction	
5	X	SS 5	0	18					CH	BEAUMONT; dark olive gray (5Y 3/2); silt; CLAY (CH); moist; stiff; medium plasticity; few calcareous nodules; strong HCl reaction	
6	X	SS 6	20	18					CH	no sample; slough material	
7	X	SS 7	18	18					CH	BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; little silt; some carbonates in microfractures	
8	X	SS 8	22	18					CH	BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; little silt	
9	X	SS 9	23	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; few silt; some carbonates in microfractures	
10	X	SS 10	23	18					CH	BEAUMONT; yellowish red (5YR 4/6) with brown (7.5YR 4/3) mottling; silt; CLAY (CH); moist; stiff; high plasticity; trace silt	
11									CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; very stiff; few silt; few carbonate nodules; strong HCl reaction	
12									CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; few silt; some calcareous deposits in microfractures; strong HCl reaction	
13	X	SS 11	8	22					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; few silt; some calcareous deposits in microfractures; strong HCl reaction	
14									CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; very stiff; few silt; one 1/2" piece of gravel; weak HCl reaction	
15									CH	BEAUMONT; yellowish red (5YR 5/6); silt; SAND (SM); wet; very firm; some silt	
16									CH	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; fine; some silt	
17									CH	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; fine; some silt	
18									CH	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; fine; some silt	
19	X	SS 12	10	22					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; fine; some silt	
20									SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; fine; some silt	
21									SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; fine; some silt	
22									SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; fine; some silt	
23									SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; fine; some silt	
24	X	SS 13	5	14					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; fine; some silt	
25									SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; fine; some silt	
26									SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; fine; some silt	
27									SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; fine; some silt	
28									SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; fine; some silt	
29	X	SS 14	5	17					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; fine; some silt	
30									SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; fine; some silt	
31									SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; fine; some silt	
32									SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; fine; some silt	
33									SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; fine; some silt	
34	X	SS 15	7	10					SP	BEAUMONT; yellow (10YR 7/6); silt; SAND (SP); moist; dense; fine; trace silt	
35									SP	BEAUMONT; yellow (10YR 7/6); silt; SAND (SP); moist; dense; fine; trace silt	
36									SP	BEAUMONT; yellow (10YR 7/6); silt; SAND (SP); moist; dense; fine; trace silt	
37									SP	BEAUMONT; yellow (10YR 7/6); silt; SAND (SP); moist; dense; fine; trace silt	
38									SP	BEAUMONT; yellow (10YR 7/6); silt; SAND (SP); moist; dense; fine; trace silt	
39	X	SS 15	16	21					SP	BEAUMONT; yellow (10YR 7/6); silt; SAND (SP); moist; dense; fine; trace silt	
40									SP	BEAUMONT; yellow (10YR 7/6); silt; SAND (SP); moist; dense; fine; trace silt	

Water level at 24 feet BGS  
 Switch to mud rotary drilling at 25 feet BGS

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-412</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
40									SP	
41										
42										
43										
44	X	SS 16	15 12	18 18						BEAUMONT; yellow (10YR 7/6); silt; SAND (SP); moist; very firm; fine; trace silt
45									CH	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; very stiff; high plasticity; few silt
46										
47										
48										
49	X	SS 17	6 6	23 18						BEAUMONT; reddish brown (5YR 4/4) with very pale brown (10YR 7/3) interbeds; silt; CLAY (CH); moist; stiff; high plasticity; interbedded with layers of silt
50										
51										
52										
53										
54	X	SS 18	4 8	24 18					CL	BEAUMONT; greenish gray (GLEYS 1 6/1); silt; CLAY (CL); moist; stiff; medium plasticity; some silt
55										
56										
57										
58										
59	X	SS 19	10 10	20 18					CH	BEAUMONT; reddish brown (5YR 4/4) with greenish gray (GLEYS 1 6/1) mottling; silt; CLAY (CH); moist; very stiff; little silt; few calcareous nodules; strong HCl reaction
60										
61										
62										
63										
64	X	SS 20	4 8	21 18						BEAUMONT; reddish brown (5YR 4/4) with greenish gray (GLEYS 1 6/1) mottling; silt; sand; CLAY (CH); moist; very stiff; little silt; few calcareous nodules; interbedded fine sand layers up to 4-inches thick
65										
66										
67										
68										
69	X	SS 21	14 17	15 18					SP-SM	BEAUMONT; light yellowish brown (10YR 6/4); silt; SAND (SP-SM); wet; dense; fine; trace silt; mostly quartz sand grains with trace mafic minerals
70										
71										
72										
73										
74	X	SS 22	21 16	15 18						BEAUMONT; brown (7.5YR 5/4); silt; SAND (SP-SM); wet; dense; fine; trace silt
75			27							
76										
77										
78										
79	X	SS 23	13 21	8 18						BEAUMONT; dark yellowish brown (10YR 4/6); silt; SAND (SP-SM); wet; dense; fine; trace silt; trace mafic minerals
80			19							

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-412</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
80										
81									SP-SM	
82										
83										
84	X	SS 24	9 11 16	20 18					CH	BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); moist; very stiff; medium plasticity; little silt
85										
86										
87										
88										
89	X	SS 25	9 11 17	22 18						BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist; very stiff; high plasticity; few silt; trace calcareous nodules; strong HCl reaction
90										
91										
92										
93										
94	X	SS 26	12 14 16	21 18						BEAUMONT; brown (7.5YR 4/3); silt; CLAY (CH); moist; very stiff; high plasticity; few silt
95										
96										
97										
98										
99	X	SS 27	7 10 11	22 18						BEAUMONT; brown (7.5YR 4/3) with occasional light greenish gray (Gley 1 7/1) mottling; silt; CLAY (CH); moist; very stiff; high plasticity; few silt; trace carbonates in microfractures; strong HCl reaction
100										Boring Terminated at 100-feet
101										
102										
103										
104										
105										
106										
107										
108										
109										
110										
111										
112										
113										
114										
115										
116										
117										
118										
119										
120										

Project Name : Job Number		<b>SOIL LOG - Boring No. B-413</b>	
STP COL : 5050-06-0496		<b>MACTEC</b>	
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 5 inch	Boring Location N 363148.27 E 2942585.19	Unit #4 Control Bay	Total Depth 100 feet
Drilling Contractor and Rig Gregg #2 / CME 55	Elevation at boring 31.16 feet	Ground Water Depth 17.6 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 27	Date Started 11/17/06
	Borehole Inclination 0	Logged by M. Fraychineaud	Date Completed 11/19/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	14	16					CL	BEAUMONT; black (GLEY 1 2.5/N); sand; CLAY (CL); moist; soft	
2	X	SS 2	2	2							No recovery SS-2
3	X	SS 3	20	20					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); moist; firm	
4	X	SS 4	21	21						BEAUMONT; dark gray (5Y 4/1); silt; CLAY (CH); moist; stiff	
5	X	SS 5	18	18						BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CH); moist; firm	
6	X	SS 6	13	13						BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff	
7	X	SS 7	17	17						BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; strong reaction with HCl; few calcareous nodules	
8	X	SS 8	22	22						BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff	
9	X	SS 9	14	14						BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff	
10	X	SS 10	22	22						BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; strong reaction with HCl; few calcareous nodules	
11											
12											
13											
14											
15											
16											
17											
18											Water level at 17.6 feet BGS
19	X	SS 11	0	0							Switch to mud rotary drilling at 18.5 feet BGS
20	X	SS 11A	19	19					ML	BEAUMONT; yellowish red (5YR 5/6); clay; SILT (ML); moist; very stiff; high plasticity; grading to a silt; SAND (SM) at 21 feet	No recovery SS-11
21									SM	BEAUMONT; strong brown (7.5YR 4/6); silt; SAND (SM); wet; loose; fine sand; little silt	
22											
23											
24	X	SS 12	4	20							
25											
26											
27											
28											
29	X	SS 13	6	9						BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; very firm; fine sand; trace silt	
30											
31											
32											
33											
34	X	SS 14	7	12						BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; fine sand; few silt	
35											
36											
37											
38											
39	X	SS 15	9	11						BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; very firm; fine sand; trace silt	
40											



Project Name : Job Number 	<b>SOIL LOG - Boring No. B-413</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
40									SM	
41										
42										
43										
44	X	SS 16	8 13	13 18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff, high plasticity; few silt
45										
46										
47										
48										
49	X	SS 17	8 13	17 18						BEAUMONT; brown (7.5YR 5/3); silt; CLAY (CH); moist; stiff, high plasticity; few silt
50										
51										
52										
53										
54	X	SS 18	8 13	19 18					CL	BEAUMONT; greenish gray (GLEYS 1 6/1); silt; CLAY (CL); moist; stiff; medium plasticity; some silt; occasional iron oxide staining.
55										
56										
57										
58										
59	X	SS 19	8 13	22 18					ML	BEAUMONT; mottled yellowish red (5YR 4/6) and greenish gray (GLEYS 1 6/1); clay; SILT (ML); moist; stiff; some clay; trace coarse sand; strong reaction to HCl; few calcareous nodules
60										
61										
62										
63										
64	X	SS 20	8 13 13	18 18						BEAUMONT; mottled yellowish red (5YR 4/6) and greenish gray (GLEYS 1 6/1), grades to a yellowish red (5YR 4/6) at sample bottom; clay; SILT (ML); moist; very stiff; few calcareous nodules
65										
66										
67										
68										
69	X	SS 21	14 16 19	13 18					SP-SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SP-SM); wet; dense; fine sand; trace silt; trace mafic minerals
70										
71										
72										
73										
74	X	SS 22	16 20 30	10 18						BEAUMONT; dark yellowish brown (10YR 4/4); silt; SAND (SP-SM); wet; dense; fine sand; trace silt; trace mafic minerals
75										
76										
77										
78										
79	X	SS 23	8 10 14	21 18					CH	BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CH); moist; very stiff; few silt; high plasticity
80										

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-413</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									CH		
81											
82											
83											
84	X	SS 24	10 11	20 18						BEAUMONT; reddish brown (5YR 4/3) with greenish gray (GLEY 1 6/1) mottling; silt; CLAY (CH); moist; very stiff; high plasticity; little silt	
85											
86											
87											
88											
89	X	SS 25	8 13	22 18						BEAUMONT; reddish brown (5YR 4/3); silt; CLAY (CH); moist; very stiff; high plasticity; few silt	
90											
91											
92											
93											
94	X	SS 26	10 13	21 18						BEAUMONT; reddish brown (5YR 4/3) with greenish gray (GLEY 1 6/1) mottling; silt; CLAY (CH); moist; very stiff; high plasticity; few silt; strong reaction with HCl; few calcareous nodules	
95											
96											
97											
98											
99	X	SS 27	10 10	23 18						BEAUMONT; reddish brown (5YR 4/3) with greenish gray (GLEY 1 6/1) mottling; silt; CLAY (CH); moist; very stiff; high plasticity; few silt	
100										Boring Terminated at 100 feet	
101											
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-414</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Rotary Wash / 4 inch		Boring Location N 363147.67 E 2942746.89		Control Bay 23.5 feet	
Drilling Contractor and Rig EEI / CME 750		Elevation at boring 32.18 feet		Ground Water Depth 23.5 feet	
Sampling Method Split Spoon		Sample Driving Hammer/Drop 138.0 lbs / 30 inches		No. of Samples 32	
		Borehole Inclination 0		Logged by D. Tibbals	
		Reviewed by / Date <u>KL 4/3/07</u>		Date Started 1/3/06	
		Reviewed by / Date <u>KAW 4/3/07</u>		Date Completed 1/6/06	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	18	18					SM	FILL: strong brown (7.5YR 5/6); silt; gravel; SAND (SM); moist; loose; poorly graded; mostly fine sand; little silt; little gravel	
2	X	SS 2	18	18					SM	FILL: strong brown (7.5YR 5/6); gravel; silt; SAND (SM); moist; loose; poorly graded; mostly fine sand; little silt; little gravel	
3	X	SS 3	24	18					CH	BEAUMONT; black (GLEY 1 2.5/N) with red (2.5YR 5/6) mottling; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
4	X	SS 4	18	18					CH	BEAUMONT; black (GLEY 1 2.5/N) with red (2.5YR 5/6) mottling; silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	
5	X	SS 5	13	18					CH	BEAUMONT; reddish brown (5YR 5/3); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
6	X	SS 6	16	18					CH	BEAUMONT; reddish brown (5YR 5/3); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
7	X	SS 7	19	18					CH	BEAUMONT; reddish brown (5YR 5/3); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	
8	X	SS 8	12	18					CH	BEAUMONT; reddish brown (5YR 5/3); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	
9	X	SS 9	24	18					ML	BEAUMONT; red (2.5YR 5/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
10	X	SS 10	24	18					CH	BEAUMONT; red (2.5YR 5/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
11											
12											
13											
14											
15											
16											
17											
18											
19	X	SS 11	4	12					CH	BEAUMONT; reddish brown (5YR 5/4); clay; SILT (ML); moist; stiff; med. plasticity; low toughness; mostly silt; little clay	
20											
21											
22											
23											
24	X	SS 12	4	12					SM	BEAUMONT; reddish brown (5YR 5/4); silt; SAND (SM); wet; loose; poorly graded; mostly fine sand; some silt	Water level at 23.5 feet BGS
25											Switch to mud rotary drilling at 25 feet BGS
26											
27											
28											
29	X	SS 13	5	13					SM	BEAUMONT; reddish brown (5YR 5/4); silt; SAND (SM); wet; firm; poorly graded; mostly fine sand; little silt	
30											
31											
32											
33											
34	X	SS 14	6	12					SM	BEAUMONT; brown (7.5YR 5/2); silt; SAND (SM); wet; very firm; poorly graded; mostly fine sand; some silt	
35											
36											
37											
38											
39	X	SS 15	5	14					SM	BEAUMONT; reddish brown (5YR 5/4); silt; SAND (SM); wet; very firm; poorly graded; mostly fine	
40											

Project Name : Job Number



SOIL LOG - Boring No. B-414

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM	sand; some silt	
41											
42											
43											
44	X	SS 16	17 12	12 18							BEAUMONT; brown (7.5YR 5/2); silt; SAND (SM); wet; very firm; poorly graded; mostly fine sand; some silt
45											
46											
47											
48											
49	X	SS 17	5 6	24 18					CH		BEAUMONT; red (2.5YR 5/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt
50											
51											
52											
53											
54	X	SS 18	3 4	26 18							BEAUMONT; gray (10YR 6/1); silt; sand; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; few sand; few silt
55											
56											
57											
58											
59	X	SS 19	7 11	20 18							BEAUMONT; gray (10YR 6/1); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt; calcareous nodules
60											
61											
62											
63											
64	X	SS 20	11 12	18 18					SM		BEAUMONT; gray (10YR 6/1); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
65									CH		BEAUMONT; reddish brown (5YR 5/4); silt; SAND (SM); wet; very firm; poorly graded; mostly fine sand; some silt
66											
67											
68											
69	X	SS 21	15 20	12 18					SM		BEAUMONT; gray (10YR 6/1); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
70											
71											
72											
73											
74	X	SS 22	20 32	18 37					SP-SM		BEAUMONT; reddish brown (5YR 5/4); silt; SAND (SP-SM); wet; very dense; poorly graded; mostly fine sand; little silt
75											
76											
77											
78											
79	X	SS 23	14 18	12 18					SP		BEAUMONT; brown (7.5YR 5/4); silt; SAND (SP); wet; dense; poorly graded; mostly fine sand; few
80											

Project Name : Job Number



**SOIL LOG - Boring No. B-414**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SP	silt	
81											
82											
83											
84	X	SS 24	10 13 16	26 18					CH	BEAUMONT; reddish brown (2.5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
85											
86											
87											
88											
89	X	SS 25	7 10 13	23 18						BEAUMONT; reddish brown (2.5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
90											
91											
92											
93											
94	X	SS 26	10 13 17	23 18						BEAUMONT; reddish brown (2.5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
95											
96											
97											
98											
99	X	SS 27	11 10 13	23 18						BEAUMONT; reddish brown (2.5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
100											
101											
102											
103											
104											
105											
106											
107											
108											
109	X	SS 28	15 15 20	12 18					SP-SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SP-SM); wet; dense; poorly graded; mostly fine sand; few silt	
110											
111											
112											
113											
114											
115											
116											
117											
118											
119	X	SS 29	7 12	18 18					CH	BEAUMONT; red (2.5YR 5/6); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness;	
120											

Project Name : Job Number



SOIL LOG - Boring No. B-414

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									CH	mostly clay; little silt	
121											
122											
123											
124											
125											
126											
127											
128											
129	X	SS 30	12 22 32	19 18							
130									SM	BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; hard; high plasticity; high toughness; mostly clay; little silt	
131										BEAUMONT; reddish brown (5YR 5/4); silt; SAND (SM); wet; very dense; poorly graded; mostly fine sand; little silt	
132											
133											
134											
135											
136											
137											
138											
139	X	SS 31	12 10	24 18							
140									CH	BEAUMONT; greenish gray (GLEYS 1 5G 6/1); silt; CLAY (CH); moist; hard; high plasticity; high toughness; mostly clay; little silt; calcareous nodules	
141											
142											
143											
144											
145											
146											
147											
148											
149	X	SS 32	22 23 36	17 18							
150									SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; very dense; poorly graded; mostly fine sand; little silt; calcareous nodules	
151										Boring Terminated at 150-feet	
152											
153											
154											
155											
156											
157											
158											
159											
160											

Project Name : Job Number		<b>MAGTEC</b>		<b>SOIL LOG - Boring No. B-415</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 4 inch		Boring Location N 363355.53 E 2942599.76		Control Bay	
Drilling Contractor and Rig Lewis Drilling / Mobile B 61		Elevation at boring 28.95 feet		Ground Water Depth 12 feet	
Sampling Method Split Spoon / UD		Sample Driving Hammer/Drop 139.58 lbs / 30 inches		No. of Samples 36	
		Borehole Inclination 0		Logged by D. Haug	
		Reviewed by / Date JWC 5/4/07		Date Started 1/5/07	
		Reviewed by / Date KAN 4/27/07		Date Completed 1/7/07	

Depth (feet)	Sample	Sample Type & No.	Undisturbed Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
1	X	SS 1	18	24					CH	BEAUMONT, very dark gray (10YR 3/1); CLAY (CH); moist; soft	
2	X	SS 2	18	19					CH	BEAUMONT, dark gray (10YR 4/1); CLAY (CH); moist; firm; few calcium carbonate nodules	
3	X	SS 3	18	18					CH	BEAUMONT, dark gray (10YR 4/1) with yellowish brown (5YR 5/6); CLAY (CH); moist; stiff; few calcium carbonate nodules	
4	X	SS 4	18	15					CH	BEAUMONT, strong brown (7.5YR 5/6); CLAY (CH); moist; stiff; calcium carbonate nodules; black organic staining	
5	X	SS 5	18	23					CH	BEAUMONT, yellowish red (5YR 5/6); CLAY (CH); moist; stiff; trace calcium carbonate nodules; trace black organic staining	
6	X	SS 6	18	22					CH	BEAUMONT, yellowish red (5YR 5/6) with greenish gray mottling; CLAY (CH); moist; stiff	
7	X	SS 7	18	24					CL	BEAUMONT, yellowish red (5YR 5/6) with greenish gray mottling; CLAY (CH); moist; stiff	
8	X	SS 8	18	22					CH	BEAUMONT, yellowish red (5YR 5/6) with greenish gray mottling; silt; CLAY (CL); moist; stiff; trace of silt	
9	X	SS 9	18	15					CH	BEAUMONT, yellowish red (5YR 5/6) with greenish gray mottling; CLAY (CH); moist; stiff	
10	X	SS 10	18	20					CH	BEAUMONT, yellowish red (5YR 5/6); silt; CLAY (CH); wet; very stiff; trace of silt	
11	X	SS 11	18	20					CH	BEAUMONT, yellowish red (5YR 5/6); CLAY (CH); moist; very stiff; trace calcium carbonate nodules; trace black staining	
12	X	SS 12	18	24					ML	BEAUMONT, strong brown (7.5YR 5/6); sand; SILT (ML); wet; soft	
13	X	SS 13	18	20					SP-SM	BEAUMONT, strong brown (7.5YR 5/6); silt; gravel; SAND (SP-SM); wet; very firm; trace of gravel (possible large calcium carbonate nodule)	
14	X	SS 14	18	20					SP-SM	BEAUMONT, strong brown (7.5YR 5/6); silt; SAND (SP-SM); wet; firm; fine sand	
15	X	SS 15	18	22					SP-SM	BEAUMONT, strong brown (7.5YR 5/6); silt; SAND (SP-SM); wet; loose; fine sand	
16	X	SS 16	18	17					SP-SM	BEAUMONT, light brown (7.5YR 6/4); silt; SAND (SP-SM); wet; dense; fine sand	

Water level at 12 feet BGS

Project Name: Job Number <b>MACTEC</b>	<b>SOIL LOG - Boring No. B-415</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow/30 inches	Recovery (feet)	Water Content	Grain Size	Alterable Limits	Lithology	Soil Type (USCS)	Remarks
40										
41									SP-SM	Switch to mud rotary drilling at 40 feet BGS
42										
43										
44	X	SS-16	18 24 25	15 18						BEAUMONT; light yellowish brown (10YR 6/4); silt; SAND (SP-SM); wet; dense; fine sand
45										
46										
47										
48										
49	X	SS-17	6 5 3	21 18					CH	BEAUMONT; yellowish red (5YR 5/6); CLAY (CH); moist; stiff
50									CL	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CL); wet; stiff
51										
52										
53										
54	X	SS-18	6 4	24 18					CH	BEAUMONT; light greenish gray (Gley 5Y 7/1); CLAY (CH); moist; stiff; few calcium carbonate nodules
55										
56										
57										
58										
59	X	SS-19	6 7 9	17 18						BEAUMONT; yellowish brown (10YR 5/4) with greenish gray mottling; sand; CLAY (CH); moist; very stiff; fine quartz sand; calcium carbonate nodules observed
60										
61										
62										
63										
64	X	SS-20	6 7 8	22 18					CL	BEAUMONT; reddish yellow (7.5YR 6/6) with greenish gray mottling; sand; CLAY (CL); wet; stiff; fine sand; few calcium carbonate nodules
65										
66										
67										
68										
69	X	SS-21	12 16 22	13 18					SP-SM	BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SP-SM); wet; dense; fine
70										
71										
72										
73										
74	X	SS-22	16 21 17	14 18						BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SP-SM); wet; dense; fine
75										
76										
77										
78										
79	X	SS-23	21 18 23	15 18						BEAUMONT; light yellowish brown (10YR 6/4); silt; gravel; SAND (SP-SM); wet; very dense; fine; trace of gravel
80										



Project Name: Job Number




**SOIL LOG - Boring No. B-415**

STP COL. 5050-05-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USEC)	Lithology	Remarks
80									SP		
81									SM		
82											
83											
84	X	SS-24	6 12	21 18					CH	BEAUMONT; brown (7.5YR 5/4); CLAY (CH); moist; very stiff; trace of calcium carbonate nodules	
85											
86											
87											
88											
89		UD 1	N/A	12 24	23.9		64/44			BEAUMONT; brown (7.5YR 5/4); CLAY (CH); moist	
90											
91											
92											
93											
94	X	SS-25	7 12	22 18					CH	BEAUMONT; brown (7.5YR 5/3); CLAY (CH); moist; very stiff	
95											
96											
97											
98											
99		UD 2	N/A	13 24					SP-SM	BEAUMONT; brown (7.5YR 5/3); CLAY (CH); moist BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SP-SM); wet; fine sand	
100											
101											
102											
103											
104											
105											
106											
107											
108											
109	X	SS-26	12 15	13 18					CH	BEAUMONT; pale brown (10YR 5/3); clay; SAND (SP-SM); wet; very firm; mostly fine sand; some coarse sand; trace clay	
110											
111											
112											
113											
114											
115											
116											
117											
118											
119	X	SS-27	6 12	22 18					CH	BEAUMONT; brown (7.5YR 5/4) with some greenish gray mottling; CLAY (CH); moist; very stiff	
120											

Project Name : Job Number	<b>SOIL LOG - Boring No. B-415</b>
STP COL : 5050-05-0496	<b>MACTEC</b>

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blowwise Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Remarks
120								CH	
121								CH	No Recovery
122		UD 3A	N/A	0/24				CH	
123								CH	
124								CH	
125		UD 3	N/A	20.5/24	23.9	61.5	54/35	CH	BEAUMONT; brown (7.5YR 5/4) with some greenish gray mottling; CLAY (CH); moist
126								CH	
127								CH	
128								CH	
129	X	SS 28	15/17	17/18				ML	BEAUMONT; strong brown (7.5YR 5/6); sand; SILT (ML); moist; hard
130								CH	
131								CH	BEAUMONT; strong brown (7.5YR 5/6) with some greenish gray mottling; silt; CLAY (CH); moist; hard
132		UD 4A	N/A	0/24				CH	No Recovery
133								CH	
134								CH	
135		UD 4	N/A	0/24				CH	No Recovery
136								CH	
137								CH	
138								CH	
139	X	SS 29	8/12	23/18				CH	BEAUMONT; light greenish gray (Gley 10Y 7/1) with some light brown mottling; sand; CLAY (CH); moist; very stiff; calcium carbonate nodules; little fine quartz sand
140								CH	
141								CH	
142								CH	
143								CH	
144								CH	
145								CH	
146								CH	
147								CH	
148								CH	
149	X	SS 30	28/34	19/18				SP-SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SP-SM); wet; very dense; fine sand
150								CH	BEAUMONT; strong brown (7.5YR 5/6) with greenish gray mottling; CLAY (CH); moist; hard
151								SP-SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SP-SM); wet; very dense; fine sand
152								SP-SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SP-SM); wet; very dense; fine sand
153								SP-SM	Boring Terminated at 150-feet
154								SP-SM	
155								SP-SM	
156								SP-SM	
157								SP-SM	
158								SP-SM	
159								SP-SM	
160								SP-SM	

Project Name : Job Number.		<b>SOIL LOG - Boring No. B-416</b>	
			
STP COL : 5050-06-0496			
Type and Diameter of Boring Rotary Wash / 4 inch	Boring Location N 363301.73 E 2942746.36	Control Bay	Total Depth 150 feet
Drilling Contractor and Rig Lewis Drilling / Mobile B 61	Elevation at boring 31.84 feet	Ground Water Depth 23.5 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 139.58 lbs / 30 inches	No. of Samples 32	Date Started 12/17/06
	Borehole Inclination 0	Logged by G. Geras	Date Completed 12/18/06

Reviewed by / Date MOS 5/14/07  
 Reviewed by / Date KAW 5/11/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Alterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	7	7					SP	BEAUMONT; brownish yellow (10YR 6/6); gravel; clay; SAND (SP); dry; loose; little gravel; few clay; mostly fine sand	
2	X	SS 2	12	12					CH	BEAUMONT; black (GLE Y 1 2.5/N); silt; CLAY (CH); dry; firm; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
3	X	SS 3	11.5	11.5					CH	BEAUMONT; black (GLE Y 1 2.5/N); silt; CLAY (CH); dry; stiff; little silt; mostly clay; trace calcareous nodules; trace ferrous nodules; strong reaction with HCl	
4	X	SS 4	10	10					CH	BEAUMONT; dark gray (GLE Y 1 4/N); gravel; silt; CLAY (CH); dry; stiff; few gravel; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl; trace ferrous nodules	
5	X	SS 5	10	10					CH	BEAUMONT; dark gray (GLE Y 1 4/N); gravel; silt; CLAY (CH); dry; firm; few gravel; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl; trace ferrous nodules	
6	X	SS 6	18	18					CH	BEAUMONT; dark gray (GLE Y 1 4/N); gravel; silt; CLAY (CH); dry; firm; few gravel; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl; trace ferrous nodules	
7	X	SS 7	18	18					CH	BEAUMONT; dark gray (GLE Y 1 4/N); gravel; silt; CLAY (CH); dry; firm; few gravel; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl; trace ferrous nodules	
8	X	SS 8	12.5	12.5					CH	BEAUMONT; dark gray (GLE Y 1 4/N); gravel; silt; CLAY (CH); dry; firm; few gravel; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl; trace ferrous nodules	
9	X	SS 9	18	18					ML	BEAUMONT; dark gray (GLE Y 1 4/N); gravel; silt; CLAY (CH); dry; firm; few gravel; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl; trace ferrous nodules	
10	X	SS 10	17	17					CH	BEAUMONT; yellowish red (5YR 4/6) with slight light greenish gray (GLE Y 1 7/1) mottling; silt; CLAY (CH); dry; stiff; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
11	X	SS 11	18	18					CH	BEAUMONT; strong brown (7.5YR 5/6) with very slight light greenish gray (GLE Y 1 10Y 7/1) mottling; silt; CLAY (CH); dry; firm; some silt; mostly clay	
12									SM	BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); moist; firm; some clay; mostly silt; trace calcareous nodules; strong reaction with HCl	
13									SM	BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH); dry; stiff; some silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
14	X	SS 12	18	18					SM	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); dry; firm; some silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
15									SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; some silt; mostly fine sand	
16									SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; little silt; mostly fine sand	
17									SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; little silt; mostly fine sand	
18									SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; little silt; mostly fine sand	
19	X	SS 13	10	13					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; little silt; mostly fine sand	
20									SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; little silt; mostly fine sand	
21									SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; little silt; mostly fine sand	
22									SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; little silt; mostly fine sand	
23	X	SS 14	11.5	11.5					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; firm; little silt; mostly fine sand	
24									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; firm; little silt; mostly fine sand	
25									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; firm; little silt; mostly fine sand	
26									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; firm; little silt; mostly fine sand	
27	X	SS 15	11	9					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; firm; little silt; mostly fine sand	
28									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; firm; little silt; mostly fine sand	
29									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; firm; little silt; mostly fine sand	
30									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; firm; little silt; mostly fine sand	
31									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; firm; little silt; mostly fine sand	
32									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; firm; little silt; mostly fine sand	
33									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; firm; little silt; mostly fine sand	
34									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; firm; little silt; mostly fine sand	
35									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; firm; little silt; mostly fine sand	
36									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; firm; little silt; mostly fine sand	
37									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; firm; little silt; mostly fine sand	
38									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; firm; little silt; mostly fine sand	
39									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; firm; little silt; mostly fine sand	
40									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; firm; little silt; mostly fine sand	

Water level at 23.5 feet BGS  
 Switch to mud rotary drilling at 25 feet BGS

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-416</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 16	15 20 22	14 18						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; little silt; mostly fine sand	
45											
46											
47											
48											
49	X	SS 17	18 18	18 18					CH	BEAUMONT; yellowish red (5YR 4/6) with brown (7.5YR 5/4) mottling; silt; sand; CLAY (CH); dry; stiff; few fine sand; little silt; mostly clay	
50											
51											
52											
53											
54	X	SS 18	18 18	18 18						BEAUMONT; greenish gray (GLEY 1 5GY 6/1); sand; silt; CLAY (CH); dry; stiff; few sand; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
55											
56											
57											
58											
59	X	SS 19	5 7 10	17 18						BEAUMONT; greenish gray (GLEY 1 5GY 6/1); sand; silt; CLAY (CH); dry; very stiff; few sand; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
60											
61											
62											
63											
64	X	SS 20	5 6 11	17 18					ML	BEAUMONT; strong brown (7.5YR 5/6) with slight greenish gray (GLEY 1 5GY 6/1) mottling; clay; SILT (ML); moist; very stiff; some clay; mostly silt	
65											
66											
67											
68											
69	X	SS 21	11 15 13	9 18					SP-SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SP-SM); wet; very firm; few silt; mostly fine sand	
70											
71											
72											
73											
74	X	SS 22	10 11 17	12 18						BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SP-SM); wet; very firm; few silt; mostly fine sand	
75											
76											
77											
78											
79	X	SS 23	16 17 20	12 18					SM	BEAUMONT; dark yellowish brown (10YR 4/6); silt; clay; SAND (SM); wet; dense; trace clay; little silt;	
80											

Project Name : Job Number



**SOIL LOG - Boring No. B-416**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SM	mostly fine sand	
81											
82											
83											
84	X	SS 24	10 18	11 18					SP-SM	BEAUMONT; dark yellowish brown (10YR 4/6); silt; SAND (SP-SM); moist; very firm; few silt; mostly medium sand	
85											
86											
87											
88											
89	X	SS 25	6 8	8 18					ML	BEAUMONT; brown (10YR 5/3); sand; clay; SILT (ML); wet; stiff; little clay; little fine sand; mostly silt; trace shells	
90											
91											
92											
93											
94	X	SS 26	16 18 20	13 18					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); moist; dense; little silt; mostly fine sand	
95											
96											
97											
98											
99	X	SS 27	4 5 7	18 18					CH	BEAUMONT; dark grayish brown (10YR 4/2); silt; sand; CLAY (CH); dry; stiff; little fine sand; little silt; mostly clay	
100											
101											
102											
103											
104											
105											
106											
107											
108											
109	X	SS 28	12 13 19	9 18					SP-SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SP-SM); moist; dense; few silt; mostly medium sand	
110											
111											
112											
113											
114											
115											
116											
117											
118											
119	X	SS 29	11 7 10	12 18					CH	BEAUMONT; yellowish red (5YR 4/6) with light greenish gray (GLE 1 10Y 8/1) mottling; silt;	
120											

Project Name : Job Number



**SOIL LOG - Boring No. B-416**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									CH	CLAY (CH); dry; very stiff; few silt; mostly clay	
121											
122											
123											
124											
125											
126											
127											
128											
129	X	SS 30	14 20 22	15 18					ML	BEAUMONT; strong brown (7.5YR 5/6); with greenish gray (GLEY 1 10Y 8/1) mottling; silt; CLAY (CH); dry; hard; some silt; mostly clay	
130										BEAUMONT; strong brown (7.5YR 5/6) with light greenish gray (GLEY 1 10Y 8/1) mottling; clay; SILT (ML); moist; hard; little clay; mostly silt	
131											
132											
133											
134											
135											
136											
137											
138											
139	X	SS 31	10 12 21	18 18					CH	BEAUMONT; light greenish gray (GLEY 1 10Y 7/1) with yellowish brown (10YR 5/6) mottling; silt; sand; CLAY (CH); dry; hard; few silt; little fine sand; mostly clay; few calcareous nodules; strong reaction with HCl	
140											
141											
142											
143											
144											
145											
146											
147											
148											
149	X	SS 32	13 20 27	12 18					SM	BEAUMONT; yellowish brown (10YR 5/6) with light greenish gray (GLEY 1 10Y 7/1) mottling; ; silt; clay; SAND (SM); moist; dense; few clay; some silt; mostly fine sand	
150										Boring Terminated at 150-feet	
151											
152											
153											
154											
155											
156											
157											
158											
159											
160											

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-417</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 5 inch & 4 inch		Boring Location Unit 4 - Turbine Building N 363361.95 E 2942331.19	Total Depth 150 feet
Drilling Contractor and Rig Gregg #2 (0' - 15') / EEI (15' - 150') / CME 55/CME 75		Elevation at boring 29.57 feet	Ground Water Depth Depth to Bedrock
Sampling Method Split Spoon/UD		Sample Driving Hammer/Drop 140/138 lbs / 30 inches	No. of Samples 32 Date Started 12/17/06
		Borehole Inclination 0	Logged by M. Fraychineaud / J. Howard Date Completed 12/19/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0									CH	BEAUMONT; black (GLE Y 1 2.5/N); silt; CLAY (CH); moist; firm; high plasticity; little silt; trace calcareous nodules; strong HCl reaction	
1	X	SS 1	13	13					CH	BEAUMONT; black (GLE Y 1 2.5/N); silt; CLAY (CH); moist; firm; high plasticity; little silt; trace calcareous nodules; strong HCl reaction	
2	X	SS 2	10	10					CH	BEAUMONT; black (GLE Y 1 2.5/N); silt; CLAY (CH); moist; firm; high plasticity; little silt; trace roots	
3	X	SS 3	13	13					CH	BEAUMONT; black (GLE Y 1 2.5/N); silt; CLAY (CH); moist; firm; high plasticity; little silt; trace roots	
4	X	SS 4	14	14					CH	BEAUMONT; black (GLE Y 1 2.5/N); silt; CLAY (CH); moist; firm; high plasticity; little silt; trace roots	
5	X	SS 5	14	14					CH	BEAUMONT; dark gray (5Y 4/1); silt; CLAY (CH); moist; firm; high plasticity; little silt; trace calcareous nodules; strong HCl reaction	
6	X	SS 6	18	18					CH	BEAUMONT; red (2.5YR 5/6); silt; CLAY (CH); moist; firm; high plasticity; few silt	
7	X	SS 7	12	12					CH	BEAUMONT; red (2.5YR 5/6); silt; CLAY (CH); moist; stiff; high plasticity; few silt; calcareous deposits in microfractures; strong HCl reaction	
8	X	SS 8	15	15					CH	BEAUMONT; red (2.5YR 5/6); silt; CLAY (CH); moist; very stiff; high plasticity; few silt; calcareous deposits in microfractures; strong HCl reaction	
9	X	SS 9	13	13					CH	BEAUMONT; red (2.5YR 5/6); silt; CLAY (CH); moist; very stiff; high plasticity; few silt; calcareous deposits in microfractures; strong HCl reaction	
10	X	SS 10	14	14					CH	BEAUMONT; red (2.5YR 5/6); silt; CLAY (CH); moist; very stiff; high plasticity; few silt; calcareous deposits in microfractures; strong HCl reaction	
11									CH	BEAUMONT; red (2.5YR 5/6); silt; CLAY (CH); moist; very stiff; high plasticity; few silt; trace calcareous nodules; strong HCl reaction	
12									CH	BEAUMONT; red (2.5YR 5/6); silt; CLAY (CH); moist; firm; high plasticity; few silt; calcareous deposits in microfractures; strong HCl reaction	
13									CH	BEAUMONT; red (2.5YR 5/6); silt; CLAY (CH); moist; firm; high plasticity; few silt; calcareous deposits in microfractures; strong HCl reaction	
14	X	SS 11	18	18					CH	BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; firm; medium plasticity	Switch to mud rotary drilling at 13.5 feet BGS
15									CH		
16									CH		
17									CH		
18									CH		
19	X	SS 12	10	14					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; loose; medium to fine sand	
20									SM		
21									SM		
22									SM		
23									SM		
24	X	SS 13	7	17					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; medium to fine sand	
25									SM		
26									SM		
27									SM		
28									SM		
29	X	SS 14	12	18					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; medium to fine sand	
30									SM		
31									SM		
32									SM		
33									SM		
34	X	SS 15	15	18					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; very firm; medium to fine sand	
35									SM		
36									SM		
37									SM		
38									SM		
39	X	SS 15	15	18					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; very firm; medium to fine sand	
40									SM		

Project Name : Job Number <div style="text-align: center;"> <b>MACTEC</b></div> STP COL : 5050-06-0496	SOIL LOG - Boring No. B-417
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 16	3 3	12 18					CH	BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; firm; high plasticity	
45											
46											
47											
48											
49	X	SS 17	4 4	18 18						BEAUMONT; light greenish gray (GLEY 2 5BG 7/1); sand; CLAY (CH); moist; stiff; high plasticity; with shell fragments	
50											
51											
52											
53											
54	X	SS 18	4 6	18 18						BEAUMONT; light greenish gray (GLEY 2 10G 7/1); sand; CLAY (CH); moist; stiff; high plasticity	
55											
56											
57											
58											
59	X	SS 19	4 6	18 18						BEAUMONT; yellowish red (5YR 5/6) with gray mottling; sand; CLAY (CH); moist; stiff; high plasticity	
60											
61											
62											
63											
64	X	SS 20	4 6	18 18						BEAUMONT; yellowish red (5YR 5/6) with gray mottling; sand; CLAY (CH); moist; stiff; high plasticity	
65											
66											
67											
68											
69	X	SS 21	8 12	14 18					SM	BEAUMONT; strong brown (7.5YR 5/6); SAND (SM); wet; very firm; medium to fine sand	
70											
71											
72											
73											
74	X	SS 22	8 17	12 18						BEAUMONT; strong brown (7.5YR 5/6); SAND (SM); wet; dense; medium to fine sand	
75											
76											
77											
78											
79	X	SS 23	13 9	14 18					CH	BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff; high plasticity	
80											



Project Name : Job Number 	<b>SOIL LOG - Boring No. B-417</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									CH		
81											
82											
83											
84	X	SS 24	106 10	18 18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff, high plasticity	
85											
86											
87											
88											
89	X	SS 25	86 11	18 18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff, high plasticity	
90											
91											
92											
93											
94	X	SS 26	106 1	18 18						BEAUMONT; strong brown (7.5YR 5/6); sand; CLAY (CH); moist; very stiff, high plasticity.	
95											
96											
97											
98											
99	X	SS 27	8 27 41	7 18					SP-SM	BEAUMONT; strong brown (7.5YR 5/6); SAND (SP-SM); wet; very dense; medium to fine sand	
100											
101											
102											
103											
104											
105											
106											
107											
108											
109	X	SS 28	10 27 31	12 18						BEAUMONT; strong brown (7.5YR 5/6); SAND (SP-SM); wet; very dense; medium to fine sand	
110											
111											
112											
113											
114											
115											
116											
117											
118											
119	X	SS 29	106 11	18 18					CH	BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff, high plasticity	
120											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-417</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									CH		
121											
122											
123											
124											
125											
126											
127											
128											
129	X	SS 30	6 7 10	18 18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff; high plasticity	
130											
131											
132											
133											
134											
135											
136											
137											
138											
139	X	SS 31	5 8 15	17 18						BEAUMONT; light greenish gray (GLE Y 2 10G 7/1); sand; CLAY (CH); moist; very stiff; high plasticity	
140											
141											
142											
143											
144											
145											
146											
147											
148											
149	X	SS 32	5 8 11 18	12 18					SC	BEAUMONT; strong brown (7.5YR 5/6); clay; SAND (SC); moist; very dense; medium to fine sand	
150											
151										Boring Terminated at 150-feet	
152											
153											
154											
155											
156											
157											
158											
159											
160											

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-418</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Rotary Wash / 4 inch	Boring Location N 363361.76 E 2942433.17	Turbine Building	Total Depth 100 feet
Drilling Contractor and Rig Lewis Drilling / Mobile B 57	Elevation at boring 29.77 feet	Ground Water Depth 18.5 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 139.58 lbs / 30 inches	No. of Samples 27	Date Started 12/6/06
	Borehole Inclination 0	Logged by G. Geras	Date Completed 12/8/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0									CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); dry; soft; little silt; mostly clay; trace organics	
1	X	SS 1	11	5					CH	BEAUMONT; black (GLEY 1 2.5/N) with slight strong brown (7.5YR 5/6) mottling; silt; CLAY (CH); dry; soft; little silt; mostly clay	
2	X	SS 2	11	7.5					CH	BEAUMONT; very dark gray (7.5YR 3/1); silt; CLAY (CH); dry; firm; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
3	X	SS 3	11	13					CH	BEAUMONT; very dark gray (7.5YR 3/1) transitioning into yellowish red (5YR 4/6) with slight light greenish gray (GLEY 1 10Y 7/1) mottling; silt; CLAY (CH); dry; firm; little silt; mostly clay	
4	X	SS 4	11	11					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; stiff; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
5	X	SS 4	11	11					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; stiff; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
6	X	SS 5	11	17					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; stiff; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
7	X	SS 6	11	17					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; stiff; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
8	X	SS 6	11	17					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; stiff; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
9	X	SS 7	11	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; stiff; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
10	X	SS 7	11	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; stiff; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
11	X	SS 8	11	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; stiff; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
12	X	SS 8	11	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; stiff; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
13	X	SS 9	11	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; stiff; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl; trace ferrous nodules	
14	X	SS 10	11	18					CH	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); dry; firm; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
15									CH	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); dry; firm; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
16									CH	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); dry; very stiff; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
17									CH	BEAUMONT; yellowish red (5YR 5/6) with slight light greenish gray (GLEY 1 10Y 7/1) mottling; silt; CLAY (CH); dry; stiff; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
18									CH	BEAUMONT; strong brown (7.5YR 5/6); sand; SILT (ML); wet; firm; some fine sand; mostly silt; trace cemented sand nodules	
19	X	SS 11	11	15					ML	BEAUMONT; yellowish red (5YR 5/6) with slight light greenish gray (GLEY 1 10Y 7/1) mottling; silt; CLAY (CH); dry; stiff; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	Water level at 18.5 feet BGS
20									ML	BEAUMONT; strong brown (7.5YR 5/6); sand; SILT (ML); wet; firm; some fine sand; mostly silt; trace cemented sand nodules	Switch to mud rotary drilling at 25 feet BGS
21									ML	BEAUMONT; strong brown (7.5YR 5/6); sand; SILT (ML); wet; firm; some fine sand; mostly silt; trace cemented sand nodules	
22									ML	BEAUMONT; strong brown (7.5YR 5/6); sand; SILT (ML); wet; firm; some fine sand; mostly silt; trace cemented sand nodules	
23									ML	BEAUMONT; strong brown (7.5YR 5/6); sand; SILT (ML); wet; firm; some fine sand; mostly silt; trace cemented sand nodules	
24	X	SS 12	11	18					SM	BEAUMONT; dark yellowish brown (10YR 4/6); silt; SAND (SM); wet; firm; some silt; mostly fine sand	
25									SM	BEAUMONT; dark yellowish brown (10YR 4/6); silt; SAND (SM); wet; firm; some silt; mostly fine sand	
26									SM	BEAUMONT; dark yellowish brown (10YR 4/6); silt; SAND (SM); wet; firm; some silt; mostly fine sand	
27									SM	BEAUMONT; dark yellowish brown (10YR 4/6); silt; SAND (SM); wet; firm; some silt; mostly fine sand	
28									SM	BEAUMONT; dark yellowish brown (10YR 4/6); silt; SAND (SM); wet; firm; some silt; mostly fine sand	
29	X	SS 13	11	17					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; mostly fine sand; some silt; trace cemented sand nodules	
30									SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; mostly fine sand; some silt; trace cemented sand nodules	
31									SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; mostly fine sand; some silt; trace cemented sand nodules	
32									SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; mostly fine sand; some silt; trace cemented sand nodules	
33									SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; mostly fine sand; some silt; trace cemented sand nodules	
34	X	SS 14	11	10					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; mostly fine sand; little silt	
35									SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; mostly fine sand; little silt	
36									SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; mostly fine sand; little silt	
37									SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; mostly fine sand; little silt	
38									SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; mostly fine sand; little silt	
39	X	SS 15	11	0					SM	BEAUMONT; silt; SAND (SM)	No Recovery at sample SS-15
40									SM	BEAUMONT; silt; SAND (SM)	

Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-418</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 16	11 10	15 18						BEAUMONT; yellowish brown (10YR 5/4) with yellowish red (5YR 5/6) mottling; silt; clay; SAND (SM); wet; very firm; few clay; little silt; mostly fine sand; presence of 1 inch thick clay laminae; trace cemented sand nodules	
45											
46											
47											
48											
49	X	SS 17	22 4	18 18					CH	BEAUMONT; yellowish red (5YR 4/6) transitioning into brown (7.5YR 4/4); silt; sand; CLAY (CH); dry; firm; few sand; little silt; mostly clay	
50											
51											
52											
53											
54	X	SS 18	20 3	18 18						BEAUMONT; greenish gray (GLEYS 10Y 6/1); silt; sand; CLAY (CH); dry; stiff; few sand; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl; trace ferrous nodules	
55											
56											
57											
58											
59	X	SS 19	6 10 10	0 18						BEAUMONT; silt; CLAY (CH)	No Recovery at sample SS-19
60											
61											
62											
63											
64	X	SS 20	6 4 3	18 18					ML	BEAUMONT; brown (7.5YR 5/4) with slight greenish gray (GLEYS 1 5GY 6/1) mottling; silt; CLAY (CH); dry; stiff, some silt; mostly clay BEAUMONT; brown (7.5YR 5/4); clay; SILT (ML); moist; stiff, some clay; mostly silt	
65											
66											
67											
68											
69	X	SS 21	7 8 15	13 18						BEAUMONT; brown (7.5YR 5/4) with greenish gray (GLEYS 1 5GY 6/1) mottling; clay; sand; SILT (ML); wet; very stiff, little clay; little fine sand; mostly silt	
70											
71											
72											
73											
74	X	SS 22	11 22 15	10 18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; dense; little silt; mostly fine sand	
75											
76											
77											
78											
79	X	SS 23	6 13	17 18					CH	BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); dry; very stiff; little silt; mostly clay; trace	
80											

Project Name : Job Number



**SOIL LOG - Boring No. B-418**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									CH	calcareous nodules; strong reaction with HCl	
81											
82											
83											
84	X	SS 24	100 16	18 18							BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); dry; very stiff; few silt; mostly clay; trace calcareous nodules; strong reaction with HCl
85											
86											
87											
88											
89	X	SS 25	7 13	18 18							BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); dry; very stiff; few silt; mostly clay; trace calcareous nodules; strong reaction with HCl
90											
91											
92											
93											
94	X	SS 26	8 10 15	18 18							BEAUMONT; brown (7.5YR 4/4); silt; sand; CLAY (CH); dry; very stiff; few sand; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl
95											
96											
97											
98											
99	X	SS 27	4 9 22	18 18							BEAUMONT; brown (7.5YR 4/4) with greenish gray (GLEY 1 5GY 6/1) mottling; silt; sand; CLAY (CH); dry; hard; few sand; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl
100									ML		BEAUMONT; dark gray (10YR 4/1); sand; SILT (ML); wet; hard; little fine sand; mostly silt
101											Boring Terminated at 100-feet
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-419 DH</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 4 inch		Boring Location N 363362.12 E 2942506.69		Total Depth 215 feet	
Drilling Contractor and Rig Best / Failing 1500		Elevation at boring 29.73 feet		Ground Water Depth	
Sampling Method Split Spoon/UD		Sample Driving Hammer/Drop 141 lbs / 30 inches		No. of Samples 37	
		Borehole Inclination 0		Logged by C. Bruce	
				Date Started 12/1/06	
				Date Completed 12/2/06	

Reviewed by / Date KRL 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	11	18					CH	BEAUMONT; black (GLE Y 1 2.5/N); gravel; silt; CLAY (CH); moist; firm; trace gravel	
2	X	SS 2	11	18					CH	BEAUMONT; black (GLE Y 1 2.5/N); silt; CLAY (CH); moist; stiff; trace calcareous nodules	
3	X	SS 3	22	18	25.3	62/43			CH	BEAUMONT; black (GLE Y 1 2.5/N) grades to a yellowish red (5YR 4/6); silt; CLAY (CH); moist; very stiff; trace calcareous nodules	
4	X	SS 4	5	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff	
5	X	SS 5	18	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; very stiff; trace calcareous nodules	
6	X	SS 6	16	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; very stiff	Water level at BGS
7	X	SS 7	14	18	22.8	58/41			CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; very stiff	
8	X	SS 8	24	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; very stiff	
9	X	SS 9	18	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; very stiff	
10	X	SS 10	17	18	21.2	51/35			CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; trace calcareous nodules	Switch to mud rotary drilling at 15 feet BGS
11	X	SS 11	16	18					CH	BEAUMONT; yellowish red (5YR 4/6); sand; silt; CLAY (CH); wet; stiff; some silt; trace fine sand	
12	X	SS 12	20	18	21.7				SM	BEAUMONT; strong brown (7.5YR 5/8); silt; SAND (SM); wet; dense; calcareous nodules	
13	X	SS 13	18	18					CL	BEAUMONT; strong brown (7.5YR 5/8); gravel; silt; SAND (SM); wet; loose; angular gravel	
14	X	SS 14	13	18	26.7	23.9			SM	BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM); wet; firm	
15	X	SS 15	12	18					SM	BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM); wet; very firm	

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-419 DH</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 16	66	23/18	29.0		73/49		CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff	
45											
46											
47											
48											
49	X	SS 17	65	24/18						BEAUMONT; dark reddish gray (5YR 4/2) grades to dark greenish gray (GLEYS 1 4/5GY); silt; CLAY (CH); moist; stiff	
50											
51											
52											
53											
54	X	SS 18	66	20/18	18.0		53/36			BEAUMONT; dark greenish gray (GLEYS 1 4/5G); silt; CLAY (CH); moist; very stiff	
55			11								
56											
57											
58											
59	X	SS 19	11	18/18					CL	BEAUMONT; yellowish brown (10YR 5/6); gravel; sand; silt; CLAY (CL); wet; very stiff; trace sand and gravel	
60			8								
61			10								
62											
63											
64	X	SS 20	9	15/18	20.5	39.5			SM	BEAUMONT; yellowish brown (10YR 5/6); gravel; silt; SAND (SM); wet; dense; trace of calcareous gravel; 1" thick clay lens at 64.5 feet bgs	
65			14								
66			19								
67											
68											
69	X	SS 21	19	7/18						BEAUMONT; dark yellowish brown (10YR 4/4); silt; SAND (SM); wet; dense	
70			23								
71			23								
72											
73											
74	X	SS 22	18	12/18	21.1	9.7			SP-SM	BEAUMONT; dark yellowish brown (10YR 4/4); silt; SAND (SP-SM); wet; very dense	
75			23								
76			31								
77											
78											
79		UD 1	N/A	24/24	22.3	99.4	47/23		CL	BEAUMONT; dark yellowish brown (10YR 4/4); silt; CLAY (CL); moist	
80											

Project Name : Job Number



SOIL LOG - Boring No. B-419 DH

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									CL		
81											
82											
83											
84	X	SS 23	7 7 10	22 18					CH	BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); moist; very stiff	
85											
86											
87											
88											
89	X	SS 24	0 11 13	20 18	25.5		66/44			BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); moist; very stiff	
90											
91											
92											
93											
94	X	SS 25	12 11 14	22 18						BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); moist; very stiff; trace calcareous nodules	
95											
96											
97											
98											
99		UD 2	N/A	19 24	27.0	95.1	61/37			BEAUMONT; silt; CLAY (CH)	
100									SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet	
101											
102											
103											
104											
105											
106											
107											
108											
109	X	SS 26	29 25 31	12 18	20.4	7.2			SP-SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SP-SM); wet; very dense; few silt	
110											
111											
112											
113											
114											
115											
116											
117											
118											
119		UD 3	N/A	23.5 24	19.3	95.1	56/39			BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist	
120											



Project Name : Job Number



**SOIL LOG - Boring No. B-419 DH**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									CH		
121											
122											
123											
124											
125											
126											
127											
128											
129	X	SS 27	10 12 15	18 18	25.0		72/49				BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; very stiff; trace calcareous nodules
130											
131											
132											
133											
134											
135											
136											
137											
138											
139		UD 4	N/A	26 24	14.9	78.7	40/25		CL		BEAUMONT; yellowish red (5YR 4/6); silt; sand; CLAY (CL); moist; trace calcareous nodules
140											
141											
142											
143											
144											
145											
146											
147											
148											
149	X	SS 28	39 50 50	15 18	21.8	14.8			SM		BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; very dense; little silt
150											
151											
152											
153											
154											
155											
156											
157											
158											
159		UD 5	N/A	23 24	19.3	98.1	47/30		CL		BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CL); moist; trace calcareous nodules
160											

Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-419 DH</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
160									CL	
161										
162										
163										
164										
165										
166										
167										
168										
169	X	SS 29	13 15 19	21 18	24.8		67/46		CH	BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CH); moist; hard; trace calcareous nodules
170										
171										
172										
173										
174										
175										
176										
177										
178										
179		UD 6	N/A	26.5 24	20.6	99.8	53/33			BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CH); moist
180										
181										
182										
183										
184										
185										
186										
187										
188										
189	X	SS 30	13 12 13	24 18	31.6		85/62			BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CH); moist; very stiff
190										
191										
192										
193										
194										
195										
196										
197										
198										
199		UD 7	N/A	26 24	25	93.7	56/66			BEAUMONT; olive (5Y 5/3); silt; CLAY (CH); moist
200										

Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-419 DH</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
200										Drill to 215 feet for geophysical logging	Stopped geotechnical drilling and sampling at 200 feet
201											
202											
203											
204											
205											
206											
207											
208											
209											
210											
211											
212											
213											
214											
215										Boring Terminated at 215 feet	
216											
217											
218											
219											
220											
221											
222											
223											
224											
225											
226											
227											
228											
229											
230											
231											
232											
233											
234											
235											
236											
237											
238											
239											
240											

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-420</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 3 inch		Boring Location Heavy Haul Road N 362900.8 E 2942008.75		Total Depth 125 feet	
Drilling Contractor and Rig EEI / CME 750 ATV		Elevation at boring 31.94 feet		Ground Water Depth 24 feet	
Sampling Method Split Spoon		Sample Driving Hammer/Drop 138.0 lbs / 30 inches		No. of Samples 30	
		Borehole Inclination 0		Logged by S. Lehman	
				Date Started 11/2/06	
				Date Completed 11/4/06	

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/gf Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	18	18					CH	BEAUMONT; very dark grayish brown (10YR 3/2); silt; sand; CLAY (CH); dry; firm; medium plasticity; low toughness; some silt; trace fine sand	
2	X	SS 2	18	18						BEAUMONT; black (5Y 2.5/2); silt; CLAY (CH); dry; stiff; medium plasticity; medium toughness; little silt	
3	X	SS 3	18	18						BEAUMONT; very dark grayish brown (5Y 3/2); CLAY (CH); dry; stiff; high plasticity; low toughness	
4	X	SS 4	18	18						BEAUMONT; black (5Y 2.5/2); silt; CLAY (CH); moist; firm; medium to high plasticity; low toughness; little silt	
5	X	SS 5	10	18						BEAUMONT; dark grayish brown (2.5Y 4/2); silt; sand; CLAY (CH); moist; stiff; medium to high plasticity; low toughness; trace fine sand	
6	X	SS 6	16	18						BEAUMONT; dark grayish brown (2.5Y 4/2) to black (5Y 2.5/2) with brown (7.5YR 4/4) mottling; silt; CLAY (CH); moist; soft; medium plasticity; some silt	
7	X	SS 7	18	18						BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist; firm; medium plasticity; medium toughness; some silt	
8	X	SS 8	8	18						BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; stiff; medium plasticity; medium toughness; some silt	
9	X	SS 9	15	18						BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CH); moist; stiff; medium plasticity; medium toughness; little silt	
10	X	SS 10	16	18						BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; very stiff; low to medium plasticity; high toughness; some silt	
11										BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; medium plasticity; medium toughness; trace silt	
12											
13											
14											
15											
16											
17											
18											
19	X	SS 11	16	18						BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; soft; high plasticity; low toughness; trace silt	
20										BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; very loose; trace silt; fine	
21											
22											
23											
24	X	SS 12	7	18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; firm; trace silt; fine; rounded to subrounded	Water level at 24 feet BGS
25											Switch to mud rotary drilling at 25 feet BGS
26											
27											
28											
29	X	SS 13	12	18						BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; firm; trace silt; fine grained; rounded to subrounded quartz grains	
30											
31											
32											
33											
34	X	SS 14	16	18						BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; firm; trace silt; fine grained; rounded to subrounded	
35											
36											
37											
38											
39	X	SS 15	12	18						BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; dense; trace to little silt; fine grained; rounded to subrounded	
40											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-420</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 16	10 23 40	16 18						BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; very dense; trace to little silt; fine grained; rounded to subrounded	
45											
46											
47											
48											
49	X	SS 17	10 14 11	18 18						BEAUMONT; light olive brown (2.5Y 5/6); SAND (SM); wet; very firm; trace fines; fine grained BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CL); moist; very stiff; medium to high plasticity; medium toughness; some silt	
50									CL		
51											
52											
53											
54	X	SS 18	10 10 10	18 18						BEAUMONT; greenish gray (GLEY 1 10Y 5/1); CLAY (CH); moist; stiff; high plasticity; low toughness	
55									CH		
56											
57											
58											
59	X	SS 19	4 7 8	18 18						BEAUMONT; greenish gray (GLEY 1 5G 5/1) with dark yellowish brown (10YR 4/6) mottling; silt; CLAY (CH); moist; stiff; medium plasticity; little silt; some medium to coarse sand-sized calcareous nodules	
60											
61											
62											
63											
64	X	SS 20	7 9 10	18 18						BEAUMONT; brown (7.5YR 5/4) with greenish gray (GLEY 1 5G 5/1) mottling; silt; CLAY (CH); dry; very stiff; medium plasticity; medium toughness; calcareous concretions throughout	
65											
66											
67											
68											
69	X	SS 21	6 10 11	18 18						BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CH); dry; very stiff; medium plasticity; high toughness; calcareous concretions throughout	
70											
71											
72											
73											
74	X	SS 22	7 6 8	18 18						BEAUMONT; brown (7.5YR 5/4) with greenish gray (GLEY 1 5G 5/1) mottling; silt; CLAY (CH); moist; stiff; medium plasticity; calcareous concretions throughout	
75											
76											
77											
78											
79	X	SS 23	5 7 10	18 18						BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CH); moist; very stiff; medium plasticity	
80											

Project Name : Job Number



**SOIL LOG - Boring No. B-420**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									CH		
81											
82											
83											
84	X	SS 24	4 4	8 18							BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CH); moist; stiff; medium plasticity
85											
86											
87											
88											
89	X	SS 25	11 14 15	16 18							BEAUMONT; yellowish red (5YR 5/6) with greenish gray (GLE Y 1 5G 5/1) mottling; CLAY (CH); moist; very stiff; medium plasticity
90											
91											
92											
93											
94	X	SS 26	6 7 11	18 18					ML		BEAUMONT; reddish brown (5YR 5/4) with greenish gray (GLE Y 1 5G 5/1) mottling; clay; SILT (ML); moist; very stiff; non-plastic
95											
96											
97											
98											
99	X	SS 27	10 10 13	18 18							BEAUMONT; reddish brown (5YR 5/4) with greenish gray (GLE Y 1 5G 5/1) mottling; clay; SILT (ML); moist; very stiff; non-plastic to low plasticity
100											
101											
102											
103											
104											
105											
106											
107											
108											
109	X	SS 28	9 10 13	18 18					CL		BEAUMONT; greenish gray (GLE Y 1 5G 5/1); CLAY (CL); moist; very stiff; medium plasticity; calcareous concretions throughout
110											
111											
112											
113											
114											
115											
116											
117											
118											
119	X	SS 29	25 25 30	18 18					CH		BEAUMONT; greenish gray (GLE Y 1 10GY 6/1) to yellowish red (5YR 5/6); CLAY (CH); moist; hard;
120											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-420</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									CH	high plasticity; high toughness; calcareous concretions throughout	
121											
122											
123											
124	X	SS 30	10 12	18 18						BEAUMONT; yellowish red (5YR 4/4) with greenish gray (GLEY 1 5G 5/1) mottling; CLAY (CH); moist; very stiff; high plasticity	
125										Boring Terminated at 125-feet	
126											
127											
128											
129											
130											
131											
132											
133											
134											
135											
136											
137											
138											
139											
140											
141											
142											
143											
144											
145											
146											
147											
148											
149											
150											
151											
152											
153											
154											
155											
156											
157											
158											
159											
160											

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-421</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 4 inch			Boring Location Unit 4 - Turbine Building N 363483.06 E 2942328.3		Total Depth 100 feet
Drilling Contractor and Rig MACTEC / CHARLOTTE / D 50			Elevation at boring 30.27 feet	Ground Water Depth 20 feet	Depth to Bedrock
Sampling Method Split Spoon/JD			Sample Driving Hammer/Drop 139.08 lbs / 30 inches	No. of Samples 28	Date Started 11/27/06
			Borehole Inclination 0	Logged by R. Clark	Date Completed 11/29/06

Reviewed by / Date KM 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0									CH	BEAUMONT; very dark gray (10YR 3/1); gravel; silt CLAY (CH); moist; stiff; trace silt and gravel; high plasticity; low reaction with HCl; abundant roots and organic matter observed	
1	X	SS 1	14	18					CH	BEAUMONT; dark gray (10YR 4/1); gravel; CLAY (CH); moist; stiff; trace of gravel; high plasticity; low reaction with HCl; roots observed	
2	X	SS 2	10	18					CH	BEAUMONT; dark gray (10YR 4/1); gravel; CLAY (CH); moist; stiff; trace of gravel and calcareous nodules; high plasticity; low reaction with HCl; roots observed	
3	X	SS 3	16	18					CH	BEAUMONT; dark gray (10YR 4/1); gravel; CLAY (CH); moist; stiff; trace of gravel and calcareous nodules; high plasticity; low reaction with HCl; roots observed	
4	X	SS 4	10	18	18.9		54/35		CH	BEAUMONT; dark gray (10YR 4/1); gravel; CLAY (CH); moist; stiff; trace of gravel and calcareous nodules; high plasticity; low reaction with HCl; roots observed	
5	X	SS 5	16	18					CH	BEAUMONT; dark gray (10YR 4/1); gravel; CLAY (CH); moist; firm; trace of gravel and calcareous nodules; high plasticity; low reaction with HCl	
6	X	SS 6	17	18					CH	BEAUMONT; yellowish red (5YR 5/6); gravel; CLAY (CH); moist; stiff; trace of silt; trace of calcareous nodules observed; high plasticity; low reaction with HCl	
7	X	SS 7	17	18					CH	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; stiff; trace of silt; some calcareous nodules observed; high plasticity; mottling observed; low reaction with HCl	
8	X	SS 8	18	18					CH	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; stiff; trace of silt; trace of calcareous nodules observed; high plasticity; low reaction with HCl	
9	X	SS 9	18	18	20.4		63/42		CH	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; stiff; trace of silt; trace of calcareous nodules observed; high plasticity; low reaction with HCl	
10	X	SS 10	18	18					CH	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; stiff; trace of silt; trace of calcareous nodules observed; high plasticity; low reaction with HCl	
11	X	SS 11	18	18	22.5		65/43		CH	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; stiff; trace of silt; trace of calcareous nodules observed; high plasticity; low reaction with HCl	
12									CH	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; very stiff; some silt; trace of calcareous nodules observed; high plasticity; mottling observed; low reaction with HCl	Water level at 20-feet BGS. Water level rose to five-feet BGS. Switch to Mud Rotary drilling at 20 feet.
13									CH	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; stiff; trace of calcareous nodules observed; high plasticity; mottling observed; low reaction with HCl	
14	X	SS 12	18	18	25.5		38/24		CL	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; stiff; some silt; high plasticity; increasing silt content downwards; low reaction with HCl	
15									SC	BEAUMONT; yellowish brown (10YR 5/6); silt; clay; SAND (SC); wet; firm; fine grained sand with some clay; trace silt; non-plastic; low reaction with HCl	Encountered difficult drilling around 30-feet; Possibly cobble-sized rocks
16									SM	BEAUMONT; yellowish brown (10YR 5/4); clay; silt SAND (SM); wet; loose; fine grained sand with some silt; trace of clay; non-plastic; low reaction with HCl	
17									SM	BEAUMONT; silt; SAND (SP-SM) top	
18	X	SS 13	4	16	23.6	24.8			SM	BEAUMONT; yellowish brown (10YR 5/4); clay; silt; SAND (SM); wet; loose; fine grained sand with some silt; trace of clay; non-plastic; low reaction with HCl	
19									SP-SM	BEAUMONT; silt; SAND (SP-SM) top	
20									SP-SM	BEAUMONT; silt; SAND (SP-SM) top	
21									SP-SM	BEAUMONT; silt; SAND (SP-SM) top	
22									SP-SM	BEAUMONT; silt; SAND (SP-SM) top	
23									SP-SM	BEAUMONT; silt; SAND (SP-SM) top	
24									SP-SM	BEAUMONT; silt; SAND (SP-SM) top	
25									SP-SM	BEAUMONT; silt; SAND (SP-SM) top	
26									SP-SM	BEAUMONT; silt; SAND (SP-SM) top	
27									SP-SM	BEAUMONT; silt; SAND (SP-SM) top	
28									SP-SM	BEAUMONT; silt; SAND (SP-SM) top	
29									SP-SM	BEAUMONT; silt; SAND (SP-SM) top	
30									SP-SM	BEAUMONT; silt; SAND (SP-SM) top	
31									SP-SM	BEAUMONT; silt; SAND (SP-SM) top	
32									SP-SM	BEAUMONT; silt; SAND (SP-SM) top	
33									SP-SM	BEAUMONT; silt; SAND (SP-SM) top	
34									SP-SM	BEAUMONT; silt; SAND (SP-SM) top	
35									SP-SM	BEAUMONT; silt; SAND (SP-SM) top	
36									SP-SM	BEAUMONT; silt; SAND (SP-SM) top	
37									SP-SM	BEAUMONT; silt; SAND (SP-SM) top	
38									SP-SM	BEAUMONT; silt; SAND (SP-SM) top	
39	X	SS 14	7	15					SM	BEAUMONT; yellowish brown (10YR 5/4); clay; silt; SAND (SM); wet; firm; fine grained sand some silt;	
40									SM	BEAUMONT; yellowish brown (10YR 5/4); clay; silt; SAND (SM); wet; firm; fine grained sand some silt;	



Project Name : Job Number



**SOIL LOG - Boring No. B-421**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM	trace of clay; non-plastic; low reaction with HCl; sand is mostly quartz	
41											
42											
43											
44	X	SS 15	16	16	22.8	8.6			SP-SM	BEAUMONT; yellowish brown (10YR 5/4); clay; silt; SAND (SP-SM); wet; very firm; poorly graded sand; some silt; trace of clay; non-plastic; low reaction with HCl; sand is mostly quartz	
45											
46											
47											
48											
49	X	SS 16	18	18	35.3				CH	BEAUMONT; greenish gray (Gley1 6/1); silt; CLAY (CH); moist; stiff; some silt; trace of calcareous nodules observed; low reaction with HCl	
50											
51											
52											
53											
54		UD 2	23	24		90.0	63/42			BEAUMONT; CLAY (CH) top BEAUMONT; CLAY (CH) bottom	
55											
56											
57											
58											
59	X	SS 17	18	18	19.0				ML	BEAUMONT; greenish gray (Gley1 6/1); silt; CLAY (CH); moist; very stiff; high plasticity	
60										BEAUMONT; brown (7.5YR 5/4); sand; clay; SILT (ML); wet; very stiff; some clay; trace of fine sand and calcareous nodules; medium plasticity	
61											
62											
63											
64	X	SS 18	10	14	18					BEAUMONT; brown (7.5YR 5/4); sand; clay; SILT (ML); wet; very stiff; some clay trace of fine sand; trace of calcareous nodules observed; low plasticity; observed mica; low reaction with HCl	
65											
66											
67											
68											
69	X	SS 19	8	15	20.1					BEAUMONT; strong brown (7.5YR 5/6); sand; clay; SILT (ML); wet; hard; mostly silt; little clay; little fine sand; low plasticity; observed mica; low reaction with HCl	
70											
71											
72											
73											
74	X	SS 20	16	15	20.3	7.8			SP-SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SP-SM); wet; dense; poorly graded sand with some silt; non-plastic; mica observed; low reaction with HCl	
75											
76											
77											
78											
79	X	SS 21	12	17					CH	BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CH); moist; very stiff; trace of silt; high plasticity; high	
80											

Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-421</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/ft Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									CH	toughness; low reaction with HCl	
81											
82											
83											
84		UD 3		21.5 24	21.2	98.0	56/36			BEAUMONT; CLAY (CH) top	
85										BEAUMONT; CLAY (CH) bottom	
86											
87											
88											
89	X	SS 22	9 11 16	20 18	23.6					BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CH); moist; very stiff; trace of silt; high plasticity; high toughness; low reaction with HCl	
90											
91											
92											
93											
94	X	SS 23	7 11	16 18	21.5		65/45			BEAUMONT; yellowish brown (10YR 5/6); CLAY (CH); moist; very stiff; high plasticity; high toughness; mottled; trace of calcareous nodules observed; low reaction with HCl; one large piece of gravel found at 94.5-feet	
95											
96											
97											
98											
99	X	SS 24	16 44 50/4"	15 18	19.3	12.3			SM	BEAUMONT; pale brown (10YR 6/3); silt; SAND (SM); wet; very dense; fine grained sand with some silt; non-plastic; low reaction with HCl; at 99.5-feet to 99.6-feet dark banding (possible cross bedding of alternating quartz and mafic silt)	
100										Boring Terminated at 100-feet	
101											
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-422C</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 4 inch		Boring Location Unit #4 Turbine Building N 363483.67 E 2942510.68	Total Depth 100 feet
Drilling Contractor and Rig EEI / CME 750 ATV		Elevation at boring 31.24 feet	Ground Water Depth 13.3 feet
Sampling Method Split Spoon		Sample Driving Hammer/Drop 138 lbs / 30 inches	No. of Samples 44
		Date Started 12/4/06	Date Completed 12/5/06
		Borehole Inclination 0	Logged by J. Howard

Reviewed by / Date KW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/18 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0	X	SS 1	12	18					CH	BEAUMONT; black (5YR 2.5/1); sand; CLAY (CH); moist; firm; trace organics	
1	X	SS 2	10	18					CH	BEAUMONT; black (5YR 2.5/1); sand; CLAY (CH); moist; stiff; trace organics	
2	X	SS 3	13	18					CH	BEAUMONT; black (5YR 2.5/1); sand; CLAY (CH); moist; soft	
3	X	SS 4	14	18					CH	BEAUMONT; dark gray (5YR 4/1); sand; CLAY (CH); moist; stiff; trace organics	
4	X	SS 5	18	18					CH	BEAUMONT; yellowish red (5YR 4/6); sand; CLAY (CH); moist; firm; medium plasticity	
5	X	SS 6	18	18					CH	BEAUMONT; yellowish red (5YR 4/6); sand; CLAY (CH); moist; stiff; medium plasticity	
6	X	SS 7	18	18					CH	BEAUMONT; yellowish red (5YR 4/6); sand; CLAY (CH); moist; stiff; medium plasticity	
7	X	SS 8	10	18					CH	BEAUMONT; yellowish red (5YR 4/6); sand; CLAY (CH); moist; very stiff; medium plasticity	
8	X	SS 9	18	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; medium plasticity	
9	X	SS 10	18	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; medium plasticity	Water level at 13.3 feet BGS
10											
11	X	SS 11	18	18					CH	BEAUMONT; yellowish red (5YR 4/6); sand; CLAY (CH); moist; stiff; high plasticity	Switched to rotary wash drilling at 15 feet bgs
12											
13	X	SS 12	18	18					CH	BEAUMONT; yellowish red (5YR 4/6); sand; CLAY (CH); moist; stiff; high plasticity	
14											
15	X	SS 13	18	18					SC	BEAUMONT; yellowish red (5YR 4/6); clay; SAND (SC); wet; firm; fine sand	
16											
17	X	SS 14	18	18	27.0	41.3			SC	BEAUMONT; yellowish red (5YR 4/6); clay; SAND (SC); wet; loose; fine sand	
18											
19	X	SS 15	14	18					SP	BEAUMONT; yellowish red (5YR 4/6); SAND (SP); wet; firm; fine to medium sand	
20											
21	X	SS 16	11	18					SM	BEAUMONT; light yellowish brown (10YR 6/4); silt; SAND (SM); wet; loose; medium to fine sand	
22											
23	X	SS 17	18	18					SP	BEAUMONT; yellowish brown (10YR 5/8); SAND (SP); wet; loose; fine/medium grained	
24											
25	X	SS 18	11	18					SP	BEAUMONT; yellowish brown (10YR 5/8); SAND (SP); wet; loose; fine/medium grained	
26											
27	X	SS 19	9	18					SP	BEAUMONT; yellowish brown (10YR 5/8); SAND (SP); wet; firm; fine/medium grained	
28											
29	X	SS 20	13	18					SP	BEAUMONT; yellowish brown (10YR 5/8); SAND (SP); wet; firm; fine/medium grained	
30											

Project Name : Job Number



**SOIL LOG - Boring No. B-422C**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SP		
41	X	SS 21	8 11 15	10 18						BEAUMONT; yellowish brown (10YR 5/8); SAND (SP); wet; very firm; fine/medium grained	
42											
43											
44	X	SS 22	10 12	18 18						BEAUMONT; yellowish brown (10YR 5/8); SAND (SP); wet; very firm; fine/medium grained	
45											
46											
47	X	SS 23	7 5 6	0 18						BEAUMONT; yellowish brown (10YR 5/8); SAND (SP); wet; firm; fine/medium grained	No recovery SS-23
48											
49	X	SS 24	3 3 4	18 18					CH	BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; firm; high plasticity	
50											
51											
52	X	SS 25	2 2 2	18 18						BEAUMONT; light bluish gray (GLE Y 2 7/1); sand; CLAY (CH); moist; stiff; high plasticity	
53											
54	X	SS 26	4 4 7	0 18						BEAUMONT; light bluish gray (GLE Y 2 7/1); sand; CLAY (CH); moist; stiff; high plasticity	No recovery SS-26
55											
56											
57	X	SS 27	5 7 8	18 18						BEAUMONT; light bluish gray (GLE Y 2 7/1) with brown staining; sand; CLAY (CH); moist; stiff; high plasticity;	
58											
59	X	SS 28	7 5 7	18 18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; stiff; high plasticity	
60											
61											
62	X	SS 29	3 3 3	18 18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; stiff; high plasticity	
63											
64	X	SS 30	12 5 8	18 18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; stiff; high plasticity	
65											
66											
67	X	SS 31	4 9 12	18 18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff; high plasticity	
68											
69	X	SS 32	13 14 18	13 18					SM	BEAUMONT; yellowish brown (10YR 5/6); SAND (SM); wet; dense; fine/medium grained	
70											
71											
72	X	SS 33	9 11 11	10 18						BEAUMONT; yellowish brown (10YR 5/6); SAND (SM); wet; very firm; fine/medium grained	
73											
74	X	SS 34	16 15 19	13 18						BEAUMONT; yellowish brown (10YR 5/6); SAND (SM); wet; dense; fine/medium grained	
75											
76											
77	X	SS 35	8 18 27	14 18						BEAUMONT; yellowish brown (10YR 5/6); SAND (SM); wet; dense; fine/medium grained	
78											
79	X	SS 36	13 13 19	18 18						BEAUMONT; yellowish brown (10YR 5/6); SAND (SM); wet; very firm; fine/medium grained	
80											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-422C</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks		
80												
81	X	SS 37	7 8	18 18				Lithology	CH	BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff; high plasticity <i>(Continued from previous page)</i>		
82												BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff; high plasticity
83												BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff; high plasticity
84	X	SS 38	6 11	18 18								BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff; high plasticity
85												
86												
87	X	SS 39	6 12	18 18								BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff; high plasticity
88												
89	X	SS 40	6 10	18 18								BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff; high plasticity
90												
91												
92	X	SS 41	8 13	18 18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff; high plasticity		
93												
94	X	SS 42	7 10	18 18						BEAUMONT; brown (10YR 5/3) with gray mottling; sand; CLAY (CH); moist; very stiff; high plasticity		
95												
96												
97	X	SS 43	3 17	18 18				Lithology	SM	BEAUMONT; light brownish gray (10YR 6/2); silt; SAND (SM); moist; dense; fine/medium grained		
98												
99	X	SS 44	6 12	18 18								BEAUMONT; light brownish gray (10YR 6/2); silt; SAND (SM); wet; firm; fine/medium grained
100										Boring Terminated at 100-feet		
101												
102												
103												
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Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-423</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Rotary Wash / 4 inch		Boring Location Unit #4 Turbine Building N 363485.34 E 2942615.65		Total Depth 100 feet	
Drilling Contractor and Rig Lewis Drilling / Mobile B 57		Elevation at boring 31.57 feet		Ground Water Depth 13.5 feet	
Sampling Method Split Spoon		Sample Driving Hammer/Drop 139.58 lbs / 30 inches		No. of Samples 27	
		Borehole Inclination 0		Logged by G. Geras	
				Date Started 12/2/06	
				Date Completed 12/3/06	

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	13	8					CH	BEAUMONT; black (GLEY 1 2.5/N); gravel; silt; CLAY (CH); dry; firm; trace gravel; little silt; mostly clay; trace organics/grass	
2	X	SS 2	13	8					CH	BEAUMONT; black (GLEY 1 2.5/N); gravel; silt; CLAY (CH); dry; firm; trace gravel; little silt; mostly clay; trace organics	
3	X	SS 3	13	7					CH	BEAUMONT; black (GLEY 1 2.5/N); gravel; silt; CLAY (CH); dry; firm; trace gravel; little silt; mostly clay; trace organics	
4	X	SS 4	13	8					CH	BEAUMONT; black (GLEY 1 2.5/N); gravel; silt; CLAY (CH); dry; firm; trace gravel; little silt; mostly clay; trace organics	
5	X	SS 5	13	8					CH	BEAUMONT; dark gray (GLEY 1 4/N); gravel; silt; CLAY (CH); dry; firm; trace gravel; little silt; mostly clay; trace organics	
6	X	SS 6	13	8					CH	BEAUMONT; dark gray (GLEY 1 4/N); gravel; silt; CLAY (CH); dry; firm; trace gravel; little silt; mostly clay; trace organics	
7	X	SS 7	15.5	18					CH	BEAUMONT; brown (10YR 4/3) to yellowish red (5YR 4/6); gravel; silt; CLAY (CH); dry; firm; little silt; mostly clay; trace gravel; strong reaction with HCl; trace calcareous nodules	
8	X	SS 8	18	18					CH	BEAUMONT; yellowish red (5YR 4/6) and slight light greenish gray (GLEY 1 7/1) mottling; silt; CLAY (CH); dry; firm; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
9	X	SS 9	18	18					CH	BEAUMONT; yellowish red (5YR 4/6) and slight light greenish gray (GLEY 1 7/1) mottling; silt; CLAY (CH); dry; firm; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
10	X	SS 10	18	18					CH	BEAUMONT; yellowish red (5YR 4/6) and slight light greenish gray (GLEY 1 7/1) mottling; silt; CLAY (CH); dry; firm; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
11											
12											
13											
14									ML		Water level at 13.5 feet BGS
15									CH		
16											
17											
18											
19	X	SS 11	18	18							
20											
21											
22											
23											
24	X	SS 12	11	18					SM	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; firm; some silt; mostly clay	
25											
26											
27											
28											
29	X	SS 13	15	10.5							
30											
31											
32											
33											
34	X	SS 14	7	13							
35											
36											
37											
38											
39	X	SS 15	3	13							
40											

Project Name : Job Number



**SOIL LOG - Boring No. B-423**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 16	40 47 50/4"	12 18							BEAUMONT; yellowish brown (10YR 5/4); gravel; silt; SAND (SM); wet; very dense; little gravel; mostly fine sand; little silt; strong reaction with HCl; calcareous nodules
45											
46											
47											
48											
49	X	SS 17	15 16 12	11 18							BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; little silt; mostly fine sand
50											
51											
52											
53											
54	X	SS 18	4 6 8	18 18					CH		BEAUMONT; greenish gray (GLEYS 1 5GY 6/1); silt; sand; CLAY (CH); dry; stiff; few silt; little fine sand; mostly clay; strong reaction with HCl; trace calcareous nodules; trace ferrous nodules
55											
56											
57											
58											
59	X	SS 19	5 10	18 18							BEAUMONT; brown (7.5YR 4/4) with greenish gray (GLEYS 1 5GY 6/1) mottling; silt; sand; CLAY (CH); dry; very stiff; few sand; little silt; mostly clay; strong reaction with HCl; few calcareous nodules
60											
61											
62											
63											
64	X	SS 20	7 8 9	18 18					SC		BEAUMONT; brown (7.5YR 4/4); clay; silt; SAND (SC); wet; firm; some clay; few silt; mostly fine sand
65									CH		BEAUMONT; brown (7.5YR 4/4) with slight gray (GLEYS 1 6/N) mottling; silt; sand; CLAY (CH); moist; very stiff; some fine sand; few silt; mostly clay
66											
67											
68											
69	X	SS 21	15 21 25	17 18					SC SM		BEAUMONT; yellowish brown (10YR 5/6) with yellowish red (5YR 4/6) mottling; clay; silt; SAND (SC); moist; dense; some clay; few silt; mostly fine sand
70											
71											
72											
73											
74	X	SS 22	15 16 21	12 18							BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; dense; some silt; mostly fine sand
75											BEAUMONT; dark yellowish brown (10YR 4/6); silt; SAND (SM); wet; dense; little silt; mostly fine sand
76											
77											
78											
79	X	SS 23	31 33 34	18 18							BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); moist; very dense; few silt; mostly fine sand
80											

Project Name : Job Number STP COL : 5050-06-0495	<b>SOIL LOG - Boring No. B-423</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SM		
81											
82											
83											
84	X	SS 24	26 21	17 18							
85										BEAUMONT; dark yellowish brown (10YR 4/4); silt; SAND (SM); wet; dense; few silt; mostly fine sand	
86											
87											
88											
89	X	SS 25	19 15 19	18 18					CH		
90									SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; little silt; mostly fine sand	
91										BEAUMONT; yellowish red (5YR 4/6) and yellowish brown (10YR 5/4) mottling; silt; sand; CLAY (CH); dry; hard; few silt; little sand; mostly clay	
92										BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; some silt; mostly fine sand	
93											
94	X	SS 26	7 11 19	18 18					CH		
95									SM	BEAUMONT; brown (10YR 4/3); silt; CLAY (CH); dry; very stiff; little silt; mostly clay	
96										BEAUMONT; brown (10YR 4/3); clay; silt; SAND (SM); moist; very firm; few clay; some silt; mostly fine sand	
97											
98											
99	X	SS 27	7 8	18 18					ML		
100									SM	BEAUMONT; grayish brown (10YR 5/2); clay; SILT (ML); moist; stiff; some clay; mostly silt	
101										BEAUMONT; dark grayish brown (10YR 4/2); silt; SAND (SM); wet; firm; little silt; mostly fine sand	
102										Boring terminated at 100-feet	
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											



Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-424</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 4 inch	Boring Location Unit 4/ Turbine Building N 363571.98 E 2942329.57	Total Depth 100 feet	
Drilling Contractor and Rig MACTEC / Charlotte / D 50 (ATV)	Elevation at boring 30.29 feet	Ground Water Depth 11 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 139.08 lbs / 30 inches	No. of Samples 27	Date Started 11/29/06
	Borehole Inclination 0	Logged by R. Clark	Date Completed 12/1/06

Reviewed by / Date KM 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/ft	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	15	18					CH	BEAUMONT; dark gray (10YR 4/1); gravel; silt; CLAY (CH); moist; firm; high plasticity; weak reaction with HCl; trace calcareous nodules; gravel and roots	
2	X	SS 2	14	18					CH	BEAUMONT; dark gray (10YR 4/1); silt; CLAY (CH); moist; stiff; high plasticity; weak reaction with HCl; trace calcareous nodules; roots; some silt.	
3	X	SS 3	15	18					CH	BEAUMONT; dark gray (7.5YR 4/1); silt; CLAY (CH); moist; stiff; high plasticity; weak reaction with HCl; trace calcareous nodules; roots	
4	X	SS 4	13	18					CH	BEAUMONT; light yellowish brown (2.5Y 6/3); silt; CLAY (CH); moist; firm; high plasticity; weak reaction with HCl	
5	X	SS 5	18	18					CH	BEAUMONT; light yellowish brown (2.5Y 6/3) with dark gray (7.5YR 4/1) mottling; silt; CLAY (CH); moist; very stiff; high plasticity; weak reaction with HCl; some organic matter; iron staining	
6	X	SS 6	18	18					SM	BEAUMONT; light yellowish brown (2.5Y 6/3); silt; CLAY (CH); moist; stiff; high plasticity; weak reaction with HCl; trace weathered organic matter; iron staining	
7	X	SS 7	10	18					SM	BEAUMONT; light yellowish brown (2.5Y 6/3) with dark gray (10YR 4/1) mottling; silt; CLAY (CH); moist; very stiff; high plasticity; weak reaction with HCl; trace organic matter; iron staining	
8	X	SS 8	18	18					SM	BEAUMONT; pale brown (10YR 6/3); silt; SAND (SM); wet; loose; non-plastic; mostly fine sand; some silt; trace clay; weak reaction with HCl	
9	X	SS 9	18	18					SM	BEAUMONT; pale brown (10YR 6/3); silt; SAND (SM); wet; loose; non-plastic; mostly fine sand; some silt; weak reaction with HCl	
10	X	SS 10	10	18					SM	BEAUMONT; pale brown (10YR 6/3); silt; SAND (SM); wet; firm; non-plastic; mostly fine sand; some silt; weak reaction with HCl	
11	X	SS 8	6	18					SM	BEAUMONT; pale brown (10YR 6/3); silt; SAND (SM); wet; loose; non-plastic; mostly fine quartz sand; some silt; weak reaction with HCl	Water level at 11 feet BGS
12	X	SS 9	18	18					SM	BEAUMONT; reddish yellow (7.5YR 6/6); clay; SILT (ML); wet; firm; low plasticity; some clay; trace fine sand; weak reaction with HCl; fining downwards	
13	X	SS 9	18	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; very loose; non-plastic; mostly fine quartz sand; some silt; weak reaction with HCl; mica flakes observed	
14	X	SS 10	10	18					SM	BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM); wet; very firm; non-plastic; mostly fine quartz sand; some silt; weak reaction with HCl	
15	X	SS 12	1	18					SM	BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM); wet; firm; non-plastic; mostly fine quartz sand; some silt; weak reaction with HCl	
16											
17											
18											
19	X	SS 11	4	24	18				ML	BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM); wet; very firm; non-plastic; mostly fine quartz sand; some silt; weak reaction with HCl	Switch to mud rotary drilling at 20 feet BGS
20											
21											
22											
23											
24	X	SS 12	1	18					SM	BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM); wet; very firm; non-plastic; mostly fine quartz sand; some silt; weak reaction with HCl	
25											
26											
27											
28											
29	X	SS 13	12	14	18				SM	BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM); wet; very firm; non-plastic; mostly fine quartz sand; some silt; weak reaction with HCl	
30											
31											
32											
33											
34	X	SS 14	6	7	13	18			SM	BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM); wet; firm; non-plastic; mostly fine quartz sand; some silt; weak reaction with HCl	
35											
36											
37											
38											
39	X	SS 15	7	11	17	18			SM	BEAUMONT; light yellowish brown (10YR 6/4); silt; SAND (SM); wet; very firm; non-plastic; mostly fine	
40											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-424</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
40									SM	quartz sand; some silt; weak reaction with HCl
41										
42										
43										
44	X	SS 16	4 4	20 18					CH	BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl
45										
46										
47										
48										
49	X	SS 17	3 4	17 18						BEAUMONT; grayish brown (10YR 5/2) with greenish gray (GLEY 1 6/1) mottling; silt; CLAY (CH); moist; firm; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules; color change at 49.5 feet
50										
51										
52										
53										
54	X	SS 18	5 4	18 18						BEAUMONT; greenish gray (GLEY 1 6/1); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules
55										
56										
57										
58										
59	X	SS 19	7 7	18 18						BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules
60										
61										
62										
63										
64	X	SS 20	7 6	18 18						BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules
65										
66										
67										
68										
69	X	SS 21	5 11	14 18					SP-SM	BEAUMONT; light yellowish brown (10YR 6/4); clay; silt; SAND (SP-SM); wet; dense; non-plastic; mostly fine sand; some silt; trace clay; weak reaction with HCl
70										
71										
72										
73										
74	X	SS 22	7 17	13 18						BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SP-SM); wet; dense; non-plastic; mostly fine sand; some silt; weak reaction with HCl
75										
76										
77										
78										
79	X	SS 23	8 10	20 18					CH	BEAUMONT; yellowish brown (10YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high
80										

Project Name : Job Number



**SOIL LOG - Boring No. B-424**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									CH	toughness	
81											
82											
83											
84	X	SS 24	6 12	20 18						BEAUMONT; yellowish brown (10YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; some silt	
85											
86											
87											
88											
89	X	SS 25	10 10 17	20 18						BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; some silt	
90											
91											
92											
93											
94	X	SS 26	10 10 18	18 18						BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; some silt; weak reaction with HCl	
95											
96											
97											
98											
99	X	SS 27	10 10 24	15 18					SC	BEAUMONT; grayish brown (10YR 5/2); clay; SAND (SC); wet; dense; low plasticity; mostly fine sand; some clay; trace silt; weak reaction with HCl	
100										Boring Terminated at 100-feet	
101											
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											

Project Name : Job Number		<b>SOIL LOG - Boring No. B-425</b>	
STP COL : 5050-06-0496		<b>MACTEC</b>	
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 4 inch	Boring Location Unit 4 - Turbine Building N 363571.49 E 2942397.45	Total Depth 100 feet	
Drilling Contractor and Rig MACTEC / CHARLOTTE / D 50 (ATV)	Elevation at boring 30.49 feet	Ground Water Depth 21 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 139.08 lbs / 30 inches	No. of Samples 27	Date Started 12/1/06
	Borehole Inclination 0	Logged by R. Clark	Date Completed 12/5/06

Reviewed by / Date KM 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	10	5					CH	BEAUMONT; very dark gray (10YR 3/1); silt; CLAY (CH); dry; stiff; high plasticity; some silt; roots observed; calcareous nodules observed; low reaction with HCl	
2	X	SS 2	10	14							
3	X	SS 3	10	11							
4	X	SS 4	10	10							
5	X	SS 5	10	16							
6	X	SS 6	10	18							
7	X	SS 7	10	18							
8	X	SS 8	10	18							
9	X	SS 9	10	18							
10	X	SS 10	10	18							
11	X	SS 11	10	18							
12	X	SS 12	10	18							
13	X	SS 13	10	18							
14	X	SS 14	10	18							
15	X	SS 15	10	18							
16											
17											
18											
19	X	SS 19	4	18							
20											
21											Water level at 21 feet BGS
22											
23											Switch to Mud Rotary drilling at feet BGS
24	X	SS 24	4	15					ML	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; stiff; high plasticity; some silt; trace calcareous nodules; low reaction with HCl	
25											
26											
27											
28											
29	X	SS 29	12	16					SM	BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM); wet; very firm; non-plastic; fine sand; some silt; low reaction with HCl; mostly quartz sand	
30			15	18							
31											
32											
33											
34	X	SS 34	4	17						BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM); wet; firm; non-plastic; fine grained sand; some silt; low reaction with HCl; mostly quartz sand	
35			6	18							
36			10								
37											
38											
39	X	SS 39	10	16						BEAUMONT; brownish yellow (10 YR 6/6); silt; SAND (SM); wet; dense; non-plastic; fine grained	
40			14	18							

Project Name : Job Number



**SOIL LOG - Boring No. B-425**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM	sand; some silt; low reaction with HCl; mostly quartz sand	
41											
42											
43											
44	X	SS 16	11 8	18 18					CH	BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH); moist; very stiff; high plasticity; some silt; low reaction with HCl	
45											
46											
47											
48											
49	X	SS 17	7 7	20 18					CH	BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH); moist; stiff; high plasticity; some silt; low reaction with HCl	
50											
51											
52											
53											
54	X	SS 18	7 8	22 18					CH	BEAUMONT; pale brown (10YR 6/3); silt; CLAY (CH); moist; very stiff; high plasticity; some silt; trace calcareous nodules; low reaction with HCl	
55											
56											
57											
58											
59	X	SS 19	11 7	16 18					CH	BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH); moist; stiff; high plasticity; some silt; trace calcareous nodules; low reaction with HCl	
60											
61											
62											
63											
64	X	SS 20	7 8	17 18					ML	BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); wet; stiff; non-plastic; some clay; low reaction with HCl	
65											
66											
67											
68											
69	X	SS 21	10 14	17 18					ML	BEAUMONT; strong brown (7.5YR 5/6); clay; sand; SILT (ML); wet; hard; low plasticity; some clay; trace of fine sand; low reaction with HCl	
70											
71											
72											
73											
74	X	SS 22	14 20	16 18					SM	BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM); wet; very dense; non-plastic; fine grained sand; some silt; low reaction with HCl; mostly quartz sand	
75											
76											
77											
78											
79	X	SS 23	8 8	15 18					CH	BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist; very stiff; high plasticity; some silt;	
80											

Project Name : Job Number



**SOIL LOG - Boring No. B-425**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									CH	high toughness; low reaction with HCl	
81											
82											
83											
84	X	SS 24	10 10 14	20 18						BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); moist; very stiff; high plasticity; some silt; trace calcareous nodules; high toughness; low reaction with HCl	
85											
86											
87											
88											
89	X	SS 25	7 11 13	18 18						BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); moist; very stiff; high plasticity; some silt; some mottling; high toughness; low reaction with HCl	
90											
91											
92											
93											
94	X	SS 26	10 15 21	18 18					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; non-plastic; some silt; low reaction with HCl	
95									ML	BEAUMONT; light yellowish brown (10YR 6/4); clay; SILT (ML); wet; hard; low plasticity; trace of clay; low reaction with HCl	
96											
97											
98											
99	X	SS 27	19 34 36	15 18					SM	BEAUMONT; pale brown (10YR 6/3); silt; SAND (SM); wet; very dense; non-plastic; some silt; low reaction with HCl	
100										Boring Terminated at 100-feet	
101											
102											
103											
104											
105											
106											
107											
108											
109											
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Project Name : Job Number		<b>SOIL LOG - Boring No. B-426</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 4 inch		Boring Location Unit # 4 Turbine Building N 363571.71 E 2942615.14	Total Depth 100 feet
Drilling Contractor and Rig MACTEC / CHARLOTTE / D 50		Elevation at boring 31.38 feet	Ground Water Depth 20.5 feet
Sampling Method Split Spoon		Sample Driving Hammer/Drop 139.08 lbs / 30 inches	No. of Samples 27
		Borehole Inclination 0	Date Started 12/6/06
		Logged by R. Clark	Date Completed 12/12/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/ft	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0									CH	BEAUMONT; very dark gray (10YR 3/1); silt; CLAY (CH); moist; firm; high plasticity; mostly clay; some silt; weak reaction with HCl; roots and organic matter	
1	X	SS 1	33	14					CH	BEAUMONT; very dark gray (10YR 3/1); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; roots and organic matter; trace calcareous nodules	
2	X	SS 2	33	11					CH	BEAUMONT; dark gray (10YR 4/1); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; roots and organic matter; trace calcareous nodules	
3	X	SS 3	33	23					CH	BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
4	X	SS 4	33	13.5					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
5	X	SS 5	33	20					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
6	X	SS 6	33	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
7	X	SS 7	33	22					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
8	X	SS 8	33	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
9	X	SS 9	33	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
10	X	SS 10	33	22					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
11	X	SS 11	33	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
12	X	SS 12	33	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
13	X	SS 13	33	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
14	X	SS 14	33	22					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
15	X	SS 15	33	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
16	X	SS 16	33	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
17	X	SS 17	33	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
18	X	SS 18	33	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
19	X	SS 19	33	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
20	X	SS 20	33	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
21	X	SS 21	33	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
22	X	SS 22	33	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
23	X	SS 23	33	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
24	X	SS 24	33	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
25	X	SS 25	33	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
26	X	SS 26	33	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
27	X	SS 27	33	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
28	X	SS 28	33	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
29	X	SS 29	33	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
30	X	SS 30	33	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
31	X	SS 31	33	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
32	X	SS 32	33	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
33	X	SS 33	33	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
34	X	SS 34	33	17					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
35	X	SS 35	33	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
36	X	SS 36	33	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
37	X	SS 37	33	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
38	X	SS 38	33	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
39	X	SS 39	33	15					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
40	X	SS 40	33	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	

Water level at 13.5 feet BGS  
 Switched to mud rotary drilling at 23.5 bgs

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-426</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/ft Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; firm; non-plastic; mostly fine sand; some silt; weak reaction with HCl <i>(Continued from previous page)</i>	
41											
42											
43											
44	X	SS 16	14	16					CH	BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); dry; stiff; high plasticity; high toughness; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules; dessication cracks infilled with fine sand observed; weak reaction with HCl	
45											
46											
47											
48											
49	X	SS 17	10	16						BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; shell fragments	
50											
51											
52											
53											
54	X	SS 18	5	18						BEAUMONT; greenish gray (GLEYS 1 5/1); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules; trace iron staining	
55											
56											
57											
58											
59	X	SS 19	11	18					ML	BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; mostly clay; some silt; weak reaction with HCl	
60			9	18						BEAUMONT; strong brown (7.5YR 5/6); sand; clay; SILT (ML); wet; very stiff; low plasticity; mostly silt; some clay; trace fine sand; weak reaction with HCl	
61											
62											
63											
64	X	SS 20	6	18						BEAUMONT; strong brown (7.5YR 5/6); sand; clay; SILT (ML); wet; very stiff; low plasticity; mostly silt; some clay; trace fine sand; weak reaction with HCl	
65			7	18							
66											
67											
68											
69	X	SS 21	16	15					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; very dense; non-plastic; mostly fine quartz sand; some silt; weak reaction with HCl	
70			23	18							
71			38								
72											
73											
74	X	SS 22	11	15						BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; dense; non-plastic; mostly fine quartz sand; some silt; weak reaction with HCl	
75			19	18							
76			20								
77											
78											
79	X	SS 23	8	16						BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; very firm; non-plastic; mostly fine quartz sand; some silt; weak reaction with HCl	
80			11	18							
			14								



Project Name : Job Number 	<b>SOIL LOG - Boring No. B-426</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SM		
81											
82											
83											
84	X	SS 24	4 8 10	18 18					CH	BEAUMONT; yellowish brown (10YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; mostly clay; some silt	
85								ML	BEAUMONT; yellowish brown (10YR 5/4); clay; SILT (ML); wet; very stiff; low plasticity; mostly silt; some clay; weak reaction with HCl		
86											
87											
88											
89	X	SS 25	6 11 14	18 18					SM	BEAUMONT; light yellowish brown (10YR 6/4); silt; SAND (SM); wet; very firm; mostly fine sand; some silt; weak reaction with HCl	
90								ML	BEAUMONT; strong brown (7.5YR 4/6); clay; SILT (ML); moist; very stiff; some clay; mostly silt		
91								SM	BEAUMONT; light yellowish brown (10YR 6/4); silt; SAND (SM); wet; very firm; non-plastic; mostly fine sand; some silt; weak reaction with HCl		
92											
93											
94	X	SS 26	8 11 8	19 18					CH	BEAUMONT; brown (10YR 5/3); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; some silt	
95											
96											
97											
98											
99	X	SS 27	1 3 5 6 8 10 NA	10 18					SM	BEAUMONT; light yellowish brown (10YR 6/4); silt; SAND (SM); wet; very dense; non-plastic; fine grained sand; some silt; weak reaction with HCl	Auto hammer not working correctly on last 6". Density was based on first 12"
100											
101										Boring Terminated at 100-feet	
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-427</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Rotary Wash / 4 inch		Boring Location Unit 4 - Turbine Building N 363660.84 E 2942331.92		Total Depth 150 feet	
Drilling Contractor and Rig Gregg #1 / FRASTE MDXL		Elevation at boring 30.56 feet		Ground Water Depth 23.5 feet	
Sampling Method Split Spoon		Sample Driving Hammer/Drop 140 lbs / 30 inches		No. of Samples 32	
		Borehole Inclination 0		Logged by W. Miller	
				Date Started 11/29/06	
				Date Completed 12/1/06	

