



engineering and constructing a better tomorrow

July 14, 2008

Memorandum to File

From: Steve Kiser *SK*

Reviewed By: Kathryn White *KAW 7/15/08*

Subject: **Report of SPT Energy – MACTEC Charlotte CME 75 Truck
Hammer Serial No. 797 Automatic Hammer
WORK INSTRUCTION No. 18 (FLR-085)
STP COL Project
Matagorda County, Texas
MACTEC Project No. 6234-08-4660**

Jonathan Honeycutt, 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 June 19, 2008, during drilling of Boring T3-5B at the referenced site. The testing was performed by Jonathan Honeycutt from approximately 10:35 AM to 11:02 AM on June 19 under sunny skies and a temperature of 90 degrees Fahrenheit. The boring was drilled with personnel and equipment from MACTEC Charlotte. 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 borings below the depth at which groundwater was encountered at the time of energy testing. The drill rig operator during sampling was Mr. Jimmy Warren. 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 PAX (Serial No. 3622L), and calibrated accelerometers (Serial Nos. K990 and K983) and strain gages (Serial Nos. NW #146/1 and NW#146/2). A 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

The calibration records for all the above are filed in DCN FLR-079.

12 Pages Total

MACTEC Engineering and Consulting, Inc.

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Nuclear Energy Systems & Services Division

DCN: FLR-317 mactec.com

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; however, maximum and minimum ETR values of up to 98% and 56%, respectively, were reported in the literature. The ETR values shown in Table 1 are generally 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 record(s) was(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 267 foot-pounds to 282 foot-pounds. These average energy transfers correspond to energy transfer ratios (ETR) of 76% to 81% 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 278.9 foot-pounds, with an average ETR of 79.7%.

Attachments: Page 4 Table 1 - Summary of SPT Energy Measurements - 1 Page
Page 5 Work Instruction - DCN FLR-085 - 1 Page
Page 6 Record of SPT Energy Measurement - 1 Page
Pages 7 - 12 PDILOT Output - 6 Pages

3867/63


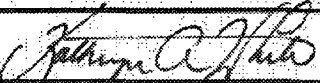
TABLE 1
SUMMARY OF SPT ENERGY MEASUREMENTS (ASTM D4633-05)
South Texas Project (STP) COL Site - Units 3 and 4
Wadsworth, Texas
MACTEC Project No. 6234-08-4660

Rig Serial No.	Rig Owner	Rig Operator	Boring No. Tested	Date Tested	Drill Rod Size	Sample Depth (feet)	SPT Blow Count (blows per six inches)	No. of Blows Analyzed	Average Measured Energy (Average EFV) (ft-lbs) ^a	Energy Transfer Ratio (%) ^b (Average ETR)
797 (CME 75 Truck)	MACTEC Charlotte	Jimmy Warren	T3-5B	6/19/2008	NW-J	17.4 - 18.9	3 - 3 - 4	11	267	76.3%
						22.4 - 23.9	8 - 14 - 11	31	281	80.3%
						27.4 - 28.9	7 - 9 - 8	21	282	80.6%
Average for Rig:									278.9	79.7%

^aMeasured 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, where EMX equals the maximum transferred energy measured by the PDA (see attached PDA data).

^bEnergy 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 PDI PLOT tables due to roundoff.

Prepared By: 	Date: 7-14-08	Checked By: 	Date: 7/15/08
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STEVE KISER

Work Instruction No. 18
STP Units 3 & 4 COL Project
MACTEC Engineering and Consulting, Inc.
MACTEC Project 6234-08-4660

Issued To: Steve Kiser, Jon Honeycutt	Rev. No. 0
Issued By: Robert E. Smith	Date: June 5, 2008
Valid From: June 5, 2008	To: June 5, 2009

Task Description: Perform SPT Energy Measurements of drill rigs

Applicable Technical Procedures or Plans, or other reference:

Work Plan (current revision), ASTM D4633-05.

Specific Instructions (note attachments where necessary): Perform energy measurements for each drill rig on site collecting split-spoon samples in accordance with ASTM D-4633-05. Consult with Site Coordinator as to schedule for rigs that may be planned for use that are not yet present. Hammer weights have been checked by site personnel, and records will be available on site. All rigs are using automatic hammer systems. Be sure to check each drill rig using all hammer/rod combinations that it will be using. Depths for measurements should be coordinated with the Site Coordinator, but should begin at a minimum depth of 10 feet. Collect at least three energy measurements per drill rig.

Submit copies of calibration records for equipment to Quality Assurance for review prior to beginning work on site.

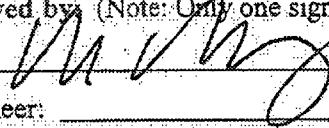
Special Instructions (note attachments where necessary): Confirm with Site Supervisor that approval of equipment calibration records has been received prior to beginning field testing. If unexpected conditions are encountered that affect measurements, notify Shaun Lehman and Rob Smith immediately.

Report Format: Standard report in accordance with ASTM D 4633-05 requirements.

Specific Quality Assurance Procedures Applicable: QAP 20-1; QAP 25-1; QAP for Reporting Nuclear-Related Defects, or Noncompliances, per Federal Regulation 10CFR21 and Section 206 of the Energy Reorganization Act of 1974. Current revisions apply.

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 for issuance)	
Project Manager: 	Date: 6/16/08
Project Principal Engineer: _____	Date: _____
Site Manager/Coordinator: _____	Date: _____
Pages:	DCN: FLR-085
Attachments:	



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RECORD OF SPT ENERGY MEASUREMENT

GENERAL INFORMATION		DRILL RIG DATA	
PROJECT:	South Texas Project COL Site	MAKE:	CME
LOCATION:	Matagorda County, Texas	MODEL:	75
PROJECT NO.:	8234-08-4660	SERIAL NO.:	797
DATE:	6-19-2008	HAMMER TYPE:	Auto
WEATHER:	Sunny, BREEZ 90°F	ROPE CONDITION:	N/A
INSPECTOR:	S. N. HANCOCK #4	ROD SIZE:	NW5
DRILLING COMPANY:	MACTEC - CHARLOTTE	NO. OF SHEAVES:	N/A

BORING DATA	
BORING NUMBER:	T3-5B
DEPTH DRILLED:	VARIOUS
TIME DRIVEN:	VARIOUS
RIG OPERATOR:	J. WARREN
HAMMER OPERATOR:	N/A
PDA PAK SERIAL NO.:	3822L
INSTR. ROD AREA:	1.49 IN ²
ACCEL SERIAL NOS.:	K-990-A1; K-993-A2
STRAIN SERIAL NOS.:	NW196 #1/2

SAMPLE DEPTH (feet)	SPT N-VALUE (blows)							
17.4-18.9	3-3-*							
22.4-23.9	8-13-11	3-14-11						
27.4-28.9	7-9-*							

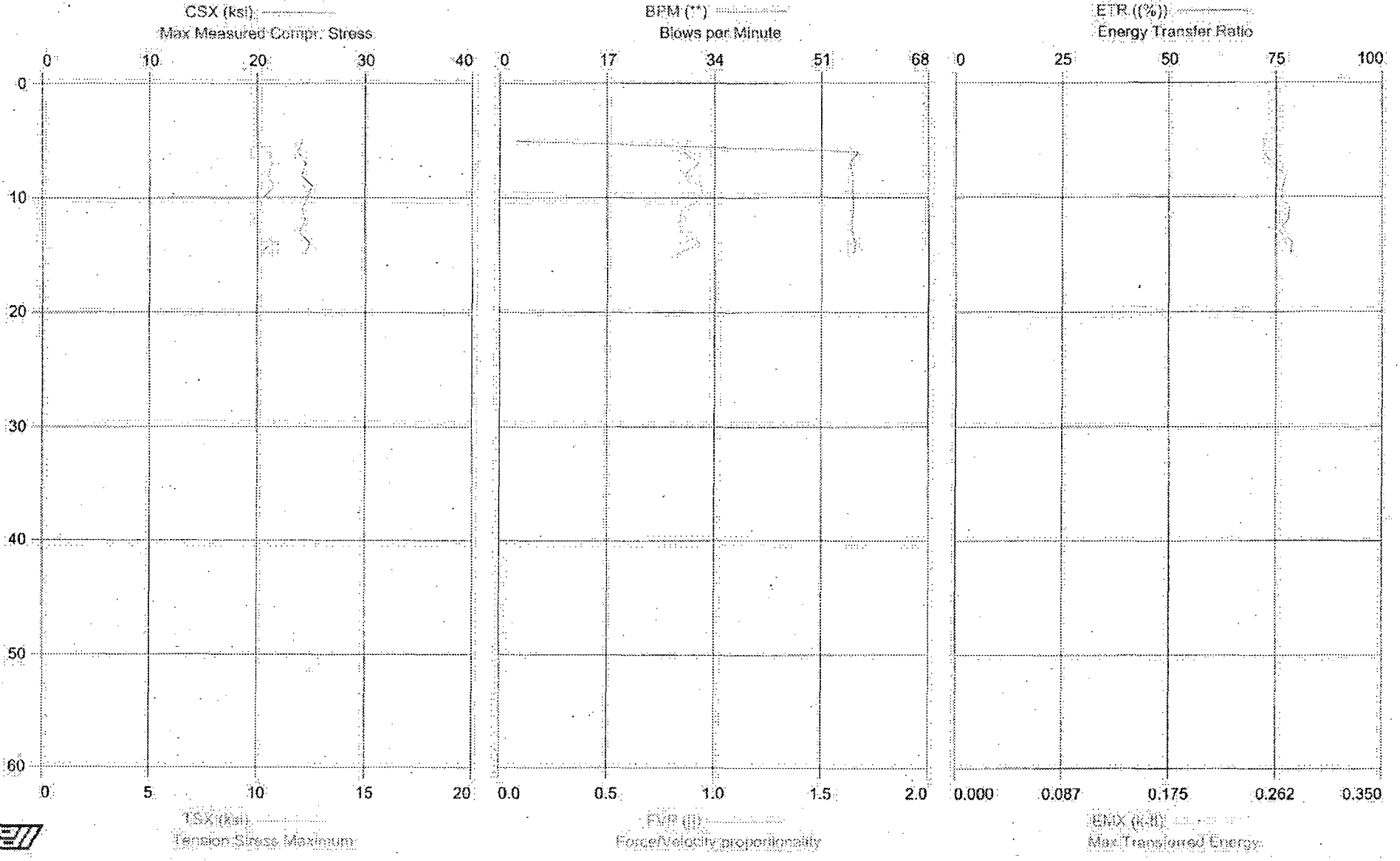
REMARKS: 1/2 F: AT 4 Blows - 1- calibration
 3- Potting Hammer on Arrivel

DIPLOT Ver. 2008.1 - Printed: 25-Jun-2008

MACTEC Engineering and Consulting, Inc. - Case Method Results

Test date: 19-Jun-2008

STP COL SITE - Boring T3-5B; 17.4' - 18.9' Sample



MACTEC Engineering and Consulting, Inc.
Case Method Results

Page 1 of 1
PDILOT Ver. 2008.1 - Printed: 25-Jun-2008

STP COL SITE - Boring T3-5B; 17.4' - 18.9' Sample
OP: JNH

Hammer ID: 797 (MACTEC CHL - CME 75)
Test date: 19-Jun-2008

AR: 1.49 in²
LE: 23.00 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft³
EM: 30,000.0 ksi
JC: 0.70

CSX: Max Measured Compr. Stress
TSX: Tension Stress Maximum
FMX: Maximum Force
VMX: Maximum Velocity
FVP: Force/Velocity proportionality

BPM: Blows per Minute
EF2: Energy of F²
ETR: Energy Transfer Ratio
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX klps	VMX f/s	FVP []	BPM **	EF2 k-ft	ETR (%)	EMX k-ft
5	0.00	24.2	10.0	36	13.4	0.87	2.2	0.268	72	0.253
6	0.00	23.7	10.6	35	12.4	0.85	56.8	0.271	72	0.252
7	0.00	24.5	10.7	36	13.3	0.93	55.5	0.272	74	0.258
8	0.00	24.1	10.5	36	13.6	0.85	55.9	0.274	77	0.271
9	0.00	25.1	10.8	37	13.5	0.94	55.9	0.280	77	0.268
10	0.00	24.6	10.3	37	13.1	0.95	56.1	0.271	76	0.267
11	0.00	24.2	10.2	36	13.9	0.85	56.1	0.277	78	0.274
12	0.00	24.5	9.8	36	13.5	0.84	55.9	0.273	78	0.273
13	0.00	23.9	10.1	36	13.6	0.84	55.9	0.271	76	0.265
14	0.00	24.9	10.7	37	13.6	0.93	56.3	0.278	79	0.276
15	0.00	24.4	10.1	36	13.1	0.82	56.2	0.266	76	0.275
Average		24.4	10.3	36	13.4	0.88	51.2	0.273	76	0.267

Total number of blows analyzed: 11

Time Summary

Drive: 11 seconds

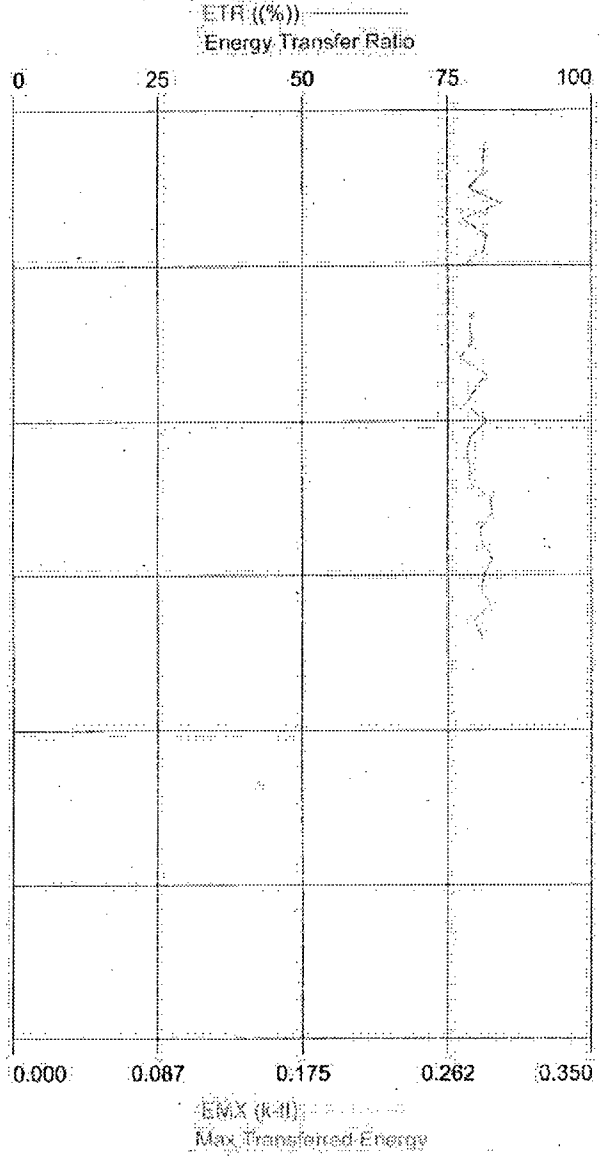
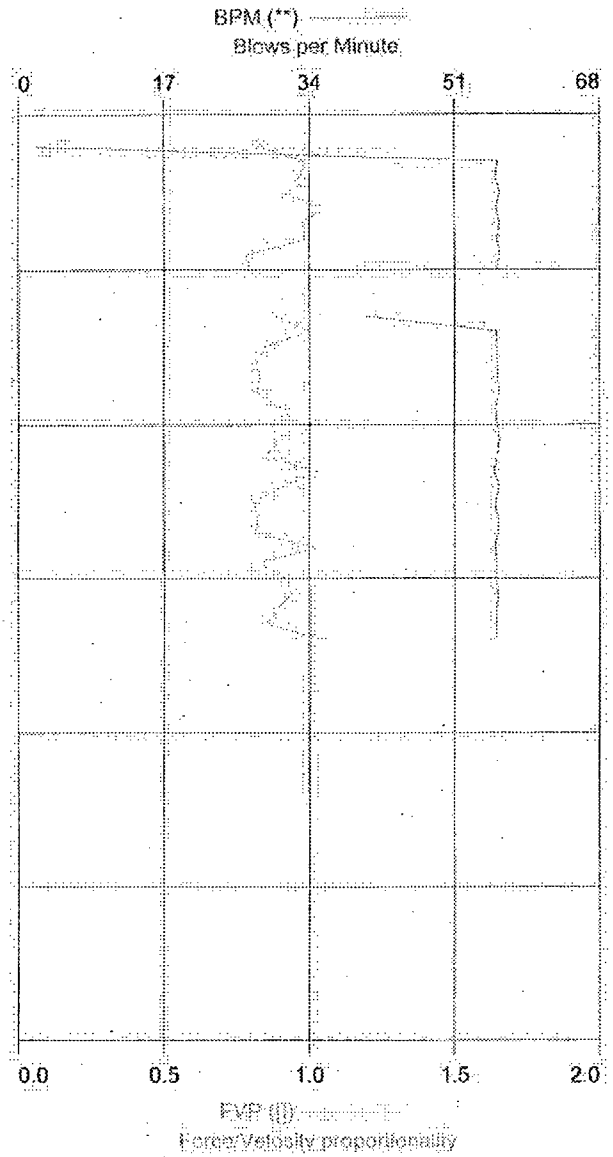
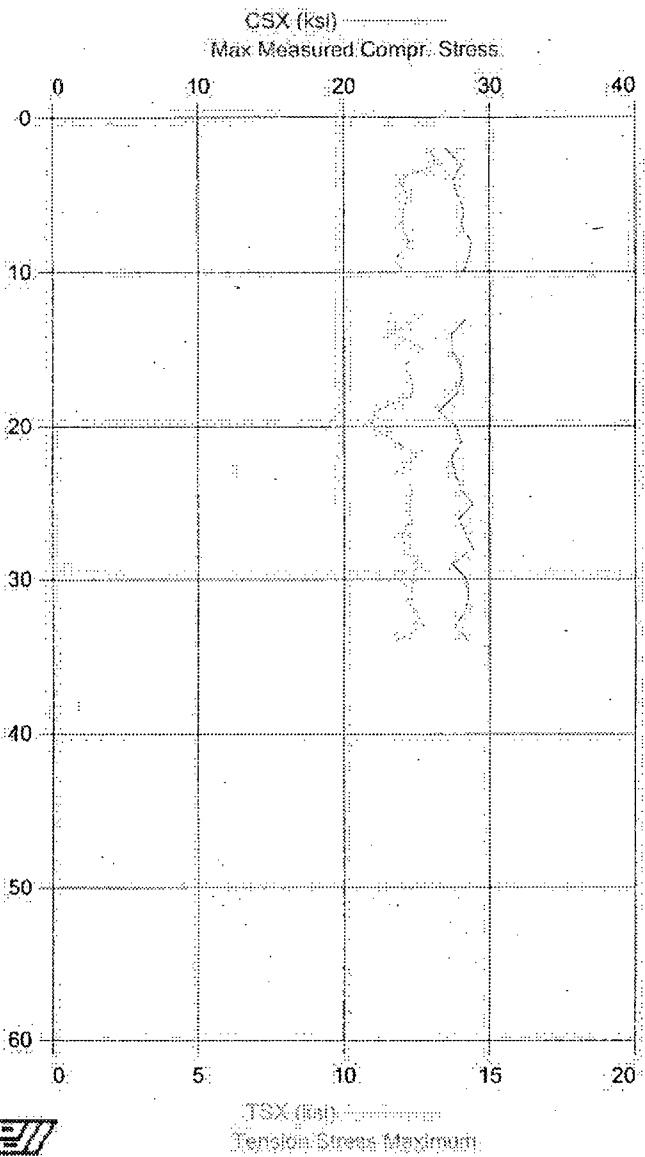
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STP COL SITE - Boring T3-5B; 22.4' - 23.9' Sample

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Nuclear Energy Systems & Services Division

399/7632

DCN: FLR-317



STP COL SITE - Boring T3-5B: 22.4' - 23.9' Sample
OP: JNH

Hammer ID: 797 (MACTEC CHL -CME 75)
Test date: 19-Jun-2008

AR: 1.49 in^2
LE: 29.00 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft³
EM: 30,000.0 ksi
JC: 0.70

CSX: Max Measured Compr. Stress
TSX: Tension Stress Maximum
FMX: Maximum Force
VMX: Maximum Velocity
FVP: Force/Velocity proportionality

BPM: Blows per Minute
EF2: Energy of F²
ETR: Energy Transfer Ratio
EMX: Max. Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	FVP []	BPM "	EF2 k-ft	ETR (%)	EMX k-ft
2	0.00	27.0	12.9	40	14.7	0.82	1.9	0.306	82	0.285
3	0.00	28.1	13.1	42	14.2	0.99	56.0	0.312	81	0.284
4	0.00	27.5	11.9	41	14.4	0.97	55.7	0.303	81	0.284
5	0.00	27.8	12.2	41	14.5	0.91	56.2	0.305	79	0.275
6	0.00	28.2	12.1	42	14.0	1.04	55.8	0.315	84	0.295
7	0.00	28.0	12.0	42	14.1	0.98	56.2	0.308	78	0.271
8	0.00	28.7	12.3	43	14.5	0.98	55.9	0.318	82	0.286
9	0.00	28.6	11.8	43	14.2	0.78	56.2	0.315	81	0.285
10	0.00	28.2	12.0	42	14.0	0.80	55.9	0.312	78	0.271
13	0.00	28.4	12.6	42	14.8	0.88	40.6	0.317	79	0.277
14	0.00	27.4	11.6	41	14.1	1.00	55.8	0.303	79	0.276
15	0.00	27.3	12.7	41	14.3	0.85	55.9	0.310	79	0.277
16	0.00	28.0	12.1	42	13.5	0.82	55.9	0.309	77	0.270
17	0.00	28.1	12.3	42	14.0	0.83	56.0	0.319	82	0.286
18	0.00	27.6	12.4	41	14.7	0.82	56.1	0.313	80	0.279
19	0.00	26.4	11.1	39	13.9	0.92	55.7	0.310	78	0.273
20	0.00	27.6	10.9	41	14.5	0.94	55.9	0.315	82	0.287
21	0.00	28.0	11.9	42	14.6	0.89	56.2	0.311	79	0.277
22	0.00	27.3	12.5	41	14.6	0.85	55.9	0.314	78	0.274
23	0.00	27.6	11.7	41	13.8	1.03	55.6	0.305	79	0.276
24	0.00	28.0	12.4	42	14.6	0.90	56.2	0.311	79	0.276
25	0.00	28.8	12.2	43	14.2	0.81	55.7	0.324	82	0.289
26	0.00	27.8	12.3	41	14.9	0.82	56.0	0.322	83	0.290
27	0.00	28.3	12.0	42	14.3	0.81	56.0	0.319	81	0.282
28	0.00	28.8	12.1	43	14.0	1.02	55.7	0.322	81	0.284
29	0.00	27.4	12.5	41	15.0	0.83	55.9	0.319	83	0.290
30	0.00	28.4	12.4	42	14.7	0.92	55.8	0.320	81	0.285
31	0.00	28.5	12.3	42	14.6	0.94	56.0	0.322	81	0.283
32	0.00	28.4	12.4	42	14.9	0.89	55.9	0.319	82	0.289
33	0.00	27.6	12.7	41	14.6	0.85	55.8	0.321	80	0.279
34	0.00	28.5	11.8	42	13.8	1.05	55.9	0.321	81	0.283
Average		27.9	12.2	42	14.3	0.90	53.7	0.314	80	0.281

Total number of blows analyzed: 31

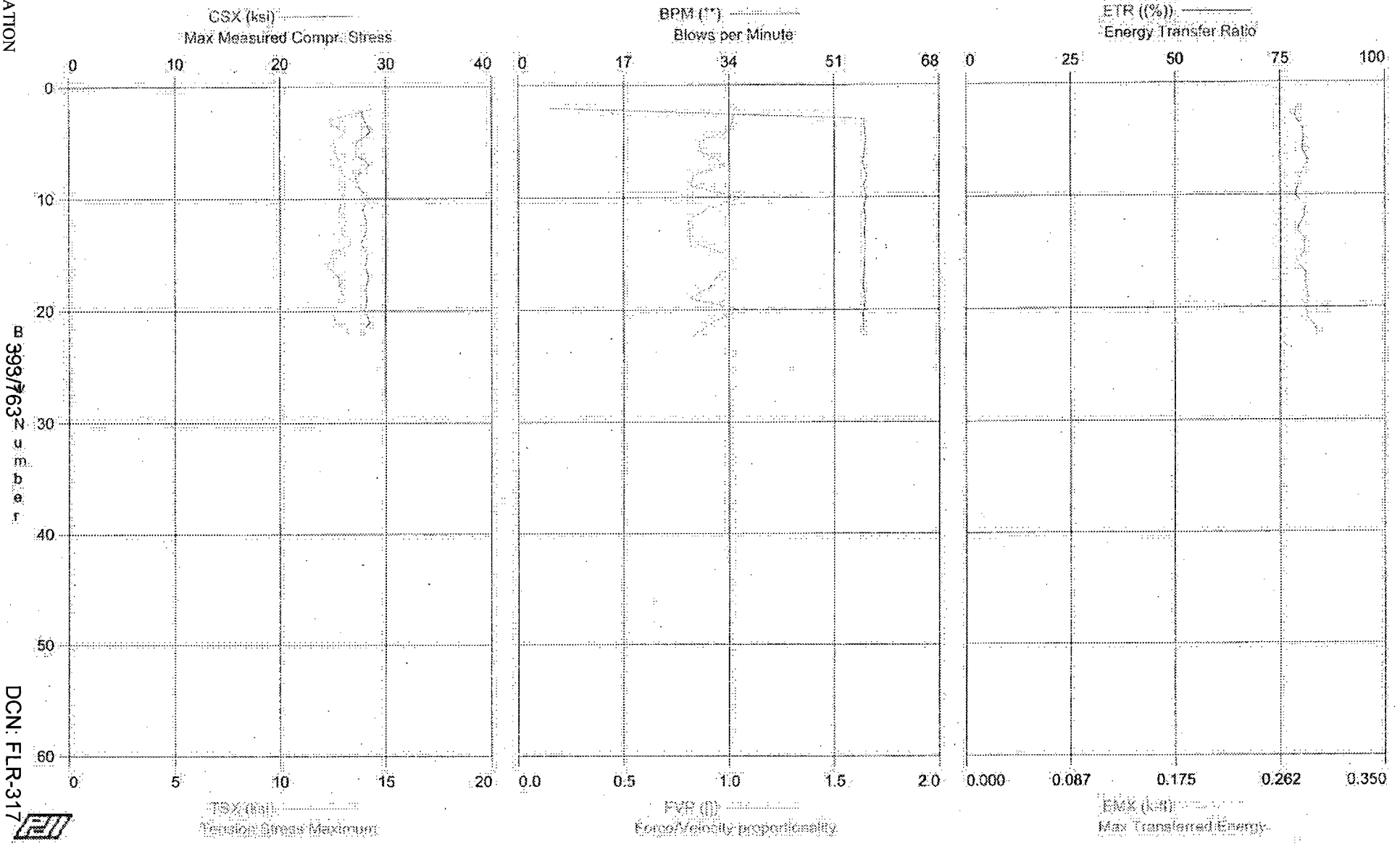
Time Summary:

Drive 34 seconds

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PDiPLOT Ver. 2008.1 - Printed: 25-Jun-2008

STP COL SITE - Boring T3-5B, 27.4' - 28.9' Sample



393/763 Z E A. A. L.

DCN: FLR-317



MACTEC Engineering and Consulting, Inc.
Case Method Results

Page 1 of 1
PDIPILOT Ver. 2008.1 - Printed: 25-Jun-2008

STP COL SITE - Boring T3-5B; 27.4' - 28.9' Sample
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Test date: 19-Jun-2008

AR: 1.49 in²
LE: 33.00 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft³
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EF2: Energy of F²
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EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksf	FMX kips	VMX f/s	FVP []	BPM "	EF2 k-ft	ETR (%)	EMX k-ft
2	0.00	27.6	14.3	41	13.6	1.03	5.0	0.312	79	0.277
3	0.00	27.9	12.2	42	13.7	1.02	55.7	0.311	78	0.274
4	0.00	28.5	13.0	42	14.0	1.01	55.9	0.324	80	0.281
5	0.00	27.1	12.6	40	14.3	0.86	56.0	0.322	81	0.282
6	0.00	27.2	12.6	40	14.2	0.87	55.8	0.323	80	0.281
7	0.00	28.4	12.8	42	14.2	0.98	55.5	0.319	82	0.288
8	0.00	27.1	13.0	40	14.3	0.83	56.2	0.325	80	0.280
9	0.00	27.5	13.1	41	14.0	0.82	55.7	0.318	79	0.278
10	0.00	28.3	12.9	42	13.4	1.06	56.1	0.319	78	0.275
11	0.00	27.8	12.8	41	14.4	0.90	55.7	0.313	81	0.283
12	0.00	28.1	13.1	42	13.9	0.81	56.0	0.319	81	0.282
13	0.00	28.1	12.9	42	13.6	0.81	55.8	0.321	79	0.277
14	0.00	27.7	13.4	41	14.3	0.81	55.9	0.323	81	0.283
15	0.00	28.2	12.5	42	14.1	0.98	55.9	0.316	81	0.283
16	0.00	28.0	12.3	42	13.6	1.03	55.8	0.319	79	0.277
17	0.00	28.4	12.7	42	14.3	0.95	55.7	0.323	81	0.284
18	0.00	28.0	12.8	42	14.4	0.91	55.6	0.319	81	0.283
19	0.00	28.2	13.1	42	14.0	0.82	56.0	0.328	82	0.286
20	0.00	28.0	12.6	42	13.6	1.05	55.7	0.318	81	0.284
21	0.00	28.5	12.8	42	14.4	0.94	55.6	0.326	82	0.286
22	0.00	27.6	13.2	41	14.5	0.84	55.7	0.334	84	0.294
Average		27.9	12.9	42	14.0	0.92	53.4	0.321	80	0.282

Total number of blows analyzed: 21

Time Summary

Drive 22 seconds

11:02:08 AM - 11:02:30 AM (6/19/2008) BN 2 - 22



engineering and constructing a better tomorrow

July 14, 2008

Memorandum to File

From: Steve Kiser

Reviewed By: Kathryn White KAW 7/15/08

**Subject: Report of SPT Energy – MACTEC Raleigh CME 55LC Track
Hammer Serial No. MEC-2 Automatic Hammer
WORK INSTRUCTION No. 18 (FLR-085)
STP COL Project
Matagorda County, Texas
MACTEC Project No. 6234-08-4660**

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13 Pages Total

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

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; however, maximum and minimum ETR values of up to 98% and 56%, respectively, were reported in the literature. The ETR values shown in Table 1 are generally 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 record(s) was(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 304 foot-pounds to 321 foot-pounds. These average energy transfers correspond to energy transfer ratios (ETR) of 87% to 92% 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 311.2 foot-pounds, with an average ETR of 88.9%.

Attachments: Page 4 Table 1 - Summary of SPT Energy Measurements - 1 Page
Page 5 Work Instruction - DCN FLR-085 - 1 Page
Pages 6-7 Record of SPT Energy Measurement - 2 Pages
Pages 8 - 13 PDILOT Output - 6 Pages

TABLE J
SUMMARY OF SPT ENERGY MEASUREMENTS (ASTM D4633-05)
South Texas Project (STP) COL Site - Units 3 and 4
Wadsworth, Texas
MACTEC Project No. 6234-08-4660

Rig Serial No.	Rig Owner	Rig Operator	Boring No. Tested	Date Tested	Drill Rod Size	Sample Depth (feet)	SPT Blow Count (blows per six inches)	No. of Blows Analyzed	Average Measured Energy (Average EFV) (ft-lbs) ^a	Energy Transfer Ratio (%) ^b (Average ETR)
MEC-2 (CME 55LC)	MACTEC Raleigh	David White	T4-5	6/11/2008	NW-J	263.5 - 265.0	6 - 11 - 14	30	313	89.4%
				6/12/2008		268.5 - 270.0	WOR - 6 - 10	16	321	91.7%
						278.5 - 280.0	6 - 9 - 14	29	304	86.9%
Average for Rig:									311.2	88.9%


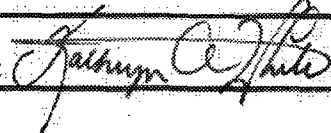
398/763

^a Measured Energy is energy based on the EFV method, as outlined in ASTM D4633-05, for each blow recorded by the PDA. In some cases, the initial 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, where EMX equals the maximum transferred energy measured by the PDA (see attached PDA data).

^b Energy Transfer Ratio is the Measured Energy divided by the theoretical SPT energy of 350 foot-pounds (140 pound hammer falling 2.5 feet).

The average ETR values may differ slightly and insignificantly from those in the PDI PLOT tables due to roundoff.

Prepared By: 	Date: 7-14-08		Checked By: 	Date: 7/15/08
STEVE KISER				

Work Instruction No. 18
 STP Units 3 & 4 COL Project
 MACTEC Engineering and Consulting, Inc.
 MACTEC Project 6234-08-4660

Issued To: <u>Steve Kiser, Jon Honeycutt</u>	Rev. No. <u>0</u>
Issued By: <u>Robert E. Smith</u>	Date: <u>June 5, 2008</u>
Valid From: <u>June 5, 2008</u>	To: <u>June 5, 2009</u>

Task Description: Perform SPT Energy Measurements of drill rigs

Applicable Technical Procedures or Plans, or other reference:

Work Plan (current revision), ASTM D4633-05.

Specific Instructions (note attachments where necessary): Perform energy measurements for each drill rig on site collecting split-spoon samples in accordance with ASTM D-4633-05. Consult with Site Coordinator as to schedule for rigs that may be planned for use that are not yet present. Hammer weights have been checked by site personnel, and records will be available on site. All rigs are using automatic hammer systems. Be sure to check each drill rig using all hammer/rod combinations that it will be using. Depths for measurements should be coordinated with the Site Coordinator, but should begin at a minimum depth of 10 feet. Collect at least three energy measurements per drill rig.

Submit copies of calibration records for equipment to Quality Assurance for review prior to beginning work on site.

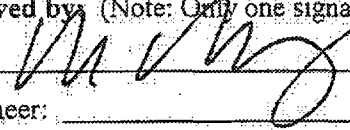
Special Instructions (note attachments where necessary): Confirm with Site Supervisor that approval of equipment calibration records has been received prior to beginning field testing. If unexpected conditions are encountered that affect measurements, notify Shaun Lehman and Rob Smith immediately.

Report Format: Standard report in accordance with ASTM D 4633-05 requirements.

Specific Quality Assurance Procedures Applicable: QAP 20-1; QAP 25-1; QAP for Reporting Nuclear-Related Defects, or Noncompliances, per Federal Regulation 10CFR21 and Section 206 of the Energy Reorganization Act of 1974. Current revisions apply.

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 for issuance)	
Project Manager: <u></u>	Date: <u>6/6/08</u> ^{DB} ^{6/6/08}
Project Principal Engineer: _____	Date: _____
Site Manager/Coordinator: _____	Date: _____
Pages: _____	DCN: FLR-085
Attachments: _____	

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 COL Site	MAKE:	CME
LOCATION:	Matagorda County, Texas	MODEL:	SSLC
PROJECT NO.:	6234-08-4660	SERIAL NO.:	MEC 2
DATE:	6-12-2008	HAMMER TYPE:	Auto
WEATHER:	Partly Cloudy - 50°F ^{SUNNY} BREEZY	ROPE CONDITION:	N/A
INSPECTOR:	J N Honeysight	ROD SIZE:	NW 3
DRILLING COMPANY:	MACTEC - Raleigh	NO. OF SHEAVES:	N/A

BORING DATA	
BORING NUMBER:	TA-5
DEPTH DRILLED:	Variable
TIME DRIVEN:	Variable
RIG OPERATOR:	D. White
HAMMER OPERATOR:	N/A
PDA PAK SERIAL NO.:	3622L
INSTR. ROD AREA:	1.49 in ²
ACCEL. SERIAL NOS.:	A1-K990-42-1050
STRAIN SERIAL NOS.:	NW-196 # 112

SAMPLE DEPTH (feet)	SPT N-VALUE (blf)								
278.5-280	6-9-14								

REMARKS:



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RECORD OF SPT ENERGY MEASUREMENT

GENERAL INFORMATION		DRILL RIG DATA	
PROJECT:	South Texas Project COL Site	MAKE:	CME
LOCATION:	Matagorda County, Texas	MODEL:	556C
PROJECT NO.:	6234-08-4660	SERIAL NO.:	MEL 2
DATE:	6-11-2008	HAMMER TYPE:	Auto
WEATHER:	Partly Cloudy / Sunny / 50's	ROPE CONDITION:	N/A
INSPECTOR:	ST. W. BER	ROD SIZE:	NW J
DRILLING COMPANY:	MACTEC - RALEIGH	NO. OF SHEAVES:	N/A

BORING DATA

BORING NUMBER:	T2-5
DEPTH DRILLED:	263.5 - 265
TIME DRIVEN:	VARIOUS
RIG OPERATOR:	David White
HAMMER OPERATOR:	N/A
PDA PAK SERIAL NO.:	3622L
INSTR. ROD AREA:	1.49 in ²
ACCEL. SERIAL NOS.:	A1-4990 - A2-1050
STRAIN SERIAL NOS.:	NW-146 #1/2

SAMPLE DEPTH (feet)	SPT N-VALUE (bpf)																		
263.5 - 265	6-11-14																		
268.5 - 270	N/A - 6-10																		

REMARKS:

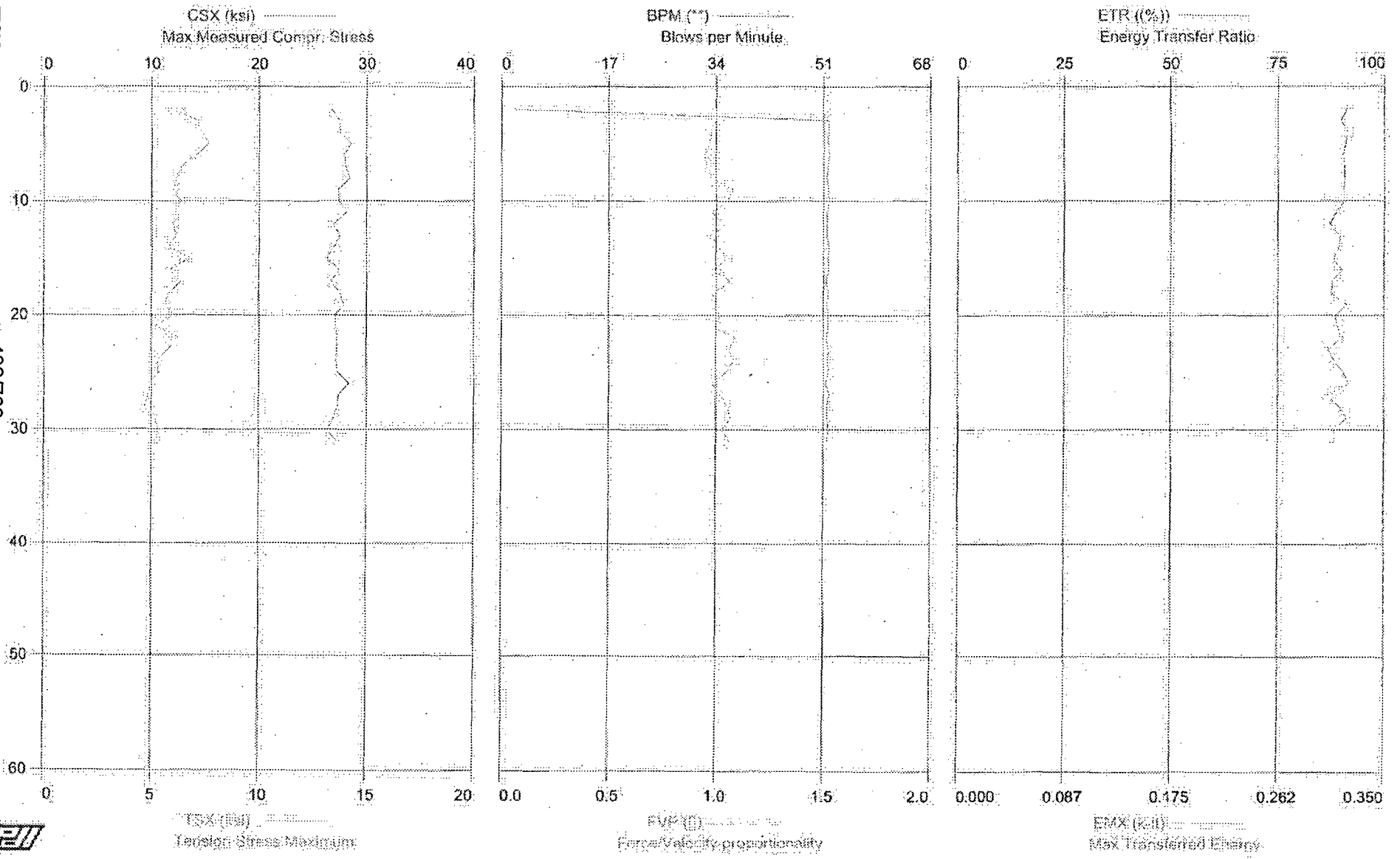


DIPILOT Ver. 2008.1 - Printed: 25-Jun-2008

MACTEC Engineering and Consulting, Inc. - Case Method Results

Test date: 11-Jun-2008

STP COL - Boring T4-5; 263.5' - 265' Sample



MACTEC Engineering and Consulting, Inc.
Case Method Results

Page 1 of 1
PDILOT Ver. 2008.1 - Printed: 25-Jun-2008

STP COL - Boring T4-5; 263.5' - 265' Sample
OP: SEK

Hammer ID: MEC-2 (MACTEC Raleigh - CME 55LC)
Test date: 11-Jun-2008

AR: 1.49 in²
LE: 269.00 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft³
EM: 30,000.0 ksi
JC: 0.70

CSX: Max Measured Compr. Stress
TSX: Tension Stress Maximum
FMX: Maximum Force
VMX: Maximum Velocity
FVP: Force/Velocity proportionality

BPM: Blows per Minute
EF2: Energy of F²
ETR: Energy Transfer Ratio
EMX: Max. Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	FVP []	BPM **	EF2 k-ft	ETR (%)	EMX k-ft
2	0.00	26.7	5.9	40	14.5	1.00	1.9	0.333	91	0.320
3	0.00	27.5	7.1	41	14.5	1.00	51.9	0.337	90	0.315
4	0.00	27.5	7.4	41	14.7	0.97	51.8	0.339	91	0.320
5	0.00	28.5	7.7	42	14.9	0.97	51.7	0.338	91	0.318
6	0.00	27.9	7.1	42	14.5	0.95	51.9	0.337	90	0.316
7	0.00	28.0	6.4	42	14.6	0.96	51.7	0.339	91	0.318
8	0.00	28.4	6.2	42	14.6	0.98	51.5	0.338	91	0.318
9	0.00	27.4	6.0	41	14.2	1.08	51.8	0.336	91	0.317
10	0.00	27.4	6.3	41	14.2	1.05	51.8	0.336	91	0.317
11	0.00	28.1	6.1	42	14.3	0.98	51.6	0.335	89	0.311
12	0.00	26.8	6.0	40	14.4	1.04	51.6	0.323	87	0.306
13	0.00	27.5	6.1	41	14.8	0.98	51.6	0.330	90	0.314
14	0.00	26.9	5.8	40	14.6	1.02	51.8	0.330	89	0.313
15	0.00	26.3	6.8	39	13.9	1.05	51.7	0.320	88	0.309
16	0.00	27.4	5.8	41	14.4	1.00	51.8	0.333	90	0.315
17	0.00	26.7	6.4	40	14.0	1.07	51.4	0.330	88	0.308
18	0.00	27.5	5.8	41	14.0	0.98	51.8	0.328	88	0.307
19	0.00	27.9	5.6	42	14.4	1.00	51.6	0.333	91	0.319
20	0.00	27.1	6.0	40	14.2	1.02	51.7	0.332	89	0.310
21	0.00	27.0	5.2	40	14.5	1.00	51.7	0.328	89	0.312
22	0.00	27.3	6.2	41	14.0	1.09	51.5	0.332	90	0.316
23	0.00	27.2	5.8	41	14.3	1.06	51.8	0.323	87	0.304
24	0.00	27.1	5.3	40	14.0	1.09	51.7	0.332	88	0.309
25	0.00	27.3	5.3	41	14.6	1.04	51.8	0.329	90	0.317
26	0.00	28.3	4.9	42	14.4	0.98	51.3	0.333	92	0.321
27	0.00	27.4	4.9	41	13.6	1.02	51.9	0.326	86	0.302
28	0.00	27.3	4.7	41	14.5	1.05	51.6	0.328	90	0.314
29	0.00	26.9	5.2	40	14.2	1.07	51.6	0.334	91	0.319
30	0.00	26.3	5.2	39	14.3	1.03	51.8	0.326	88	0.309
31	0.00	27.1	5.5	40	14.3	1.06	51.5	0.325	89	0.310
Average		27.4	6.0	41	14.4	1.02	50.0	0.331	90	0.313

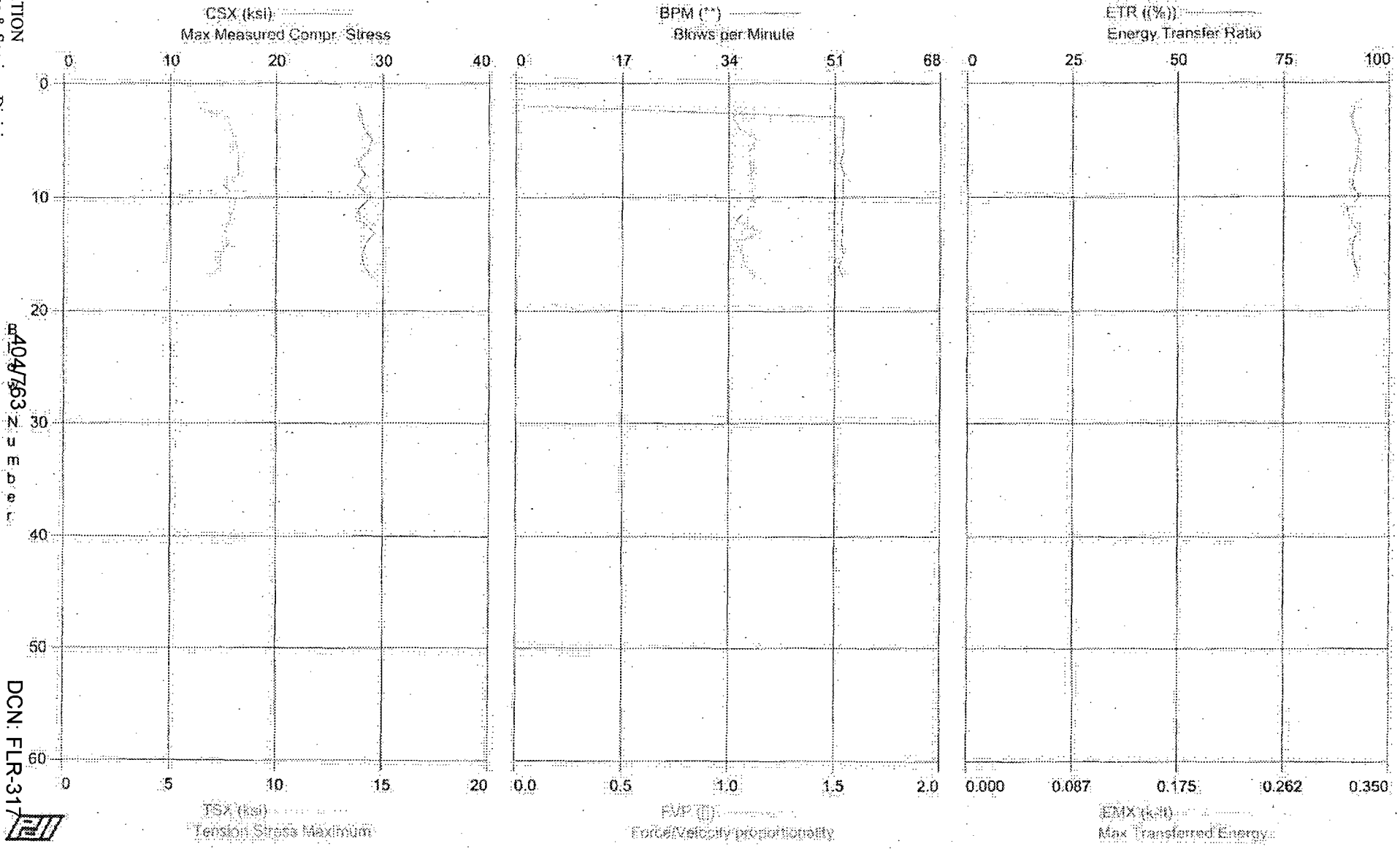
Total number of blows analyzed: 30

Time Summary

Drive 34 seconds

4:40:25 PM - 4:40:59 PM (6/11/2008) BN 2 - 31

STP COL - Boring T4-5; 268.5' - 270' Sample



404763 Z = E.D.

DCN: FLR-31



MACTEC Engineering and Consulting, Inc.
Case Method Results

Page 1 of 1
PDILOT Ver. 2008.1 - Printed: 25-Jun-2008

STP COL - Boring T4-5; 268.5' - 270' Sample
OP: SEK

Hammer ID: MEC-2 (MACTEC Raleigh CME5LC)
Test date: 11-Jun-2008

AR: 1.49 in²
LE: 274.00 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft³
EM: 30,000.0 ksi
JC: 0.70

CSX: Max Measured Compr. Stress
TSX: Tension Stress Maximum
FMX: Maximum Force
VMX: Maximum Velocity
FVP: Force/Velocity proportionality

BPM: Blows per Minute
EF2: Energy of F²
ETR: Energy Transfer Ratio
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	FVP □	BPM **	EF2 k-ft	ETR (%)	EMX k-ft
2	0.00	27.8	6.1	41	14.2	1.10	1.9	0.315	92	0.322
3	0.00	28.0	7.8	42	14.2	1.02	52.4	0.353	91	0.319
4	0.00	28.2	7.9	42	14.5	1.05	52.4	0.354	92	0.321
5	0.00	28.9	6.1	43	14.4	1.13	52.2	0.317	93	0.325
6	0.00	28.6	8.2	43	14.7	1.10	52.4	0.347	93	0.324
7	0.00	27.7	8.2	41	14.1	1.10	51.9	0.316	92	0.323
8	0.00	28.3	8.2	42	14.3	1.11	52.5	0.318	92	0.321
9	0.00	27.6	7.5	41	14.1	1.10	52.3	0.314	91	0.319
10	0.00	28.9	8.1	43	14.6	1.11	52.4	0.318	93	0.325
11	0.00	27.7	8.0	41	14.1	1.10	52.2	0.313	90	0.315
12	0.00	27.9	7.8	42	14.6	1.03	52.2	0.349	91	0.318
13	0.00	29.2	7.6	44	14.2	1.15	52.3	0.322	93	0.324
14	0.00	28.4	7.8	42	14.4	1.04	52.1	0.351	91	0.319
15	0.00	28.0	7.4	42	14.6	1.07	52.4	0.350	91	0.320
16	0.00	28.3	7.4	42	14.6	1.08	51.7	0.318	92	0.322
17	0.00	28.9	7.0	43	14.4	1.13	52.4	0.320	93	0.325
Average		28.3	7.7	42	14.4	1.09	49.1	0.330	92	0.321

Total number of blows analyzed: 16

Time Summary

Drive: 17 seconds

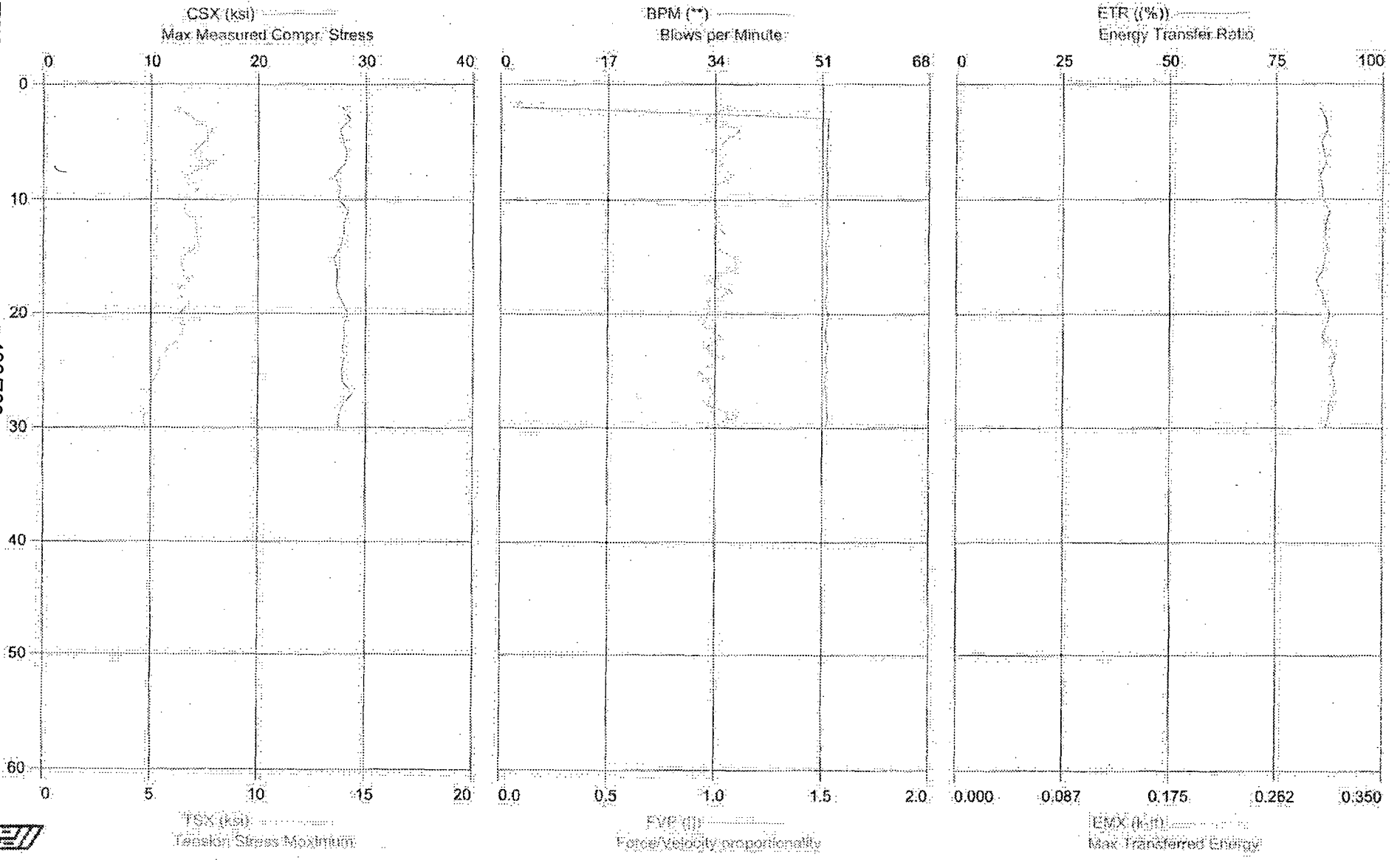
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DIPILOT Ver. 2008.1 - Printed: 25-Jun-2008

STP.COL SITE - Boring T4-5; 278.5' - 280' Sample

406/63 Z Z E D 0

DCN: FLR-31



MACTEC Engineering and Consulting, Inc.
Case Method Results

Page 1 of 1
PDILOT Ver. 2008.1 - Printed: 25-Jun-2008

STP COL SITE - Boring T4-5; 278.5' - 280' Sample
OP: JNH

Hammer ID: MEC-2 (MACTEC RAL-CME55LC)
Test date: 12-Jun-2008

AR: 1.49 in²
LE: 294.00 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft³
EM: 30,000.0 ksi
JC: 0.70

CSX: Max Measured Compr. Stress
TSX: Tension Stress Maximum
FMX: Maximum Force
VMX: Maximum Velocity
FVP: Force/Velocity proportionality

BPM: Blows per Minute
EF2: Energy of F²
ETR: Energy Transfer Ratio
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	FVP □	BPM *	EF2 k-ft	ETR (%)	EMX k-ft
2	0.00	27.7	6.2	41	13.7	1.07	1.9	0.331	85	0.295
3	0.00	28.5	6.9	42	13.8	0.95	51.9	0.343	86	0.303
4	0.00	27.6	7.8	41	13.6	1.12	51.9	0.345	87	0.305
5	0.00	27.9	7.5	42	13.8	1.04	51.8	0.329	86	0.300
6	0.00	28.2	7.0	42	13.8	0.98	51.7	0.331	86	0.302
7	0.00	28.0	7.8	42	13.8	1.03	51.6	0.331	87	0.303
8	0.00	27.0	6.6	40	13.6	1.08	51.9	0.324	85	0.298
9	0.00	27.6	7.3	41	13.7	0.99	51.7	0.344	86	0.301
10	0.00	27.4	6.7	41	13.5	0.98	51.8	0.344	86	0.301
11	0.00	28.4	6.6	42	13.9	1.01	51.7	0.345	88	0.307
12	0.00	27.9	7.1	42	13.7	1.00	51.7	0.343	87	0.304
13	0.00	28.0	7.2	42	13.7	1.05	52.0	0.343	87	0.303
14	0.00	27.7	7.3	41	13.8	0.99	51.6	0.341	87	0.305
15	0.00	27.0	6.4	40	13.6	1.09	51.8	0.326	87	0.303
16	0.00	27.3	6.5	41	13.6	1.10	51.7	0.330	86	0.301
17	0.00	27.3	6.8	41	13.5	0.96	51.8	0.337	84	0.295
18	0.00	27.3	6.1	41	13.7	1.08	51.8	0.340	86	0.300
19	0.00	27.8	6.8	41	13.6	0.95	51.4	0.344	87	0.303
20	0.00	28.4	6.4	42	13.7	0.97	51.9	0.345	88	0.307
21	0.00	27.9	6.6	42	13.5	0.94	51.7	0.346	87	0.304
22	0.00	28.0	6.4	42	13.7	1.03	51.5	0.342	86	0.301
23	0.00	27.8	5.9	41	13.5	0.96	51.9	0.349	88	0.308
24	0.00	28.0	5.4	42	13.9	1.04	51.5	0.330	89	0.311
25	0.00	27.7	5.4	41	13.4	0.93	51.8	0.349	88	0.307
26	0.00	27.8	5.1	41	13.8	0.97	51.4	0.346	89	0.311
27	0.00	28.8	4.9	43	13.8	0.99	51.7	0.351	89	0.310
28	0.00	27.9	5.0	42	13.6	0.96	51.7	0.334	88	0.306
29	0.00	27.5	4.7	41	13.6	1.11	51.9	0.332	87	0.306
30	0.00	27.5	4.7	41	13.6	0.95	51.6	0.329	87	0.303
Average		27.8	6.4	41	13.7	1.01	50.0	0.339	87	0.304

Total number of blows analyzed: 29

Time Summary

Drive: 32 seconds

10:04:30 AM - 10:05:02 AM (6/12/2008) BN 2 - 30



engineering and constructing a better tomorrow

July 14, 2008

Memorandum to File

From: Steve Kiser

Reviewed By: Kathryn White KAW 7/15/08

Subject: **Report of SPT Energy – Miller CME 85 Truck
Hammer Serial No. 356 Automatic Hammer
WORK INSTRUCTION No. 18 (FLR-085)
STP COL Project
Matagorda County, Texas
MACTEC Project No. 6234-08-4660**

Jonathan Honeycutt, 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 June 12, 14, and 15, 2008, during drilling of Boring U3-3 at the referenced site. The testing was performed by Jonathan Honeycutt from approximately 12:16 AM to 1:58 PM on June 12 under partly cloudy skies and a temperature of 87 in degrees Fahrenheit, from 9:18 AM to 9:18 AM on June 14 under overcast conditions with a temperature of 85 degrees Fahrenheit, and from 11:35 AM to 11:36 AM on June 15 under sunny skies with a temperature of 90 degrees Fahrenheit. The boring was drilled with personnel and equipment from Miller Drilling. The drilling equipment consisted of a CME 85 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 borings below the depth at which groundwater was encountered at the time of energy testing. The drill rig operator during sampling was Mr. Jason Cook. 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 PAX (Serial No. 3622L), and calibrated accelerometers (Serial Nos. K990 and K983) and strain gages (Serial Nos. NW #146/1 and NW#146/2). A 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

The calibration records for all the above are filed in DCN FLR-079.

18 Pages Total

MACTEC Engineering and Consulting, Inc.

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TOSHIBA CORPORATION
Nuclear Energy Systems & Services Division

DCN: FLR-0817 ctec.com

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; however, maximum and minimum ETR values of up to 98% and 56%, respectively, were reported in the literature. The ETR values shown in Table 1 are generally 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 record(s) was(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 314 foot-pounds to 327 foot-pounds. These average energy transfers correspond to energy transfer ratios (ETR) of 90% to 93% 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 318.6 foot-pounds, with an average ETR of 91%.

Attachments: Page 4 Table 1 - Summary of SPT Energy Measurements - 1 Page
Page 5 Work Instruction - DCN FLR-085 - 1 Page
Pages 6 - 8 Record of SPT Energy Measurement - 3 Pages
Pages 9 - 18 PDI PLOT Output - 10 Pages

4111763

DCN: FLR-317


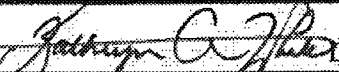
TABLE 1
SUMMARY OF SPT ENERGY MEASUREMENTS (ASTM D4633-05)
South Texas Project (STP) COL Site - Units 3 and 4
Wadsworth, Texas
MACTEC Project No. 6234-08-4660

Rig Serial No.	Rig Owner	Rig Operator	Boring No. Tested	Date Tested	Drill Rod Size	Sample Depth (feet)	SPT Blow Count (blows per six inches)	No. of Blows Analyzed	Average Measured Energy (Average EFV) (ft-lbs) ^a	Energy Transfer Ratio (%) ^b (Average ETR)
356 (CME 85)	Miller Drilling	Jason Cook	U3-3	6/12/2008	NW-J	61.0 - 62.5	4 - 4 - 7	16	318	90.9%
						63.5 - 65.0	3 - 4 - 7	14	324	92.6%
						66.0 - 67.5	2 - 2 - 4	9	327	93.4%
				6/14/2008		126.0 - 127.5	8 - 11 - 14	33	314	89.7%
				6/15/2008		141.0 - 142.5	8 - 10 - 16	34	319	91.1%
Average for Rig:									318.6	91.0%

^aMeasured 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, where EMX equals the maximum transferred energy measured by the PDA (see attached PDA data).

^bEnergy 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: 	Date: 7-14-08		Checked By: 	Date: 7-14-08
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STEVE KISER

Work Instruction No. 18
STP Units 3 & 4 COL Project
MACTEC Engineering and Consulting, Inc.
MACTEC Project 6234-08-4660

Issued To: Steve Kiser, Jon Honeycutt	Rev. No.: 0
Issued By: Robert E. Smith	Date: June 5, 2008
Valid From: June 5, 2008	To: June 5, 2009

Task Description: Perform SPT Energy Measurements of drill rigs

Applicable Technical Procedures or Plans, or other reference:

Work Plan (current revision), ASTM D4633-05.

Specific Instructions (note attachments where necessary): Perform energy measurements for each drill rig on site collecting split-spoon samples in accordance with ASTM D-4633-05. Consult with Site Coordinator as to schedule for rigs that may be planned for use that are not yet present. Hammer weights have been checked by site personnel, and records will be available on site. All rigs are using automatic hammer systems. Be sure to check each drill rig using all hammer/rod combinations that it will be using. Depths for measurements should be coordinated with the Site Coordinator, but should begin at a minimum depth of 10 feet. Collect at least three energy measurements per drill rig.

Submit copies of calibration records for equipment to Quality Assurance for review prior to beginning work on site.

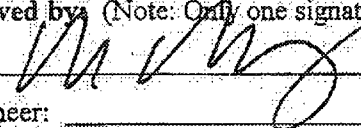
Special Instructions (note attachments where necessary): Confirm with Site Supervisor that approval of equipment calibration records has been received prior to beginning field testing. If unexpected conditions are encountered that affect measurements, notify Shaun Lehman and Rob Smith immediately.

Report Format: Standard report in accordance with ASTM D 4633-05 requirements.

Specific Quality Assurance Procedures Applicable: QAP 20-1; QAP 25-1; QAP for Reporting Nuclear-Related Defects, or Noncompliances, per Federal Regulation 10CFR21 and Section 206 of the Energy Reorganization Act of 1974. Current revisions apply.

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 for issuance)	
Project Manager: 	Date: 6/16/08 ⁰⁸ 6/6/08
Project Principal Engineer: _____	Date: _____
Site Manager/Coordinator: _____	Date: _____
Pages:	DCN: FLR-085
Attachments:	



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 COL Site	MAKE:	CME
LOCATION:	Mtstogorda County, Texas	MODEL:	85
PROJECT NO.:	6234-08-4660	SERIAL NO.:	356
DATE:	6-12-2003	HAMMER TYPE:	356 Auto
WEATHER:	P. Cloudy - BREEZY, Sunny 87°	ROPE CONDITION:	N/A
INSPECTOR:	J.M. HONEWELL	ROD SIZE:	NW 3
DRILLING COMPANY:	M-1140	NO. OF SHEAVES:	N/A

BORING DATA		
BORING NUMBER:	M3-3	
DEPTH DRILLED:	VARIABLES	
TIME DRIVEN:	VARIABLES	
RIG OPERATOR:	Cook	
HAMMER OPERATOR:	N/A	
PDA PAK SERIAL NO.:	3622L	
INSTR. ROD AREA:	1.49 in ²	
ACCEL. SERIAL NOS.:	01-4990 A2 4993	
STRAIN SERIAL NOS.:	NW 196 # 112	

SAMPLE DEPTH (feet)	SPT N-VALUE (bpf)																			
60-																				
61-62.5	4-4-7																			
63.5-65	3-4-7																			
66-67.5	2-2-4																			

REMARKS:



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RECORD OF SPT ENERGY MEASUREMENT

GENERAL INFORMATION		DRILL RIG DATA	
PROJECT:	South Texas Project COL Site	MAKE:	CME
LOCATION:	Matagorda County, Texas	MODEL:	85
PROJECT NO.:	6234-08-4660	SERIAL NO.:	356
DATE:	6-14-2008	HAMMER TYPE:	out
WEATHER:	Overcast 85°	ROPE CONDITION:	N/A
INSPECTOR:	JNH	ROD SIZE:	NW 3
DRILLING COMPANY:	Miller	NO. OF SHEAVES:	N/A

BORING DATA			
BORING NUMBER:	MS-3		
DEPTH DRILLED:	Various		
TIME DRIVEN:	Various		
RIG OPERATOR:	Cook		
HAMMER OPERATOR:	N/A		
FDA PAK SERIAL NO.:	3622L		
INSTR. ROD AREA:	1.47 in ²		
ACCEL. SERIAL NOS.:	M-4990 - 492-4983		
STRAIN SERIAL NOS.:	NW 142 - 11/12		

SAMPLE DEPTH (feet)	SPT N-VALUE (bpf)							
126-127.5	8-11-14							
131-132.5								

REMARKS:



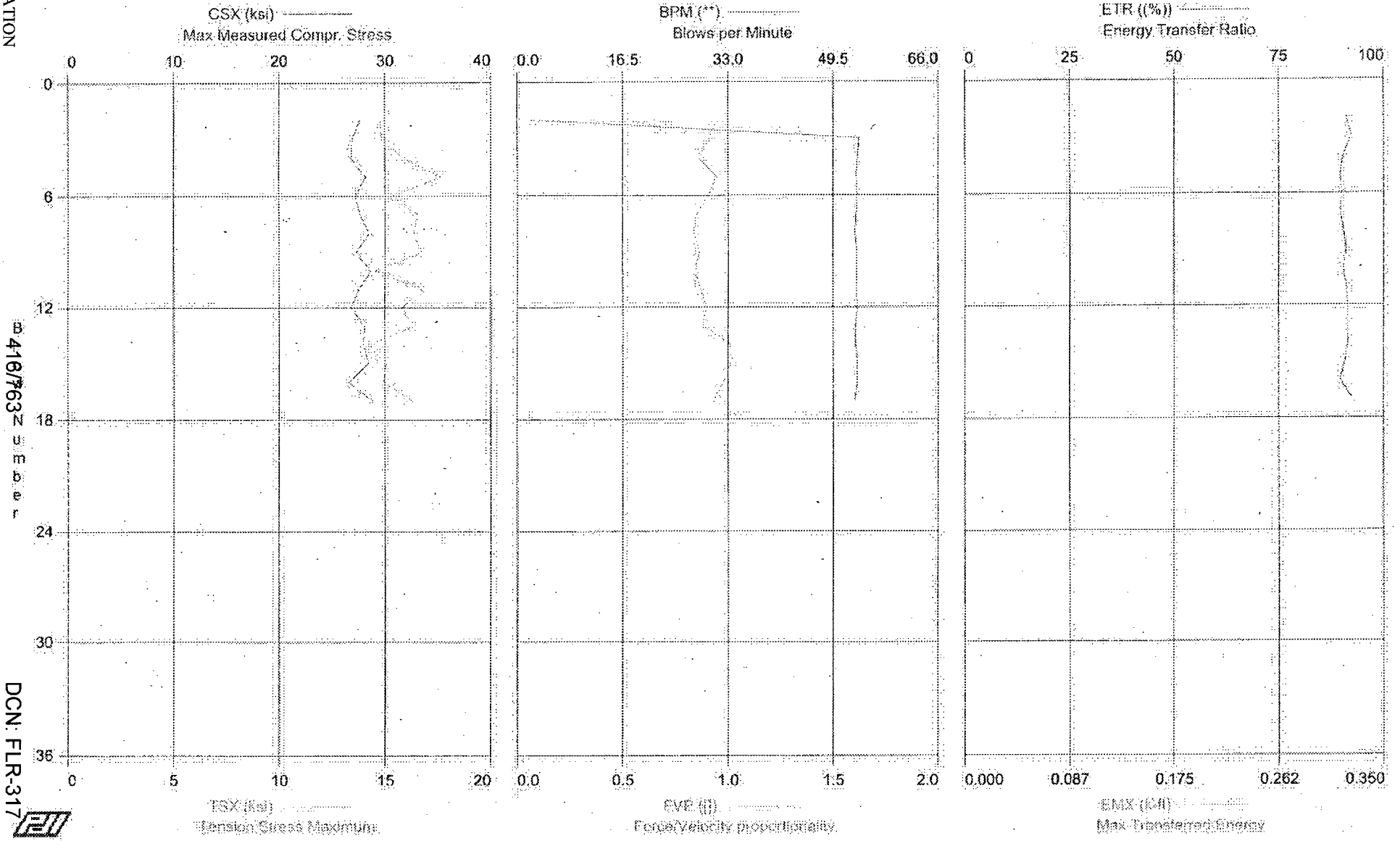
2801 YORKMONT ROAD, SUITE 100 □ CHARLOTTE, NC 28208
 Telephone: (704) 357-8500 / Facsimile: (704) 357-8638

RECORD OF SPT ENERGY MEASUREMENT

GENERAL INFORMATION		DRILL RIG DATA	
PROJECT:	South Texas Project COL Site	MAKE:	CMB
LOCATION:	Matagorda County, Texas	MODEL:	85
PROJECT NO.:	8234-08-4860	SERIAL NO.:	356
DATE:	6-15-2008	HAMMER TYPE:	12510
WEATHER:	Sunny 90° F	ROPE CONDITION:	N/A
INSPECTOR:	J N Honeycutt	ROD SIZE:	MUS
DRILLING COMPANY:	Miller	NO. OF SHEAVES:	N/A

BORING DATA										
BORING NUMBER:	M-3-3									
DEPTH DRILLED:	Various									
TIME DRIVEN:	Various									
RIG OPERATOR:	Cook									
HAMMER OPERATOR:	N/A									
PDA PAK SERIAL NO.:	3622L									
INSTR. ROD AREA:	1.49 in ²									
ACCEL SERIAL NOS.:	A1-4990 42-4983									
STRAIN SERIAL NOS.:										
	SAMPLE DEPTH (feet)	SPT N-VALUE (bpf)								
	141-142.5	8-10-14								
REMARKS:										

STP COL SITE - Boring U3-3; 61' - 62.5' Sample



418763Z

DCN: FLR-317



MACTEC Engineering and Consulting, Inc.
Case Method Results

Page 1 of 1
PDILOT Ver. 2008.1 - Printed: 29-Jun-2008

STP COL SITE - Boring U3-3; 61' - 62.5' Sample
OP: JNH

Hammer ID: 356 (MILLER-CME 85)
Test date: 12-Jun-2008

AR: 1.49 in²
LE: 67.00 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft³
EM: 30,000 ksi
JC: 0.70

CSX: Max Measured Compr. Stress
TSX: Tension Stress Maximum
FMX: Maximum Force
VMX: Maximum Velocity
BPM: Blows per Minute

FVP: Force/Velocity proportionality
EF2: Energy of F²
ETR: Energy Transfer Ratio
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	BPM **	FVP []	EF2 k-ft	ETR (%)	EMX k-ft
2	0.00	27.6	14.8	41	14.1	1.9	0.95	0.333	91	0.319
3	0.00	26.9	14.8	40	14.3	53.6	0.91	0.344	92	0.323
4	0.00	26.8	15.8	40	14.3	53.3	0.86	0.337	90	0.317
5	0.00	28.2	17.6	42	14.2	53.1	0.94	0.342	90	0.314
6	0.00	27.2	15.3	41	14.6	53.3	0.91	0.341	90	0.315
7	0.00	27.7	16.6	41	13.9	53.1	0.85	0.342	90	0.314
8	0.00	28.5	16.4	42	14.2	52.9	0.84	0.348	90	0.317
9	0.00	27.3	16.7	41	14.7	53.2	0.86	0.345	91	0.319
10	0.00	28.7	14.5	43	14.2	53.2	0.84	0.350	90	0.316
11	0.00	27.5	16.8	41	14.6	53.1	0.87	0.347	91	0.319
12	0.00	26.8	15.8	40	14.7	53.3	0.90	0.345	91	0.320
13	0.00	28.1	16.4	42	14.7	53.0	0.88	0.349	91	0.320
14	0.00	28.0	14.2	42	14.0	53.0	1.01	0.347	92	0.320
15	0.00	28.4	15.1	42	14.0	53.3	1.01	0.348	91	0.318
16	0.00	26.6	14.9	40	14.1	53.3	0.98	0.345	90	0.314
17	0.00	28.9	16.4	43	14.9	52.9	0.93	0.351	92	0.324
Average		27.7	15.8	41	14.3	50.0	0.91	0.345	91	0.318

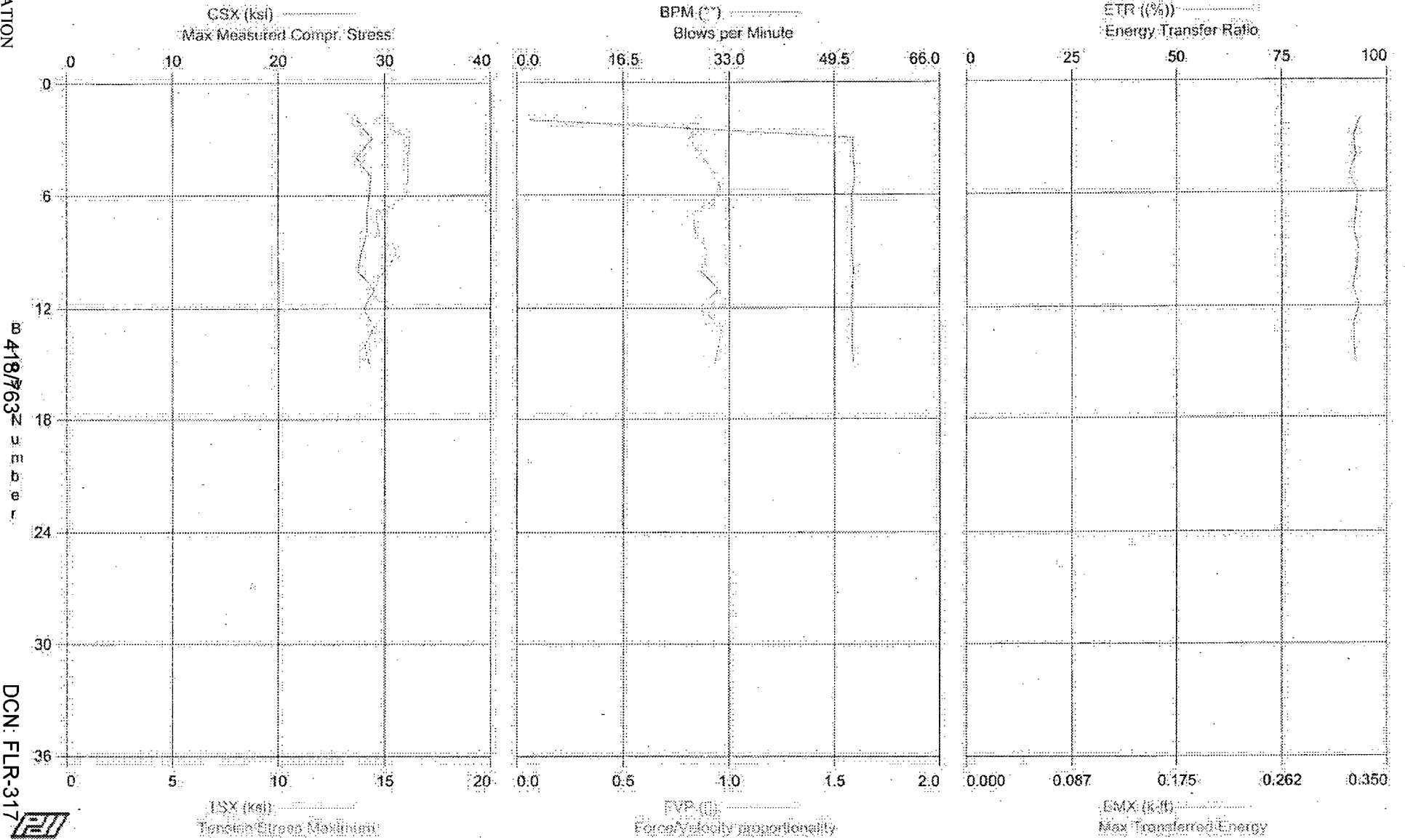
Total number of blows analyzed: 16

Time Summary

Drive 17 seconds

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STP COL SITE - Boring U3-3: 63.5' - 65' Sample



418763

DCN: FLR-317



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Case Method Results

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STP COL SITE - Boring U3-3; 63.5' - 65' Sample
OP: JNH

Hammer ID: 356 (MILLER-CME 85)
Test date: 12-Jun-2008

AR: 1.49 in²
LE: 69.00 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft³
EM: 30,000 ksi
JC: 0.70

CSX: Max Measured Compr. Stress
TSX: Tension Stress Maximum
FMX: Maximum Force
VMX: Maximum Velocity
BPM: Blows per Minute

FVP: Force/Velocity proportionality
EF2: Energy of F²
ETR: Energy Transfer Ratio
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	BPM **	FVP []	EF2 k-ft	ETR (%)	EMX k-ft
2	0.00	27.4	14.5	41	14.2	1.9	0.87	0.344	94	0.328
3	0.00	28.8	16.2	43	14.4	52.4	0.81	0.345	92	0.322
4	0.00	27.3	16.1	41	14.6	52.5	0.87	0.345	93	0.324
5	0.00	28.7	16.1	43	14.5	52.7	0.94	0.342	91	0.319
6	0.00	28.5	16.0	42	14.4	52.3	0.96	0.344	93	0.326
7	0.00	28.3	14.8	42	14.2	52.3	0.83	0.344	93	0.324
8	0.00	28.3	14.7	42	14.2	52.2	0.84	0.345	92	0.323
9	0.00	27.8	15.6	41	14.6	52.2	0.90	0.351	93	0.327
10	0.00	27.5	15.0	41	14.5	52.5	0.87	0.345	93	0.325
11	0.00	29.0	14.2	43	14.4	52.3	0.95	0.346	92	0.322
12	0.00	28.0	15.2	42	14.6	52.2	0.86	0.349	94	0.327
13	0.00	29.0	14.3	43	14.4	52.3	0.97	0.345	92	0.322
14	0.00	28.1	14.6	42	14.3	52.3	0.95	0.349	92	0.323
15	0.00	28.5	13.8	42	14.4	52.5	0.93	0.343	93	0.324
Average		28.2	15.1	42	14.4	48.8	0.90	0.345	93	0.324

Total number of blows analyzed: 14

Time Summary

Drive 14 seconds

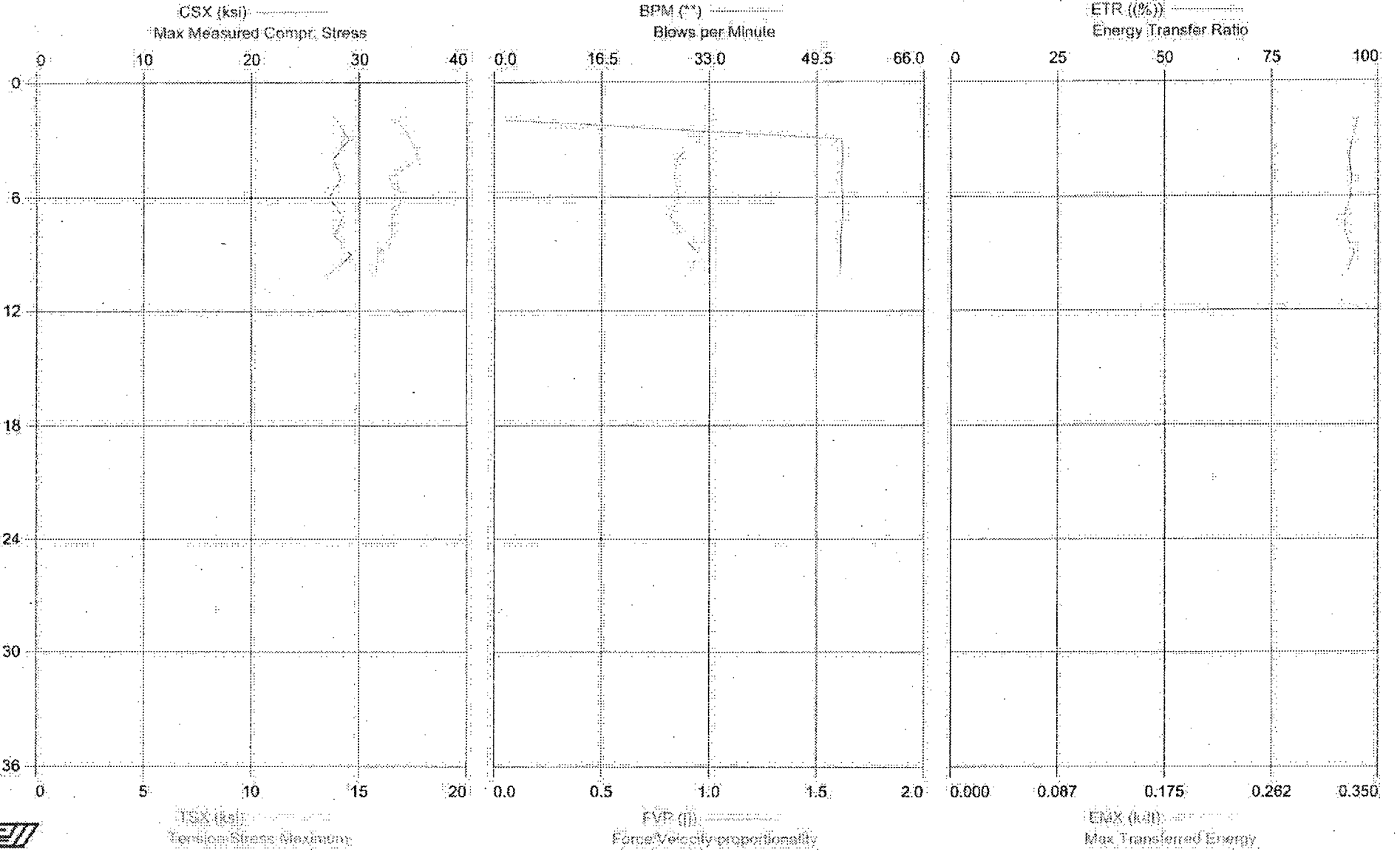
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STR COL SITE - Boring U3-3; 66' - 67.5' Sample

TOSHIBA CORPORATION
Nuclear Energy Systems & Services Division

420/6325 E.A. #1

DCN: FLR-317



MACTEC Engineering and Consulting, Inc.
Case Method Results

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STP COL SITE - Boring U3-3; 66' - 67.5' Sample

Hammer ID: 356 (MILLER-CME 85)

OP: JNH

Test date: 12-Jun-2008

AR: 1.49 in²

SP: 0.492 k/ft³

LE: 72.00 ft.