Reviewed by / Date KLM 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/18 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	18	18					CH	BEAUMONT; dark olive gray (5Y 3/2); silt; CLAY (CH); moist; firm; high plasticity; medium toughness; some roots	
2	X	SS 2	6	18					CH	BEAUMONT; black (5Y 2.5/2); silt; CLAY (CH); moist; firm; high plasticity; medium toughness	
3	X	SS 3	18	18	23.5		58/39		CH	BEAUMONT; black (5Y 2.5/2); silt; CLAY (CH); moist; firm; high plasticity; high toughness	
4	X	SS 4	16	18					CH	BEAUMONT; dark olive gray (5Y 3/2); trace gray mottling; silt; CLAY (CH); moist; stiff; high plasticity; medium toughness; trace ferrous staining	
5	X	SS 5	13	18					CH	BEAUMONT; strong brown (7.5YR 4/6) with light greenish gray (GLE 1 8/1) and trace black (GLE 1 2.5/N) staining; silt; CLAY (CH); moist; stiff; high plasticity; medium toughness; trace ferrous staining	
6	X	SS 6	13	18					CH	BEAUMONT; yellow red (5YR 4/6) some light greenish gray (GLE 1 8/1) mottling; trace black (GLE 1 2.5/N) mottling; silt; CLAY (CH); moist; stiff; high plasticity; medium toughness; trace ferrous staining	
7	X	SS 7	20	18	24.0		66/47		CH	BEAUMONT; yellow red (5YR 4/6) trace light greenish gray (GLE 1 8/1) mottling; silt; CLAY (CH); moist; stiff; high plasticity; high toughness; strong reaction with HCl; trace <1/4" dia calcareous nodules	
8	X	SS 8	19	18					CH	BEAUMONT; yellow red (5YR 4/6) trace light greenish gray (GLE 1 8/1) mottling; silt; CLAY (CH); moist; stiff; high plasticity; high toughness; strong reaction with HCl; trace <1/8" dia calcareous nodules	
9	X	SS 9	24	18					CH	BEAUMONT; yellow red (5YR 4/6) trace light greenish gray (GLE 1 8/1) mottling; silt; CLAY (CH); moist; stiff; high plasticity; high toughness; strong reaction with HCl; trace <1/8" dia calcareous nodules	
10	X	SS 10	15	18					CH	BEAUMONT; yellow red (5YR 4/6) trace light greenish gray (GLE 1 8/1) mottling; silt; CLAY (CH); moist; stiff; high plasticity; high toughness; strong reaction with HCl; trace <1/8" dia calcareous nodules	
11	X	SS 11	23	18					CH	BEAUMONT; yellow red (5YR 4/6) trace light greenish gray (GLE 1 8/1) mottling; silt; CLAY (CH); moist; stiff; high plasticity; high toughness; strong reaction with HCl; trace <1/8" dia calcareous nodules	
12	X	SS 12	5	12	23.6	40.6			SM	BEAUMONT; brown (7.5 YR 5/4); silt; SAND (SM); wet; firm; non-plastic; mostly fine sand; some silt	Water at 23.5 feet BGS
13	X	SS 13	6	15					SM	BEAUMONT; brown (7.5 YR 5/4); silt; SAND (SM); wet; firm; non-plastic; mostly fine sand; some silt	
14	X	SS 14	3	15	24.6	7.8			SP-SM	BEAUMONT; brown (7.5 YR 5/4); silt; SAND (SP-SM); wet; very firm; non-plastic; mostly fine sand; few silt	
15	X	SS 15	10	14					SM	BEAUMONT; yellowish brown (10 YR 5/4); silt; SAND (SM); wet; dense; non-plastic; mostly fine	

Project Name : Job Number <div style="text-align: center; font-weight: bold; font-size: 1.2em;">                      MACTEC                 </div> STP COL : 5050-06-0496	SOIL LOG - Boring No. B-427
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM	sand; some silt	
41											
42											
43											
44	X	SS 16	5 10 6	20 18					CH	BEAUMONT; yellowish red (5YR 4/6) with gray and yellow-orange mottling ; silt; CLAY (CH); moist; very stiff; high plasticity; medium toughness	
45											
46											
47											
48											
49	X	SS 17	4 4 5	16 18	43.0		74/52			BEAUMONT; greenish gray (GLEYS 1.5/1); silt; CLAY (CH); moist; stiff; high plasticity; medium toughness	
50											
51											
52											
53											
54	X	SS 18	4 4 5	21 18						BEAUMONT; greenish gray (GLEYS 1.6/1); silt; sand; CLAY (CH); moist; stiff; high plasticity; medium toughness; some <1/8" dia calcareous nodules; strong to weak reaction with HCl; trace fine sand	
55											
56											
57											
58											
59	X	SS 19	9 9 9	23 18	18.9		39/23		CL	BEAUMONT; yellow red (5YR 4/6) with greenish gray (GLEYS 1.6/1) mottling; silt; CLAY (CL); moist; very stiff; high plasticity; medium toughness; strong reaction with HCl; few 1/4" dia +/- calcareous nodules	
60											
61											
62											
63											
64	X	SS 20	4 7 13	18 18					CH	BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CH); moist; very stiff; high plasticity; medium toughness	
65											
66											
67											
68											
69	X	SS 21	16 30 40	18 18	20.3	9.1			SP-SM	BEAUMONT; yellow brown (10YR 5/4); silt; SAND (SP-SM); wet; very dense; non-plastic; mostly fine sand; few silt	
70											
71											
72											
73											
74	X	SS 22	11 14 16	15 18						BEAUMONT; yellow brown (10YR 5/6); silt; SAND (SP-SM); wet; very firm; mostly fine sand; some silt	
75											
76											
77											
78											
79	X	SS 23	6 7 10	24 18					CH	BEAUMONT; brown (7.5YR 5/4) with some greenish gray (GLEYS 1.6/1) mottling; silt; CLAY	
80											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-427</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									CH	(CH); moist; very stiff; high plasticity; medium toughness	
81											
82											
83											
84	X	SS 24	4	21/18	18.9		37/24		CL	BEAUMONT; brown (7.5YR 5/4) trace greenish gray (GLEYS 1 6/1) mottling; silt; CLAY (CL); moist; very stiff; low plasticity; medium toughness	
85											
86											
87											
88											
89	X	SS 25	10	18					SM	BEAUMONT; dark yellowish brown (10YR 4/4); silt; SAND (SM); wet; very firm; non-plastic; mostly fine sand; some silt	
90											
91											
92											
93											
94	X	SS 26	19	16	21.5	13.1				BEAUMONT; brown (10YR 5/3); silt; SAND (SM); wet; very dense; non-plastic; mostly fine sand; few to little silt; trace medium sand	
95											
96											
97											
98											
99	X	SS 27	35	18						BEAUMONT; grayish brown (10YR 5/2); silt; fine SAND (SM); wet; very dense; non-plastic; mostly fine sand; some silt; trace medium sand	
100											
101											
102											
103											
104											
105											
106											
107											
108											
109	X	SS 28	19	16	16.7				SP	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SP); wet; dense; non-plastic; mostly fine sand; some medium sand; trace coarse sand; trace silt	
110											
111											
112											
113											
114											
115											
116											
117											
118											
119	X	SS 29	11	24	21.0		59/38		CH	BEAUMONT; yellowish red (5YR 4/6) with some light greenish gray (GLEYS 1 8/1) mottling; silt;	
120											

Project Name : Job Number <div style="text-align: center;"> <b>MACTEC</b></div> STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-427</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
120									CH	CLAY (CH); moist; very stiff; high plasticity; high toughness           BEAUMONT; yellowish red (5YR 4/6) with trace light greenish gray (GLEY 1 8/1) mottling; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness
121										
122										
123										
124										
125										
126										
127										
128										
129	X	SS 30	9 12 14	22 18	20.6		63/43			
130										
131										
132										
133										
134										
135										
136										
137										
138										
139	X	SS 31	10 13 17	20 18	15.7		45/27		CL	BEAUMONT; light greenish gray (GLEY 1 8/1) with yellowish red (5YR 4/6) and reddish yellow (5YR 7/8) mottling; silt; CLAY (CL); moist; very stiff; high plasticity; medium toughness; ferrous nodules           BEAUMONT; light greenish gray (GLEY 1 8/1) with trace reddish yellow (5YR 7/8) mottling; sand; clay; SILT (ML); wet; very stiff; some fine sand; trace clay  Boring Terminated at 150 feet
140										
141										
142										
143										
144										
145										
146										
147										
148										
149	X	SS 32	10 11	18 18	22.3	53.5			ML	
150										
151										
152										
153										
154										
155										
156										
157										
158										
159										
160										

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-428 DH</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Rotary Wash / 4 inch	Boring Location Unit #4 Turbine Building N 363660.05 E 2942398.55	Total Depth 218 feet	
Drilling Contractor and Rig Gregg #1 / FRASTE MDXL	Elevation at boring 30.9 feet	Ground Water Depth 23 feet	Depth to Bedrock
Sampling Method Split Spoon/UD	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 40	Date Started 11/19/06
	Borehole Inclination 0	Logged by W. Miller	Date Completed 11/29/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/18 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	3	0					CH	BEAUMONT; black (GLE Y 1 2.5/N); silt; CLAY (CH); moist; soft; high plasticity; medium toughness	
2	X	SS 2	3	22					CH	BEAUMONT; black (GLE Y 1 2.5/N); silt; CLAY (CH); moist; firm; high plasticity; medium toughness	
3											
4		UD 1	N/A	20							
5				24							
6	X	SS 3	4	18					CH	BEAUMONT; black (GLE Y 1 2.5/N); silt; CLAY (CH); moist; high plasticity; high toughness	
7	X	SS 4	4	18					CH	BEAUMONT; black (GLE Y 1 2.5/N) to brownish yellow (10YR 6/6); silt; CLAY (CH); moist; stiff; high plasticity; medium toughness; weak reaction with HCl; trace calcareous nodules	
8	X	SS 5	4	14					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; firm; high plasticity; high toughness; trace calcareous nodules	
9	X	SS 6	4	16					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; strong reaction with HCl; some calcareous nodules (1" +/- dia)	
10	X	SS 7	4	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; firm; high plasticity; high toughness	
11	X	SS 8	4	14					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness	
12	X	SS 9	4	16					CH	BEAUMONT; yellowish red (5YR 4/6) with trace gray mottling; silt; CLAY (CH); moist; stiff; high plasticity; high toughness	
13											
14	X	SS 10	4	24					CH	BEAUMONT; yellowish red (5YR 4/6) with some gray mottling; silt; CLAY (CH); moist; stiff; high plasticity; high toughness; strong reaction with HCl; some calcareous nodules	
15											
16											
17											
18											
19	X	SS 11	4	15					SM	BEAUMONT; brown (7.5YR 5/4); clay; silt; SAND (SM); wet; very firm; non-plastic; mostly fine sand; some silt; trace clay	
20											
21											
22											
23											Water level at 23 feet BGS
24		UD 2	N/A	0					SM	BEAUMONT; brown; silt; SAND (SM); wet; fine	UD-2; No sample recovery from 23 to 25 feet BGS
25											
26		UD 2A	N/A	0					SM	BEAUMONT; brown; silt; SAND (SM); wet; fine	UD-2A; No sample recovery from 25 to 26 feet BGS
27											Switch to mud rotary drilling at 27 feet BGS
28											
29	X	SS 12	5	15					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; non-plastic; mostly fine sand; some silt	
30											
31											
32											
33											
34	X	SS 13	5	15					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; very dense; non-plastic; mostly fine sand;	
35											
36											
37											
38											
39	X	SS 13	12	10					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; very dense; non-plastic; mostly fine sand;	
40			50/5"	18							

Project Name : Job Number



**SOIL LOG - Boring No. B-428 DH**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM	some silt; strong reaction with HCl; refusal on strongly cemented fine sand	
41											
42											
43											
44		UD 3	N/A	23.5 24					CH	BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CH); wet; high plasticity; medium toughness	
45											
46											
47											
48											
49	X	SS 14	4 3 4	24 18						BEAUMONT; brown (7.5YR 4/3) with trace gray mottling; silt; CLAY (CH); moist; firm; high plasticity; high toughness	
50											
51											
52											
53											
54	X	SS 15	4 9	21 18						BEAUMONT; greenish gray (GLEYS 1 5/1); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; presence of few calcareous nodules <1/8" dia.	
55											
56											
57											
58											
59	X	SS 16	6 9 10	23 18						BEAUMONT; greenish gray (GLEYS 1 5/1) and brown (7.5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; medium toughness; some small <1/8" dia. calcareous nodules	
60											
61											
62											
63											
64		UD 4	N/A	18 24						BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CH); wet; high plasticity; medium toughness	
65									ML	BEAUMONT; brown (7.5YR 5/4); sand; clay; SILT (ML); wet; low plasticity; low toughness; little fine sand and clay	
66											
67											
68											
69	X	SS 17	12 12 18	0 18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; very firm; non-plastic; mostly fine sand; some silt	No sample recovery in sample SS-17 from 68.5 to 70 feet bgs
70											
71											
72											
73											
74	X	SS 18	15 17 17	12 18						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; non-plastic; mostly fine sand; some silt	
75											
76											
77											
78											
79	X	SS 19	9 13 11	15 18						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; non-plastic; mostly fine	
80											

Project Name : Job Number 	SOIL LOG - Boring No. B-428 DH
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
80										Lithology
81									ML	sand; trace medium sand; some silt BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; medium toughness
82									CH	
83										
84	X	SS 20	11 13 16	16 18					ML	BEAUMONT; brown (7.5YR 5/4) with trace greenish gray (GLEYS 1 6/1) mottling; sand; clay; SILT (ML); wet; very stiff; low plasticity; low toughness; little fine sand
85										
86										
87										
88										
89	X	SS 21	8 8 11	4 18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; non-plastic; mostly fine sand; some silt
90										
91										
92										
93										
94		UD 5	N/A	0 24						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; non-plastic; mostly fine sand; some silt BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; non-plastic; mostly fine sand; some silt
95										
96		UD 5A	N/A	0 24						
97										
98										
99	X	SS 22	24 33 41	16 18						BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SM); wet; very dense; non-plastic; mostly fine sand; some silt
100										
101										
102										
103										
104										
105										
106										
107										
108										
109	X	SS 23	14 17 17	12 18					SP-SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SP-SM); wet; dense; non-plastic; mostly fine to medium sand; trace coarse sand; trace silt
110										
111										
112										
113										
114		UD 6	N/A	24 24	27.3 91.4	62/41			CH	BEAUMONT; brown (7.5YR 5/4) with some gray mottling; silt; CLAY (CH); moist; high plasticity; high toughness
115										
116										
117										
118										
119	X	SS 24	8 10 13	24 18						BEAUMONT; yellowish red (5YR 4/6) with light greenish gray (GLEYS 1 7/1) mottling; silt; CLAY
120										



Project Name : Job Number 	<b>SOIL LOG - Boring No. B-428 DH</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
120									CH	(CH); moist; very stiff; high plasticity; high toughness
121										
122										
123										
124										
125										
126										
127										
128										
129	X	SS 25	9 11 15	21 18						BEAUMONT; yellowish red (5YR 4/6) with trace greenish gray (GLEY 1 6/1) mottling; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; trace calcareous nodules <1/8" dia.
130										
131										
132										
133										
134										
135										
136										
137										
138										
139	X	SS 26	9 12 18	16 18						BEAUMONT; light greenish gray (GLEY 1 8/1); sand; silt; CLAY (CH); moist; very stiff; high plasticity; medium toughness; little silt; trace fine sand
140										
141										
142										
143										
144										
145										
146										
147										
148										
149	X	SS 27	12 15 16	0 18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; dense; non-plastic; mostly fine sand; some silt
150										
151										
152										
153										
154										
155										
156										
157										
158										
159	X	SS 28	10 13 18	22 18					CH	BEAUMONT; yellowish red (5YR 4/6) with some light greenish gray (GLEY 1 7/1) mottling; silt;
160										

Project Name : Job Number 	SOIL LOG - Boring No. B-428 DH
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
160									CH	CLAY (CH); moist; hard; high plasticity; high toughness; strong reaction with HCl; trace calcareous nodules	
161											
162											
163											
164											
165											
166											
167											
168											
169	X	SS 29	23 40	15 18					ML	BEAUMONT; yellowish red (5YR 5/6); SILT (ML); wet; hard; low plasticity; low toughness  BEAUMONT; yellowish red (5YR 5/6); silt; SAND (SM); wet; very dense; non-plastic; fine sand	
170									SM		
171											
172											
173											
174											
175											
176											
177											
178											
179	X	SS 30	11 13 16	23 18					CH	BEAUMONT; reddish brown (2.5YR 4/4) with trace gray mottling; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness          BEAUMONT; reddish brown (2.5YR 4/4) with trace gray mottling; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness	
180											
181											
182											
183											
184											
185											
186											
187											
188											
189	X	SS 31	7 11 15	28 18							
190											
191											
192											
193											
194											
195											
196											
197											
198											
199	X	SS 32	6 11 11	24 18						BEAUMONT; greenish gray (GLEYS 1 5/1); silt; CLAY (CH); moist; very stiff; high plasticity; high	
200											

Project Name : Job Number



**SOIL LOG - Boring No. B-428 DH**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
200											
201										toughness; some shells	Geotechnical drilling and sampling completed at 200 feet bgs. Continued drilling to 218 feet bgs for geophysical logging
202										Continued drilling to 218 feet bgs for geophysical logging; no geotechnical sampling	
203											
204											
205											
206											
207											
208											
209											
210											
211											
212											
213											
214											
215											
216											
217											
218											
219										Boring Terminated at 218 feet	
220											
221											
222											
223											
224											
225											
226											
227											
228											
229											
230											
231											
232											
233											
234											
235											
236											
237											
238											
239											
240											

Project Name : Job Number		<b>SOIL LOG - Boring No. B-429</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 4 inch		Boring Location Unit 4 - Turbine Building N 363660.04 E 2942505.46	Total Depth 100 feet
Drilling Contractor and Rig Lewis Drilling / B 57		Elevation at boring 31.16 feet	Ground Water Depth Depth to Bedrock
Sampling Method Split Spoon		Sample Driving Hammer/Drop 139.58 lbs / 30 inches	No. of Samples 27
		Borehole Inclination 0	Date Started 11/21/06
		Logged by G. Geras	Date Completed 11/27/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	12.5	18					CH	BEAUMONT; very dark gray (Gley1 3/ N); silt; CLAY (CH); dry; firm; high plasticity; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl; trace organics (grass)	
2	X	SS 2	12.5	18					CH	BEAUMONT; very dark gray (Gley1 3/ N); silt; CLAY (CH); dry; firm; high plasticity; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
3	X	SS 3	9	18					CH	BEAUMONT; dark gray (10YR 4/1); silt; CLAY (CH); dry; firm; high plasticity; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
4	X	SS 4	11	18					CH	BEAUMONT; dark gray (10YR 4/1) transitioning into strong brown (7.5YR 4/6); silt; CLAY (CH); dry; firm; high plasticity; little silt; mostly clay	
5	X	SS 5	12.5	18					CH	BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); dry; firm; high plasticity; little silt; mostly clay	
6	X	SS 6	13.5	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; firm; high plasticity; little silt; mostly clay	
7	X	SS 7	16	18					CH	BEAUMONT; yellowish red (5YR 4/6) with slight light greenish gray (Gley1 7/1) mottling; silt; CLAY (CH); dry; firm; high plasticity; little silt; mostly clay	
8	X	SS 8	16.5	18					CH	BEAUMONT; yellowish red (5YR 4/6) with slight light greenish gray (Gley1 7/1) mottling; silt; CLAY (CH); dry; firm; high plasticity; little silt; mostly clay	
9	X	SS 9	18	18					CH	BEAUMONT; yellowish red (5YR 4/6) with slight light greenish gray (Gley1 7/1) mottling; silt; CLAY (CH); dry; firm; high plasticity; little silt; mostly clay	
10	X	SS 10	16	18					CH	BEAUMONT; yellowish red (5YR 4/6) with slight light greenish gray (Gley1 7/1) mottling; silt; CLAY (CH); dry; firm; high plasticity; little silt; mostly clay	
11	X	SS 11	2	16					CH	BEAUMONT; yellowish red (5YR 4/6) with slight light greenish gray (Gley1 7/1) mottling; silt; CLAY (CH); dry; stiff; high plasticity; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
12	X	SS 12	5.4	16					ML	BEAUMONT; strong brown (7.5YR 5/6); clay; sand; SILT (ML); moist; stiff; high plasticity; little clay; few sand; mostly silt	
13	X	SS 13	2	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; loose; some silt; mostly fine sand; trace cemented sand nodules	Water level at 28.5 feet BGS Switch to mud rotary drilling at 30 feet BGS
14	X	SS 14	4	11					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; loose; little silt; mostly fine sand	
15	X	SS 15	6.5	18					ML	BEAUMONT; strong brown (7.5YR 4/6); clay; SILT (ML); moist; stiff; some clay; mostly silt	

Project Name : Job Number



**SOIL LOG - Boring No. B-429**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40											BEAUMONT; strong brown (7.5YR 4/6); clay; SILT (ML); moist; stiff; some clay; mostly silt (Continued from previous page).
41											
42											
43											
44	X	SS 16	2 4 5	18 18					CH		BEAUMONT; reddish brown (5YR 4/4); sand; silt; CLAY (CH); dry; stiff; high plasticity; few fine sand; few silt; mostly clay
45											
46											
47											
48											
49	X	SS 17	3 3 3	18 18							BEAUMONT; reddish brown (5YR 4/4); sand; silt; CLAY (CH); dry; firm; high plasticity; little sand; little silt; mostly clay; alternating laminae of sand, silt, and clay
50											
51											
52											
53											
54	X	SS 18	4 4 7	18 18							BEAUMONT; greenish gray (Gley1 5/1); sand; CLAY (CH); dry; stiff; high plasticity; few sand; little silt; mostly clay; trace calcareous nodules; strong reaction with .HCl
55											
56											
57											
58											
59	X	SS 19	9 15 15	16 18					SP-SC		BEAUMONT; brown (7.5YR 4/4) with greenish gray (Gley1 5/1) mottling; sand; CLAY (CH); dry; very stiff; high plasticity; some sand; mostly clay; trace calcareous nodules; strong reaction with HCl
60											
61											
62									SM		BEAUMONT; brown (7.5YR 4/4) slightly mottled with greenish gray (Gley1 5/1); clay; SAND (SP-SC); dry; very firm; some clay; mostly fine sand
63											
64	X	SS 20	6 7	13 18							BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; firm; some silt; mostly fine sand
65											
66											
67											
68											
69	X	SS 21	6 10 17	12 18							BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; little silt; mostly fine sand
70											
71											
72											
73											
74	X	SS 22	7 7 14	12 18							BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; few silt; mostly fine sand
75											
76											
77											
78											
79	X	SS 23	11 8 10	14 18					CH		
80											

Project Name : Job Number <div style="text-align: center;"> <span style="font-size: 1.2em; font-weight: bold; vertical-align: middle;">MACTEC</span> </div> STP COL : 5050-06-0496	<h2 style="margin: 0;">SOIL LOG - Boring No. B-429</h2>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80										BEAUMONT; brown (7.5YR 4/3); silt; CLAY (CH); dry; very stiff; high plasticity; few fine sand; little silt; mostly clay <i>(Continued from previous page)</i>	
81											
82											
83											
84	X	SS 24	10.8	18					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; little silt; mostly fine sand	
85											
86											
87											
88											
89	X	SS 25	15.2	13						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; few silt; mostly fine sand	
90											
91											
92											
93											
94	X	SS 26	13.2	12.5						BEAUMONT; brown (10YR 4/3); silt; SAND (SM); wet; dense; little silt; mostly fine sand	
95											
96											
97											
98											
99	X	SS 27	9.6	13.5						BEAUMONT; brown (10YR 4/3); silt; SAND (SM); wet; very firm; some silt; mostly fine sand	
100										Boring Terminated at 100-feet	
101											
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-430</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Rotary Wash / 4 inch		Boring Location Turbine Building N 363624.24 E 2942617.3		Total Depth 150 feet	
Drilling Contractor and Rig Best / Failing 1500		Elevation at boring 30.92 feet	Ground Water Depth 23.5 feet		Depth to Bedrock
Sampling Method Split Spoon/UD		Sample Driving Hammer/Drop 141 lbs / 30 inches	No. of Samples 34		Date Started 12/29/06
		Borehole Inclination 0	Logged by M. Fraychineaud & D. Tibbals		Date Completed 1/8/07

Reviewed by / Date KML 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	10	12					CH	BEAUMONT; very dark greenish gray (GLEY 1 3/1); silt; gravel; CLAY (CH); moist; firm; few silt; trace gravel/calcareous nodules; strong reaction with HCl	
2	X	SS 2	10	15					CH	BEAUMONT; very dark greenish gray (GLEY 1 3/1); silt; CLAY (CH); moist; stiff; few silt	
3	X	SS 3	10	15					CH	BEAUMONT; very dark greenish gray (GLEY 1 3/1); silt; CLAY (CH); moist; very stiff; little silt	
4	X	SS 4	10	15					CH	BEAUMONT; black (GLEY 1 2.5/N); with olive (5Y 5/3) mottling; silt; CLAY (CH); moist; very stiff; few silt	
5	X	SS 5	10	14					CH	BEAUMONT; yellowish red (5YR 5/6) with trace of olive (5Y 5/3) mottling; silt; CLAY (CH); moist; very stiff; few silt	
6	X	SS 6	10	13					CH	BEAUMONT; yellowish red (5YR 5/6) with few light greenish gray (GLEY 1 8/1) mottling; silt; CLAY (CH); moist; stiff; few silt; trace calcareous nodules; strong reaction with HCl	
7	X	SS 7	10	13					CH	BEAUMONT; red (2.5YR 5/6); silt; CLAY (CH); moist; very stiff; few silt; trace calcareous nodules; strong reaction with HCl	
8	X	SS 8	10	20					CH	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; stiff; some silt	
9	X	SS 9	10	14					ML	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; stiff; some silt; trace calcareous nodules; strong reaction with HCl	
10	X	SS 10	10	18					CH	BEAUMONT; yellowish red (5YR 5/6); clay; SILT (ML); moist; stiff; little clay	
11	X	SS 11	5	22					ML	BEAUMONT; yellowish red (5YR 5/6) with trace of light greenish gray (GLEY 1 8/1) mottling; silt; CLAY (CH); moist; very stiff; some silt; trace calcareous nodules; strong reaction with HCl	
12											
13											
14											
15											
16											
17											
18											
19	X	SS 11	5	22					ML	BEAUMONT; yellowish red (5YR 5/6) with trace of light greenish gray (GLEY 1 8/1) mottling; silt; CLAY (CH); moist; very stiff; some silt; trace calcareous nodules; strong reaction with HCl	
20											
21											
22											
23											
24	X	SS 12	5	22					ML	BEAUMONT; red (2.5YR 5/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	Water level at 23.5 feet BGS
25											Switch to mud rotary drilling at 25 feet BGS
26											
27											
28											
29	X	SS 13	5	15					SM	BEAUMONT; reddish brown (5YR 5/4); sand; SILT (ML); wet; firm; high plasticity; low toughness; mostly silt; some sand	
30											
31											
32											
33											
34	X	SS 14	5	15					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; mostly fine sand; some silt; poorly graded	
35											
36											
37											
38											
39	X	SS 15	5	15					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; mostly fine sand; little silt; poorly graded	
40											

Project Name : Job Number



SOIL LOG - Boring No. B-430

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM	graded	
41											
42											
43											
44	X	SS 16	6	7	18				CH	BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
45											
46											
47											
48											
49	X	SS 17	4	22	18					BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
50											
51											
52											
53											
54	X	SS 18	6	18	18					BEAUMONT; greenish gray (GLE Y 2 6/10G); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt; presence of calcareous nodules	
55											
56		UD 1	N/A	18	24					BEAUMONT; greenish gray (GLE Y 2 6/10G); silt; CLAY (CH); moist; high plasticity; high toughness; mostly clay; little silt; presence of calcareous nodules	
57											
58											
59	X	SS 19	6	19	18					BEAUMONT; greenish gray (GLE Y 2 6/10G); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt; presence of calcareous nodules	
60											
61											
62											
63											
64	X	SS 20	10	24	18				ML	BEAUMONT; reddish brown (5YR 5/6); sand; SILT (ML); wet; very stiff; high plasticity; low toughness; mostly silt; little sand	
65											
66											
67											
68											
69	X	SS 21	10	12	18					BEAUMONT; reddish brown (5YR 5/6); sand; SILT (ML); wet; very stiff; high plasticity; low toughness; mostly silt; little sand	
70											
71											
72											
73											
74	X	SS 22	12	12	18				SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; mostly fine sand; little silt; poorly graded	
75											
76											
77											
78											
79	X	SS 23	15	12	18					BEAUMONT; brown (7.5YR 5/2); silt; SAND (SM); wet; dense; mostly fine sand; few silt; poorly	
80											



Project Name : Job Number <b>MACTEC</b> STP COL : 5050-06-0496	<h2 style="margin: 0;">SOIL LOG - Boring No. B-430</h2>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SM	graded	
81											
82											
83											
84		UD 2	N/A	15 24							BEAUMONT; brown (7.5YR 5/2); silt; SAND (SM); wet; mostly fine sand; few silt; poorly graded
85											
86											
87											
88											
89	X	SS 24	13 18 26	18							BEAUMONT; brown (7.5YR 5/2); silt; SAND (SM); wet; dense; mostly fine sand; few silt; poorly graded
90											
91											
92											
93											
94	X	SS 25	23 21 19	18 18							BEAUMONT; brown (7.5YR 5/2); silt; SAND (SM); wet; dense; mostly fine sand; few silt; poorly graded
95											
96											
97											
98											
99	X	SS 26	3 4 18	19 18							BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; very firm; mostly fine sand; little silt; poorly graded
100											
101											
102											
103											
104											
105											
106											
107											
108											
109	X	SS 27	15 17 19	18 18							BEAUMONT; brown (7.5YR 5/2); silt; SAND (SM); wet; dense; mostly fine sand; few silt; poorly graded
110											
111											
112											
113											
114											
115											
116											
117											
118											
119	X	SS 28	10 11 15	22 18					CH		BEAUMONT; reddish brown (2.5YR 5/4) with greenish gray mottling; silt; CLAY (CH); moist; very
120											

Project Name : Job Number



**SOIL LOG - Boring No. B-430**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									CH	stiff, high plasticity; high toughness; mostly clay; little silt	
121											
122											
123											
124											
125											
126											
127											
128											
129	X	SS 29	14 10 2	16 18						BEAUMONT; red (2.5YR 5/6) with light gray mottling; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
130											
131											
132											
133											
134		UD 3	N/A	20 24						BEAUMONT; red (2.5YR 5/6) with light gray mottling; silt; CLAY (CH); moist; high plasticity; high toughness; mostly clay; little silt	
135											
136											
137											
138											
139	X	SS 30	21 19	15 18						BEAUMONT; greenish gray (GLE 2 6/10G); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt; presence of calcareous nodules	
140											
141											
142											
143											
144											
145											
146											
147											
148											
149	X	SS 31	19 23 34	16 18					SM	BEAUMONT; yellowish brown (10YR 5/8); silt; SAND (SM); wet; very dense; mostly fine sand; some silt	
150										Boring Terminated at 150-feet	
151											
152											
153											
154											
155											
156											
157											
158											
159											
160											

Project Name : Job Number		<b>SOIL LOG - Boring No. B-431</b>	
STP COL : 5050-06-0496		<b>MACTEC</b>	
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 3 inch	Boring Location N. 363634.57 E 2942841.92	Power Block	Total Depth 75 feet.
Drilling Contractor and Rig MACTEC / RALEIGH / CME 45C	Elevation at boring 31.06 feet	Ground Water Depth 12 feet	Depth to Bedrock
Sampling Method Split-Spoon	Sample Driving Hammer/Drop 139.62 lbs / 30 inches	No. of Samples 22	Date Started 11/29/06
	Borehole Inclination 0	Logged by D. Tibbals	Date Completed 11/21/06

Reviewed by / Date HIC 5/1/07  
 Reviewed by / Date KAW 4/27/07

Depth (feet)	Sample No.	Sample Type & No.	Uncorrelated Blowback Inches	Recovery (Inches)	Water Content	Grain Size	Alteration Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0									CH	BEAUMONT; black (Gley 1 2.5/N); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	
1	1	SS 4	10	18					CH	BEAUMONT; black (Gley 1 2.5/N); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	
2	2	SS 2	20	18					CH	BEAUMONT; black (Gley 1 2.5/M); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
3	3	SS 4	24	18					CH	BEAUMONT; black (Gley 1 2.5/M); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
4	4	SS 4	15	18					CH	BEAUMONT; black (Gley 1 2.5/M); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
5	5	SS 5	18	18					CH	BEAUMONT; reddish brown (5YR 4/3) and black (Gley 1 2.5/M); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt; calcareous nodules	
6	6	SS 6	18	18					CH	BEAUMONT; red (2.5YR 4/8); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt; calcareous nodules	
7	7	SS 7	7	18					CH	BEAUMONT; red (2.5YR 4/8); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt; calcareous nodules	
8	8	SS 8	12	18					CH	BEAUMONT; red (2.5YR 4/8); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt; calcareous nodules	
9	9	SS 9	23	18					CH	BEAUMONT; red (2.5YR 4/8); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt; calcareous nodules	
10	10	SS 10	18	18					CH	BEAUMONT; reddish brown (2.5YR 4/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt; calcareous nodules	
11									CH	BEAUMONT; reddish brown (2.5YR 4/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt; calcareous nodules	
12									CH	BEAUMONT; reddish brown (2.5YR 4/4); silt; CLAY (CH); wet; hard; high plasticity; high toughness; mostly clay; little silt; little mottling	Water level at 12 feet BGS
13									CH	BEAUMONT; yellowish red (5YR 5/8); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
14									CH	BEAUMONT; reddish yellow (5YR 6/6); silt; CLAY (CH); wet; firm; high plasticity; high toughness; mostly clay; little silt	
15									CH	BEAUMONT; reddish yellow (5YR 6/6); silt; CLAY (CH); wet; firm; high plasticity; high toughness; mostly clay; little silt	Switch to Mud Rotary drilling at 20 feet BGS
16									CH	BEAUMONT; reddish yellow (5YR 6/6); silt; CLAY (CH); wet; firm; high plasticity; high toughness; mostly clay; little silt	
17									CH	BEAUMONT; reddish yellow (5YR 6/6); silt; CLAY (CH); wet; firm; high plasticity; high toughness; mostly clay; little silt	
18									CH	BEAUMONT; reddish yellow (5YR 6/6); silt; CLAY (CH); wet; firm; high plasticity; high toughness; mostly clay; little silt	
19	11	SS 11	23	18					SM	BEAUMONT; reddish yellow (5YR 6/6); silt; SAND (SM); wet; loose; non-plastic; fine; poorly graded; mostly sand; little silt	
20									CH	BEAUMONT; reddish yellow (5YR 6/6); silt; CLAY (CH); wet; firm; high plasticity; high toughness; mostly clay; little silt	
21									CH	BEAUMONT; reddish yellow (5YR 6/6); silt; CLAY (CH); wet; firm; high plasticity; high toughness; mostly clay; little silt	
22									CH	BEAUMONT; reddish yellow (5YR 6/6); silt; CLAY (CH); wet; firm; high plasticity; high toughness; mostly clay; little silt	
23									CH	BEAUMONT; reddish yellow (5YR 6/6); silt; CLAY (CH); wet; firm; high plasticity; high toughness; mostly clay; little silt	
24	12	SS 12	22	18					SM	BEAUMONT; reddish yellow (5YR 6/6); silt; SAND (SM); wet; firm; non-plastic; fine; poorly graded; mostly sand; little silt	
25									CH	BEAUMONT; reddish yellow (5YR 6/6); silt; CLAY (CH); wet; firm; high plasticity; high toughness; mostly clay; little silt	
26									CH	BEAUMONT; reddish yellow (5YR 6/6); silt; CLAY (CH); wet; firm; high plasticity; high toughness; mostly clay; little silt	
27									CH	BEAUMONT; reddish yellow (5YR 6/6); silt; CLAY (CH); wet; firm; high plasticity; high toughness; mostly clay; little silt	
28									CH	BEAUMONT; reddish yellow (5YR 6/6); silt; CLAY (CH); wet; firm; high plasticity; high toughness; mostly clay; little silt	
29	13	SS 13	21	18					SM	BEAUMONT; reddish yellow (5YR 6/6); silt; SAND (SM); wet; firm; non-plastic; fine; poorly graded; mostly sand; little silt	
30									CH	BEAUMONT; reddish yellow (5YR 6/6); silt; CLAY (CH); wet; firm; high plasticity; high toughness; mostly clay; little silt	
31									CH	BEAUMONT; reddish yellow (5YR 6/6); silt; CLAY (CH); wet; firm; high plasticity; high toughness; mostly clay; little silt	
32									CH	BEAUMONT; reddish yellow (5YR 6/6); silt; CLAY (CH); wet; firm; high plasticity; high toughness; mostly clay; little silt	
33									CH	BEAUMONT; reddish yellow (5YR 6/6); silt; CLAY (CH); wet; firm; high plasticity; high toughness; mostly clay; little silt	
34	14	SS 14	15	18					SM	BEAUMONT; reddish yellow (5YR 6/6); silt; SAND (SM); wet; firm; non-plastic; fine; poorly graded; mostly sand; little silt	
35									CH	BEAUMONT; reddish yellow (5YR 6/6); silt; CLAY (CH); wet; firm; high plasticity; high toughness; mostly clay; little silt	
36									CH	BEAUMONT; reddish yellow (5YR 6/6); silt; CLAY (CH); wet; firm; high plasticity; high toughness; mostly clay; little silt	
37									CH	BEAUMONT; reddish yellow (5YR 6/6); silt; CLAY (CH); wet; firm; high plasticity; high toughness; mostly clay; little silt	
38									CH	BEAUMONT; reddish yellow (5YR 6/6); silt; CLAY (CH); wet; firm; high plasticity; high toughness; mostly clay; little silt	
39	15	SS 15	15	18					SM	BEAUMONT; reddish yellow (5YR 6/6); silt; SAND (SM); wet; firm; non-plastic; fine; poorly graded; mostly sand; little silt	
40									CH	BEAUMONT; reddish yellow (5YR 6/6); silt; CLAY (CH); wet; firm; high plasticity; high toughness; mostly clay; little silt	

Project Name : Job Number

**MACTEC**

STP COL 5050-06-0498

**SOIL LOG - Boring No. B-431**

Depth (feet)	Sample	Sample Type & No.	Unlubricated Blow/ft (inches)	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM	mostly sand; little silt	
41											
42											
43											
44	X	SS 16	5	17					CH	BEAUMONT; red (2.5YR 4/8); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
45											
46											
47											
48											
49	X	SS 17	4	24					CH	BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	
50											
51											
52											
53											
54	X	SS 18	6	22					CH	BEAUMONT; greenish gray (Gley 1, 6/5GY); silt; CLAY (CH); stiff; high plasticity; high toughness; mostly clay; little silt	
55											
56											
57											
58											
59	X	SS 19	4	15					CH	BEAUMONT; greenish gray (Gley 1, 6/5GY); silt; CLAY (CH); very stiff; high plasticity; high toughness; mostly clay; little silt; calcareous nodules	
60											
61											
62											
63											
64	X	SS 20	4	23					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; non-plastic; fine; poorly graded; mostly sand; little silt	
65											
66											
67											
68											
69	X	SS 21	4	18					CH	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; very firm; non-plastic; fine; poorly graded; mostly sand; little silt	
70											
71											
72											
73											
74	X	SS 22	11	22					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; dense; non-plastic; fine; poorly graded	
75											
76											Boring Terminated at 75-feet
77											
78											
79											
80											

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-432</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Rotary Wash / 4 inch	Boring Location Unit 4 - Power Block N 363739.93 E 2942701.18	Total Depth 150 feet	
Drilling Contractor and Rig Gregg #1 / FRASTE MDXL	Elevation at boring 31.2 feet	Ground Water Depth 23.5 feet	Depth to Bedrock
Sampling Method Split Spoon/UD	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 33	Date Started 11/8/06
	Borehole Inclination 0	Logged by W. Miller	Date Completed 11/14/06

Reviewed by / Date KAW 4/3/07

Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0									CH	BEAUMONT; bluish black (GLE Y 2.5/1); silt; CLAY (CH); moist; firm; high plasticity; low to medium toughness; trace roots	
1	X	SS 1	3	18					CH	BEAUMONT; black (GLE Y 1, 2.5/N); silt; CLAY (CH); moist; firm; high plasticity; low to medium toughness; trace roots; trace calcareous nodules	
2	X	SS 2	3	24					CH	BEAUMONT; black (GLE Y 1, 2.5/O); silt; CLAY (CH); moist; high plasticity; low to medium toughness; trace calcareous nodules	
3		UD 1	N/A	26	21.8	90.4	65/42				
4											
5	X	SS 3	4	20					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; medium toughness; trace calcareous nodules	
6	X	SS 4	3	7					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; soft; high plasticity; medium toughness	
7	X	SS 5	4	17	22.3				CH	BEAUMONT; yellowish red (5YR 4/6) with trace gray mottling; silt; CLAY (CH); moist; stiff; high plasticity; medium to high toughness	
8	X	SS 6	4	18					CH	BEAUMONT; yellowish red (5YR 4/6) with trace gray mottling; silt; CLAY (CH); moist; stiff; high plasticity; medium to high toughness	
9	X	SS 7	4	18					CH	BEAUMONT; yellowish red (5YR 4/6) with trace gray mottling; silt; CLAY (CH); moist; stiff; high plasticity; medium to high toughness	
10	X	SS 8	5	20	21.4		44/26		CL	BEAUMONT; yellowish red (5YR 4/6) with trace gray mottling; silt; CLAY (CH); moist; stiff; high plasticity; medium to high toughness; trace calcareous nodules	
11											
12		UD 2	N/A	24	24.0	99.6	31/11				
13											
14	X	SS 9	4	20					CL	BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CL); moist; high plasticity; medium toughness	
15											
16	X	SS 10	3	9	25.6	36.1			SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; loose; non-plastic; mostly fine sand; some silt	Water level at 23.5 feet BGS
17		UD 3	NA	4	17.6		NV/NP				
18											
19	X	SS 11	5	12					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; non-plastic; mostly fine sand; some silt	
20											
21											
22	X	SS 12	5	9	24.2	20.0			SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; mostly fine sand; little silt	
23											
24											
25	X	SS 13	5	17					CH	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; mostly fine sand; some silt	
26											
27											
28											
29											
30											
31											
32											
33											
34											
35											
36											
37											
38											
39											
40											

AJ  
4/3/07

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-432</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
40									SM	CLAY (CH); moist; very stiff; high plasticity; medium toughness; fine sand
41										BEAUMONT; brown; (7.5YR 5/4); silt; SAND (SM); wet; firm; mostly fine sand; some silt
42										
43										
44	X	SS 14	10	20					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; medium toughness
45				18					SM	
46									CH	BEAUMONT; brown; (7.5YR 5/4); silt; SAND (SM); wet; firm; non plastic
47										BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; medium toughness
48										
49	X	SS 15	4	22	29.8		60/39			BEAUMONT; reddish brown (5YR 4/4); silt; sand; CLAY (CH); moist; stiff; medium to high plasticity; medium to high toughness; little silt; trace fine sand
50			6	18						
51										
52										
53										
54	X	SS 16	5	23	23.4					BEAUMONT; gray (5Y 5/1) with brown mottling; silt; CLAY (CH); moist; stiff; high plasticity; medium toughness; some <1/8" dia. calcareous nodules; trace shell fragments
55				18						
56										
57										
58										
59	X	SS 17	6	22	21.2					BEAUMONT; reddish brown (5YR 4/4) with gray and black mottling; silt; CLAY (CH); moist; very stiff; high plasticity; medium toughness; trace <1/8" dia calcareous nodules; trace shell fragments
60			12	18						
61										
62										
63										
64	X	SS 18	5	22	26.2		84/57			BEAUMONT; gray (5YR 5/4); with red brown mottling; silt; CLAY (CH); moist; very stiff; high plasticity; medium toughness; some calcareous nodules <1/8" to 1/2" dia.
65			5	18						
66										
67										
68										
69	X	SS 19	5	22	28.1					BEAUMONT; reddish brown (5 YR 4/4) with some gray mottling silt CLAY (CH); moist; stiff; high plasticity; medium toughness; calcareous nodules
70			7	18						
71			8							
72										
73										
74	X	SS 20	5	18					SM	BEAUMONT; greenish gray (GLE 1 6/1); silt; sand CLAY (CH); moist; very stiff; high plasticity; low toughness; little fine sand
75			14							BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; very firm; non-plastic; mostly fine sand; little silt; few medium sand grains
76			16							
77										
78										
79	X	SS 21	16	4	20.8	8.6			SP-SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SP-SM); wet; dense; non-plastic; mostly fine sand;
80			20	18						

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-432</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SP-SM	trace medium sand; trace silt	
81											
82											
83											
84	X	SS 22	18 23	16 18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; dense; non-plastic; mostly fine sand; some silt	
85											
86											
87											
88											
89	X	SS 23	16 27	18 15	21.6	42.3			CH	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; non-plastic; mostly fine sand; some silt	
90											
91											
92											
93											
94	X	SS 24	3 5	19 12					CL-ML	BEAUMONT; brown (10YR 5/3); silt; sand; CLAY (CL-ML); wet; very stiff; low plasticity; low toughness; little fine sand; interbedded lenses of silt and clay	
95									CH		
96									SM		
97											
98											
99	X	SS 25	11 18	6 22	22.8	12.7				BEAUMONT; brown (10YR 5/3); silt; CLAY (CH); moist; very stiff; high plasticity; medium toughness	
100										BEAUMONT; brown (10YR 5/3); silt; SAND (SM); wet; firm; non-plastic; mostly fine sand; some silt; trace clay	
101										BEAUMONT; grayish brown (10YR 5/2); silt; SAND (SM); wet; dense; non-plastic; mostly fine sand; few to little silt	
102											
103											
104											
105											
106											
107											
108											
109	X	SS 26	18 21	16 26						BEAUMONT; brown (10YR 5/3); silt; SAND (SM); wet; dense; mostly fine to medium sand; trace coarse sand; little silt; trace gravel-sized cemented nodules; low reaction with HCl	
110											
111											
112											
113											
114											
115											
116											
117											
118											
119	X	SS 27	6 11	23 18	24.7		70/47		CH	BEAUMONT; greenish gray (GLEYS 1 7/1) with red brown (5YR 5/4) mottling; silt; CLAY (CH); moist;	
120											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-432</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									CH	very stiff; high plasticity; medium toughness; trace fine <1/8" dia. calcareous-cemented nodules	
121											
122											
123											
124											
125											
126											
127											
128											
129	×	SS 28	9 11 13	20 18	21.2		66/47			BEAUMONT; yellowish red (5YR 4/6) with trace gray mottling; silt; CLAY (CH); moist; very stiff; high plasticity; medium toughness; trace fine < 1/8" dia. calcareous nodules	
130											
131											
132											
133											
134											
135											
136											
137											
138											
139	×	SS 29	9 10 18	19 18						BEAUMONT; light greenish gray (GLY 1 7/1) with yellowish red (5YR 4/6) mottling; silt; CLAY (CH); moist; very stiff; high plasticity; medium toughness; little to some silt; some 1/4" +/- dia. calcareous nodules; low reaction with HCl	
140											
141											
142											
143											
144											
145											
146											
147											
148											
149	×	SS 30	28 40 40	16 18	19.8	17.5			SM	BEAUMONT; light yellowish brown (10YR 6/4); silt; SAND (SM); wet; very dense; non-plastic; mostly fine sand; little silt	
150										Boring Terminated at 150-feet	
151											
152											
153											
154											
155											
156											
157											
158											
159											
160											



Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-433</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 4 inch	Boring Location N 363747.31 E 2942458.8	Switch Yard	Total Depth 100 feet
Drilling Contractor and Rig MACTEC / CHARLOTTE / D 50	Elevation at boring 31.61 feet	Ground Water Depth 13.5 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 139.08 lbs / 30 inches	No. of Samples 27	Date Started 11/4/06
	Borehole Inclination 0	Logged by J. Cerceo/R. Clark	Date Completed 11/15/06

Reviewed by / Date KM 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	16	18					CH	BEAUMONT; greenish black (GLEY 1 2.5/1); silt; CLAY (CH); dry; firm; medium plasticity; little silt; trace roots	
2	X	SS 2	16	18					CH	BEAUMONT; greenish black (GLEY 1 2.5/1); silt; CLAY (CH); dry; stiff; high to medium plasticity; little silt; trace roots	
3	X	SS 3	18	18					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; gravel; CLAY (CH); dry; firm; high plasticity; trace silt; trace fine gravel; trace roots	
4	X	SS 4	18	18					CH	BEAUMONT; black (GLEY 1 2.5/N) with greenish gray (GLEY 1 5/1); silt; gravel; CLAY (CH); dry; very stiff; high plasticity; trace silt; trace fine gravel; trace roots; calcareous concretions	
5	X	SS 5	18	18					CH	BEAUMONT; yellowish red (5YR 4/6); CLAY (CH); dry; very stiff; trace calcareous concretions	
6	X	SS 6	18	18					CH	BEAUMONT; yellowish red (5YR 4/6); CLAY (CH); dry; stiff; high plasticity; strong reaction with HCl; trace calcareous concretions	
7	X	SS 7	18	18					CH	BEAUMONT; yellowish red (5YR 4/6); CLAY (CH); dry; stiff; high plasticity; strong reaction with HCl; trace calcareous concretions	
8	X	SS 8	18	18					CH	BEAUMONT; yellowish red (5YR 4/6); CLAY (CH); dry; stiff; high plasticity; strong reaction with HCl; trace calcareous concretions	
9	X	SS 9	18	18					CH	BEAUMONT; yellowish red (5YR 4/6); CLAY (CH); dry; stiff; high plasticity; strong reaction with HCl; trace calcareous concretions	
10	X	SS 10	18	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; firm; high plasticity	
11	X	SS 11	18	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; sand; CLAY (CH); wet; stiff; little silt; trace sand; high dry strength; strong reaction with HCl; trace calcareous nodules	Water level at 13.5 feet BGS
12											
13											
14											
15											
16											
17											
18											
19	X	SS 12	16	18					SM	BEAUMONT; yellowish red (5YR 5/8); silt; SAND (SM); wet; firm; fine sand; few silt	
20											
21											
22											
23											
24											
25											
26											
27											
28											
29	X	SS 13	12	18					SM	BEAUMONT; yellowish red (5YR 5/8); silt; SAND (SM); wet; loose; fine sand; few silt	
30											
31											
32											
33											
34	X	SS 14	12	18					SP	BEAUMONT; yellowish red (5YR 5/8); silt; SAND (SP); wet; firm; fine; trace silt; strong reaction with HCl; fine gravel-sized calcareous concretions	
35											
36											
37											
38											
39	X	SS 15	16	18					SP	BEAUMONT; reddish yellow (7.5YR 6/6); silt; SAND (SP); wet; dense; trace silt; fine sand	
40											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-433</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SP		
41											
42											
43											
44	X	SS 16	54	18					CH	BEAUMONT; reddish yellow (7.5YR 6/6); silt; sand; CLAY (CH); wet; stiff; high plasticity; little silt; trace sand	
45											
46											
47											
48											
49	X	SS 17	60	18						BEAUMONT; brown (7.5YR 4/4); sand; CLAY (CH); moist; stiff; trace sand; cemented shells	
50											
51											
52											
53											
54	X	SS 18	64	18						BEAUMONT; gray (5Y 5/1); CLAY (CH); wet; stiff; high plasticity; high dry strength; high toughness	
55											
56											
57											
58											
59	X	SS 19	70	18					CL	BEAUMONT; gray (5Y 5/1) and brown (7.5YR 4/4) sand; CLAY (CL); moist; very stiff; high plasticity; trace silt; shell and calcareous concretions	
60											
61											
62											
63											
64	X	SS 20	61	18					SC	BEAUMONT; gray (5Y 5/1) and brown (7.5YR 4/4); sand; CLAY (CL); moist; very stiff; high plasticity; trace silt; shell and calcareous concretions	
65										BEAUMONT; brown (7.5YR 5/4); clay; SAND (SC); wet; very firm; little clay; fine sand	
66											
67											
68											
69	X	SS 21	11	18						BEAUMONT; brown (7.5YR 5/4); clay; SAND (SC); wet; very firm; fine sand; with interbedded clay and poorly-graded sand	
70											
71											
72											
73											
74	X	SS 22	15	9					SP	BEAUMONT; yellowish brown (7.5YR 5/6); silt; SAND (SP); wet; very dense; fine sand; trace silt; trace mafic minerals; poorly-graded; sub-angular	
75											
76											
77											
78											
79	X	SS 23	12	18					CH	BEAUMONT; yellowish brown (7.5YR 5/6); silt; SAND (SP); wet; very firm; fine sand; trace silt;	
80											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-433</b>
STP COL : 5050-06-0495	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									CH	trace mafic minerals; poorly-graded; sub-angular	
81										BEAUMONT; reddish brown (5YR 5/4); CLAY (CH); moist; very stiff; high plasticity; high toughness	
82											
83											
84	X	SS 24	11 10 10	18 18					SP-SC	BEAUMONT; brown (7.5YR 5/4); clay; SAND (SP-SC); wet; firm; non-plastic; trace clay; fine sand	
85											
86											
87											
88											
89	X	SS 25	9 11 23	17 18						BEAUMONT; brown (7.5YR 5/4); clay; SAND (SP-SC); wet; dense; non-plastic; trace clay; fine sand	
90											
91											
92											
93											
94	X	SS 26	10 22 35	18 18						BEAUMONT; brown (7.5YR 5/4); clay; SAND (SP-SC); wet; very dense; mostly fine sand; trace clay; strong reaction with HCl	
95											
96											
97											
98											
99	X	SS 27	26 35 35	18 18						BEAUMONT; brown (7.5YR 5/4); clay; SAND (SP-SC); wet; very dense; mostly fine sand; trace clay; strong reaction with HCl	
100										Boring Terminated at 100 feet	
101											
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-434</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 4 inch		Boring Location N 363752.98 E 2942354.31		Switch Yard Total Depth 100 feet	
Drilling Contractor and Rig MACTEC / Charlotte / D 50 (ATV)		Elevation at boring 31.1 feet		Ground Water Depth 13 feet	
Sampling Method Split Spoon and UD		Sample Driving Hammer/Drop 139.08 / 30 inches		No. of Samples 26	
		Borehole Inclination 0		Logged by R. Clark	
				Date Started 11/16/06	
				Date Completed 11/20/06	

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/9 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0									CH	BEAUMONT; very dark gray (7.5YR 3/1); CLAY (CH); moist; stiff; high plasticity; trace silt; weak reaction with HCl; roots	
1	X	SS 1	18	18					CH	BEAUMONT; dark gray (7.5YR 3/1); CLAY (CH); moist; stiff; high plasticity; trace silt; weak reaction with HCl; some roots	
2	X	SS 2	18	18					CH	BEAUMONT; brown (7.5YR 4/2); CLAY (CH); moist; stiff; high plasticity; trace silt; weak reaction with HCl	
3	X	SS 3	18	18					CH	BEAUMONT; dark gray (10YR 4/1); CLAY (CH); moist; stiff; high plasticity; trace silt; weak reaction with HCl; roots; iron oxide staining	
4	X	SS 4	18	18					CH	BEAUMONT; grayish brown (10YR 5/2); CLAY (CH); moist; stiff; high plasticity; trace silt; weak reaction with HCl; iron staining	
5	X	SS 5	18	18					CH	CLAY (CH)	
6	X	SS 6	18	18					CH	BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CH); moist; stiff; high plasticity; some silt	
7	X	SS 7	18	18					CH	BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CH); moist; stiff; high plasticity; some silt	
8	X	SS 8	18	18					CH	BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CL); wet; stiff; low plasticity	Water level at 13 feet BGS
9		UD 1	N/A	24	24					BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH); moist; stiff; high plasticity; some silt	
10											
11	X	SS 9	4	18	18					BEAUMONT; strong brown (7.5YR 5/6); CLAY (CH); moist; stiff; high plasticity; some silt	
12	X	SS 10	6	12	18				SM	BEAUMONT; reddish yellow (7.5YR 6/6); clay; SAND (SM); wet; firm; non-plastic; mostly fine sand; little clay; trace silt	
13	X	SS 11	10	12	18					clay; SAND (SM)	Switch to mud rotary drilling at 20 feet BGS
14	X	SS 12	10	15	18					BEAUMONT; reddish yellow (7.5YR 6/6); clay; SAND (SM); wet; dense; mostly fine sand; few silt; some clay; weak reaction with HCl	
15	X	SS 13	10	15	18						
16	X	SS 14	10	15	18						
17	X	SS 15	10	15	18						
18	X	SS 16	10	15	18						
19	X	SS 17	10	15	18						
20	X	SS 18	10	15	18						
21	X	SS 19	10	15	18						
22	X	SS 20	10	15	18						
23	X	SS 21	10	15	18						
24	X	SS 22	10	15	18						
25	X	SS 23	10	15	18						
26	X	SS 24	10	15	18						
27	X	SS 25	10	15	18						
28	X	SS 26	10	15	18						
29	X	SS 27	10	15	18						
30	X	SS 28	10	15	18						
31	X	SS 29	10	15	18						
32	X	SS 30	10	15	18						
33	X	SS 31	10	15	18						
34	X	SS 32	10	15	18						
35	X	SS 33	10	15	18						
36	X	SS 34	10	15	18						
37	X	SS 35	10	15	18						
38	X	SS 36	10	15	18						
39	X	SS 37	10	15	18						
40	X	SS 38	10	15	18						

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-434</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM	silt; some clay; weak reaction with HCl	
41											
42											
43											
44	X	SS 13	10	18					SC	BEAUMONT; reddish yellow (7.5YR 6/6); clay; SAND (SC); wet; firm; mostly fine sand; few silt; some clay	
45											
46											
47											
48											
49	X	SS 14	10	18					CH	BEAUMONT; light yellowish brown (10YR 6/4); CLAY (CH); moist; very stiff; high plasticity; weak reaction with HCl; calcareous nodules	
50											
51											
52											
53											
54		UD 3	N/A	25							
55				24							
56											
57											
58											
59	X	SS 15	10	17						BEAUMONT; strong brown (7.5YR 5/6); CLAY (CH); moist; very stiff; high plasticity; weak reaction with HCl; calcareous nodules	
60			11	18							
61											
62											
63											
64	X	SS 16	8	18					CL	BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CL); wet; very stiff; low plasticity; mostly clay; some silt; few fine sand; weak reaction with HCl	
65			11	18							
66											
67											
68											
69	X	SS 17	19	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; very dense; mostly fine sand; some silt; few clay; weak reaction with HCl	
70			30	18							
71			44	18							
72											
73											
74	X	SS 18	14	18						BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM); wet; very firm; few clay; mostly fine sand; some silt; weak reaction with HCl	
75			13	18							
76			16	18							
77											
78											
79	X	SS 19	10	18					CH	BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM); wet; very firm; mostly fine sand; some	
80			10	18							
			12	18							

Project Name : Job Number



SOIL LOG - Boring No. B-434

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									CH	silt; weak reaction with HCl	
81									CH	BEAUMONT; yellowish brown (10YR 5/6); CLAY (CH); moist; very stiff; high plasticity	
82									CH		
83									CH		
84	X	SS 20	8 10	18 18					SC	BEAUMONT; yellowish brown (10YR 5/6); CLAY (CH); wet; very stiff; high plasticity; mostly clay; some fine sand	
85									SC	BEAUMONT; brownish yellow (10YR 6/6); clay; SAND (SC); wet; very firm; non-plastic; mostly fine sand; some clay; weak reaction with HCl	
86									SC		
87									SC		
88									SC		
89	X	SS 21	21 20	16 18					SC	BEAUMONT; light yellowish brown (10YR 6/4); clay; SAND (SC); wet; dense; non-plastic; mostly fine sand; little clay; few silt; weak reaction with HCl	
90									SC		
91									SC		
92									SC		
93									SC		
94	X	SS 22	4 6	18 18					SC	BEAUMONT; light yellowish brown (10YR 6/4); clay; SAND (SC); wet; firm; non-plastic; mostly fine sand; some clay; few silt; weak reaction with HCl	
95									SC		
96									SC		
97									SC		
98									SC		
99	X	SS 23	16 22	17 18					SC	BEAUMONT; pale brown (10YR 6/3); clay; SAND (SC); wet; dense; non-plastic; mostly fine sand; little clay; weak reaction with HCl	
100									SC		
101									SC	Boring Terminated at 100 feet	
102									SC		
103									SC		
104									SC		
105									SC		
106									SC		
107									SC		
108									SC		
109									SC		
110									SC		
111									SC		
112									SC		
113									SC		
114									SC		
115									SC		
116									SC		
117									SC		
118									SC		
119									SC		
120									SC		

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-435</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 4 inch	Boring Location Unit 4 - Maintenance Shop N 363736.38 E 2942141.62	Total Depth 75 feet	
Drilling Contractor and Rig MACTEC / CHARLOTTE / D 50	Elevation at boring 28.87 feet	Ground Water Depth 12 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 139.08 lbs / 30 inches	No. of Samples 22	Date Started 11/20/06
	Borehole Inclination 0	Logged by R. Clark	Date Completed 11/21/06

Reviewed by / Date KR 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	4	5					CH	BEAUMONT; dark grayish brown (10YR 4/2); gravel; CLAY (CH); moist; firm; high plasticity; trace gravel; roots	
2	X	SS 2	4	5					CH	BEAUMONT; dark grayish brown (10YR 4/2); gravel; CLAY (CH); moist; very stiff, high plasticity; trace gravel; roots observed	
3	X	SS 3	4	5					CH	BEAUMONT; dark grayish brown (10YR 4/2); gravel; sand; CLAY (CH); moist; stiff, high plasticity; some gravel; trace sand; mostly clay; subangular gravel	
4	X	SS 4	4	7					CH	BEAUMONT; dark grayish brown (10YR 4/2); gravel; sand; CLAY (CH); moist; stiff, high plasticity; some gravel; trace sand; mostly clay; subangular gravel	
5	X	SS 5	4	7					CH	BEAUMONT; dark grayish brown (10YR 4/2); gravel; sand; CLAY (CH); moist; stiff, high plasticity; some gravel; mostly clay; few sand; subangular to subrounded gravel	
6	X	SS 6	4	7					CH	BEAUMONT; dark grayish brown (10YR 4/2); gravel; sand; CLAY (CH); moist; stiff, high plasticity; some gravel; mostly clay; few sand; subangular to subrounded gravel	
7	X	SS 7	4	7					CH	BEAUMONT; dark grayish brown (10YR 4/2); gravel; sand; CLAY (CH); moist; stiff, high plasticity; some gravel; mostly clay; few sand; subangular to subrounded gravel	
8	X	SS 8	4	7					CH	BEAUMONT; dark grayish brown (10YR 4/2); gravel; sand; CLAY (CH); moist; stiff, high plasticity; some gravel; mostly clay; few sand; subangular to subrounded gravel	
9	X	SS 9	4	7					CH	BEAUMONT; dark grayish brown (10YR 4/2); gravel; sand; CLAY (CH); moist; stiff, high plasticity; some gravel; mostly clay; few sand; subangular to subrounded gravel	
10	X	SS 10	4	7					CH	BEAUMONT; dark grayish brown (10YR 4/2); gravel; sand; CLAY (CH); moist; stiff, high plasticity; some gravel; mostly clay; few sand; subangular to subrounded gravel	
11	X	SS 11	5	21					CH	BEAUMONT; yellowish red (5YR 5/6); CLAY (CH); moist; stiff, high plasticity	
12	X	SS 12	5	21					CH	BEAUMONT; yellowish red (5YR 5/6); CLAY (CH); moist; stiff, high plasticity; mottled	
13	X	SS 13	5	20					CH	BEAUMONT; yellowish red (5YR 5/6); CLAY (CH); moist; stiff, high plasticity; mottled; high toughness	Water at 12 feet BGS
14	X	SS 14	5	21					CH	BEAUMONT; yellowish red (5YR 5/6); CLAY (CH); moist; very stiff, high plasticity; trace calcareous nodules	
15	X	SS 15	5	21					CH	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); wet; very stiff, high plasticity; some silt	
16	X	SS 16	5	21					CH	BEAUMONT; yellowish red (5YR 5/6); CLAY (CH); wet; stiff, high plasticity; high toughness; mottled	
17	X	SS 17	5	21					CH	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); wet; stiff, high plasticity; little silt	
18	X	SS 18	5	21					CH	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); wet; stiff, high plasticity; little silt	
19	X	SS 19	5	24					CH	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); wet; stiff, high plasticity; little silt	
20	X	SS 20	8	18					SM	BEAUMONT; strong brown (7.5YR 5/5); silt; SAND (SM); wet; firm; non-plastic; fine sand; some silt; weak reaction with HCl	Switch to mud rotary wash at 20 feet BGS
21	X	SS 21	8	18					SM	BEAUMONT; strong brown (7.5YR 5/5); silt; SAND (SM); wet; firm; non-plastic; fine sand; some silt; weak reaction with HCl	
22	X	SS 22	8	18					SM	BEAUMONT; strong brown (7.5YR 5/5); silt; SAND (SM); wet; firm; non-plastic; fine sand; some silt; weak reaction with HCl	
23	X	SS 23	8	18					SM	BEAUMONT; strong brown (7.5YR 5/5); silt; SAND (SM); wet; firm; non-plastic; fine sand; some silt; weak reaction with HCl	
24	X	SS 24	7	15					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; non-plastic; fine sand; some silt; weak reaction with HCl	
25	X	SS 25	9	18					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; non-plastic; fine sand; some silt; weak reaction with HCl	
26	X	SS 26	9	18					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; non-plastic; fine sand; some silt; weak reaction with HCl	
27	X	SS 27	9	18					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; non-plastic; fine sand; some silt; weak reaction with HCl	
28	X	SS 28	9	18					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; non-plastic; fine sand; some silt; weak reaction with HCl	
29	X	SS 29	18	10					SM	BEAUMONT; strong brown (5YR 5/6); silt; clay; SAND (SM); wet; dense; non-plastic; fine sand; some silt; trace clay; weak reaction with HCl	
30	X	SS 30	19	18					SM	BEAUMONT; strong brown (5YR 5/6); silt; clay; SAND (SM); wet; dense; non-plastic; fine sand; some silt; trace clay; weak reaction with HCl	
31	X	SS 31	20	18					SM	BEAUMONT; strong brown (5YR 5/6); silt; clay; SAND (SM); wet; dense; non-plastic; fine sand; some silt; trace clay; weak reaction with HCl	
32	X	SS 32	20	18					SM	BEAUMONT; strong brown (5YR 5/6); silt; clay; SAND (SM); wet; dense; non-plastic; fine sand; some silt; trace clay; weak reaction with HCl	
33	X	SS 33	20	18					SM	BEAUMONT; strong brown (5YR 5/6); silt; clay; SAND (SM); wet; dense; non-plastic; fine sand; some silt; trace clay; weak reaction with HCl	
34	X	SS 34	11	16					SM	BEAUMONT; brownish yellow (10YR 6/6); silt; clay; SAND (SM); wet; very firm; non-plastic; fine sand; some silt; trace clay; weak reaction with HCl	
35	X	SS 35	11	18					SM	BEAUMONT; brownish yellow (10YR 6/6); silt; clay; SAND (SM); wet; very firm; non-plastic; fine sand; some silt; trace clay; weak reaction with HCl	
36	X	SS 36	10	18					SM	BEAUMONT; brownish yellow (10YR 6/6); silt; clay; SAND (SM); wet; very firm; non-plastic; fine sand; some silt; trace clay; weak reaction with HCl	
37	X	SS 37	10	18					SM	BEAUMONT; brownish yellow (10YR 6/6); silt; clay; SAND (SM); wet; very firm; non-plastic; fine sand; some silt; trace clay; weak reaction with HCl	
38	X	SS 38	10	18					SM	BEAUMONT; brownish yellow (10YR 6/6); silt; clay; SAND (SM); wet; very firm; non-plastic; fine sand; some silt; trace clay; weak reaction with HCl	Difficult drilling from 37 to 38 feet
39	X	SS 39	18	18					SM	BEAUMONT; brownish yellow (10YR 6/6); gravel; clay; silt; SAND (SM); wet; firm; non-plastic; fine	
40	X	SS 40	18	18					SM	BEAUMONT; brownish yellow (10YR 6/6); gravel; clay; silt; SAND (SM); wet; firm; non-plastic; fine	

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-435</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
40									CH	sand; some silt; trace clay; subangular and subrounded gravel; calcareous nodules BEAUMONT; strong brown (7.5YR 5/6); sand; silt; CLAY (CH); moist; very stiff; high plasticity; trace sand; trace silt; weak reaction with HCl BEAUMONT; strong brown (7.5YR 5/6); CLAY (CH); moist; stiff; high plasticity; high toughness; weak reaction with HCl BEAUMONT; greenish gray (GLE 1 6/1); CLAY (CH); moist; stiff; high plasticity; weak reaction with HCl; trace subrounded calcareous concretions BEAUMONT; strong brown (7.5YR 5/6); silt; sand; CLAY (CH); moist; very stiff; medium plasticity; some silt; trace fine sand; weak reaction with HCl; calcareous nodules BEAUMONT; strong brown (7.5YR 5/6); silt; sand; CLAY (CH); wet; very stiff; medium plasticity; some silt; trace fine sand; weak reaction with HCl; calcareous nodules
41										
42										
43										
44	X	SS 16	10	20						
45										
46										
47										
48										
49	X	SS 17	5	20						
50										
51										
52										
53										
54	X	SS 18	8 11	18						
55			13	18						
56										
57										
58										
59	X	SS 19	6 8	18						
60			11	18						
61										
62										
63										
64	X	SS 20	10 22	17					SC	
65			39	18						
66										
67										
68										
69	X	SS 21	9 16	16					SM	
70			22	18						
71										
72										
73										
74	X	SS 22	15 24	16						
75			35	18						
76										
77										
78										
79										
80										



Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-436</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 4 inch		Boring Location N 363681.44 E 2942034.98		Total Depth 75 feet	
Drilling Contractor and Rig Lewis Drilling / B 57		Elevation at boring 30.25 feet		Ground Water Depth 18.5 feet	
Sampling Method Split Spoon		Sample Driving Hammer/Drop 139.58 lbs / 30 inches		No. of Samples 22	
		Borehole Inclination 0		Logged by G. Geras	
				Date Started 11/18/06	
				Date Completed 11/19/06	

Reviewed by / Date KM 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/18 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	ANN 4	4.5 18					CH	BEAUMONT; dark gray (GLEY 1 4/N); silt; CLAY (CH); dry; firm; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
2	X	SS 2	ANN 4	11 18					CH	BEAUMONT; dark gray (GLEY 1 4/N); silt; CLAY (CH); dry; firm; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
3	X	SS 3	ANN 4	9 18					CH	BEAUMONT; dark gray (GLEY 1 4/N) mottled strong brown (7.5YR 4/6); silt; CLAY (CH); dry; firm; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
4	X	SS 4	ANN 4	11 18					CH	BEAUMONT; gray (GLEY 1 6/N) mottled yellowish red (5YR 4/6); silt; CLAY (CH); dry; stiff; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
5	X	SS 5	ANN 4	14 18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; firm; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
6	X	SS 6	ANN 4	9 18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; firm; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
7	X	SS 7	ANN 4	15 18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; firm; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
8	X	SS 8	ANN 4	18 18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; firm; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules; trace ferrous nodules	
9	X	SS 9	ANN 4	16 18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; firm; some silt; mostly clay; strong reaction with HCl; trace calcareous nodules; trace ferrous nodules	
10	X	SS 10	ANN 4	17.5 18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; firm; little silt; mostly clay	
11											
12											
13											
14											
15											
16											
17											
18											
19	X	SS 11	ANN 2	18 18					ML	BEAUMONT; yellowish red (5YR 4/6) and slight greenish gray (GLEY 1 6/1) mottling; silt; CLAY (CH); dry; stiff; little silt; mostly clay	
20											
21											
22											
23											
24	X	SS 12	ANN 4	18 18					SM	BEAUMONT; strong brown (7.5YR 4/6); silt; SAND (SM); wet; very loose; some silt; mostly fine sand	
25											
26											
27											
28											
29	X	SS 13	ANN 1	18 18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); moist; very firm; little silt; mostly fine sand	
30											
31											
32											
33											
34	X	SS 14	ANN 20	12 18					SM	BEAUMONT; dark yellowish brown (10YR 4/6); silt; SAND (SM); moist; loose; little silt; mostly fine sand	
35											
36											
37											
38											
39	X	SS 15	ANN 3	11 18					SM	BEAUMONT; dark yellowish brown (10YR 4/6); silt; SAND (SM); moist; loose; little silt; mostly fine sand	
40											

Water level at 18.5 feet BGS  
 Switch to mud rotary drilling at 30 feet BGS

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-436</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM	sand	
41											
42											
43											
44	X	SS 16	2 4 11	16 18					CH	BEAUMONT; yellowish red (5YR 4/6); sand; silt; CLAY (CH); dry; stiff; trace sand; little silt; mostly clay; few fine sand laminae in sample	
45											
46											
47											
48											
49	X	SS 17	2 5 6	18 18						BEAUMONT; dark grayish brown (10YR 4/2); silt; CLAY (CH); dry; stiff; few silt; mostly clay	
50											
51											
52											
53											
54	X	SS 18	0 4 6	18 18						BEAUMONT; greenish gray (GLEY 1 5/1); sand; silt; CLAY (CH); dry; stiff; few clay; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules	
55											
56											
57											
58											
59	X	SS 19	4 4 7	18 18						BEAUMONT; greenish gray (GLEY 1 5/1) mottled with dark yellowish brown (10YR 4/6); sand; silt; CLAY (CH); dry; stiff; few sand; little silt; mostly clay; trace calcareous nodules; strong reaction with HCL	
60											
61											
62											
63											
64	X	SS 20	3 5 12	18 18						BEAUMONT; brown (7.5YR 4/4); silt; sand; CLAY (CH); dry; very stiff; some sand; little silt; some clay	
65									SM	BEAUMONT; brown (7.5YR 4/4); silt; SAND (SM); wet; firm; some silt; mostly fine sand	
66											
67											
68											
69	X	SS 21	12 10 11	14 18						BEAUMONT; dark yellowish brown (10YR 4/4); silt; SAND (SM); wet; very firm; little silt; mostly fine sand	
70											
71											
72											
73											
74	X	SS 22	10 18 25	10.5 18						BEAUMONT; brown (10YR 5/3); silt; SAND (SM); moist; dense; little silt; mostly fine sand	
75										Boring Terminated at 75 feet	
76											
77											
78											
79											
80											

Project Name : Job Number		<b>SOIL LOG - Boring No. B-437</b>	
STP COL : 5050-06-0495		<b>MACTEC</b>	
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 4 inch	Boring Location Unit 4 - Maintenance Shop N 363679.95 E 2942247.72	Total Depth 75 feet	
Drilling Contractor and Rig MACTEC / CHARLOTTE / D 50	Elevation at boring 28.18 feet	Ground Water Depth 19 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 139.08 lbs / 30 inches	No. of Samples 22	Date Started 11/21/06
	Borehole Inclination 0	Logged by R. Clark	Date Completed 11/22/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Alterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0									CH	BEAUMONT; dark grayish brown (10YR 4/2); gravel; CLAY (CH); dry; firm; high plasticity; trace gravel; roots observed; low reaction with HCl	
1	X	SS 1	14	7					CH	BEAUMONT; dark grayish brown (10YR 4/2); CLAY (CH); dry; very stiff; high plasticity; trace gravel; subrounded gravel; roots observed; low reaction with HCl	
2	X	SS 2	12	12					CH	BEAUMONT; yellowish brown (10YR 5/4); CLAY (CH); moist; stiff; high plasticity; trace gravel; low reaction with HCl	
3	X	SS 3	12	18					CH	BEAUMONT; reddish yellow (7.5YR 6/6); gravel, CLAY (CH); moist; stiff; high plasticity	
4	X	SS 4	12	17					CH	BEAUMONT; reddish yellow (7.5YR 6/6); CLAY (CH); moist; stiff; high plasticity; low reaction with HCl	
5	X	SS 5	12	14					CH	BEAUMONT; strong brown (7.5YR 5/6); CLAY (CH); moist; stiff; high plasticity; low reaction with HCl	
6	X	SS 6	12	21					CH	BEAUMONT; strong brown (7.5YR 5/6); CLAY (CH); moist; very stiff; high plasticity	
7	X	SS 7	12	18					CH	BEAUMONT; strong brown (7.5YR 5/6); CLAY (CH); moist; very stiff; high plasticity; low reaction with HCl; trace calcareous nodules	
8	X	SS 8	12	15					CH	BEAUMONT; strong brown (7.5YR 5/6); CLAY (CH); moist; very stiff; high plasticity; low reaction with HCl	
9	X	SS 9	12	20					CH	BEAUMONT; strong brown (7.5YR 5/6); CLAY (CH); moist; stiff; high plasticity; low reaction with HCl	
10	X	SS 7	11	18					CH	BEAUMONT; strong brown (7.5YR 5/6); CLAY (CH); moist; stiff; high plasticity; low reaction with HCl	
11	X	SS 8	10	20					CH	BEAUMONT; strong brown (7.5YR 5/6); CLAY (CH); moist; stiff; high plasticity; low reaction with HCl	
12	X	SS 9	10	20					CH	BEAUMONT; strong brown (7.5YR 5/6); CLAY (CH); moist; very stiff; high plasticity	
13	X	SS 9	10	20					CH	BEAUMONT; strong brown (7.5YR 5/6); CLAY (CH); moist; very stiff; high plasticity; low reaction with HCl; trace calcareous nodules	
14	X	SS 10	10	16					CH	BEAUMONT; strong brown (7.5YR 5/6); CLAY (CH); moist; very stiff; high plasticity; low reaction with HCl	
15	X	SS 10	10	18					CH	BEAUMONT; strong brown (7.5YR 5/6); CLAY (CH); moist; very stiff; high plasticity; low reaction with HCl	
16											
17											
18											
19	X	SS 11	6	20					SM	BEAUMONT; strong brown (7.5YR 5/6); CLAY (CH); moist; stiff; high plasticity; low reaction with HCl	Water level at 19 feet BGS
20			7	18					SM	BEAUMONT; strong brown (7.5YR 5/6); CLAY (CH); moist; stiff; high plasticity; low reaction with HCl	Switch to Mud Rotary drilling at 20 feet BGS
21											
22											
23											
24	X	SS 12	8	18					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; clay; SAND (SM); wet; firm; non-plastic; mostly fine sand; little silt; few clay; low reaction with HCl	
25	X	SS 13	15	18					SM	BEAUMONT; brownish yellow (10YR 6/6); silt; clay; SAND (SM); wet; very firm; non-plastic; mostly fine sand; little silt; few clay; low reaction with HCl	
26											
27											
28											
29	X	SS 13	9	14					SM	BEAUMONT; brownish yellow (10YR 6/6); silt; clay; SAND (SM); wet; dense; non-plastic; mostly fine sand; little silt; few clay; low reaction with HCl	
30			15	18					SM	BEAUMONT; brownish yellow (10YR 6/6); silt; clay; SAND (SM); wet; dense; non-plastic; mostly fine sand; little silt; few clay; low reaction with HCl	
31											Difficult drilling at 31 feet
32											
33											
34	X	SS 14	9	18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; clay; SAND (SM); wet; firm; non-plastic; mostly fine sand; little silt; few clay; low reaction with HCl	
35			9	18					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; clay; SAND (SM); wet; firm; non-plastic; mostly fine sand; little silt; few clay; low reaction with HCl	
36											
37											
38											
39	X	SS 15	9	19					SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; firm; non-plastic; mostly fine	
40									CH	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; firm; non-plastic; mostly fine	

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-437</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									CH	sand; little silt; few clay; low reaction with HCl BEAUMONT; strong brown (7.5YR 5/6); CLAY (CH); moist; stiff; high plasticity; high toughness; low reaction with HCl	
41											
42											
43											
44	X	SS 16	6 8	14 18						BEAUMONT; strong brown (7.5YR 5/6); CLAY (CH); moist; stiff; high plasticity; high toughness; low reaction with HCl	
45									SC		
46										BEAUMONT; yellowish brown (10YR 5/6); clay; SAND (SC); very firm; non-plastic; fine sand; some clay; low reaction with HCl	
47											
48											
49	X	SS 17	4 4	20 18					CH	BEAUMONT; greenish gray (Gley1 6/1); CLAY (CH); moist; stiff; high plasticity; trace calcareous nodules	
50											
51											
52											
53											
54	X	SS 18	13 16	21 18						BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; hard; medium to high plasticity; some silt; trace calcareous nodules; low reaction with HCl	
55											
56											
57											
58											
59	X	SS 19	5 6	18 18						BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; stiff; high plasticity; some silt; trace calcareous nodules; low reaction with HCl	
60											
61											
62											
63											
64	X	SS 20	4 5	18 18					ML	BEAUMONT; yellowish brown (10YR 5/4); clay; SILT (ML); moist; very stiff; high plasticity; mostly silt; some clay; low reaction with HCl	
65											
66											
67											
68											
69	X	SS 21	22 25	17 18					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; clay; SAND (SM); wet; very dense; non-plastic; mostly fine sand; little silt; few clay; low reaction with HCl	
70											
71											
72											
73											
74	X	SS 22	20 29	18 18						BEAUMONT; yellowish brown (10YR 5/6); silt; clay; SAND (SM); wet; dense; non-plastic; mostly fine sand; little silt; few clay; low reaction with HCl	
75											
76										Boring Terminated at 75-feet	
77											
78											
79											
80											

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-438</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Rotary wash / 4 inch		Boring Location Maintenance Shop N 363791.36 E 2942033.39		Total Depth 125 feet	
Drilling Contractor and Rig Gregg #1 / FRASTE MDXL		Elevation at boring 30.19 feet		Ground Water Depth 23.5 feet	
Sampling Method Split Spoon/UD		Sample Driving Hammer/Drop 140 lbs / 30 inches		No. of Samples 30	
		Borehole Inclination 0		Logged by W. Miller	
				Date Started 11/15/06	
				Date Completed 11/16/06	

Reviewed by / Date KM 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	14	18					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); moist; firm; high plasticity; medium toughness	
2	X	SS 2	12	18					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); moist; firm; high plasticity; medium toughness	
3	X	SS 3	12	18					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); moist; stiff; high plasticity; medium toughness	
4	X	SS 4	9	18					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); moist; stiff; high plasticity; medium toughness	
5	X	SS 5	16	18					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); moist; stiff; high plasticity; medium toughness	
6	X	SS 6	14	18					CH	BEAUMONT; black (GLEY 1 2.5/N) with trace reddish brown mottling (5YR 5/3); silt; CLAY (CH); moist; stiff; high plasticity; medium to high toughness; few <1/4" dia calcareous nodules	
7	X	SS 7	20	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; medium toughness	
8	X	SS 8	20	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; medium toughness	
9	X	SS 9	24	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; firm; high plasticity; medium toughness	
10	X	SS 10	16	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; medium toughness	
11											
12											
13											
14											
15											
16											
17											
18											
19		UD 1	N/A	26	24						
20											
21											
22											
23											
24	X	SS 11	14	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; loose; mostly fine sand; some silt	Water level at 23.5 feet BGS
25											
26											
27											
28											
29	X	SS 12	11	15	19					BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; mostly fine sand; some silt	
30											
31											
32											
33											
34		UD 2	N/A	0	24					BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; mostly fine sand; some silt	
35											
36											
37											
38											
39	X	SS 13	9	14	19					BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; dense; mostly fine sand; some silt	
40											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-438</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44		UD 3	N/A	26/24							
45									ML	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; mostly fine sand; some silt; trace medium sand; non plastic	
46										BEAUMONT; brown (7.5YR 5/4); clay; sand; SILT (ML); moist; low plasticity; mostly silt; some fine sand; trace clay	
47											
48											
49	X	SS 14	14.3/7	25/18					CH	BEAUMONT; grayish brown (10YR 5/2); silt; CLAY (CH); moist; stiff; high plasticity; medium toughness; high shell fragment concentration (49.5 to 50 feet)	
50											
51											
52											
53											
54	X	SS 15	9.5/4	21/18						BEAUMONT; greenish gray (GLE 1 5/1); silt; CLAY (CH); moist; stiff; high plasticity; medium toughness; some 1/8" +/- dia calcareous nodules	
55											
56											
57											
58											
59	X	SS 16	5.0/3	21/18					ML	BEAUMONT; brown (7.5YR 5/4); SILT (ML); moist; stiff; low plasticity; low toughness	
60											
61											
62											
63											
64	X	SS 17	8/14/16	15/18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); moist; very firm; non-plastic; mostly fine sand; some silt; slight increase in fines with depth	
65											
66											
67											
68											
69	X	SS 18	15/14/15	11/18						BEAUMONT; brown (10YR 5/3); silt; SAND (SM); wet; very firm; non-plastic; mostly fine sand; some silt; trace medium sand	
70											
71											
72											
73											
74	X	SS 19	12/15/20	14/18						BEAUMONT; brown (10YR 5/3); silt; SAND (SM); wet; dense; non-plastic; mostly fine sand; some silt; trace medium sand	
75											
76											
77											
78											
79	X	SS 20	6/10/11	24/18					CH	BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness	
80											

Project Name : Job Number



**SOIL LOG - Boring No. B-438**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									CH		
81											
82											
83											
84	X	SS 21	7 11 13	21 18							BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; trace < 1/8" dia. calcareous nodules
85											
86											
87											
88											
89	X	SS 22	10 10 10	22 18							BEAUMONT; brown (7.5YR 4/3) with trace gray mottling; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; slight silt increase 89.5 to 89.8 feet; trace < 1/8" dia. calcareous nodules
90											
91											
92											
93											
94	X	SS 23	18 30 34	13 18					SM		BEAUMONT; brown (10YR 5/3); silt; SAND (SM); wet; very dense; non-plastic; mostly fine sand; some silt; trace medium sand at 95 feet
95											
96											
97											
98											
99	X	SS 24	13 23 28	15 18							BEAUMONT; brown (10YR 5/3); silt; SAND (SM); wet; very dense; non-plastic; mostly fine sand; some silt; trace to little medium sand (99.3 to 99.5 feet);
100											
101											
102											
103											
104											
105											
106											
107											
108											
109	X	SS 25	11 13 13	11 18							BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; very firm; non-plastic; mostly fine sand; little silt
110											
111											
112											
113											
114											
115											
116											
117											
118											
119	X	SS 26	6 10 11	22 18					CH		BEAUMONT; yellowish red (5YR 4/6) with trace gray mottling; silt; CLAY (CH); moist; very stiff;
120											

Project Name : Job Number



SOIL LOG - Boring No. B-438

STP COL : 505D-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									CH	high plasticity; high toughness; trace calcareous nodules	
121											
122											
123											
124	X	SS 27	9 11 15	22 18							
125										BEAUMONT; yellowish red (5YR 4/6) with trace gray mottling; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness	
126										Boring Terminated at 125 feet	
127											
128											
129											
130											
131											
132											
133											
134											
135											
136											
137											
138											
139											
140											
141											
142											
143											
144											
145											
146											
147											
148											
149											
150											
151											
152											
153											
154											
155											
156											
157											
158											
159											
160											



Project Name : Job Number		<b>SOIL LOG - Boring No. B-439</b>	
STP COL : 5050-06-0496		<b>MACTEC</b>	
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 4 inch	Boring Location N 363790.82 E 2942250.03	Maintenance Shop	Total Depth 125 feet
Drilling Contractor and Rig Lewis Drilling / B 57	Elevation at boring 28.7 feet	Ground Water Depth 18.5 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 139.58 lbs / 30 inches	No. of Samples 30	Date Started 11/19/06
	Borehole Inclination 0	Logged by G. Geras	Date Completed 11/21/06

Reviewed by / Date KM 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0									CH	BEAUMONT; black (GLEY 1 2.5/N); CLAY (CH); dry; firm; little silt; mostly clay; strong reaction with HCl; trace calcareous nodules; trace organics (grass)	
1	X	SS 1	18	8					CH		
2	X	SS 2	18	8.5					CH		
3	X	SS 3	18	11.5					CH		
4	X	SS 4	18	18					CH		
5	X	SS 5	18	18					CH		
6	X	SS 6	18	12.5					CH		
7	X	SS 7	18	18					CH		
8	X	SS 8	18	17.5					CH		
9	X	SS 9	18	18					CH		
10	X	SS 10	18	18					CH		
11	X	SS 11	18	18					CH		
12	X	SS 12	18	18					CH		
13	X	SS 13	18	18					CH		
14	X	SS 14	18	18					CH		
15	X	SS 15	18	18					CH		
16											
17											
18											
19	X	SS 11	18	18					ML		Water level at 18.5 feet BGS
20											
21											Switch to mud rotary drilling at 35 feet BGS
22											
23											
24	X	SS 12	18	18					SM		
25											
26											
27											
28											
29	X	SS 13	10.5	18							
30											
31											
32											
33											
34	X	SS 14	2	18							
35			4	18							
36			10	18							
37											
38											
39	X	SS 15	20	15							
40			43	18							

Project Name : Job Number



**SOIL LOG - Boring No. B-439**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM	sand; trace cemented sand nodules	
41											
42											
43											
44	X	SS 16	3	18					CH	BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CH); dry; firm; few sand; few silt; mostly clay; fine sand; strong reaction with HCl; trace calcareous nodules	
45											
46											
47											
48											
49	X	SS 17	2	18						BEAUMONT; greenish gray (GLEYS 1 5/1) mottled yellowish brown (10YR 5/6); silt; CLAY (CH); dry; soft; few silt; few sand; mostly clay; trace shells	
50											
51											
52											
53											
54	X	SS 18	2	18						BEAUMONT; greenish gray (GLEYS 1 5/1) slightly mottled yellowish brown (10YR 5/4); silt; CLAY (CH); dry; stiff; few silt; few sand; mostly clay; strong reaction with HCl; trace calcareous nodules	
55											
56											
57											
58											
59	X	SS 19	2	18						BEAUMONT; strong brown (7.5YR 4/6) slightly mottled greenish gray (GLEYS 1 5/1); sand; CLAY (CH); dry; stiff; few silt; some sand; mostly clay	
60											
61											
62											
63											
64	X	SS 20	2	18					SP-SC	BEAUMONT; strong brown (7.5YR 4/6); clay; SAND (SP-SC); dry; firm; few silt; some clay; mostly fine sand	
65											
66											
67											
68									SM		
69	X	SS 21	12	10						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; little silt; mostly fine sand	
70											
71											
72											
73											
74	X	SS 22	9	9						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; little silt; mostly fine sand	
75											
76											
77											
78											
79	X	SS 23	7	18					CH	BEAUMONT; brown (7.5YR 4/3); sand; CLAY (CH); dry; very stiff; little sand; few silt; mostly clay;	
80											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-439</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
80									CH	strong reaction with HCl; trace calcareous nodules
81										
82										
83										
84	X	SS 24	9 17 22	14 18					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; some silt; mostly sand; fine sand
85										
86										
87										
88										
89	X	SS 25	13 16 20	14 18						BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); moist; dense; little silt; mostly sand
90										
91										
92										
93										
94	X	SS 26	4 6 10	18 18						BEAUMONT; brown (10YR 4/3); silt; SAND (SM); wet; firm; some silt; mostly fine sand
95										
96										
97										
98										
99	X	SS 27	8 11 16	13.5 18						BEAUMONT; brown (10YR 4/3); silt; SAND (SM); wet; very firm; little silt; mostly fine sand
100										
101										
102										
103										
104										
105										
106										
107										
108										
109	X	SS 28	15 24 28	12.5 18					SP-SM	BEAUMONT; yellowish brown (10YR 5/4); gravel; SAND (SP-SM); moist; very dense; few silt; some fine gravel; mostly fine and medium sand
110										
111										
112										
113										
114										
115										
116										
117										
118										
119	X	SS 29	8 10 13	18 18					GP CH	BEAUMONT; yellowish brown (10YR 5/4); sand; GRAVEL (GP); wet; very firm; few silt; some fine
120										

Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-439</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120											
121								CH	CH	sand; mostly coarse gravel	
122								CH	CH	BEAUMONT; yellowish red (5YR 4/6) with light greenish gray (GLE 1 7/1) mottling; silt; CLAY (CH); dry; very stiff, little silt; mostly clay	
123								CH	CH		
124	X	SS 30	1706	16				CH	CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; very stiff, little silt; mostly clay	
125											
126											Boring Terminated at 125 feet
127											
128											
129											
130											
131											
132											
133											
134											
135											
136											
137											
138											
139											
140											
141											
142											
143											
144											
145											
146											
147											
148											
149											
150											
151											
152											
153											
154											
155											
156											
157											
158											
159											
160											

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-440</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 3 inch		Boring Location N 363281.42 E 2942249.68		Total Depth 200 feet	
Drilling Contractor and Rig EEI / CME 75		Elevation at boring 31.13 feet		Ground Water Depth 12 feet	
Sampling Method Split Spoon		Sample Driving Hammer/Drop 138 lbs / 30 inches		No. of Samples 37	
		Borehole Inclination 0		Logged by D. Tibbals	
				Date Started 12/31/06	
				Date Completed 1/3/07	

Reviewed by / Date KLW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Flows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	15	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	
2	X	SS 2	16	18					CH	BEAUMONT; gray (5YR 5/1); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
3	X	SS 3	10	18					CH	BEAUMONT; dark gray (5YR 4/1); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
4	X	SS 4	10	18					CH	BEAUMONT; reddish brown (5YR 4/3); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	
5	X	SS 5	14	18					CH	BEAUMONT; reddish brown (5YR 4/3); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	
6	X	SS 6	12	18					CH	BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
7	X	SS 7	20	18					CH	BEAUMONT; reddish brown (5YR 4/3); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	
8	X	SS 8	19	18					CH	BEAUMONT; reddish brown (5YR 4/3); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	
9	X	SS 9	20	18					CH	BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	Water level at 12 feet BGS
10	X	SS 10	14	18					CH	BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
11											
12											
13											
14											
15											
16											
17											
18											
19	X	SS 11	21	18					SM	BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
20											
21											
22											
23											
24	X	SS 12	23	18					SM	BEAUMONT; red (2.5YR 5/6) with light gray mottling; silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	Switch to mud rotary drilling at 15 feet BGS
25											
26											
27											
28											
29	X	SS 13	17	18					SM	BEAUMONT; strong brown (7.5YR 5/8); silt; SAND (SM); wet; firm; poorly graded; mostly fine sand; some silt	
30											
31											
32											
33											
34	X	SS 14	14	13					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; very firm; poorly graded; mostly fine sand; little silt	
35											
36											
37											
38											
39	X	SS 15	10	13					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; dense; poorly graded; mostly fine sand; little silt	
40											

Project Name : Job Number



**SOIL LOG - Boring No. B-440**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41									SM		
42									SM		
43									SM		
44	X	SS 16	20 18 11	19 18					SM		BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; very firm; poorly graded; mostly fine sand; little silt.
45									CH		BEAUMONT; red (2.5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
46									CH		BEAUMONT; red (2.5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
47									CH		BEAUMONT; red (2.5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
48									CH		BEAUMONT; red (2.5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
49	X	SS 17	5 5	15 18					ML		BEAUMONT; reddish brown (5YR 5/4); sand; SILT (ML); wet; stiff; high plasticity; low toughness; mostly silt; some sand
50									ML		BEAUMONT; reddish brown (5YR 5/4); sand; SILT (ML); wet; stiff; high plasticity; low toughness; mostly silt; some sand
51									ML		BEAUMONT; reddish brown (5YR 5/4); sand; SILT (ML); wet; stiff; high plasticity; low toughness; mostly silt; some sand
52									ML		BEAUMONT; reddish brown (5YR 5/4); sand; SILT (ML); wet; stiff; high plasticity; low toughness; mostly silt; some sand
53									ML		BEAUMONT; reddish brown (5YR 5/4); sand; SILT (ML); wet; stiff; high plasticity; low toughness; mostly silt; some sand
54	X	SS 18	20 20 6	26 18					CH		BEAUMONT; greenish gray (GLEY 2 10G 6/1); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt
55									CH		BEAUMONT; greenish gray (GLEY 2 10G 6/1); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt
56									CH		BEAUMONT; greenish gray (GLEY 2 10G 6/1); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt
57									CH		BEAUMONT; greenish gray (GLEY 2 10G 6/1); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt
58									CH		BEAUMONT; greenish gray (GLEY 2 10G 6/1); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt
59	X	SS 19	7 10 15	20 18					CH		BEAUMONT; greenish gray (GLEY 2 5BG 5/1); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
60									CH		BEAUMONT; greenish gray (GLEY 2 5BG 5/1); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
61									CH		BEAUMONT; greenish gray (GLEY 2 5BG 5/1); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
62									CH		BEAUMONT; greenish gray (GLEY 2 5BG 5/1); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
63									CH		BEAUMONT; greenish gray (GLEY 2 5BG 5/1); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
64	X	SS 20	20 20 6	15 18					CH		BEAUMONT; dark reddish gray (5YR 4/2); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt
65									CH		BEAUMONT; dark reddish gray (5YR 4/2); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt
66									CH		BEAUMONT; dark reddish gray (5YR 4/2); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt
67									CH		BEAUMONT; dark reddish gray (5YR 4/2); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt
68									CH		BEAUMONT; dark reddish gray (5YR 4/2); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt
69	X	SS 21	6 8 10	18 18					CH		BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
70									CH		BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
71									CH		BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
72									CH		BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
73									CH		BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
74	X	SS 22	20 26 28	6 18					SM		BEAUMONT; brown (7.5YR 5/3); silt; SAND (SM); wet; very dense; poorly graded; mostly fine sand; little silt
75									SM		BEAUMONT; brown (7.5YR 5/3); silt; SAND (SM); wet; very dense; poorly graded; mostly fine sand; little silt
76									SM		BEAUMONT; brown (7.5YR 5/3); silt; SAND (SM); wet; very dense; poorly graded; mostly fine sand; little silt
77									SM		BEAUMONT; brown (7.5YR 5/3); silt; SAND (SM); wet; very dense; poorly graded; mostly fine sand; little silt
78									SM		BEAUMONT; brown (7.5YR 5/3); silt; SAND (SM); wet; very dense; poorly graded; mostly fine sand; little silt
79	X	SS 23	18 36 30	13 18					SP		BEAUMONT; brown (7.5YR 5/3); silt; SAND (SP); wet; very dense; poorly graded; mostly fine sand;
80									SP		BEAUMONT; brown (7.5YR 5/3); silt; SAND (SP); wet; very dense; poorly graded; mostly fine sand;

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-440</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SP	few silt	
81											
82											
83											
84	X	SS 24	9 14	29 18					CH	BEAUMONT; reddish brown (2.5YR 4/3); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
85											
86											
87											
88											
89	X	SS 25	7 12	22 18						BEAUMONT; reddish brown (2.5YR 4/3); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
90											
91											
92											
93											
94	X	SS 26	8 14	20 18						BEAUMONT; reddish brown (2.5YR 4/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
95											
96											
97											
98											
99	X	SS 27	8 12	20 18						BEAUMONT; reddish brown (2.5YR 4/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
100											
101											
102											
103											
104											
105											
106											
107											
108											
109	X	SS 28	24 34	11 18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; very dense; poorly graded; mostly fine sand; few silt; little medium sand	
110											
111											
112											
113											
114											
115											
116											
117											
118											
119	X	SS 29	13 14 16	24 18					CH	BEAUMONT; greenish gray (GLEY 2 10G 6/1); silt; CLAY (CH); moist; very stiff; high plasticity; high	
120											

Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-440</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									CH	toughness; mostly clay; little silt	
121											
122											
123											
124											
125											
126											
127											
128											
129	X	SS 30	17 20 22	18 18						BEAUMONT; red (2.5YR 5/6); silt; CLAY (CH); moist; hard; high plasticity; high toughness; mostly clay; little silt	
130											
131											
132											
133											
134											
135											
136											
137											
138											
139	X	SS 31	13 10 14	18 18						BEAUMONT; greenish gray (GLEY 2 10G 6/1); sand; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little sand	
140											
141											
142											
143											
144											
145											
146											
147											
148											
149	X	SS 32	17 20 23	12 18					SC	BEAUMONT; brown (7.5YR 5/2); clay; SAND (SC); wet; dense; fine; poorly graded; mostly sand; little clay	
150									CL	BEAUMONT; greenish gray (GLEY 2 10G 6/1); sand; CLAY (CL); moist; hard; low plasticity; medium toughness; mostly clay; some sand	
151											
152											
153											
154											
155											
156											
157											
158											
159	X	SS 33	29 32	10 18					CH	BEAUMONT; red (2.5YR 5/6); silt; CLAY (CH); dry; hard; high plasticity; high toughness; mostly clay;	
160											



Project Name : Job Number 	<b>SOIL LOG - Boring No. B-440</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
160								Lithology	CH	little silt; little mottling
161								Lithology		
162								Lithology		
163								Lithology		
164								Lithology		
165								Lithology		
166								Lithology		
167								Lithology		
168								Lithology		
169	X	SS 34	23 16 22	18 18				Lithology		BEAUMONT; red (2.5YR 5/6); silt; CLAY (CH); moist; hard; high plasticity; high toughness; mostly clay; little silt
170								Lithology		
171								Lithology		
172								Lithology		
173								Lithology		
174								Lithology		
175								Lithology		
176								Lithology		
177								Lithology		
178								Lithology		
179	X	SS 35	10 10 16	23 18				Lithology		BEAUMONT; red (2.5YR 5/6); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
180								Lithology		
181								Lithology		
182								Lithology		
183								Lithology		
184								Lithology		
185								Lithology		
186								Lithology		
187								Lithology		
188								Lithology		
189	X	SS 36	11 11 18	20 18				Lithology		BEAUMONT; red (2.5YR 5/6); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
190								Lithology		
191								Lithology		
192								Lithology		
193								Lithology		
194								Lithology		
195								Lithology		
196								Lithology		
197								Lithology		
198								Lithology		
199	X	SS 37	10 10 16	26 18				Lithology		BEAUMONT; brown (7.5YR 5/3); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness;
200								Lithology		

Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-440</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
200										mostly clay; little silt	
201										Boring Terminated at 200-feet	
202											
203											
204											
205											
206											
207											
208											
209											
210											
211											
212											
213											
214											
215											
216											
217											
218											
219											
220											
221											
222											
223											
224											
225											
226											
227											
228											
229											
230											
231											
232											
233											
234											
235											
236											
237											
238											
239											
240											

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-450</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 3 inch		Boring Location N 363539.57 E 2942057.93	Plant Stack Total Depth 100 feet
Drilling Contractor and Rig MACTEC / Raleigh / CME 45C		Elevation at boring 28.84 feet	Ground Water Depth 13.5 feet
Sampling Method Split Spoon		Sample Driving Hammer/Drop 139.62 lbs / 30 inches	No. of Samples 27
		Borehole Inclination 0	Logged by D. Tibbals
			Date Started 11/19/06
			Date Completed 11/20/06

Reviewed by / Date KM 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	14	9					CH	BEAUMONT; black (GLEY 1 2.5/1); silt; CLAY (CH); moist; firm; high plasticity; medium toughness; mostly clay; little silt; high organic matter	
2	X	SS 2	13	18					CH	BEAUMONT; black (GLEY 1 2.5/1); silt; CLAY (CH); moist; firm; high plasticity; medium toughness; mostly clay; little silt; high organic matter	
3	X	SS 3	18	18					CH	BEAUMONT; black (GLEY 1 2.5/1); silt; CLAY (CH); moist; firm; high plasticity; medium toughness; mostly clay; little silt; high organic matter	
4	X	SS 4	20	18					CH	BEAUMONT; very dark gray (10YR 3/1); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; little organic matter	
5	X	SS 5	20	18					CH	BEAUMONT; red (10R 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt; calcareous nodules	
6	X	SS 6	22	18					CH	BEAUMONT; red (10R 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt; calcareous nodules	
7	X	SS 7	20	18					CH	BEAUMONT; red (10R 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt; calcareous nodules	
8	X	SS 8	22	18					CH	BEAUMONT; red (10R 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt; calcareous nodules	
9	X	SS 9	19	18					CH	BEAUMONT; red (10R 4/6); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt; calcareous nodules	
10	X	SS 10	18	18					CH	BEAUMONT; red (10R 5/6); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt; calcareous nodules	Water at 13.5 feet BGS
11											
12											
13											
14											
15											Switch to mud rotary drilling at 15 feet BGS
16											
17											
18											
19	X	SS 11	4	19					SC	BEAUMONT; red (2.5YR 5/6) with gray mottling; silt; CLAY (CH); moist; hard; high plasticity; high toughness; mostly clay; little silt	
20											
21											
22											
23											
24	X	SS 12	5	13					SM	BEAUMONT; yellowish red (5YR 5/6); silt; SAND (SM); wet; firm; non-plastic; poorly graded; mostly fine sand; little silt	
25											
26											
27											
28											
29	X	SS 13	4	18						BEAUMONT; light reddish brown (5YR 6/4); silt; SAND (SM); wet; dense; non-plastic; poorly graded; mostly fine sand; little silt; micaceous	
30											
31											
32											
33											
34	X	SS 14	3	14						BEAUMONT; reddish brown (5YR 5/4); silt; SAND (SM); wet; dense; non-plastic; poorly graded; mostly fine sand; little silt; micaceous	
35											
36											
37											
38											
39	X	SS 15	7	13						BEAUMONT; reddish brown (5YR 5/4); silt; SAND (SM); wet; dense; non-plastic; mostly fine sand;	
40											

Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-450</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
40									SM	little silt; micaceous
41										
42										
43										
44	X	SS 16	513	22					CH	BEAUMONT; reddish brown (2.5YR 5/4) with gray mottling; silt; CLAY (CH); moist; firm; high plasticity; high toughness
45										
46										
47										
48										
49	X	SS 17	612	23					CL	BEAUMONT; mottled olive gray (5Y 5/2); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt
50										
51										
52										BEAUMONT; yellowish red (5YR 4/6); sand; CLAY (CL); moist; firm; low plasticity; low toughness; mostly clay; little sand
53										
54	X	SS 18	406	18					CH	BEAUMONT; gray (5Y 6/1); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; calcareous nodules
55										
56										
57										
58										
59	X	SS 19	713	18					SC	BEAUMONT; gray (5Y 5/1); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; calcareous nodules
60										
61										BEAUMONT; light gray (5Y 7/1); clay; SAND (SC); moist; firm; low plasticity; low toughness
62										
63										
64	X	SS 20	513	9					SM	BEAUMONT; reddish brown (5YR 5/4) and light gray (5Y 7/1); silt; SAND (SM); moist; very firm; non-plastic; mostly fine sand; little silt; poorly graded
65									CH	BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
66										
67										
68										
69	X	SS 21	2520	16					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); dense; non-plastic; mostly fine sand; little silt; poorly graded
70										
71										
72										
73										
74	X	SS 22	1319	13					SC	BEAUMONT; strong brown (7.5YR 5/6); clay; SAND (SC); wet; dense; non-plastic; mostly fine sand; little clay; trace medium sand; poorly graded;
75										
76										
77										
78										
79	X	SS 23	4810	20					CH	BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH); moist; very stiff; high plasticity; high
80										

Project Name : Job Number



**SOIL LOG - Boring No. B-450**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow#/8 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									CH	toughness	
81											
82											
83											
84	X	SS 24	11.00	22 18						BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness	
85											
86											
87											
88											
89	X	SS 25	10.00	22 18						BEAUMONT; reddish brown (5YR 4/3); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt; trace sand	
90											
91											
92											
93											
94	X	SS 26	10.04	24 18						BEAUMONT; reddish brown (5YR 4/3); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little sand	
95									SC	BEAUMONT; red (2.5YR 4/8); clay; SAND (SC); moist; firm; non-plastic; mostly fine sand; little clay; poorly graded	
96											
97											
98											
99	X	SS 27	23.28	12 18					SP	BEAUMONT; reddish gray (2.5YR 5/1); SAND (SP); wet; very dense; mostly fine sand; trace silt; trace medium sand; poorly graded	
100										Boring Terminated at 100 feet	
101											
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-901</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Rotary Wash / 4 inch		Boring Location N 363771.76 E 2941809.14		UHS Basin 100 feet	
Drilling Contractor and Rig Lewis Drilling / Mobile B 57		Elevation at boring 29.26 feet		Ground Water Depth 23.5 feet	
Sampling Method Split Spoon		Sample Driving Hammer/Drop 139.58 lbs / 30 inches		No. of Samples 27	
		Borehole Inclination 0		Logged by G. Geras	
				Date Started 12/14/06	
				Date Completed 12/15/06	

Reviewed by / Date KM 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	10	4					CH	BEAUMONT; black (GLEY 1 2.5/N) with strong brown (7.5YR 5/6) mottling; silt; CLAY (CH); dry; firm; little silt; mostly clay; trace organics	
2	X	SS 2	10	9					CH	BEAUMONT; black (GLEY 1 2.5/N) with strong brown (7.5YR 5/6) mottling; silt; gravel; CLAY (CH); dry; firm; little silt; mostly clay; trace gravel	
3	X	SS 3	10	9					CH	BEAUMONT; black (GLEY 1 2.5/N) with strong brown (7.5YR 5/6) mottling; silt; CLAY (CH); dry; firm; little silt; mostly clay	
4	X	SS 4	10	7					CH	BEAUMONT; black (GLEY 1 2.5/N) with yellowish red (5YR 5/6) mottling; silt; CLAY (CH); dry; firm; little silt; mostly clay	
5	X	SS 5	10	12					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; firm; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
6	X	SS 6	10	8					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; stiff; little silt; mostly clay	
7	X	SS 7	10	13					CH	BEAUMONT; yellowish red (5YR 4/6) with very slight light greenish gray (GLEY 1 10Y 7/1) mottling; silt; CLAY (CH); dry; stiff; little silt; mostly clay	
8	X	SS 8	10	16					CH	BEAUMONT; yellowish red (5YR 4/6) with very slight light greenish gray (GLEY 1 10Y 7/1) mottling; silt; CLAY (CH); dry; stiff; little silt; mostly clay	
9	X	SS 9	10	18					CH	BEAUMONT; yellowish red (5YR 4/6) with very slight light greenish gray (GLEY 1 10Y 7/1) mottling; silt; CLAY (CH); dry; stiff; little silt; mostly clay	
10	X	SS 10	10	18					CH	BEAUMONT; yellowish red (5YR 4/6) with very slight light greenish gray (GLEY 1 10Y 7/1) mottling; silt; CLAY (CH); dry; stiff; little silt; mostly clay	
11	X	SS 11	10	17					CH	BEAUMONT; yellowish red (5YR 5/6) with very slight light greenish gray (GLEY 1 10Y 7/1) mottling; silt; CLAY (CH); dry; stiff; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
12	X	SS 12	10	13					ML	BEAUMONT; brown (7.5YR 5/4); sand; SILT (ML); wet; firm; some fine sand; mostly silt	
13	X	SS 13	10	10					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; some silt; mostly fine sand	
14	X	SS 14	10	12					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; firm; little silt; mostly fine sand	
15	X	SS 15	10	10					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; little silt; mostly fine sand	
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											Water level at 23.5 feet BGS Switch to mud rotary drilling at 25 feet BGS
26											
27											
28											
29											
30											
31											
32											
33											
34											
35											
36											
37											
38											
39											
40											

Project Name : Job Number



**SOIL LOG - Boring No. B-901**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 16	5 7	17 18					CH	BEAUMONT; strong brown (7.5YR 4/6); silt; sand; CLAY (CH); dry; stiff; few fine sand; little silt; mostly clay	
45											
46											
47											
48											
49	X	SS 17	4 7	18 18						BEAUMONT; brown (7.5YR 4/4); silt; sand; CLAY (CH); dry; stiff; few fine sand; little silt; mostly clay; trace shells	
50											
51											
52											
53											
54	X	SS 18	4 7	18 18						BEAUMONT; greenish gray (GLEYS 1 6/5GY); sand; silt; CLAY (CH); dry; stiff; few fine sand; few silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
55											
56											
57											
58											
59	X	SS 19	4 9	16 18						BEAUMONT; reddish brown (5YR 5/4) with slight greenish gray (GLEYS 1 5GY 6/1) mottling; silt; sand; CLAY (CH); dry; very stiff; few fine sand; little silt; mostly clay	
60											
61											
62											
63											
64	X	SS 20	6 13	17 18						BEAUMONT; yellowish red (5YR 4/6) with very slight greenish gray (GLEYS 1 5GY 6/1) mottling; silt; CLAY (CH); dry; very stiff; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
65											
66											
67											
68											
69	X	SS 21	5 14 13	18 18						BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CH); dry; very stiff; few silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
70											
71											
72											
73											
74	X	SS 22	7 10 13	17 18						BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CH); dry; very stiff; few silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
75											
76											
77											
78											
79	X	SS 23	6 11	18 18						BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); dry; very stiff; few silt; mostly clay; trace	
80											

Project Name : Job Number



**SOIL LOG - Boring No. B-901**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									CH	calcareous nodules; strong reaction with HCl	
81											
82											
83											
84	X	SS 24	8 14	18 18							
85										BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); dry; very stiff; few silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
86											
87											
88											
89	X	SS 25	6 10	18 18							
90										BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); dry; very stiff; few silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
91											
92											
93											
94	X	SS 26	10 15	18 18							
95										BEAUMONT; brown (10YR 4/3); silt; CLAY (CH); dry; very stiff; few silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
96											
97											
98											
99	X	SS 27	22 34 40	13 18					SM	BEAUMONT; gray (10YR 6/1); silt; SAND (SM); wet; very dense; some silt; mostly fine sand	
100										Boring Terminated at 100-feet	
101											
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											



Project Name : Job Number		<b>SOIL LOG - Boring No. B-902</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 4 inch		Boring Location UHS Basin N 363496.08 E 2941927	Total Depth 100 feet
Drilling Contractor and Rig MACTEC / Charlotte / D 50		Elevation at boring 29.1 feet	Ground Water Depth 18.5 feet
Sampling Method Split Spoon/UD		Sample Driving Hammer/Drop 139.08 lbs / 30 inches	No. of Samples 27
		Borehole Inclination 0	Logged by R. Clark
		Date Started 12/12/06	
		Date Completed 12/13/06	

Reviewed by / Date KLR 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0									CH	BEAUMONT; dark gray (10YR 4/1) silt; CLAY (CH); dry; firm; high plasticity; mostly clay; some silt; weak reaction with HCl; roots	
1	X	SS 1	13	11					CH	BEAUMONT; dark gray (7.5YR 4/1); silt; CLAY (CH); dry; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; some roots	
2	X	SS 2	14	14					CH	BEAUMONT; dark gray (7.5YR 4/1); silt; CLAY (CH); dry; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; some roots	
3	X	SS 2	14	14					CH	BEAUMONT; dark gray (7.5YR 4/1); silt; CLAY (CH); dry; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; some roots	
4	X	SS 3	14	14					CH	BEAUMONT; dark gray (7.5YR 4/1); silt; CLAY (CH); dry; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
5											
6		UD 1	N/A	20	21.3		65/43				
7											
8	X	SS 4	14	17					CH	BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; trace calcareous nodules; mostly clay; some silt; weak reaction with HCl	
9	X	SS 5	20	20					CH	BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl	
10	X	SS 6	15	15					CH	BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl	
11	X	SS 7	24	19.5		58/36			CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
12	X	SS 8	23	23					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
13	X	SS 8	17	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
14	X	SS 8	17	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
15											
16		UD 2	N/A	27	24.3		59/39				
17											Water level at 17 feet BGS
18											
19	X	SS 9	4	14	26.8	72.0	NV/NP		ML	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; trace of calcareous nodules	
20	X	SS 9	4	14	26.8	72.0	NV/NP		ML	BEAUMONT; silt; CLAY (CH)	
21											
22											
23											
24		UD 3	N/A	21	24.9	46.4	NV/NP		SM	BEAUMONT; silt; SAND (SM)	
25											
26											
27											
28											
29	X	SS 10	13	18	24.0	18.6			SM	BEAUMONT; light yellowish brown (10YR 6/4); silt; SAND (SM); wet; firm; non-plastic; mostly fine quartz sand; some silt; weak reaction with HCl	
30	X	SS 10	13	18	24.0	18.6			SM	BEAUMONT; light yellowish brown (10YR 6/4); silt; SAND (SM); wet; firm; non-plastic; mostly fine quartz sand; some silt; weak reaction with HCl	
31											
32											
33											
34	X	SS 11	14	18	22.5	10.2			SP-SM	BEAUMONT; light yellowish brown (10YR 6/4); silt; SAND (SP-SM); wet; very firm; non-plastic; mostly fine quartz sand; some silt; weak reaction with HCl	
35	X	SS 11	15	18	22.5	10.2			SP-SM	BEAUMONT; light yellowish brown (10YR 6/4); silt; SAND (SP-SM); wet; very firm; non-plastic; mostly fine quartz sand; some silt; weak reaction with HCl	
36											
37											
38											
39	X	SS 12	14	18	22.5	6.5			SP-SM	BEAUMONT; light yellowish brown (10YR 6/4); silt; SAND (SP-SM); wet; firm; non-plastic; mostly fine quartz sand; few silt; weak reaction with HCl	
40	X	SS 12	14	18	22.5	6.5			SP-SM	BEAUMONT; light yellowish brown (10YR 6/4); silt; SAND (SP-SM); wet; firm; non-plastic; mostly fine quartz sand; few silt; weak reaction with HCl	

Project Name : Job Number



**SOIL LOG - Boring No. B-902**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SP-SM		
41											
42											
43											
44	X	SS 13	10	18					CH	BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist; stiff, high plasticity; mostly clay; some silt; weak reaction with HCl	
45											
46											
47											
48											
49	X	SS 14	3	18	31.4		67/49			BEAUMONT; greenish gray (GLEYS 1 5/1); silt; CLAY (CH); moist; stiff, high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
50											
51											
52											
53											
54	X	SS 15	7	18						BEAUMONT; greenish gray (GLEYS 1, 6/1); silt; CLAY (CH); moist; very stiff, high plasticity; mostly clay; some silt; trace calcareous nodules	
55											
56											
57											
58											
59	X	SS 16	9	18	24.9	80.1	IN/NP		ML	BEAUMONT; brown (7.5YR 5/4); clay; sand; SILT (ML); wet; very stiff, low plasticity; mostly silt; little clay; little sand; weak reaction with HCl	
60											
61											
62											
63											
64	X	SS 17	6	18					CH	BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CH); moist; stiff, high plasticity; mostly clay; some silt; trace calcareous nodules; weak reaction with HCl	
65											
66											
67											
68											
69	X	SS 18	6	19	25.7		73/48			BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH); moist; very stiff, high plasticity; mostly clay; some silt; trace calcareous nodules; weak reaction with HCl	
70											
71											
72											
73											
74	X	SS 19	5	17						BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH); moist; very stiff, high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
75											
76											
77											
78											
79	X	SS 20	6	18	23.2		61/42			BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist; very stiff, high plasticity; mostly clay; some silt; weak reaction with HCl	
80											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-902</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									CH		
81											
82											
83											
84	X	SS 21	5 10	18 18						BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist; very stiff; high plasticity; mostly clay; some silt; weak reaction with HCl	
85											
86											
87											
88											
89	X	SS 22	8 10 14	18 18	23.8		66/44			BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist; very stiff; high plasticity; mostly clay; some silt; weak reaction with HCl	
90											
91											
92											
93											
94	X	SS 23	7 9 18	18 18						BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist; very stiff; high plasticity; ; high toughness; mostly clay; some silt; weak reaction with HCl	
95											
96											
97											
98											
99	X	SS 24	6 7 11	18 18	28.0		71/51			BEAUMONT; brown (7.5YR 5/2); silt; CLAY (CH); dry; very stiff; high plasticity; high toughness; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
100										Boring Terminated at 100 feet	
101											
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-903</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Rotary Wash / 4 inch		Boring Location N 363672.23 E 2941664.45		Total Depth 100 feet	
Drilling Contractor and Rig Lewis Drilling / Mobile B57		Elevation at boring 30.02 feet		Ground Water Depth 25 feet	
Sampling Method Split Spoon		Sample Driving Hammer/Drop 139.58 lbs / 30 inches		No. of Samples 27	
		Borehole Inclination 0		Logged by G. Geras	
				Date Started 12/12/06	
				Date Completed 12/13/06	

Reviewed by / Date KLM 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	5	18					CH		
2	X	SS 2	13	18					CH		
3	X	SS 3	12	18					CH		
4	X	SS 4	8	18					CH		
5	X	SS 5	11	18					CH		
6	X	SS 6	14	18					CH		
7	X	SS 7	16	18					CH		
8	X	SS 8	18	18					CH		
9	X	SS 9	18	18					CH		
10	X	SS 10	18	18					CH		
11									CH		
12									CH		
13									CH		
14									CH		
15									CH		
16									CH		
17									CH		
18									CH		
19	X	SS 11	3	17					CH		
20			4	18					CH		
21									CH		
22									CH		
23									CH		
24	X	SS 12	6	18					CH		
25			6	18					ML		
26									ML		Water level at 25 feet BGS
27									ML		Switch to mud rotary drilling at 25 feet BGS
28									ML		
29	X	SS 13	6	10					ML		
30			6	18					ML		
31									ML		
32									ML		
33									ML		
34	X	SS 14	3	16					SM		
35			4	18					SM		
36									SM		
37									SM		
38									SM		
39	X	SS 15	6	18					SM		
40			11	18					SM		

Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-903</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
40									SM	
41										
42										
43										
44	X	SS 16	5.0	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; firm; little silt; mostly clay
45										
46										
47										
48										
49	X	SS 17	4.0	18						BEAUMONT; brown (7.5YR 4/4); silt; sand; CLAY (CH); dry; firm; few fine sand; little silt; mostly clay
50										
51										
52										
53										
54	X	SS 18	5.0	18						BEAUMONT; greenish gray (GLEYS 1 5GY 5/1); silt; sand; CLAY (CH); dry; stiff; few fine sand; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl
55										
56										
57										
58										
59	X	SS 19	5.0	18						BEAUMONT; yellowish red (5YR 4/6) with greenish gray (GLEYS 1 5GY 5/1) mottling; silt; CLAY (CH); dry; stiff; trace calcareous nodules; strong reaction with HCl
60										
61										
62										
63										
64	X	SS 20	5.0	18						BEAUMONT; yellowish red (5YR 4/6) with slight greenish gray (GLEYS 1 5GY 6/1) mottling; silt; CLAY (CH); dry; very stiff; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl
65										
66										
67										
68										
69	X	SS 21	4.7	18						BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; very stiff; few silt; mostly clay; trace calcareous nodules; strong reaction with HCl
70										
71										
72										
73										
74	X	SS 22	5.0	17						BEAUMONT; strong brown (7.5YR 4/6) with very slight greenish gray (GLEYS 1 5GY 6/1) mottling; silt; CLAY (CH); dry; very stiff; few silt; mostly clay; trace calcareous nodules; strong HCl reaction
75										
76										
77										
78										
79	X	SS 23	5.0	15						BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); dry; very stiff; few silt; mostly clay
80										

Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-903</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									CH		
81											
82											
83											
84	X	SS 24	8 10 12	18 18						BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); dry; very stiff, few silt; mostly clay	
85											
86											
87											
88											
89	X	SS 25	8 10 13	18 18						BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); dry; very stiff; few silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
90											
91											
92											
93											
94	X	SS 26	6 10 13	18 18						BEAUMONT; brown (7.5YR 4/4) with slight greenish gray (GLEY 1 5GY 6/1) mottling; silt; CLAY (CH); dry; very stiff, little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
95											
96											
97											
98											
99	X	SS 27	6 10 13	18 18						BEAUMONT; brown (7.5YR 4/4); silt; sand; CLAY (CH); dry; stiff; few fine sand; little silt; mostly clay	
100										Boring Terminated at 100-feet	
101											
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-904</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Rotary Wash / 3 inch	Boring Location UHS Basin N 363485.07 E 2941727.16	Total Depth 100 feet	
Drilling Contractor and Rig MACTEC / RALEIGH / CME 45C	Elevation at boring 29.84 feet	Ground Water Depth 23.5 feet	Depth to Bedrock
Sampling Method Split Spoon/UD	Sample Driving Hammer/Drop 139.62 lbs / 30 inches	No. of Samples 26	Date Started 12/16/06
	Borehole Inclination 0	Logged by D. Tibbals	Date Completed 12/17/06

Reviewed by / Date LM 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	13	18					CH	BEAUMONT; greenish black (GLEY 2 10G 2.5/1); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; some silt	
2	X	SS 2	15	18					CH	BEAUMONT; greenish black (GLEY 2 10G 2.5/1); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; some silt	
3	X	SS 3	18	18					CH	BEAUMONT; greenish black (GLEY 2 10G 2.5/1); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; some silt	
4	X	SS 4	18	18					CH	BEAUMONT; greenish black (GLEY 2 10G 2.5/1); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; some silt	
5											
6		UD 1	N/A	22.5 24	22.3		68/46			BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH); moist; high plasticity; high toughness; mostly clay; little silt	
7										BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
8	X	SS 4	22	18						BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
9	X	SS 5	22	18						BEAUMONT; red (2.5YR 4/8); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
10	X	SS 6	14	18						BEAUMONT; red (2.5YR 4/8); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	Some seepage observed in boring at 10.5-feet below ground surface (bgs)
11	X	SS 7	22	18						BEAUMONT; red (2.5YR 4/8); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
12	X	SS 8	24	18						BEAUMONT; red (2.5YR 4/8); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
13	X	SS 8	10	18						BEAUMONT; red (2.5YR 4/8); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
14	X	SS 8	11	18						BEAUMONT; red (2.5YR 4/8); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
15										BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; high plasticity; high toughness; mostly clay; little silt	
16											
17											
18											
19		UD 2	N/A	26 24	21.1		63/41			BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; high plasticity; high toughness; mostly clay; little silt	
20											
21											
22											
23											
24	X	SS 9	19	18					SM	BEAUMONT; reddish brown (2.5YR 5/4); silt; SAND (SM); wet; firm; mostly fine sand; some silt; poorly graded	Water level at 23.5 feet BGS
25											
26											
27											
28											
29		UD 3	N/A	24 24	25.2	65.7	NV/NP		ML	BEAUMONT; yellowish red (5YR 5/6); SILT (ML); moist; high plasticity; high toughness; mostly clay; some silt	
30											
31											
32											
33											
34	X	SS 10	19	18					SM	BEAUMONT; reddish brown (2.5YR 5/4); silt; SAND (SM); wet; firm; mostly fine sand; some silt; poorly graded	
35											
36											
37											
38											
39	X	SS 11	12	18	22.4	16.6				BEAUMONT; reddish brown (2.5YR 5/4); silt; SAND (SM); wet; very firm; mostly fine sand; little silt; poorly graded	
40											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-904</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 12	6	18					CH	BEAUMONT; reddish brown (2.5YR 5/4); silt; SAND (SM); wet; firm; mostly fine sand; little silt; poorly graded	
45										BEAUMONT; red (2.5YR 4/8); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
46											
47											
48											
49	X	SS 13	7	12						BEAUMONT; red (2.5YR 4/8); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
50			7	18							
51											
52											
53											
54		UD 4	N/A	26	32.5	23.7	62/41		SC	BEAUMONT; red (2.5YR 4/8) to greenish gray (GLE Y 2 10G 6/1); clay; SAND (SC); moist; high plasticity; high toughness; mostly clay; little silt	
55				24							
56											
57											
58											
59	X	SS 14	7	22					CH	BEAUMONT; reddish brown (5YR 5/4) with greenish gray (GLE Y 1 10Y 6/1) mottling; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
60			10	18							
61											
62											
63											
64	X	SS 15	6	22	23.1		64/43			BEAUMONT; reddish brown (5YR 5/4) with greenish gray (GLE Y 1 10Y 6/1) mottling; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
65			10	18							
66											
67											
68											
69	X	SS 16	7	22						BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
70			10	18							
71											
72											
73											
74	X	SS 17	7	18	22.4		65/42			BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
75			10	18							
76											
77											
78											
79	X	SS 18	4	23						BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
80			8	18							



Project Name : Job Number 	<b>SOIL LOG - Boring No. B-904</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									CH		
81											
82											
83											
84		UD 5	N/A	25 24	24.0		62/41			BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; high plasticity; high toughness; mostly clay; little silt	
85											
86											
87											
88											
89	X	SS 19	6 10 11	26 18						BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
90											
91											
92											
93											
94	X	SS 20	7 12	26 18	25.0		63/42			BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness	
95											
96											
97											
98											
99	X	SS 21	5 10	3 18						BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness	
100											
101										Boring Terminated at 100 feet	
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-905</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 3 inch	Boring Location UHS Basin N 363348.01 E 2941571.36	Total Depth 100 feet	
Drilling Contractor and Rig MACTEC / RALEIGH / CME 45C	Elevation at boring 29.24 feet	Ground Water Depth 18.5 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 139.62 lbs / 30 inches	No. of Samples 27	Date Started 12/14/06
	Borehole Inclination 0	Logged by D. Tibbals	Date Completed 12/15/06

Reviewed by / Date KML 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0									CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); moist; soft; high plasticity; high toughness; mostly clay; little silt; roots observed	
1	X	SS 1	11	18					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	
2	X	SS 2	11	18					CH	BEAUMONT; very dark gray (GLEY 1 3/N); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	
3	X	SS 3	11	18					CH	BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	
4	X	SS 4	11	18					CH	BEAUMONT; red (10R 4/8); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
5	X	SS 5	11	18					CH	BEAUMONT; red (10R 4/8); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
6	X	SS 6	11	18					CH	BEAUMONT; red (10R 4/8); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
7	X	SS 7	11	18					CH	BEAUMONT; red (10R 4/8); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
8	X	SS 8	11	18					CH	BEAUMONT; red (10R 4/8); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
9	X	SS 9	11	18					CH	BEAUMONT; red (10R 4/8); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
10	X	SS 10	11	18					CH	BEAUMONT; red (10R 4/8); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
11									CH	BEAUMONT; red (10R 4/8); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
12									CH	BEAUMONT; red (10R 4/8); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
13									CH	BEAUMONT; red (10R 4/8); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
14									CH	BEAUMONT; red (10R 4/8); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
15									CH	BEAUMONT; red (10R 4/8); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
16									CH	BEAUMONT; red (10R 4/8); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
17									CH	BEAUMONT; red (10R 4/8); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
18									CH	BEAUMONT; red (10R 4/8); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
19	X	SS 11	11	18					ML	BEAUMONT; reddish brown (2.5YR 5/4); sand; SILT (ML); wet; firm; high plasticity; low toughness; mostly silt; some sand	Water level appears at 18.5 feet BGS based on sample visual
20									ML	BEAUMONT; reddish brown (2.5YR 5/4); sand; SILT (ML); wet; firm; high plasticity; high toughness; mostly silt; some sand	Switch to mud rotary drilling at 15 feet BGS
21									ML		
22									ML		
23									ML		
24	X	SS 12	11	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; loose; poorly graded; mostly fine sand; some silt	
25									SM		
26									SM		
27									SM		
28									SM		
29	X	SS 13	11	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; poorly graded; mostly fine sand; some silt	
30									SM		
31									SM		
32									SM		
33									SM		
34	X	SS 14	11	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; poorly graded; mostly fine sand; some silt	
35									SM		
36									SM		
37									SM		
38									SM		
39	X	SS 15	11	18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; very firm; poorly graded; mostly fine sand; little silt	
40									SM		

Project Name : Job Number



SOIL LOG - Boring No. B-905

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
40									SM	
41										
42										
43										
44	X	SS 16	7 10 14	12 18						BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; very firm; poorly graded; mostly fine sand; little silt
45										
46										
47										
48										
49	X	SS 17	6 9 13	18 18					CH	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; poorly graded; mostly fine sand; little silt
50										BEAUMONT; greenish gray (GLEYS 1 10Y 6/1); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
51										
52										
53										
54	X	SS 18	10 11 12	23 18						BEAUMONT; greenish gray (GLEYS 1 5GY 6/1); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
55										
56										
57										
58										
59	X	SS 19	7 11 13	20 18						BEAUMONT; reddish brown (5YR 4/6); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
60										
61										
62										
63										
64	X	SS 20	6 10 14	21 18						BEAUMONT; reddish brown (5YR 4/6); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
65										
66										
67										
68										
69	X	SS 21	6 10 14	26 18						BEAUMONT; reddish brown (5YR 4/6); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
70										
71										
72										
73										
74	X	SS 22	7 9 12	20 18						BEAUMONT; reddish brown (5YR 4/6); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
75										
76										
77										
78										
79	X	SS 23	5 9 11	22 18						BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
80										

Project Name : Job Number



SOIL LOG - Boring No. B-905

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									CH		
81											
82											
83											
84	X	SS 24	5	22							
85			12	18						BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; very stiff, high plasticity; high toughness; mostly clay; little silt	
86											
87											
88											
89	X	SS 25	6	23							
90			10	18						BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; very stiff, high plasticity; high toughness; mostly clay; little silt	
91											
92											
93											
94	X	SS 26	6	24							
95			11	18						BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); moist; very stiff, high plasticity; high toughness; mostly clay; little silt	
96											
97											
98											
99	X	SS 27	6	18							
100			7	18						BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); moist; very stiff, high plasticity; high toughness; mostly clay; little silt	
101										Boring Terminated at 100-feet	
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-906</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Rotary Wash / 4 inch	Boring Location N 363574.46 E 2941430.55	Total Depth 100 feet	
Drilling Contractor and Rig Lewis Drilling / Mobile B57	Elevation at boring 29.5 feet	Ground Water Depth 23.5 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 139.58 lbs / 30 inches	No. of Samples 27	Date Started 12/13/06
	Borehole Inclination 0	Logged by G. Geras	Date Completed 12/14/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	18	6					CH	BEAUMONT; very dark gray (GLEY 1 3/N); silt; CLAY (CH); dry; firm; little silt; mostly clay; trace organics (grass); trace ferrous nodules	
2	X	SS 2	18	8					CH	BEAUMONT; very dark gray (GLEY 1 3/N); silt; CLAY (CH); dry; firm; little silt; mostly clay; trace organics (grass)	
3	X	SS 3	18	14					CH	BEAUMONT; very dark gray (GLEY 1 3/N); silt; CLAY (CH); dry; firm; little silt; mostly clay; trace organics (grass)	
4	X	SS 4	18	7					CH	BEAUMONT; very dark gray (GLEY 1 3/N); silt; CLAY (CH); dry; stiff; little silt; mostly clay; trace ferrous nodules	
5	X	SS 5	18	12					CH	BEAUMONT; very dark gray (GLEY 1 3/N); silt; CLAY (CH); dry; firm; little silt; mostly clay; trace ferrous nodules	
6	X	SS 6	18	11					CH	BEAUMONT; very dark gray (GLEY 1 3/N) transitioning into yellowish red (5YR 4/6) with slight light greenish gray (GLEY 1 10Y 7/1) mottling; silt; CLAY (CH); dry; firm; little silt; mostly clay	
7	X	SS 7	18	15					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; firm; little silt; mostly clay	
8	X	SS 8	18	17					CH	BEAUMONT; yellowish red (5YR 4/6) with very slight light greenish gray (GLEY 1 10Y 7/1) mottling; silt; CLAY (CH); dry; firm; little silt; mostly clay; trace mottling	
9	X	SS 9	18	18					CH	BEAUMONT; yellowish red (5YR 4/6) with very slight light greenish gray (GLEY 1 10Y 7/1) mottling; silt; CLAY (CH); dry; firm; little silt; mostly clay; trace mottling	
10	X	SS 10	18	16					CH	BEAUMONT; yellowish red (5YR 4/6) with very slight light greenish gray (GLEY 1 10Y 7/1) mottling; silt; CLAY (CH); dry; stiff; little silt; mostly clay	
11	X	SS 11	18	18					CH	BEAUMONT; yellowish red (5YR 4/6) with slight light greenish gray (GLEY 1 10Y 7/1) mottling; silt; CLAY (CH); dry; stiff; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
12	X	SS 12	18	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; stiff; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
13	X	SS 13	18	7					CH	BEAUMONT; yellowish red (5YR 4/6) with very slight light greenish gray (GLEY 1 10Y 7/1) mottling; silt; CLAY (CH); dry; stiff; few silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
14	X	SS 14	18	18					CH	BEAUMONT; yellowish red (5YR 4/6) with very slight light greenish gray (GLEY 1 10Y 7/1) mottling; silt; CLAY (CH); dry; stiff; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
15	X	SS 15	18	13					SM	BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); wet; stiff; little clay; mostly silt	
16	X	SS 16	18	13					SM	BEAUMONT; strong brown (7.5YR 5/6); sand; SILT (ML); wet; stiff; little fine sand; mostly silt	
17	X	SS 17	18	13					SM	BEAUMONT; strong brown (7.5YR 5/6); sand; SILT (ML); wet; firm; little fine sand; mostly silt; trace cemented sand nodules	
18	X	SS 18	18	13					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; dense; some silt; mostly fine sand; trace	
19											
20											
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											
31											
32											
33											
34											
35											
36											
37											
38											
39											
40											


Water level at 23.5 feet BGS  
 Switch to mud rotary drilling at 25 feet BGS

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-906</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM	cemented sand nodules	
41											
42											
43											
44	X	SS 16	70/4	18/18					CH	BEAUMONT; reddish brown (5YR 4/4); sand; silt; CLAY (CH); dry; stiff; few fine sand; little silt; mostly clay	
45											
46											
47											
48											
49	X	SS 17	60/2	18/18						BEAUMONT; brown (7.5YR 4/4) with greenish gray (GLE 1 5GY 5/1) mottling; sand; silt; CLAY (CH); dry; firm; few fine sand; little silt; mostly clay	
50											
51											
52											
53											
54	X	SS 18	60/3	18/18						BEAUMONT; greenish gray (GLE 1 5GY 6/1); sand; silt; CLAY (CH); dry; stiff; few fine sand; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
55											
56											
57											
58											
59	X	SS 19	60/4	18/18						BEAUMONT; strong brown (7.5YR 4/6) with greenish gray (GLE 1 5GY 6/1) mottling; silt; sand; CLAY (CH); dry; stiff; few sand; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
60											
61											
62											
63											
64	X	SS 20	60/5	18/18						BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); dry; stiff; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
65											
66											
67											
68											
69	X	SS 21	60/5	18/18						BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CH); dry; stiff; few silt; mostly clay	
70											
71											
72											
73											
74	X	SS 22	57/10	18/18						BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); dry; very stiff; few silt; mostly clay	
75											
76											
77											
78											
79	X	SS 23	60/5	18/18						BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); dry; stiff; few silt; mostly clay	
80											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-906</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									CH		
81											
82											
83											
84	X	SS 24	6 10	18 18						BEAUMONT; brown (7.5YR 4/4) with very slight greenish gray (GLEYS 1 5GY 6/1) mottling; silt; CLAY (CH); dry; very stiff; few silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
85											
86											
87											
88											
89	X	SS 25	6 10	18 18						BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); dry; very stiff; few silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
90											
91											
92											
93											
94	X	SS 26	5 10	18 18						BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); dry; very stiff; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
95											
96											
97											
98											
99	X	SS 27	4 10	18						BEAUMONT; brown (7.5YR 5/2); silt; CLAY (CH); dry; stiff; some silt; mostly clay; trace calcareous nodules; strong reaction with HCl Boring Terminated at 100-feet	
100											
101											
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											

Project Name : Job Number		<b>SOIL LOG - Boring No. B-907</b>	
			
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 4 inch		Boring Location N 363549.17 E 2941252.15	Total Depth 100 feet
Drilling Contractor and Rig Lewis Drilling / Mobile B 61		Elevation at boring 29.2 feet	Ground Water Depth 21 feet
Sampling Method Split Spoon/UD		Sample Driving Hammer/Drop 139.58 lbs / 30 inches	No. of Samples 25
		Borehole Inclination 0	Date Started 12/19/06
		Logged by R. Clark & A. Osorio	Date Completed 1/3/07

Reviewed by / Date KMS 5/14/07  
 Reviewed by / Date KAW 5/11/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	3	4	18				CH	BEAUMONT; very dark gray (10YR 3/1); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; roots	
2											
3											
4		UD 1	N/A	13	24					BEAUMONT; silt; CLAY (CH)	
5											
6	X	SS 2	4	16	18				CH	BEAUMONT; very dark gray (10YR 3/1); silt; CLAY (CH); moist; firm; high plasticity; mostly clay; some silt; weak reaction with HCl; roots	
7	X	SS 3	4	18	18				CH	BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH); moist; firm; high plasticity; mostly clay; some silt; weak reaction with HCl	
8	X	SS 4	4	17	18				CH	BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH); moist; firm; high plasticity; mostly clay; some silt; weak reaction with HCl	
9	X	SS 5	4	18	18				CH	BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH); moist; firm; high plasticity; mostly clay; some silt; weak reaction with HCl	
10	X	SS 6	4	20	18				CH	BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; firm; high plasticity; mostly clay; some silt; weak reaction with HCl	
11	X	SS 6	4	20	18				CH	BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; firm; high plasticity; mostly clay; some silt; weak reaction with HCl	
12											
13											
14		UD 2	N/A	18	24					BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl	
15										BEAUMONT; silt; CLAY (CH)	
16											
17											
18											
19	X	SS 7	2	18	18				CH	BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl	
20											
21											Water level at 21 feet BGS
22											
23											
24	X	SS 8	3	17	18				SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; loose; non-plastic; mostly fine quartz sand; some silt; weak reaction with HCl	
25											Switched to mud rotary drilling at 25.0-foot bgs
26											
27											
28											
29		UD 3	N/A	12	24					BEAUMONT; silt; SAND (SM)	
30											
31											
32											
33											
34	X	SS 9	40	15	18					BEAUMONT; yellowish brown (10YR 5/6); gravel; silt; SAND (SM); wet; very dense; non-plastic; fine sand; trace gravel; trace silt; weak reaction with HCl	
35			34								
36			33								
37											
38											
39	X	SS 10	8	12	18					BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; firm; non-plastic; fine sand; some	
40			10								



Project Name : Job Number



**SOIL LOG - Boring No. B-907**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/ft Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM	silt; weak reaction with HCl	
41											
42											
43											
44	X	SS 11	6.4 3	19 18					CH	BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl	
45											
46											
47											
48											
49	X	SS 12	5 4 5	4 18						BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl	
50											
51											
52											
53											
54	X	SS 13	10.0 7	19 18						BEAUMONT; greenish gray (GLE Y 1 6/1); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
55											
56											
57											
58											
59	X	SS 14	7 8 11	16 18						BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; some silt; weak reaction with HCl	
60											
61											
62											
63											
64	X	SS 15	6 6 10	20 18						BEAUMONT; strong brown (7.5YR 4/6) with greenish gray (GLE Y 1 6/1) mottling; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; weak reaction with HCl	
65											
66											
67											
68											
69	X	SS 16	4 8 10	13 18						BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness	
70											
71											
72											
73											
74	X	SS 17	5 7 9	20.5 18						BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness	
75											
76											
77											
78											
79	X	SS 18	6 7 10	21 18						BEAUMONT; strong brown (7.5YR 4/6); gravel; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; some fine gravel; calcareous nodules	
80											

Project Name : Job Number



**SOIL LOG - Boring No. B-907**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									CH		
81											
82											
83											
84	X	SS 19	10	20.5 18							BEAUMONT; strong brown (7.5YR 4/6); gravel; silt; CLAY (CH); moist; stiff; high plasticity; high toughness; some fine gravel; calcareous nodules
85											
86											
87											
88											
89	X	SS 20	6 13	20 18							BEAUMONT; strong brown (7.5YR 4/6); gravel; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; some fine gravel; calcareous nodules; some black roots
90											
91											
92											
93											
94	X	SS 21	10	21 18							BEAUMONT; strong brown (7.5YR 4/6) with greenish gray (GLEY 1 6/1) mottling; silt; CLAY (CH); moist; stiff; some fine gravel; calcareous nodules; some black roots
95											
96											
97											
98											
99	X	SS 22	10	20.5 18							BEAUMONT; greenish gray (GLEY 1 6/1); silt; CLAY (CH); moist; stiff; calcareous nodules
100											Boring Terminated at 100 feet
101											
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-908</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 3 inch		Boring Location UHS Basin N 383273.09 E 2941356.36		Total Depth 100 feet	
Drilling Contractor and Rig MACTEC / RALEIGH / CME 45C		Elevation at boring 29.56 feet		Ground Water Depth 23.5 feet	
Sampling Method Split Spoon		Sample Driving Hammer/Drop 139.62 lbs / 30 inches		No. of Samples 27	
		Borehole Inclination 0		Logged by D. Tibbals	
		Reviewed by / Date <u>KRL 4/3/07</u>		Date Started 12/15/06	
		Reviewed by / Date <u>KAW 4/3/07</u>		Date Completed 12/15/06	

Depth (feet)	Sample	Sample Type & No.	Unconnected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	15	18					CH	BEAUMONT; black (GLEY 1 2.5/N) with white (GLEY 1 8/N) mottling; gravel; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little gravel	
2		SS 2	3	18							
3		SS 3	16	18	27.0		53/32			BEAUMONT; black (GLEY 1 2.5/N) with white (GLEY 1 8/N) mottling; gravel; CLAY (CH); moist; soft; high plasticity; high toughness; mostly clay; little gravel	
4	X	SS 4	17	18						BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	
5	X	SS 5	9	18						BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	
6	X	SS 6	13	18						BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	
7	X	SS 7	15	18						BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	
8	X	SS 8	16	18						BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	
9	X	SS 9	16	18	24.8		72/47			BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	
10	X	SS 10	16	18						BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
11	X	SS 11	3	15						BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
12											
13											
14											
15											
16											
17											
18											
19	X	SS 11	4	15						BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
20											
21											
22											
23											
24	X	SS 12	6	17	24.0	33.8			SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; very firm; poorly graded; mostly fine sand; little silt	Water level appears at 23.5 feet BGS based on sample visual
25			11	18							
26											
27											
28											
29	X	SS 13	4	16	24.3	33.4				BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; poorly graded; mostly fine sand; little silt	
30			8	18							
31											
32											
33											
34	X	SS 14	4	14	23.0	14.6				BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; poorly graded; mostly fine sand; little silt	
35			6	18							
36											
37											
38											
39	X	SS 15	11	22	20.2	12.3			SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; very dense; poorly graded; mostly fine sand;	
40			25	18							

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-908</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
40									SM	little silt
41										BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; very firm; poorly graded; mostly fine sand; little silt
42										
43										
44	X	SS 16	8 10 13	14 18	22.4	42.9				
45										
46										
47										
48										
49	X	SS 17	5 6 7	24 18					CH	BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt
50										
51										
52										
53										
54	X	SS 18	5 6 6	24 18	30.6		83/59			BEAUMONT; greenish gray (GLE 1 10Y 6/1); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt
55										
56										
57										
58										
59	X	SS 19	4 7 9	20 18						BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
60										
61										
62										
63										
64	X	SS 20	5 5 10	20 18						BEAUMONT; reddish brown (2.5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt; mottled
65										
66										
67										
68										
69	X	SS 21	5 8 10	24 18	26.1		71/40			BEAUMONT; reddish brown (2.5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
70										
71										
72										
73										
74	X	SS 22	5 5 6	18 18						BEAUMONT; reddish brown (2.5YR 5/4); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt
75										
76										
77										
78										
79	X	SS 23	5 8 10	24 18	21.8		59/42			BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness;
80										

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-908</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
80									CH	mostly clay; little silt
81										
82										
83										
84	×	SS 24	5 10 12	24 18	20.5		27/6		CL-ML	BEAUMONT; brown (7.5YR 5/4); sand; silt; CLAY (CL-ML); moist; very stiff; medium to low plasticity; low toughness; mostly silt; little sand
85										
86										
87										
88										
89	×	SS 25	9 12 14	24 18					CH	BEAUMONT; greenish gray (GLEY 110GY 6/1); silt; CLAY (CH); moist; very stiff; high plasticity; low toughness; mostly clay; little silt; calcareous nodules observed
90										
91										
92										
93										
94	×	SS 26	9 11 15	24 18	19.1		52/34			BEAUMONT; brown (7.5YR 5/4) with greenish gray mottling; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
95										
96										
97										
98										
99	×	SS 27	9 11 13	20 18						BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
100										Boring Terminated at 100-feet
101										
102										
103										
104										
105										
106										
107										
108										
109										
110										
111										
112										
113										
114										
115										
116										
117										
118										
119										
120										

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-909</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 4 inch		Boring Location N 363521.67 E 2941580.66		Total Depth 100 feet	
Drilling Contractor and Rig MACTEC / CHARLOTTE / D 50		Elevation at boring 29.72 feet	Ground Water Depth 20 feet	Depth to Bedrock	
Sampling Method Split Spoon		Sample Driving Hammer/Drop 139.08 lbs / 30 inches	No. of Samples 27	Date Started 12/13/06	
		Borehole Inclination 0	Logged by R. Clark	Date Completed 12/15/06	

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	14	18					CH	BEAUMONT; very dark gray (10YR 3/1); silt; CLAY (CH); dry; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules; roots	
2	X	SS 2	15	18	27.0		63/44		CH	BEAUMONT; very dark gray (10YR 3/1); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules; roots	
3	X	SS 3	16	18					CH	BEAUMONT; very dark gray (10YR 3/1); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules; roots	
4	X	SS 4	14	18					CH	BEAUMONT; very dark gray (10YR 3/1); silt; CLAY (CH); moist; very stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules; roots	
5	X	SS 5	15	18					CH	BEAUMONT; very dark gray (10YR 3/1); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules; roots	
6	X	SS 6	14	18	26.5		77/53		CH	BEAUMONT; very dark gray (10YR 3/1); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules; roots	
7	X	SS 7	18	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl; trace calcareous nodules	
8	X	SS 8	18	18					CH	BEAUMONT; yellowish red (5YR 4/6) mottling; silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl	
9	X	SS 9	22	18					CH	BEAUMONT; yellowish red (5YR 4/6) mottling; silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl	
10	X	SS 10	18	18	21.1		64/36		CH	BEAUMONT; yellowish red (5YR 4/6) mottling; silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl	
11									CH	BEAUMONT; yellowish red (5YR 4/6) mottling; silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl	
12									CH	BEAUMONT; yellowish red (5YR 4/6) mottling; silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl	
13									CH	BEAUMONT; yellowish red (5YR 4/6) mottling; silt; CLAY (CH); moist; very stiff; high plasticity; mostly clay; some silt; weak reaction with HCl	
14									CH	BEAUMONT; yellowish red (5YR 4/6) mottling; silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl	
15									CH	BEAUMONT; yellowish red (5YR 4/6) mottling; silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl	
16									CH	BEAUMONT; yellowish red (5YR 4/6) mottling; silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl	
17									CH	BEAUMONT; yellowish red (5YR 4/6) mottling; silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl	
18									CH	BEAUMONT; yellowish red (5YR 4/6) mottling; silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl	
19	X	SS 11	4	20					ML	BEAUMONT; yellowish red (5YR 4/6) mottling; silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl	
20									ML	BEAUMONT; yellowish red (5YR 4/6) mottling; silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl	Water level at 20 feet BGS
21									ML	BEAUMONT; yellowish red (5YR 4/6) mottling; silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl	Switch to mud rotary drilling at 20 feet BGS
22									ML	BEAUMONT; yellowish red (5YR 4/6) mottling; silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl	
23									ML	BEAUMONT; yellowish red (5YR 4/6) mottling; silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak reaction with HCl	
24	X	SS 12	18	18	21.6		30/10		ML	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; trace calcareous nodules	
25									ML	BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); wet; stiff; low plasticity; mostly silt; some clay; weak reaction with HCl	
26									ML	BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); wet; stiff; low plasticity; mostly silt; some clay; weak reaction with HCl	
27									ML	BEAUMONT; strong brown (7.5YR 5/6); sand; gravel; SILT (ML); wet; stiff; non-plastic; mostly silt; some fine sand; trace gravel; weak reaction with HCl	
28									ML	BEAUMONT; strong brown (7.5YR 5/6); sand; gravel; SILT (ML); wet; stiff; non-plastic; mostly silt; some fine sand; trace gravel; weak reaction with HCl	
29	X	SS 13	19	18	26.0	59.6			SM	BEAUMONT; strong brown (7.5YR 5/6); sand; gravel; SILT (ML); wet; stiff; non-plastic; mostly silt; some fine sand; trace gravel; weak reaction with HCl	
30									SM	BEAUMONT; strong brown (7.5YR 5/6); sand; gravel; SILT (ML); wet; stiff; non-plastic; mostly silt; some fine sand; trace gravel; weak reaction with HCl	
31									SM	BEAUMONT; strong brown (7.5YR 5/6); sand; gravel; SILT (ML); wet; stiff; non-plastic; mostly silt; some fine sand; trace gravel; weak reaction with HCl	
32									SM	BEAUMONT; strong brown (7.5YR 5/6); sand; gravel; SILT (ML); wet; stiff; non-plastic; mostly silt; some fine sand; trace gravel; weak reaction with HCl	
33									SM	BEAUMONT; strong brown (7.5YR 5/6); sand; gravel; SILT (ML); wet; stiff; non-plastic; mostly silt; some fine sand; trace gravel; weak reaction with HCl	
34		UD 1	N/A	24	23.2	24.1			SM	BEAUMONT; silt; SAND (SM); wet; non-plastic; mostly fine sand; some silt	
35									SM	BEAUMONT; silt; SAND (SM); wet; non-plastic; mostly fine sand; some silt	
36									SM	BEAUMONT; silt; SAND (SM); wet; non-plastic; mostly fine sand; some silt	
37									SM	BEAUMONT; silt; SAND (SM); wet; non-plastic; mostly fine sand; some silt	
38									SM	BEAUMONT; silt; SAND (SM); wet; non-plastic; mostly fine sand; some silt	
39	X	SS 14	8	16					SM	BEAUMONT; light brown (7.5YR 6/4); silt; SAND (SM); wet; very firm; non-plastic; mostly fine quartz sand; some silt; weak reaction with HCl	
40									SM	BEAUMONT; light brown (7.5YR 6/4); silt; SAND (SM); wet; very firm; non-plastic; mostly fine quartz sand; some silt; weak reaction with HCl	

Project Name : Job Number



**SOIL LOG - Boring No. B-909**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43		UD 2	N/A	25/24	25.0	100	62/78		CH	BEAUMONT; silt; CLAY (CH), moist; high plasticity; mostly clay; some silt	
44											
45											
46											
47											
48		UD 3	N/A	25/24	30.6		74/53			BEAUMONT; silt; CLAY (CH), moist; high plasticity; mostly clay; some silt	
49											
50											
51											
52											
53											
54		UD 4	N/A	24/24	30	95.7	66/40			BEAUMONT; silt; CLAY (CH), moist; high plasticity; mostly clay; some silt	
55											
56											
57											
58											
59	X	SS 15	7/10	18/18						BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH), moist; very stiff; high plasticity; mostly clay; some silt; weak reaction with HCl	
60											
61											
62											
63											
64	X	SS 16	9/11	22/18	23.5		68/47			BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH), moist; very stiff; high plasticity; high toughness; mostly clay; some silt; weak reaction with HCl	
65											
66											
67											
68											
69	X	SS 17	8/14	19/18						BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH), moist; very stiff; high plasticity; high toughness; mostly clay; some silt; weak reaction with HCl	
70											
71											
72											
73											
74	X	SS 18	7/11	19/18	23.7		71/50			BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH), moist; very stiff; high plasticity; high toughness; mostly clay; some silt; weak reaction with HCl	
75											
76											
77											
78											
79	X	SS 19	7/13	19/18						BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH), moist; very stiff; high plasticity; high toughness; mostly clay; some silt; weak reaction with HCl	
80											

Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-909</b>
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Depth (feet)	Sample	Sample Type & No.	Unconnected Blows/8 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									CH		
81											
82											
83											
84											
85											
86		UD 5	N/A	24/24	21.9	96.2	49/26		CL	BEAUMONT; silt; CLAY (CL), moist; high plasticity; high toughness; mostly clay; some silt	
87											
88											
89	X	SS 20	8/14	22/18					CH	BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH), moist; very stiff; high plasticity; high toughness; mostly clay; some silt; weak reaction with HCl	
90											
91											
92											
93											
94		UD 6	N/A	25/24	17.9		55/34			BEAUMONT; silt; CLAY (CH), moist; high plasticity; high toughness; mostly clay; some silt	
95											
96											
97											
98											
99		UD 7	N/A	24/24	21.5					BEAUMONT; silt; CLAY (CH), moist; high plasticity; high toughness; mostly clay; some silt	
100										Boring Terminated at 100 feet	
101											
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											



Project Name : Job Number		<b>SOIL LOG - Boring No. B-910</b>	
STP COL : 5050-06-0496		<b>MACTEC</b>	
Type and Diameter of Boring Rotary Wash / 4 inch	Boring Location N 363362.31 E 2941257.1	UHS Basin	Total Depth 125 feet
Drilling Contractor and Rig EEI / CME 750 ATV	Elevation at boring 30.36 feet	Ground Water Depth 19 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 138 lbs / 30 inches	No. of Samples 30	Date Started 12/15/06
	Borehole Inclination 0	Logged by J. Howard	Date Completed 12/15/06

Reviewed by / Date KM 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0									CH	BEAUMONT; black (5YR 2.5/1); sand; CLAY (CH); moist; soft; high plasticity; trace organics	
1	X	SS 1	17	18					CH	BEAUMONT; black (5YR 2.5/1); sand; CLAY (CH); dry; very stiff; medium plasticity	
2	X	SS 2	18	18					CH	BEAUMONT; black (5YR 2.5/1); sand; CLAY (CH); dry; very stiff; medium plasticity	
3	X	SS 3	18	18					CH	BEAUMONT; black (5YR 2.5/1); sand; CLAY (CH); dry; very stiff; medium plasticity	
4	X	SS 4	14	18					CH	BEAUMONT; black (5YR 2.5/1); sand; CLAY (CH); moist; firm; high plasticity	
5	X	SS 5	14	18					CH	BEAUMONT; black (5YR 2.5/1); sand; CLAY (CH); moist; stiff; high plasticity	
6	X	SS 6	18	18					CH	BEAUMONT; dark gray (5YR 4/1); sand; CLAY (CH); moist; stiff; high plasticity	
7	X	SS 7	18	18					CH	BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; stiff; high plasticity	
8	X	SS 8	18	18					CH	BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; stiff; high plasticity	
9	X	SS 9	18	18					CH	BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; stiff; high plasticity	
10	X	SS 10	18	18					CH	BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff; high plasticity	
11											
12											
13											
14											
15											
16											
17											
18											
19	X	SS 11	14	18					SM	BEAUMONT; yellowish red (5YR 5/6); silt; SAND (SM); wet; loose; medium to fine sand	Water level at 19 feet BGS
20											
21											
22											
23											
24	X	SS 12	10	18						BEAUMONT; strong brown (7.5YR 5/8); silt; SAND (SM); wet; loose; medium to fine sand	
25											
26											
27											
28											
29	X	SS 13	14	18						BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; medium to fine sand	
30											
31											
32											
33											
34	X	SS 14	11	18						BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; medium to fine sand	
35											
36											
37											
38											
39	X	SS 15	18	18					SP	BEAUMONT; strong brown (7.5YR 5/6); SAND (SP); wet; dense; medium to fine sand	
40											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-910</b>
STP COL : 5050-06-0496	


Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
40									SP	
41										
42										
43										
44	X	SS 16	45	18					CH	BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; stiff; high plasticity
45			5	18						
46										
47										
48										
49	X	SS 17	45	18						BEAUMONT; light greenish gray (GLEY 2 7/1); sand; CLAY (CH); moist; stiff; high plasticity
50			5	18						
51										
52										
53										
54	X	SS 18	45	18						BEAUMONT; light greenish gray (GLEY 2 7/1); sand; CLAY (CH); moist; stiff; high plasticity
55			5	18						
56										
57										
58										
59	X	SS 19	9	18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff; high plasticity
60			14	18						
61										
62										
63										
64	X	SS 20	6	18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff; high plasticity
65			10	18						
66										
67										
68										
69	X	SS 21	6	18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff; high plasticity
70			6	18						
71										
72										
73										
74	X	SS 22	4	18						BEAUMONT; yellowish red (5YR 5/6) with white mottling; sand; CLAY (CH); moist; stiff; high plasticity
75			9	18						
76										
77										
78										
79	X	SS 23	5	18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; stiff; high plasticity
80			8	18						

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-910</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
80									CH	
81										
82										
83										
84	X	SS 24	10 8 13	18 18					SM	BEAUMONT; yellowish red (5YR 5/6); silt; SAND (SM); wet; very firm; mostly fine sand
85										
86										
87										
88										
89	X	SS 25	4 5 7	18 18					CH	BEAUMONT; light greenish gray (GLE Y 2 7/1); sand; CLAY (CH); moist; stiff; high plasticity
90										
91										
92										
93										
94	X	SS 26	5 5 9	18 18						BEAUMONT; light greenish gray (GLE Y 2 7/1); sand; CLAY (CH); moist; very stiff; high plasticity
95										
96										
97										
98										
99	X	SS 27	7 8 15	18 18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff; high plasticity
100										
101										
102										
103										
104										
105										
106										
107										
108										
109	X	SS 28	6 6 10	18 18						BEAUMONT; light greenish gray (GLE Y 2 7/1); sand; CLAY (CH); moist; very stiff; high plasticity
110										
111										
112										
113										
114										
115										
116										
117										
118										
119	X	SS 29	8 11 15	18 18						BEAUMONT; yellowish red (5YR 5/6) with gray streaks; sand; CLAY (CH); moist; very stiff; high plasticity
120										

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-910</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									CH		
121											
122											
123											
124	X	SS 30	34 25 32	18 18					SP	BEAUMONT; yellowish red (5YR 5/6); SAND (SP); wet; very dense; medium to fine sand	
125										Boring terminated at 125 feet	
126											
127											
128											
129											
130											
131											
132											
133											
134											
135											
136											
137											
138											
139											
140											
141											
142											
143											
144											
145											
146											
147											
148											
149											
150											
151											
152											
153											
154											
155											
156											
157											
158											
159											
160											

Project Name : Job Number		<b>SOIL LOG - Boring No. B-911</b>	
			
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 3 inch		Boring Location RSW Lines N 363254.68 E 2941663.52	Total Depth 50 feet
Drilling Contractor and Rig MACTEC / RALEIGH / CME 45C		Elevation at boring 30.81 feet	Ground Water Depth 23.5 feet
Sampling Method Split Spoon		Sample Driving Hammer/Drop 139.62 lbs / 30 inches	No. of Samples 17
		Borehole Inclination 0	Date Started 12/14/06
		Logged by D. Tibbals	Date Completed 12/14/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	11	12					CH	BEAUMONT; black (GLEY 1 2.5/N) with white (GLEY 1 8/N) mottling; sand; gravel; CLAY (CH); moist; hard; high plasticity; high toughness; mostly clay; few sand; few gravel	
2	X	SS 2	10	4					CH	BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; few sand; few silt	
3	X	SS 3	10	19					CH	BEAUMONT; very dark gray (GLEY 1 3/N); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
4	X	SS 4	10	16					CH	BEAUMONT; very dark gray (GLEY 1 3/N); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
5	X	SS 5	10	17					CH	BEAUMONT; very dark gray (GLEY 1 3/N); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
6	X	SS 6	10	21					CH	BEAUMONT; red (2.5YR 4/8) with gray (GLEY 1 5/N) mottling; silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	
7	X	SS 7	10	18					CH	BEAUMONT; red (2.5YR 4/8); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
8	X	SS 8	10	14					CH	BEAUMONT; red (2.5YR 4/8); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
9	X	SS 9	10	22					CH	BEAUMONT; red (2.5YR 4/8); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
10	X	SS 10	10	16					CH	BEAUMONT; red (2.5YR 4/8); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
11											
12											
13											
14											
15											
16											
17											
18											
19	X	SS 11	4	20					CH	BEAUMONT; red (2.5YR 4/8); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
20											
21											
22											
23											
24	X	SS 12	3	18	28.4	94.3	NV/NP		ML	BEAUMONT; strong brown (7.5YR 4/6); sand; SILT (ML); wet; firm; high plasticity; low toughness; mostly silt; some sand	Water level appears at 23.5 feet BGS based on sample visual
25											
26											
27											
28											
29	X	SS 13	3	20					ML	BEAUMONT; yellowish red (5YR 5/8); sand; SILT (ML); wet; stiff; high plasticity; low toughness; mostly silt; some sand	
30											
31											
32											
33											
34	X	SS 14	5	24					SM	BEAUMONT; yellowish red (5YR 5/4); silt; SAND (SM); wet; loose; poorly graded; mostly fine sand; some silt	
35											
36											
37											
38											
39	X	SS 15	5	18					SM	BEAUMONT; yellowish red (5YR 5/4); silt; SAND (SM); wet; firm; poorly graded; mostly fine sand; some silt	
40											

Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-911</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 16	4 6 10	12 18						BEAUMONT; yellowish red (5YR 5/4); silt; SAND (SM); wet; firm; poorly graded; mostly fine sand; some silt	
45											
46											
47											
48											
49	X	SS 17	8 16 18	16 18						BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; poorly graded; mostly fine sand; little silt	
50										Boring Terminated at 50-feet	
51											
52											
53											
54											
55											
56											
57											
58											
59											
60											
61											
62											
63											
64											
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67											
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69											
70											
71											
72											
73											
74											
75											
76											
77											
78											
79											
80											

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-912</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 3 inch		Boring Location N 363253.49 E 2941860.53		Total Depth 100 feet	
Drilling Contractor and Rig MACTEC / RALEIGH / CME 45C		Elevation at boring 30.97 feet	Ground Water Depth 23.5 feet		Depth to Bedrock
Sampling Method Split Spoon		Sample Driving Hammer/Drop 139.62 lbs / 30 inches	No. of Samples 27		Date Started 12/13/06
		Borehole Inclination 0	Logged by D. Tibbals		Date Completed 12/13/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/# Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	6	18						FILL; white (GLEY 1 8/N); sand; GRAVEL (GW); dry; firm; mostly angular gravel; little sand	
2	X	SS 2	0	18					CH	BEAUMONT; silt; CLAY (CH); stiff	
3	X	SS 3	4	18						BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	No recovery in soil sample SS-2
4	X	SS 4	20	18						BEAUMONT; black (GLEY 1 2.5/N); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
5	X	SS 5	24	18						BEAUMONT; dark reddish brown (2.5YR 3/4); CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
6	X	SS 6	16	18	28.5		80/58			BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
7	X	SS 7	19	18						BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
8	X	SS 8	23	18						BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
9	X	SS 9	26	18						BEAUMONT; red (2.5YR 4/6) with gray mottling; silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
10	X	SS 10	25	18	17.2		58/41			BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
11	X	SS 11	15	18						BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt; caliche; calcareous nodules	
12	X	SS 12	12	18	23.8				ML	BEAUMONT; red (2.5YR 4/6); sand; SILT (ML); wet; stiff; high plasticity; low toughness; mostly silt; little sand	
13	X	SS 13	13	18						BEAUMONT; red (2.5YR 4/6); sand; SILT (ML); wet; stiff; high plasticity; low toughness; mostly silt; little sand	Converted to mud rotary drilling at 25 feet
14	X	SS 14	5	18	26.5	59.2				BEAUMONT; red (2.5YR 4/6); sand; gravel; SILT (ML); wet; soft; mostly silt; some sand; thin sand lenses; trace gravel	
15	X	SS 15	18	18					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; loose; mostly sand; little silt	

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-912</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 16	22 15 27	18 18	18.8	81.5			ML		BEAUMONT; strong brown (7.5YR 5/6); sand; gravel; SILT (ML); wet; hard; mostly silt; little sand; heavily cemented; trace gravel
45											
46											
47											
48											
49	X	SS 17	7 7 6	20 18	26.2				SM		BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; mostly fine sand; some silt; poorly graded
50									CH		BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt
51											
52											
53											
54	X	SS 18	2 4 4	23 18	34.3						BEAUMONT; red (2.5YR 4/6) with gray (GLEY 1 5/N) mottling; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt
55											
56											
57											
58											
59	X	SS 19	4 5 7	22 18	25.9		72/50				BEAUMONT; greenish gray (GLEY 1 10Y 6/1); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt; calcareous nodules
60											
61											
62											
63											
64	X	SS 20	6 10 12	20 18	20.6						BEAUMONT; red (10R 4/8); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; few silt
65											
66											
67											
68											
69	X	SS 21	6 9 12	21 18	19.2		46/28		CL		BEAUMONT; red (10R 4/8); silt; CLAY (CL); moist; very stiff; high plasticity; high toughness; mostly clay; few silt
70											
71											
72											
73											
74	X	SS 22	7 8 12	20 18	24.8				CH		BEAUMONT; red (10R 4/8); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; few silt
75											
76											
77											
78											
79	X	SS 23	6 8 12	21 18	24.5						BEAUMONT; reddish brown (2.5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
80											



Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-912</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									CH		
81											
82											
83											
84	X	SS 24	10/10	26/18	25.0		74/53			BEAUMONT; reddish brown (2.5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
85											
86											
87											
88											
89	X	SS 25	6/11	26/18	26.2					BEAUMONT; reddish brown (2.5YR 4/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
90											
91											
92											
93											
94	X	SS 26	7/12	26/18	29.2					BEAUMONT; weak red (10R 4/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
95											
96											
97											
98											
99	X	SS 27	5/9	26/18	26.4					BEAUMONT; weak red (10R 4/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
100											
101										Boring Terminated at 100-feet	
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-913</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Rotary Wash / 6 inch		Boring Location N 363253.07 E 2942031.18		RSW Lines	
Drilling Contractor and Rig Best / Failing 1500		Elevation at boring 30.57 feet		Ground Water Depth 23.5 feet	
Sampling Method Split Spoon		Sample Driving Hammer/Drop 141 lbs / 30 inches		No. of Samples 17	
		Borehole Inclination 0		Logged by M.H. Niemann	
				Date Started 12/13/06	
				Date Completed 12/13/06	

Reviewed by / Date KM 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	16	18					CH	FILL; reddish yellow (7.5YR 6/6); gravel; sand; CLAY (CH); dry; firm; some gravel; some rootlets	
2	X	SS 2	13	18						BEAUMONT; black (7.5YR 2.5/1); CLAY (CH); moist; firm; rootlets	
3	X	SS 3	17	18						BEAUMONT; black (7.5YR 2.5/1); CLAY (CH); moist; stiff	
4	X	SS 4	12	18						BEAUMONT; black (7.5YR 2.5/1) with brownish yellow (10YR 6/6) mottling; CLAY (CH); moist; very stiff; trace iron nodules	
5	X	SS 5	18	18						BEAUMONT; light yellow brown (10YR 6/4); silt; CLAY (CH); moist; stiff	
6	X	SS 6	14	18						BEAUMONT; reddish brown (5YR 4/4); CLAY (CH); moist; very stiff; few very small calcareous nodules	
7	X	SS 7	16	18						BEAUMONT; reddish brown (5YR 4/4) and gray (10YR 6/1) mottling; silt; CLAY (CH); moist; very stiff; few calcareous nodules	
8	X	SS 8	16	18						BEAUMONT; reddish brown (2.5YR 4/4); CLAY (CH); moist; very stiff	
9	X	SS 9	18	18						BEAUMONT; reddish brown (2.5YR 4/4); CLAY (CH); moist; very stiff; few calcareous nodules	
10	X	SS 10	17	18						BEAUMONT; reddish brown (2.5YR 4/4); CLAY (CH); moist; very stiff; trace calcareous nodules	
11										BEAUMONT; reddish brown (2.5YR 4/4) with gray (10YR 6/1) mottling; silt; CLAY (CH); moist; very stiff	
12											
13											
14											
15											
16											
17											
18											
19	X	SS 11	6	17	18					BEAUMONT; reddish brown (2.5YR 4/4) and gray (10YR 6/1) mottling; silt; CLAY (CH); moist; stiff	
20											
21											
22											
23											
24	X	SS 12	4	20	18				SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; loose	Water level at 23.5 feet BGS
25											
26											
27											
28											
29	X	SS 13	4	15	18					BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; loose	
30											
31											
32											
33											
34	X	SS 14	3	16	18					BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; loose; fine sand	
35											
36											
37											
38											
39	X	SS 15	8	15	18					BEAUMONT; brownish yellow (10YR 6/8); silt; SAND (SM); wet; very firm; fine sand	
40											

Project Name : Job Number



**SOIL LOG - Boring No. B-913**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 16	9	22/18					CH	BEAUMONT; reddish brown (5YR 4/4); CLAY (CH); moist; stiff	
45								SM	BEAUMONT; reddish brown (5YR 4/4); silt; SAND (SM); wet; firm		
46								CH			
47										BEAUMONT; reddish brown (5YR 4/4); sand; CLAY (CH); moist; stiff; interbedded clay, silt, and sand	
48											
49	X	SS 17	11	17/18					SM	BEAUMONT; reddish brown (5YR 4/4); silt; SAND (SM); moist; firm; interbedded clay, silt, and sand	
50								CH			
51										BEAUMONT; brown (10YR 5/3); CLAY (CH); moist; stiff	
52										Boring Terminated at 50 feet	
53											
54											
55											
56											
57											
58											
59											
60											
61											
62											
63											
64											
65											
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67											
68											
69											
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72											
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77											
78											
79											
80											

Project Name: Job Number <b>MACTEC</b>	<b>SOIL LOG - Boring No. B-914</b>
STP COL: 5050-06-0496	

Type and Diameter of Boring: Hollow Stem Auger / Rotary Wash / 4 inch	Boring Location N 363216.3 E 2642181.9	RSW Lines Total Depth 100 feet
Drilling Contractor and Rig MACTEC / RALEIGH / CME 450	Elevation of boring 26.17 feet	Ground Water Depth 23.5 feet
Sampling Method Split Spoon	Sample Driving Hammer/Drop 139.62 lbs / 30 inches	No. of Samples: 27
Borehole Inclination 0		Date Started: 12/12/06
Logged by D. Tibbals		Date Completed 12/12/06

Reviewed by / Date HC 5/1/07  
 Reviewed by / Date KA W 4/27/07

Depth (feet)	Sample	Sample Type & No.	Unrestricted blowblow/feet	Recovery (inches)	Water Content	Grain Size	Attending Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	16	18					GH	BEAUMONT; black (GLEYS 1 2.5/N); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	
2	X	SS 2	16	18					GH	BEAUMONT; black (GLEYS 1 2.5/N); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	
3	X	SS 3	21	18					GH	BEAUMONT; black (GLEYS 1 2.5/N); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	
4	X	SS 4	16	18	16.5		44/32		CL	BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	
5	X	SS 5	24	18					GH	BEAUMONT; red (2.5YR 5/6); silt; CLAY (CL); moist; firm; high plasticity; high toughness; mostly clay; little silt; calcareous nodules	
6	X	SS 6	26	18	28.0				GH	BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt; calcareous nodules	
7	X	SS 7	23	18					GH	BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
8	X	SS 8	17	18	26.0				GH	BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
9	X	SS 9	27	18					GH	BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt; small silt lenses	
10	X	SS 10	26	18	21.5				GH	BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; some silt	
11											
12											
13											
14											
15											
16											
17											
18											
19	X	SS 11	19	18	24.4		65/46		GH	BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
20											
21											
22											
23											
24	X	SS 12	18	18	26.9	69.8			ML	BEAUMONT; yellowish red (5YR 5/8); sand; SILT (ML); wet; stiff; mostly silt; some fine sand	Water level at 23.5 feet BGS
25											Switch to mud rotary drilling at 25 feet BGS
26											
27											
28											
29	X	SS 13	12	18	25.4	33.7			SM	BEAUMONT; yellowish red (5YR 5/8); silt; SAND (SM); wet; firm; mostly fine sand; poorly graded; little silt	
30											
31											
32											
33											
34	X	SS 14	14	18	25.5	53.0			ML	BEAUMONT; yellowish red (5YR 5/8); sand; SILT (ML); wet; very stiff; mostly silt; some fine sand	
35											
36											
37											
38											
39	X	SS 15	12	18	25.0	21.0			SM	BEAUMONT; yellowish red (5YR 5/8); silt; clay; SAND (SM); wet; firm; mostly fine sand; poorly	
40											

Project Name: Job Number <div style="text-align: center; font-weight: bold; font-size: 1.2em;">MACTEC</div>	<b>SOIL LOG - Boring No. B-914</b>
STP.COL: 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow/6 inches	Penetration (inches)	Water Content	Grain Size#	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks		
40								Lithology	CH	graded; few silt; few clay		
41										BEAUMONT; reddish brown (5YR 4/4); silt; sand; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; few silt; few sand (Continued from previous page)		
42												
43												
44	X	SS 15	6.5	16.18	28.1	72/52						BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt
45												
46												
47												
48												
49	X	SS 17	6.3	25.18	38.8							BEAUMONT; gray (5YR 5/1); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt
50												
51												
52												
53												
54	X	SS 18	7.6	20.18	24.7							BEAUMONT; greenish gray (GLEYS 2.5/10BG); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt; calcareous nodules
55												
56												
57												
58												
59	X	SS 19	10.4	25.18	20.5							BEAUMONT; reddish brown (5YR 4/4) and greenish gray (GLEYS 2.5/10BG) mottling; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
60												
61												
62												
63												
64	X	SS 20	4.8	18.18	22.9	57.3				BEAUMONT; strong brown (7.5YR 4/6); sand; gravel; SILT (ML); wet; very stiff; mostly silt; some fine sand; trace gravel		
65												
66												
67												
68												
69	X	SS 21	9.20	21.18	19.25	20				BEAUMONT; brown (7.5YR 4/4); sand; SILT (ML); wet; hard; mostly silt; some fine sand		
70												
71												
72												
73												
74	X	SS 22	13.28	14.18	19.8	18.7				BEAUMONT; strong brown (7.5YR 4/6); silt; SAND (SM); wet; very dense; mostly fine sand; little silt; poorly graded		
75												
76												
77												
78												
79	X	SS 23	16.18	19.18	18.8	14.2				BEAUMONT; brown (7.5YR 4/4); silt; SAND (SM); wet; dense; mostly fine sand; few silt; poorly		
80												

Project Name: Job Number:



SOIL LOG - Boring No. B-914

STP COL: 5050-06-0486

Depth (feet)	Sample	Sample Type & No.	Uncorrected blow counts (blows/ft)	Penetration (blows)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									CH	graded	
81									CH	BEAUMONT, brown (7.5YR 4/4); silt; CLAY (CH); moist; hard; high plasticity; high toughness; mostly clay; little silt	
82									CH	(Continued from previous page)	
83									CH		
84	X	SS 24	10	24	22.3		68/49		SP	BEAUMONT, brown (7.5YR 4/4); silt; CLAY (CH); moist; hard; high plasticity; high toughness; mostly clay; little silt	
85									CH		
86									CH	BEAUMONT, brown (7.5YR 4/4); silt; SAND (SP); wet; firm; mostly fine sand; few silt; poorly graded	
87									CH	BEAUMONT, brown (7.5YR 4/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
88									CH		
89	X	SS 25	8	25	24.5				CH	BEAUMONT, brown (7.5YR 4/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
90									CH		
91									CH		
92									CH		
93									CH		
94	X	SS 26	11	24	23.3				CH	BEAUMONT, brown (7.5YR 4/3); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
95									CH		
96									CH		
97									CH		
98									CH		
99	X	SS 27	5	25	28.1				CH	BEAUMONT, brown (7.5YR 4/3); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
100									CH		
101									CH	Boring Terminated at 100 feet	
102									CH		
103									CH		
104									CH		
105									CH		
106									CH		
107									CH		
108									CH		
109									CH		
110									CH		
111									CH		
112									CH		
113									CH		
114									CH		
115									CH		
116									CH		
117									CH		
118									CH		
119									CH		
120									CH		

Project Name: Job Number		<b>SOIL LOG - Boring No. B-915</b>	
STP COL 5050-06-0496			
Type and Diameter of Boring: Hollow Stem Auger & Rotary Wash / 4 inch		Boring Location: RSW Lines N 363957.95 E 2942118.79	Total Depth: 50 feet
Drilling Contractor and Rig MACTEC / RALEIGH / CME 45C		Elevation at boring: 28.95 feet	Ground Water Depth: 10.5 feet
Sampling Method Split Spoon		Sample Driving Hammer/Drop: 139.62 lbs / 30 inches	No. of Samples: 17
		Borehole Inclination: 0	Date Started: 12/12/06
		Logged by: D. Tibbals	Date Completed: 12/13/06

Reviewed by: Date JLC 5/4/07  
 Reviewed by: Date KAW 4/27/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow/Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0	X	SS 1	16	18					CH	BEAUMONT; black (GLEYS 1.2.5/N); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt; topsoil; roots	
1	X	SS 2	16	18					CH	BEAUMONT; black (GLEYS 1.2.5/N); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	
2	X	SS 3	15	18					CH	BEAUMONT; very dark greenish gray (GLEYS 1.3/N); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt; roots; topsoil	
3	X	SS 4	7	18					CH	BEAUMONT; very dark greenish gray (GLEYS 1.3/N); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt; topsoil	
4	X	SS 5	10	18					CH	BEAUMONT; strong brown (7.5YR 5/8); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
5	X	SS 6	20	18					SM	BEAUMONT; strong brown (7.5YR 5/8) and gray (7.5YR 5/1); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; some silt	
6	X	SS 7	21	18					SM	BEAUMONT; dark brown (7.5YR 3/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; some silt	
7	X	SS 8	16	18					CH	BEAUMONT; light brown (7.5YR 6/3); silt; SAND (SM); moist; firm; mostly fine sand; poorly graded; little silt	
8	X	SS 9	21	18					CH	BEAUMONT; yellowish brown (10YR 5/8); silt; SAND (SM); wet; firm; mostly fine sand; poorly graded; little silt	
9	X	SS 10	20	18					CH	BEAUMONT; brownish yellow (10YR 5/8); silt; SAND (SM); moist; loose; mostly fine sand; poorly graded; some silt	
10	X	SS 11	20	18					CH	BEAUMONT; light brown (7.5YR 6/3); silt; SAND (SM); wet; loose; mostly fine sand; poorly graded; some silt	
11	X	SS 12	0	18					SM	BEAUMONT; red (2.5YR 5/8); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	No recovery in SS-12. Sand based on residue in SS-12 sampler, blow counts, and material recovered in SS-13
12	X	SS 13	21	18					SM	BEAUMONT; red (2.5YR 5/8); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	
13	X	SS 14	15	18					CH	BEAUMONT; strong brown (7.5YR 4/8); silt; SAND (SM); wet; loose; mostly fine sand; poorly graded; some silt	
14	X	SS 15	22	18					CH	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; mostly fine sand; poorly graded; some silt	
15	X	SS 16	22	18					CH	BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly	

Project Name: Job Number



**SOIL LOG - Boring No. B-915**

STP COL: 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Undisturbed Blowable Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
40									CH	clay; little silt
41										
42										
43										
44	X	SS 16	2.4	21						BEAUMONT; brown (7.5YR 5/4); sand; silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt; few sand
45										
46										
47										
48										
49	X	SS 17	4.0	18						BEAUMONT; brown (7.5YR 5/4) and bluish gray (GLAY 2.5/BB); sand; silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt; little sand; thin sand lens
50										Boring terminated at 50 feet
51										
52										
53										
54										
55										
56										
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80										



Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-916</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 4 inch	Boring Location N 363599.37 E 2942120.7	RSW Lines	Total Depth 50 feet
Drilling Contractor and Rig MACTEC / CHARLOTTE / D 50 (ATV)	Elevation at boring 27.8 feet	Ground Water Depth 10 feet	Depth to Bedrock
Sampling Method Split Spoon/UD	Sample Driving Hammer/Drop 139.08 lbs / 30 inches	No. of Samples 17	Date Started 12/16/06
	Borehole Inclination 0	Logged by R. Clark	Date Completed 12/16/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0									CH	FILL; very dark gray (10YR 3/1); gravel; silt; CLAY (CH); dry; firm; some silt; trace gravel; high plasticity; weak reaction with HCl	
1	X	SS 1	18	18					GC	FILL; yellowish brown (10YR 5/6); silt; sand; clay; GRAVEL (GC); dry; very firm; low plasticity; mostly fine gravel; some clay; trace silt; trace fine sand; weak reaction with HCl; gravel is subrounded to subangular	
2	X	SS 2	18	18					CH	FILL; yellowish brown (10YR 5/6); silt; sand; clay; GRAVEL (GC); dry; loose; low plasticity; mostly fine gravel; some clay; trace silt; trace fine sand; weak reaction with HCl; gravel is subrounded to subangular	
3	X	SS 3	18	18					CH	FILL; yellowish brown (10YR 5/6); silt; sand; clay; GRAVEL (GC); dry; loose; low plasticity; mostly fine gravel; some clay; trace silt; trace fine sand; weak reaction with HCl; gravel is subrounded to subangular	
4	X	SS 4	18	18					CH	FILL; yellowish brown (10YR 5/6); silt; sand; clay; GRAVEL (GC); dry; loose; low plasticity; mostly fine gravel; some clay; trace silt; trace fine sand; weak reaction with HCl; gravel is subrounded to subangular	
5	X	SS 5	18	18					CH	FILL; yellowish brown (10YR 5/6); silt; sand; clay; GRAVEL (GC); dry; loose; low plasticity; mostly fine gravel; some clay; trace silt; trace fine sand; weak reaction with HCl; gravel is subrounded to subangular	
6	X	SS 6	18	18					CH	FILL; yellowish brown (10YR 5/6); silt; sand; clay; GRAVEL (GC); dry; loose; low plasticity; mostly fine gravel; some clay; trace silt; trace fine sand; weak reaction with HCl; gravel is subrounded to subangular	
7	X	SS 7	20	18					CH	BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); moist; firm; high plasticity; some silt; weak reaction with HCl	
8	X	SS 8	20	18					CH	BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); moist; soft; high plasticity; some silt; weak reaction with HCl	
9									CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; some silt; weak reaction with HCl	
10									CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; some silt; weak reaction with HCl	
11									CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; some silt; weak reaction with HCl	
12									CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; some silt; weak reaction with HCl	
13									CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; some silt; weak reaction with HCl	
14		UD 1	N/A	24	23.3		58/34		UD		
15									UD		
16									UD		
17									UD		
18									UD		
19	X	SS 9	20	18					ML	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; some silt; weak reaction with HCl	Water level at 18 feet BGS
20									ML	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; some silt; weak reaction with HCl	Switched to mud rotary at 20 feet BGS
21									ML	shelby tube contained silt; CLAY (CH)	
22									ML	BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); wet; stiff; some clay; low plasticity; weak reaction with HCl	
23									ML	BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); wet; stiff; some clay; low plasticity; weak reaction with HCl	
24	X	SS 10	16	18					SM	BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM); wet; very firm; non-plastic; mostly fine quartz sand; some silt; weak reaction with HCl	
25									SM	BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM); wet; very firm; non-plastic; mostly fine quartz sand; some silt; weak reaction with HCl	
26									SM	BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM); wet; very firm; non-plastic; mostly fine quartz sand; some silt; weak reaction with HCl	
27									SM	BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM); wet; very firm; non-plastic; mostly fine quartz sand; some silt; weak reaction with HCl	
28									SM	BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM); wet; very firm; non-plastic; mostly fine quartz sand; some silt; weak reaction with HCl	
29		UD 2	N/A	0	24				UD		No recovery UD-2
30									UD		
31		UD 2A	N/A	0	24				UD		No recovery UD-2A
32									UD		
33									UD		
34	X	SS 11	16	18					SM	BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM); wet; very dense; non-plastic; mostly fine quartz sand; some silt; weak reaction with HCl	
35									SM	BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM); wet; very dense; non-plastic; mostly fine quartz sand; some silt; weak reaction with HCl	
36									SM	BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM); wet; very dense; non-plastic; mostly fine quartz sand; some silt; weak reaction with HCl	
37									SM	BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM); wet; very dense; non-plastic; mostly fine quartz sand; some silt; weak reaction with HCl	
38									SM	BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM); wet; very dense; non-plastic; mostly fine quartz sand; some silt; weak reaction with HCl	
39	X	SS 12	4	18					CH	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; stiff; high plasticity; some silt; weak	
40									CH	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; stiff; high plasticity; some silt; weak	

Project Name : Job Number



**SOIL LOG - Boring No. B-916**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									CH	reaction with HCl; trace calcareous nodules	
41											
42											
43											
44	X	SS 13	18	18					ML	BEAUMONT; yellowish red (5YR 5/6); clay; SILT (ML); moist; stiff; medium plasticity; mostly silt; some clay	
45											
46											
47											
48											
49		UD 3	N/A	24	20.8		59/35		CH	Shelby tube contained silt; CLAY (CH) at top and bottom of tube	
50										Boring Terminated at 50-feet	
51											
52											
53											
54											
55											
56											
57											
58											
59											
60											
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Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-917</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 4 inch		Boring Location RSW Lines N 363694.58 E 2942832.71		Total Depth 50 feet	
Drilling Contractor and Rig MACTEC / RALEIGH / CME 45C		Elevation at boring 31.06 feet	Ground Water Depth 40 feet	Depth to Bedrock	
Sampling Method Split Spoon		Sample Driving Hammer Drop 139.62 lbs / 30 inches	No. of Samples 17	Date Started 12/16/06	
		Borehole Inclination 0	Logged by D. Tibbals	Date Completed 12/16/06	

Reviewed by / Date JUL 5 / 107  
 Reviewed by / Date KAW 4 / 27 / 07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Elevations (feet)	Corrected Elevations (feet)	Water Content	Grain Size	Alteration Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	12.18						CH	BEAUMONT; greenish black (GLEY 2.2.5/10BG); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt; roots; topsoil first 6 inches	
2	X	SS 2	17.18						CH	BEAUMONT; greenish black (GLEY 2.2.5/10BG); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	
3	X	SS 3	18.18						CH	BEAUMONT; greenish black (GLEY 2.2.5/10BG); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	
4	X	SS 4	18.18						CH	BEAUMONT; greenish black (GLEY 2.2.5/10BG); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; little silt	
5	X	SS 5	19.18						CH	BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
6	X	SS 6	18.18						CH	BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
7	X	SS 7	24.18						CH	BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
8	X	SS 8	18.18						CH	BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
9	X	SS 9	21.18						CH	BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt	
10	X	SS 10	14.18						CH	BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; some silt	
11	X	SS 11	16.18						CH	BEAUMONT; red (2.5YR 4/6); sand; SILT (ML); wet; stiff; high plasticity; low toughness; mostly silt; some sand	
12	X	SS 12	21.18						CH	BEAUMONT; red (2.5YR 4/6); sand; SILT (ML); moist; stiff; high plasticity; low toughness; mostly silt; some sand; calcareous nodules; cemented sand	Water level at 10 feet BGS
13	X	SS 13	17.18						CH	BEAUMONT; red (2.5YR 4/6); sand; SILT (ML); moist; stiff; high plasticity; low toughness; mostly silt; some sand	Switch to mud rotary drilling at 20 feet BGS
14	X	SS 14	17.18						CH	BEAUMONT; red (2.5YR 4/6); sand; SILT (ML); moist; stiff; high plasticity; low toughness; mostly silt; some sand	
15	X	SS 15	17.18						CH	BEAUMONT; red (2.5YR 4/6); clay; sand; SILT (ML); moist; firm; high plasticity; high toughness; mostly silt; little sand; few clay; small clay lens at 24.5 to 24.6 feet bgs	
16	X	SS 16	15.18						SM	BEAUMONT; reddish yellow (7.5YR 6/6); silt; SAND (SM); wet; firm; mostly fine sand; little silt; poorly graded	
17	X	SS 17	19.18						SM	BEAUMONT; brown (10YR 5/3); silt; SAND (SM); wet; firm; mostly fine sand; poorly graded; some silt	
18	X	SS 18	16.18						SM	BEAUMONT; brown (10YR 5/3); silt; SAND (SM); wet; very firm; mostly fine sand; poorly graded; little	

Project Name : Job Number



**SOIL LOG - Boring No. B-917**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow/ft (inches)	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM	silt, cemented layer	
41											
42											
43											
44	X	SS 16	65 16	20 18					CH	BEAUMONT, red (2.5YR 4/6); silt, CLAY (CH); moist, stiff, high plasticity, high toughness, mostly clay, little silt	
45											
46											
47											
48											
49	X	SS 17	54 16	15 18					CH	BEAUMONT, red (2.5YR 4/6); silt, CLAY (CH); moist, stiff, high plasticity, high toughness, mostly clay, little silt	
50											
51											Boring Terminated at 50-feet
52											
53											
54											
55											
56											
57											
58											
59											
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62											
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Project Name: Job Number: <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-918</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring: Hollow Stem Auger / Rotary Wash / 4 inch	Boring Location N 364814.6 E 2942784.1	Switchyard	Total Depth 100 feet
Drilling Contractor and Rig: MACTEC / CHARLOTTE & RALEIGH / D-50 & CME 45C	Elevation at boring: 30.8 feet	Ground Water Depth: 16 feet	Depth to Bedrock
Sampling Method: Split Spoon/UD	Sample Driving Hammer/Drop 39.08/139.62 lbs / 30 inches	No. of Samples 26	Date Started 12/16/06
	Borehole Inclination 0	Logged by R. Clark	Date Completed 12/19/06

Reviewed by / Date: AKC 5/4/07  
 Reviewed by / Date: KAW 4/27/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
1	X	SS 1	15	18					CH	BEAUMONT, very dark gray (10YR 3/1); silt; CLAY (CH); dry; firm; high plasticity; some silt; weak HCl reaction; roots and organic matter observed	Start drilling with Hollow Stem Auger
2											
3											
4		UD 1	N/A	24	15.7					BEAUMONT; silt; CLAY (CH)	UD-1 sample appeared to be CLAY (CH)
5											
6	X	SS 2	18	18						BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH); moist; stiff; high plasticity; some silt; weak HCl reaction	
7	X	SS 3	18	18						BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; some silt; weak HCl reaction	
8	X	SS 4	18	18						BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; some silt; weak HCl reaction	
9	X	SS 5	18	18						BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; some silt; weak HCl reaction	
10	X	SS 6	18	18						BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; some silt; weak HCl reaction	
11	X	SS 7	18	18						BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; some silt; weak HCl reaction	
12	X	SS 8	18	18						BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; very stiff; high plasticity; some silt; weak HCl reaction	
13											
14											
15											Water level at 16-foot BGS
16											
17											
18											
19		UD 2	N/A	24	23.8	46/25			CL	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; firm; high plasticity; some silt; weak HCl reaction	UD-2; Shelby tube contained silt (ML) at both top and bottom of tube
20										BEAUMONT; silt; CLAY (CL)	Switch to Rotary Wash drilling at 20 feet
21											
22											
23											
24											
25											
26		UD 3	N/A	21	24				SM	BEAUMONT; silt; SAND (SM)	UD-3; Shelby tube contained SAND (SM) at both top and bottom of tube
27											
28											
29	X	SS 9	5	15						BEAUMONT; light yellowish brown (10YR 6/4); silt; SAND (SM); wet; firm; non-plastic; mostly fine sand; some silt; weak HCl reaction	
30											
31											
32											
33											
34	X	SS 10	5	18						BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM); wet; very firm; non-plastic; mostly fine sand; some silt; weak HCl reaction	
35											
36											
37											
38											
39	X	SS 11	10	17						BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM); wet; dense; non-plastic; mostly fine sand; some silt; weak HCl reaction	
40											

Project Name: Job Number: <b>MACTEC</b>	<b>SOIL LOG - Boring No. B-918</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow/ft (inches)	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 12	60-4	16					CH	BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak HCl reaction	Rig D 50 broke down. Switched to CME 45C at 45'
45				18							
46											
47											
48											
49	X	SS 13	4b	22						BEAUMONT; greenish gray (GLEYS 10/1); silt; CLAY (CH); moist; very stiff; high plasticity; mostly clay; some silt; trace of calcareous nodules; weak HCl reaction	
50			0	18							
51											
52											
53											
54	X	SS 14	60-2	20						BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH); moist; very stiff; high plasticity; mostly clay; some silt; trace of calcareous nodules; weak HCl reaction	
55				18							
56											
57											
58											
59		UD 4	N/A	24	17.7		22/6		CL-ML	BEAUMONT; silt; CLAY (CL-ML); moist; mostly clay; some silt	
60				24							
61											
62											
63											
64	X	SS 15	10	17					SM	BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; very firm; non-plastic; mostly fine quartz sand; some silt; weak HCl reaction	
65			14	18							
66											
67											
68											
69	X	SS 16	11	19						BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; dense; mostly fine quartz sand; some silt; weak HCl reaction	
70			15	18							
71											
72											
73											
74	X	SS 17	12	13						BEAUMONT; yellowish brown (7.5YR 5/4); silt; SAND (SM); wet; dense; mostly fine quartz sand; some silt; weak HCl reaction	
75			20	18							
76			21								
77											
78											
79	X	SS 18	12	16						BEAUMONT; yellowish brown (7.5YR 5/4); silt; SAND (SM); wet; dense; non-plastic; fine sand with some silt; weak HCl reaction	
80			17	18							

Project Name: Job Number: <div style="text-align: center; font-weight: bold; font-size: 1.2em;">MACTEC</div>	<b>SOIL LOG - Boring No. B-918</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected blowblow inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SM		
81											
82											
83											
84	X	SS 19	13	14	19.3	3.0	W/NP		SP	BEAUMONT; yellowish brown (7.5YR 5/4); silt; SAND (SP); wet very firm; non-plastic; mostly fine sand; some silt; weak HCl reaction	
85											
86											
87											
88											
89	X	SS 20	13	16	18					BEAUMONT; yellowish brown (7.5YR 5/4); silt; SAND (SP); wet very firm; mostly fine sand; some silt; weak HCl reaction	
90											
91											
92											
93											
94	X	SS 21	14	18					CH	BEAUMONT; strong brown (7.5 YR 5/6); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; some silt; trace of calcareous nodules	
95											
96											
97											
98											
99	X	SS 22	6	18						BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt; weak HCl reaction	
100										Boring terminated at 100 feet	
101											
102											
103											
104											
105											
106											
107											
108											
109											
110											
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											

Project Name: Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-919</b>	
STP COL.: 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 4-inch	Boring Location N 364814.59 E 2943088.48	Switch Yard	Total Depth 100 feet
Drilling Contractor and Rig MACTEC / RALEIGH / CME 45L	Elevation at boring 31.91 feet	Ground Water Depth 12 feet	Depth to Bedrock
Sampling Method Split Spoon/UD	Sample Driving Hammer/Drop 139.62 lbs / 30 inches	Nq. of Samples 26	Date Started 12/17/06
	Borehole Inclination 0	Logged by D. Tibbals	Date Completed 12/18/06

Reviewed by: Date HL 5/4/07  
 Reviewed by: Date KAW 4/27/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow/6 inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
1	SS 1	1	13	18				CH	CH	BEAUMONT; black (5YR 2.5/1); silt; CLAY (CH); moist; firm; high plasticity; high toughness; mostly clay; some silt
2	SS 2	2	9	18						BEAUMONT; black (5YR 2.5/1); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; some silt
3	SS 3	3	13	18	22.2					BEAUMONT; black (5YR 2.5/1); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; some silt
4	SS 4	4	17	18						BEAUMONT; black (5YR 2.5/1); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; some silt
5	SS 5	5	19	18						BEAUMONT; black (5YR 2.5/1); silt; CLAY (CH); moist; stiff; high plasticity; mostly clay; some silt
6	UD 1	N/A	24	24	23.5	68/21				BEAUMONT; reddish brown (2.5YR 4/4); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt
7	SS 6	6	17	18						BEAUMONT; reddish brown (2.5YR 4/4); silt; CLAY (CH); moist; high plasticity; high toughness; mostly clay; little silt
8	SS 7	7	22	18						BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt
9	SS 8	8	15	18						BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt
10	SS 9	9	20	18						BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; stiff; high plasticity; high toughness; mostly clay; little silt
11	UD 2	N/A	20.5	24	21.6	NV/NP		ML	BEAUMONT; reddish yellow (5YR 6/6); sand; SILT (ML); wet; mostly fine sand; poorly graded; some silt	
12	SS 10	10	16	18				SP-SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SP-SM); wet; firm; mostly fine sand; poorly graded; little silt	
13	SS 11	11	13	18	27.0	11.8			BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SP-SM); wet; very firm; mostly fine sand; poorly graded; little silt	
14	SS 12	12	11	18					BEAUMONT; brown (7.5YR 5/4); silt; SAND (SP-SM); wet; dense; mostly fine sand; poorly	

Water level at 12 feet BGS

Switch to mud rotary drilling at 15 feet BGS



Project Name : Job Number



SOIL LOG - Boring No. B-919

STP COL: 3-5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected blow count (blows)	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SP-SM	graded; little silt	
41											
42											
43											
44		UD-9	N/A	25/24	26.5		66/42		CH	BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; high plasticity; high toughness; mostly clay; little silt	
45											
46											
47											
48											
49	X	SS-13	10/9	14/18	23.1		65/45			BEAUMONT; greenish gray (GLY 1.6/5G); silt; CLAY (CH); moist; very stiff; mostly clay; little silt	
50											
51											
52											
53											
54	X	SS-14	14/15	24/18					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; very firm; mostly fine sand; poorly graded; little silt	
55									CH	BEAUMONT; reddish brown (5YR 5/4); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; mostly clay; little silt	
56											
57											
58											
59	X	SS-15	9/15	16/18					CL	BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CL); moist; hard; low plasticity; low toughness; some sand; mostly clay	
60									SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; dense; mostly fine sand; poorly graded; few silt	
61											
62											
63											
64	X	SS-16	11/16	12/18	18.9	19.9				BEAUMONT; brown (10YR 5/3); silt; SAND (SM); wet; dense; mostly fine sand; poorly graded; few silt	
65											
66											
67											
68											
69	X	SS-17	16/17	11/18						BEAUMONT; brown (10YR 5/3); silt; SAND (SM); wet; dense; mostly fine sand; poorly graded; few silt	
70											
71											
72											
73											
74	X	SS-18	10/13	12/18	19.4	9.3			SP-SM	BEAUMONT; brown (10YR 5/3); silt; SAND (SP-SM); wet; very firm; mostly fine sand; poorly graded; few silt	
75											
76											
77											
78											
79	X	SS-19	14/16	12/18						BEAUMONT; brown (10YR 5/3); silt; SAND (SM); wet; very firm; mostly fine sand; poorly graded; few	
80											

Project Name : Job Number STP.DOL : 5050-06-0496	<b>MACTEC</b> <b>SOIL LOG - Boring No. B-919</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blowable Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
80									SP	silt
81									SM	
82										
83										
84		UD 4	N/A	24 24						BEAUMONT; brown (10YR 5/3); silt; SAND (SP-SM); wet; mostly fine sand; poorly graded; few silt
85										
86										
87										
88										
89	X	SS 20	13 20	15 18						BEAUMONT; brown (10YR 5/3); silt; SAND (SP-SM); wet; dense; mostly fine sand; poorly graded; few silt
90										
91										
92										
93										
94	X	SS 21	7 8	12 15	25.2	43.7			SM	BEAUMONT; gray (7.5YR 5/1); silt; SAND (SM); wet; firm; mostly fine sand; poorly graded; little silt
95										
96										
97										
98										
99	X	SS 22	13 24	10 18						BEAUMONT; gray (7.5YR 5/1); silt; SAND (SM); wet; dense; mostly fine sand; poorly graded
100										Boring terminated at 100-feet
101										
102										
103										
104										
105										
106										
107										
108										
109										
110										
111										
112										
113										
114										
115										
116										
117										
118										
119										
120										

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-920</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow stem auger / 6 inch	Boring Location Heavy Haul Road N 362943.94 E 2943897.79	Total Depth 30 feet	
Drilling Contractor and Rig EEI / CME 750 ATV	Elevation at boring 28.21 feet	Ground Water Depth 13.5 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 138 lbs / 30 inches	No. of Samples 13	Date Started 11/6/06
	Borehole Inclination 0	Logged by S. Lehman	Date Completed 11/6/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	16	18						Fill: gravel; sand; CLAY	Drilled using hollow stem augers
2	X	SS 2	11	18				CH	Fill: reddish brown (5YR 4/4) to black (2.5Y 2.5/1); silt; sand; CLAY(CL); dry; firm		
3	X	SS 3	5	18				CL	BEAUMONT; black (2.5Y 2.5/1) to dark brown (10YR 3/3); CLAY (CH); moist; stiff; high plasticity		
4	X	SS 4	14	18				CL	BEAUMONT; black (2.5Y 2.5/1); CLAY (CH); moist; stiff; high plasticity		
5	X	SS 5	11	18				ML	BEAUMONT; light olive brown (2.5Y 5/3); silt; CLAY (CL); moist; stiff; medium plasticity		
6	X	SS 6	9	18				ML	BEAUMONT; yellowish brown (10YR 5/4) mottled with greenish gray (GLEY 2 5BG 6/1); silt; sand; CLAY (CL); moist; stiff; medium plasticity; trace sand		
7	X	SS 7	19	18				ML	BEAUMONT; yellowish red (5YR 5/6); clay; SILT (ML); moist; firm; low plasticity		
8	X	SS 8	18	18				ML	BEAUMONT; yellowish red (5YR 5/6); clay; SILT (ML); moist; stiff; low plasticity		
9	X	SS 9	18	18				CL	BEAUMONT; yellowish red (5YR 5/6) with greenish gray (GLEY 2 5BG 6/1); clay; SILT (ML); moist; stiff; low plasticity		
10	X	SS 10	14	18				ML	BEAUMONT; yellowish red (5YR 5/6) mottled with greenish gray (GLEY 2 5BG 6/1); silt; CLAY (CL); moist; stiff; medium plasticity		
11										Water at 13.5 feet BGS	
12											
13											
14											
15											
16											
17											
18											
19	X	SS 11	18	18				CL	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY(CL); moist; stiff; low plasticity		
20											
21											
22											
23											
24	X	SS 12	14	18						BEAUMONT; yellowish red (5YR 5/6); silt; CLAY(CL); dry; firm; low plasticity; calcareous concretions	
25											
26											
27											
28											
29	X	SS 13	18	18				ML	BEAUMONT; yellowish red (5YR 5/6); sand; SILT(ML); wet; firm; non-plastic; little sand		
30										Boring Terminated at 30 feet	
31											
32											
33											
34											
35											
36											
37											
38											
39											
40											

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-927</b>	
STP COL : 5050-06-0495			
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 4 inch	Boring Location Training Center Building N 362183.19 E 2949228.65	Total Depth 60 feet	
Drilling Contractor and Rig Lewis Drilling / Mobile B57	Elevation at boring 26.79 feet	Ground Water Depth 12 feet	Depth to Bedrock
Sampling Method Split Spoon/UD	Sample Driving Hammer/Drop 139.58 lbs / 30 inches	No. of Samples 19	Date Started 12/15/06
	Borehole Inclination 0	Logged by G. Geras	Date Completed 12/16/06