EM: 30,000 ksi

WS: 16,807.9 f/s

JC: 0.70

CSX: Max Measured Compr. Stress

FVP: Force/Velocity proportionality

TSX: Tension Stress Maximum

EF2: Energy of F²

FMX: Maximum Force

ETR: Energy Transfer Ratio

VMX: Maximum Velocity

EMX: Max Transferred Energy

BPM: Blows per Minute

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	BPM	FVP	EF2 k-ft	ETR (%)	EMX k-ft
2	0.00	27.9	16.8	42	14.8	1.9	1.02	0.361	95	0.334
3	0.00	29.0	17.4	43	14.9	53.4	0.95	0.361	94	0.329
4	0.00	27.6	17.7	41	15.0	53.5	0.85	0.359	93	0.325
5	0.00	28.3	16.4	42	15.3	53.3	0.84	0.360	94	0.328
6	0.00	27.2	17.1	41	15.1	53.5	0.86	0.360	94	0.328
7	0.00	28.5	16.5	42	14.6	53.5	0.82	0.356	92	0.322
8	0.00	27.6	16.5	41	14.9	53.2	0.87	0.354	92	0.323
9	0.00	29.2	15.9	44	15.4	53.2	0.95	0.365	95	0.331
10	0.00	27.3	15.7	41	15.1	53.1	0.89	0.359	93	0.325
Average		28.1	16.7	42	15.0	47.6	0.89	0.359	94	0.327

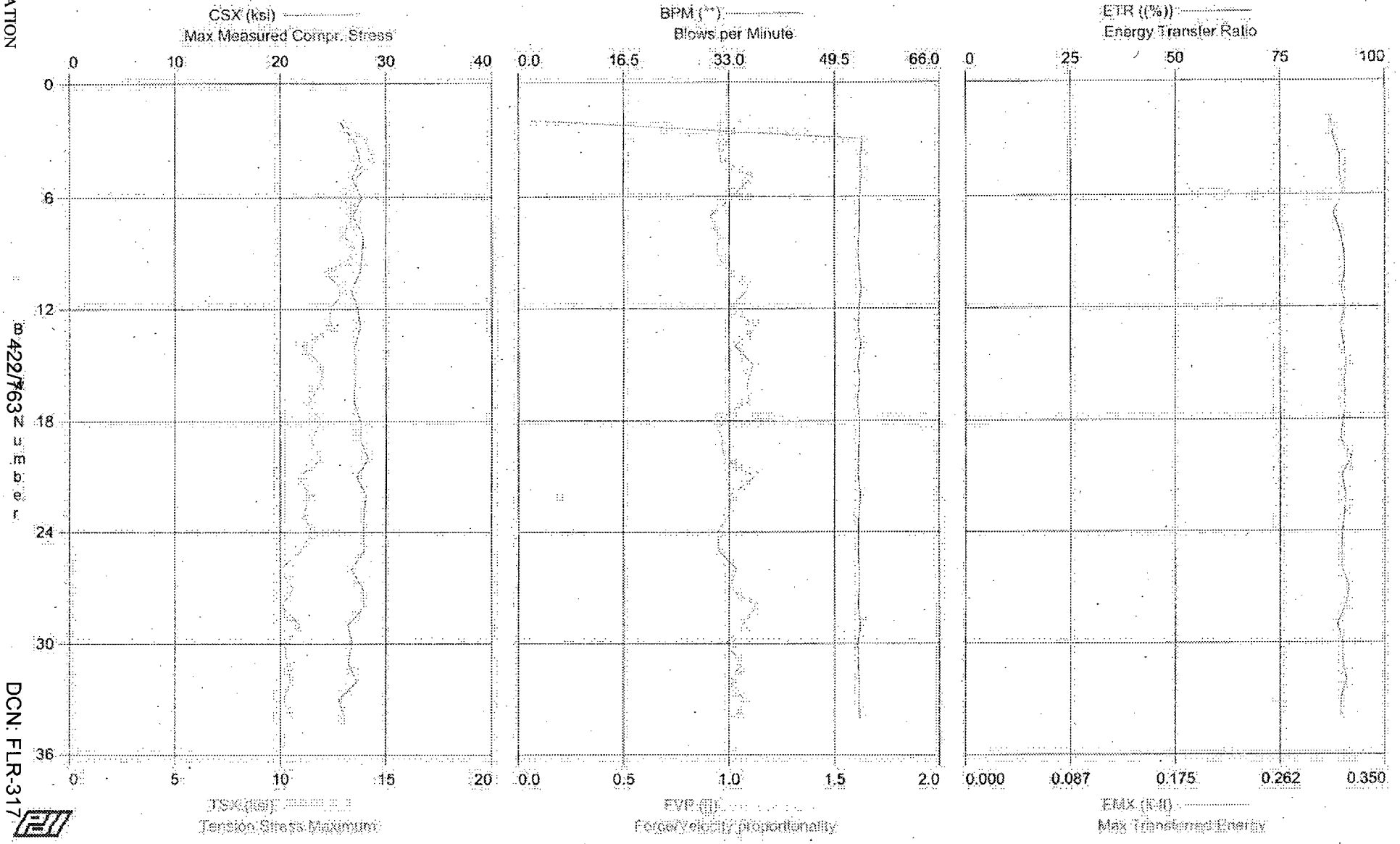
Total number of blows analyzed: 9

Time Summary

Drive 9 seconds

1:57:52 PM - 1:58:01 PM (6/12/2008) BN 2 - 10

STP COL SITE - Boring U3-3; 126' - 127.5' Sample



422/763 z z E o o

DCN: FLR-317



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Case Method Results

Page 1 of 1
PDILOT Ver. 2008.1 - Printed: 29-Jun-2008

STP COL SITE - Boring U3-3; 126' - 127.5' Sample
OP: JNH

Hammer ID: 356 (MILLER-CME 85)
Test date: 14-Jun-2008

AR: 1.49 in²
LE: 132.00 ft
WS: 16.807.9 f/s

SP: 0.492 k/ft³
EM: 30,000 ksi
JC: 0.70

CSX: Max Measured Compr. Stress
TSX: Tension Stress Maximum
FMX: Maximum Force
VMX: Maximum Velocity
BPM: Blows per Minute

FVP: Force/Velocity proportionality
EF2: Energy of F²
ETR: Energy Transfer Ratio
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	BPM **	FVP 0	EF2 k-ft	ETR (%)	EMX k-ft
2	0.00	25.6	12.8	38	12.5	1.9	0.97	0.328	87	0.304
3	0.00	26.9	14.0	40	13.1	53.9	0.95	0.333	88	0.307
4	0.00	27.6	14.4	41	13.6	53.6	0.96	0.339	89	0.312
5	0.00	26.8	13.6	40	13.5	53.7	1.11	0.337	89	0.312
6	0.00	27.7	13.0	41	13.7	53.5	1.02	0.338	90	0.315
7	0.00	26.9	13.4	40	13.4	53.5	0.91	0.334	88	0.307
8	0.00	27.9	13.0	41	13.8	53.4	0.95	0.335	89	0.313
9	0.00	27.8	13.7	41	13.7	53.2	0.94	0.338	90	0.316
10	0.00	27.6	12.1	41	13.9	53.5	1.00	0.337	90	0.317
11	0.00	26.7	13.1	40	13.8	53.7	1.08	0.337	90	0.314
12	0.00	27.4	12.3	41	13.8	53.4	1.01	0.336	91	0.317
13	0.00	27.6	12.4	41	13.7	53.3	1.13	0.337	89	0.313
14	0.00	27.1	11.0	40	13.8	53.7	1.03	0.339	90	0.315
15	0.00	27.1	11.9	40	13.6	53.2	1.11	0.339	91	0.318
16	0.00	27.1	11.9	40	14.0	53.5	1.09	0.339	90	0.316
17	0.00	27.0	11.4	40	13.9	53.1	1.09	0.337	91	0.317
18	0.00	27.6	11.9	41	13.7	53.5	0.94	0.335	90	0.315
19	0.00	27.6	11.5	41	13.6	53.4	0.97	0.333	89	0.313
20	0.00	28.3	12.0	42	14.1	53.3	0.98	0.340	92	0.322
21	0.00	27.3	10.9	41	13.6	53.3	1.12	0.337	90	0.314
22	0.00	28.1	11.4	42	13.9	53.6	1.01	0.339	91	0.317
23	0.00	27.9	11.1	42	13.9	53.4	1.00	0.334	90	0.317
24	0.00	27.9	11.5	42	13.8	53.3	0.95	0.333	90	0.314
25	0.00	27.9	11.0	42	13.8	53.3	0.95	0.332	90	0.314
26	0.00	26.7	9.9	40	13.6	53.4	1.04	0.335	90	0.314
27	0.00	27.8	10.6	41	13.9	53.4	1.00	0.335	91	0.320
28	0.00	27.9	10.1	42	13.9	53.3	1.13	0.332	91	0.317
29	0.00	26.4	10.9	39	13.8	53.6	1.07	0.329	89	0.310
30	0.00	26.8	10.2	40	13.5	53.2	0.98	0.331	90	0.315
31	0.00	26.4	10.3	39	14.0	53.3	1.06	0.329	90	0.315
32	0.00	27.2	10.5	41	13.8	53.4	1.01	0.331	91	0.318
33	0.00	25.6	10.1	38	13.4	53.4	1.07	0.329	90	0.313
34	0.00	26.1	10.6	39	13.7	53.5	1.03	0.329	89	0.313
Average		27.2	11.8	41	13.7	51.9	1.02	0.335	90	0.314

Total number of blows analyzed: 33

Time Summary:

Drive 36 seconds

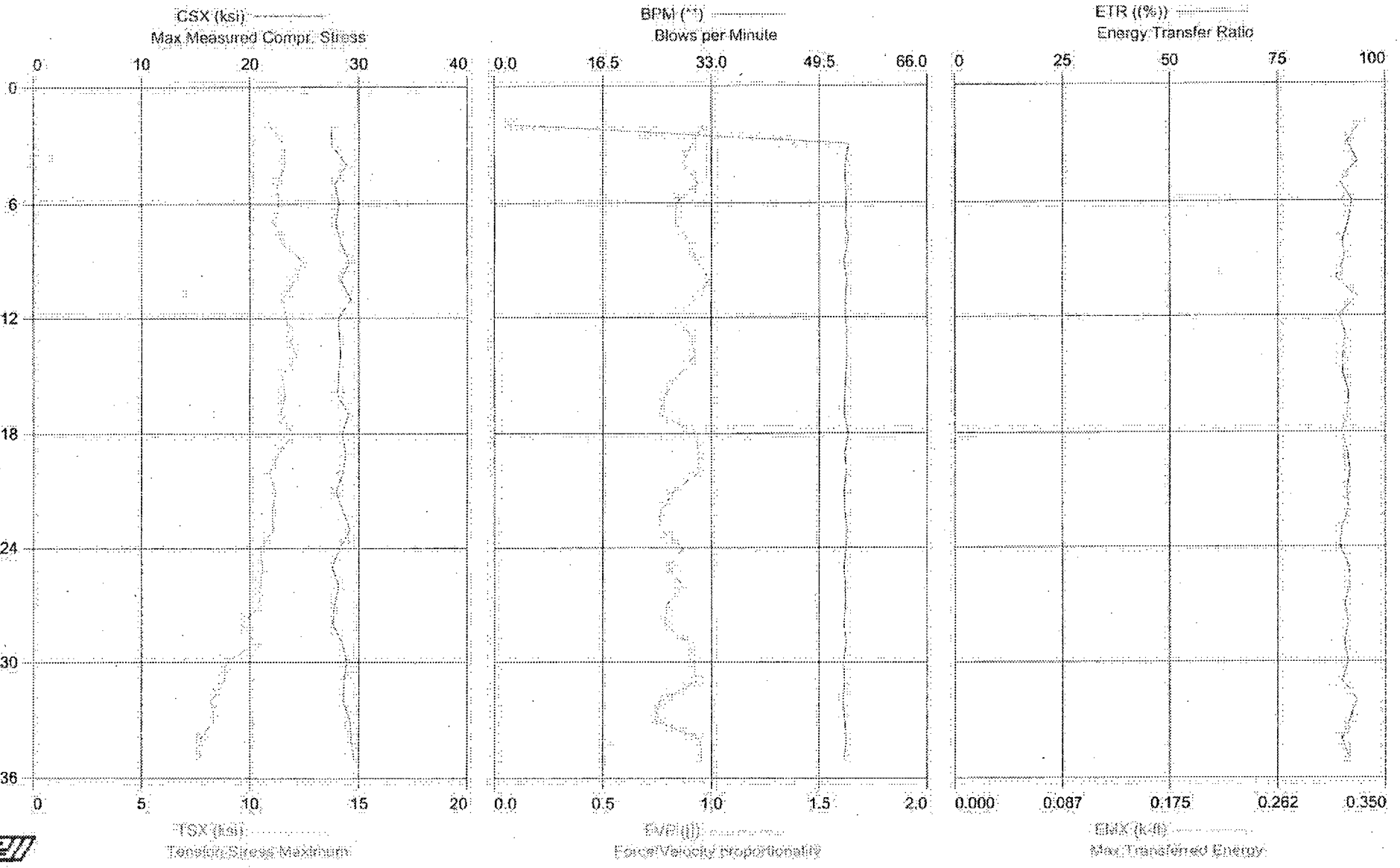
9:18:07 AM - 9:18:43 AM (6/14/2008) BN 2 - 34

DIPILOT Ver. 2008.1 - Printed: 29-Jun-2008

STP-COL SITE - Boring U3-3; 141' - 142.5' Sample

424/763 Z E D L

DCN: FLR-317



MACTEC Engineering and Consulting, Inc.
Case Method Results

Page 1 of 1
PDILOT Ver. 2008.1 - Printed: 29-Jun-2008

STP COL SITE - Boring U3-3; 141' - 142.5' Sample
OP: JNH

Hammer ID: 356 (MILLER - CME 85)
Test date: 15-Jun-2006

AR: 1.49 in^2
LE: 147.00 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft3
EM: 30,000 ksi
JC: 0.70

CSX: Max Measured Compr. Stress
TSX: Tension Stress Maximum
FMX: Maximum Force
VMX: Maximum Velocity
BPM: Blows per Minute

FVP: Force/Velocity proportionality
EF2: Energy of F^2
ETR: Energy Transfer Ratio
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX klps	VMX f/s	BPM **	FVP []	EF2 k-ft	ETR (%)	EMX k-ft
2	0.00	27.5	10.9	41	15.5	19	0.97	0.345	94	0.330
3	0.00	27.6	11.6	41	15.3	54.0	0.91	0.345	91	0.319
4	0.00	28.9	11.6	43	16.1	53.5	0.87	0.354	94	0.327
5	0.00	27.8	11.2	41	15.1	52.5	0.94	0.347	89	0.313
6	0.00	28.2	11.3	42	16.1	53.6	0.84	0.350	92	0.323
7	0.00	27.9	11.2	42	15.7	53.5	0.83	0.350	92	0.320
8	0.00	28.3	11.5	42	15.4	53.9	0.90	0.348	90	0.315
9	0.00	29.1	12.5	43	15.4	53.3	0.94	0.354	91	0.317
10	0.00	28.4	12.1	42	14.4	53.7	0.99	0.352	89	0.310
11	0.00	29.3	11.5	44	15.8	53.5	0.93	0.355	93	0.327
12	0.00	28.1	11.7	42	15.4	53.5	0.84	0.356	89	0.313
13	0.00	28.2	11.8	42	15.5	53.7	0.91	0.349	91	0.317
14	0.00	28.3	12.2	42	15.4	53.7	0.92	0.350	90	0.316
15	0.00	28.1	11.5	42	15.8	53.5	0.85	0.351	90	0.315
16	0.00	28.1	11.6	42	15.9	53.4	0.79	0.353	92	0.320
17	0.00	29.0	11.4	43	15.2	53.3	0.76	0.355	91	0.319
18	0.00	28.5	12.0	42	15.3	53.9	0.93	0.348	90	0.315
19	0.00	28.8	11.3	43	15.3	53.4	0.94	0.352	91	0.319
20	0.00	28.6	10.9	43	15.3	53.6	0.94	0.352	92	0.321
21	0.00	27.9	11.2	42	15.8	53.3	0.83	0.350	91	0.319
22	0.00	28.6	11.0	43	15.6	53.4	0.77	0.356	91	0.320
23	0.00	29.2	11.1	44	14.9	53.7	0.76	0.355	90	0.315
24	0.00	28.3	10.5	42	15.5	53.6	0.87	0.349	89	0.313
25	0.00	27.6	10.6	41	15.8	53.3	0.80	0.351	92	0.320
26	0.00	28.2	10.5	42	15.9	53.5	0.87	0.351	92	0.321
27	0.00	27.8	10.4	41	15.2	53.5	0.79	0.349	91	0.317
28	0.00	27.6	9.6	41	16.1	53.3	0.78	0.352	91	0.320
29	0.00	28.5	10.3	42	15.7	53.6	0.89	0.350	90	0.317
30	0.00	28.9	8.9	43	15.7	53.2	0.92	0.353	91	0.320
31	0.00	28.6	8.8	43	15.2	53.4	0.93	0.350	90	0.315
32	0.00	28.6	8.2	43	16.0	53.1	0.76	0.356	93	0.327
33	0.00	29.2	8.4	43	15.5	53.4	0.74	0.353	92	0.321
34	0.00	29.3	7.7	44	14.7	53.6	0.95	0.351	90	0.315
35	0.00	29.6	7.7	44	15.0	53.3	0.96	0.353	92	0.321
Average		28.4	10.7	42	15.5	52.0	0.87	0.351	91	0.319

Total number of blows analyzed: 34

Time Summary

Drive 37 seconds

11:35:40 AM - 11:36:17 AM (6/15/2008) BN 2 - 35



engineering and constructing a better tomorrow

July 14, 2008

Memorandum to File

From: Steve Kiser

Reviewed By: Kathryn White KAW 7/15/08

Subject: **Report of SPT Energy – Miller CME 750 ATV
Hammer Serial No. 07 Automatic Hammer
WORK INSTRUCTION No. 18 (FLR-085)
STP COL Project
Matagorda County, Texas
MACTEC Project No. 6234-08-4660**

Jonathan Honeycutt, 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 June 11 and 12, 2008, during drilling of Boring U4-4 at the referenced site. The testing was performed by Jonathan Honeycutt from approximately 5:54 PM to 6:11 PM on June 11 under partly cloudy skies and a temperature of 90 degrees Fahrenheit, and from 10:42 AM to 11:51 AM on June 12 under partly cloudy skies and a temperature of 80 degrees Fahrenheit. The boring was drilled with personnel and equipment from Miller Drilling. The drilling equipment consisted of a CME 750 model ATV 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 borings below the depth at which groundwater was encountered at the time of energy testing. The drill rig operator during sampling was Mr. Glen Bilbrey. 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 PAX (Serial No. 36221), and calibrated accelerometers (Serial Nos. K990 and 1050) and strain gages (Serial Nos. NW #146/1 and NW#146/2). A 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

The calibration records for all the above are filed in DCN FLR-079.

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 I.

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 and minimum ETR values of up to 98% and 56%, respectively, were reported in the literature. The ETR values shown in Table I are generally 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 record(s) was(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 303 foot-pounds to 331 foot-pounds. These average energy transfers correspond to energy transfer ratios (ETR) of 87% to 95% 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 313.2 foot-pounds, with an average ETR of 89.5%.

Attachments: Page 4 Table 1 - Summary of SPT Energy Measurements - 1 Page
Page 5 Work Instruction - DCN FLR-085 - 1 Page
Pages 6 - 7 Record of SPT Energy Measurement - 2 Pages
Pages 8 - 18 PDILOT Output - 11 Pages

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DCN: FLR-317

TABLE 1
SUMMARY OF SPT ENERGY MEASUREMENTS (ASTM D4633-05)
South Texas Project (STP) COL Site - Units 3 and 4
Wadsworth, Texas
MACTEC Project No. 6234-08-4660

Rig Serial No.	Rig Owner	Rig Operator	Boring No. Tested	Date Tested	Drill Rod Size	Sample Depth (feet)	SPT Blow Count (blows per six inches)	No. of Blows Analyzed	Average Measured Energy (Average EFV) (ft-lbs) ^a	Energy Transfer Ratio (%) ^b (Average ETR)
07 (CME 750)	Miller Drilling	Glen Bilbrey	U4-4	6/11/2008	NW-J	33.0 - 34.5	7 - 9 - 9	25	304	86.9%
						38.0 - 39.5	8 - 14 - 50/0.5'	74	303	86.6%
				6/12/2008		73.1 - 74.6	12 - 15 - 21	48	319	91.1%
				83.0 - 84.5		5 - 8 - 10	23	331	94.6%	
				93.0 - 94.5		8 - 10 - 14	33	322	92.0%	
Average for Rig:									313.2	89.5%

^aMeasured 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, where EMX equals the maximum transferred energy measured by the PDA (see attached PDA data).

^bEnergy 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>SK</i>	Date: 7/14/08	Checked By: <i>John White</i>	Date: 7/15/08
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STEVE KISER

Work Instruction No. 18
STP Units 3 & 4 COL Project
MACTEC Engineering and Consulting, Inc.
MACTEC Project 6234-08-4660

Issued To: Steve Kiser, Jon Honeycutt	Rev. No.: 0
Issued By: Robert E. Smith	Date: June 5, 2008
Valid From: June 5, 2008	To: June 5, 2009

Task Description: Perform SPT Energy Measurements of drill rigs

Applicable Technical Procedures or Plans, or other reference:

Work Plan (current revision), ASTM D4633-05.

Specific Instructions (note attachments where necessary): Perform energy measurements for each drill rig on site collecting split-spoon samples in accordance with ASTM D-4633-05. Consult with Site Coordinator as to schedule for rigs that may be planned for use that are not yet present. Hammer weights have been checked by site personnel, and records will be available on site. All rigs are using automatic hammer systems. Be sure to check each drill rig using all hammer/rod combinations that it will be using. Depths for measurements should be coordinated with the Site Coordinator, but should begin at a minimum depth of 10 feet. Collect at least three energy measurements per drill rig.

Submit copies of calibration records for equipment to Quality Assurance for review prior to beginning work on site.

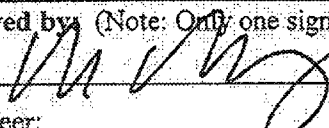
Special Instructions (note attachments where necessary): Confirm with Site Supervisor that approval of equipment calibration records has been received prior to beginning field testing. If unexpected conditions are encountered that affect measurements, notify Shaun Lehman and Rob Smith immediately.

Report Format: Standard report in accordance with ASTM D 4633-05 requirements.

Specific Quality Assurance Procedures Applicable: QAP 20-1; QAP 25-1; QAP for Reporting Nuclear-Related Defects, or Noncompliances, per Federal Regulation 10CFR21 and Section 206 of the Energy Reorganization Act of 1974. Current revisions apply.

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 for issuance)	
Project Manager: 	Date: 6/6/08
Project Principal Engineer: _____	Date: _____
Site Manager/Coordinator: _____	Date: _____
Pages:	DCN: FLR-085
Attachments:	

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 COL Site	MAKE:	<i>CME</i>
LOCATION:	Matagorda County, Texas	MODEL:	<i>750</i>
PROJECT NO.:	6234-08-4680	SERIAL NO.:	<i>07</i>
DATE:	<i>6-11-2008</i>	HAMMER TYPE:	<i>W.T.O</i>
WEATHER:	<i>Partly cloudy, windy 90°F</i>	ROPE CONDITION:	N/A
INSPECTOR:	<i>JMK</i>	ROD SIZE:	<i>NUT</i>
DRILLING COMPANY:	<i>Miller</i>	NO. OF SHEAVES:	N/A

BORING DATA

BORING NUMBER:	<i>114-4</i>	TIME DRIVEN:	<i>VARIABLES</i>
DEPTH DRILLED:	<i>JMK - VARIABLE - 300 FT PLANNED</i>	RIG OPERATOR:	<i>B. LOONEY, CIEN</i>
HAMMER OPERATOR:	<i>N/A</i>	PDA PAK SERIAL NO.:	3622L
INSTR. ROD AREA:	<i>1.49 in²</i>	ACCEL. SERIAL NOS.:	<i>A1-4590: A2-4650</i>
STRAIN SERIAL NOS.:	<i>NW-146 4 1 1 2</i>		

SAMPLE DEPTH (feet)	SPT N-VALUE (blf)						
<i>33-34.5</i>	<i>7-9-9</i>						
<i>38-39.5</i>	<i>8-14-58-84</i>						

REMARKS:

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 COL Site	MAKE:	CME 750
LOCATION:	Matagorda County, Texas	MODEL:	750
PROJECT NO.:	6234-08-4860	SERIAL NO.:	02
DATE:	6-12-2009	HAMMER TYPE:	Auto
WEATHER:	P. Cloudy - Sunny - BREEZY 50°	ROPE CONDITION:	N/A
INSPECTOR:	JNH	ROD SIZE:	NW 5
DRILLING COMPANY:	Miller	NO. OF SHEAVES:	N/A

BORING DATA			
BORING NUMBER:	NF-4		
DEPTH DRILLED:	variable		
TIME DRIVEN:	various		
RIG OPERATOR:	GLEN O'BERRY		
HAMMER OPERATOR:	N/A		
PDA PAK SERIAL NO.:	3822L		
INSTR. ROD AREA:	1.44 in ²		
ACCEL. SERIAL NOS.:	#1-K980, #2-1050		
STRAIN SERIAL NOS.:	nw 246 # 112		

SAMPLE DEPTH (feet)	SPT N-VALUE (blf)								
73.1 - 74.6	12-15-21								
83 - 84.5	5-8-10	* Accel	K 953	- Channel	#2 - A2				
93 - 94.5	8-10-14	* Accel	K 993	Channel	#2 - A2				

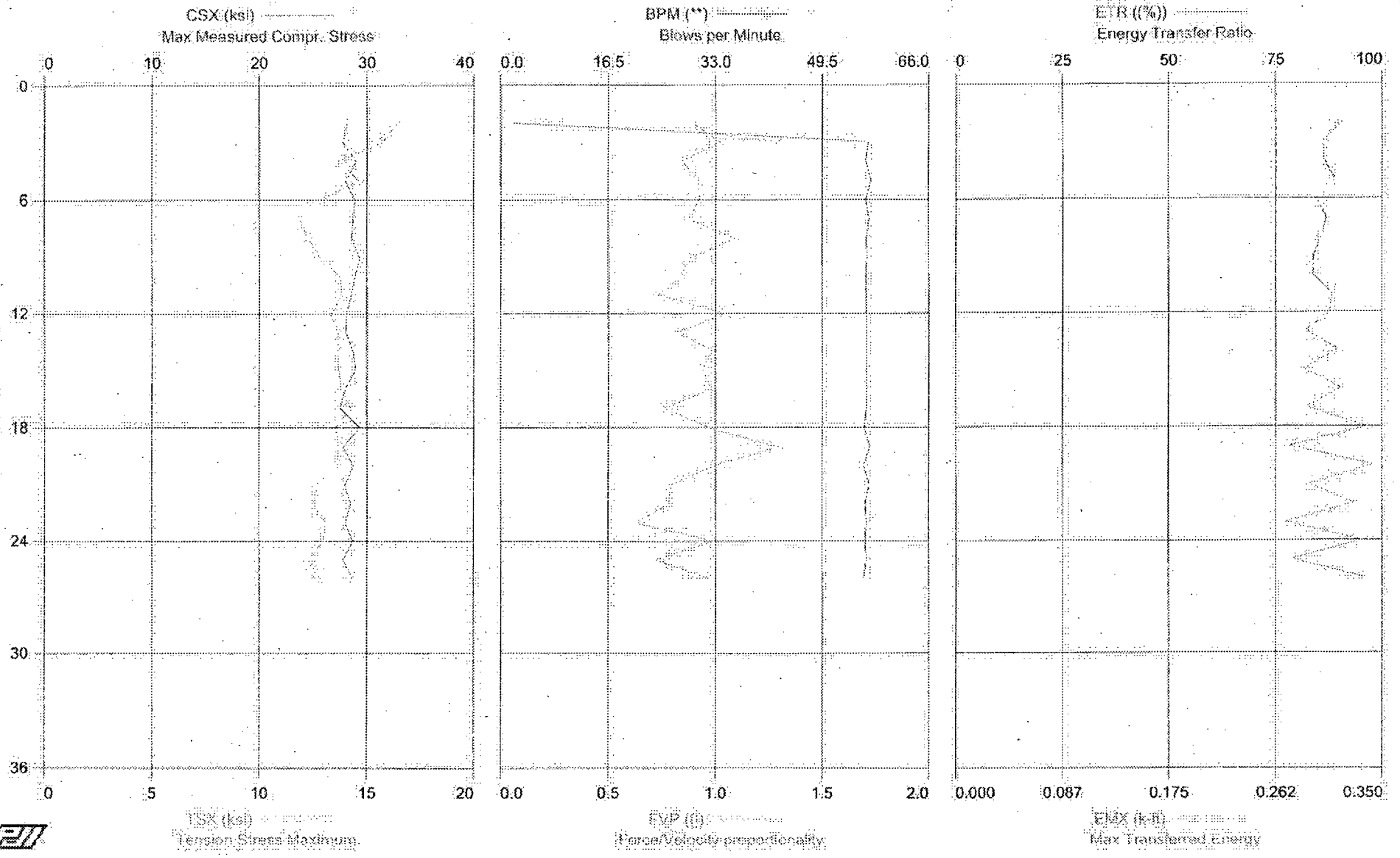
REMARKS: * Accel. 5953 (at) DEPTH 83-84.5
 * Accel. K993 (at) DEPTH 93-94.5

PDIPLOT Ver. 2008.1 - Printed: 29-Jun-2008

STP COL - Boring U4-4; 33' - 34.5' Sample

433763

DCN: FLR-317



MACTEC Engineering and Consulting, Inc.
Case Method Results

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STP COL - Boring U4-4: 33' - 34.5' Sample
OP: SEK

Hammer ID: 07 (MILLER BILBREY CME750)
Test date: 11-Jun-2008

AR: 1.49 in²
LE: 39.00 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft³
EM: 30,000 ksi
JC: 0.70

CSX: Max Measured Compr. Stress
TSX: Tension Stress Maximum
FMX: Maximum Force
VMX: Maximum Velocity
BPM: Blows per Minute

FVP: Force/Velocity proportionality
EF2: Energy of F²
ETR: Energy Transfer Ratio
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	BPM **	FVP □	EF2 k-ft	ETR (%)	EMX k-ft
2	0.00	28.2	16.4	42	14.1	1.9	0.89	0.339	91	0.317
3	0.00	27.8	15.7	41	12.7	56.6	1.02	0.336	86	0.302
4	0.00	29.0	13.7	43	12.4	56.2	0.84	0.345	86	0.302
5	0.00	28.0	14.6	42	13.1	57.0	0.92	0.343	89	0.311
6	0.00	28.9	12.8	43	12.1	56.2	0.92	0.348	85	0.296
7	0.00	28.7	11.9	43	13.2	56.7	0.87	0.347	87	0.304
8	0.00	28.6	12.3	43	11.9	56.3	1.09	0.349	86	0.300
9	0.00	29.3	12.9	44	11.5	56.4	0.89	0.348	84	0.294
10	0.00	28.9	13.8	43	12.0	56.2	0.84	0.349	84	0.293
11	0.00	28.5	13.9	43	12.5	56.3	0.73	0.350	88	0.309
12	0.00	28.1	13.3	42	12.6	56.3	1.04	0.346	88	0.307
13	0.00	28.0	13.7	42	11.6	56.4	0.82	0.346	82	0.287
14	0.00	28.7	13.7	43	13.5	56.4	0.99	0.349	90	0.314
15	0.00	29.0	13.7	43	10.9	56.3	0.94	0.345	82	0.286
16	0.00	28.0	13.8	42	13.4	56.4	0.98	0.344	90	0.316
17	0.00	27.5	14.2	41	10.8	56.3	0.76	0.349	82	0.288
18	0.00	29.3	13.5	44	14.7	56.0	0.97	0.349	96	0.338
19	0.00	27.8	13.7	41	10.1	56.8	1.30	0.343	78	0.274
20	0.00	28.7	13.6	43	14.5	55.9	0.99	0.352	98	0.342
21	0.00	28.0	12.7	42	11.3	56.7	0.79	0.347	83	0.290
22	0.00	28.5	12.6	42	13.8	56.1	0.78	0.345	93	0.327
23	0.00	28.0	13.1	42	10.1	56.3	0.63	0.341	77	0.271
24	0.00	28.7	13.0	43	14.3	56.1	0.99	0.345	95	0.333
25	0.00	27.8	12.3	41	10.3	56.3	0.72	0.340	79	0.276
26	0.00	28.6	12.8	43	14.3	55.9	0.97	0.347	96	0.335
Average		28.4	13.5	42	12.5	54.2	0.91	0.346	87	0.304

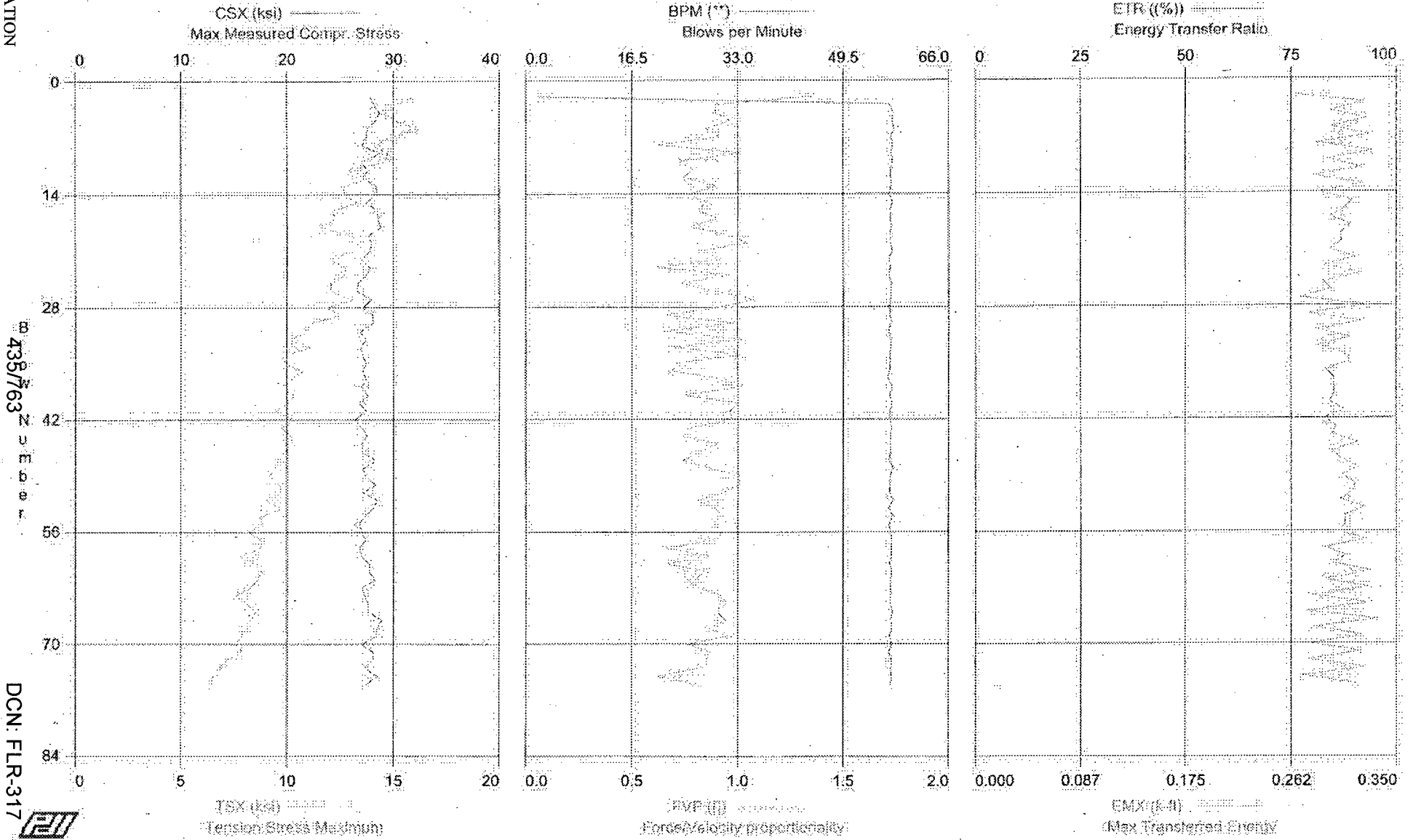
Total number of blows analyzed: 25

Time Summary

Drive 25 seconds

5:54:43 PM - 5:55:08 PM (6/11/2008) BN.2 - 26

STP COL - Boring U4-4, 38' - 39.5' Sample



435/63

DCN: FLR-317



MACTEC Engineering and Consulting, Inc.
Case Method Results

Page 1 of 2
PDIPLOT Ver. 2008.1 - Printed: 29-Jun-2008

STP COL - Boring U4-4: 38' - 39.5' Sample
OP: SEK

Hammer ID: 07 (MILLER BILBREY CME750)
Test date: 11-Jun-2008

AR: 1.49 in²
LE: 44.00 ft
WS: 16,007.9 f/s

SP: 0.492 k/ft³
EM: 30,000 ksi
JC: 0.70

CSX: Max Measured Compr. Stress
TSX: Tension Stress Maximum
FMX: Maximum Force
VMX: Maximum Velocity
BPM: Blows per Minute

FVP: Force/Velocity proportionality
EF2: Energy of F²
ETR: Energy Transfer Ratio
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	BPM **	FVP []	EF2 k-ft	ETR (%)	EMX k-ft
2	0.00	27.9	15.9	41	11.6	1.9	1.35	0.331	77	0.268
3	0.00	28.2	15.0	42	14.5	56.6	0.90	0.336	92	0.324
4	0.00	28.7	14.7	43	12.3	57.3	0.89	0.338	84	0.295
5	0.00	28.3	15.2	42	14.4	57.1	0.96	0.337	93	0.325
6	0.00	27.6	16.2	41	12.6	57.4	0.85	0.336	85	0.297
7	0.00	27.5	14.8	41	14.6	56.9	0.91	0.341	94	0.327
8	0.00	27.1	14.1	40	11.3	57.2	0.62	0.334	81	0.283
9	0.00	28.8	14.7	43	14.5	56.9	1.02	0.343	95	0.331
10	0.00	27.1	14.6	40	11.8	57.2	0.72	0.336	84	0.293
11	0.00	27.6	12.9	41	14.1	56.9	0.79	0.336	92	0.321
12	0.00	27.2	13.9	41	10.8	56.9	0.74	0.339	80	0.280
13	0.00	28.4	12.6	42	14.6	57.0	0.90	0.338	92	0.323
14	0.00	28.4	12.7	42	11.6	56.6	0.77	0.338	81	0.285
15	0.00	27.4	13.3	41	14.4	57.2	0.86	0.336	90	0.314
16	0.00	28.5	12.1	43	13.5	56.8	0.81	0.336	88	0.308
17	0.00	28.5	12.3	43	12.3	56.8	0.91	0.340	84	0.294
18	0.00	28.8	11.6	43	14.0	57.0	0.78	0.339	89	0.312
19	0.00	27.7	13.1	41	12.7	56.8	0.95	0.341	87	0.304
20	0.00	28.0	13.4	42	12.9	56.8	1.05	0.342	87	0.304
21	0.00	27.8	13.0	41	12.8	57.2	0.82	0.332	84	0.295
22	0.00	27.0	12.1	40	13.8	56.6	0.92	0.338	90	0.315
23	0.00	27.8	12.7	41	11.5	56.9	0.62	0.337	83	0.290
24	0.00	27.5	12.7	41	13.9	56.6	0.97	0.342	92	0.321
25	0.00	26.7	12.1	40	12.0	57.0	0.73	0.329	83	0.289
26	0.00	26.6	12.1	40	13.2	56.9	0.88	0.330	85	0.295
27	0.00	28.0	13.1	42	10.1	56.9	1.08	0.332	77	0.270
28	0.00	27.1	11.9	40	14.6	56.7	0.92	0.335	93	0.326
29	0.00	28.1	12.5	42	10.5	56.8	0.66	0.338	79	0.275
30	0.00	28.1	11.1	42	14.1	57.0	0.98	0.334	92	0.321
31	0.00	26.9	11.0	40	11.2	56.6	0.65	0.334	81	0.284
32	0.00	27.4	10.2	41	13.4	56.9	1.02	0.333	89	0.312
33	0.00	26.9	11.1	40	10.7	56.9	0.69	0.336	81	0.285
34	0.00	27.1	10.0	40	13.2	56.8	1.02	0.326	88	0.307
35	0.00	27.5	9.9	41	13.4	56.8	0.72	0.334	89	0.311
36	0.00	27.2	10.7	40	12.0	56.7	0.69	0.333	83	0.291
37	0.00	27.4	10.3	41	12.5	56.4	0.92	0.338	85	0.298
38	0.00	27.0	9.7	40	12.9	57.2	1.02	0.327	85	0.298
39	0.00	27.6	10.3	41	12.4	56.7	0.74	0.336	85	0.298
40	0.00	26.8	10.1	40	12.0	57.1	1.01	0.333	84	0.294
41	0.00	27.5	9.4	41	13.2	56.8	0.96	0.334	87	0.306
42	0.00	26.4	10.3	39	12.3	56.8	0.97	0.326	83	0.291
43	0.00	27.1	9.8	40	12.8	57.0	0.78	0.323	86	0.300
44	0.00	27.6	10.2	41	12.4	56.9	0.74	0.334	85	0.297
45	0.00	27.0	10.3	40	14.0	56.8	0.91	0.328	91	0.318
46	0.00	27.1	9.8	40	12.7	56.9	0.82	0.325	85	0.296
47	0.00	28.4	9.6	42	13.0	56.6	0.74	0.334	87	0.304
48	0.00	27.1	9.5	40	14.1	57.3	0.87	0.331	91	0.319
49	0.00	27.4	9.2	41	12.6	56.8	1.01	0.330	87	0.305
50	0.00	28.3	9.7	42	13.6	56.8	1.01	0.330	90	0.316
51	0.00	27.1	9.7	40	13.7	56.7	0.93	0.327	90	0.314
52	0.00	28.5	9.0	42	13.1	57.3	0.81	0.329	87	0.304
53	0.00	28.1	9.8	42	14.6	56.6	0.90	0.335	92	0.323
54	0.00	27.3	8.8	41	13.5	57.3	0.92	0.328	88	0.307
55	0.00	26.8	8.9	40	13.7	56.6	0.88	0.325	88	0.308
56	0.00	27.1	8.2	40	12.7	56.9	0.93	0.333	86	0.300
57	0.00	27.4	8.8	41	14.6	57.1	0.89	0.329	93	0.326
58	0.00	26.9	8.8	40	12.3	57.0	0.66	0.324	83	0.291
59	0.00	27.0	7.7	40	14.2	57.0	0.87	0.326	88	0.308
60	0.00	27.7	8.6	41	12.6	56.7	0.67	0.332	85	0.298
61	0.00	27.8	8.8	41	14.7	57.1	0.87	0.330	94	0.330
62	0.00	28.2	8.6	42	11.9	56.8	0.76	0.332	83	0.290
63	0.00	27.1	8.3	40	14.5	56.9	0.83	0.331	93	0.327
64	0.00	27.3	7.6	41	11.2	56.8	0.93	0.325	80	0.280
65	0.00	27.6	8.2	41	14.7	56.8	0.92	0.332	93	0.326
66	0.00	27.7	8.5	41	10.5	57.2	0.91	0.326	79	0.276

MACTEC Engineering and Consulting, Inc.
Case Method Results

Page 2 of 2
PDILOT Ver. 2008.1 - Printed: 29-Jun-2008

STP COL - Boring U4-4: 38' - 39.5' Sample
OP: SEK

Hammer ID: 07 (MILLER BILBREY CME750)
Test date: 11-Jun-2008

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	BPM **	FVP □	EF2 k-ft	ETR (%)	EMX k-ft
67	0.00	28.9	8.3	43	14.9	56.9	0.94	0.335	96	0.335
68	0.00	28.4	7.9	42	11.2	57.1	0.87	0.330	80	0.281
69	0.00	28.4	7.9	42	14.1	56.7	0.95	0.333	92	0.323
70	0.00	27.1	7.6	40	10.5	57.1	0.77	0.330	79	0.278
71	0.00	28.1	7.9	42	14.5	56.6	0.87	0.337	91	0.319
72	0.00	28.1	7.2	42	10.1	57.1	0.85	0.334	79	0.277
73	0.00	27.4	6.9	41	14.8	56.9	0.82	0.334	93	0.325
74	0.00	28.5	6.5	42	10.1	57.0	0.62	0.333	78	0.271
75	0.00	27.5	6.4	41	14.2	56.9	0.81	0.334	91	0.318
Average		27.6	10.7	41	12.9	56.2	0.86	0.333	87	0.303

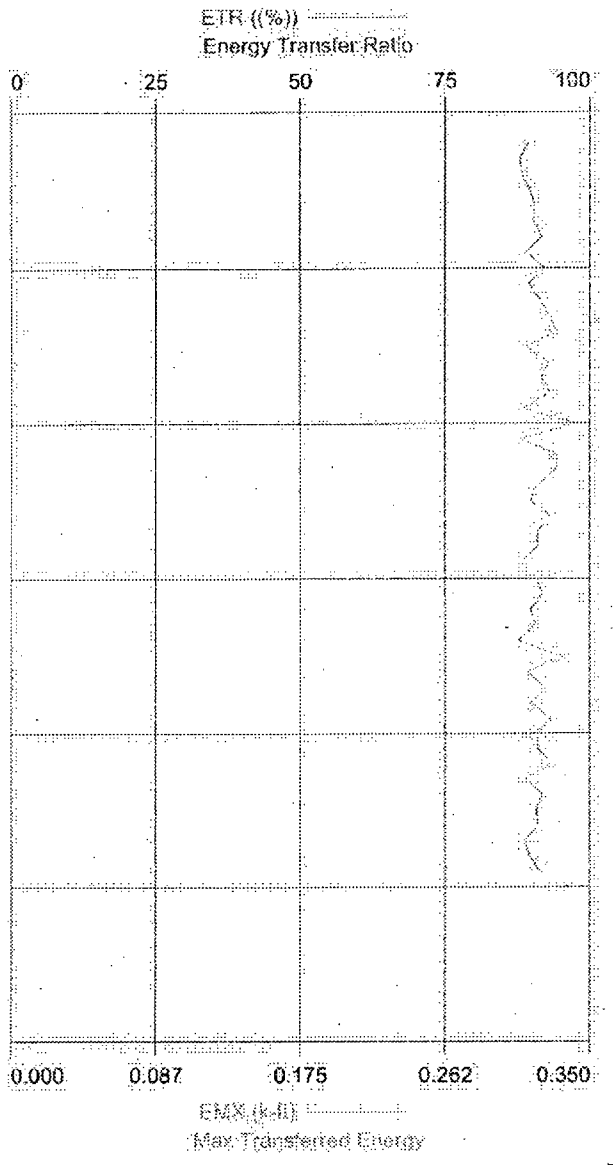
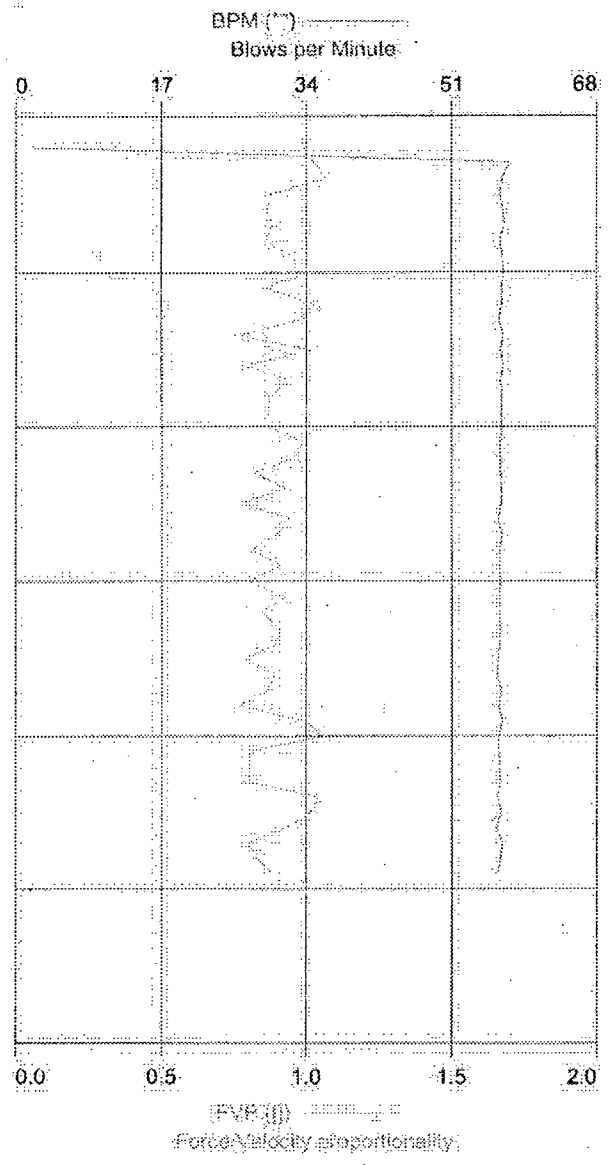
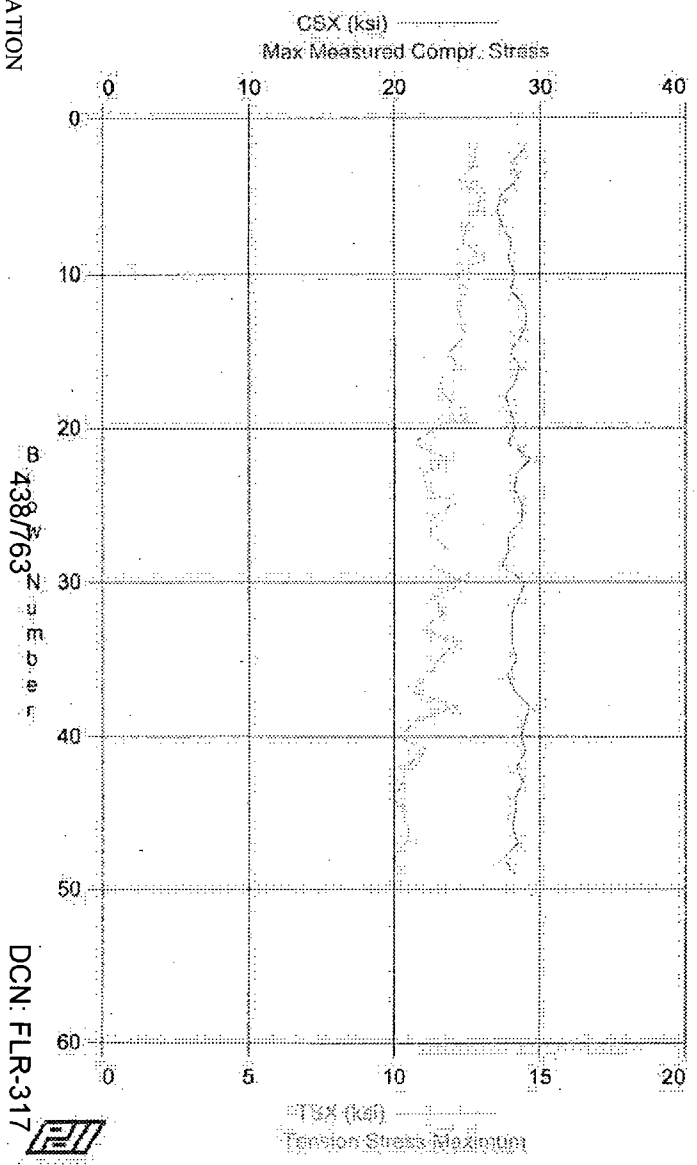
Total number of blows analyzed: 74

Time Summary:

Drive 1 minute 17 seconds

6:09:47 PM - 6:11:04 PM (6/11/2008) BN 2 - 75

SIP COL SITE - Boring U4-4; 73.1' - 74.6' Sample



MACTEC Engineering and Consulting, Inc.
Case Method Results

Page 1 of 1
PDILOT Ver. 2008.1 - Printed: 30-Jun-2008

STP COL SITE - Boring U4-4; 73.1' - 74.6' Sample
OP: JNH

Hammer ID: 07 (MILLER-CME 750)
Test date: 12-Jun-2008

AR: 1.49 in²
LE: 79.00 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft³
EM: 30,000.0 ksi
JC: 0.70

CSX: Max Measured Compr. Stress
TSX: Tension Stress Maximum
FMX: Maximum Force
VMX: Maximum Velocity
FVP: Force/Velocity proportionality

BPM: Blows per Minute
EF2: Energy of F²
ETR: Energy Transfer Ratio
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	FVP []	BPM **	EF2 k-ft	ETR (%)	EMX k-ft
2	0.00	28.9	12.8	43	13.3	0.99	1.9	0.362	90	0.313
3	0.00	28.1	12.8	42	12.9	1.02	57.7	0.353	88	0.308
4	0.00	28.6	12.2	43	12.9	1.07	56.9	0.358	88	0.309
5	0.00	27.3	12.9	41	12.8	0.88	56.6	0.349	90	0.314
6	0.00	27.1	12.9	40	13.7	0.86	56.9	0.349	90	0.317
7	0.00	27.4	12.5	41	13.5	0.88	57.1	0.358	90	0.316
8	0.00	28.1	12.4	42	13.9	0.86	56.6	0.360	92	0.321
9	0.00	27.8	13.2	41	13.5	0.95	56.9	0.352	89	0.311
10	0.00	28.3	12.1	42	14.4	0.97	57.0	0.357	92	0.323
11	0.00	28.0	12.5	42	13.2	0.86	56.8	0.356	90	0.313
12	0.00	28.9	12.2	43	13.8	1.03	56.8	0.358	92	0.320
13	0.00	29.1	12.3	43	14.2	0.98	56.5	0.362	93	0.326
14	0.00	28.7	12.4	43	14.0	0.77	57.0	0.362	94	0.330
15	0.00	27.9	11.9	42	12.9	1.02	56.7	0.359	89	0.312
16	0.00	28.6	12.2	43	13.9	0.78	57.0	0.362	93	0.325
17	0.00	28.2	11.6	42	13.6	0.95	56.7	0.361	92	0.321
18	0.00	27.6	11.8	41	14.1	0.87	56.8	0.361	93	0.326
19	0.00	28.0	12.5	42	13.3	0.87	56.8	0.359	88	0.310
20	0.00	28.3	11.4	42	14.8	0.87	56.8	0.364	98	0.341
21	0.00	27.8	10.7	41	12.4	0.98	56.7	0.361	88	0.308
22	0.00	29.3	11.9	44	14.8	0.97	56.7	0.359	94	0.330
23	0.00	28.4	11.0	42	14.4	0.82	56.7	0.360	94	0.330
24	0.00	28.2	11.1	42	13.8	0.93	56.8	0.361	91	0.318
25	0.00	28.8	12.0	43	13.3	0.78	56.8	0.359	90	0.314
26	0.00	28.8	11.3	43	14.4	0.95	56.4	0.361	93	0.326
27	0.00	27.8	11.3	41	13.8	0.89	56.9	0.360	91	0.318
28	0.00	27.8	11.9	41	14.0	0.81	56.6	0.359	91	0.318
29	0.00	27.4	11.3	41	13.4	0.91	56.6	0.354	88	0.309
30	0.00	29.0	12.4	43	14.2	0.80	56.7	0.360	91	0.318
31	0.00	28.6	11.4	43	14.4	0.93	56.6	0.361	92	0.321
32	0.00	28.1	11.7	42	13.1	0.84	56.6	0.359	90	0.314
33	0.00	28.1	11.0	42	14.3	0.91	56.7	0.357	90	0.317
34	0.00	28.1	12.2	42	13.7	0.90	56.6	0.358	88	0.307
35	0.00	28.4	11.5	42	14.5	0.79	56.4	0.362	95	0.333
36	0.00	27.7	11.3	41	13.8	0.89	56.3	0.358	89	0.312
37	0.00	28.2	10.6	42	14.8	0.87	56.8	0.365	92	0.323
38	0.00	29.3	12.2	44	12.9	0.77	56.5	0.360	90	0.314
39	0.00	29.0	10.7	43	14.8	0.99	56.9	0.358	93	0.327
40	0.00	28.7	10.3	43	14.0	1.06	56.5	0.359	91	0.318
41	0.00	29.0	11.1	43	13.8	0.80	56.5	0.358	91	0.319
42	0.00	28.4	10.4	42	14.3	0.81	56.6	0.361	93	0.327
43	0.00	28.8	10.3	43	13.6	0.80	56.7	0.354	89	0.311
44	0.00	28.3	10.0	42	14.6	1.04	56.3	0.357	92	0.321
45	0.00	28.3	10.3	42	13.7	1.02	56.8	0.357	91	0.318
46	0.00	28.1	10.5	42	14.3	0.94	56.2	0.354	91	0.319
47	0.00	28.5	10.4	42	14.0	0.80	56.9	0.356	89	0.311
48	0.00	27.5	9.9	41	13.9	0.83	56.7	0.351	90	0.314
49	0.00	28.3	10.4	42	14.6	0.88	56.4	0.355	91	0.320
Average		28.3	11.6	42	13.8	0.90	55.6	0.358	91	0.319

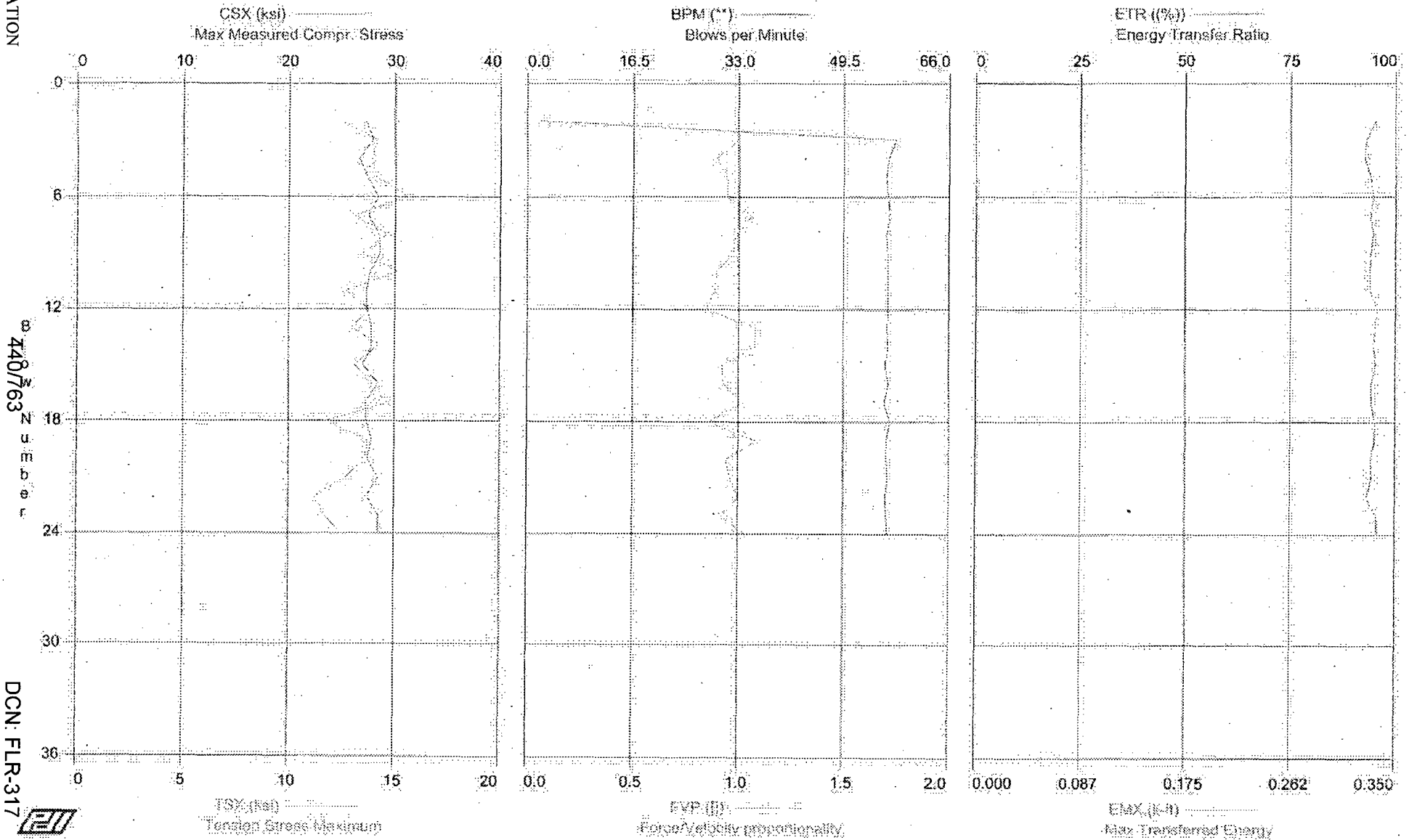
Total number of blows analyzed: 48

Time Summary

Drive: 49 seconds

10:42:17 AM - 10:43:06 AM (6/12/2008) BN 2 - 49

STP COL SITE - Boring U4-4; 83' - 84.5' Sample



440763

DCN: FLR-317



MACTEC Engineering and Consulting, Inc.
Case Method Results

Page 1 of 1
PDFPLOT Ver. 2008.1 - Printed: 29-Jun-2008

STP COL SITE - Boring U4-4: 83' - 84.5' Sample
OP: JNH

Hammer ID: 07 (MILLER-CME 750)
Test date: 12-Jun-2008

AR: 1.49 in²
LE: 89.00 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft³
EM: 30,000 ksi
JC: 0.70

CSX: Max Measured Compr. Stress
TSX: Tension Stress Maximum
FMX: Maximum Force
VMX: Maximum Velocity
BPM: Blows per Minute

FVP: Force/Velocity proportionality
EF2: Energy of F²
ETR: Energy Transfer Ratio
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	BPM **	FVP []	EF2 k-ft	ETR (%)	EMX k-ft
2	0.00	27.2	12.5	41	13.4	1.9	0.98	0.359	95	0.334
3	0.00	27.9	14.1	42	13.8	57.7	1.00	0.354	93	0.326
4	0.00	26.6	13.9	40	14.0	56.5	0.90	0.345	93	0.324
5	0.00	27.4	14.1	41	13.6	56.1	0.94	0.357	94	0.329
6	0.00	28.4	15.6	42	14.4	56.5	0.95	0.355	95	0.332
7	0.00	27.5	13.1	41	14.2	56.7	1.06	0.354	94	0.329
8	0.00	28.5	14.7	42	14.2	56.2	0.99	0.361	95	0.332
9	0.00	28.6	13.5	43	14.6	56.4	0.97	0.353	94	0.330
10	0.00	27.7	15.1	41	13.9	56.4	0.90	0.355	94	0.329
11	0.00	27.3	12.7	41	13.8	56.4	0.89	0.356	94	0.329
12	0.00	27.4	13.8	41	14.6	56.5	0.84	0.354	96	0.335
13	0.00	27.8	13.0	41	13.9	56.3	1.09	0.363	95	0.333
14	0.00	27.8	14.2	41	14.0	56.5	1.08	0.355	95	0.332
15	0.00	27.0	13.1	40	13.9	56.1	0.92	0.359	95	0.334
16	0.00	28.4	13.9	42	14.9	56.6	0.93	0.353	94	0.330
17	0.00	27.3	14.8	41	14.5	55.9	1.02	0.354	94	0.330
18	0.00	27.4	11.8	41	14.7	56.8	0.86	0.355	95	0.333
19	0.00	27.8	13.7	41	14.1	56.2	1.09	0.359	95	0.333
20	0.00	27.5	13.6	41	14.8	56.3	0.94	0.351	94	0.330
21	0.00	28.4	12.7	42	14.2	56.5	0.96	0.359	94	0.330
22	0.00	27.4	11.2	41	14.6	56.1	1.00	0.349	93	0.326
23	0.00	28.5	11.7	42	14.6	56.3	0.92	0.357	96	0.335
24	0.00	28.5	12.5	42	14.3	56.5	1.03	0.356	96	0.335
Average:		27.8	13.5	41	14.2	54.1	0.97	0.355	95	0.331

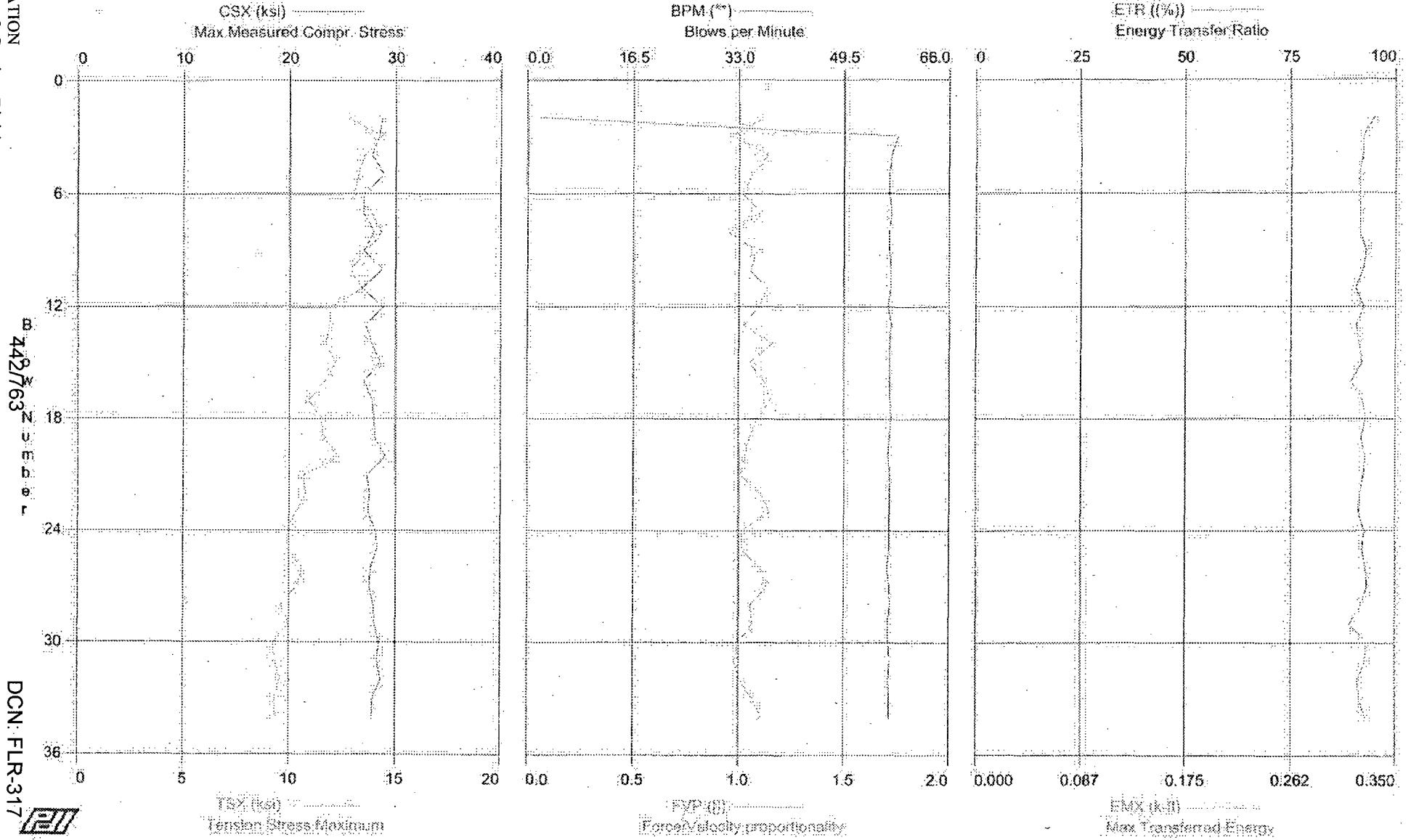
Total number of blows analyzed: 23

Time Summary

Drive 23 seconds

11:13:05 AM - 11:13:28 AM (6/12/2008) BN 2 - 24

STP-COL-SITE - Boring U4-4; 93' - 94.5' Sample



B 442763

DCN-FLR-317



MACTEC Engineering and Consulting, Inc.
Case Method Results

Page 1 of 1
PDIPILOT Ver: 2008.1 - Printed: 29-Jun-2008

STP COL SITE - Boring U4-4: 93' - 94.5' Sample
OP: JNH

Hammer ID: 07 (MILLER-CME 750)
Test date: 12-Jun-2008

AR: 1.49 in² SP: 0.482 k/ft³
LE: 99.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.70

CSX: Max Measured Compr. Stress FVP: Force/Velocity proportionality
TSX: Tension Stress Maximum EF2: Energy of F²
FMX: Maximum Force ETR: Energy Transfer Ratio
VMX: Maximum Velocity EMX: Max Transferred Energy
BPM: Blows per Minute

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	BPM *	FVP []	EF2 k-ft	ETR (%)	EMX k-ft
2	0.00	28.7	12.8	43	13.7	1.9	1.12	0.376	95	0.332
3	0.00	28.4	14.3	42	13.7	57.9	0.97	0.371	92	0.323
4	0.00	27.7	13.5	41	13.4	56.9	1.14	0.350	92	0.323
5	0.00	28.9	13.2	43	13.8	56.6	1.06	0.370	91	0.320
6	0.00	27.0	13.1	40	13.2	56.6	1.02	0.367	92	0.320
7	0.00	27.0	13.8	40	13.5	56.9	1.11	0.348	92	0.321
8	0.00	27.9	14.3	42	13.4	56.6	0.95	0.370	91	0.320
9	0.00	27.0	13.7	40	13.6	56.6	1.09	0.371	93	0.325
10	0.00	28.7	12.9	43	13.9	56.8	1.05	0.370	92	0.323
11	0.00	26.8	13.5	40	13.2	56.8	1.14	0.366	90	0.317
12	0.00	28.8	12.0	43	13.8	56.4	1.10	0.371	93	0.324
13	0.00	27.2	11.9	41	13.4	56.9	1.02	0.361	91	0.317
14	0.00	27.8	11.7	41	13.4	56.6	1.16	0.363	91	0.320
15	0.00	28.5	12.2	43	13.8	56.7	1.05	0.361	92	0.322
16	0.00	27.1	11.7	40	13.4	56.6	1.12	0.356	90	0.313
17	0.00	27.8	10.9	41	13.5	56.7	1.15	0.364	92	0.323
18	0.00	28.0	11.6	42	13.8	56.9	1.09	0.363	93	0.325
19	0.00	28.0	11.6	42	13.8	56.6	1.05	0.360	92	0.321
20	0.00	29.1	12.4	43	13.9	56.4	1.03	0.366	93	0.325
21	0.00	27.3	10.7	41	13.4	56.7	1.01	0.367	92	0.323
22	0.00	27.6	10.8	41	13.8	56.6	1.11	0.346	91	0.320
23	0.00	27.4	10.3	41	13.4	56.6	1.15	0.362	91	0.319
24	0.00	28.2	9.9	42	13.8	56.6	1.02	0.368	93	0.324
25	0.00	28.3	9.9	42	13.8	56.6	1.02	0.365	92	0.322
26	0.00	27.7	10.6	41	13.8	56.3	1.10	0.360	93	0.325
27	0.00	27.6	10.4	41	13.7	56.6	1.13	0.371	93	0.326
28	0.00	27.9	9.6	42	14.0	56.7	1.06	0.363	92	0.321
29	0.00	28.1	10.0	42	13.8	56.4	1.07	0.356	89	0.312
30	0.00	28.5	9.2	42	13.8	56.5	1.00	0.364	93	0.326
31	0.00	28.3	9.4	42	13.6	56.7	0.98	0.360	93	0.325
32	0.00	28.7	9.6	43	13.8	56.5	1.01	0.355	91	0.319
33	0.00	27.9	9.3	42	14.0	56.6	1.07	0.363	91	0.320
34	0.00	27.8	9.4	41	13.9	56.6	1.11	0.362	93	0.325
Average		27.9	11.5	42	13.7	55.0	1.07	0.363	92	0.322

Total number of blows analyzed: 33

Time Summary

Drive 34 seconds

11:50:55 AM - 11:51:29 AM (6/12/2008) BN 2 - 34



engineering and constructing a better tomorrow

July 14, 2008

Memorandum to File

From: Steve Kiser *SK*

Reviewed By: Kathryn White KAW 7/15/08

Subject: **Report of SPT Energy – Miller CME 550 ATV
Hammer Serial No. 353 Automatic Hammer
WORK INSTRUCTION No. 18 (FLR-085)
STP COL Project
Matagorda County, Texas
MACTEC Project No. 6234-08-4660**

Jonathan Honeycutt, 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 June 17, 2008, during drilling of Boring U3-1 at the referenced site. The testing was performed by Jonathan Honeycutt from approximately 2:21 PM to 3:14 PM on June 17 under sunny skies and a temperature of 90 degrees Fahrenheit. The boring was drilled with personnel and equipment from Miller Drilling. The drilling equipment consisted of a CME 550 model ATV 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 borings below the depth at which groundwater was encountered at the time of energy testing. The drill rig operator during sampling was Mr. Rick White. 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 PAX (Serial No. 36221), and calibrated accelerometers (Serial Nos. K990 and K983) and strain gages (Serial Nos. NW #146/1 and NW#146/2). A 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

The calibration records for all the above are filed in DCN FLR-079.

14 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; however, maximum and minimum ETR values of up to 98% and 56%, respectively, were reported in the literature. The ETR values shown in Table 1 are generally 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 record(s) was(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 295 foot-pounds to 310 foot-pounds. These average energy transfers correspond to energy transfer ratios (ETR) of 84% to 89% 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 304.4 foot-pounds, with an average ETR of 87.0%.

Attachments: Page 4 Table 1 - Summary of SPT Energy Measurements -- 1 Page
Page 5 Work Instruction - DCN FLR-085 -- 1 Page
Page 6 Record of SPT Energy Measurement -- 1 Page
Pages 7 - 14 PDILOT Output -- 8 Pages

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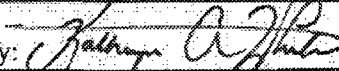
TABLE 1
SUMMARY OF SPT ENERGY MEASUREMENTS (ASTM D4633-05)
South Texas Project (STP) COL Site - Units 3 and 4
Wadsworth, Texas
MACTEC Project No. 6234-08-4660

Rig Serial No.	Rig Owner	Rig Operator	Boring No. Tested	Date Tested	Drill Rod Size	Sample Depth (feet)	SPT Blow Count (blows per six inches)	No. of Blows Analyzed	Average Measured Energy (Average EFV) ^a (ft-lbs)	Energy Transfer Ratio (%) ^b (Average ETR)
353 (CME 550)	Miller Drilling	Rick White	U3-1	6/17/2008	NW-J	21.0 - 22.5	4 - 11 - 12	25	295	84.3%
						26.0 - 27.5	9 - 18 - 17	42	303	86.6%
						31.0 - 32.5	9 - 13 - 19	40	310	88.6%
						36.0 - 37.5	3 - 7 - 16	27	307	87.7%
Average for Rig:									304.4	87.0%

^aMeasured 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, where EMX equals the maximum transferred energy measured by the PDA (see attached PDA data).

^bEnergy 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: 	Date: 7-14-08	Checked By: 	Date: 7/15/08
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STEVE KISER

Work Instruction No. 18
STP Units 3 & 4 COL Project
MACTEC Engineering and Consulting, Inc.
MACTEC Project 6234-08-4660

Issued To: Steve Kiser, Jon Honeycutt	Rev. No. 0
Issued By: Robert E. Smith	Date: June 5, 2008
Valid From: June 5, 2008	To: June 5, 2009

Task Description: Perform SPT Energy Measurements of drill rigs

Applicable Technical Procedures or Plans, or other reference:

Work Plan (current revision), ASTM D4633-05.

Specific Instructions (note attachments where necessary): Perform energy measurements for each drill rig on site collecting split-spoon samples in accordance with ASTM D-4633-05. Consult with Site Coordinator as to schedule for rigs that may be planned for use that are not yet present. Hammer weights have been checked by site personnel, and records will be available on site. All rigs are using automatic hammer systems. Be sure to check each drill rig using all hammer/rod combinations that it will be using. Depths for measurements should be coordinated with the Site Coordinator, but should begin at a minimum depth of 10 feet. Collect at least three energy measurements per drill rig.

Submit copies of calibration records for equipment to Quality Assurance for review prior to beginning work on site.

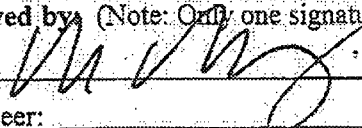
Special Instructions (note attachments where necessary): Confirm with Site Supervisor that approval of equipment calibration records has been received prior to beginning field testing. If unexpected conditions are encountered that affect measurements, notify Shaun Lehman and Rob Smith immediately.

Report Format: Standard report in accordance with ASTM D 4633-05 requirements.

Specific Quality Assurance Procedures Applicable: QAP 20-1; QAP 25-1; QAP for Reporting Nuclear-Related Defects, or Noncompliances, per Federal Regulation 10CFR21 and Section 206 of the Energy Reorganization Act of 1974. Current revisions apply.

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 for issuance)	
Project Manager: 	Date: 6/16/08
Project Principal Engineer:	Date:
Site Manager/Coordinator:	Date:
Pages:	DCN: FLR-085
Attachments:	



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 COL Site	MAKE:	CME
LOCATION:	Metagorda County, Texas	MODEL:	550
PROJECT NO.:	6234-09-4660	SERIAL NO.:	353
DATE:	6-17-2002	HAMMER TYPE:	Auto
WEATHER:	Sunny, Breezy 90°F	ROPE CONDITION:	N/A
INSPECTOR:	JN Harner	ROD SIZE:	NW3
DRILLING COMPANY:	Miller	NO. OF SHEAVES:	N/A

BORING DATA			
BORING NUMBER:	AS-1		
DEPTH DRILLED:	Various		
TIME DRIVEN:	Various		
RIG OPERATOR:	B. White		
HAMMER OPERATOR:	N/A		
POA PAK SERIAL NO.:	3622L		
INSTR. ROD AREA:	1.4910 ²		
ACCEL. SERIAL NOS.:	K990-01 ; K983-02		
STRAIN SERIAL NOS.:	NW106 - #1/2		

SAMPLE DEPTH (feet)	SPT N-VALUE (bls)							
21-22.5	4-11-12							
26-27.5	9-18-17	9-18-17						
32-33.5								
31-32.5	9-13-19							
36-37.5	3-7-11							

REMARKS: H - Rich started TEST BEFORE Calibration was Finished - lost \approx 2-3 Blows @ depth

MACTEC Engineering and Consulting, Inc. - Case Method Results

Test date: 17-Jun-2008

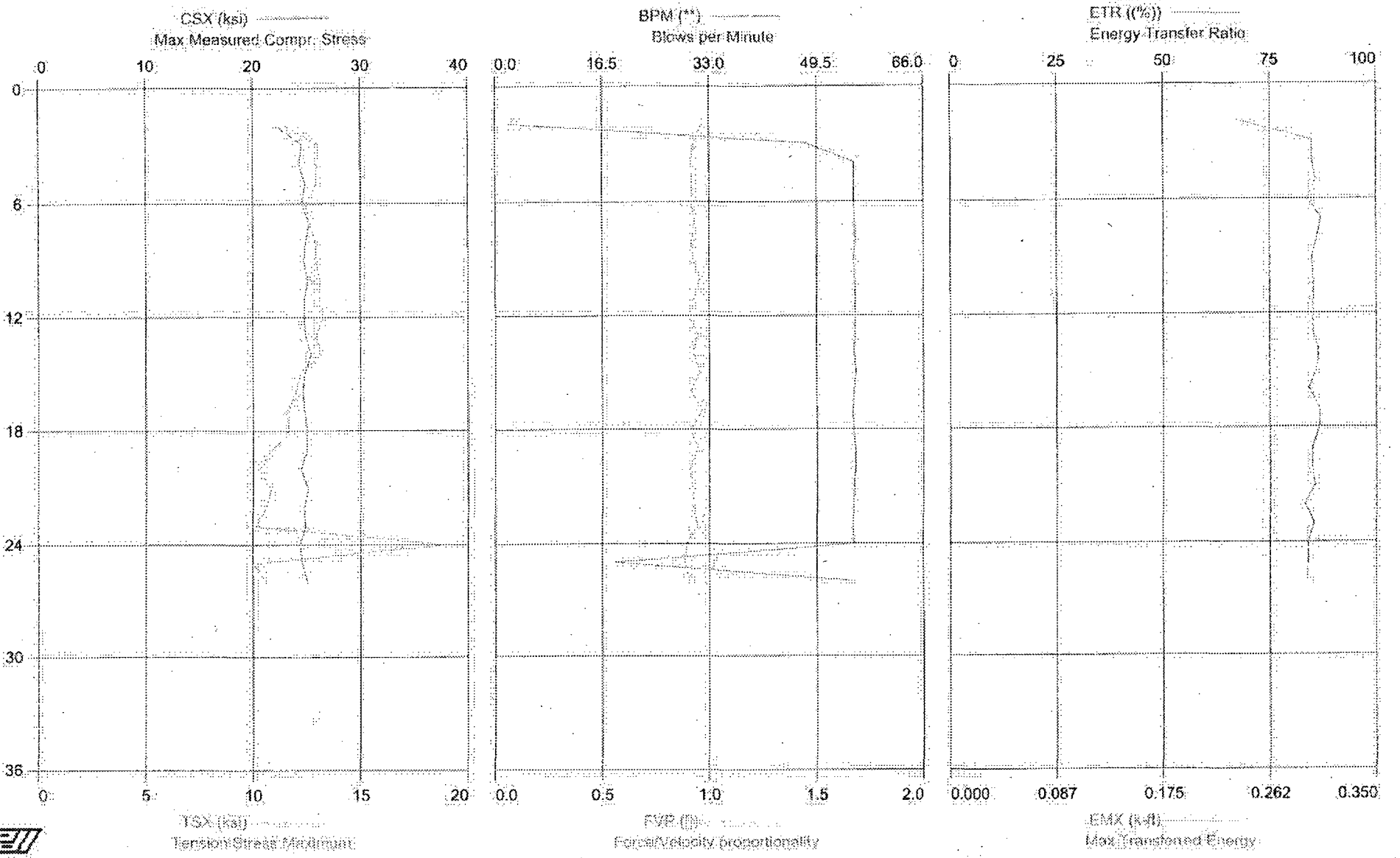
DIPILOT Ver. 2008.1 - Printed: 29-Jun-2008

STP COL SITE - Boring U3-1; 21' - 22.5' Sample.

TOSHIBA CORPORATION
Nuclear Energy Systems & Services Division

DCN: 459/763

DCN: FLR-317



MACTEC Engineering and Consulting, Inc.
Case Method Results

Page 1 of 1
PDILOT Ver. 2008.1 - Printed: 29-Jun-2008

STP COL SITE - Boring U3-1; 21' - 22.5' Sample
OP: JNH

Hammer ID: 353 (MILLER - CME 550)
Test date: 17-Jun-2008

AR: 1.49 in²
LE: 27.00 ft
WS: 16,807.9 f/s

SP: 0.492 k/r3
EM: 30,000 ksi
JC: 0.70

CSX: Max Measured Compr. Stress
TSX: Tension Stress Maximum
FMX: Maximum Force
VMX: Maximum Velocity
BPM: Blows per Minute

FVP: Force/Velocity proportionality
EF2: Energy of F²
ETR: Energy Transfer Ratio
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX klps	VMX f/s	BPM **	FVP []	EF2 k-ft	ETR (%)	EMX k-ft
2	0.00	22.2	11.5	33	12.0	1.9	0.97	0.252	68	0.237
3	0.00	24.6	13.1	37	14.6	47.7	0.92	0.307	85	0.297
4	0.00	24.3	13.0	38	14.5	55.3	0.92	0.307	85	0.297
5	0.00	24.9	12.9	37	14.7	55.3	0.92	0.306	86	0.300
6	0.00	24.6	12.5	37	14.0	55.3	0.92	0.304	84	0.293
7	0.00	25.2	12.6	38	14.6	55.4	0.93	0.309	87	0.304
8	0.00	24.9	12.9	37	14.6	55.5	0.92	0.309	86	0.301
9	0.00	24.7	13.0	37	14.1	55.2	0.92	0.308	85	0.297
10	0.00	25.1	13.1	37	14.3	55.4	0.96	0.308	85	0.298
11	0.00	24.8	13.1	37	14.5	55.5	0.93	0.304	85	0.298
12	0.00	24.7	13.3	37	14.1	55.4	0.91	0.308	85	0.298
13	0.00	24.9	13.0	37	14.4	55.4	0.95	0.305	85	0.298
14	0.00	25.4	13.1	38	14.7	55.3	0.93	0.308	86	0.302
15	0.00	24.8	12.2	37	14.3	55.6	0.96	0.305	86	0.301
16	0.00	24.6	12.0	37	14.3	55.3	0.91	0.305	84	0.294
17	0.00	24.8	11.6	37	14.2	55.1	0.97	0.308	87	0.303
18	0.00	25.0	11.6	37	14.7	55.2	0.91	0.310	87	0.303
19	0.00	25.0	10.9	37	14.4	55.5	0.95	0.306	85	0.297
20	0.00	24.5	10.3	36	14.4	55.5	0.91	0.305	85	0.297
21	0.00	25.1	10.8	37	14.6	55.3	0.92	0.306	86	0.299
22	0.00	24.7	10.6	37	14.4	55.2	0.93	0.298	83	0.291
23	0.00	24.9	10.1	37	14.5	55.1	0.95	0.303	85	0.299
24	0.00	24.4	19.0	36	14.2	55.3	0.90	0.298	84	0.294
25	0.00	24.6	10.0	37	14.2	18.4	0.88	0.301	84	0.294
26	0.00	25.1	10.6	37	14.5	55.2	0.91	0.300	84	0.293
Average		24.7	12.3	37	14.3	51.4	0.93	0.303	84	0.295

Total number of blows analyzed: 25

Time Summary

Drive 28 seconds

2:21:02 PM - 2:21:30 PM (6/17/2008) BN 2 - 26

MACTEC Engineering and Consulting, Inc. - Case Method Results

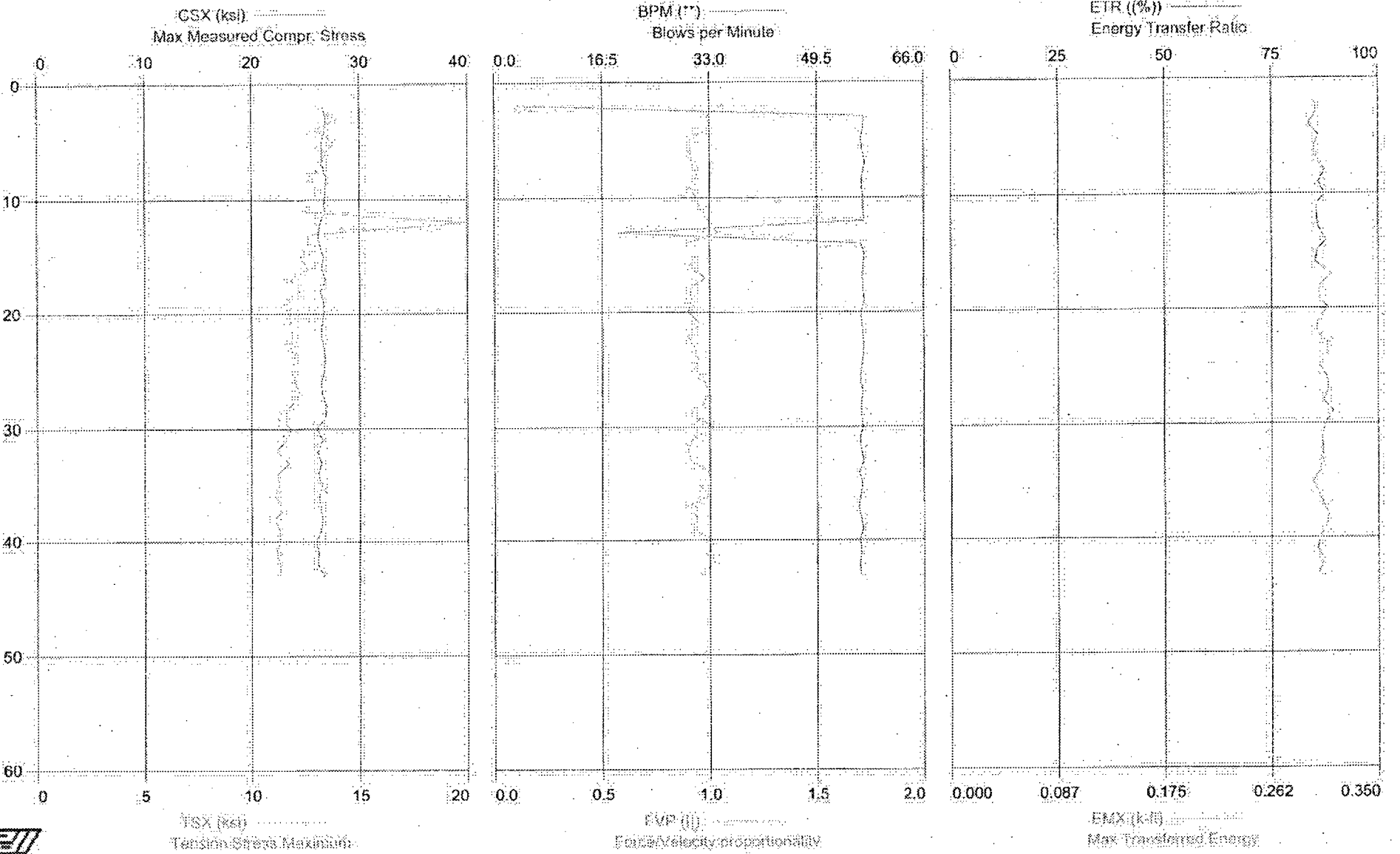
Test date: 17-Jun-2008

DIPILOT Ver. 2008.1 - Printed: 29-Jun-2008

STP COL SITE - Boring U3-1; 26' - 27.5' Sample

452763 ZEPHAR

DCN: FLR-317



MACTEC Engineering and Consulting, Inc.
Case Method Results

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PDIPILOT Ver. 2008.1 - Printed: 29-Jun-2008

STP COL SITE - Boring U3-1; 26' - 27.5' Sample
OP: JNH

Hammer ID: 353 (MILLER - CME 550)
Test date: 17-Jun-2008

AR: 1.49 in²
LE: 32.00 ft
WS: 16.807.9 f/s

SP: 0.482 k/ft³
EM: 30,000 ksi
JC: 0.70

CSX: Max Measured Compr. Stress
TSX: Tension Stress Maximum
FMX: Maximum Force
VMX: Maximum Velocity
BPM: Blows per Minute

FVP: Force/Velocity proportionality
EF2: Energy of F²
ETR: Energy Transfer Ratio
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	BPM **	FVP □	EF2 k-ft	ETR (%)	EMX k-ft
2	0.00	26.6	13.0	40	14.4	3.5	1.06	0.324	85	0.298
3	0.00	26.9	13.9	40	14.6	56.7	0.99	0.319	85	0.299
4	0.00	26.8	12.9	40	14.4	56.6	1.00	0.321	84	0.293
5	0.00	26.5	13.8	40	14.3	56.3	0.91	0.319	86	0.301
6	0.00	26.5	13.4	40	14.1	56.5	0.91	0.321	85	0.297
7	0.00	26.5	13.2	40	14.3	56.9	0.92	0.320	85	0.299
8	0.00	26.9	12.8	40	14.9	56.5	0.94	0.319	87	0.306
9	0.00	26.8	12.9	40	14.6	56.4	0.91	0.323	86	0.301
10	0.00	26.7	12.9	40	14.9	56.6	0.94	0.320	87	0.306
11	0.00	26.8	12.4	40	14.6	56.6	0.96	0.321	85	0.299
12	0.00	26.3	30.2	39	14.3	56.8	1.00	0.320	86	0.299
13	0.00	26.1	12.6	39	14.1	18.9	1.04	0.318	86	0.301
14	0.00	26.3	12.6	39	14.4	56.2	0.88	0.322	88	0.307
15	0.00	26.7	12.3	40	14.7	56.8	0.93	0.317	86	0.299
16	0.00	26.5	12.7	39	14.4	56.6	0.91	0.318	85	0.298
17	0.00	26.9	11.8	40	14.8	56.5	0.98	0.321	89	0.311
18	0.00	26.4	12.3	39	14.6	56.6	0.91	0.318	86	0.302
19	0.00	26.7	11.5	40	14.7	56.8	0.92	0.319	86	0.301
20	0.00	26.7	11.8	40	14.9	56.3	0.90	0.321	88	0.308
21	0.00	26.5	11.8	40	14.5	56.4	0.95	0.316	86	0.301
22	0.00	26.4	11.9	39	14.3	56.6	0.90	0.321	86	0.299
23	0.00	26.7	11.8	40	14.7	56.7	0.93	0.319	88	0.308
24	0.00	26.8	12.0	40	14.8	56.6	0.95	0.318	88	0.308
25	0.00	26.7	11.8	40	14.6	56.3	0.93	0.319	86	0.302
26	0.00	26.4	12.0	39	14.6	56.2	0.97	0.315	88	0.308
27	0.00	26.5	12.2	40	14.6	56.6	1.00	0.320	88	0.309
28	0.00	26.9	11.8	40	14.7	56.3	0.97	0.321	87	0.305
29	0.00	26.8	11.2	40	14.9	56.3	0.91	0.322	89	0.313
30	0.00	26.0	11.8	39	14.2	56.6	1.02	0.318	88	0.306
31	0.00	26.6	11.6	40	14.6	56.1	0.92	0.321	87	0.304
32	0.00	26.1	11.1	39	14.0	56.3	0.90	0.319	87	0.304
33	0.00	26.4	11.8	39	14.7	56.7	0.91	0.317	87	0.305
34	0.00	26.2	11.2	39	14.4	56.0	1.00	0.316	86	0.302
35	0.00	26.5	11.3	40	14.4	56.5	0.95	0.313	85	0.296
36	0.00	26.2	11.1	39	14.3	56.2	1.00	0.315	86	0.300
37	0.00	26.4	11.5	39	14.7	55.9	0.90	0.320	87	0.305
38	0.00	26.5	11.0	40	14.8	56.3	0.94	0.317	88	0.309
39	0.00	26.4	11.3	39	14.8	56.6	0.92	0.316	88	0.307
40	0.00	26.0	11.3	39	14.1	56.1	1.02	0.315	86	0.302
41	0.00	26.2	11.1	39	14.2	56.3	1.00	0.314	86	0.300
42	0.00	26.1	11.3	39	14.1	56.1	1.03	0.314	87	0.305
43	0.00	26.7	11.4	40	14.5	56.2	0.95	0.316	86	0.301
Average:		26.5	12.5	40	14.5	54.3	0.95	0.319	87	0.303