Reviewed by / Date LM 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0	X	SS 1	8	18					CH	BEAUMONT; very dark gray (GLEY 1 3/N); silt; CLAY (CH); dry; firm; little silt; mostly clay; trace organics (grass)	
1	X	SS 2	10	18					CH	BEAUMONT; very dark gray (GLEY 1 3/N); silt; CLAY (CH); dry; firm; little silt; mostly clay; trace organics (grass)	
2	X	SS 3	12	18	IP				CH	BEAUMONT; gray (GLEY 1 6/N) with yellowish brown (10YR 5/6) mottling; silt; CLAY (CH); dry; firm; little silt; mostly clay; trace ferrous nodules; trace organics (grass)	
3	X	SS 4	11	18	17.0				ML	BEAUMONT; strong brown (7.5YR 5/6) with gray (GLEY 1 6/N) mottling; sand; silt; CLAY (CH); dry; stiff; little fine sand; few silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
4	X	SS 5	14	18	19.2	78.4	34/16		ML	BEAUMONT; strong brown (7.5YR 5/6) with gray (GLEY 1 6/N) mottling; sand; SILT (ML); moist; firm; little fine sand; mostly silt; trace calcareous nodules; strong reaction with HCl	
5	X	SS 6	18	18					ML	BEAUMONT; strong brown (7.5YR 5/6) with gray (GLEY 1 6/N) mottling; sand; SILT (ML); moist; firm; little fine sand; mostly silt; trace calcareous nodules; strong reaction with HCl	
6	X	SS 7	18	18	IP				ML	BEAUMONT; strong brown (7.5YR 5/6) with gray (GLEY 1 6/N) mottling; sand; SILT (ML); moist; firm; little fine sand; mostly silt; trace calcareous nodules; strong reaction with HCl	
7	X	SS 8	22.3	18	68.1	NV/NP			ML	BEAUMONT; strong brown (7.5YR 5/6) with slight gray (GLEY 1 6/N) mottling; clay; SILT (ML); moist; firm; some clay; mostly silt; trace calcareous nodules; strong reaction with HCl	Water level at 12 feet BGS
8		UD 1	N/A	3	24				SM	BEAUMONT; strong brown (7.5YR 5/6) with slight gray (GLEY 1 6/N) mottling; clay; SILT (ML); moist; firm; some clay; mostly silt; trace calcareous nodules; strong reaction with HCl	No Recovery in Sample UD-1A
9		UD 1A	N/A	0	24				SM	BEAUMONT; strong brown (7.5YR 5/6) with slight gray (GLEY 1 6/N) mottling; clay; SILT (ML); moist; firm; some clay; mostly silt; trace calcareous nodules; strong reaction with HCl	
10	X	SS 9	2	18					CH	BEAUMONT; strong brown (7.5YR 5/6); sand; gravel; SILT (ML); wet; firm; some sand; mostly silt; trace gravel	Switch to mud rotary drilling at 20 feet BGS
11									CH	BEAUMONT; silt; SAND (SM)	
12									CH	BEAUMONT; silt; SAND (SM)	
13									CH	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; little silt; mostly fine sand	
14	X	SS 10	6	16	25.5	29/10			CL	BEAUMONT; yellowish red (5YR 4/6) with slight greenish gray (GLEY 1 10Y 7/1) mottling; sand; silt; CLAY (CH); dry; stiff; few silt; few sand; mostly clay; trace calcareous nodules; strong reaction with HCl	
15									CL	BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CL); moist; stiff; some clay; trace cemented sand nodules	
16									CH	BEAUMONT; strong brown (7.5YR 5/6) with yellowish red (5YR 4/6) mottling; silt; CLAY (CH); moist; some silt; mostly clay	
17									CH		
18									CH		
19	X	SS 11	5	18					ML	BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); moist; very stiff; some clay; mostly silt; trace cemented silt nodules	
20									ML		
21									ML		
22									ML		
23									ML		
24	X	SS 12	4	17					CH	BEAUMONT; yellowish red (5YR 4/6) transitioning into strong brown (7.5YR 5/6); silt; CLAY (CH); dry;	

Project Name : Job Number



SOIL LOG - Boring No. B-927

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									CH	stiff, some silt; mostly clay	
41											
42											
43											
44	X	SS 13	8.007	18						BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); dry; stiff; little silt; mostly clay	
45				18							
46											
47											
48											
49		UD 3	N/A	24	28.2		54/33			BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH)	
50											
51											
52											
53											
54	X	SS 14	4.7	18						BEAUMONT; greenish gray (GLEY 1 5GY 6/1); silt; sand; CLAY (CH); dry; stiff; few fine sand; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
55				18							
56											
57											
58											
59	X	SS 15	5.007	15						BEAUMONT; greenish gray (GLEY 1 5GY 6/1) with yellowish red (5YR 5/4) mottling; silt; sand; CLAY (CH); dry; very stiff; few fine sand; little silt; mostly clay; trace calcareous nodules; strong reaction with HCl	
60			15	18							
61											
62											
63											
64											
65											
66											
67											
68											
69											
70											
71											
72											
73											
74											
75											
76											
77											
78											
79											
80											

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-928</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 4 inch	Boring Location NW of Power Block N 364932.77 E 2940366.26	Total Depth 125 feet	
Drilling Contractor and Rig EEI / CME-750 ATV	Elevation at boring 29.56 feet	Ground Water Depth 10 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 138 lbs / 30 inches	No. of Samples 30	Date Started 12/13/06
	Borehole Inclination 0	Logged by J. Howard	Date Completed 12/14/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	4	18					CH	BEAUMONT; black (5YR 2.5/1); sand; CLAY (CH); moist; firm; medium plasticity; trace organics	
2	X	SS 2	4	18					CH	BEAUMONT; black (5YR 2.5/1); sand; CLAY (CH); moist; firm; medium plasticity; trace organics	
3	X	SS 3	4	18					CH	BEAUMONT; black (5YR 2.5/1); sand; CLAY (CH); moist; soft; medium plasticity	
4	X	SS 4	4	15					CH	BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; firm; medium plasticity	
5	X	SS 5	4	18					CH	BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; firm; medium plasticity	
6	X	SS 6	4	18					CH	BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff; medium plasticity	
7	X	SS 7	4	18					CH	BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); wet; firm; high plasticity	
8	X	SS 8	4	18					CH	BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); wet; stiff; high plasticity	
9	X	SS 9	4	18					CH	BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); wet; stiff; high plasticity	
10	X	SS 10	4	18					CH	BEAUMONT; yellowish red (5YR 4/6); sand; CLAY (CH); moist; very stiff; high plasticity	
11											Water level at 10 feet BGS
12											Switch to mud rotary drilling at 15 feet BGS
13											
14											
15											
16											
17											
18											
19	X	SS 11	4	18					CH	BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; firm; high plasticity	
20											
21											
22											
23											
24	X	SS 12	6	16					SM	BEAUMONT; yellowish red (5YR 5/6); silt; SAND (SM); wet; firm; mostly fine sand	
25											
26											
27											
28											
29	X	SS 13	4	18					SM	BEAUMONT; yellowish red (5YR 5/6); silt; SAND (SM); wet; loose; mostly fine sand	
30											
31											
32											
33											
34	X	SS 14	6	15					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; fine grained	
35											
36											
37											
38											
39	X	SS 15	6	17					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; firm; mostly fine sand	
40											

Project Name : Job Number



**SOIL LOG - Boring No. B-928**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 16	4 5 0 4	18 18					CH	BEAUMONT; yellowish red (5YR 4/6); sand; CLAY (CH); moist; stiff; high plasticity	
45											
46											
47											
48											
49	X	SS 17	2 5 2	18 18						BEAUMONT; light greenish gray (GLEY 2 7/1); sand; CLAY (CH); moist; stiff; high plasticity	
50											
51											
52											
53											
54	X	SS 18	5 5 5	18 18						BEAUMONT; light greenish gray (GLEY 2 7/1); sand; CLAY (CH); moist; stiff; high plasticity	
55											
56											
57											
58											
59	X	SS 19	6 5 11	18 18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff; high plasticity	
60											
61											
62											
63											
64	X	SS 20	6 10 15	18 18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff; high plasticity	
65											
66											
67											
68											
69	X	SS 21	9 10 15	18 18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff; high plasticity	
70											
71											
72											
73											
74	X	SS 22	6 7 8	18 18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; stiff; high plasticity	
75											
76											
77											
78											
79	X	SS 23	7 8 12	18 18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff; high plasticity	
80											

Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-928</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									CH		
81											
82											
83											
84	X	SS 24	6 10 14	18 18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff, high plasticity	
85											
86											
87											
88											
89	X	SS 25	8 10 14	18 18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff, high plasticity	
90											
91											
92											
93											
94	X	SS 26	7 8 13	18 18						BEAUMONT; strong brown (7.5YR 5/6); sand; CLAY (CH); moist; very stiff, high plasticity	
95											
96											
97											
98											
99	X	SS 27	4 10 10	18 18						BEAUMONT; strong brown (7.5YR 5/6); sand; CLAY (CH); moist; stiff, high plasticity	
100											
101											
102											
103											
104											
105											
106											
107											
108											
109	X	SS 28	9 10 13	12 18					SP	BEAUMONT; yellowish red (5YR 5/6); SAND (SP); wet; very firm; mostly medium to fine sand	
110											
111											
112											
113											
114											
115											
116											
117											
118											
119	X	SS 29	26 29 34	14 18						BEAUMONT; reddish yellow (7.5YR 6/8) with gray mottling; SAND (SP); wet; very dense; medium fine	
120											



Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-928</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									SP		
121											
122											
123											
124	X	SS 30	14 16 20	18					CH	BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; hard; high plasticity	
125										Boring Terminated at 125-feet	
126											
127											
128											
129											
130											
131											
132											
133											
134											
135											
136											
137											
138											
139											
140											
141											
142											
143											
144											
145											
146											
147											
148											
149											
150											
151											
152											
153											
154											
155											
156											
157											
158											
159											
160											

Project Name : Job Number		<b>SOIL LOG - Boring No. B-929</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 4 inch		Boring Location NE of Power Block N 364672.42 E 2945487.07	Total Depth 130 feet
Drilling Contractor and Rig EEI / CME 750 ATV		Elevation at boring 36.56 feet	Ground Water Depth 18.5 feet
Sampling Method Split Spoon		Sample Driving Hammer/Drop 138 lbs / 30 inches	No. of Samples 30
		Borehole Inclination 0	Date Started 11/30/06
		Logged by J. Howard	Date Completed 12/1/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Afterberg Limits	Lithology	Soil Type (USCS)	Remarks
0										
1	X	SS 1	18	17					CH	FILL: yellowish red (5YR 4/6); sand; CLAY (CH); moist to dry; firm; trace organics
2	X	SS 2	18	18					SC	FILL: strong brown (7.5YR 5/6); clay; SAND (SC); medium to fine sand; dry; firm
3	X	SS 3	18	18						FILL: strong brown (7.5YR 5/6); clay; SAND (SC); medium to fine sand; dry; firm
4	X	SS 4	18	18					CH	FILL: light bluish gray (GLEYS 2 7/5B); sand; CLAY (CH); moist; firm; medium to high plasticity
5	X	SS 5	18	18						FILL: light bluish gray (GLEYS 2 7/5B); sand; CLAY (CH); moist; firm; medium to high plasticity
6	X	SS 6	18	18						FILL: yellowish red (5YR 5/6); sand; CLAY (CH); moist; firm; high plasticity
7	X	SS 7	18	18						FILL: red (2.5YR 4/6); sand; CLAY (CH); moist; stiff; with trace organics
8	X	SS 8	18	18						FILL: black (7.5YR 2.5/1); sand; CLAY (CH); moist; firm; high plasticity
9	X	SS 9	18	18						FILL: very dark gray (10YR 3/1); sand; CLAY (CH); moist; stiff; high plasticity
10	X	SS 10	18	18						FILL: grayish brown (10YR 5/2); sand; CLAY (CH); moist; firm; medium to high plasticity
11	X	SS 11	18	18						BEAUMONT; yellowish red (5YR 4/6); sand; CLAY (CH); moist; stiff; medium to high plasticity
12										
13										
14										
15										
16										
17										
18										
19	X	SS 11	4	18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist to wet; stiff; high plasticity
20										
21										
22										
23										
24	X	SS 12	4	18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist to wet; firm; high plasticity
25										
26										
27										
28										
29	X	SS 13	4	18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist to wet; firm; high plasticity
30										
31										
32										
33										
34	X	SS 14	4	18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist to wet; firm; high plasticity
35										
36										
37										
38										
39	X	SS 15	4	18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; stiff; high plasticity
40										

Project Name : Job Number



**SOIL LOG - Boring No. B-929**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									CH		
41											
42											
43											
44	X	SS 16	4 4	18 18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; stiff; high plasticity	
45											
46											
47											
48											
49	X	SS 17	5 9	18 18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; stiff; high plasticity	
50											
51											Switch to mud rotary drilling at 50 feet BGS
52											
53											
54	X	SS 18	20 16	13 18					SM	BEAUMONT; brown; (7.5YR 5/4); silt; SAND (SM); moist; very firm; medium to fine sand	
55											
56											
57											
58											
59	X	SS 19	4 5	18 18					CH	BEAUMONT; reddish brown (5YR 5/4); sand; CLAY (CH); moist; stiff; high plasticity	
60											
61											
62											
63											
64	X	SS 20	5 9	18 18						BEAUMONT; light greenish gray (GLE 1 7/10GY); sand; CLAY (CH); moist; stiff; high plasticity	
65											
66											
67											
68											
69	X	SS 21	7 9	18 18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff; medium plasticity	
70											
71											
72											
73											
74	X	SS 22	3 4	18 18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist to wet; stiff; medium to high plasticity	
75											
76											
77											
78											
79	X	SS 23	7 13	17 18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist to wet; very stiff; high plasticity; with	
80											

Project Name : Job Number



SOIL LOG - Boring No. B-929

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/S Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									CH	sand lens	
81											
82											
83											
84	X	SS 24	15 12	18					SC	BEAUMONT; brown (7.5YR 5/4); clay; SAND (SC); wet; very firm; medium to fine sand	
85											
86											
87											
88											
89	X	SS 25	10 11	14					SP-SM	BEAUMONT; brown (7.5YR 5/4); clay; SAND (SP-SM); wet; very firm; poorly graded; with clay lens	
90											
91											
92											
93											
94	X	SS 26	12 14	17						BEAUMONT; brown (7.5YR 5/4); SAND (SP-SM); wet; very firm; poorly graded	
95											
96											
97											
98											
99	X	SS 27	6 10	14					SC	BEAUMONT; brown (7.5YR 5/4); clay; SAND (SC); wet; very firm	
100											
101											
102											
103											
104											
105											
106											
107											
108											
109	X	SS 28	11 11	14					SP	BEAUMONT; reddish gray (10R 5/1); SAND (SP); wet; very firm; medium to fine sand	
110											
111											
112											
113											
114											
115											
116											
117											
118											
119	X	SS 29	12 12	8						BEAUMONT; brown (10YR 5/3); SAND (SP); moist; very firm; medium to fine sand	
120											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-929</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									SP		
121											
122											
123											
124											
125											
126											
127											
128											
129	X	SS 30	10 22 36	17 18					CH	BEAUMONT; light greenish gray (GLEY 2 7/10G); sand; CLAY (CH); moist to wet; hard; high to medium plasticity Boring Terminated at 130-feet	
130											
131											
132											
133											
134											
135											
136											
137											
138											
139											
140											
141											
142											
143											
144											
145											
146											
147											
148											
149											
150											
151											
152											
153											
154											
155											
156											
157											
158											
159											
160											

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-930</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 4 inch		Boring Location SE of Unit 1 & 2 ECR & UHS N 360212.08 E 2949516.47	Total Depth 120 feet
Drilling Contractor and Rig EEI / CME 750 ATV		Elevation at boring 25.58 feet	Ground Water Depth 10.3 feet
Sampling Method Split Spoon		Sample Driving Hammer/Drop 138 lbs / 30 inches	No. of Samples 29
		Borehole inclination 0	Date Started 11/28/06
		Logged by J. Howard	Date Completed 11/29/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	14	10					CH	BEAUMONT; very dark grayish brown (10YR 3/2); sand; CLAY (CH); moist; firm; trace organics	
2	X	SS 2	14	18					CH	BEAUMONT; very dark grayish brown (10YR 3/2); sand; CLAY (CH); moist; very stiff; medium to high plasticity	
3	X	SS 3	14	18					CH	BEAUMONT; very dark grayish brown (10YR 3/2); sand; CLAY (CH); moist; firm; high plasticity	
4	X	SS 4	14	18					CH	BEAUMONT; very dark grayish brown (10YR 3/2); sand; CLAY (CH); moist; stiff; high plasticity	
5	X	SS 5	14	18					CH	BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; firm; high plasticity	
6	X	SS 6	14	18					CH	BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff; high plasticity	
7	X	SS 7	14	18					CH	BEAUMONT; red (2.5YR 5/8); sand; CLAY (CH); moist; firm; high plasticity	
8	X	SS 8	14	18					CH	BEAUMONT; red (2.5YR 5/8); sand; CLAY (CH); moist; stiff; high plasticity	
9	X	SS 9	14	18					CH	BEAUMONT; red (2.5YR 5/8); sand; CLAY (CH); moist; stiff; high plasticity	
10	X	SS 10	14	18					CH	BEAUMONT; red (2.5YR 5/8); sand; CLAY (CH); moist; stiff; high plasticity	
11											
12											
13											
14											
15											
16											
17											
18											
19	X	SS 11	33	14					SM	BEAUMONT; yellowish red (5YR 5/8); sand; CLAY (CH); wet; firm	
20									SM	BEAUMONT; reddish yellow (5YR 6/6); silt; SAND (SM); wet; loose	
21											
22											
23											
24	X	SS 12	108	13					SM	BEAUMONT; reddish yellow (5YR 6/6); silt; SAND (SM); wet; very firm	
25											
26											
27											
28											
29	X	SS 13	10	18					SC	BEAUMONT; reddish yellow (5YR 6/6); silt; SAND (SM); wet; firm	
30									SC	BEAUMONT; reddish yellow (5YR 6/6); clay; SAND (SC); wet; firm	
31											
32											
33											
34	X	SS 14	8	14					SM	BEAUMONT; reddish yellow (5YR 6/6); silt; SAND (SM); wet; firm	
35											
36											
37											
38											
39	X	SS 15	6	14					SM	BEAUMONT; reddish yellow (5YR 6/6); silt; SAND (SM); wet; very firm	
40											

Water level at 10.3 feet BGS  
 Switch to mud rotary drilling  
 at 10.3 feet BGS

Project Name : Job Number STP COL : 5050-06-0496	<b>SOIL LOG - Boring No. B-930</b>
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM		
41											
42											
43											
44	X	SS 16	6	18					CH	BEAUMONT; reddish yellow (5YR 6/6); sand; CLAY (CH); wet; stiff; medium plasticity	
45											
46											
47											
48											
49	X	SS 17	6	18						BEAUMONT; reddish yellow (5YR 6/6); sand; CLAY (CH); wet; stiff; medium to high plasticity	
50											
51											
52											
53											
54	X	SS 18	4	18						BEAUMONT; bluish gray (GLE 2 6/10B); sand; CLAY (CH); wet; stiff; medium to high plasticity; with brown gray mottling	
55											
56											
57											
58											
59	X	SS 19	8	18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); moist; very stiff; high plasticity	
60											
61											
62											
63											
64	X	SS 20	6	18						BEAUMONT; yellowish red (5YR 5/6); sand; CLAY (CH); wet to moist; very stiff; high plasticity; with gray mottling	
65											
66											
67											
68											
69	X	SS 21	5	18						BEAUMONT; yellowish red (5YR 4/6); sand; CLAY (CH); moist; stiff; high plasticity	
70											
71											
72											
73											
74	X	SS 22	5	18						BEAUMONT; light brown (7.5YR 6/3); sand; CLAY (CH); moist; very stiff; high plasticity	
75											
76											
77											
78											
79		SS 23	10	11					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; very firm; trace shell fragments	
80											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-930</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									SM		
81											
82											
83											
84	X	SS 24	22 41	18 18						BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; very dense	
85											
86											
87											
88											
89	X	SS 25	6 13	11 18						BEAUMONT; pale brown (10YR 6/3); silt; SAND (SM); wet; very dense	
90											
91											
92											
93											
94	X	SS 26	14 10	13 18					SC	BEAUMONT; brown (10YR 5/3); silt; clay; SAND (SC); wet; firm; trace fine gravel (subrounded)	
95											
96											
97											
98											
99	X	SS 27	11 10	18 18					SP	BEAUMONT; brown (7.5YR 5/3); SAND (SP); wet; firm; coarse to fine sand	
100											
101											
102											
103											
104											
105											
106											
107											
108											
109	X	SS 28	6 9	18 18						BEAUMONT; brown (7.5YR 5/3); clay; SAND (SP); wet; very firm; medium to coarse sand; with clay lenses and subrounded grains	
110											
111											
112											
113											
114											
115											
116											
117											
118											
119	X	SS 29	14 17	18 18					CH	BEAUMONT; light brown (7.5YR 6/4); sand; CLAY (CH); moist; hard; medium to high plasticity	As authorized by Bechtel's representative, Boring B-930
120											



Project Name : Job Number 	<b>SOIL LOG - Boring No. B-930</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
120										Boring Terminated at 120-feet
121										terminated prior to reaching the scheduled depth. The boring shows it has penetrated thru the sand strata and back into the clay strata
122										
123										
124										
125										
126										
127										
128										
129										
130										
131										
132										
133										
134										
135										
136										
137										
138										
139										
140										
141										
142										
143										
144										
145										
146										
147										
148										
149										
150										
151										
152										
153										
154										
155										
156										
157										
158										
159										
160										

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-931</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 4 inch			Boring Location Southwest of Power Block N 361984.41 E 2939511.72		Total Depth 125 feet
Drilling Contractor and Rig Best / Failing 1500			Elevation at boring 29.92 feet	Ground Water Depth 18 feet	Depth to Bedrock
Sampling Method Split Spoon			Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 30	Date Started 11/29/06
			Borehole Inclination 0	Logged by C. Bruce	Date Completed 11/30/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	18	18					CH	BEAUMONT; greenish gray (GLEY 1 5/10Y); gravel; silt; CLAY (CH); dry; stiff; trace sand and well rounded gravel	
2	X	SS 2	18	18						BEAUMONT; very dark greenish gray (GLEY 1 3/1); gravel; silt; CLAY (CH); dry; very stiff; trace sand and well rounded gravel	
3	X	SS 3	12	12						BEAUMONT; very dark greenish gray (GLEY 1 3/1); silt; CLAY (CH); dry; very stiff	
4	X	SS 4	13	13						BEAUMONT; very dark greenish gray (GLEY 1 3/1); silt; CLAY (CH); dry; very stiff	
5	X	SS 5	13	13						BEAUMONT; very dark greenish gray (GLEY 1 3/1); silt; CLAY (CH); dry; very stiff	
6	X	SS 6	13	13						BEAUMONT; very dark greenish gray (GLEY 1 3/1); silt; CLAY (CH); dry; very stiff	
7	X	SS 7	13	13						BEAUMONT; very dark greenish gray (GLEY 1 3/1); silt; CLAY (CH); dry; very stiff	
8	X	SS 8	16	16						BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); dry; stiff; trace calcareous nodules	
9	X	SS 9	16	16						BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); dry; stiff; trace calcareous nodules	
10	X	SS 10	24	18						BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); dry; hard; trace calcareous nodules	
11									CL	BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); dry; very stiff; trace calcareous nodules	
12										BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CL); moist; very stiff; trace calcareous nodules	
13											
14											
15											
16											
17											
18											
19	X	SS 11	4	16					SM	BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CL); wet; very stiff; trace of calcareous nodules	Water level at 19 feet BGS
20			14	18						BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; very firm	Switch to mud rotary drilling at 19 feet BGS
21											
22											
23											
24	X	SS 12	11	13						BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; very firm	
25			14	18							
26											
27											
28											
29	X	SS 13	14	12						BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; dense	
30			23	18							
31											
32											
33											
34	X	SS 14	31	12						BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; dense; 1" calcareous layer at sample top	
35			15	18							
36			16								
37											
38											
39	X	SS 15	22	14						BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; very firm; 1" clay layer at 39.5	
40			13	18							

Project Name : Job Number



**SOIL LOG - Boring No. B-931**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
40									SM	feet; increased silt in sand below clay layer	
41											
42											
43											
44	X	SS 16	9 14 17	13 18							BEAUMONT; strong brown (7.5YR 5/6); silt; SAND (SM); wet; dense; more silt than SS-15
45											
46											
47											
48											
49	X	SS 17	7 10 16	24 18					CH		BEAUMONT; brown (7.5YR 4/4); silt; CLAY (CH); moist; stiff
50											
51											
52											
53											
54	X	SS 18	5 10 19	20 18							BEAUMONT; greenish gray (GLEY 1 6/5GY); silt; CLAY (CH); moist; very stiff; calcareous nodules
55											
56											
57											
58											
59	X	SS 19	7 8	22 18							BEAUMONT; greenish gray (GLEY 1 6/5GY) to a brown (7.5YR 4/4); silt; CLAY (CH); moist; stiff; mottled color; some calcareous nodules
60											
61											
62											
63											
64	X	SS 20	7 8 10	17 18							BEAUMONT; greenish gray (GLEY 1 5/10GY); silt; CLAY (CH); moist; very stiff; trace fine sand; some silt
65											
66											
67											
68											
69	X	SS 21	8 10 16	22 18							BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist; very stiff; trace manganese/iron nodules
70											
71											
72											
73											
74	X	SS 22	10 11 14	18							BEAUMONT; yellowish brown (10YR 5/4); silt; CLAY (CH); moist; very stiff; trace calcareous nodules
75											
76											
77											
78											
79	X	SS 23	10 11 16	21 18							BEAUMONT; mottled yellowish brown (10YR 5/4) and greenish gray (GLEY 1 5/10GY); silt; CLAY
80											

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-931</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks		
80								Lithology	CH	(CH); moist; very stiff; trace manganese and iron nodules		
81												
82												
83												
84	X	SS 24	10 12	22 18								BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist; very stiff; trace calcareous nodules
85												
86												
87												
88												
89	X	SS 25	7 9	24 18								BEAUMONT; greenish gray (GLEYS 1 6/10Y); silt; CLAY (CH); moist; very stiff; trace iron/manganese nodules
90												
91												
92												
93												
94	X	SS 26	18 20 18	21 18								BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CH); moist; hard; some calcareous nodules
95												
96												
97												
98												
99	X	SS 27	13 11 11	18								BEAUMONT; mottled yellowish brown (10YR 5/6) and greenish gray (GLEYS 1 6/5GY); silt; CLAY (CH); moist; very stiff; trace sand
100												
101												
102												
103												
104												
105												
106												
107												
108												
109	X	SS 28	11 12 14	24 18						BEAUMONT; greenish gray (GLEYS 1 6/5G); silt; CLAY (CH); moist; very stiff; abundant calcareous nodules		
110												
111												
112												
113												
114												
115												
116												
117												
118												
119	X	SS 29	15 17 18	24 18						BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist; hard; manganese/iron nodules		
120												

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-931</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									CH		
121											
122											
123											
124	X	SS 30	14 20	18						BEAUMONT; strong brown (7.5YR 4/6); silt; CLAY (CH); moist; hard	
125										Boring Terminated at 125-feet	
126											
127											
128											
129											
130											
131											
132											
133											
134											
135											
136											
137											
138											
139											
140											
141											
142											
143											
144											
145											
146											
147											
148											
149											
150											
151											
152											
153											
154											
155											
156											
157											
158											
159											
160											

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-932</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 4 inch	Boring Location South of Power Block N 361899.52 E 2942106.11	Total Depth 125 feet	
Drilling Contractor and Rig Gregg #2 / CME 55	Elevation at boring 31.04 feet	Ground Water Depth 18.5 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 30	Date Started 12/12/06
	Borehole Inclination 0	Logged by M. Fraychineaud	Date Completed 12/13/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/18 Inches	Recovery (inches)	Water Content	Grain Size	Alterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	6	18					CH	FILL: pale yellow (2.5Y 7/4); sand; CLAY (CH); moist; stiff; few gravel; trace roots/grass	
2	X	SS 2	10	18					CH	BEAUMONT; black (GLEYS 1 2.5/N); silt; CLAY (CH); moist; stiff; little silt	
3	X	SS 3	10	18						BEAUMONT; black (GLEYS 1 2.5/N); silt; CLAY (CH); moist; very stiff; little silt	
4	X	SS 4	10	18						BEAUMONT; very dark gray (10YR 3/1); silt; CLAY (CH); moist; stiff; little silt; few rootlets	
5	X	SS 5	10	18						BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; stiff; few silt	
6	X	SS 6	10	18						BEAUMONT; red (2.5YR 4/8); silt; CLAY (CH); moist; stiff; trace silt	
7	X	SS 7	10	18						BEAUMONT; mottled red (2.5YR 4/8) and light gray (10YR 7/2); silt; CLAY (CH); moist; very stiff; trace silt; weak reaction with HCl	
8	X	SS 8	10	18						BEAUMONT; mottled red (2.5YR 4/8) and light gray (10YR 7/2); silt; CLAY (CH); moist; very stiff; trace silt; weak reaction with HCl	
9	X	SS 9	10	18						BEAUMONT; red (2.5YR 5/6); silt; CLAY (CH); moist; hard; trace silt	
10	X	SS 10	15	18						BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; very stiff; trace silt; strong reaction with HCl; trace calcareous nodules	
11	X	SS 11	4	20					ML	BEAUMONT; yellowish red (5YR 5/6); sand; SILT (ML); wet; stiff; little fine sand; trace clay	Water level at 18.5 feet BGS
12											
13	X	SS 12	4	18						BEAUMONT; yellowish red (5YR 5/6); sand; SILT (ML); wet; stiff; little fine sand; trace clay	Switch to mud rotary drilling at 25 feet BGS
14											
15	X	SS 13	5	12					SM	BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; firm; mostly fine sand; little silt	
16											
17	X	SS 14	9	12						BEAUMONT; brown (7.5YR 5/4); silt; SAND (SM); wet; very firm; few silt	
18											
19	X	SS 15	5	18					ML	BEAUMONT; brown (7.5YR 5/4); sand; SILT (ML); wet; very stiff; few fine sand; few clay	

Project Name : Job Number 	<b>SOIL LOG - Boring No. B-932</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow#6 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
40									CH	BEAUMONT; yellowish red (5YR 5/6); silt; CLAY (CH); moist; very stiff, little silt
41									CH	
42										
43										
44	X	SS 16	7 8 11	21 18						BEAUMONT; reddish brown (5YR 4/4); silt; CLAY (CH); moist; very stiff, interbedded silt layers up to 4" thick
45										
46										
47										
48										
49	X	SS 17	7 8 9	22 18						BEAUMONT; mottled reddish brown (5YR 4/4) and light greenish gray (GLEYS 2 8/1); silt; CLAY (CH); moist; very stiff; strong reaction with HCl
50										
51										
52										
53										
54	X	SS 18	4 7 11	23 18						BEAUMONT; greenish gray (GLEYS 1 6/1) and dark yellowish brown (10YR 4/6); silt; CLAY (CH); moist; very stiff
55										
56										
57										
58										
59	X	SS 19	6 10 15	24 18						BEAUMONT; yellowish red (5YR 4/6) mottling with greenish gray (GLEYS 1 6/1); silt; CLAY (CH); moist; very stiff; calcareous nodules
60										
61										
62										
63										
64	X	SS 20	5 10 7	24 18					CL	BEAUMONT; yellowish red (5YR 4/6) mottling with greenish gray (GLEYS 1 6/1); silt; CLAY (CL); moist; very stiff; some silt
65									ML	BEAUMONT; strong brown (7.5YR 4/6); sand; SILT (ML); wet; very stiff; fine sand
66										
67										
68										
69	X	SS 21	12 16 38	14 18					SM	
70										
71										
72										
73										
74	X	SS 22	30 32 35	0 18						No recovery SS-22.
75										
76										
77										
78										
79	X	SS 23	26 15 24	18 18					CH	BEAUMONT; brown (10YR 5/3); silt; SAND (SM); wet; dense; trace silt
80										

Project Name : Job Number



**SOIL LOG - Boring No. B-932**

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									CH	BEAUMONT; mottled yellowish red (5YR 4/6) and light greenish gray (GLEY 1 7/1); silt; CLAY (CH); moist; hard; little silt; strong reaction with HCl; few calcareous deposits in microfractures	
81											
82											
83											
84	X	SS 24	9 14	21 18						BEAUMONT; yellow red (5YR 4/6) and light greenish gray (GLEY 1 7/1) mottling; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; strong reaction with HCl; trace <1/4" dia calcareous nodules	
85											
86											
87											
88											
89	X	SS 25	7 9	22 18						BEAUMONT; light greenish gray (GLEY 1 7/1) with yellowish red (5YR 4/6) mottling; silt; CLAY (CH); moist; very stiff; high plasticity; high toughness	
90											
91											
92											
93											
94	X	SS 26	14 16	18 18						BEAUMONT; mottled yellowish red (5YR 4/6) and light greenish gray (GLEY 1 7/1); silt; CLAY (CH); moist; hard; high plasticity; high toughness	
95											
96											
97											
98											
99	X	SS 27	10 14	23 18						BEAUMONT; mottled yellowish red (5YR 4/6) and light greenish gray (GLEY 1 7/1); silt; CLAY (CH); moist; hard; high plasticity; high toughness	
100											
101											
102											
103											
104											
105											
106											
107											
108											
109	X	SS 28	7 10	24 18						BEAUMONT; mottled greenish gray (GLEY 1 6/1) and reddish yellow (5YR 6/8); silt; CLAY (CH); moist; very stiff; high plasticity; high toughness; strong reaction with HCl; trace approx 1/4" dia. calcareous nodules	
110											
111											
112											
113											
114											
115											
116											
117											
118											
119	X	SS 29	18 27	18 18						BEAUMONT; mottled strong brown (7.5YR 4/6) and greenish gray (GLEY 1 6/1); silt; CLAY (CH);	
120											



Project Name : Job Number 	<b>SOIL LOG - Boring No. B-932</b>
STP COL : 5050-06-0496	

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
120										
121									CH	moist; hard; high plasticity; high toughness; strong reaction with HCl; calcareous nodules some up to 1/4" diameter
122										
123										
124	X	SS 30	24 23	18 18						BEAUMONT; mottled yellowish red (5YR 4/6) and greenish gray (GLEYS 1 6/1); silt; CLAY (CH); moist; hard; high plasticity; high toughness. Approx. 123 to 124 feet bgs, trace 1" layers with increased silt and fine sand; separated by clay (CH) Boring Terminated at 125-feet
125										
126										
127										
128										
129										
130										
131										
132										
133										
134										
135										
136										
137										
138										
139										
140										
141										
142										
143										
144										
145										
146										
147										
148										
149										
150										
151										
152										
153										
154										
155										
156										
157										
158										
159										
160										

Project Name : Job Number <b>MACTEC</b>		<b>SOIL LOG - Boring No. B-933</b>	
STP COL : 5050-06-0496			
Type and Diameter of Boring Hollow Stem Auger & Rotary Wash / 4 inch	Boring Location South of Power Block N 361895.26 E 2943504.02	Total Depth 125 feet	
Drilling Contractor and Rig EEI / CME 750 ATV	Elevation at boring 28.65 feet	Ground Water Depth 10.5 feet	Depth to Bedrock
Sampling Method Split Spoon	Sample Driving Hammer/Drop 138 lbs / 30 inches	No. of Samples 30	Date Started 11/4/06
	Borehole Inclination 0	Logged by S. Lehman	Date Completed 11/6/06

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blow(s) Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	18	18					CL	FILL; strong brown (7.5YR 4/6) to black (2.5Y 2.5/1); silt; sand; gravel; CLAY (CL); dry; stiff; low to medium plasticity	Water level at approximately 10.5 feet below ground surface (bgs).
2	X	SS 2	18	18					CL	BEAUMONT; black (2.5Y 2.5/1); silt; CLAY (CL); moist; very stiff; medium plasticity	
3	X	SS 3	14	18					CL	BEAUMONT; black (2.5Y 2.5/1); silt; CLAY (CL); moist; stiff; high to medium plasticity	
4	X	SS 4	4	18					CH	BEAUMONT; dark brown (10YR 3/3); silt; CLAY (CH); moist; stiff; high plasticity	
5	X	SS 5	18	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; firm; high plasticity; little silt	
6	X	SS 6	18	18					ML	BEAUMONT; yellowish red (5YR 4/6); clay; SILT (ML); moist; stiff; low plasticity	
7	X	SS 7	18	18					ML	BEAUMONT; yellowish red (5YR 4/6) mottled with gray (GLEY 1 6/N); clay; SILT (ML); moist; soft; low plasticity	
8	X	SS 8	18	18					CH	BEAUMONT; yellowish red (5YR 4/6); clay; SILT (ML); wet; stiff; low plasticity	
9	X	SS 9	18	18					CH	BEAUMONT; yellowish red (5YR 4/6) mottled with gray (GLEY 1 6/N); silt; CLAY (CH); moist; stiff; low plasticity	
10	X	SS 10	18	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; low plasticity	
11											
12											
13											
14											
15											
16											
17											
18											
19	X	SS 11	4	18					CH	BEAUMONT; yellowish red (5YR 4/6); silt; CLAY (CH); moist; stiff; medium to low plasticity; little to some silt	
20											
21											
22											
23											
24	X	SS 12	4	18					ML	BEAUMONT; strong brown (7.5YR 5/6) with widely spaced greenish gray laminae; sand; clay; SILT (ML); wet; firm; non-plastic; trace sand	
25											
26											
27											
28											
29	X	SS 13	2	18					ML	BEAUMONT; brown (7.5YR 5/4) with widely spaced greenish gray laminae; sand; SILT (ML); wet; soft; non-plastic	
30											
31											
32											
33											
34	X	SS 14	5	14					SP	BEAUMONT; yellowish brown (10YR 5/4); SAND (SP); wet; firm; fine grained	
35											
36											
37											
38											
39	X	SS 15	3	18					ML	BEAUMONT; brown (7.5YR 5/4); clay; SILT (ML); moist; stiff; non-plastic	
40											

Project Name : Job Number



**SOIL LOG - Boring No. B-933**

STP COL : 5050-06-0495

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
40									ML	
41										
42										
43										
44	X	SS 16	4 6	18 18					CH	BEAUMONT; reddish brown (5YR 4/4); CLAY (CH); moist; stiff; high plasticity
45										
46										
47										
48										
49	X	SS 17	4 6	18 18					CH	BEAUMONT; reddish brown (5YR 4/4); CLAY (CH); moist; stiff; high plasticity
50										
51										
52										
53										
54	X	SS 18	6 9	18 18					CH	BEAUMONT; reddish brown (5YR 4/4) mottled with greenish gray (GLEYS 1 6/1); silt; CLAY (CH); moist; very stiff; medium to high plasticity; mostly clay; little silt
55										
56										
57										
58										
59	X	SS 19	16 18	18 18					CH	BEAUMONT; reddish brown (5YR 4/4) mottled with greenish gray (GLEYS 1 6/1); silt; CLAY (CH); moist; hard; medium to high plasticity
60										
61										
62										
63										
64	X	SS 20	7 10	15 18					CL	BEAUMONT; interbedded reddish brown (5YR 4/4) and yellowish brown (10YR 5/4); sand; silt; CLAY (CL); moist; very stiff; medium to high plasticity; interbedded with silt and sand
65										
66										
67										
68										
69	X	SS 21	4 6	14 18					CL	BEAUMONT; reddish brown (5YR 4/4); silt; sand; CLAY (CL); moist; stiff; medium to high plasticity; interbedded sand and silt
70										
71										
72										
73										
74	X	SS 22	12 12	15 18					CL	BEAUMONT; reddish brown (5YR 4/4); silt; sand; CLAY (CL); moist; very stiff; medium to high plasticity; interbedded sand and silt
75										
76										
77										
78										
79	X	SS 23	6 20	15 18					CH	BEAUMONT; yellowish brown (10YR 5/4); silt; sand; CLAY (CH); moist; hard; high plasticity;
80										

Project Name : Job Number



SOIL LOG - Boring No. B-933

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80									CH	interbedded sand and silt	
81											
82											
83											
84	X	SS 24	11 16 23	16 18					SP	BEAUMONT; light olive brown (2.5Y 5/6); SAND (SP); wet; dense; fine grained	
85											
86											
87											
88											
89	X	SS 25	9 10	18 18					CH	BEAUMONT; strong brown (7.5YR 4/6); CLAY (CH); moist; very stiff; medium to high plasticity	
90											
91											
92											
93											
94	X	SS 26	10 11 17	18 18					ML CL	BEAUMONT; reddish brown (5YR 4/4) mottled with greenish gray (GLEYS 1 10Y 6/1); clay; SILT (ML); moist; very stiff; low plasticity; calcareous concretions BEAUMONT; reddish brown (5YR 4/4) mottled with greenish gray (GLEYS 1 10Y 6/1); silt; CLAY (CL); moist; very stiff; medium plasticity; calcareous concretions	
95											
96											
97											
98											
99	X	SS 27	6 10 12	18 18						BEAUMONT; reddish brown (5YR 4/4) mottled with greenish gray (GLEYS 1 10Y 6/1); silt; CLAY (CL); moist; very stiff; medium plasticity; calcareous concretions	
100											
101											
102											
103											
104											
105											
106											
107											
108											
109	X	SS 28	5 10 12	18 18					CH	BEAUMONT; light greenish gray (GLEYS 1 10Y 7/1); CLAY (CH); moist; very stiff; high plasticity; ferrous nodules and staining	
110											
111											
112											
113											
114											
115											
116											
117											
118											
119	X	SS 29	10 10 14	18 18					ML	BEAUMONT; light greenish gray (GLEYS 1 10Y 7/1) and yellowish red (5YR 4/6); clay; SILT (ML);	
120											

Project Name : Job Number  
  
 STP COL : 5050-06-0496

**SOIL LOG - Boring No. B-933**

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
120									ML		
121											
122											
123											
124	X	SS 30.	16 24	18 18					CL		
125											BEAUMONT; yellowish red (5YR 4/6) with light greenish gray (GLEYS 1 10Y 7/1) mottling; silt; CLAY(CL); dry; hard; medium plasticity
126											Boring Terminated at 125 feet
127											
128											
129											
130											
131											
132											
133											
134											
135											
136											
137											
138											
139											
140											
141											
142											
143											
144											
145											
146											
147											
148											
149											
150											
151											
152											
153											
154											
155											
156											
157											
158											
159											
160											

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Boring No. B-934</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Hollow Stem Auger / Rotary Wash / 3 inch		Boring Location N.E. of Units 1 & 2 ECR/UHS N 362081.37 E 2948244.01		Total Depth 110 feet	
Drilling Contractor and Rig EEI / CME 750 ATV		Elevation at boring 28.59 feet	Ground Water Depth 9.8 feet	Depth to Bedrock	
Sampling Method Split Spoon		Sample Driving Hammer/Drop 138 lbs / 30 inches	No. of Samples 28	Date Started 11/20/06	
		Borehole Inclination 0	Logged by S. Lehman	Date Completed 11/21/06	

Reviewed by / Date KAW 4/3/07  
 Reviewed by / Date KAW 4/3/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
0											
1	X	SS 1	12	18					CH	BEAUMONT; black (2.5Y 2.5/1); silt; CLAY (CH); moist; firm; medium plasticity	Water level at 9.8 feet BGS
2	X	SS 2	11	18					CH	BEAUMONT; black (2.5Y 2.5/1); silt; CLAY (CH); dry; very stiff; medium plasticity	
3	X	SS 3	11	18					CH	BEAUMONT; black (2.5Y 2.5/1); silt; CLAY (CH); moist; stiff; medium plasticity; coarse sand-sized; ferrous stained nodules.; some calcareous concretions	
4	X	SS 4	13	18					CH	BEAUMONT; black (2.5Y 2.5/1); silt; CLAY (CH); moist; very stiff; medium plasticity; ferrous stained nodules; calcareous concretions	
5	X	SS 5	14	18					CL	BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CL); moist; firm; medium plasticity	
6	X	SS 6	15	18					ML	BEAUMONT; strong brown (7.5YR 5/6); silt; CLAY (CL); moist; stiff; medium plasticity; some silt	
7	X	SS 7	14	18					ML	BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); moist; soft; low plasticity	
8	X	SS 8	4	18					ML	BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); moist; stiff; non-plastic	
9	X	SS 9	3	18					ML	BEAUMONT; strong brown (7.5YR 5/6); sand; SILT (ML); wet; stiff; non-plastic	
10	X	SS 10	6	18					ML	BEAUMONT; strong brown (7.5YR 5/6); sand; clay; SILT (ML); wet; stiff; non-plastic; trace sand	
11											
12											
13											
14											
15											
16											
17											
18											
19	X	SS 11	5	18					CH	BEAUMONT; yellowish red (5YR 5/6); CLAY (CH); moist; stiff; high plasticity	
20											
21											
22											
23											
24	X	SS 12	4	16					ML	BEAUMONT; strong brown (7.5YR 5/6); clay; SILT (ML); moist; firm; low plasticity	
25									SM	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; loose; fine grained	
26											
27											
28											
29	X	SS 13	7	18					CL-ML	BEAUMONT; yellowish brown (10YR 5/6); silt; SAND (SM); wet; firm; fine grained	
30											
31											
32											
33											
34	X	SS 14	2	18					CL-ML	BEAUMONT; brown (7.5YR 5/4); silt; CLAY (CL-ML); interbedded clay, SILT (ML), wet, soft, low plasticity	
35											
36											
37											
38											
39	X	SS 15	12	13					SP	BEAUMONT; yellowish brown (10YR 5/4); SAND (SP); wet; very firm; fine grained	
40											

Project Name : Job Number <div style="text-align: center; font-weight: bold; font-size: 1.2em;">                      MACTEC                 </div> STP COL : 5050-06-0496	SOIL LOG - Boring No. B-934
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Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Remarks
40									SP	
41										
42										
43										
44	X	SS 16	4 6 8	17 18					CH	BEAUMONT; yellowish red (5YR 5/6); CLAY (CH); moist; stiff; high plasticity
45										
46										
47										
48										
49	X	SS 17	3 7	18 18						BEAUMONT; reddish brown (5YR 5/4) to greenish gray (Gley1 6/5GY); CLAY (CH); moist; stiff; high plasticity; interbedded with yellowish brown (10YR 5/4); sand; SILT (ML); wet; stiff; non-plastic; fine grained sand
50										
51										
52										
53										
54	X	SS 18	4 7	18 18						BEAUMONT; greenish gray (Gley1 6/10Y); silt; CLAY (CH); moist; stiff; medium plasticity
55										
56										
57										
58										
59	X	SS 19	6 7	18 18					CL	BEAUMONT; greenish gray (Gley1 6/10Y) with strong brown (7.5YR 5/8) mottling; silt; CLAY (CL); moist; very stiff; medium plasticity; some coarse sand - gravel- sized calcareous concretions; strong reaction with HCl
60										
61										
62										
63										
64	X	SS 20	4 3.4	18 18					CL-ML	BEAUMONT; brown (7.5YR 5/4) to greenish gray (Gley1 6/5GY); sand; SILT (ML); moist; firm; non-plastic; interbedded with silt; CLAY (CL); moist; firm; medium plasticity
65										
66										
67										
68										
69	X	SS 21	12 16 15	16 18					SM	BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM); wet; dense; fine grained
70										
71										
72										
73										
74	X	SS 22	10 12 14	13 18						BEAUMONT; brownish yellow (10YR 6/4); SAND (SM); wet; very firm; fine grained
75										
76										
77										
78										
79	X	SS 23	16 16 22	15 18						BEAUMONT; olive yellow (2.5Y 6/6); silt; SAND (SM); wet; dense; fine grained
80										

Project Name : Job Number



SOIL LOG - Boring No. B-934

STP COL : 5050-06-0496

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
80											BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM); wet; dense; fine grained (Continued from previous page)
81											
82											
83											
84	X	SS 24	10 17	13 18							BEAUMONT; brownish yellow (10YR 6/6); silt; SAND (SM); wet; very firm; fine grained; few medium grains
85											
86											
87											
88											
89	X	SS 25	16 15 17	12 18							BEAUMONT; yellowish brown (10YR 5/4); silt; SAND (SM); wet; dense; fine to medium grained
90											
91											
92											
93											
94	X	SS 26	21 16 16	18 18							BEAUMONT; gray (2.5Y 5/1); silt; SAND (SM); wet; dense; fine grained
95											
96											
97											
98											
99	X	SS 27	14 10 11	18							BEAUMONT; dark grayish brown (10YR 4/2); gravel; silt; clay; SAND (SM); wet; very firm; fine to medium grained; some coarse grains; trace gravel; interbedded with brown (10YR 4/3); CLAY (CH); moist; very stiff; high plasticity
100									CH		
101											
102											BEAUMONT; brown (7.5YR 5/4) with greenish gray (Gley1 6/5GY); CLAY (CH); moist; very stiff; high plasticity
103											
104											
105											
106											
107											
108											
109	X	SS 28	12 14 15	18 18						CL	BEAUMONT; brown (7.5YR 5/4) with greenish gray (Gley1 6/5GY); silt; CLAY (CL); moist; very stiff; medium plasticity; with interbedded yellow (2.5Y 7/6); SILT (ML); moist; very stiff; non-plastic; trace fine sand
110											Boring Terminated at 110.0-feet
111											
112											
113											
114											
115											
116											
117											
118											
119											
120											




**Appendix B-2**  
**Geotechnical Test Pits**

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Test Pit No. TP-B322C</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Test Pit / NA		Boring Location Unit 3 - Turbine Building NE	Total Depth 8 feet		
Drilling Contractor and Rig Stone and Webster / Backhoe - Ford 655E		Elevation feet	Ground Water Depth	Depth to Bedrock	
Sampling Method Bulk		Sample Driving Hammer/Drop NA / NA	No. of Samples 1	Date Started 12/18/06	
		Borehole Inclination 0	Logged by M. Fraychineaud	Date Completed 12/18/06	

Reviewed by / Date C. White 2/10/07  
 Reviewed by / Date KAW 2/26/07


Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (Inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0									SW	Topsoil	Test pit excavated with rubber-tired backhoe.	0
1									SC	FILL: brownish yellow (10YR 6/6); silt; gravel; SAND(SW); moist; trace silt; some gravel/small cobbles		1
2									CH	FILL: light olive brown (2.5Y 5/3); clay; SAND (SC); moist; little clay BEAUMONT; black (GLEYS 1 2.5/N); silt; CLAY (CH); moist; medium/ high plasticity; little silt	Obtained bulk sample (TP1-B322C) from 1.5 to 6 feet using a 5-gallon bucket. A glass jar with a moisture seal lid was also filled and placed in the bucket.	2
3												3
4			54									4
5												5
6									CH	BEAUMONT; light olive brown (2.5Y 5/4); silt; CLAY (CH); moist; high plasticity; little silt		6
7												7
8												8
9												9
10												10
11												11
12												12
13												13
14												14
15												15
16												16
17												17
18												18
19												19
20												20

Test Pit Terminated at 8-feet

Project Name : Job Number				<b>SOIL LOG - Test Pit No. TP-B409</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Test Pit / NA			Boring Location Unit 4 - Reactor Building NE		Total Depth 8.5 feet
Drilling Contractor and Rig Stone and Webster / Backhoe - Ford 655E			Elevation feet	Ground Water Depth	Depth to Bedrock
Sampling Method Bulk			Sample Driving Hammer/Drop NA / NA	No. of Samples 1	Date Started 12/18/06
			Borehole Inclination 0	Logged by M. Fraychineaud	Date Completed 12/18/06

Reviewed by / Date C. White 2/10/07  
 Reviewed by / Date KAW 2/22/07

Depth (feet)	Sample	Sample Type & No.	Unconsolidated Blows/6 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0										Topsoil	Test pit excavated with rubber tired backhoe.	
1									SW	FILL: brownish yellow (10YR 6/6); silt; gravel; SAND (SW); moist; trace silt; some gravel/small cobbles		
2									CH	BEAUMONT; black (GLEYS 1 2.5/N); silt; CLAY (CH); moist; medium/high plasticity; some silt; few calcareous nodules	Obtained bulk sample (TP1-B409) from 1.5 to 6.5 feet using a 5-gallon bucket. A glass jar with a moisture seal lid was also filled and placed in the bucket.	
4			60									
7									CH	BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; high plasticity; little silt; few calcareous deposits		
8.5										Bottom of Test Pit at 8.5-feet		
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

Project Name : Job Number				<b>SOIL LOG - Test Pit No. TP-B919</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Test Pit / NA			Boring Location Switch Yard NE		Total Depth 8.5 feet
Drilling Contractor and Rig Stone and Webster / Backhoe - Ford 655E			Elevation feet	Ground Water Depth	Depth to Bedrock
Sampling Method Bulk			Sample Driving Hammer/Drop NA / NA	No. of Samples 2	Date Started 12/19/06
			Borehole Inclination 0	Logged by M. Fraychineaud	Date Completed 12/19/06

Reviewed by / Date C. White 2/10/07

Reviewed by / Date KAW 2/26/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/8 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0									CH	Topsoil	Test pit excavated with rubber-tired backhoe. Obtained bulk sample (TP1-B919) from 0.5 to 6 ft. using a 5-gallon bucket. A glass jar with a moisture seal lid was also filled and placed in the bucket.	0
1									CH	BEAUMONT; black (GLEY 1 2.5/N); silt; sand; CLAY (CH); moist; high plasticity; some silt; trace sand		1
2												2
3					66	20.2	89.650/33					3
4												4
5												5
6									CH	BEAUMONT; red (2.5YR 4/6); silt; CLAY (CH); moist; high plasticity; trace silt; mottled with trace calcareous deposits; strong reaction with HCl	Obtained bulk sample (TP2-B919) from 6 to 8.5 ft. using a 5-gallon bucket. A glass jar with a moisture seal lid was also filled and placed in the bucket.	6
7					30	25.9	99.274/52					7
8												8
9										Test Pit Terminated at 8.5-feet		9
10												10
11												11
12												12
13												13
14												14
15												15
16												16
17												17
18												18
19												19
20												20

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Test Pit No. TP-B927</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Test Pit / NA			Boring Location Training Center Building NE		Total Depth 9 feet
Drilling Contractor and Rig Stone and Webster / Backhoe - Ford 655E			Elevation feet	Ground Water Depth	Depth to Bedrock
Sampling Method Bulk			Sample Driving Hammer/Drop NA / NA	No. of Samples 2	Date Started 12/19/06
			Borehole Incination 0	Logged by M. Fraychineaud	Date Completed 12/19/06

Reviewed by / Date C. White 2/10/07


Reviewed by / Date KAW 2/16/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 Inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0										Topsoil	Test pit excavated with rubber-tired backhoe. Obtained bulk sample (TP1-B927) from 0.5 to 4 ft. using a 5-gallon bucket. A glass jar with a moisture seal lid was also filled and placed in the bucket.	
1								CH	BEAUMONT; black (GLEY 1 2.5/N); silt; sand; CLAY (CH); moist; high plasticity; little silt; little sand			
2			42	24.1	88.6	45/30			CH	BEAUMONT; dark greenish gray (GLEY 1 4/1); silt; CLAY (CH); moist; high plasticity; little silt		
3									CH	BEAUMONT; pale olive (5Y 6/4) and olive yellow (2.5Y 6/6) mottling; silt; CLAY (CH); high plasticity; trace silt		
4									CH	BEAUMONT; yellowish red (5YR 5/6) and light greenish gray (GLEY 1 7/1) mottling; silt; sand; CLAY (CH); high plasticity; trace sand; little silt	Obtained bulk sample (TP2-B927) from 5.5 to 8.5 ft. using a 5-gallon bucket. A glass jar with a moisture seal lid was also filled and placed in the bucket.	
5			36	22.0	91.0	41/25						
6												
7												
8												
9										Test Pit Terminated at 9-feet		
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

Project Name : Job Number		<b>MACTEC</b>		<b>SOIL LOG - Test Pit No. TP-C304</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Test Pit / NA		Boring Location Unit 3 - Power Block N E		Total Depth 9 feet	
Drilling Contractor and Rig Stone and Webster / Backhoe - Ford 655E		Elevation feet		Ground Water Depth Depth to Bedrock	
Sampling Method Bulk		Sample Driving Hammer/Drop NA / NA		No. of Samples 2	
		Borehole Inclination 0		Logged by M. Fraychineaud	
				Date Started 12/18/06	
				Date Completed 12/18/06	

Reviewed by / Date C. White 2/10/07  
 Reviewed by / Date KAW 2/26/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0										FILL: Topsoil and some sand/gravel	Test pit excavated with rubber-tired backhoe.	
1								SM	BEAUMONT; reddish brown (5YR 5/4); silt; gravel; SAND (SM); moist; few silt; trace clay; few gravel			
2								CL	BEAUMONT; dark greenish gray (GLE Y 1 4/1); sand; CLAY (CL); moist; some sand			
3											Obtained bulk sample (TP1-C304) from 3 to 7 ft. using a 5-gallon bucket. A glass jar with a moisture seal lid was also filled and placed in the bucket.	
4								CH	BEAUMONT; black (GLE Y 1 2.5/N); silt; sand; CLAY (CH); moist; some silt; trace sand			
5				48	21.7	90.55	1/36					
6												
7											Obtained bulk sample from TP2-C304) 7 to 9 ft. using a 5-gallon bucket. A glass jar with a moisture seal lid was also filled and placed in the bucket.	
8				24	25.5	90.44	0/23		CH	BEAUMONT; reddish brown (5YR 5/4); silt; sand; CLAY (CH); moist; some silt; trace sand		
9										Test Pit Terminated at 9-feet	Slight water seepage observed at the bottom of Test Pit (8.5 to 9 feet BGS).	
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

Project Name : Job Number				<b>SOIL LOG - Test Pit No. TP-C404</b>	
STP COL : 5050-06-0496					
Type and Diameter of Boring Test Pit / NA			Boring Location Unit 4 - Power Block NE		Total Depth 9 feet
Drilling Contractor and Rig Stone and Webster / Backhoe - Ford 655E			Elevation feet	Ground Water Depth	Depth to Bedrock
Sampling Method Bulk			Sample Driving Hammer/Drop NA / NA	No. of Samples 2	Date Started 12/18/06
			Borehole Inclination 0	Logged by M. Fraychineaud	Date Completed 12/18/06

Reviewed by / Date C. White 2/10/07  
 Reviewed by / Date KAW 2/26/07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0									SW	Topsoil	Test pit excavated with rubber-tired backhoe.	0
1									SM	FILL: brownish yellow (10YR 6/6); silt; gravel; SAND (SW); moist; trace silt; some gravel; some small cobbles		1
2									CH	BEAUMONT; yellowish red (5YR 4/6); silt; gravel; SAND (SM); moist; few silt; few gravel	Obtained bulk sample (TP1-C404) from 2 to 7 ft. using a 5-gallon bucket. A glass jar with moisture seal lid was also filled and placed in the bucket.	2
3									CH	BEAUMONT; black (GLEYS 1 2.5/N); silt; CLAY (CH); moist; medium to high plasticity; some silt		3
4												4
5				60	24.3	87.062/44						5
6												6
7									CH	BEAUMONT; red (2.5YR 4/8); silt; CLAY (CH); moist; high plasticity; few calcareous deposits	Obtained bulk sample (TP2-C404) from 7 to 9 ft. using a 5-gallon bucket. A glass jar with moisture seal lid was also filled and placed in the bucket.	7
8				24	28.4	97.177/56						8
9										Bottom of Test Pit at 9-feet		9
10												10
11												11
12												12
13												13
14												14
15												15
16												16
17												17
18												18
19												19
20												20

## **Appendix B-3**

### **SPT Energy Ratio Measurements**





engineering and constructing a better tomorrow

February 22, 2007

Memorandum to File DCN STP657

From: Steve Kiser SK 2-22-07

Reviewed By: Kathryn White KAW 2/22/07

Subject: **Report of SPT Energy – Best Failing 1500 Truck Rig (Serial No. 502)  
Automatic Hammer  
WORK INSTRUCTION DCN STP657  
South Texas Project (STP) COL Site  
Wadsworth, Texas  
MACTEC Project No. 5050-06-0496**

Mr. Steve Kiser of MACTEC Engineering and Consulting, Inc. (MACTEC) performed energy measurements on the drill rig at the subject site per the referenced Work Instruction. This memorandum summarizes the field testing activities and presents the results of the energy measurements.

#### **SPT Energy Field Measurements**

SPT energy measurements were made on December 1, 2006, during drilling of Boring B-419DH at the referenced site. The testing was performed from approximately 2:30 to 3:30 PM under sunny skies and a temperature of about 55 degrees Fahrenheit. The boring was drilled with personnel and equipment from Best. The drilling equipment consisted of a Failing 1500 model truck-mounted drill rig with an SPT automatic hammer. The drilling tools consisted of N3-sized drilling rods and a 2-foot long split tube sampler. Mud rotary drilling techniques were used to advance the boring below the depth at which groundwater was encountered at the time of energy testing. The drill rig operator during sampling was Mr. Alfredo Palacios. Energy measurements were recorded during sampling at the depth intervals shown in Table 1.

The energy measurements were performed with a Pile Driving Analyzer (PDA) model PAK (Serial No. 1430), and calibrated accelerometers (Serial Nos. P5953 and P5094) and strain gages (Serial Nos. NW #146/1 and NW#146/2). An NW-sized steel drill rod, 2 feet long and instrumented with dedicated strain gages, was inserted at the top of the drill rod string immediately below the SPT hammer. The inserted rod was also instrumented with two piezoresistive accelerometers that were bolted to the outside of the rod. The instrumented rod insert had a cross-sectional area of approximately 1.49 square inches and an outside diameter of approximately 2.625 inches at the gage location. The drill rods included in the drill rod string were hollow rods in 5- to 10-foot long sections, with an outside and inside diameter of approximately 2.625 and 2.25 inches, respectively. The recommended operation rate of the hammer is not known. Due to the closed hammer system, the hammer lubrication condition and anvil dimensions could not be observed.

14 Pages Total

### **Calibration Records**

Calibration records provided to Bechtel January 9, 2007. The calibration records for all the above are filed in DCN STP850.

### **Calculations for EFV**

The work was done in general accordance with ASTM D 4633-05. The strain and acceleration signals were converted to force and velocity by the PDA, and the data was interpreted by the PDA according to the Case Method equation. The maximum energy transmitted to the drill rod string (as measured at the location of the strain gages and accelerometers) was calculated by the PDA using the EFV method equation, as shown below:

$$EFV = \int F(t) * V(t) * dt$$

Where: EFV = Transferred energy (EFV equation), or Energy of FV

F(t) = Calculated force at time t

V(t) = Calculated velocity at time t

The EFV method of energy calculation is recommended in ASTM Standard D4633-05. The EFV equation, integrated over the complete wave event, measures the total energy content of the event using both force and velocity measurements. The EFV values associated with each blow analyzed are tabulated in the attached PDILOT tables and are also shown graphically in the PDILOT charts.

### **Calculations for ETR**

The ratio of the measured transferred energy (EFV) to the theoretical potential energy of the SPT system (140 lb weight with the specified 30-inch fall) is the ETR. The ETR values (as percent of the theoretical value) are shown in Table 1.

### **Comparison of ETR to Typical Energy Transfer Ratio Range**

Based on a research report published by the Florida Department of Transportation (FDOT) (Report WPI No. 0510859, 1999), the average ETR measured for automatic hammers is 79.6%. The standard deviation was 7.9%; therefore, the range of ETRs within one standard deviation of the average was reported to be 71.7% to 87.5%. This range of ETRs was also consistent with other research that was cited in the FDOT research paper. The overall average ETR values shown in Table 1 are within the range of typical values for automatic hammers as reported in the literature.

### **Discussion**

Based on the field testing results, observations from the SPT energy measurements are summarized below:

- The data obtained by the PDA are consistent between individual hammer blows and between the sample depths tested. In general, the first and last one (and

sometimes two) hammer blow records recorded by the PDA produced poor quality data (which is relatively common) and, as such, the records were not used in the data reduction.

- The average energy transferred from the hammer to the drill rods for each individual depth interval using the EFV method ranged from 244 foot-pounds and 263 foot-pounds. These average energy transfers correspond to energy transfer ratios (ETR) of 70% to 75% of the theoretical energy (350 foot-pounds) of the SPT hammer.
- The average at each depth interval was calculated as the transferred energy for each analyzed blow of the depth intervals divided by the total number of hammer blows analyzed. The overall average energy transfer of the SPT system (for all the depth intervals tested) was 255.5 foot-pounds, with an average ETR of 73.0%.

Attachments: Page 4 Table 1 - Summary of SPT Energy Measurements – 1 Page  
Page 5 Work Instructions – SPT Energy #502 – 1 Page  
Page 6 Record of SPT Energy Measurement – 1 Page  
Pages 7-14 PDILOT Output – 8 Pages

**TABLE 1**  
**SUMMARY OF SPT ENERGY MEASUREMENTS (ASTM D4633-05)**  
 South Texas Project (STP) COL Site  
 Wadsworth, Texas  
 MACTEC Project No. 5050-06-0496

Rig Serial No.	Rig Owner	Rig Operator	Boring No. Tested	Date Tested	Sample Depth (feet)	SPT Blow Count (blows per six inches)	No. of Blows Analyzed	Average Measured Energy (Average EFV) (ft-lbs) <sup>a</sup>	Energy Transfer Ratio (%) <sup>b</sup> (Average ETR)
502 (Failing 1500 Truck)	Best	Alfredo Palacios	B-419 DH	12/1/2006	43.5 - 45.0	6 - 6 - 8	19	244	69.7%
					48.5 - 50.0	5 - 5 - 6	15	251	71.7%
					53.5 - 55.0	6 - 8 - 11	24	259	74.0%
					58.5 - 60.0	11 - 8 - 10	27	263	75.1%
<b>Average for Rig:</b>								<b>255.5</b>	<b>73.0%</b>

<sup>a</sup>Measured Energy is energy based on the EFV method, as outlined in ASTM D4633-05, for each blow recorded by the PDA. In some cases, the initial and final one to two blows produced poor quality data, and were not used to calculate the Average Measured Energy.

ETR = EMX \* 1000 lbs/kip

<sup>b</sup>Energy Transfer Ratio is the Measured Energy divided by the theoretical SPT energy of 350 foot-pounds (140 pound hammer falling 2.5 feet). The average ETR values may differ slightly and insignificantly from those in the PDILOT tables due to roundoff.

Prepared By: <i>AL</i>	Date: 2-22-07	Checked By: <i>John A. White</i>	Date: 2/22/07
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Work Instructions - SPT Energy #502  
South Texas COL Project  
MACTEC Engineering and Consulting, Inc.

Issued To: Steve Kiser \_\_\_\_\_  
Location: STP COL Project Field Office \_\_\_\_\_ Date: November 30, 2006 \_\_\_\_\_  
Issued By: Jay Cerceo, Site Coordinator \_\_\_\_\_ MACTEC Project No.: 5050-06-0496  
Valid From: November 30, 2006 \_\_\_\_\_ To: November 30, 2007 \_\_\_\_\_ Rev. \_\_\_\_\_ 0 \_\_\_\_\_

**Task Description:** Measurement of energy transferred to the drill string rods from a Standard Penetration Test (SPT) automatic hammer mounted on a drill rig. Testing will be performed using a Pile Driving Analyzer (PDA) model PAK at various depth intervals from approximately 15 to 100 feet below the ground surface for each rig drilling SPT borings at the South Texas COL Project.

**Applicable Technical Procedures or Plans, or other reference:** ASTM D4633-05 Standard Test Method for Energy Measurement for Dynamic Penetrometers.

**Specific Instructions** (note attachments where necessary): Obtain energy measurements with the PDA at depth intervals in the range of about 15 to 100 feet below the ground surface in general accordance with ASTM D4633-05. Perform energy measurement testing for Failing 1500 Automatic Hammer #502.

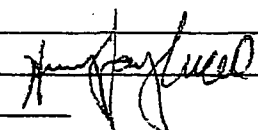
**Report Format:** Written report documenting results of field testing in general accordance with ASTM D4633-05, to include completed Summary of Daily Observations and Testing, Photographs of the setup, Record of SPT Energy Measurement sheet(s), and PDILOT output data.

**Specific Quality Assurance Procedures Applicable:** \_\_\_\_\_ None \_\_\_\_\_

Hold Points or Witness Points: None

Records: All records generated shall be considered QA Records.

Reviewed and Approved By (Note: Only One Signature is Required to Issue):

Project Manager: \_\_\_\_\_ Date: \_\_\_\_\_  
Project Principal: \_\_\_\_\_ Date: \_\_\_\_\_  
Site Coordinator:  \_\_\_\_\_ Date: 11/30/06  
No. of Pages: 1 \_\_\_\_\_ DCN: STP657 \_\_\_\_\_

# MACTEC

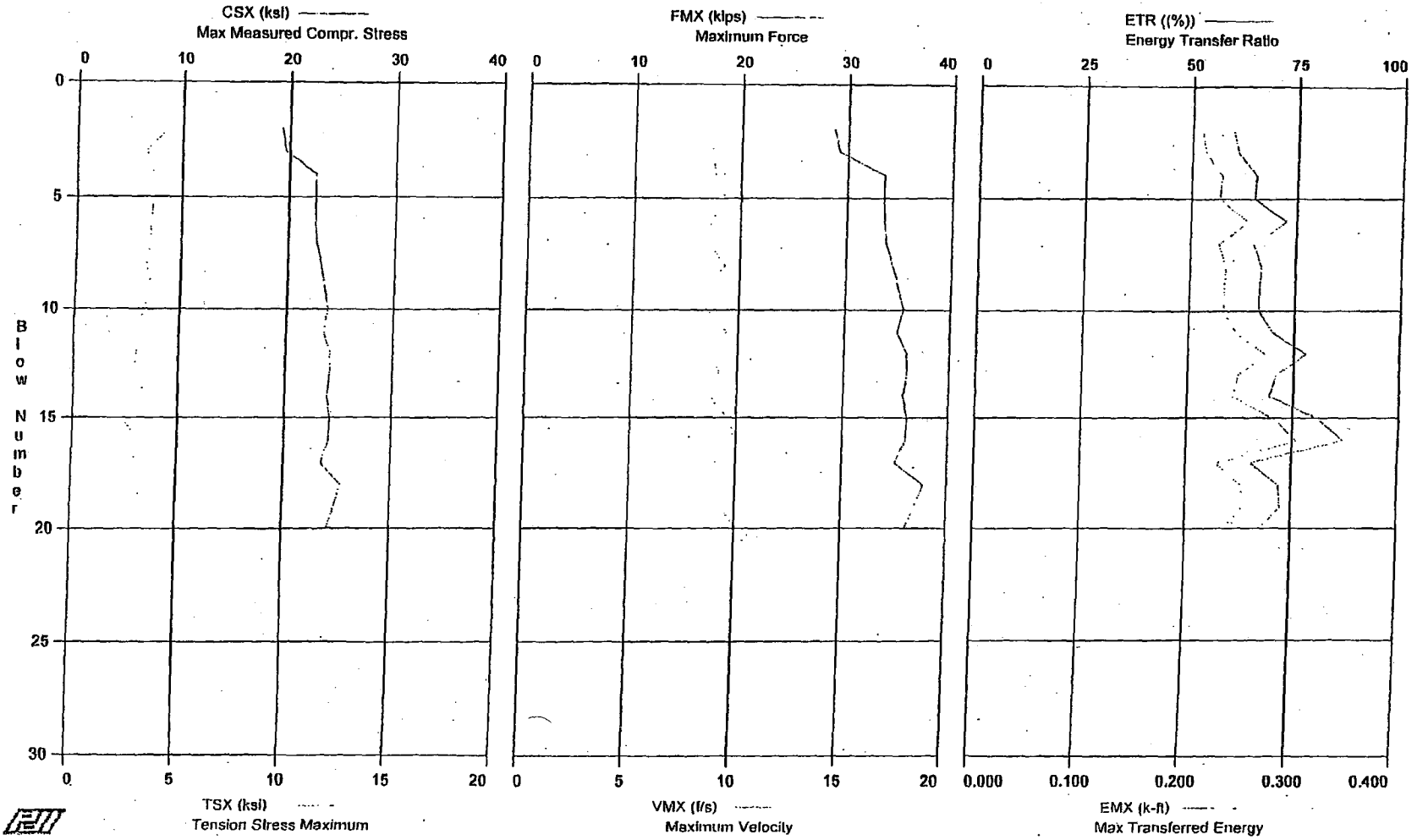
2801 YORKMONT ROAD, SUITE 100 □ CHARLOTTE, NC 28208  
Telephone: (704) 357-8600 / Facsimile: (704) 357-8638

## RECORD OF SPT ENERGY MEASUREMENT

GENERAL INFORMATION		DRILL RIG DATA	
PROJECT:	South Texas Project	MAKE:	FAILING
LOCATION:	Wadsworth, Texas	MODEL:	1500 TRUCK
PROJECT NO.:	5050-01-0496	SERIAL NO.:	502
DATE:	12-1-06	HAMMER TYPE:	AUTOMATIC (LINE)
WEATHER:	SUNNY 55'	ROPE CONDITION:	N/A
INSPECTOR:	Steve Kiser	ROD SIZE:	N3
DRILLING COMPANY:	BEST	NO. OF SHEAVES:	N/A

BORING DATA												
BORING NUMBER:		B-419 DH										
DEPTH DRILLED:		200' PLANNED										
TIME DRIVEN:		2:45 PM										
RIG OPERATOR:		ALFREDO PALACIOS										
HAMMER OPERATOR:		N.R.										
PDA PAK SERIAL NO.:		1430			1430				1430			
INSTR. ROD AREA:		1.49 in <sup>2</sup>										
ACCEL. SERIAL NOS.:		5953 / 5094										
STRAIN SERIAL NOS.:		146 NW 1/2										
	SAMPLE DEPTH (feet)	SPT N-VALUE (bpf)	DEPTH cont. (feet)	SPT N-VALUE (bpf)	SAMPLE DEPTH (feet)	SPT N-VALUE (bpf)	DEPTH cont. (feet)	SPT N-VALUE (bpf)	SAMPLE DEPTH (feet)	SPT N-VALUE (bpf)	DEPTH cont. (feet)	SPT N-VALUE (bpf)
	43.5/45	6-6-8										
	48.5/50	5-5-6										
	53.5/55	6-8-11										
	58.5/60	11-8-10										
REMARKS:												

STP COL Project - Boring B-419DH; 43.5' - 45' Sample



STP COL Project - Boring B-419DH; 43.5' - 45' Sample  
OP: SEK

Rig Serial No. 502 (Best Falling 1500)  
Test date: 1-Dec-2006

AR: 1.49 in<sup>2</sup>  
LE: 49.00 ft  
WS: 16,807.9 f/s

SP: 0.492 k/ft<sup>3</sup>  
EM: 30,000.0 ksi  
JC: 0.60

FMX: Maximum Force  
VMX: Maximum Velocity  
CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
BPM: Blows per Minute

DFN: Final Displacement  
E2E: Energy of FV at 2L/c  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	FMX kips	VMX f/s	CSX ksi	TSX ksi	BPM **	DFN in	E2E k-ft	ETR (%)	EMX k-ft
2	0.00	29	8.5	19.2	4.3	37.2	1.86	0.204	59.6	0.209
3	0.00	29	8.7	19.6	3.3	39.9	1.73	0.202	61.0	0.213
4	0.00	34	8.8	22.5	3.7	40.4	1.84	0.226	65.4	0.229
5	0.00	34	9.3	22.5	3.7	40.0	1.76	0.224	65.0	0.227
6	0.00	34	8.6	22.5	3.6	39.9	2.03	0.228	72.7	0.254
7	0.00	34	8.5	22.7	3.5	40.2	1.80	0.224	65.0	0.227
8	0.00	34	9.3	23.1	3.4	40.1	0.85	0.231	66.9	0.234
9	0.00	35	8.2	23.5	3.6	40.1	1.32	0.230	66.6	0.233
10	0.00	36	8.5	23.9	3.3	40.1	1.50	0.230	66.6	0.233
11	0.00	35	9.5	23.5	3.1	40.1	0.74	0.238	69.9	0.245
12	0.00	36	8.8	24.1	3.0	39.8	1.51	0.245	77.9	0.273
13	0.00	36	9.2	24.2	3.0	40.1	1.03	0.242	71.0	0.248
14	0.00	36	8.7	24.0	3.5	40.1	1.67	0.239	69.4	0.243
15	0.00	36	9.6	24.3	2.4	39.9	1.55	0.247	80.8	0.283
16	0.00	36	10.0	24.2	3.2	40.3	2.03	0.241	86.9	0.304
17	0.00	35	10.0	23.5	2.9	40.0	1.11	0.222	65.4	0.229
18	0.00	38	10.0	25.4	3.1	39.7	1.27	0.239	72.2	0.253
19	0.00	37	9.3	24.8	2.8	40.2	1.47	0.243	72.6	0.254
20	0.00	36	10.2	24.2	2.8	39.9	1.32	0.232	67.5	0.236
Average		35	9.1	23.3	3.3	39.9	1.49	0.231	69.6	0.244

Total number of blows analyzed: 19

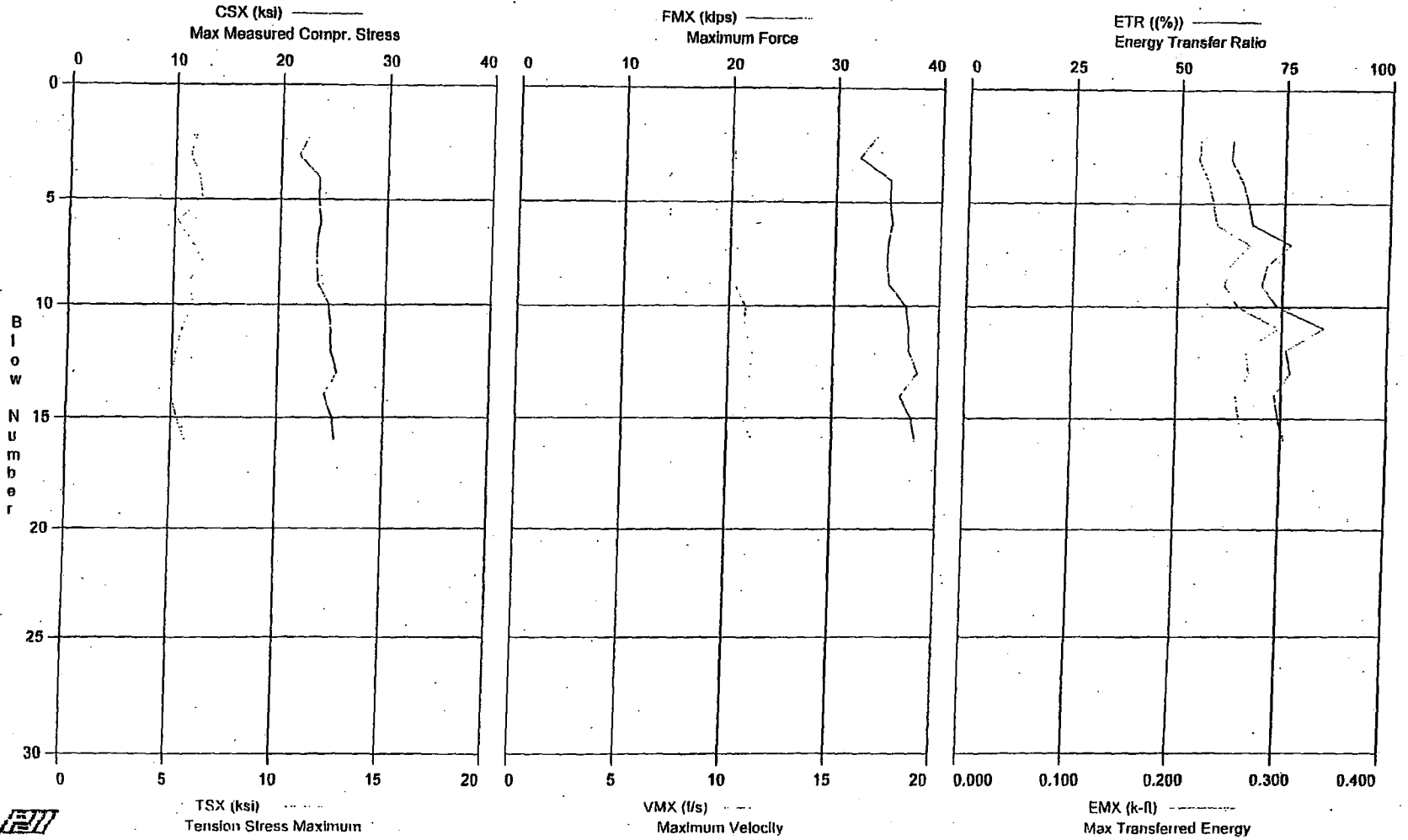
Time Summary

Drive 28 seconds

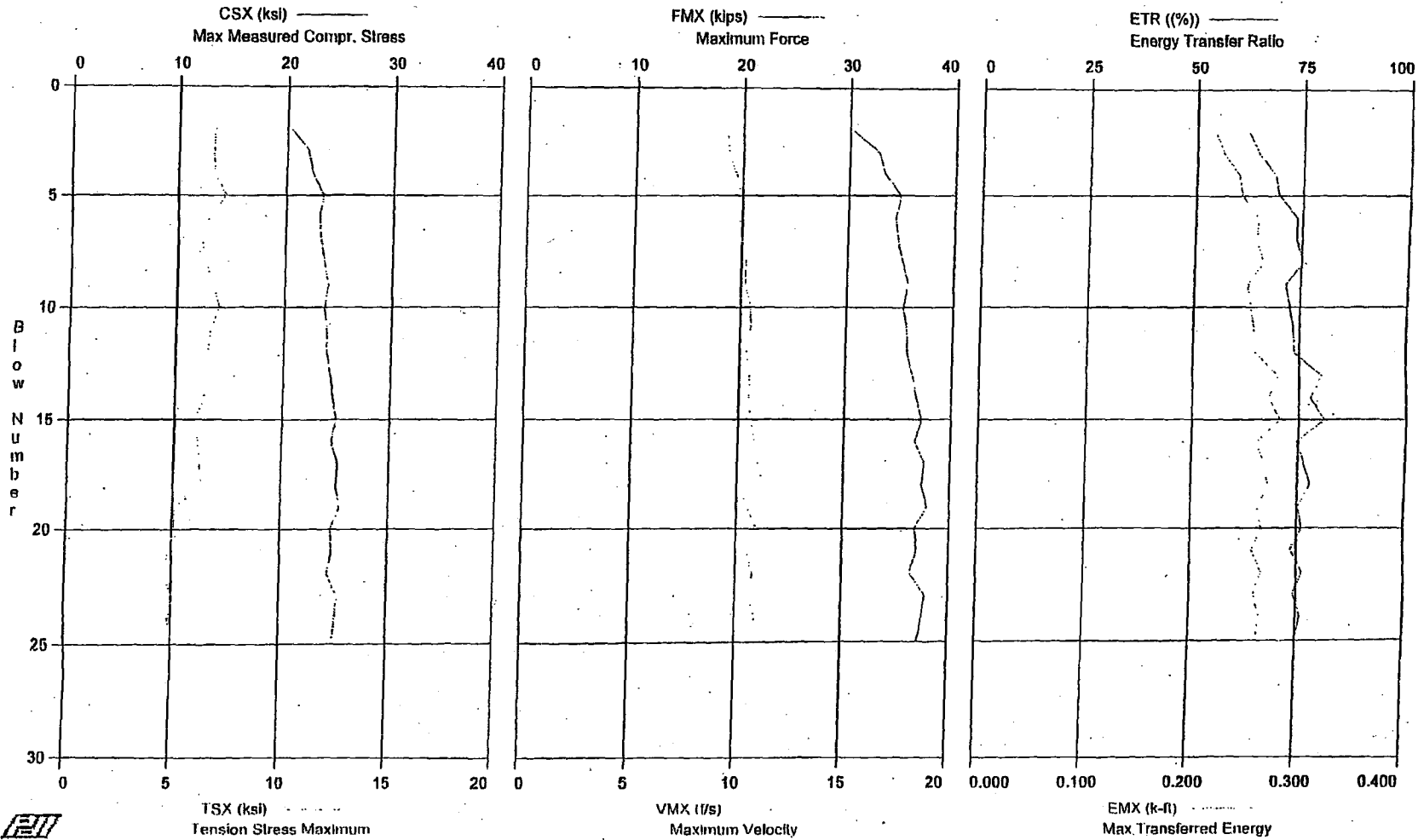
2:37:56 PM - 2:38:24 PM (12/1/2006) BN 1 - 20



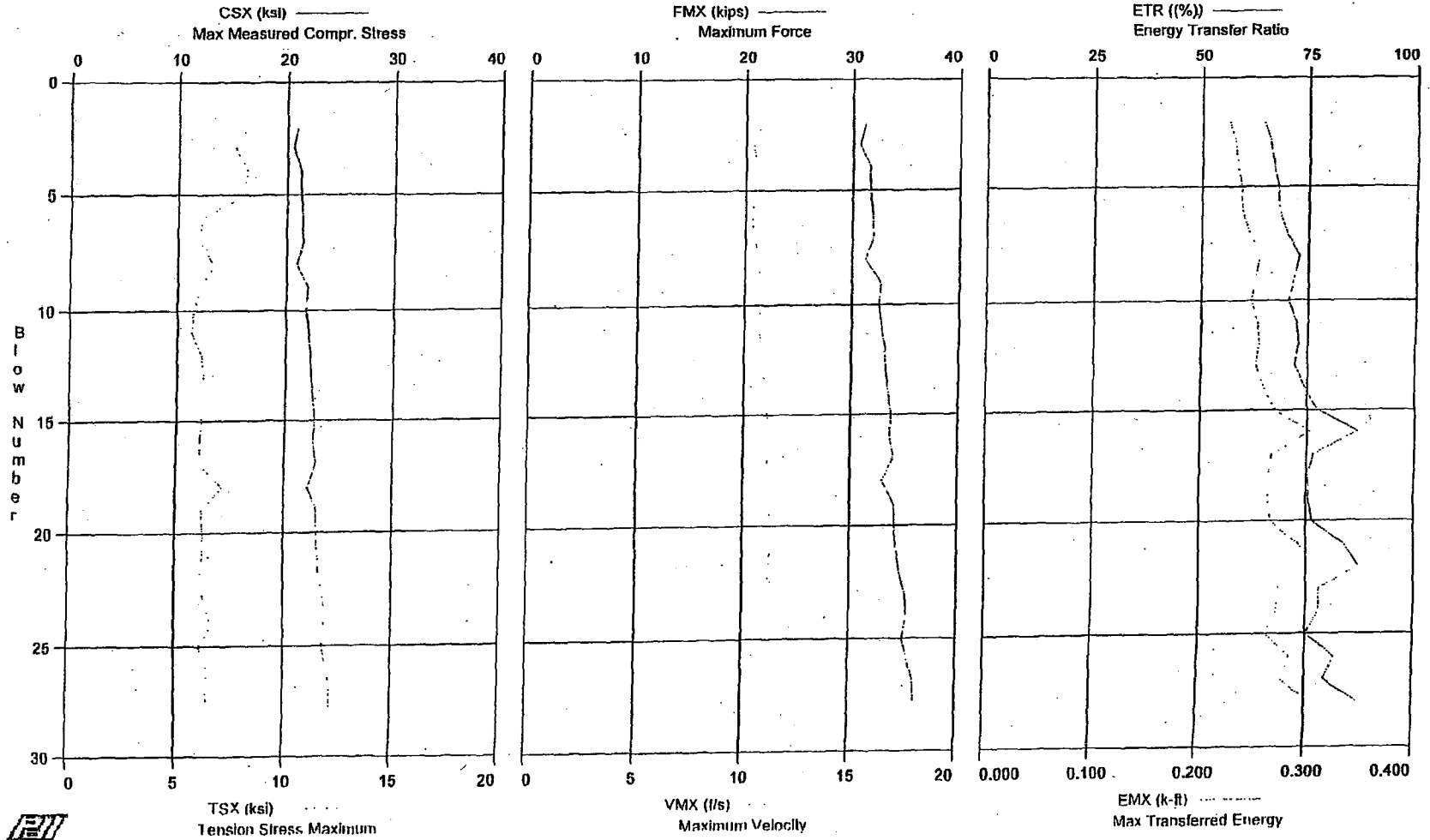
STP COL Project - Boring B-419DH; 48.5' - 50' Sample



STP COL Project - Boring B-419DH; 53.5' - 55' Sample



STP COL Project - Boring B-419DH; 58.5' - 60' Sample



STP COL Project - Boring B-419DH; 58.5' - 60' Sample  
OP: SEK

Rig Serial No. 502 (Best Falling 1500)  
Test date: 1-Dec-2006

AR: 1.49 in<sup>2</sup> SP: 0.492 k/ft<sup>3</sup>  
LE: 64.00 ft EM: 30,000.0 ksi  
WS: 16,807.9 f/s JC: 0.60

FMX: Maximum Force DFN: Final Displacement  
VMX: Maximum Velocity E2E: Energy of FV at 2L/c  
CSX: Max Measured Compr. Stress ETR: Energy Transfer Ratio  
TSX: Tension Stress Maximum EMX: Max Transferred Energy  
BPM: Blows per Minute

BL#	depth ft	FMX kips	VMX f/s	CSX ksi	TSX ksi	BPM **	DFN in	E2E k-ft	ETR (%)	EMX k-ft
2	0.00	31	10.7	21.0	8.2	38.0	2.12	0.224	64.3	0.225
3	0.00	31	10.4	20.6	7.6	39.9	1.49	0.230	65.9	0.231
4	0.00	32	10.5	21.2	8.1	40.0	1.97	0.233	66.7	0.233
5	0.00	32	10.5	21.3	8.0	39.7	1.73	0.237	67.8	0.237
6	0.00	32	10.2	21.4	6.1	40.1	1.41	0.237	68.1	0.238
7	0.00	32	10.4	21.5	6.0	40.1	1.40	0.244	70.0	0.245
8	0.00	31	10.6	21.0	6.6	39.9	1.89	0.246	72.9	0.255
9	0.00	33	10.7	21.9	6.0	39.9	1.01	0.250	71.7	0.251
10	0.00	33	10.8	21.8	5.8	39.8	1.81	0.246	70.5	0.247
11	0.00	33	10.7	22.0	5.7	40.0	1.78	0.252	72.3	0.253
12	0.00	33	10.8	22.2	6.1	39.7	1.90	0.254	73.0	0.255
13	0.00	33	10.9	22.3	6.2	39.8	1.96	0.251	72.1	0.252
14	0.00	34	11.0	22.5	5.9	39.8	2.16	0.258	74.4	0.280
15	0.00	34	11.1	22.7	6.1	40.1	1.66	0.260	77.4	0.271
16	0.00	34	11.1	22.6	6.1	40.0	1.61	0.261	86.7	0.303
17	0.00	34	11.2	22.9	6.1	39.9	1.65	0.267	76.7	0.268
18	0.00	33	11.0	22.1	7.1	39.8	1.55	0.262	75.3	0.264
19	0.00	34	11.2	22.9	6.2	39.7	1.15	0.264	75.6	0.285
20	0.00	34	11.3	22.9	6.3	39.8	1.34	0.266	76.3	0.267
21	0.00	34	11.3	23.1	6.2	39.8	1.58	0.269	83.7	0.293
22	0.00	35	11.1	23.3	6.1	39.7	1.49	0.270	87.1	0.305
23	0.00	35	11.5	23.6	6.3	39.7	1.90	0.267	77.8	0.272
24	0.00	35	11.3	23.7	6.7	39.8	1.64	0.271	77.9	0.273
25	0.00	35	11.3	23.5	6.1	39.8	1.71	0.262	75.0	0.263
26	0.00	36	11.3	23.9	6.5	39.8	1.45	0.265	81.8	0.286
27	0.00	36	11.4	24.2	6.4	39.7	1.52	0.274	79.3	0.278
28	0.00	36	11.3	24.3	6.5	39.6	2.26	0.276	86.9	0.304
Average		33	11.0	22.5	6.5	39.8	1.67	0.255	75.1	0.263

Total number of blows analyzed: 27

Time Summary

Drive 41 seconds

3:31:37 PM - 3:32:18 PM (12/1/2006) BN 1 - 28



# MACTEC

engineering and constructing a better tomorrow

February 22, 2007

Memorandum to File DCN STP 095

From: Steve Kiser *Gj* 2-22-07

Reviewed By: Kathryn White *KAW* 2/22/07

Subject: **Report of SPT Energy – Environmental Exploration CME 750 ATV (Serial No. 263048) Automatic Hammer  
WORK INSTRUCTION DCN STP 095  
South Texas Project (STP) COL Site  
Wadsworth, Texas  
MACTEC Project No. 5050-06-0496**

Mr. Steve Kiser of MACTEC Engineering and Consulting, Inc. (MACTEC) performed energy measurements on the drill rig at the subject site per the referenced Work Instruction. This memorandum summarizes the field testing activities and presents the results of the energy measurements.

## **SPT Energy Field Measurements**

SPT energy measurements were made on November 7, 2006, during drilling of Boring B-346 at the referenced site. The testing was performed from approximately 12:50 to 3:55 PM under sunny skies and a temperature of about 72 degrees Fahrenheit. The boring was drilled with personnel and equipment from Environmental Exploration. The drilling equipment consisted of a CME 750 model ATV-mounted drill rig with an SPT automatic hammer. The drilling tools consisted of AW-J-sized drilling rods and a 2-foot long split tube sampler. Mud rotary drilling techniques were used to advance the boring below the depth at which groundwater was encountered at the time of energy testing. The drill rig operator during sampling was Mr. David Nalls. Energy measurements were recorded during sampling at the depth intervals shown in Table 1.

The energy measurements were performed with a Pile Driving Analyzer (PDA) model PAK (Serial No. 1430), and calibrated accelerometers (Serial Nos. P5953 and K0686) and strain gages (Serial Nos. AW #144/1 and AW#144/2). An AW-sized steel drill rod, 2 feet long and instrumented with dedicated strain gages, was inserted at the top of the drill rod string immediately below the SPT hammer. The inserted rod was also instrumented with two piezoresistive accelerometers that were bolted to the outside of the rod. The instrumented rod insert had a cross-sectional area of approximately 1.19 square inches and an outside diameter of approximately 1.75 inches at the gage location. The drill rods included in the drill rod string were hollow rods in 5 to 10 foot long sections, with an outside and inside diameter of approximately 1.75 and 1.375 inches, respectively. The recommended operation rate of the hammer is not known. Due to the closed hammer system, the hammer lubrication condition and anvil dimensions could not be observed.

17 Pages Total

### Calibration Records

Calibration records were provided to Bechtel on January 9, 2007. The calibration records for all the above are filed in DCN STP850.

### Calculations for EFV

The work was done in general accordance with ASTM D 4633-05. The strain and acceleration signals were converted to force and velocity by the PDA, and the data was interpreted by the PDA according to the Case Method equation. The maximum energy transmitted to the drill rod string (as measured at the location of the strain gages and accelerometers) was calculated by the PDA using the EFV method equation, as shown below:

$$EFV = \int F(t) * V(t) * dt$$

Where: EFV = Transferred energy (EFV equation), or Energy of FV

F(t) = Calculated force at time t

V(t) = Calculated velocity at time t

The EFV method of energy calculation is recommended in ASTM Standard D4633-05. The EFV equation, integrated over the complete wave event, measures the total energy content of the event using both force and velocity measurements. The EFV values associated with each blow analyzed are tabulated in the attached PDILOT tables and are also shown graphically in the PDILOT charts.

### Calculations for ETR

The ratio of the measured transferred energy (EFV) to the theoretical potential energy of the SPT system (140 lb weight with the specified 30-inch fall) is the ETR. The ETR values (as percent of the theoretical value) are shown in Table 1.

### Comparison of ETR to Typical Energy Transfer Ratio Range

Based on a research report published by the Florida Department of Transportation (FDOT) (Report WPI No. 0510859, 1999), the average ETR measured for automatic hammers is 79.6%. The standard deviation was 7.9%; therefore, the range of ETRs within one standard deviation of the average was reported to be 71.7% to 87.5%. This range of ETRs was also consistent with other research that was cited in the FDOT research paper. The ETR values shown in Table 1 are within the range of typical values for automatic hammers as reported in the literature.

### Discussion

Based on the field testing results, observations from the SPT energy measurements are summarized below:

- The data obtained by the PDA are consistent between individual hammer blows and between the sample depths tested. In general, the first and last one (and sometimes two) hammer blow records recorded by the PDA produced poor quality

data (which is relatively common) and, as such, the records were not used in the data reduction.

- The average energy transferred from the hammer to the drill rods for each individual depth interval using the EFV method ranged from 278 foot-pounds to 293 foot-pounds. These average energy transfers correspond to energy transfer ratios (ETR) of 79% to 84% of the theoretical energy (350 foot-pounds) of the SPT hammer.
- The average at each depth interval was calculated as the transferred energy for each analyzed blow of the depth intervals divided by the total number of hammer blows analyzed. The overall average energy transfer of the SPT system (for all the depth intervals tested) was 285.6 foot-pounds, with an average ETR of 81.6%.

Attachments: Page 4 Table 1 - Summary of SPT Energy Measurements – 1 Page  
Page 5 Work Instructions – SPT Energy Environmental Exploration CME 750  
(Hammer #263048) – 1 Page  
Page 6 Record of SPT Energy Measurement – 1 Page  
Pages 7-17 PDILOT Output – 11 Pages

**TABLE 1**  
**SUMMARY OF SPT ENERGY MEASUREMENTS (ASTM D4633-05)**  
 South Texas Project (STP) COL Site  
 Wadsworth, Texas  
 MACTEC Project No. 5050-06-0496

Rig Serial No.	Rig Owner	Rig Operator	Boring No. Tested	Date Tested	Sample Depth (feet)	SPT Blow Count (blows per six inches)	No. of Blows Analyzed	Average Measured Energy (Average EFV) (ft-lbs) <sup>a</sup>	Energy Transfer Ratio (%) <sup>b</sup> (Average ETR)
263048 (CME 750 ATV)	Environmental Exploration	David Nalls	B-346	11/7/2006	18.5 - 20.0	4 - 3 - 5	12	278	79.4%
					28.5 - 30.0	6 - 7 - 9	22	282	80.6%
					33.5 - 35.0	12 - 22 - 22	57	279	79.7%
					38.5 - 40.0	21 - 28 - 20	68	287	82.0%
					43.5 - 45.0	21 - 21 - 19	60	293	83.7%
<b>Average for Rig:</b>								<b>285.6</b>	<b>81.6%</b>

<sup>a</sup>Measured Energy is energy based on the EFV method, as outlined in ASTM D4633-05, for each blow recorded by the PDA. In some cases, the initial and final one to two blows produced poor quality data, and were not used to calculate the Average Measured Energy.

ETR = EMX \* 1000 lbs/kip

<sup>b</sup>Energy Transfer Ratio is the Measured Energy divided by the theoretical SPT energy of 350 foot-pounds (140 pound hammer falling 2.5 feet). The average ETR values may differ slightly and insignificantly from those in the PDILOT tables due to roundoff.

Prepared By: <i>[Signature]</i>	Date: 2-22-07	Checked By: <i>[Signature]</i>	Date: 2/22/07
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**Work Instruction SPT-ENERGY #263048**

South Texas COL Project  
MACTEC Engineering and Consulting, Inc.

Issued To: Steve Kiser  
Location: STP Field Office Date: November 7, 2006  
Issued By: Jay Cerceo, Site Coordinator MACTEC Project No.: 5050-06-0496  
Valid Thru: 11/7/2006 To 11/7/2007 Rev. No. 0

**Task Description:** Perform SPT Energy measurements of drill rigs at the South Texas COL Project.

**Applicable Technical Procedures or Plans, or other reference:** ASTM (D4633), South Texas COL Geotechnical Work Plan Attachment 3, Bechtel's Engineering Specification for Subsurface Investigation and Laboratory Testing for South Texas Project Units 3 & 4 (Specification).

**Specific Instructions** (note attachments where necessary): Follow guidelines in South Texas COL Work Plan, Attachment 3. Energy measurements to be performed on drill rigs while performing SPT sampling. Obtain energy measurements with the PDA at depth intervals in the range of 15 to 100 feet below the ground surface in general accordance with ASTM D4633-05. Perform energy measurement for SPT automatic hammer number 263048.

**Special Instructions:** Complete all field forms in ink.

**Report Format:** Completed Field Forms As Follows: Daily Field Report, Record of SPT Energy Measurement and PDILOT output data, Photographs (rig and equipment setup, energy measurement equipment).

**Specific Quality Assurance Procedures Applicable:** None

**Hold Points or Witness Points:** Direction to perform energy measurements received from the Site Coordinator.  
Calibration record of energy measurement equipment on file.

**Records:** All records generated shall be considered QA Records.

Reviewed and Approved By: (Note: Only one signature is required to issue)

Project Manager (MACTEC): \_\_\_\_\_ Date: \_\_\_\_\_

Project Principal (MACTEC): \_\_\_\_\_ Date: \_\_\_\_\_

Site Coordinator (MACTEC) Jay Cerceo Date: 11/7/06

No. of Pages: 1

DCN: STP095



2801 YORKMONT ROAD, SUITE 100 □ CHARLOTTE, NC 28208  
Telephone: (704) 357-8600 / Facsimile: (704) 357-8638

### RECORD OF SPT ENERGY MEASUREMENT

GENERAL INFORMATION		DRILL RIG DATA	
PROJECT:	South Texas Project	MAKE:	CME
LOCATION:	Wadsworth, Texas	MODEL:	750 AN
PROJECT NO.:	5050-06-0496	SERIAL NO.:	263048
DATE:	11-7-06	HAMMER TYPE:	AUTOMATIC
WEATHER:	SUNNY - WARM 73°	ROPE CONDITION:	N/A
INSPECTOR:	Steve Kiser	ROD SIZE:	AW-5
DRILLING COMPANY:	ENVIRONMENTAL EXPLORATION	NO. OF SHEAVES:	N/A

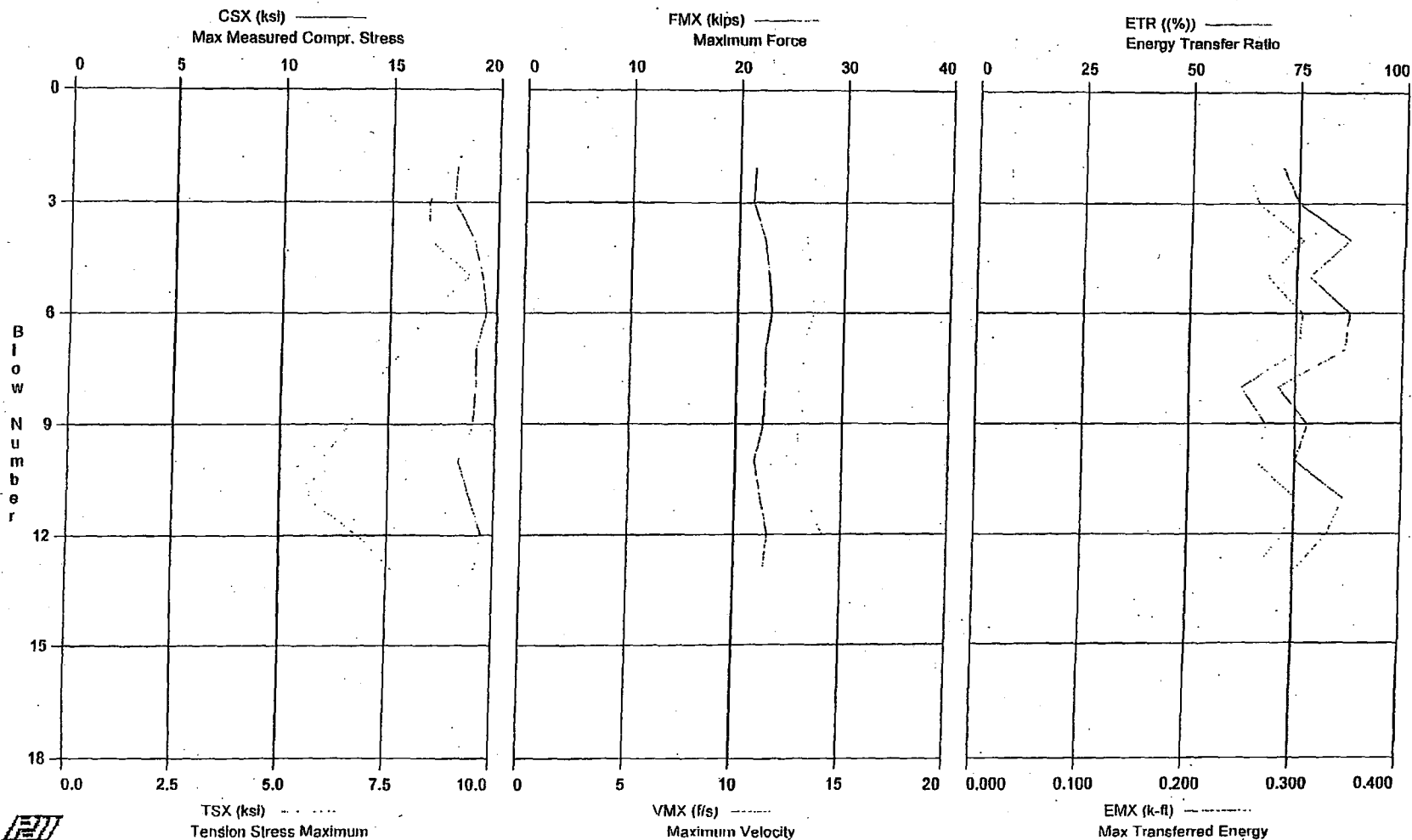
BORING DATA			
BORING NUMBER:	B-378		
DEPTH DRILLED:	75' PLANNED		
TIME DRIVEN:	1:00 PM		
RIG OPERATOR:	DAVID NALLS		
HAMMER OPERATOR:	N.R.		
PDA PAK SERIAL NO.:	1430	1430	1430
INSTR. ROD AREA:	1.19 in <sup>2</sup>		
ACCEL. SERIAL NOS.:	P5953 / K2686		
STRAIN SERIAL NOS.:	AW # 144 1/2		

SAMPLE DEPTH (feet)	SPT N-VALUE (bpf)	DEPTH cont. (feet)	SPT N-VALUE (bpf)	SAMPLE DEPTH (feet)	SPT N-VALUE (bpf)	DEPTH cont. (feet)	SPT N-VALUE (bpf)	SAMPLE DEPTH (feet)	SPT N-VALUE (bpf)	DEPTH cont. (feet)	SPT N-VALUE (bpf)
18.5/20	4-3-3										
29.5/35	6-7-9										
33.5/35	11-22-22										
38.5/40	21-25-20										
43.5/45	21-21-19										

REMARKS:

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STP COL Project - Boring B-346; 18.5' - 20' Sample



STP COL Project - Boring B-346; 18.5' - 20' Sample  
OP: SEK

Rig Serial No. 263048 (Environmental Exploration CME 75)  
Test date: 7-Nov-2006

AR: 1.19 in<sup>2</sup>  
LE: 24.00 ft  
WS: 16,807.9 f/s

SP: 0.492 k/ft<sup>3</sup>  
EM: 30,000 ksi  
JC: 0.60

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
FVP: Force/Velocity proportionality

BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	FVP []	BPM **	EFV **	ETR (%)	EMX k-ft
2	0.00	18.00	8.85	21	13.5	0.58	0.0	0.2	71.2	0.249
3	0.00	17.91	8.36	21	13.5	0.75	53.5	0.3	75.0	0.263
4	0.00	18.86	8.35	22	13.2	0.81	52.4	0.3	87.2	0.305
5	0.00	19.29	9.35	23	13.5	0.86	52.2	0.3	78.1	0.273
6	0.00	19.49	8.35	23	13.6	0.51	52.7	0.3	87.6	0.306
7	0.00	19.07	7.83	23	13.0	0.51	52.5	0.3	86.5	0.303
8	0.00	19.08	7.03	23	13.3	0.53	52.9	0.2	71.0	0.249
9	0.00	18.97	6.57	23	13.0	0.51	52.9	0.3	77.9	0.273
10	0.00	18.29	5.89	22	12.8	0.49	52.3	0.3	75.1	0.263
11	0.00	18.85	5.66	22	13.4	0.50	52.6	0.3	86.4	0.302
12	0.00	19.43	6.84	23	14.1	0.51	52.7	0.3	82.8	0.290
13	0.00	19.10	7.67	23	13.4	0.51	52.8	0.3	75.2	0.263
Average		18.86	7.56	22	13.3	0.59	52.7	0.3	79.5	0.278

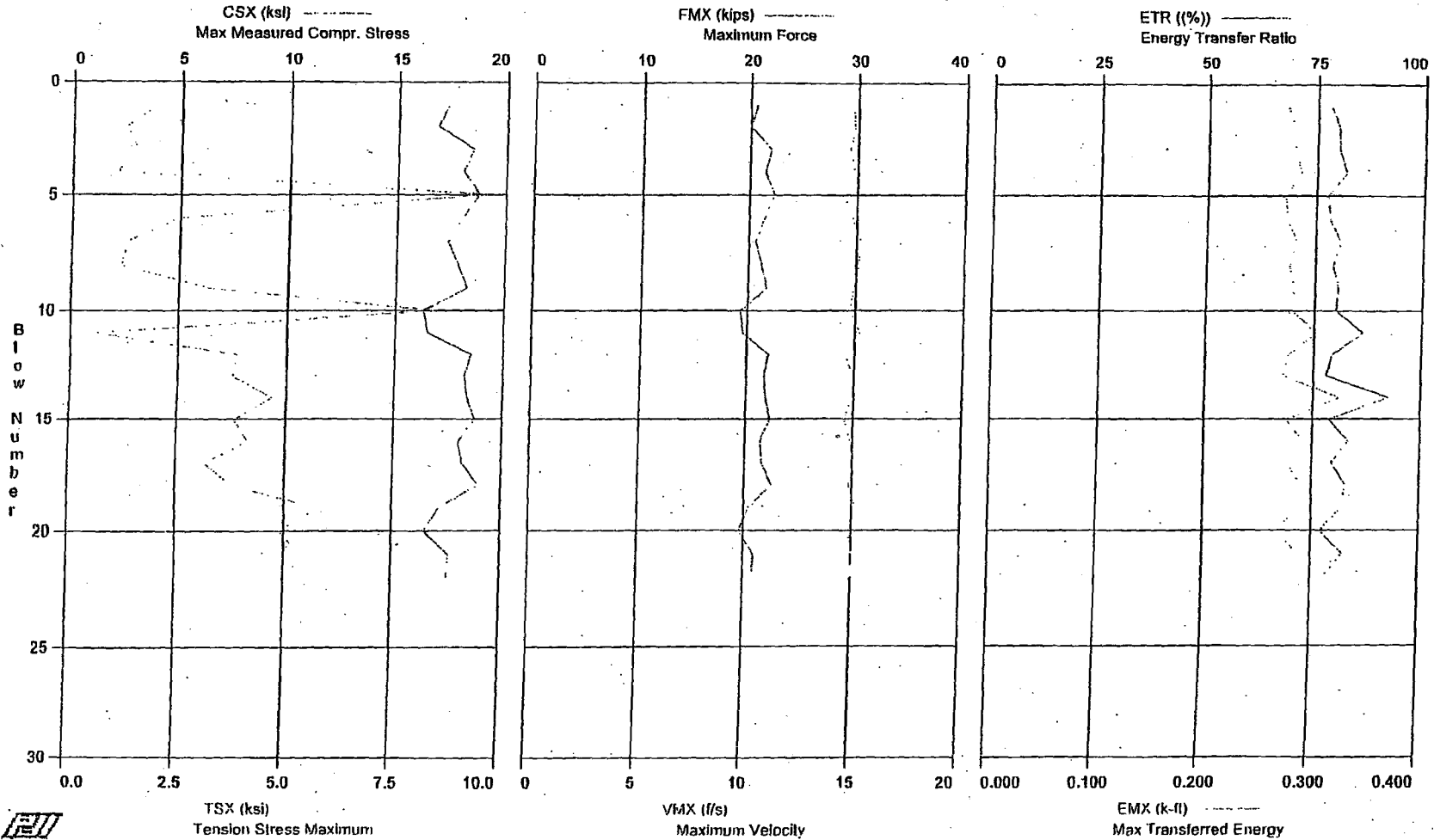
Total number of blows analyzed: 12

Time Summary

Drive 12 seconds

12:52:36 PM - 12:52:48 PM (11/7/2006) BN 2 - 13

STP COL Project - Boring B-348; 28.5' - 30' Sample



STP COL Project - Boring B-346; 28.5' - 30' Sample  
OP: SEK

Rig Serial No. 263048 (Environmental Exploration CME 75)  
Test date: 7-Nov-2006

AR: 1.19 in<sup>2</sup>  
LE: 33.00 ft  
WS: 16,807.9 f/s

SP: 0.492 k/ft<sup>3</sup>  
EM: 30,000 ksi  
JC: 0.60

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
FVP: Force/Velocity proportionality

BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	FVP []	BPM **	EFV **	ETR (%)	EMX k-ft
1	0.00	17.30	1.93	21	14.7	0.00	0.0	0.3	78.0	0.273
2	0.00	16.80	1.21	20	14.8	-0.09	52.9	0.3	80.0	0.280
3	0.00	18.47	1.47	22	14.6	-0.08	51.6	0.3	80.0	0.280
4	0.00	18.00	1.02	21	14.9	0.14	52.3	0.3	81.9	0.286
5	0.00	18.77	9.56	22	14.4	0.52	51.8	0.3	77.7	0.272
6	0.00	17.96	2.43	21	14.8	-0.10	51.9	0.3	78.2	0.274
7	0.00	17.33	1.29	21	15.2	0.00	51.2	0.3	80.7	0.283
8	0.00	17.82	1.14	21	15.1	-0.07	52.4	0.3	79.1	0.277
9	0.00	18.26	3.22	22	14.9	0.35	51.8	0.3	80.3	0.281
10	0.00	16.27	8.37	19	14.8	0.62	51.2	0.3	80.0	0.280
11	0.00	16.48	0.57	20	15.2	0.17	52.2	0.3	86.4	0.302
12	0.00	18.50	3.83	22	14.6	0.00	51.9	0.3	79.3	0.277
13	0.00	18.22	3.76	22	14.9	0.00	52.1	0.3	78.0	0.273
14	0.00	18.33	4.65	22	14.9	0.16	50.5	0.3	82.5	0.324
15	0.00	18.73	3.80	22	14.6	0.00	52.6	0.3	78.7	0.276
16	0.00	17.99	4.12	21	14.9	0.00	50.8	0.3	83.3	0.292
17	0.00	18.18	3.13	22	15.1	-0.07	52.4	0.3	79.5	0.278
18	0.00	18.94	3.77	23	14.8	0.08	51.6	0.3	82.9	0.290
19	0.00	17.16	5.76	20	15.1	0.00	52.0	0.3	81.9	0.287
20	0.00	16.46	4.88	20	14.8	-0.12	51.3	0.3	78.9	0.289
21	0.00	17.63	5.39	21	15.0	-0.11	51.9	0.3	82.4	0.288
22	0.00	17.54	5.46	21	15.0	0.00	52.3	0.3	78.0	0.273
Average		17.78	3.67	21	14.9	0.06	51.8	0.3	80.7	0.282

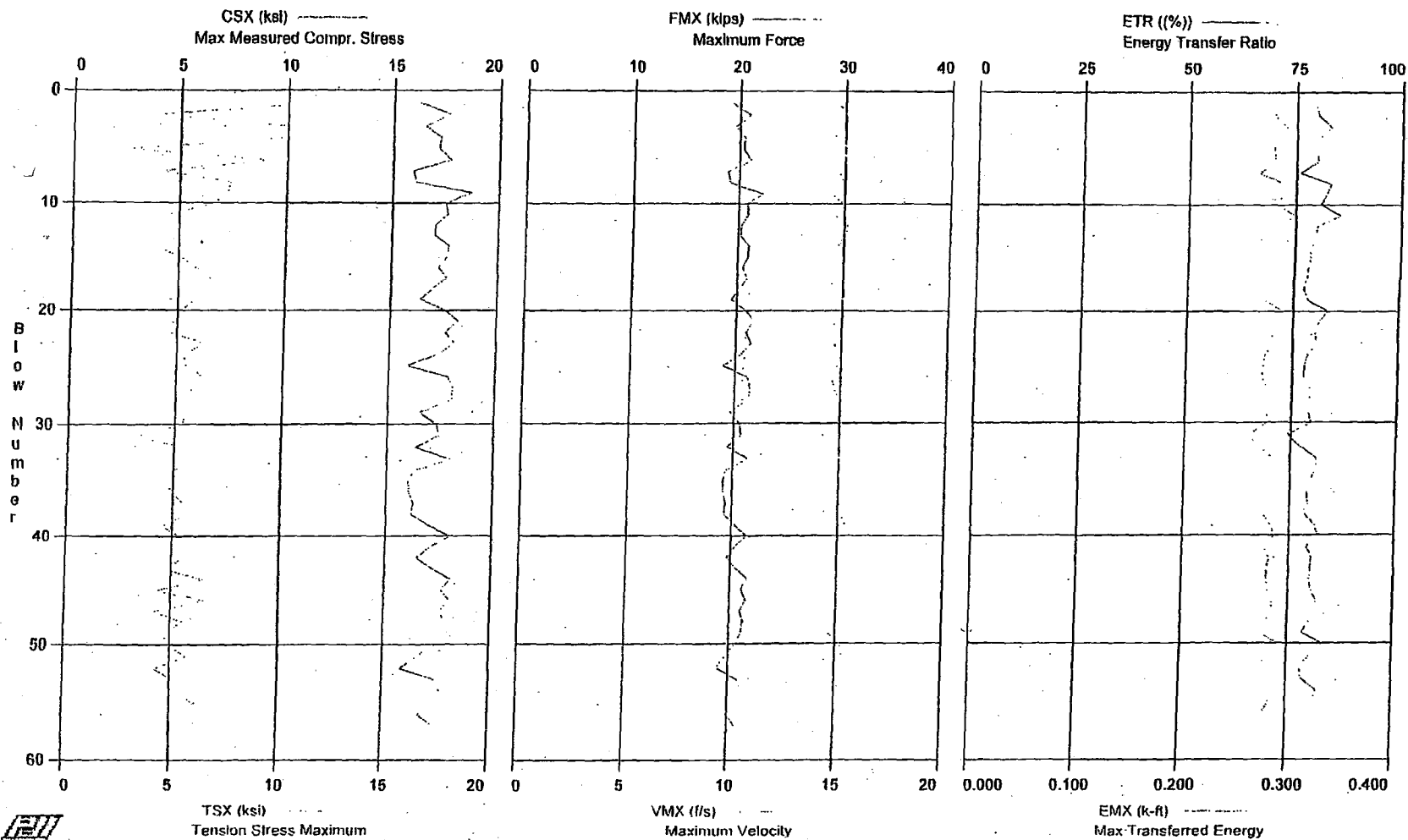
Total number of blows analyzed: 22

Time Summary

Drive 25 seconds

3:11:42 PM - 3:12:07 PM (11/7/2006) BN 1 - 22

STP COL Project - Boring B-346; 33.5' - 35' Sample



STP COL Project - Boring B-346; 33.5' - 35' Sample  
OP: SEK

Rig Serial No. 263048 (Environmental Exploration CME 76)  
Test date: 7-Nov-2006

AR: 1.19 in<sup>2</sup>  
LE: 38.00 ft  
WS: 16,807.9 f/s

SP: 0.492 k/ft<sup>3</sup>  
EM: 30,000 ksi  
JC: 0.60

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
FVP: Force/Velocity proportionality

BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	FVP □	BPM **	EFV **	ETR (%)	EMX k-ft
1	0.00	16.21	11.63	19	14.7	0.62	0.0	0.3	79.4	0.278
2	0.00	17.65	4.08	21	15.1	-0.18	51.7	0.3	80.1	0.280
3	0.00	16.50	10.01	20	13.4	0.70	50.5	0.3	83.2	0.291
4	0.00	17.22	9.90	20	14.9	0.58	51.1	0.3	79.7	0.279
5	0.00	17.14	2.64	20	15.0	0.11	50.6	0.3	79.8	0.279
6	0.00	17.71	9.16	21	15.0	0.00	50.6	0.3	79.9	0.280
7	0.00	15.92	4.08	19	14.7	-0.08	50.3	0.3	75.7	0.265
8	0.00	16.08	7.35	19	14.9	0.61	50.5	0.3	83.2	0.291
9	0.00	18.71	7.19	22	14.4	0.52	51.2	0.3	82.1	0.287
10	0.00	17.50	6.53	21	14.9	0.13	49.9	0.3	80.8	0.283
11	0.00	17.61	4.51	21	14.6	0.51	51.5	0.3	85.7	0.300
12	0.00	17.04	3.94	20	15.2	0.00	51.0	0.3	79.9	0.280
13	0.00	17.03	2.59	20	15.1	-0.18	50.1	0.3	80.1	0.280
14	0.00	17.68	3.86	21	14.7	0.20	50.6	0.3	78.7	0.275
15	0.00	17.60	5.07	21	14.8	-0.28	50.5	0.3	78.6	0.275
16	0.00	17.21	5.79	20	15.0	0.43	50.8	0.3	78.3	0.274
17	0.00	17.60	6.45	21	14.8	-0.10	50.7	0.3	78.0	0.273
18	0.00	16.94	5.97	20	14.9	0.00	50.7	0.3	77.3	0.270
19	0.00	16.40	5.79	20	15.0	-0.57	50.1	0.3	78.4	0.274
20	0.00	17.55	5.15	21	15.1	0.30	50.0	0.3	83.1	0.291
21	0.00	18.19	4.81	22	14.6	0.09	50.9	0.3	81.1	0.284
22	0.00	17.62	4.67	21	14.9	-0.17	50.3	0.3	80.2	0.281
23	0.00	18.02	6.27	21	14.7	0.23	50.5	0.3	80.4	0.281
24	0.00	17.25	5.35	21	15.0	0.11	50.4	0.3	78.5	0.275
25	0.00	15.82	5.42	19	14.8	0.10	49.8	0.3	77.9	0.273
26	0.00	17.78	6.30	21	14.6	1.00	50.5	0.3	77.6	0.272
27	0.00	18.02	5.73	21	14.7	0.07	51.1	0.3	79.2	0.277
28	0.00	17.97	5.62	21	14.9	0.53	49.6	0.3	79.1	0.277
29	0.00	16.47	5.49	20	15.1	0.11	50.9	0.3	78.8	0.276
30	0.00	17.27	5.34	21	15.1	0.08	50.5	0.3	79.7	0.279
31	0.00	17.42	3.21	21	14.2	0.52	50.0	0.3	74.3	0.260
32	0.00	16.33	5.53	19	15.0	0.13	50.8	0.3	77.1	0.270
33	0.00	18.00	5.57	21	15.0	-0.16	49.8	0.3	81.2	0.284
34	0.00	16.27	5.00	19	15.2	-0.21	50.5	0.3	81.1	0.284
35	0.00	16.01	4.56	19	15.1	0.58	50.2	0.3	79.6	0.279
36	0.00	16.07	4.97	19	15.0	0.00	50.7	0.3	79.0	0.277
37	0.00	16.27	5.52	19	15.0	0.08	50.1	0.3	79.2	0.277
38	0.00	16.18	5.57	19	15.2	0.00	50.3	0.3	78.8	0.276
39	0.00	17.03	4.52	20	15.3	0.00	50.5	0.3	81.0	0.283
40	0.00	18.05	5.34	21	15.0	-0.08	50.3	0.3	81.8	0.286
41	0.00	17.10	5.94	20	15.1	0.00	51.1	0.3	79.1	0.277
42	0.00	16.50	5.52	20	15.1	0.09	50.3	0.3	80.5	0.282
43	0.00	17.23	4.62	21	15.1	0.12	50.6	0.3	80.1	0.280
44	0.00	18.12	6.49	22	14.8	0.32	50.7	0.3	79.9	0.280
45	0.00	17.68	4.35	21	15.2	0.00	50.8	0.3	80.3	0.281
46	0.00	18.08	6.52	22	15.2	0.00	50.5	0.3	81.7	0.286
47	0.00	17.63	4.23	21	14.9	0.00	50.3	0.3	81.4	0.285
48	0.00	17.90	5.58	21	14.9	0.18	51.1	0.3	80.1	0.280
49	0.00	17.80	4.61	21	14.6	0.09	50.1	0.3	78.5	0.275
50	0.00	17.28	5.00	21	15.2	0.09	50.3	0.3	83.4	0.292
51	0.00	16.68	5.73	20	15.3	-0.20	50.4	0.3	80.8	0.283
52	0.00	15.82	4.30	19	15.1	-0.25	60.5	0.3	78.2	0.274
53	0.00	17.48	5.03	21	15.1	-0.09	50.2	0.3	78.4	0.274
54	0.00	17.73	4.76	21	15.2	0.15	49.8	0.3	82.2	0.288
55	0.00	17.44	6.20	21	15.2	0.42	50.7	0.3	81.2	0.284
56	0.00	16.75	1.85	20	15.2	0.09	50.8	0.3	79.3	0.278
57	0.00	17.42	2.16	21	14.9	0.09	50.5	0.3	78.6	0.275
Average		17.19	5.43	20	14.9	0.13	50.5	0.3	79.9	0.279

Total number of blows analyzed: 57

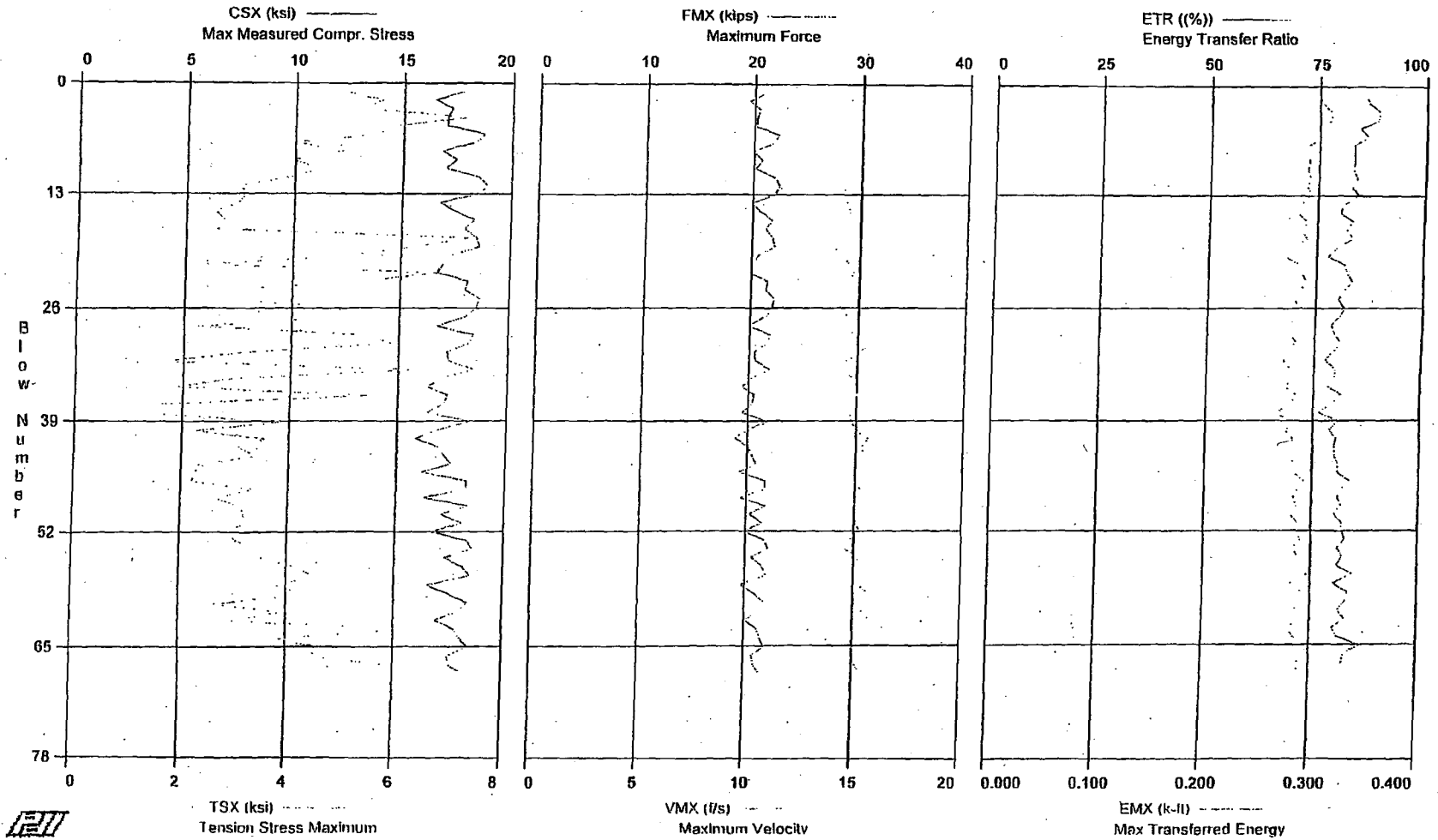
Time Summary

Drive 1 minute 6 seconds

3:23:04 PM - 3:24:10 PM (11/7/2006) BN 1 - 57



STP COL Project - Boring B-346; 38.5' - 40' Sample



STP COL Project - Boring B-346; 38.5' - 40' Sample  
OP: SEK

Rig Serial No. 263048 (Environmental Exploration CME 75)  
Test date: 7-Nov-2006

AR: 1.19 in<sup>2</sup>  
LE: 43.00 ft  
WS: 16,807.9 f/s

SP: 0.482 k/R3  
EM: 30,000 ksi  
JC: 0.60

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
FVP: Force/Velocity proportionality

BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	FVP []	BPM **	EFV **	ETR (%)	EMX k-ft
1	0.00	17.68	4.91	21	14.4	0.09	0.0	0.3	85.5	0.299
2	0.00	16.40	5.61	20	14.5	0.23	52.4	0.3	86.4	0.302
3	0.00	17.22	5.19	20	14.6	0.21	52.2	0.3	88.9	0.311
4	0.00	16.99	7.16	20	14.6	0.00	51.5	0.3	88.6	0.310
5	0.00	16.95	5.91	20	14.6	0.00	51.7	0.3	84.4	0.296
6	0.00	18.72	5.52	22	14.0	0.24	51.6	0.3	86.3	0.302
7	0.00	18.27	3.98	22	14.3	0.11	51.4	0.3	83.1	0.291
8	0.00	16.78	4.90	20	14.4	0.28	51.7	0.3	83.1	0.291
9	0.00	17.42	3.91	21	14.3	0.00	51.2	0.3	83.1	0.291
10	0.00	16.94	4.48	20	14.4	0.19	51.3	0.3	83.0	0.290
11	0.00	18.46	3.90	22	14.3	0.25	52.0	0.3	83.8	0.293
12	0.00	18.86	2.99	22	14.2	0.00	50.9	0.3	82.7	0.290
13	0.00	18.47	3.09	22	14.2	0.06	51.5	0.3	84.4	0.295
14	0.00	16.73	2.95	20	14.4	0.00	51.7	0.3	81.1	0.284
15	0.00	17.37	2.54	21	14.5	-0.09	51.4	0.3	80.2	0.281
16	0.00	18.31	2.71	22	14.3	-0.32	50.9	0.3	83.2	0.291
17	0.00	17.86	2.58	21	14.4	-0.13	51.7	0.3	81.8	0.286
18	0.00	18.37	7.21	22	14.2	0.00	51.9	0.3	83.2	0.291
19	0.00	18.57	6.23	22	13.8	0.57	52.0	0.3	79.8	0.279
20	0.00	17.33	5.05	21	14.1	-0.13	51.0	0.3	77.6	0.272
21	0.00	16.91	2.42	20	14.5	-0.09	50.8	0.3	81.7	0.286
22	0.00	16.66	6.66	20	14.7	0.64	51.6	0.3	82.0	0.287
23	0.00	18.09	5.18	22	14.4	0.20	51.1	0.3	83.4	0.292
24	0.00	17.94	2.56	21	14.5	0.00	51.6	0.3	81.2	0.284
25	0.00	18.61	2.74	22	14.3	0.00	51.2	0.3	80.2	0.281
26	0.00	18.47	4.90	22	14.0	0.54	51.7	0.3	81.6	0.285
27	0.00	18.00	4.82	21	14.5	0.63	50.9	0.3	80.6	0.282
28	0.00	16.66	2.26	20	14.5	0.00	51.0	0.3	78.7	0.276
29	0.00	18.39	5.39	22	14.8	0.00	52.2	0.3	79.5	0.278
30	0.00	18.21	5.87	22	14.7	-0.18	50.5	0.3	81.2	0.284
31	0.00	17.17	3.07	20	15.3	0.00	51.7	0.3	79.2	0.277
32	0.00	17.27	1.62	21	14.5	-0.11	50.9	0.3	77.7	0.272
33	0.00	18.40	6.29	22	14.3	0.19	51.5	0.3	79.9	0.279
34	0.00	17.03	2.93	20	14.8	0.14	50.9	0.3	79.9	0.280
35	0.00	16.29	1.87	19	14.8	-0.13	51.7	0.3	78.3	0.274
36	0.00	17.25	5.49	21	15.0	-0.29	50.9	0.3	81.7	0.286
37	0.00	17.10	1.52	20	15.0	0.44	51.5	0.3	79.2	0.277
38	0.00	16.33	1.48	19	14.7	0.26	51.2	0.3	76.4	0.267
39	0.00	18.31	3.82	22	14.7	0.54	51.6	0.3	81.0	0.283
40	0.00	16.81	2.25	20	15.0	0.00	25.5	0.3	78.7	0.275
41	0.00	15.85	3.57	19	15.6	0.57	51.7	0.3	80.5	0.282
42	0.00	16.85	3.06	20	15.3	-0.22	51.2	0.3	80.0	0.280
43	0.00	17.15	3.39	20	15.4	0.23	51.5	0.3	80.1	0.280
44	0.00	17.47	2.33	21	15.1	-0.15	51.2	0.3	80.9	0.283
45	0.00	16.16	2.27	19	15.2	0.25	51.0	0.3	80.9	0.283
46	0.00	18.21	2.19	22	15.0	0.13	51.2	0.3	83.6	0.293
47	0.00	18.20	3.35	22	15.2	0.00	51.6	0.3	81.9	0.287
48	0.00	16.26	2.63	19	15.2	0.00	51.4	0.3	81.0	0.283
49	0.00	18.29	3.12	22	15.0	0.00	50.8	0.3	81.8	0.286
50	0.00	17.05	3.17	20	15.2	0.29	51.8	0.3	80.4	0.281
51	0.00	18.05	3.19	21	15.0	-0.24	50.4	0.3	82.0	0.287
52	0.00	16.65	2.90	20	15.3	0.16	52.1	0.3	82.2	0.288
53	0.00	18.25	3.03	22	14.8	-0.28	50.5	0.3	82.8	0.290
54	0.00	18.55	3.69	22	14.5	0.51	52.0	0.3	81.2	0.284
55	0.00	17.26	3.50	21	15.2	0.10	51.2	0.3	82.3	0.288
56	0.00	18.11	4.22	22	14.9	0.23	51.3	0.3	80.8	0.283
57	0.00	18.44	4.48	22	15.1	0.08	50.8	0.3	84.7	0.297
58	0.00	16.48	3.82	20	15.1	0.74	51.9	0.3	80.2	0.281
59	0.00	17.50	4.31	21	15.7	-0.17	51.2	0.3	83.7	0.293
60	0.00	18.34	2.63	22	15.4	0.19	51.5	0.3	83.0	0.291
61	0.00	17.91	3.91	21	15.4	-6.38	52.1	0.3	81.4	0.285
62	0.00	16.89	2.98	20	15.8	-0.08	51.3	0.3	83.0	0.290
63	0.00	17.79	6.08	21	14.8	0.00	51.8	0.3	80.1	0.280
64	0.00	18.02	3.85	21	15.0	-0.17	51.6	0.3	81.5	0.285
65	0.00	18.42	4.64	22	15.0	0.00	51.8	0.3	86.9	0.304

STP COL Project - Boring B-346; 38.5' - 40' Sample  
OP: SEK

Rig Serial No. 263048 (Environmental Exploration CME 75)  
Test date: 7-Nov-2006

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	FVP []	BPM **	EFV **	ETR (%)	EMX k-ft
66	0.00	17.46	4.45	21	14.9	0.08	51.6	0.3	83.0	0.291
67	0.00	17.56	5.81	21	15.1	-0.20	51.6	0.3	82.6	0.289
68	0.00	18.13	3.00	22	15.4	0.00	51.4	0.3	82.8	0.290
Average		17.57	3.87	21	14.8	0.00	51.0	0.3	81.9	0.287

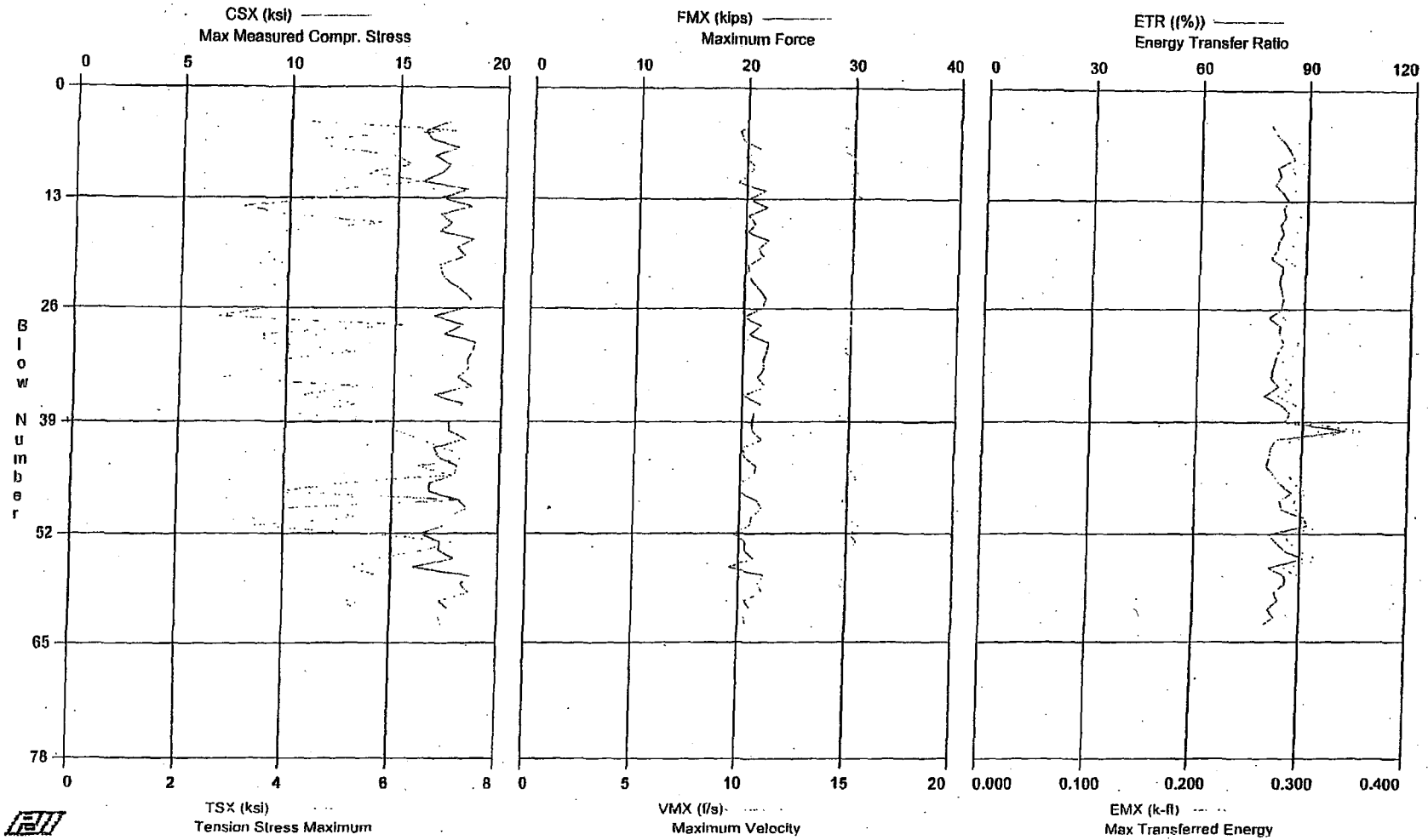
Total number of blows analyzed: 68

Time Summary

Drive 1 minute 19 seconds

3:35:15 PM - 3:36:34 PM (11/7/2006) BN 1 - 68

STP COL Project - Boring B-346; 43.5' - 45' Sample



STP COL Project - Boring B-346; 43.5' - 45' Sample  
OP: SEK

Rig Serial No. 263048 (Environmental Exploration CME 75)  
Test date: 7-Nov-2006

AR: 1.19 in<sup>2</sup>  
LE: 48.00 ft  
WS: 16.807.9 f/s

SP: 0.492 k/ft<sup>3</sup>  
EM: 30,000 ksi  
JC: 0.60

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
FVP: Force/Velocity proportionality

BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	FVP []	BPM **	EFV **	ETR (%)	EMX k-ft
4	0.00	17.35	4.30	21	14.3	0.00	0.0	0.3	79.7	0.279
5	0.00	16.22	7.06	19	14.9	-0.12	52.0	0.3	81.0	0.283
6	0.00	16.46	4.52	20	15.1	0.28	52.2	0.3	83.2	0.291
7	0.00	17.77	4.76	21	14.4	0.17	51.9	0.3	84.9	0.297
8	0.00	16.67	5.96	20	15.0	0.34	51.6	0.3	86.2	0.302
9	0.00	17.37	6.23	21	15.0	0.00	51.5	0.3	81.3	0.285
10	0.00	17.00	5.38	20	15.2	0.26	51.4	0.3	82.5	0.289
11	0.00	16.11	6.47	19	14.9	0.43	50.9	0.3	80.8	0.283
12	0.00	18.27	4.88	22	15.1	0.12	52.4	0.3	83.0	0.291
13	0.00	16.97	4.68	20	15.4	0.08	51.1	0.3	84.7	0.296
14	0.00	18.43	3.11	22	14.9	0.00	52.4	0.3	83.4	0.292
15	0.00	16.95	3.92	20	15.3	0.12	51.5	0.3	84.1	0.294
16	0.00	17.49	5.72	21	15.4	0.00	51.5	0.3	82.5	0.289
17	0.00	16.95	3.93	20	15.2	0.00	51.8	0.3	83.5	0.292
18	0.00	18.53	3.95	22	15.1	-0.07	51.5	0.3	82.2	0.288
19	0.00	17.76	3.70	21	15.1	-0.40	51.7	0.3	81.8	0.286
20	0.00	18.17	3.55	22	14.8	-0.13	51.9	0.3	80.2	0.281
21	0.00	16.98	3.96	20	15.1	0.00	51.4	0.3	83.5	0.292
22	0.00	17.06	3.90	20	15.2	0.00	51.8	0.3	83.3	0.291
23	0.00	17.47	3.80	21	15.1	-0.17	51.3	0.3	82.8	0.290
24	0.00	18.03	3.63	21	15.1	0.00	51.5	0.3	83.5	0.292
25	0.00	18.47	3.71	22	15.0	0.21	51.8	0.3	84.1	0.294
26	0.00	18.19	3.71	22	15.0	-0.21	51.4	0.3	83.7	0.293
27	0.00	16.79	2.69	20	14.9	0.00	51.9	0.3	80.1	0.280
28	0.00	18.13	6.12	22	15.0	0.59	51.5	0.3	83.3	0.291
29	0.00	17.27	3.56	21	15.0	0.41	51.5	0.3	83.2	0.291
30	0.00	18.72	3.57	22	14.8	0.00	51.5	0.3	84.4	0.295
31	0.00	18.57	5.27	22	14.7	0.58	51.5	0.3	82.7	0.290
32	0.00	18.37	3.86	22	15.2	0.00	51.5	0.3	82.2	0.288
33	0.00	18.41	3.79	22	15.0	0.00	52.2	0.3	81.3	0.285
34	0.00	17.96	2.78	21	14.7	0.00	51.0	0.3	81.1	0.284
35	0.00	18.59	5.37	22	14.6	0.58	51.6	0.3	83.1	0.291
36	0.00	16.83	4.30	20	14.8	-0.10	51.3	0.3	79.2	0.277
37	0.00	18.18	5.37	22	14.9	0.28	51.7	0.3	83.7	0.293
38	0.00	17.75	4.14	21	15.0	0.19	51.6	0.3	86.5	0.303
39	0.00	17.54	5.65	21	14.9	0.40	51.2	0.3	85.2	0.298
40	0.00	17.58	6.04	21	15.0	0.34	51.5	0.4	102.5	0.359
41	0.00	18.36	6.48	22	14.9	-0.25	51.7	0.3	82.8	0.290
42	0.00	16.87	6.93	20	15.1	-0.18	52.1	0.3	81.2	0.284
43	0.00	17.14	7.47	20	15.1	0.00	51.4	0.3	81.1	0.284
44	0.00	18.01	6.49	21	15.0	-0.91	52.1	0.3	80.3	0.281
45	0.00	17.88	7.08	21	15.3	0.00	51.5	0.3	82.5	0.289
46	0.00	16.72	5.07	20	15.4	0.00	51.8	0.3	84.2	0.295
47	0.00	16.75	3.85	20	15.4	0.12	51.8	0.3	87.6	0.306
48	0.00	18.09	7.21	22	14.8	0.84	52.0	0.3	84.1	0.294
49	0.00	18.47	3.97	22	15.1	0.00	51.2	0.3	84.6	0.296
50	0.00	17.74	5.39	21	14.9	0.00	52.3	0.3	90.9	0.318
51	0.00	17.59	3.43	21	15.6	0.31	51.1	0.3	91.9	0.322
52	0.00	16.38	5.61	19	15.2	-0.12	52.6	0.3	81.5	0.285
53	0.00	17.26	7.13	21	15.5	0.00	51.4	0.3	83.4	0.292
54	0.00	17.20	6.62	20	15.1	0.89	51.9	0.3	85.8	0.300
55	0.00	17.93	5.76	21	15.2	0.00	51.5	0.3	91.1	0.319
56	0.00	16.00	5.32	19	15.0	0.29	52.3	0.3	81.3	0.285
57	0.00	18.70	5.74	22	14.9	0.16	51.0	0.3	85.8	0.300
58	0.00	18.27	5.78	22	14.7	0.57	52.1	0.3	86.0	0.301
59	0.00	18.64	5.88	22	15.0	0.00	51.9	0.3	83.0	0.291
60	0.00	17.26	5.13	21	15.3	0.00	51.5	0.3	83.9	0.294
61	0.00	17.72	5.37	21	15.3	0.58	52.2	0.3	81.2	0.284
62	0.00	17.26	5.03	21	15.3	0.10	51.5	0.3	83.1	0.291
63	0.00	17.41	6.27	21	14.9	-0.18	25.9	0.3	79.3	0.278
Average		17.58	5.00	21	15.0	0.11	51.2	0.3	83.7	0.293

Total number of blows analyzed: 60

Time Summary

Drive 1 minute 9 seconds

3:53:30 PM - 3:54:39 PM (11/7/2006) BN 4 - 63



engineering and constructing a better tomorrow

February 22, 2007

Memorandum to File DCN STP0102  
From: Steve Kiser *SK* 2-22-07  
Reviewed By: Kathryn White *KAW* 2/22/07

Subject: **Report of SPT Energy – Gregg Drilling (Gregg 1) Fraste Track Rig (Serial No. B6731-152) Automatic Hammer  
WORK INSTRUCTION DCN STP0102  
South Texas Project (STP) COL Site  
Wadsworth, Texas  
MACTEC Project No. 5050-06-0496**

Mr. Steve Kiser of MACTEC Engineering and Consulting, Inc. (MACTEC) performed energy measurements on the drill rig at the subject site per the referenced Work Instruction. This memorandum summarizes the field testing activities and presents the results of the energy measurements.

#### **SPT Energy Field Measurements**

SPT energy measurements were made on November 30, 2006, during drilling of Boring B-427 at the referenced site. The testing was performed from approximately 8:30 to 9:40 AM under cloudy skies, moderate winds, and a temperature of about 70 degrees Fahrenheit. The boring was drilled with personnel and equipment from Gregg Drilling. The drilling equipment consisted of a Fraste track-mounted drill rig with an SPT automatic hammer. The drilling tools consisted of NW-J-sized drilling rods and a 2-foot long split tube sampler. Mud rotary drilling techniques were used to advance the boring below the depth at which groundwater was encountered at the time of energy testing. The drill rig operator during sampling was Mr. Bill Poole. Energy measurements were recorded during sampling at the depth intervals shown in Table 1.

The energy measurements were performed with a Pile Driving Analyzer (PDA) model PAK (Serial No. 1430), and calibrated accelerometers (Serial Nos. P5953 and P5094) and strain gages (Serial Nos. NW #146/1 and NW#146/2). An NW-sized steel drill rod, 2 feet long and instrumented with dedicated strain gages, was inserted at the top of the drill rod string immediately below the SPT hammer. The inserted rod was also instrumented with two piezoresistive accelerometers that were bolted to the outside of the rod. The instrumented rod insert had a cross-sectional area of approximately 1.49 square inches and an outside diameter of approximately 2.625 inches at the gage location. The drill rods included in the drill rod string were hollow rods in 5 to 10-foot long sections, with an outside and inside diameter of approximately 2.625 and 2.25 inches, respectively. The recommended operation rate of the hammer is not known. Due to the closed hammer system, the hammer lubrication condition and anvil dimensions could not be observed.

12 Pages Total

### Calibration Records

Calibration records were provided to Bechtel on January 9, 2007. The calibration records for all the above are filed in DCN STP850.

### Calculations for EFV

The work was done in general accordance with ASTM D 4633-05. The strain and acceleration signals were converted to force and velocity by the PDA, and the data was interpreted by the PDA according to the Case Method equation. The maximum energy transmitted to the drill rod string (as measured at the location of the strain gages and accelerometers) was calculated by the PDA using the EFV method equation, as shown below:

$$EFV = \int F(t) * V(t) * dt$$

Where: EFV = Transferred energy (EFV equation), or Energy of FV

F(t) = Calculated force at time t

V(t) = Calculated velocity at time t

The EFV method of energy calculation is recommended in ASTM Standard D4633-05. The EFV equation, integrated over the complete wave event, measures the total energy content of the event using both force and velocity measurements. The EFV values associated with each blow analyzed are tabulated in the attached PDILOT tables and are also shown graphically in the PDILOT charts.

### Calculations for ETR

The ratio of the measured transferred energy (EFV) to the theoretical potential energy of the SPT system (140 lb weight with the specified 30-inch fall) is the ETR. The ETR values (as percent of the theoretical value) are shown in Table 1.

### Comparison of ETR to Typical Energy Transfer Ratio Range

Based on a research report published by the Florida Department of Transportation (FDOT) (Report WPI No. 0510859, 1999), the average ETR measured for automatic hammers is 79.6%. The standard deviation was 7.9%; therefore, the range of ETRs within one standard deviation of the average was reported to be 71.7% to 87.5%. This range of ETRs was also consistent with other research that was cited in the FDOT research paper. The ETR values shown in Table 1 are within the range of typical values for automatic hammers as reported in the literature.

### Discussion

Based on the field testing results, observations from the SPT energy measurements are summarized below:

- The data obtained by the PDA are consistent between individual hammer blows and between the sample depths tested. In general, the first and last one (and sometimes two) hammer blow records recorded by the PDA produced poor quality

data (which is relatively common) and, as such, the records were not used in the data reduction.

- The average energy transferred from the hammer to the drill rods for each individual depth interval using the EFV method ranged from 278 foot-pounds to 281 foot-pounds. These average energy transfers correspond to energy transfer ratios (ETR) of 79% to 80% of the theoretical energy (350 foot-pounds) of the SPT hammer.
- The average at each depth interval was calculated as the transferred energy for each analyzed blow of the depth intervals divided by the total number of hammer blows analyzed. The overall average energy transfer of the SPT system (for all the depth intervals tested) was 279.3 foot-pounds, with an average ETR of 79.8%.

Attachments: Page 4 Table 1 - Summary of SPT Energy Measurements – 1 Page  
Page 5 Work Instructions – SPT Energy #B6731-152 – 1 Page  
Page 6 Record of SPT Energy Measurement – 1 Page  
Pages 7-12 PDILOT Output – 6 Pages



**TABLE 1**  
**SUMMARY OF SPT ENERGY MEASUREMENTS (ASTM D4633-05)**  
 South Texas Project (STP) COL Site  
 Wadsworth, Texas  
 MACTEC Project No. 5050-06-0496

Rig Serial No.	Rig Owner	Rig Operator	Boring No. Tested	Date Tested	Sample Depth (feet)	SPT Blow Count (blows per six inches)	No. of Blows Analyzed	Average Measured Energy (Average EFV) (ft-lbs) <sup>a</sup>	Energy Transfer Ratio (%) <sup>b</sup> (Average ETR)
B6731-152 (Fraste)	Gregg Drilling	Bill Poole	B-427	11/30/2006	38.5 - 40.0	10 - 18 - 18	46	278	79.4%
					43.5 - 45.0	6 - 10 - 8	25	281	80.3%
					48.5 - 50.0	4 - 4 - 5	12	281	80.3%
<b>Average for Rig:</b>								<b>279.3</b>	<b>79.8%</b>

<sup>a</sup>Measured Energy is energy based on the EFV method, as outlined in ASTM D4633-05, for each blow recorded by the PDA. In some cases, the initial and final one to two blows produced poor quality data, and were not used to calculate the Average Measured Energy.

ETR = EMX \* 1000 lbs/kip

<sup>b</sup>Energy Transfer Ratio is the Measured Energy divided by the theoretical SPT energy of 350 foot-pounds (140 pound hammer falling 2.5 feet). The average ETR values may differ slightly and insignificantly from those in the PDILOT tables due to roundoff.

Prepared By: <i>SW</i>	Date: 2-22-07	Checked By: <i>John White</i>	Date: 2/22/07
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**Work Instruction SPT-ENERGY #B6731-152**  
South Texas COL Project  
MACTEC Engineering and Consulting, Inc.

Issued To: Steve Kiser  
Location: STP Field Office Date: November 8, 2006  
Issued By: Jay Cerceo, Site Coordinator MACTEC Project No.: 5050-06-0496  
Valid Thru: 11/8/2006 To 11/8/2007 Rev. No. 0

**Task Description:** Perform SPT Energy measurements of drill rigs at the South Texas COL Project.

**Applicable Technical Procedures or Plans, or other reference:** ASTM (D4633), South Texas COL Geotechnical Work Plan Attachment 3, Bechtel's Engineering Specification for Subsurface Investigation and Laboratory Testing for South Texas Project Units 3 & 4 (Specification).

**Specific Instructions** (note attachments where necessary): Follow guidelines in South Texas COL Work Plan, Attachment 3. Energy measurements to be performed on drill rigs while performing SPT sampling. Obtain energy measurements with the PDA at depth intervals in the range of 15 to 100 feet below the ground surface in general accordance with ASTM D4633-05. Perform energy measurement for SPT automatic hammer number B6731-152.

**Special Instructions:** Complete all field forms in ink.

**Report Format:** Completed Field Forms As Follows: Daily Field Report, Record of SPT Energy Measurement and PDILOT output data, Photographs (rig and equipment setup, energy measurement equipment).

**Specific Quality Assurance Procedures Applicable:** None

**Hold Points or Witness Points:** Direction to perform energy measurements received from the Site Coordinator.  
Calibration record of energy measurement equipment on file.

**Records:** All records generated shall be considered OA Records.

Reviewed and Approved By: (Note: Only one signature is required to issue)

Project Manager (MACTEC): \_\_\_\_\_ Date: \_\_\_\_\_  
Project Principal (MACTEC): \_\_\_\_\_ Date: \_\_\_\_\_  
Site Coordinator (MACTEC) Jay Cerceo Date: 11/8/2006

No. of Pages: 1

DCN: STP007



2801 YORKMONT ROAD, SUITE 100 □ CHARLOTTE, NC 28208  
 Telephone: (704) 357-8600 / Facsimile: (704) 357-8638

### RECORD OF SPT ENERGY MEASUREMENT

GENERAL INFORMATION		DRILL RIG DATA	
PROJECT:	South Texas Project	MAKE:	FRASTE
LOCATION:	Wadsworth, Texas	MODEL:	TRACK MOUNTED
PROJECT NO.:	5050-D <sub>3</sub> -0496	SERIAL NO.:	86731-152
DATE:	11-30-06	HAMMER TYPE:	AUTOMATIC
WEATHER:	CLOUDY WINDY 70°	ROPE CONDITION:	N/A
INSPECTOR:	Steve Kiser	ROD SIZE:	NW-J
DRILLING COMPANY:	GREEN DRILLING I	NO. OF SHEAVES:	N/A

#### BORING DATA

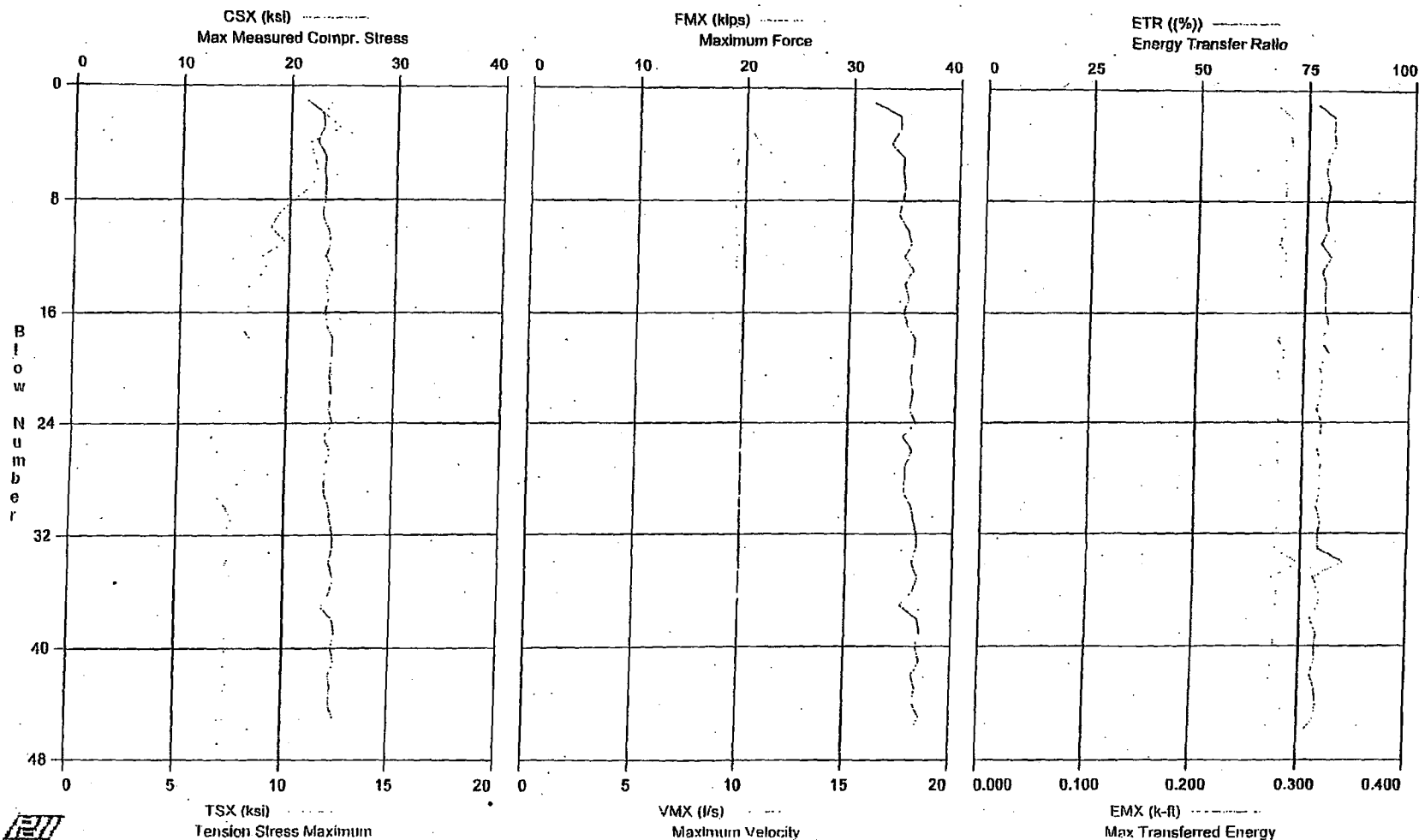
BORING NUMBER:	B-427		
DEPTH DRILLED:	100' PLANNED		
TIME DRIVEN:	9:30 AM		
RIG OPERATOR:	BILL POOLE		
HAMMER OPERATOR:	NR		
PDA PAK SERIAL NO.:	1430	1430	1430
INSTR. ROD AREA:	1.44 in <sup>2</sup>		
ACCEL. SERIAL NOS.:	5094 / 5953		
STRAIN SERIAL NOS.:	146 NW 1/2		

SAMPLE DEPTH (feet)	SPT N-VALUE (bpf)	DEPTH cont. (feet)	SPT N-VALUE (bpf)	SAMPLE DEPTH (feet)	SPT N-VALUE (bpf)	DEPTH cont. (feet)	SPT N-VALUE (bpf)	SAMPLE DEPTH (feet)	SPT N-VALUE (bpf)	DEPTH cont. (feet)	SPT N-VALUE (bpf)
38.5/40	10-10-10										
43.5/45	6-10-8										
48.5/50	4-4-5										

REMARKS:

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STP COL Project - Boring B-427; 38.5' - 40' Sample



STP COL Project - Boring B-427; 38.5' - 40' Sample  
OP: SEK

Rig Serial No. B6731-152 (Gregg Fraste)  
Test date: 30-Nov-2006

AR: 1.49 in<sup>2</sup>  
LE: 44.00 ft  
WS: 16,807.9 f/s

SP: 0.492 k/ft<sup>3</sup>  
EM: 30,000.0 ksi  
JC: 0.60

FMX: Maximum Force  
VMX: Maximum Velocity  
CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
BPM: Blows per Minute

DFN: Final Displacement  
E2E: Energy of FV at 2L/c  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	FMX kips	VMX f/s	CSX ksi	TSX ksi	BPM **	DFN in	E2E k-ft	ETR (%)	EMX k-ft
1	0.00	32	11.2	21.4	11.9	0.0	2.08	0.270	77.1	0.270
2	0.00	34	10.6	23.1	11.6	45.0	2.28	0.283	81.1	0.284
3	0.00	34	10.2	23.1	12.3	45.1	1.72	0.283	81.0	0.283
4	0.00	34	10.7	22.5	10.9	45.1	2.26	0.284	81.3	0.285
5	0.00	35	9.6	23.3	11.1	45.2	1.76	0.279	79.8	0.279
6	0.00	35	9.5	23.3	11.2	45.3	1.27	0.277	79.3	0.278
7	0.00	35	9.5	23.4	11.1	45.2	1.48	0.281	80.3	0.281
8	0.00	35	9.5	23.3	10.2	45.3	1.35	0.279	79.8	0.279
9	0.00	34	9.6	23.1	9.5	45.2	1.36	0.278	79.4	0.278
10	0.00	35	9.5	23.6	9.1	45.2	1.20	0.280	80.0	0.280
11	0.00	36	9.7	23.9	9.8	45.2	1.36	0.275	78.5	0.275
12	0.00	35	9.6	23.5	8.7	45.3	1.72	0.283	80.9	0.283
13	0.00	36	9.6	24.0	9.0	45.2	1.15	0.276	78.9	0.276
14	0.00	35	9.6	23.5	8.1	45.2	0.88	0.279	79.8	0.279
15	0.00	35	9.7	23.8	8.2	45.2	1.36	0.279	79.7	0.279
16	0.00	35	9.6	23.5	8.1	45.2	1.08	0.279	79.9	0.280
17	0.00	35	9.9	23.7	7.8	45.3	1.51	0.282	80.7	0.282
18	0.00	36	10.1	24.3	8.2	45.2	1.12	0.276	78.9	0.276
19	0.00	36	9.8	24.2	7.5	45.3	1.18	0.283	80.9	0.283
20	0.00	36	10.0	24.0	7.5	45.3	1.40	0.275	78.7	0.275
21	0.00	36	10.2	24.0	7.8	45.2	1.21	0.278	79.4	0.278
22	0.00	36	10.1	24.2	7.4	45.2	1.36	0.276	79.0	0.277
23	0.00	36	10.1	24.0	6.9	45.3	0.65	0.274	78.2	0.274
24	0.00	36	10.1	24.4	7.0	45.3	1.10	0.278	79.4	0.278
25	0.00	35	10.1	23.6	6.5	45.2	1.37	0.275	79.3	0.278
26	0.00	36	10.0	24.2	6.8	45.2	1.08	0.274	78.6	0.275
27	0.00	35	10.1	23.8	7.2	45.2	1.26	0.277	79.3	0.278
28	0.00	35	10.0	23.8	6.7	45.3	1.45	0.276	78.9	0.276
29	0.00	35	10.0	23.7	6.7	45.1	1.52	0.276	79.2	0.277
30	0.00	36	10.0	24.2	7.2	45.2	1.22	0.274	78.3	0.274
31	0.00	36	9.9	24.3	7.6	45.2	1.67	0.277	79.3	0.278
32	0.00	37	9.8	24.6	7.1	45.2	1.72	0.276	79.0	0.276
33	0.00	37	9.9	24.5	7.6	45.3	0.90	0.276	78.9	0.276
34	0.00	36	10.0	24.3	7.3	45.2	1.45	0.278	85.1	0.298
35	0.00	37	10.0	24.6	7.5	45.3	1.04	0.273	78.0	0.273
36	0.00	36	10.0	24.4	7.4	45.2	0.86	0.277	79.4	0.278
37	0.00	35	10.0	23.6	7.8	45.2	0.93	0.278	79.4	0.278
38	0.00	37	9.8	24.7	7.7	45.2	1.15	0.271	77.5	0.271
39	0.00	37	9.9	24.9	7.3	45.2	1.08	0.276	79.0	0.276
40	0.00	37	9.9	24.6	7.3	45.2	1.48	0.275	78.7	0.276
41	0.00	37	9.9	24.9	7.2	45.1	1.42	0.275	78.6	0.275
42	0.00	36	10.0	24.4	7.5	45.4	1.07	0.272	77.8	0.272
43	0.00	37	10.0	24.6	7.3	45.1	1.17	0.276	78.9	0.276
44	0.00	36	9.9	24.5	7.3	45.1	1.61	0.277	79.2	0.277
45	0.00	37	9.8	24.9	7.3	45.3	0.72	0.276	79.1	0.277
46	0.00	37	9.8	24.5	7.1	45.2	1.44	0.268	76.7	0.268
Average		36	9.9	23.9	8.3	45.2	1.34	0.277	79.4	0.278

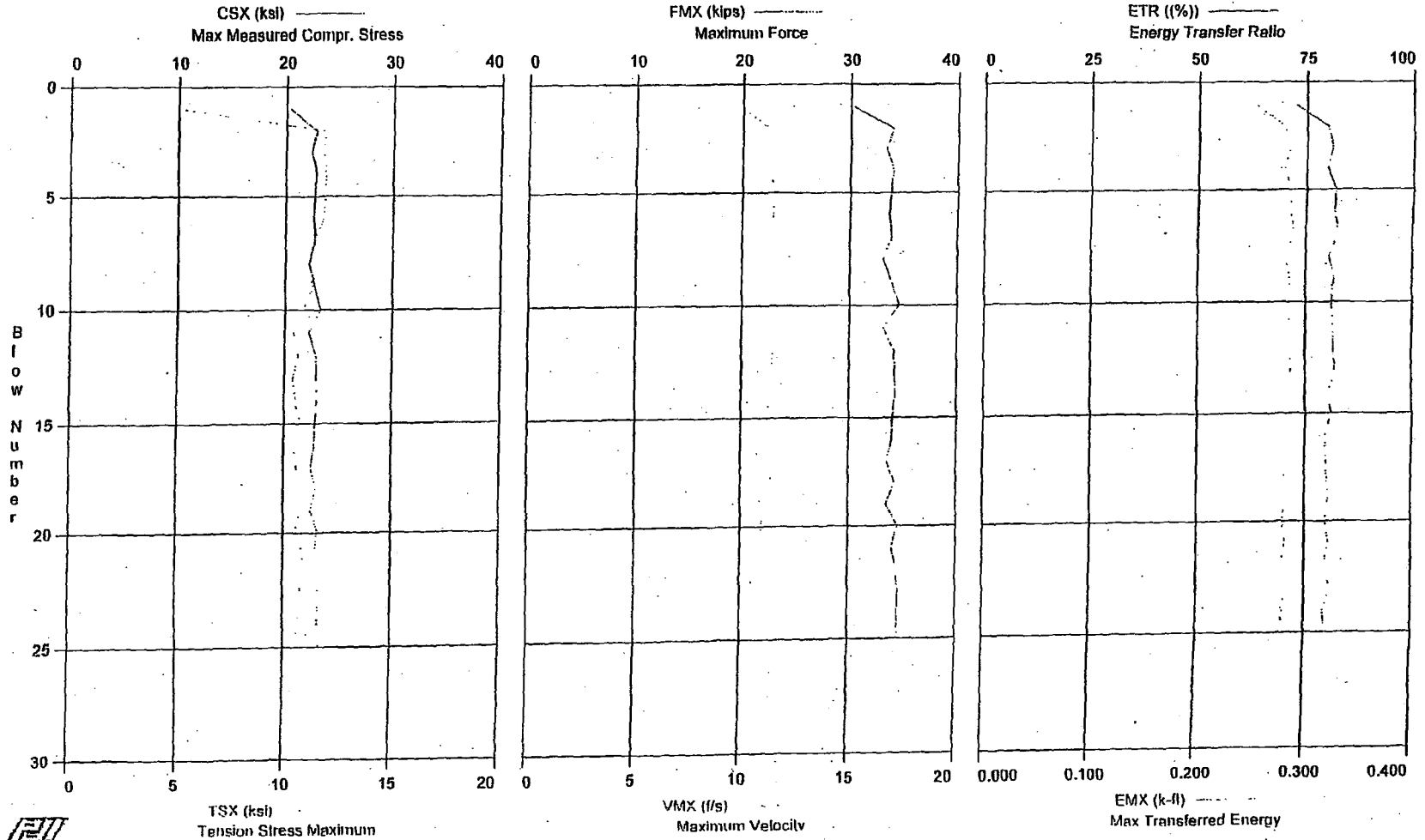
Total number of blows analyzed: 46

Time Summary

Drive 59 seconds

8:33:40 AM - 8:34:39 AM (11/30/2006) BN 1 - 46

STP COL Project - Boring B-427; 43.5' - 45' Sample



STP COL Project - Boring B-427; 43.5' - 45' Sample  
OP: SEK

Rig Serial No. B6731-152 (Gregg Fraste)  
Test date: 30-Nov-2006

AR: 1.49 in<sup>2</sup>  
LE: 49.00 ft  
WS: 16.807.9 f/s

SP: 0.492 k/f<sup>3</sup>  
EM: 30,000.0 ksi  
JC: 0.60

FMX: Maximum Force  
VMX: Maximum Velocity  
CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
BPM: Blows per Minute

DFN: Final Displacement  
E2E: Energy of FV at 2L/c  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	FMX kips	VMX f/s	CSX ksi	TSX ksi	BPM "	DFN in	E2E k-ft	ETR (%)	EMX k-ft
1	0.00	30	9.9	20.3	5.2	0.0	1.21	0.000	72.3	0.253
2	0.00	34	11.3	22.8	11.8	37.2	1.22	0.280	79.9	0.280
3	0.00	33	11.4	22.4	11.8	44.9	1.36	0.283	81.0	0.284
4	0.00	34	11.4	22.8	11.9	45.0	1.50	0.279	79.9	0.280
5	0.00	34	11.4	22.7	11.8	44.9	1.53	0.286	81.8	0.286
6	0.00	34	11.4	22.6	11.8	45.0	1.69	0.286	81.6	0.286
7	0.00	34	11.4	22.7	11.3	45.1	1.87	0.289	82.6	0.289
8	0.00	33	11.3	22.2	11.1	45.1	1.32	0.281	80.4	0.281
9	0.00	34	11.4	22.8	11.3	45.0	1.35	0.286	81.7	0.286
10	0.00	35	11.4	23.2	10.8	45.0	1.74	0.284	81.1	0.284
11	0.00	33	11.3	22.2	10.4	45.1	1.74	0.285	81.5	0.285
12	0.00	34	11.4	22.9	10.6	45.1	1.60	0.286	81.7	0.286
13	0.00	34	11.4	23.0	10.4	45.0	1.54	0.286	81.9	0.287
14	0.00	34	11.3	23.0	10.5	45.1	1.49	0.282	80.7	0.282
15	0.00	34	11.2	22.8	10.7	45.0	1.83	0.283	81.0	0.283
16	0.00	34	11.1	22.8	10.4	45.1	1.46	0.279	79.8	0.279
17	0.00	34	11.0	22.5	10.6	45.0	1.58	0.280	79.9	0.280
18	0.00	34	11.0	23.0	10.7	45.1	1.50	0.280	80.2	0.281
19	0.00	34	11.0	22.5	10.7	45.2	1.54	0.281	80.5	0.282
20	0.00	35	11.0	23.2	10.5	45.0	2.05	0.279	79.8	0.279
21	0.00	34	11.0	22.9	10.9	45.1	1.40	0.282	80.6	0.282
22	0.00	34	10.9	23.1	10.7	45.2	1.63	0.278	79.5	0.278
23	0.00	35	11.0	23.3	10.8	45.1	1.16	0.283	81.0	0.284
24	0.00	35	10.9	23.2	10.5	45.1	1.37	0.278	79.4	0.278
25	0.00	35	11.0	23.3	10.8	45.1	1.20	0.280	79.9	0.280
Average		34	11.2	22.7	10.7	44.7	1.52	0.271	80.4	0.281

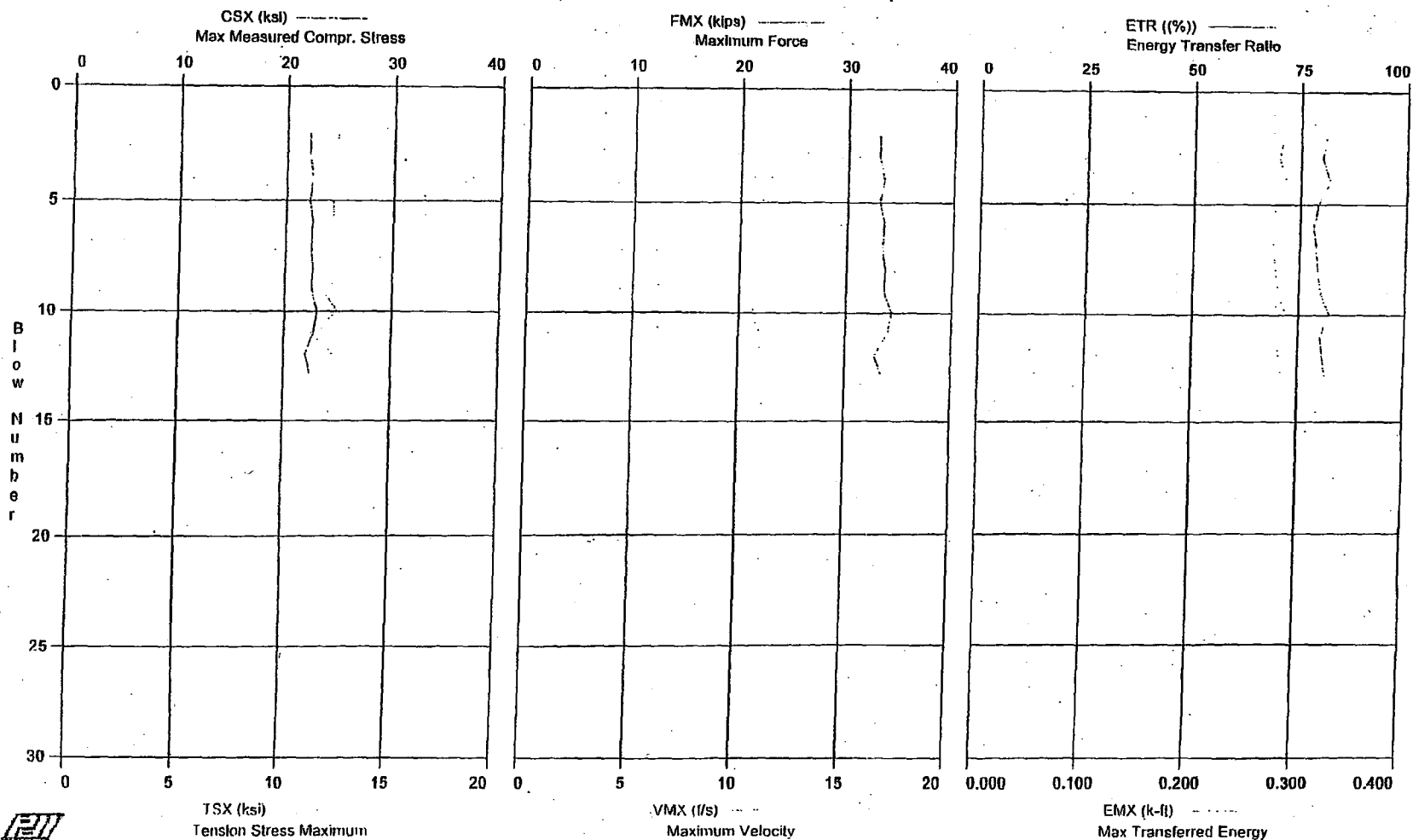
Total number of blows analyzed: 25

Time Summary

Drive 33 seconds

9:14:30 AM - 9:15:03 AM (11/30/2006) BN 1 - 25

STP COL Project - Boring B-427; 48.6' - 50' Sample





MACTEC Engineering and Consulting, Inc.  
Case Method Results

Page 1 of 1  
PDIPILOT Ver. 2005.2 - Printed: 21-Dec-2006

STP COL Project - Boring B-427; 48.5' - 50' Sample  
OP: SEK

Rig Serial No. B6731-152 (Gregg Fraste)  
Test date: 30-Nov-2006

AR: 1.49 in<sup>2</sup>  
LE: 54.00 ft  
WS: 16,807.9 f/s

SP: 0.492 k/ft<sup>3</sup>  
EM: 30,000.0 ksi  
JC: 0.60

FMX: Maximum Force  
VMX: Maximum Velocity  
CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
BPM: Blows per Minute

DFN: Final Displacement  
E2E: Energy of FV at 2L/c  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	FMX kips	VMX f/s	CSX ksi	TSX ksi	BPM **	DFN in	E2E k-ft	ETR (%)	EMX k-ft
2	0.00	33	11.5	22.1	12.3	44.8	2.48	0.282	81.0	0.283
3	0.00	33	11.5	22.1	12.4	45.5	2.62	0.279	80.0	0.280
4	0.00	33	11.3	22.4	12.4	45.4	2.89	0.286	81.9	0.287
5	0.00	33	11.0	22.2	12.2	45.6	3.04	0.276	79.2	0.277
6	0.00	33	10.7	22.5	12.2	45.6	2.81	0.273	78.2	0.274
7	0.00	33	10.5	22.4	11.8	45.6	3.09	0.275	78.8	0.276
8	0.00	34	10.8	22.6	11.8	45.4	2.37	0.277	79.4	0.278
9	0.00	34	10.9	22.5	11.8	45.6	2.59	0.280	80.2	0.281
10	0.00	34	10.6	23.0	12.5	45.4	2.76	0.285	82.2	0.286
11	0.00	34	11.1	22.8	11.3	45.5	2.02	0.280	80.2	0.281
12	0.00	33	11.0	22.0	12.3	45.6	2.09	0.282	80.7	0.282
13	0.00	34	11.1	22.5	12.5	45.5	1.78	0.285	81.6	0.286
Average		33	11.0	22.4	12.1	45.5	2.54	0.280	80.3	0.281

Total number of blows analyzed: 12

Time Summary

Drive 16 seconds

9:40:23 AM - 9:40:39 AM (11/30/2006) BN 1 - 13



engineering and constructing a better tomorrow

February 22, 2007

Memorandum to File DCN STP095

From: Steve Kiser *SK 2-22-07*

Reviewed By: Kathryn White *KAW 2/22/07*

Subject: **Report of SPT Energy – Jedi Drilling CME 75 Truck Rig (Serial No. 165447) Automatic Hammer WORK INSTRUCTION DCN STP095**  
South Texas Project (STP) COL Site  
Wadsworth, Texas  
MACTEC Project No. 5050-06-0496

Mr. Steve Kiser of MACTEC Engineering and Consulting, Inc. (MACTEC) performed energy measurements on the drill rig at the subject site per the referenced Work Instruction. This memorandum summarizes the field testing activities and presents the results of the energy measurements.

#### **SPT Energy Field Measurements**

SPT energy measurements were made on November 28, 2006, during drilling of Boring B-303 at the referenced site. The testing was performed from approximately 2:00 to 3:40 PM under sunny skies and a temperature of about 70 degrees Fahrenheit. The boring was drilled with personnel and equipment from Jedi Drilling. The drilling equipment consisted of a CME 75 model truck-mounted drill rig with an SPT automatic hammer. The drilling tools consisted of NW-J-sized drilling rods and a 2-foot long split tube sampler. Mud rotary drilling techniques were used to advance the boring below the depth at which groundwater was encountered at the time of energy testing. The drill rig operator during sampling was Mr. Oscar Garcia. Energy measurements were recorded during sampling at the depth intervals shown in Table 1.

The energy measurements were performed with a Pile Driving Analyzer (PDA) model PAK (Serial No. 1430), and calibrated accelerometers (Serial Nos. P5953 and P5094) and strain gages (Serial Nos. NW #146/1 and NW#146/2). An NW-sized steel drill rod, 2 feet long and instrumented with dedicated strain gages, was inserted at the top of the drill rod string immediately below the SPT hammer. The inserted rod was also instrumented with two piezoresistive accelerometers that were bolted to the outside of the rod. The instrumented rod insert had a cross-sectional area of approximately 1.49 square inches and an outside diameter of approximately 2.625 inches at the gage location. The drill rods included in the drill rod string were hollow rods in 5 to 10-foot long sections, with an outside and inside diameter of approximately 2.625 and 2.25 inches, respectively. The recommended operation rate of the hammer is not known. Due to the closed hammer system, the hammer lubrication condition and anvil dimensions could not be observed.

16 Pages Total

### Calibration Records

Calibration records were provided to Bechtel on January 9, 2007. The calibration records for all the above are filed in DCN STP850.

### Calculations for EFV

The work was done in general accordance with ASTM D 4633-05. The strain and acceleration signals were converted to force and velocity by the PDA, and the data was interpreted by the PDA according to the Case Method equation. The maximum energy transmitted to the drill rod string (as measured at the location of the strain gages and accelerometers) was calculated by the PDA using the EFV method equation, as shown below:

$$EFV = \int F(t) * V(t) * dt$$

Where: EFV = Transferred energy (EFV equation), or Energy of FV  
F(t) = Calculated force at time t  
V(t) = Calculated velocity at time t

The EFV method of energy calculation is recommended in ASTM Standard D4633-05. The EFV equation, integrated over the complete wave event, measures the total energy content of the event using both force and velocity measurements. The EFV values associated with each blow analyzed are tabulated in the attached PDILOT tables and are also shown graphically in the PDILOT charts.

### Calculations for ETR

The ratio of the measured transferred energy (EFV) to the theoretical potential energy of the SPT system (140 lb weight with the specified 30-inch fall) is the ETR. The ETR values (as percent of the theoretical value) are shown in Table 1.

### Comparison of ETR to Typical Energy Transfer Ratio Range

Based on a research report published by the Florida Department of Transportation (FDOT) (Report WPI No. 0510859, 1999), the average ETR measured for automatic hammers is 79.6%. The standard deviation was 7.9%; therefore, the range of ETRs within one standard deviation of the average was reported to be 71.7% to 87.5%. This range of ETRs was also consistent with other research that was cited in the FDOT research paper. The ETR values shown in Table 1 are within the range of typical values for automatic hammers as reported in the literature.

### Discussion

Based on the field testing results, observations from the SPT energy measurements are summarized below:

- The data obtained by the PDA are consistent between individual hammer blows and between the sample depths tested. In general, the first and last one (and sometimes two) hammer blow records recorded by the PDA produced poor quality

data (which is relatively common) and, as such, the records were not used in the data reduction.

- The average energy transferred from the hammer to the drill rods for each individual depth interval using the EFV method ranged from 250 foot-pounds to 270 foot-pounds. These average energy transfers correspond to energy transfer ratios (ETR) of 71% to 77% of the theoretical energy (350 foot-pounds) of the SPT hammer.
- The average at each depth interval was calculated as the transferred energy for each analyzed blow of the depth intervals divided by the total number of hammer blows analyzed. The overall average energy transfer of the SPT system (for all the depth intervals tested) was 262.2 foot-pounds, with an average ETR of 74.9%.

Attachments: Page 4 Table 1 - Summary of SPT Energy Measurements – 1 Page  
Page 5 Work Instructions – SPT Energy #165447 – 1 Page  
Page 6 Record of SPT Energy Measurement – 1 Page  
Pages 7-16 PDILOT Output – 10 Pages

**TABLE 1**  
**SUMMARY OF SPT ENERGY MEASUREMENTS (ASTM D4633-05)**  
 South Texas Project (STP) COL Site  
 Wadsworth, Texas  
 MACTEC Project No. 5050-06-0496

Rig Serial No.	Rig Owner	Rig Operator	Boring No. Tested	Date Tested	Sample Depth (feet)	SPT Blow Count (blows per six inches)	No. of Blows Analyzed	Average Measured Energy (Average EFV) (ft-lbs) <sup>a</sup>	Energy Transfer Ratio (%) <sup>b</sup> (Average ETR)
165447 (CME 75 Truck)	Jedi Drilling	Oscar Garcia	B-303	11/28/2006	13.5 - 15.0	3 - 4 - 6	13	250	71.4%
					18.5 - 20.0	2 - 4 - 5	11	254	72.6%
					23.5 - 25.0	11 - 11 - 12	34	255	72.9%
					28.5 - 30.0	7 - 8 - 9	24	264	75.4%
					33.5 - 35.0	12 - 23 - 25	58	270	77.1%
<b>Average for Rig:</b>								<b>262.2</b>	<b>74.9%</b>


<sup>a</sup>Measured Energy is energy based on the EFV method, as outlined in ASTM D4633-05, for each blow recorded by the PDA. In some cases, the initial and final one to two blows produced poor quality data, and were not used to calculate the Average Measured Energy.

ETR = EMX \* 1000 lbs/kip

<sup>b</sup>Energy Transfer Ratio is the Measured Energy divided by the theoretical SPT energy of 350 foot-pounds (140 pound hammer falling 2.5 feet). The average ETR values may differ slightly and insignificantly from those in the PDILOT tables due to roundoff.

Prepared By: <i>CV</i>	Date: 2-22-07	Checked By: <i>James O. White</i>	Date: 2/22/07
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Work Instruction SPT-ENERGY #165447  
South Texas COL Project  
MACTEC Engineering and Consulting, Inc.

 COPY

Issued To: Steve Kiser  
Location: STP Field Office Date: November 7, 2006  
Issued By: Jay Cerceo, Site Coordinator MACTEC Project No.: 5050-06-0496  
Valid Thru: 11/7/2006 To 11/7/2007 Rev. No. 0

**Task Description:** Perform SPT Energy measurements of drill rigs at the South Texas COL Project.

**Applicable Technical Procedures or Plans, or other reference:** ASTM (D4633), South Texas COL Geotechnical Work Plan Attachment 3, Bechtel's Engineering Specification for Subsurface Investigation and Laboratory Testing for South Texas Project Units 3 & 4 (Specification).

**Specific Instructions** (note attachments where necessary): Follow guidelines in South Texas COL Work Plan, Attachment 3. Energy measurements to be performed on drill rigs while performing SPT sampling. Obtain energy measurements with the PDA at depth intervals in the range of 15 to 100 feet below the ground surface in general accordance with ASTM D4633-05. Perform energy measurement for SPT automatic hammer number 165447.

**Special Instructions:** Complete all field forms in ink.

**Report Format:** Completed Field Forms As Follows: Daily Field Report, Record of SPT Energy Measurement and PDILOT output data, Photographs (rig and equipment setup, energy measurement equipment).

**Specific Quality Assurance Procedures Applicable:** None

**Hold Points or Witness Points:** Direction to perform energy measurements received from the Site Coordinator.  
Calibration record of energy measurement equipment on file.

**Records:** All records generated shall be considered OA Records.

Reviewed and Approved By: (Note: Only one signature is required to issue)

Project Manager (MACTEC): \_\_\_\_\_ Date: \_\_\_\_\_  
Project Principal (MACTEC): \_\_\_\_\_ Date: \_\_\_\_\_  
Site Coordinator (MACTEC): \_\_\_\_\_ Date: \_\_\_\_\_

No. of Pages: 1

DCN: STP095

C:\05-0496 STP COL\Work Instructions\work instructions for SPT Energy #165447 Jedi Drilling #1.doc



2801 YORKMONT ROAD, SUITE 100 □ CHARLOTTE, NC 28208  
Telephone: (704) 357-8600 / Facsimile: (704) 357-8638

### RECORD OF SPT ENERGY MEASUREMENT

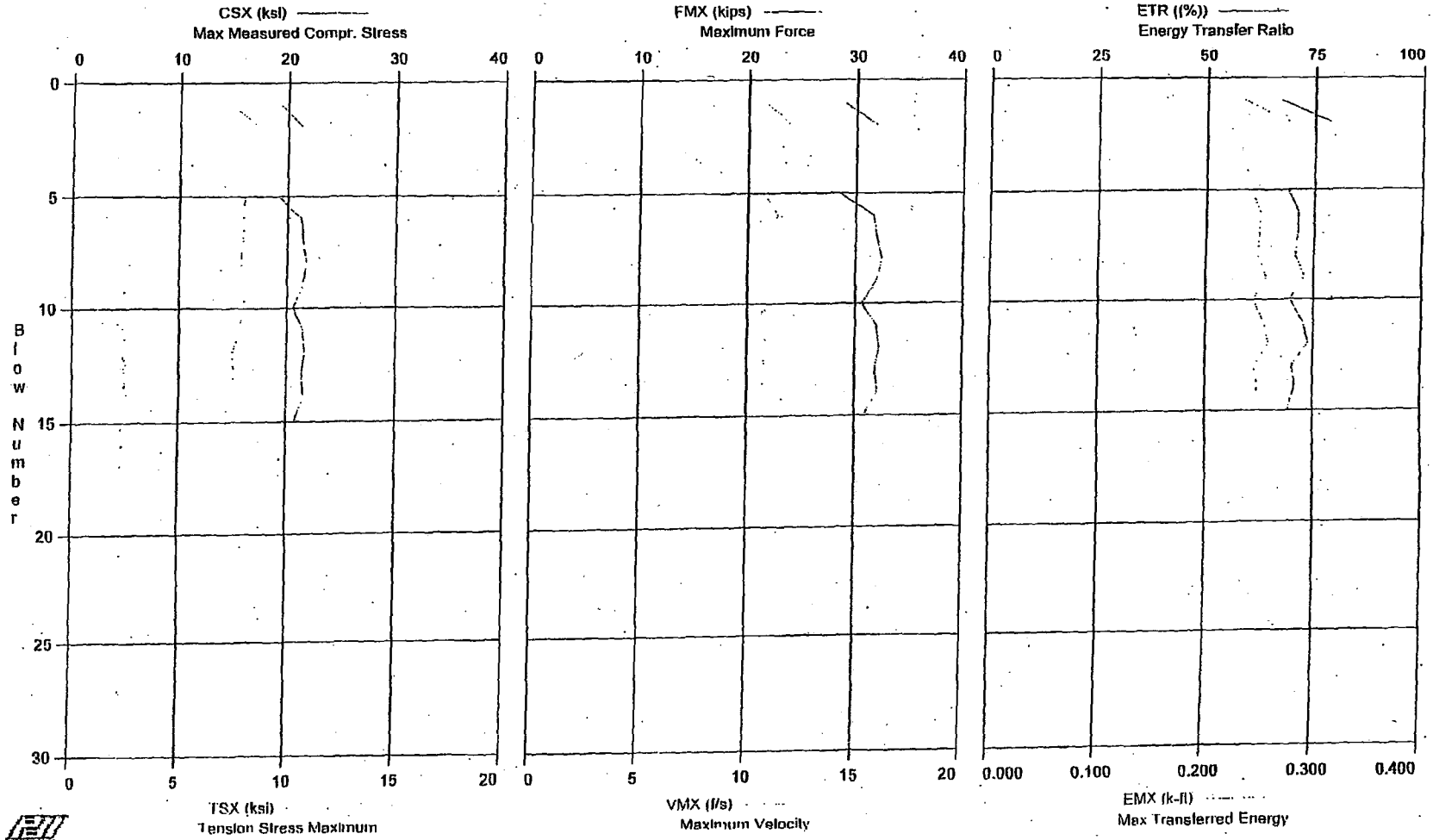
GENERAL INFORMATION		DRILL RIG DATA	
PROJECT:	South Texas Project	MAKE:	ME 75
LOCATION:	Wadsworth, Texas	MODEL:	TRUCK
PROJECT NO.:	5150-06-0496	SERIAL NO.:	165447
DATE:	11-28-06	HAMMER TYPE:	AUTOMATIC
WEATHER:	SUNNY WARM 70°	ROPE CONDITION:	N/A
INSPECTOR:	Steve Kiser	ROD SIZE:	NW-5
DRILLING COMPANY:	JEDI	NO. OF SHEAVES:	N/A

BORING DATA			
BORING NUMBER:	B-303		
DEPTH DRILLED:	200' PLANNED		
TIME DRIVEN:	1:50 PM		
RIG OPERATOR:	OSCAR GARCIA		
HAMMER OPERATOR:	N.R.		
PDA PAK SERIAL NO.:	1430	1430	1430
INSTR. ROD AREA:	1.49 in <sup>2</sup>		
ACCEL. SERIAL NOS.:	5094 / 5953		
STRAIN SERIAL NOS.:	146 MW 1/2		

SAMPLE DEPTH (feet)	SPT N-VALUE (bpf)	DEPTH cont. (feet)	SPT N-VALUE (bpf)	SAMPLE DEPTH (feet)	SPT N-VALUE (bpf)	DEPTH cont. (feet)	SPT N-VALUE (bpf)	SAMPLE DEPTH (feet)	SPT N-VALUE (bpf)	DEPTH cont. (feet)	SPT N-VALUE (bpf)
17.5/15	3-4-6										
18.5/20	2-4-5										
23.5/25	11-11-12										
28.5/30	7-8-9										
33.5/35	12-23-25										

REMARKS: MWB RATHBY DRILLING

STP COL Project - Boring B-303; 13.5' - 15' Sample





STP COL Project - Boring B-303; 13.5' - 15' Sample  
OP: SEK

Rig Serial No. 165447 (Jedi CME 75 Truck)  
Test date: 28-Nov-2006

AR: 1.49 in<sup>2</sup>  
LE: 19.00 ft  
WS: 16,807.9 f/s

SP: 0.492 k/ft<sup>3</sup>  
EM: 30,000 kJ  
JC: 0.60

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
DFN: Final Displacement

BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX klps	VMX f/s	DFN in	BPM **	EFV **	ETR (%)	EMX k-ft
1	0.00	19.35	7.41	29	10.8	2.69	0.0	0.2	66.8	0.234
2	0.00	21.47	8.74	32	12.0	2.25	34.4	0.3	79.0	0.277
5	0.00	19.04	8.01	28	10.8	1.66	0.0	0.2	68.7	0.241
6	0.00	21.26	7.94	32	11.4	2.50	34.7	0.3	71.5	0.250
7	0.00	21.43	7.96	32	10.7	2.17	34.7	0.2	71.3	0.249
8	0.00	21.79	7.83	32	11.2	1.88	34.8	0.2	70.8	0.248
9	0.00	21.46	8.25	32	10.7	2.41	34.8	0.3	73.0	0.256
10	0.00	20.56	7.87	31	10.8	2.07	34.9	0.2	69.6	0.244
11	0.00	21.42	7.83	32	10.9	2.01	34.8	0.3	72.3	0.253
12	0.00	21.65	7.47	32	10.8	1.74	34.9	0.3	74.0	0.259
13	0.00	21.40	7.55	32	10.8	1.87	34.9	0.2	70.3	0.246
14	0.00	21.53	7.18	32	10.7	1.13	34.9	0.2	70.8	0.248
15	0.00	20.72	7.31	31	10.7	1.77	34.6	0.2	69.3	0.243
Average		21.01	7.80	31	10.9	2.01	34.8	0.2	71.3	0.250

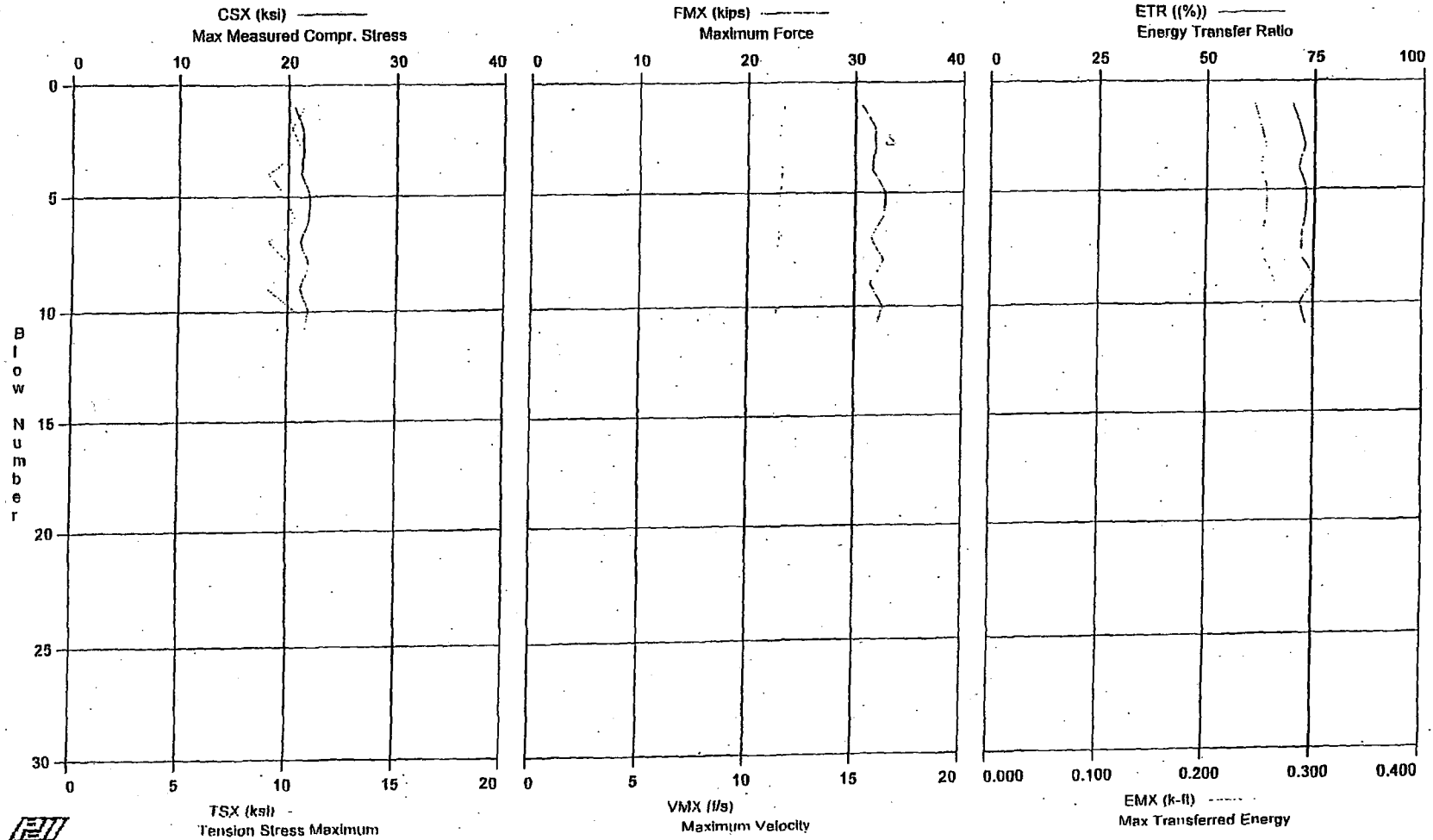
Total number of blows analyzed: 13

Time Summary

Drive 1 minute 40 seconds

2:01:57 PM - 2:03:37 PM (11/28/2006) BN 1 - 15

STP COL Project - Boring B-303; 18.5' - 20' Sample



STP COL Project - Boring B-303; 18.5' - 20' Sample  
OP: SEK

Rig Serial No. 165447 (Jedi CME 75 Truck)  
Test date: 26-Nov-2006

AR: 1.49 in<sup>2</sup>  
LE: 24.00 ft  
WS: 16,807.9 f/s

SP: 0.492 k/ft<sup>3</sup>  
EM: 30,000 ksi  
JC: 0.60

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
DFN: Final Displacement

BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	DFN in	BPM **	EFV **	ETR (%)	EMX k-ft
1	0.00	20.49	10.70	31	11.7	4.29	0.0	0.2	69.8	0.244
2	0.00	21.31	10.14	32	11.5	3.02	34.2	0.3	71.6	0.250
3	0.00	21.39	10.62	32	11.4	2.27	38.6	0.3	72.8	0.255
4	0.00	21.17	9.08	32	11.6	1.93	38.8	0.3	71.5	0.250
5	0.00	21.98	9.85	33	11.5	1.94	38.8	0.3	73.1	0.256
6	0.00	21.91	10.31	33	11.4	2.18	38.7	0.3	73.2	0.256
7	0.00	21.13	9.07	31	11.4	1.75	38.8	0.3	72.1	0.252
8	0.00	21.89	10.09	33	11.3	0.99	38.9	0.3	72.2	0.253
9	0.00	21.06	9.06	31	11.3	1.81	38.8	0.3	75.4	0.264
10	0.00	21.89	10.33	33	11.3	1.85	38.9	0.3	71.9	0.252
11	0.00	21.41	9.30	32	11.3	1.92	38.7	0.3	73.4	0.257
Average		21.42	9.87	32	11.4	2.18	38.3	0.3	72.5	0.254

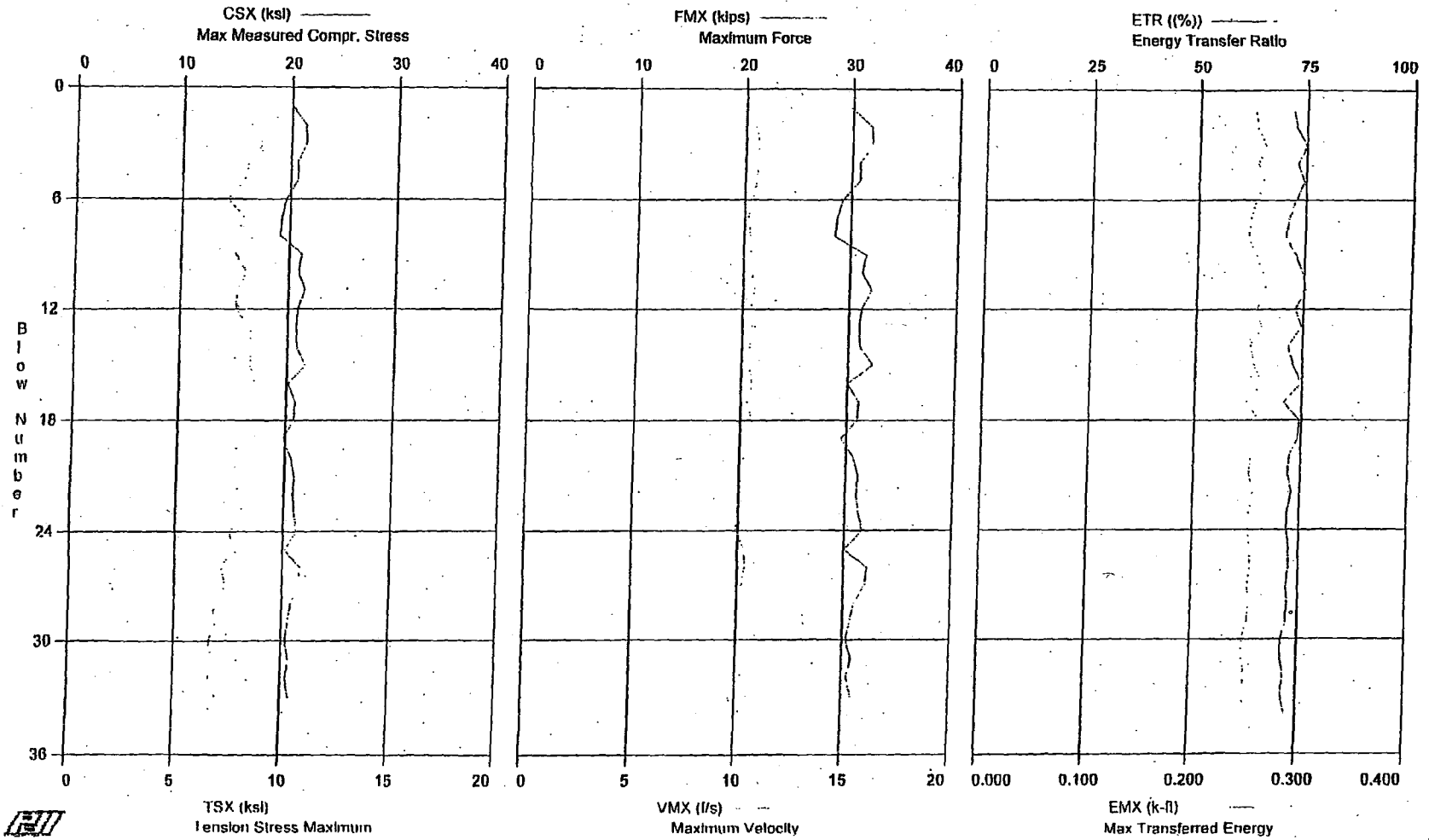
Total number of blows analyzed: 11

Time Summary

Drive 16 seconds

2:54:35 PM - 2:54:51 PM (11/26/2006) BN 1 - 11

STP COL Project - Boring B-303; 23.5' - 25' Sample



STP COL Project - Boring B-303; 23.5' - 25' Sample  
OP: SEK

Rig Serial No. 165447 (Jedi CME 75 Truck)  
Test date: 28-Nov-2006

AR: 1.49 in<sup>2</sup>  
LE: 29.00 ft  
WS: 16,807.9 f/s

SP: 0.492 k/ft<sup>3</sup>  
EM: 30,000 ksi  
JC: 0.60

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
DFN: Final Displacement

BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	DFN in	BPM **	EFV **	ETR (%)	EMX k-ft
1	0.00	20.02	9.59	30	10.4	1.24	0.0	0.3	71.9	0.252
2	0.00	21.33	9.08	32	10.4	1.01	36.3	0.3	72.6	0.254
3	0.00	21.36	8.68	32	10.6	0.85	38.0	0.3	74.9	0.262
4	0.00	20.62	8.04	31	10.5	1.02	38.1	0.3	72.9	0.255
5	0.00	20.64	7.88	31	10.5	1.32	38.3	0.3	74.6	0.261
6	0.00	19.59	7.09	29	10.3	1.30	38.0	0.3	72.6	0.254
7	0.00	18.24	7.91	29	10.1	0.78	38.0	0.2	71.2	0.249
8	0.00	19.10	7.47	28	10.3	1.22	38.1	0.2	70.5	0.247
9	0.00	21.15	7.51	32	10.3	0.63	38.1	0.3	73.0	0.255
10	0.00	20.90	8.02	31	10.4	1.07	38.0	0.3	74.5	0.261
11	0.00	21.49	7.61	32	10.5	0.74	38.2	0.3	75.4	0.264
12	0.00	20.92	7.60	31	10.3	0.99	38.2	0.3	73.0	0.256
13	0.00	20.78	8.24	31	10.6	0.90	38.1	0.3	74.6	0.261
14	0.00	20.82	8.28	31	10.3	1.09	38.2	0.3	71.7	0.251
15	0.00	21.66	8.28	32	10.3	1.41	38.3	0.3	72.7	0.255
16	0.00	20.12	8.52	30	10.5	0.87	38.1	0.3	74.8	0.262
17	0.00	20.84	8.15	31	10.2	1.04	38.3	0.2	70.8	0.248
18	0.00	20.75	8.11	31	10.5	0.69	38.2	0.3	74.5	0.261
19	0.00	19.80	7.83	29	10.4	1.00	38.1	0.3	74.2	0.260
20	0.00	20.54	7.88	31	10.2	0.85	38.3	0.3	72.3	0.253
21	0.00	20.90	7.71	31	10.2	0.91	38.2	0.3	72.0	0.252
22	0.00	20.82	7.87	31	10.2	0.86	38.2	0.3	73.1	0.256
23	0.00	20.97	8.11	31	9.9	1.02	38.2	0.3	72.2	0.253
24	0.00	21.21	7.55	32	9.9	0.71	38.4	0.3	72.1	0.252
25	0.00	20.17	7.61	30	10.3	0.95	38.2	0.3	72.7	0.255
26	0.00	21.61	7.16	32	10.3	0.47	38.3	0.3	72.8	0.255
27	0.00	21.45	7.38	32	10.2	0.70	38.1	0.3	72.2	0.253
28	0.00	20.81	6.82	31	10.1	0.88	38.2	0.3	72.5	0.254
29	0.00	20.59	6.92	31	10.0	0.13	38.3	0.3	72.3	0.253
30	0.00	20.36	6.63	30	10.1	0.84	38.2	0.2	71.3	0.249
31	0.00	20.71	6.81	31	10.0	0.94	38.1	0.2	71.2	0.249
32	0.00	20.46	6.64	30	10.3	0.68	38.2	0.3	72.0	0.252
33	0.00	20.74	7.00	31	9.7	0.40	38.2	0.3	71.5	0.250
34	0.00	20.08	6.50	30	10.3	0.94	38.1	0.3	72.5	0.254
Average		20.66	7.71	31	10.3	0.89	38.1	0.3	72.7	0.255