Total number of blows analyzed: 42

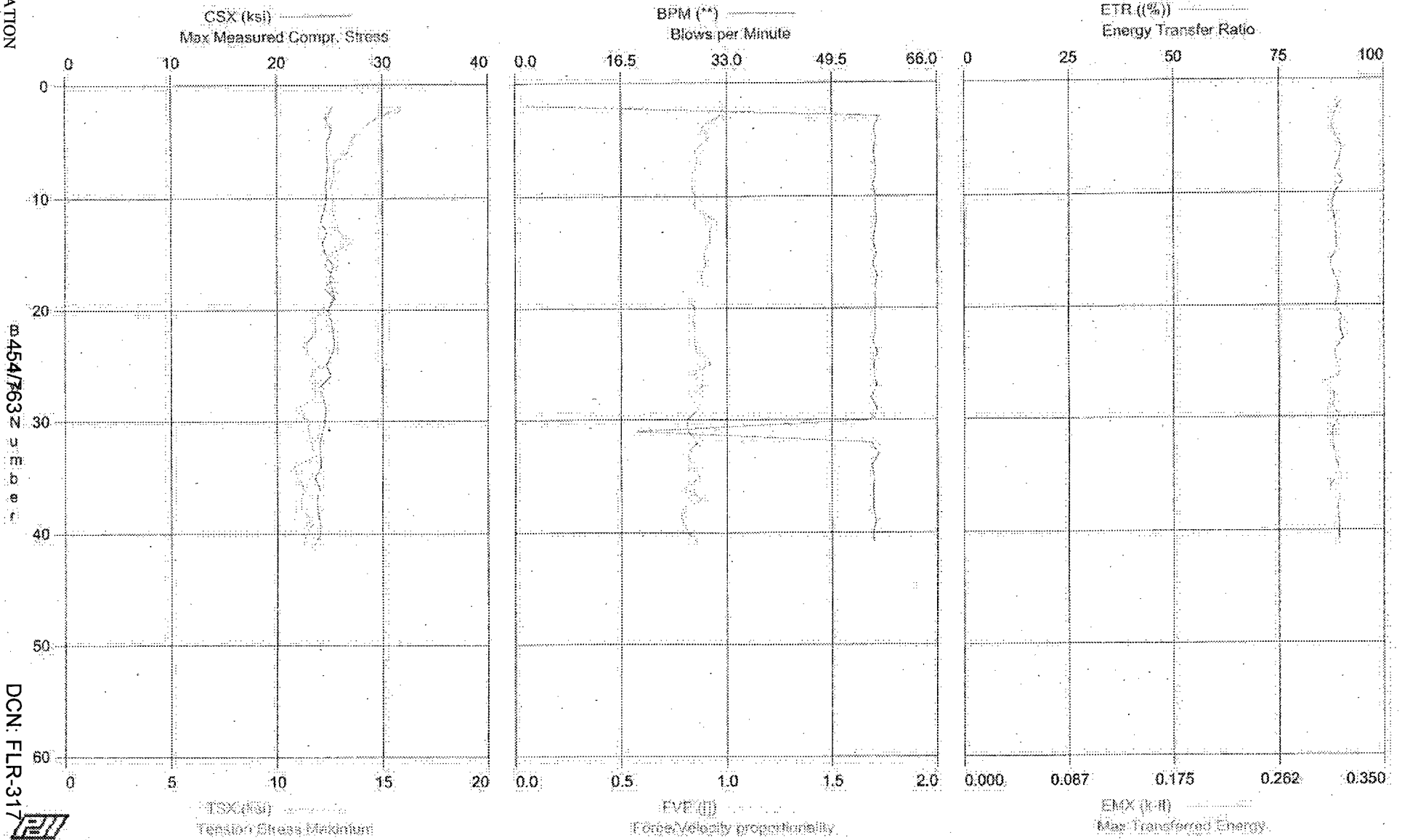
Time Summary

Drive: 46 seconds

2:33:45 PM - 2:34:31 PM (6/17/2008) BN 2 - 43

DIPLOT Ver. 2008.1 - Printed: 29-Jun-2008

STP COL SITE - Boring U3-1; 31' - 32.5' Sample



MACTEC Engineering and Consulting, Inc.
Case Method Results

Page 1 of 1
PDIPILOT Ver. 2008.1 - Printed: 29-Jun-2008

STP COL SITE - Boring U3-1; 31' - 32.5' Sample
OP: JNH

Hammer ID: 353 (MILLER - CME 550)
Test date: 17-Jun-2008

AR: 1.49 in²
LE: 37.00 ft
WS: 16,807.9 l/s

SP: 0.492 k/ft³
EM: 30,000 ksi
JC: 0.70

CSX: Max Measured Compr. Stress
TSX: Tension Stress Maximum
FMX: Maximum Force
VMX: Maximum Velocity
BPM: Blows per Minute

FVP: Force/Velocity proportionality
EF2: Energy of F²
ETR: Energy Transfer Ratio
EMX: Max Transferred Energy

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	BPM **	FVP []	EF2 k-ft	ETR (%)	EMX k-ft
2	0.00	25.3	15.8	38	16.1	1.9	0.99	0.315	90	0.315
3	0.00	24.6	14.7	37	15.5	57.0	0.96	0.308	88	0.309
4	0.00	25.2	13.9	38	14.5	56.0	0.88	0.306	88	0.307
5	0.00	24.8	13.5	37	14.9	56.4	0.91	0.305	89	0.310
6	0.00	24.7	13.3	37	14.9	56.0	0.85	0.303	90	0.315
7	0.00	24.8	12.7	37	15.1	56.2	0.86	0.303	90	0.313
8	0.00	24.7	12.7	37	14.7	56.4	0.84	0.301	88	0.309
9	0.00	24.6	12.6	37	14.7	55.9	0.83	0.301	90	0.316
10	0.00	24.7	12.7	37	14.9	56.3	0.85	0.300	88	0.309
11	0.00	24.5	12.6	37	14.5	56.3	0.85	0.299	88	0.307
12	0.00	24.2	12.8	36	14.6	56.5	0.93	0.299	88	0.309
13	0.00	24.7	12.9	37	14.8	56.2	0.92	0.304	89	0.310
14	0.00	24.3	13.5	36	14.8	55.9	0.92	0.300	89	0.310
15	0.00	24.6	12.4	37	14.9	56.5	0.89	0.299	89	0.311
16	0.00	25.4	12.3	38	14.8	55.9	0.90	0.306	87	0.305
17	0.00	25.0	12.7	37	15.1	56.6	0.88	0.303	88	0.308
18	0.00	25.2	12.3	38	15.1	56.2	0.89	0.303	89	0.312
19	0.00	25.4	12.8	38	14.9	56.3	0.83	0.303	89	0.312
20	0.00	24.8	12.1	37	14.3	56.3	0.85	0.304	88	0.309
21	0.00	25.1	11.8	37	14.7	56.2	0.84	0.302	90	0.315
22	0.00	25.3	11.9	38	15.2	56.3	0.85	0.302	90	0.313
23	0.00	25.4	11.4	38	14.8	55.9	0.85	0.306	90	0.316
24	0.00	25.2	11.5	38	14.6	56.6	0.86	0.299	88	0.309
25	0.00	24.7	12.1	37	14.6	56.0	0.93	0.304	89	0.310
26	0.00	25.1	11.6	37	14.7	56.1	0.84	0.301	90	0.314
27	0.00	24.0	11.8	36	14.7	56.5	0.89	0.296	85	0.299
28	0.00	24.4	11.8	36	15.1	55.6	0.83	0.296	88	0.309
29	0.00	24.6	10.8	37	15.2	56.5	0.86	0.299	88	0.307
30	0.00	24.5	11.5	37	14.7	56.1	0.81	0.298	89	0.313
31	0.00	24.3	11.5	36	15.3	18.7	0.82	0.293	88	0.307
32	0.00	24.1	11.6	36	15.0	55.7	0.86	0.293	88	0.307
33	0.00	24.1	11.9	36	15.0	56.8	0.81	0.289	88	0.308
34	0.00	24.2	10.8	36	15.3	55.7	0.84	0.294	89	0.311
35	0.00	23.6	11.0	35	15.3	56.1	0.87	0.294	90	0.314
36	0.00	24.1	11.3	36	14.6	56.0	0.80	0.297	87	0.305
37	0.00	23.8	11.1	35	15.1	56.0	0.88	0.296	90	0.314
38	0.00	23.9	11.2	36	15.1	56.0	0.78	0.293	89	0.311
39	0.00	24.1	11.7	36	15.2	56.4	0.79	0.296	89	0.313
40	0.00	24.1	11.4	36	15.5	55.9	0.82	0.297	89	0.313
41	0.00	23.5	11.3	35	15.3	56.1	0.86	0.294	89	0.313
Average		24.6	12.2	37	15.0	53.9	0.86	0.300	89	0.310

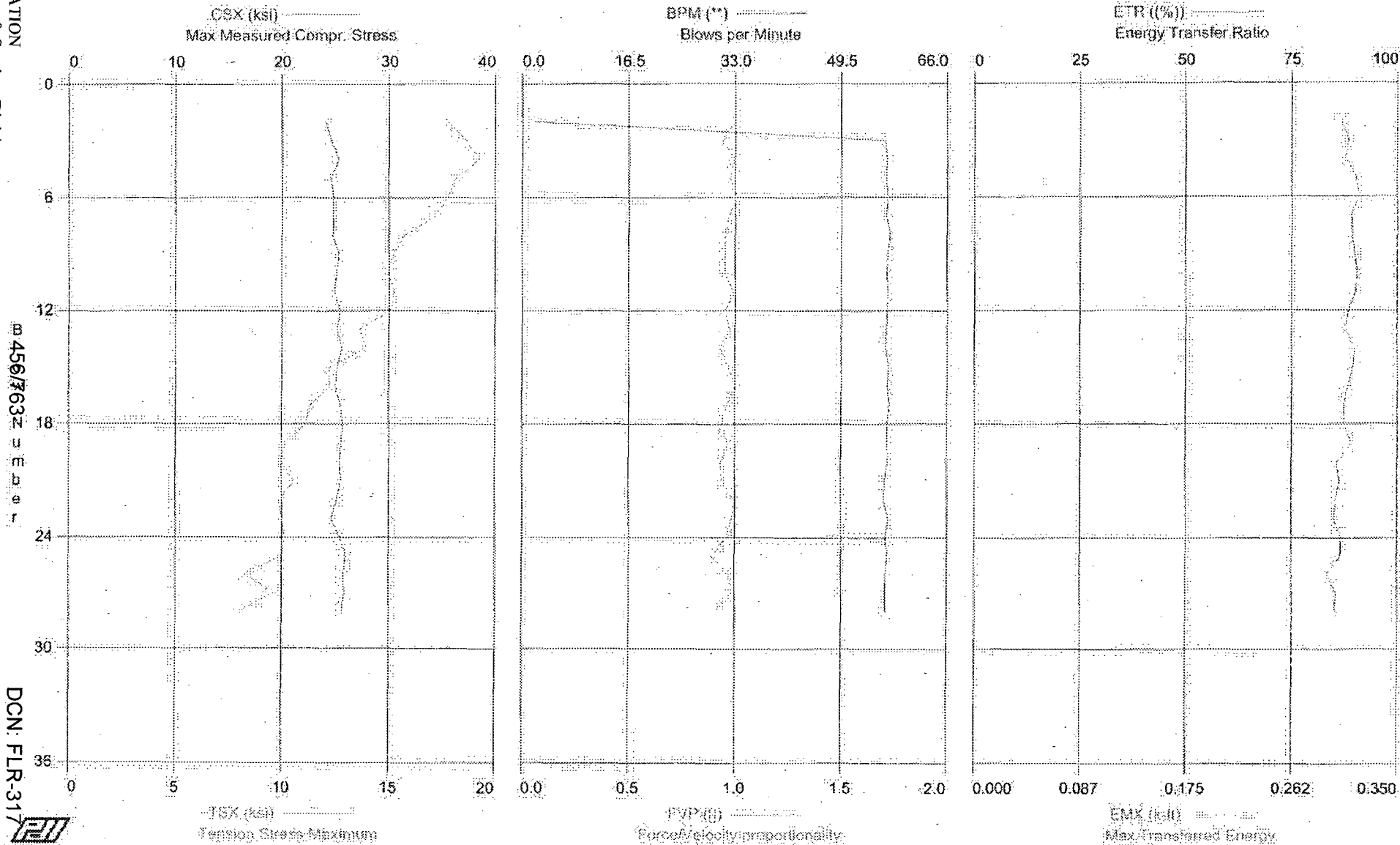
Total number of blows analyzed: 40

Time Summary

Drive 44 seconds

2:55:51 PM - 2:56:35 PM (6/17/2008) BN 2 - 41

STP COL SITE - Boring U3-1; 36' - 37.5' Sample



MACTEC Engineering and Consulting, Inc.
Case Method Results

Page 1 of 1
PDILOT Ver. 2008.1 - Printed: 29-Jun-2008

STP COL SITE - Boring U3-1; 36" - 37.5' Sample
OP: JNH

Hammer ID: 353 (MILLER - CME 550)
Test date: 17-Jun-2008

AR: 1.49 in² SP: 0.492 kN/3
LE: 42.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.70

CSX: Max Measured Compr. Stress FVP: Force/Velocity proportionality
TSX: Tension Stress Maximum EF2: Energy of P²
FMX: Maximum Force ETR: Energy Transfer Ratio
VMX: Maximum Velocity EMX: Max Transferred Energy
BPM: Blows per Minute

BL#	depth ft	CSX ksi	TSX ksi	FMX kips	VMX f/s	BPM **	FVP □	EF2 k-ft	ETR (%)	EMX k-ft
2	0.00	24.1	17.7	36	14.2	1.9	1.00	0.305	87	0.303
3	0.00	24.6	18.6	37	15.3	56.3	0.94	0.317	89	0.310
4	0.00	25.3	19.2	38	15.2	56.6	1.00	0.319	88	0.307
5	0.00	24.6	18.1	37	14.4	56.5	0.98	0.317	90	0.316
6	0.00	24.8	17.7	37	14.2	56.7	1.02	0.320	91	0.318
7	0.00	24.8	17.1	37	14.1	56.5	0.97	0.317	89	0.312
8	0.00	24.8	15.7	37	14.0	57.1	0.96	0.315	89	0.313
9	0.00	25.3	15.2	38	14.1	56.7	0.95	0.316	90	0.315
10	0.00	25.1	14.9	37	14.0	56.8	0.95	0.313	90	0.317
11	0.00	24.9	15.3	37	13.9	56.7	1.00	0.321	90	0.315
12	0.00	25.4	15.0	38	14.0	56.6	0.95	0.316	88	0.309
13	0.00	25.2	13.6	37	14.0	56.5	0.98	0.313	88	0.307
14	0.00	25.6	14.0	38	14.2	56.4	0.93	0.315	90	0.315
15	0.00	25.2	12.2	38	14.1	56.8	0.97	0.308	89	0.313
16	0.00	25.0	12.2	37	13.9	56.6	1.00	0.311	88	0.309
17	0.00	25.5	11.4	38	14.1	57.0	0.96	0.304	88	0.306
18	0.00	25.7	11.1	38	14.0	56.6	0.94	0.307	87	0.306
19	0.00	25.5	10.2	38	14.3	56.6	0.96	0.302	89	0.312
20	0.00	25.4	10.0	38	14.0	56.7	0.93	0.290	86	0.300
21	0.00	25.5	10.6	38	14.1	56.3	0.94	0.295	86	0.302
22	0.00	25.1	9.9	37	13.9	56.1	1.00	0.295	85	0.299
23	0.00	24.6	10.0	37	13.9	56.8	0.99	0.293	85	0.298
24	0.00	25.4	10.1	38	14.3	56.3	0.96	0.299	87	0.303
25	0.00	26.0	10.0	39	14.6	56.7	0.89	0.306	87	0.303
26	0.00	25.7	8.3	38	14.3	56.4	0.97	0.293	83	0.292
27	0.00	25.8	9.6	38	14.4	56.3	0.98	0.307	86	0.299
28	0.00	25.6	8.0	38	14.3	56.3	0.91	0.300	85	0.298
Average		25.2	13.2	38	14.2	54.5	0.96	0.308	88	0.307

Total number of blows analyzed: 27

Time Summary:

Drive 28 seconds

3:13:51 PM - 3:14:19 PM (6/17/2008) BN 2 - 28

MACTEC Engineering and Consulting, Inc.
STP COL Units 3 & 4 Revised Data Report
Project No. 6234-08-4660 Revision 2

July 15, 2008
Revised December 23, 2008

ATTACHMENT C

PRESSUREMETER TESTING REPORT

Report of In Situ Pressuremeter Geotechnical Testing

**Conducted at the
South Texas Project Electric Generating Station**

Bay City, Texas

STP Units 3 & 4

Submitted to

MACTEC Engineering and Consulting, Inc.

In Situ Engineering Project Number 762

MACTEC Project Number 6234-08-4660

July 2008

Testing conducted and report prepared by

In Situ Engineering

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APPENDIX

Pressuremeter Data and Interpretation

1.0 INTRODUCTION

This report presents the results of a pressuremeter study, conducted from July 10th to 16th, 2008, in two boreholes, T4-3A and T3-5A. The pressuremeter testing (PMT) was conducted by In Situ Engineering, Snohomish, WA under contract to MACTEC. The drilling and deployment of the pressuremeter for the boreholes was accomplished by a MACTEC drill crew using a CME drill rig and mud rotary techniques. In all, 16 pressuremeter tests were attempted, of which 15 produced PMT data. The borehole name, test depths and preliminary material descriptions are presented in Table 1.

2.0 PURPOSE

The purpose of this study was to evaluate *in-situ* the material properties of the clays and sands encountered at the assigned depths. The tested clay soils are within the F-Clay Stratum, while the tested sands are within the H Sand Stratum according to MACTEC.

3.0 PRESSUREMETER

The pressuremeter used for this study was a prebored monocell pressuremeter. Three electronic displacement sensors, spaced 120 degrees apart are located at the center of the pressuremeter. The flexible membrane is placed over the sensors, clamped at each end. The membrane is covered by a protective sheet of stainless steel strips. The PMT instrument is pressurized using compressed nitrogen to deform the adjacent material. The electronic signals from displacement sensors and the pressure sensor are transmitted by cable to the surface. During the test, the average expansion versus pressure is displayed on a computer screen. The pressuremeter is expanded by regulating the flow of compressed nitrogen to the PMT unit.

Fig. 1 presents the essential details of the PMT instrument.

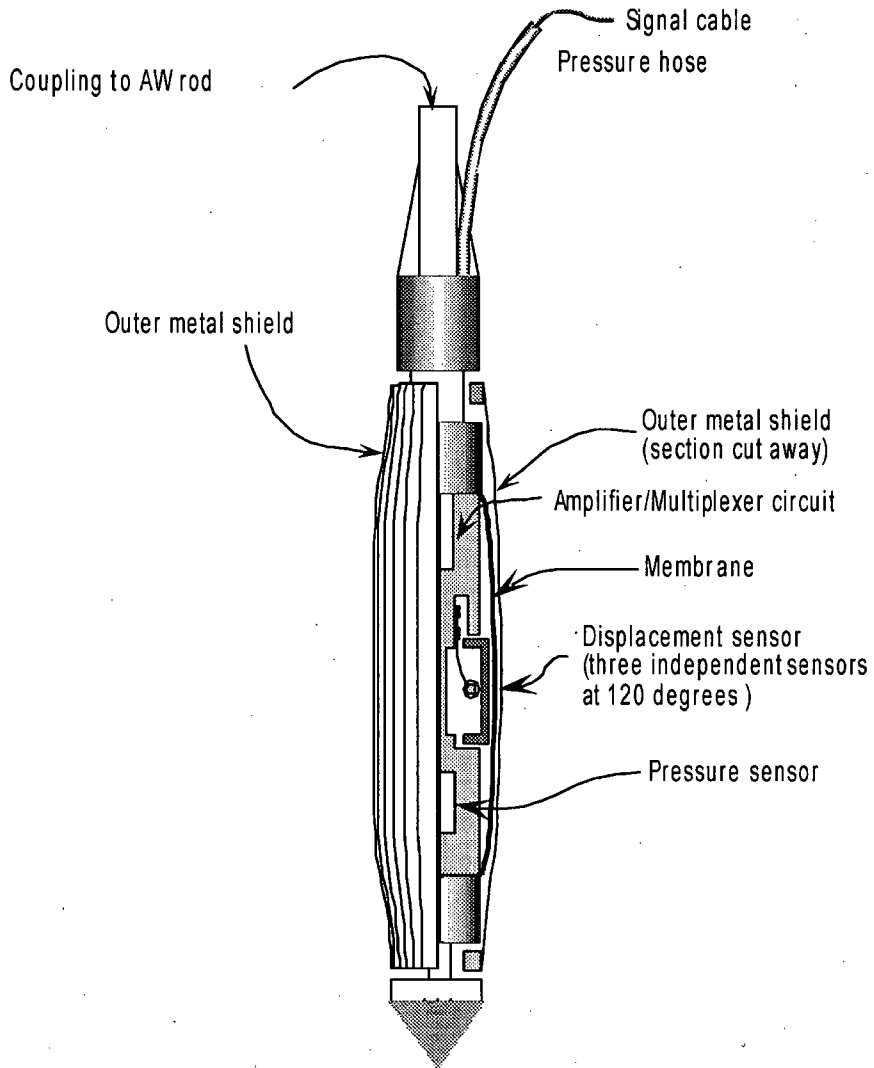


Fig. 1. Schematic details of the pressuremeter instrument.

4.0 HOLE FORMATION

A MACTEC drilling crew used a CME track rig for the borings. A 4 inch tri-cone bit was used to drill the hole just above the test level. A test pocket for the pressuremeter was drilled, five feet long, using a 2-15/16 inch tri-cone bit, below the bottom of the 4 inch hole. After an SPT test was performed at the bottom of the 2-15/16 inch diameter test pocket. The hole was then drilled out using a 4 inch bit and advanced just above the next test interval and the process was repeated.

The details of the SPT and initial sample description are given in Table 1. The hole location and surface are provided by MACTEC.

If the pilot hole remained open, and was the appropriate size two tests were generally performed in each of the pilot holes. If both tests yielded similar results, then there is added confidence that the data reflects the material properties in that test zone.

Hole T4-3A (STP4) Elevation 31.55 ft, Coordinates: N363203.59 ft, E2942351.91 ft

Date	file name	Depth (ft)	SPT (1)	SPT depth (ft)	material
6/13/2008	Stp02	86.5	7-9-14	83.5-85	Clay
6/13/2008	Stp01	88	7-9-14	83.5-85	Clay
6/13/2008	Stp04	93.5	7-9-11	91-92.5	Clay
6/13/2008	Stp03	95	7-9-11	91-92.5	Clay
6/14/2008	Stp06	99	7-10-12	96-97.5	Clay
6/14/2008	Stp05	100.5	7-10-12	96-97.5	Clay
6/14/2008	Stp08	105.5	woh/12"-42	103.3-104.8	Clay
6/14/2008	Stp07	107	woh/12"-42	103.3-104.8	Clay
6/14/2008	Stp10	110.5	8-13-21	108.3-109.8	Sand
6/14/2008	Stp09	112	8-13-21	108.3-109.8	Sand

Hole T3-5A (STP3) Elevation 20.05 ft, Coordinates: N363012.09ft, E2943233.51 ft

Date	file name	Depth(ft)	SPT (1)	SPT depth (ft)	Material
6/15/2008	Stp12	90	8-12-14	91-92.5	Clay
6/15/2008	Stp11	91.5	8-12-14	91-92.5	Clay
6/15/2008	Stp14	96.5	8-9-12	93.5-95	Clay
6/15/2008	Stp13	98	8-9-12	93.5-95	Clay
6/16/2008	Stp16	102.5	48-47-45	103.5-105	Sand
6/16/2008	Stp15	104	4-5-8	98.5-100	Sand

(1) SPT test performed with an automatic hammer with an average energy transfer ratio equal to 88.9% according to MACTEC.

Table 1 Pressuremeter Test Locations and Material Description

5.0 TEST PROCEDURE

The membrane was expanded by controlling the flow of compressed nitrogen into the pressuremeter, increasing the pressure in small steps until the membrane starts to expand against the borehole wall. Once the average strain of the wall was greater than about 1.5% the pressure the pressure is reduced to no more than 40% of the maximum previously applied pressure, then increased again.

The resulting unload-reload loop can be used to evaluate the elastic behavior of the material. In materials which behave in a linear manner, the loops will exhibit little hysteretic behavior. That is, the linear unloading path will follow the reloading path. The loops will be very tight. This was the case for the tests presented herein.

The first unload-reload loop in test Stp06, with 2% radial displacement (from the start of expansion of the wall at 3%), is a typical example of this behavior (Fig. 2). The pressure is then advanced in steps until the strain is increased a further 3% before completing a second unload-reload cycle. If the disturbance is small during the insertion stage, the slope of the loops will tend to be parallel. In some tests a third was performed.

After the strain approached or exceeds 12%, the pressure is reduced to zero.

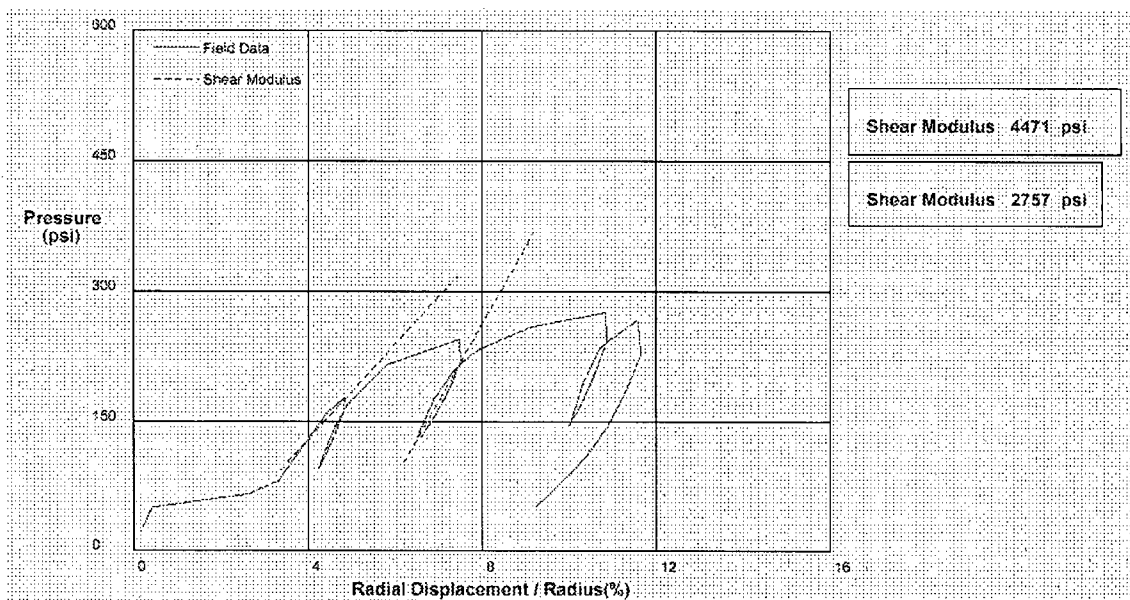


Fig. 2. Test Stp06 in T4-3A at 99 ft

6.0 QUALITY OF THE DATA

In general, the goal of the testing is to conduct PMT in pairs as close together as possible. After the 5 ft long and 3 inch diameter test pocket is drilled, the pressuremeter is lowered down the hole and a test conducted. If there is only a small amount of slough in the hole, the pressuremeter is raised approximately 1.5 ft, and a second test is performed. In this manner, two tests are performed as close together as possible.

If the results of the two tests are similar, and follow the anticipated form for ideal materials rather than slough, then there is reason to believe that the results are representative of the formation. If the two tests are distinctly different, however, then either one of the tests is influenced by disturbance, or there is a geological reason for the difference.

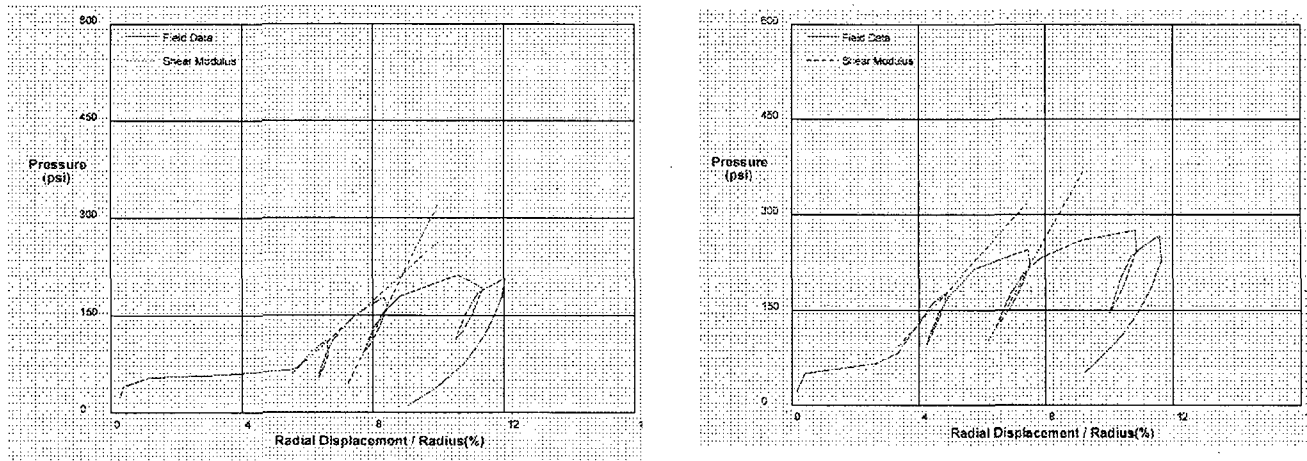


Fig. 3. Pair of pressuremeter tests at T4-3A
(Stp06 at 99 ft and Stp05 at 100.5 ft)

Fig. 3 shows a pair of tests, Stp06 and Stp05, which were performed adjacent to each other. The results are very similar. Hence, in this situation, the tests probably reflect consistent material behavior at that level. As a further indication of the quality of each individual test, the slope of the unload-reload loops should be parallel. In both tests, the slopes are relatively parallel, resulting in a shear modulus in the range of 4,500 to 5,000 psi.

During the testing the data was displayed on the computer screen every 5 seconds. This gave a continuous curve from which the operator used to control the test. In the data acquisition part of the program the data was saved every 20 seconds. Hence the resulting pressuremeter curves are

straight line segments. This condition was noted during the data analysis on July 15, two days after the testing was started. Subsequently, tests all the data was captured every 5 seconds see Fig.4b.

7.0 TYPES OF PRESSUREMETER TEST RESULTS

At this site there are basically two types of test results. The first type occurs in the clay and the second occurs in the sand below the clay layers (Fig. 5). For comparative purposes the data for the test shown in Figures 4a & 4b have been plotted to the same scale. In general, the clay tests tend, relatively quickly, to reach a maximum pressure; in contrast, the sand tests tend to reach a maximum pressure much more slowly over the same strain range. Further the slope of the unload-reload loops in the sand tests are significantly steeper than the clay tests. (The shear modulus, determined from the clay tests, is in the 5,000 psi range; whereas, the sand tests the shear moduli are in the 16,000 psi range.)

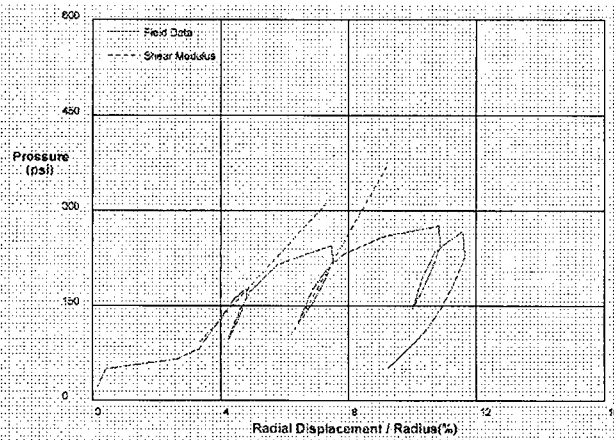


Fig. 4a (clay)

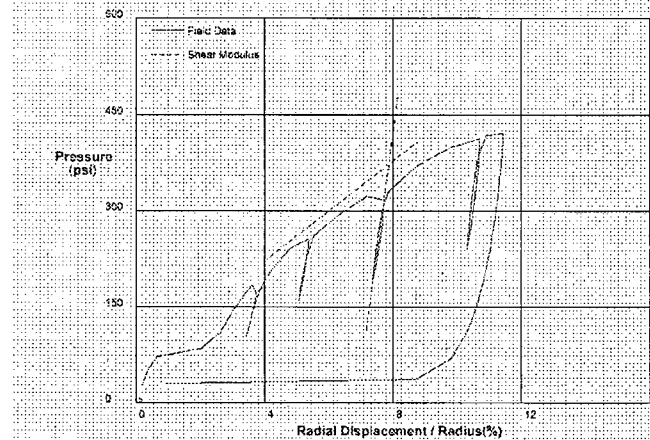


Fig.4b (sand)

Fig. 4. Test result Stp05 in T4-3A at 100.5 ft and Stp15 in T3-5A at 104 ft

(Note that data from figure 4a was captured every 20 seconds and from figure 4b every 5 seconds)

8.0 STANDARD METHOD OF ANALYSIS OF THE SHEAR MODULUS

If the material surrounding the pressuremeter is assumed to extend to infinity and assumed to behave as an idealized linear elastic, homogeneous material, which does not fail under shear or

tension, then the displacement on the boundary of the pressuremeter, u_a , for a given pressure, P , is given by:

$$u_a = P(a) (1+\mu) / E \quad 1)$$

where "E" is the Young's Modulus, "a" the radius of the pressuremeter cavity, and "μ" the Poisson's ratio. As the shear modulus, "G", and the Young's modulus, "E", are related by the following relationship:

$$E=2(G)(1+\mu) \quad 2)$$

Equation 1 reduces to:

$$u_a = 0.5P(a) / G \quad 3)$$

Hence, the shear modulus G is given by:

$$G = 0.5 * \Delta \text{ Pressure} / \Delta(\text{radial displacement}/\text{radius}) \quad 4)$$

The modulus for the average slope of the initial part of the pressuremeter curve (A-B in Fig.5) expressed as a Young's modulus (assuming a Poisson's ratio of 0.33) is the same as the "pressuremeter modulus" defined in the American Society for Testing and Materials (ASTM) D4719, Section 9.5. However, the modulus determined from the unload-reload loops, which is often higher than the initial loading modulus, is probably more representative of the modulus for the *in-situ* material. This data is summarized in Table 2.

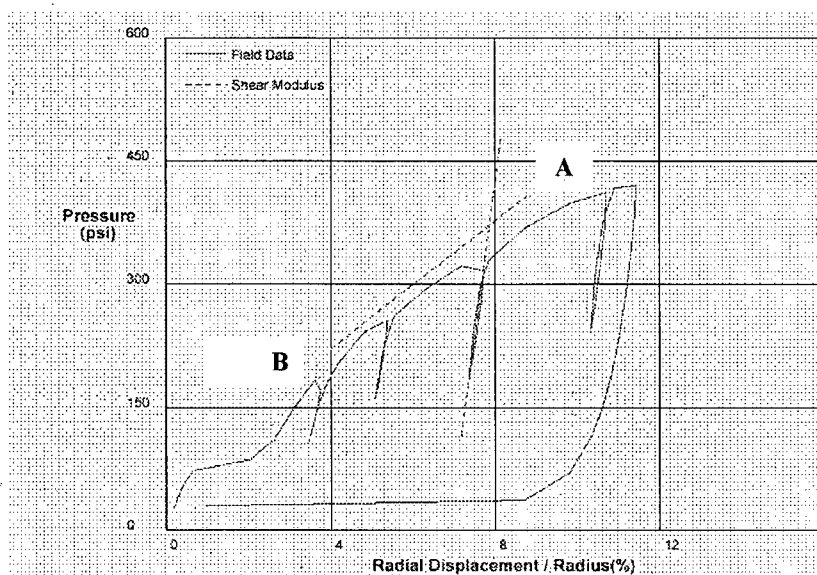


Fig. 5. Modulus determination for Test Stp16

T4-3A

Date	file name	Depth (ft)	Initial shear modulus (psi)	Unload reload shear modulus (psi)
6/13/2008	Stp02	86.5	1,858	3,805
6/13/2008	Stp01	88	2,625	3,428
6/13/2008	Stp04	93.5	3,915	6,752
6/13/2008	Stp03	95	2,625	5,961
6/14/2008	Stp06	99	2,757	4,471
6/14/2008	Stp05	100.5	2,266	5,000
6/14/2008	Stp08	105.5		Hole washed out
6/14/2008	Stp07	107		Hole washed out
6/14/2008	Stp10	110.5	2,266	15,859
6/14/2008	Stp09	112	3,362	18,563

T3-5A

Date	file name	Depth(ft)	Initial shear modulus (psi)	Unload reload shear modulus (psi)
6/15/2008	Stp12	90	1,091	4,471
6/15/2008	Stp11	91.5	969	3,805
6/15/2008	Stp14	96.5	748	3,611
6/15/2008	Stp13	98	648	3,093
6/16/2008	Stp16	102.5	2,500	16,538
6/16/2008	Stp15	104	1,954	18,563

Table 2 Shear Modulus from the Pressuremeter Tests**9.0 STRENGTH PROPERTIES FROM LIMIT PRESSURE**

From a visual inspection of the typical pressuremeter curve in the sands as shown in Fig. 4a, the pressure approaches a limit. For Test Stp05 this limit pressure is in the range of 300 psi. However, to make this limit pressure a quantitative measurement, the limit pressure is defined as that pressure which occurs when the volume of the pressuremeter has doubled. However, few

pressuremeter tests ever actually expand this far before reaching the limit of the strain sensing system. The pressuremeters used in this investigation will only expand to about 20% before the displacement limit is reached.

If the material being tested is assumed to behave as an elastic cohesive material, then the equation governing the pressure-displacement curve is given by:

$$P = P_L + (c) \log_e (u_a/a) \quad 5)$$

$$P_L = P_o + c + (c) \log_e [G/c] \quad 6)$$

Where:

P_L is the theoretical limit pressure at infinite expansion

"c" is the undrained cohesive strength,

" P_o " is the total *in-situ* lateral stress, and "G" is the shear modulus.

For typical values of G and c, the ratio of G/c lies between 50 to 100. Hence, the limit pressure is approximately 5 times the shear strength (assuming P_o is small relative to c) of the soil.

From Equation 5, a plot of pressure P against the log of u_a/a will be a straight line, provided the shear strength remains constant with strain. The slope of this line will provide a measure of the undrained shear strength, c. The Limit Pressure, as defined by the ASTM code D4719, Section 10.6, is the pressure at which the cavity has doubled in size. This doubling in size occurs when u_a/a is equal to 41%. (The origin of the strain used in the log/normal plots is the assumed origin at the *in-situ* stress state). If any disturbance is present, the above method of determining the cohesive strength usually provides an overly optimistic value. In Fig. 6, Test Stp05 is plotted in the above manner. The above method applies to cohesive materials. See Section 9 for an alternate method that can also provide an indication of shear strength parameters (friction angle) for frictional materials.

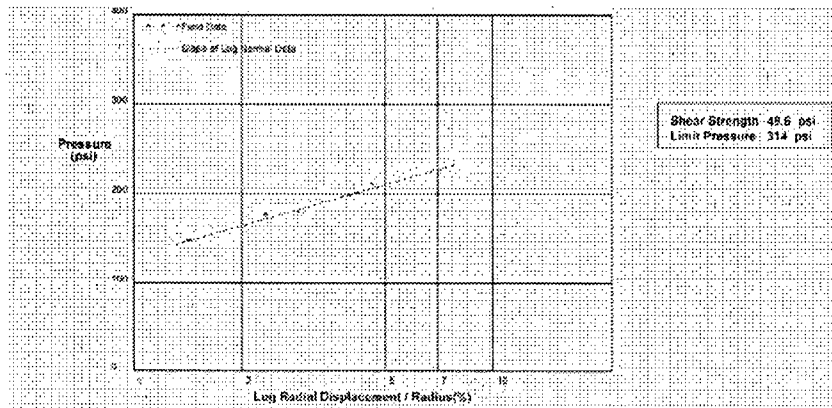


Fig. 6. Limit Pressure Determination for Test Stp05

Hole T4-3A

Date	file name	Depth (ft)	Limit Pressure (psi)	Shear strength from Limit pressure (psi)
6/13/2008	Stp02	86.5	314	54
6/13/2008	Stp01	88	308	47
6/13/2008	Stp04	93.5	344	44
6/13/2008	Stp03	95	351	52
6/14/2008	Stp06	99	388	68
6/14/2008	Stp05	100.5	314	49
6/14/2008	Stp08	105.5	Hole too large	-
6/14/2008	Stp07	107	Hole too large	-
6/14/2008	Stp10	110.5	>550	N/A
6/14/2008	Stp09	112	500	N/A

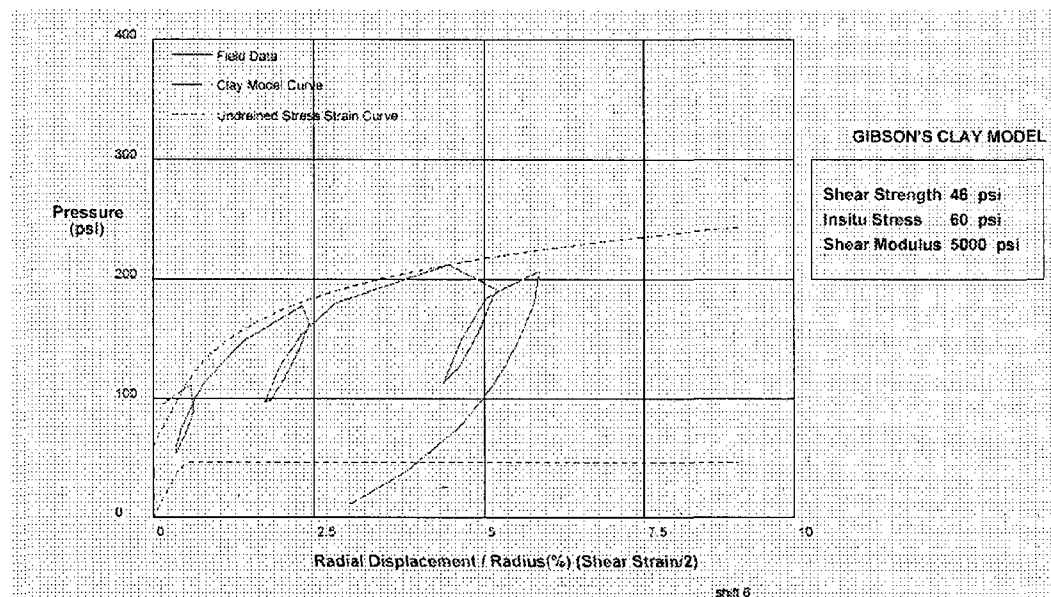
Hole T3-5A

Date	file name	Depth(ft)	Limit Pressure (psi)	Shear strength from Limit pressure (psi)
6/15/2008	Stp12	90	323	60
6/15/2008	Stp11	91.5	289	50
6/15/2008	Stp14	96.5	226	38
6/15/2008	Stp13	98	206	25
6/16/2008	Stp16	102.5	953	N/A
6/16/2008	Stp15	104	637	N/A

Table 3 Limit Pressure and Shear strength (log method)**10.0 STRENGTH PROPERTIES FROM MODEL ANALYSIS**

The PMT data can some times be used directly to determine the *in-situ* material properties such as the cohesive strength and the friction angle. To do so, a material model and failure mechanism must be assumed. If it is assumed that the material behaves in an ideal manner, in that the material deforms at constant volume throughout the test, i.e. it does not consolidate or dilate, and the shear strength remains constant the pressuremeter curve can be interpreted by simple analytical means. The slope of the plot of pressure against the log of the strain can be used to give a direct measure of the shear strength, as discussed in Section 8. Unfortunately, real materials do not quite behave in this manner, and the shear strength determined by this method may not be accurate, particularly in disturbed material, materials which degrade or partial tests in an enlarged hole. The shear strength determined by this method is not appropriate in frictional materials. However, this method of analysis often forms a basis of rating all materials.

A more realistic method of determining the shear strength in clays is to compare the field PMT data with an ideal model pressuremeter curve based on an assumed set of material parameters. If, for instance, the material is assumed to be cohesive and fails at a constant shear strength and at constant volume, then the material parameters required for this model are the shear strength, lateral stress, and shear modulus. Adjustments can be made to those three parameters until a mathematical curve can be fitted to the field data. Judgment is required to adjust these three parameters to determine the best fit to the data, particularly if there is disturbance present. The results of this model analysis approach are summarized in Table 4.

**Fig. 7. Simple Constant Shear Strength Model Analysis for Test Stp05**

In the frictional materials such as the sand if it is assumed that the material has a constant friction angle and no cohesion, then a simple model can be used to compare the data. For the tests in the sand only one is complete expansion is sufficient to capture the data fully. Test Stp15 is analyzed in this manner in Fig. 8.

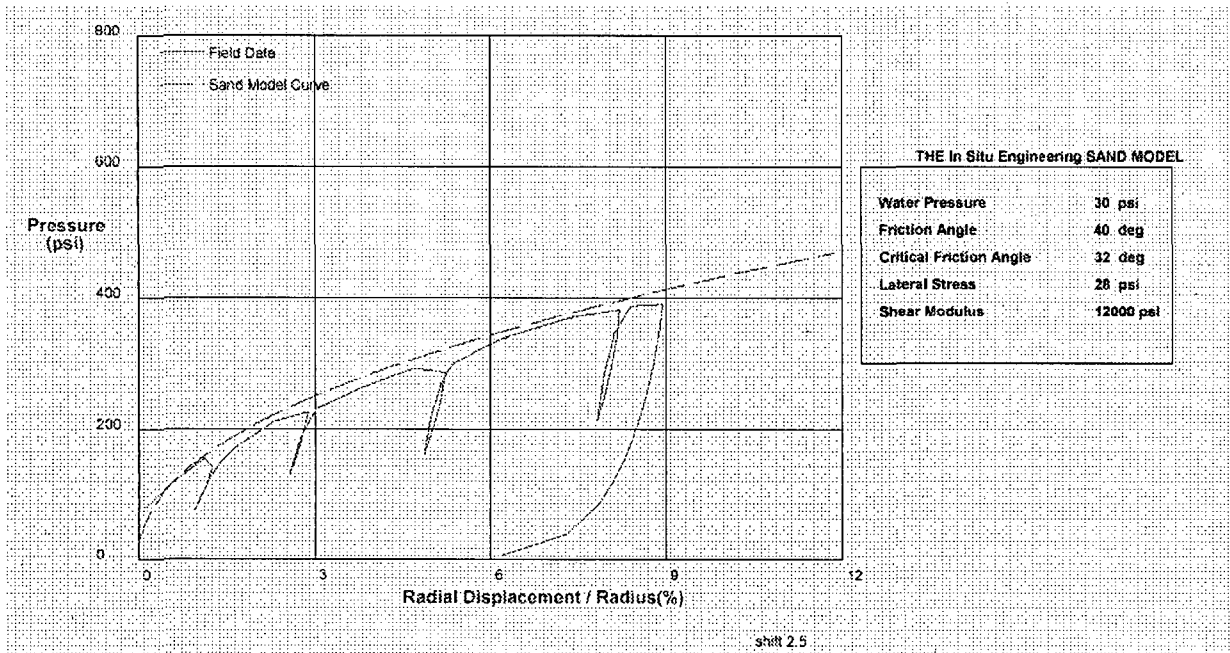


Fig. 8. Frictional Model for Test Stp15

Hole T4-3A

Date	file name	Depth (ft)	Shear strength from model analysis (psi)	Shear strength from limit pressure (psi)	Friction angle from model analysis (degrees)
6/13/2008	Stp02	86.5	48	54	N/A
6/13/2008	Stp01	88	50	47	N/A
6/13/2008	Stp04	93.5	48	44	N/A
6/13/2008	Stp03	95	52	52	N/A
6/14/2008	Stp06	99	60	68	N/A
6/14/2008	Stp05	100.5	46	49	N/A
6/14/2008	Stp08	105.5	Hole too large	-	N/A
6/14/2008	Stp07	107	Hole too large	-	N/A
6/14/2008	Stp10	110.5	N/A	N/A	40
6/14/2008	Stp09	112	N/A	N/A	40

HoleT3-5A

Date	file name	Depth(ft)	Shear strength from model analysis (psi)	Shear strength from limit pressure (psi)	Fiction angle from model analysis (degrees)
6/15/2008	Stp12	90	54	60	N/A
6/15/2008	Stp11	91.5	50	50	N/A
6/15/2008	Stp14	96.5	32	38	N/A
6/15/2008	Stp13	98	30	25	N/A
6/16/2008	Stp16	102.5	N/A	N/A	42
6/16/2008	Stp15	104	N/A	N/A	40

Table 4 Material Properties from Model Analysis.

11.0 CONCLUSIONS

In the above study there are two distinct material types; the F-Clay Stratum (clay) and the H Sand Stratum (sand).

The tested clays have a shear modulus (unload-reload) in the range of 3400 to 6000 psi if the highest and lowest values are excluded. The tested sands have a shear modulus in the range of 16,000 to 18,500 psi.

Based on the shear strength from the model analysis method, and excluding the highest and lowest values, the tested clay has an undrained shear strength in the range of 32 to 54 psi (4.6 ksf to 7.8 ksf).

The tested sands have a friction angle in the range of 40 degrees.

11.0 REFERENCES

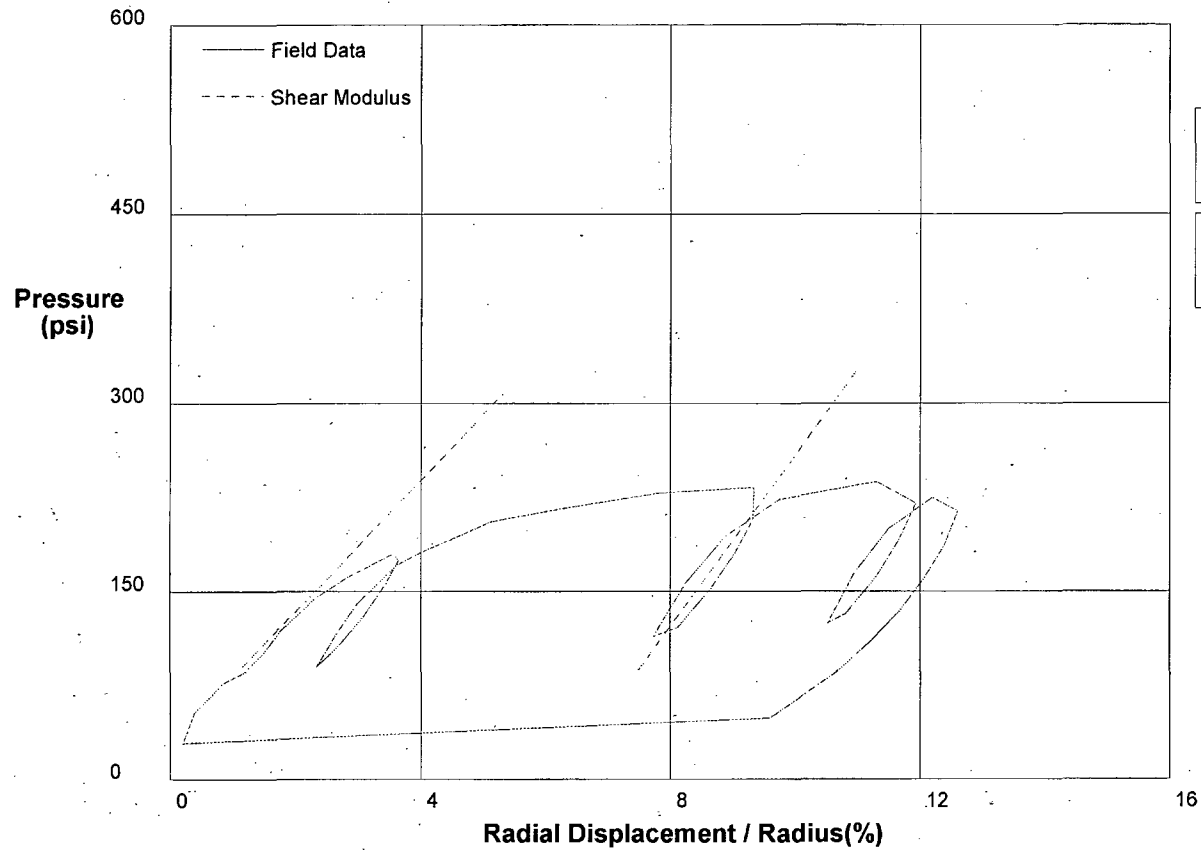
Mair, R.J. and Wood, D.M. 1987. Pressuremeter testing: methods and interpretation. CIRIA Ground Engineering Report. Butterworths, London.

ASTM D4719. 2007. Standard tests method for pressuremeter testing in soils.

APPENDIX

Pressuremeter Data

PRESSUREMETER DATA		Mactec Engineering and Consulting Inc.	
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City /Texas		6/13/2008	
Hole No. T4-3A	Depth 88ft	File C:\DATA\ISE-762\STP01.P	



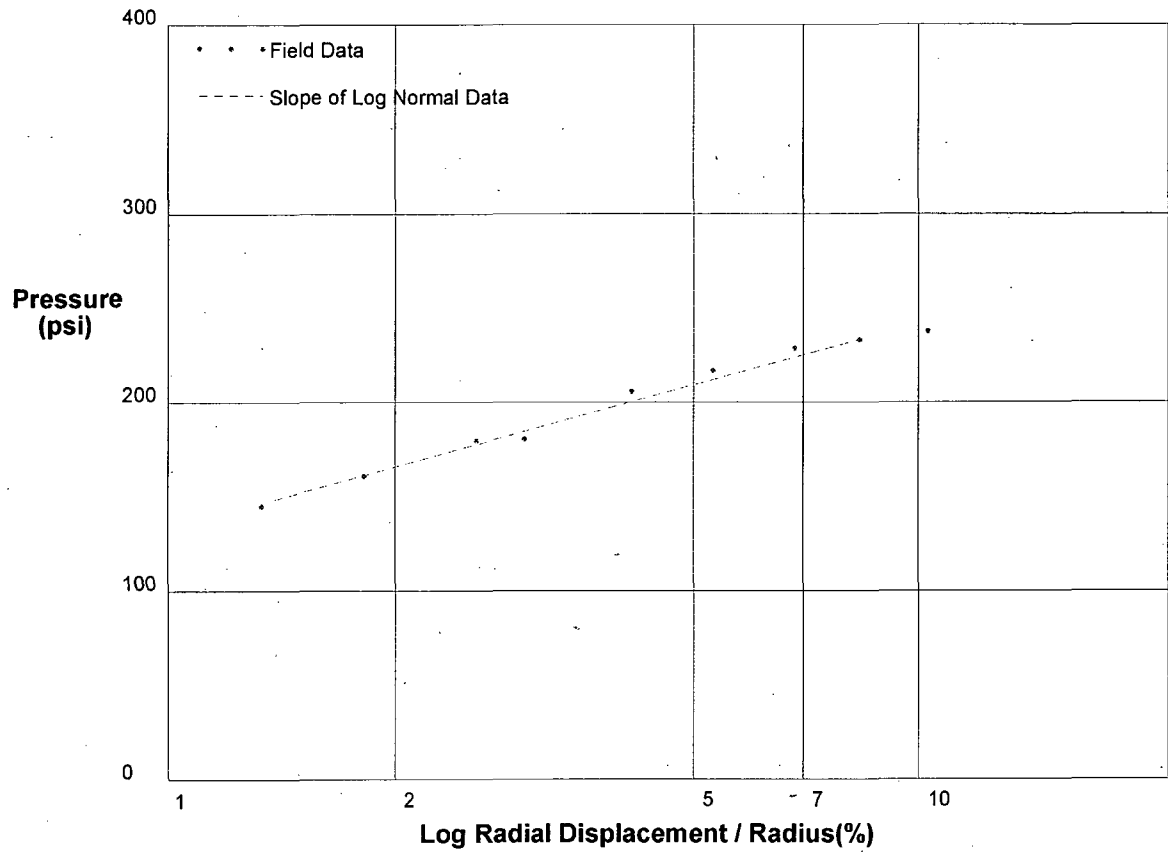
Shear Modulus 3428 psi

Shear Modulus 2625 psi

shift 0

In Situ Engineering

PRESSUREMETER DATA		Mactec Engineering and Consulting Inc.	
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City/Texas		6/13/2008	
Hole No. T4-3A	Depth 88ft	File C:\DATA\ISE-762\STP01.P	

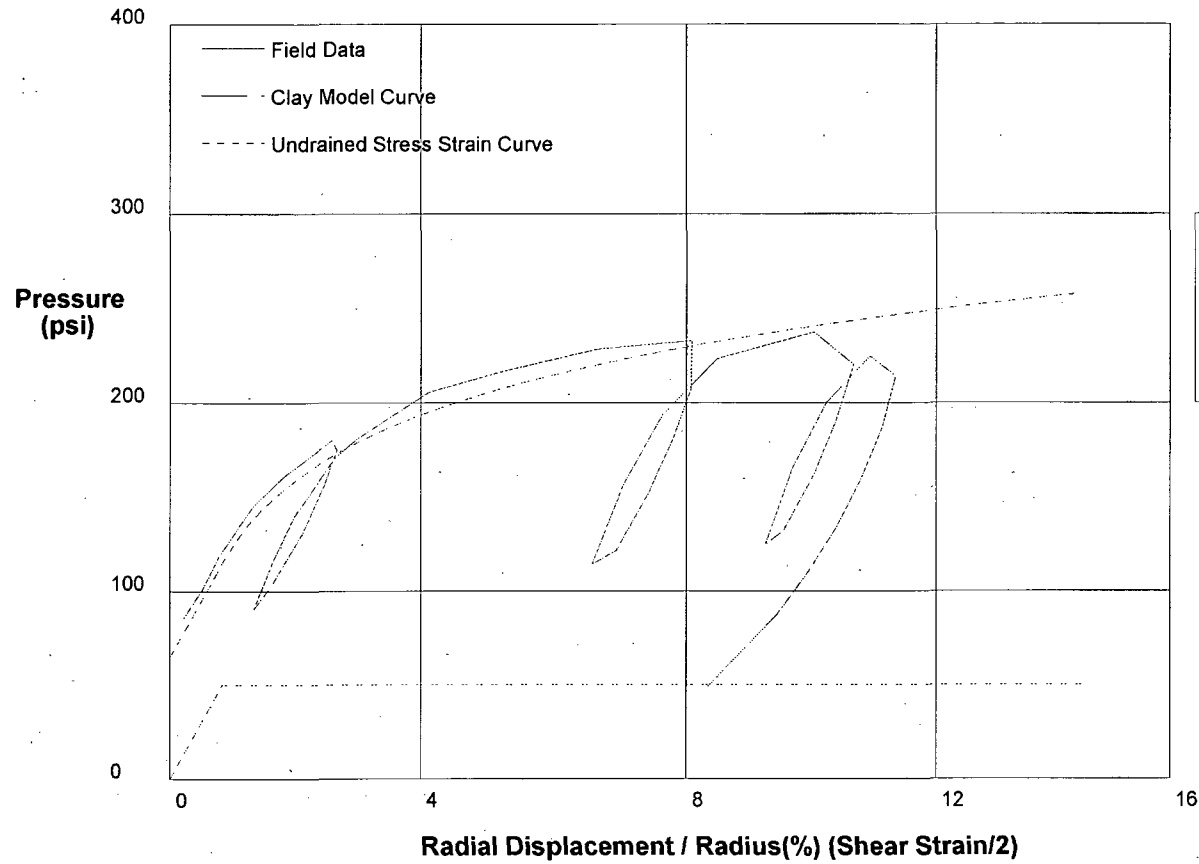


Shear Strength 47.1 psi
Limit Pressure 308 psi

shift 1

In Situ Engineering

PRESSUREMETER DATA		Mactec Engineering and Consulting Inc.
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City /Texas		6/13/2008
Hole No. T4-3A	Depth 88ft	File C:\DATA\ISE-762\STP01.P



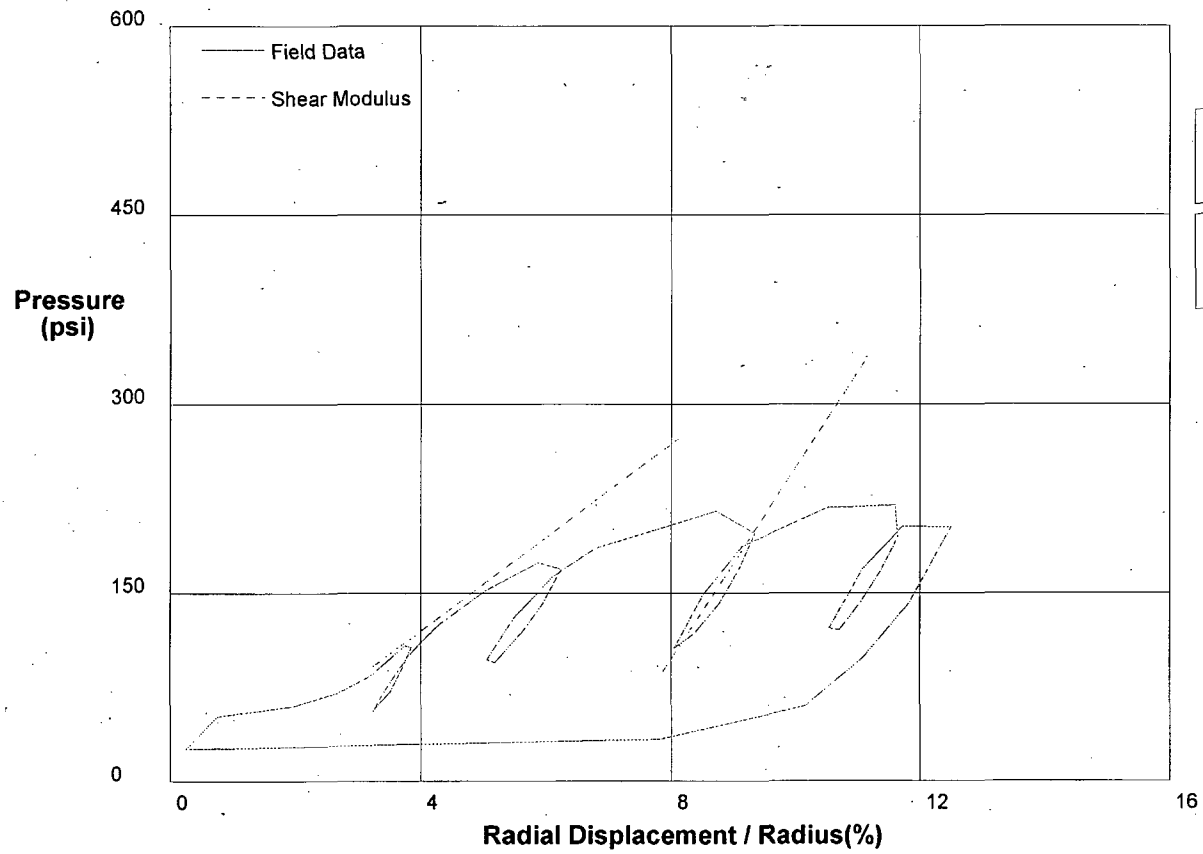
GIBSON'S CLAY MODEL

Shear Strength 50 psi
In situ Stress 65 psi
Shear Modulus 3000 psi

shift 1

In Situ Engineering

PRESSUREMETER DATA		Mactec Engineering and Consulting Inc.
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City /Texas		6/13/2008
Hole No. T4-3A	Depth 86.5ft	File C:\DATA\ISE-762\STP02.P



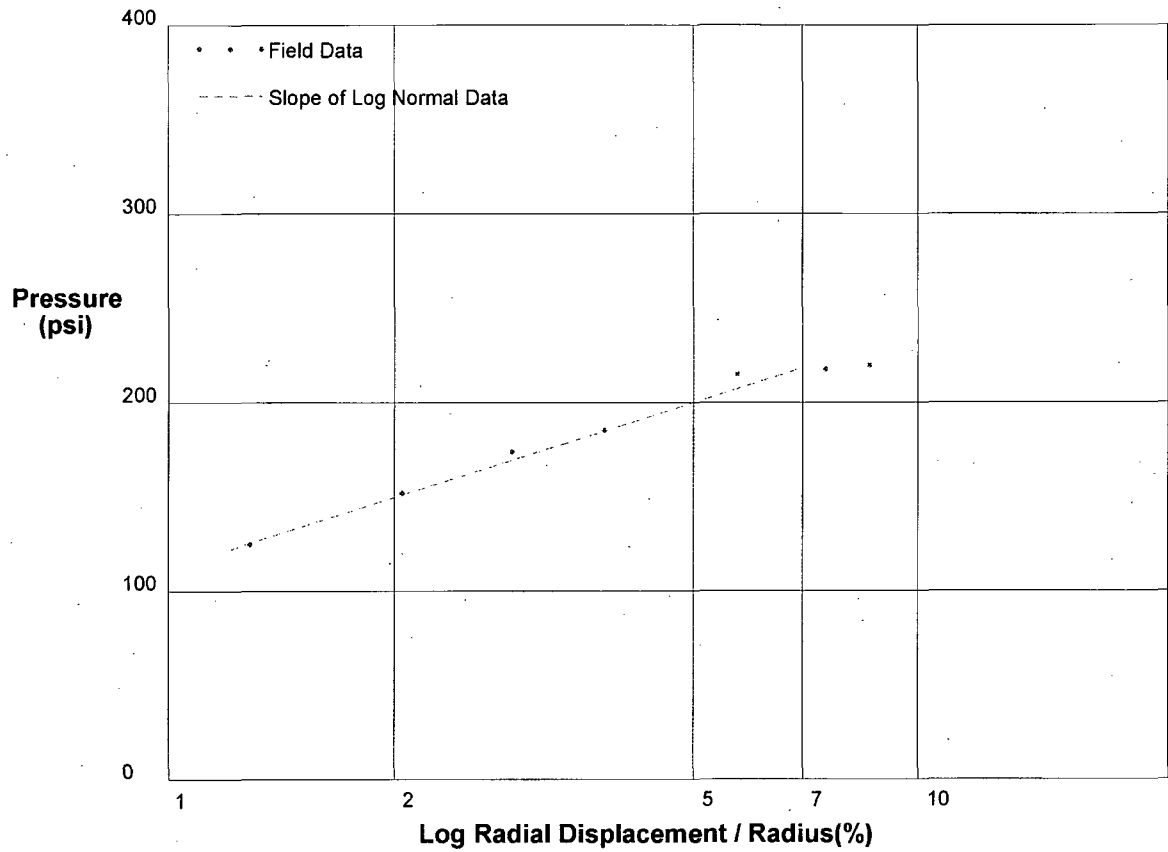
Shear Modulus 3805 psi

Shear Modulus 1858 psi

shift 0

In Situ Engineering

PRESSUREMETER DATA		Mactec Engineering and Consulting Inc.
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City/Texas		6/13/2008
Hole No. T4-3A	Depth 86.5ft	File C:\DATA\ISE-762\STP02.P

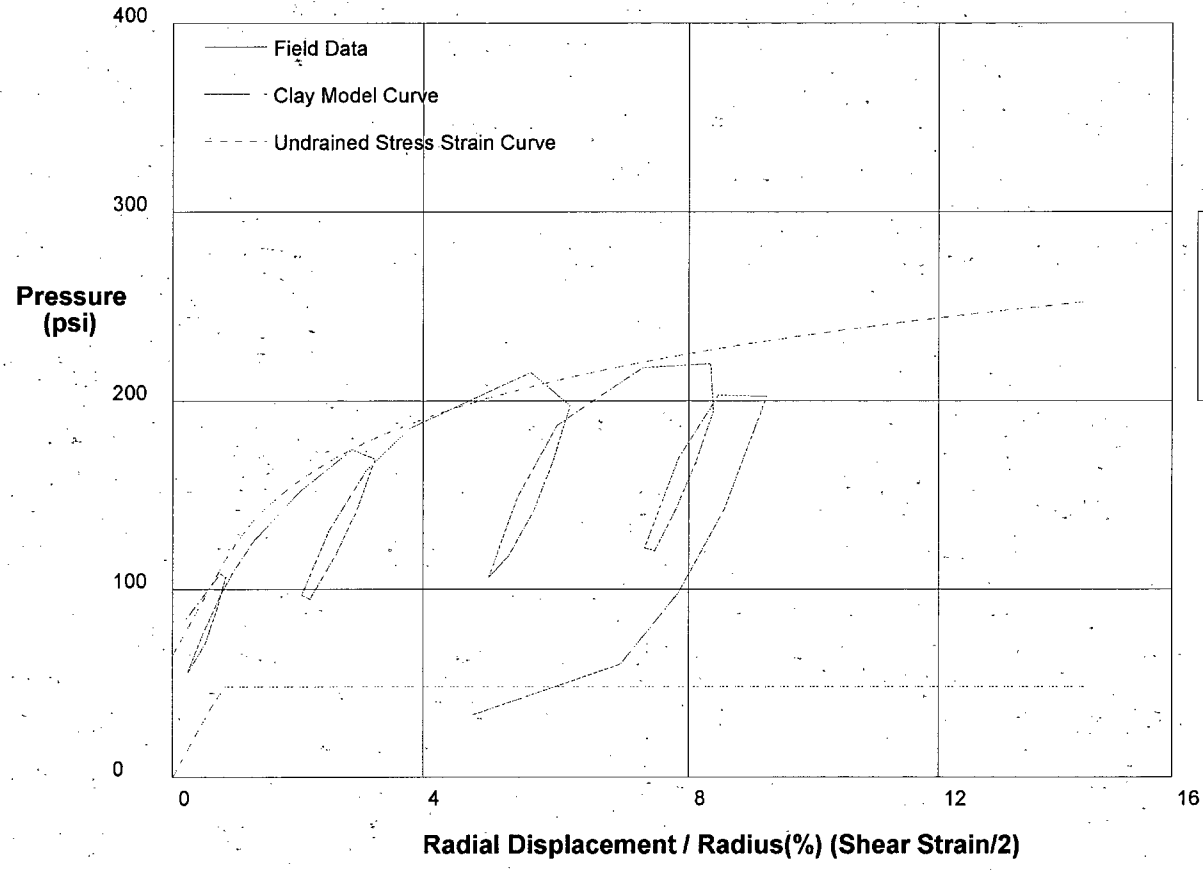


Shear Strength 54.7 psi
Limit Pressure 314 psi

shift 3

In Situ Engineering

PRESSUREMETER DATA	Mactec Engineering and Consulting Inc.	
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City/Texas	6/13/2008	
Hole No. T4-3A	Depth 86.5ft	File C:\DATA\ISE-762\STP02.P



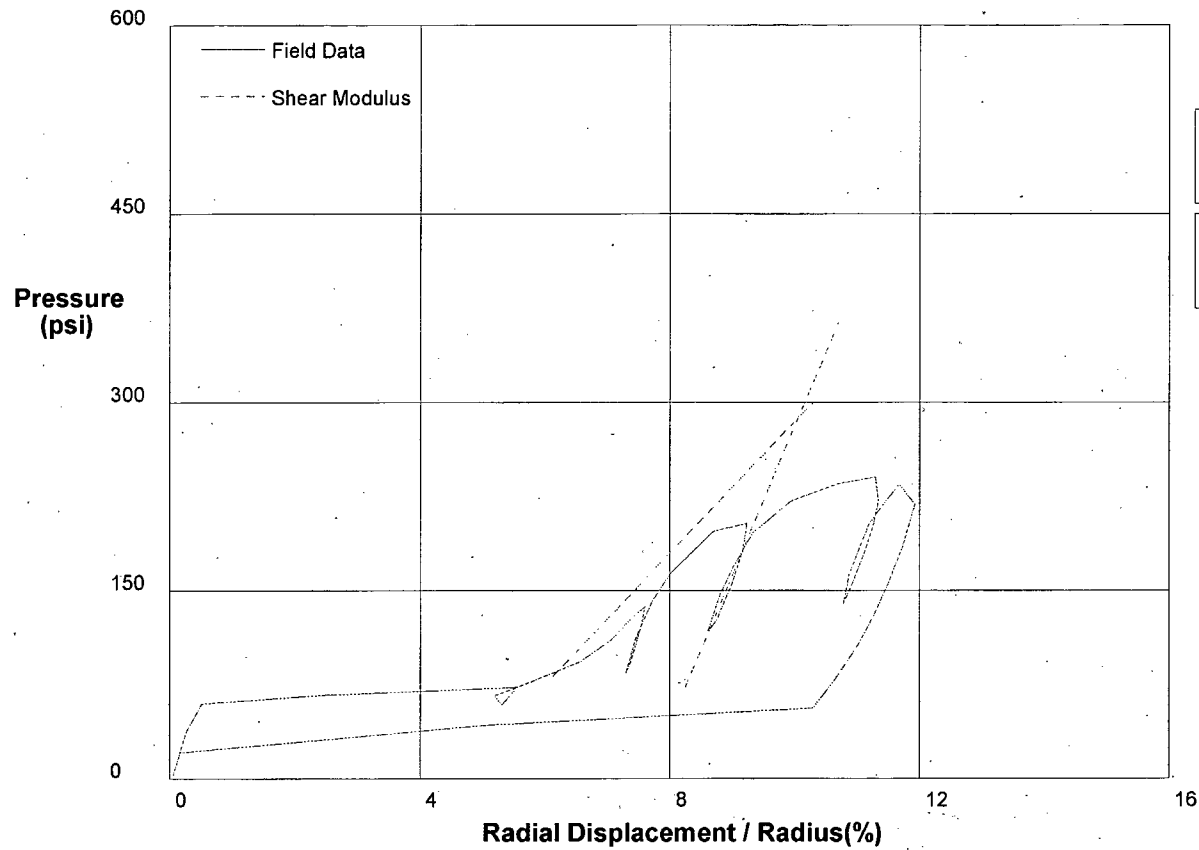
GIBSON'S CLAY MODEL

Shear Strength 48 psi
Insitu Stress 65 psi
Shear Modulus 3000. psi

shift 3

In Situ Engineering

PRESSUREMETER DATA	Mactec Engineering and Consulting Inc.	
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City/Texas	6/13/2008	
Hole No. T4-3A	Depth 95ft	File C:\DATA\ISE-762\STP03.P



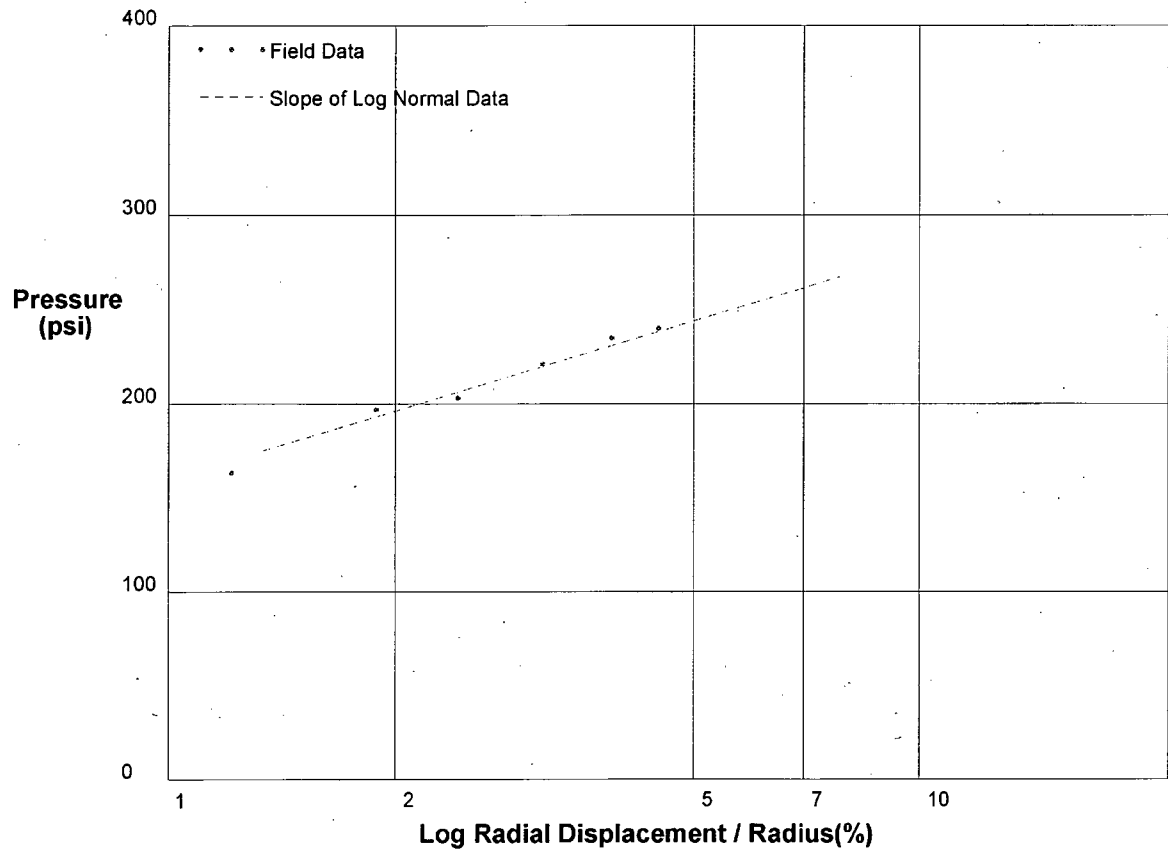
Shear Modulus 5961 psi

Shear Modulus 2625 psi

shift 0

In Situ Engineering

PRESSUREMETER DATA		Mactec Engineering and Consulting Inc.
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City /Texas		6/13/2008
Hole No. T4-3A	Depth 95ft	File C:\DATA\ISE-762\STP03.P

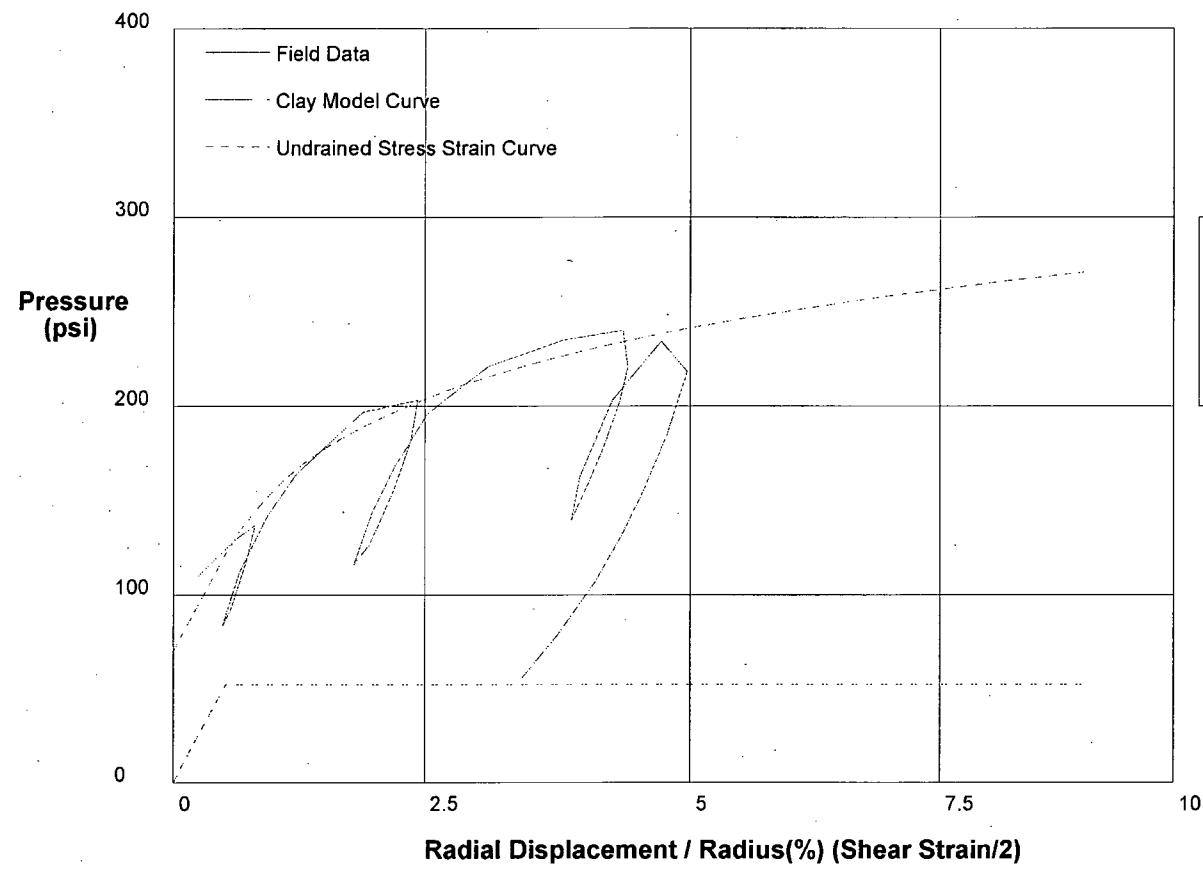


Shear Strength 52.1 psi
Limit Pressure 353 psi

shift 6.8

In Situ Engineering

PRESSUREMETER DATA		Mactec Engineering and Consulting Inc.	
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City /Texas		6/13/2008	
Hole No. T4-3A	Depth 95ft	File C:\DATA\ISE-762\STP03.P	



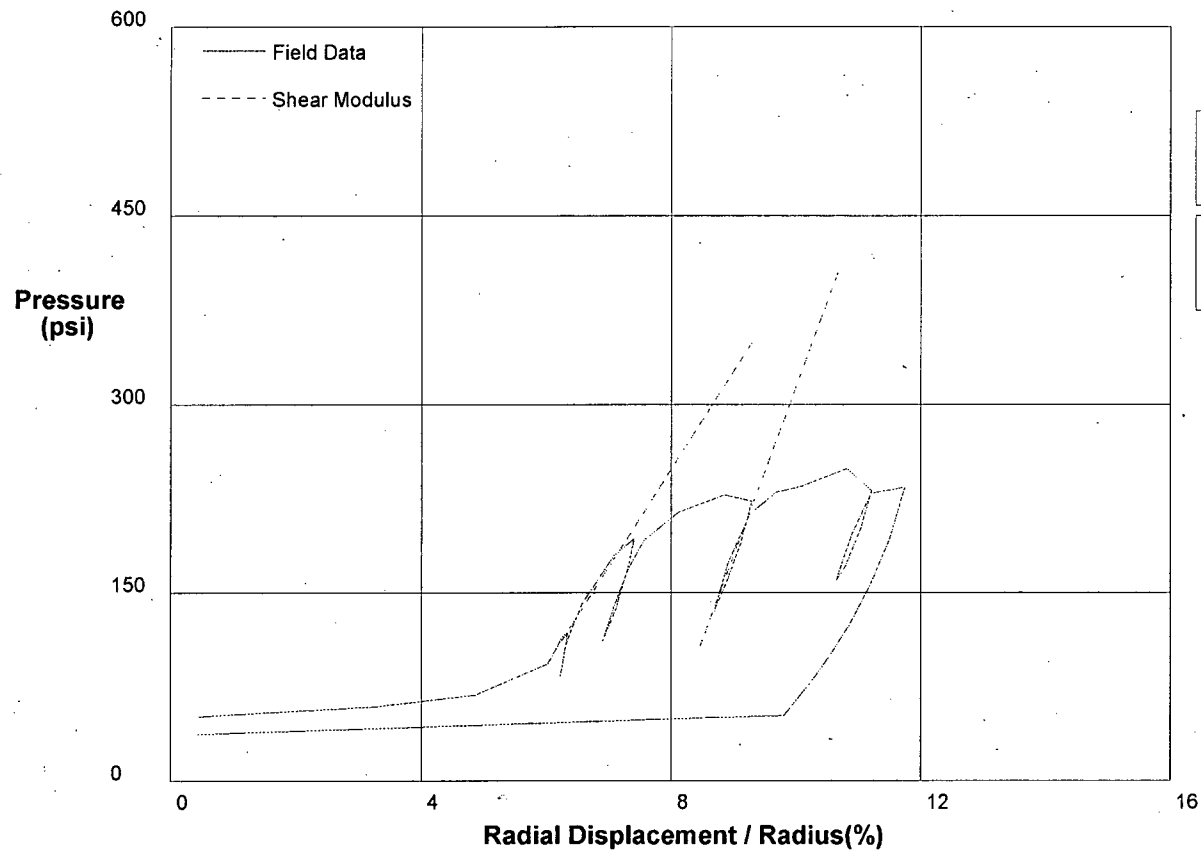
GIBSON'S CLAY MODEL

Shear Strength 52 psi
Insitu Stress 70 psi
Shear Modulus 5000 psi

shift 6.8

In Situ Engineering

PRESSUREMETER DATA	Mactec Engineering and Consulting Inc.	
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City /Texas	6/13/2008	
Hole No. T4-3A	Depth 93.5ft	File C:\DATA\ISE-762\STP04.P



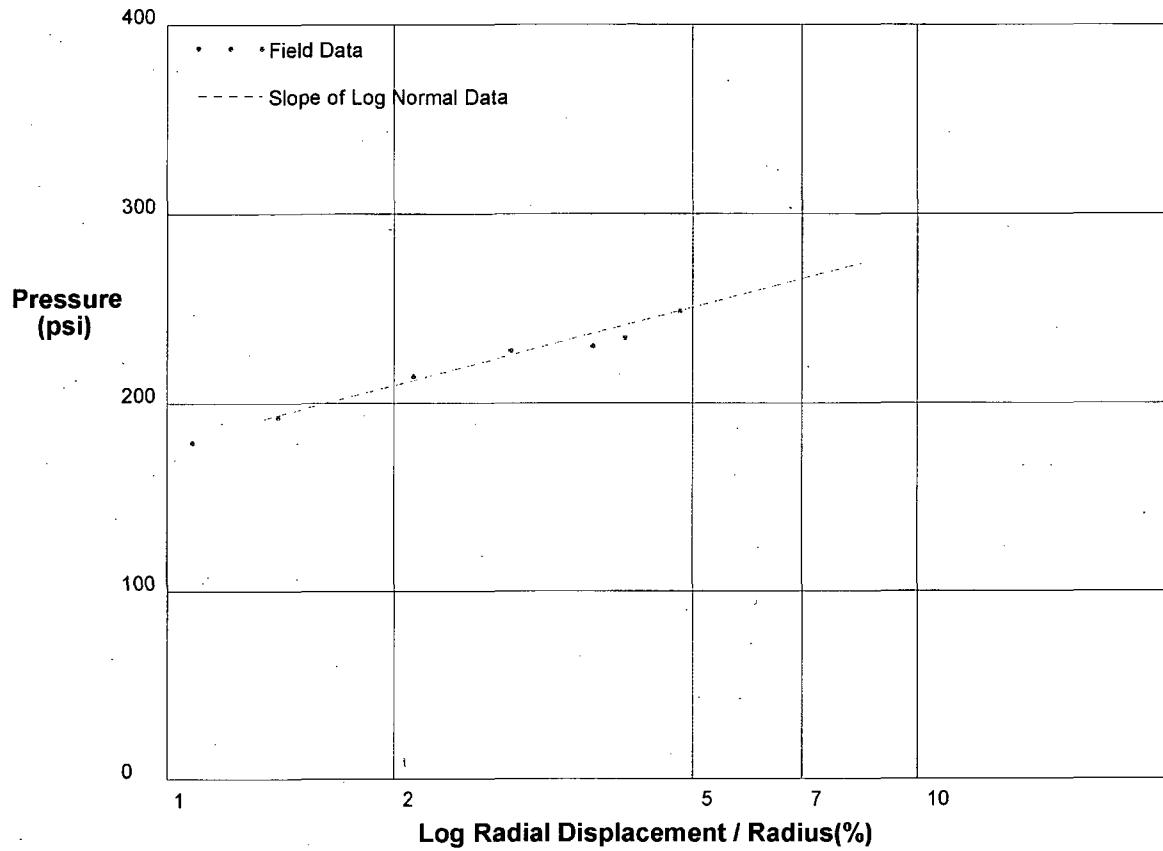
Shear Modulus 6752 psi

Shear Modulus 3915 psi

shift 0

In Situ Engineering

PRESSUREMETER DATA		Mactec Engineering and Consulting Inc.
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City/Texas		6/13/2008
Hole No. T4-3A	Depth 93.5ft	File C:\DATA\SE-762\STP04.P

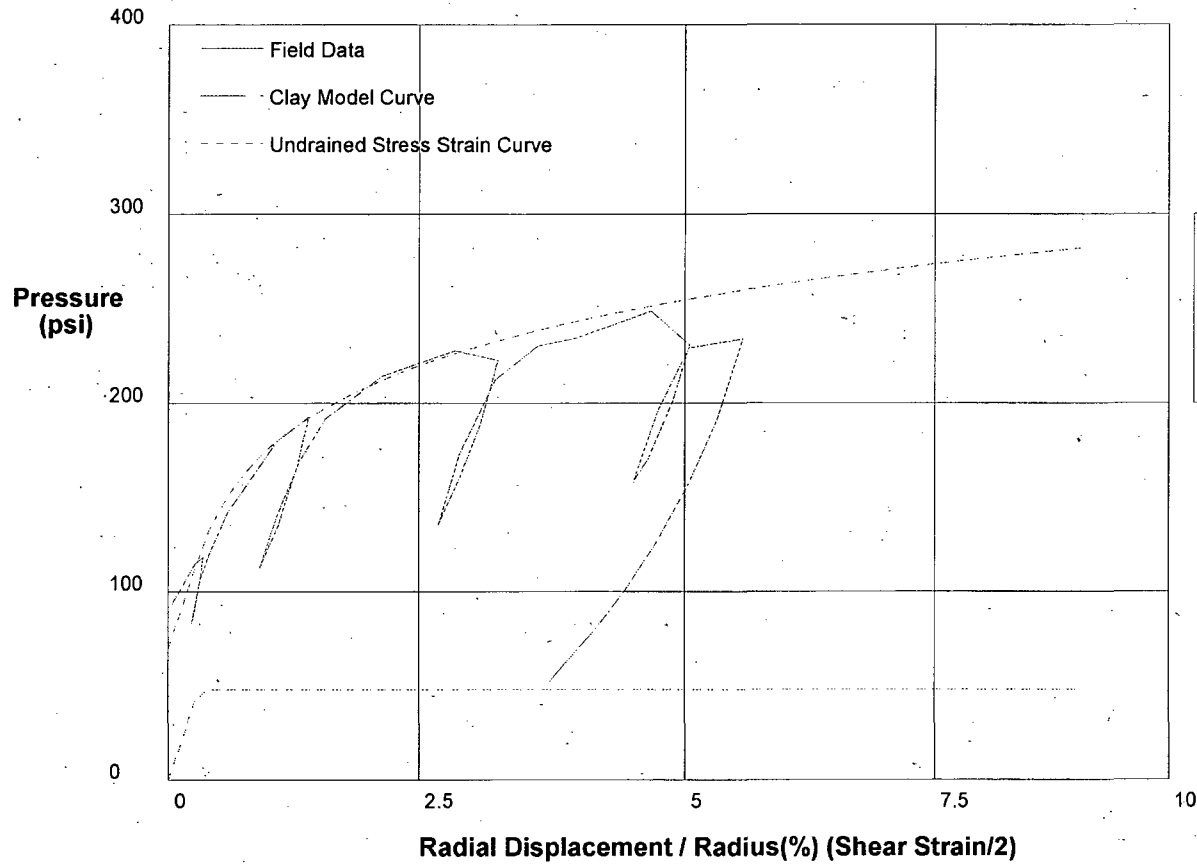


Shear Strength 44.7 psi
Limit Pressure 344 psi

shift 6

In Situ Engineering

PRESSUREMETER DATA	Mactec Engineering and Consulting Inc.	
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City/Texas	6/13/2008	
Hole No. T4-3A	Depth 93.5ft	File C:\DATA\ISE-762\STP04.P



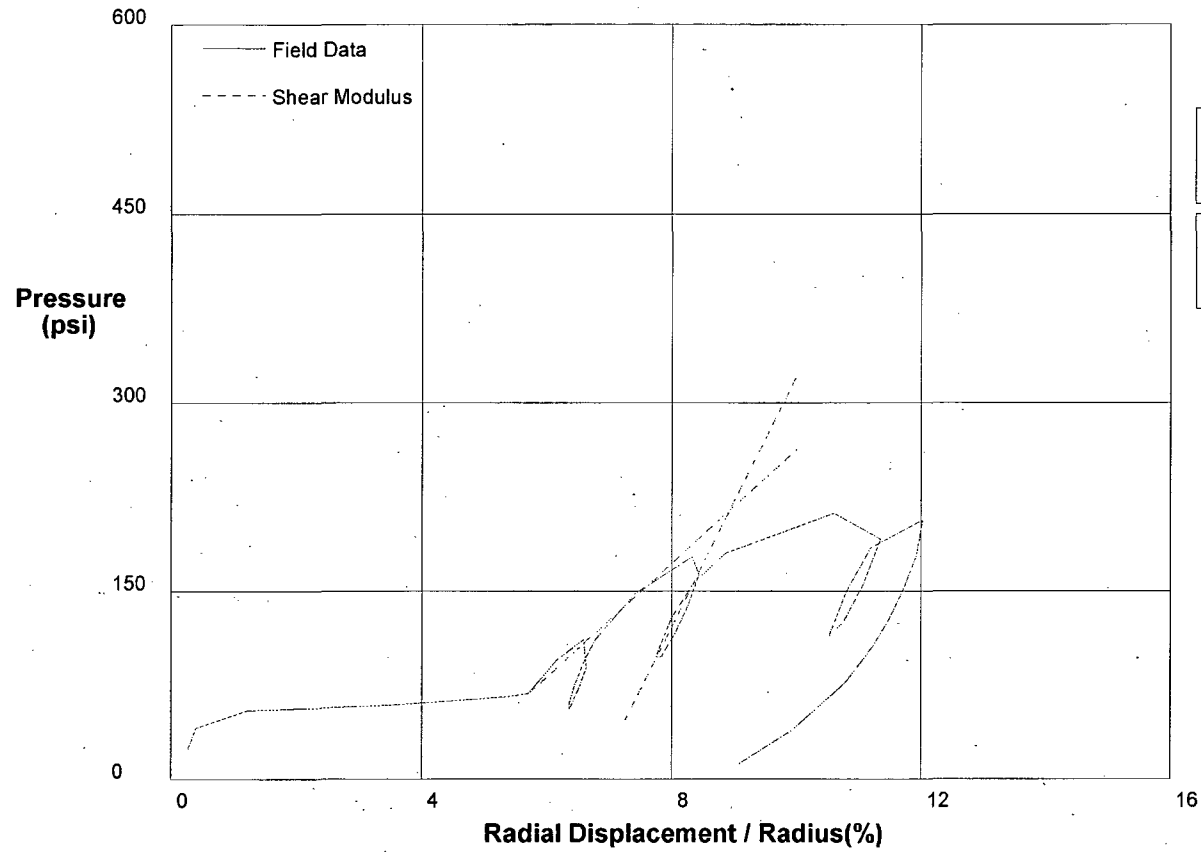
GIBSON'S CLAY MODEL

Shear Strength 48 psi
Insitu Stress 70 psi
Shear Modulus 8000 psi

shift 6

In Situ Engineering

PRESSUREMETER DATA	Mactec Engineering and Consulting Inc.	
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City /Texas	6/14/2008	
Hole No. T4-3A	Depth 100.5ft	File C:\DATA\ISE-762\STP05.P



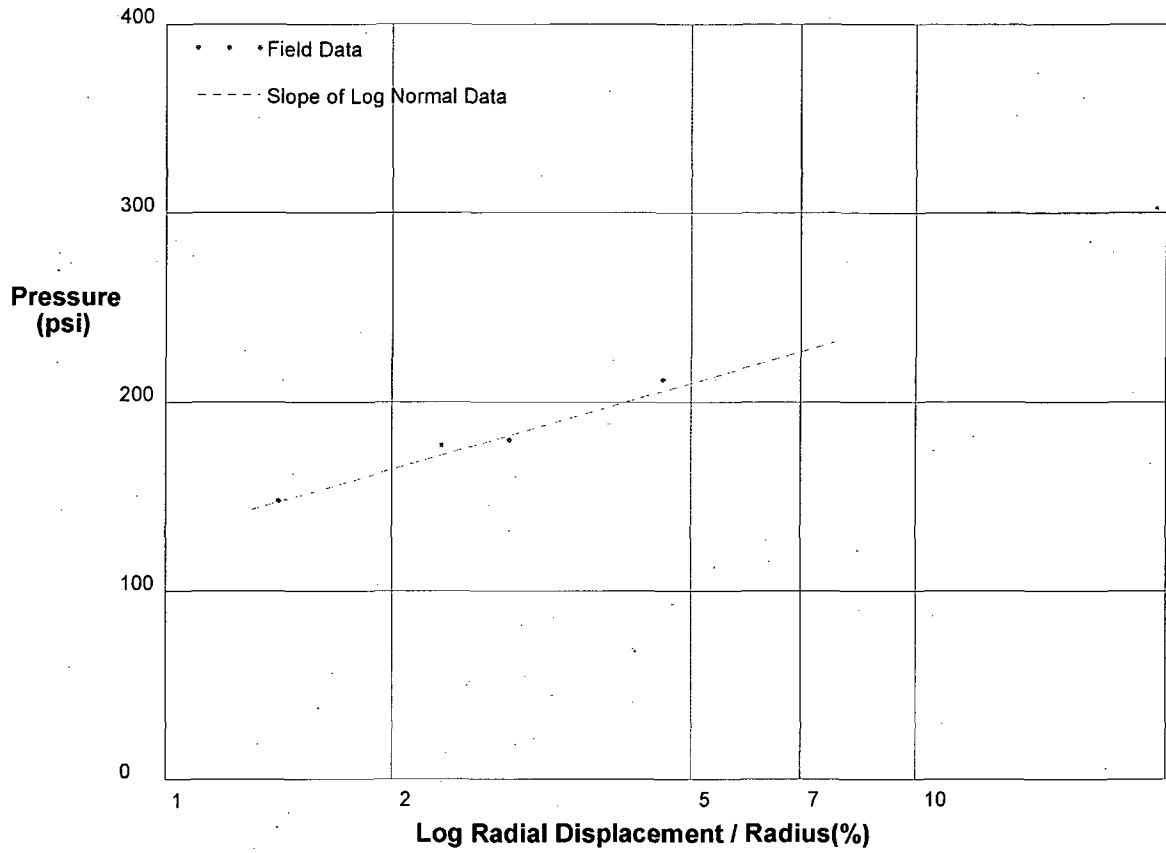
Shear Modulus 5000 psi

Shear Modulus 2266 psi

shift 0

In Situ Engineering

PRESSUREMETER DATA	Mactec Engineering and Consulting Inc.
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City /Texas	6/14/2008
Hole No. T4-3A	Depth 100.5ft
	File C:\DATA\ISE-762\STP05.P

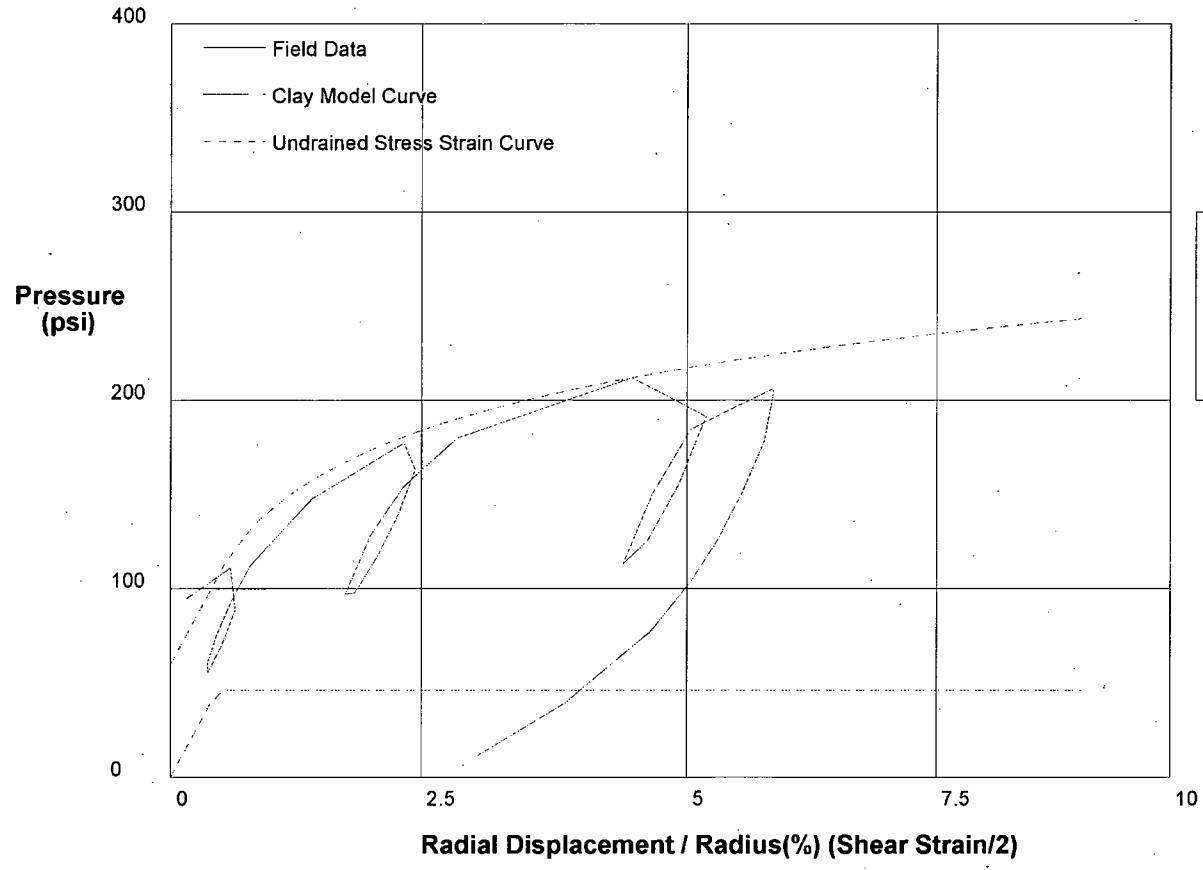


Shear Strength 49.6 psi
Limit Pressure 314 psi

shift 6

In Situ Engineering

PRESSUREMETER DATA	Mactec Engineering and Consulting Inc.	
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City/Texas	6/14/2008	
Hole No. T4-3A	Depth 100.5ft	File C:\DATA\ISE-762\STP05.P



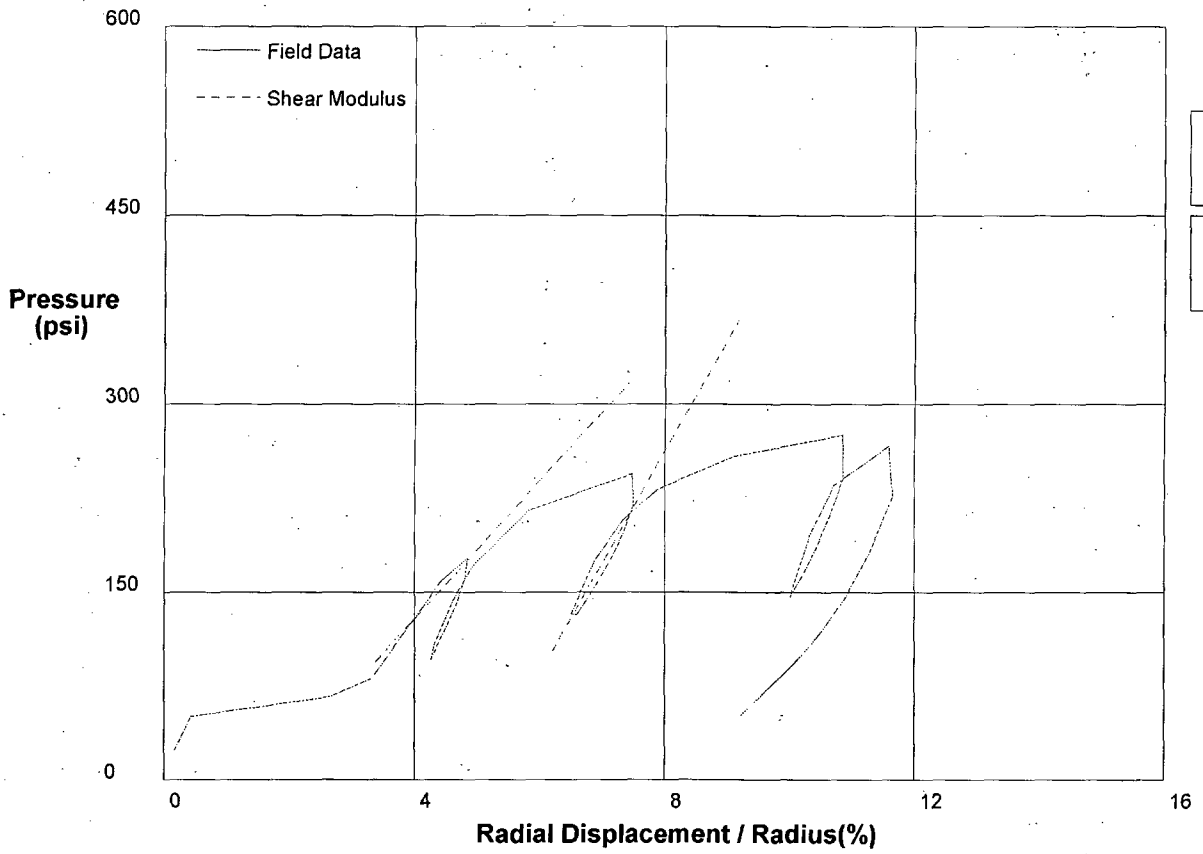
GIBSON'S CLAY MODEL

Shear Strength 46 psi
Insitu Stress 60 psi
Shear Modulus 5000 psi

shift 6

In Situ Engineering

PRESSUREMETER DATA	Mactec Engineering and Consulting Inc.	
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City /Texas	6/14/2008	
Hole No. T4-3A	Depth 99ft	File C:\DATA\ISE-762\STP06.P



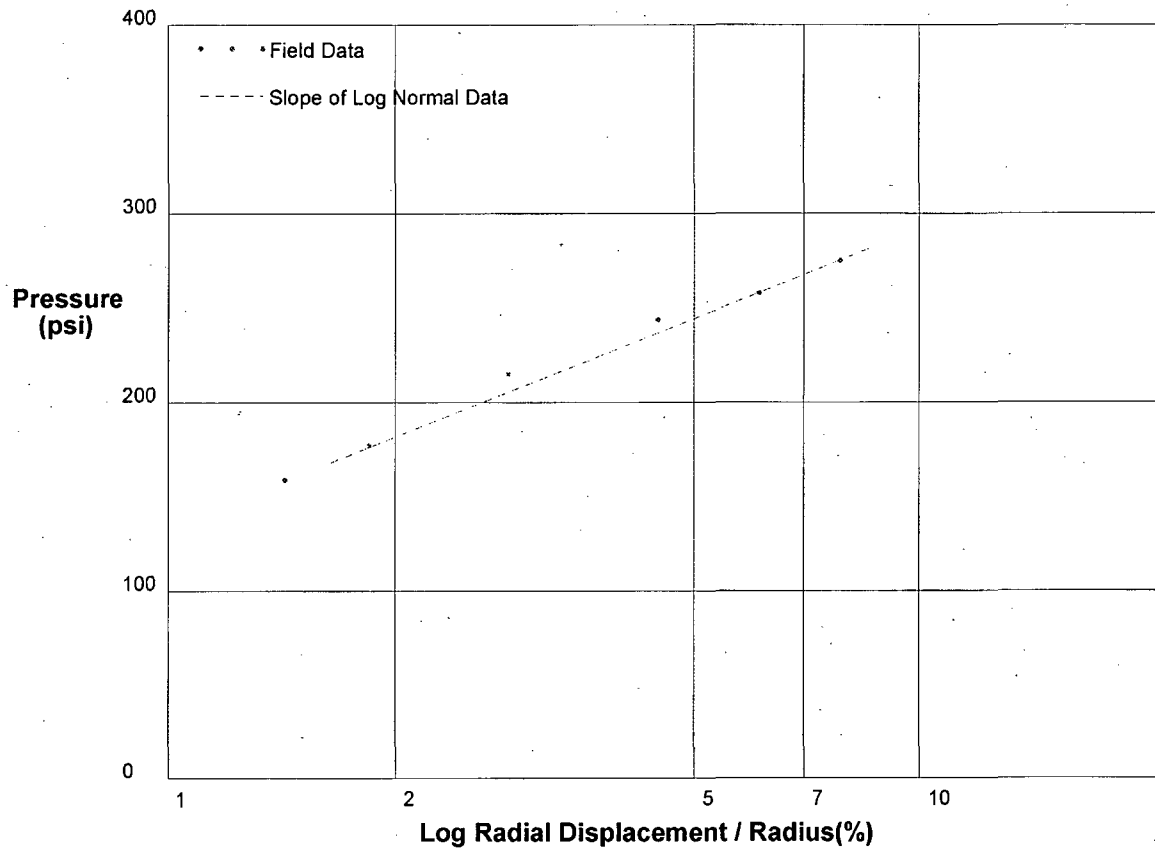
Shear Modulus 4471 psi

Shear Modulus 2757 psi

shift 0

In Situ Engineering

PRESSUREMETER DATA		Mactec Engineering and Consulting Inc.	
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City /Texas		6/14/2008	
Hole No. T4-3A	Depth 99ft	File C:\DATA\ISE-762\STP06.P	

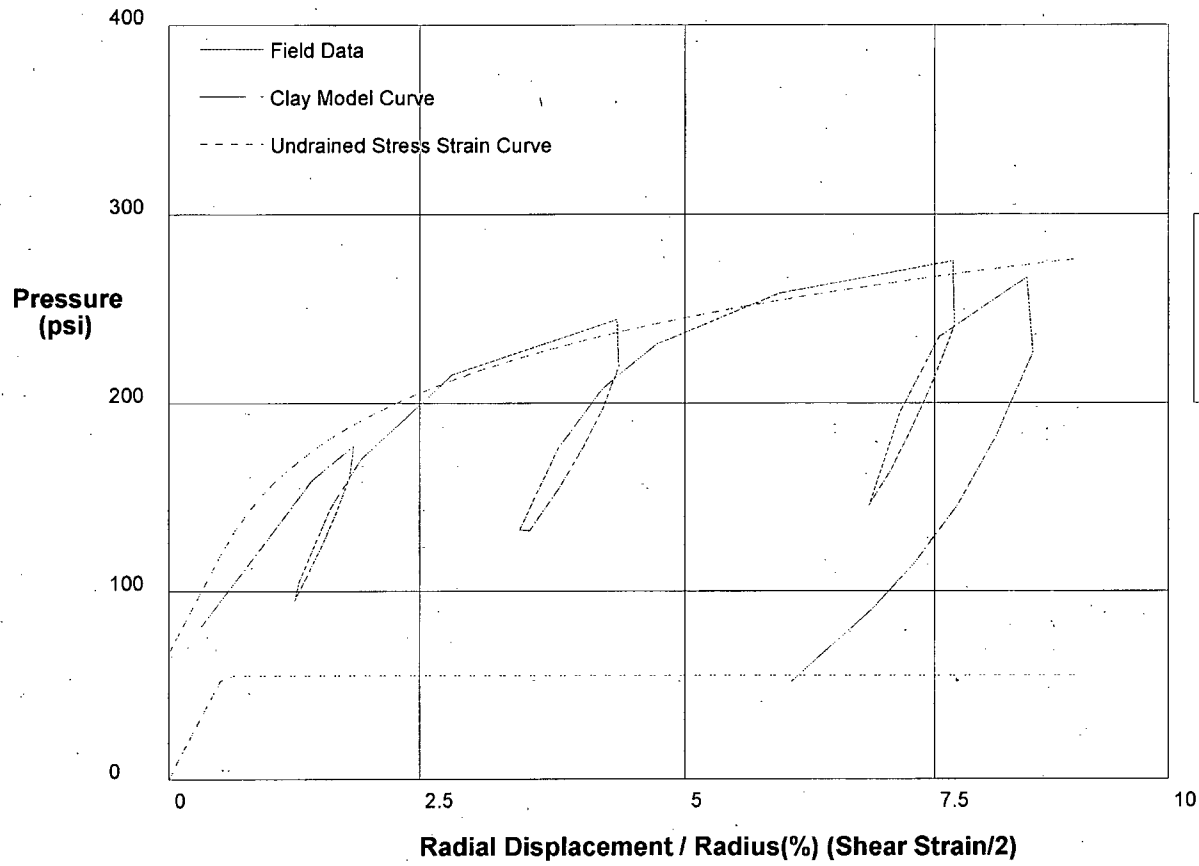


Shear Strength 68.5 psi
Limit Pressure 388 psi

shift 3

In Situ Engineering

PRESSUREMETER DATA		Mactec Engineering and Consulting Inc.	
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City/Texas		6/14/2008	
Hole No. T4-3A	Depth 99ft	File C:\DATA\ISE-762\STP06.P	



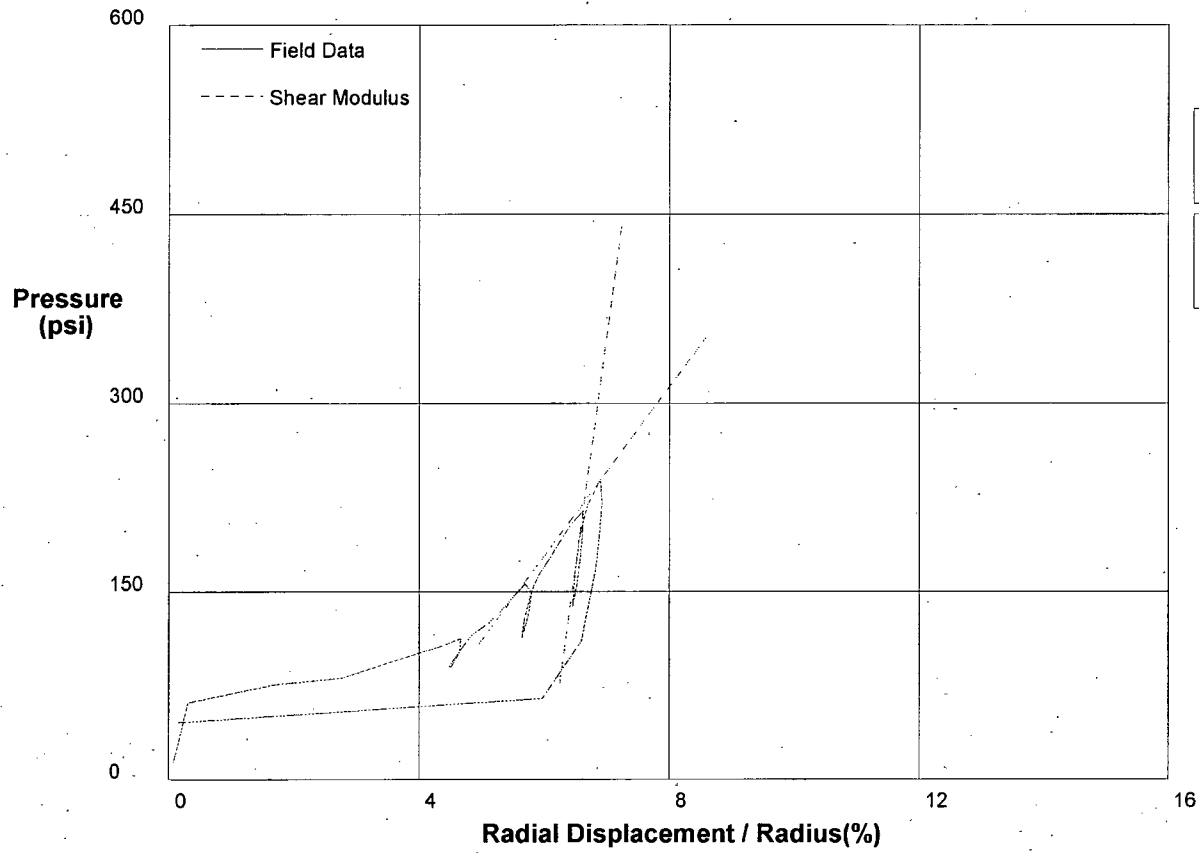
GIBSON'S CLAY MODEL

Shear Strength 55 psi
Insitu Stress 67 psi
Shear Modulus 5000 psi

shift 3

In Situ Engineering

PRESSUREMETER DATA	Mactec Engineering and Consulting Inc.	
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City /Texas	6/14/2008	
Hole No. T4-3A	Depth 112ft	File C:\DATA\ISE-762\STP09.P



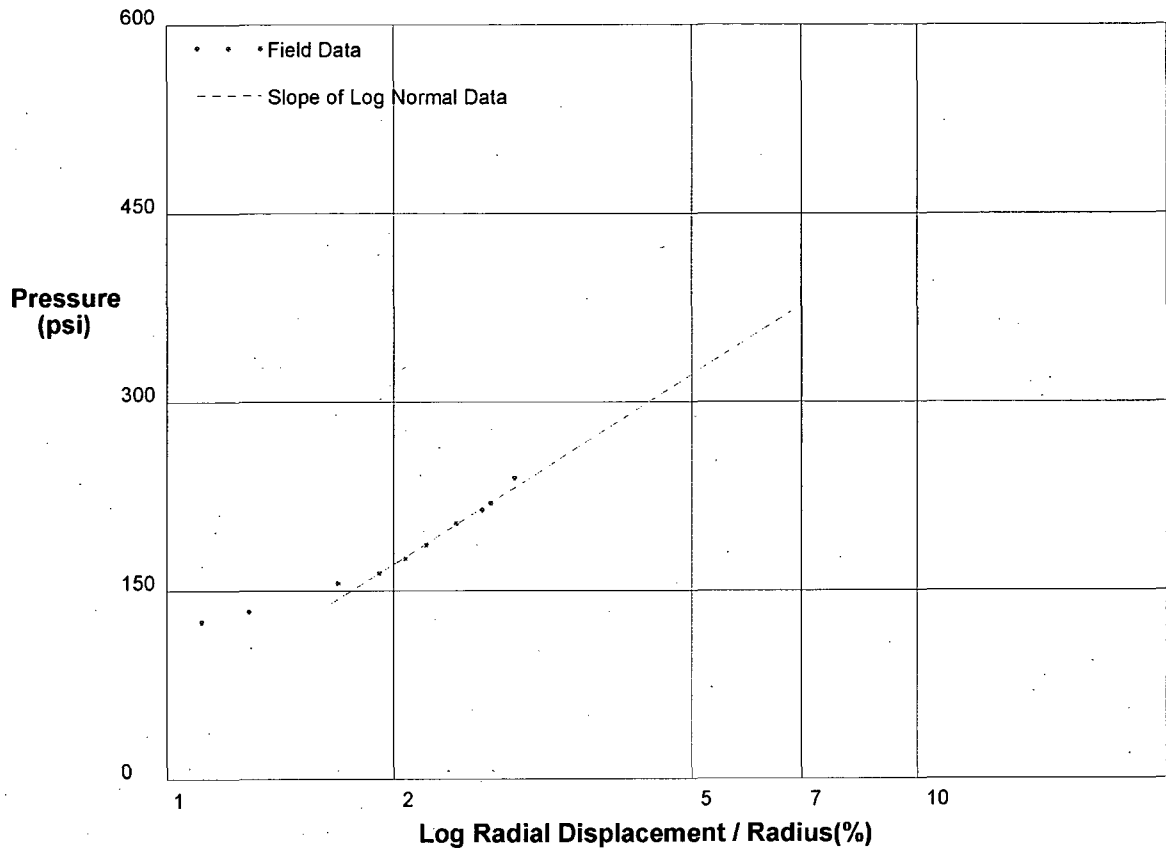
Shear Modulus 18563 psi

Shear Modulus 3362 psi

shift 0

In Situ Engineering

PRESSUREMETER DATA		Mactec Engineering and Consulting Inc.	
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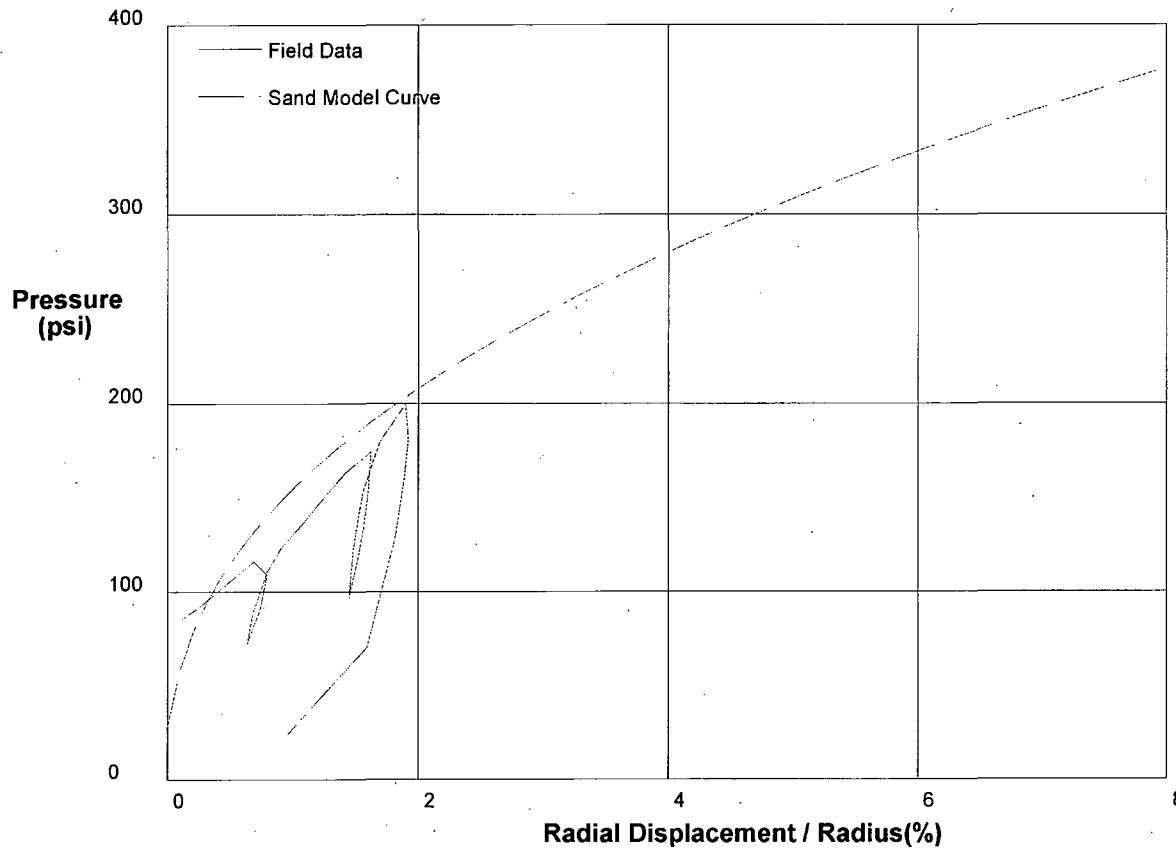


Shear Strength 164.6 psi
Limit Pressure 667 psi

shift 4

In Situ Engineering

PRESSUREMETER DATA		Mactec Engineering and Consulting Inc.
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City /Texas		6/14/2008
Hole No. T4-3A	Depth 112ftft	File C:\DATA\ISE-762\STP09.P



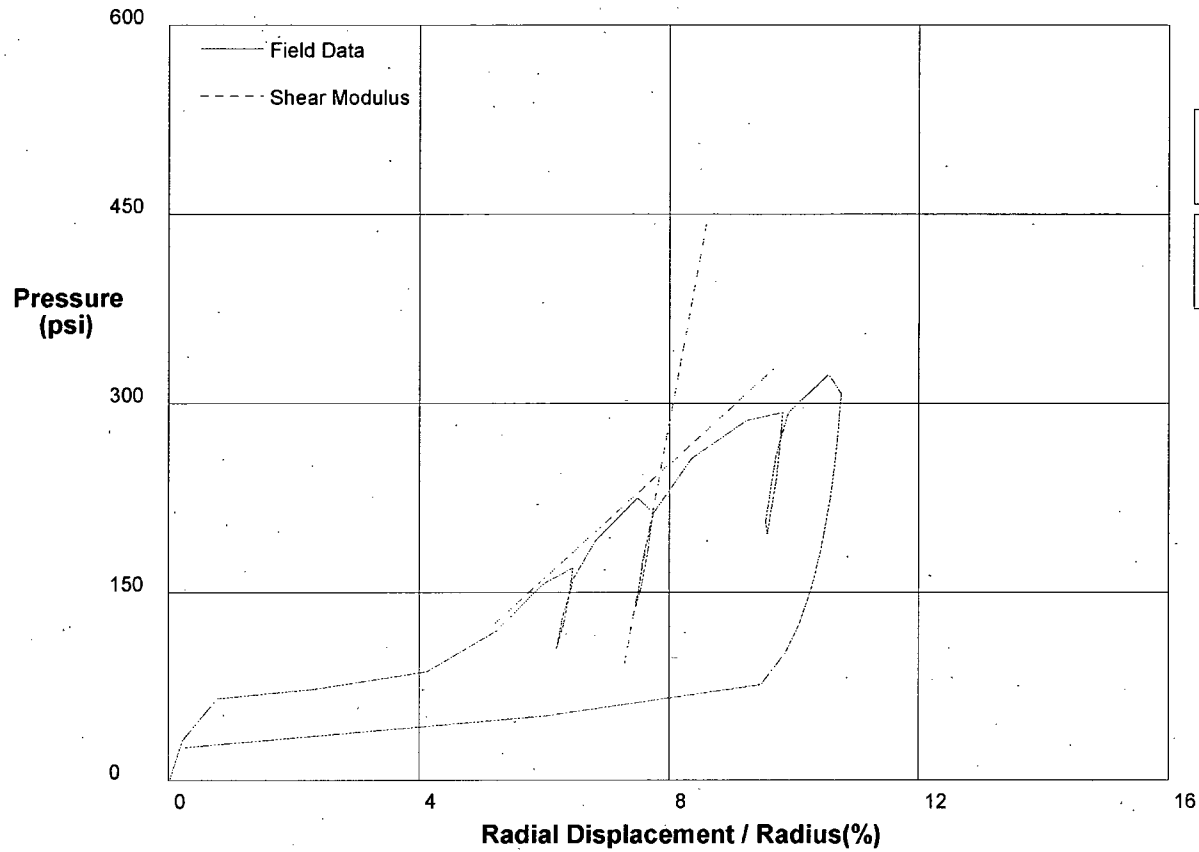
THE In Situ Engineering SAND MODEL

Water Pressure	40 psi
Friction Angle	38 deg
Critical Friction Angle	32 deg
Lateral Stress	28 psi
Shear Modulus	15000 psi

shift 5

In. Situ Engineering

PRESSUREMETER DATA		Mactec Engineering and Consulting Inc.	
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City /Texas		6/14/2008	
Hole No. T4-3A	Depth 110.5ft	File C:\DATA\ISE-762\STP10.P	



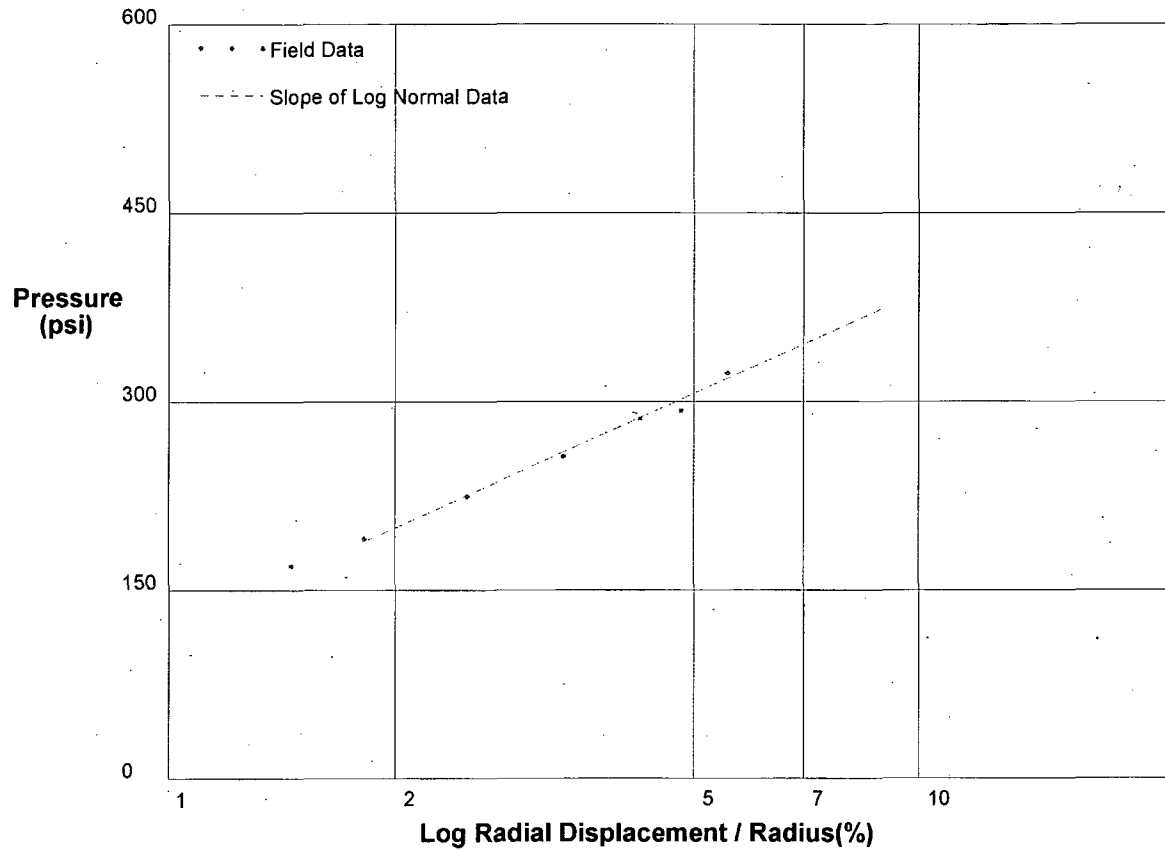
Shear Modulus 13467 psi

Shear Modulus 2266 psi

shift 0

In Situ Engineering

PRESSUREMETER DATA		Mactec Engineering and Consulting Inc.
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City/Texas		6/14/2008
Hole No. T4-3A	Depth 110.5ft	File C:\DATA\ISE-762\STP10.P

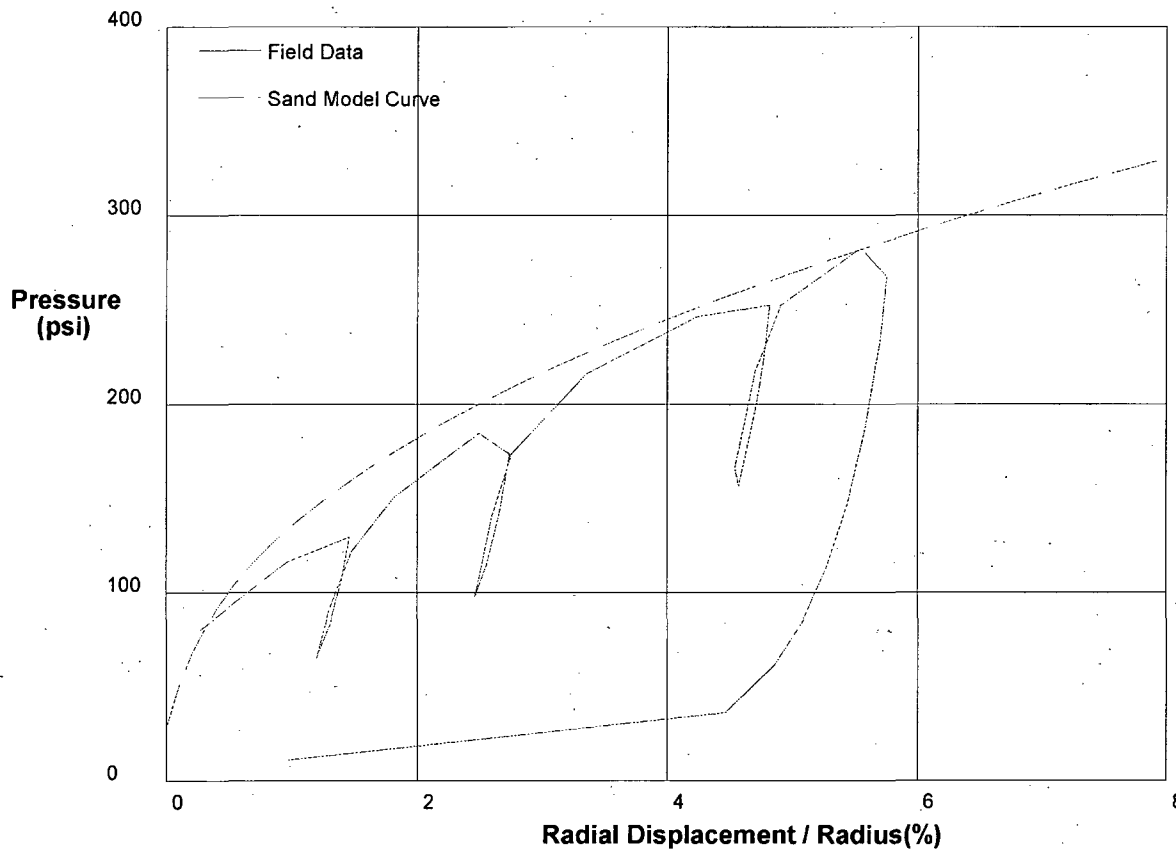


Shear Strength 116.5 psi
Limit Pressure 551 psi

shift 5

In Situ Engineering

PRESSUREMETER DATA		Mactec Engineering and Consulting Inc.	
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City /Texas		6/14/2008	
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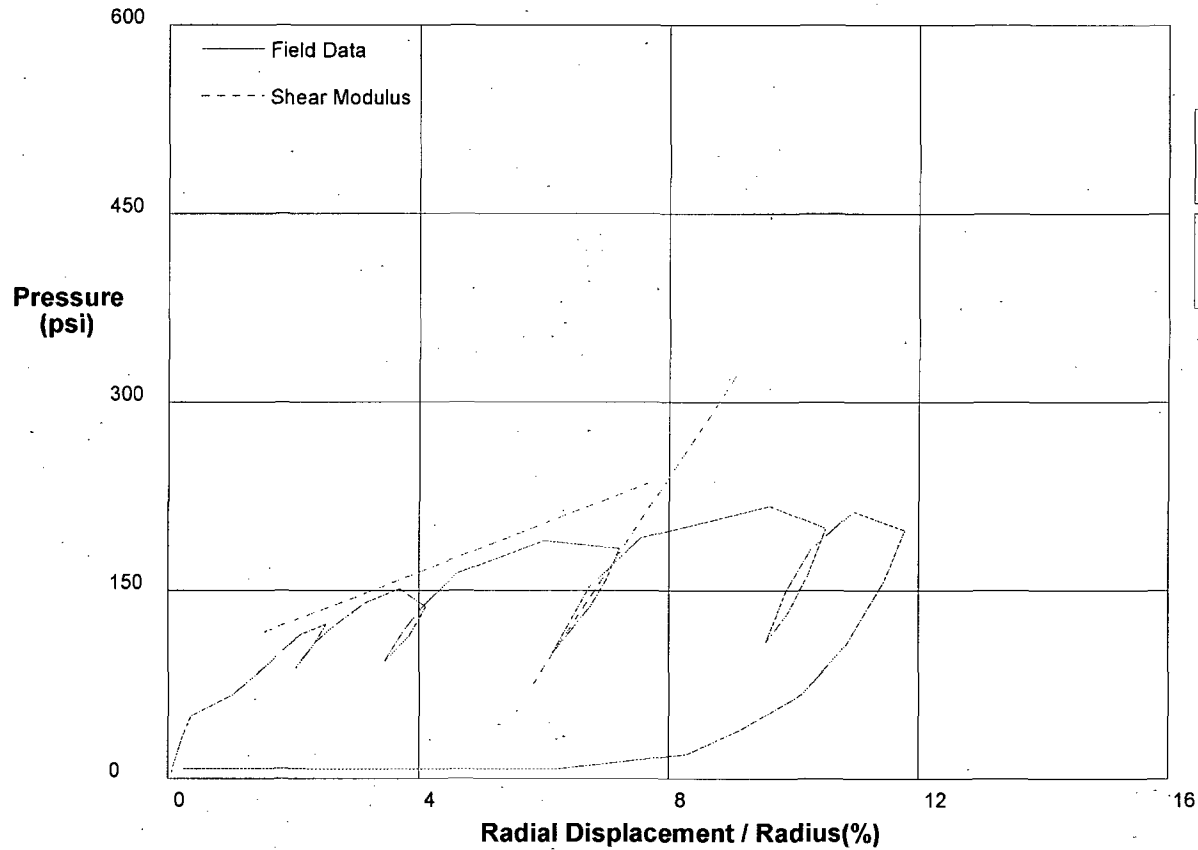
THE In Situ Engineering SAND MODEL

Water Pressure	40 psi
Friction Angle	38 deg
Critical Friction Angle	32 deg
Lateral Stress	28 psi
Shear Modulus	11000 psi

shift 5

In Situ Engineering

PRESSUREMETER DATA	Mactec Engineering and Consulting Inc.	
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City /Texas	6/15/2008	
Hole No. T3-5A	Depth 91.5ft	File C:\DATA\ISE-762\STP11.P



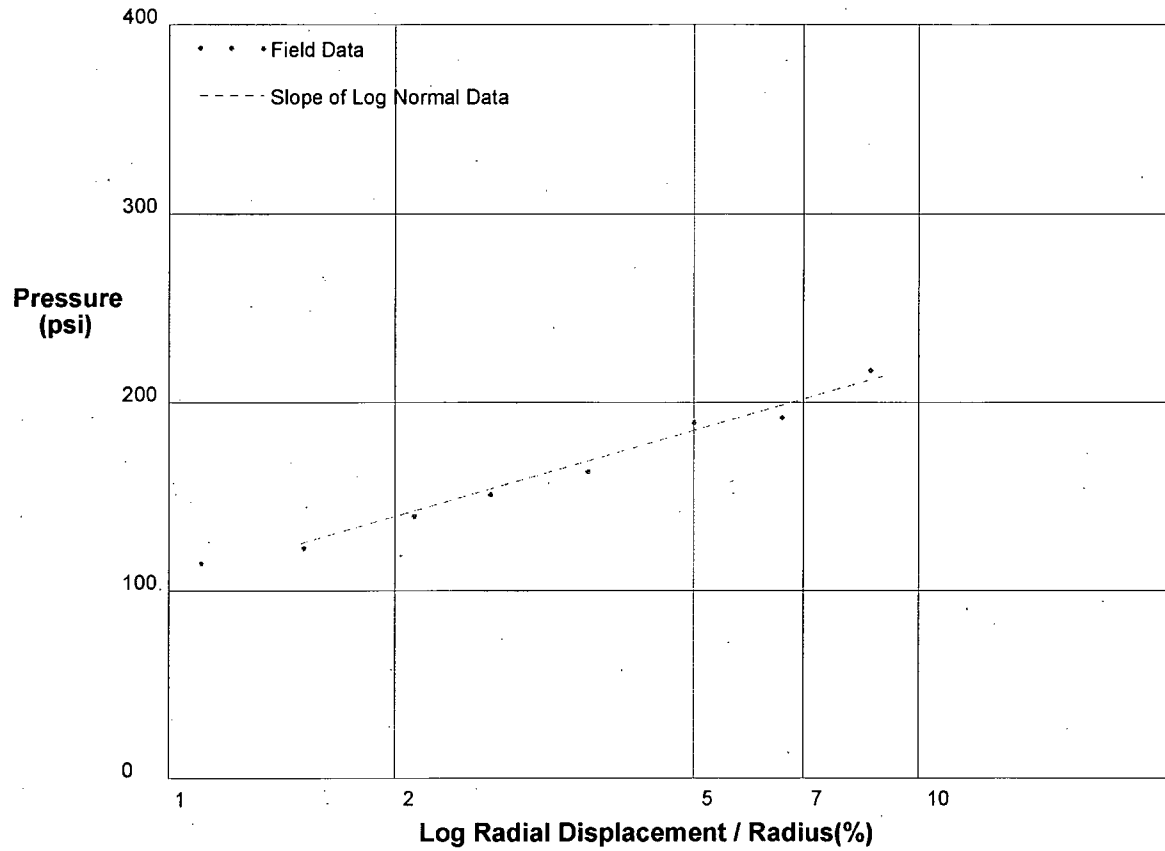
Shear Modulus 3805 psi

Shear Modulus 969 psi

shift 0

In Situ Engineering

PRESSUREMETER DATA		Mactec Engineering and Consulting Inc.
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City /Texas		6/15/2008
Hole No. T3-5A	Depth 91.5ft	File C:\DATA\ISE-762\STP11.P

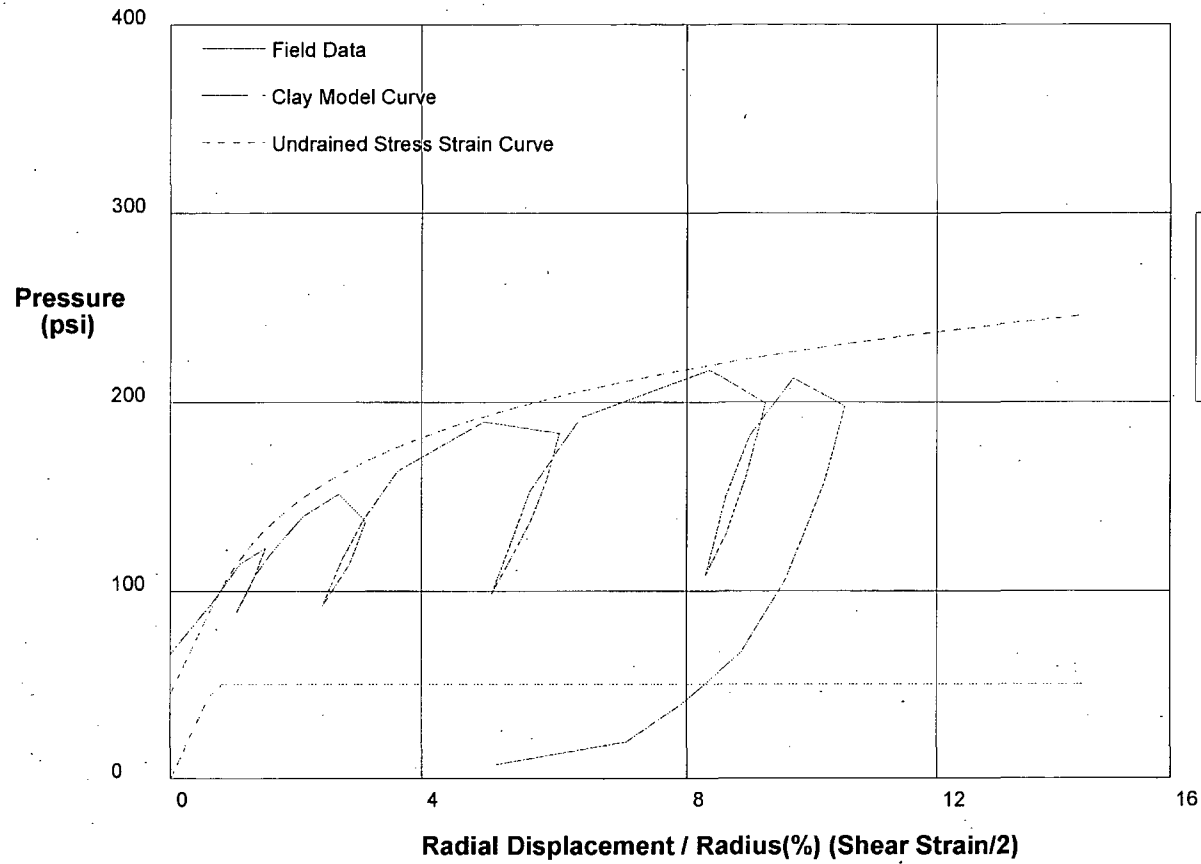


Shear Strength 49.6 psi
Limit Pressure 289 psi

shift 1

In Situ Engineering

PRESSUREMETER DATA		Mactec Engineering and Consulting Inc.
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City /Texas		6/15/2008
Hole No. T3-5A	Depth 91.5ft	File C:\DATA\ISE-762\STP11.P



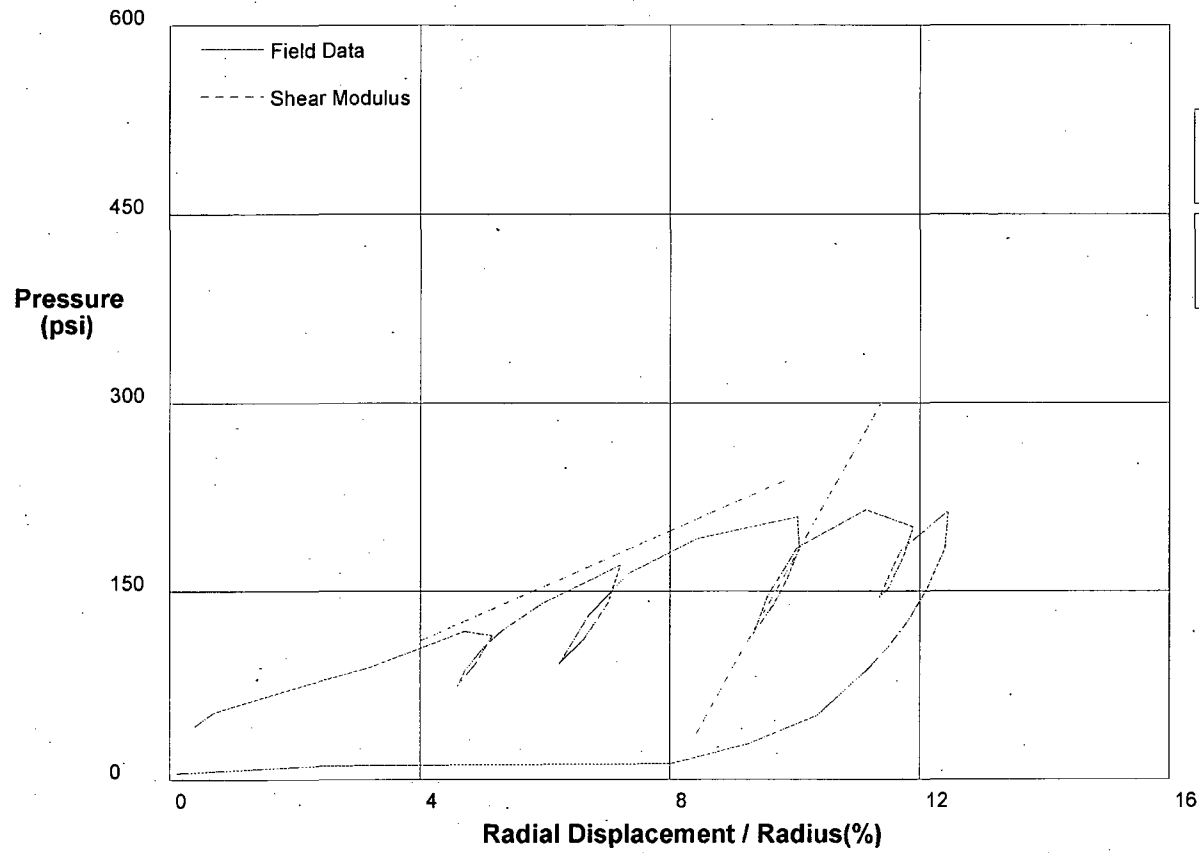
GIBSON'S CLAY MODEL

Shear Strength	50 psi
Insitu Stress	45 psi
Shear Modulus	3500 psi

shift 1

In Situ Engineering

PRESSUREMETER DATA		Mactec Engineering and Consulting Inc.	
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City /Texas		6/15/2008	
Hole No. T3-5A	Depth 90ft	File C:\DATA\ISE-762\STP12.P	



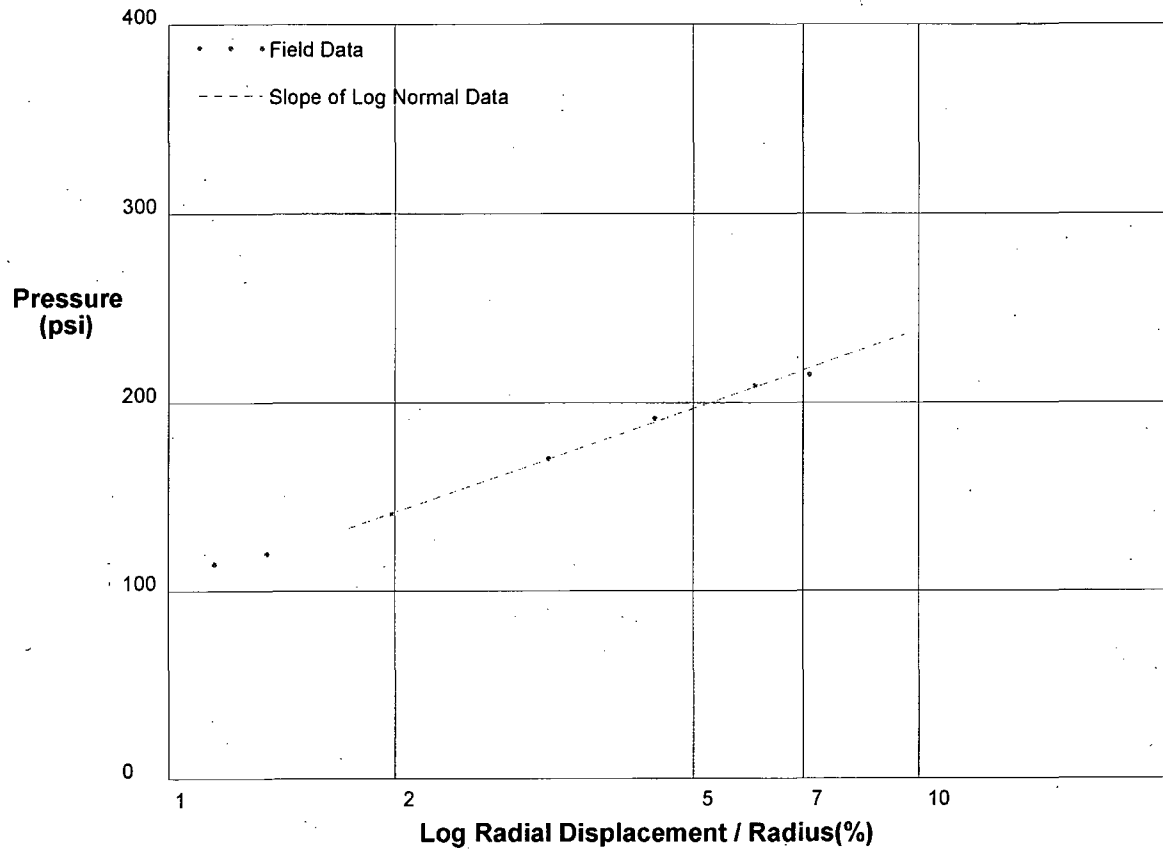
Shear Modulus 4471 psi

Shear Modulus 1091 psi

shift 0

In Situ Engineering

PRESSUREMETER DATA		Mactec Engineering and Consulting Inc.	
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City/Texas		6/15/2008	
Hole No. T3-5A	Depth 90ft	File C:\DATA\ISE-762\STP12.P	

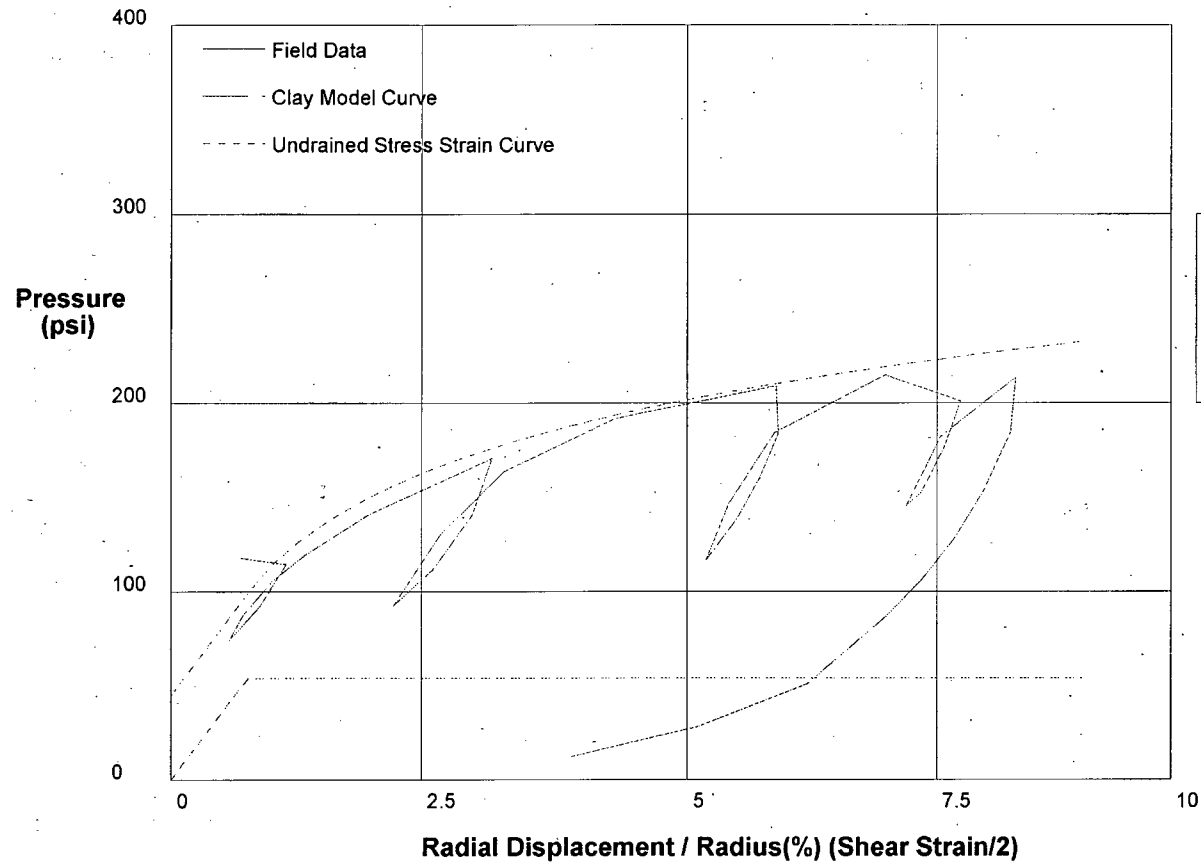


Shear Strength 60 psi
Limit Pressure 323 psi

shift 4

In Situ Engineering

PRESSUREMETER DATA		Mactec Engineering and Consulting Inc.	
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City/Texas		6/15/2008	
Hole No. T3-5A	Depth 90ft	File C:\DATA\ISE-762\STP12.P	



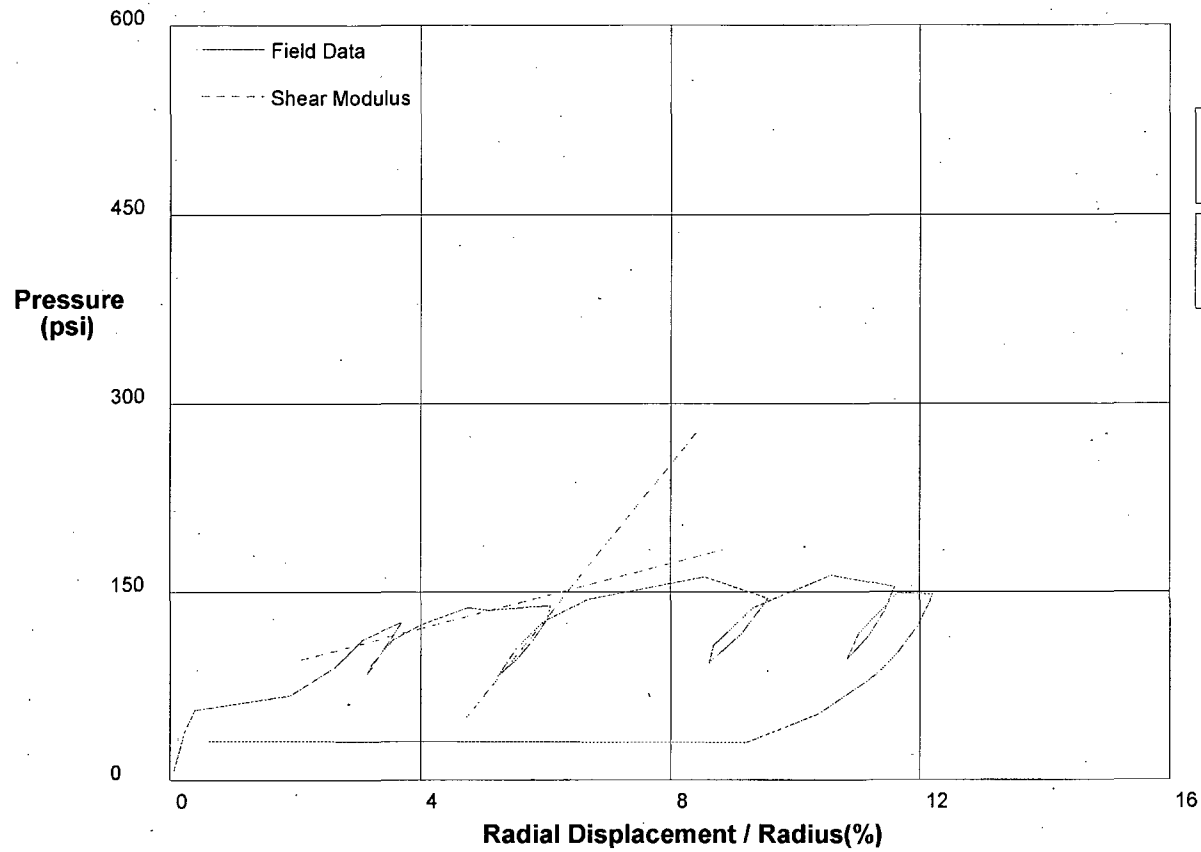
GIBSON'S CLAY MODEL

Shear Strength 54 psi
Insitu Stress 45 psi
Shear Modulus 3500 psi

shift 4

In Situ Engineering

PRESSUREMETER DATA	Mactec Engineering and Consulting Inc.	
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City/Texas	6/15/2008	
Hole No. T3-5A	Depth 98ft	File C:\DATA\ISE-762\STP13.P



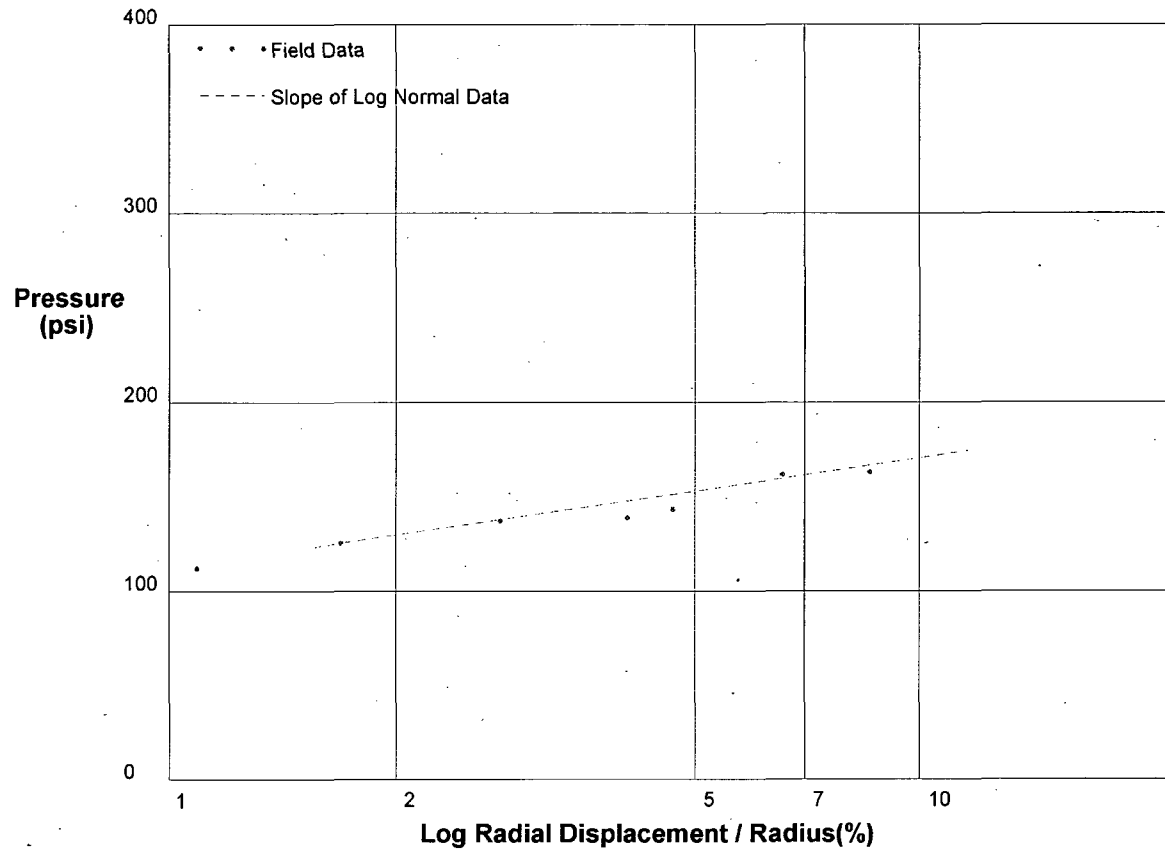
Shear Modulus 3093 psi

Shear Modulus 648 psi

shift 0

In Situ Engineering

PRESSUREMETER DATA		Mactec Engineering and Consulting Inc.	
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City/Texas		6/15/2008	
Hole No. T3-5A	Depth 98ft	File C:\DATA\ISE-762\STP13.P	

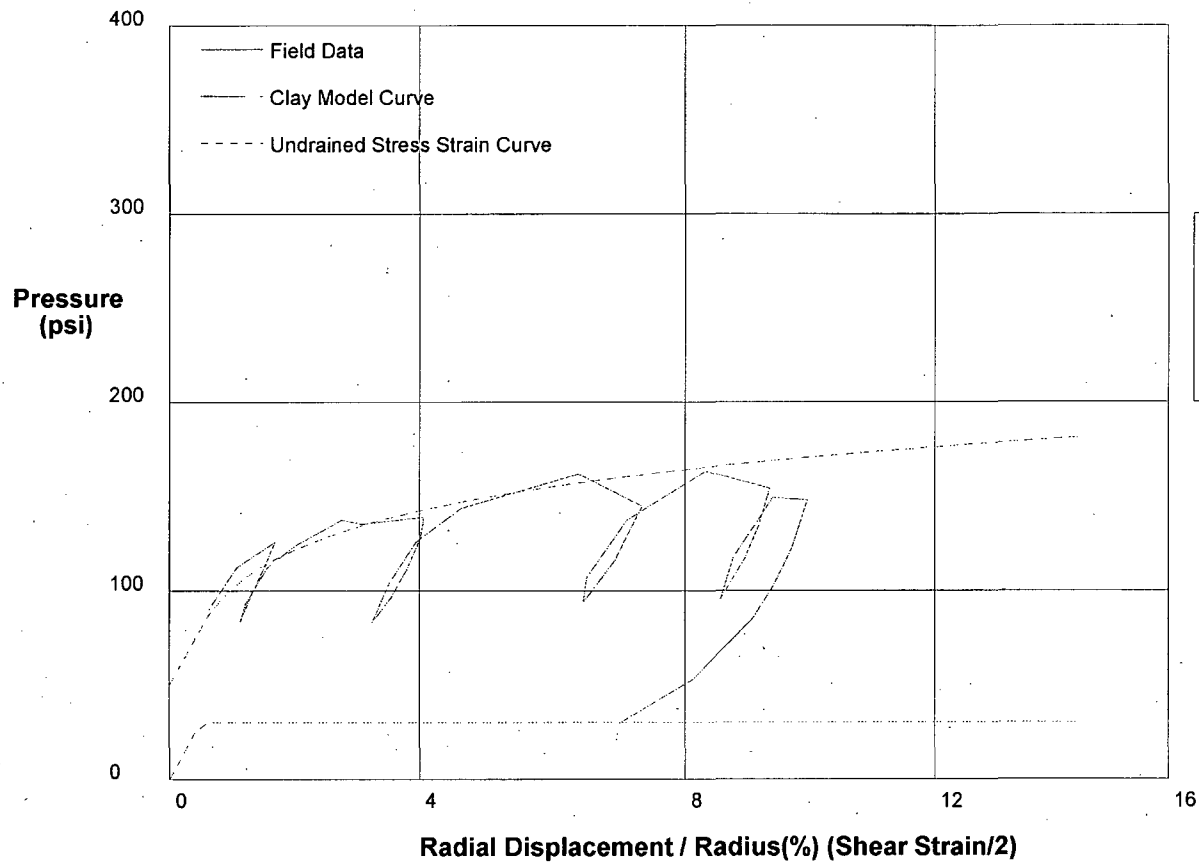


Shear Strength 25.2 psi
Limit Pressure 206 psi

shift 2

In Situ Engineering

PRESSUREMETER DATA		Mactec Engineering and Consulting Inc.	
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City /Texas		6/15/2008	
Hole No. T3-5A	Depth 98ft	File C:\DATA\ISE-762\STP13.P	



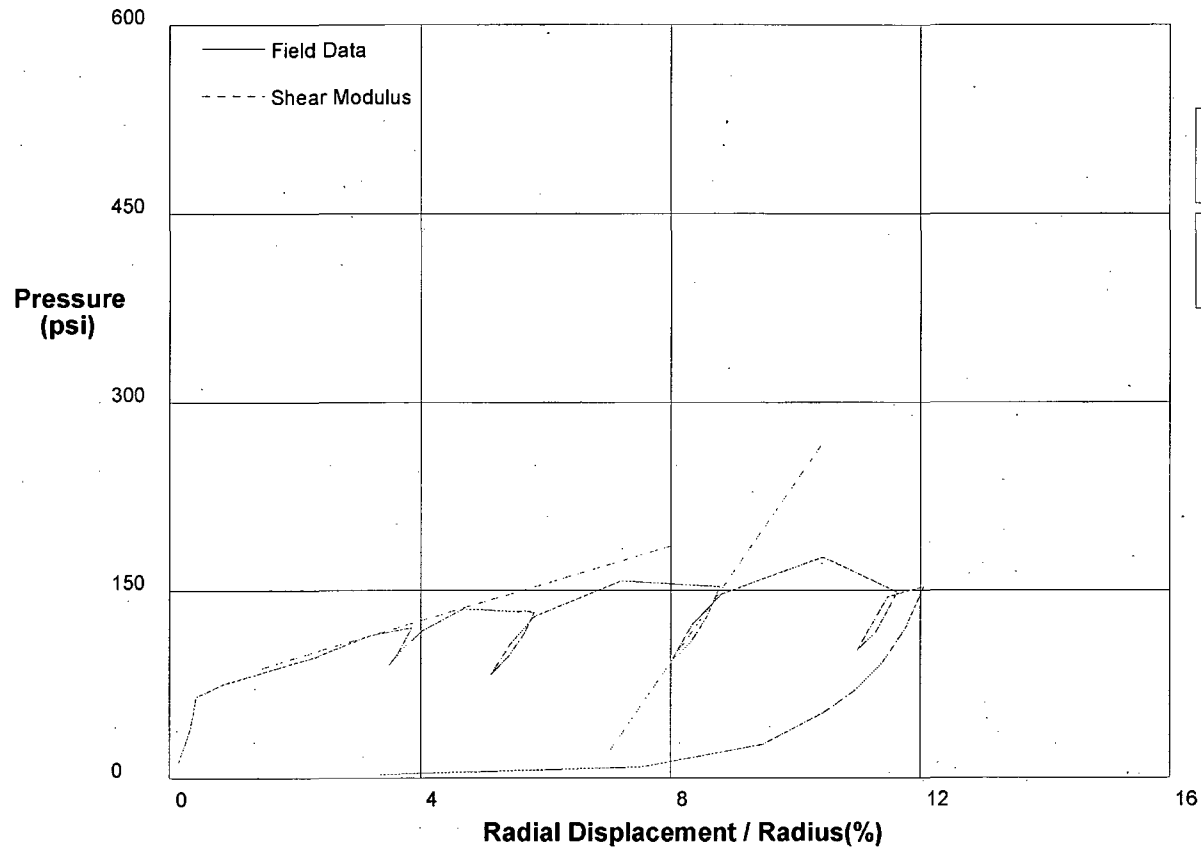
GIBSON'S CLAY MODEL

Shear Strength 30 psi
 Insitu Stress 50 psi
 Shear Modulus 3000 psi

shift 2

In Situ Engineering

PRESSUREMETER DATA		Mactec Engineering and Consulting Inc.	
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City /Texas		6/15/2008	
Hole No. T3-5A	Depth 96.5ft	File C:\DATA\ISE-762\STP14.P	



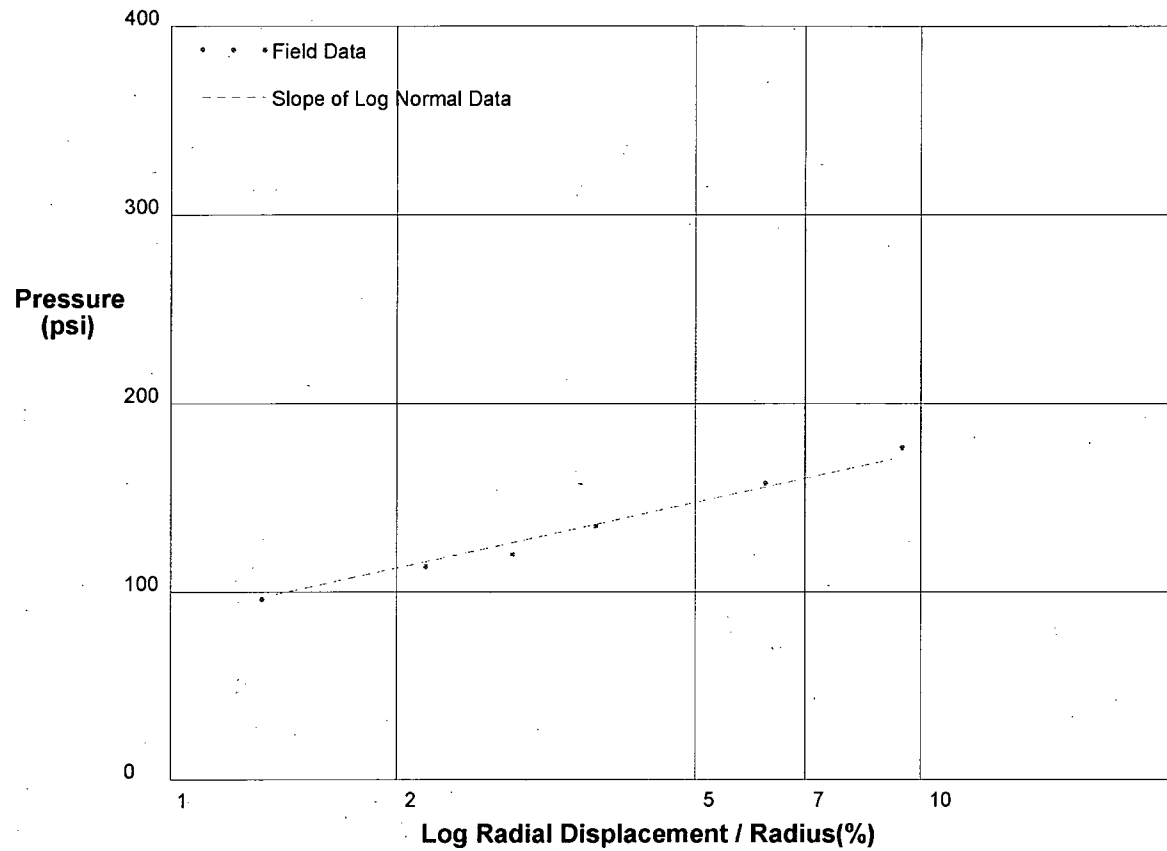
Shear Modulus 3611 psi

Shear Modulus 748 psi

shift 0

In Situ Engineering

PRESSUREMETER DATA		Mactec Engineering and Consulting Inc.
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City /Texas		6/15/2008
Hole No. T3-5A	Depth 96.5ft	File C:\DATA\ISE-762\STP14.P

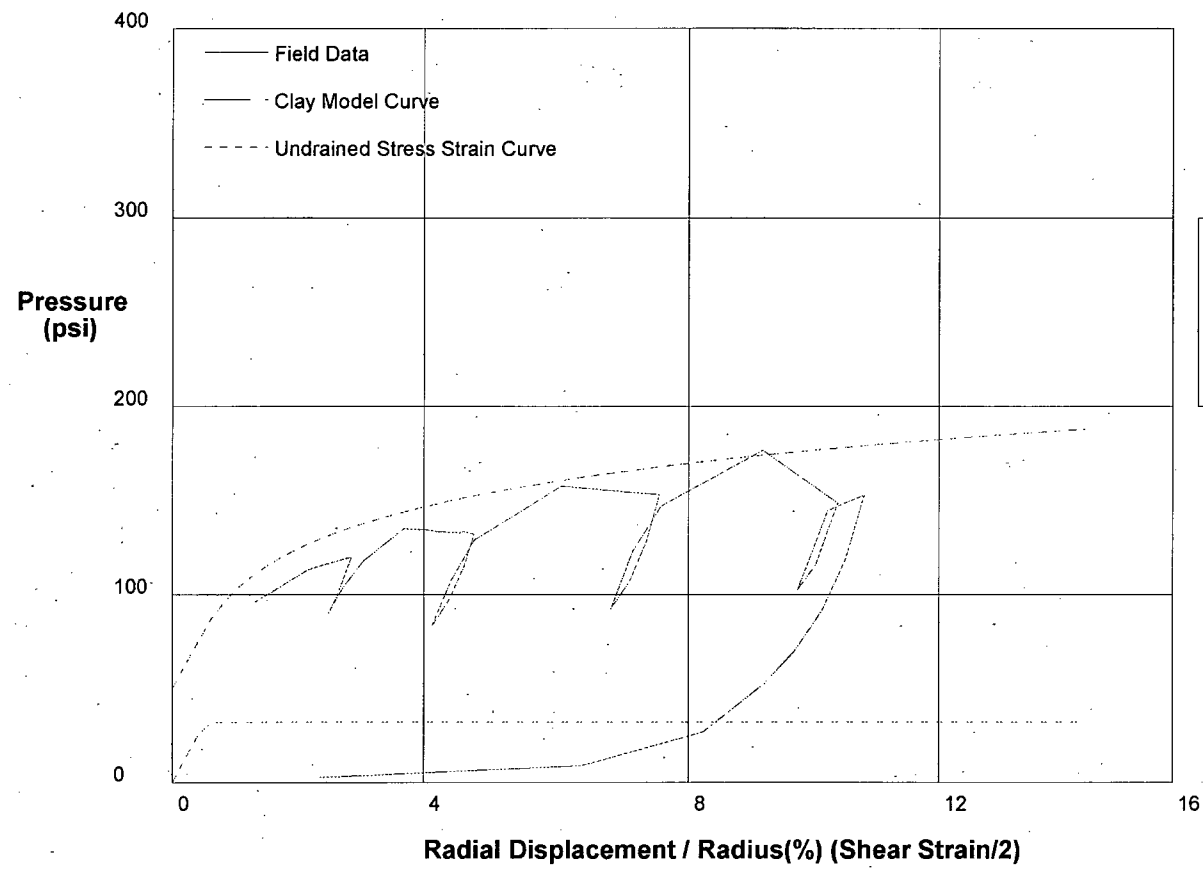


Shear Strength 37.8 psi
Limit Pressure 226 psi

shift 1

In Situ Engineering

PRESSUREMETER DATA	Mactec Engineering and Consulting Inc.	
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City/Texas	6/15/2008	
Hole No. T3-5A	Depth 96.5ft	File C:\DATA\ISE-762\STP14.P



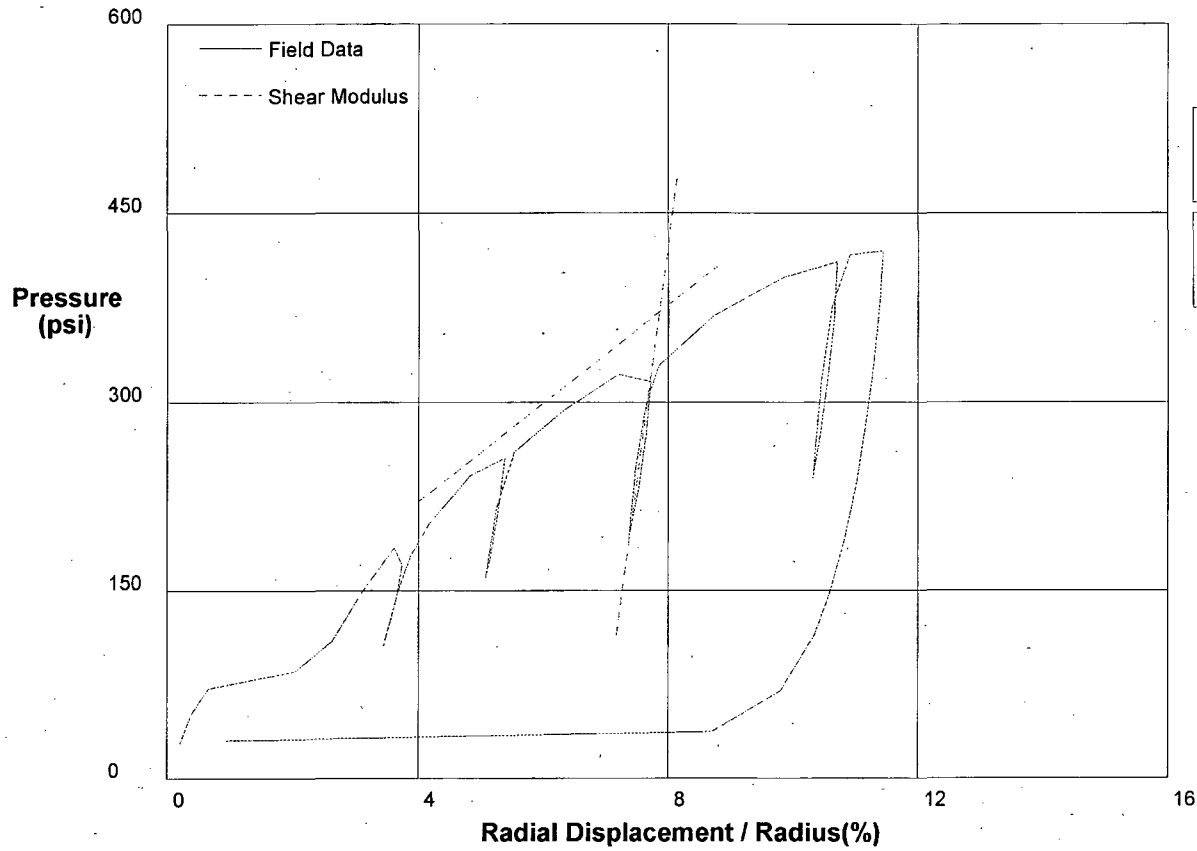
GIBSON'S CLAY MODEL

Shear Strength 32 psi
Insitu Stress 50 psi
Shear Modulus 3000 psi

shift 1

In Situ Engineering

PRESSUREMETER DATA	Mactec Engineering and Consulting Inc.	
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City /Texas	6/16/2008	
Hole No. T3-5A	Depth 104ft	File C:\DATA\ISE-762\STP15.P



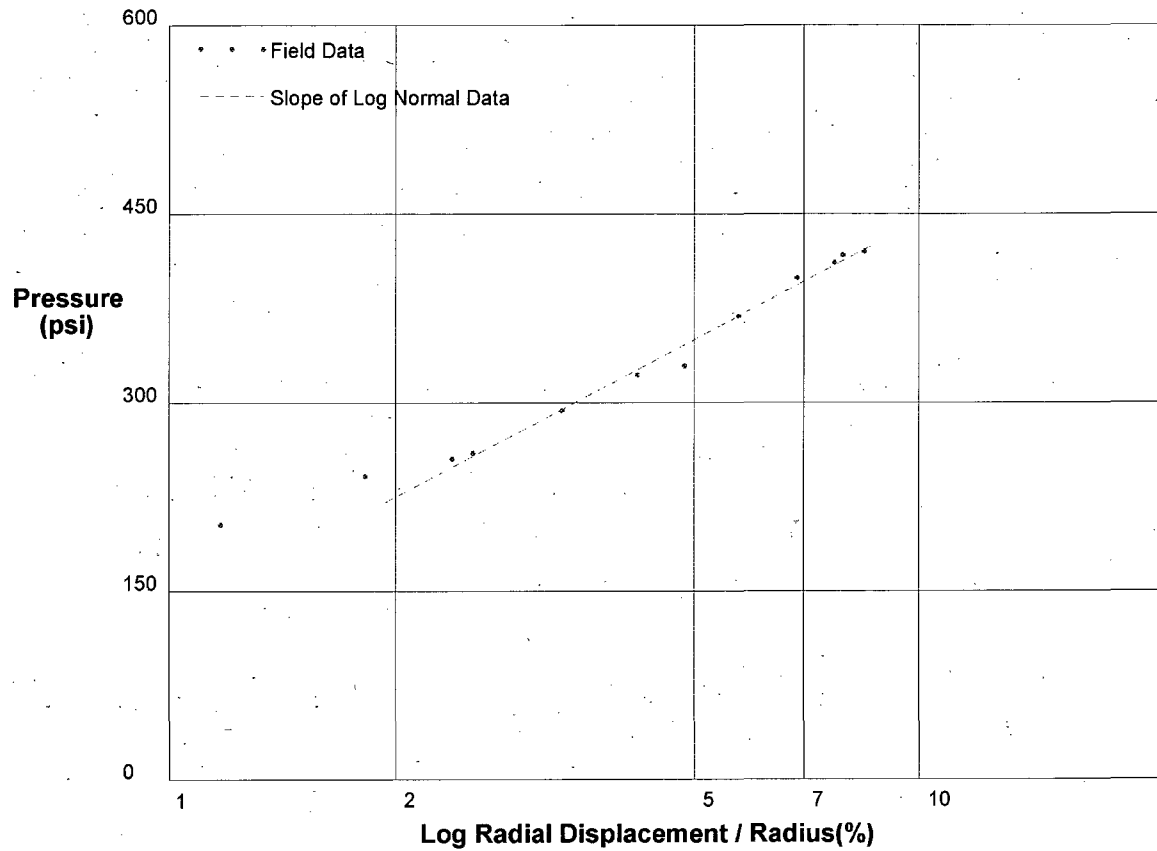
Shear Modulus 18563 psi

Shear Modulus 1954 psi

shift 0

In Situ Engineering

PRESSUREMETER DATA		Mactec Engineering and Consulting Inc.
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City/Texas		6/16/2008
Hole No. T3-5A	Depth 104ft	File C:\DATA\ISE-762\STP15.P