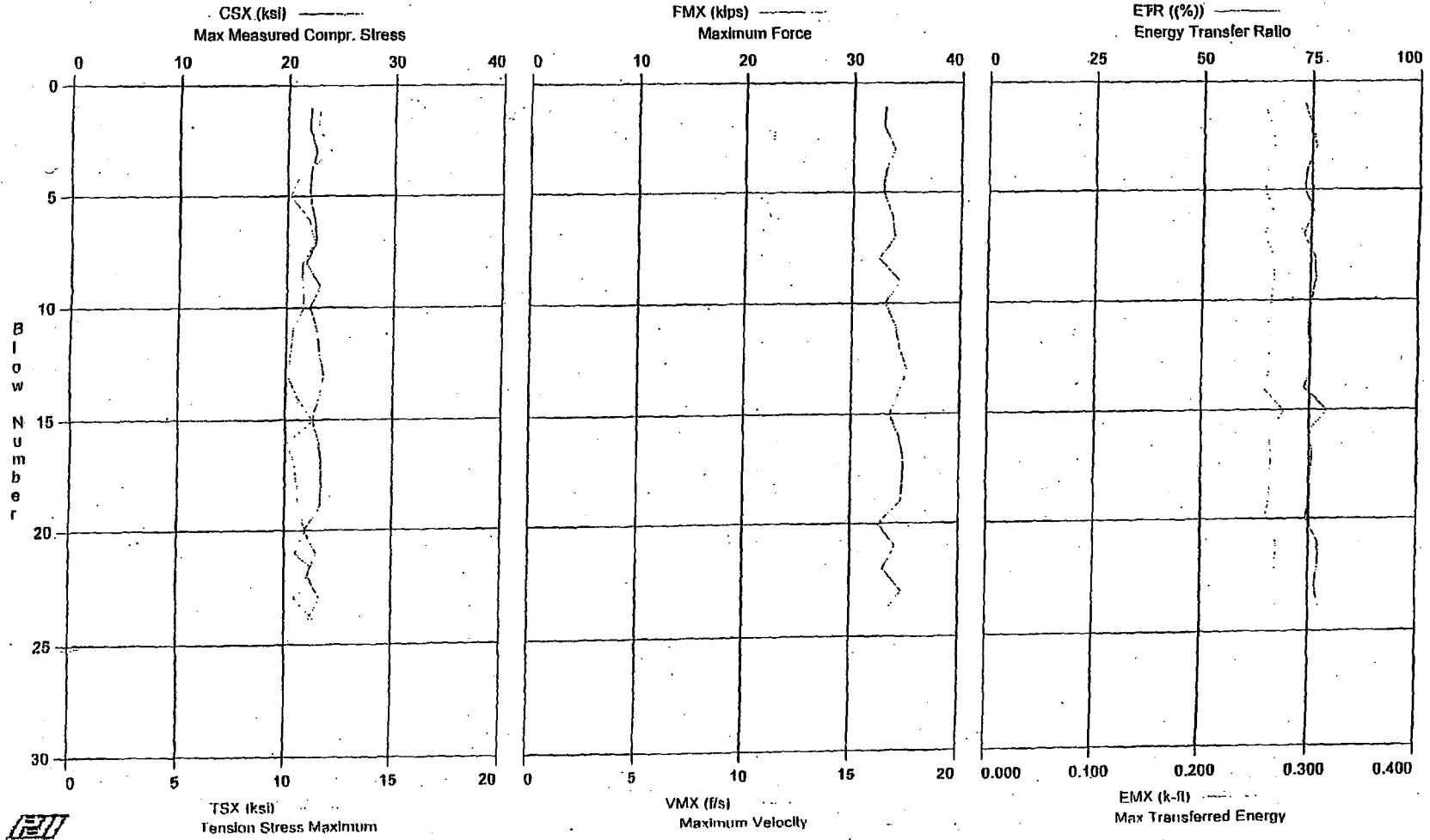
Total number of blows analyzed: 34

Time Summary

Drive 52 seconds

3:09:56 PM - 3:10:48 PM (11/28/2006) BN 1 - 34

STP COL Project - Boring B-303; 28.5' - 30' Sample



STP COL Project - Boring B-303; 28.5' - 30' Sample  
OP: SEK

AR: 1.49 in<sup>2</sup>  
LE: 34.00 ft  
WS: 16.807.9 f/s

SP: 0.492 k/R<sup>3</sup>  
EM: 30,000 ksi  
JC: 0.60

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
DFN: Final Displacement

BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	DFN in	BPM "	EFV "	ETR (%)	EMX k-ft
1	0.00	22.13	11.50	33	11.2	1.65	0.0	0.3	73.2	0.256
2	0.00	22.04	11.43	33	11.3	1.46	36.0	0.3	75.1	0.263
3	0.00	22.69	12.08	34	11.3	1.31	36.5	0.3	76.0	0.266
4	0.00	22.18	10.62	33	10.6	1.40	36.5	0.3	74.0	0.259
5	0.00	22.00	10.09	33	10.6	1.47	36.4	0.3	73.3	0.257
6	0.00	22.54	11.00	34	11.2	1.83	36.6	0.3	75.7	0.266
7	0.00	22.75	11.30	34	10.6	1.37	36.5	0.3	73.3	0.257
8	0.00	21.79	10.70	32	10.8	1.52	36.5	0.3	76.0	0.266
9	0.00	23.10	10.73	34	10.8	1.40	36.5	0.3	76.3	0.267
10	0.00	22.19	10.78	33	10.8	1.30	36.6	0.3	75.4	0.264
11	0.00	22.83	10.31	34	10.6	0.62	36.6	0.3	74.6	0.261
12	0.00	23.07	10.22	34	10.9	1.31	36.5	0.3	74.7	0.261
13	0.00	23.56	10.07	35	10.8	0.77	36.5	0.3	75.2	0.263
14	0.00	23.12	10.53	34	10.6	1.20	36.6	0.3	73.8	0.258
15	0.00	22.54	11.29	34	10.7	1.18	36.7	0.3	79.1	0.277
16	0.00	23.09	10.06	34	10.8	1.41	36.6	0.3	74.8	0.262
17	0.00	23.36	10.42	35	10.7	1.08	36.5	0.3	75.7	0.265
18	0.00	23.38	10.53	35	10.8	1.22	36.7	0.3	75.3	0.264
19	0.00	23.23	10.59	35	10.9	1.22	36.5	0.3	75.1	0.263
20	0.00	21.86	11.00	33	10.7	0.95	36.7	0.3	74.3	0.260
21	0.00	22.92	10.48	34	10.8	1.06	36.5	0.3	77.0	0.270
22	0.00	22.18	11.71	33	10.7	1.19	36.6	0.3	77.2	0.270
23	0.00	23.32	10.44	35	10.9	1.32	36.7	0.3	76.5	0.268
24	0.00	22.21	11.46	33	10.8	1.32	36.7	0.3	77.4	0.271
Average		22.67	10.80	34	10.8	1.27	36.5	0.3	75.4	0.264

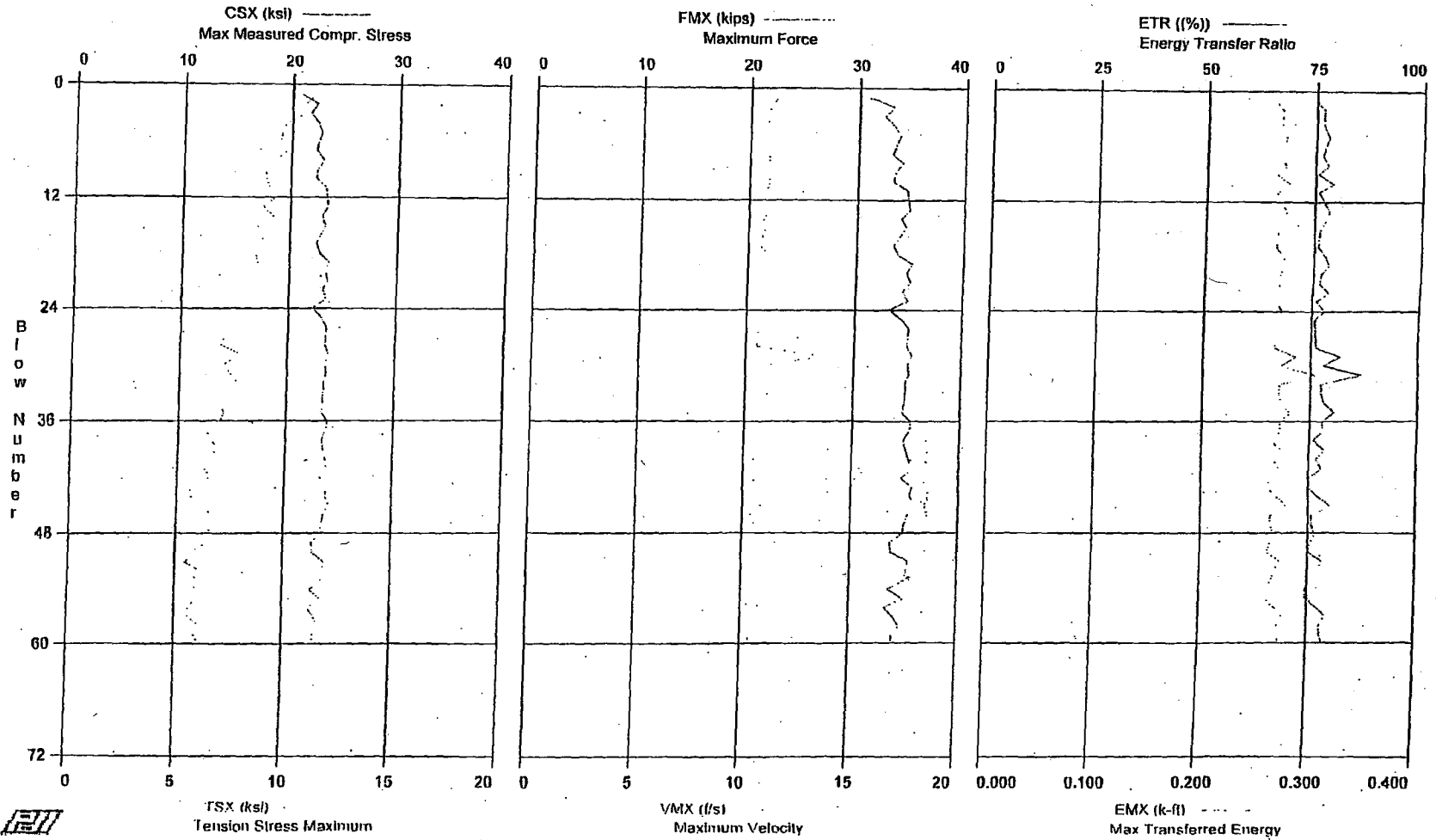
Total number of blows analyzed: 24

Time Summary

Drive 38 seconds

3:26:43 PM - 3:27:21 PM (11/28/2006) BN 1 - 24

STP COL Project - Boring B-303; 33.6' - 35' Sample





STP COL Project - Boring B-303; 33.5' - 35' Sample  
OP: SEK

Rig Serial No. 165447 (Jedl CME 75 Truck)  
Test date: 28-Nov-2006

AR: 1.49 in<sup>2</sup>  
LE: 39.00 ft  
WS: 16,807.9 f/s

SP: 0.492 k/#3  
EM: 30,000 ksi  
JC: 0.60

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
DFN: Final Displacement

BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	DFN in	BPM **	EFV **	ETR (%)	EMX k-ft
1	0.00	20.78	11.01	31	11.2	0.71	0.0	0.3	74.5	0.261
2	0.00	22.31	10.55	33	10.9	0.90	41.8	0.3	76.8	0.269
3	0.00	21.70	10.56	32	10.8	0.68	42.2	0.3	76.5	0.268
4	0.00	22.35	9.74	33	10.8	0.71	42.1	0.3	76.9	0.269
5	0.00	22.75	9.50	34	10.9	1.00	42.3	0.3	77.9	0.273
6	0.00	22.48	9.45	34	10.9	1.25	42.2	0.3	77.2	0.270
7	0.00	22.28	9.76	33	10.9	0.88	42.3	0.3	76.7	0.268
8	0.00	22.95	9.29	34	10.9	1.28	42.2	0.3	77.9	0.273
9	0.00	22.48	8.81	34	10.8	0.99	42.3	0.3	75.6	0.265
10	0.00	22.32	8.82	33	10.9	1.10	42.3	0.3	79.0	0.276
11	0.00	23.25	8.98	35	10.8	0.81	42.3	0.3	75.8	0.265
12	0.00	23.30	9.25	35	10.9	0.43	42.2	0.3	77.1	0.270
13	0.00	23.43	8.69	35	10.8	0.85	42.3	0.3	78.3	0.274
14	0.00	22.90	9.16	34	10.7	1.18	42.2	0.3	77.6	0.271
15	0.00	23.21	8.44	35	10.7	0.68	42.3	0.3	76.3	0.267
17	0.00	22.44	8.79	33	10.5	0.71	42.5	0.3	75.8	0.265
18	0.00	22.75	8.37	34	10.9	0.74	42.0	0.3	77.6	0.272
19	0.00	23.63	8.49	35	10.7	0.91	42.4	0.3	78.4	0.274
20	0.00	23.31	8.46	35	10.7	1.38	42.3	0.3	76.8	0.269
21	0.00	23.53	8.14	35	10.5	0.70	42.3	0.3	76.4	0.268
22	0.00	23.06	8.09	34	10.6	0.88	42.5	0.3	78.6	0.275
23	0.00	23.42	7.44	35	10.5	1.07	42.3	0.3	76.0	0.266
24	0.00	22.24	7.38	33	10.6	1.30	42.5	0.3	77.9	0.273
25	0.00	23.03	7.11	34	10.5	0.82	42.3	0.3	75.8	0.265
26	0.00	23.51	7.15	35	10.4	0.78	42.3	0.3	75.8	0.265
28	0.00	23.46	6.87	35	10.5	1.47	42.6	0.3	76.2	0.267
29	0.00	23.74	7.81	35	13.5	14.91	42.2	0.3	81.7	0.286
30	0.00	23.52	7.08	35	10.8	2.87	42.3	0.3	77.9	0.273
31	0.00	23.58	7.28	35	10.9	2.17	42.3	0.3	86.8	0.304
32	0.00	23.37	7.76	35	11.0	1.89	42.3	0.3	77.3	0.271
33	0.00	23.41	6.84	35	11.0	1.31	42.5	0.3	77.4	0.271
34	0.00	23.32	6.71	35	10.9	2.50	42.4	0.3	78.1	0.273
35	0.00	23.19	7.10	35	10.7	2.80	42.2	0.3	80.5	0.282
36	0.00	23.76	6.87	35	10.7	1.41	42.4	0.3	77.7	0.272
37	0.00	23.69	6.30	35	10.8	1.60	42.3	0.3	78.0	0.273
38	0.00	23.33	6.53	35	10.6	1.63	42.3	0.3	75.8	0.265
39	0.00	23.50	6.80	35	10.7	1.65	42.4	0.3	78.6	0.275
40	0.00	23.69	6.32	35	10.4	1.62	42.3	0.3	76.7	0.268
41	0.00	23.85	6.21	36	10.6	1.56	42.4	0.3	77.8	0.272
42	0.00	23.25	6.52	35	10.4	1.50	42.7	0.3	75.2	0.263
43	0.00	23.94	6.81	36	10.6	2.30	41.9	0.3	75.1	0.263
44	0.00	23.79	6.55	35	10.6	1.33	42.4	0.3	77.1	0.270
45	0.00	24.14	5.99	36	10.6	1.52	42.3	0.3	79.9	0.280
46	0.00	23.67	6.65	35	10.4	2.05	42.3	0.3	75.7	0.265
47	0.00	23.50	6.36	35	10.5	2.07	42.4	0.3	75.7	0.265
48	0.00	23.41	6.62	35	10.7	1.28	42.3	0.3	76.4	0.268
49	0.00	22.62	6.34	34	10.7	1.60	42.3	0.3	75.7	0.265
50	0.00	22.68	5.97	34	10.6	0.81	42.4	0.3	75.0	0.262
51	0.00	23.78	5.44	35	10.5	1.37	42.4	0.3	78.2	0.274
52	0.00	23.67	6.24	35	10.6	2.42	42.3	0.3	77.2	0.270
53	0.00	23.55	5.76	35	10.4	1.32	42.4	0.3	76.2	0.267
54	0.00	22.53	6.02	34	10.4	1.24	42.3	0.3	74.6	0.261
55	0.00	23.53	5.98	35	10.4	1.45	42.3	0.3	74.5	0.261
56	0.00	22.35	5.66	33	10.3	1.29	42.5	0.3	77.2	0.270
57	0.00	22.94	5.61	34	10.3	0.97	42.3	0.3	79.2	0.277
58	0.00	23.30	6.22	35	10.4	1.23	42.5	0.3	77.9	0.273
59	0.00	22.86	5.93	34	10.4	1.56	42.4	0.3	78.1	0.273
60	0.00	22.86	6.14	34	10.4	1.42	42.3	0.3	78.6	0.275
Average		23.12	7.46	34	10.7	1.57	42.3	0.3	77.3	0.270

Total number of blows analyzed: 58

Time Summary

Drive 1 minute 24 seconds

3:37:44 PM - 3:39:08 PM (11/28/2006) BN 1 - 60



engineering and constructing a better tomorrow

February 22, 2007

Memorandum to File DCN STP643

From: Steve Kiser *SK 2-22-07*

Reviewed By: Kathryn White *KAW 2/22/07*

Subject: **Report of SPT Energy – Gregg Drilling (Gregg 2) CME 55 Truck Rig (Serial No. 03) Automatic Hammer**  
**WORK INSTRUCTION DCN STP643**  
South Texas Project (STP) COL Site  
Wadsworth, Texas  
MACTEC Project No. 5050-06-0496

Mr. Steve Kiser of MACTEC Engineering and Consulting, Inc. (MACTEC) performed energy measurements on the drill rig at the subject site per the referenced Work Instruction. This memorandum summarizes the field testing activities and presents the results of the energy measurements.

#### **SPT Energy Field Measurements**

SPT energy measurements were made on December 1, 2006, during drilling of Boring B-409 at the referenced site. The testing was performed from approximately 9:00 AM to 2:15 PM under sunny skies and a temperature of about 40 degrees Fahrenheit. The boring was drilled with personnel and equipment from Gregg Drilling. The drilling equipment consisted of a CME 55 model truck-mounted drill rig with an SPT automatic hammer. The drilling tools consisted of NW-J-sized drilling rods and a 2-foot long split tube sampler. Mud rotary drilling techniques were used to advance the boring below the depth at which groundwater was encountered at the time of energy testing. The drill rig operator during sampling was Mr. Brian Giesecke. Energy measurements were recorded during sampling at the depth intervals shown in Table 1.

The energy measurements were performed with a Pile Driving Analyzer (PDA) model PAK (Serial No. 1430), and calibrated accelerometers (Serial Nos. P5953 and P5094) and strain gages (Serial Nos. NW #146/1 and NW#146/2). An NW-sized steel drill rod, 2-feet long and instrumented with dedicated strain gages, was inserted at the top of the drill rod string immediately below the SPT hammer. The inserted rod was also instrumented with two piezoresistive accelerometers that were bolted to the outside of the rod. The instrumented rod insert had a cross-sectional area of approximately 1.49 square inches and an outside diameter of approximately 2.625 inches at the gage location. The drill rods included in the drill rod string were hollow rods in 5 to 10-foot long sections, with an outside and inside diameter of approximately 2.625 and 2.25 inches, respectively. The recommended operation rate of the hammer is not known. Due to the closed hammer system, the hammer lubrication condition and anvil dimensions could not be observed.

13 Pages Total

### Calibration Records

Calibration records were provided to Bechtel on January 9, 2007. The calibration records for all the above are filed in DCN STP850.

### Calculations for EFV

The work was done in general accordance with ASTM D 4633-05. The strain and acceleration signals were converted to force and velocity by the PDA, and the data was interpreted by the PDA according to the Case Method equation. The maximum energy transmitted to the drill rod string (as measured at the location of the strain gages and accelerometers) was calculated by the PDA using the EFV method equation, as shown below:

$$EFV = \int F(t) * V(t) * dt$$

Where: EFV = Transferred energy (EFV equation), or Energy of FV

F(t) = Calculated force at time t

V(t) = Calculated velocity at time t

The EFV method of energy calculation is recommended in ASTM Standard D4633-05. The EFV equation, integrated over the complete wave event, measures the total energy content of the event using both force and velocity measurements. The EFV values associated with each blow analyzed are tabulated in the attached PDILOT tables and are also shown graphically in the PDILOT charts.

### Calculations for ETR

The ratio of the measured transferred energy (EFV) to the theoretical potential energy of the SPT system (140 lb weight with the specified 30-inch fall) is the ETR. The ETR values (as percent of the theoretical value) are shown in Table 1.

### Comparison of ETR to Typical Energy Transfer Ratio Range

Based on a research report published by the Florida Department of Transportation (FDOT) (Report WPI No. 0510859, 1999), the average ETR measured for automatic hammers is 79.6%. The standard deviation was 7.9%; therefore, the range of ETRs within one standard deviation of the average was reported to be 71.7% to 87.5%. This range of ETRs was also consistent with other research that was cited in the FDOT research paper. The ETR values shown in Table 1 are within the range of typical values for automatic hammers as reported in the literature.

### Discussion

Based on the field testing results, observations from the SPT energy measurements are summarized below:

- The data obtained by the PDA are consistent between individual hammer blows and between the sample depths tested. In general, the first and last one (and sometimes two) hammer blow records recorded by the PDA produced poor quality

data (which is relatively common) and, as such, the records were not used in the data reduction.

- The average energy transferred from the hammer to the drill rods for each individual depth interval using the EFV method ranged from 302 foot-pounds to 307 foot-pounds. These average energy transfers correspond to energy transfer ratios (ETR) of 86% to 88% of the theoretical energy (350 foot-pounds) of the SPT hammer.
- The average at each depth interval was calculated as the transferred energy for each analyzed blow of the depth intervals divided by the total number of hammer blows analyzed. The overall average energy transfer of the SPT system (for all the depth intervals tested) was 304.3 foot-pounds, with an average ETR of 86.9%.

Attachments: Page 4 Table 1 - Summary of SPT Energy Measurements – 1 Page  
Page 5 Work Instructions – SPT Energy #03 – 1 Page  
Page 6 Record of SPT Energy Measurement – 1 Page  
Pages 7-13 PDILOT Output – 7 Pages

**TABLE 1**  
**SUMMARY OF SPT ENERGY MEASUREMENTS (ASTM D4633-05)**

South Texas Project (STP) COL Site  
Wadsworth, Texas  
MACTEC Project No. 5050-06-0496

Rig Serial No.	Rig Owner	Rig Operator	Boring No. Tested	Date Tested	Sample Depth (feet)	SPT Blow Count (blows per six inches)	No. of Blows Analyzed	Average Measured Energy (Average EFV) (ft-lbs) <sup>a</sup>	Energy Transfer Ratio (%) <sup>b</sup> (Average ETR)
03 (CME 55 Truck)	Gregg Drilling	Brian Giesecke	B-409	12/1/2006	168.5 - 170.0	11 - 12 - 17	42	302	86.3%
					178.5 - 180.0	10 - 11 - 16	36	302	86.3%
					190.0 - 191.5	19 - 26 - 24	67	307	87.7%
<b>Average for Rig:</b>								<b>304.3</b>	<b>86.9%</b>

<sup>a</sup>Measured Energy is energy based on the EFV method, as outlined in ASTM D4633-05, for each blow recorded by the PDA. In some cases, the initial and final one to two blows produced poor quality data, and were not used to calculate the Average Measured Energy.

ETR = EMX \* 1000 lbs/kip

<sup>b</sup>Energy Transfer Ratio is the Measured Energy divided by the theoretical SPT energy of 350 foot-pounds (140 pound hammer falling 2.5 feet). The average ETR values may differ slightly and insignificantly from those in the PDILOT tables due to roundoff.

Prepared By: <i>GW</i>	Date:	Checked By: <i>James White</i>	Date: 2/22/07
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**Work Instruction SPT Energy #03**  
South Texas COL Project  
MACTEC Engineering and Consulting, Inc.

Issued To: Steve Kiser  
Location: STP COL Project Field Office Date: December 1, 2006  
Issued By: Jay Cerceo, Site Coordinator MACTEC Project No.: 5050-06-0496  
Valid From: 12/1/2006 To: 12/1/2007 Rev. 1

**Task Description:** Perform SPT Energy measurements of drill rigs at the South Texas COL Project.

**Applicable Technical Procedures or Plans, or other reference:** ASTM (D4633), South Texas COL Geotechnical Work Plan Attachments 3 and 8, Bechtel's Engineering Specification for Subsurface Investigation and Laboratory Testing for South Texas Project Units 3 & 4.

**Specific Instructions:** (note attachments where necessary): Follow logging guidelines in South Texas COL Work Plan, attachment 3. Energy measurements to be performed on drill rigs while performing SPT sampling. Obtain energy measurements with the PDA at depth intervals in the range of 15 and 200 ft below the ground surface in general accordance with ASTM D4633-05. Perform energy measurements for SPT automatic hammer number 03.

**Special Instructions:** Complete all forms in Ink.

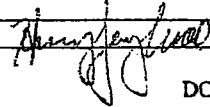
**Report Format:** Completed Forms in Ink as Follows: Record of SPT Energy Measurement and PDILOT output data, Photographs (rig and equipment setup, energy measurement equipment).

**Specific Quality Assurance Procedures Applicable:** None

**Hold Points or Witness Points:** None

**Records:** All records generated shall be considered QA Records.

Reviewed and Approved By: (Note: Only One Signature is Required to Issue):

Project Manager (MACTEC): \_\_\_\_\_ Date: \_\_\_\_\_  
Project Principal (MACTEC): \_\_\_\_\_ Date: \_\_\_\_\_  
Site Coordinator (MACTEC):  Date: 12/1/06

No. of Pages: 1 DCN: STP643



2801 YORKMONT ROAD, SUITE 100 □ CHARLOTTE, NC 28208  
 Telephone: (704) 357-8600 / Facsimile: (704) 357-8638

### RECORD OF SPT ENERGY MEASUREMENT

GENERAL INFORMATION		DRILL RIG DATA	
PROJECT:	South Texas Project	MAKE:	CME
LOCATION:	Wadsworth, Texas	MODEL:	55 TRUCK
PROJECT NO.:	5150-06-0496	SERIAL NO.:	03
DATE:	12-1-06	HAMMER TYPE:	AUTO MATIL
WEATHER:	SUNNY (over) 40°	ROPE CONDITION:	N/A
INSPECTOR:	Steve Kiser	ROD SIZE:	NW-J
DRILLING COMPANY:	BREGG DRILLING	NO. OF SHEAVES:	N/A

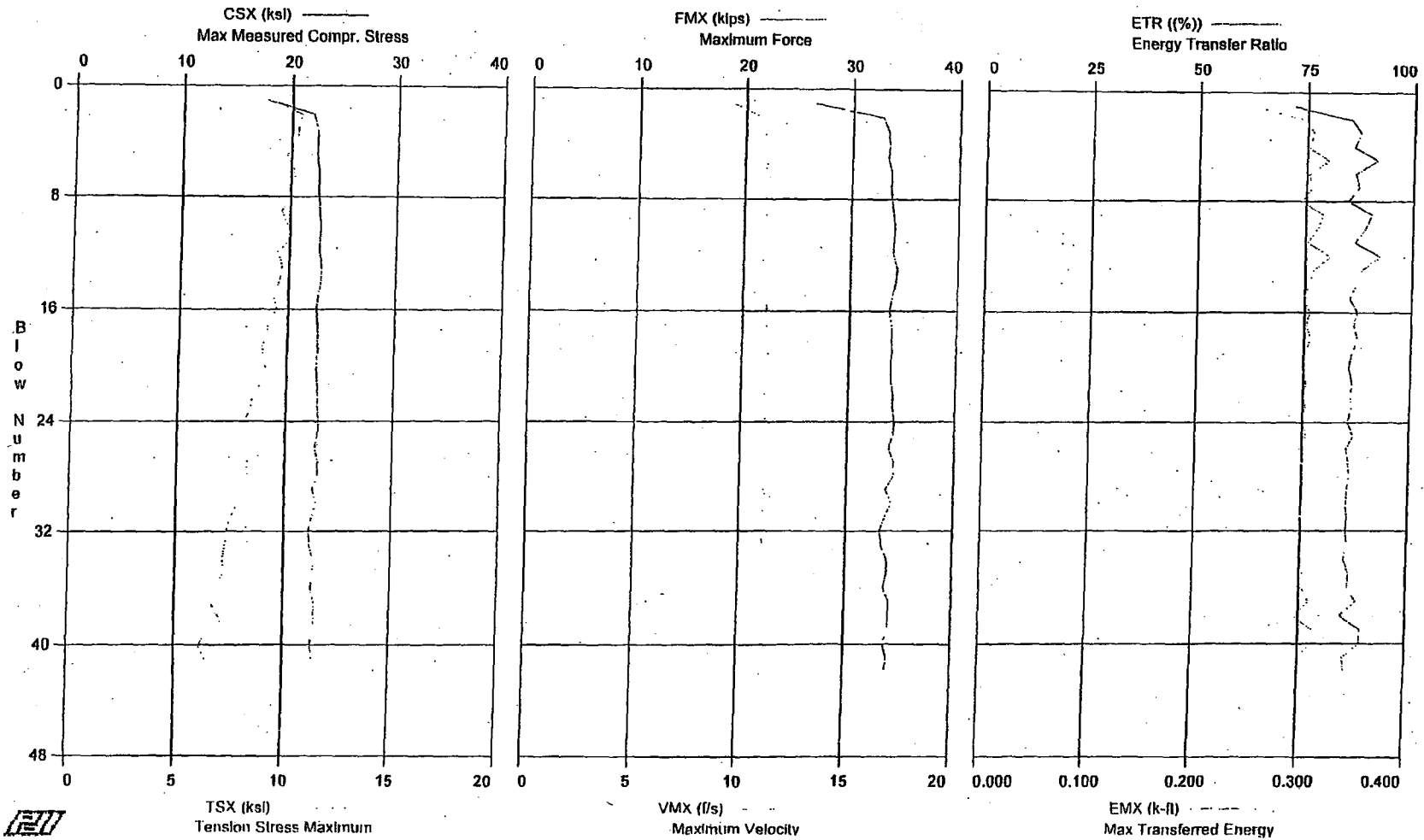
BORING DATA			
BORING NUMBER:	B-4M		
DEPTH DRILLED:	200' PLANNED		
TIME DRIVEN:	9:00 AM		
RIG OPERATOR:	BRIAN GIESECKE		
HAMMER OPERATOR:	N.R.		
PDA PAK SERIAL NO.:	1430	1430	1430
INSTR. ROD AREA:	1.49 in <sup>2</sup>		
ACCEL. SERIAL NOS.:	5953 15044		
STRAIN SERIAL NOS.:	146 NW 1/2		

SAMPLE DEPTH (feet)	SPT N-VALUE (bpf)	DEPTH cont. (feet)	SPT N-VALUE (bpf)	SAMPLE DEPTH (feet)	SPT N-VALUE (bpf)	DEPTH cont. (feet)	SPT N-VALUE (bpf)	SAMPLE DEPTH (feet)	SPT N-VALUE (bpf)	DEPTH cont. (feet)	SPT N-VALUE (bpf)
168.5	170	11-12-17									
178.5	180	18-11-16									
190	191.5	17-26-24									

REMARKS:

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STP COL Project - Boring B-409; 168.5' - 170' Sample





STP COL Project - Boring B-409; 168.5' - 170' Sample  
OP: SEK

Rig Serial No. 03 (Gregg 2 CME 55)  
Test date: 1-Dec-2006

AR: 1.49 in^2  
LE: 174.00 ft  
WS: 16,807.9 f/s

SP: 0.492 k/ft3  
EM: 30,000 ksi  
JC: 0.60

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
DFN: Final Displacement

BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth	CSX	TSX	FMX	VMX	DFN	BPM	EFV	ETR	EMX
	ft	ksi	ksi	kips	f/s	in	**	**	(%)	k-ft
1	0.00	17.61	8.95	26	9.3	0.76	0.0	0.3	71.8	0.251
2	0.00	22.03	10.48	33	10.8	1.28	0.0	0.3	85.2	0.298
3	0.00	22.36	10.29	33	10.9	1.19	53.9	0.3	87.4	0.306
4	0.00	22.47	10.25	33	10.9	1.61	53.7	0.3	85.9	0.301
5	0.00	22.39	9.76	33	11.1	1.32	53.8	0.3	91.5	0.320
6	0.00	22.62	10.10	34	10.9	1.36	53.7	0.3	86.3	0.302
7	0.00	22.63	10.17	34	11.0	1.64	53.6	0.3	87.2	0.305
8	0.00	22.65	10.03	34	10.9	1.50	53.6	0.3	84.7	0.296
9	0.00	22.77	9.58	34	11.0	1.63	53.5	0.3	90.3	0.316
10	0.00	22.88	9.86	34	11.1	1.72	53.6	0.3	88.8	0.311
11	0.00	22.84	10.11	34	11.0	1.08	53.5	0.3	86.4	0.302
12	0.00	22.79	9.42	34	10.9	2.10	53.6	0.3	92.2	0.323
13	0.00	23.06	9.66	34	11.1	1.78	53.4	0.3	88.0	0.308
14	0.00	23.01	9.56	34	11.1	0.81	53.4	0.3	86.9	0.304
15	0.00	22.79	9.32	34	11.0	1.13	53.7	0.3	85.4	0.299
16	0.00	22.59	9.44	34	11.1	1.28	53.5	0.3	87.2	0.305
17	0.00	22.75	9.12	34	11.1	1.49	53.3	0.3	86.4	0.302
18	0.00	22.80	8.95	34	11.2	0.88	53.4	0.3	87.3	0.306
19	0.00	22.84	8.84	34	11.2	1.23	53.4	0.3	86.1	0.301
20	0.00	22.77	8.99	34	11.1	1.02	53.6	0.3	85.4	0.299
21	0.00	22.79	9.00	34	11.1	1.34	53.2	0.3	86.1	0.302
22	0.00	22.96	8.45	34	11.1	0.89	53.5	0.3	86.0	0.301
23	0.00	22.93	8.38	34	11.1	1.04	53.4	0.3	86.2	0.302
24	0.00	23.07	8.15	34	11.1	1.24	53.4	0.3	85.4	0.299
25	0.00	23.03	8.27	34	11.1	1.10	53.6	0.3	86.8	0.304
26	0.00	22.75	8.56	34	11.1	1.30	53.2	0.3	85.2	0.298
27	0.00	23.07	8.26	34	11.0	0.98	53.4	0.3	85.7	0.300
28	0.00	23.08	8.28	34	11.0	1.21	53.3	0.3	86.0	0.301
29	0.00	22.62	8.13	34	11.1	1.13	53.6	0.3	85.5	0.299
30	0.00	23.01	7.87	34	11.3	0.99	53.2	0.3	85.4	0.299
31	0.00	22.59	7.53	34	11.0	1.57	53.4	0.3	85.7	0.300
32	0.00	22.28	7.35	33	10.9	0.90	53.4	0.3	85.5	0.299
33	0.00	22.40	7.31	33	11.2	2.17	53.3	0.3	85.7	0.300
34	0.00	22.74	7.19	34	11.0	0.94	53.3	0.3	85.1	0.298
35	0.00	22.77	7.24	34	11.1	1.31	53.4	0.3	86.5	0.303
36	0.00	22.55	6.72	34	11.2	0.98	53.2	0.3	86.2	0.302
37	0.00	22.93	6.68	34	11.1	1.25	53.4	0.3	88.3	0.309
38	0.00	22.92	7.05	34	11.1	1.04	53.2	0.3	84.6	0.296
39	0.00	22.90	6.57	34	11.1	1.02	53.4	0.3	89.3	0.313
40	0.00	22.64	6.10	34	11.0	0.83	53.4	0.3	89.2	0.312
41	0.00	22.85	6.43	34	11.1	0.89	53.3	0.3	85.2	0.298
42	0.00	22.77	5.77	34	11.3	1.09	53.3	0.3	85.9	0.301
Average		22.62	8.53	34	11.0	1.24	53.5	0.3	86.3	0.302

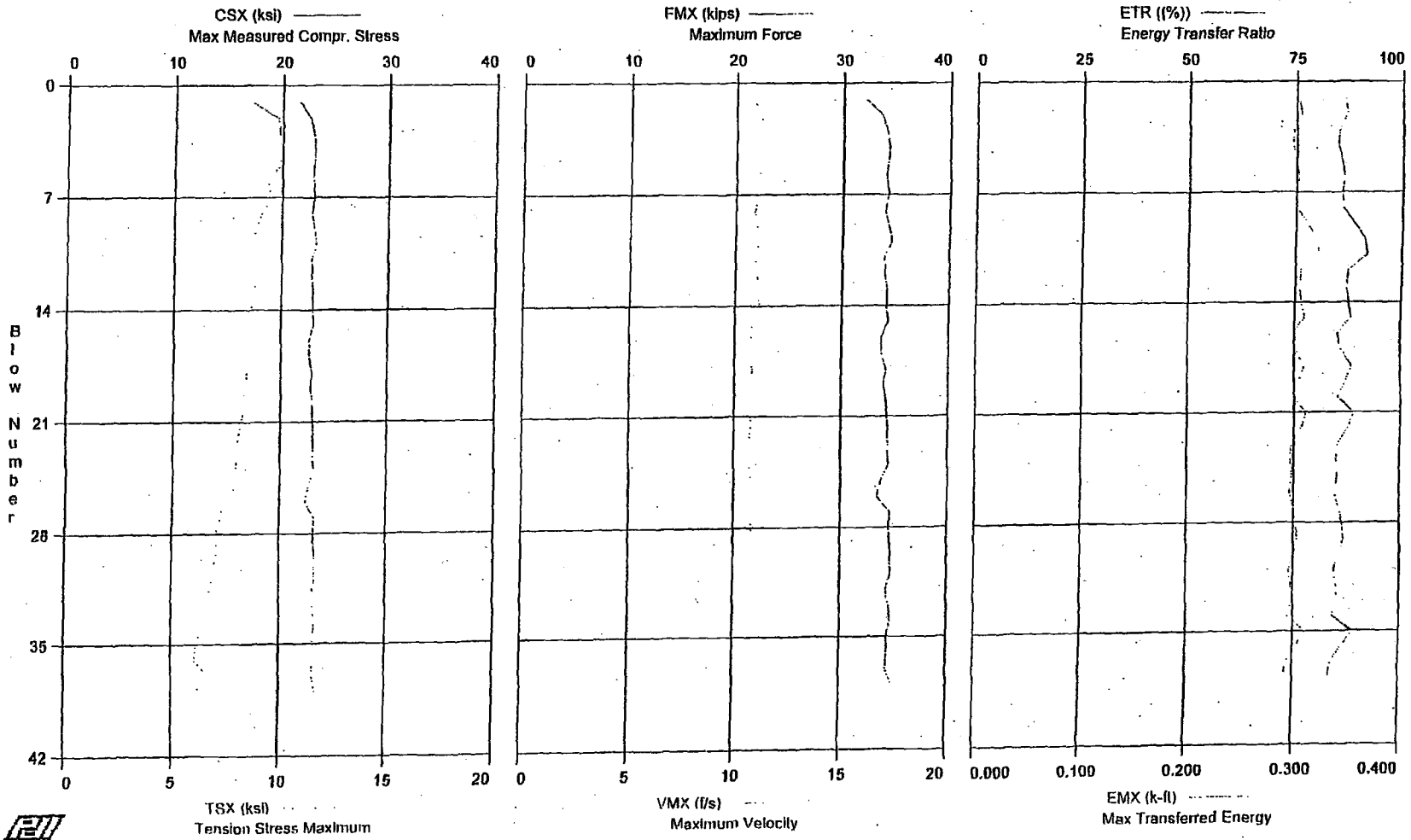
Total number of blows analyzed: 42

Time Summary

Drive 1 minute 26 seconds

9:04:16 AM - 9:05:42 AM (12/1/2006) BN 1 - 42

STP COL Project - Boring B-409; 178.5' - 180' Sample



STP COL Project - Boring B-409; 178.5' - 180' Sample

Rig Serial No. 03 (Gregg 2 CME 55)

OP: SEK

Test date: 1-Dec-2006

AR: 1.48 in<sup>2</sup>

SP: 0.492 k/ft<sup>3</sup>

LE: 184.00 ft

EM: 30,000 ksi

WS: 16,807.9 f/s

JC: 0.60

CSX: Max Measured Compr. Stress

BPM: Blows per Minute

TSX: Tension Stress Maximum

EFV: Energy of FV

FMX: Maximum Force

ETR: Energy Transfer Ratio

VMX: Maximum Velocity

EMX: Max Transferred Energy

DFN: Final Displacement

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	DFN in	BPM **	EFV **	ETR (%)	EMX k-ft
1	0.00	21.50	8.50	32	10.7	1.60	0.0	0.3	86.3	0.302
2	0.00	22.58	9.76	34	11.2	1.12	53.6	0.3	86.8	0.304
3	0.00	22.86	9.82	34	10.9	2.06	54.1	0.3	84.8	0.297
4	0.00	23.03	9.87	34	10.9	1.53	54.2	0.3	84.7	0.296
5	0.00	22.95	9.85	34	11.0	1.31	53.6	0.3	85.6	0.300
6	0.00	22.84	9.28	34	11.2	1.31	54.0	0.3	86.2	0.302
7	0.00	22.98	9.44	34	11.0	1.65	53.6	0.3	85.6	0.300
8	0.00	22.80	9.02	34	10.9	1.77	53.8	0.3	86.1	0.301
10	0.00	23.23	8.52	35	11.1	1.55	53.8	0.3	91.1	0.319
11	0.00	22.78	8.63	34	10.9	1.34	54.1	0.3	91.9	0.322
12	0.00	22.79	8.61	34	11.0	1.49	53.7	0.3	87.3	0.305
13	0.00	22.93	8.82	34	11.0	1.96	53.7	0.3	87.0	0.304
14	0.00	22.95	8.52	34	11.1	1.51	53.6	0.3	87.6	0.306
15	0.00	23.05	8.59	34	10.8	1.54	53.6	0.3	88.2	0.309
16	0.00	22.63	8.62	34	10.8	1.39	54.0	0.3	85.1	0.298
17	0.00	22.63	8.62	34	10.7	1.65	53.7	0.3	85.9	0.301
18	0.00	22.93	8.37	34	10.8	1.55	53.6	0.3	88.4	0.309
19	0.00	22.80	8.43	34	10.8	1.12	53.6	0.3	87.0	0.305
20	0.00	22.96	8.38	34	10.9	1.39	53.9	0.3	85.1	0.298
21	0.00	23.02	8.15	34	10.8	1.64	53.5	0.3	88.9	0.311
22	0.00	23.07	8.02	34	10.8	1.42	53.8	0.3	87.6	0.307
23	0.00	23.08	8.01	34	10.7	1.40	53.7	0.3	85.1	0.298
24	0.00	23.15	7.92	34	10.7	1.55	53.5	0.3	85.0	0.297
25	0.00	22.65	7.91	34	10.8	1.25	53.5	0.3	85.2	0.298
26	0.00	22.42	7.34	33	10.8	0.94	53.8	0.3	84.6	0.296
27	0.00	23.24	7.24	35	10.8	1.67	53.8	0.3	85.6	0.300
28	0.00	23.18	7.04	35	10.8	1.43	53.7	0.3	86.3	0.302
29	0.00	23.25	7.07	35	10.8	1.54	53.4	0.3	86.9	0.304
31	0.00	23.28	6.85	35	10.8	1.85	53.7	0.3	84.5	0.296
32	0.00	23.03	6.69	34	10.8	1.68	53.5	0.3	85.2	0.298
33	0.00	23.18	6.42	35	10.9	1.20	53.6	0.3	85.5	0.299
34	0.00	23.28	6.44	35	10.8	1.54	53.5	0.3	84.1	0.295
35	0.00	23.12	6.11	34	10.8	1.48	53.7	0.3	89.1	0.312
36	0.00	23.15	6.07	34	10.8	1.25	53.4	0.3	86.3	0.302
37	0.00	23.09	6.79	34	10.8	1.32	53.7	0.3	83.9	0.294
38	0.00	23.43	5.96	35	10.8	0.91	53.6	0.3	83.5	0.292
Average		22.94	8.05	34	10.9	1.47	53.7	0.3	86.3	0.302

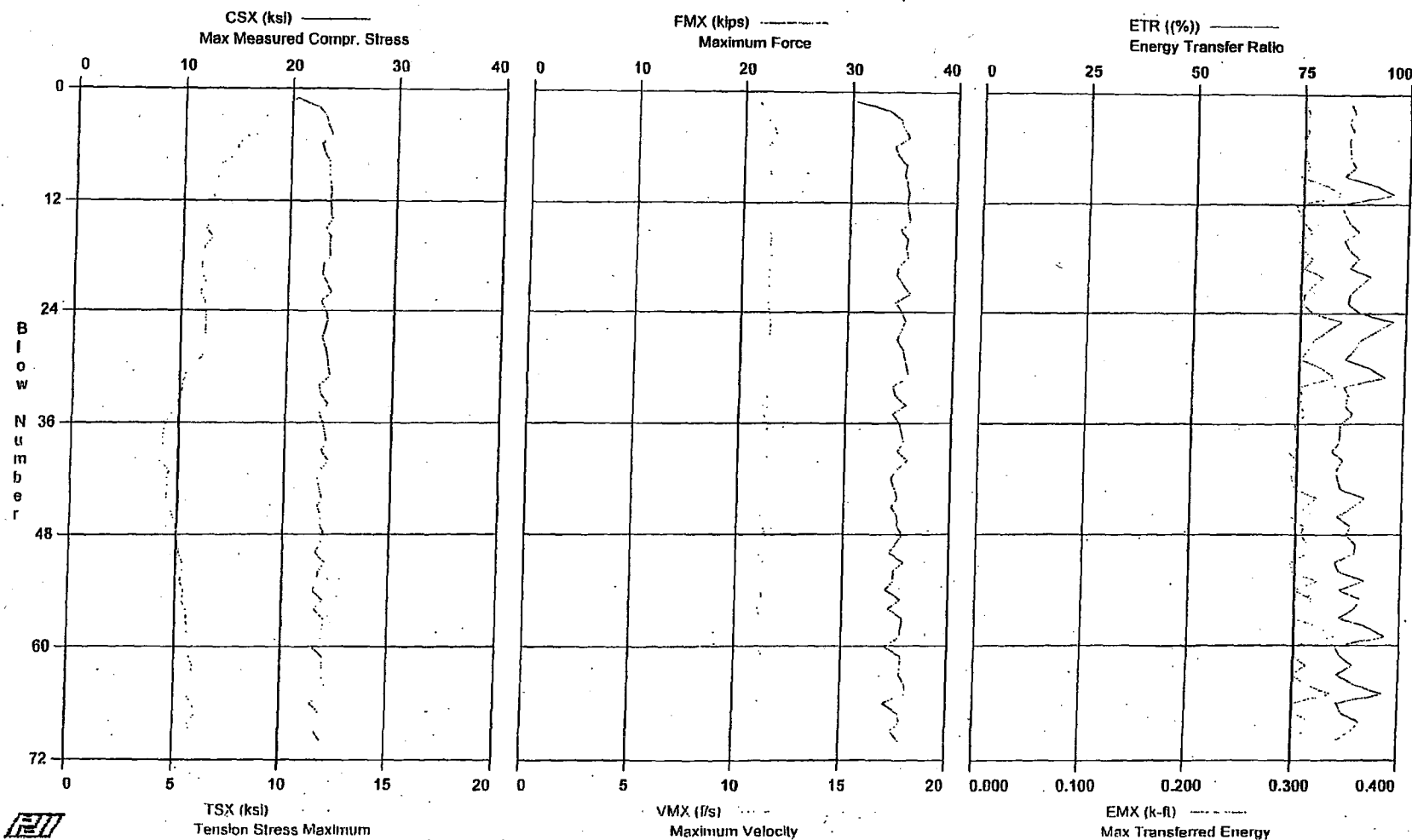
Total number of blows analyzed: 36

Time Summary

Drive 42 seconds

10:31:12 AM - 10:31:54 AM (12/1/2006) BN 1 - 38

STP COL Project - Boring B-409; 180' - 191.5' Sample



STP COL Project - Boring B-408; 190' - 191.5' Sample  
OP: SEK

Rig Serial No. 03 (Gregg 2 CME 55)  
Test date: 1-Dec-2006

AR: 1.49 in^2  
LE: 195.00 ft  
WS: 16,807.9 ffs

SP: 0.492 k/ft3  
EM: 30,000 ksi  
JC: 0.60

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
DFN: Final Displacement

BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	DFN in	BPM **	EFV **	ETR (%)	EMX k-ft
1	0.00	20.36	10.19	30	10.6	1.83	0.0	0.3	86.0	0.301
2	0.00	22.49	9.58	34	11.0	1.56	54.1	0.3	86.9	0.304
3	0.00	23.20	8.71	35	11.1	1.25	54.2	0.3	85.3	0.299
4	0.00	23.41	8.67	35	11.4	0.97	53.7	0.3	86.4	0.303
5	0.00	23.76	7.99	35	11.4	0.86	54.0	0.3	85.6	0.300
6	0.00	22.84	7.50	34	11.0	1.25	53.8	0.3	85.7	0.300
7	0.00	23.09	7.42	34	11.2	1.58	53.6	0.3	85.9	0.301
8	0.00	23.63	6.74	35	11.1	0.83	53.7	0.3	87.1	0.305
9	0.00	23.50	6.68	35	11.2	1.58	53.6	0.3	84.6	0.296
10	0.00	23.67	6.35	35	11.2	1.42	54.0	0.3	92.2	0.323
11	0.00	23.82	6.35	35	11.1	1.54	53.5	0.3	96.4	0.337
12	0.00	23.69	6.40	35	11.3	1.61	53.9	0.3	83.7	0.293
14	0.00	23.92	6.21	36	11.3	1.43	53.8	0.3	86.0	0.301
15	0.00	23.32	6.04	35	11.2	1.40	53.7	0.3	88.3	0.309
16	0.00	23.82	6.33	35	11.3	1.03	53.7	0.3	85.0	0.297
17	0.00	23.70	5.99	35	11.2	1.13	53.7	0.3	86.1	0.301
18	0.00	23.81	5.94	35	11.3	1.10	53.5	0.3	88.5	0.310
19	0.00	23.26	5.90	35	11.3	1.18	53.8	0.3	86.4	0.302
20	0.00	23.15	5.91	34	11.2	1.12	53.5	0.3	91.3	0.320
21	0.00	23.56	6.07	35	11.2	1.49	53.7	0.3	88.9	0.311
22	0.00	24.03	5.84	36	11.4	0.51	53.8	0.3	86.6	0.303
23	0.00	23.08	6.07	34	11.2	1.35	53.7	0.3	86.2	0.302
24	0.00	23.51	6.10	35	11.3	1.27	53.7	0.3	89.0	0.311
25	0.00	23.76	6.14	35	11.4	1.49	53.6	0.3	97.0	0.339
27	0.00	23.24	6.14	35	11.3	1.12	53.8	0.3	89.3	0.313
28	0.00	23.64	6.12	35	11.4	1.12	53.6	0.3	87.9	0.308
29	0.00	23.77	5.97	35	11.4	0.98	53.5	0.3	85.9	0.301
30	0.00	23.87	5.36	36	11.3	1.41	53.8	0.3	92.0	0.322
31	0.00	24.07	5.25	36	11.3	1.58	53.5	0.3	95.4	0.334
32	0.00	23.06	5.11	34	11.3	1.15	53.6	0.3	85.7	0.300
33	0.00	23.21	5.10	35	11.3	1.51	53.6	0.3	86.9	0.304
34	0.00	23.93	4.88	36	11.4	1.39	53.6	0.3	86.1	0.301
35	0.00	23.12	4.62	34	11.2	1.60	53.5	0.3	86.0	0.308
36	0.00	23.54	4.38	35	11.4	0.85	53.5	0.3	85.2	0.298
38	0.00	23.82	4.22	35	11.2	0.96	53.6	0.3	84.9	0.297
39	0.00	23.45	4.42	35	11.3	1.36	53.7	0.3	83.3	0.292
40	0.00	24.09	4.07	36	11.4	1.28	53.3	0.3	86.0	0.301
41	0.00	23.41	4.59	35	11.4	1.62	53.7	0.3	84.4	0.295
42	0.00	23.10	4.49	34	11.2	1.27	53.8	0.3	84.6	0.296
43	0.00	23.29	4.51	35	11.2	1.73	53.6	0.3	85.4	0.299
44	0.00	23.48	4.46	35	11.2	1.25	53.6	0.3	91.2	0.319
45	0.00	23.16	4.61	35	11.1	1.46	53.7	0.3	88.2	0.309
46	0.00	23.47	4.78	35	11.1	1.13	53.5	0.3	84.7	0.296
47	0.00	23.51	4.95	35	11.2	1.27	53.6	0.3	88.0	0.308
48	0.00	23.83	5.04	36	11.4	1.22	53.6	0.3	87.0	0.305
49	0.00	23.45	5.10	35	11.2	1.34	53.6	0.3	89.1	0.312
50	0.00	23.06	5.13	34	11.1	1.37	53.6	0.3	89.1	0.312
51	0.00	23.96	5.29	36	11.3	1.15	53.6	0.3	84.4	0.296
52	0.00	23.31	5.27	35	11.2	1.22	53.6	0.3	85.2	0.298
53	0.00	23.35	5.21	35	11.2	1.22	53.5	0.3	91.7	0.321
54	0.00	22.86	5.38	34	11.2	1.60	53.7	0.3	85.6	0.300
55	0.00	23.82	5.30	35	11.3	1.60	53.5	0.3	90.7	0.317
56	0.00	23.08	5.49	34	11.0	1.51	53.5	0.3	89.4	0.313
57	0.00	23.96	5.50	36	11.2	1.50	53.7	0.3	85.6	0.300
58	0.00	23.88	5.52	36	11.2	1.22	53.4	0.3	92.8	0.325
59	0.00	23.85	5.59	36	11.3	1.59	53.7	0.3	96.6	0.338
60	0.00	22.84	5.90	34	11.2	1.20	53.5	0.3	84.7	0.296
61	0.00	23.89	5.66	36	11.3	1.51	53.5	0.3	85.8	0.300
62	0.00	23.93	5.84	36	11.3	1.74	53.4	0.3	89.1	0.312
63	0.00	23.84	5.74	36	11.3	1.02	53.8	0.3	85.3	0.299
64	0.00	24.20	5.55	36	11.3	1.16	53.3	0.3	89.4	0.313
65	0.00	24.26	5.55	36	11.3	1.36	53.7	0.3	96.3	0.337
66	0.00	22.83	5.83	34	11.2	1.37	53.5	0.3	85.4	0.299
67	0.00	23.81	6.04	35	11.3	1.64	53.6	0.3	86.7	0.303
68	0.00	23.92	5.66	36	11.3	1.49	53.8	0.3	91.0	0.318

STP COL Project - Boring B-409; 190' - 191.5' Sample  
OP: SEK

Rig Serial No. 03 (Gregg 2 CME 55)  
Test date: 1-Dec-2006

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	DFN in	BPM **	EFV **	ETR (%)	EMX k-ft
69	0.00	23.39	6.74	35	11.1	1.30	53.6	0.3	89.2	0.312
70	0.00	23.99	6.78	36	11.3	1.32	53.5	0.3	85.4	0.299
Average		23.49	6.82	35	11.2	1.32	53.6	0.3	87.8	0.307

Total number of blows analyzed: 67

Time Summary

Drive 1 minute 17 seconds

2:14:59 PM - 2:16:16 PM (12/1/2006) BN 1 - 70



engineering and constructing a better tomorrow

February 22, 2007  
Revised: April 27, 2007

Memorandum to: File DCN STP129, STP129 Rev. 1, and STP737  
From: Steve Kiser SK 4-27-07  
Reviewed By: Kathryn White KAW 4/27/07

Subject: Report of SPT Energy - Lewis Environmental Mobile B57 and Mobile B61 Rigs (Hammer Serial No. 216265-45) Automatic Hammer, Revision No. 1  
WORK INSTRUCTION DCN STP129, STP129 Rev. 1, and STP737  
South Texas Project (STP) COL Site  
Wadsworth, Texas  
MACTEC Project No. 5050-06-0496

Mr. Steve Kiser of MACTEC Engineering and Consulting Inc. (MACTEC), performed energy measurements on the drill rigs at the subject site per the referenced Work Instructions. This memorandum summarizes the field testing activities and presents the results of the energy measurements.

SPT Energy Field Measurements

SPT energy measurements were made on the subject hammer while operating at the STP COL Site as indicated in Table 1 below.

Table 1: Summary of SPT Testing Information

Test Date	Test Time	Boring No.	Weather	Drill Rig
11/28/2006	4:05 to 5:20 PM	B-324	Sunny, 72° Fahrenheit	Mobile B-57 ATV
11/29/2006	8:00 to 8:35 AM	B-324	Sunny, 68° Fahrenheit	Mobile B-57 ATV
12/13/2006	2:15 to 3:20 PM	B-906	Sunny, Clear, 70° Fahrenheit	Mobile B-57 ATV
1/3/2007	1:55 to 3:10 PM	B-907	Cloudy, Cool, 50° Fahrenheit	Mobile B-61 Truck

Prepared By: SK Date: 4-27-07  
Checked By: KAW Date: 4/27/07

The borings were drilled with personnel and equipment from Lewis Environmental. The hammer was operated from a winch line and was not permanently attached to the drill rig. The energy of the SPT system with the automatic hammer was initially tested during drilling of Boring B-324. Following repairs to the lifting chain contained within the hammer housing on December 8, 2006, energy measurements were again performed during drilling of Boring B-906 to determine if significant changes in SPT energy resulted from the repairs. Since the Mobile B-57 ATV rig was limited as to the maximum depth it could drill, the hammer was removed from the Mobile B-57 ATV rig on December 16, 2006, and placed on the Mobile B-61 truck rig on December 17, 2006 so that deeper borings could be drilled. Therefore, energy testing was again performed on the SPT system to determine if the switched drill rig changed the energy of the hammer.

The drilling tools consisted of NW-J-sized drilling rods and a 2-foot long split tube sampler. Mud rotary drilling techniques were used to advance the boring below the depth at which

groundwater was encountered at the time of energy testing. The drill rig operator during sampling was Mr. Dany Gonzalez. Energy measurements were recorded during sampling at the depth intervals shown in Table 2.

The energy measurements were performed with a Pile Driving Analyzer (PDA) model PAK (Serial No. 1430), and calibrated accelerometers (Serial Nos. P5953 and P5094) and strain gages (Serial Nos. NW #146/1 and NW#146/2). An NW-sized steel drill rod, 2 feet long and instrumented with dedicated strain gages, was inserted at the top of the drill rod string immediately below the SPT hammer. The inserted rod was also instrumented with two piezoresistive accelerometers that were bolted to the outside of the rod. The instrumented rod insert had a cross-sectional area of approximately 1.49 square inches and an outside diameter of approximately 2.625 inches at the gage location. The drill rods included in the drill rod string were hollow rods in 5 to 10-foot long sections, with an outside and inside diameter of approximately 2.625 and 2.25 inches, respectively. The recommended operation rate of the hammer is not known. Due to the closed hammer system, the hammer lubrication condition and anvil dimensions could not be observed.

#### Calibration Records

Calibration records were provided to Bechtel on January 9, 2007. The calibration records for all the above are filed in DCN STP850.

#### Calculations for EFV

The work was done in general accordance with ASTM D 4633-05. The strain and acceleration signals were converted to force and velocity by the PDA, and the data was interpreted by the PDA according to the Case Method equation. The maximum energy transmitted to the drill rod string (as measured at the location of the strain gages and accelerometers) was calculated by the PDA using the EFV method equation, as shown below:

$$EFV = \int R(t) * V(t) * dt$$

Where: EFV = Transferred energy (EFV equation), or Energy of FV

R(t) = Calculated force at time t

V(t) = Calculated velocity at time t

The EFV method of energy calculation is recommended in ASTM Standard D4633-05. The EFV equation, integrated over the complete wave event, measures the total energy content of the event using both force and velocity measurements. The EFV values associated with each blow analyzed are tabulated in the attached PDILOT tables and are also shown graphically in the PDILOT charts.

#### Calculations for ETR

The ratio of the measured transferred energy (EFV) to the theoretical potential energy of the SPT system (140 lb weight with the specified 30-inch fall) is the ETR. The ETR values (as percent of the theoretical value) are shown in Table 1.



### Comparison of ETR to Typical Energy Transfer Ratio Range

Based on a research report published by the Florida Department of Transportation (FDOT) (Report WPI No. 0510859, 1999), the average ETR measured for automatic hammers is 79.6%. The standard deviation was 7.9%; therefore, the range of ETRs within one standard deviation of the average was reported to be 71.7% to 87.5%. This range of ETRs was also consistent with other research that was cited in the FDOT research paper; however, maximum ETR values of up to 98% were reported in the literature. The ETR values shown in Table 1 are within the range of typical values for automatic hammers as reported in the literature.

### Discussion

Based on the field testing results, observations from the SPT energy measurements are summarized below:

- The data obtained by the PDA are relatively consistent between individual hammer blows and between the sample depths tested. In general, the first and last one (and sometimes two) hammer blow records recorded by the PDA produced poor quality data (which is relatively common) and, as such, the records were not used in the data reduction. In addition, an occasional blow during the course of sampling produced data records that were not in the data reduction. In these instances, the hammer impacted the drill rod string eccentrically and the PDA data between individual gages was not proportional; as such, the hammer blows were removed from the analysis.
- The average energy transferred from the hammer to the drill rods for each individual depth interval using the EFV method ranged from 292 foot-pounds and 376 foot-pounds. These average energy transfers correspond to energy transfer ratios (ETR) of 83% to 107% of the theoretical energy (350 foot-pounds) of the SPT hammer.
- The average at each depth interval was calculated as the transferred energy for each analyzed blow of the depth intervals divided by the total number of hammer blows analyzed. The overall average energy transfer of the SPT system (for all the depth intervals tested) was 330.9 foot-pounds, with an average ETR of 94.5%.

Attachments: Page 4-5 Table 2 - Summary of SPT Energy Measurements - 2 Pages  
Pages 6-8 Work Instructions - DCN SPT129, STP129, Rev. 1,  
and STP737 - 3 Pages  
Pages 9-11 Record of SPT Energy Measurement - 3 Pages  
Pages 12 - 40 PDIPLOT Output - 29 Pages

**TABLE 2**  
**SUMMARY OF SPT ENERGY MEASUREMENTS (ASTM D4633-05)**  
 South Texas Project (STP) COL Site  
 Wadsworth, Texas  
 MACTEC Project No. 5050-06-0496

Rig Serial No.	Rig Owner	Rig Operator	Boring No. Tested	Date Tested	Sample Depth (feet)	SPT Blow Count (blows per six inches)	No. of Blows Analyzed	Average Measured Energy (Average EFV) (ft-lbs) <sup>a</sup>	Energy Transfer Ratio (%) <sup>b</sup> (Average ETR)
216265-45 (Mobile B-57 ATV)	Lewis Environmental	Danny Gonzalez	B-324	11/28/06 and 11/29/06	33.5 - 35.0	7 - 7 - 13	27	328	93.7%
					38.5 - 40.0	13 - 30 - 35	68	359	102.6%
					48.5 - 50.0	3 - 3 - 6	11	376	107.4%
					53.5 - 55.0	4 - 3 - 6	14	344	98.3%
					58.5 - 60.0	6 - 6 - 9	21	316	90.3%
<b>Average for Rig:</b>								<b>346.5</b>	<b>99.0%</b>
216265-45 (Mobile B-57 ATV)	Lewis Environmental	Danny Gonzalez	B-906	12/13/2006	28.5 - 30.0	6 - 5 - 5	16	300	85.7%
					33.5 - 35.0	2 - 3 - 3	8	292	83.4%
					38.5 - 40.0	13 - 14 - 18	45	306	87.4%
					43.5 - 45.0	4 - 5 - 7	16	302	86.3%
					48.5 - 50.0	2 - 3 - 5	9	310	88.6%
<b>Average for Rig:</b>								<b>303.5</b>	<b>86.7%</b>

**TABLE 2**  
**SUMMARY OF SPT ENERGY MEASUREMENTS (ASTM D4633-05)**  
 South Texas Project (STP) COL Site  
 Wadsworth, Texas  
 MACTEC Project No. 5050-06-0496

Rig Serial No.	Rig Owner	Rig Operator	Boring No. Tested	Date Tested	Sample Depth (feet)	SPT Blow Count (blows per six inches)	No. of Blows Analyzed	Average Measured Energy (Average EFV) (ft-lbs) <sup>a</sup>	Energy Transfer Ratio (%) <sup>b</sup> (Average ETR)
216265-45 (Mobile B-61 ATV)	Lewis Environmental	Danny Gonzalez	B-907	1/3/2007	88.5 - 90.0	6 - 7 - 13	24	342	97.7%
					93.5 - 95.0	5 - 6 - 9	19	329	94.0%
					98.5 - 100.0	5 - 6 - 8	19	338	96.6%
<b>Average for Rig:</b>								<b>336.8</b>	<b>96.2%</b>
<b>TOTAL AVERAGE FOR RIG:</b>								<b>330.9</b>	<b>94.5%</b>

<sup>a</sup>Measured Energy is energy based on the EFV method, as outlined in ASTM D4633-05, for each blow recorded by the PDA. In some cases, the initial and final one to two blows produced poor quality data, and were not used to calculate the Average Measured Energy.

ETR = EMX \* 1000 lbs/kip

<sup>b</sup>Energy Transfer Ratio is the Measured Energy divided by the theoretical SPT energy of 350 foot-pounds (140 pound hammer falling 2.5 feet). The average ETR values may differ slightly and insignificantly from those in the PDILOT tables due to roundoff.

Prepared By: <i>AW</i>	Date: 2-22-07	Checked By: <i>Jathryn A. White</i>	Date: 2/22/07
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**Work Instruction SPT-ENERGY #216265-45**

South Texas COL Project  
MACTEC Engineering and Consulting, Inc.

Issued To: Steve Kiser  
Location: STP Field Office Date: November 16, 2006  
Issued By: Jay Cerceo, Site Coordinator MACTEC Project No.: 5050-06-0496  
Valid Thru: 11/16/2006 To 11/16/2007 Rev. No. 0

**Task Description:** Perform SPT Energy measurements of drill rigs at the South Texas COL Project.

**Applicable Technical Procedures or Plans, or other reference:** ASTM (D4633), South Texas COL Geotechnical Work Plan Attachment 3, Bechtel's Engineering Specification for Subsurface Investigation and Laboratory Testing for South Texas Project Units 3 & 4 (Specification).

**Specific Instructions** (note attachments where necessary): Follow guidelines in South Texas COL Work Plan, Attachment 3. Energy measurements to be performed on drill rigs while performing SPT sampling. Obtain energy measurements with the PDA at depth intervals in the range of 15 to 75 feet below the ground surface in general accordance with ASTM D4633-05. Perform energy measurement for SPT automatic hammer number #216265-45.

**Special Instructions:** Complete all field forms in ink.

**Report Format:** Completed Field Forms As Follows: Daily Field Report, Record of SPT Energy Measurement and PDILOT output data, Photographs (rig and equipment setup, energy measurement equipment).

**Specific Quality Assurance Procedures Applicable:** None

**Hold Points or Witness Points:** None

**Records:** All records generated shall be considered QA Records.

Reviewed and Approved By: (Note: Only one signature is required to issue)

Project Manager (MACTEC): \_\_\_\_\_ Date: \_\_\_\_\_  
Project Principal (MACTEC): \_\_\_\_\_ Date: \_\_\_\_\_  
Site Coordinator (MACTEC): [Signature] Date: 11/16/06

No. of Pages: 1

DCN: STP129

C:\06-0496 STP COL\Work Instructions\work instructions for SPT Energy #216265-45 Louis Environmental - Mobile B-57.doc

**Work Instructions – SPT Energy #216265-45**  
South Texas COL Project  
MACTEC Engineering and Consulting, Inc.

Issued To: Steve Kiser  
Location: STP COL Project Field Office \_\_\_\_\_ Date: December 13, 2006 \_\_\_\_\_  
Issued By: Jay Cerceo, Site Coordinator \_\_\_\_\_ MACTEC Project No.: 5050-06-0496  
Valid From: December 13, 2006 \_\_\_\_\_ To: December 13, 2007 \_\_\_\_\_ Rev. 1 \_\_\_\_\_

**Task Description:** Measurement of energy transferred to the drill string rods from a Standard Penetration Test (SPT) automatic hammer mounted on a drill rig. Testing will be performed using a Pile Driving Analyzer (PDA) model PAK at various depth intervals from approximately 15 to 100 feet below the ground surface for each rig drilling SPT borings at the South Texas COL Project.

**Applicable Technical Procedures or Plans, or other reference:** ASTM D4633-05 Standard Test Method for Energy Measurement for Dynamic Penetrometers.

**Specific Instructions** (note attachments where necessary): Obtain energy measurements with the PDA at depth intervals in the range of about 15 to 75 feet below the ground surface in general accordance with ASTM D4633-05. Perform energy measurement testing for Mobil B-57 Automatic Hammer #216265-45.

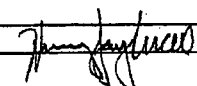
**Report Format:** Written report documenting results of field testing in general accordance with ASTM D4633-05, to include completed in ink Summary of Daily Observations and Testing, Photographs of the setup, Record of SPT Energy Measurement sheet(s), and PDILOT output data.

**Specific Quality Assurance Procedures Applicable:** \_\_\_\_\_ None \_\_\_\_\_

Hold Points or Witness Points: None

Records: All records generated shall be considered QA Records.

Reviewed and Approved By (Note: Only One Signature is Required to Issue):

Project Manager (MACTEC): _____	Date: _____
Project Principal (MACTEC): _____	Date: _____
Site Coordinator (MACTEC): 	Date: 12-13-06
No. of Pages: 1	DCN: STP129

Work Instruction SPT-Energy #216265-45  
STP COL Site  
MACTEC Engineering and Consulting, Inc.

Issued To: Steve Kiser  
Location: STP COL Field Office Date: January 3, 2007  
Issued By: Lorri Johnson, Site Coordinator MACTEC Project No.: 5050-06-0496  
Valid Thru: 1/3/2007 To 12/18/2007 Rev. No. 0

**Task Description:** Perform SPT Energy measurements of drill rigs at the South Texas COL Project.

**Applicable Technical Procedures or Plans, or other reference:** ASTM (D4633), South Texas COL Geotechnical Work Plan Attachment 3, Bechtel Specification for Subsurface

**Specific Instructions:** Follow guidelines in Work Plan, Attachment 3. Energy measurements to be performed on drill rigs while performing SPT sampling. Obtain energy measurements with the PDA at depth intervals in the range of 15 feet to 160 feet below ground surface in general accordance with ASTM D4633-05. Perform energy measurement for SPT automatic hammer number 216265-45. The hammer number is stamped on the hammer.

**Special Instructions:** Complete all field forms in ink.

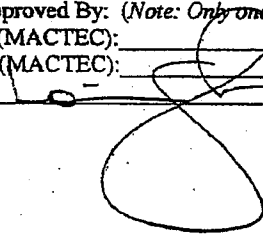
**Report Format:** Completed field forms as follows: Daily Field Report, Record of SPT Energy Measurement and PDILOT output data, Photographs (rig and equipment setup, energy measurement equipment).

**Specific Quality Assurance Procedures Applicable:** None

**Hold Points or Witness Points:** Calibration record of energy measurement equipment on file.

**Records:** All records generated shall be considered OA Records.

Reviewed and Approved By: *(Note: Only one signature is required to issue)*

Project Manager (MACTEC): \_\_\_\_\_ Date: \_\_\_\_\_  
Project Principal (MACTEC): \_\_\_\_\_ Date: \_\_\_\_\_  
Site Coordinator:  \_\_\_\_\_ Date: 1-3-07

No. of Pages: 1

DCN STP

STP737



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### RECORD OF SPT ENERGY MEASUREMENT

GENERAL INFORMATION		DRILL RIG DATA	
PROJECT:	South Texas Project	MAKE:	MOBILE
LOCATION:	Wadsworth, Texas	MODEL:	B-57 ATV
PROJECT NO.:	5050-06-0496	SERIAL NO.:	216265-45
DATE:	11-28-06 / 11-29-06	HAMMER TYPE:	AUTOMATIC (LINE)
WEATHER:	SUNNY-WARM 72° / SUNNY 68°	ROPE CONDITION:	N/A
INSPECTOR:	Steve Kiser	ROD SIZE:	NW-5
DRILLING COMPANY:	LEWIS ENVIRONMENTAL	NO. OF SHEAVES:	N/A

BORING DATA			
BORING NUMBER:	B-324		
DEPTH DRILLED:	100' PLANNED		
TIME DRIVEN:	4:10 PM		
RIG OPERATOR:	DANNY GONZALEZ		
HAMMER OPERATOR:	N.R.		
PDA PAK SERIAL NO.:	1430	1430	1430
INSTR. ROD AREA:	1.49 in <sup>2</sup>		
ACCEL. SERIAL NOS.:	5094 / 5953		
STRAIN SERIAL NOS.:	146 NW 1/2		

SAMPLE DEPTH (feet)	SPT N-VALUE (bpf)	DEPTH cont. (feet)	SPT N-VALUE (bpf)	SAMPLE DEPTH (feet)	SPT N-VALUE (bpf)	DEPTH cont. (feet)	SPT N-VALUE (bpf)	SAMPLE DEPTH (feet)	SPT N-VALUE (bpf)	DEPTH cont. (feet)	SPT N-VALUE (bpf)
33.5/35	7-7-13										
38.5/40	15-30-35										
43.5/45	4-3-5										
48.5/50	3-3-6										
53.5/55	4-3-6										
58.5/60	6-6-9										
REMARKS:											

↓  
11-29-06



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## RECORD OF SPT ENERGY MEASUREMENT

GENERAL INFORMATION		DRILL RIG DATA	
PROJECT:	South Texas Project	MAKE:	MOBILE
LOCATION:	Wadsworth, Texas	MODEL:	657 ATV
PROJECT NO.:	5050-06-0496	SERIAL NO.:	216255 Re 216265-45
DATE:	12-13-06	HAMMER TYPE:	AUTOMATIC - LINE
WEATHER:	SUNNY-CLEAR 70°	ROPE CONDITION:	N/A
INSPECTOR:	Steve Kiser	ROD SIZE:	NW-J
DRILLING COMPANY:	LEWIS ENVIRONMENTAL	NO. OF SHEAVES:	N/A

BORING DATA			
BORING NUMBER:	B-906		
DEPTH DRILLED:	100'		
TIME DRIVEN:	2:30 PM		
RIG OPERATOR:	DANNY GONZALEZ		
HAMMER OPERATOR:	N.R.		
PDA PAK SERIAL NO.:	1430	1430	1430
INSTR. ROD AREA:	1.44 in <sup>2</sup>		
ACCEL. SERIAL NOS.:	P5953 / P5994		
STRAIN SERIAL NOS.:	146 NW 1/2		

SAMPLE DEPTH (feet)	SPT N-VALUE (bpf)	DEPTH cont. (feet)	SPT N-VALUE (bpf)	SAMPLE DEPTH (feet)	SPT N-VALUE (bpf)	DEPTH cont. (feet)	SPT N-VALUE (bpf)	SAMPLE DEPTH (feet)	SPT N-VALUE (bpf)	DEPTH cont. (feet)	SPT N-VALUE (bpf)
28.5/30	6-5-5										
33.5/35	2-3-3										
38.5/40	13-14-18										
43.5/45	4-5-7										
48.5/50	2-3-5										

REMARKS: ORIGINAL HAMMER BROKE ON 12-9-06; LIFTING CHAIN WAS REPLACED BETWEEN 12-9 AND 12-13-06





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## RECORD OF SPT ENERGY MEASUREMENT

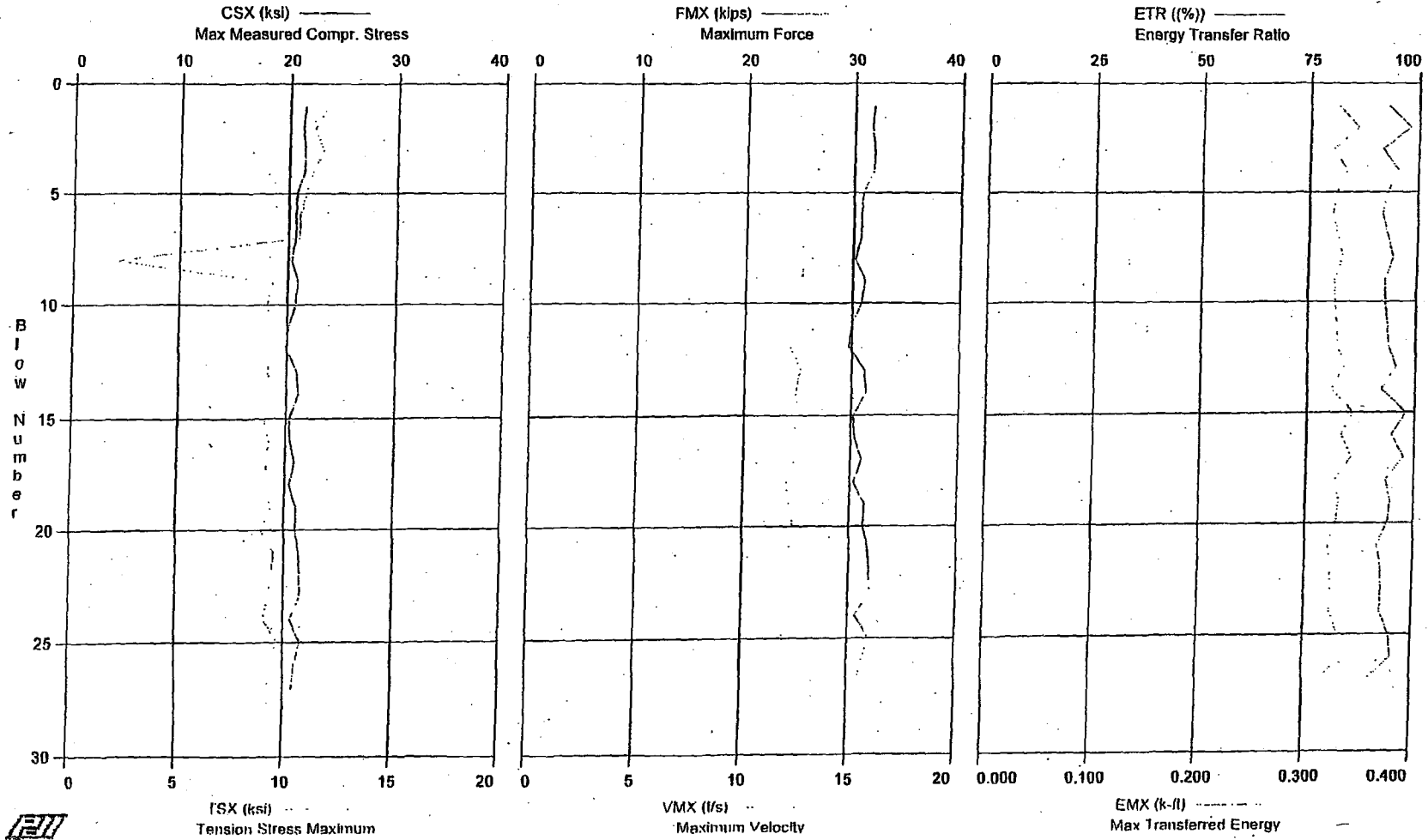
GENERAL INFORMATION		DRILL RIG DATA	
PROJECT:	South Texas Project	MAKE:	MOBILE
LOCATION:	Wadsworth, Texas	MODEL:	B-61 TRUCK
PROJECT NO.:	5050-06-0496	SERIAL NO.:	216265-45
DATE:	1-3-07	HAMMER TYPE:	AUTOMATIC
WEATHER:	CLOUDY COOL 50°	ROPE CONDITION:	N/A
INSPECTOR:	Steve Kiser	ROD SIZE:	NW-J
DRILLING COMPANY:	LEWIS ENV.	NO. OF SHEAVES:	N/A

BORING DATA			
BORING NUMBER:	S-907		
DEPTH DRILLED:	100' PLANNED		
TIME DRIVEN:	145 PM		
RIG OPERATOR:	DANNY GONZALEZ		
HAMMER OPERATOR:	N.R.		
PDA PAK SERIAL NO.:	1430	1430	1430
INSTR. ROD AREA:	1.49 in <sup>2</sup>		
ACCEL. SERIAL NOS.:	PS094 / PS953		
STRAIN SERIAL NOS.:	146 NEW 1/2		

SAMPLE DEPTH (feet)	SPT N-VALUE (blf)	DEPTH cont. (feet)	SPT N-VALUE (blf)	SAMPLE DEPTH (feet)	SPT N-VALUE (blf)	DEPTH cont. (feet)	SPT N-VALUE (blf)	SAMPLE DEPTH (feet)	SPT N-VALUE (blf)	DEPTH cont. (feet)	SPT N-VALUE (blf)
29.5/90	6-7-13										
43.5/95	5-6-9										
98.5/100	5-6-8										

REMARKS:

STP COL Project - Boring B-324; 33.5' - 35' Sample



STP COL Project - Boring B-324; 33.5' - 35' Sample  
OP: SEK

Rlg Serial No. 216285-45 (Lewis Mobile B-57)  
Test date: 26-Nov-2006

AR: 1.49 m<sup>2</sup> SP: 0.492 k/ft<sup>2</sup>  
LE: 39.00 ft EM: 30,000 ksi  
WS: 16,807.9 f/s JC: 0.60

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
DFN: Final Displacement  
BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	DFN in	BPM **	EFV **	ETR (%)	EMX k-ft
1	0.00	21.32	11.69	32	13.7	2.10	0.0	0.3	92.9	0.325
2	0.00	21.19	11.11	32	13.3	1.68	34.9	0.3	98.0	0.343
3	0.00	21.37	11.51	32	13.5	1.44	35.3	0.3	91.7	0.321
4	0.00	21.35	11.04	32	13.2	1.76	34.8	0.3	95.4	0.334
5	0.00	20.70	10.77	31	13.1	1.80	35.5	0.3	92.9	0.325
6	0.00	20.58	10.48	31	12.7	2.14	35.9	0.3	91.8	0.321
7	0.00	20.58	10.46	31	12.5	2.20	35.6	0.3	93.1	0.326
8	0.00	20.25	1.98	30	12.7	1.31	0.0	0.3	94.4	0.331
9	0.00	20.89	9.29	31	12.6	1.27	35.9	0.3	92.7	0.324
10	0.00	20.68	9.04	31	12.7	1.71	35.3	0.3	92.9	0.325
11	0.00	20.09	9.26	30	12.3	1.66	35.7	0.3	93.4	0.327
12	0.00	19.94	9.32	30	12.1	1.59	35.7	0.3	93.7	0.328
13	0.00	20.91	9.09	31	12.6	1.40	35.5	0.3	95.5	0.334
14	0.00	21.04	9.49	31	12.4	1.45	35.6	0.3	92.1	0.322
15	0.00	20.27	8.98	30	12.6	1.85	0.0	0.3	98.0	0.343
16	0.00	20.34	9.21	30	12.3	1.42	35.7	0.3	94.7	0.332
17	0.00	20.82	9.16	31	12.4	1.22	35.5	0.3	97.6	0.342
18	0.00	20.34	9.03	30	12.0	1.56	36.1	0.3	93.5	0.327
19	0.00	21.07	9.39	31	12.2	1.14	35.4	0.3	94.6	0.331
20	0.00	21.01	8.92	31	12.4	2.02	35.9	0.3	94.1	0.329
21	0.00	21.30	9.51	32	12.2	1.27	36.2	0.3	91.7	0.321
22	0.00	21.41	9.40	32	12.1	1.18	35.9	0.3	92.5	0.324
23	0.00	21.46	9.27	32	12.1	1.09	36.3	0.3	92.7	0.324
24	0.00	20.58	9.05	31	11.5	0.99	36.1	0.3	92.6	0.324
25	0.00	21.50	9.74	32	12.0	1.32	35.7	0.3	94.8	0.332
26	0.00	21.02	9.02	31	11.6	1.45	35.9	0.3	95.4	0.334
27	0.00	20.73	9.31	31	11.3	1.43	36.0	0.3	89.5	0.313
Average		20.84	9.43	31	12.4	1.54	35.7	0.3	93.8	0.328

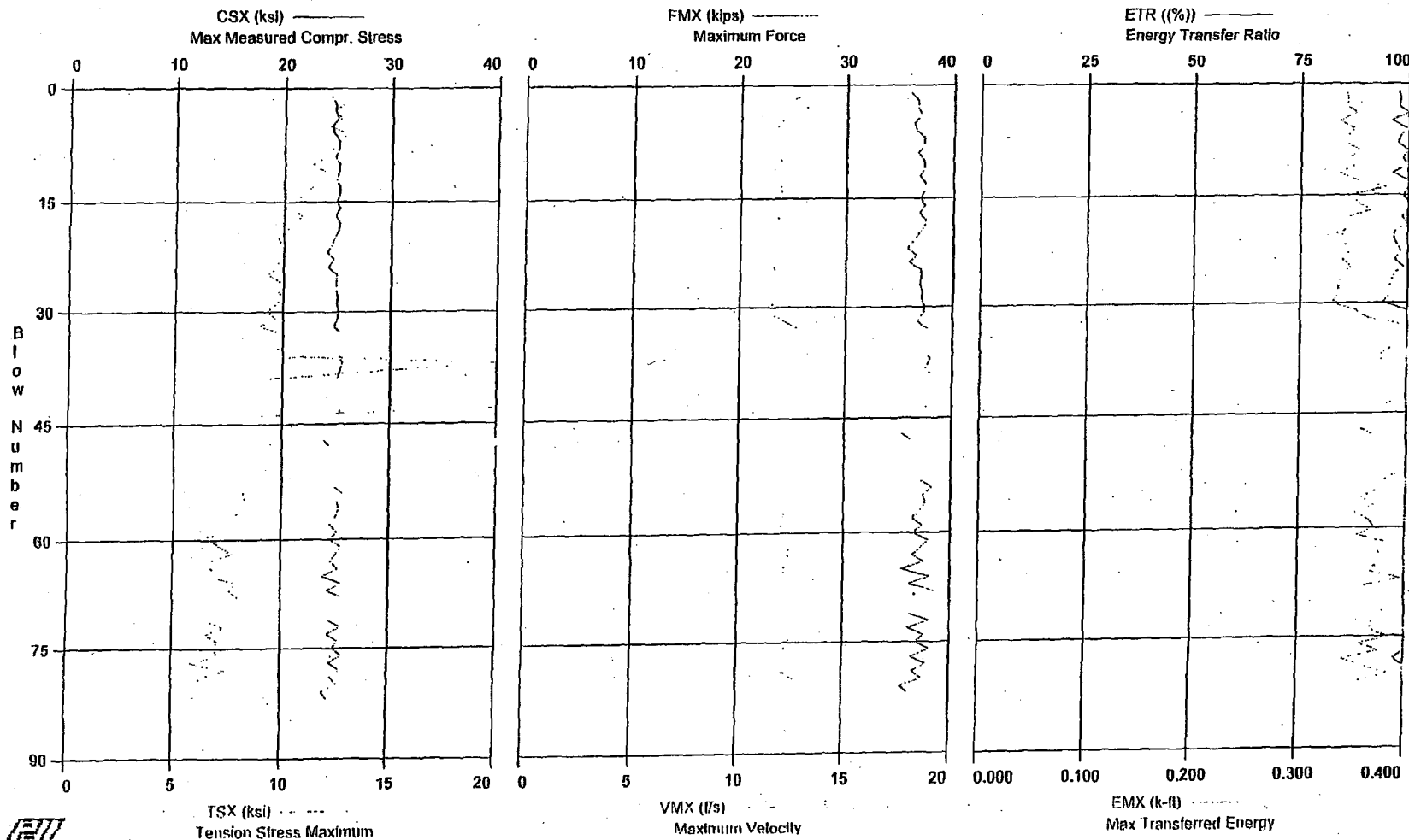
Total number of blows analyzed: 27

Time Summary

Drive 58 seconds

4:05:18 PM - 4:06:16 PM (11/28/2006) BN 1 - 27

STP COL Project - Boring B-324; 38.5' - 40' Sample



STP COL Project - Boring B-324; 38.5' - 40' Sample  
OP: SEK

Rig Serial No. 216265-45 (Lewis Mobile B-57)  
Test date: 28-Nov-2006

AR: 1.48 in<sup>2</sup>  
LE: 44.00 ft  
WS: 16,807.9 f/s

SP: 0.492 k/#3  
EM: 30,000 ksi  
JC: 0.60

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
DFN: Final Displacement

BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	DFN in	BPM **	EFV **	ETR (%)	EMX k-ft
1	0.00	24.15	13.14	36	13.0	1.22	0.0	0.3	97.6	0.341
2	0.00	24.59	12.79	37	12.4	1.53	39.7	0.3	98.0	0.343
3	0.00	24.59	12.21	37	12.4	0.98	40.0	0.3	97.6	0.342
4	0.00	24.79	12.57	37	12.2	1.50	39.6	0.4	100.4	0.351
5	0.00	24.34	12.03	36	11.8	1.29	40.0	0.3	95.8	0.335
6	0.00	24.48	12.79	36	11.6	1.13	40.1	0.3	99.3	0.348
7	0.00	24.99	12.63	37	11.9	1.19	39.7	0.3	98.1	0.343
8	0.00	24.97	12.12	37	12.0	1.10	40.3	0.3	97.3	0.341
9	0.00	24.59	11.88	37	11.7	1.50	40.2	0.4	101.1	0.354
10	0.00	25.02	11.21	37	11.9	1.49	39.5	0.3	98.6	0.345
11	0.00	24.98	11.83	37	11.8	1.38	40.1	0.4	99.9	0.350
12	0.00	24.73	11.68	37	11.9	1.11	40.1	0.3	96.1	0.336
13	0.00	25.09	11.25	37	11.9	1.62	39.7	0.4	100.2	0.351
14	0.00	25.00	10.70	37	11.9	2.04	40.3	0.4	108.3	0.379
15	0.00	24.75	10.62	37	11.9	2.18	40.3	0.3	98.7	0.345
16	0.00	25.04	10.36	37	11.9	1.18	38.7	0.4	100.1	0.351
17	0.00	24.69	10.76	37	11.7	1.61	0.0	0.4	104.3	0.365
18	0.00	25.12	10.46	37	11.8	1.77	44.5	0.3	98.7	0.345
19	0.00	25.03	10.03	37	11.8	0.68	43.6	0.3	99.7	0.349
20	0.00	24.67	9.71	37	11.7	1.07	44.2	0.3	97.0	0.339
21	0.00	24.37	9.84	36	11.5	1.58	44.3	0.3	96.7	0.339
22	0.00	23.96	9.63	36	11.5	1.24	43.4	0.3	97.6	0.342
23	0.00	24.55	9.63	37	11.6	1.40	43.9	0.3	98.2	0.344
24	0.00	24.09	9.79	36	11.5	1.04	44.1	0.3	97.0	0.339
25	0.00	24.85	9.21	37	11.7	1.54	43.6	0.3	99.1	0.347
26	0.00	24.81	9.79	37	11.6	1.24	44.6	0.3	96.9	0.339
27	0.00	24.77	9.61	37	11.5	1.88	44.5	0.3	96.1	0.336
28	0.00	24.95	9.92	37	11.4	0.37	44.1	0.3	95.7	0.335
29	0.00	24.91	9.66	37	11.5	1.10	44.4	0.3	95.6	0.335
30	0.00	25.07	9.22	37	11.5	1.00	44.3	0.3	94.1	0.329
31	0.00	24.99	9.61	37	11.6	1.96	43.9	0.4	100.3	0.351
32	0.00	24.64	8.91	37	12.1	1.24	44.6	0.4	103.4	0.362
33	0.00	25.31	8.90	38	12.8	1.71	44.5	0.4	112.2	0.393
36	0.00	25.11	9.63	37	13.5	2.95	44.5	0.4	110.2	0.386
37	0.00	25.46	29.46	38	13.3	-19.50	43.9	0.4	107.6	0.376
39	0.00	25.03	9.32	37	12.9	2.76	44.8	0.4	107.1	0.375
43	0.00	25.32	29.66	38	12.9	5.64	43.7	0.4	111.8	0.391
44	0.00	25.17	8.63	37	12.9	3.07	44.4	0.4	108.3	0.379
47	0.00	23.71	29.70	35	12.3	-23.63	0.0	0.4	101.8	0.356
48	0.00	24.35	29.71	36	12.0	-3.50	45.5	0.4	105.8	0.370
53	0.00	24.85	8.28	37	12.6	3.33	46.3	0.4	111.9	0.392
54	0.00	25.68	8.18	38	12.5	2.62	48.0	0.4	107.6	0.377
55	0.00	25.09	8.28	37	12.4	3.15	48.4	0.4	107.0	0.374
56	0.00	25.26	8.27	38	12.3	1.66	47.6	0.4	102.6	0.359
57	0.00	24.91	7.62	37	12.2	2.37	48.2	0.4	105.8	0.370
58	0.00	24.41	7.15	36	12.0	1.49	48.5	0.4	101.0	0.353
59	0.00	25.08	6.93	37	12.1	1.17	47.7	0.4	104.6	0.366
60	0.00	24.46	6.68	36	12.0	2.06	48.0	0.4	106.1	0.371
61	0.00	25.45	7.16	38	12.2	1.65	48.7	0.4	101.5	0.355
62	0.00	25.04	7.73	37	12.4	2.18	48.1	0.4	109.0	0.381
63	0.00	24.51	6.47	37	12.4	1.44	48.6	0.4	107.2	0.375
64	0.00	25.17	6.75	38	12.4	3.18	48.9	0.4	107.5	0.376
65	0.00	23.79	6.83	35	12.1	1.25	48.2	0.4	107.0	0.374
66	0.00	25.54	7.90	38	12.4	0.29	48.8	0.4	104.6	0.366
67	0.00	24.25	7.61	36	12.5	2.85	48.9	0.4	113.6	0.397
68	0.00	25.92	8.02	39	12.5	0.93	48.4	0.4	103.6	0.362
71	0.00	24.28	6.51	36	12.3	1.50	47.9	0.4	108.5	0.380
72	0.00	25.54	7.34	38	12.5	1.27	48.5	0.4	107.9	0.378
73	0.00	24.23	6.50	36	12.6	1.17	48.7	0.4	105.5	0.369
74	0.00	25.22	7.04	38	12.6	1.38	48.0	0.4	105.3	0.368
75	0.00	24.66	6.87	37	12.3	2.26	48.8	0.4	109.8	0.384
76	0.00	25.62	7.07	38	12.2	1.64	48.7	0.4	102.3	0.358
77	0.00	24.45	5.83	36	12.6	1.35	48.0	0.4	107.5	0.376
78	0.00	25.38	7.44	38	12.1	1.79	48.7	0.3	97.6	0.342
79	0.00	24.56	6.33	37	12.1	2.17	48.8	0.4	102.7	0.360

MACTEC Engineering and Consulting, Inc.  
Case Method Results

Page 2 of 2  
PDILOT Ver. 2005.2 - Printed: 26-Dec-2006

STP COL Project - Boring B-324; 38.5' - 40' Sample  
OP: SEK

Rig Serial No. 216265-45 (Lewis Mobile B-57)  
Test date: 28-Nov-2006

BL#	depth ft	CSX ksi	TSX ksi	FMX klps	VMX f/s	DFN in	BPM **	EFV **	ETR (%)	EMX k-ft
80	0.00	25.14	5.95	37	12.7	0.27	48.1	0.4	110.2	0.386
81	0.00	23.78	6.16	35	12.1	1.16	48.8	0.4	102.2	0.358
82	0.00	24.29	5.88	36	12.1	0.77	49.1	0.4	100.5	0.352
Average		24.82	10.30	37	12.1	0.90	45.0	0.4	102.7	0.359

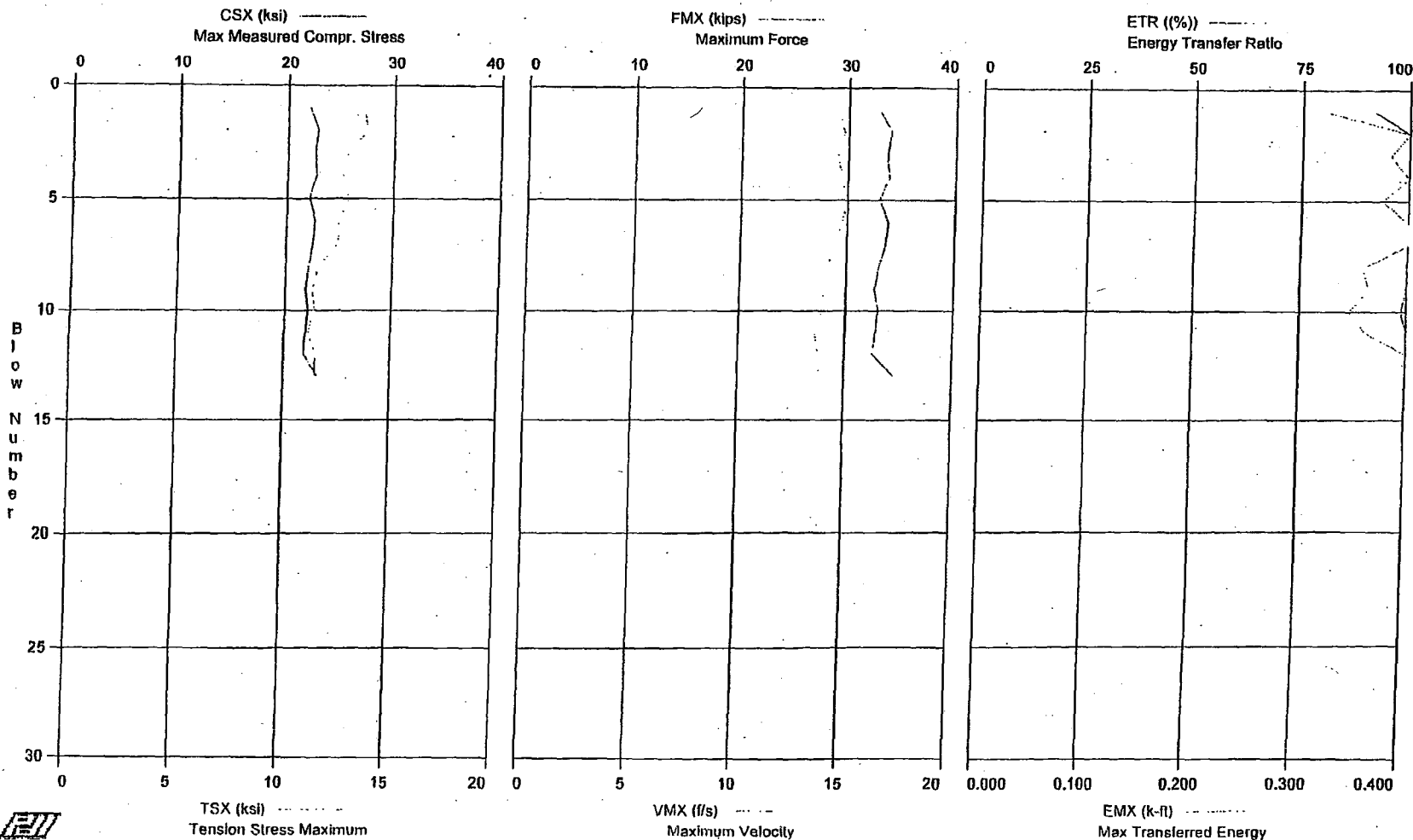
Total number of blows analyzed: 68

Time Summary

Drive 2 minutes 2 seconds

4:20:33 PM - 4:22:35 PM (11/29/2006) BN 1 - 82

STP COL Project - Boring B-324; 43.5' - 45' Sample



MACTEC Engineering and Consulting, Inc.  
Case Method Results

Page 1 of 1  
PDILOT Ver. 2005.2 - Printed: 26-Dec-2006

STP COL Project - Boring B-324; 43.5' - 45' Sample  
OP: SEK

Rig Serial No. 216285-45 (Lewis Mobile B-57)  
Test date: 28-Nov-2006

AR: 1.49 in<sup>2</sup>  
LE: 49.00 ft  
WS: 16,807.9 f/s

SP: 0.492 k/ft<sup>3</sup>  
EM: 30,000 ksi  
JC: 0.60

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
DFN: Final Displacement

BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	DFN in	BPM **	EFV **	ETR (%)	EMX k-ft
1	0.00	22.03	13.51	33	14.5	2.55	0.0	0.3	91.8	0.321
2	0.00	22.79	13.71	34	14.8	2.46	43.6	0.4	125.6	0.440
3	0.00	22.56	12.79	34	14.5	2.36	47.5	0.4	109.2	0.382
4	0.00	22.68	12.59	34	14.7	2.54	46.7	0.4	118.0	0.413
5	0.00	22.09	12.89	33	14.9	2.87	0.0	0.4	107.3	0.375
6	0.00	22.67	12.42	34	14.8	2.95	50.0	0.4	120.6	0.422
7	0.00	22.53	12.42	34	14.3	2.78	48.7	0.4	119.6	0.419
8	0.00	22.15	11.54	33	14.1	2.38	48.9	0.4	102.7	0.359
9	0.00	21.90	11.27	33	14.0	2.42	48.0	0.4	104.1	0.364
10	0.00	22.13	11.36	33	13.9	2.27	41.8	0.3	98.8	0.346
11	0.00	22.02	11.12	33	13.6	1.88	41.7	0.4	103.0	0.361
12	0.00	21.86	11.47	33	13.7	2.44	0.0	0.4	125.2	0.438
13	0.00	23.21	11.48	35	13.8	2.05	49.8	0.4	113.3	0.396
Average		22.36	12.20	33	14.3	2.46	46.7	0.4	110.7	0.387