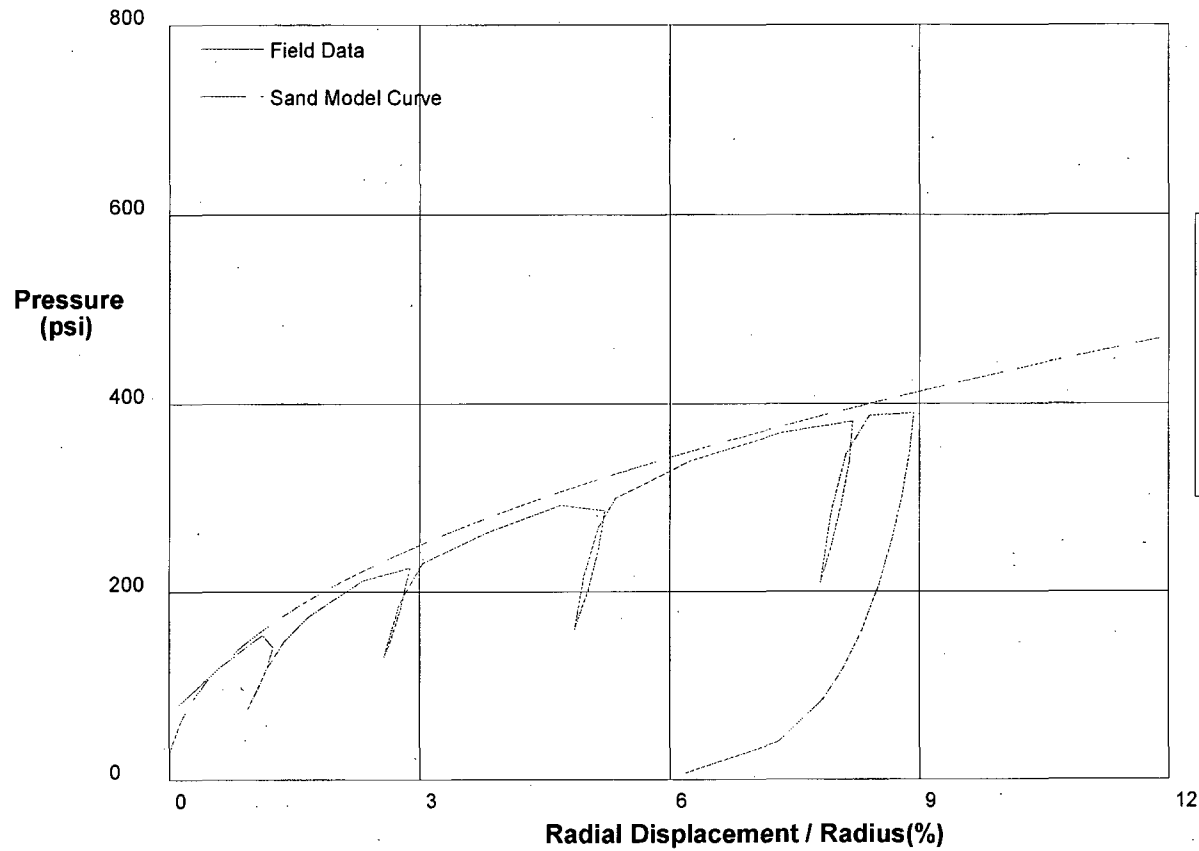


Shear Strength 136.4 psi
Limit Pressure 637 psi

shift 3

In Situ Engineering

PRESSUREMETER DATA		Mactec Engineering and Consulting Inc.	
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City /Texas		6/16/2008	
Hole No. T3-5A	Depth 104ft	File C:\DATA\ISE-762\STP15.P	



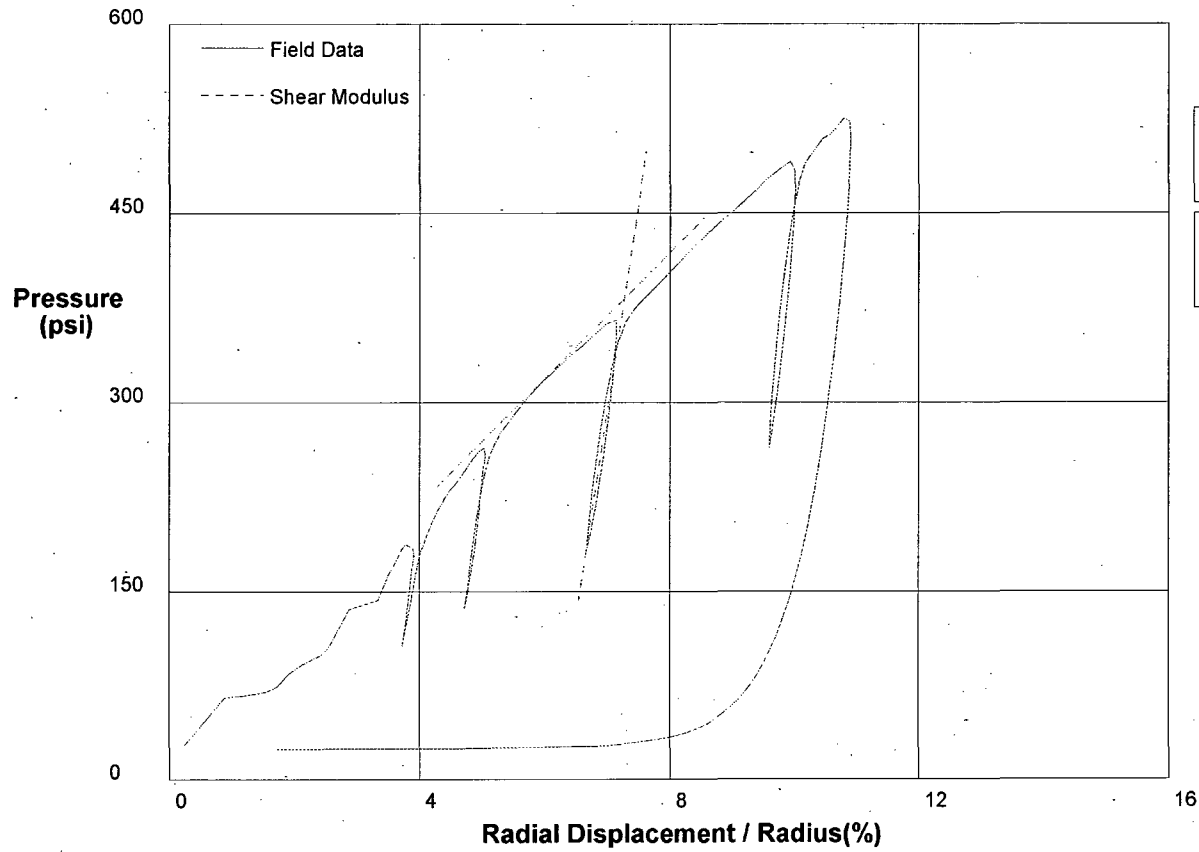
THE In Situ Engineering SAND MODEL

Water Pressure	30 psi
Friction Angle	40 deg
Critical Friction Angle	32 deg
Lateral Stress	28 psi
Shear Modulus	12000 psi

shift 2.5

In Situ Engineering

PRESSUREMETER DATA	Mactec Engineering and Consulting Inc.	
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City /Texas	6/16/2008	
Hole No. T3-5A	Depth 102.5ft	File C:\DATA\ISE-762\STP16.P



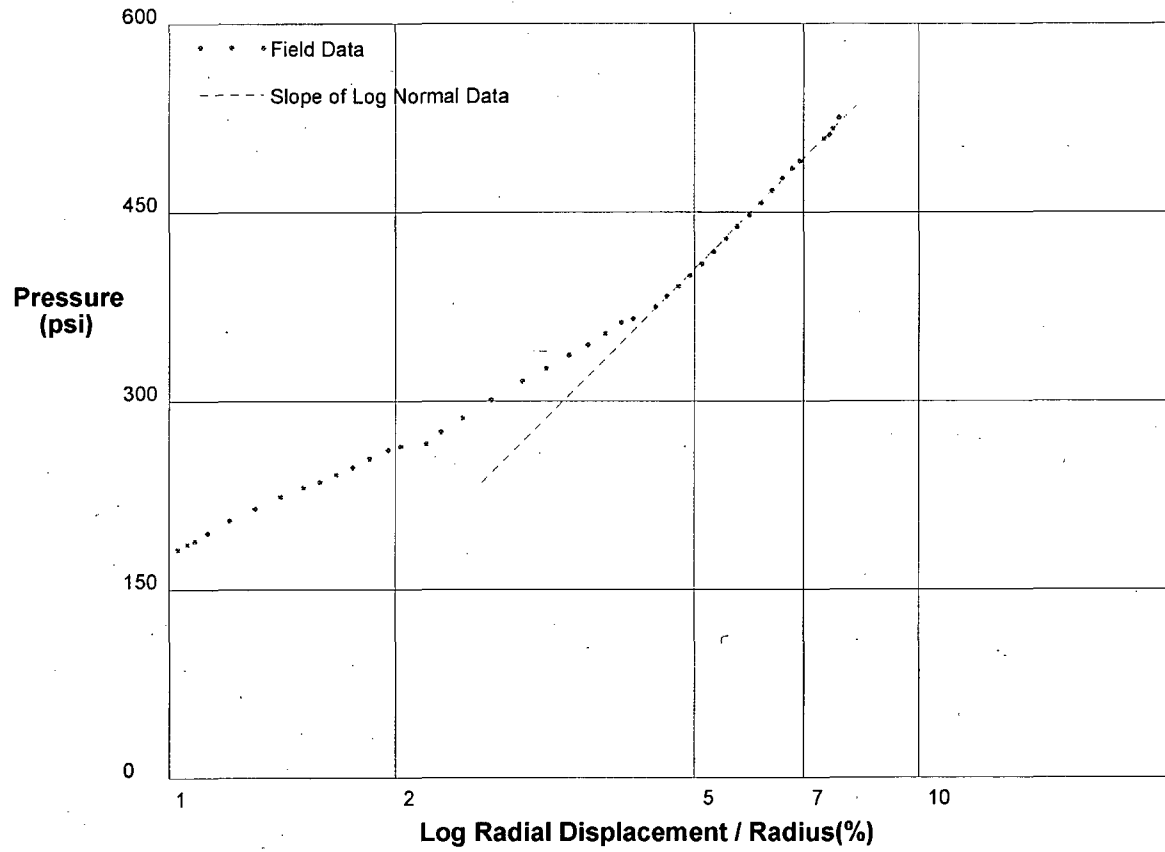
Shear Modulus 16538 psi

Shear Modulus 2500 psi

shift 0

In Situ Engineering

PRESSUREMETER DATA		Mactec Engineering and Consulting Inc.
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City /Texas		6/16/2008
Hole No. T3-5A	Depth 102.5ft	File C:\DATA\ISE-762\STP16.P

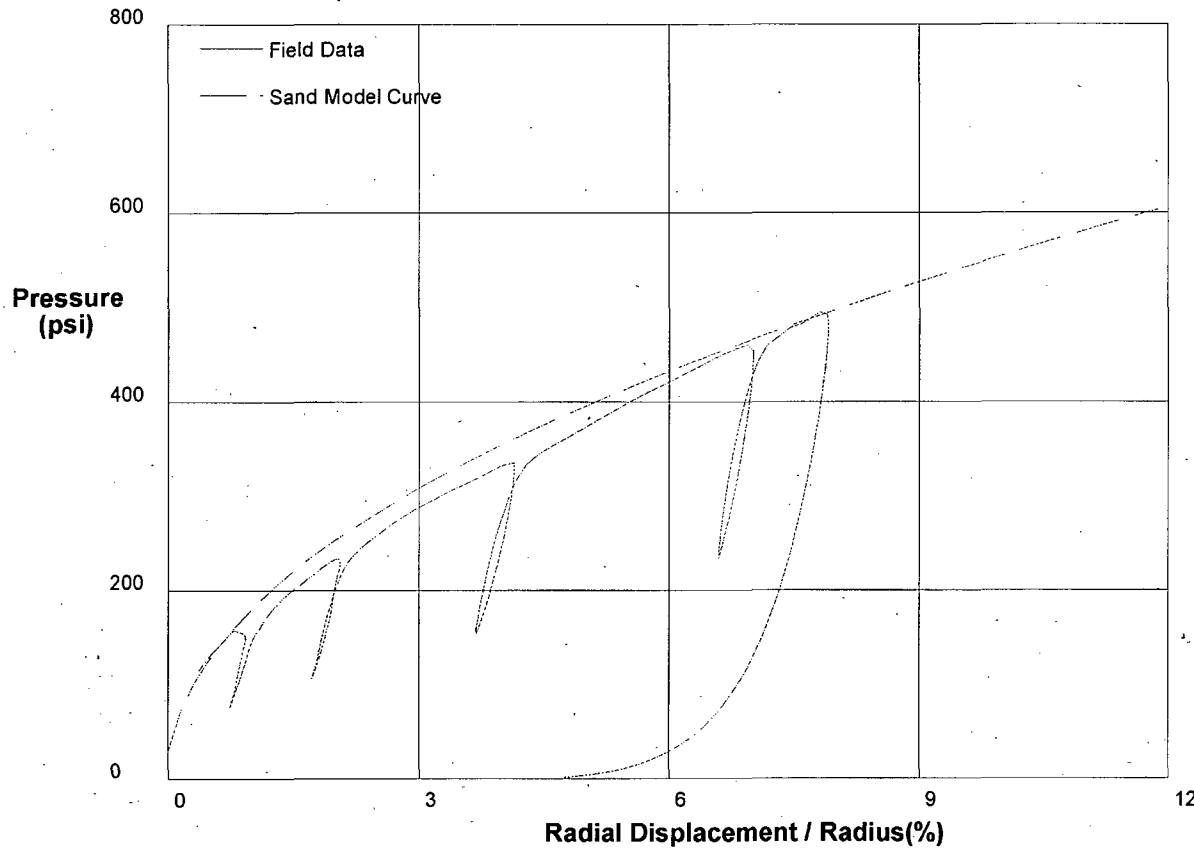


Shear Strength 260.5 psi
Limit Pressure 953 psi

shift 3

In Situ Engineering

PRESSUREMETER DATA		Mactec Engineering and Consulting Inc.
South Texas Nuclear Plant - Flour/STP/Unit 3 & 4/Bay City /Texas		6/16/2008
Hole No. T3-5A	Depth 102.5ft	File C:\DATA\ISE-762\STP16.P



THE In Situ Engineering SAND MODEL

Water Pressure	30 psi
Friction Angle	42 deg
Critical Friction Angle	32 deg
Lateral Stress	28 psi
Shear Modulus	15000 psi

shift 3

In Situ Engineering

MACTEC Engineering and Consulting, Inc.
STP COL Units 3 & 4 Revised Data Report
Project No. 6234-08-4660 Revision 2

July 15, 2008
Revised December 23, 2008

ATTACHMENT D

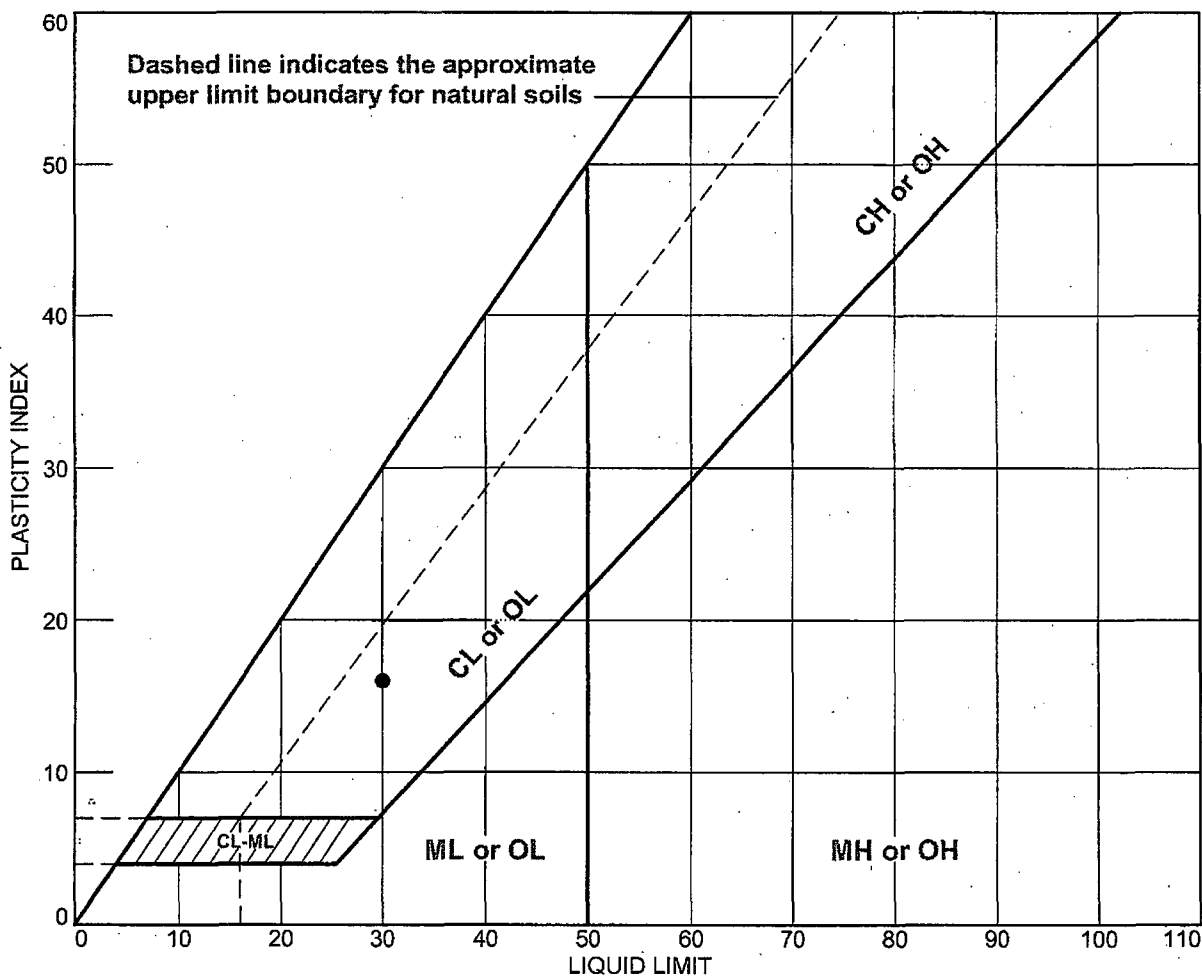
LABORATORY TESTING RESULTS

STP Units 3 & 4
MACTEC Project No. 6234-08-4660
Summary of Laboratory Testing
For Moisture Content
ASTM D 2216-05 Method B

Boring No.	Sample No.	Depth (ft)	Moisture Content (%)
U4-4	SS-15	63.0-64.5	21.1
U3-4	SS-13	48.1-49.6	35.5
U3-4	SS-16	78.1-79.6	19.9
U4-1	SS-14	58.1-59.6	18.8
U4-3	SS-24	59.4-60.9	20.9
T3-7	SS-7	18.4-19.9	22.6
T3-7	SS-8	23.4-24.9	22.6
T3-7	SS-9	28.4-29.9	22.2
T3-7	SS-10	33.4-34.9	23.7
T3-7	SS-11	38.4-39.9	23.8
T3-7	SS-12	43.4-44.9	23.4
T3-7	SS-14	53.4-54.9	24.9
T3-7	SS-15	58.4-59.9	23.9
T3-7	SS-16	63.4-64.9	22.9
T3-7	SS-17	68.4-69.8	22.6
T3-7	SS-18	73.4-74.9	24.2
T3-7	SS-19	78.4-79.9	18.4
T3-7	SS-20	83.4-84.9	23.6
T3-7	SS-21	88.4-89.8	27.7
T3-7	SS-22	93.4-94.9	26.2
T3-7	SS-23	98.4-99.9	34.6
T3-7	SS-24	108.4-109.9	24.5
T3-7	SS-25	118.4-119.9	20.3
T3-7	SS-26	128.4-129.9	22.4
T3-7	SS-27	138.4-139.9	21.4
T3-7	SS-28	148.4-149.9	23.2
T3-7	SS-29	158.4-159.9	20.3
T3-7	SS-31	178.4-179.9	26.2
T3-7	SS-32	188.4-189.9	29.1
T3-7	SS-33	198.4-199.9	33.7
T3-7	SS-34	218.4-219.9	20.1
T3-7	SS-35	238.4-239.9	20.0
T3-7	SS-36	248.4-249.9	30.2
T3-7	SS-38	268.4-269.9	38.6
T3-7	SS-39	278.4-279.9	34.3

Reviewed by: MA 7-6-02

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
•	U4-4	SS-15	63.0'-64.5'	21.1	14	30	16	CL

MACTEC Engineering and Consulting, Inc.

Client: Fluor
Project: STP Units 3 & 4

Charlotte, North Carolina

Project No.: 6234084660

Figure MA 7-8-02

Tested By: Doug Pryor

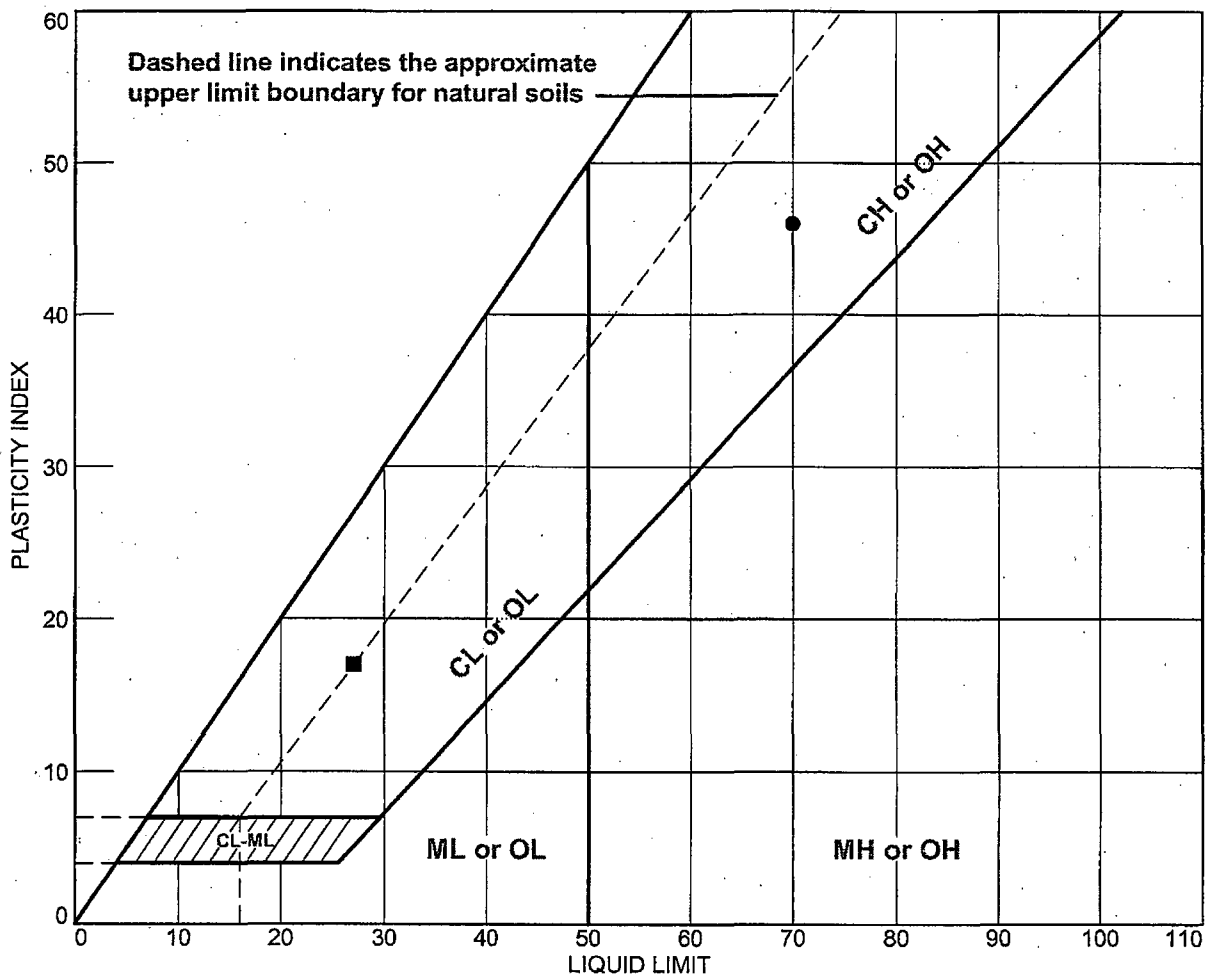
Checked By: David Kopitsky

TOSHIBA CORPORATION
Nuclear Energy Systems & Services Division

520/763

DCN: FLR-321
DCN: FLR-317

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	U3-4	SS-13	48.1'-49.6'	35.5	24	70	46	CH
■	U3-4	SS-16	78.1'-79.6'	19.9	10	27	17	CL

MACTEC Engineering and Consulting, Inc.

Charlotte, North Carolina

Client: Fluor

Project: STP Units 3 & 4

Project No.: 6234084660

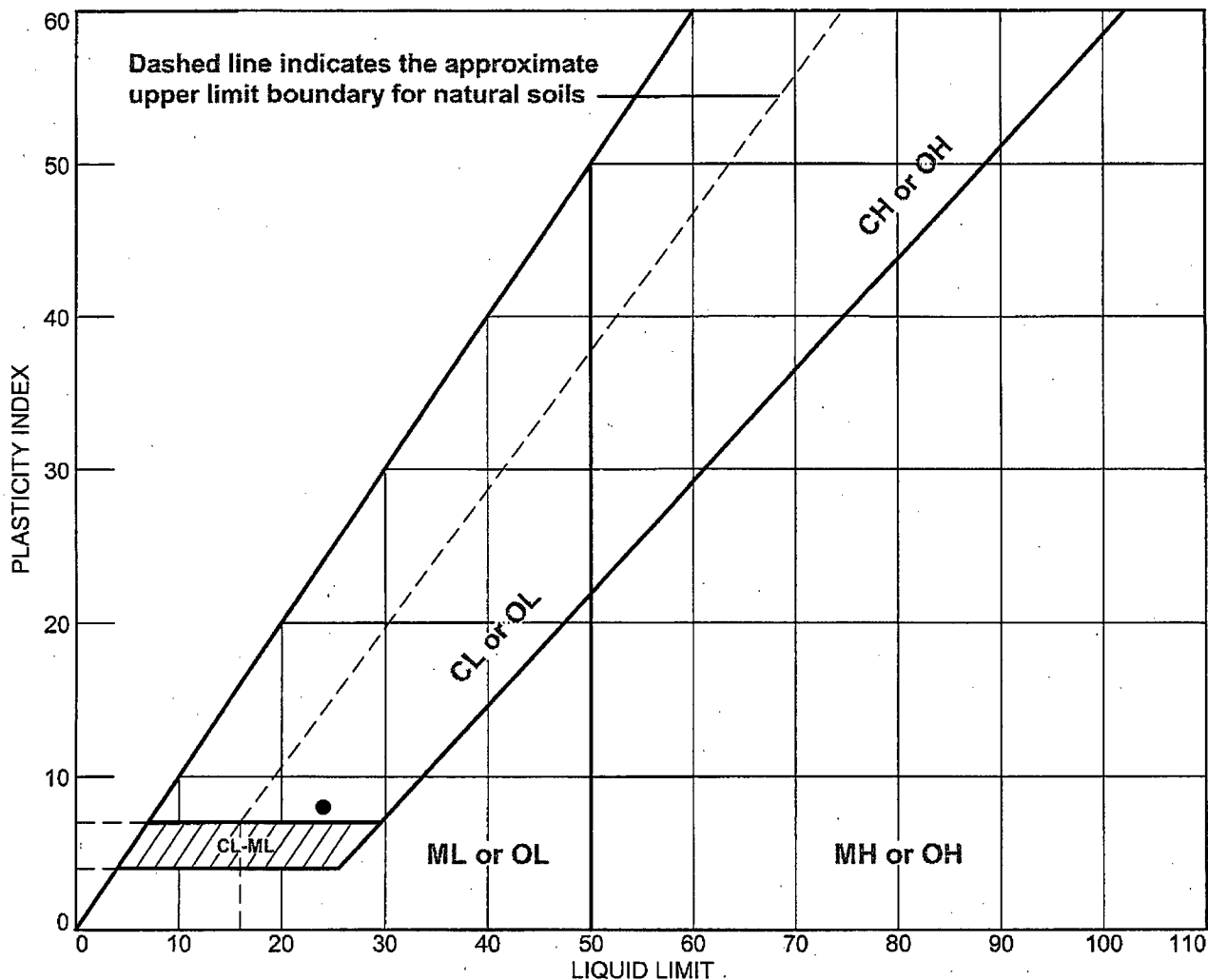
Figure *MA-7-8-02*

Tested By: Doug Pryor
 TOSHIBA CORPORATION
 Nuclear Energy Systems & Services Division

Checked By: David Kopitsky
 521/763

DCN: FLR-321
 DCN: FLR-317

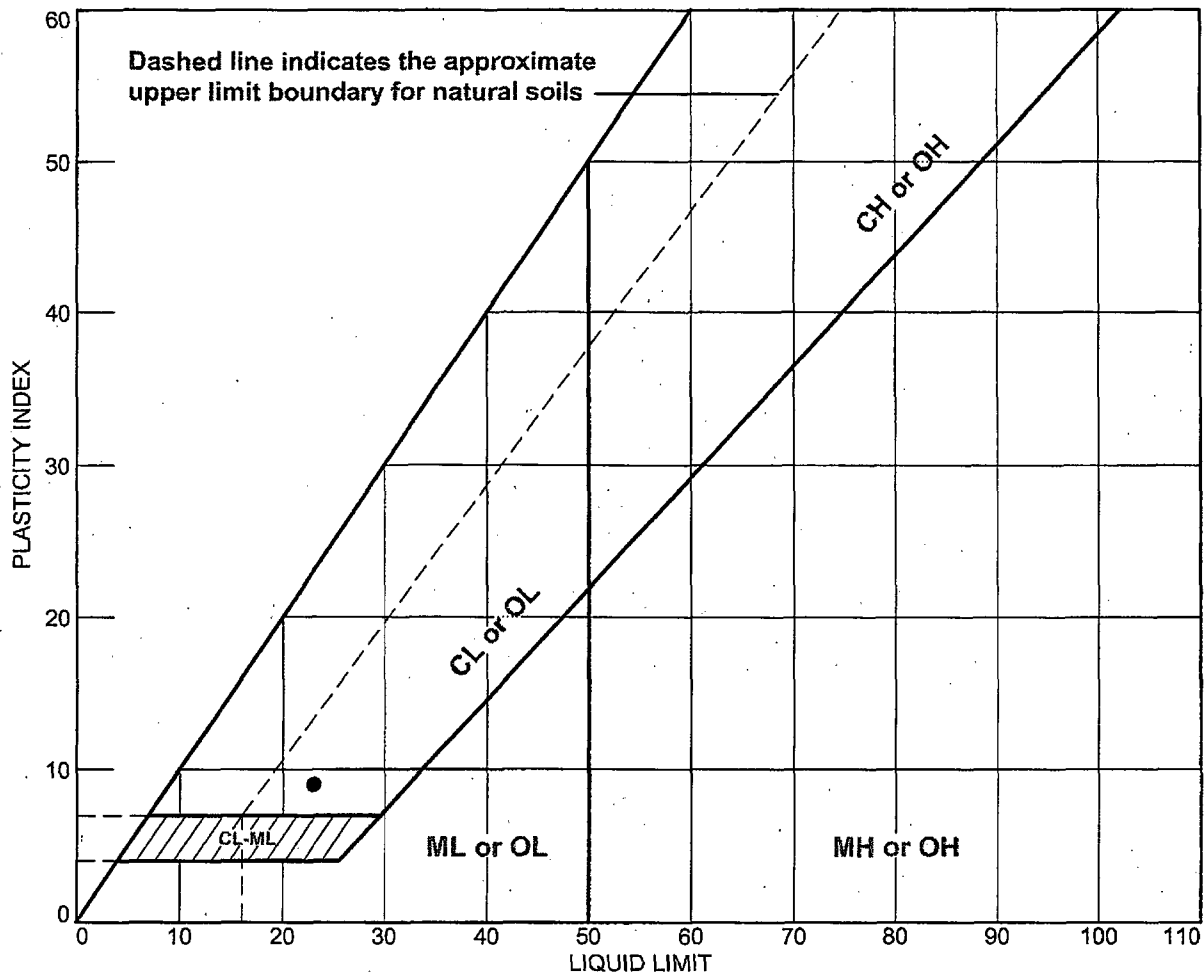
LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
•	U4-1	SS-14	58.1'-59.6'	18.8	16	24	8	CL

<p>MACTEC Engineering and Consulting, Inc.</p> <p style="text-align: center;">Charlotte, North Carolina</p>	<p>Client: Fluor</p> <p>Project: STP Units 3 & 4</p> <p>Project No.: 6234084660</p> <p style="text-align: right;">Figure <i>MA-7-3-02</i></p>
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LIQUID AND PLASTIC LIMITS TEST REPORT

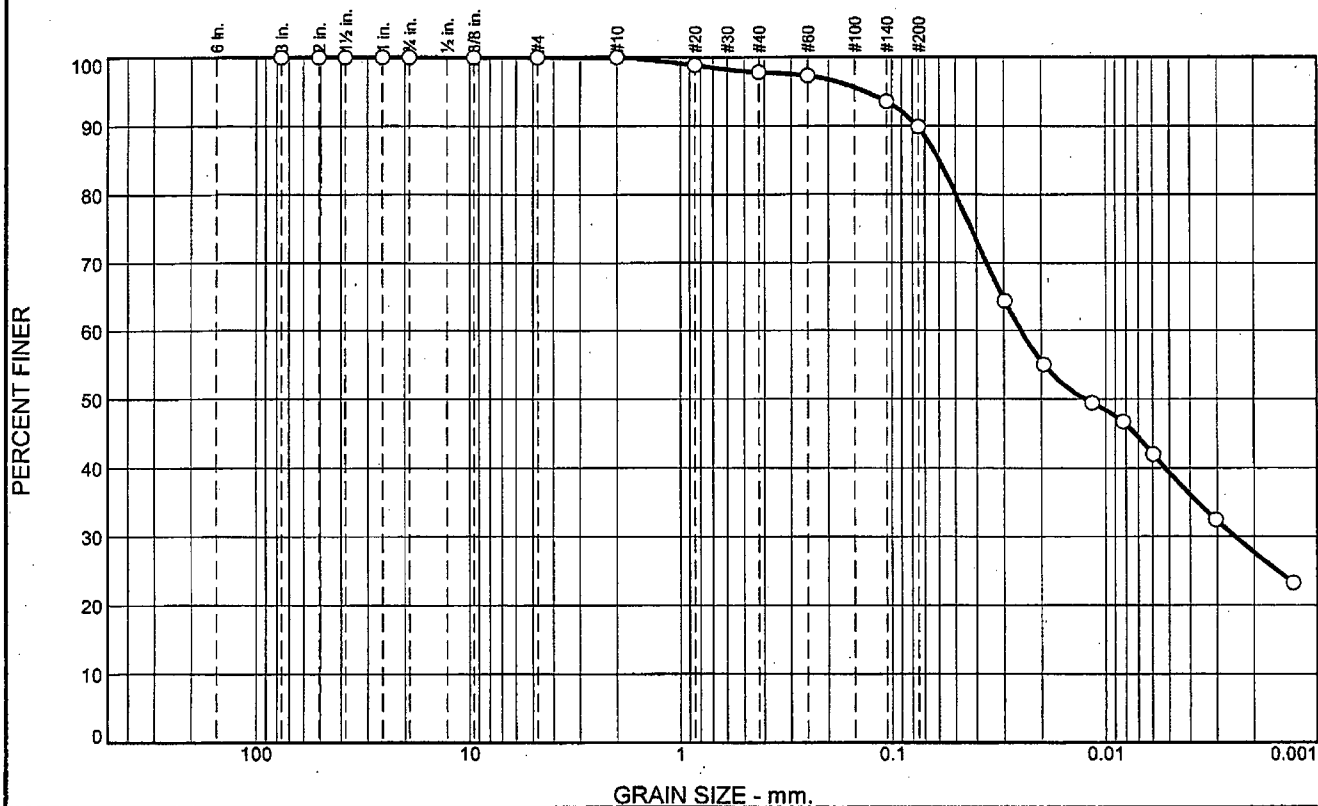


SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
•	U4-3	SS-24	59.4'-60.9'	20.9	14	23	9	CL

<p>MACTEC Engineering and Consulting, Inc.</p> <p style="text-align: center;">Charlotte, North Carolina</p>	<p>Client: Fluor</p> <p>Project: STP Units 3 & 4</p> <p>Project No.: 6234084660</p>
--	--

Figure ~~10~~ 7-2-08

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	2.2	8.0	50.5	39.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3in.	100.0		
2in.	100.0		
1.5in.	100.0		
1in.	100.0		
3/4in.	100.0		
3/8in.	100.0		
#4	100.0		
#10	100.0		
#20	98.8		
#40	97.8		
#60	97.3		
#140	93.5		
#200	89.8		
0.0297 mm.	64.4		
0.0195 mm.	55.1		
0.0116 mm.	49.4		
0.0082 mm.	46.7		
0.0059 mm.	42.0		
0.0030 mm.	32.5		
0.0013 mm.	23.3		

Soil Description

PL= 14 **Atterberg Limits** LL= 30 PI= 16

Coefficients

D₈₅= 0.0597 D₆₀= 0.0250 D₅₀= 0.0125
D₃₀= 0.0025 D₁₅= D₁₀=
C_u= C_c=

USCS= CL **Classification** AASHTO= A-6(13)

Remarks

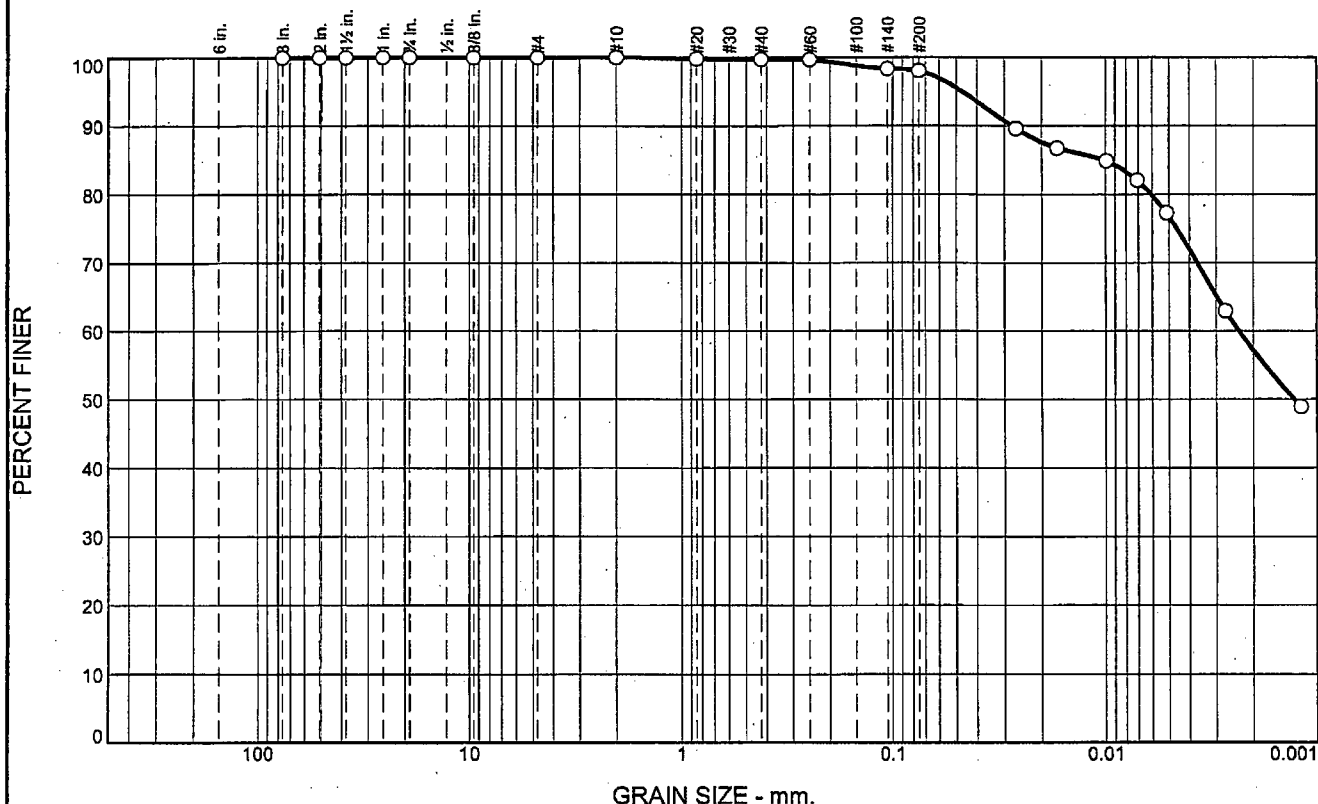
Jar Sample

(no specification provided)

Sample No.: SS-15 Source of Sample: U4-4 Date: 6-25-08
Location: U4-4 Elev./Depth: 63.0'-64.5'

MACTEC Engineering and Consulting, Inc. Charlotte, North Carolina	Client: Fluor Project: STP Units 3 & 4 Project No: 6234084660
Figure MA-7-2-02	

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.2	1.8	21.2	76.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3in.	100.0		
2in.	100.0		
1.5in.	100.0		
1in.	100.0		
3/4in.	100.0		
3/8in.	100.0		
#4	100.0		
#10	100.0		
#20	99.8		
#40	99.8		
#60	99.7		
#140	98.3		
#200	98.0		
0.0263 mm.	89.6		
0.0169 mm.	86.8		
0.0099 mm.	84.9		
0.0071 mm.	82.1		
0.0051 mm.	77.3		
0.0027 mm.	63.0		
0.0012 mm.	48.9		

Soil Description

Atterberg Limits
 PL = 24 LL = 70 PI = 46

Coefficients
 D₈₅ = 0.0101 D₆₀ = 0.0023 D₅₀ = 0.0013
 D₃₀ = D₁₅ = D₁₀ =
 C_u = C_c =

Classification
 USCS = CH AASHTO = A-7-6(52)

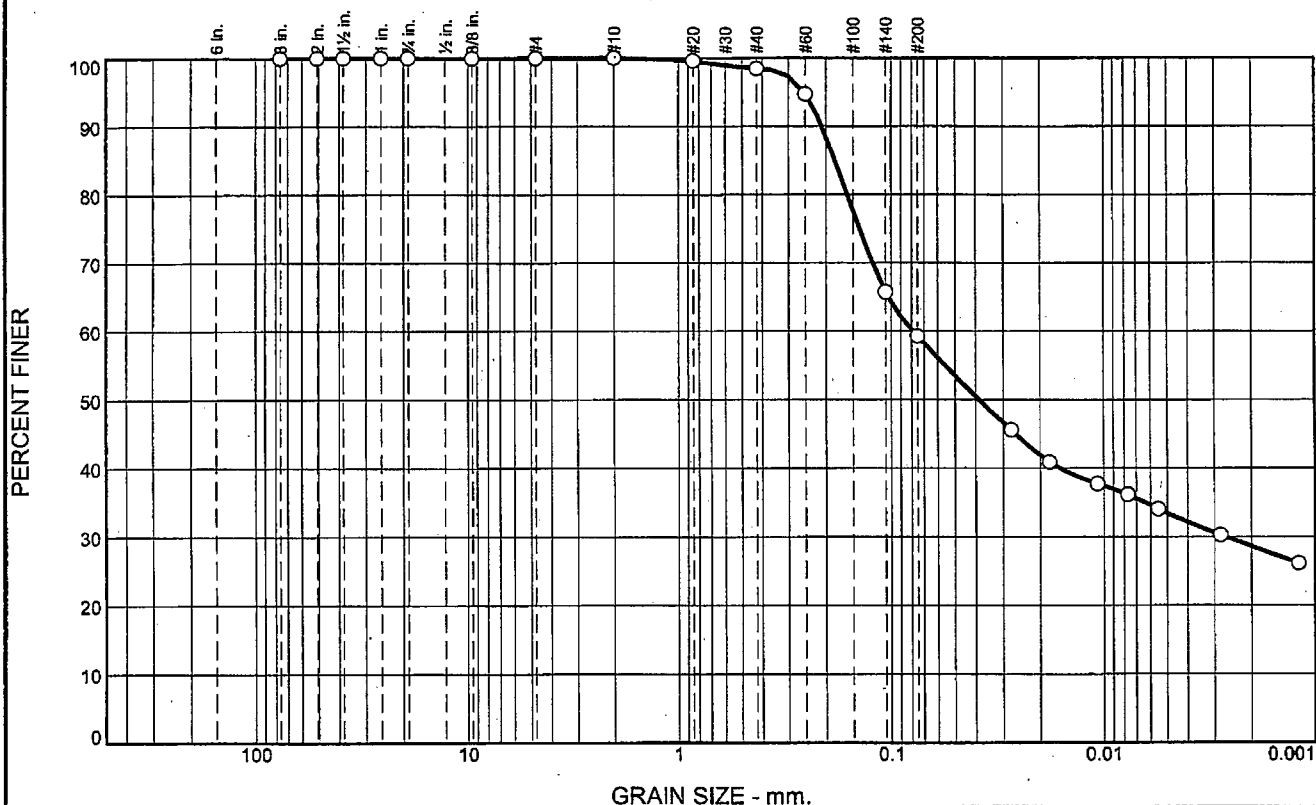
Remarks
 Jar Sample

* (no specification provided)

Sample No.: SS-13 Source of Sample: U3-4 Date: 6-25-08
 Location: U3-4 Elev./Depth: 48.1'-49.6'

MACTEC Engineering and Consulting, Inc. Charlotte, North Carolina	Client: Fluor Project: STP Units 3 & 4 Project No: 6234084660
Figure MA 7-B-03	

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	1.5	39.2	25.8	33.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3in	100.0		
2in	100.0		
1.5in	100.0		
1in	100.0		
3/4in	100.0		
3/8in	100.0		
#4	100.0		
#10	100.0		
#20	99.6		
#40	98.5		
#60	94.7		
#140	65.7		
#200	59.3		
0.0274 mm.	45.6		
0.0181 mm.	40.9		
0.0107 mm.	37.8		
0.0077 mm.	36.2		
0.0055 mm.	34.1		
0.0028 mm.	30.3		
0.0012 mm.	26.2		

Soil Description

PL= 10 **Atterberg Limits** LL= 27 PI= 17

Coefficients

D₈₅= 0.1815 D₆₀= 0.0788 D₅₀= 0.0385
D₃₀= 0.0026 D₁₅= D₁₀=
C_u= C_c=

USCS= CL **Classification** AASHTO= A-6(6)

Remarks

Jar Sample

(no specification provided)

Sample No.: SS-16
Location: U3-4

Source of Sample: U3-4

Date: 6-25-08
Elev./Depth: 78.1'-79.6'

MACTEC Engineering and Consulting, Inc.

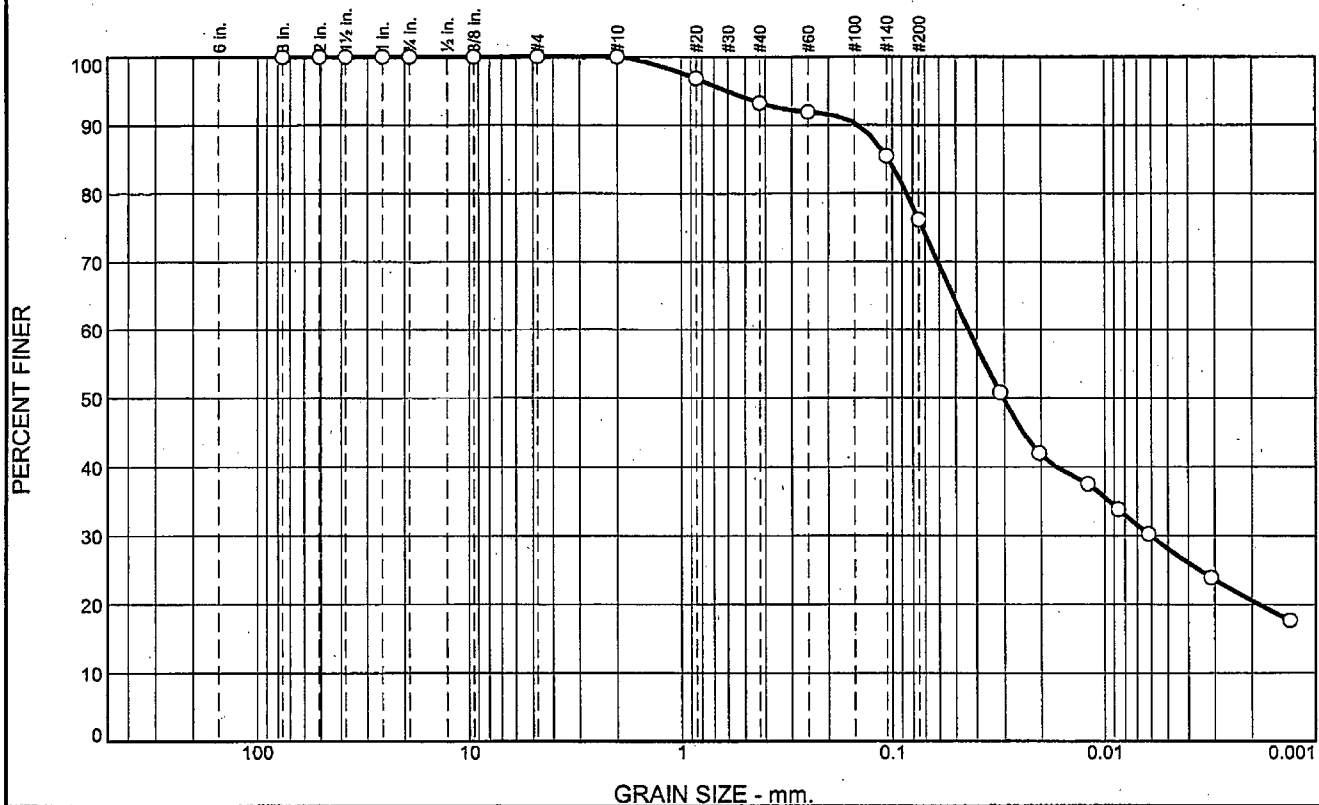
Client: Fluor
Project: STP Units 3 & 4

Charlotte, North Carolina

Project No: 6234084660

Figure ~~NA~~ 1-a-0a

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	6.7	17.1	48.1	28.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3in.	100.0		
2in.	100.0		
1.5in.	100.0		
1in.	100.0		
3/4in.	100.0		
3/8in.	100.0		
#4	100.0		
#10	100.0		
#20	96.8		
#40	93.3		
#60	91.9		
#140	85.5		
#200	76.2		
0.0312 mm.	50.8		
0.0204 mm.	42.0		
0.0120 mm.	37.5		
0.0086 mm.	33.9		
0.0062 mm.	30.3		
0.0031 mm.	23.9		
0.0013 mm.	17.7		

Soil Description

PL= 16 Atterberg Limits LL= 24 PI= 8

Coefficients

D₈₅= 0.1035 D₆₀= 0.0436 D₅₀= 0.0302
D₃₀= 0.0060 D₁₅= D₁₀=
C_u= C_c=

USCS= CL Classification AASHTO= A-4(4)

Remarks

Jar Sample

* (no specification provided)

Sample No.: SS-14
 Location: U4-1

Source of Sample: U4-1

Date: 6-25-08
 Elev./Depth: 58.1'-59.6'

MACTEC Engineering and Consulting, Inc.

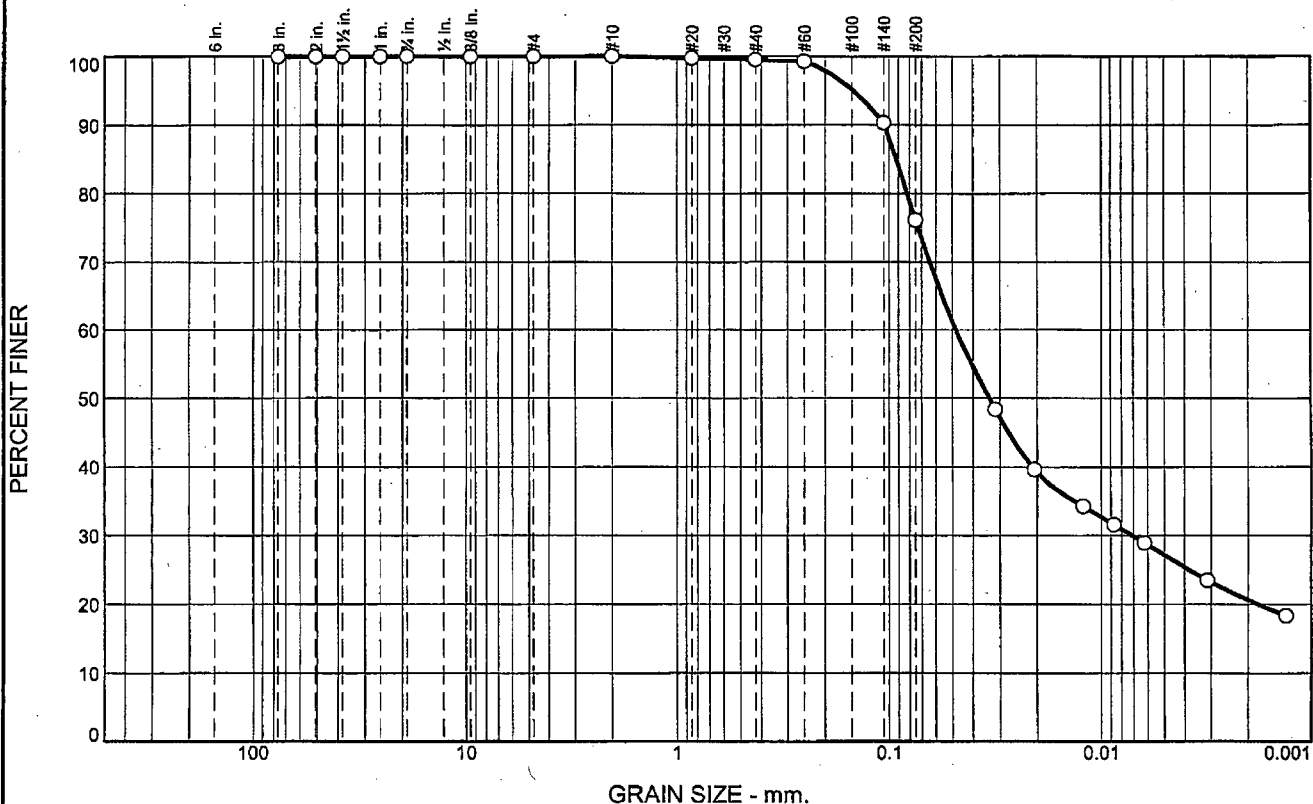
Client: Fluor
 Project: STP Units 3 & 4

Charlotte, North Carolina

Project No: 6234084660

Figure MA 7-a-08

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.5	23.3	49.0	27.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3in.	100.0		
2in.	100.0		
1.5in.	100.0		
1in.	100.0		
3/4in.	100.0		
3/8in.	100.0		
#4	100.0		
#10	100.0		
#20	99.8		
#40	99.5		
#60	99.3		
#140	90.3		
#200	76.2		
0.0314 mm.	48.4		
0.0206 mm.	39.6		
0.0121 mm.	34.3		
0.0087 mm.	31.6		
0.0062 mm.	28.9		
0.0031 mm.	23.5		
0.0013 mm.	18.3		

Soil Description

PL= 14 **Atterberg Limits** LL= 23 PI= 9

Coefficients

D₈₅= 0.0921 D₆₀= 0.0480 D₅₀= 0.0335
D₃₀= 0.0071 D₁₅= D₁₀=
C_u= C_c=

USCS= CL **Classification** AASHTO= A-4(4)

Remarks

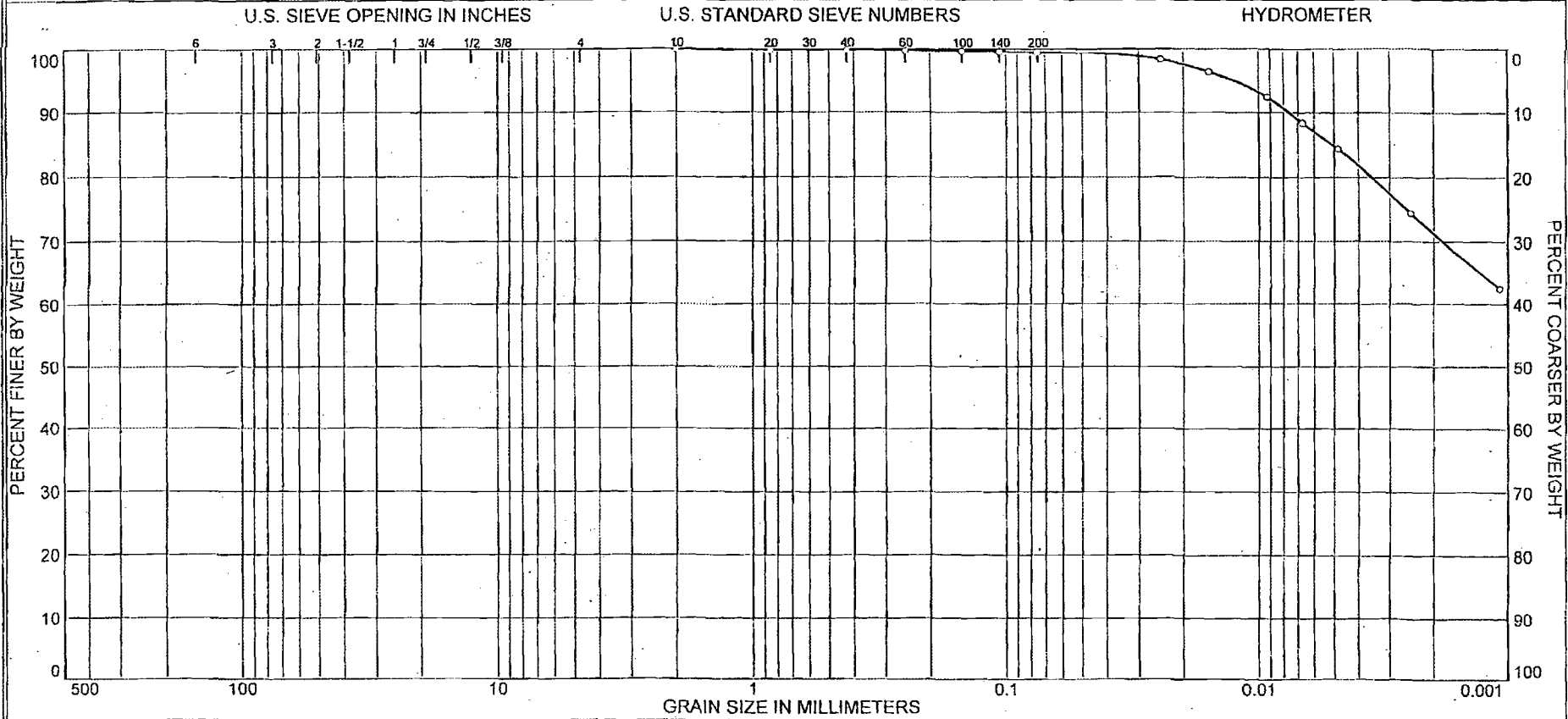
Jar Sample

(no specification provided)

Sample No.: SS-24 Source of Sample: U4-3 Date: 6-25-08
Location: U4-3 Elev./Depth: 59.4'-60.9'

MACTEC Engineering and Consulting, Inc. Charlotte, North Carolina	Client: Fluor Project: STP Units 3 & 4 Project No: 6234084660 Figure MA 7-3-08
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Particle Size Distribution Report (ASTM D422-63 (2007))



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	0.5	14.6	84.9

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
U3-2A	UD-1	48-50 ft	6/25/08	CH	Brown Fat Clay		61	25

Client Fluor Enterprises, Inc.	MACTEC ENGINEERING AND CONSULTING, INC.	Tested by: EH Reviewed by: JW
Project STP Units 3 & 4		Specific Gravity = 2.749 (ASTM D 854-06)
Project No. 6234084660, Task 1.2		Lab No. 8950

GRAIN SIZE DISTRIBUTION TEST DATA

RS-ST30404

Client: Fluor Enterprises, Inc.
 Project: STP Units 3 & 4
 Project Number: 6234084660, Task 1.2

Sample Data

Source: U3-2A
 Sample No.: UD-1
 Elev. or Depth: 48-50 ft Sample Length(in./cm.): 8950
 Location: U3-2A
 Description: Brown Fat Clay
 Date: 6/25/08 Natural Moisture: 34.9
 Liquid Limit: 61 Plastic Limit: 25 USCS Class.: CH
 Testing Remarks: Tested by: EH Reviewed by: JW

Specific Gravity = 2.749 (ASTM D 854-06)

Mechanical Analysis Data

	Initial	
Dry sample and tare=	64.96	
Tare =	15.86	
Dry sample weight =	49.10	
Tare for cumulative weight retained=	.00	
Sieve	Cumul. Wt. retained	Percent finer
# 10	0.00	100.0
# 20	0.04	99.9
# 40	0.06	99.9
# 60	0.10	99.8
# 100	0.13	99.7
# 140	0.18	99.6
# 200	0.23	99.5

Hydrometer Analysis Data

Separation sieve is #200
 Percent -#200 based upon complete sample= 99.5
 Weight of hydrometer sample: 48.87
 Calculated biased weight= 49.12
 Automatic temperature correction
 Composite correction at 20 deg C = -5.4

 Meniscus correction only= 0
 Specific gravity of solids= 2.749
 Specific gravity correction factor= 0.979
 Hydrometer type: 152H
 Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
2.00	23.3	54.0	49.3	0.0127	54.0	7.4	0.0246	98.4
5.00	23.3	53.0	48.3	0.0127	53.0	7.6	0.0157	96.4
15.00	23.3	51.0	46.3	0.0127	51.0	7.9	0.0093	92.4
30.00	23.3	49.0	44.3	0.0127	49.0	8.3	0.0067	88.4
60.00	23.3	47.0	42.3	0.0127	47.0	8.6	0.0048	84.4

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer	10404
250.00	23.3	42.0	37.3	0.0127	42.0	9.4	0.0025	74.4	
1440.00	23.3	36.0	31.3	0.0127	36.0	10.4	0.0011	62.5	

Fractional Components

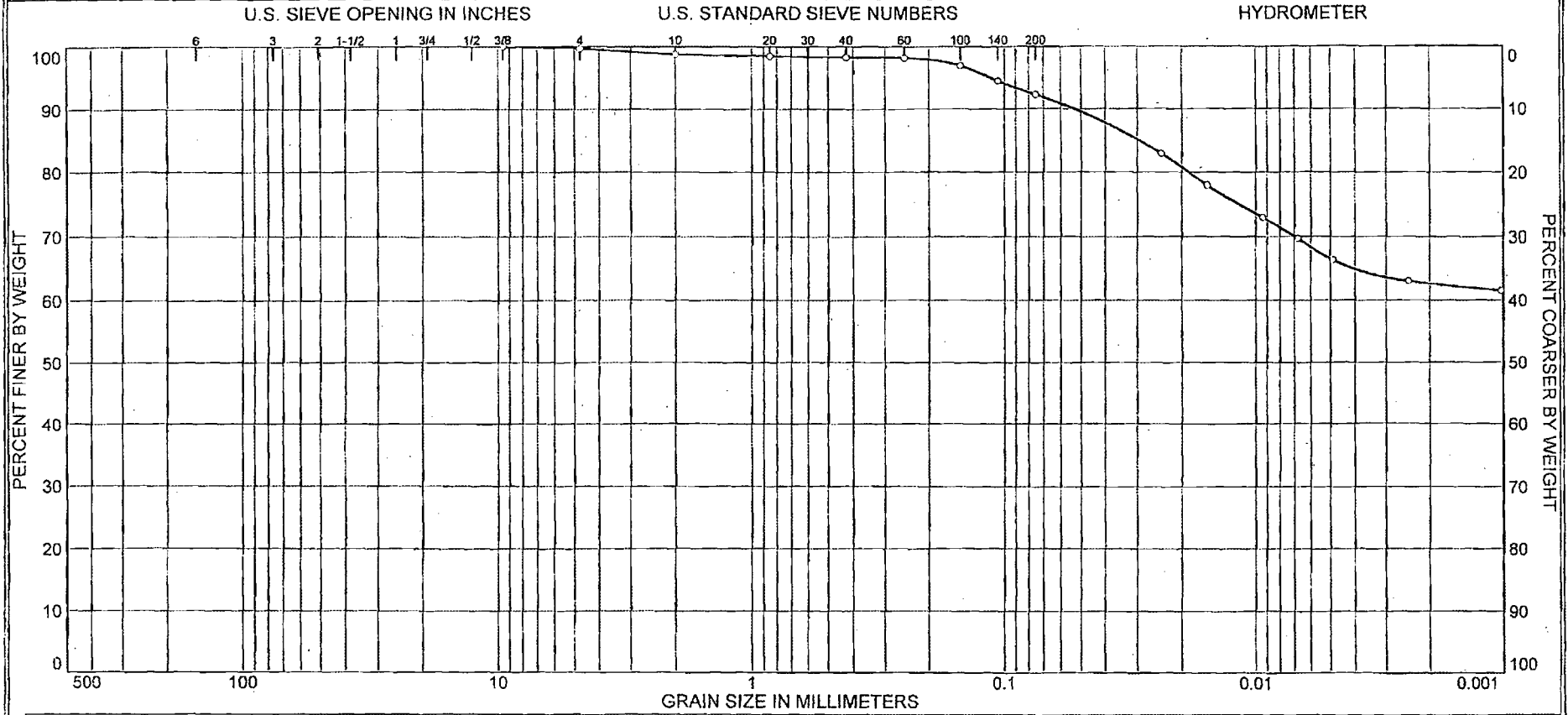
Gravel/Sand based on #4

Sand/Fines based on #200

% COBBLES = % GRAVEL = % SAND = 0.5
 % SILT = 14.6 % CLAY = 84.9

D₈₅ = 0.01

Particle Size Distribution Report (ASTM D422-63 (2007))



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.3	7.4	25.7	66.6

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
U3-3A	UD-2	50-52 ft	6/23/08	CH	Gray Fat Clay		60	24

Client Fluor Enterprises, Inc.	MACTEC ENGINEERING AND CONSULTING, INC.	Tested by: EH	Reviewed by: HJ
Project STP Units 3 & 4		Specific Gravity = 2.784 (ASTM D 854-06)	
Project No. 6234084660, Task 1.2		Lab No. 8956	

Client: Fluor Enterprises, Inc.
 Project: STP Units 3 & 4
 Project Number: 6234084660, Task 1.2

Sample Data

Source: U3-3A
 Sample No.: UD-2
 Elev. or Depth: 50-52 ft Sample Length(in./cm.): 8956
 Location: U3-3A
 Description: Gray Fat Clay
 Date: 6/23/08 Natural Moisture:
 Liquid Limit: 60 Plastic Limit: 24 USCS Class.: CH
 Testing Remarks: Tested by: EH Reviewed by: HJ

Specific Gravity = 2.784 (ASTM D 854-06)

Mechanical Analysis Data

Initial
 Dry sample and tare= 75.19
 Tare = 16.24
 Dry sample weight = 58.95
 Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
.375 inch	0.00	100.0
# 4	0.16	99.7
# 10	0.68	98.8
# 20	0.89	98.5
# 40	0.99	98.3
# 60	1.06	98.2
# 100	1.77	97.0
# 140	3.25	94.5
# 200	4.54	92.3

Hydrometer Analysis Data

Separation sieve is #200
 Percent -#200 based upon complete sample= 92.3
 Weight of hydrometer sample: 54.41
 Calculated biased weight= 58.95
 Automatic temperature correction
 Composite correction at 20 deg C = -5.4

Meniscus correction only= 0
 Specific gravity of solids= 2.784
 Specific gravity correction factor= 0.972
 Hydrometer type: 152H
 Effective depth $L = 16.294964 - 0.164 \times R_m$

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	R _m	Eff. depth	Diameter mm	Percent finer
2.00	23.1	55.0	50.3	0.0126	55.0	7.3	0.0241	82.9
5.00	23.1	52.0	47.3	0.0126	52.0	7.8	0.0157	78.0
15.00	23.1	49.0	44.3	0.0126	49.0	8.3	0.0094	73.0

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
30.00	23.1	47.0	42.3	0.0126	47.0	8.6	0.0068	69.7
60.00	23.1	45.0	40.3	0.0126	45.0	8.9	0.0049	66.4
250.00	23.1	43.0	38.3	0.0126	43.0	9.2	0.0024	63.1
1440.00	23.1	42.0	37.3	0.0126	42.0	9.4	0.0010	61.5

Fractional Components

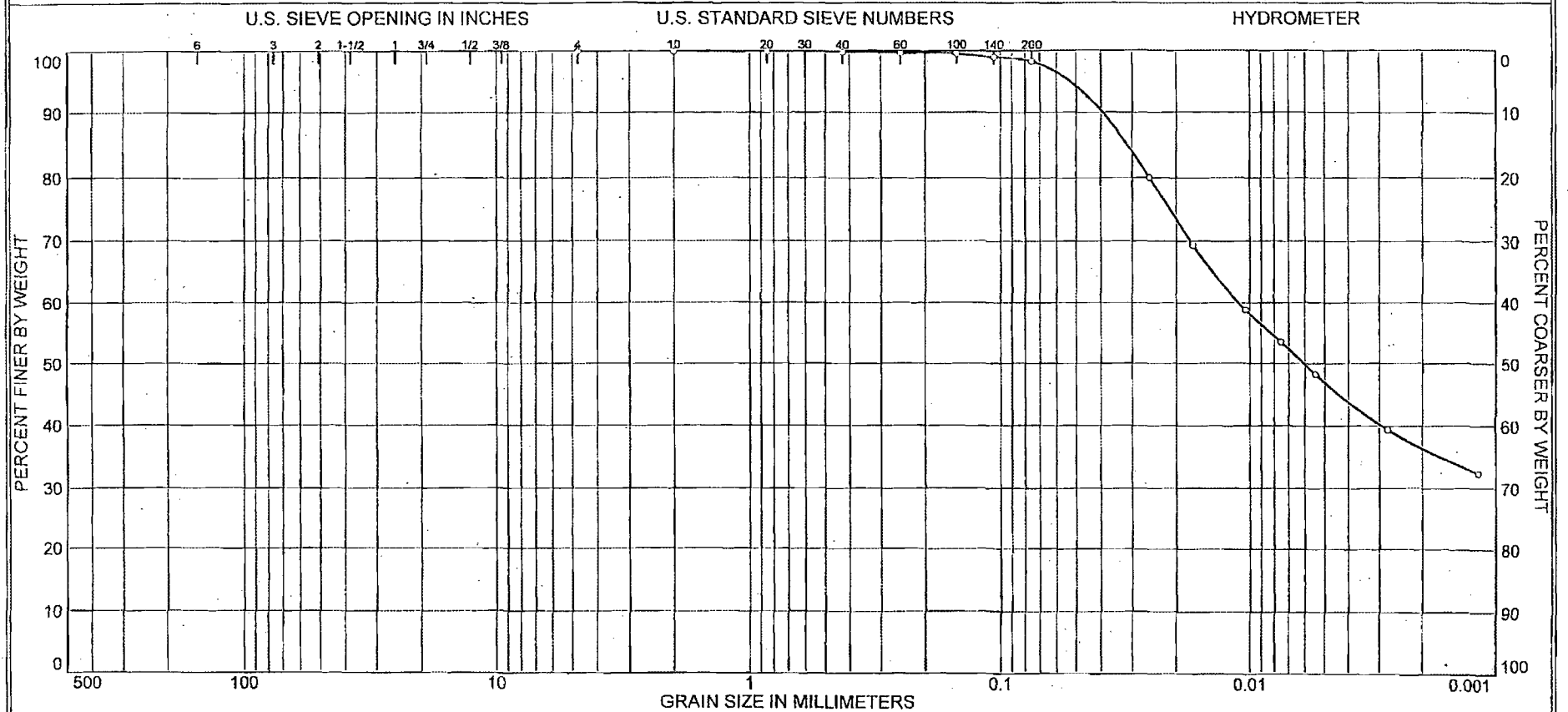
Gravel/Sand based on #4

Sand/Fines based on #200

% COBBLES = % GRAVEL = 0.3 % SAND = 7.4
 % SILT = 25.7 % CLAY = 66.6

D₈₅ = 0.03

Particle Size Distribution Report (ASTM D422-63 (2007))



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	1.7	51.4	46.9

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
U3-3A	UD-3	60-62 ft	6/23/08	CL	Strong Brown Lean Clay		35	16

Client Fluor Enterprises, Inc. Project STP Units 3 & 4	MACTEC ENGINEERING AND CONSULTING, INC.	Tested by: EH Reviewed by: JW Specific Gravity = 2.758 (ASTM D 854-06)
Project No. 6234084660, Task 1.2 Lab No. 8951		

GRAIN SIZE DISTRIBUTION TEST DATA

RS-5130404

Client: Fluor Enterprises, Inc.
 Project: STP Units 3 & 4
 Project Number: 6234084660, Task 1.2

Sample Data

Source: U3-3A
 Sample No.: UD-3
 Elev. or Depth: 60-62 ft Sample Length(in./cm.): 8951
 Location: U3-3A
 Description: Strong Brown Lean Clay
 Date: 6/23/08 Natural Moisture: 22.2
 Liquid Limit: 35 Plastic Limit: 16 USCS Class.: CL
 Testing Remarks: Tested by: EH Reviewed by: JW

Specific Gravity = 2.758 (ASTM D 854-06)

Mechanical Analysis Data

Initial

Dry sample and tare= 71.98
 Tare = 16.60
 Dry sample weight = 55.38
 Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
# 4	0.00	100.0
# 10	0.05	99.9
# 20	0.07	99.9
# 40	0.11	99.8
# 60	0.16	99.7
# 100	0.26	99.5
# 140	0.56	99.0
# 200	0.93	98.3

Hydrometer Analysis Data

Separation sieve is #200
 Percent -#200 based upon complete sample= 98.3
 Weight of hydrometer sample: 54.45
 Calculated biased weight= 55.39
 Automatic temperature correction
 Composite correction at 20 deg C = -5.4

Meniscus correction only= 0
 Specific gravity of solids= 2.758
 Specific gravity correction factor= 0.977
 Hydrometer type: 152H
 Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
2.00	23.3	50.0	45.3	0.0127	50.0	8.1	0.0255	80.0
5.00	23.3	44.0	39.3	0.0127	44.0	9.1	0.0171	69.4
15.00	23.3	38.0	33.3	0.0127	38.0	10.1	0.0104	58.8
30.00	23.3	35.0	30.3	0.0127	35.0	10.6	0.0075	53.5

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer	Settling time, min
60.00	23.3	32.0	27.3	0.0127	32.0	11.0	0.0054	48.2	10404
250.00	23.3	27.0	22.3	0.0127	27.0	11.9	0.0028	39.4	
1440.00	23.3	23.0	18.3	0.0127	23.0	12.5	0.0012	32.4	

Fractional Components

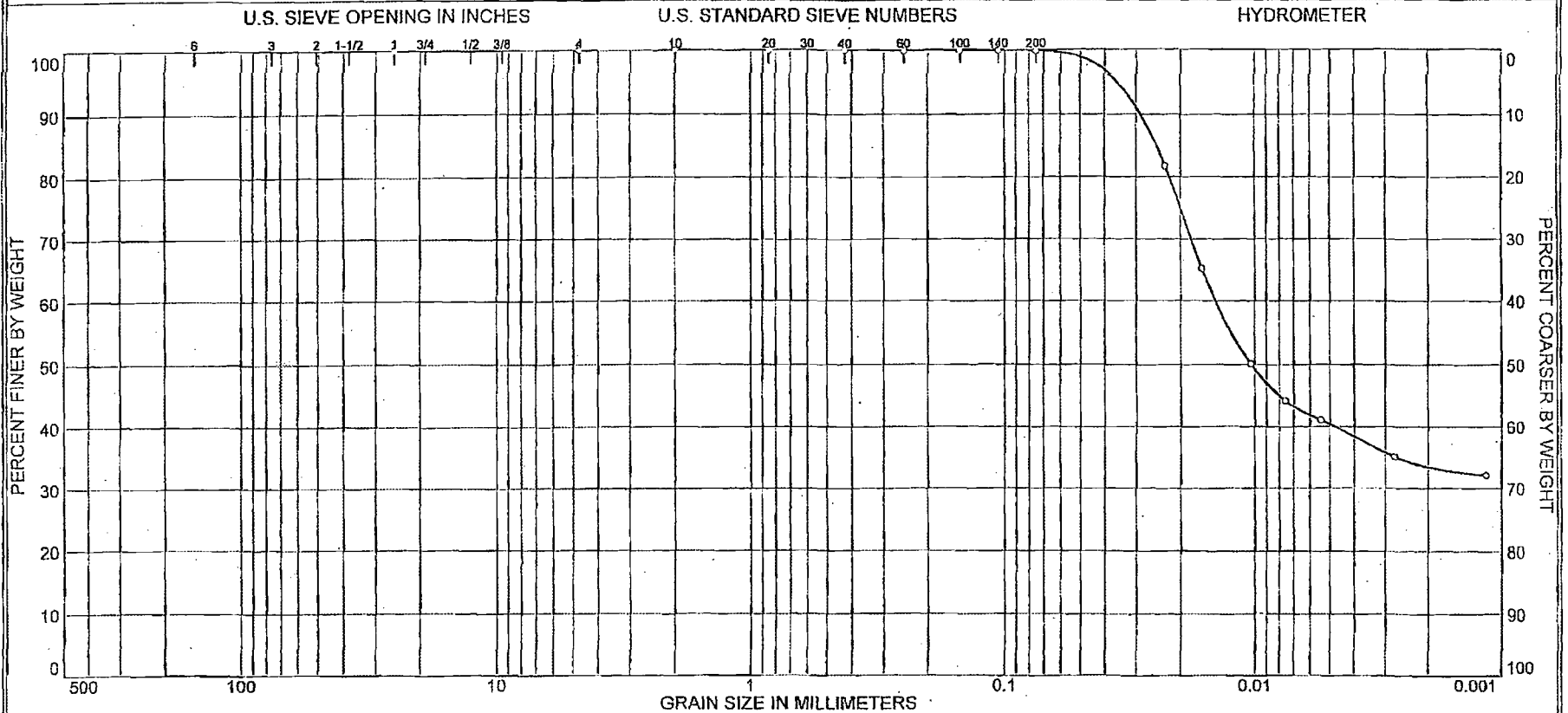
Gravel/Sand based on #4

Sand/Fines based on #200

% COBBLES = % GRAVEL = % SAND = 1.7
 % SILT = 51.4 % CLAY = 46.9

D₈₅ = 0.03 D₆₀ = 0.01 D₅₀ = 0.01

Particle Size Distribution Report (ASTM D422-63 (2007))



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	0.2	59.4	40.4

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
U3-6A	UD-3	100-102 ft	6/25/08	CL	Brown and Light Brownish Gray Lean Clay		43	18

Client: Fluor Enterprises, Inc.	MACTEC ENGINEERING AND CONSULTING, INC.	Tested by: BH	Reviewed by: HJ
Project: STP Units 3 & 4		Specific Gravity = 2.777 (ASTM D.854-06)	
Project No. 6234084660, Task 1.2		Lab No. 8957	

Client: Fluor Enterprises, Inc.
 Project: STP Units 3 & 4
 Project Number: 6234084660, Task 1.2

Sample Data

Source: U3-6A
 Sample No.: UD-3
 Elev. or Depth: 100-102 ft Sample Length(in./cm.): 8957
 Location: u3-6A
 Description: Brown and Light Brownish Gray Lean Clay
 Date: 6/25/08 Natural Moisture: 27.1
 Liquid Limit: 43 Plastic Limit: 18 USCS Class.: CL
 Testing Remarks: Tested by: EH Reviewed by: HJ

Specific Gravity = 2.777

Mechanical Analysis Data

Initial
 Dry sample and tare= 81.39
 Tare = 16.79
 Dry sample weight = 64.60
 Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
1 inch	0.00	100.0
# 4	0.00	100.0
# 10	0.01	100.0
# 20	0.01	100.0
# 40	0.03	100.0
# 60	0.04	99.9
# 100	0.07	99.9
# 140	0.09	99.9
# 200	0.10	99.8

Hydrometer Analysis Data

Separation sieve is #200
 Percent -#200 based upon complete sample= 99.8
 Weight of hydrometer sample: 64.5
 Calculated biased weight= 64.63
 Automatic temperature correction
 Composite correction at 20 deg C = -5.4

Meniscus correction only= 0
 Specific gravity of solids= 2.777
 Specific gravity correction factor= 0.973
 Hydrometer type: 152H
 Effective depth $L = 16.294964 - 0.164 \times R_m$

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
2.00	23.1	59.0	54.3	0.0127	59.0	6.6	0.0230	81.7
5.00	23.1	48.0	43.3	0.0127	48.0	8.4	0.0164	65.2
15.00	23.1	38.0	33.3	0.0127	38.0	10.1	0.0104	50.1

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
30.00	23.1	34.0	29.3	0.0127	34.0	10.7	0.0076	44.1
60.00	23.1	32.0	27.3	0.0127	32.0	11.0	0.0054	41.1
250.00	23.1	28.0	23.3	0.0127	28.0	11.7	0.0027	35.1
1440.00	23.1	26.0	21.3	0.0127	26.0	12.0	0.0012	32.1

Fractional Components

Gravel/Sand based on #4

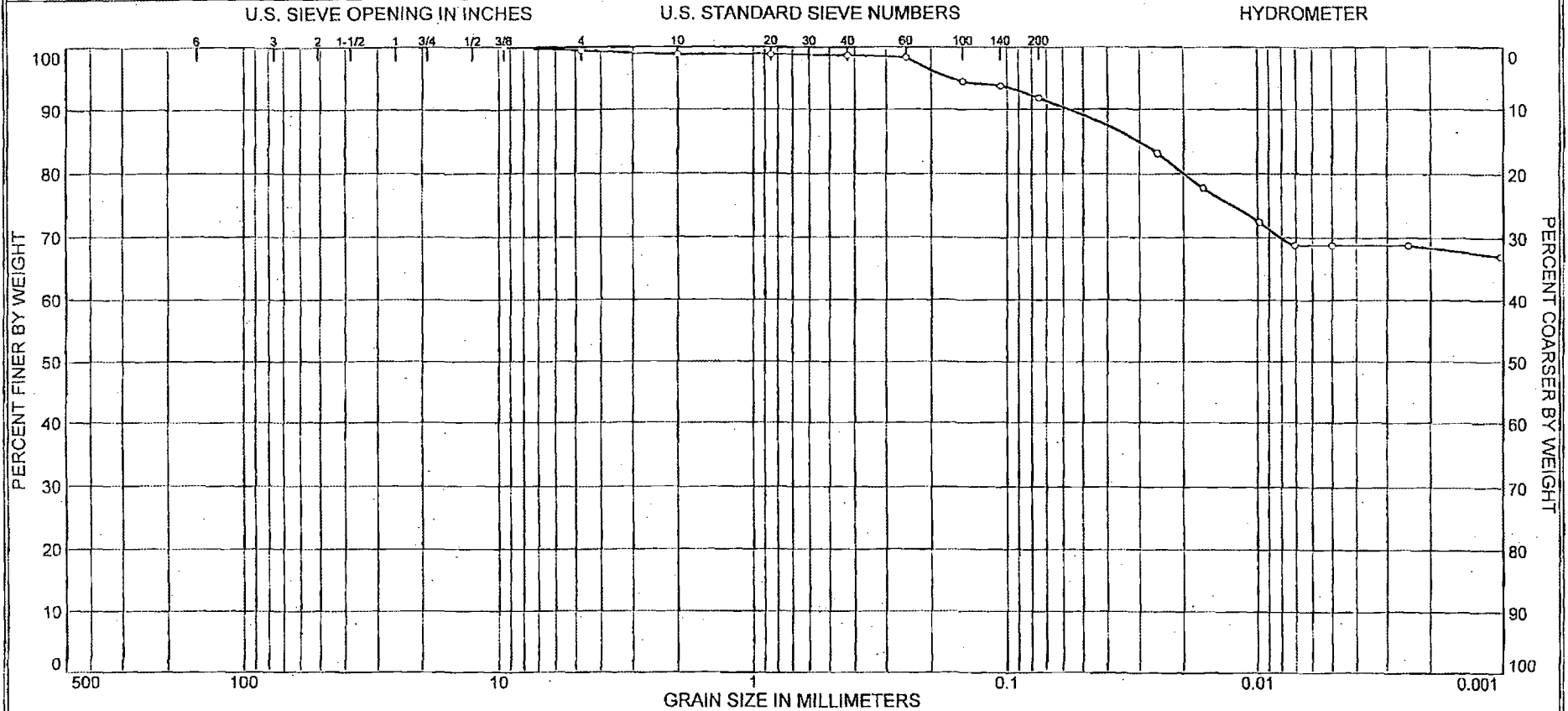
Sand/Fines based on #200

% COBBLES = % GRAVEL = % SAND = 0.2

% SILT = 59.4 % CLAY = 40.4

D85= 0.02 D60= 0.01 D50= 0.01

Particle Size Distribution Report (ASTM D422-63 (2007))



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.5	7.7	23.0	68.8

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
U4-1A	UD-2	108-110 R	6/28/08	CH	Light Greenish Gray Fat Clay		60	22

Client Fluor Enterprises, Inc.	MACTEC ENGINEERING AND CONSULTING, INC.	○ Tested by: EH Reviewed by: JW Specific Gravity = 2.744 (ASTM D 854-06)
Project STP Units 3 & 4		
Project No. 6234084660, Task 1.2 Lab No. 8963		

Client: Fluor Enterprises, Inc.
 Project: STP Units 3 & 4
 Project Number: 6234084660, Task 1.2

Sample Data

Source: U4-1A
 Sample No.: UD-2
 Elev. or Depth: 108-110 ft Sample Length (in./cm.): 8963
 Location: U4-1A
 Description: Light Greenish Gray Fat Clay
 Date: 6/28/08 Natural Moisture: 25.0
 Liquid Limit: 60 Plastic Limit: 22 USCS Class.: CH
 Testing Remarks: Tested by: EH Reviewed by: JW

Specific Gravity = 2.744 (ASTM D 854-06)

Mechanical Analysis Data

Initial
 Dry sample and tare = 69.85
 Tare = 15.20
 Dry sample weight = 54.65
 Tare for cumulative weight retained = .00

Sieve	Cumul. Wt. retained	Percent finer
.375 inch	0.00	100.0
# 4	0.28	99.5
# 10	0.58	98.9
# 20	0.62	98.9
# 40	0.71	98.7
# 60	0.86	98.4
# 100	3.02	94.5
# 140	3.40	93.8
# 200	4.50	91.8

Hydrometer Analysis Data

Separation sieve is #200
 Percent -#200 based upon complete sample = 91.8
 Weight of hydrometer sample: 50.15
 Calculated biased weight = 54.63
 Automatic temperature correction
 Composite correction at 20 deg C = -5.4

Meniscus correction only = 0
 Specific gravity of solids = 2.744
 Specific gravity correction factor = 0.980
 Hydrometer type: 152H

Effective depth $L = 16.294964 - 0.164 \times R_m$

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
2.00	23.3	51.0	46.3	0.0127	51.0	7.9	0.0254	83.1
5.00	23.3	48.0	43.3	0.0127	48.0	8.4	0.0165	77.8
15.00	23.3	45.0	40.3	0.0127	45.0	8.9	0.0098	72.4

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
30.00	23.3	43.0	38.3	0.0127	43.0	9.2	0.0071	68.8
60.00	23.3	43.0	38.3	0.0127	43.0	9.2	0.0050	68.8
250.00	23.3	43.0	38.3	0.0127	43.0	9.2	0.0025	68.8
1440.00	23.3	42.0	37.3	0.0127	42.0	9.4	0.0010	67.0

Fractional Components

Gravel/Sand based on #4

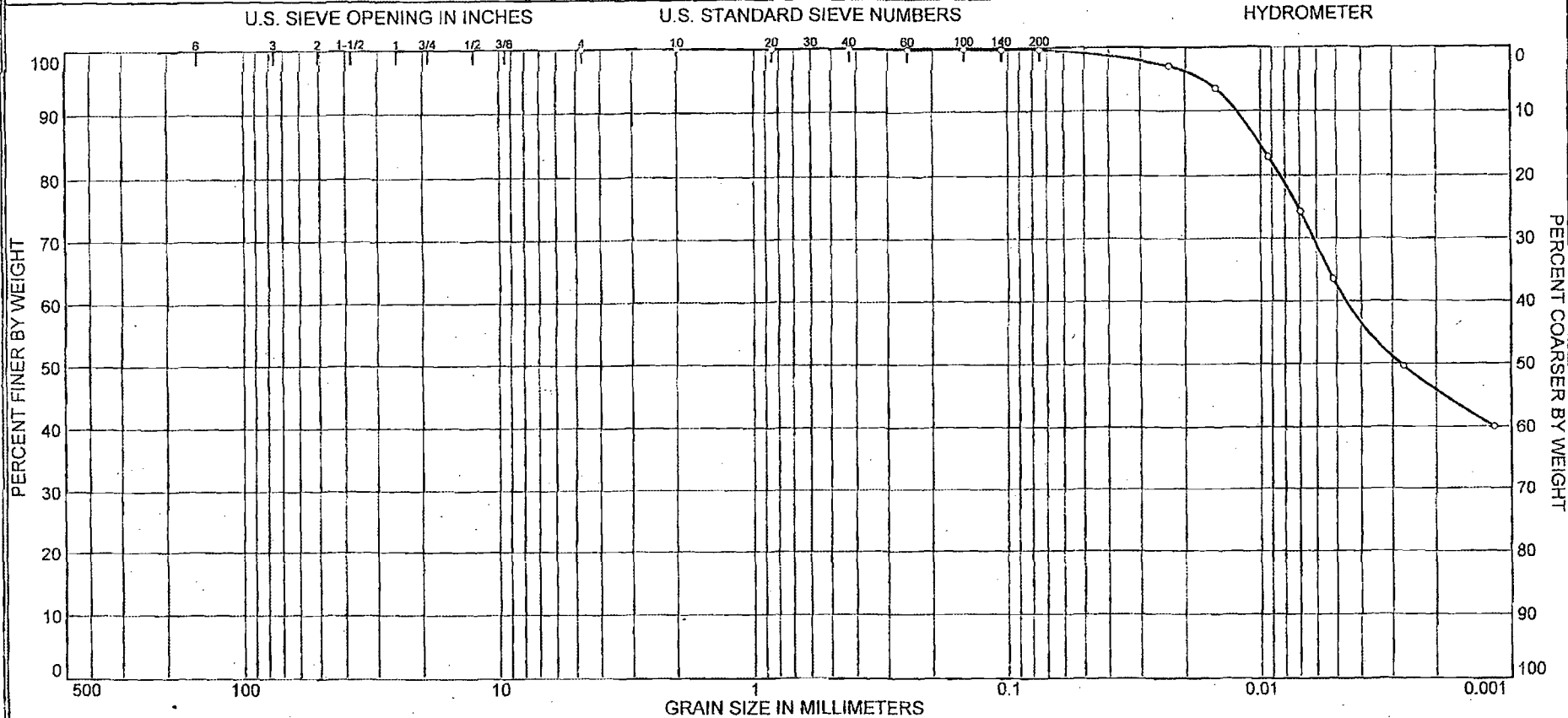
Sand/Fines based on #200

% COBBLES = % GRAVEL = 0.5 % SAND = 7.7

% SILT = 23.0 % CLAY = 68.8

D₈₅ = 0.03

Particle Size Distribution Report (ASTM D422-63 (2007))



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	0.3	37.2	62.5

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
U4-1A	UD-4	218-220 ft	6/25/08	CH	Dark Gray Fat Clay		61	22

Client Fluor Enterprises, Inc.	MACTEC ENGINEERING AND CONSULTING, INC.	Tested by: EH	Reviewed by: HJ
Project STP Units 3 & 4		Specific Gravity = 2.793 (ASTM D 854-06)	
Project No. 6234084660, Task 1.2		Lab No. 8958	

GRAIN SIZE DISTRIBUTION TEST DATA

RS-5130404

Client: Fluor Enterprises, Inc.
 Project: STP Units 3 & 4
 Project Number: 6234084660, Task 1.2

Sample Data

Source: U4-1A
 Sample No.: UD-4
 Elev. or Depth: 218-220 ft Sample Length(in./cm.): 8958
 Location: U4-1A
 Description: Dark Gray Fat Clay
 Date: 6/25/08 Natural Moisture:
 Liquid Limit: 61 Plastic Limit: 22 USCS Class.: CH
 Testing Remarks: Tested by: EH Reviewed by: HJ

Specific Gravity = 2.793 (ASTM D 854-06)

Mechanical Analysis Data

Initial

Dry sample and tare= 72.02
 Tare = 15.63
 Dry sample weight = 56.39
 Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
# 4	0.00	100.0
# 10	0.00	100.0
# 20	0.04	99.9
# 40	0.07	99.9
# 60	0.10	99.8
# 100	0.13	99.8
# 140	0.15	99.7
# 200	0.17	99.7

Hydrometer Analysis Data

Separation sieve is #200
 Percent -#200 based upon complete sample= 99.7
 Weight of hydrometer sample: 56.22
 Calculated biased weight= 56.39
 Automatic temperature correction
 Composite correction at 20 deg C = -5.4

Meniscus correction only= 0
 Specific gravity of solids= 2.7
 Specific gravity correction factor= 0.989
 Hydrometer type: 152H
 Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
2.00	23.1	60.0	55.3	0.0129	60.0	6.5	0.0233	97.0
5.00	23.1	58.0	53.3	0.0129	58.0	6.8	0.0151	93.5
15.00	23.1	52.0	47.3	0.0129	52.0	7.8	0.0093	82.9
30.00	23.1	47.0	42.3	0.0129	47.0	8.6	0.0069	74.2

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
60.00	23.1	41.0	36.3	0.0129	41.0	9.6	0.0052	63.6
250.00	23.1	33.0	28.3	0.0129	33.0	10.9	0.0027	49.6
1440.00	23.1	27.5	22.8	0.0129	27.5	11.8	0.0012	40.0

Fractional Components

Gravel/Sand based on #4

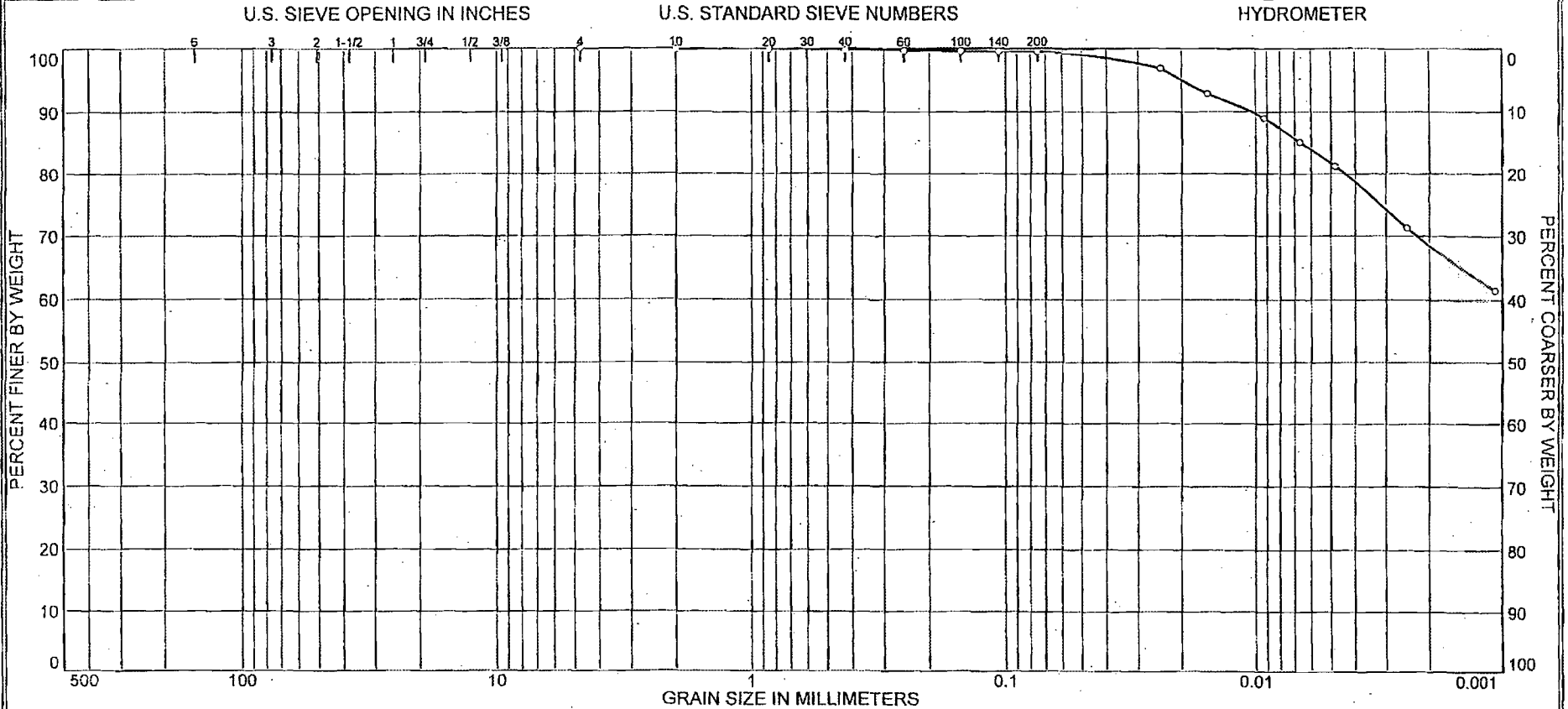
Sand/Fines based on #200

% COBBLES = % GRAVEL = % SAND = 0.3

% SILT = 37.2 % CLAY = 62.5

D85= 0.01 D60= 0.00 D50= 0.00

Particle Size Distribution Report (ASTM D422-63 (2007))



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	0.5	17.8	81.7

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
U4-1A	UD-5	228-230 ft	6/25/08	CH	Very Dark Greenish Gray Fat Clay		68	29

Client Fluor Enterprises, Inc.	MACTEC ENGINEERING AND CONSULTING, INC.	Tested by: EH Reviewed by: JW
Project STP Units 3 & 4		Specific Gravity = 2.791 (ASTM D 854-06)
Project No. 6234084660, Task 1.2 Lab No. 8964		

Client: Fluor Enterprises, Inc.
 Project: STP Units 3 & 4
 Project Number: 6234084660, Task 1.2

 Sample Data

Source: U4-1A
 Sample No.: UD-5
 Elev. or Depth: 228-230 ft Sample Length(in./cm.): 8964
 Location: U4-1A
 Description: Very Dark Greenish Gray Fat Clay
 Date: 6/25/08 Natural Moisture: 41.1
 Liquid Limit: 68 Plastic Limit: 29 USCS Class.: CH
 Testing Remarks: Tested by: EH Reviewed by: JW

Specific Gravity = 2.791 (ASTM D 854-06)

 Mechanical Analysis Data

	Initial
Dry sample and tare=	65.62
Tare =	16.19
Dry sample weight =	49.43
Tare for cumulative weight retained=	.00

Sieve	Cumul. Wt. retained	Percent finer
# 4	0.00	100.0
# 10	0.03	99.9
# 20	0.06	99.9
# 40	0.11	99.8
# 60	0.16	99.7
# 100	0.20	99.6
# 140	0.24	99.5
# 200	0.26	99.5

 Hydrometer Analysis Data

Separation sieve is #200
 Percent -#200 based upon complete sample= 99.5
 Weight of hydrometer sample: 49.17
 Calculated biased weight= 49.42
 Automatic temperature correction
 Composite correction at 20 deg C = -5.4

Meniscus correction only= 0
 Specific gravity of solids= 2.791
 Specific gravity correction factor= 0.970
 Hydrometer type: 152H
 Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
2.00	23.3	54.0	49.3	0.0126	54.0	7.4	0.0243	96.9
5.00	23.3	52.0	47.3	0.0126	52.0	7.8	0.0157	92.9
15.00	23.3	50.0	45.3	0.0126	50.0	8.1	0.0092	89.0
30.00	23.3	48.0	43.3	0.0126	48.0	8.4	0.0067	85.1

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
60.00	23.3	46.0	41.3	0.0126	46.0	8.8	0.0048	81.2
250.00	23.3	41.0	36.3	0.0126	41.0	9.6	0.0025	71.3
1440.00	23.3	36.0	31.3	0.0126	36.0	10.4	0.0011	61.5

Fractional Components

Gravel/Sand based on #4

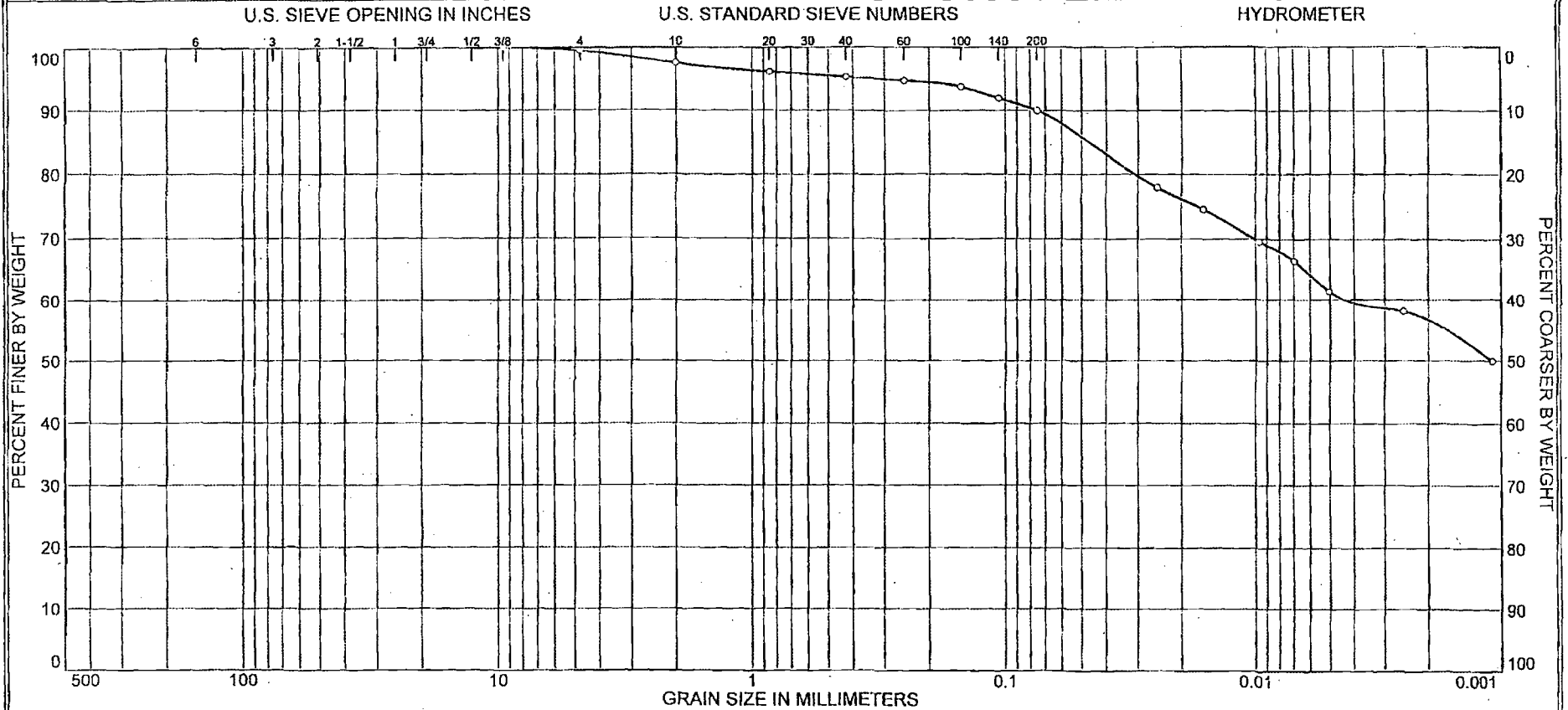
Sand/Fines based on #200

% COBBLES = % GRAVEL = % SAND = 0.5

% SILT = 17.8 % CLAY = 81.7

D85= 0.01

Particle Size Distribution Report (ASTM D422-63 (2007))



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.5	9.5	28.7	61.3

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
U4-1A	UD-6	268.5-270.5 ft	6/26/08	CH	Greenish Gray Fat Clay		74	24

Client Fluor Enterprises, Inc. Project STP Units 3 & 4	MACTEC ENGINEERING AND CONSULTING, INC.	Tested by: EH Reviewed by: JW Specific Gravity = 2.746 (ASTM D 854-06)
Project No. 6234084660, Task 1.2 Lab No. 8965		

GRAIN SIZE DISTRIBUTION TEST DATA

RS-5130404

Client: Fluor Enterprises, Inc.
 Project: STP Units 3 & 4
 Project Number: 6234084660, Task 1.2

Sample Data

Source: U4-1A
 Sample No.: UD-6
 Elev. or Depth: 268.5-270.5 ft Sample Length(in./cm.): 8965
 Location: U4-1A
 Description: Greenish Gray Fat Clay
 Date: 6/26/08 Natural Moisture: 43.0
 Liquid Limit: 74 Plastic Limit: 24 USCS Class.: CH
 Testing Remarks: Tested by: EH Reviewed by: JW

Specific Gravity = 2.746 (ASTM D 854-06)

Mechanical Analysis Data

Initial
 Dry sample and tare= 75.28
 Tare = 15.73
 Dry sample weight = 59.55
 Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
.375 inch	0.00	100.0
# 4	0.27	99.5
# 10	1.47	97.5
# 20	2.33	96.1
# 40	2.81	95.3
# 60	3.16	94.7
# 100	3.77	93.7
# 140	4.81	91.9
# 200	5.97	90.0

Hydrometer Analysis Data

Separation sieve is #200
 Percent -#200 based upon complete sample= 90.0
 Weight of hydrometer sample: 53.58
 Calculated biased weight= 59.53
 Automatic temperature correction
 Composite correction at 20 deg C = -5.4

Meniscus correction only= 0
 Specific gravity of solids= 2.746
 Specific gravity correction factor= 0.979
 Hydrometer type: 152H

Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, Actual deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
2.00	23.3	52.0	47.3	0.0127	52.0	7.8	0.0251	77.9
5.00	23.3	50.0	45.3	0.0127	50.0	8.1	0.0162	74.6
15.00	23.3	47.0	42.3	0.0127	47.0	8.6	0.0096	69.6

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
30.00	23.3	45.0	40.3	0.0127	45.0	8.9	0.0069	66.4
60.00	23.3	42.0	37.3	0.0127	42.0	9.4	0.0050	61.4
250.00	23.3	40.0	35.3	0.0127	40.0	9.7	0.0025	58.1
1440.00	23.3	35.0	30.3	0.0127	35.0	10.6	0.0011	49.9

Fractional Components

Gravel/Sand based on #4

Sand/Fines based on #200

% COBBLES = % GRAVEL = 0.5 % SAND = 9.5

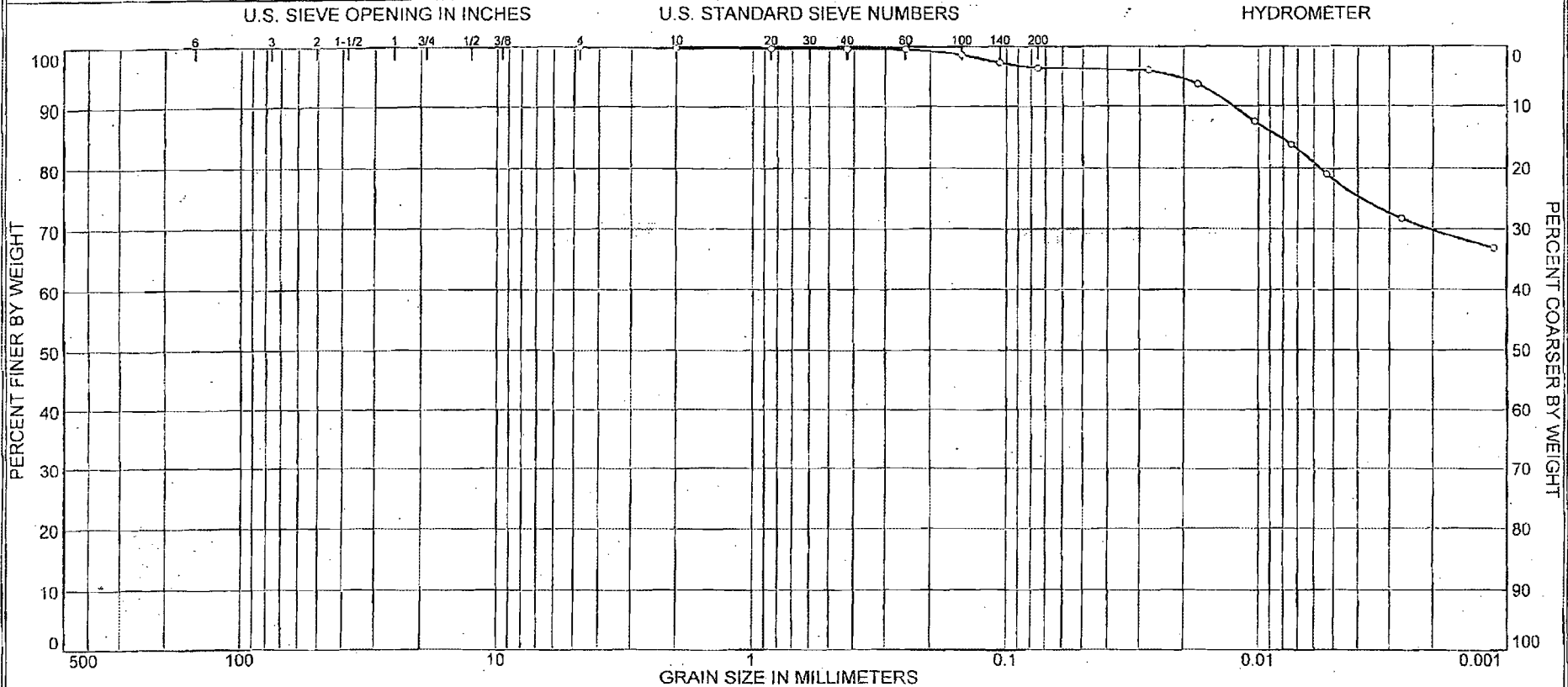
% SILT = 28.7 % CLAY = 61.3

D85= 0.05 D60= 0.00 D50= 0.00

553/763

DCNDP/R/817

Particle Size Distribution Report (ASTM D422-63 (2007))



% COBBLES	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.2	0.2	3.1	18.4	78.1

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
U4-1A	UD-7	277-279.2 Ft	6/27/08	CH	Dark Bluish Gray Fat Clay		81	27

Client Fluor Enterprises, Inc.	MACTEC ENGINEERING AND CONSULTING, INC.	Tested by: EH	Reviewed by: HJ
Project STP Units 3 & 4		Specific Gravity = 2.689 (ASTM D 854-06)	
Project No. 6234084660, Task 1.2		Lab No. 8952	

Client: Fluor Enterprises, Inc.
 Project: STP Units 3 & 4
 Project Number: 6234084660, Task 1.2

Sample Data

Source: U4-1A
 Sample No.: UD-7
 Elev. or Depth: 277-279.2 Ft Sample Length(in./cm.): 8952
 Location: U4-1A
 Description: Dark Bluish Gray Fat clay
 Date: 6/27/08 Natural Moisture:
 Liquid Limit: 81 Plastic Limit: 27 USCS Class.: CH
 Testing Remarks: Tested by: EH Reviewed by: HJ

Specific Gravity = 2.689 (ASTM D 854-06)

Mechanical Analysis Data

Initial

Dry sample and tare= 56.39
 Tare = 15.91
 Dry sample weight = 40.48
 Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
# 4	0.00	100.0
# 10	0.08	99.8
# 20	0.11	99.7
# 40	0.15	99.6
# 60	0.18	99.6
# 100	0.53	98.7
# 140	1.05	97.4
# 200	1.42	96.5

Hydrometer Analysis Data

Separation sieve is #200
 Percent -#200 based upon complete sample= 96.5
 Weight of hydrometer sample: 39.06
 Calculated biased weight= 40.48
 Automatic temperature correction
 Composite correction at 20 deg C = -5.4

Meniscus correction only= 0
 Specific gravity of solids= 2.7
 Specific gravity correction factor= 0.989
 Hydrometer type: 152H
 Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
2.00	23.3	44.0	39.3	0.0129	44.0	9.1	0.0275	96.1
5.00	23.3	43.0	38.3	0.0129	43.0	9.2	0.0176	93.7
15.00	23.3	40.5	35.8	0.0129	40.5	9.7	0.0104	87.6
30.00	23.3	39.0	34.3	0.0129	39.0	9.9	0.0074	83.9

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	KM	ELL. depth	DIAMETER mm	PERCENT finer
60.00	23.3	37.0	32.3	0.0129	37.0	10.2	0.0053	79.0
250.00	23.3	34.0	29.3	0.0129	34.0	10.7	0.0027	71.7
1440.00	23.3	32.0	27.3	0.0129	32.0	11.0	0.0011	66.8

Fractional Components

Gravel/Sand based on #4

Sand/Fines based on #200

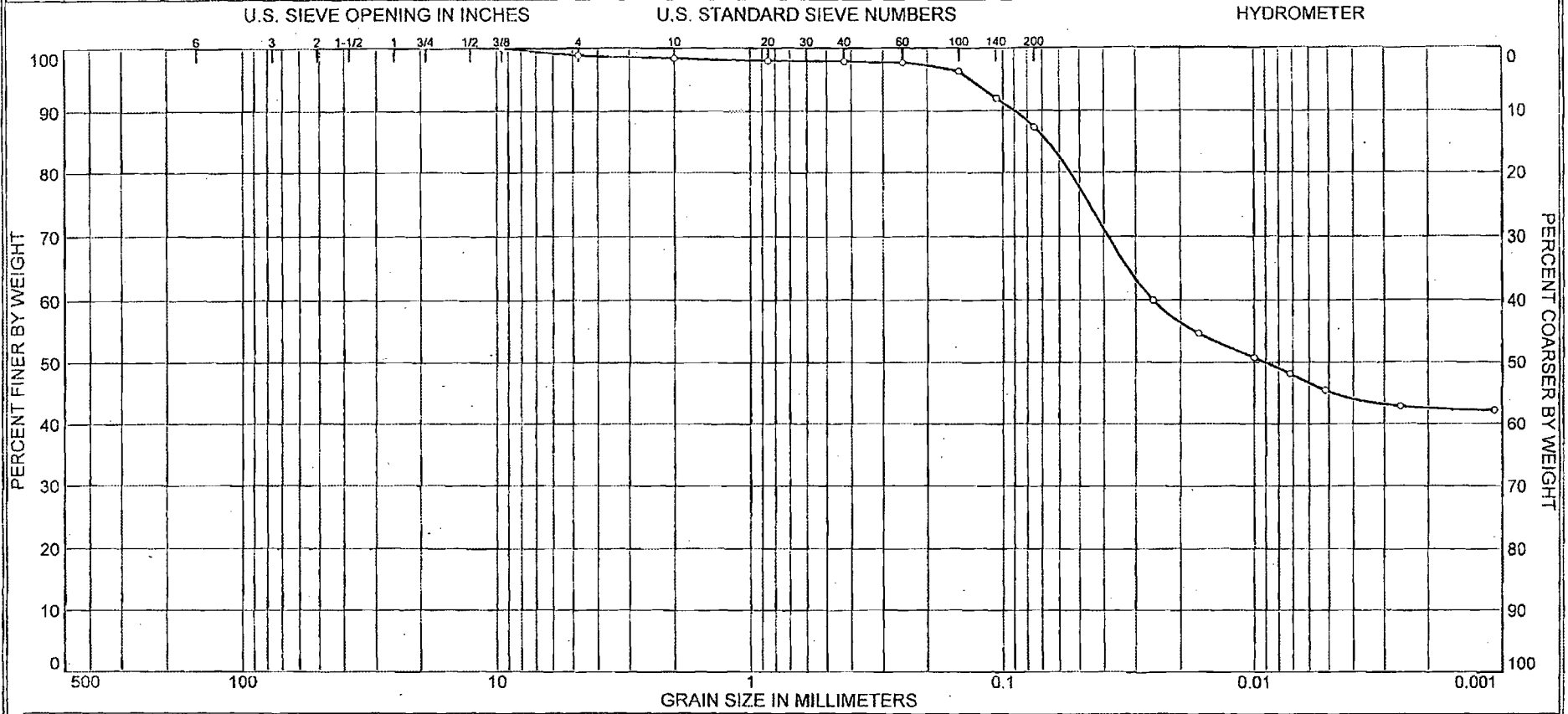
% COBBLES = % GRAVEL =

% SAND = 3.5 (% coarse = 0.2 % medium = 0.2 % fine = 3.1)

% SILT = 18.4 % CLAY = 78.1

D₈₅ = 0.01

Particle Size Distribution Report (ASTM D422-63 (2007))



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	1.1	11.5	42.2	45.2

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
U4-3A	UD-1	52-54'	6/25/08	CL	Light Reddish Brown to Light Olive Gray Lean Clay		46	20

Client Fluor Enterprises, Inc.	MACTEC ENGINEERING AND CONSULTING, INC.	Tested by:	Reviewed by: HJ
Project STP Units 3 & 4		Specific Gravity = 2.762 (ASTM D 854-06)	
Project No. 6234084660, Task 1.2		Lab No.	8959

Client: Fluor Enterprises, Inc.
 Project: STP Units 3 & 4
 Project Number: 6234084660, Task 1.2

 Sample Data

Source: U4-3A
 Sample No.: UD-1
 Elev. or Depth: 52-54' Sample Length(in./cm.): 8959
 Location: U4-3A
 Description: Light Reddish Brown to Light Olive Gray Lean Clay
 Date: 6/25/08 Natural Moisture:
 Liquid Limit: 46 Plastic Limit: 20 USCS Class.: CL
 Testing Remarks: Tested by: Reviewed by: HJ

Specific Gravity = 2.762 (ASTM D 854-06)

 Mechanical Analysis Data

Initial
 Dry sample and tare= 94.64
 Tare = 15.98
 Dry sample weight = 78.66
 Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
.375 inch	0.00	100.0
# 4	0.84	98.9
# 10	1.28	98.4
# 20	1.56	98.0
# 40	1.62	97.9
# 60	1.81	97.7
# 100	2.91	96.3
# 140	6.27	92.0
# 200	9.94	87.4

 Hydrometer Analysis Data

Separation sieve is #200
 Percent -#200 based upon complete sample= 87.4
 Weight of hydrometer sample: 64.37
 Calculated biased weight= 73.65
 Automatic temperature correction
 Composite correction at 20 deg C = -5.4

Meniscus correction only= 0
 Specific gravity of solids= 2.762
 Specific gravity correction factor= 0.976
 Hydrometer type: 152H
 Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
2.00	23.1	50.0	45.3	0.0127	50.0	8.1	0.0256	60.0
5.00	23.1	46.0	41.3	0.0127	46.0	8.8	0.0168	54.7
15.00	23.1	43.0	38.3	0.0127	43.0	9.2	0.0100	50.7

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
30.00	23.1	41.0	36.3	0.0127	41.0	9.6	0.0072	48.1
60.00	23.1	39.0	34.3	0.0127	39.0	9.9	0.0052	45.4
250.00	23.1	37.0	32.3	0.0127	37.0	10.2	0.0026	42.8
1440.00	23.1	36.5	31.8	0.0127	36.5	10.3	0.0011	42.1

Fractional Components

Gravel/Sand based on #4

Sand/Fines based on #200

% COBBLES = % GRAVEL = 1.1 % SAND = 11.5

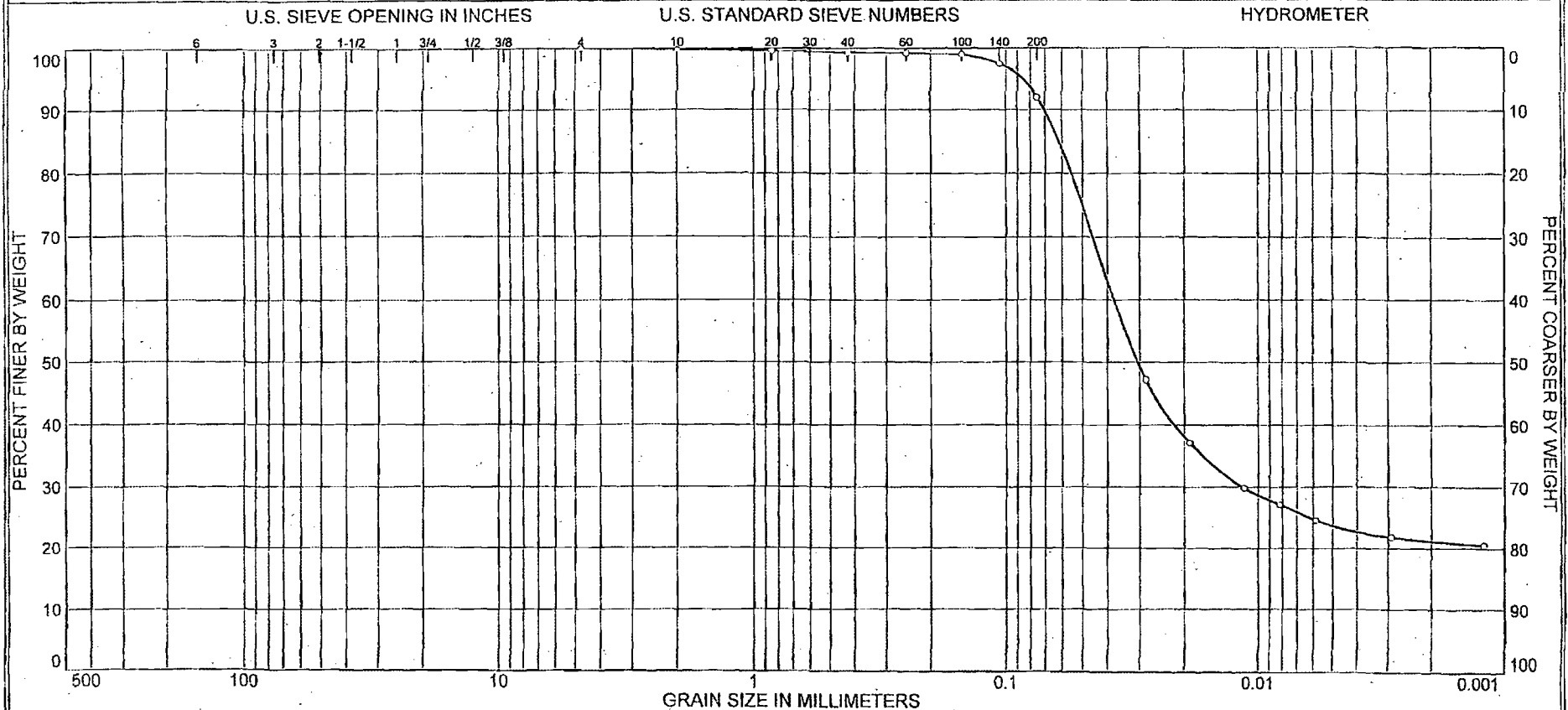
% SILT = 42.2 % CLAY = 45.2

D85= 0.07 D60= 0.03 D50= 0.01

559/763

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Particle Size Distribution Report (ASTM D422-63 (2007))



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	8.0	68.4	23.6

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
U4-3A	UD-2	85-87 ft	6/25/08	CL	Light Gray to Light Brown Lean Clay		30	19

Client Fluor Enterprises, Inc.	MACTEC ENGINEERING AND CONSULTING, INC.	Tested by: EH Reviewed by: JW
Project STP Units 3 & 4		Specific Gravity = 2.725 (ASTM D 854-06)
Project No. 6234084660, Task 1.2 Lab No. 8953		

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
60.00	23.3	23.0	18.3	0.0128	23.0	12.5	0.0059	24.5
250.00	23.3	21.0	16.3	0.0128	21.0	12.9	0.0029	21.8
1440.00	23.3	20.0	15.3	0.0128	20.0	13.0	0.0012	20.5

Fractional Components

Gravel/Sand based on #4

Sand/Fines based on #200

% COBBLES = % GRAVEL = % SAND = 8.0
 % SILT = 68.4 % CLAY = 23.6

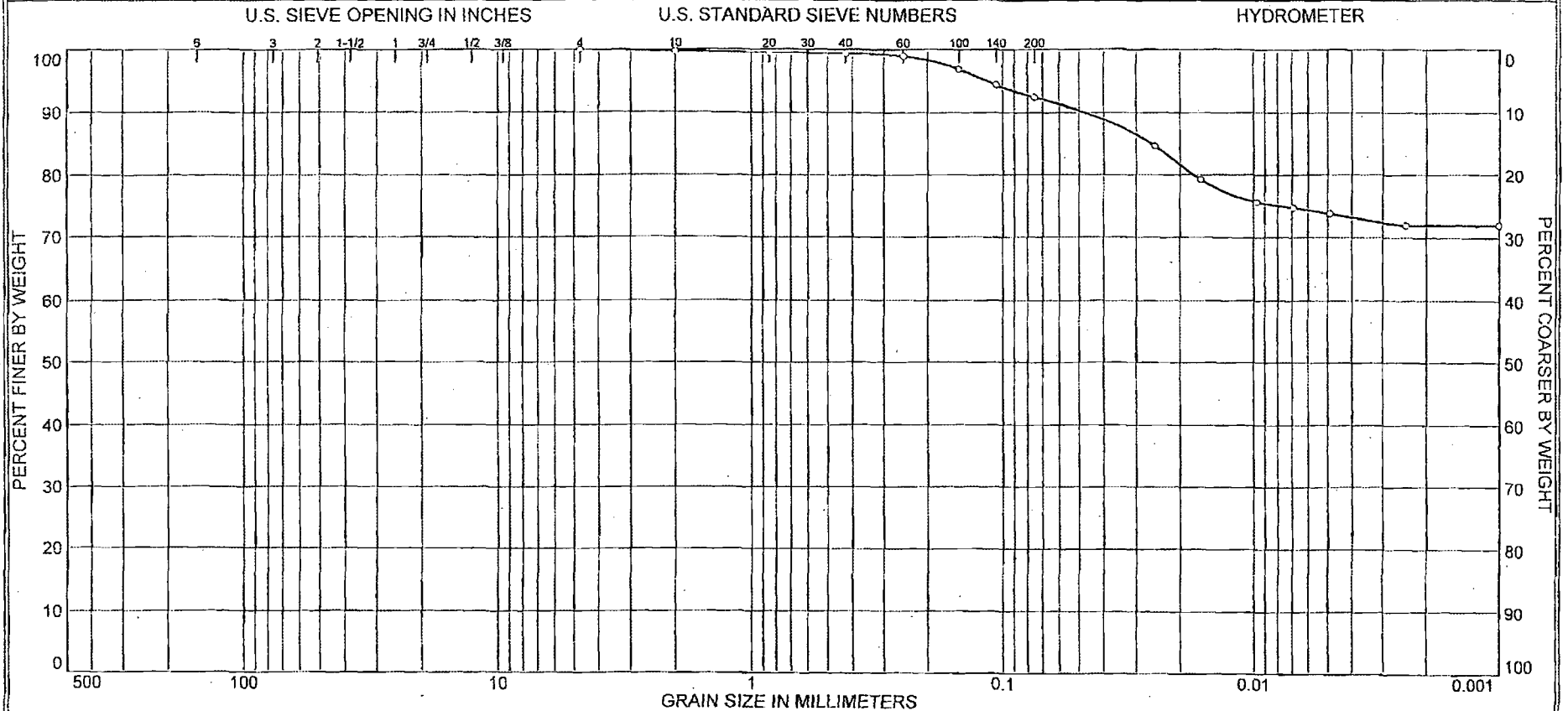
D₈₅ = 0.06 D₆₀ = 0.04 D₅₀ = 0.03

D₃₀ = 0.01

562763

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Particle Size Distribution Report (ASTM D422-63 (2007))



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	7.6	18.6	73.8

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
U4-6A	UD-3	110.5-112.5 ft	6/26/08	CH	Light Greenish Gray Fat Clay		84	22

Client Fluor Enterprises, Inc.		MACTEC ENGINEERING AND CONSULTING, INC.	○ Tested by: EH Reviewed by: JW	
Project STP Units 3 & 4			Specific Gravity = 2.762 (ASTM D 854-06)	
Project No. 6234084660, Task 1.2	Lab No. 8954			

Client: Fluor Enterprises, Inc.
 Project: STP Units 3 & 4
 Project Number: 6234084660, Task 1.2

 Sample Data

Source: U4-6A
 Sample No.: UD-3
 Elev. or Depth: 110.5-112.5 ft Sample Length(in./cm.): 8954
 Location: U4-6A
 Description: Light Greenish Gray Fat Clay
 Date: 6/26/08 Natural Moisture: 30.7
 Liquid Limit: 84 Plastic Limit: 22 USCS Class.: CH
 Testing Remarks: Tested by: EH Reviewed by: JW

Specific Gravity = 2.762 (ASTM D 854-06)

 Mechanical Analysis Data

	Initial
Dry sample and tare=	70.16
Tare =	16.74
Dry sample weight =	53.42
Tare for cumulative weight retained=	.00

Sieve	Cumul. Wt. retained	Percent finer
# 4	0.00	100.0
# 10	0.15	99.7
# 20	0.29	99.5
# 40	0.34	99.4
# 60	0.51	99.0
# 100	1.66	96.9
# 140	2.97	94.4
# 200	4.04	92.4

 Hydrometer Analysis Data

Separation sieve is #200
 Percent -#200 based upon complete sample= 92.4
 Weight of hydrometer sample: 49.38
 Calculated biased weight= 53.44
 Automatic temperature correction
 Composite correction at 20 deg C = -5.4

Meniscus correction only= 0
 Specific gravity of solids= 2.762
 Specific gravity correction factor= 0.976
 Hydrometer type: 152H
 Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
2.00	23.3	51.0	46.3	0.0127	51.0	7.9	0.0253	84.6
5.00	23.3	48.0	43.3	0.0127	48.0	8.4	0.0165	79.2
15.00	23.3	46.0	41.3	0.0127	46.0	8.8	0.0097	75.5
30.00	23.3	45.5	40.8	0.0127	45.5	8.8	0.0069	74.6

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer	Sen 10404
60.00	23.3	45.0	40.3	0.0127	45.0	8.9	0.0049	73.7	
250.00	23.3	44.0	39.3	0.0127	44.0	9.1	0.0024	71.9	
1440.00	23.3	44.0	39.3	0.0127	44.0	9.1	0.0010	71.9	

Fractional Components

Gravel/Sand based on #4

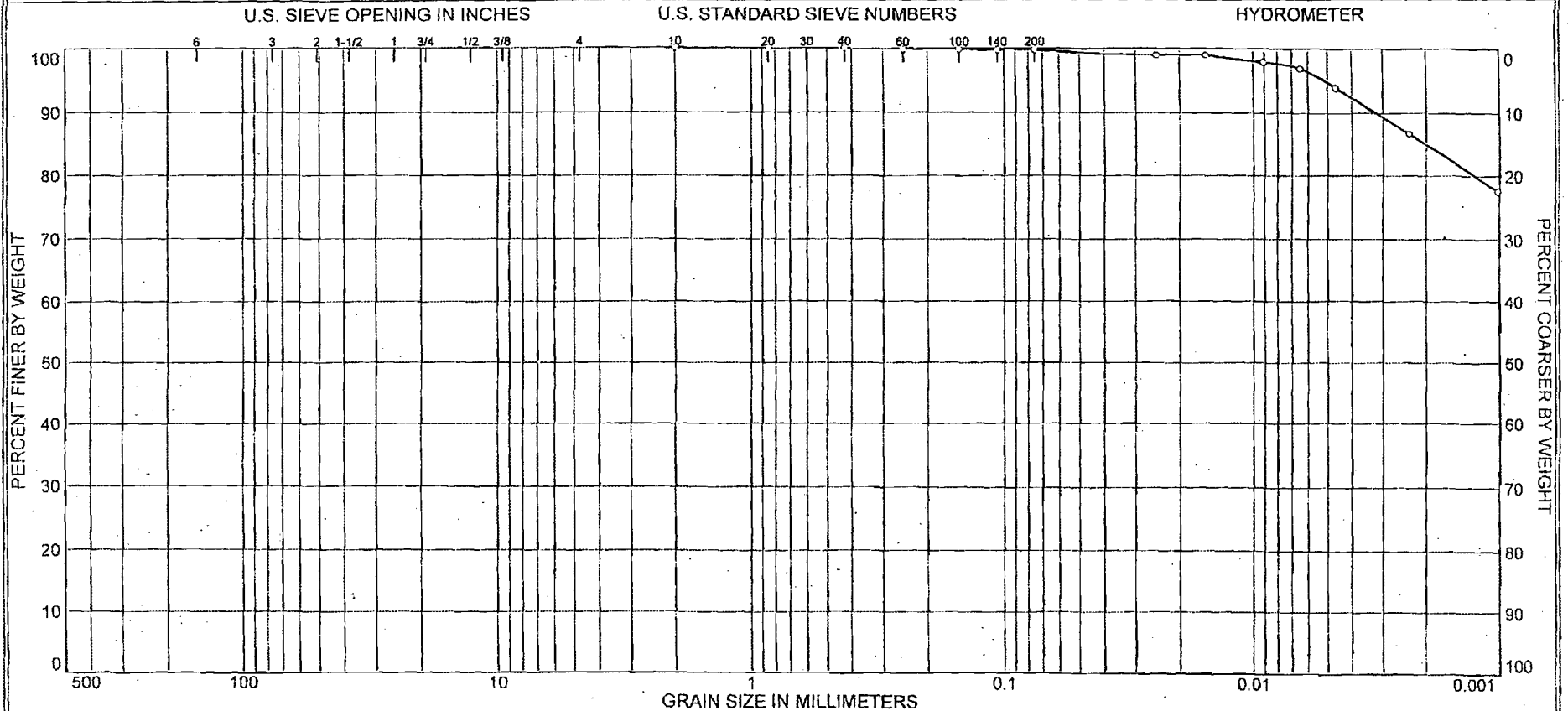
Sand/Fines based on #200

% COBBLES = % GRAVEL = % SAND = 7.6

% SILT = 18.6 % CLAY = 73.8

D₈₅ = 0.03

Particle Size Distribution Report (ASTM D422-63 (2007))



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	0.2	5.1	94.7

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
U4-6A	UD-4	265-267 ft	6/27/08	CH	Olive Brown Fat Clay		87	34

Client Fluor Enterprises, Inc.	MACTEC ENGINEERING AND CONSULTING, INC.	Tested by: EH Reviewed by: JW
Project STP Units 3 & 4		Specific Gravity = 2.77 (ASTM D 854-06)
Project No. 6234084660, Task 1.2 Lab No. 8955		

GRAIN SIZE DISTRIBUTION TEST DATA

RS-5130404

Client: Fluor Enterprises, Inc.
 Project: STP Units 3 & 4
 Project Number: 6234084660, Task 1.2

Sample Data

Source: U4-6A
 Sample No.: UD-4
 Elev. or Depth: 265-267 ft Sample Length(in./cm.): 8955
 Location: U4-6A
 Description: Olive Brown Fat Clay
 Date: 6/27/08 Natural Moisture: 38.8
 Liquid Limit: 87 Plastic Limit: 34 USCS Class.: CH
 Testing Remarks: Tested by: EH Reviewed by: JW

Specific Gravity = 2.77 (ASTM D 854-06)

Mechanical Analysis Data

Initial

Dry sample and tare= 63.49
 Tare = 15.91
 Dry sample weight = 47.58
 Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
# 10	0.00	100.0
# 20	0.02	100.0
# 40	0.02	100.0
# 60	0.04	99.9
# 100	0.06	99.9
# 140	0.08	99.8
# 200	0.10	99.8

Hydrometer Analysis Data

Separation sieve is #200
 Percent -#200 based upon complete sample= 99.8
 Weight of hydrometer sample: 47.48
 Calculated biased weight= 47.58
 Automatic temperature correction
 Composite correction at 20 deg C = -5.4

Meniscus correction only= 0
 Specific gravity of solids= 2.77
 Specific gravity correction factor= 0.974
 Hydrometer type: 152H
 Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
2.00	23.3	53.0	48.3	0.0127	53.0	7.6	0.0247	99.0
5.00	23.3	53.0	48.3	0.0127	53.0	7.6	0.0156	99.0
15.00	23.3	52.5	47.8	0.0127	52.5	7.7	0.0091	97.9
30.00	23.3	52.0	47.3	0.0127	52.0	7.8	0.0064	96.9
60.00	23.3	50.5	45.8	0.0127	50.5	8.0	0.0046	93.9

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer	Test #
250.00	23.3	47.0	42.3	0.0127	47.0	8.6	0.0023	86.7	0404
1440.00	23.3	42.5	37.8	0.0127	42.5	9.3	0.0010	77.5	

Fractional Components

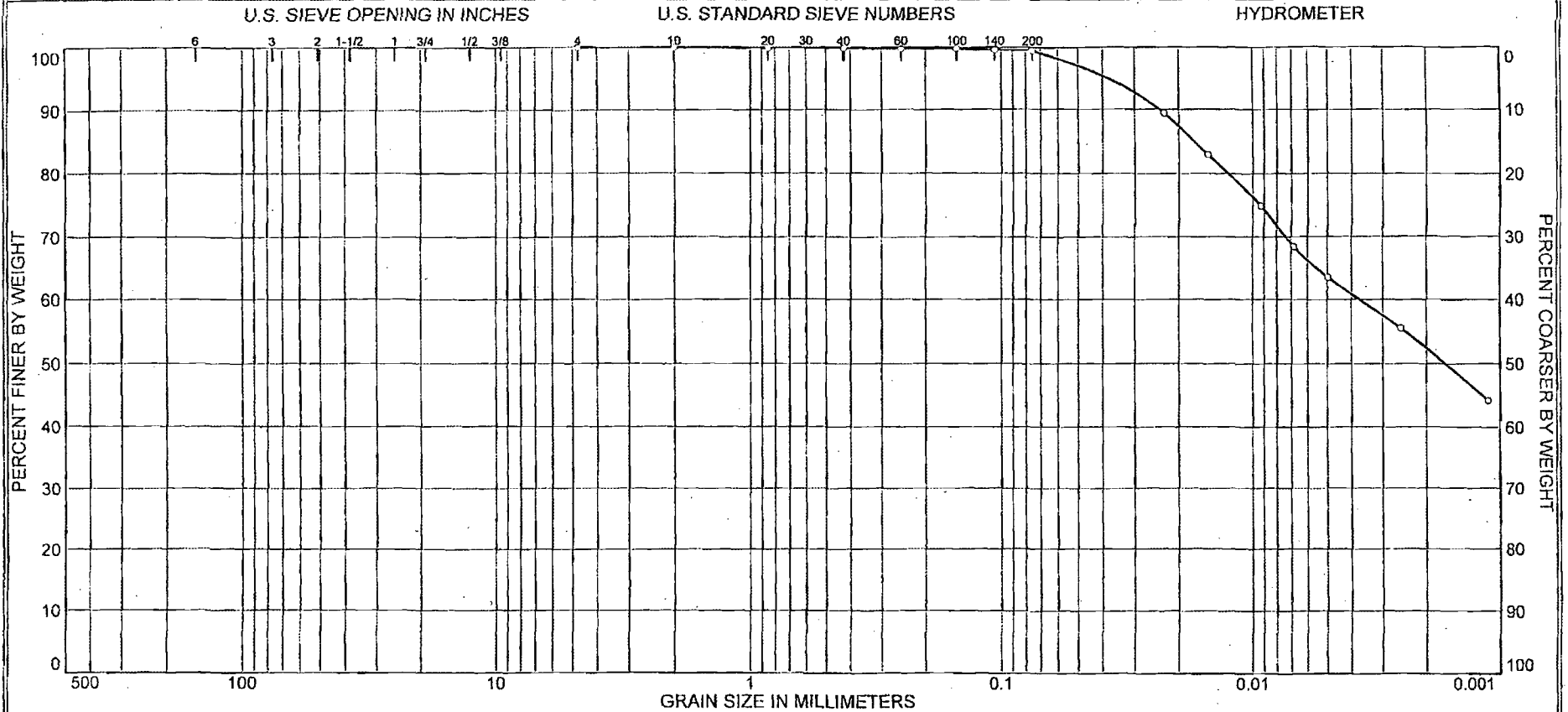
Gravel/Sand based on #4

Sand/Fines based on #200

% COBBLES = % GRAVEL = % SAND = 0.2
 % SILT = 5.1 % CLAY = 94.7

D₈₅ = 0.00

Particle Size Distribution Report (ASTM D422-63 (2007))



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	0.5	35.9	63.6

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
T3-5B	UD-4	98-100 Ft.	6/25/08	CH	Brown Fat Clay		55	25

Client Fluor Enterprises, Inc.	MACTEC ENGINEERING AND CONSULTING, INC.	Tested by: EH Reviewed by: HJ
Project STP Units 3 & 4		Specific Gravity = 2.754 (ASTM D 854-06)
Project No. 6234084660, Task 1.2 Lab No. 8960		

Client: Fluor Enterprises, Inc.
 Project: STP Units 3 & 4
 Project Number: 6234084660, Task 1.2

Sample Data

Source: T3-5B
 Sample No.: UD-4
 Elev. or Depth: 98-100 Ft. Sample Length(in./cm.): 8960
 Location: T3-5B
 Description: Brown Fat Clay
 Date: 6/25/08 Natural Moisture:
 Liquid Limit: 55 Plastic Limit: 25 USCS Class.: CH
 Testing Remarks: Tested by: EH Reviewed by: HJ

Specific Gravity = 2.754 (ASTM D 854-06)

Mechanical Analysis Data

Initial
 Dry sample and tare= 76.16
 Tare = 15.98
 Dry sample weight = 60.18
 Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
# 4	0.00	100.0
# 10	0.00	100.0
# 20	0.04	99.9
# 40	0.09	99.9
# 60	0.13	99.8
# 100	0.15	99.8
# 140	0.25	99.6
# 200	0.31	99.5

Hydrometer Analysis Data

Separation sieve is #200
 Percent -#200 based upon complete sample= 99.5
 Weight of hydrometer sample: 60.18
 Calculated biased weight= 60.48
 Automatic temperature correction
 Composite correction at 20 deg C = -5.4

Meniscus correction only= 0
 Specific gravity of solids= 2.754
 Specific gravity correction factor= 0.978
 Hydrometer type: 152H
 Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, Actual deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
2.00	23.1	60.0	55.3	0.0127	60.0	6.5	0.0229	89.4
5.00	23.1	56.0	51.3	0.0127	56.0	7.1	0.0152	82.9
15.00	23.1	51.0	46.3	0.0127	51.0	7.9	0.0093	74.9
30.00	23.1	47.0	42.3	0.0127	47.0	8.6	0.0068	68.4

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
60.00	23.1	44.0	39.3	0.0127	44.0	9.1	0.0050	63.5
250.00	23.1	39.0	34.3	0.0127	39.0	9.9	0.0025	55.5
1440.00	23.1	32.0	27.3	0.0127	32.0	11.0	0.0011	44.1

Fractional Components

Gravel/Sand based on #4

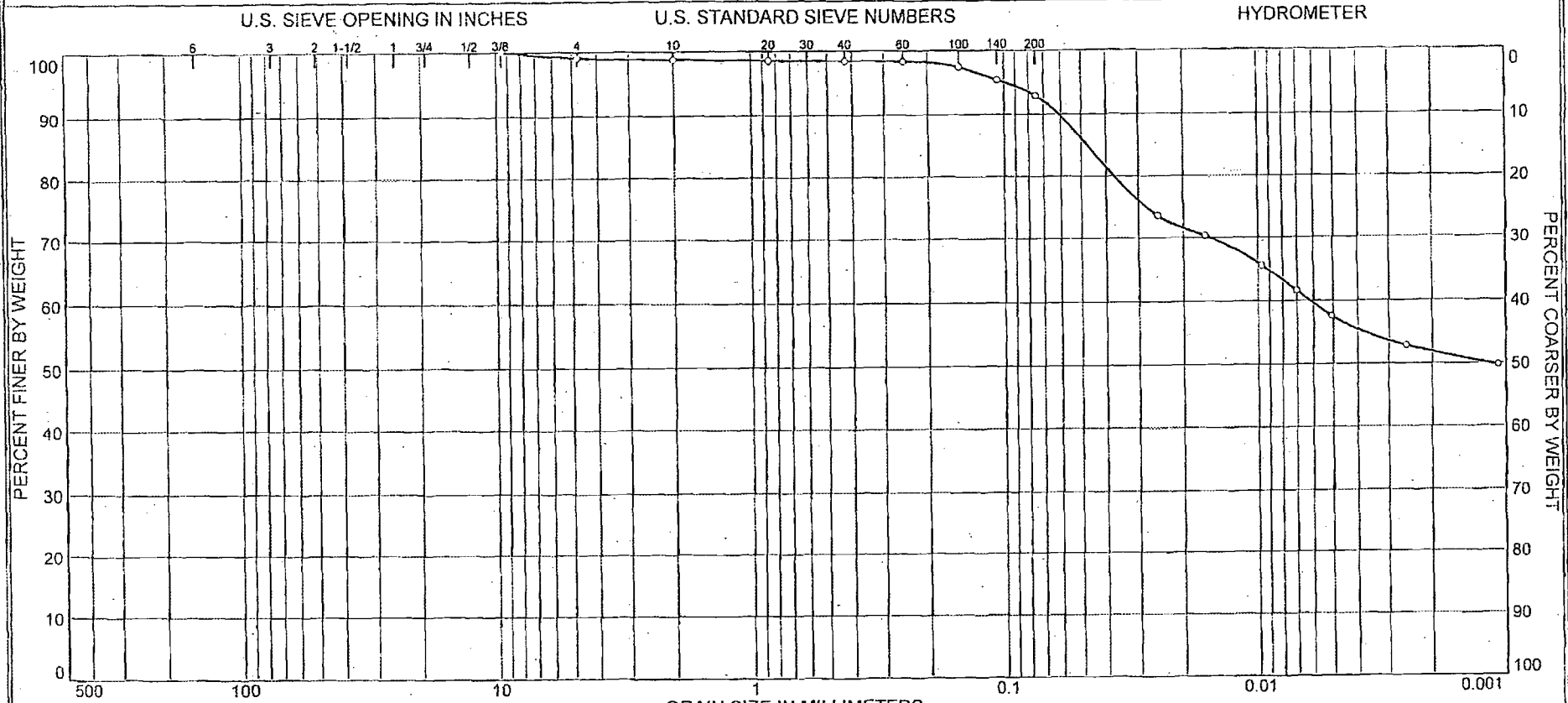
Sand/Fines based on #200

% COBBLES = % GRAVEL = % SAND = 0.5

% SILT = 35.9 % CLAY = 63.6

D85= 0.02 D60= 0.00 D50= 0.00

Particle Size Distribution Report (ASTM D422-63 (2007))



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.9	6.1	35.5	57.5

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
D3-1A	UD-1	48-50 Ft.	6/24/08	CH	Reddish Brown and Light Greenish Gray Fat Clay		60	20

Client: Fluor Enterprises, Inc.	MACTEC ENGINEERING AND CONSULTING, INC.	Tested by: EH Reviewed by: HJ
Project: STP Units 3 & 4		Specific Gravity = 2.775 (ASTM D 854-06)
Project No. 6234084660, Task 1.2 Lab No. 8961		

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
30.00	23.1	43.5	38.8	0.0127	43.5	9.2	0.0070	61.6
60.00	23.1	41.0	36.3	0.0127	41.0	9.6	0.0051	57.6
250.00	23.1	38.0	33.3	0.0127	38.0	10.1	0.0025	52.9
1440.00	23.1	36.0	31.3	0.0127	36.0	10.4	0.0011	49.7

Fractional Components

Gravel/Sand based on #4

Sand/Fines based on #200

% COBBLES = % GRAVEL = 0.9 % SAND = 6.1

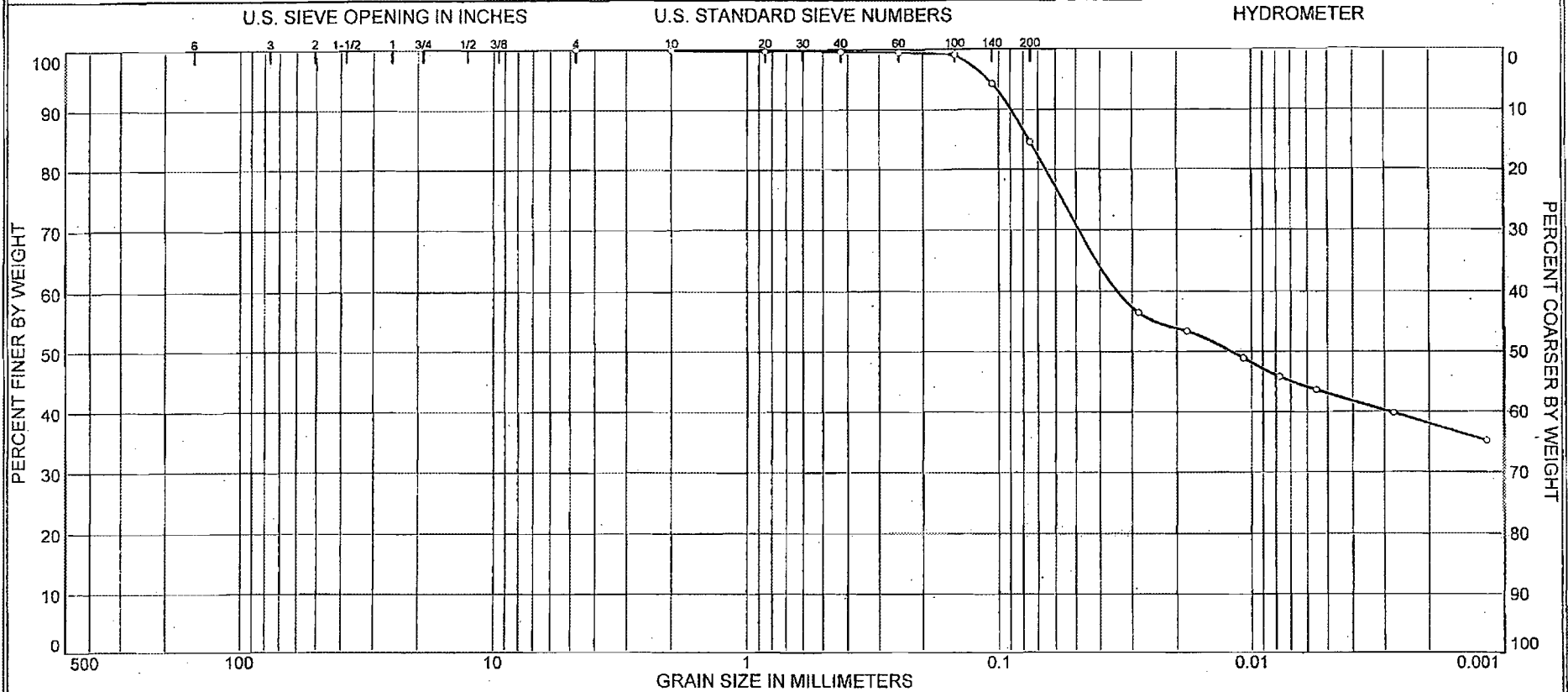
% SILT = 35.5 % CLAY = 57.5

D85= 0.05 D60= 0.01 D50= 0.00

5747/63

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Particle Size Distribution Report (ASTM D422-63 (2007))



% COBBLES	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.1	0.3	15.0	41.6	43.0

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
D3-1A	UD-2	98-100 Ft.	11/11/08	CL	Brown Lean Clay with Sand		44	18

Client Fluor Enterprises, Inc.	MACTEC ENGINEERING AND CONSULTING, INC.	Tested by: EH	Reviewed by: HJ
Project STP Units 3 & 4		Specific Gravity = 2.692 (ASTM D 854-06)	
Project No. 6234084660, Task 1.2		Lab No. 8962	

Client: Fluor Enterprises, Inc.
 Project: STP Units 3 & 4
 Project Number: 6234084660, Task 1.2

Sample Data

Source: D3-1A
 Sample No.: UD-2
 Elev. or Depth: 98-100 Ft. Sample Length(in./cm.): 8962
 Location: D3-1A
 Description: Brown Lean Clay with Sand
 Date: 11/11/08 Natural Moisture:
 Liquid Limit: 44 Plastic Limit: 18 USCS Class.: CL
 Testing Remarks: Tested by: EH Reviewed by: HJ

Specific Gravity = 2.692 (ASTM D 854-06)

Mechanical Analysis Data

	Initial
Dry sample and tare=	81.63
Tare =	16.35
Dry sample weight =	65.28
Tare for cumulative weight retained=	.00
Sieve	Cumul. Wt. Percent
	retained finer
# 4	0.00 100.0
# 10	0.09 99.9
# 20	0.20 99.7
# 40	0.29 99.6
# 60	0.34 99.5
# 100	0.62 99.1
# 140	3.75 94.3
# 200	10.04 84.6

Hydrometer Analysis Data

Separation sieve is #200
 Percent -#200 based upon complete sample= 84.6
 Weight of hydrometer sample: 55.24
 Calculated biased weight= 65.30
 Automatic temperature correction
 Composite correction at 20 deg C = -5.4

Meniscus correction only= 0
 Specific gravity of solids= 2.692
 Specific gravity correction factor= 0.991
 Hydrometer type: 152H
 Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
2.00	22.8	42.0	37.2	0.0130	42.0	9.4	0.0282	56.5
5.00	22.8	40.0	35.2	0.0130	40.0	9.7	0.0182	53.4
15.00	22.8	37.0	32.2	0.0130	37.0	10.2	0.0108	48.9
30.00	22.8	35.0	30.2	0.0130	35.0	10.6	0.0077	45.8

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
60.00	22.8	33.5	28.7	0.0130	33.5	10.8	0.0055	43.6
250.00	22.8	31.0	26.2	0.0130	31.0	11.2	0.0028	39.8
1440.00	22.8	28.0	23.2	0.0130	28.0	11.7	0.0012	35.2

Fractional Components

Gravel/Sand based on #4

Sand/Fines based on #200

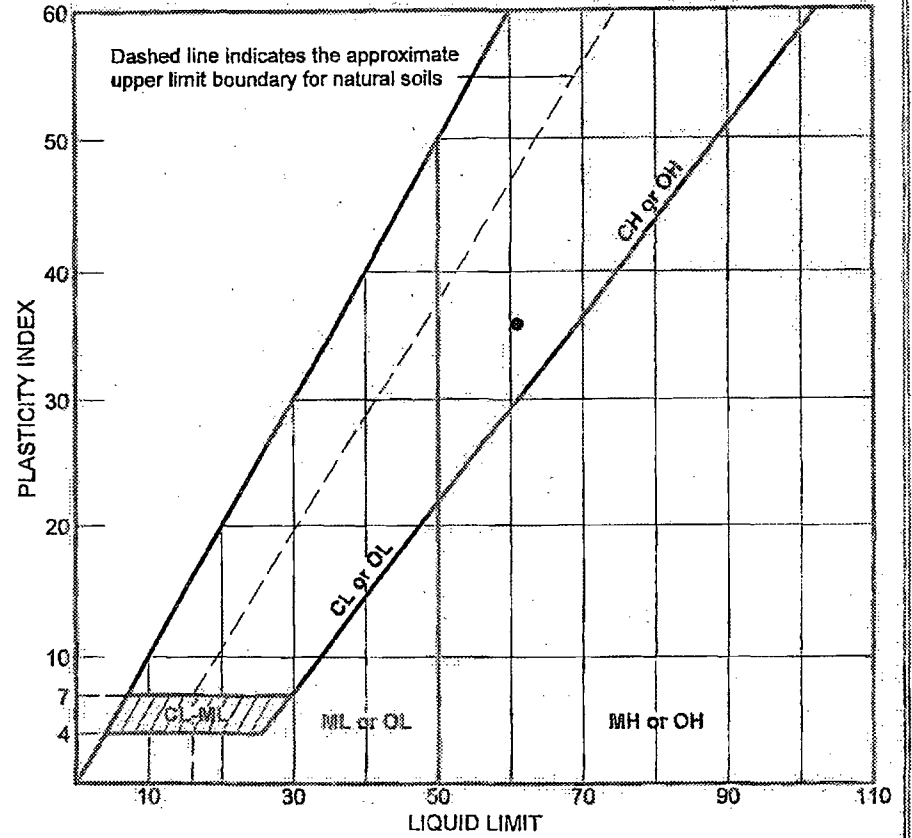
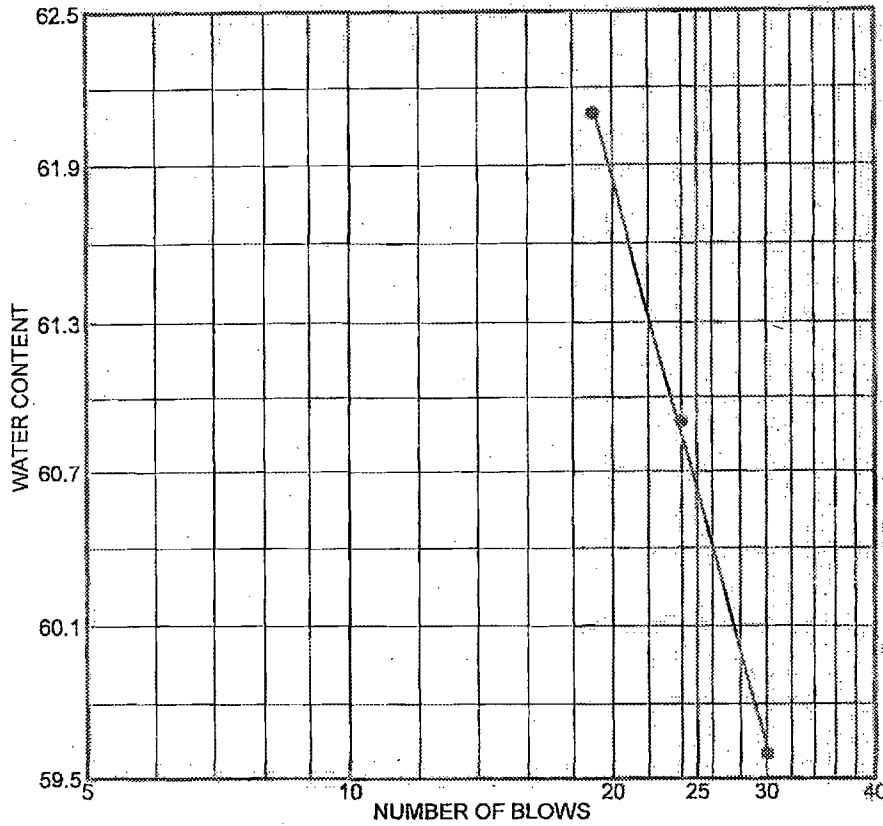
% COBBLES = % GRAVEL =

% SAND = 15.4 (% coarse = 0.1 % medium = 0.3 % fine = 15.0)

% SILT = 41.6 % CLAY = 43.0

D85= 0.08 D60= 0.03 D50= 0.01

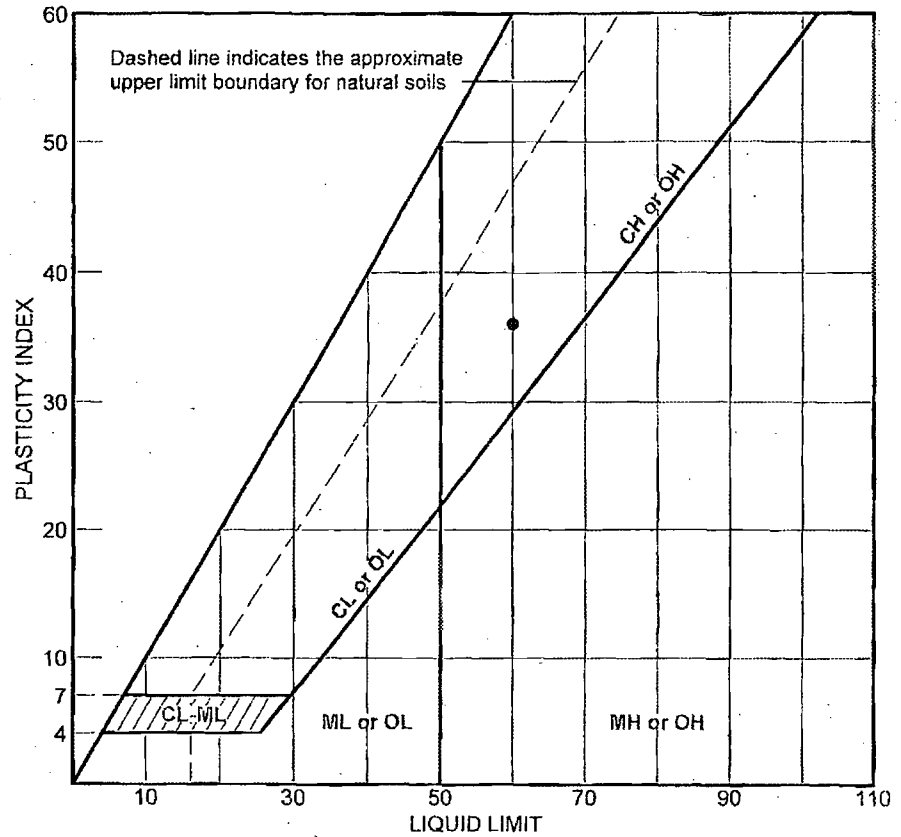
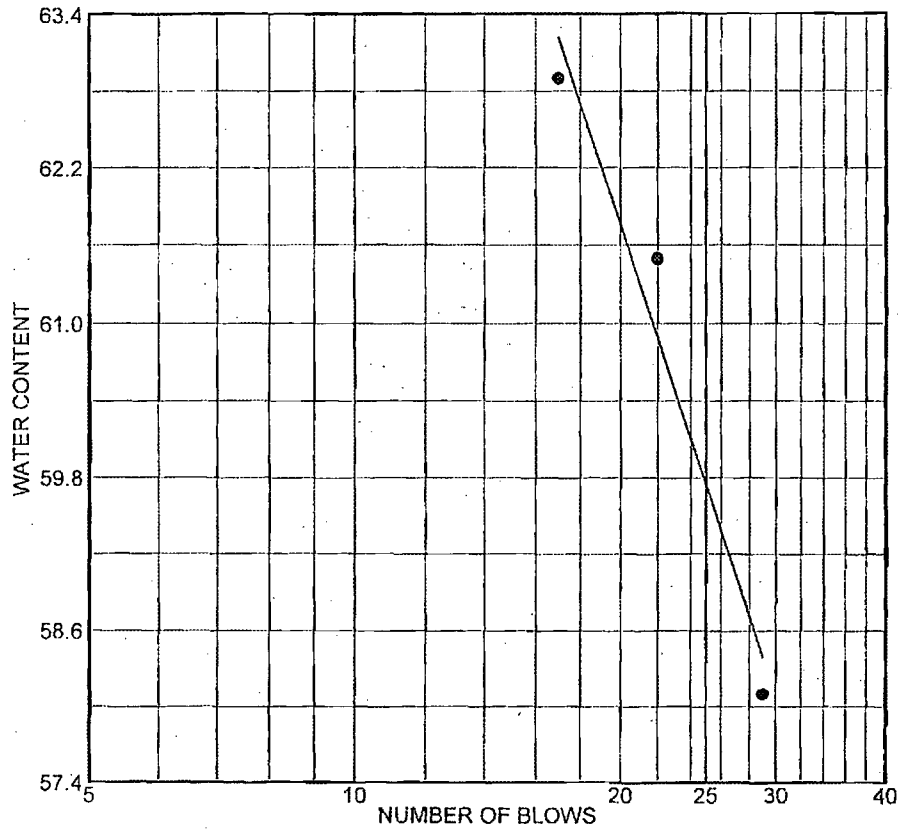
LIQUID AND PLASTIC LIMITS TEST REPORT (ASTM D 4318-05)



SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
U3-2A	UD-1	48-50 ft	6/25/08	CH	Brown Fat Clay	34.9	61	36

Client Fluor Enterprises, Inc.	MACTEC ENGINEERING AND CONSULTING, INC.	• Tested by: EH Reviewed by: JW
Project STP Units 3 & 4		Specific Gravity = 2.749 (ASTM D 854-06)
Project No. 6234084660, Task 1.2 Lab No. 8950		

LIQUID AND PLASTIC LIMITS TEST REPORT (ASTM D 4318-05)



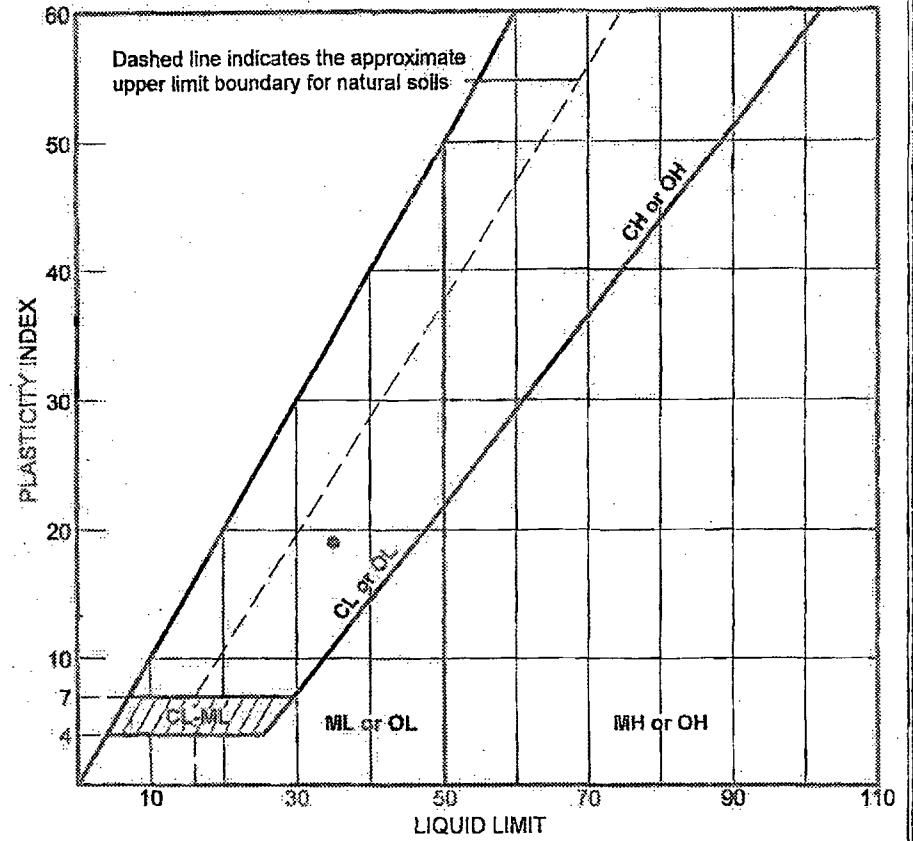
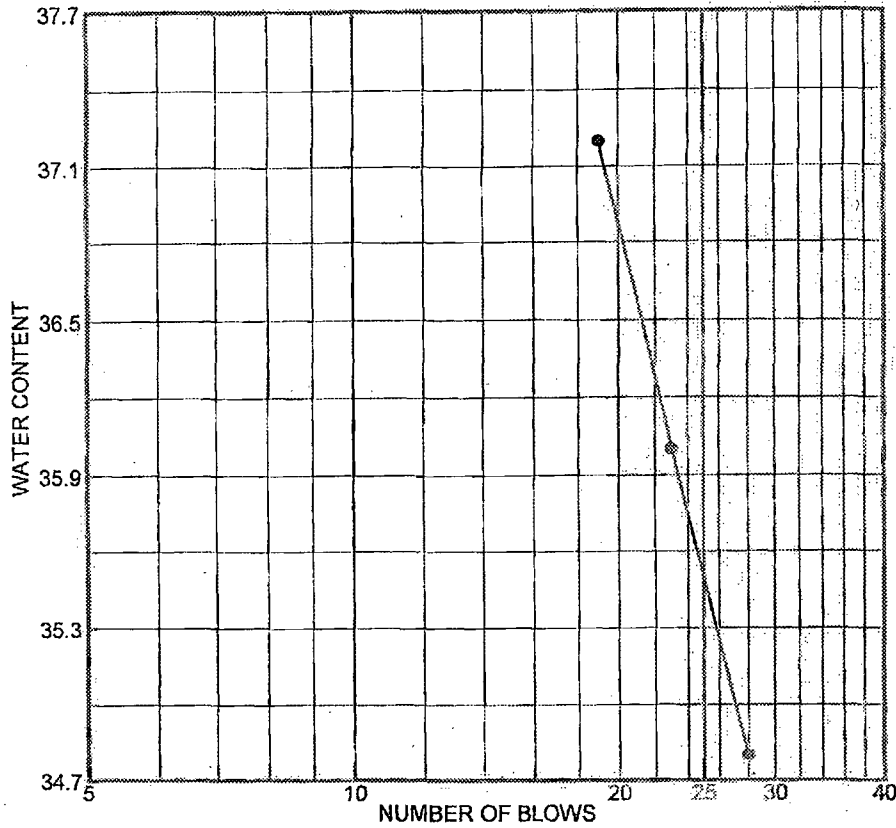
SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
U3-3A	UD-2	50-52 ft	6/23/08	CH	Gray Fat Clay		60	36

Client Fluor Enterprises, Inc.
Project STP Units 3 & 4
Project No. 6234084660, Task 1.2 Lab No. 8956

**MACTEC ENGINEERING
AND
CONSULTING, INC.**

• Tested by: EH Reviewed by: HJ
Specific Gravity = 2.784 (ASTM D 854-06)

LIQUID AND PLASTIC LIMITS TEST REPORT (ASTM D 4318-05)



SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
U3-3A	UD-3	60-62 ft	6/23/08	CL	Strong Brown Lean Clay	22.2	35	19

Client Fluor Enterprises, Inc.