Total number of blows analyzed: 13

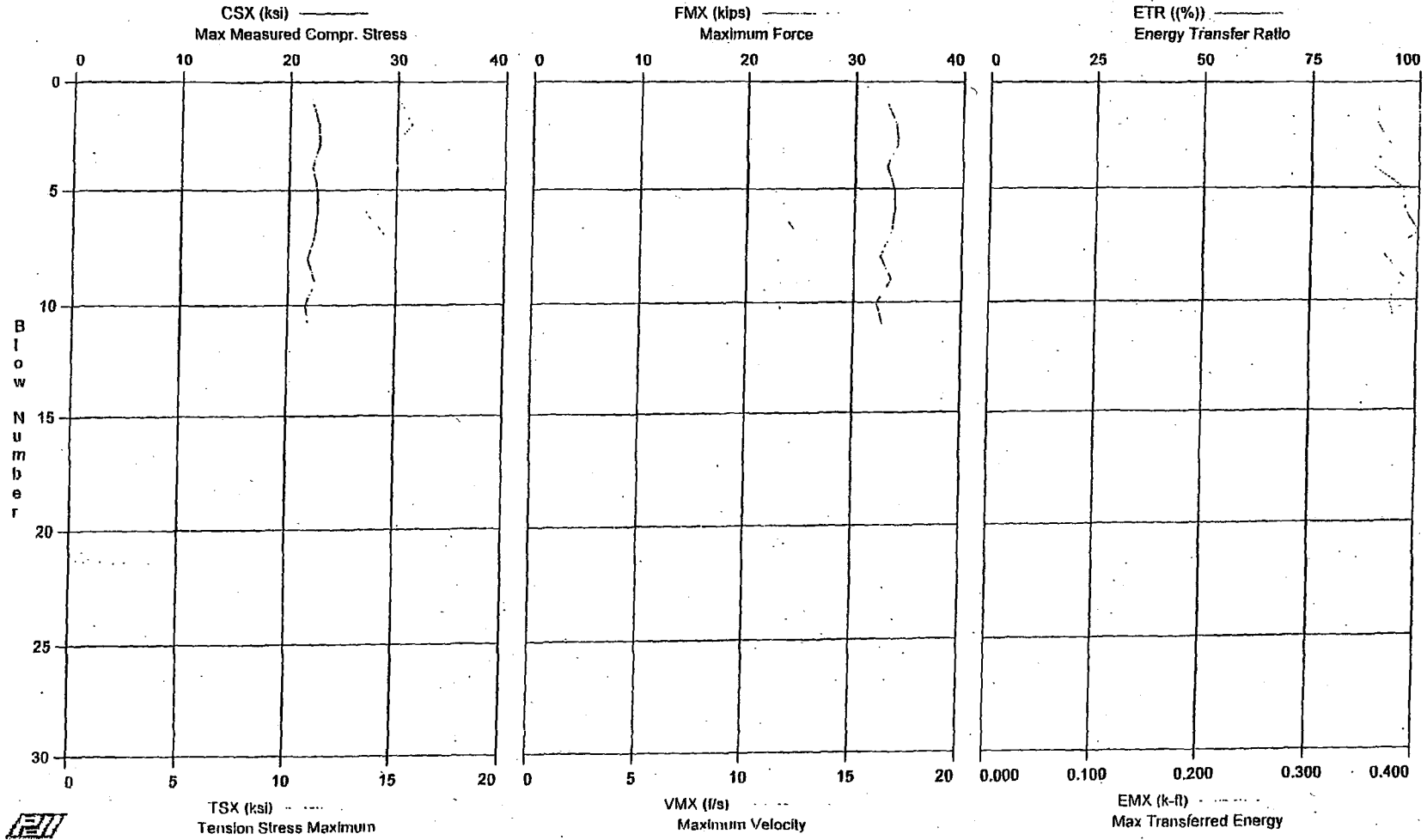
Time Summary

Drive 29 seconds

4:39:30 PM - 4:39:59 PM (11/28/2006) BN 1 - 13



STP COL Project - Boring B-324; 48.5' - 50' Sample



STP COL Project - Boring B-324; 48.5' - 50' Sample  
OP: SEK

Rig Serial No. 216265-45 (Lewis Mobile B-57)  
Test date: 28-Nov-2006

AR: 1.49 in<sup>2</sup>  
LE: 54.00 ft  
WS: 16,807.9 f/s

SP: 0.492 k/ft<sup>3</sup>  
EM: 30,000 ksi  
JC: 0.60

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
DFN: Final Displacement

BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	DFN in	BPM **	EFV **	ETR (%)	EMX k-ft
1	0.00	22.11	15.13	33	12.0	3.72	37.9	0.4	103.4	0.362
2	0.00	22.68	15.65	34	12.1	2.41	53.5	0.4	103.0	0.361
3	0.00	22.77	14.83	34	11.6	2.85	50.6	0.4	107.0	0.374
4	0.00	22.11	15.00	33	11.6	2.38	51.1	0.4	102.1	0.357
5	0.00	22.57	14.20	34	11.8	2.75	53.6	0.4	110.1	0.385
6	0.00	22.62	13.52	34	11.6	2.28	51.5	0.4	110.6	0.387
7	0.00	22.44	14.45	33	12.3	2.48	50.6	0.4	114.2	0.400
8	0.00	21.78	13.79	32	11.5	1.77	53.4	0.4	105.4	0.369
9	0.00	22.43	12.82	33	11.6	1.81	51.3	0.4	110.4	0.367
10	0.00	21.56	12.83	32	11.6	2.03	51.0	0.4	106.7	0.373
11	0.00	21.93	12.72	33	11.7	1.99	53.1	0.4	108.6	0.380
Average		22.27	14.09	33	11.8	2.41	50.7	0.4	107.4	0.376

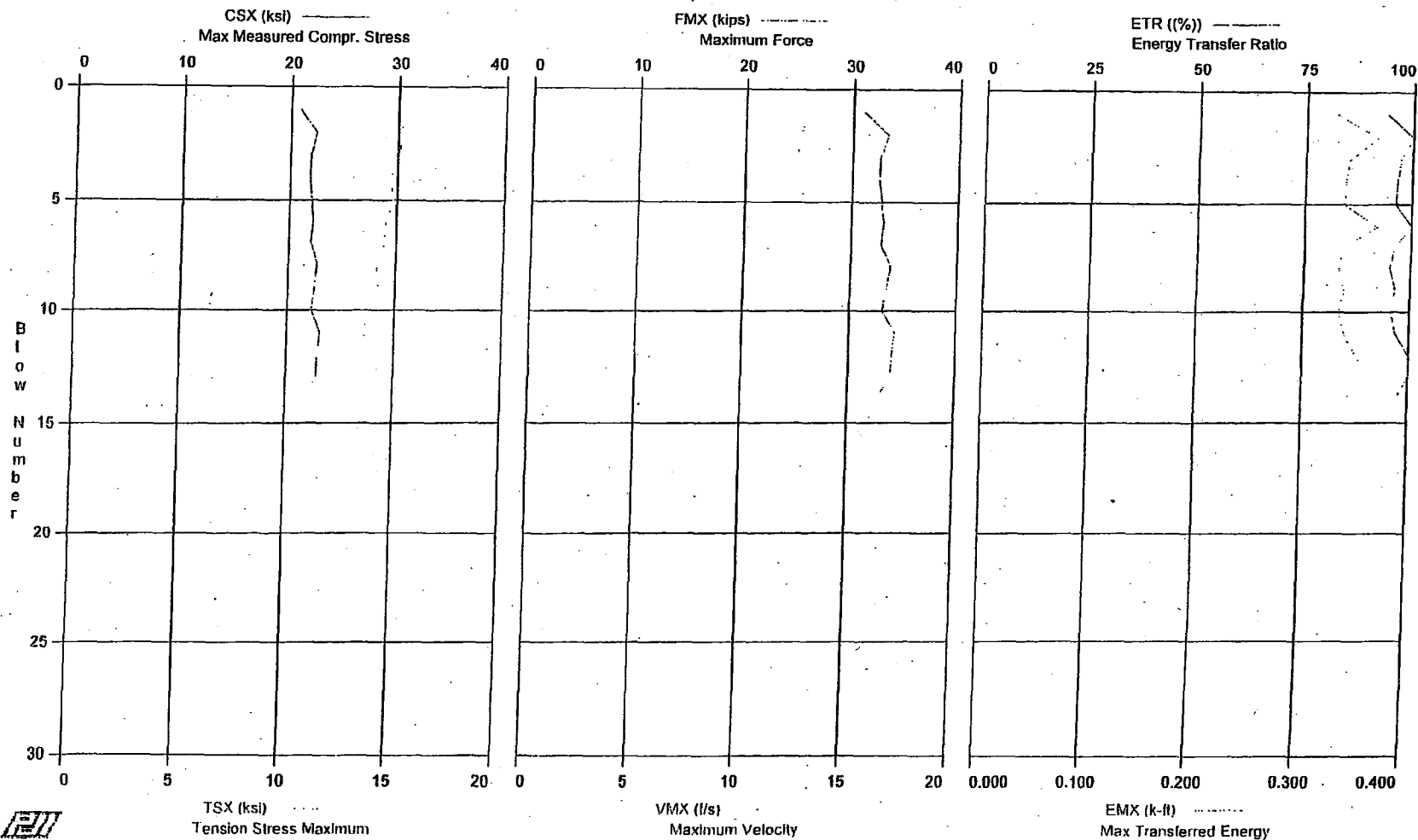
Total number of blows analyzed: 11

Time Summary

Drive 12 seconds

5:19:58 PM - 5:20:10 PM (11/28/2006) BN 1 - 11

STP COL Project - Boring B-324; 53.5' - 55' Sample



MACTEC Engineering and Consulting, Inc.  
Case Method Results

Page 1 of 1  
PDILOT Ver. 2005.2 - Printed: 26-Dec-2006

STP CDL Project - Boring B-324; 53.5' - 55' Sample  
OP: SEK

Rig Serial No. 216265-45 (Lewis Mobile B-57)  
Test date: 29-Nov-2006

AR: 1.49 in<sup>2</sup>  
LE: 59.00 ft  
WS: 16,807.9 f/s

SP: 0.492 k/ft<sup>3</sup>  
EM: 30,000 ksi  
JC: 0.60

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
DFN: Final Displacement

BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	DFN in	BPM **	EFV **	ETR (%)	EMX k-ft
1	0.00	20.79	15.45	31	12.8	2.64	0.0	0.3	93.9	0.329
2	0.00	22.31	15.07	33	12.5	2.72	39.8	0.4	104.9	0.367
3	0.00	21.87	15.04	33	12.3	2.80	39.1	0.3	97.3	0.341
4	0.00	21.81	14.64	32	11.9	2.32	39.5	0.3	96.5	0.338
5	0.00	21.99	14.80	33	12.0	2.66	39.5	0.3	96.2	0.337
6	0.00	22.15	14.49	33	11.4	2.05	39.2	0.4	105.1	0.368
7	0.00	22.00	14.44	33	11.2	1.94	39.8	0.3	96.1	0.336
8	0.00	22.65	14.12	34	11.3	2.02	39.7	0.3	95.1	0.333
9	0.00	22.41	14.18	33	11.5	2.43	39.3	0.3	96.5	0.338
10	0.00	22.19	13.86	33	11.4	2.07	39.9	0.3	95.6	0.334
11	0.00	23.02	13.57	34	11.4	1.90	40.1	0.3	96.8	0.339
12	0.00	22.82	13.75	34	11.6	1.91	39.7	0.4	100.2	0.351
13	0.00	22.75	13.28	34	11.5	1.65	40.4	0.4	103.4	0.362
14	0.00	21.90	13.49	33	11.4	1.86	40.1	0.3	97.1	0.340
Average		22.19	14.30	33	11.7	2.21	39.7	0.3	98.2	0.344

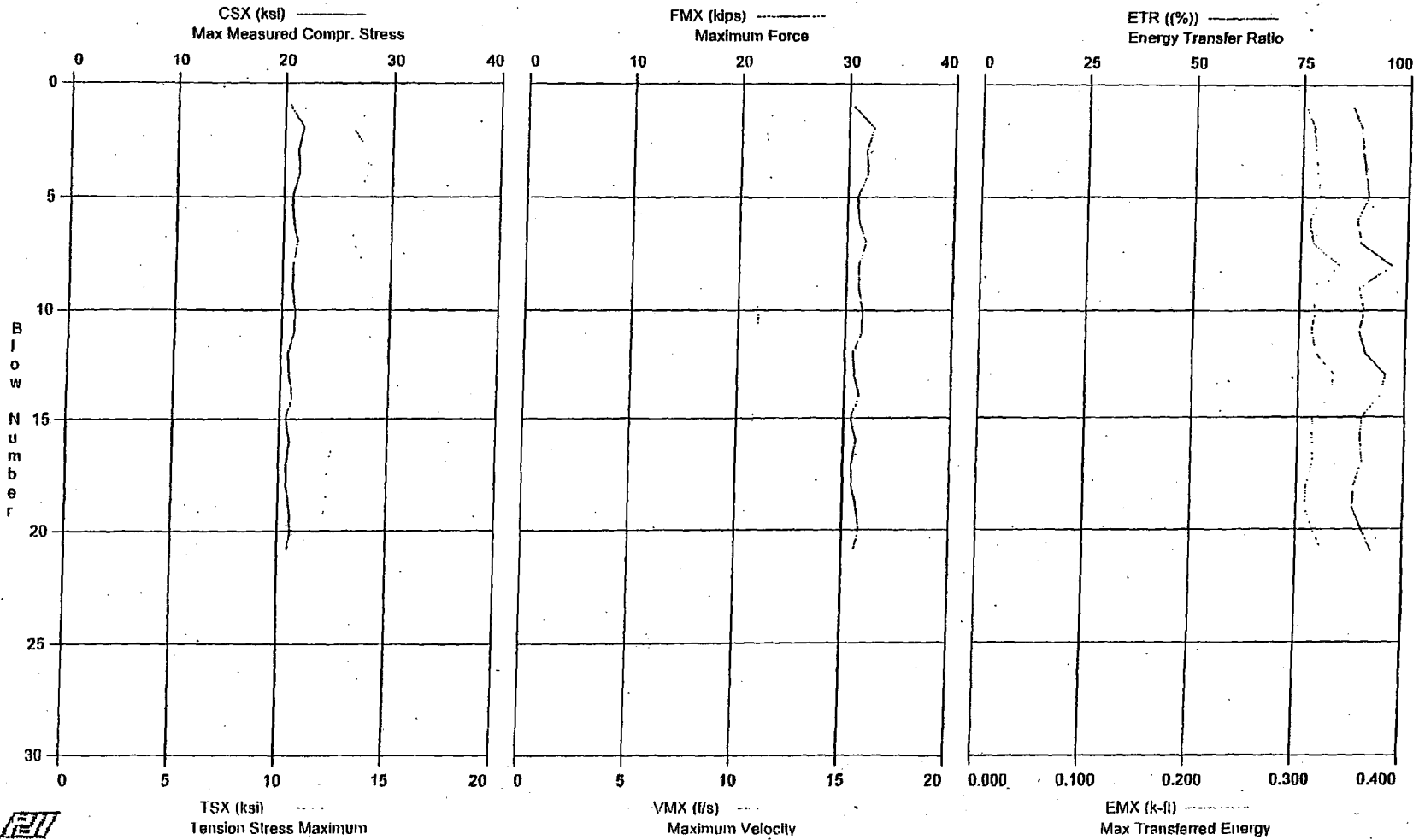
Total number of blows analyzed: 14

Time Summary

Drive 19 seconds

8:00:27 AM - 8:00:46 AM (11/29/2006) BN 1 - 14

STP COL Project - Boring B-324; 58.5' - 80' Sample



STP COL Project - Boring B-324; 58.5' - 60' Sample  
OP: SEK

AR: 1.49 in<sup>2</sup>  
LE: 64.00 ft  
WS: 16.807.9 f/s

SP: 0.492 k/ft<sup>3</sup>  
EM: 30,000 ksi  
JC: 0.60

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
DFN: Final Displacement

BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	DFN in	BPM **	EFV **	ETR (%)	EMX k-ft
1	0.00	20.34	14.04	30	11.5	0.79	0.0	0.3	86.7	0.303
2	0.00	21.67	13.13	32	11.1	1.75	21.7	0.3	88.6	0.310
3	0.00	21.24	13.80	32	11.2	2.27	22.2	0.3	89.1	0.312
4	0.00	21.36	13.84	32	11.4	2.04	21.8	0.3	89.8	0.314
5	0.00	20.73	13.35	31	10.8	1.26	21.9	0.3	90.6	0.317
6	0.00	20.85	13.06	31	10.8	1.98	22.2	0.3	88.1	0.308
7	0.00	21.30	13.24	32	10.9	1.89	21.8	0.3	89.0	0.311
8	0.00	20.89	13.71	31	10.7	1.82	22.0	0.3	96.4	0.337
9	0.00	20.91	13.20	31	10.8	1.71	22.3	0.3	88.8	0.311
10	0.00	21.16	12.84	32	10.9	2.15	22.2	0.3	90.0	0.315
11	0.00	21.14	12.92	32	10.9	1.57	21.7	0.3	89.1	0.312
12	0.00	20.63	12.89	31	10.8	1.09	22.1	0.3	90.7	0.317
13	0.00	20.73	12.79	31	10.8	1.85	21.9	0.3	95.4	0.334
14	0.00	21.06	12.92	31	10.9	1.51	21.8	0.3	94.1	0.329
15	0.00	20.56	12.59	31	10.7	1.31	21.8	0.3	89.9	0.314
16	0.00	20.90	12.50	31	10.8	1.51	21.7	0.3	89.6	0.314
17	0.00	20.68	12.25	31	10.8	1.64	21.5	0.3	90.1	0.315
18	0.00	20.68	12.24	31	10.8	1.41	22.0	0.3	88.4	0.308
19	0.00	21.00	12.16	31	10.8	1.46	21.6	0.3	88.1	0.308
20	0.00	21.18	11.92	32	10.9	1.23	21.6	0.3	90.3	0.316
21	0.00	20.63	12.00	31	10.8	1.58	21.6	0.3	92.8	0.325
Average		20.94	12.92	31	10.9	1.61	21.9	0.3	90.3	0.316

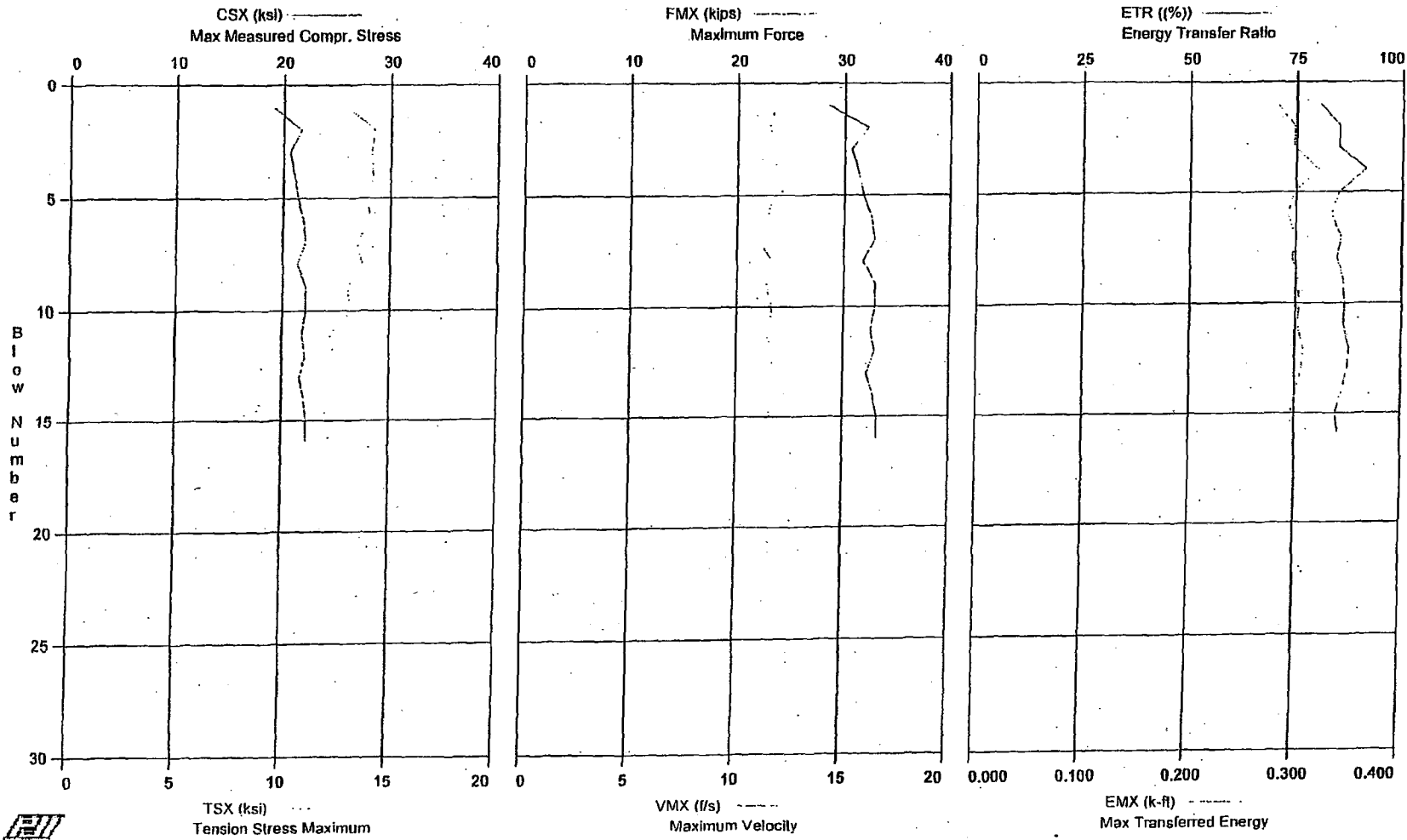
Total number of blows analyzed: 21

Time Summary

Drive 54 seconds

8:35:42 AM - 8:36:36 AM (11/29/2006) BN 1 - 21

STP COL Project - Boring B-006; 28.5' - 30' Sample



MACTEC Engineering and Consulting, Inc.  
Case Method Results

Page 1 of 1  
PDILOT Ver. 2005.2 - Printed: 26-Dec-2006  
Rig Serial No. 216265-45 (Lewis Mobile B-57)  
Test date: 13-Dec-2006

STP COL Project - Boring B-908; 28.5' - 30' Sample  
OP: SEK

AR: 1.48 in<sup>2</sup>  
LE: 34.00 ft  
WS: 16,807.9 f/s

SP: 0.492 k/ft<sup>3</sup>  
EM: 30,000 ksi  
JC: 0.60

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
DFN: Final Displacement

BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	DFN in	BPM **	EFV **	ETR (%)	EMX k-ft
1	0.00	19.04	12.90	28	11.7	2.72	0.0	0.3	80.3	0.281
2	0.00	21.61	14.23	32	11.5	1.83	20.9	0.3	85.1	0.298
3	0.00	20.56	14.07	31	11.8	2.00	22.5	0.3	85.1	0.298
4	0.00	21.01	14.16	31	11.7	2.56	24.4	0.3	91.6	0.321
5	0.00	21.32	13.88	32	11.7	1.89	24.2	0.3	85.2	0.298
6	0.00	21.84	14.03	33	11.4	1.66	24.4	0.3	83.3	0.292
7	0.00	22.07	13.45	33	11.0	2.36	24.6	0.3	85.6	0.300
8	0.00	21.35	13.71	32	11.6	1.86	24.5	0.3	84.8	0.297
9	0.00	22.08	12.98	33	11.3	2.17	24.6	0.3	86.2	0.302
10	0.00	22.11	13.19	33	11.6	2.28	24.8	0.3	86.5	0.303
11	0.00	21.85	12.20	33	11.5	1.92	24.6	0.3	86.4	0.302
12	0.00	22.09	12.40	33	11.5	2.00	24.5	0.3	87.9	0.308
13	0.00	21.61	12.43	32	11.8	1.80	24.7	0.3	87.4	0.306
14	0.00	22.01	11.99	33	11.6	1.87	24.8	0.3	86.1	0.301
15	0.00	22.27	12.03	33	11.5	1.91	24.5	0.3	84.7	0.296
16	0.00	22.26	12.24	33	11.5	1.61	24.5	0.3	85.3	0.298
Average		21.57	13.12	32	11.5	2.03	24.2	0.3	85.7	0.300

Total number of blows analyzed: 16

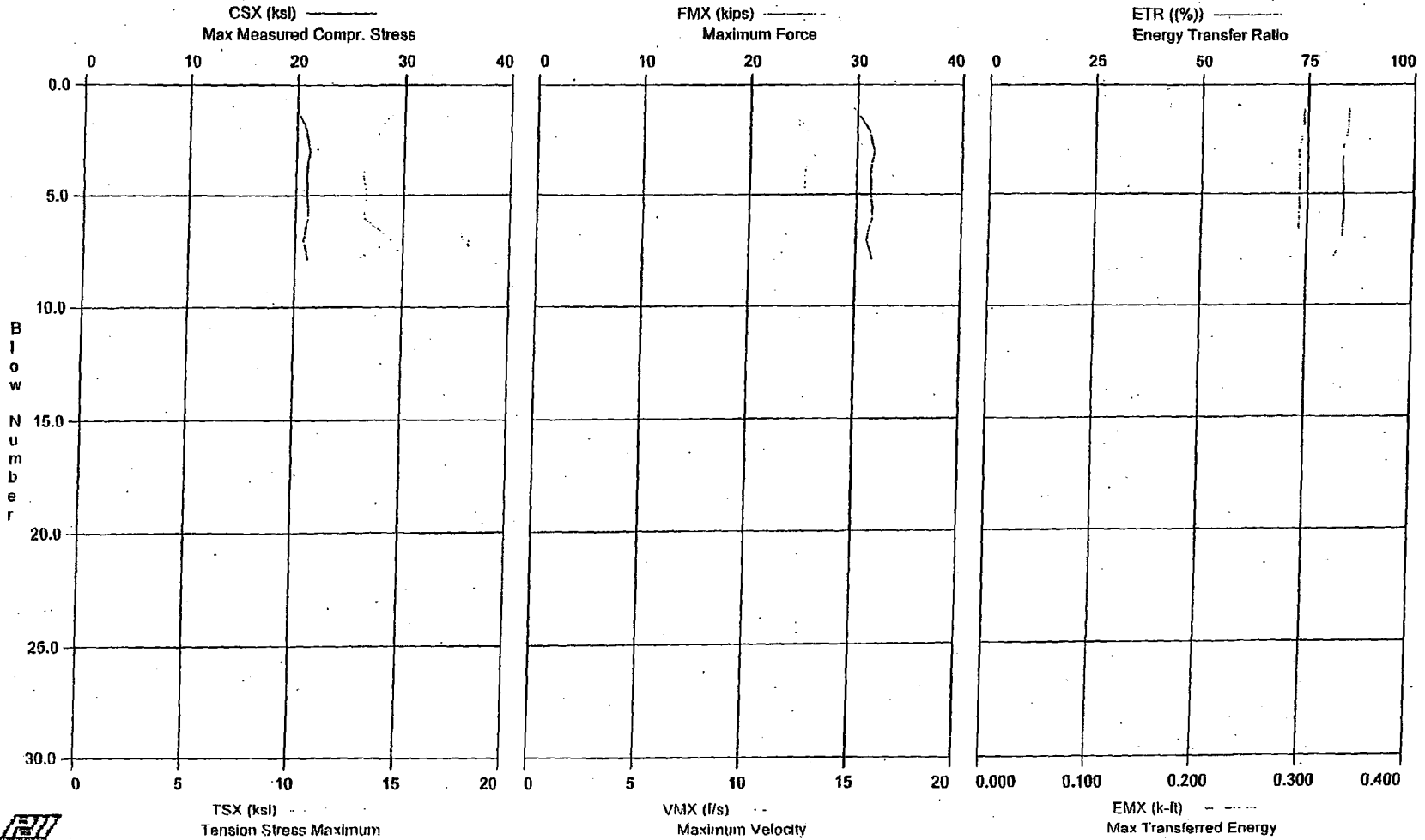
Time Summary

Drive 38 seconds

2:18:06 PM - 2:18:46 PM (12/13/2006) BN 1 - 16



STP COL Project - Boring B-906; 33.5' - 35' Sample



STP COL Project - Boring B-906; 33.5' - 35' Sample  
OP: SEK

Rig Serial No. 218265-45 (Lewis Mobile B-57)  
Test date: 13-Dec-2006

AR: 1.49 in<sup>2</sup> SP: 0.492 k/R3  
LE: 39.00 ft EM: 30,000 ksi  
WS: 16.807.9 f/s JC: 0.60

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
DFN: Final Displacement  
BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	DFN in	BPM **	EFV **	ETR (%)	EMX k-ft
1	0.00	19.87	14.67	30	11.9	3.55	0.0	0.3	84.5	0.296
2	0.00	20.86	13.77	31	12.6	3.47	0.0	0.3	84.5	0.296
3	0.00	21.21	13.81	32	12.8	2.23	20.8	0.3	83.2	0.291
4	0.00	21.02	13.11	31	12.5	2.57	21.1	0.3	83.3	0.292
5	0.00	21.04	13.28	31	12.5	3.28	21.8	0.3	83.5	0.292
6	0.00	21.17	13.17	32	12.0	2.69	22.0	0.3	83.5	0.292
7	0.00	20.78	14.47	31	12.0	2.18	21.7	0.3	83.4	0.292
8	0.00	21.23	12.60	32	11.2	1.91	21.7	0.3	81.1	0.284
Average		20.90	13.61	31	12.2	2.74	21.5	0.3	83.4	0.292

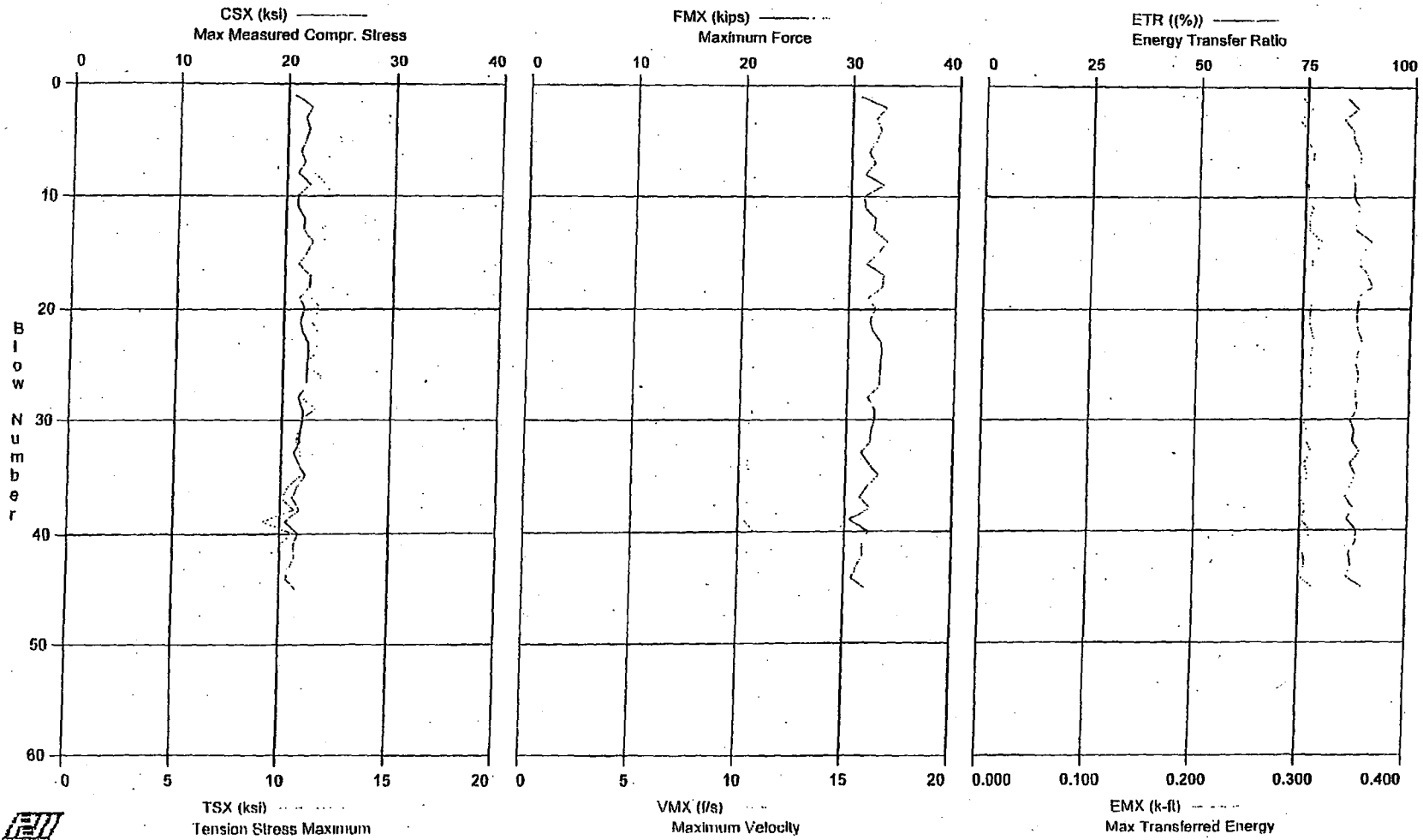
Total number of blows analyzed: 8

Time Summary

Drive 20 seconds

2:31:11 PM - 2:31:31 PM (12/13/2006) BN 1 - 8

STP COL Project - Boring B-906; 38.5' - 40' Sample



STP COL Project - Boring B-906; 38.5' - 40' Sample  
OP: SEK

Rig Serial No. 216265-45 (Lewis Mobile B-57)  
Test date: 13-Dec-2006

AR: 1.49 in<sup>2</sup>  
LE: 44.00 ft  
WS: 16,807.9 f/s

SP: 0.492 k/ft<sup>3</sup>  
EM: 30,000 ksi  
JC: 0.60

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
DFN: Final Displacement

BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	DFN in	BPM **	EFV **	ETR (%)	EMX k-ft
1	0.00	20.59	13.50	31	11.0	1.53	0.0	0.3	84.2	0.295
2	0.00	22.22	13.13	33	10.8	1.68	23.9	0.3	86.7	0.304
3	0.00	21.63	12.64	32	10.3	1.49	25.1	0.3	83.6	0.293
4	0.00	21.92	12.71	33	10.5	1.90	25.5	0.3	85.7	0.300
5	0.00	21.66	12.24	32	10.5	1.51	25.4	0.3	86.1	0.301
6	0.00	21.20	12.02	32	10.5	1.32	25.3	0.3	87.6	0.307
7	0.00	21.58	11.66	32	10.5	1.76	25.4	0.3	87.5	0.306
8	0.00	20.98	11.22	31	10.4	1.49	25.5	0.3	85.8	0.300
9	0.00	22.18	11.76	33	10.4	1.36	25.5	0.3	86.3	0.302
10	0.00	20.95	12.04	31	10.5	1.56	25.4	0.3	86.1	0.301
11	0.00	21.00	12.21	31	10.5	2.00	25.3	0.3	87.7	0.307
12	0.00	21.68	12.14	32	10.5	1.57	25.2	0.3	86.6	0.303
13	0.00	21.56	11.49	32	10.4	1.84	25.2	0.3	86.9	0.304
14	0.00	22.44	11.78	33	10.6	1.44	25.4	0.3	90.4	0.316
15	0.00	21.91	11.70	33	10.4	1.79	25.3	0.3	88.3	0.309
16	0.00	21.19	11.23	32	10.5	1.37	25.3	0.3	87.8	0.307
17	0.00	22.28	12.79	33	10.8	0.94	25.2	0.3	89.6	0.314
18	0.00	22.20	12.21	33	10.6	1.21	25.5	0.3	90.8	0.318
19	0.00	21.33	11.19	32	10.4	1.32	25.5	0.3	87.7	0.307
20	0.00	21.81	11.63	32	10.5	1.88	25.5	0.3	87.6	0.307
21	0.00	21.47	11.20	32	10.5	1.47	25.8	0.3	87.5	0.306
22	0.00	21.65	11.50	32	10.6	1.48	25.5	0.3	87.9	0.308
23	0.00	22.20	11.54	33	10.7	1.42	25.6	0.3	88.9	0.311
24	0.00	22.22	11.40	33	10.5	1.61	25.6	0.3	87.9	0.308
25	0.00	22.17	10.96	33	10.5	1.59	25.7	0.3	87.4	0.306
26	0.00	22.16	11.73	33	10.6	1.03	25.6	0.3	88.2	0.309
27	0.00	22.09	11.64	33	10.7	1.27	25.8	0.3	87.7	0.307
28	0.00	21.41	10.88	32	10.6	1.35	25.7	0.3	87.4	0.306
29	0.00	21.85	11.48	33	10.6	1.49	25.7	0.3	87.9	0.308
30	0.00	21.89	10.73	33	10.5	1.34	25.8	0.3	86.4	0.302
31	0.00	21.65	10.75	32	10.3	0.90	25.8	0.3	87.2	0.305
32	0.00	21.63	10.67	32	10.5	1.23	25.6	0.3	87.0	0.305
33	0.00	21.09	10.84	31	10.5	2.02	25.7	0.3	88.7	0.310
34	0.00	21.58	10.89	32	10.3	1.93	25.6	0.3	86.5	0.303
35	0.00	22.19	10.88	33	10.6	1.20	25.7	0.3	87.8	0.307
36	0.00	21.52	10.33	32	10.3	1.03	25.7	0.3	86.7	0.303
37	0.00	21.04	10.04	31	10.3	0.82	25.5	0.3	85.6	0.300
38	0.00	21.71	10.58	32	10.5	1.43	25.7	0.3	87.2	0.305
39	0.00	20.42	9.19	30	10.3	1.17	25.4	0.3	85.0	0.301
40	0.00	21.64	10.59	32	10.7	1.27	25.5	0.3	88.2	0.309
41	0.00	21.21	9.89	32	10.5	1.48	25.3	0.3	88.0	0.308
42	0.00	21.28	9.50	32	10.4	1.46	25.5	0.3	88.4	0.303
43	0.00	20.92	9.04	31	10.5	0.76	25.6	0.3	87.1	0.305
44	0.00	20.59	9.10	31	10.4	1.72	25.6	0.3	86.1	0.301
45	0.00	21.50	9.28	32	10.4	1.55	25.3	0.3	89.8	0.314
Average		21.59	11.24	32	10.5	1.44	25.5	0.3	87.3	0.306

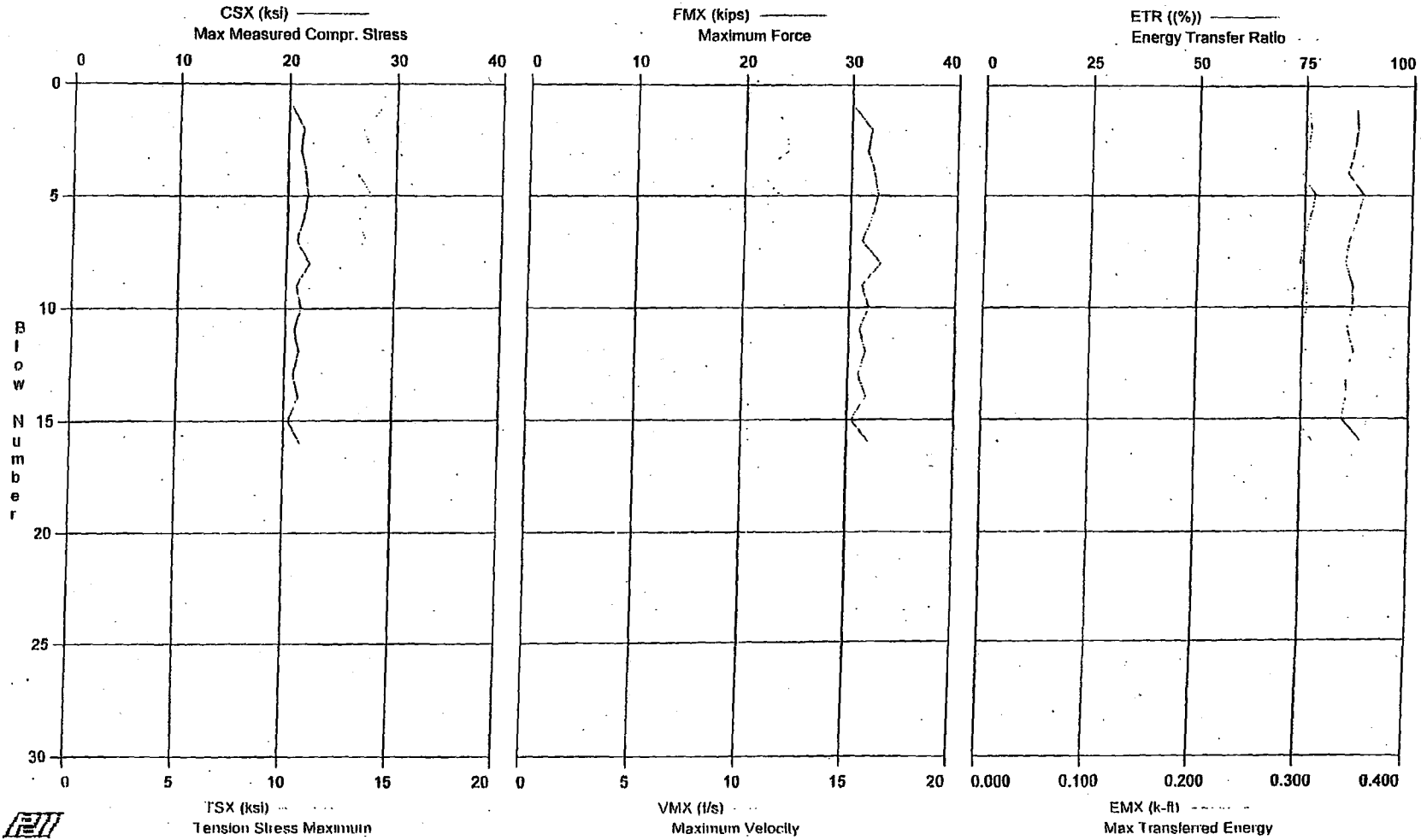
Total number of blows analyzed: 45

Time Summary

Drive 1 minute 44 seconds

2:44:13 PM - 2:45:57 PM (12/13/2006) BN 1 - 45

STP COL Project - Boring B-906; 43.5' - 45' Sample



MACTEC Engineering and Consulting, Inc.  
Case Method Results

Page 1 of 1  
PDIPILOT Ver. 2005.2 - Printed: 26-Dec-2006

STP COL Project - Boring B-906; 43.5' - 45' Sample  
OP: SEK

Rig Serial No. 216265-45 (Lewis Mobile B-57)  
Test date: 13-Dec-2006

AR: 1.49 in<sup>2</sup> SP: 0.492 k/ft<sup>3</sup>  
LE: 49.00 ft EM: 30,000 ksi  
WS: 16,807.9 f/s JC: 0.60

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
DFN: Final Displacement  
BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	DFN in	BPM **	EFV **	ETR (%)	EMX k-ft
1	0.00	20.26	14.37	30	11.4	2.16	0.0	0.3	86.7	0.303
2	0.00	21.38	13.40	32	12.0	2.39	22.0	0.3	87.1	0.305
3	0.00	21.16	13.76	32	12.0	2.48	22.3	0.3	86.3	0.302
4	0.00	21.57	13.15	32	10.7	2.17	22.4	0.3	84.9	0.297
5	0.00	21.84	13.83	33	11.7	2.29	22.1	0.3	88.7	0.310
6	0.00	21.44	13.28	32	11.5	2.53	22.3	0.3	87.2	0.305
7	0.00	20.88	13.54	31	10.7	2.19	22.4	0.3	85.5	0.299
8	0.00	22.07	12.41	33	10.8	1.93	22.3	0.3	84.8	0.297
9	0.00	20.90	12.48	31	10.5	1.64	22.4	0.3	86.5	0.303
10	0.00	21.37	12.80	32	10.5	2.02	22.2	0.3	86.7	0.304
11	0.00	20.80	12.95	31	10.4	1.55	22.2	0.3	85.5	0.299
12	0.00	21.20	12.48	32	10.4	1.90	22.1	0.3	86.9	0.304
13	0.00	20.79	12.86	31	10.4	1.33	22.2	0.3	85.4	0.299
14	0.00	21.26	12.41	32	10.4	1.27	22.3	0.3	85.4	0.299
15	0.00	20.39	12.54	30	10.3	1.20	22.1	0.3	84.4	0.295
16	0.00	21.54	11.98	32	10.4	1.86	22.3	0.3	88.9	0.311
Average		21.18	13.01	32	10.9	1.93	22.2	0.3	86.3	0.302

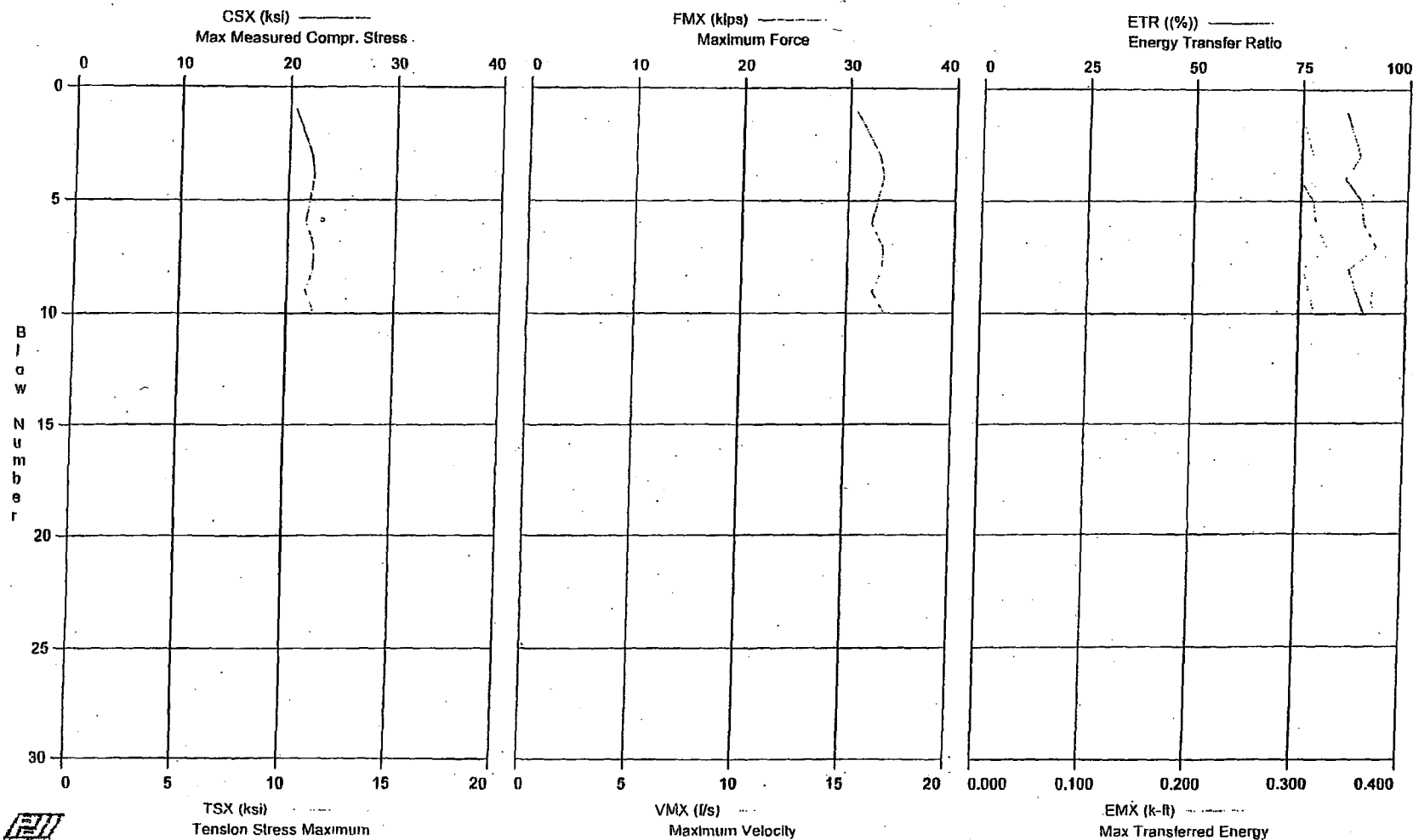
Total number of blows analyzed: 16

Time Summary

Drive 57 seconds

2:58:45 PM - 2:59:42 PM (12/13/2006) BN 1 - 17

STP COL Project - Boring B-906; 48.5' - 50' Sample



STP COL Project - Boring B-906; 48.5' - 50' Sample  
OP: SEK

AR: 1.49 in<sup>2</sup> SP: 0.492 k/ft<sup>3</sup>  
LE: 54.00 ft EM: 30,000 ksi  
WS: 16,807.9 f/s JC: 0.60

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
DFN: Final Displacement  
BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	DFN in	BPM **	EFV **	ETR (%)	EMX k-ft
1	0.00	20.51	12.83	31	11.0	3.41	0.0	0.3	85.3	0.298
3	0.00	22.07	13.19	33	11.5	3.63	23.2	0.3	88.7	0.311
4	0.00	22.31	13.27	33	10.5	2.35	23.3	0.3	85.2	0.298
5	0.00	21.96	12.88	33	10.8	1.90	23.2	0.3	89.1	0.312
6	0.00	21.61	12.19	32	10.7	2.22	23.2	0.3	89.9	0.315
7	0.00	22.33	12.43	33	10.7	2.24	23.3	0.3	92.9	0.325
8	0.00	22.31	12.94	33	11.0	2.59	23.1	0.3	86.4	0.303
9	0.00	21.69	12.29	32	10.5	2.22	23.1	0.3	88.1	0.309
10	0.00	22.51	13.36	34	10.7	2.63	22.8	0.3	90.1	0.315
Average		21.92	12.82	33	10.8	2.58	23.1	0.3	88.4	0.310

Total number of blows analyzed: 9

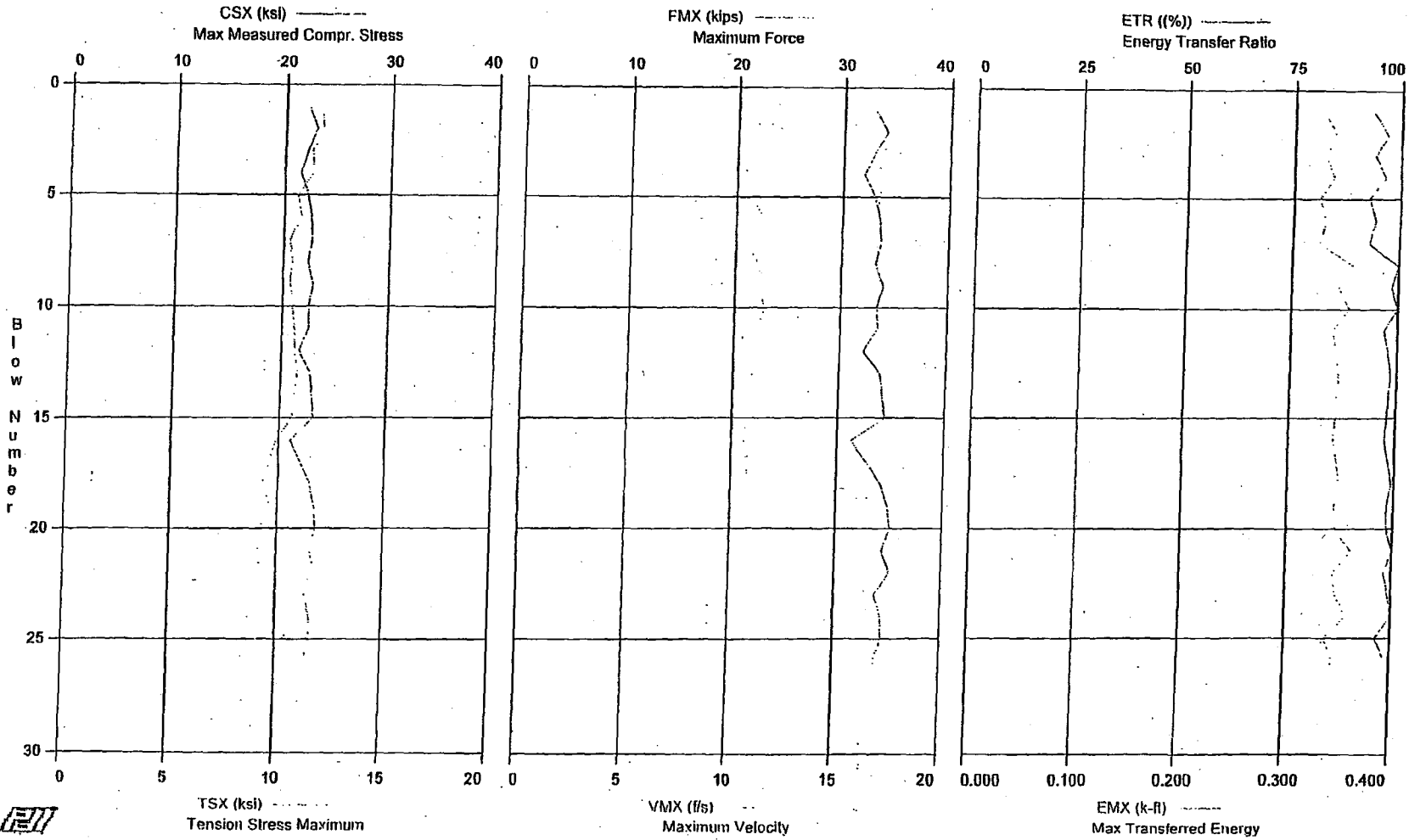
Time Summary

Drive 23 seconds

3:21:36 PM - 3:21:59 PM (12/13/2006) BN 1 - 10



STP COL Project - Boring B-007; 88.5' - 90' Sample



STP COL Project - Boring B-907; 88.5' - 90' Sample  
OP: SEK

Rig Serial No. 216265-45 (Lewis Mobile B-61 Truck)  
Test date: 3-Jan-2007

AR: 1.49 in<sup>2</sup>  
LE: 94.00 ft  
WS: 16.807.9 f/s

SP: 0.492 k/ft<sup>3</sup>  
EM: 30,000.0 ksi  
JC: 0.60

FMX: Maximum Force  
VMX: Maximum Velocity  
CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
BPM: Blows per Minute

DFN: Final Displacement  
E2E: Energy of FV at 2L/c  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	FMX kips	VMX f/s	CSX ksi	TSX ksi	BPM **	DFN in	E2E k-ft	ETR (%)	EMX k-ft
1	0.00	33	10.8	22.1	11.6	0.0	1.72	0.326	93.4	0.327
2	0.00	34	11.0	22.9	11.7	29.5	1.71	0.338	96.7	0.338
3	0.00	33	10.7	22.1	11.3	29.9	1.30	0.328	93.9	0.329
4	0.00	32	10.9	21.5	11.3	29.9	1.99	0.335	96.3	0.337
5	0.00	33	10.6	22.2	10.6	30.0	1.23	0.324	92.5	0.324
6	0.00	34	11.3	22.5	10.8	30.0	1.22	0.329	94.2	0.330
7	0.00	34	10.5	22.6	10.3	30.1	1.62	0.325	92.9	0.325
8	0.00	33	11.0	22.3	10.4	30.1	1.78	0.342	102.3	0.358
9	0.00	34	11.1	22.8	10.3	30.2	1.80	0.340	98.4	0.344
10	0.00	33	11.4	22.4	10.5	30.1	1.78	0.341	101.0	0.354
11	0.00	34	11.1	22.5	10.6	30.2	1.77	0.339	96.8	0.339
12	0.00	32	10.9	21.6	10.6	30.1	1.56	0.342	97.8	0.342
13	0.00	34	10.9	22.7	10.8	30.1	1.87	0.345	98.5	0.345
15	0.00	34	10.7	23.1	10.6	30.2	1.75	0.342	98.0	0.343
16	0.00	31	10.6	21.1	9.9	30.2	1.58	0.333	97.6	0.342
18	0.00	34	10.9	22.9	9.3	30.1	2.06	0.343	99.4	0.348
19	0.00	35	10.9	23.4	9.6	30.1	1.98	0.344	98.4	0.344
20	0.00	35	10.7	23.6	9.2	30.2	2.07	0.341	98.5	0.345
21	0.00	34	10.8	23.1	9.1	30.1	1.82	0.352	103.1	0.361
22	0.00	35	10.9	23.6	9.2	30.2	1.70	0.344	98.2	0.344
23	0.00	34	10.8	22.7	9.1	30.2	1.63	0.343	99.2	0.347
24	0.00	34	10.9	23.1	8.7	30.1	1.89	0.348	102.0	0.357
25	0.00	35	10.8	23.2	9.2	30.3	1.25	0.337	96.4	0.337
26	0.00	34	10.7	22.7	8.2	30.2	0.72	0.341	98.9	0.346
Average		34	10.9	22.6	10.1	30.1	1.66	0.338	97.7	0.342

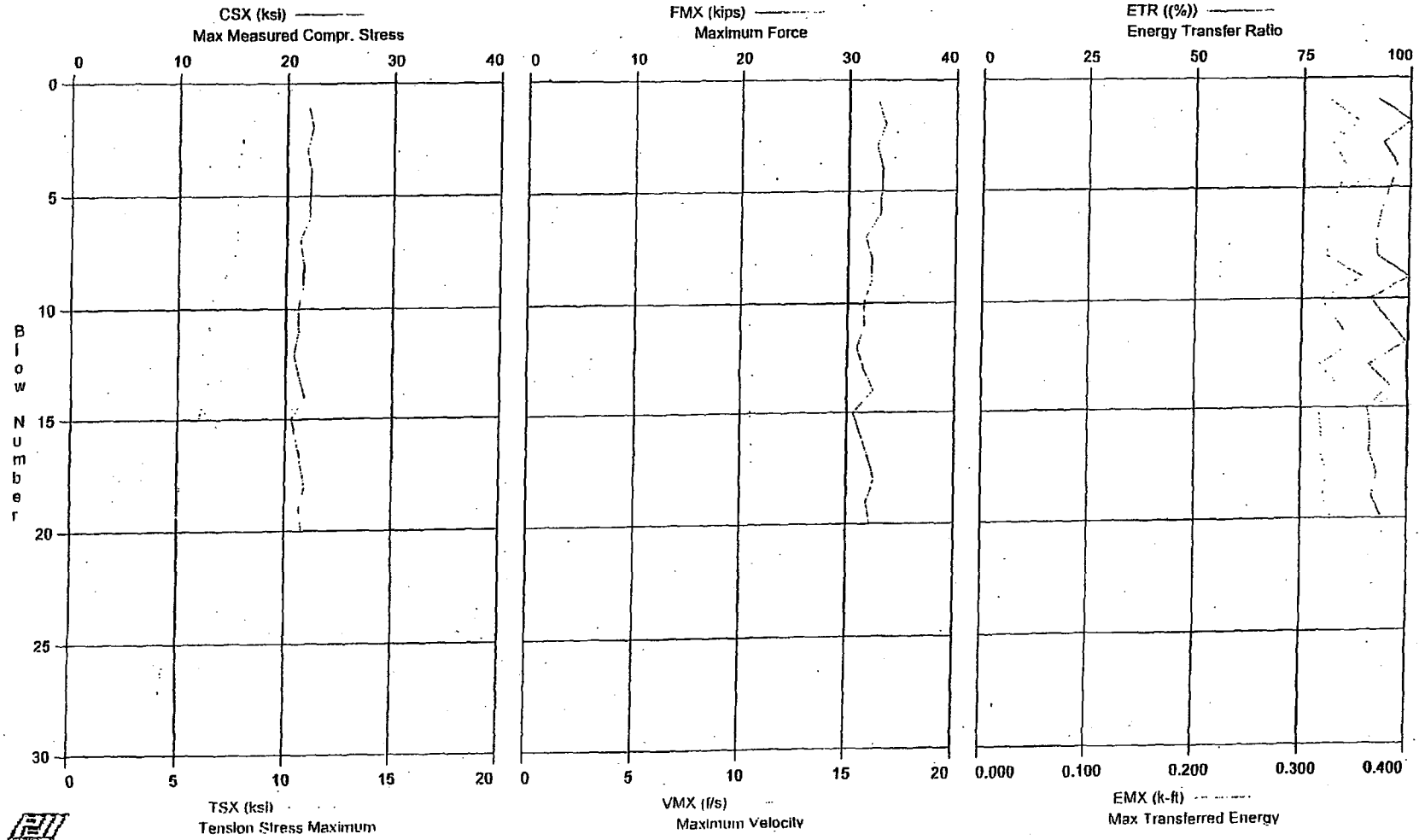
Total number of blows analyzed: 24

Time Summary

Drive 50 seconds

1:57:50 PM - 1:58:40 PM (1/3/2007) BN 1 - 26

STP COL Project - Boring B-907; 93.5' - 95' Sample



STP COL Project - Boring B-907; 93.5' - 95' Sample  
OP: SEK

Rig Serial No. 216265-45 (Lewis Mobile B-81 Truck)  
Test date: 3-Jan-2007

AR: 1.49 in<sup>2</sup>  
LE: 99.00 ft  
WS: 16,807.9 f/s

SP: 0.492 k/ft<sup>3</sup>  
EM: 30,000.0 ksi  
JC: 0.60

FMX: Maximum Force  
VMX: Maximum Velocity  
CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
BPM: Blows per Minute

DFN: Final Displacement  
E2E: Energy of FV at 2L/c  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	FMX kips	VMX f/s	CSX ksi	TSX ksi	BPM **	DFN in	E2E k-ft	ETR (%)	EMX k-ft
1	0.00	33	10.2	22.0	7.9	0.0	2.11	0.323	92.2	0.323
2	0.00	33	10.9	22.4	8.0	28.5	1.45	0.333	100.2	0.351
3	0.00	33	10.7	21.9	7.9	29.1	2.06	0.327	93.6	0.327
4	0.00	33	10.8	22.2	7.6	29.2	1.70	0.330	97.0	0.340
6	0.00	33	10.7	22.1	7.7	29.2	1.83	0.326	93.3	0.326
7	0.00	32	10.6	21.2	7.7	29.4	1.49	0.323	92.2	0.323
8	0.00	32	10.7	21.6	7.5	29.4	1.28	0.323	92.4	0.323
9	0.00	32	10.5	21.6	6.9	29.3	2.01	0.318	101.6	0.356
10	0.00	31	10.5	21.1	6.4	29.4	1.41	0.317	90.9	0.318
11	0.00	32	10.4	21.2	6.4	29.3	1.44	0.316	95.3	0.333
12	0.00	31	10.5	20.7	6.1	29.4	1.88	0.318	99.5	0.348
13	0.00	32	10.6	21.2	6.5	29.4	1.41	0.318	90.9	0.318
14	0.00	32	10.6	21.8	6.2	29.4	1.30	0.320	95.8	0.335
15	0.00	31	10.4	20.5	5.9	29.3	1.41	0.316	90.3	0.316
16	0.00	31	10.6	21.0	5.8	29.4	1.13	0.319	91.1	0.319
17	0.00	32	10.5	21.4	5.5	29.4	1.16	0.316	90.9	0.318
18	0.00	33	10.6	21.9	5.1	29.4	1.80	0.320	92.8	0.325
19	0.00	32	10.6	21.3	5.0	29.3	1.17	0.320	91.6	0.321
20	0.00	32	10.6	21.6	4.9	29.5	1.04	0.320	94.0	0.329
Average		32	10.6	21.5	6.6	29.3	1.53	0.321	94.0	0.329

Total number of blows analyzed: 19

Time Summary

Drive 39 seconds

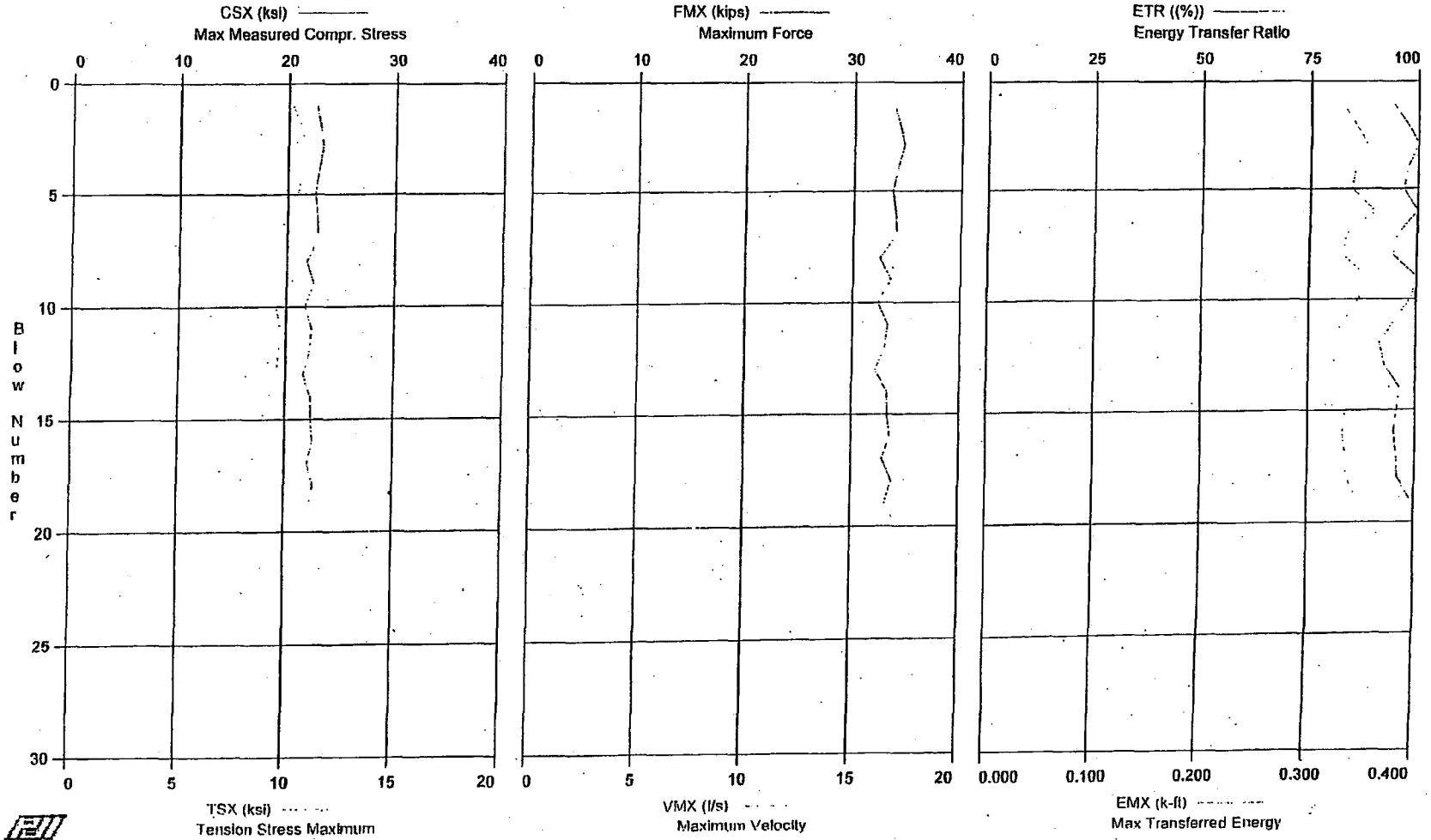
2:37:32 PM - 2:38:11 PM (1/3/2007) BN 1 - 20

MACTEC Engineering and Consulting, Inc. - Case Method Results

PDILOT Ver. 2005.2 - Printed: 15-Jan-2007

Test date: 3-Jan-2007

STP COL Project - Boring B-907; 98.5' - 100' Sample



STP COL Project - Boring B-907; 98.5' - 100' Sample  
OP: SEK

Rig Serial No. 216265-45 (Lewis Mobile B-61 Truck)  
Test date: 3-Jan-2007

AR: 1.49 in<sup>2</sup> SP: 0.482 k/r3  
LE: 104.00 ft EM: 30,000.0 ksi  
WS: 16,807.9 f/s JC: 0.60

FMX: Maximum Force DFN: Final Displacement  
VMX: Maximum Velocity E2E: Energy of FV at 2L/c  
CSX: Max Measured Compr. Stress ETR: Energy Transfer Ratio  
TSX: Tension Stress Maximum EMX: Max Transferred Energy  
BPM: Blows per Minute

BL#	depth ft	FMX kips	VMX f/s	CSX ksi	TSX ksi	BPM **	DFN in	E2E k-ft	ETR (%)	EMX k-ft
1	0.00	34	10.8	22.6	10.2	0.0	2.30	0.328	94.1	0.329
2	0.00	34	11.1	23.0	10.6	29.0	2.40	0.340	97.5	0.341
3	0.00	35	10.9	23.2	10.8	29.3	2.38	0.339	100.7	0.352
4	0.00	34	11.1	22.8	10.6	29.4	1.83	0.341	97.7	0.342
5	0.00	34	11.0	22.5	10.5	29.3	1.65	0.337	96.6	0.338
6	0.00	34	11.1	22.7	9.7	29.4	1.86	0.340	102.8	0.360
7	0.00	34	10.7	22.8	10.1	29.4	1.61	0.327	95.5	0.334
8	0.00	32	10.7	21.8	10.0	29.4	1.43	0.330	94.5	0.331
9	0.00	34	11.2	22.5	10.3	29.5	2.12	0.344	100.9	0.353
10	0.00	32	10.7	21.7	9.5	29.6	1.81	0.332	98.8	0.346
11	0.00	33	10.7	22.3	9.7	29.7	1.64	0.329	94.9	0.332
12	0.00	33	10.8	22.2	9.6	29.5	1.53	0.319	91.6	0.320
13	0.00	32	10.6	21.6	9.5	29.7	1.34	0.324	92.8	0.325
14	0.00	33	10.8	22.3	9.2	29.5	1.12	0.336	95.5	0.338
15	0.00	33	10.9	22.4	8.9	29.6	1.53	0.334	95.7	0.335
16	0.00	34	10.7	22.5	8.8	29.7	1.17	0.332	95.0	0.332
17	0.00	33	10.8	22.1	8.4	29.5	1.67	0.334	95.7	0.335
18	0.00	34	10.7	22.7	7.7	29.7	1.40	0.330	95.9	0.336
19	0.00	33	10.9	22.2	7.5	29.5	1.77	0.335	99.2	0.347
Average		33	10.9	22.4	9.6	29.5	1.71	0.333	96.6	0.338

Total number of blows analyzed: 19

Time Summary

Drive 37 seconds

3:08:40 PM - 3:09:17 PM (1/3/2007) BN 1 - 19



engineering and constructing a better tomorrow

February 22, 2007

Memorandum to File DCN STP 093  
From: Steve Kiser *SK 2-22-07*  
Reviewed By: Kathryn White **KAW 2/22/07**

Subject: **Report of SPT Energy – MACTEC Charlotte D-50 ATV Rig (Serial No. 01) Automatic Hammer**  
**WORK INSTRUCTION DCN STP 093**  
South Texas Project (STP) COL Site  
Wadsworth, Texas  
MACTEC Project No. 5050-06-0496

Mr. Steve Kiser of MACTEC Engineering and Consulting, Inc. (MACTEC) performed energy measurements on the drill rig at the subject site per the referenced Work Instruction. This memorandum summarizes the field testing activities and presents the results of the energy measurements.

#### **SPT Energy Field Measurements**

SPT energy measurements were made on November 6 and 7, 2006, during drilling of Boring B-433 at the referenced site. The testing was performed from approximately 2:45 to 4:20 PM on November 6, and 8:00 to 9:00 AM on November 7 under cloudy skies and a temperature of about 78 degrees Fahrenheit. The boring was drilled with personnel and equipment from the MACTEC office in Charlotte, North Carolina. The drilling equipment consisted of a Diedrich D-50 model ATV-mounted drill rig with an SPT automatic hammer. The drilling tools consisted of AW-J-sized drilling rods and a 2-foot long split tube sampler. Mud rotary drilling techniques were used to advance the boring below the depth at which groundwater was encountered at the time of energy testing. The drill rig operator during sampling was Mr. Gary Skoglund. Energy measurements were recorded during sampling at the depth intervals shown in Table 1.

The energy measurements were performed with a Pile Driving Analyzer (PDA) model PAK (Serial No. 1430), and calibrated accelerometers (Serial Nos. P5953 and K0686) and strain gages (Serial Nos. AW #144/1 and AW#144/2). An AW-sized steel drill rod, 2-feet long and instrumented with dedicated strain gages, was inserted at the top of the drill rod string immediately below the SPT hammer. The inserted rod was also instrumented with two piezoresistive accelerometers that were bolted to the outside of the rod. The instrumented rod insert had a cross-sectional area of approximately 1.19 square inches and an outside diameter of approximately 1.75 inches at the gage location. The drill rods included in the drill rod string were hollow rods in 5 to 10-foot long sections, with an outside and inside diameter of approximately 1.75 and 1.375 inches, respectively. The recommended operation rate of the hammer is not known. Due to the closed hammer system, the hammer lubrication condition and anvil dimensions could not be observed.

14 Pages Total

### Calibration Records

Calibration records were provided to Bechtel on January 9, 2007. The calibration records for all the above are filed in DCN STP850.

### Calculations for EFV

The work was done in general accordance with ASTM D 4633-05. The strain and acceleration signals were converted to force and velocity by the PDA, and the data was interpreted by the PDA according to the Case Method equation. The maximum energy transmitted to the drill rod string (as measured at the location of the strain gages and accelerometers) was calculated by the PDA using the EFV method equation, as shown below:

$$EFV = \int F(t) * V(t) * dt$$

Where: EFV = Transferred energy (EFV equation), or Energy of FV

F(t) = Calculated force at time t

V(t) = Calculated velocity at time t

The EFV method of energy calculation is recommended in ASTM Standard D4633-05. The EFV equation, integrated over the complete wave event, measures the total energy content of the event using both force and velocity measurements. The EFV values associated with each blow analyzed are tabulated in the attached PDILOT tables and are also shown graphically in the PDILOT charts.

### Calculations for ETR

The ratio of the measured transferred energy (EFV) to the theoretical potential energy of the SPT system (140 lb weight with the specified 30-inch fall) is the ETR. The ETR values (as percent of the theoretical value) are shown in Table 1.

### Comparison of ETR to Typical Energy Transfer Ratio Range

Based on a research report published by the Florida Department of Transportation (FDOT) (Report WPI No. 0510859, 1999), the average ETR measured for automatic hammers is 79.6%. The standard deviation was 7.9%; therefore, the range of ETRs within one standard deviation of the average was reported to be 71.7% to 87.5%. This range of ETRs was also consistent with other research that was cited in the FDOT research paper. The ETR values shown in Table 1 are within the range of typical values for automatic hammers as reported in the literature.

### Discussion

Based on the field testing results, observations from the SPT energy measurements are summarized below:

- The data obtained by the PDA are consistent between individual hammer blows and between the sample depths tested. In general, the first and last one (and sometimes two) hammer blow records recorded by the PDA produced poor quality



data (which is relatively common) and, as such, the records were not used in the data reduction.

- The average energy transferred from the hammer to the drill rods for each individual depth interval using the EFV method ranged from 242 foot-pounds to 259 foot-pounds. These average energy transfers correspond to energy transfer ratios (ETR) of 69% to 74% of the theoretical energy (350 foot-pounds) of the SPT hammer.
- The average at each depth interval was calculated as the transferred energy for each analyzed blow of the depth intervals divided by the total number of hammer blows analyzed. The overall average energy transfer of the SPT system (for all the depth intervals tested) was 253.1 foot-pounds, with an average ETR of 72.3%.

Attachments: Page 4 Table 1 - Summary of SPT Energy Measurements – 1 Page  
Page 5 Work Instructions – SPT Energy MACTEC Charlotte D-50  
(Hammer #01) – 1 Page  
Page 6 Record of SPT Energy Measurement – 1 Page  
Pages 7-14 PDILOT Output – 8 Pages

**TABLE 1**  
**SUMMARY OF SPT ENERGY MEASUREMENTS (ASTM D4633-05)**  
 South Texas Project (STP) COL Site  
 Wadsworth, Texas  
 MACTEC Project No. 5050-06-0496

Rig Serial No.	Rig Owner	Rig Operator	Boring No. Tested	Date Tested	Sample Depth (feet)	SPT Blow Count (blows per six inches)	No. of Blows Analyzed	Average Measured Energy (Average EFV) (ft-lbs) <sup>a</sup>	Energy Transfer Ratio (%) <sup>b</sup> (Average ETR)
01 (D-50 ATV)	MACTEC (Charlotte Office)	Gary Skoglund	B-433	11/6/06 to 11/7/06	68.5 - 70.0	11 - 11 - 16	37	242	69.1%
					78.5 - 80.0	12 - 9 - 13	36	259	74.0%
					83.5 - 85.0	11 - 10 - 10	30	257	73.4%
					88.5 - 90.0	9 - 11 - 23	42	255	72.9%
<b>Average for Rig:</b>								<b>253.1</b>	<b>72.3%</b>

<sup>a</sup>Measured Energy is energy based on the EFV method, as outlined in ASTM D4633-05, for each blow recorded by the PDA. In some cases, the initial and final one to two blows produced poor quality data, and were not used to calculate the Average Measured Energy.

ETR = EMX \* 1000 lbs/kip

<sup>b</sup>Energy Transfer Ratio is the Measured Energy divided by the theoretical SPT energy of 350 foot-pounds (140 pound hammer falling 2.5 feet).

The average ETR values may differ slightly and insignificantly from those in the PDILOT tables due to roundoff.

Prepared By: <i>AVL</i>	Date: 2-22-07	Checked By: <i>J. Skoglund</i>	Date: 2/22/07
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**Work Instruction SPT-ENERGY #01**  
South Texas COL Project  
MACTEC Engineering and Consulting, Inc.

Issued To: Steve Kiser  
Location: STP Field Office Date: November 6, 2006  
Issued By: Jay Cerreo, Site Coordinator MACTEC Project No.: 5050-06-0496  
Valid Thru: 11/6/2006 To 11/6/2007 Rev. No. 0

**Task Description:** Perform SPT Energy measurements of drill rigs at the South Texas COL Project.

**Applicable Technical Procedures or Plans, or other reference:** ASTM (D4633), South Texas COL Geotechnical Work Plan Attachment 3, Bechtel's Engineering Specification for Subsurface Investigation and Laboratory Testing for South Texas Project Units 3 & 4 (Specification).

**Specific Instructions** (note attachments where necessary): Follow guidelines in South Texas COL Work Plan, Attachment 3. Energy measurements to be performed on drill rigs while performing SPT sampling. Obtain energy measurements with the PDA at depth intervals in the range of <sup>10 to 15</sup> ~~5~~ to 100 feet below the ground surface in general accordance with ASTM D4633-05. Perform energy measurement for SPT automatic hammer number 01. The hammer number is stamped on the hammer.

**Special Instructions:** Complete all field forms in ink.

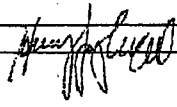
**Report Format:** Completed Field Forms As Follows: Daily Field Report, Record of SPT Energy Measurement and PDILOT output data, Photographs (rig and equipment setup, energy measurement equipment).

**Specific Quality Assurance Procedures Applicable:** None

**Hold Points or Witness Points:** Direction to perform energy measurements received from the Site Coordinator.  
Calibration record of energy measurement equipment on file.

**Records:** All records generated shall be considered QA Records.

Reviewed and Approved By: (Note: Only one signature is required to issue)

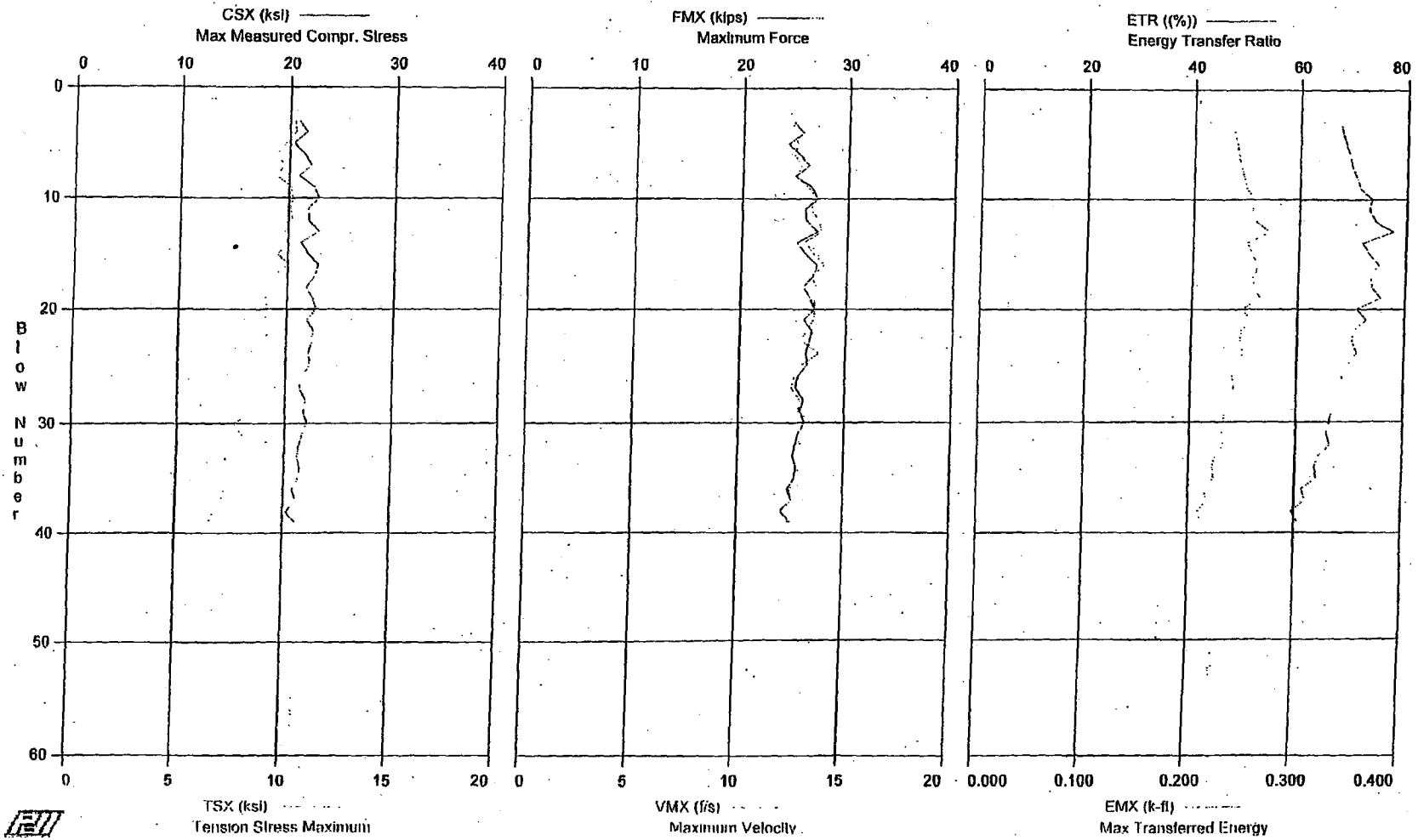
Project Manager (MACTEC): \_\_\_\_\_ Date: \_\_\_\_\_  
Project Principal (MACTEC): \_\_\_\_\_ Date: \_\_\_\_\_  
Site Coordinator (MACTEC):  Date: 11/6/06

No. of Pages: 1

DCN: STP093



STP COL Project - Boring B-433; 68.5' - 70' Sample



STP COL Project - Boring B-433; 68.5' - 70' Sample  
OP: SEK

Rig Serial No. 01 (MACTEC Charlotte D-50)  
Test date: 6-Nov-2006

AR: 1.19 in<sup>2</sup>  
LE: 71.00 ft  
WS: 16,807.9 f/s

SP: 0.492 k/ft<sup>3</sup>  
EM: 30,000 ksi  
JC: 0.60

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
FVP: Force/Velocity proportionality

BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	FVP []	BPM **	EFV **	ETR (%)	EMX .k-ft
3	0.00	20.80	10.20	25	12.4	0.66	52.9	0.2	67.5	0.236
4	0.00	21.58	10.28	26	12.2	0.71	51.5	0.2	67.8	0.237
5	0.00	20.34	9.81	24	12.6	0.70	51.5	0.2	68.5	0.240
6	0.00	21.33	9.41	25	12.4	0.67	51.4	0.2	69.2	0.242
7	0.00	22.02	9.71	26	12.7	0.66	51.4	0.2	69.7	0.244
8	0.00	20.94	9.39	25	12.5	0.65	51.5	0.2	70.5	0.247
9	0.00	22.30	10.06	27	13.1	0.64	51.4	0.2	71.2	0.249
10	0.00	22.78	10.15	27	13.6	0.63	51.5	0.3	73.4	0.257
11	0.00	21.81	10.07	26	13.2	0.64	51.4	0.3	73.0	0.255
12	0.00	21.86	10.15	26	13.6	0.62	51.2	0.3	74.1	0.259
13	0.00	22.84	9.82	27	13.7	0.64	51.2	0.3	77.5	0.271
14	0.00	21.19	10.08	25	13.0	0.64	53.4	0.3	71.8	0.251
15	0.00	21.91	9.50	26	13.4	0.63	49.6	0.3	73.2	0.256
16	0.00	22.81	10.05	27	13.9	0.64	51.0	0.3	74.9	0.262
17	0.00	22.55	9.25	27	13.3	0.65	51.1	0.3	73.4	0.257
18	0.00	21.76	9.29	26	13.5	0.63	51.6	0.3	73.7	0.258
19	0.00	22.30	8.96	27	13.5	0.64	50.6	0.3	75.4	0.264
20	0.00	22.70	9.06	27	13.5	0.66	52.0	0.2	70.9	0.248
21	0.00	21.87	8.99	26	13.5	0.64	51.2	0.3	72.9	0.255
22	0.00	22.48	8.96	27	13.1	0.67	51.2	0.2	70.5	0.247
23	0.00	22.32	9.24	27	12.9	0.68	51.4	0.2	70.2	0.246
24	0.00	22.08	8.91	26	13.7	0.63	51.4	0.2	71.2	0.249
25	0.00	22.22	9.44	26	13.0	0.67	51.4	0.2	69.8	0.244
26	0.00	21.46	9.45	26	12.6	0.65	51.4	0.2	68.4	0.239
27	0.00	21.33	9.53	25	12.5	0.66	51.4	0.2	68.8	0.241
28	0.00	21.96	9.16	26	12.9	0.66	51.2	0.2	68.0	0.236
29	0.00	21.72	8.43	26	12.8	0.66	51.4	0.2	66.6	0.233
30	0.00	22.03	7.58	26	13.4	0.65	51.5	0.2	66.2	0.232
31	0.00	21.61	8.00	26	12.7	0.67	51.1	0.2	65.7	0.230
32	0.00	21.32	7.72	25	12.9	0.64	51.2	0.2	66.3	0.232
33	0.00	21.22	7.46	25	12.5	0.67	51.4	0.2	64.4	0.225
34	0.00	21.43	7.41	25	12.8	0.70	51.2	0.2	63.6	0.222
35	0.00	21.35	7.17	25	13.0	0.65	51.4	0.2	64.0	0.224
36	0.00	20.83	7.24	25	12.5	0.65	51.5	0.2	61.4	0.216
37	0.00	21.11	7.09	25	12.6	0.66	51.0	0.2	62.0	0.217
38	0.00	20.30	6.73	24	12.0	0.67	51.4	0.2	59.6	0.209
39	0.00	21.08	6.54	25	12.4	0.70	50.8	0.2	60.7	0.212
Average		21.72	8.93	26	13.0	0.66	51.4	0.2	69.1	0.242

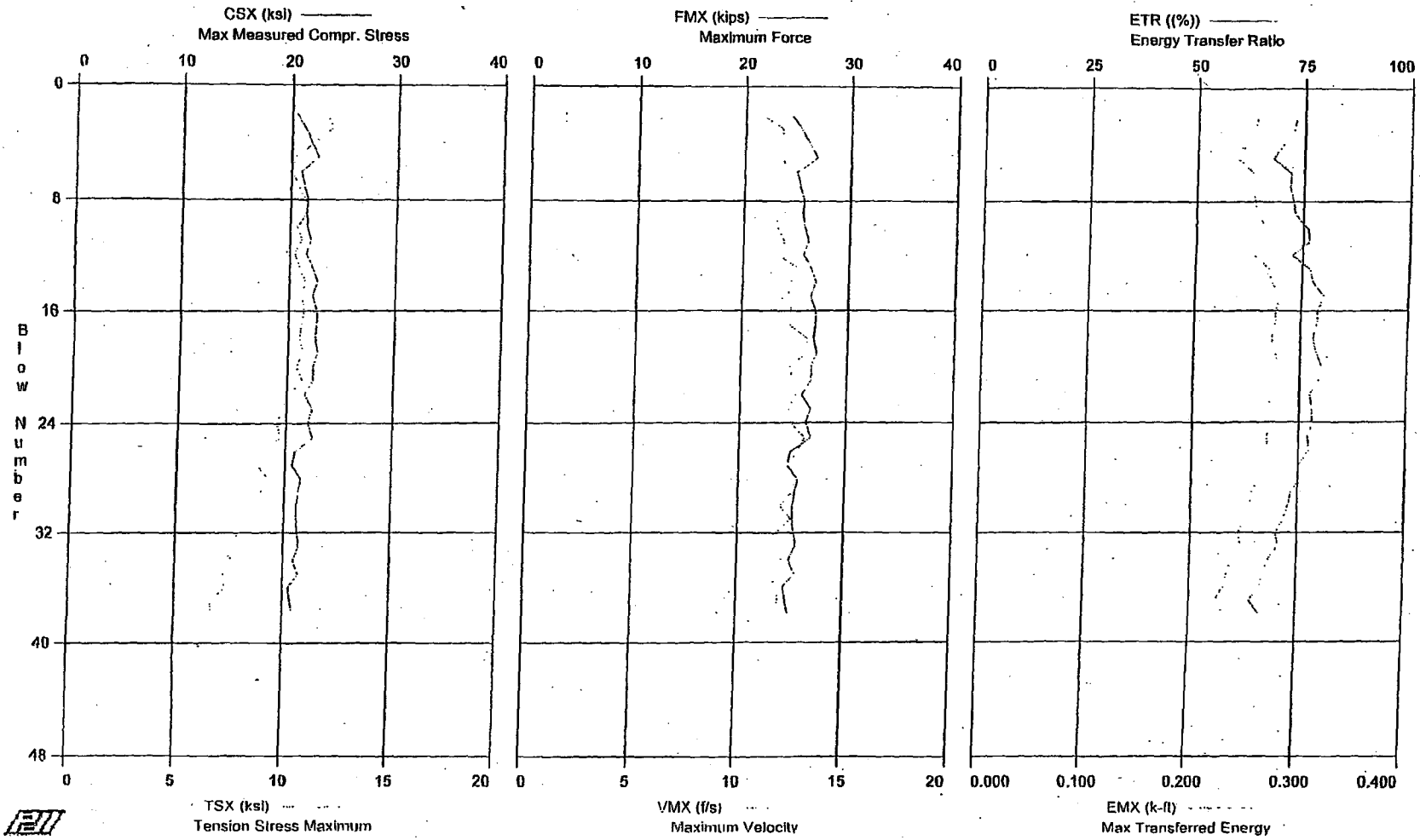
Total number of blows analyzed: 37

Time Summary

Drive 44 seconds

2:46:51 PM - 2:47:35 PM (11/6/2006) BN 2 - 40

STP COL Project - Boring B-433; 78.5' - 80' Sample



STP COL Project - Boring B-433; 78.5' - 80' Sample  
OP: SEK

Rig Serial No. 01 (MACTEC Charlotte D-50)  
Test date: 6-Nov-2006

AR: 1.19 in<sup>2</sup> SP: 0.492 k/ft<sup>3</sup>  
LE: 81.00 ft EM: 30,000 ksi  
WS: 16,807.9 f/s JC: 0.60

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
FVP: Force/Velocity proportionality  
BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	FVP ↓	BPM **	EFV **	ETR (%)	EMX k-ft
2	0.00	20.40	11.60	24	10.7	0.79	0.0	0.3	73.2	0.256
3	0.00	21.19	11.91	25	11.7	0.86	49.4	0.3	72.2	0.253
5	0.00	22.53	10.17	27	11.7	1.08	0.0	0.2	67.6	0.237
6	0.00	20.91	9.95	25	12.1	0.97	49.8	0.3	71.9	0.252
7	0.00	21.21	10.32	25	11.8	1.00	50.0	0.3	71.7	0.251
8	0.00	21.55	10.66	26	11.4	0.87	49.9	0.3	72.5	0.254
9	0.00	21.44	10.76	26	11.5	1.05	49.7	0.3	73.2	0.256
10	0.00	21.63	10.32	26	11.6	0.86	49.8	0.3	76.2	0.267
11	0.00	21.91	10.50	26	11.9	0.87	49.5	0.3	76.5	0.268
12	0.00	21.56	10.20	26	11.6	0.86	55.9	0.3	72.5	0.254
13	0.00	22.20	10.46	26	12.6	0.83	50.3	0.3	76.8	0.269
14	0.00	22.60	10.71	27	12.2	0.84	52.9	0.3	77.5	0.271
15	0.00	22.20	10.60	26	12.1	1.02	52.9	0.3	80.4	0.281
16	0.00	22.62	10.66	27	12.3	0.85	53.1	0.3	78.9	0.276
17	0.00	22.64	10.59	27	12.2	0.85	53.4	0.3	78.9	0.276
18	0.00	22.50	10.49	27	13.1	0.97	53.1	0.3	77.9	0.273
19	0.00	22.79	10.67	27	13.1	0.97	53.0	0.3	78.8	0.276
20	0.00	22.38	10.39	27	12.3	0.85	53.1	0.3	80.2	0.281
21	0.00	22.39	10.69	27	12.4	0.86	53.2	0.3	79.6	0.278
22	0.00	21.67	9.96	26	12.6	0.84	53.5	0.3	77.8	0.272
23	0.00	22.37	9.80	27	12.3	1.02	52.5	0.3	77.9	0.273
24	0.00	22.03	9.54	26	12.4	0.85	53.1	0.3	78.2	0.274
25	0.00	22.49	9.75	27	13.1	0.97	52.8	0.3	77.1	0.270
26	0.00	20.88	8.66	25	12.7	0.85	53.0	0.3	77.4	0.271
27	0.00	20.61	8.68	25	12.2	0.85	53.3	0.3	75.0	0.263
28	0.00	21.47	9.24	26	12.7	0.85	52.7	0.3	75.3	0.263
29	0.00	21.26	8.90	25	12.5	0.95	53.4	0.3	73.4	0.257
30	0.00	21.12	8.56	25	12.0	0.99	53.1	0.3	72.8	0.256
31	0.00	21.12	8.26	25	12.5	0.82	52.6	0.3	71.7	0.251
32	0.00	21.23	7.97	25	11.8	0.82	53.0	0.2	70.0	0.245
33	0.00	21.41	7.22	25	12.0	0.99	52.8	0.2	70.4	0.247
34	0.00	20.86	7.61	25	12.1	0.81	53.0	0.2	68.3	0.239
35	0.00	21.37	7.23	25	11.6	0.81	52.8	0.2	67.2	0.235
36	0.00	20.46	7.31	24	11.9	0.82	53.1	0.2	66.3	0.232
37	0.00	20.69	6.64	25	11.9	0.97	52.9	0.2	64.1	0.224
38	0.00	20.88	6.69	25	11.9	0.79	53.0	0.2	66.4	0.233
Average		21.63	9.55	26	12.1	0.90	52.3	0.3	74.0	0.259

Total number of blows analyzed: 36

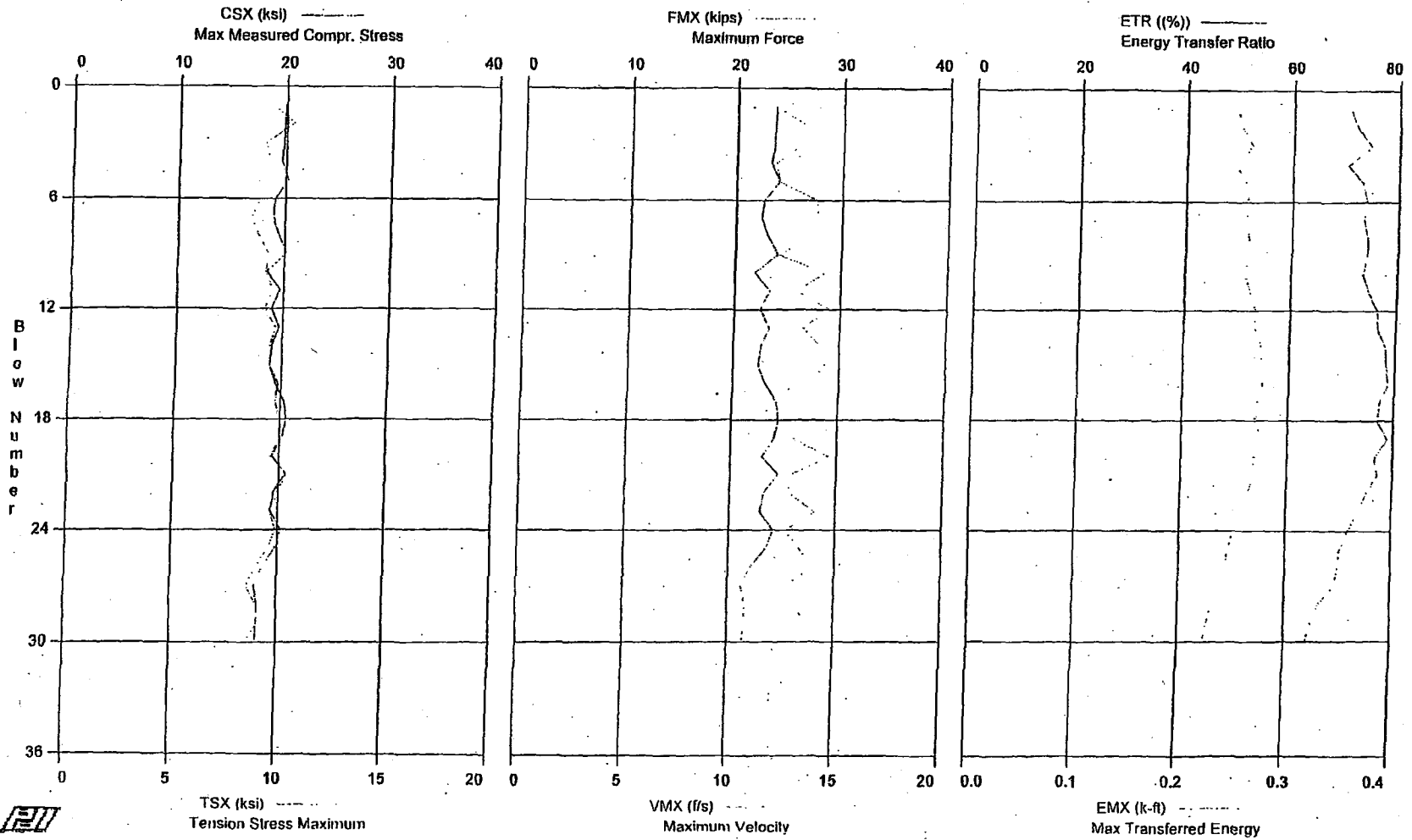
Time Summary

Drive 49 seconds

4:18:00 PM - 4:18:49 PM (11/6/2006) BN 2 - 39



STP COL Project - Boring B-433; 83.5' - 85' Sample



MACTEC Engineering and Consulting, Inc.  
Case Method Results

Page 1 of 1  
PDIPILOT Ver. 2005.2 - Printed: 7-Nov-2006

STP COL Project - Boring B-433; 83.5' - 85' Sample  
OP: SEK

Rig Serial No. 01 (MACTEC Charlotte D-60)  
Test date: 7-Nov-2006

AR: 1.19 in<sup>2</sup>  
LE: 86.00 ft  
WS: 16,807.9 f/s

SP: 0.492 k/ft<sup>3</sup>  
EM: 30,000 ksi  
JC: 0.60

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
FVP: Force/Velocity proportionality

BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	FVP []	BPM **	EFV **	ETR (%)	EMX k-ft
1	0.00	19.87	9.26	24	11.8	0.56	56.9	0.2	70.6	0.247
2	0.00	19.76	10.31	24	13.2	0.85	57.1	0.3	71.8	0.251
3	0.00	19.71	8.99	23	13.0	0.85	54.7	0.3	74.7	0.261
4	0.00	19.50	9.23	23	11.8	0.54	55.8	0.2	70.2	0.246
5	0.00	20.20	8.86	24	12.0	0.96	55.2	0.3	73.1	0.256
6	0.00	19.00	8.77	23	13.8	0.78	55.7	0.3	73.8	0.258
7	0.00	18.81	8.39	22	13.9	0.77	57.4	0.3	73.3	0.257
8	0.00	19.34	8.72	23	13.3	0.83	53.6	0.3	74.1	0.259
9	0.00	20.14	9.21	24	12.0	0.96	55.9	0.3	74.1	0.259
10	0.00	18.37	9.13	22	14.2	0.74	55.7	0.3	73.4	0.257
11	0.00	19.58	9.42	23	12.9	0.86	55.5	0.3	74.6	0.261
12	0.00	18.85	9.11	22	14.5	0.74	55.6	0.3	76.3	0.267
13	0.00	19.59	9.61	23	13.2	0.84	55.5	0.3	76.4	0.267
14	0.00	19.01	9.42	23	14.2	0.76	55.1	0.3	78.1	0.274
15	0.00	18.79	9.39	22	14.3	0.74	55.6	0.3	78.3	0.274
16	0.00	19.36	9.80	23	13.5	0.81	55.4	0.3	78.7	0.275
17	0.00	20.29	9.73	24	13.6	0.85	55.1	0.3	77.3	0.271
18	0.00	20.52	9.95	24	13.7	0.85	55.6	0.3	76.8	0.269
19	0.00	20.23	10.03	24	12.9	0.89	55.4	0.3	78.9	0.276
20	0.00	19.30	9.54	23	14.6	0.75	55.1	0.3	76.5	0.268
21	0.00	20.55	10.29	24	12.8	0.92	55.1	0.3	77.0	0.269
22	0.00	19.50	9.96	23	12.8	0.62	55.2	0.3	75.0	0.263
23	0.00	19.24	9.57	23	14.1	0.78	55.4	0.3	73.3	0.257
24	0.00	20.28	9.86	24	12.6	0.91	55.2	0.3	71.8	0.251
25	0.00	19.72	9.50	23	13.4	0.84	54.5	0.2	70.2	0.246
26	0.00	18.50	8.95	22	13.9	0.76	55.3	0.2	69.8	0.244
27	0.00	17.85	8.53	21	12.7	0.79	54.9	0.2	69.2	0.242
28	0.00	18.15	9.02	22	13.1	0.79	54.7	0.2	66.3	0.232
29	0.00	18.11	9.11	22	13.7	0.75	55.2	0.2	65.0	0.227
30	0.00	17.97	8.53	21	13.7	0.74	55.1	0.2	64.1	0.224
Average		19.34	9.34	23	13.3	0.78	55.4	0.3	73.4	0.257

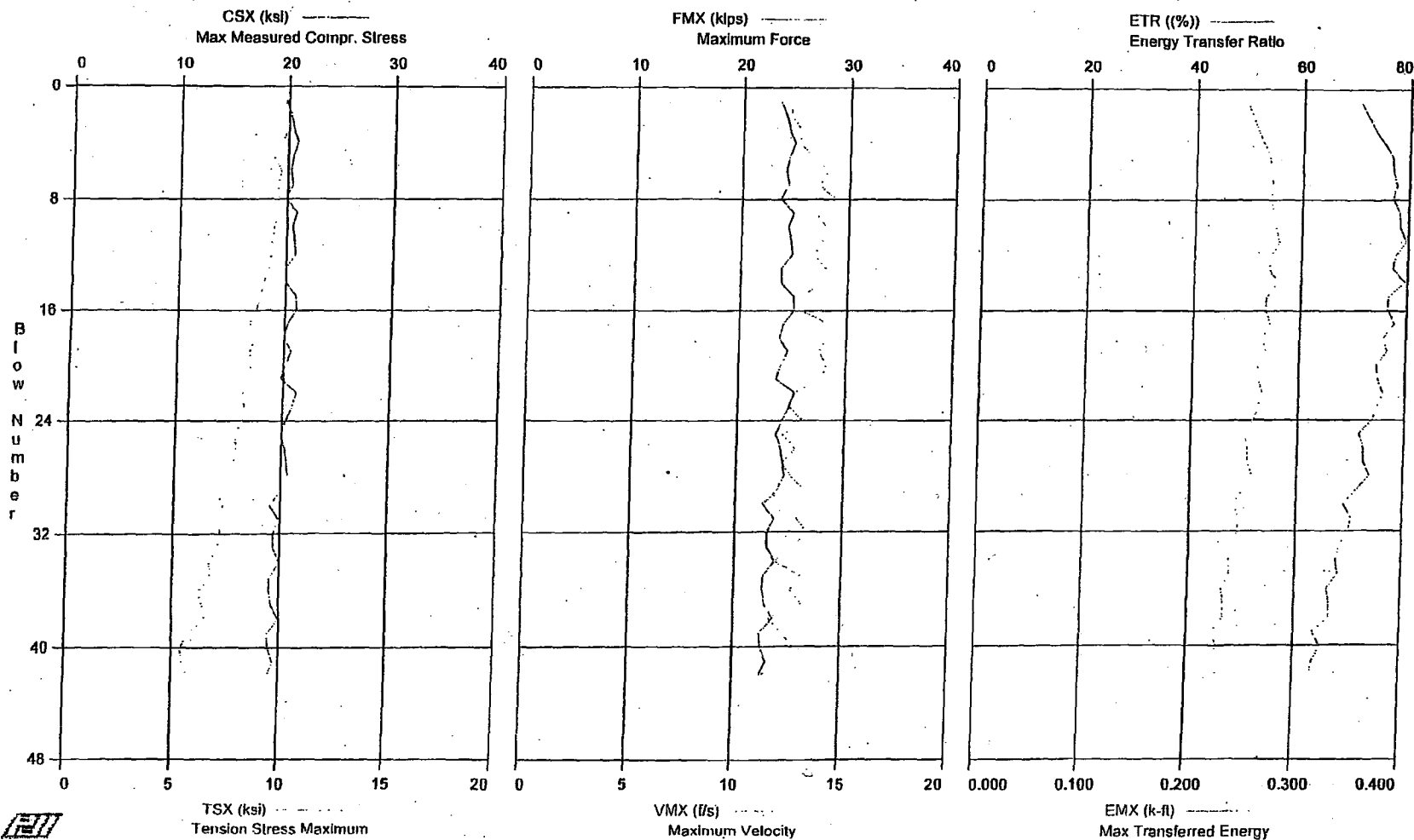
Total number of blows analyzed: 30

Time Summary

Drive 33 seconds

8:04:38 AM - 8:05:11 AM (11/7/2006) BN 1 - 31

STP COL Project - Boring B-433; 88.5' - 90' Sample



STP COL Project - Boring B-433; 88.5' - 90' Sample  
OP: SEK

Rig Serial No. 01 (MACTEC Charlotte D-50)  
Test date: 7-Nov-2006

AR: 1.19 in<sup>2</sup>  
LE: 91.00 ft  
WS: 16,807.9 f/s

SP: 0.492 k/ft<sup>3</sup>  
EM: 30,000 ksi  
JC: 0.60

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
FVP: Force/Velocity proportionality

BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	FVP []	BPM **	EFV **	ETR (%)	EMX k-ft
1	0.00	19.69	9.76	23	12.3	0.55	0.0	0.2	70.7	0.247
2	0.00	20.13	10.08	24	12.2	0.94	56.2	0.3	72.0	0.252
3	0.00	20.38	10.00	24	12.6	0.92	55.2	0.3	73.4	0.257
4	0.00	20.85	9.67	25	12.6	0.94	55.1	0.3	75.3	0.263
5	0.00	20.45	9.31	24	13.3	0.88	54.3	0.3	76.8	0.269
6	0.00	20.22	9.67	24	13.9	0.82	55.2	0.3	76.9	0.269
7	0.00	20.42	9.51	24	13.6	0.86	54.5	0.3	77.6	0.272
8	0.00	19.81	9.59	24	14.4	0.78	55.4	0.3	77.0	0.270
9	0.00	20.88	9.53	25	13.4	0.88	54.8	0.3	78.4	0.274
10	0.00	20.46	9.38	24	14.0	0.83	54.5	0.3	78.4	0.275
11	0.00	20.70	9.30	25	13.8	0.85	55.1	0.3	79.6	0.279
12	0.00	20.77	9.24	25	13.4	0.88	54.8	0.3	77.7	0.272
13	0.00	19.96	9.21	24	14.0	0.81	54.8	0.3	77.2	0.270
14	0.00	19.97	8.92	24	13.8	0.82	54.9	0.3	79.5	0.278
15	0.00	20.95	8.83	25	12.9	0.92	54.8	0.3	76.4	0.268
16	0.00	21.02	8.58	25	12.8	0.93	54.9	0.3	76.4	0.267
17	0.00	20.26	8.33	24	14.2	0.81	54.5	0.3	77.7	0.272
18	0.00	19.92	8.60	24	14.2	0.80	54.7	0.3	75.7	0.265
19	0.00	20.63	8.36	25	13.7	0.85	54.4	0.3	76.5	0.268
20	0.00	20.11	8.41	24	14.1	0.81	55.0	0.3	74.6	0.261
21	0.00	19.74	8.29	23	13.9	0.81	54.2	0.3	74.8	0.262
22	0.00	21.19	8.06	25	12.6	0.59	54.3	0.3	75.8	0.266
23	0.00	20.82	8.14	25	12.4	0.60	54.8	0.3	74.8	0.262
24	0.00	20.29	8.08	24	13.1	0.88	54.6	0.3	73.8	0.258
25	0.00	19.82	7.72	24	12.1	0.93	54.8	0.3	71.4	0.250
26	0.00	20.24	7.80	24	12.7	0.91	54.3	0.3	72.4	0.253
27	0.00	20.40	7.69	24	12.1	0.63	54.6	0.3	72.4	0.253
28	0.00	20.58	7.30	24	12.5	0.59	53.5	0.3	73.7	0.258
29	0.00	20.02	6.90	24	13.2	0.86	54.8	0.2	71.2	0.249
30	0.00	18.96	7.26	23	13.3	0.81	54.3	0.2	68.8	0.241
31	0.00	19.82	7.08	24	12.8	0.88	54.0	0.2	70.3	0.246
32	0.00	19.33	7.13	23	13.4	0.82	53.9	0.2	69.9	0.245
33	0.00	19.33	6.99	23	12.6	0.88	54.5	0.2	68.2	0.239
34	0.00	19.98	6.66	24	11.9	0.96	54.7	0.2	67.6	0.237
35	0.00	19.10	6.71	23	13.1	0.83	54.1	0.2	68.0	0.238
36	0.00	19.04	6.18	23	12.6	0.86	54.2	0.2	66.0	0.231
37	0.00	19.25	6.37	23	13.2	0.83	54.3	0.2	66.5	0.233
38	0.00	19.91	6.50	24	11.6	0.64	54.1	0.2	66.5	0.233
39	0.00	18.88	5.77	22	12.2	0.88	54.4	0.2	63.6	0.223
40	0.00	18.97	5.38	23	12.8	0.84	54.3	0.2	65.0	0.228
41	0.00	19.45	5.48	23	12.2	0.90	54.2	0.2	63.8	0.223
42	0.00	18.88	5.72	22	11.3	0.95	54.0	0.2	63.1	0.221
Average		20.04	8.04	24	13.0	0.83	54.6	0.3	72.8	0.255

Total number of blows analyzed: 42

Time Summary

Drive 47 seconds

8:58:41 AM - 8:59:28 AM (11/7/2006) BN 1 - 44



engineering and constructing a better tomorrow

January 16, 2007

Memorandum to File DCN STP644  
From: Steve Kiser *AK* 1-16-07  
Reviewed By: Kathryn White KAW 1/16/07

Subject: **Report of SPT Energy – MACTEC Raleigh CME 45 Trailer Rig (Serial No. 04) Automatic Hammer**  
**WORK INSTRUCTION DCN STP644**  
South Texas Project (STP) COL Site  
Wadsworth, Texas  
MACTEC Project No. 5050-06-0496

Mr. Steve Kiser of MACTEC Engineering and Consulting, Inc. (MACTEC) performed energy measurements on the drill rig at the subject site per the referenced Work Instruction. This memorandum summarizes the field testing activities and presents the results of the energy measurements.