Project STP Units 3 & 4

Project No. 6234084660, Task 1.2

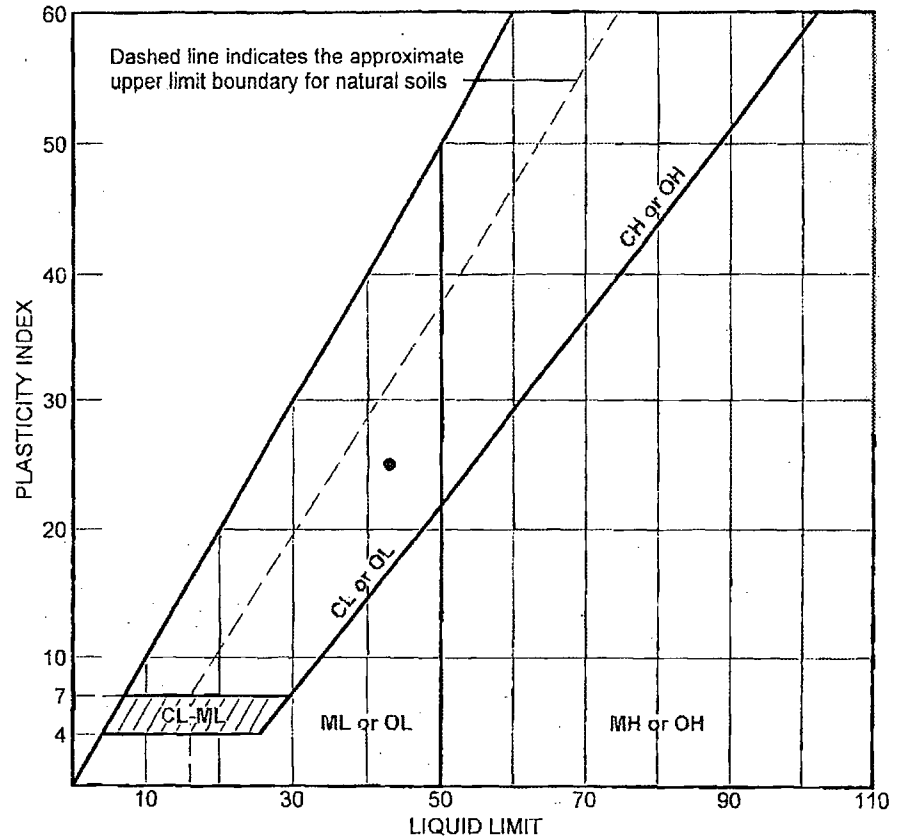
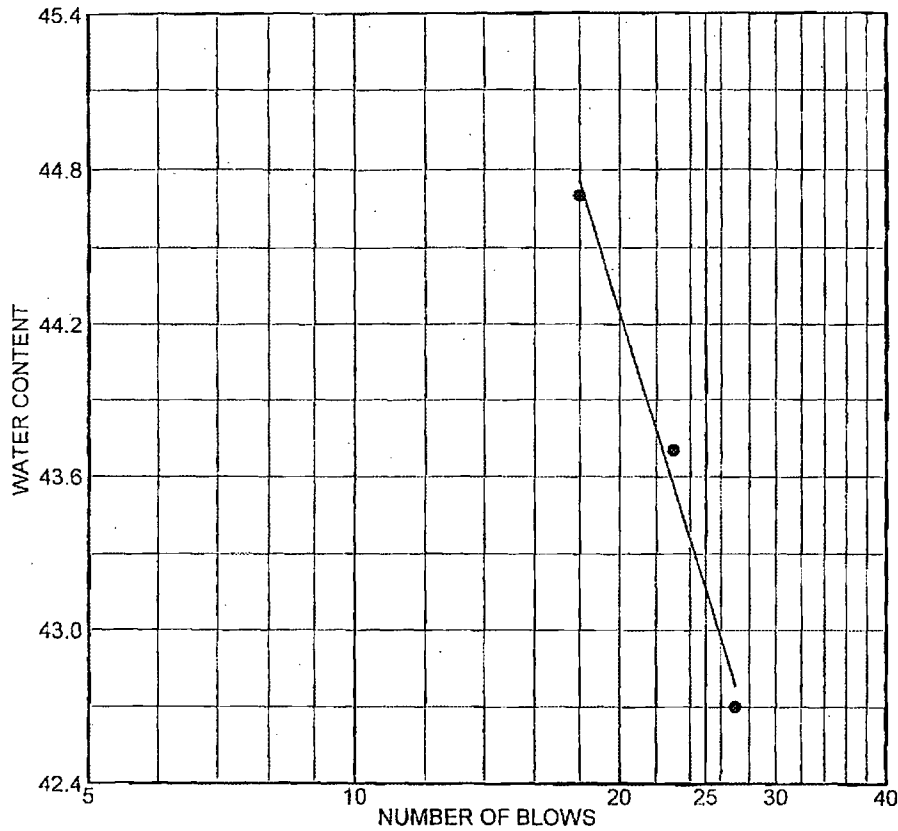
Lab No. 8951

**MACTEC ENGINEERING
AND
CONSULTING, INC.**

• Tested by: EH Reviewed by: JW

Specific Gravity = 2.758 (ASTM D 854-06)

LIQUID AND PLASTIC LIMITS TEST REPORT (ASTM D 4318-05)



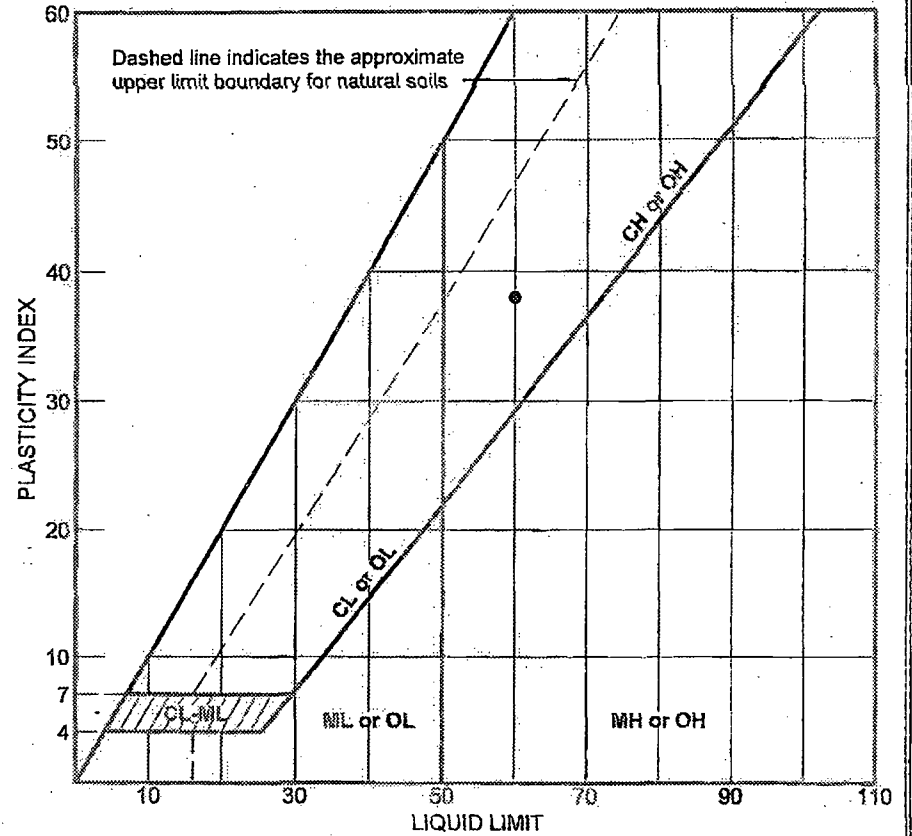
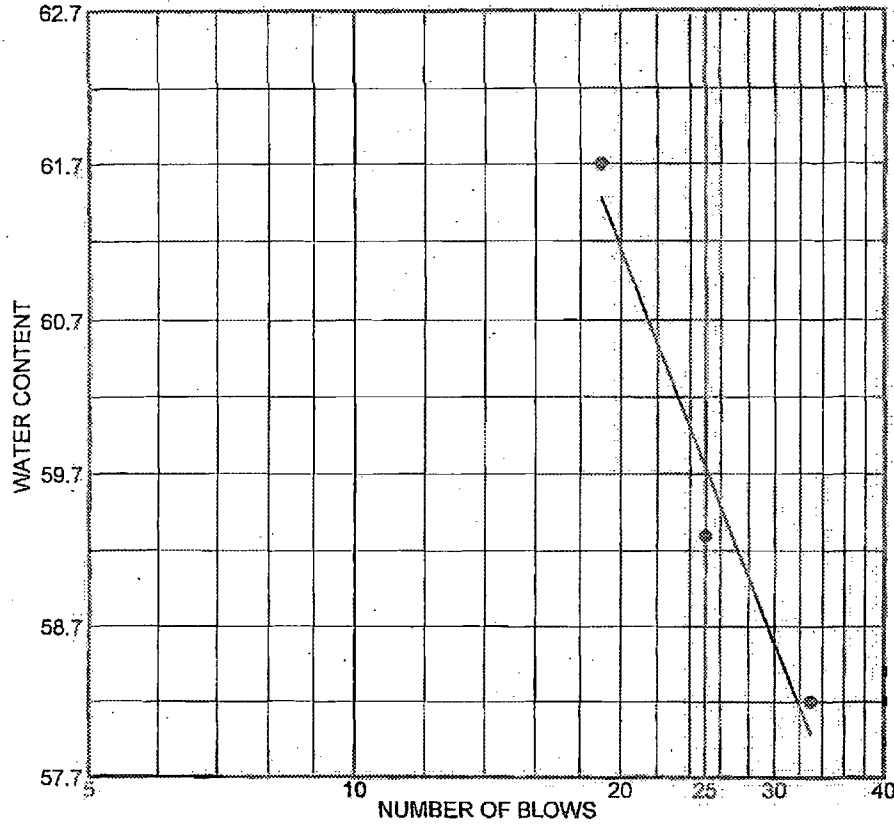
SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
U3-6A	UD-3	100-102 ft	6/25/08	CL	Brown and Light Brownish Gray Lean Clay	27.1	43	25

Client Fluor Enterprises, Inc.
Project STP Units 3 & 4
Project No. 6234084660, Task 1.2

**MACTEC ENGINEERING
AND
CONSULTING, INC.**

Tested by: EH Reviewed by: HJ
Specific Gravity = 2.777 (ASTM D 854-06)

LIQUID AND PLASTIC LIMITS TEST REPORT (ASTM D 4318-05)



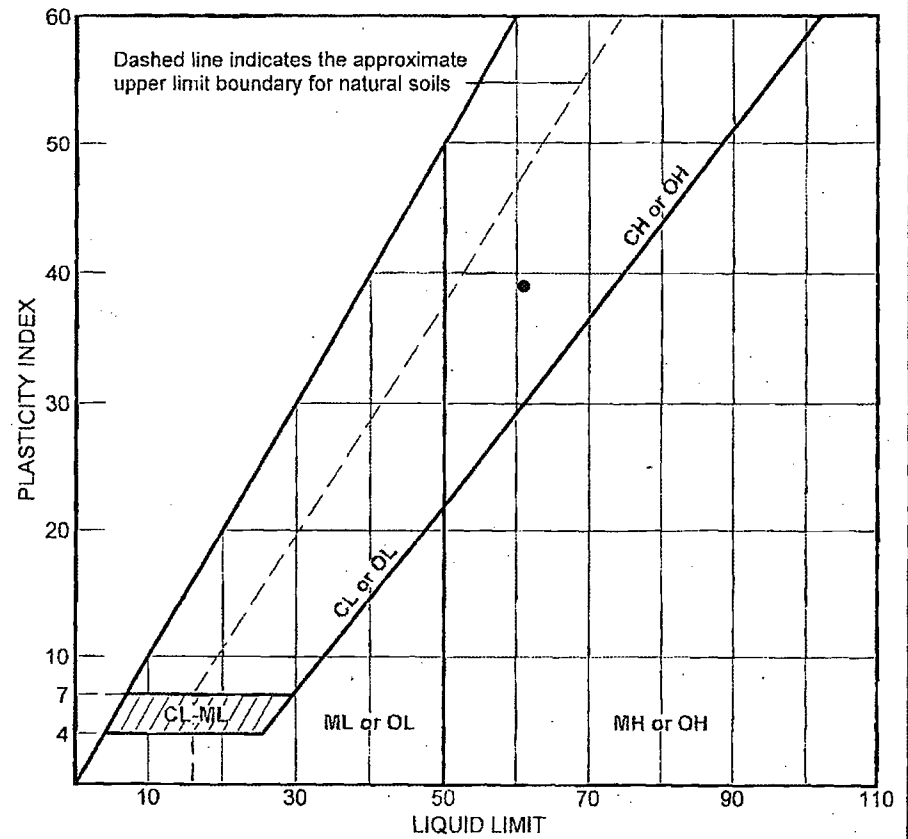
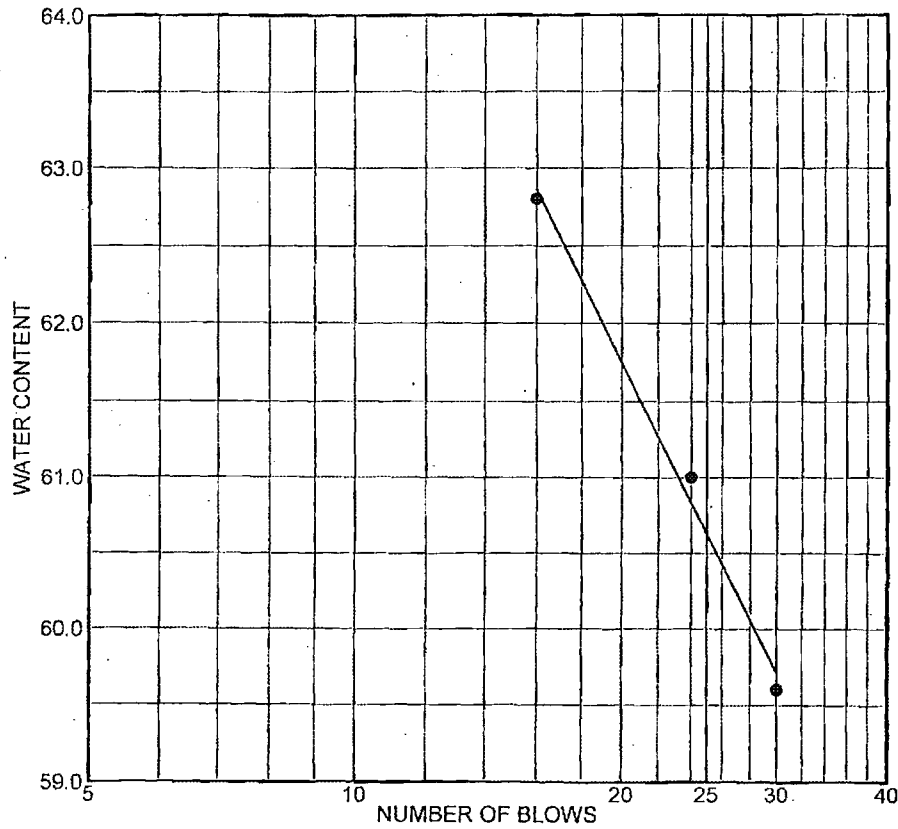
SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
U4-1A	UD-2	108-110 ft	6/28/08	CH	Light Greenish Gray Fat Clay	25.0	60	38

Client Fluor Enterprises, Inc.
Project STP Units 3 & 4
Project No. 6234084660, Task 1.2 Lab No. 8963

**MACTEC ENGINEERING
AND
CONSULTING, INC.**

Tested by: EH Reviewed by: JW
Specific Gravity = 2.744 (ASTM D 854-06)

LIQUID AND PLASTIC LIMITS TEST REPORT (ASTM D 4318-05)



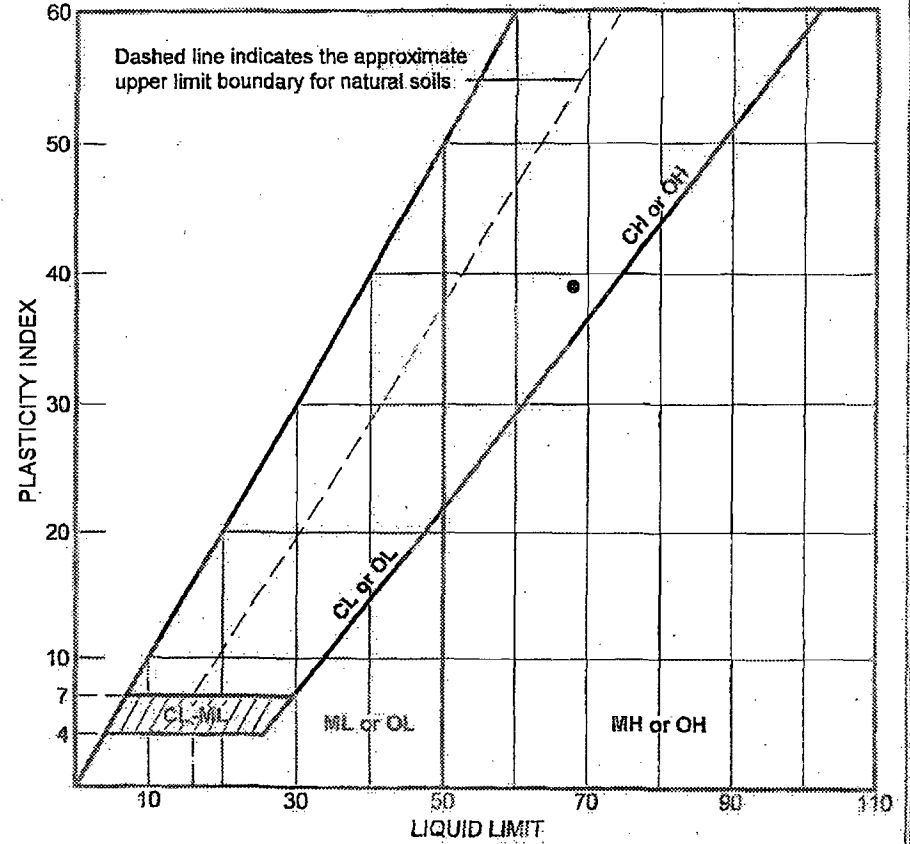
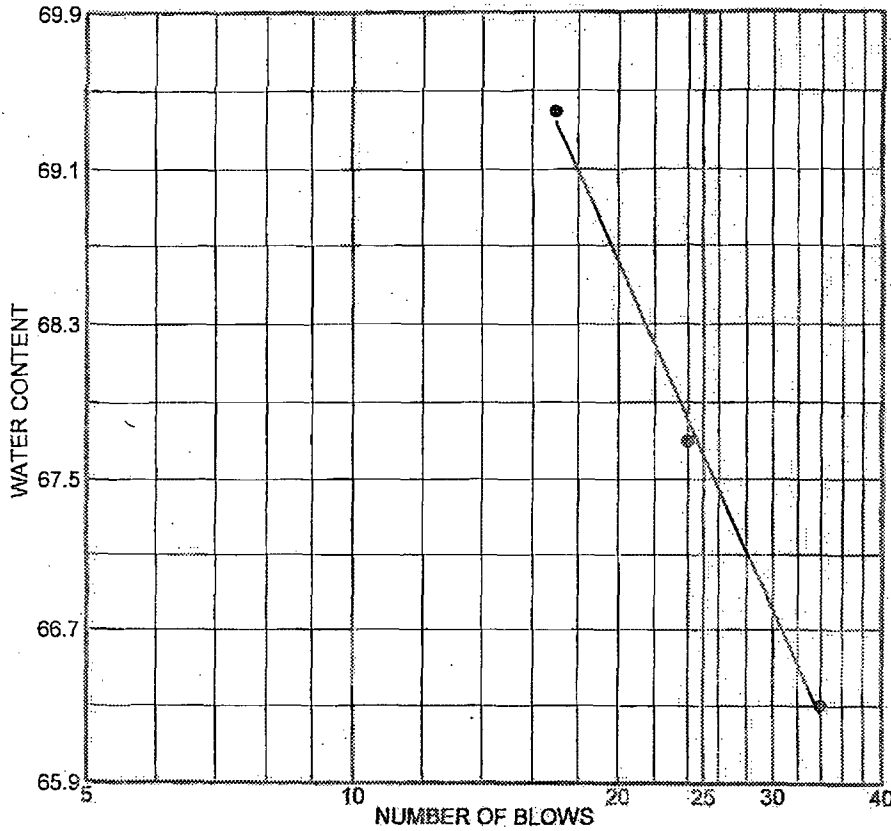
SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
• U4-1A	UD-4	218-220 ft	6/25/08	CH	Dark Gray Fat Clay		61	39

Client Fluor Enterprises, Inc.
 Project STP Units 3 & 4
 Project No. 6234084660, Task 1.2 Lab No. 8958

**MACTEC ENGINEERING
AND
CONSULTING, INC.**

• Tested by: EH Reviewed by: HJ
 Specific Gravity = 2.793 (ASTM D 854-06)

LIQUID AND PLASTIC LIMITS TEST REPORT (ASTM D 4318-05)



SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
U4-1A	UD-5	228-230 ft	6/25/08	CH	Very Dark Greenish Gray Fat Clay	41.1	68	39

Client Fluor Enterprises, Inc.

Project STP Units 3 & 4

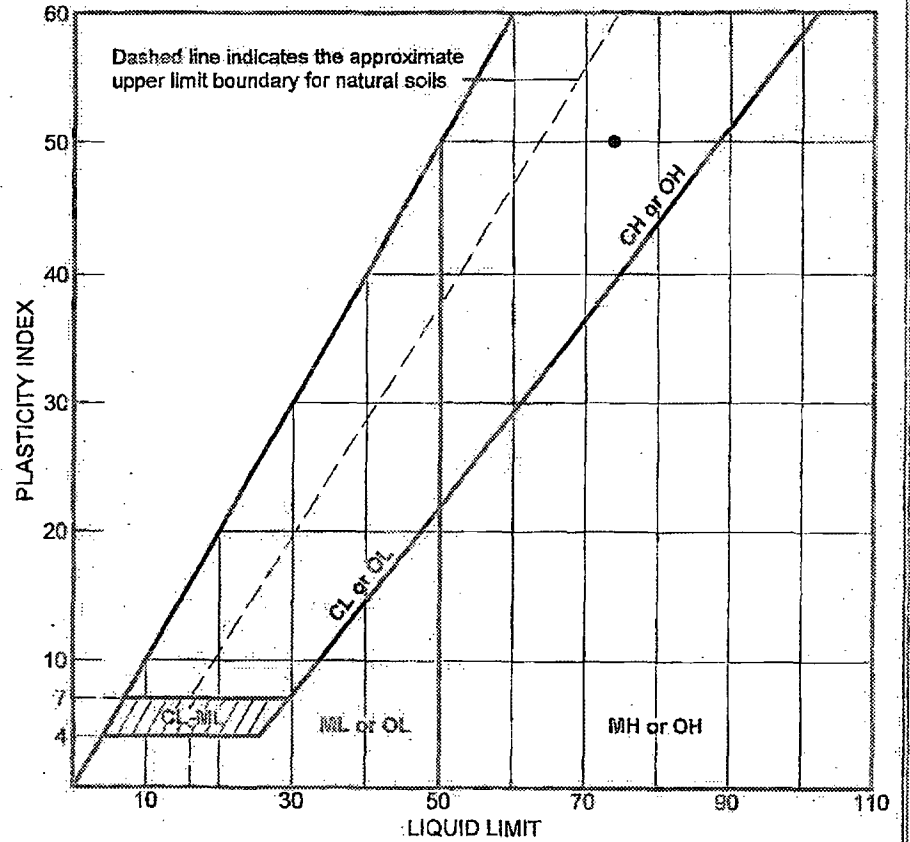
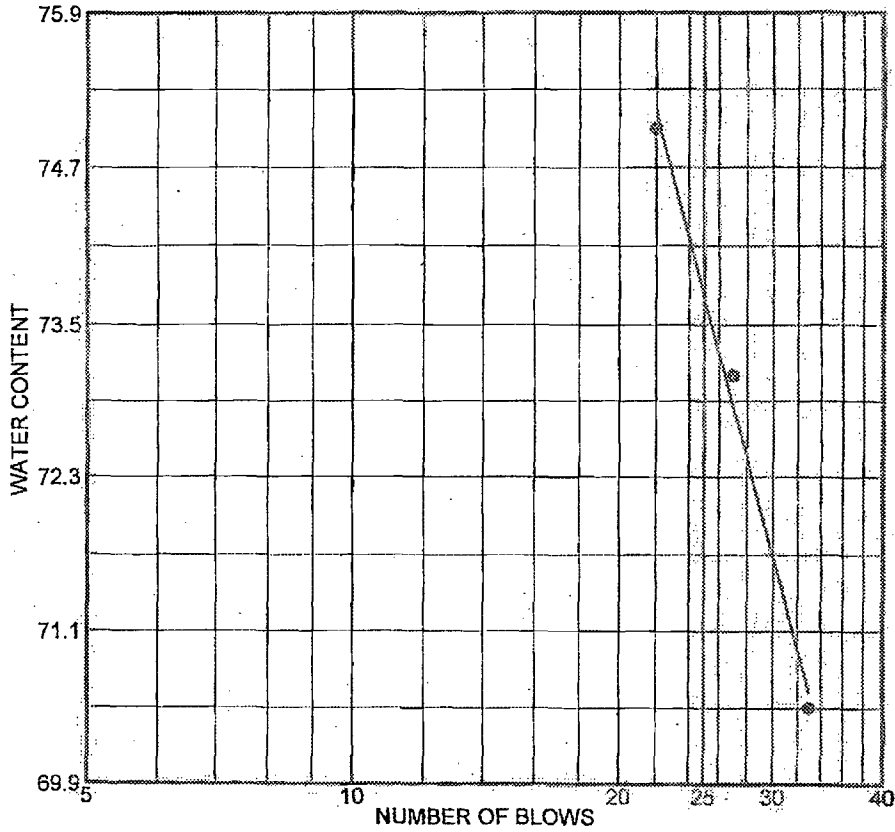
Project No. 6234084660, Task 1.2

Lab No. 8964

**MACTEC ENGINEERING
AND
CONSULTING, INC.**

• Tested by: EH Reviewed by: JW
Specific Gravity = 2.791 (ASTM D 854-06)

LIQUID AND PLASTIC LIMITS TEST REPORT (ASTM D 4318-05)



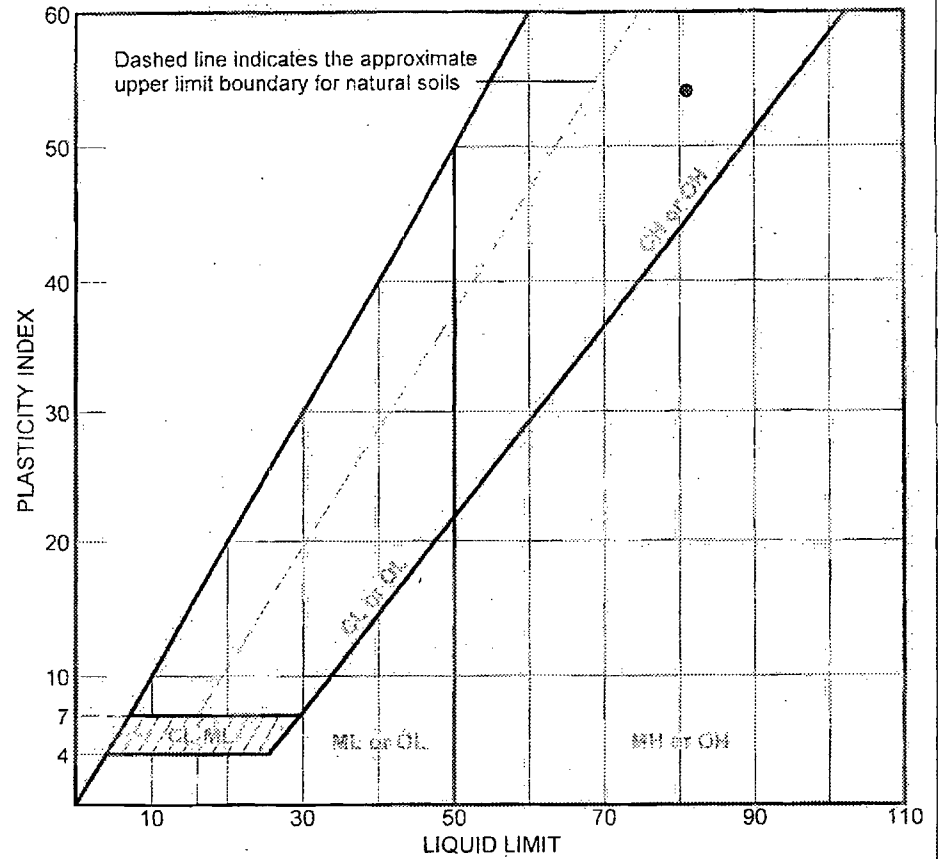
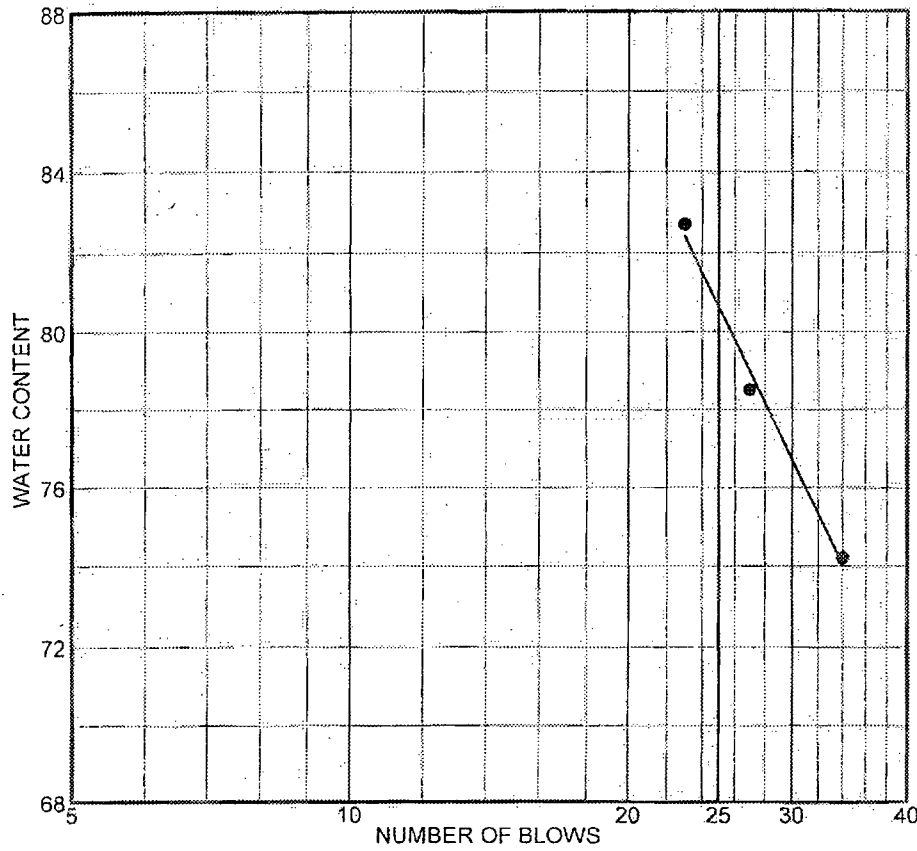
SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
U4-1A	UD-6	268.5-270.5 ft	6/26/08	CH	Greenish Gray Fat Clay	43.0	74	50

Client Fluor Enterprises, Inc.,
Project STP Units 3 & 4
Project No. 6234084660, Task 1.2 Lab No. 8965

**MACTEC ENGINEERING
AND
CONSULTING, INC.**

Tested by: EH Reviewed by: JW
Specific Gravity = 2.746 (ASTM D 854-06)

LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318 (05)



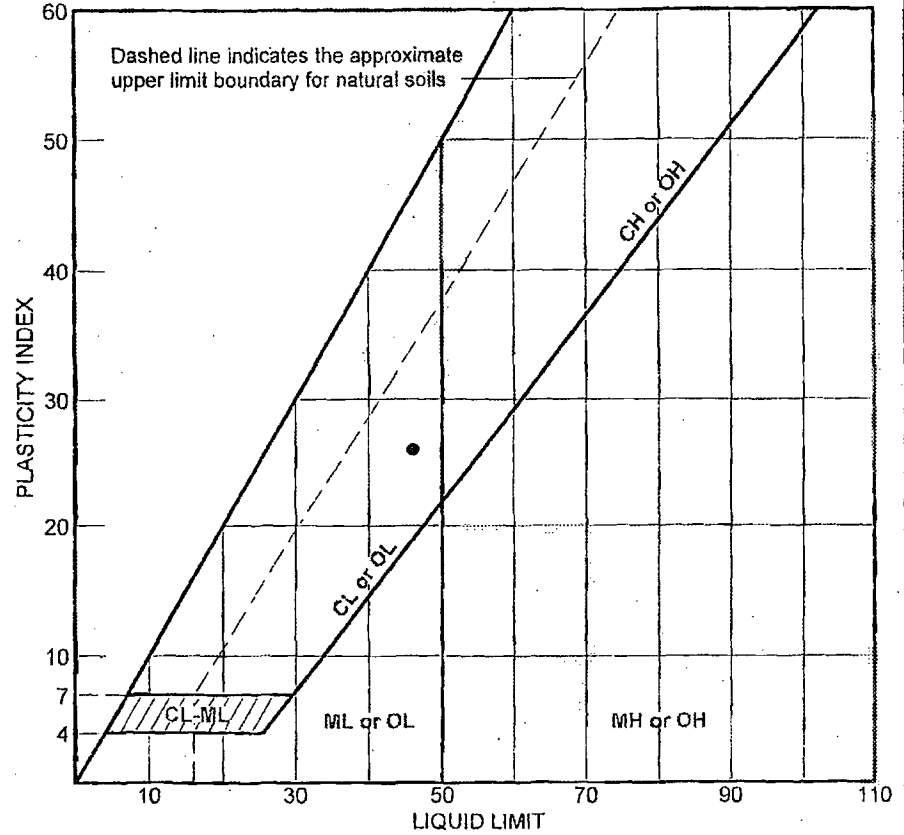
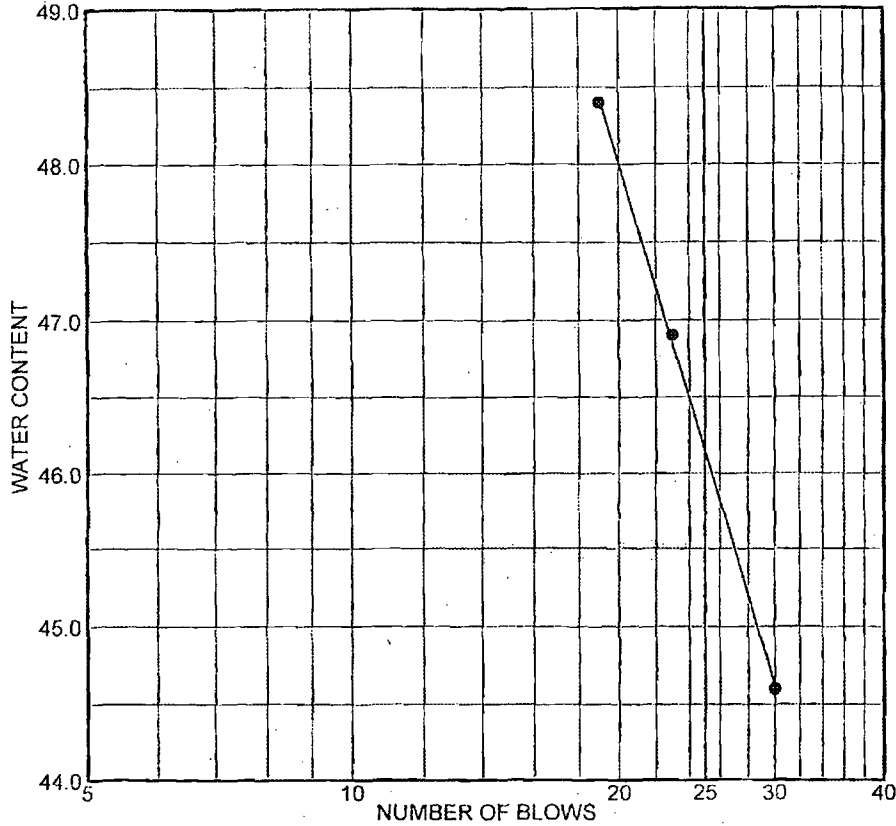
SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
U4-1A	UD-7	277-279.2 Ft	6/27/08	CH	Dark Bluish Gray Fat clay		81	54

Client Fluor Enterprises, Inc.
Project STP Units 3 & 4
Project No. 6234084660, Task I.2 Lab No.

**MACTEC ENGINEERING
AND
CONSULTING, INC.**

• Tested by: EH Reviewed by: HJ

LIQUID AND PLASTIC LIMITS TEST REPORT (ASTM D 4318-05)



SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
• U4-3A	UD-1	52-54'	6/25/08	CL	Light Reddish Brown to Light Olive Gray Lean Clay		46	26

Client Fluor Enterprises, Inc.	
Project STP Units 3 & 4	
Project No. 6234084660, Task 1.2	Lab No. 8959

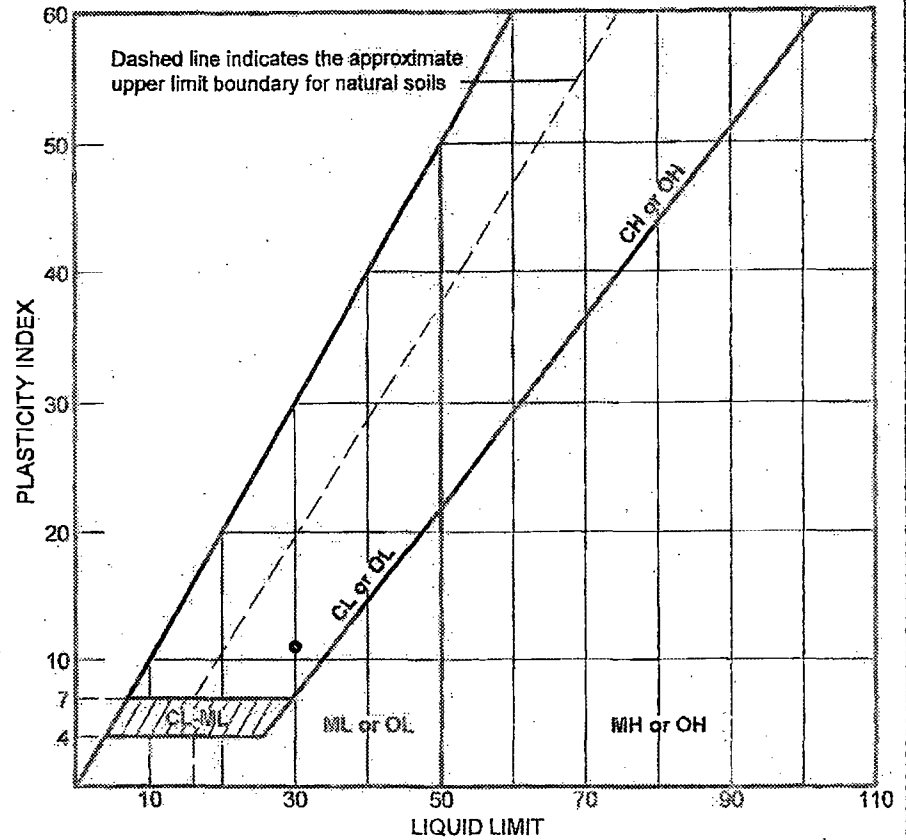
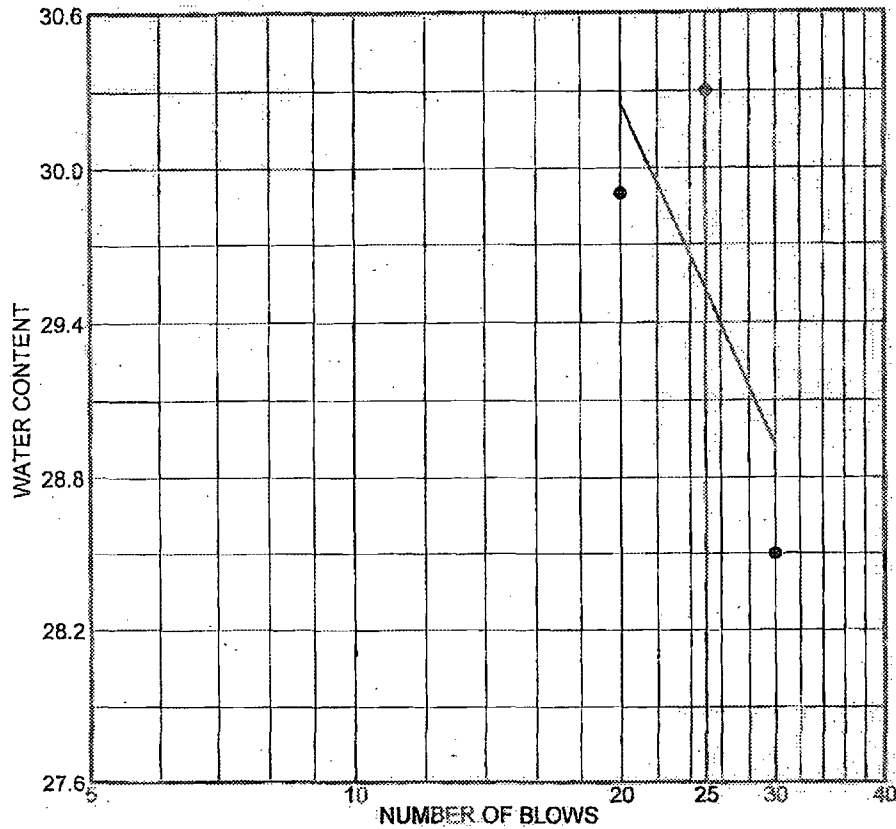
**MACTEC ENGINEERING
AND
CONSULTING, INC.**

• Tested by: EH Reviewed by: HJ
Specific Gravity = 2.762 (ASTM D 854-06)

5877/63

DCND6LR817

LIQUID AND PLASTIC LIMITS TEST REPORT (ASTM D 4318-05)



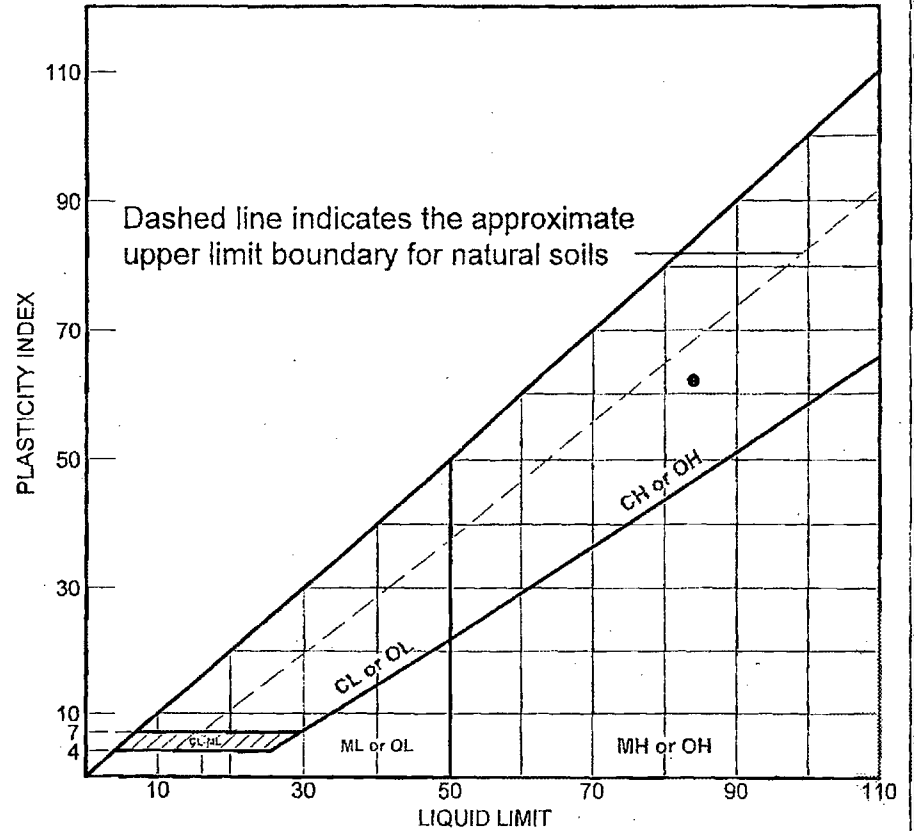
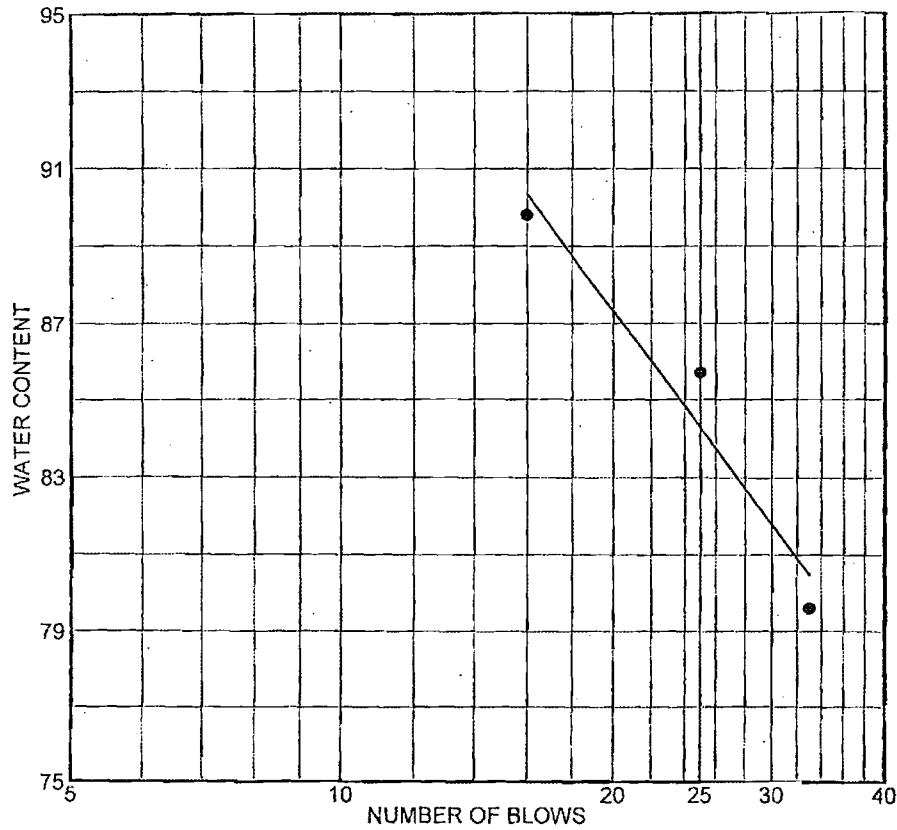
SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
U4-3A	UD-2	85-87 ft	6/25/08	CL	Light Gray to Light Brown Lean Clay	27.9	30	11

Client Fluor Enterprises, Inc.
Project STP Units 3 & 4
Project No. 6234084660, Task 1.2 Lab No. 8953

**MACTEC ENGINEERING
AND
CONSULTING, INC.**

Tested by: EH Reviewed by: JW
Specific Gravity = 2.725 (ASTM D 854-06)

LIQUID AND PLASTIC LIMITS TEST REPORT (ASTM D 4318-05)



SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
U4-6A	UD-3	110.5-112.5 ft	6/26/08	CH	Light Greenish Gray Fat Clay	30.7	84	62

Client Fluor Enterprises, Inc.

Project STP Units 3 & 4

Project No. 6234084660, Task 1.2

Lab No. 8954

**MACTEC ENGINEERING
AND
CONSULTING, INC.**

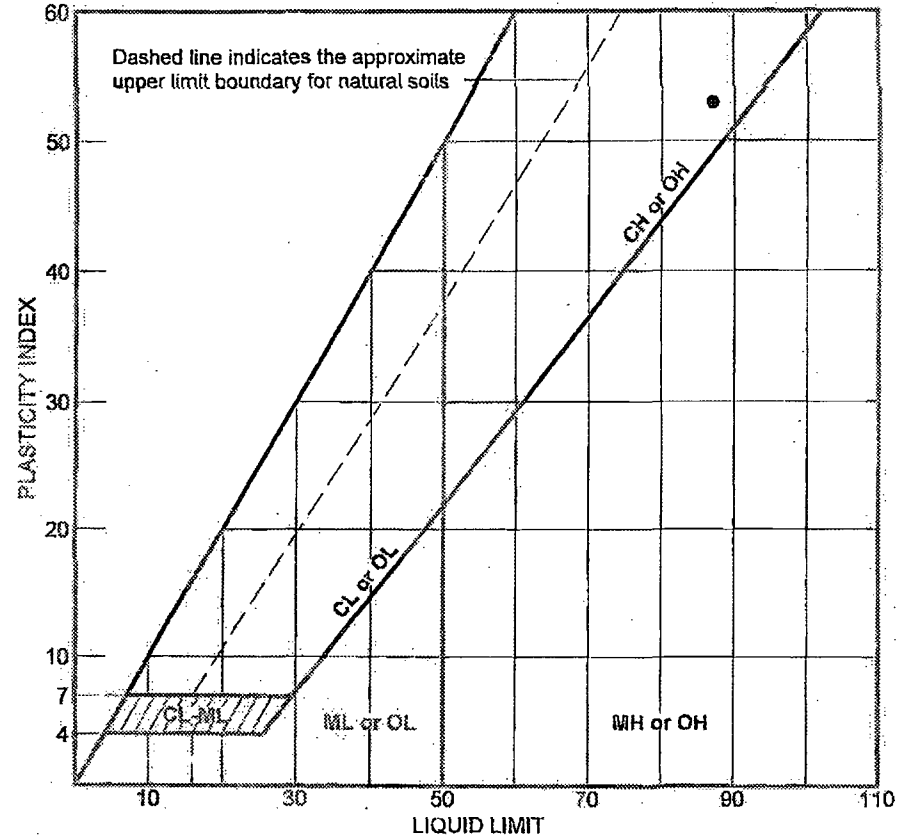
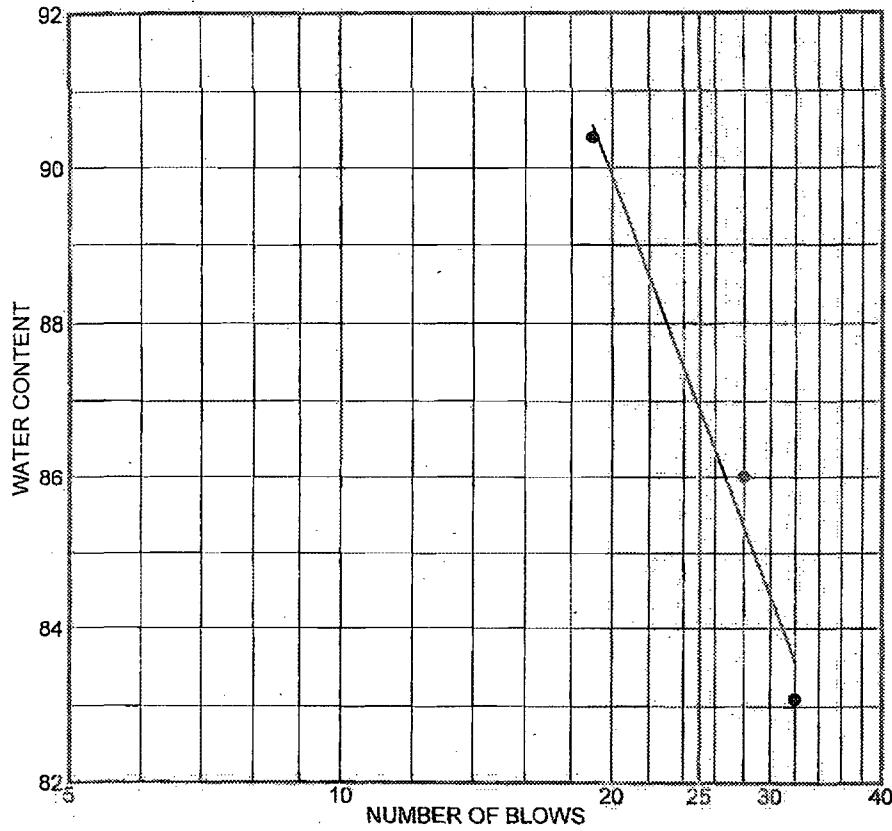
Tested by: EH Reviewed by: JW

Specific Gravity = 2.762 (ASTM D 854-06)

5897/63

DCND/RLR/817

LIQUID AND PLASTIC LIMITS TEST REPORT (ASTM D 4318-05)



SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
U4-6A	UD-4	265-267 ft	6/27/08	CH	Olive Brown Fat Clay	38.8	87	53

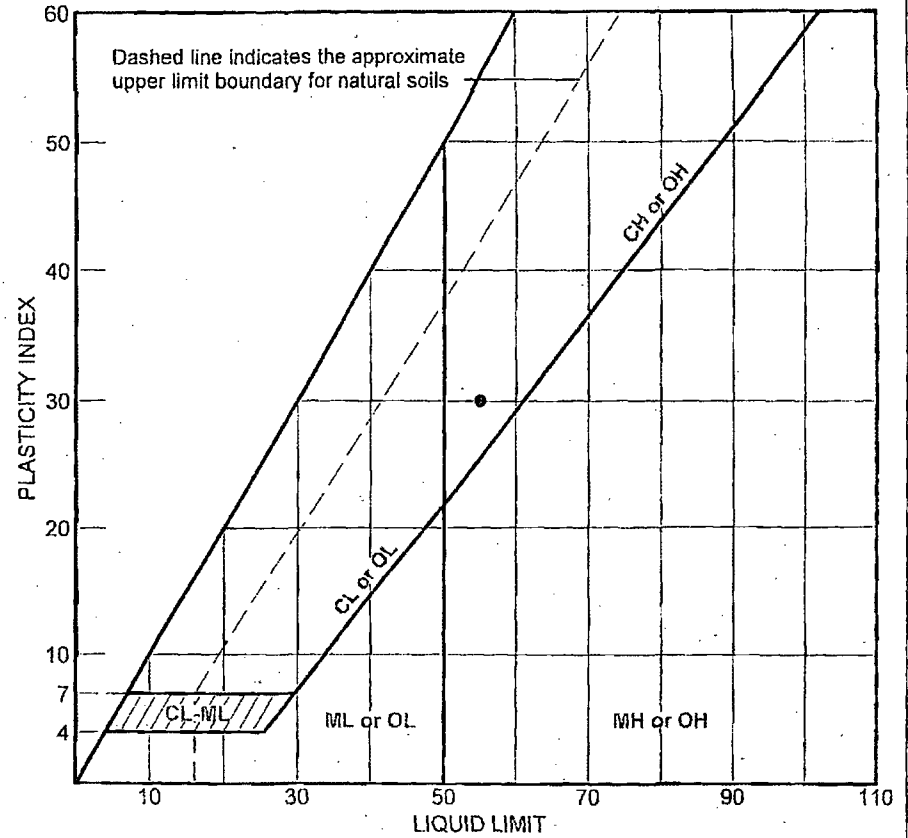
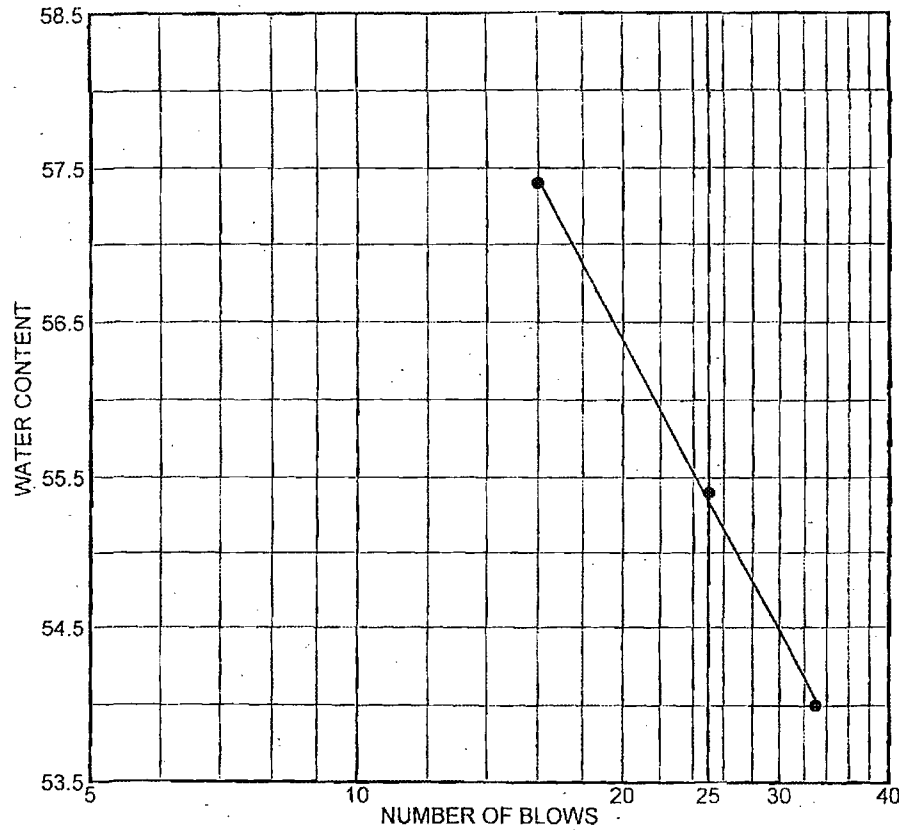
Client Fluor Enterprises, Inc.
Project STP Units 3 & 4

Project No. 6234084660, Task 1.2 Lab No. 8955

**MACTEC ENGINEERING
AND
CONSULTING, INC.**

Tested by: EH Reviewed by: JW
Specific Gravity = 2.77 (ASTM D 854-06)

LIQUID AND PLASTIC LIMITS TEST REPORT (ASTM D 4318-05)



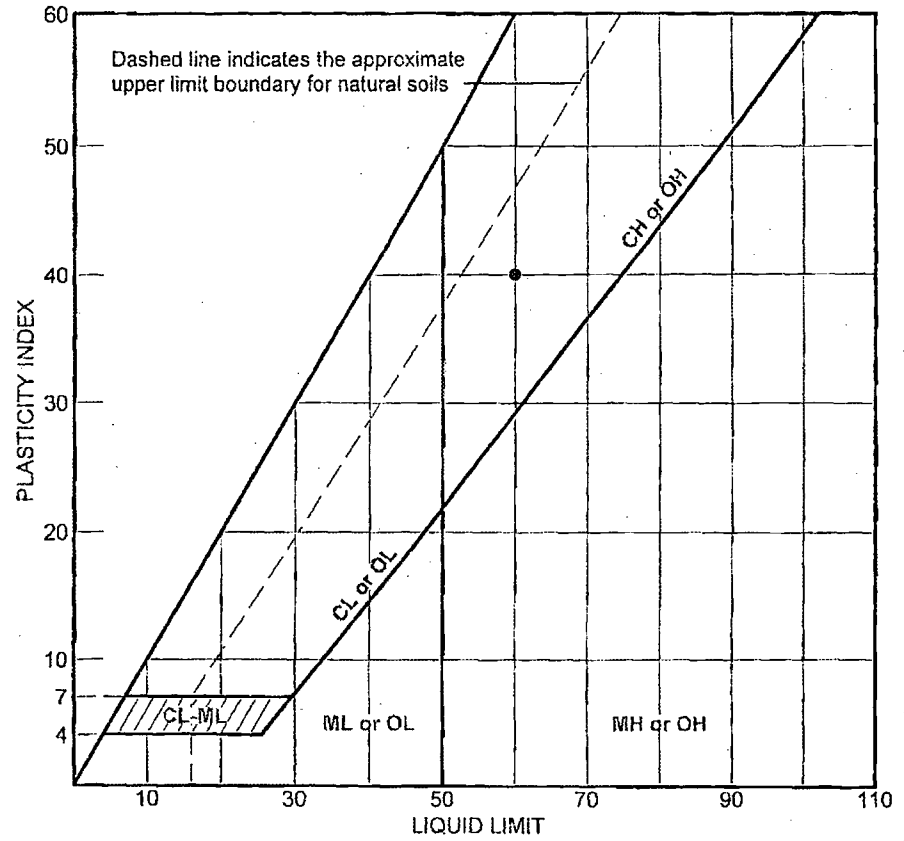
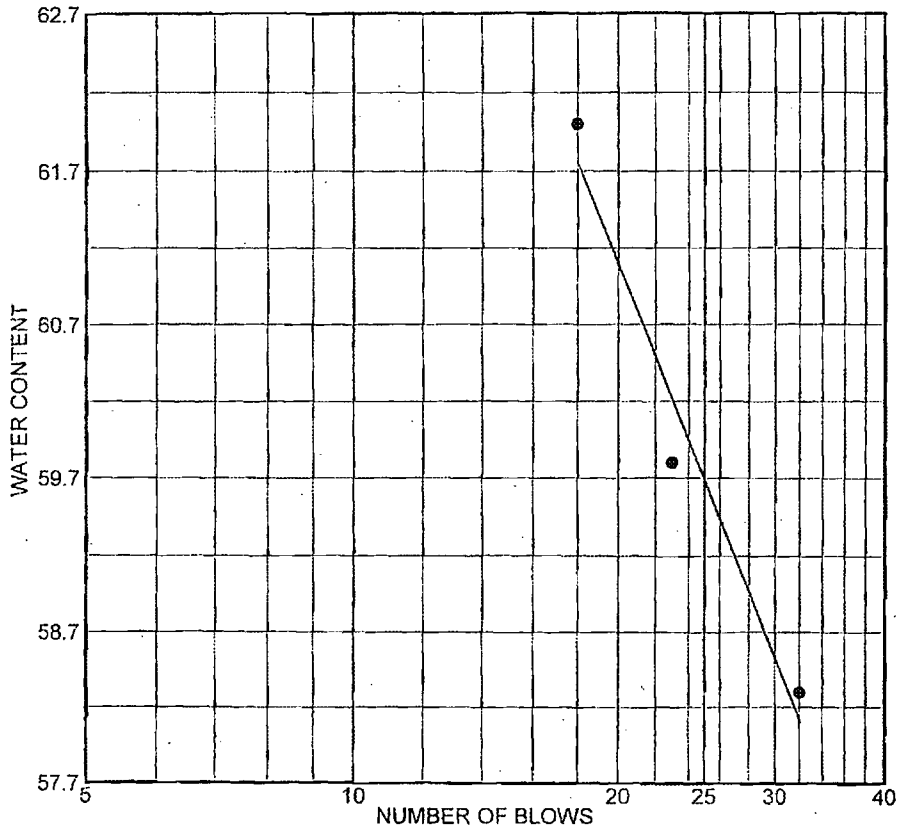
SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
• T3-5B	UD-4	98-100 Ft.	6/25/08	CH	Brown Fat Clay		55	30

Client Fluor Enterprises, Inc.
 Project STP Units 3 & 4
 Project No. 6234084660, Task 1.2 Lab No. 8960

**MACTEC ENGINEERING
AND
CONSULTING, INC.**

• Tested by: EH Reviewed by: HJ
 Specific Gravity = 2.754 (ASTM D 854-06)

LIQUID AND PLASTIC LIMITS TEST REPORT (ASTM D 4318-05)



SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
D3-1A	UD-1	48-50 Ft.	6/24/08	CH	Reddish Brown and Light Greenish Gray Fat Clay	23.4	60	40

Client Fluor Enterprises, Inc.
Project STP Units 3 & 4
Project No. 6234084660, Task 1.2 Lab No. 8961

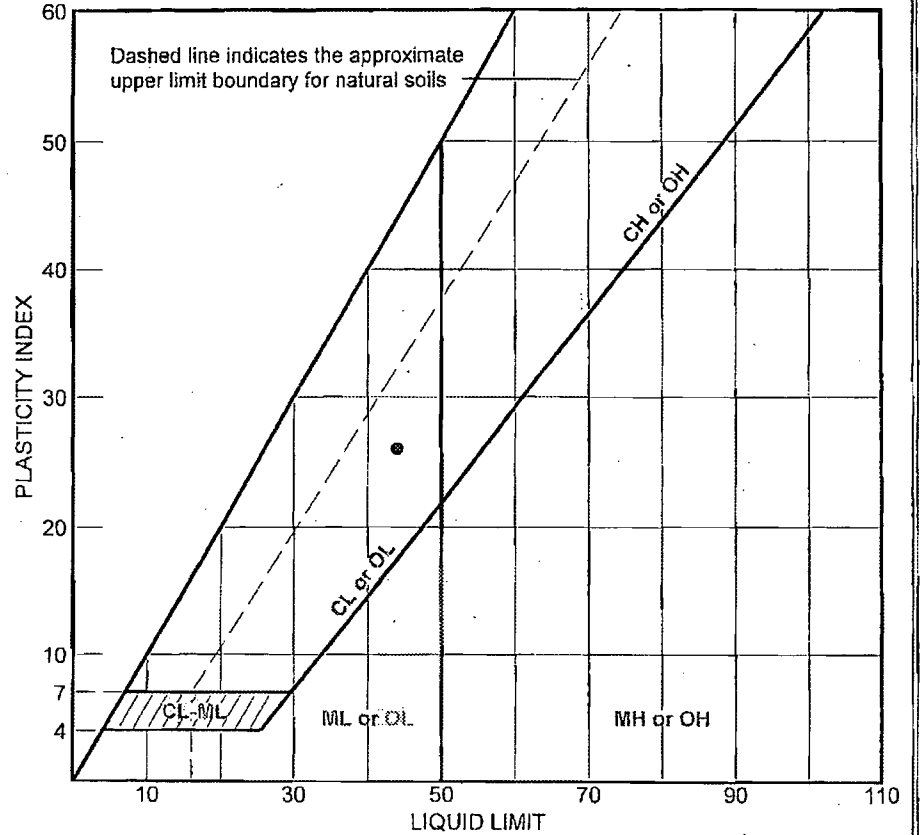
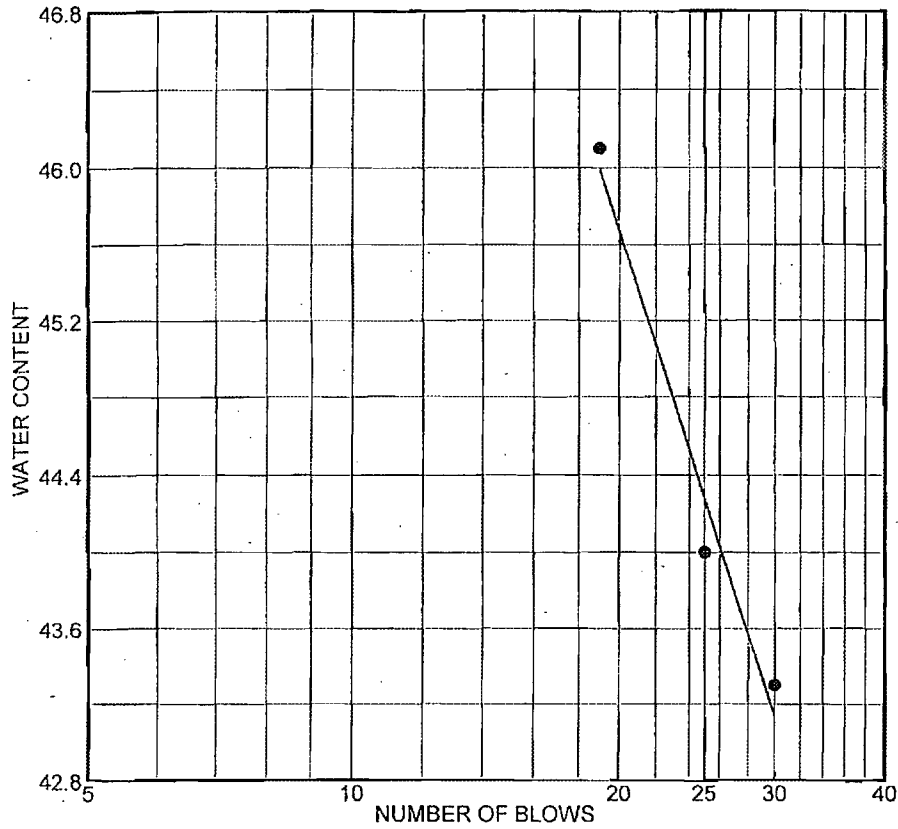
**MACTEC ENGINEERING
AND
CONSULTING, INC.**

• Tested by: EH Reviewed by: HJ
Specific Gravity = 2.775 (ASTM D 854-06)

5927/63

DCND6LR-8317

LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318 (05)



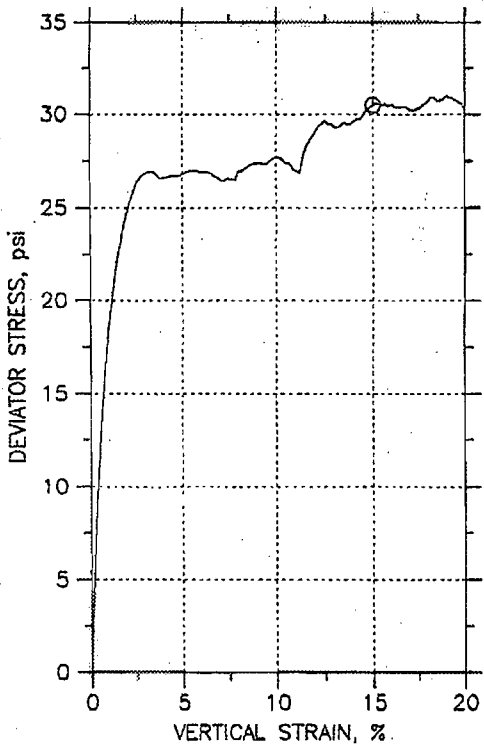
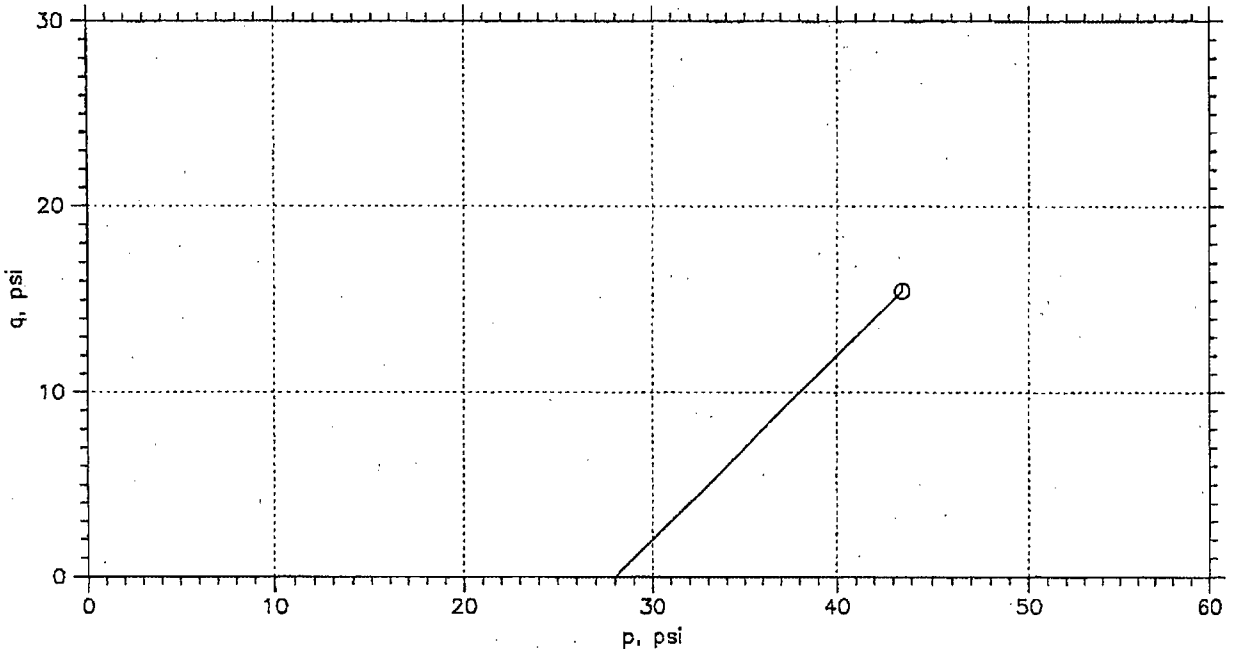
SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
• D3-1A	UD-2	98-100 Ft.	11/11/08	CL	Brown Lean Clay with Sand		44	26

Client Fluor Enterprises, Inc.	
Project STP Units 3 & 4	
Project No. 6234084660, Task 1.2	Lab No. 8962

**MACTEC ENGINEERING
AND
CONSULTING, INC.**

• Tested by: EH Reviewed by: HJ

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850

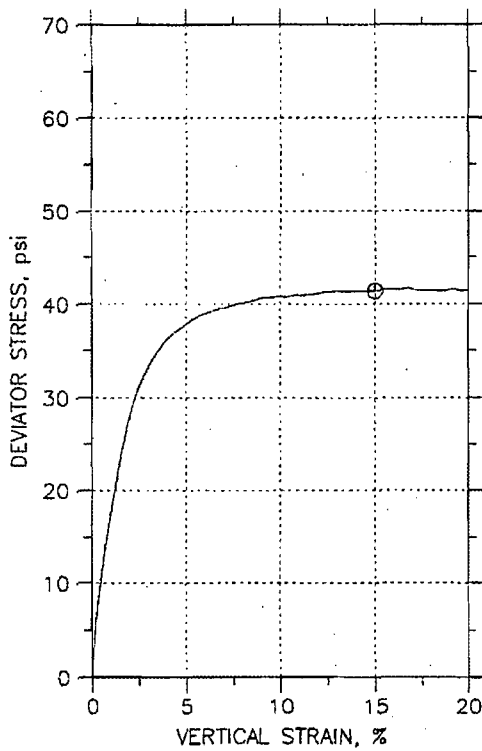
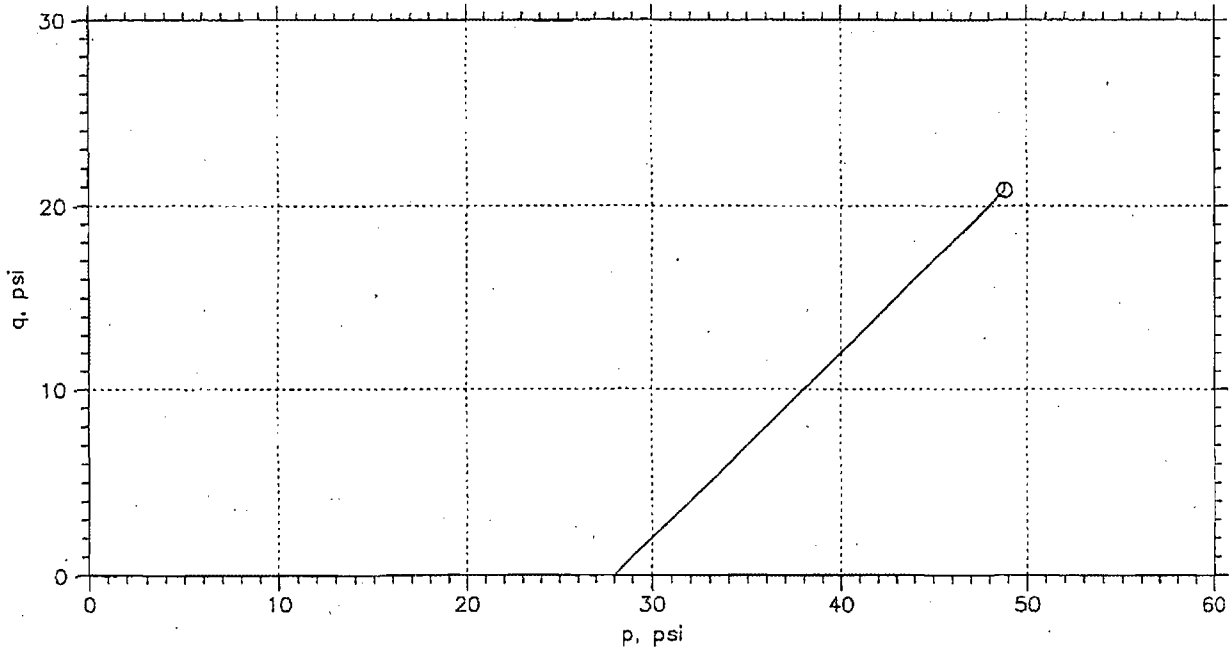


Symbol	⊙		
Sample No.	UD-1		
Test No.	8950		
Depth	48-50 ft		
Tested by	BM		
Test Date	08/27/08		
Checked by	JW		
Check Date	10/6/08		
Diameter, in	2.856		
Height, in	6.006		
Water Content, %	34.9		
Dry Density, pcf	87.37		
Saturation, %	99.5		
Void Ratio	0.965		
Confining Stress, psi	28		
Undrained Strength, psi	15.25		
Max. Dev. Stress, psi	30.49		
Strain at Failure, %	15		
Strain Rate, %/min	1		
Measured Specific Gravity	2.73		
Liquid Limit	61		
Plastic Limit	25		
Plasticity Index	36		

MACTEC	Project: STP Units 3 & 4				
	Location: U3-2A UD-1				
	Project No.: 6234084660				
	Boring No.: U3-2A				
	Sample Type: Undisturbed				
Description: Brown Fat Clay (CH)					
Remarks: By ASTM D2850-03a 2007. SG (ASTM D854-06), PI (ASTM D4318-05). Task 1.2					

Phase calculations based on start of test.

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850

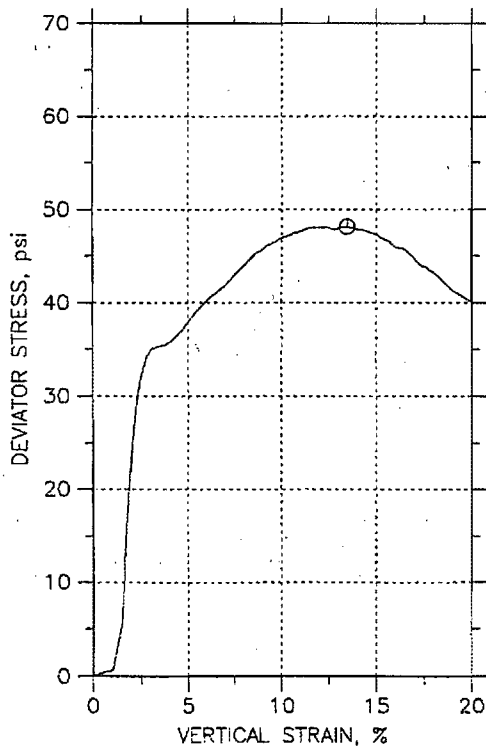
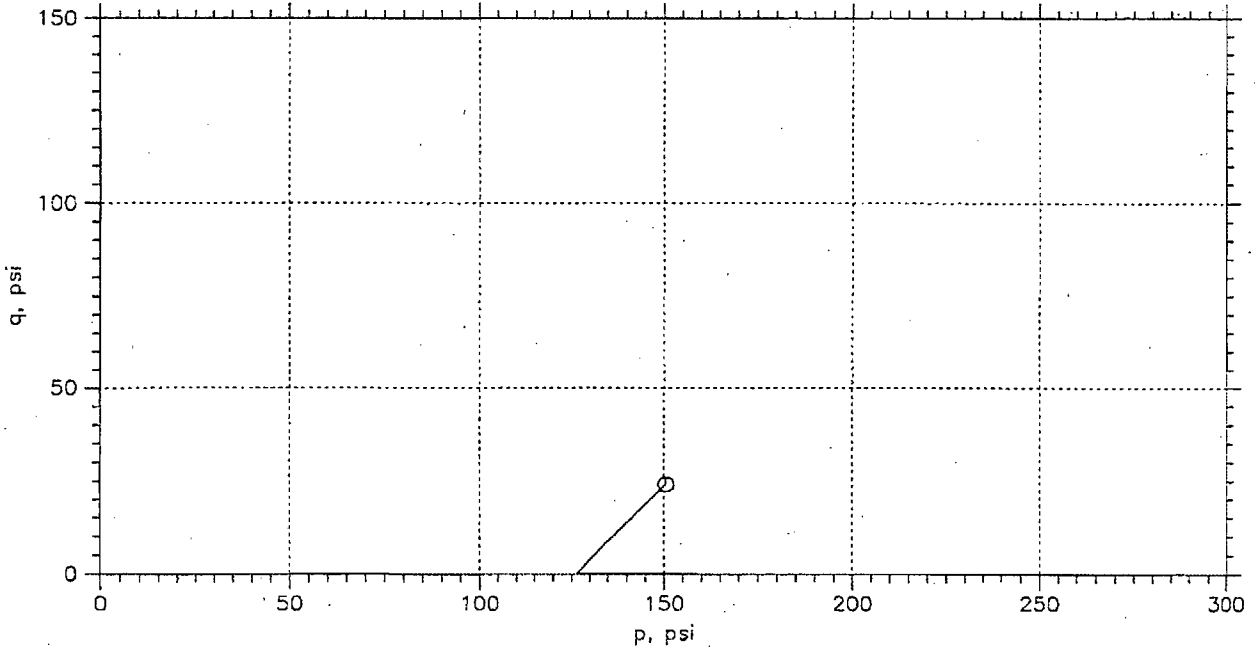


Symbol	⊙		
Sample No.	UD-3		
Test No.	8951		
Depth	60-62 ft		
Tested by	BM		
Test Date	08/28/08		
Checked by	JW		
Check Date	10/14/08		
Diameter, in	2.866		
Height, in	5.996		
Water Content, %	22.2		
Dry Density, pcf	104.9		
Saturation, %	95.3		
Void Ratio	0.643		
Confining Stress, psi	28		
Undrained Strength, psi	20.69		
Max. Dev. Stress, psi	41.38		
Strain at Failure, %	15		
Strain Rate, %/min	1		
Measured Specific Gravity	2.76		
Liquid Limit	35		
Plastic Limit	16		
Plasticity Index	19		

MACTEC	Project: STP Units 3 & 4	
	Location: U3-3A UD-3	
	Project No.: 6234084660	
	Boring No.: U3-3A	
	Sample Type: Undisturbed	
	Description: Strong Brown Lean Clay (CL)	
Remarks: By ASTM D2850-03a 2007. SG (ASTM D854-06), PI (ASTM D4318-05)		Task 1.2

Phase calculations based on start of test.

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850

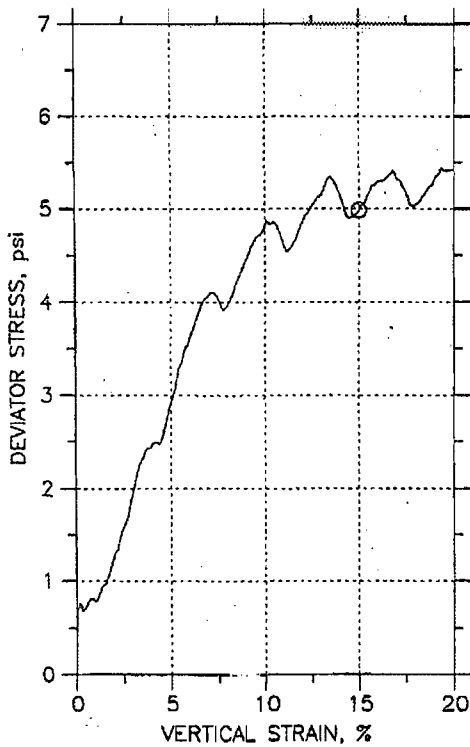
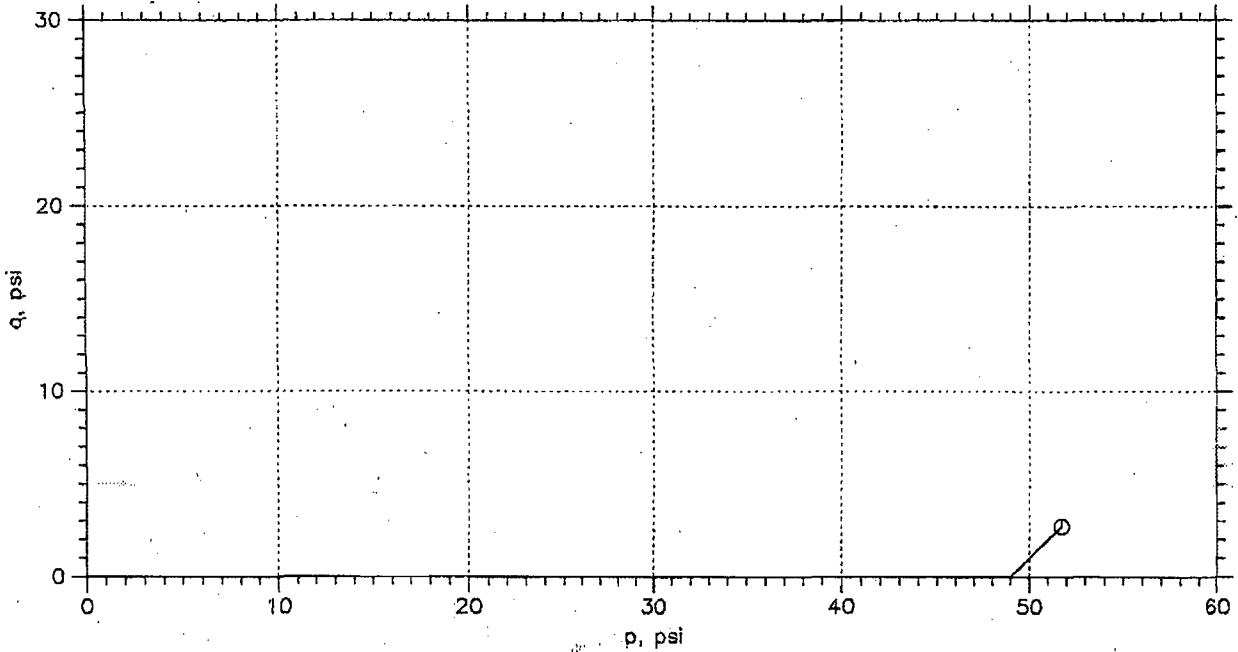


Symbol	⊙			
Sample No.	UD-7			
Test No.	8952			
Depth	277-279.2 f			
Tested by	HJ			
Test Date	10/9/08			
Checked by	<i>JW</i>			
Check Date	11/20/08			
Diameter, in	2.864			
Height, in	6			
Water Content, %	32.2			
Dry Density, pcf	88.55			
Saturation, %	96.7			
Void Ratio	0.896			
Confining Stress, psi	126.4			
Undrained Strength, psi	24.08			
Max. Dev. Stress, psi	48.16			
Strain at Failure, %	13.5			
Strain Rate, %/min	1			
Measured Specific Gravity	2.69			
Liquid Limit	81			
Plastic Limit	27			
Plasticity Index	54			

MACTEC	Project: STP Units 3 & 4				
	Location: U4-1A, UD-7				
	Project No.: 6234084660				
	Boring No.: U4-1A				
	Sample Type: Undisturbed				
Description: Dark Bluish Gray Fat Clay (CH)	Task 1.2				
Remarks: By ASTM D2850-03a 2007. SG (ASTM D854-06), PI (ASTM D4318-05).					

Phase calculations based on start of test.

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850

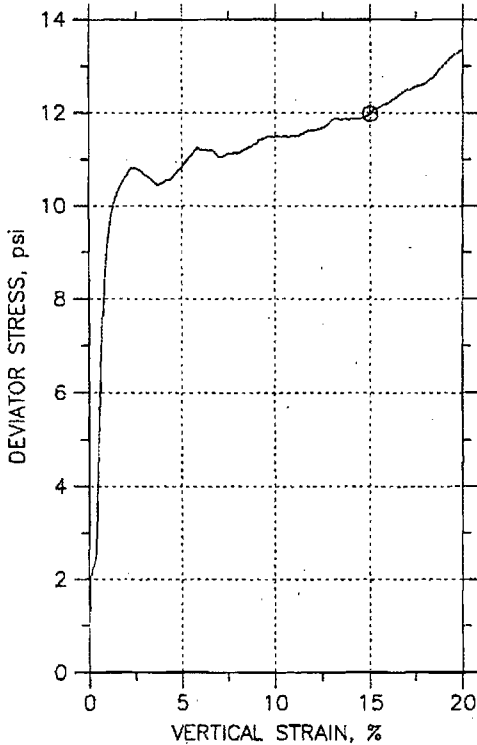
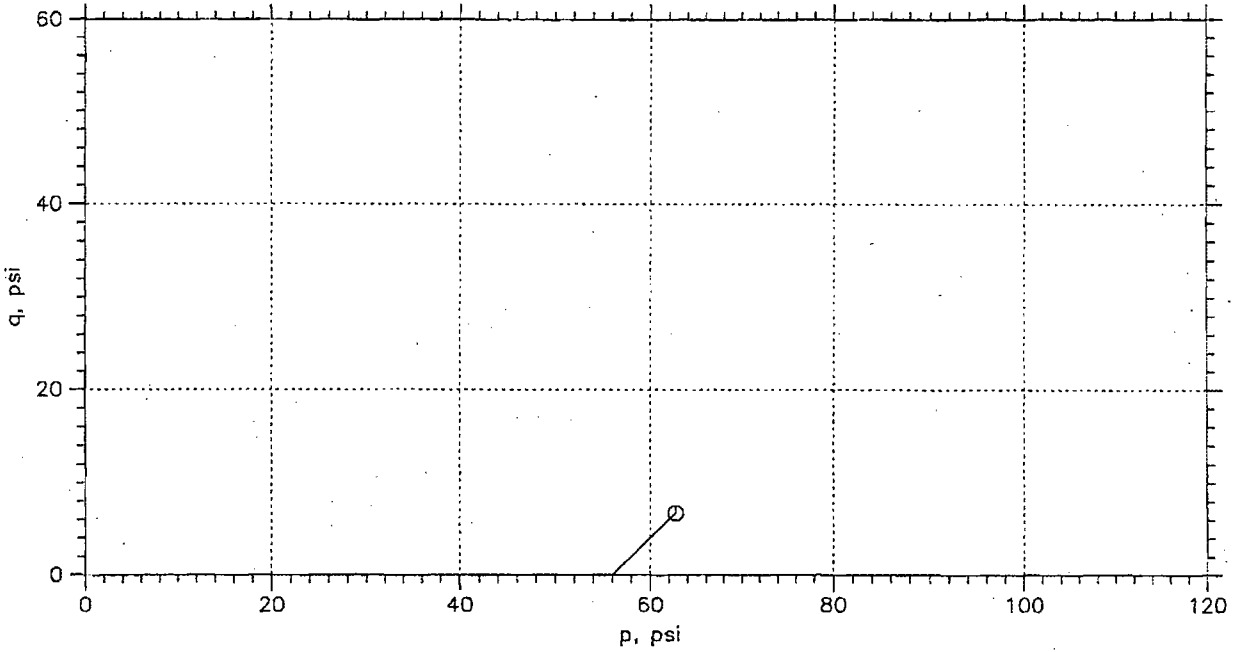


Symbol	⊙			
Sample No.	UD-2			
Test No.	8953			
Depth	85-87 ft			
Tested by	BM			
Test Date	08/28/08			
Checked by	JW			
Check Date	10/8/08			
Diameter, in	2.854			
Height, in	5.969			
Water Content, %	27.9			
Dry Density, pcf	95.49			
Saturation, %	97.2			
Void Ratio	0.785			
Confining Stress, psi	49			
Undrained Strength, psi	2.49			
Max. Dev. Stress, psi	4.981			
Strain at Failure, %	15			
Strain Rate, %/min	1			
Measured Specific Gravity	2.73			
Liquid Limit	30			
Plastic Limit	19			
Plasticity Index	11			

MACTEC	Project: STP Units 3 & 4	
	Location: U4-3A UD-2	
	Project No.: 6234084660	
	Boring No.: U4-3A	
	Sample Type: Undisturbed	
Description: Light Gray to Light Brown Lean Clay (CL)		
Remarks: By ASTM D2850-03a 2007. SG (ASTM D854-06), PI (ASTM 4318-05)		
Task 1.2		

Phase calculations based on start of test.

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850

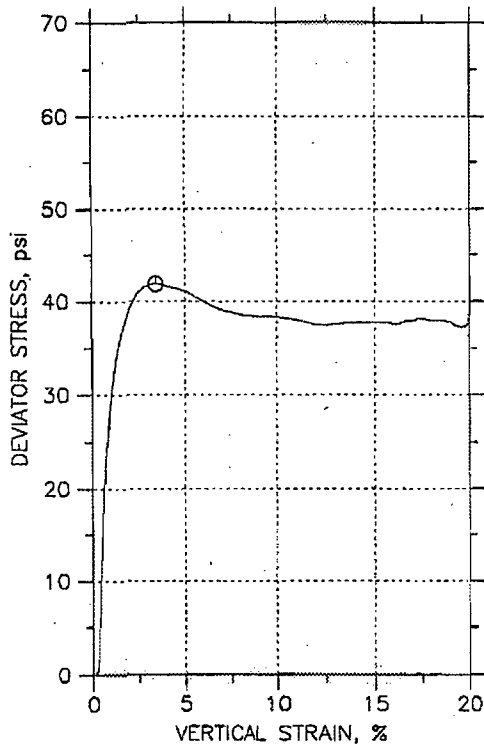
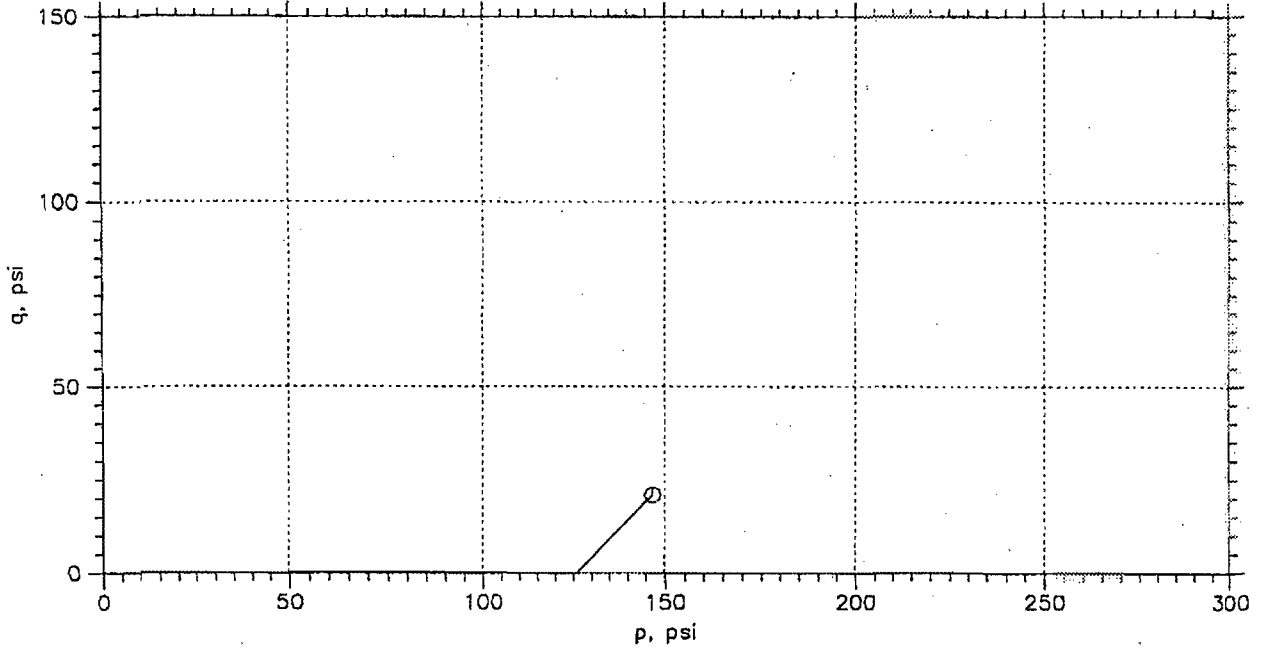


Symbol	⊙		
Sample No.	UD-3		
Test No.	8954		
Depth	110.5-112.5		
Tested by	BM		
Test Date	08/28/08		
Checked by	JW		
Check Date	10/13/08		
Diameter, in	2.863		
Height, in	5.62		
Water Content, %	30.7		
Dry Density, pcf	91.87		
Saturation, %	96.9		
Void Ratio	0.875		
Confining Stress, psi	56		
Undrained Strength, psi	5.987		
Max. Dev. Stress, psi	11.97		
Strain at Failure, %	15		
Strain Rate, %/min	1		
Measured Specific Gravity	2.76		
Liquid Limit	84		
Plastic Limit	22		
Plasticity Index	62		

MACTEC	Project: STP Units 3 & 4			
	Location: U4-6A UD-3			
	Project No.: 6234084660			
	Boring No.: U4-6A			
	Sample Type: Undisturbed			
Description: Light Greenish Gray Fat Clay (CH)				
Remarks: By ASTM D2850-03a 2007. SG(ASTM D854-06), PI(ASTM D4318-05). Depth in feet. Task 1.2				

Phase calculations based on start of test.

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850

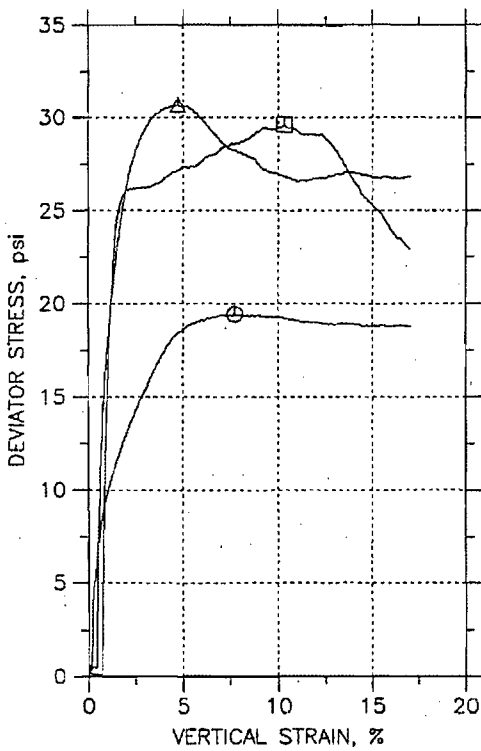
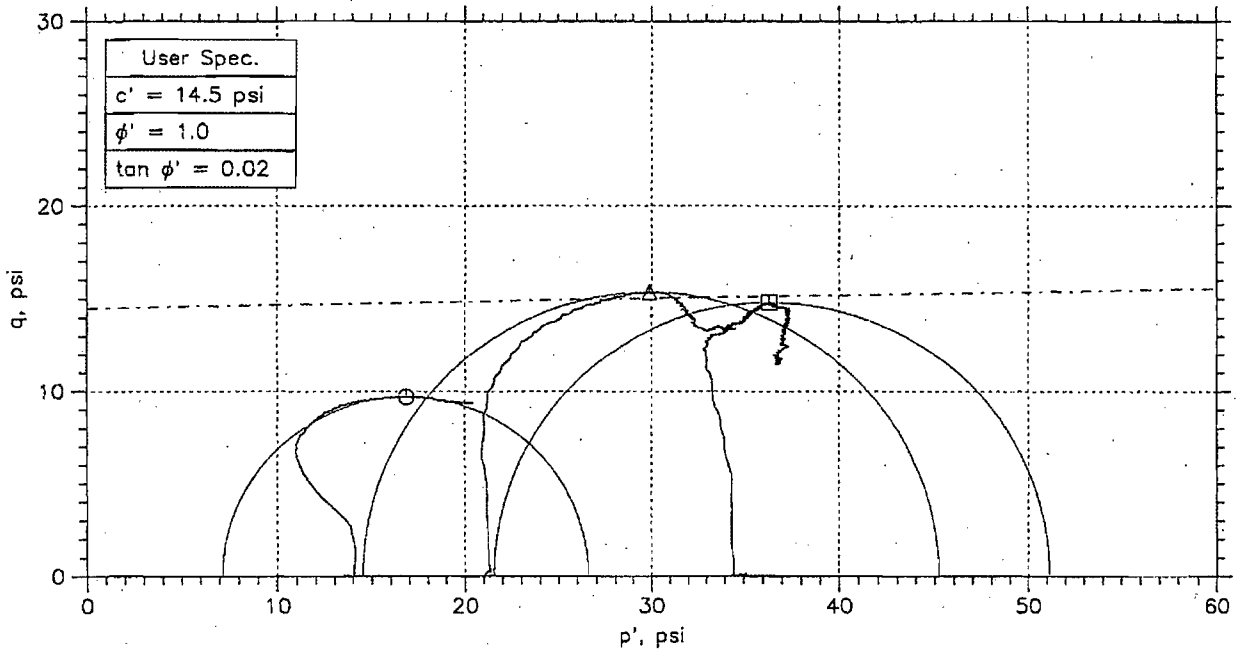


Symbol	⊙		
Sample No.	UD-4		
Test No.	8955		
Depth	265-267 ft		
Tested by	BM		
Test Date	08/28/08		
Checked by	JW		
Check Date	10/8/08		
Diameter, in	2.857		
Height, in	5.601		
Water Content, %	38.8		
Dry Density, pcf	83.33		
Saturation, %	100.0		
Void Ratio	1.08		
Confining Stress, psi	126		
Undrained Strength, psi	20.91		
Max. Dev. Stress, psi	41.81		
Strain at Failure, %	3.39		
Strain Rate, %/min	1		
Measured Specific Gravity	2.77		
Liquid Limit	87		
Plastic Limit	54		
Plasticity Index	53		

MACTEC	Project: STP Units 3 & 4	(N)				
	Location: U4-6A UD-4					
	Project No.: 6234084660					
	Boring No.: U4-6A					
	Sample Type: Undisturbed					
Description: Olive Brown Fat Clay (CH)						
Remarks: By ASTM D2850-03a 2007. SG (ASTM D-854-06), PI (ASTM D4318-05)	Task 1.2					

Phase calculations based on start of test.