#### **SPT Energy Field Measurements**

SPT energy measurements were made on November 29, 2006, during drilling of Boring B-333 at the referenced site. The testing was performed from approximately 2:15 to 3:45 PM under cloudy skies and a temperature of about 70 degrees Fahrenheit. The boring was drilled with personnel and equipment from the MACTEC office in Raleigh, North Carolina. The drilling equipment consisted of a CME 45 model trailer-mounted drill rig with an SPT automatic hammer. The drilling tools consisted of AW-J-sized drilling rods and a 2-foot long split tube sampler. Mud rotary drilling techniques were used to advance the boring below the depth at which groundwater was encountered at the time of energy testing. The drill rig operator during sampling was Mr. Danny Rhodes. Energy measurements were recorded during sampling at the depth intervals shown in Table 1.

The energy measurements were performed with a Pile Driving Analyzer (PDA) model PAK (Serial No. 1430), and calibrated accelerometers (Serial Nos. P5953 and P5094) and strain gages (Serial Nos. AW #144/1 and AW#144/2). An AW-sized steel drill rod, 2 feet long and instrumented with dedicated strain gages, was inserted at the top of the drill rod string immediately below the SPT hammer. The inserted rod was also instrumented with two piezoresistive accelerometers that were bolted to the outside of the rod. The instrumented rod insert had a cross-sectional area of approximately 1.19 square inches and an outside diameter of approximately 1.75 inches at the gage location. The drill rods included in the drill rod string were hollow rods in 5 to 10 foot long sections, with an outside and inside diameter of approximately 1.75 and 1.375 inches, respectively. The recommended operation rate of the hammer is not known. Due to the closed hammer system, the hammer lubrication condition and anvil dimensions could not be observed.

#### **Calibration Records**

The calibration records for all the above are filed in DCN STP850.

18 Pages Total

### Calculations for EFV

The work was done in general accordance with ASTM D 4633-05. The strain and acceleration signals were converted to force and velocity by the PDA, and the data was interpreted by the PDA according to the Case Method equation. The maximum energy transmitted to the drill rod string (as measured at the location of the strain gages and accelerometers) was calculated by the PDA using the EFV method equation, as shown below:

$$EFV = \int F(t) * V(t) * dt$$

Where: EFV = Transferred energy (EFV equation), or Energy of FV  
F(t) = Calculated force at time t  
V(t) = Calculated velocity at time t

The EFV method of energy calculation is recommended in ASTM Standard D4633-05. The EFV equation, integrated over the complete wave event, measures the total energy content of the event using both force and velocity measurements. The EFV values associated with each blow analyzed are tabulated in the attached PDILOT tables and are also shown graphically in the PDILOT charts.

### Calculations for ETR

The ratio of the measured transferred energy (EFV) to the theoretical potential energy of the SPT system (140 lb weight with the specified 30-inch fall) is the ETR. The ETR values (as percent of the theoretical value) are shown in Table 1.

### Comparison of ETR to Typical Energy Transfer Ratio Range

Based on a research report published by the Florida Department of Transportation (FDOT) (Report WPI No. 0510859, 1999), the average ETR measured for automatic hammers is 79.6%. The standard deviation was 7.9%; therefore, the range of ETRs within one standard deviation of the average was reported to be 71.7% to 87.5%. This range of ETRs was also consistent with other research that was cited in the FDOT research paper. The ETR values shown in Table 1 are within the range of typical values for automatic hammers as reported in the literature.

### Discussion

Based on the field testing results, observations from the SPT energy measurements are summarized below:

- The data obtained by the PDA are consistent between individual hammer blows and between the sample depths tested. In general, the first and last one (and sometimes two) hammer blow records recorded by the PDA produced poor quality data (which is relatively common) and, as such, the records were not used in the data reduction.
- The average energy transferred from the hammer to the drill rods for each individual depth interval using the EFV method ranged from 260 foot-pounds to

295 foot-pounds. These average energy transfers correspond to energy transfer ratios (ETR) of 74% to 84% of the theoretical energy (350 foot-pounds) of the SPT hammer.

- The average at each depth interval was calculated as the transferred energy for each analyzed blow of the depth intervals divided by the total number of hammer blows analyzed. The overall average energy transfer of the SPT system (for all the depth intervals tested) was 289.0 foot-pounds, with an average ETR of 82.6%.

Attachments: Page 4 Table 1 - Summary of SPT Energy Measurements – 1 Page  
Page 5 Work Instructions – SPT-Energy #04 – 1 Page  
Page 6 Record of SPT Energy Measurement – 1 Page  
Pages 7-18 PDILOT Output – 12 Pages

**TABLE 1**  
**SUMMARY OF SPT ENERGY MEASUREMENTS (ASTM D4633-05)**  
 South Texas Project (STP) COL Site  
 Wadsworth, Texas.  
 MACTEC Project No. 5050-06-0496

Rig Serial No.	Rig Owner	Rig Operator	Boring No. Tested	Date Tested	Sample Depth (feet)	SPT Blow Count (blows per six inches)	No. of Blows Analyzed	Average Measured Energy (Average EFV) (ft-lbs) <sup>a</sup>	Energy Transfer Ratio (%) <sup>b</sup> (Average ETR)
04 (CME 45 Trailer)	MACTEC (Raleigh Office)	Danny Rhodes	B-333	11/29/2006	13.5 - 15.0	6 - 7 - 9	22	260	74.3%
					23.5 - 25.0	3 - 5 - 5	13	281	80.3%
					28.5 - 30.0	7 - 11 - 12	29	289	82.6%
					33.5 - 35.0	16 - 24 - 23	63	288	82.3%
					38.5 - 40.0	15 - 41 - 68	134	295	84.3%
<b>Average for Rig:</b>								<b>289.0</b>	<b>82.6%</b>

<sup>a</sup>Measured Energy is energy based on the EFV method, as outlined in ASTM D4633-05, for each blow recorded by the PDA. In some cases, the initial and final one to two blows produced poor quality data, and were not used to calculate the Average Measured Energy.

EFV = EMX \* 1000 lbs/kip.

<sup>b</sup>Energy Transfer Ratio is the Measured Energy divided by the theoretical SPT energy of 350 foot-pounds (140 pound hammer falling 2.5 feet). The average ETR values may differ slightly and insignificantly from those in the PDILOT tables due to roundoff.

Prepared By: <i>RL</i>	Date: 1-16-07	Checked By: <i>KAW</i>	Date: 1-16-07
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**Work Instruction SPT-ENERGY #04**  
South Texas COL Project  
MACTEC Engineering and Consulting, Inc.

Issued To: Steve Kiser  
Location: STP Field Office Date: November 28, 2006  
Issued By: Jay Cerceo, Site Coordinator MACTEC Project No.: 5050-06-0496  
Valid Thru: 11/28/2006 To 11/28/2007 Rev. No. 0

**Task Description:** Perform SPT Energy measurements of drill rigs at the South Texas COL Project.

**Applicable Technical Procedures or Plans, or other reference:** ASTM (D4633), South Texas COL Geotechnical Work Plan Attachment 3, Bechtel's Engineering Specification for Subsurface Investigation and Laboratory Testing for South Texas Project Units 3 & 4 (Specification).

**Specific Instructions** (note attachments where necessary): Follow guidelines in South Texas COL Work Plan, Attachment 3. Energy measurements to be performed on drill rigs while performing SPT sampling. Obtain energy measurements with the PDA at depth intervals in the range of 15 to 100 feet below the ground surface in general accordance with ASTM D4633-05. Perform energy measurement for SPT automatic hammer number 04. The hammer number is stamped on the hammer.

**Special Instructions:** Complete all field forms in ink.

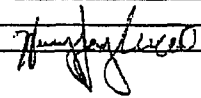
**Report Format:** Completed Field Forms As Follows: Daily Field Report, Record of SPT Energy Measurement and PDILOT output data, Photographs (rig and equipment setup, energy measurement equipment).

**Specific Quality Assurance Procedures Applicable:** None

**Hold Points or Witness Points:** None

**Records:** All records generated shall be considered QA Records.

Reviewed and Approved By: (Note: Only one signature is required to issue)

Project Manager (MACTEC):	_____	Date:	_____
Project Principal (MACTEC):	_____	Date:	_____
Site Coordinator (MACTEC):		Date:	<u>11/28/2006</u>

No. of Pages: 1

DCN: STP644

C:\06-0496 STP COL\Work Instructions\work instructions for SPT Energy #04 MACTEC - Raleigh.doc

# MACTEC

2801 YORKMONT ROAD, SUITE 100 □ CHARLOTTE, NC 28208  
 Telephone: (704) 357-8600 / Facsimile: (704) 357-8638

## RECORD OF SPT ENERGY MEASUREMENT

GENERAL INFORMATION		DRILL RIG DATA	
PROJECT:	South Texas Project	MAKE:	CME
LOCATION:	Wadsworth, Texas	MODEL:	45 TRAILER
PROJECT NO.:	5050-DE-0496	SERIAL NO.:	# 04
DATE:	11-29-06	HAMMER TYPE:	AUTO MATEC
WEATHER:	CLOUDY; 70°	ROPE CONDITION:	N/A
INSPECTOR:	Steve Kiser	ROD SIZE:	AW-5
DRILLING COMPANY:	MACTEC - RALEIGH	NO. OF SHEAVES:	N/A

### BORING DATA

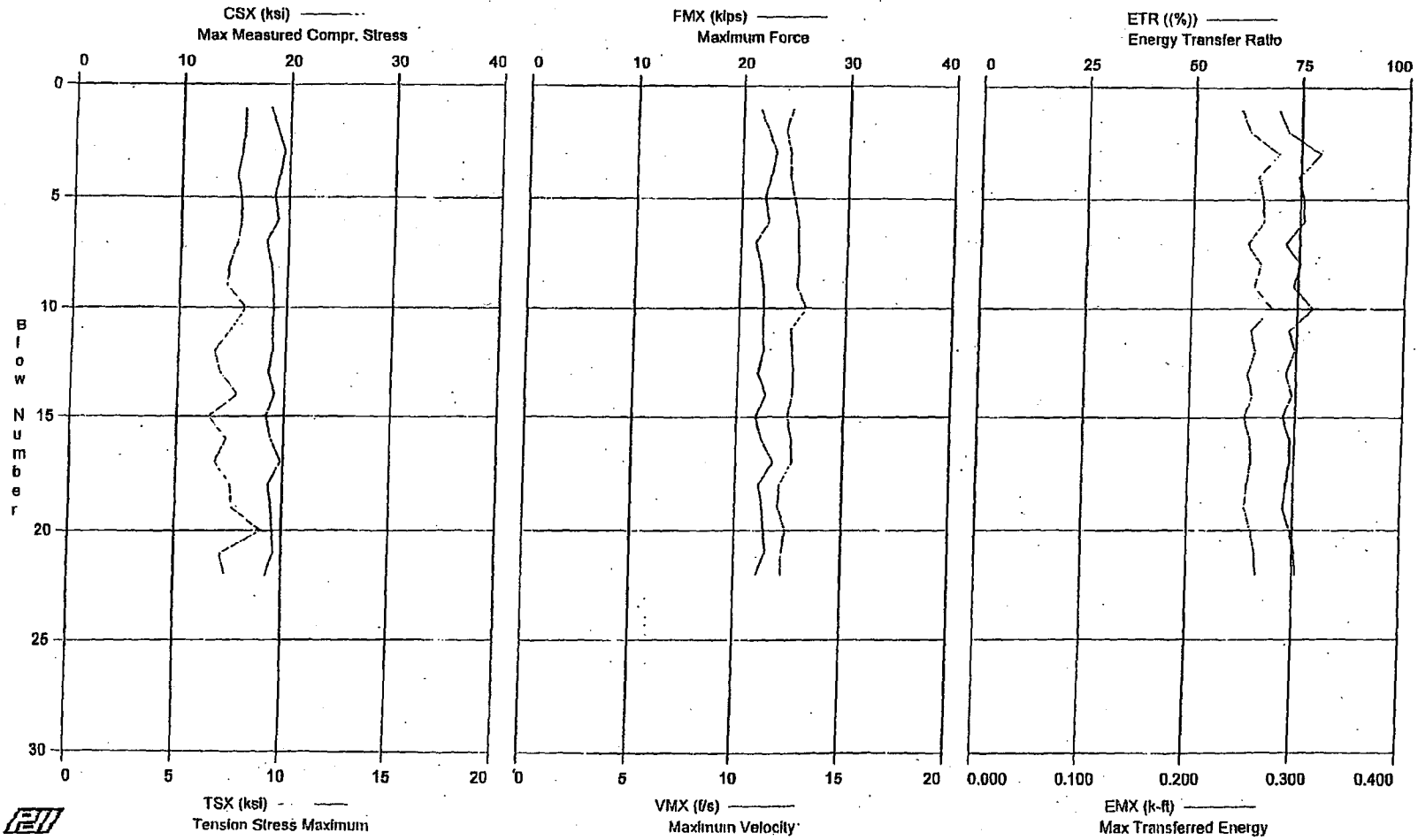
BORING NUMBER:	B-333		
DEPTH DRILLED:	100' PLANNED		
TIME DRIVEN:	1:45 PM		
RIG OPERATOR:	DOANMY RHODES		
HAMMER OPERATOR:	N.L.		
PDA PAK SERIAL NO.:	1430	1430	1430
INSTR. ROD AREA:	1.19 in <sup>2</sup>		
ACCEL. SERIAL NOS.:	5074 / 5953		
STRAIN SERIAL NOS.:	144 AW 1/2		

SAMPLE DEPTH (feet)	SPT N-VALUE (bpf)	DEPTH cont. (feet)	SPT N-VALUE (bpf)	SAMPLE DEPTH (feet)	SPT N-VALUE (bpf)	DEPTH cont. (feet)	SPT N-VALUE (bpf)	SAMPLE DEPTH (feet)	SPT N-VALUE (bpf)	DEPTH cont. (feet)	SPT N-VALUE (bpf)
13.5/15	6-7-9										
23.5/25	3-5-5										
29.5/30	7-11-12										
33.5/35	10-24-23										
38.5/40	15-41-68										

REMARKS:

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STP COL Project - Boring B-333; 13.5' - 15' Sample



STP COL Project - Boring B-333; 13.5' - 15' Sample

Rig Serial No. 04 (MACTEC Raleigh CME 45 Trailer)

OP: SEK

Test date: 29-Nov-2006

AR: 1.18 in<sup>2</sup>

SP: 0.492 k/ft<sup>3</sup>

LE: 19.00 ft

EM: 30,000 ksi

WS: 16,807.9 f/s

JC: 0.60

CSX: Max Measured Compr. Stress

BPM: Blows per Minute

TSX: Tension Stress Maximum

EFV: Energy of FV

FMX: Maximum Force

ETR: Energy Transfer Ratio

VMX: Maximum Velocity

EMX: Max Transferred Energy

DFN: Final Displacement

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	DFN in	BPM **	EFV **	ETR (%)	EMX k-ft
1	0.00	18.09	7.86	22	12.3	1.11	0.0	0.2	69.4	0.243
2	0.00	18.81	7.88	22	12.0	1.18	36.3	0.3	71.8	0.251
3	0.00	19.47	7.76	23	12.3	1.28	36.4	0.3	79.7	0.279
4	0.00	19.10	7.55	23	12.3	1.28	36.4	0.3	74.4	0.260
5	0.00	18.64	7.75	22	12.5	1.25	36.5	0.3	75.7	0.265
6	0.00	18.99	7.79	23	12.7	1.28	36.5	0.3	75.9	0.266
7	0.00	17.94	7.61	21	12.7	1.65	36.5	0.3	71.6	0.251
8	0.00	18.41	7.26	22	12.7	2.23	36.4	0.3	75.4	0.264
9	0.00	18.67	7.19	22	12.7	1.31	36.5	0.3	73.9	0.259
10	0.00	18.76	8.06	22	13.1	2.19	36.5	0.3	78.8	0.276
11	0.00	18.70	7.42	22	12.4	1.74	36.5	0.3	73.1	0.256
12	0.00	18.81	6.65	22	12.5	1.72	36.6	0.3	74.6	0.261
13	0.00	18.42	6.93	22	12.6	1.60	36.5	0.3	72.6	0.254
14	0.00	19.08	7.79	23	12.6	1.75	36.5	0.3	74.0	0.259
15	0.00	18.30	6.46	22	12.4	1.40	36.5	0.3	72.1	0.252
16	0.00	18.79	7.28	22	12.6	1.89	36.5	0.3	73.8	0.258
17	0.00	19.72	6.77	23	12.6	1.90	36.5	0.3	73.9	0.259
18	0.00	18.66	7.53	22	12.1	1.58	36.4	0.3	73.3	0.256
19	0.00	18.93	7.60	23	12.0	1.40	36.6	0.3	72.6	0.254
20	0.00	19.09	9.02	23	12.4	1.35	36.4	0.3	74.2	0.260
21	0.00	19.25	7.12	23	12.2	1.53	36.5	0.3	75.4	0.264
22	0.00	18.52	7.35	22	12.2	1.28	36.5	0.3	75.7	0.266
Average		18.78	7.48	22	12.5	1.54	36.5	0.3	74.2	0.260

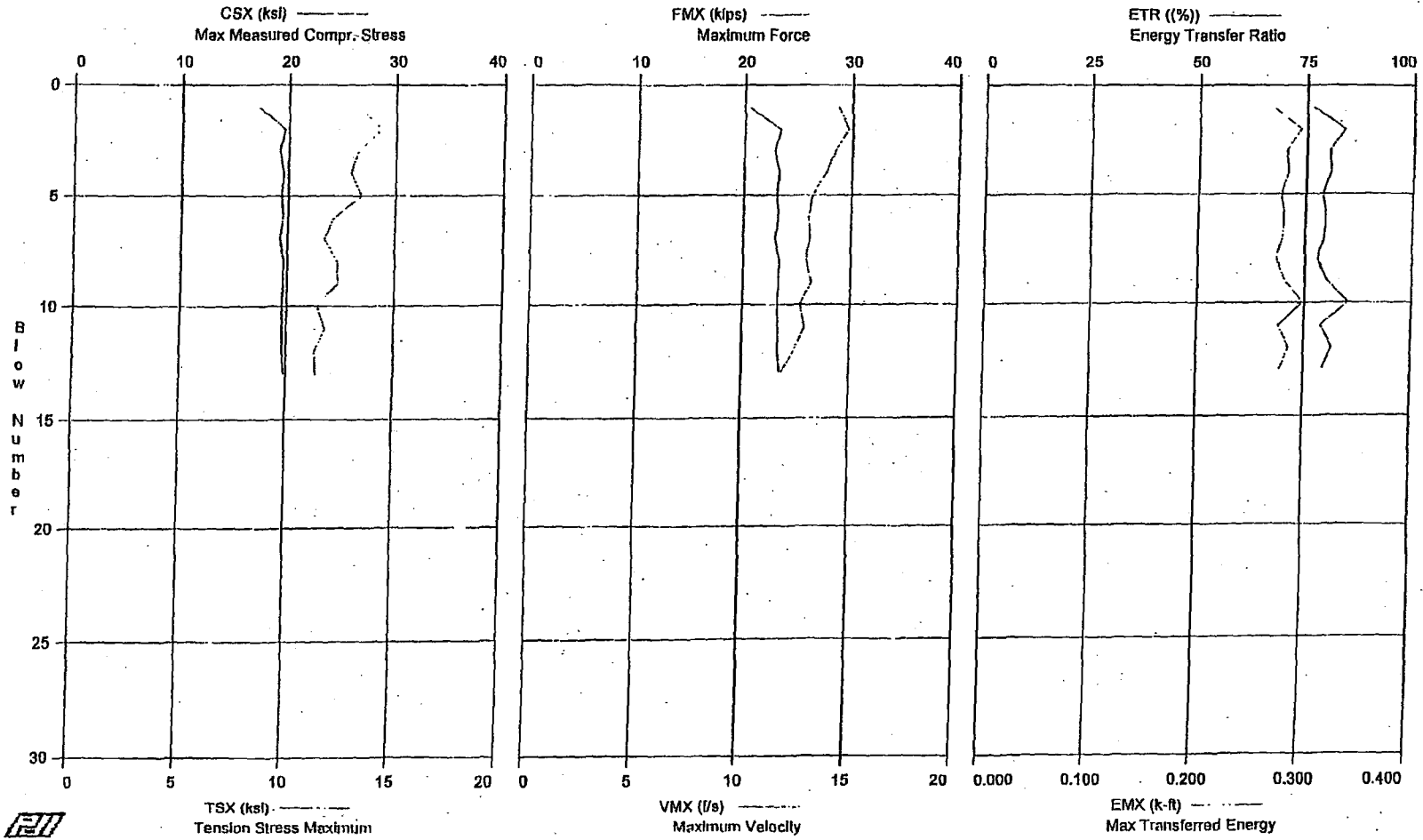
Total number of blows analyzed: 22

Time Summary

Drive 35 seconds

2:13:34 PM - 2:14:09 PM (11/29/2006) BN 1 - 22

STP COL Project - Boring B-333; 23.5' - 25' Sample



STP COL Project - Boring B-333; 23.5' - 25' Sample  
OP: SEK

Rig Serial No. 04 (MACTEC Raleigh CME 45 Trailer)  
Test date: 29-Nov-2006

AR: 1.18 in<sup>2</sup>  
LE: 29.00 ft  
WS: 16,807.9 lbs

SP: 0.492 k/ft<sup>3</sup>  
EM: 30,000 ksi  
JC: 0.60

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
DFN: Final Displacement

BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX ft/s	DFN in	BPM **	EFV **	ETR (%)	EMX k-ft
1	0.00	17.18	13.23	20	14.4	2.24	0.0	0.3	76.7	0.268
2	0.00	19.63	14.31	23	14.8	2.67	48.6	0.3	83.9	0.294
3	0.00	19.16	13.23	23	14.2	2.67	48.6	0.3	80.4	0.281
4	0.00	19.57	12.90	23	13.8	2.19	48.8	0.3	80.8	0.283
5	0.00	19.38	13.41	23	13.2	2.22	48.8	0.3	79.1	0.277
6	0.00	19.54	12.13	23	13.0	2.35	48.7	0.3	79.9	0.280
7	0.00	19.31	11.72	23	13.1	2.39	48.8	0.3	79.7	0.279
8	0.00	19.63	12.31	23	12.9	2.43	48.9	0.3	78.0	0.273
9	0.00	19.61	12.37	23	13.2	1.74	48.7	0.3	80.2	0.281
10	0.00	19.52	11.41	23	12.7	1.75	48.9	0.3	85.2	0.298
11	0.00	19.63	11.80	23	12.9	1.61	48.7	0.3	79.0	0.276
12	0.00	19.61	11.33	23	12.5	1.35	48.9	0.3	81.6	0.286
13	0.00	19.78	11.36	24	11.9	1.49	49.0	0.3	79.3	0.277
Average		19.35	12.42	23	13.3	2.10	48.8	0.3	80.3	0.281

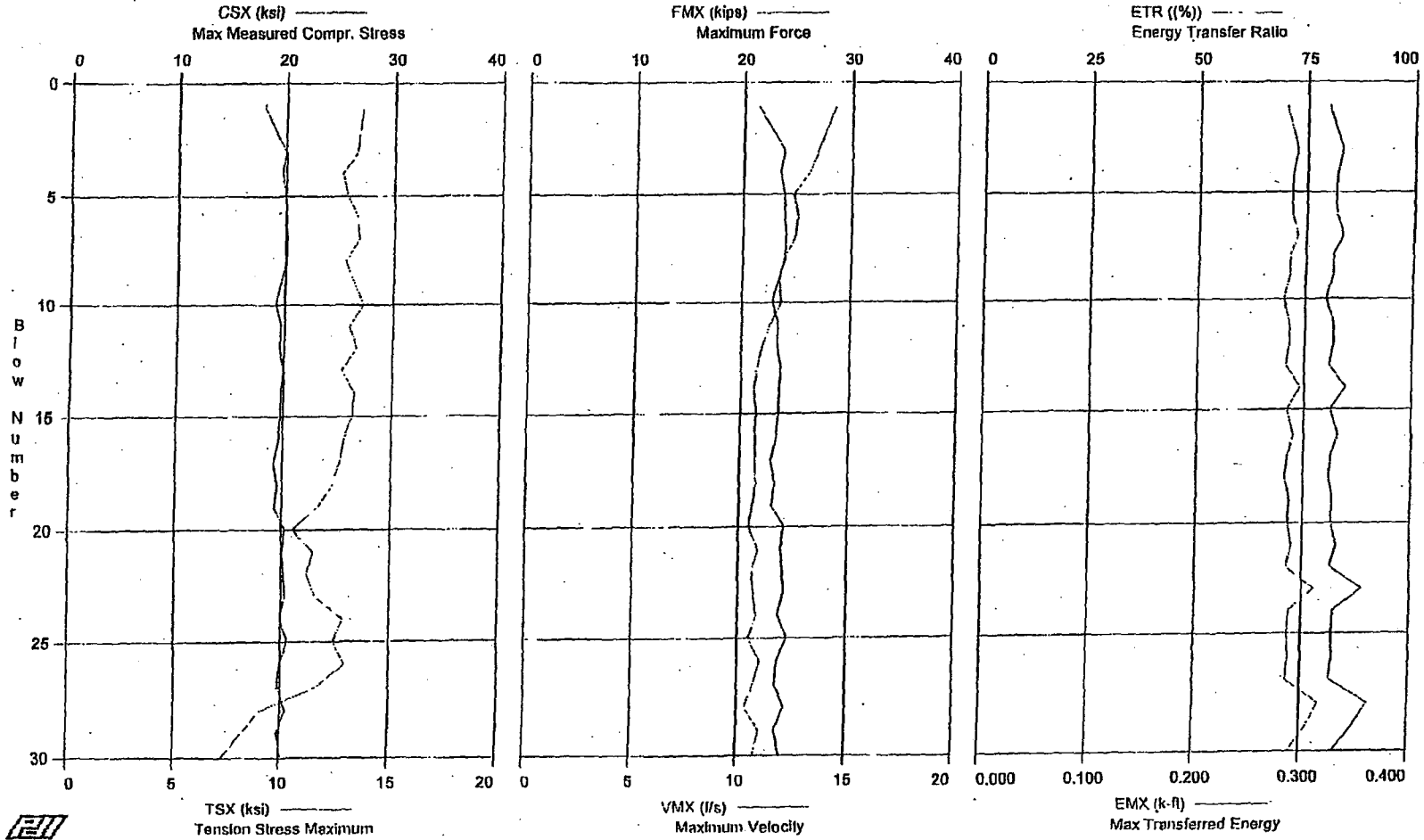
Total number of blows analyzed: 13

Time Summary

Drive 16 seconds

3:13:34 PM - 3:13:50 PM (11/29/2006) BN 1 - 14

STP COL Project - Boring B-333; 28.5' - 30' Sample



STP COL Project - Boring B-333; 28.5' - 30' Sample  
OP: SEK

Rig Serial No. 04 (MACTEC Raleigh CME 45 Trailer)  
Test date: 29-Nov-2006

AR: 1.19 in<sup>2</sup>  
LE: 34.00 ft  
WS: 16,807.9 f/s

SP: 0.482 k/ft<sup>3</sup>  
EM: 30,000 ksi  
JC: 0.80

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
DFN: Final Displacement

BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	DFN in	BPM **	EFV **	ETR (%)	EMX k-ft
1	0.00	17.90	13.54	21	14.2	1.37	0.0	0.3	78.9	0.280
3	0.00	19.95	13.32	24	13.4	1.23	48.7	0.3	83.2	0.291
4	0.00	19.60	12.61	23	13.0	1.50	48.9	0.3	82.1	0.287
5	0.00	20.00	12.88	24	12.3	1.11	49.0	0.3	81.7	0.286
6	0.00	20.00	13.34	24	12.5	1.51	48.9	0.3	81.8	0.286
7	0.00	20.13	13.41	24	12.4	0.83	48.9	0.3	83.6	0.292
8	0.00	20.09	12.79	24	11.9	1.23	48.9	0.3	81.3	0.285
9	0.00	19.56	13.19	23	11.7	0.81	48.8	0.3	81.4	0.285
10	0.00	19.17	13.66	23	11.8	1.30	48.9	0.3	80.0	0.280
11	0.00	19.60	13.01	23	11.3	0.96	48.8	0.3	81.5	0.285
12	0.00	19.56	13.36	23	11.0	0.71	48.7	0.3	81.9	0.286
13	0.00	19.91	12.70	24	10.7	0.67	49.0	0.3	80.8	0.283
14	0.00	19.78	13.27	24	10.6	1.05	49.0	0.3	84.6	0.296
15	0.00	18.76	13.21	24	10.7	1.21	48.9	0.3	81.1	0.284
16	0.00	19.60	12.83	23	10.7	0.75	48.8	0.3	82.9	0.290
17	0.00	19.20	12.67	23	10.7	1.65	49.0	0.3	81.4	0.285
18	0.00	19.53	12.30	23	10.8	1.08	49.0	0.3	81.0	0.283
19	0.00	19.29	11.65	23	10.6	0.60	48.9	0.3	81.9	0.287
20	0.00	20.29	10.52	24	10.5	0.84	48.9	0.3	81.6	0.286
21	0.00	20.05	11.46	24	10.9	1.12	48.9	0.3	82.8	0.290
22	0.00	20.22	11.16	24	10.6	0.94	48.9	0.3	81.5	0.285
23	0.00	20.31	11.56	24	10.7	1.00	48.9	0.3	88.8	0.311
24	0.00	19.90	12.89	24	10.9	1.08	49.0	0.3	82.2	0.288
25	0.00	20.64	12.46	25	10.6	1.04	48.9	0.3	82.1	0.287
26	0.00	19.88	13.00	24	11.1	1.02	48.9	0.3	82.2	0.288
27	0.00	19.75	11.64	23	10.8	1.00	49.0	0.3	81.6	0.286
28	0.00	20.44	9.05	24	10.4	1.63	48.9	0.3	90.6	0.317
29	0.00	19.75	8.21	23	11.1	0.99	48.9	0.3	87.3	0.306
30	0.00	20.18	7.29	24	10.8	0.99	48.9	0.3	82.8	0.290
Average		19.79	12.17	24	11.3	1.08	48.9	0.3	82.6	0.289

Total number of blows analyzed: 29

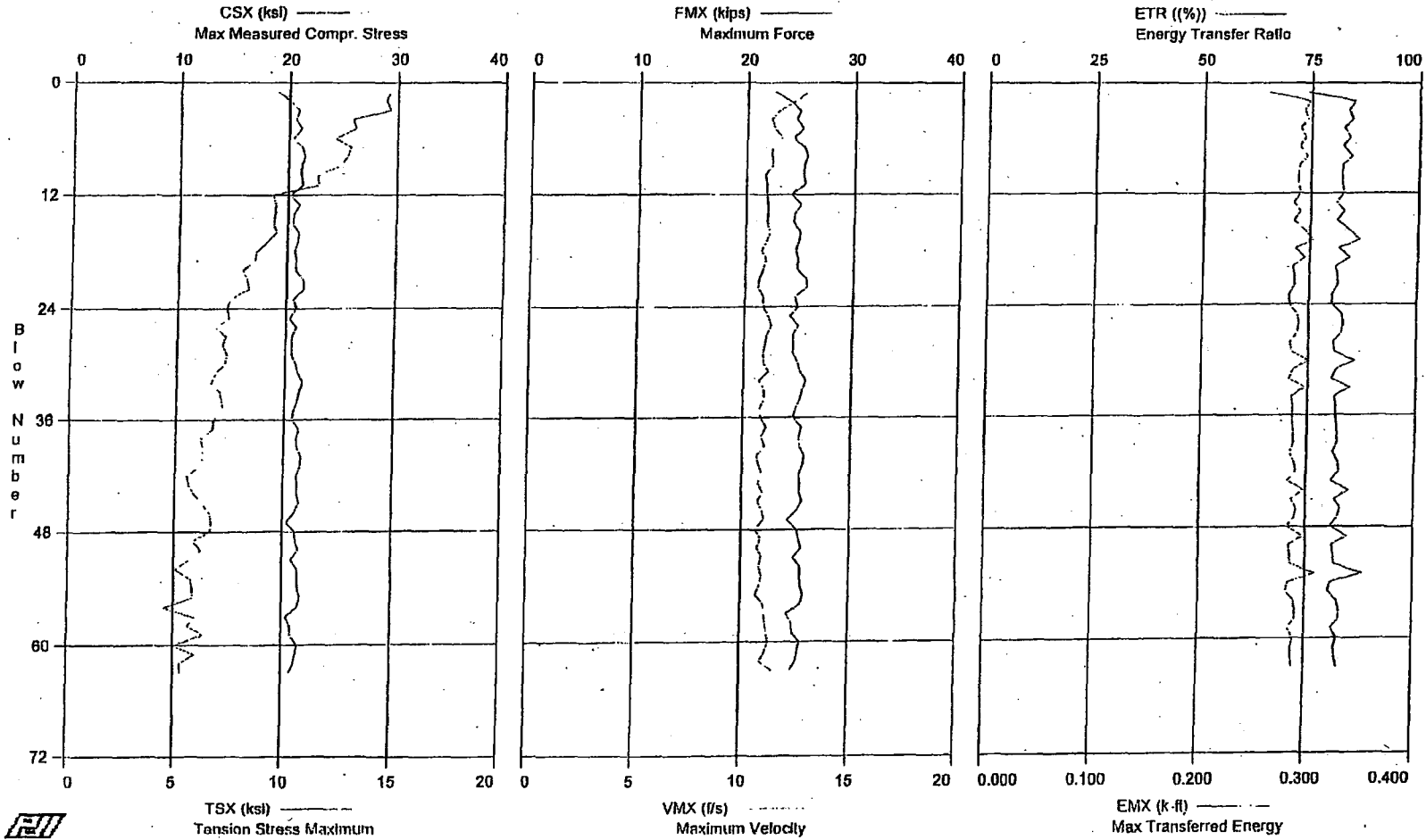
Time Summary

Drive 35 seconds

3:22:19 PM - 3:22:54 PM (11/29/2006) BN 1 - 30



STP COL Project - Boring B-333; 33.5' - 35' Sample



13



STP COL Project - Boring B-333; 33.5' - 35' Sample  
OP: SEK

Rig Serial No. 04 (MACTEC Raleigh CME 45 Traller)  
Test date: 29-Nov-2006

AR: 1.19 in<sup>2</sup>  
LE: 39.00 ft  
WS: 16,807.9 f/s

SP: 0.482 kRf3  
EM: 30,000 ksi  
JC: 0.60

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
DFN: Final Displacement

BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	DFN in	BPM "	EFV "	ETR (%)	EMX k-ft
1	0.00	18.93	14.63	23	12.8	1.35	0.0	0.3	74.2	0.260
2	0.00	20.07	14.46	24	12.2	1.50	45.8	0.3	85.1	0.298
3	0.00	20.90	14.86	25	11.4	1.13	48.8	0.3	83.6	0.293
4	0.00	20.59	12.93	24	11.1	1.08	48.9	0.3	84.5	0.296
5	0.00	21.12	13.08	25	11.2	0.88	48.9	0.3	82.6	0.289
6	0.00	20.37	12.12	24	11.6	0.86	48.9	0.3	84.0	0.294
7	0.00	21.25	12.88	25	11.1	0.80	49.0	0.3	82.6	0.289
8	0.00	21.49	12.70	26	11.1	0.12	48.8	0.3	84.6	0.296
9	0.00	21.20	12.36	25	11.2	0.98	48.9	0.3	82.5	0.289
10	0.00	21.20	11.33	25	10.8	0.79	49.0	0.3	82.4	0.288
11	0.00	21.33	11.41	25	10.9	0.40	48.9	0.3	82.4	0.288
12	0.00	20.22	9.30	24	10.9	1.27	49.0	0.3	82.8	0.290
13	0.00	21.04	9.42	25	11.0	0.37	48.9	0.3	81.1	0.284
14	0.00	20.55	9.41	24	11.0	0.70	49.0	0.3	82.9	0.290
15	0.00	20.43	9.33	24	10.9	0.63	49.1	0.3	81.2	0.284
16	0.00	21.04	9.50	25	11.1	0.16	48.9	0.3	84.3	0.295
17	0.00	20.94	9.03	25	10.9	1.26	48.8	0.3	86.6	0.303
18	0.00	20.65	8.59	25	10.7	1.10	48.9	0.3	81.8	0.286
19	0.00	20.83	8.49	25	10.9	0.98	49.0	0.3	84.4	0.295
20	0.00	20.81	7.98	25	10.8	0.83	48.9	0.3	81.2	0.284
21	0.00	21.50	8.18	26	10.6	0.99	48.8	0.3	81.7	0.286
22	0.00	21.57	8.25	26	10.6	1.34	48.9	0.3	81.7	0.286
23	0.00	20.64	7.45	25	10.8	1.21	48.9	0.3	80.4	0.281
24	0.00	20.94	7.27	25	10.9	1.56	48.8	0.3	80.6	0.282
25	0.00	20.32	7.37	24	11.1	1.07	48.9	0.3	82.7	0.289
26	0.00	20.99	6.77	25	11.2	1.84	48.8	0.3	83.1	0.291
27	0.00	20.55	7.25	24	11.0	1.71	49.0	0.3	82.7	0.289
28	0.00	20.65	7.13	25	11.0	1.83	48.9	0.3	81.0	0.283
29	0.00	20.59	7.32	25	10.9	1.55	49.0	0.3	81.3	0.284
30	0.00	20.98	7.22	25	10.9	1.24	48.8	0.3	85.9	0.301
31	0.00	21.16	6.84	25	11.1	0.81	48.8	0.3	81.7	0.286
32	0.00	21.63	6.61	26	10.7	0.92	48.9	0.3	80.5	0.282
33	0.00	21.39	7.00	25	11.0	0.90	48.9	0.3	84.8	0.297
34	0.00	21.22	7.08	25	11.0	1.04	49.0	0.3	81.3	0.285
35	0.00	20.89	7.18	25	10.8	0.65	48.7	0.3	81.6	0.286
36	0.00	20.71	6.74	25	10.8	1.44	48.9	0.3	81.6	0.286
37	0.00	21.35	6.71	25	11.1	1.44	48.9	0.3	81.8	0.286
38	0.00	21.16	6.18	25	10.9	1.10	49.0	0.3	82.0	0.287
39	0.00	21.21	6.27	25	11.0	0.52	48.9	0.3	82.3	0.288
40	0.00	21.57	6.28	26	10.7	0.19	49.0	0.3	81.1	0.284
41	0.00	21.51	6.14	26	10.7	1.40	48.9	0.3	82.4	0.288
42	0.00	21.22	5.57	25	10.9	0.80	49.1	0.3	82.7	0.290
43	0.00	21.28	5.65	25	10.7	1.36	48.9	0.3	80.9	0.283
44	0.00	21.27	5.89	25	11.0	1.17	48.9	0.3	85.0	0.296
45	0.00	21.46	6.29	26	10.7	0.49	48.9	0.3	81.8	0.286
46	0.00	21.05	6.61	25	10.9	1.11	48.9	0.3	83.1	0.291
47	0.00	20.33	6.72	24	11.0	0.86	48.9	0.3	82.4	0.289
48	0.00	21.13	6.57	25	10.7	1.21	48.9	0.3	80.9	0.283
49	0.00	21.22	5.88	25	10.9	1.91	49.0	0.3	84.7	0.297
50	0.00	21.47	6.24	26	10.7	0.63	49.0	0.3	81.2	0.284
51	0.00	20.86	5.75	25	11.0	1.45	48.9	0.3	81.5	0.285
52	0.00	21.41	5.06	25	10.8	0.90	48.9	0.3	81.8	0.286
53	0.00	21.42	5.78	25	11.0	1.96	48.9	0.3	88.3	0.309
54	0.00	21.42	5.86	25	10.9	1.00	48.9	0.3	81.1	0.284
55	0.00	21.63	5.87	26	10.7	1.42	48.9	0.3	80.4	0.282
56	0.00	21.46	4.56	26	11.1	1.10	48.9	0.3	82.5	0.289
57	0.00	20.37	5.98	24	11.1	1.64	48.9	0.3	83.1	0.291
58	0.00	20.75	5.66	25	11.2	0.70	48.7	0.3	83.1	0.291
59	0.00	20.83	6.41	25	11.2	1.17	48.9	0.3	81.2	0.284
60	0.00	21.49	5.02	26	11.3	0.42	48.9	0.3	82.7	0.290
61	0.00	21.31	6.02	25	11.2	1.24	49.0	0.3	82.2	0.288
62	0.00	21.15	5.30	25	10.9	1.11	48.9	0.3	82.3	0.288
63	0.00	20.72	5.32	25	11.5	1.56	48.9	0.3	82.7	0.289

MACTEC Engineering and Consulting, Inc.  
Case Method Results

Page 2 of 2  
POIPILOT Ver. 2005.2 - Printed: 26-Dec-2006

STP COL Project - Boring B-333; 33.5' - 35' Sample  
OP: SEK

Rig Serial No. 04 (MACTEC Raleigh CME 45 Trailer)  
Test date: 28-Nov-2006

	CSX	TSX	FMX	VMX	DFN	BPM	EFV	ETR	EMX
	ksi	ksi	kips	f/s	in	mm	mm	(%)	k-ft
Average	21.00	7.82	25	11.0	1.06	48.9	0.3	82.4	0.288

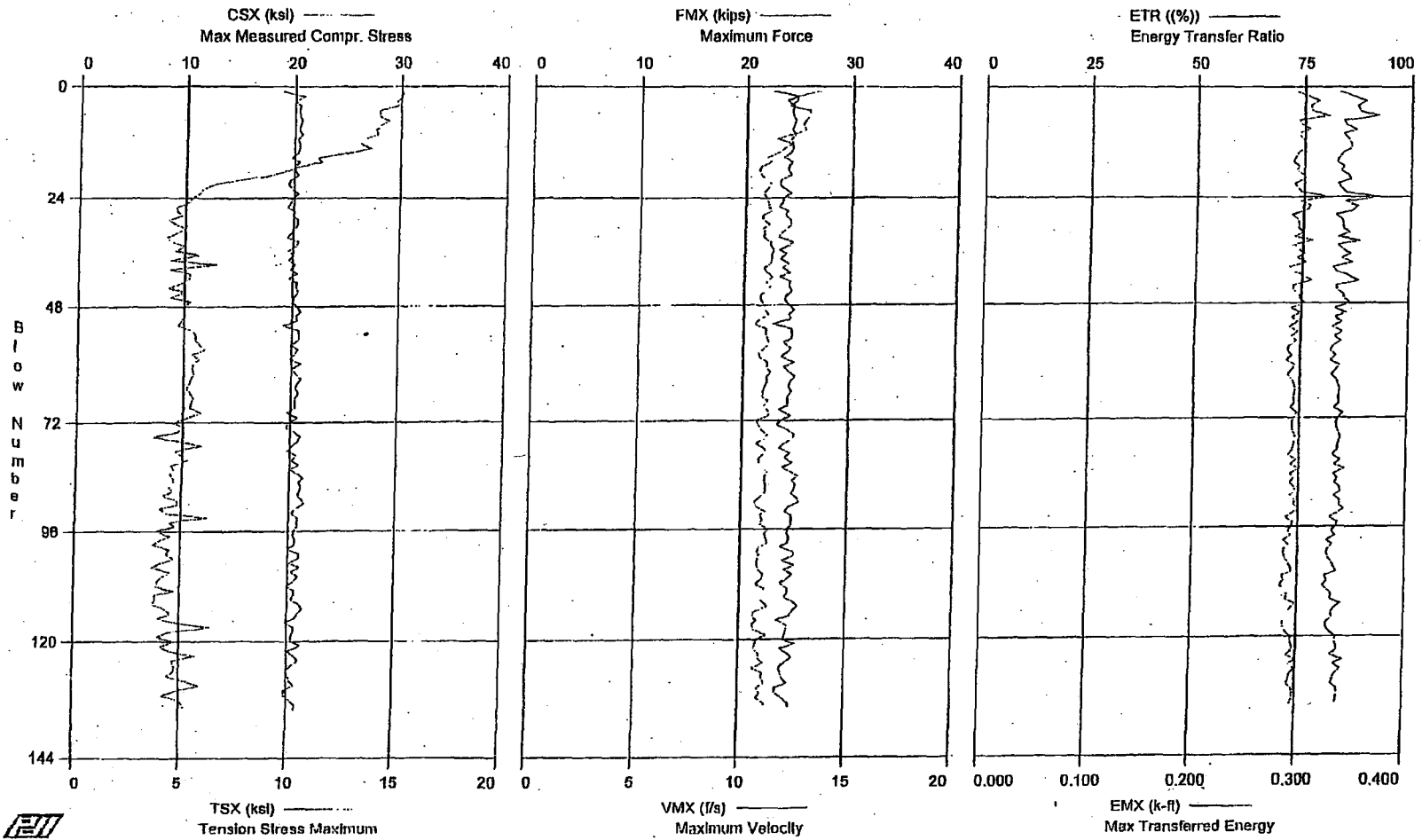
Total number of blows analyzed: 63

Time Summary

Drive 1 minute 17 seconds

3:35:31 PM - 3:36:48 PM (11/29/2006) BN 1 - 64

STP COL Project - Boring B-333; 38.5' - 40' Sample



11



STP COL Project - Boring B-333; 38.5' - 40' Sample  
OP: SEK

Rig Serial No. 04 (MACTEC Raleigh CME 45 Trailer)  
Test date: 29-Nov-2006

AR: 1.19 in<sup>2</sup>

SP: 0.492 k/ft<sup>3</sup>

LE: 44.00 ft

EM: 30,000 ksi

WS: 16,807.9 f/s

JC: 0.80

CSX: Max Measured Compr. Stress

BPM: Blows per Minute

TSX: Tension Stress Maximum

EFV: Energy of FV

FMX: Maximum Force

ETR: Energy Transfer Ratio

VMX: Maximum Velocity

EMX: Max Transferred Energy

DFN: Final Displacement

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	DFN in	BPM "	EFV "	ETR (%)	EMX k-ft
1	0.00	18.86	14.99	22	13.5	1.92	0.0	0.3	83.3	0.292
3	0.00	19.96	14.77	24	12.3	1.41	48.7	0.3	89.3	0.313
5	0.00	20.36	13.94	24	13.0	2.10	48.9	0.3	87.8	0.307
7	0.00	20.66	14.40	25	12.8	1.76	48.8	0.3	84.1	0.295
9	0.00	20.35	13.78	24	12.8	2.27	48.8	0.3	87.1	0.305
11	0.00	20.27	13.27	24	11.4	0.57	48.9	0.3	85.2	0.298
13	0.00	20.48	13.58	24	11.8	1.33	48.9	0.3	86.0	0.301
15	0.00	19.74	11.06	23	10.9	1.60	48.9	0.3	83.3	0.292
17	0.00	20.13	10.20	24	10.7	1.65	48.7	0.3	84.3	0.295
19	0.00	20.38	8.95	24	10.7	1.48	49.0	0.3	85.4	0.299
21	0.00	19.46	6.33	23	11.2	1.60	48.9	0.3	83.1	0.291
23	0.00	20.37	5.61	24	10.8	2.06	48.9	0.3	85.0	0.298
25	0.00	19.72	5.15	23	11.0	1.98	48.9	0.3	84.7	0.297
27	0.00	20.18	4.60	24	11.2	1.54	48.9	0.3	86.5	0.303
29	0.00	20.39	4.21	24	10.8	1.63	49.0	0.3	84.1	0.294
31	0.00	20.18	5.02	24	10.8	2.55	48.8	0.3	84.4	0.295
33	0.00	19.48	4.15	23	10.9	1.49	48.9	0.3	83.4	0.292
35	0.00	20.28	5.01	24	11.2	2.13	48.8	0.3	83.3	0.292
37	0.00	20.11	5.65	24	11.3	2.96	48.8	0.3	86.3	0.302
39	0.00	20.26	6.47	24	11.2	1.46	48.7	0.3	86.9	0.304
41	0.00	20.46	5.23	24	11.1	1.81	48.7	0.3	83.2	0.291
43	0.00	20.45	4.90	24	11.0	1.88	48.7	0.3	86.3	0.309
45	0.00	20.58	5.08	24	11.1	1.41	48.5	0.3	83.4	0.292
47	0.00	20.03	5.29	24	10.8	1.10	48.5	0.3	85.2	0.298
49	0.00	20.80	4.97	25	11.0	0.97	49.0	0.3	82.8	0.290
51	0.00	20.52	4.87	24	10.8	2.13	48.7	0.3	83.1	0.291
53	0.00	20.61	5.32	25	11.1	1.47	48.5	0.3	82.5	0.289
55	0.00	20.67	5.51	25	11.1	2.58	48.7	0.3	83.1	0.291
57	0.00	20.64	5.97	25	11.1	1.55	48.7	0.3	82.8	0.290
59	0.00	19.86	5.69	24	10.8	1.93	48.8	0.3	83.5	0.292
61	0.00	20.00	5.36	24	11.1	1.34	48.7	0.3	84.3	0.295
63	0.00	20.96	5.34	25	11.1	1.52	48.7	0.3	82.3	0.288
65	0.00	20.42	5.16	24	11.0	1.75	48.7	0.3	84.0	0.294
67	0.00	20.38	5.45	24	10.9	1.26	48.7	0.3	84.3	0.295
69	0.00	20.39	5.28	24	11.0	1.66	48.7	0.3	84.4	0.295
71	0.00	20.70	5.22	25	11.3	0.96	48.6	0.3	85.3	0.298
73	0.00	19.58	5.08	23	10.8	1.99	48.7	0.3	83.8	0.293
75	0.00	20.93	3.60	25	11.2	1.44	48.9	0.3	84.1	0.294
77	0.00	20.24	5.91	24	10.7	1.34	48.7	0.3	84.5	0.296
79	0.00	20.64	4.96	25	11.1	1.47	48.7	0.3	84.1	0.294
81	0.00	20.81	4.45	25	10.8	1.78	48.7	0.3	84.8	0.297
83	0.00	20.71	4.42	25	11.2	1.55	48.5	0.3	85.9	0.301
85	0.00	20.82	4.60	25	11.1	1.88	48.6	0.3	84.2	0.295
87	0.00	20.97	4.57	25	11.1	1.68	48.8	0.3	84.6	0.296
89	0.00	21.21	4.77	25	10.8	1.43	48.7	0.3	83.5	0.292
91	0.00	20.60	3.99	25	10.8	1.44	48.7	0.3	84.7	0.296
93	0.00	20.75	6.20	25	10.9	1.29	48.7	0.3	84.3	0.295
95	0.00	20.83	4.71	25	10.9	1.21	48.5	0.3	84.4	0.296
97	0.00	20.47	4.53	24	11.1	1.42	48.7	0.3	83.0	0.291
99	0.00	20.59	3.69	25	11.3	1.63	48.6	0.3	81.8	0.286
101	0.00	20.99	4.32	25	10.8	1.42	48.6	0.3	82.1	0.287
103	0.00	20.18	4.08	24	10.8	1.10	48.5	0.3	82.2	0.288
105	0.00	20.29	4.56	24	10.9	1.33	48.4	0.3	83.6	0.293
107	0.00	20.58	3.95	24	11.0	0.77	48.6	0.3	81.3	0.285
109	0.00	20.63	4.71	25	11.2	1.25	48.7	0.3	80.9	0.283
111	0.00	20.38	3.85	24	10.9	1.21	48.6	0.3	83.2	0.291
113	0.00	21.38	4.38	25	11.3	1.09	48.6	0.3	85.2	0.298
115	0.00	20.77	4.01	25	10.7	1.13	48.6	0.3	83.0	0.291
117	0.00	20.61	6.47	25	10.6	1.79	48.6	0.3	82.1	0.287
119	0.00	20.42	3.98	24	11.3	1.56	48.5	0.3	82.8	0.290
121	0.00	21.26	4.12	25	10.8	1.86	48.7	0.3	83.9	0.294
123	0.00	20.67	5.73	25	10.9	1.64	48.7	0.3	84.4	0.296
125	0.00	20.44	4.75	24	11.2	1.33	48.7	0.3	86.1	0.301
127	0.00	20.16	4.43	24	11.2	1.64	48.7	0.3	85.6	0.299
129	0.00	20.72	5.96	25	11.2	0.71	48.6	0.3	83.9	0.294

MACTEC Engineering and Consulting, Inc.  
Case Method Results

Page 2 of 2  
PDILOT Ver. 2005.2 - Printed: 26-Dec-2006

STP COL Project - Boring B-333; 38.5' - 40' Sample  
OP: SEK

Rig Serial No. 04 (MACTEC Raleigh CME 45 Trailer)  
Test date: 29-Nov-2006

BL#	depth ft	GSX ksi	TSX ksi	FMX kips	VMX ffs	DFN in	BPM --	EFV --	ETR (%)	EMX k-ft
131	0.00	19.74	4.19	23	11.1	1.61	48.6	0.3	84.9	0.297
133	0.00	20.77	5.17	25	11.2	1.95	48.8	0.3	84.7	0.297
Average		20.38	6.01	24	11.1	1.51	48.7	0.3	84.3	0.295

Total number of blows analyzed: 134

Time Summary

Drive 2 minutes 44 seconds

3:45:22 PM - 3:48:06 PM (11/29/2006) BN 1 - 134



engineering and constructing a better tomorrow

February 22, 2007

Memorandum to File DCN STP611 and STP611, Rev. 1

From: Steve Kiser *AK 2-22-07*

Reviewed By: Kathryn White *KAW 2/22/07*

Subject: **Report of SPT Energy – Miller Drilling CME 750 ATV (Serial No. 299709)  
Automatic Hammer  
WORK INSTRUCTION DCN STP611 and STP611, Rev. 1  
South Texas Project (STP) COL Site  
Wadsworth, Texas  
MACTEC Project No. 5050-06-0496**

Steve Kiser, of MACTEC Engineering and Consulting, Inc. (MACTEC), performed energy measurements on the drill rig at the subject site per the referenced Work Instructions. This memorandum summarizes the field testing activities and presents the results of the energy measurements.

#### **SPT Energy Field Measurements**

SPT energy measurements were made on November 16 and 30, 2006, during drilling of Boring B-302DH and B-305DH, respectively, at the referenced site. The testing was performed from approximately 2:15 to 2:40 PM under sunny skies and a temperature of about 65 degrees Fahrenheit on November 16, and from approximately 1:15 to 4:10 PM under cloudy skies and a temperature of about 40 degrees Fahrenheit on November 30. The borings were drilled with personnel and equipment from Miller Drilling. The drilling equipment consisted of a CME 75 model ATV-mounted drill rig with an SPT automatic hammer. The drilling tools consisted of NW-J-sized drilling rods and a 2-foot long split tube sampler. Mud rotary drilling techniques were used to advance the boring. The drill rig operator during sampling was Mr. Glenn Bilbrey. Energy measurements were recorded during sampling at the depth intervals shown in Table 1. The total length of the drill rod string (including the instrumented drill rod insert described below) for each sample was generally 4 feet longer than the depth of the sample being collected.

The energy measurements were performed with a Pile Driving Analyzer (PDA) model PAK (Serial No. 1430), and calibrated accelerometers (Serial Nos. P5953 and P5094) and strain gages (Serial Nos. NW #95/1 and NW #95/2 for Boring B-302DH, and Serial Nos. NW #146/1 and NW#146/2 for Boring B-305DH). An NW-sized steel drill rod, 2 feet long and instrumented with dedicated strain gages, was inserted at the top of the drill rod string immediately below the SPT hammer. The inserted rod was also instrumented with two piezoresistive accelerometers that were bolted to the outside of the rod. The instrumented rod insert had a cross-sectional area of approximately 2.28 and 1.49 square inches at the gage location for rod Serial Nos. NW #95 and NW #146, respectively, and both rods had an outside diameter of approximately 2.625 inches at the gage location. The drill rods included in the drill rod string were hollow rods in 5 to 10-foot long sections, with an outside and inside diameter of approximately 2.625 and 2.25 inches, respectively. The recommended operation rate of the hammer is not known. Due to the closed hammer system, the hammer lubrication condition and anvil dimensions could not be observed.

16 Pages Total

### Calibration Records

Calibration records were provided to Bechtel on January 9, 2007. The calibration records for all the above are filed in DCN STP850.

### Calculations for EFV

The work was done in general accordance with ASTM D 4633-05. The strain and acceleration signals were converted to force and velocity by the PDA, and the data was interpreted by the PDA according to the Case Method equation. The maximum energy transmitted to the drill rod string (as measured at the location of the strain gages and accelerometers) was calculated by the PDA using the EFV method equation, as shown below:

$$EFV = \int F(t) * V(t) * dt$$

Where: EFV = Transferred energy (EFV equation), or Energy of FV

F(t) = Calculated force at time t

V(t) = Calculated velocity at time t

The EFV method of energy calculation is recommended in ASTM Standard D4633-05. The EFV equation, integrated over the complete wave event, measures the total energy content of the event using both force and velocity measurements. The EFV values associated with each blow analyzed are tabulated in the attached PDILOT tables and are also shown graphically in the PDILOT charts.

### Calculations for ETR

The ratio of the measured transferred energy (EFV) to the theoretical potential energy of the SPT system (140 lb weight with the specified 30-inch fall) is the ETR. The ETR values (as percent of the theoretical value) are shown in Table 1.

### Comparison of ETR to Typical Energy Transfer Ratio Range

Based on a research report published by the Florida Department of Transportation (FDOT) (Report WPI No. 0510859, 1999), the average ETR measured for automatic hammers is 79.6%. The standard deviation was 7.9%; therefore, the range of ETRs within one standard deviation of the average was reported to be 71.7% to 87.5%. This range of ETRs was also consistent with other research that was cited in the FDOT research paper. The ETR values shown in Table 1 are within the range of typical values for automatic hammers as reported in the literature.

### Discussion

Based on the field testing results, observations from the SPT energy measurements are summarized below:

- The data obtained by the PDA are consistent between individual hammer blows and between the sample depths tested. In general, the first and last one (and sometimes two) hammer blow records recorded by the PDA produced poor quality



*SPT Energy Measurements – STP COL Site*

*February 22, 2007*

*MACTEC Project No. 5050-06-0496*

*Page 3*

data (which is relatively common) and, as such, the records were not used in the data reduction.

- The average energy transferred from the hammer to the drill rods for each individual depth interval using the EFV method ranged from 291 foot-pounds to 302 foot-pounds. These average energy transfers correspond to energy transfer ratios (ETR) of 83% to 86% of the theoretical energy (350 foot-pounds) of the SPT hammer.
- The average at each depth interval was calculated as the transferred energy for each analyzed blow of the depth intervals divided by the total number of hammer blows analyzed. The overall average energy transfer of the SPT system (for all the depth intervals tested) was 296.0 foot-pounds, with an average ETR of 84.6%.

Attachments: Page 4 Table 1 - Summary of SPT Energy Measurements – 1 Page  
Pages 5-6 Work Instructions – SPT Energy #299709, and Work Instructions – SPT  
Energy #299709, Rev. 1 – 2 Pages  
Pages 7-8 Record of SPT Energy Measurement – 2 Pages  
Pages 9-16 PDIPLOT Output – 8 Pages

**TABLE 1**  
**SUMMARY OF SPT ENERGY MEASUREMENTS (ASTM D4633-05)**

South Texas Project (STP) COL Site

Wadsworth, Texas

MACTEC Project No. 5050-06-0496

Rig Serial No.	Rig Owner	Rig Operator	Boring No. Tested	Date Tested	Sample Depth (feet)	SPT Blow Count (blows per six inches)	No. of Blows Analyzed	Average Measured Energy (Average EFV) (ft-lbs) <sup>a</sup>	Energy Transfer Ratio (%) <sup>b</sup> (Average ETR)
299709 (CME 750 ATV)	Miller Drilling	Glenn Bilbrey	B-302DH	11/16/2006	58.5 - 60.0	6 - 10 - 11	25	298	85.1%
					63.5 - 65.0	4 - 5 - 6	16	294	84.0%
			B-305DH	11/30/2006	318.5 - 320.0	12 - 17 - 16	45	302	86.3%
					358.5 - 360.0	11 - 21 - 26	58	291	83.1%
							<b>Average for Rig:</b>	<b>296.0</b>	<b>84.6%</b>

<sup>a</sup>Measured Energy is energy based on the EFV method, as outlined in ASTM D4633-05, for each blow recorded by the PDA. In some cases, the initial and final one to two blows produced poor quality data, and were not used to calculate the Average Measured Energy.

ETR = EMX \* 1000 lbs/kip

<sup>b</sup>Energy Transfer Ratio is the Measured Energy divided by the theoretical SPT energy of 350 foot-pounds (140 pound hammer falling 2.5 feet). The average ETR values may differ slightly and insignificantly from those in the PDILOT tables due to roundoff.

Prepared By: <i>[Signature]</i>	Date: 2-22-07	Checked By: <i>[Signature]</i>	Date: 2/22/07
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**Work Instruction SPT-ENERGY #299709**

South Texas COL Project  
MACTEC Engineering and Consulting, Inc.

Issued To: Steve Kiser  
Location: STP Field Office Date: November 14, 2006  
Issued By: Jay Cerceo, Site Coordinator MACTEC Project No.: 5050-06-0496  
Valid Thru: 11/14/2006 To 11/14/2007 Rev. No. 0

**Task Description:** Perform SPT Energy measurements of drill rigs at the South Texas COL Project.

**Applicable Technical Procedures or Plans, or other reference:** ASTM (D4633), South Texas COL Geotechnical Work Plan Attachment 3, Bechtel's Engineering Specification for Subsurface Investigation and Laboratory Testing for South Texas Project Units 3 & 4 (Specification).

**Specific Instructions** (note attachments where necessary): Follow guidelines in South Texas COL Work Plan, Attachment 3. Energy measurements to be performed on drill rigs while performing SPT sampling. Obtain energy measurements with the PDA at depth intervals in the range of 15 to 200 feet below the ground surface in general accordance with ASTM D4633-05. Perform energy measurement for SPT automatic hammer number 299709.

**Special Instructions:** Complete all field forms in ink.

**Report Format:** Completed Field Forms As Follows: Daily Field Report, Record of SPT Energy Measurement and PDILOT output data, Photographs (rig and equipment setup, energy measurement equipment).

**Specific Quality Assurance Procedures Applicable:** None

**Hold Points or Witness Points:** Direction to perform energy measurements received from the Site Coordinator.  
Calibration record of energy measurement equipment on file.

**Records:** All records generated shall be considered QA Records.

Reviewed and Approved By: (Note: Only one signature is required to issue)

Project Manager (MACTEC): \_\_\_\_\_ Date: \_\_\_\_\_  
Project Principal (MACTEC): \_\_\_\_\_ Date: \_\_\_\_\_  
Site Coordinator (MACTEC): [Signature] Date: 11/14/2006

No. of Pages: 1

DCN: STP611

**Work Instructions – SPT Energy #299709**  
South Texas COL Project  
MACTEC Engineering and Consulting, Inc.

Issued To: Steve Kiser \_\_\_\_\_  
Location: STP COL Project Field Office \_\_\_\_\_ Date: November 30, 2006 \_\_\_\_\_  
Issued By: Jay Cerceo, Site Coordinator \_\_\_\_\_ MACTEC Project No.: 5050-06-0496  
Valid From: November 30, 2006 \_\_\_ To: November 30, 2007 \_\_\_ Rev. \_\_\_ 1 \_\_\_

**Task Description:** Perform SPT Energy measurements of drill rigs at the South Texas COL Project.

**Applicable Technical Procedures or Plans, or other reference:** ASTM D4633-05 Standard Test Method for Energy Measurement for Dynamic Penetrometers, South Texas COL Geotechnical Work Plan Attachment 3, Bechtel's Engineering Specification for Subsurface Investigation and Laboratory Testing for South Texas Project Units 3 & 4.

**Specific Instructions** (note attachments where necessary): Follow guidelines in South Texas COL Work Plan, Attachment 3. Energy measurements to be performed on drill rigs while performing SPT sampling. Obtain energy measurements with the PDA at depth intervals in the range of about 15 to 600 feet below the ground surface in general accordance with ASTM D4633-05. Perform energy measurement testing for CME 750 Automatic Hammer #299709.

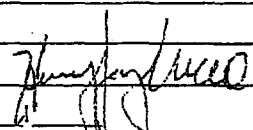
**Report Format:** Completed Forms in Ink as follows: Daily Filed Report, Record of SPT Energy Measurement and PDILOT output data, Photographs (rig and equipment setup, energy measurement equipment)..

**Specific Quality Assurance Procedures Applicable:** None

**Hold Points or Witness Points:** None

**Records:** All records generated shall be considered QA Records.

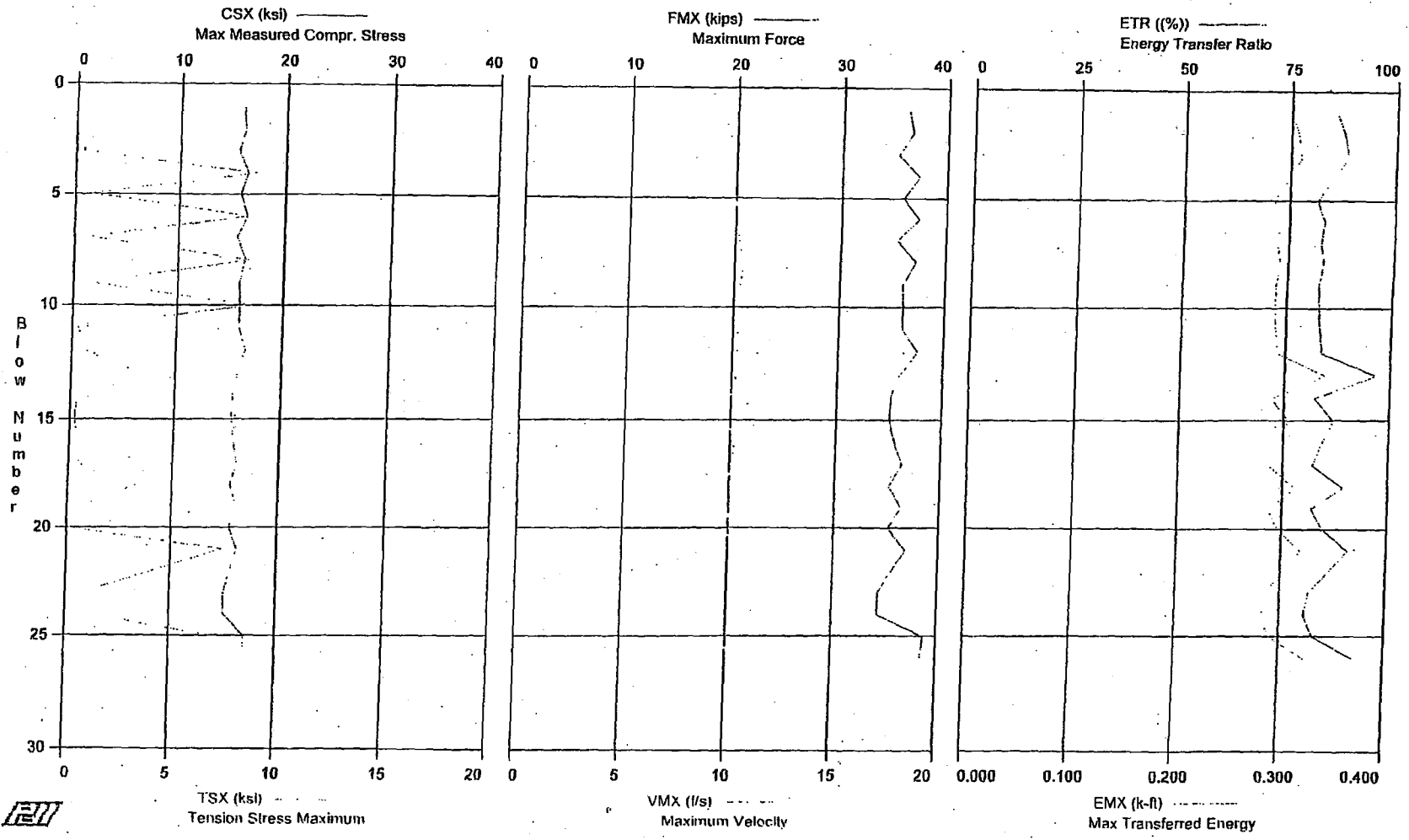
Reviewed and Approved By (Note: Only One Signature is Required to Issue):

Project Manager: _____	Date: _____
Project Principal: _____	Date: _____
Site Coordinator:  _____	Date: 11/30/06 _____
No. of Pages: _____	DCN: _____ STP611 _____





STP COL Project - Boring B-302-DH; 58.5' - 60' Sample



STP COL Project - Boring B-302-DH; 58.5' - 60' Sample  
OP: SEK

Rig Serial No. 299709 (Miller Drilling - CME 750)  
Test date: 16-Nov-2006

AR: 2.28 in<sup>2</sup> SP: 0.492 k/ft<sup>3</sup>  
LE: 64.00 ft EM: 30,000 ksi  
WS: 16,807.9 f/s JC: 0.60

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
DFN: Final Displacement  
BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	DFN in	BPM **	EFV **	ETR (%)	EMX k-ft
1	0.00	15.91	0.25	36	10.1	1.44	0.0	0.3	85.8	0.300
2	0.00	16.07	0.40	37	10.3	1.40	58.5	0.3	87.7	0.307
3	0.00	15.52	0.36	35	10.4	1.21	56.3	0.3	88.6	0.310
4	0.00	16.37	8.62	37	10.3	0.66	56.8	0.3	85.0	0.298
5	0.00	15.74	0.76	36	10.0	1.42	56.2	0.3	81.6	0.285
6	0.00	16.40	8.34	37	10.0	1.02	56.5	0.3	83.3	0.291
7	0.00	15.52	0.78	35	10.1	1.51	28.2	0.3	82.7	0.289
8	0.00	16.31	8.30	37	10.4	1.12	56.6	0.3	83.3	0.292
9	0.00	15.79	0.82	36	10.2	1.53	56.3	0.3	82.5	0.289
10	0.00	15.84	8.53	36	10.2	1.80	56.6	0.3	82.7	0.289
11	0.00	15.83	0.26	36	10.2	2.29	56.2	0.3	83.0	0.290
12	0.00	16.48	0.65	38	10.2	1.15	56.6	0.3	83.5	0.292
13	0.00	15.78	3.24	36	10.2	1.31	56.3	0.3	96.7	0.338
14	0.00	15.43	0.30	35	10.0	0.99	56.2	0.3	82.2	0.288
15	0.00	15.39	0.19	35	9.9	1.42	56.6	0.3	86.7	0.304
16	0.00	15.62	0.36	36	10.2	1.36	56.1	0.3	84.1	0.294
17	0.00	15.96	0.45	36	10.0	1.38	56.7	0.3	82.1	0.287
18	0.00	15.44	3.23	35	9.9	1.24	56.3	0.3	89.3	0.312
19	0.00	15.96	0.64	36	9.9	0.96	56.2	0.3	81.9	0.287
20	0.00	16.43	0.15	35	10.1	1.69	56.0	0.3	84.7	0.297
21	0.00	16.18	7.39	37	9.9	1.10	56.6	0.3	90.7	0.318
23	0.00	15.08	0.87	34	9.7	0.40	56.2	0.3	81.8	0.286
24	0.00	15.06	1.08	34	9.7	0.85	56.3	0.3	80.7	0.283
25	0.00	17.00	6.92	39	10.1	1.57	55.9	0.3	83.1	0.291
26	0.00	16.89	6.49	39	9.9	1.58	56.0	0.3	92.9	0.325
Average		15.88	2.77	36	10.1	1.29	55.3	0.3	85.1	0.298

Total number of blows analyzed: 25

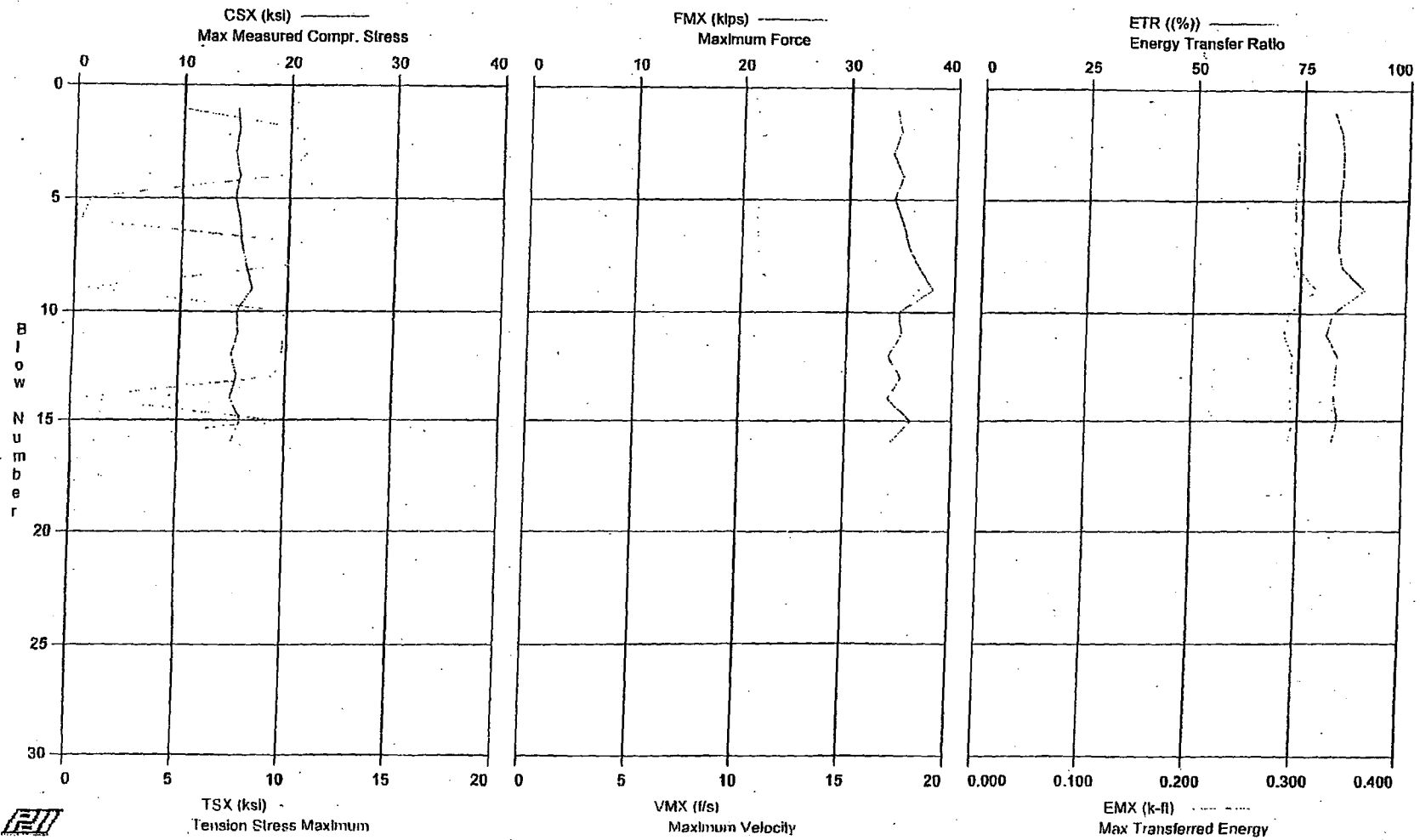
Time Summary

Drive 28 seconds

2:16:57 PM - 2:17:25 PM (11/16/2006) BN 1 - 26



STP COL Project - Boring B-302-DH; 63.5' - 65' Sample



STP COL Project - Boring B-302-DH; 63.5' - 65' Sample  
OP: SEK

Rig Serial No. 299709 (Miller Drilling - CME 750)  
Test date: 16-Nov-2006

AR: 2.28 in<sup>2</sup>  
LE: 68.00 ft  
WS: 16,807.9 f/s

SP: 0.492 k/ft<sup>3</sup>  
EM: 30,000 ksi  
JC: 0.60

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
DFN: Final Displacement

BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	DFN in	BPM **	EFV **	ETR (%)	EMX k-ft
1	0.00	15.03	4.58	34	10.6	1.40	0.0	0.3	82.1	0.287
2	0.00	15.22	10.42	35	10.9	2.00	55.8	0.3	84.0	0.294
3	0.00	14.90	10.83	34	10.8	2.03	55.0	0.3	84.4	0.295
4	0.00	15.32	9.80	35	10.9	1.56	55.2	0.3	84.4	0.295
5	0.00	14.99	0.69	34	10.7	1.43	54.9	0.3	83.8	0.293
6	0.00	15.35	0.22	35	10.7	1.02	55.1	0.3	84.0	0.294
7	0.00	15.58	10.57	36	10.8	1.81	55.0	0.3	83.6	0.293
8	0.00	16.05	9.97	37	10.8	1.46	55.0	0.3	84.8	0.297
9	0.00	16.63	0.55	38	11.4	2.04	55.2	0.3	90.0	0.315
10	0.00	15.26	9.78	35	10.7	1.62	55.1	0.3	82.9	0.290
11	0.00	15.39	9.80	35	10.7	1.78	55.0	0.3	81.4	0.285
12	0.00	14.86	9.75	34	10.7	1.86	54.6	0.3	84.1	0.294
13	0.00	15.40	9.43	35	10.8	1.75	55.2	0.3	83.6	0.293
14	0.00	14.87	0.42	34	10.7	0.97	54.8	0.3	83.3	0.292
15	0.00	15.86	9.53	36	10.8	1.96	55.0	0.3	84.4	0.295
16	0.00	15.01	0.48	34	10.6	1.12	55.0	0.3	83.1	0.291
Average		15.36	6.68	35	10.8	1.61	55.1	0.3	84.0	0.294

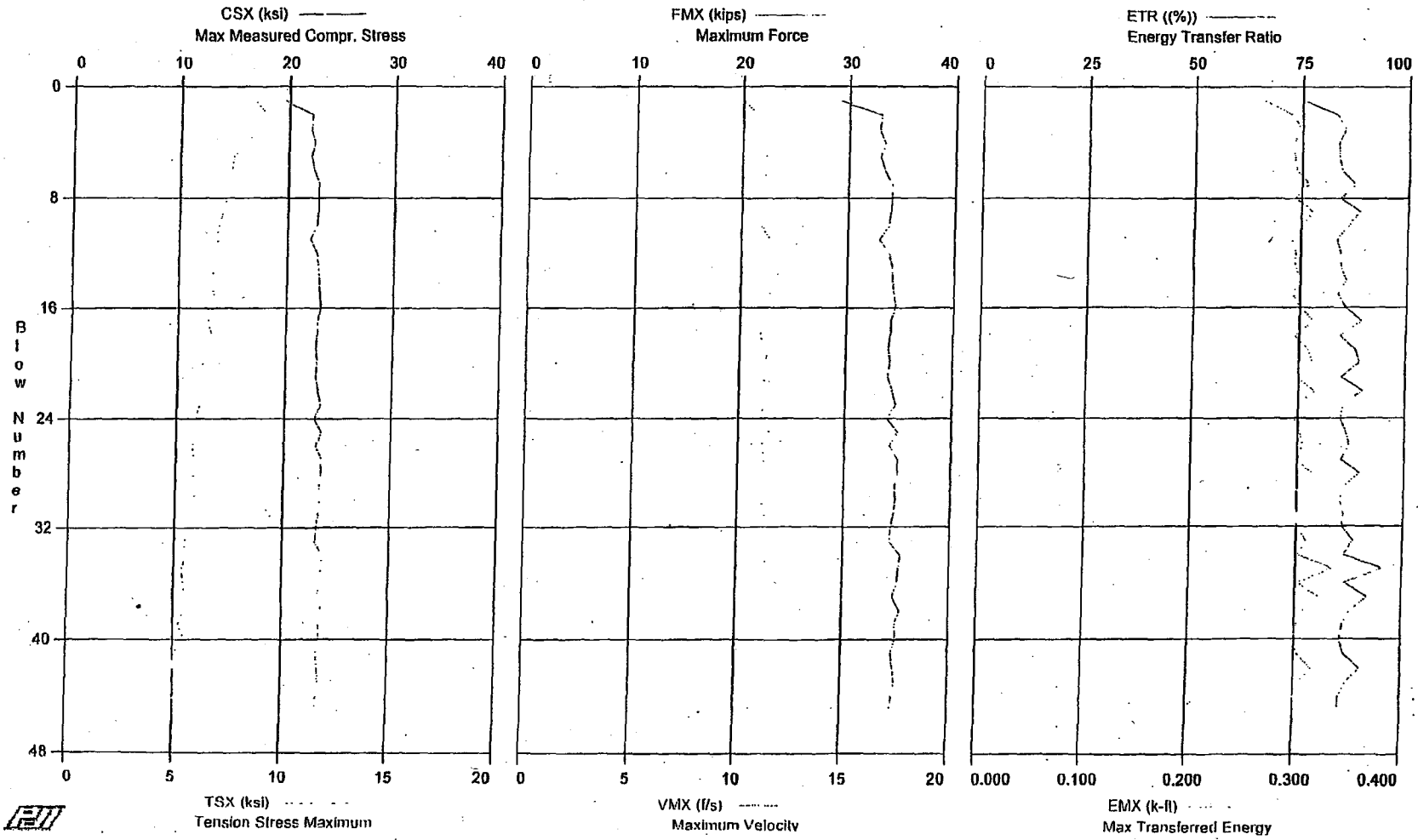
Total number of blows analyzed: 16

Time Summary

Drive 16 seconds

2:40:55 PM - 2:41:11 PM (11/16/2006) BN 1 - 16

STP COL Project - Boring B-305DH; 318.5' - 320' Sample



STP COL Project - Boring B-305DH; 318.5' - 320' Sample  
OP: SEK

Rig Serial No. 299709 (Miller CME 75)  
Test date: 30-Nov-2006

AR: 1.49 in<sup>2</sup>  
LE: 324.00 ft  
WS: 16,807.9 f/s

SP: 0.492 k/ft<sup>3</sup>  
EM: 30,000 ksi  
JC: 0.60

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
DFN: Final Displacement

BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	DFN in	BPM **	EFV **	ETR (%)	EMX k-ft
1	0.00	19.47	8.35	29	9.9	1.43	0.0	0.3	75.5	0.264
2	0.00	22.14	8.97	33	10.7	1.53	46.9	0.3	83.1	0.291
3	0.00	22.02	8.66	33	10.9	1.49	53.3	0.3	85.1	0.298
4	0.00	22.37	7.91	33	11.2	0.96	54.5	0.3	83.4	0.292
5	0.00	22.12	7.46	33	11.1	1.92	55.3	0.3	83.7	0.293
6	0.00	22.38	7.36	33	11.1	1.22	53.7	0.3	84.3	0.295
7	0.00	22.84	7.28	34	11.1	1.37	54.2	0.3	87.4	0.306
8	0.00	22.84	7.15	34	11.1	1.23	55.0	0.3	84.0	0.294
9	0.00	22.80	6.98	34	11.1	1.23	54.3	0.3	88.6	0.310
10	0.00	22.68	6.80	34	10.9	1.55	55.8	0.3	86.0	0.301
11	0.00	22.11	6.72	33	11.3	1.19	53.7	0.3	83.4	0.292
12	0.00	22.70	6.95	34	11.2	1.21	54.8	0.3	84.3	0.295
13	0.00	22.93	6.63	34	11.2	1.48	54.4	0.3	84.4	0.295
14	0.00	22.94	6.49	34	11.5	1.02	54.6	0.3	85.6	0.300
15	0.00	23.06	6.60	34	11.3	1.40	54.7	0.3	83.8	0.293
16	0.00	23.18	6.60	35	11.3	0.88	54.5	0.3	85.6	0.300
17	0.00	22.90	6.32	34	11.0	1.23	55.6	0.3	89.5	0.313
18	0.00	22.90	6.55	34	10.9	0.88	53.6	0.3	84.5	0.286
19	0.00	22.80	6.35	34	11.2	1.50	54.9	0.3	88.1	0.308
20	0.00	22.90	6.13	34	11.2	1.45	54.4	0.3	89.1	0.312
21	0.00	22.78	6.07	34	11.1	1.52	54.9	0.3	84.9	0.297
22	0.00	23.04	5.94	34	11.3	1.41	54.6	0.3	90.0	0.315
23	0.00	23.29	6.00	35	11.0	1.45	54.6	0.3	85.5	0.299
24	0.00	22.77	5.87	34	11.2	1.20	54.8	0.3	84.9	0.297
25	0.00	23.42	5.85	35	11.4	1.26	54.3	0.3	86.1	0.301
26	0.00	22.95	5.73	34	11.1	1.18	55.0	0.3	87.1	0.305
27	0.00	23.47	5.77	35	11.2	1.18	54.5	0.3	85.1	0.298
28	0.00	23.50	5.79	35	11.0	1.29	54.8	0.3	89.6	0.314
29	0.00	23.31	5.77	35	11.1	1.28	54.5	0.3	86.0	0.301
30	0.00	23.38	5.90	35	11.1	1.54	54.8	0.3	85.1	0.298
31	0.00	23.28	5.67	35	11.2	1.23	54.5	0.3	85.7	0.300
32	0.00	23.15	5.55	34	11.4	1.11	54.5	0.3	85.7	0.300
33	0.00	23.03	5.45	34	11.3	1.35	54.9	0.3	88.3	0.309
34	0.00	23.74	5.49	35	11.2	1.42	54.2	0.3	86.2	0.302
35	0.00	23.64	5.35	35	11.2	1.28	55.1	0.3	95.3	0.334
36	0.00	23.58	5.43	35	11.1	1.27	54.3	0.3	86.4	0.302
37	0.00	23.30	5.56	35	11.1	1.73	55.0	0.3	92.0	0.322
38	0.00	23.76	5.43	35	11.3	1.48	54.4	0.3	87.8	0.307
39	0.00	23.47	5.22	35	11.3	1.17	54.8	0.3	86.2	0.302
40	0.00	23.53	5.54	35	11.4	1.70	54.6	0.3	85.5	0.299
41	0.00	23.28	4.98	35	11.2	0.84	54.6	0.3	86.6	0.303
42	0.00	23.36	5.00	35	11.1	1.17	54.7	0.3	90.4	0.316
43	0.00	23.51	5.05	35	11.3	1.37	54.3	0.3	87.2	0.305
44	0.00	23.37	5.02	35	11.1	1.26	54.9	0.3	85.6	0.300
45	0.00	23.26	4.93	35	11.0	0.82	55.3	0.3	85.4	0.299
Average		22.86	6.24	34	11.1	1.30	54.5	0.3	86.2	0.302

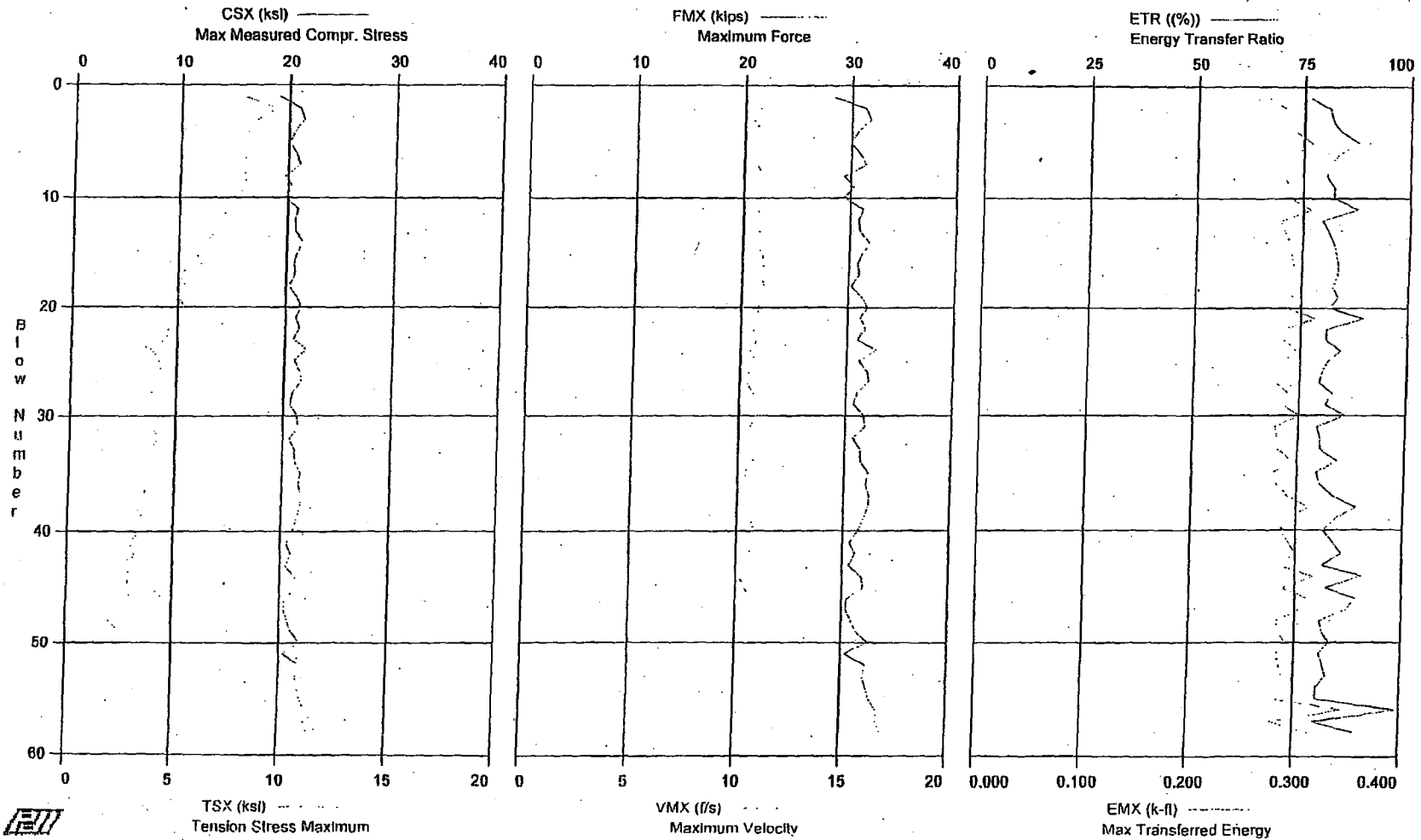
Total number of blows analyzed: 45

Time Summary

Drive 48 seconds

1:17:09 PM - 1:17:57 PM (11/30/2006) BN1 - 45

STP COL Project - Boring B-305DH; 358.5' - 36' Sample



STP COL Project - Boring B-305DH; 358.5' - 36' Sample  
OP: SEK

Rig Serial No. 299709 (Miller CME 75)  
Test date: 1-Dec-2006

AR: 1.49 in^2  
LE: 364.00 ft  
WS: 16,807.9 f/s

SP: 0.492 k/ft3  
EM: 30,000 ksi  
JC: 0.80

CSX: Max Measured Compr. Stress  
TSX: Tension Stress Maximum  
FMX: Maximum Force  
VMX: Maximum Velocity  
DFN: Final Displacement

BPM: Blows per Minute  
EFV: Energy of FV  
ETR: Energy Transfer Ratio  
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	DFN in	BPM **	EFV **	ETR (%)	EMX k-ft
1	0.00	18.99	7.87	28	10.5	0.87	0.0	0.3	76.4	0.267
2	0.00	21.02	9.38	31	10.7	1.17	51.4	0.3	81.2	0.284
3	0.00	21.32	8.48	32	10.4	1.33	55.4	0.3	81.6	0.286
4	0.00	20.57	8.34	31	10.8	1.32	54.7	0.3	83.6	0.293
5	0.00	20.11	8.15	30	10.8	1.06	55.4	0.3	88.0	0.308
6	0.00	20.69	8.03	31	10.9	1.47	54.1	0.3	83.2	0.291
7	0.00	21.09	7.82	31	10.6	1.23	55.4	0.3	81.1	0.284
8	0.00	19.72	7.98	29	10.9	1.03	54.3	0.3	80.5	0.282
9	0.00	20.32	8.04	30	10.9	0.94	54.3	0.3	82.2	0.288
10	0.00	19.75	7.44	29	10.9	1.24	55.0	0.3	82.2	0.288
11	0.00	20.96	7.13	31	10.7	1.40	54.8	0.3	87.8	0.307
12	0.00	20.70	6.94	31	10.6	0.99	55.1	0.3	79.6	0.279
13	0.00	20.76	6.66	31	10.7	1.52	54.7	0.3	80.9	0.283
14	0.00	21.38	6.25	32	10.5	1.23	54.7	0.3	82.2	0.288
15	0.00	20.98	5.94	31	10.9	0.87	54.1	0.3	83.0	0.290
16	0.00	20.65	5.61	31	11.0	1.27	54.3	0.3	83.4	0.292
17	0.00	20.79	5.04	31	10.8	1.48	55.4	0.3	83.5	0.292
18	0.00	20.29	5.32	30	11.0	1.13	54.3	0.3	82.4	0.288
19	0.00	20.95	4.95	31	10.8	1.28	54.9	0.3	83.5	0.292
20	0.00	21.40	5.27	32	10.8	0.77	54.3	0.3	81.9	0.287
21	0.00	20.92	4.83	31	10.7	1.49	54.7	0.3	89.6	0.314
22	0.00	21.28	4.57	32	10.6	0.91	54.6	0.3	81.2	0.284
23	0.00	20.76	4.48	31	10.8	1.11	54.5	0.3	81.0	0.284
24	0.00	21.96	3.76	33	10.4	0.82	54.9	0.3	84.5	0.296
25	0.00	20.89	4.13	31	10.7	1.16	54.4	0.3	81.4	0.285
26	0.00	21.43	4.26	32	10.4	1.30	54.9	0.3	80.2	0.281
27	0.00	21.52	3.95	32	10.3	0.81	54.3	0.3	79.5	0.278
28	0.00	20.81	3.83	31	10.6	1.11	55.0	0.3	82.6	0.289
29	0.00	20.64	4.23	31	10.8	1.24	54.5	0.3	81.1	0.284
30	0.00	21.28	4.02	32	10.8	1.03	54.5	0.3	85.9	0.301
31	0.00	21.37	3.89	32	10.5	1.27	54.7	0.3	79.4	0.278
32	0.00	20.60	4.17	31	10.5	1.24	54.8	0.3	80.1	0.280
33	0.00	21.09	3.79	31	10.5	1.24	54.7	0.3	80.2	0.281
34	0.00	21.14	3.73	31	10.7	1.02	53.8	0.3	84.4	0.295
35	0.00	21.64	3.91	32	10.3	0.98	55.0	0.3	79.4	0.278
36	0.00	21.48	3.52	32	10.6	0.96	54.4	0.3	80.4	0.281
37	0.00	21.71	3.81	32	10.2	0.88	54.7	0.3	83.5	0.292
38	0.00	21.69	3.25	32	10.4	1.52	54.5	0.3	89.0	0.311
39	0.00	21.37	3.60	32	10.6	1.31	54.1	0.3	84.1	0.294
40	0.00	21.09	3.39	31	10.8	1.40	54.4	0.3	81.4	0.285
41	0.00	20.55	2.93	31	10.9	1.14	54.5	0.3	83.7	0.293
42	0.00	20.93	3.14	31	10.5	0.92	54.8	0.3	85.7	0.300
43	0.00	20.53	2.87	31	10.8	0.83	54.5	0.3	81.2	0.284
44	0.00	21.34	2.89	32	10.1	1.22	55.1	0.3	90.5	0.317
45	0.00	21.45	2.79	32	10.4	0.34	54.0	0.3	82.2	0.288
46	0.00	20.47	3.04	31	10.7	1.28	55.0	0.3	89.1	0.312
47	0.00	20.40	2.69	30	10.8	1.30	54.8	0.3	87.2	0.305
48	0.00	20.74	1.96	31	10.8	0.25	54.8	0.3	80.8	0.283
49	0.00	21.08	2.57	31	10.6	0.78	53.7	0.3	81.5	0.285
50	0.00	21.85	2.65	33	10.6	1.32	54.7	0.3	83.1	0.291
51	0.00	20.37	2.55	30	10.7	1.22	54.6	0.3	80.7	0.283
52	0.00	21.74	2.46	32	10.5	1.71	54.2	0.3	81.7	0.286
53	0.00	21.56	2.57	32	10.2	1.31	55.2	0.3	82.5	0.289
54	0.00	21.74	2.41	32	10.5	1.21	53.9	0.3	80.4	0.281
55	0.00	21.98	1.88	33	10.7	0.27	54.9	0.3	80.4	0.281
56	0.00	22.45	2.22	33	10.8	1.82	54.2	0.3	99.0	0.346
57	0.00	22.44	2.29	33	10.4	1.41	55.0	0.3	79.7	0.279
58	0.00	22.76	2.30	34	10.2	1.57	54.1	0.3	89.7	0.314
Average		21.06	4.58	31	10.6	1.14	54.6	0.3	83.0	0.291

Total number of blows analyzed: 58

Time Summary

Drive 1 minute 3 seconds

4:07:52 PM - 4:08:55 PM (12/1/2006) BN 1 - 58