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Symbol	⊙	△	⊠	
Sample No.	UD-2	UD-2	UD-2	
Test No.	8956.1	8956.2	8956.3	
Depth	50-52 ft	50-52 ft	50-52 ft	
Initial	Diameter, in	2.858	2.864	2.867
	Height, in	6.004	6.007	6.002
	Water Content, %	27.6	26.7	26.6
	Dry Density, pcf	93.82	97.2	97.53
	Saturation, %	90.1	94.4	94.5
Before Shear	Void Ratio	0.852	0.788	0.782
	Water Content, %	28.2	27.5	26.9
	Dry Density, pcf	97.35	98.38	99.45
	Saturation*, %	100.0	100.0	100.0
	Void Ratio	0.785	0.767	0.748
	Back Press., psi	99.99	104.	94.
	Ver. Eff. Cons. Stress, psi	13.99	20.99	35.
	Shear Strength, psi	9.71	15.34	14.79
	Strain at Failure, %	7.75	4.73	10.3
	Strain Rate, %/min	0.008	0.008	0.008
	B-Value	0.96	0.90	0.76
	Measured Specific Gravity	2.78	2.78	2.78
	Liquid Limit	60	60	60
	Plastic Limit	24	24	24

MACTEC	Project: STP Units 3&4	
	Location: U3-3A UD-2	
	Project No.: 6234084660	
	Boring No.: U3-3A	
	Sample Type: Undisturbed	
	Description: Gray Fat Clay (CH)	
Remarks: ASTM D4767-04		

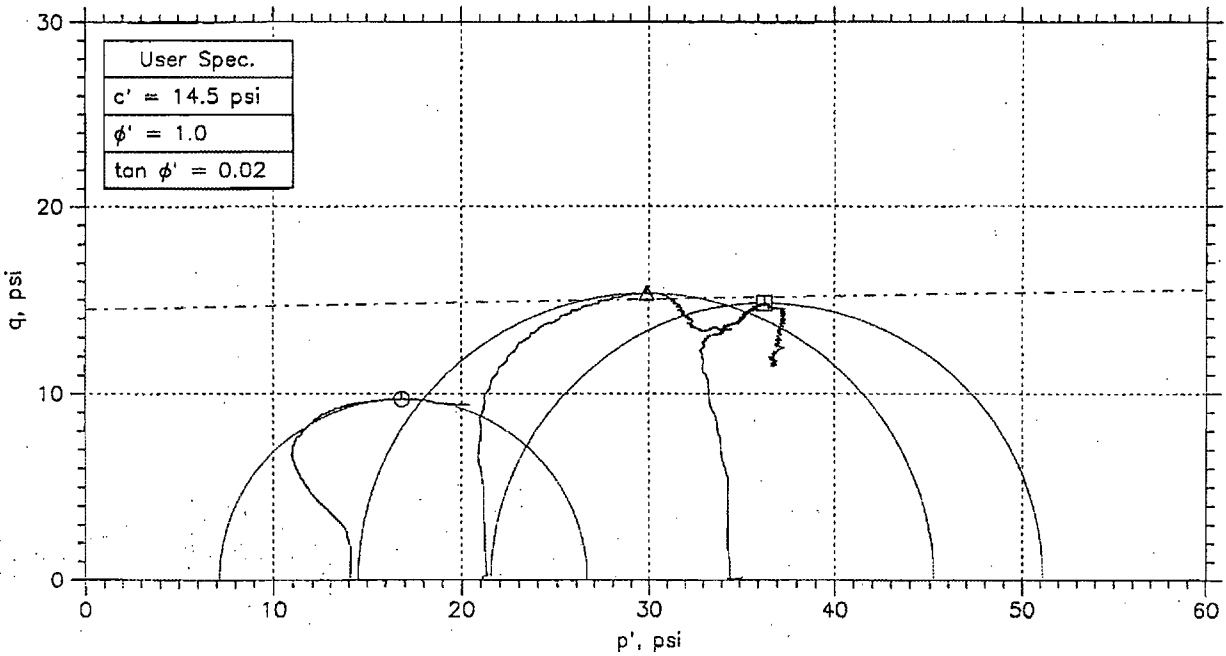
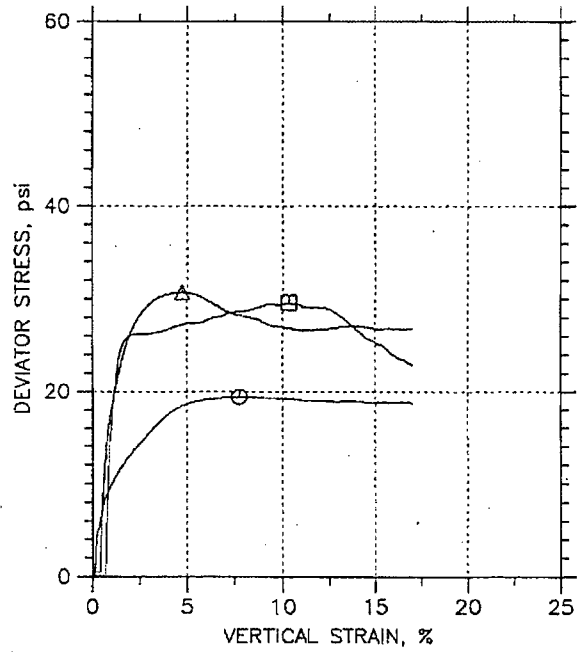
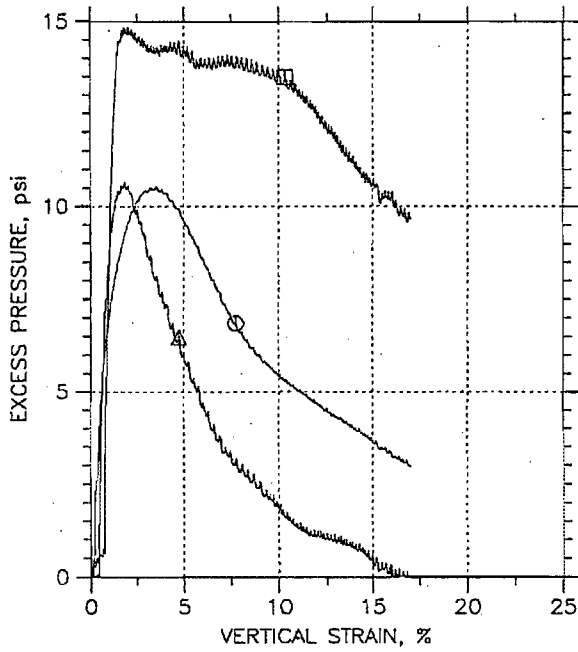
Phase calculations based on start and end of test.

* Saturation is set to 100% for phase calculations.

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CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767

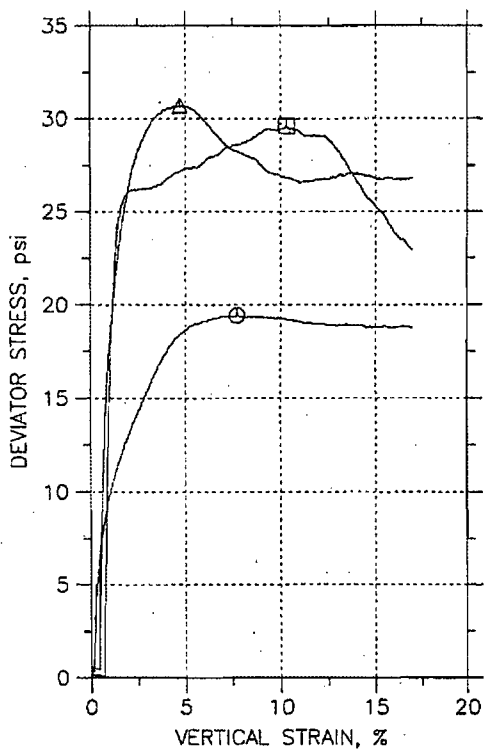
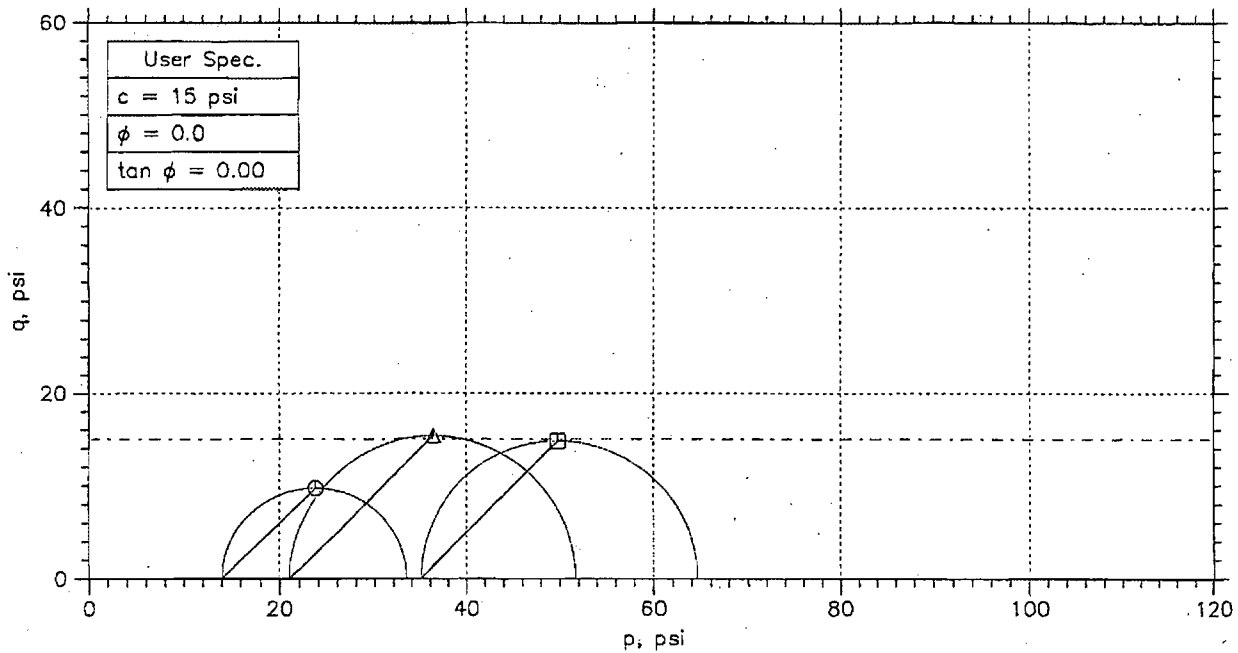
RS-5130404



Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File													
○	UD-2	8956.1	50-52 ft	JW	9/17/08		8956.1_2581a.dat													
△	UD-2	8956.2	50-52 ft	JW	9/18/08	<i>See 11/4/08</i>	8956.2_2582.dat													
□	UD-2	8956.3	50-52 ft	JW	9/18/08		8956.3_2583.dat													
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td rowspan="4" style="width: 20%; text-align: center; vertical-align: middle;">MACTEC</td> <td style="width: 30%;">Project: STP Units 3&4</td> <td style="width: 30%;">Location: U3-3A UD-2</td> <td style="width: 20%;">Project No.: 6234084660</td> </tr> <tr> <td>Boring No.: U3-3A</td> <td>Sample Type: Undisturbed</td> <td></td> </tr> <tr> <td colspan="3">Description: Gray Fat Clay (CH)</td> </tr> <tr> <td colspan="3">Remarks: ASTM D4767-04</td> </tr> </table>								MACTEC	Project: STP Units 3&4	Location: U3-3A UD-2	Project No.: 6234084660	Boring No.: U3-3A	Sample Type: Undisturbed		Description: Gray Fat Clay (CH)			Remarks: ASTM D4767-04		
MACTEC	Project: STP Units 3&4	Location: U3-3A UD-2	Project No.: 6234084660																	
	Boring No.: U3-3A	Sample Type: Undisturbed																		
	Description: Gray Fat Clay (CH)																			
	Remarks: ASTM D4767-04																			

Thu, 04-DEC-2008 09:22:03

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Symbol	○	△	□	
Sample No.	UD-2	UD-2	UD-2	
Test No.	8956.1	8956.2	8956.3	
Depth	50-52 ft	50-52 ft	50-52 ft	
Initial	Diameter, in	2.858	2.864	2.867
	Height, in	6.004	6.007	6.002
	Water Content, %	27.6	26.7	26.6
	Dry Density, pcf	93.82	97.2	97.53
	Saturation, %	90.1	94.4	94.5
Before Shear	Void Ratio	0.852	0.788	0.782
	Water Content, %	28.2	27.5	26.9
	Dry Density, pcf	97.35	98.38	99.45
	Saturation*, %	100.0	100.0	100.0
	Void Ratio	0.785	0.767	0.748
	Back Press., psi	99.99	104.	94.
Ver. Eff. Cons. Stress, psi	13.99	20.99	35.	
Shear Strength, psi	9.71	15.34	14.79	
Strain at Failure, %	7.75	4.73	10.3	
Strain Rate, %/min	0.008	0.008	0.008	
B-Value	0.96	0.90	0.76	
Measured Specific Gravity	2.78	2.78	2.78	
Liquid Limit	60	60	60	
Plastic Limit	24	24	24	

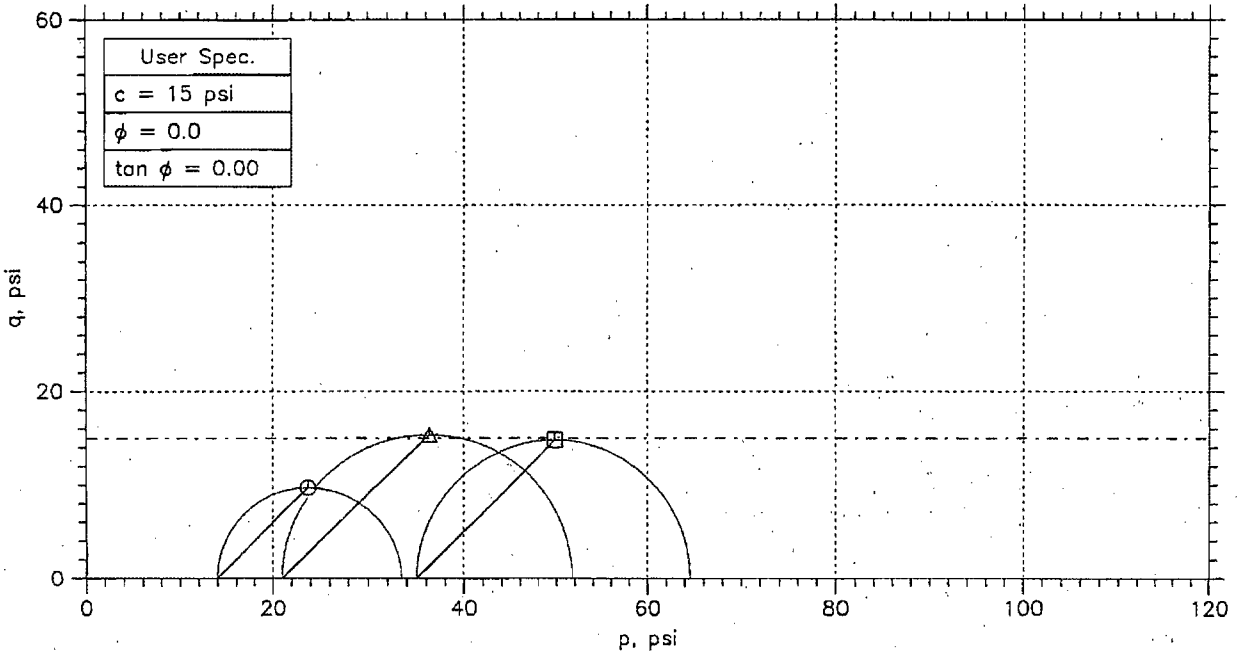
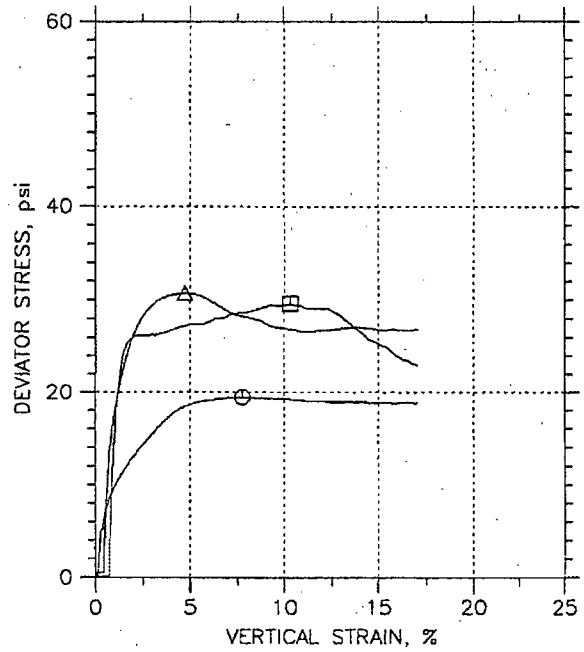
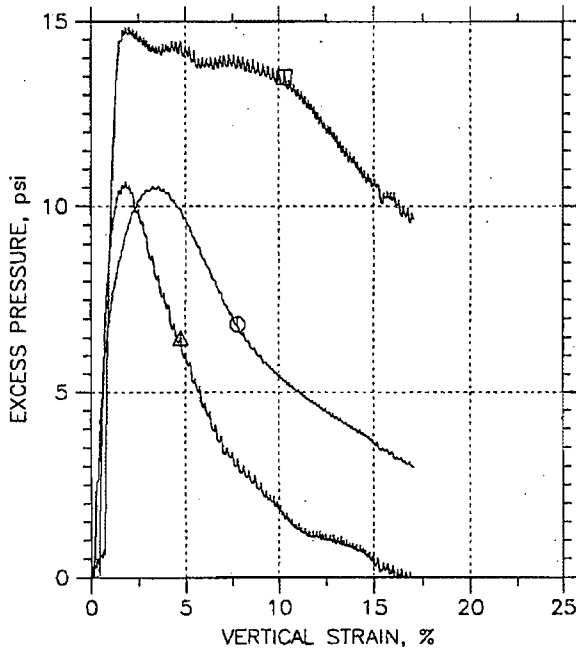
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	Location: U3-3A UD-2	
	Project No.: 6234084660	
	Boring No.: U3-3A	
	Sample Type: Undisturbed	
	Description: Gray Fat Clay (CH)	
Remarks: ASTM D4767-04		

Phase calculations based on start and end of test.

Thu, 04-DEC-2008 09:23:34

* Saturation is set to 100% for phase calculations.

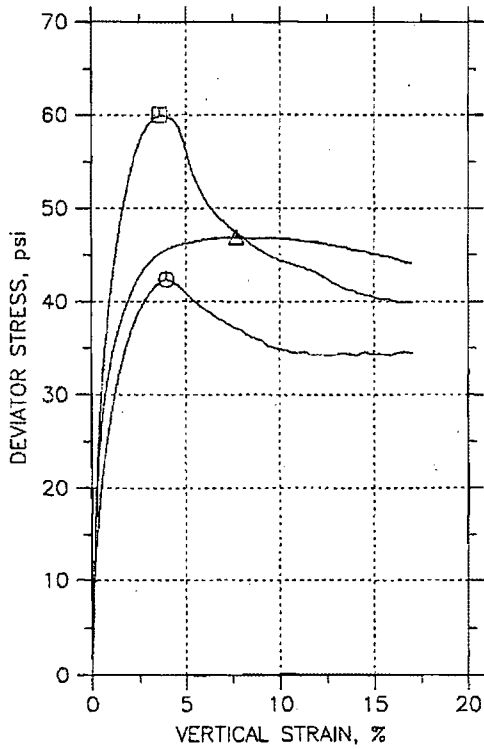
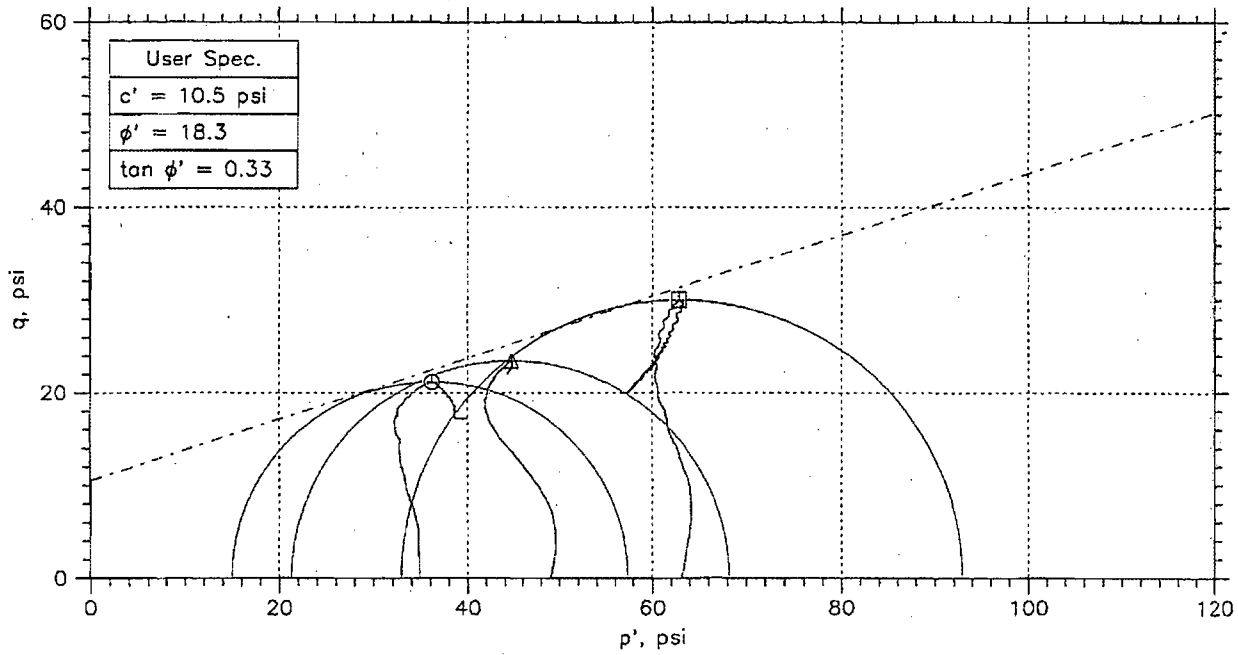
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File																									
⊙	UD-2	8956.1	50-52 ft	JW	9/17/08		8956.1_2581a.dat																									
△	UD-2	8956.2	50-52 ft	JW	9/18/08	JW 12/4/08	8956.2_2582.dat																									
□	UD-2	8956.3	50-52 ft	JW	9/18/08		8956.3_2583.dat																									
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td rowspan="4" style="background-color: #cccccc; text-align: center; vertical-align: middle;">MACTEC</td> <td colspan="2">Project: STP Units 3&4</td> <td colspan="2">Location: U3-3A UD-2</td> <td colspan="2">Project No.: 6234084660</td> </tr> <tr> <td colspan="2">Boring No.: U3-3A</td> <td colspan="2">Sample Type: Undisturbed</td> <td colspan="2"></td> </tr> <tr> <td colspan="6">Description: Gray Fat Clay (CH)</td> </tr> <tr> <td colspan="6">Remarks: ASTM D4767-04</td> </tr> </table>								MACTEC	Project: STP Units 3&4		Location: U3-3A UD-2		Project No.: 6234084660		Boring No.: U3-3A		Sample Type: Undisturbed				Description: Gray Fat Clay (CH)						Remarks: ASTM D4767-04					
MACTEC	Project: STP Units 3&4		Location: U3-3A UD-2		Project No.: 6234084660																											
	Boring No.: U3-3A		Sample Type: Undisturbed																													
	Description: Gray Fat Clay (CH)																															
	Remarks: ASTM D4767-04																															

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CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Symbol	⊙	△	⊠	
Sample No.	UD-3	UD-3	UD-3	
Test No.	8957.1	8957.2	8957.3	
Depth	100-102 ft	100-102 ft	100-102 ft	
Initial	Diameter, in	2.863	2.86	2.841
	Height, in	5.948	5.963	5.561
	Water Content, %	27.0	23.6	24.2
	Dry Density, pcf	95.65	101.3	99.82
Before Shear	Saturation, %	92.2	92.3	91.1
	Void Ratio	0.812	0.712	0.737
	Water Content, %	26.5	22.5	23.6
	Dry Density, pcf	99.82	106.7	104.8
	Saturation*, %	100.0	100.0	100.0
	Void Ratio	0.737	0.624	0.654
	Back Press., psi	89.99	98.	84.01
	Ver. Eff. Cons. Stress, psi	35.01	49.	62.98
	Shear Strength, psi	21.18	23.46	29.99
	Strain at Failure, %	3.95	7.71	3.57
	Strain Rate, %/min	0.01	0.01	0.01
	B-Value	0.96	0.96	0.92
	Measured Specific Gravity	2.78	2.78	2.78
	Liquid Limit	43	43	43
	Plastic Limit	18	18	18

MACTEC	Project: STP Units 3&4	
	Location: U3-6A UD-3	
	Project No.: 6234084660	
	Boring No.: U3-6A	
	Sample Type: Undisturbed	
	Description: Brown and Light Brownish Gray Lean Clay (CL)	
Remarks: ASTM D4767-04		

Phase calculations based on start and end of test.

* Saturation is set to 100% for phase calculations.

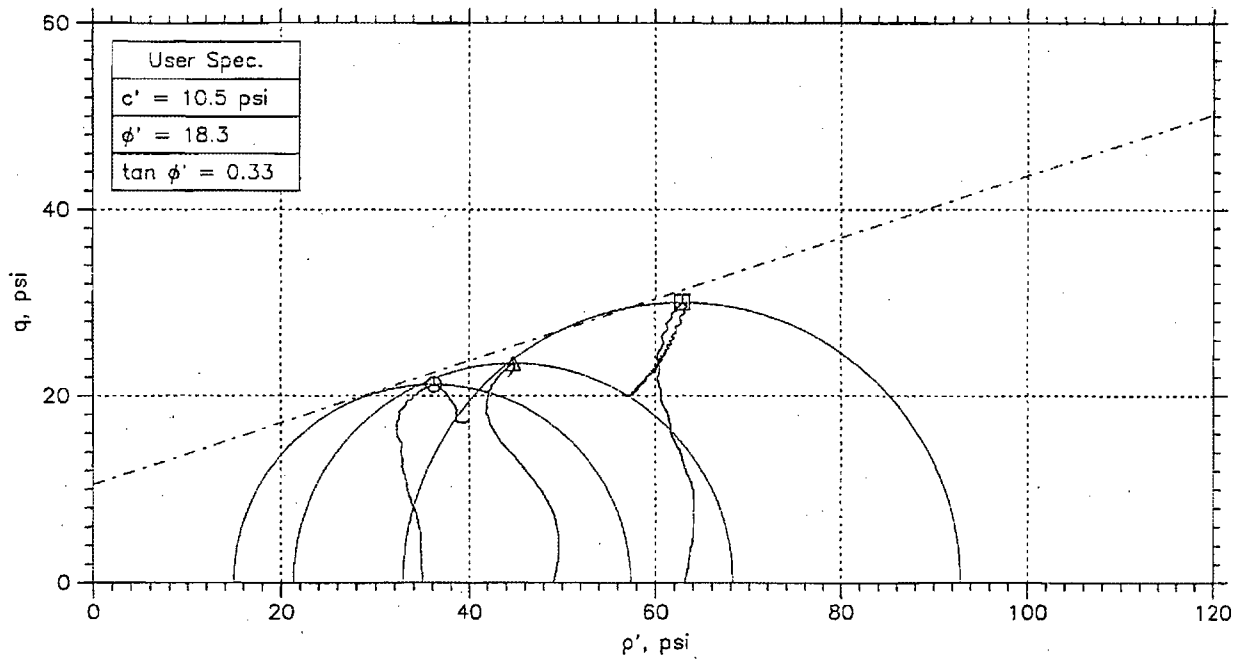
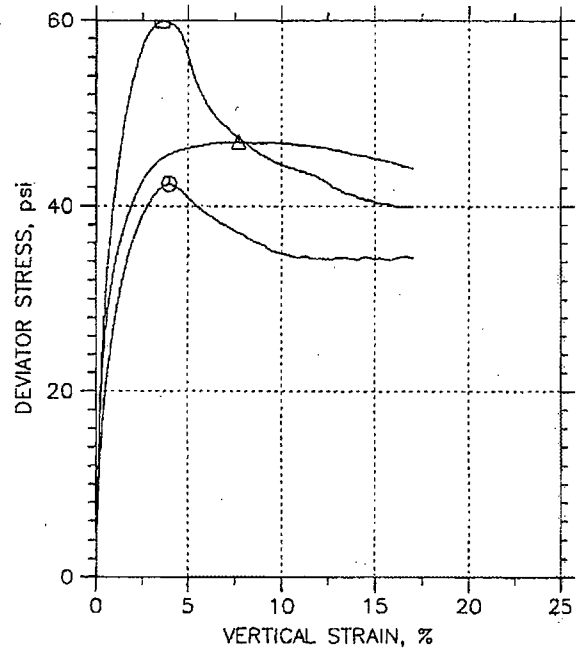
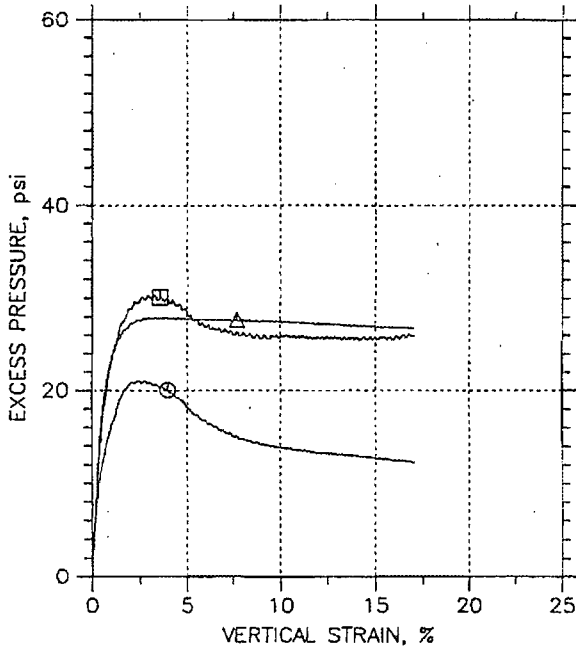
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TOSHIBA CORPORATION
Nuclear Energy Systems & Services Division

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DCND-FLR-817

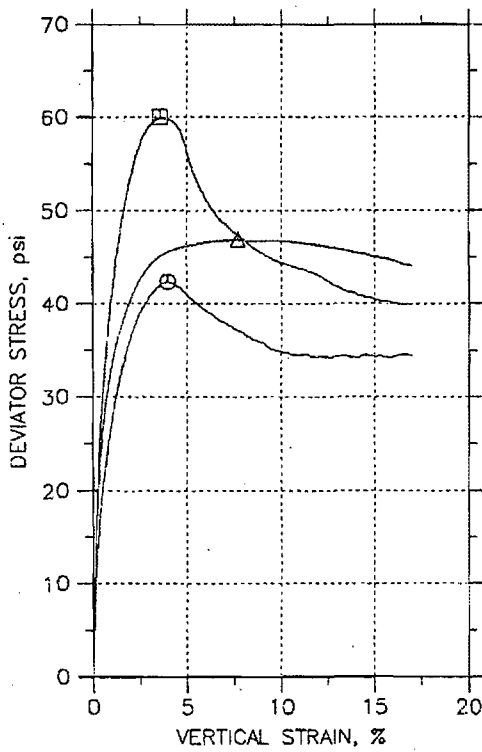
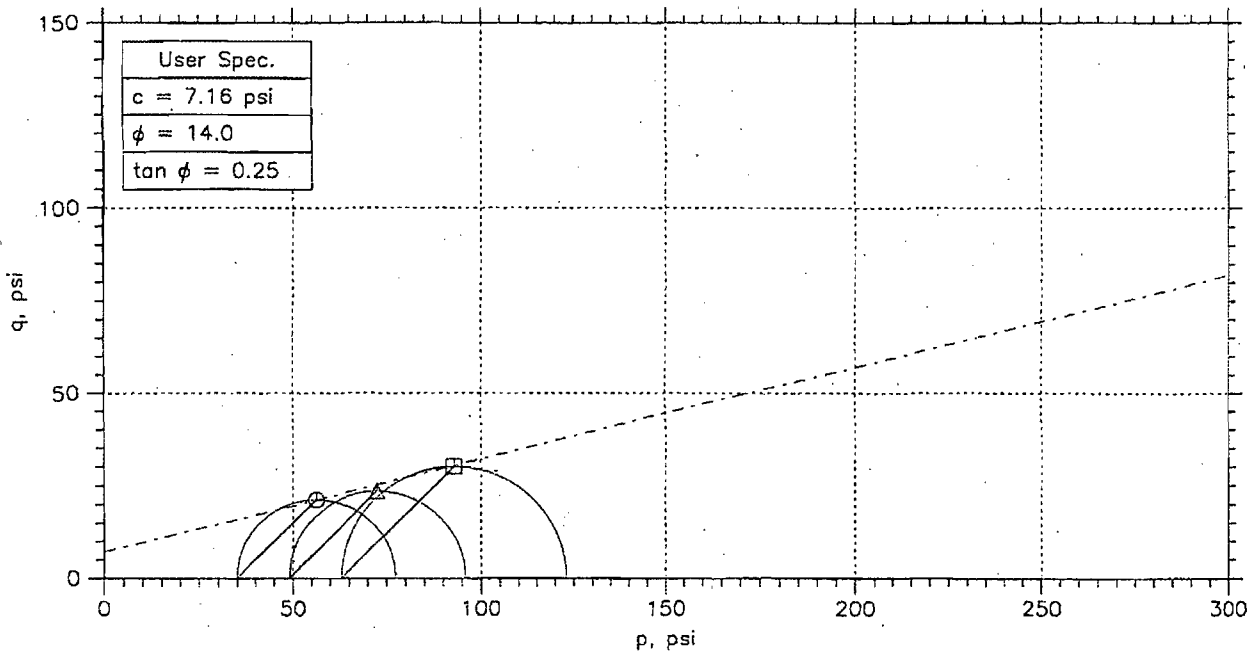
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊙	UD-3	8957.1	100-102 ft JW	9/27/08			8957.1_2581.dat
△	UD-3	8957.2	100-102 ft JW	9/18/08	HJ	11/20/08	8957.2_2582.dat
□	UD-3	8957.3	100-102 ft JW	9/27/08			8957.3_2583_a.dat

MACTEC	Project: STP Units 3&4		Location: U3-6A UD-3		Project No.: 6234084660	
	Boring No.: U3-6A		Sample Type: Undisturbed			
	Description: Brown and Light Brownish Gray Lean Clay (CL)					
	Remarks: ASTM D4767-04					

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Symbol	⊙	△	□	
Sample No.	UD-3	UD-3	UD-3	
Test No.	8957.1	8957.2	8957.3	
Depth	100-102 ft	100-102 ft	100-102 ft	
Initial	Diameter, in	2.863	2.86	2.841
	Height, in	5.948	5.963	5.561
	Water Content, %	27.0	23.6	24.2
	Dry Density, pcf	95.65	101.3	99.82
	Saturation, %	92.2	92.3	91.1
	Void Ratio	0.812	0.712	0.737
Before Shear	Water Content, %	26.5	22.5	23.6
	Dry Density, pcf	99.82	106.7	104.8
	Saturation*, %	100.0	100.0	100.0
	Void Ratio	0.737	0.624	0.654
Back Press., psi	89.99	98.	84.01	
Ver. Eff. Cons. Stress, psi	35.01	49.	62.98	
Shear Strength, psi	21.18	23.46	29.99	
Strain at Failure, %	3.95	7.71	3.57	
Strain Rate, %/min	0.01	0.01	0.01	
B-Value	0.96	0.96	0.92	
Measured Specific Gravity	2.78	2.78	2.78	
Liquid Limit	43	43	43	
Plastic Limit	18	18	18	

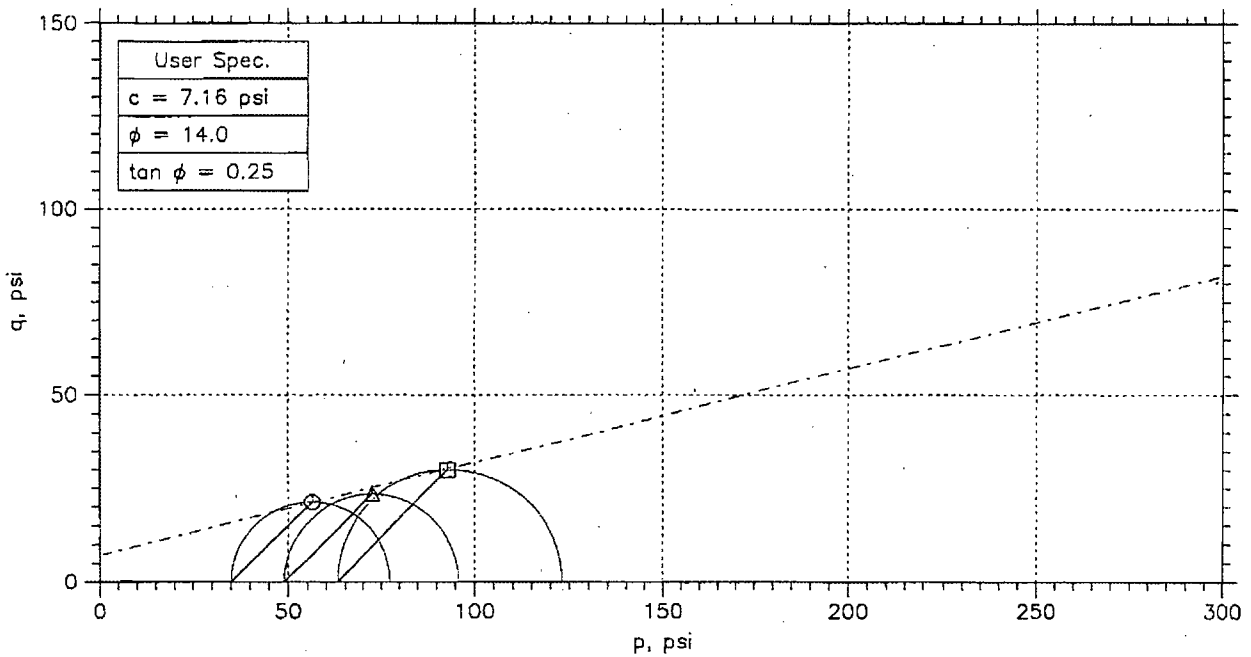
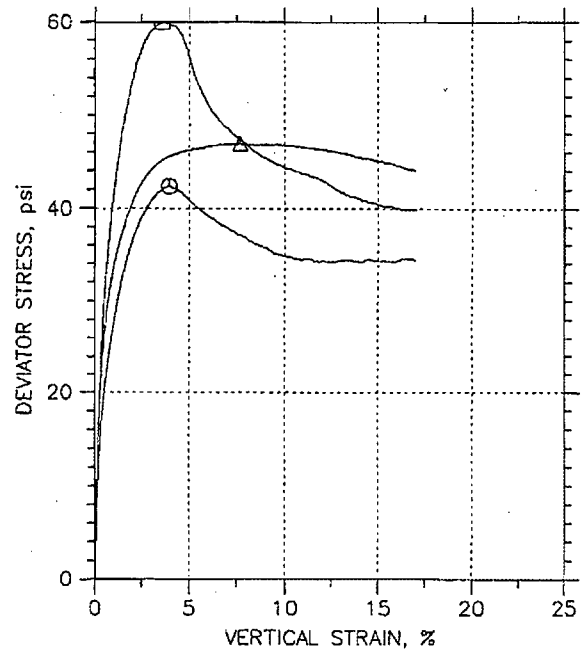
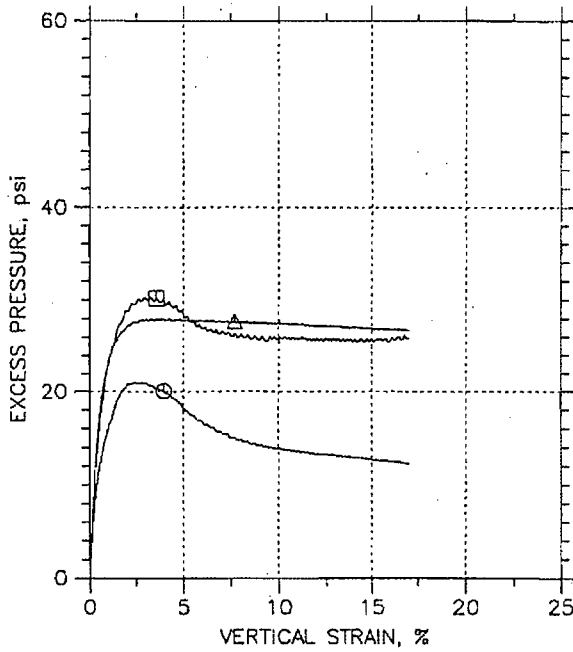
MACTEC	Project: STP Units 3&4	
	Location: U3-6A UD-3	
	Project No.: 6234084660	
	Boring No.: U3-6A	
	Sample Type: Undisturbed	
	Description: Brown and Light Brownish Gray Lean Clay (CL)	
Remarks: ASTM D4767-04		

Phase calculations based on start and end of test.

* Saturation is set to 100% for phase calculations.

Thu, 20-NOV-2008 13:18:57

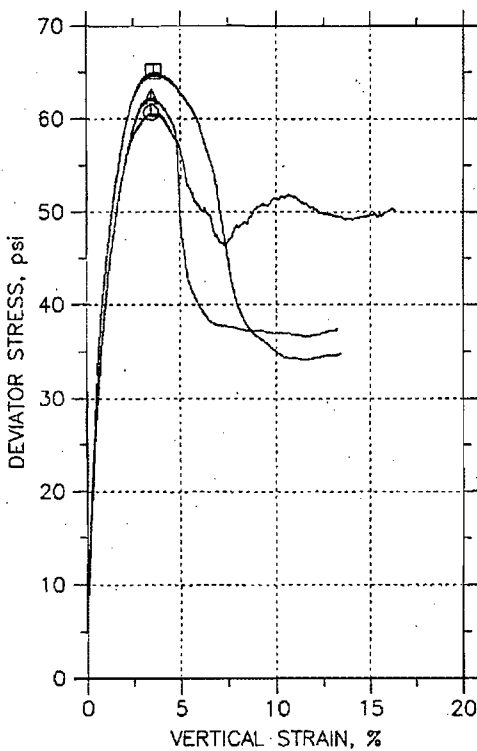
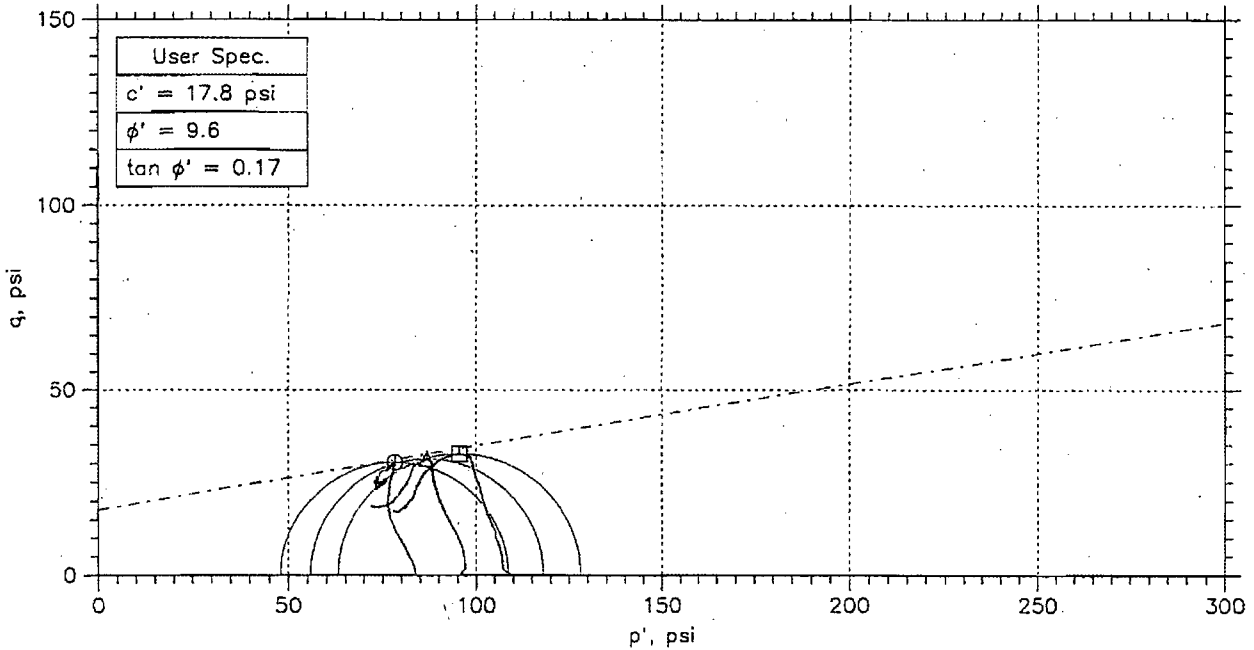
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Symbol	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
○	UD-3	8957.1	100-102 ft	JW	9/27/08			8957.1_2581.dat
△	UD-3	8957.2	100-102 ft	JW	9/18/08	HJ	11/20/08	8957.2_2582.dat
□	UD-3	8957.3	100-102 ft	JW	9/27/08			8957.3_2583_a.dat

MACTEC	Project: STP Units 3&4		Location: U3-6A UD-3		Project No.: 6234084660	
	Boring No.: U3-6A		Sample Type: Undisturbed			
	Description: Brown and Light Brownish Gray Lean Clay (CL)					
	Remarks: ASTM D4767-04					

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767

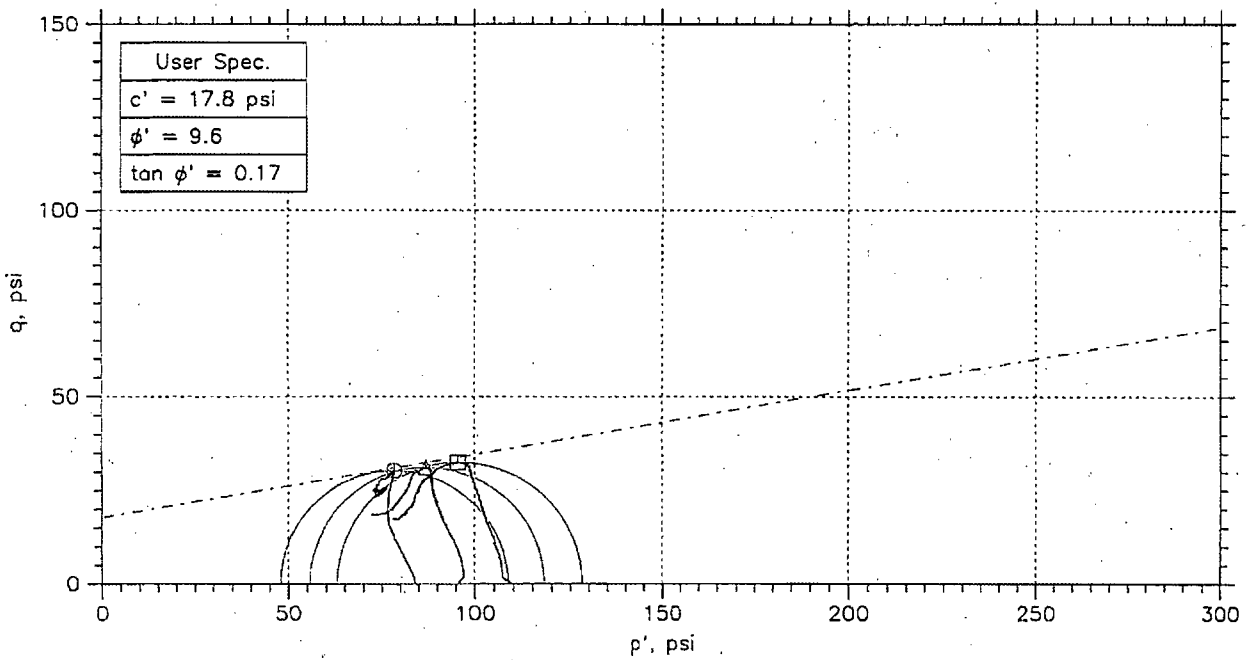
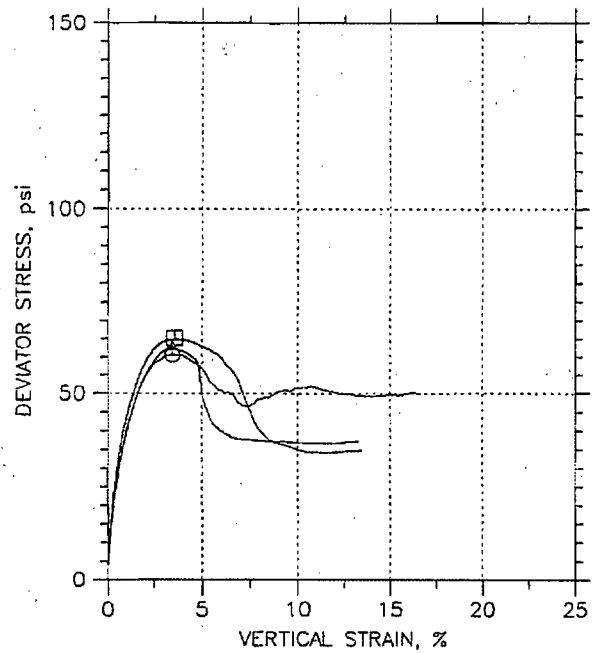
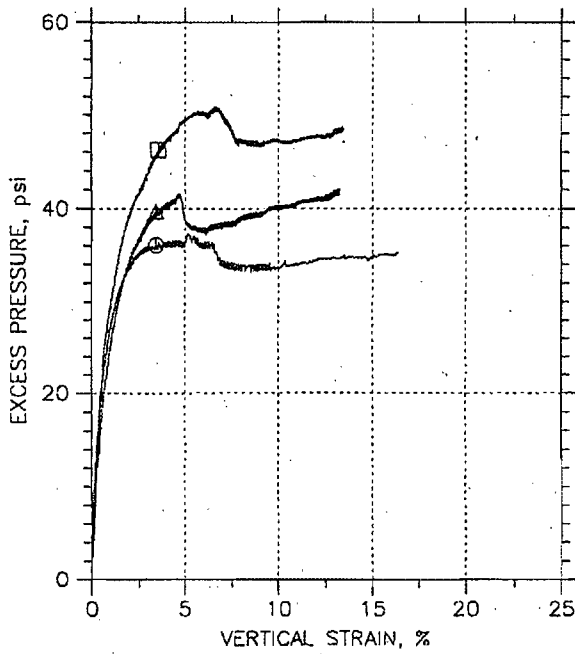


Symbol	⊙	△	□	
Sample No.	UD-4	UD-4	UD-4	
Test No.	8958.1	8958.2	8958.3	
Depth	218-220 ft	218-220 ft	218-220 ft	
Initial	Diameter, in	2.862	2.863	2.863
	Height, in	5.999	5.612	6.018
	Water Content, %	40.4	33.9	35.9
	Dry Density, pcf	80.41	86.01	83.2
	Saturation, %	96.7	92.3	91.6
Before Shear	Void Ratio	1.17	1.03	1.1
	Water Content, %	34.4	33.0	35.0
	Dry Density, pcf	88.92	90.72	88.14
	Saturation*, %	100.0	100.0	100.0
Before Shear	Void Ratio	0.961	0.922	0.978
	Back Press., psi	137.	138.	126.
Ver. Eff. Cons. Stress, psi	83.99	97.96	112.	
Shear Strength, psi	30.32	31.19	32.53	
Strain at Failure, %	3.45	3.44	3.58	
Strain Rate, %/min	0.00114	0.00114	0.00114	
B-Value	0.73	0.87	0.84	
Measured Specific Gravity	2.79	2.79	2.79	
Liquid Limit	61	61	61	
Plastic Limit	22	22	22	

MACTEC	Project: STP Units 3&4	
	Location: U4-1A UD-4	
	Project No.: 6234084660	
	Boring No.: U4-1A	
	Sample Type: Undisturbed	
	Description: Dark Gray Fat Clay (CH)	
Remarks: ASTM D4767-04		

Phase calculations based on start and end of test.

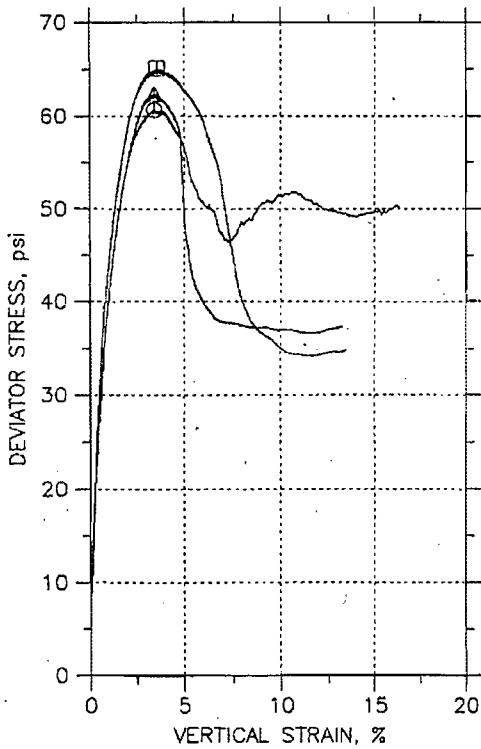
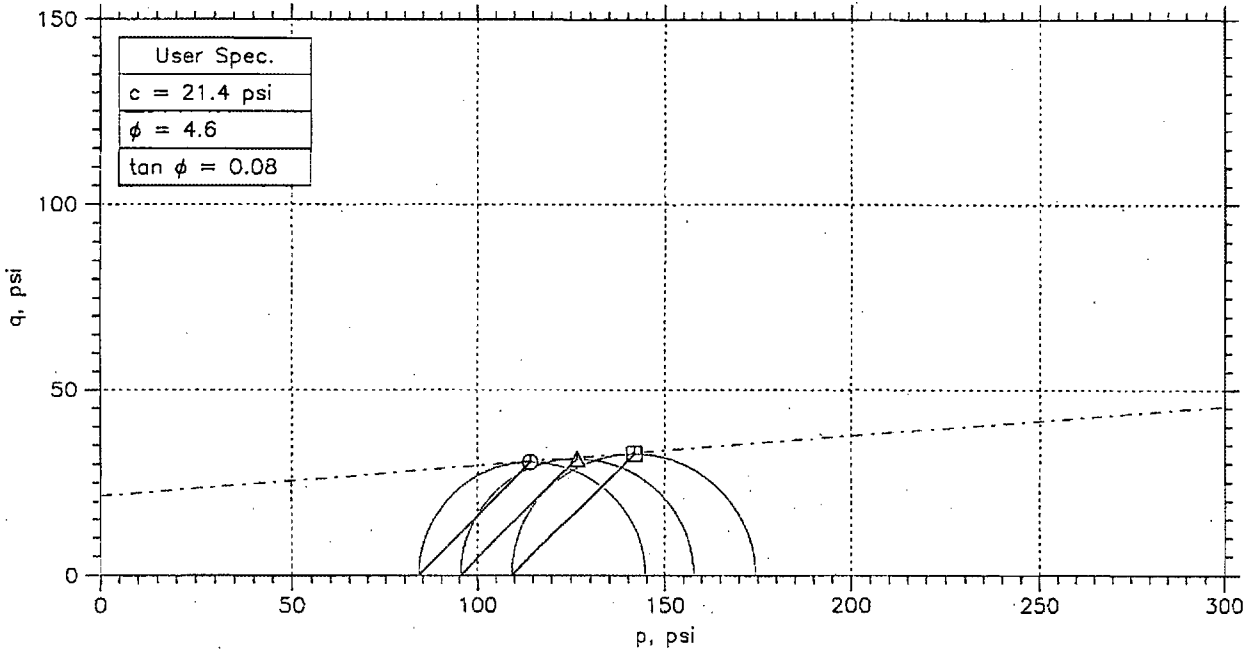
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Symbol	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
○	UD-4	8958.1	218-220 ft	JW	9/18/08			8958.1_2547.dat
△	UD-4	8958.2	218-220 ft	JW	9/18/08	JW	11/24/08	8958.2_2546a.dat
□	UD-4	8958.3	218-220 ft	JW	9/18/08			8958.3_2580a.dat

MACTEC	Project: STP Units 3&4		Location: U4-1A UD-4		Project No.: 6234084660	
	Boring No.: U4-1A		Sample Type: Undisturbed			
	Description: Dark Gray Fat Clay (CH)					
	Remarks: ASTM D4767-04					

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767

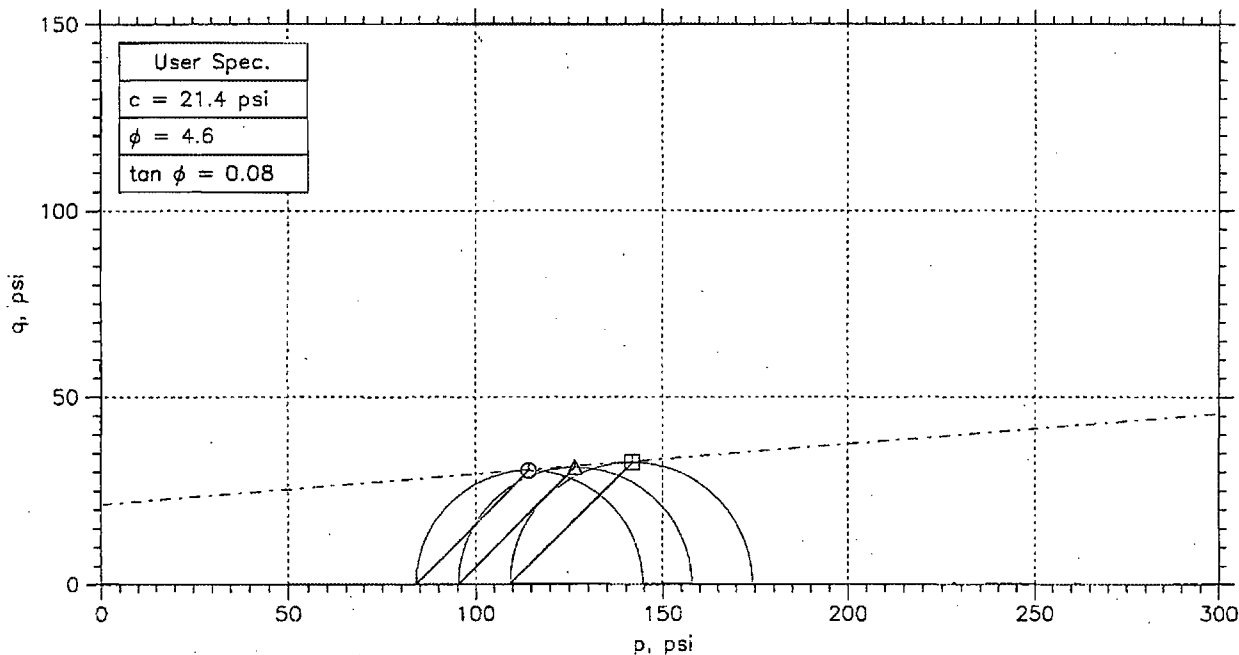
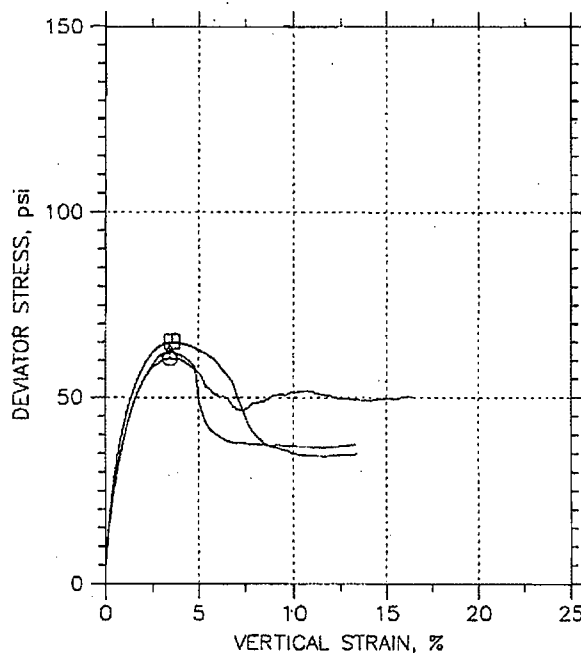
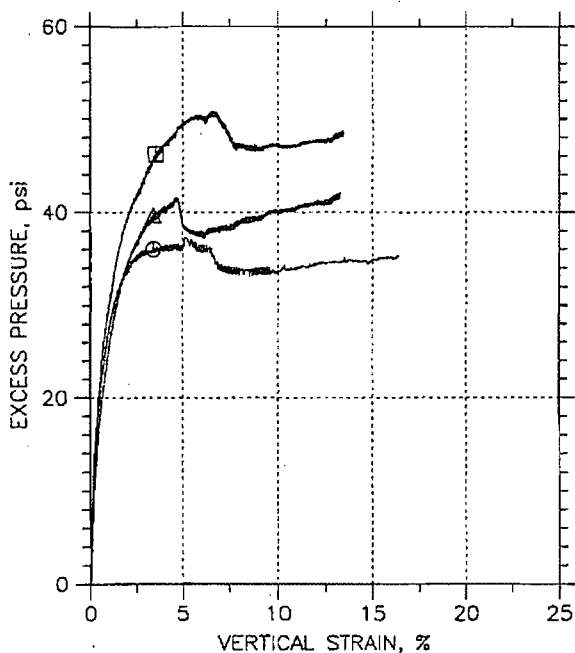


Symbol	⊙	△	□
Sample No.	UD-4	UD-4	UD-4
Test No.	8958.1	8958.2	8958.3
Depth	218-220 ft	218-220 ft	218-220 ft
Initial	Diameter, in	2.862	2.863
	Height, in	5.999	5.612
	Water Content, %	40.4	33.9
	Dry Density, pcf	80.41	86.01
	Saturation, %	96.7	92.3
Before Shear	Void Ratio	1.17	1.03
	Water Content, %	34.4	33.0
	Dry Density, pcf	88.92	90.72
	Saturation*, %	100.0	100.0
	Void Ratio	0.961	0.922
	Back Press., psi	137.	138.
Ver. Eff. Cons. Stress, psi	83.99	97.96	112.
Shear Strength, psi	30.32	31.19	32.53
Strain at Failure, %	3.45	3.44	3.58
Strain Rate, %/min	0.00114	0.00114	0.00114
B-Value	0.73	0.87	0.84
Measured Specific Gravity	2.79	2.79	2.79
Liquid Limit	61	61	61
Plastic Limit	22	22	22

MACTEC	Project: STP Units 3&4	
	Location: U4-1A UD-4	
	Project No.: 6234084660	
	Boring No.: U4-1A	
	Sample Type: Undisturbed	
	Description: Dark Gray Fat Clay (CH)	
Remarks: ASTM D4767-04		

Phase calculations based on start and end of test.

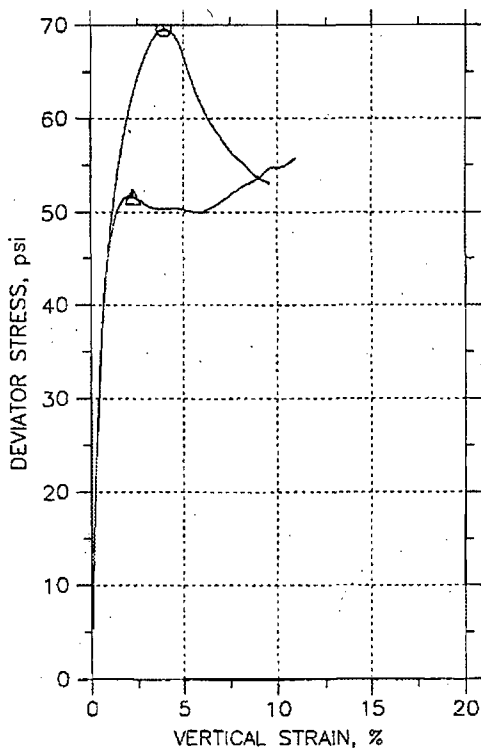
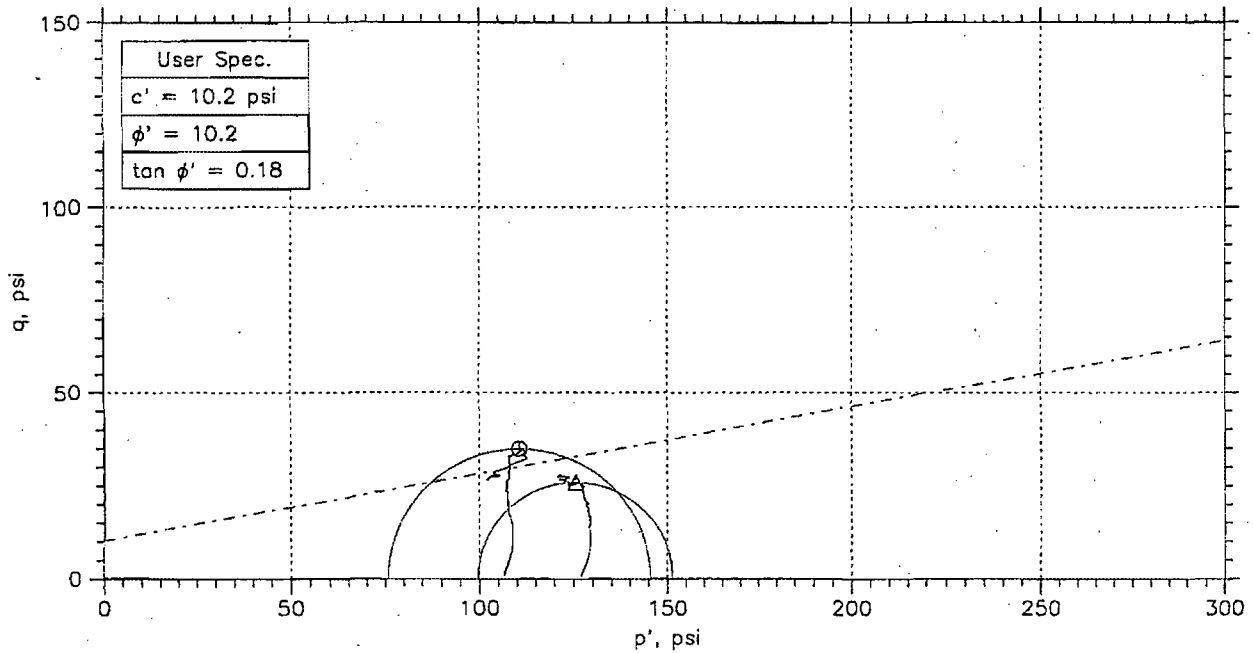
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
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△	UD-4	8958.2	218-220 ft	JW	9/18/08	JW	11/24/08	8958.2_2546a.dat
□	UD-4	8958.3	218-220 ft	JW	9/18/08			8958.3_2580a.dat

MACTEC	Project: STP Units 3&4		Location: U4-1A UD-4		Project No.: 6234084660	
	Boring No.: U4-1A		Sample Type: Undisturbed			
	Description: Dark Gray Fat Clay (CH)					
	Remarks: ASTM D4767-04					

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767

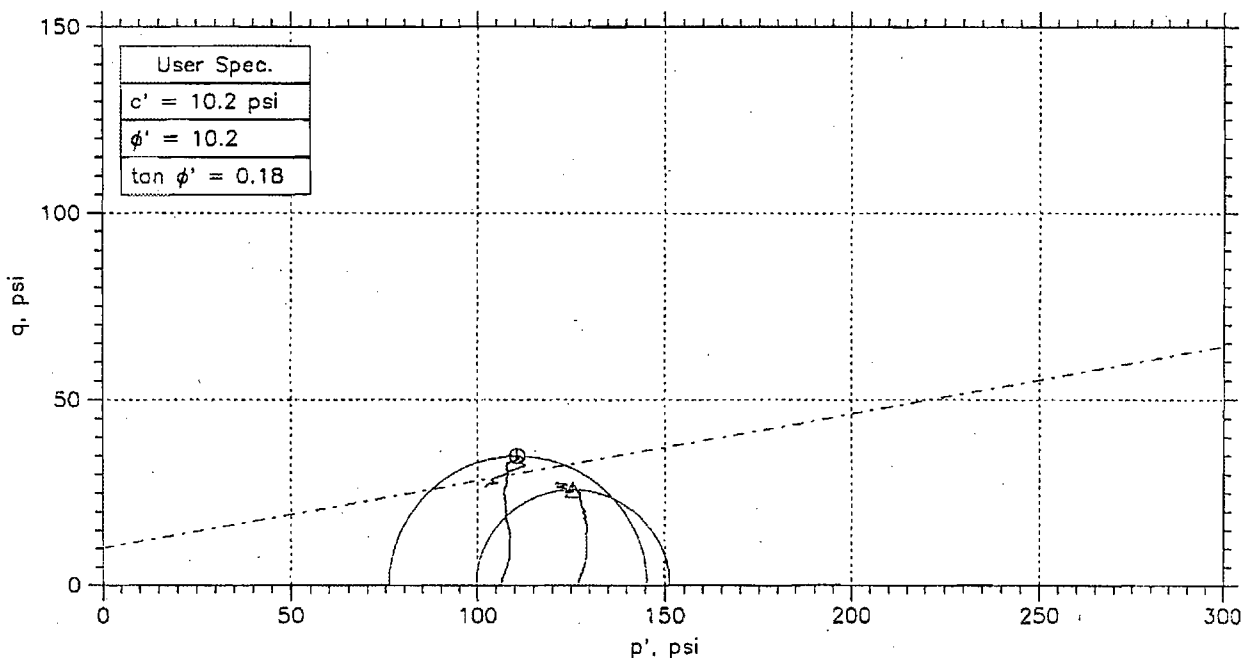
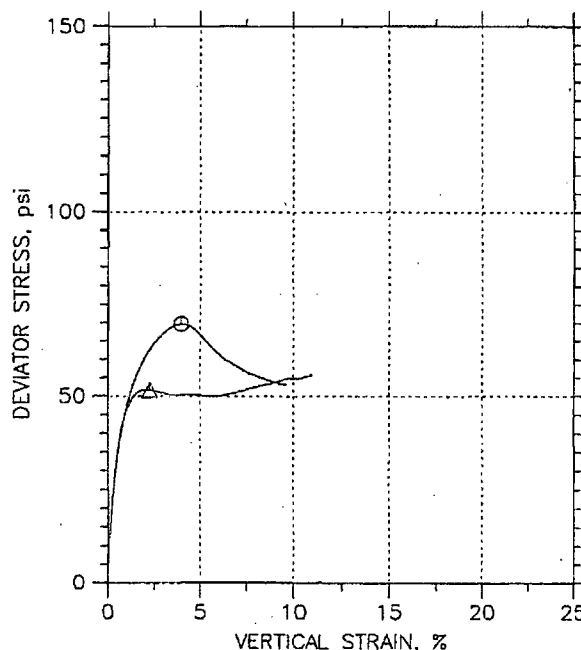
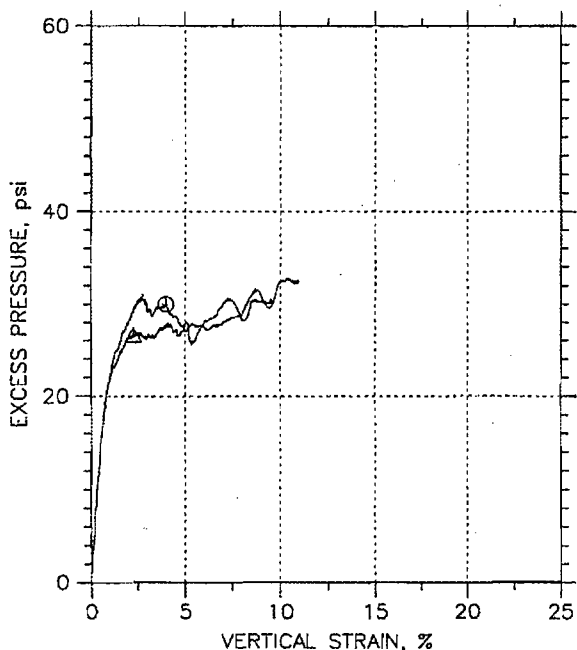


Symbol	⊙	△		
Sample No.	UD-7	UD-7		
Test No.	8952.1	8952.3		
Depth	277-279.2			
Initial	Diameter, in	2.874	2.876	
	Height, in	6	5.998	
	Water Content, %	32.8	33.0	
	Dry Density, pcf	89.99	89.44	
	Saturation, %	101.9	101.1	
Before Shear	Void Ratio	0.865	0.877	
	Water Content, %	31.7	31.5	
	Dry Density, pcf	90.63	90.85	
	Saturation*, %	100.0	100.0	
	Void Ratio	0.852	0.848	
	Back Press., psi	116.	96.	
	Ver. Eff. Cons. Stress, psi	125.	138.9	
	Shear Strength, psi	34.8	25.82	
	Strain at Failure, %	3.96	2.25	
	Strain Rate, %/min	0.00114	0.00114	
	B-Value	0.83	0.68	
	Measured Specific Gravity	2.69	2.69	
	Liquid Limit	81	81	
	Plastic Limit	27	27	

MACTEC	Project: STP Units 3&4	
	Location: U4-1A UD-7	
	Project No.: 6234084660	
	Boring No.: U4-1A	
	Sample Type: Undisturbed	
	Description: Dark Bluish Gray Fat Clay (CH)	
Remarks: ASTM D4767-04		

Phase calculations based on start and end of test.

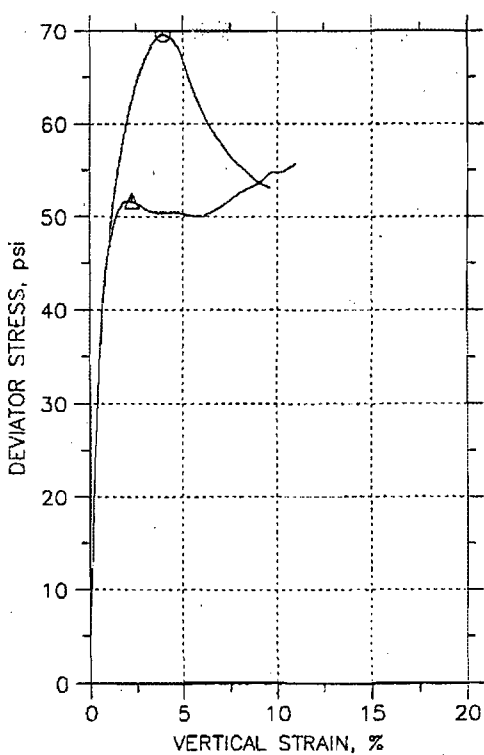
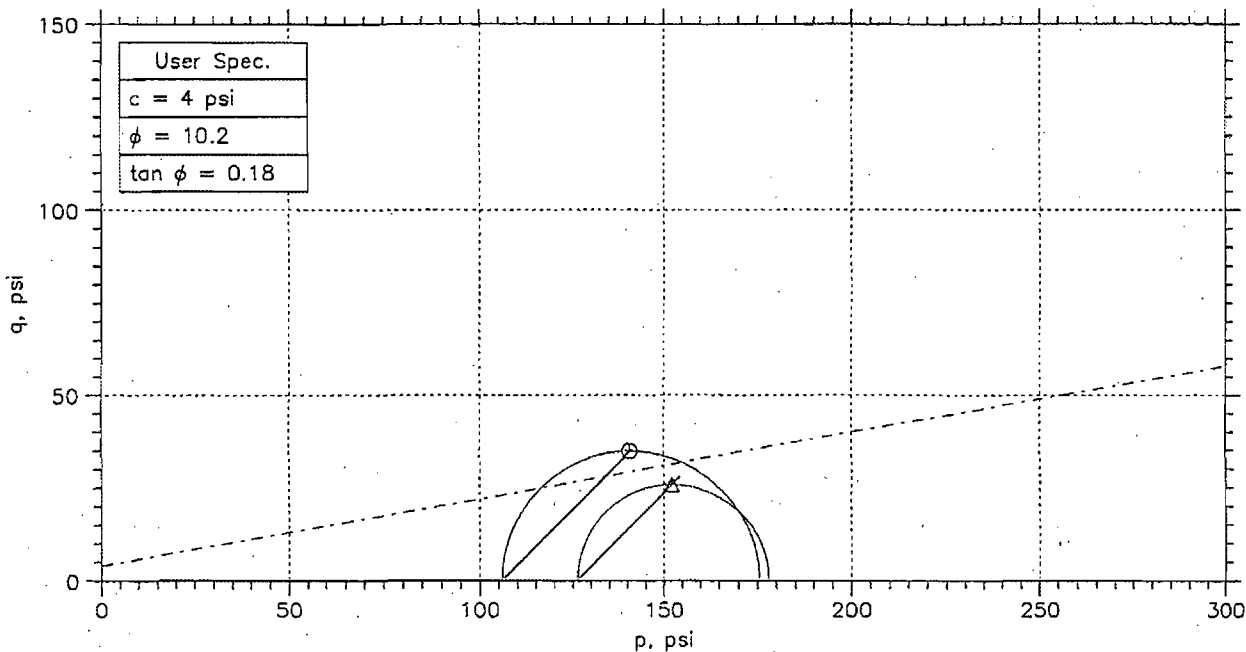
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
○	UD-7	8952.1	277-279.2'	HJ	10/8/08	<i>[Signature]</i>		8952.1_2580a.dat
△	UD-7	8952.3	277-279.2'	HJ	10/9/08	<i>[Signature]</i>		8952.3_2546a.dat

MACTEC	Project: STP Units 3&4		Location: U4-1A UD-7		Project No.: 6234084660	
	Boring No.: U4-1A		Sample Type: Undisturbed			
	Description: Dark Bluish Gray Fat Clay (CH)					
	Remarks: ASTM D4767-04					

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767

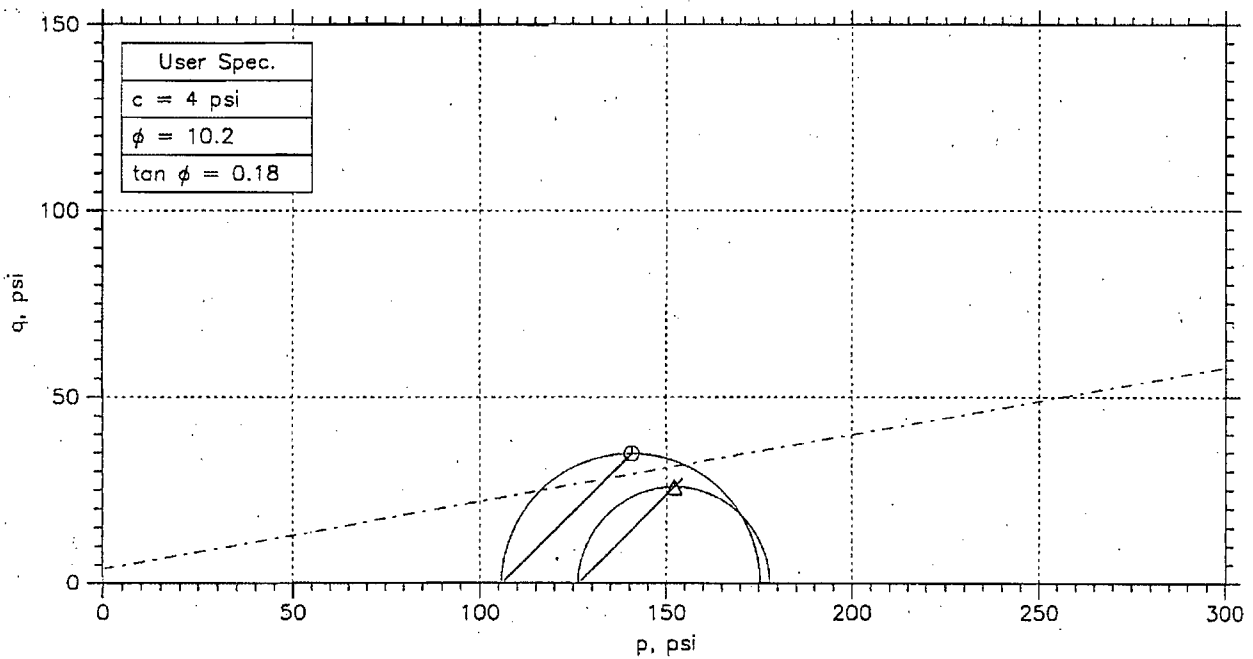
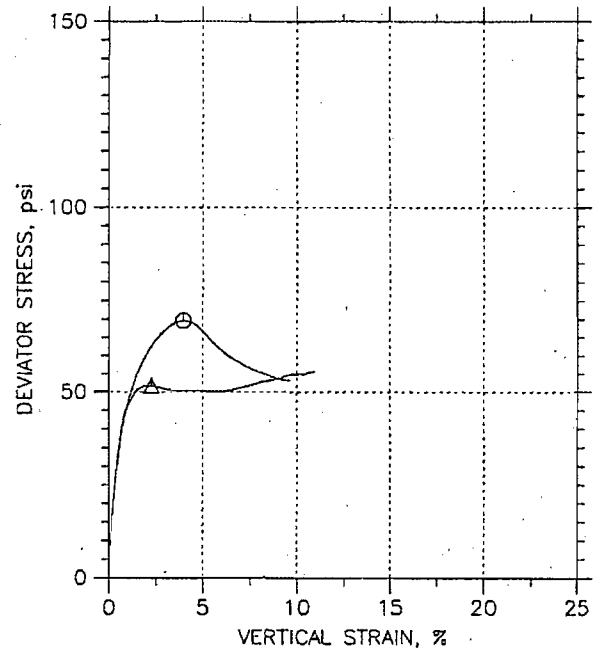
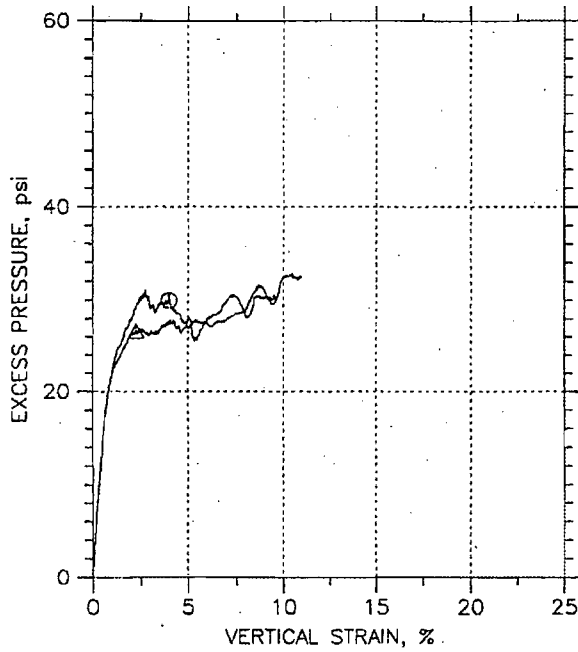


Symbol	⊙	△		
Sample No.	UD-7	UD-7		
Test No.	8952.1	8952.3		
Depth	277-279.2	277-279.2		
Initial	Diameter, in	2.874	2.876	
	Height, in	6	5.998	
	Water Content, %	32.8	33.0	
	Dry Density, pcf	89.99	89.44	
	Saturation, %	101.9	101.1	
Before Shear	Void Ratio	0.865	0.877	
	Water Content, %	31.7	31.5	
	Dry Density, pcf	90.63	90.85	
	Saturation*, %	100.0	100.0	
	Void Ratio	0.852	0.848	
	Back Press., psi	116.	96.	
	Ver. Eff. Cons. Stress, psi	125.	138.9	
	Shear Strength, psi	34.8	25.82	
	Strain at Failure, %	3.96	2.25	
	Strain Rate, %/min	0.00114	0.00114	
	B-Value	0.83	0.68	
	Measured Specific Gravity	2.69	2.69	
	Liquid Limit	81	81	
	Plastic Limit	27	27	

MACTEC	Project: STP Units 3&4	
	Location: U4-1A UD-7	
	Project No.: 6234084660	
	Boring No.: U4-1A	
	Sample Type: Undisturbed	
	Description: Dark Bluish Gray Fat Clay (CH)	
Remarks: ASTM D4767-04		

Phase calculations based on start and end of test.

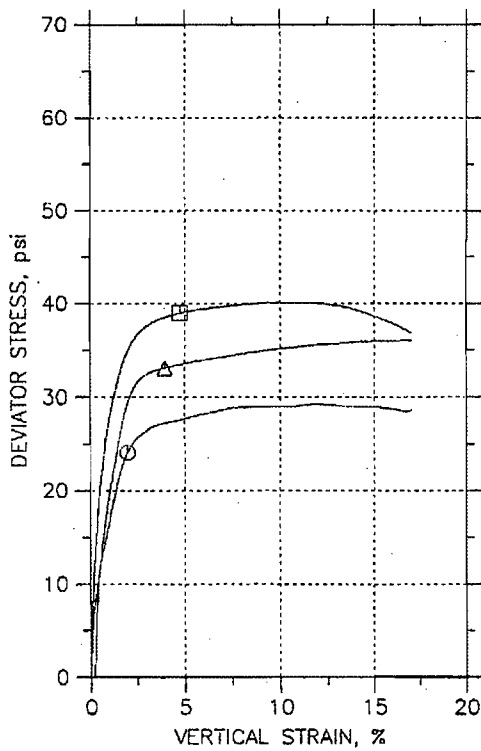
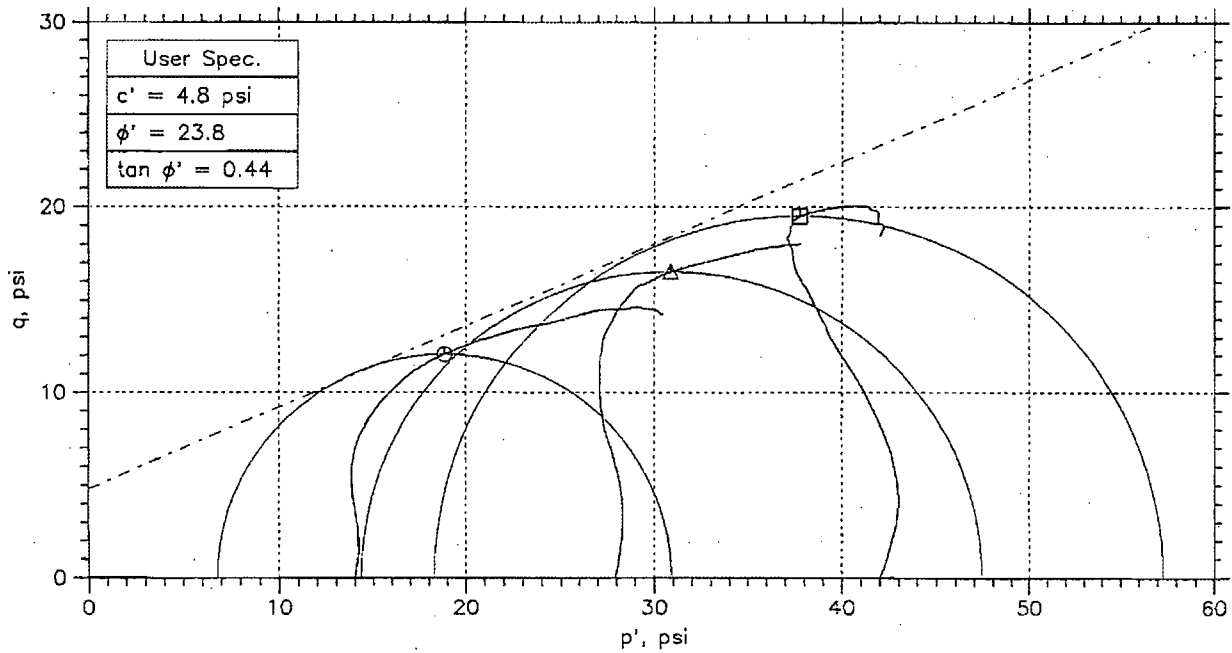
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊙	UD-7	8952.1	HJ	10/8/08	JSD	11/24/08	8952.1_2580a.dat
△	UD-7	8952.3	HJ	10/9/08	JSD	11/24/08	8952.3_2546a.dat

MACTEC	Project: STP Units 3&4	Location: U4-1A UD-7	Project No.: 6234084660
	Boring No.: U4-1A	Sample Type: Undisturbed	
	Description: Dark Bluish Gray Fat Clay (CH)		
	Remarks: ASTM D4767-04		

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Symbol	○	△	□	
Sample No.	UD-1	UD-1	UD-1	
Test No.	8959.1	8959.2	8959.3	
Depth	52-54 ft	52-54 ft	52-54 ft	
Initial	Diameter, in	2.872	2.864	2.863
	Height, in	6	6	6
	Water Content, %	21.2	21.7	21.9
	Dry Density, pcf	106.1	105.3	104.1
	Saturation, %	93.6	94.1	92.3
Before Shear	Void Ratio	0.625	0.638	0.656
	Water Content, %	21.2	21.1	21.0
	Dry Density, pcf	108.7	108.9	109.2
	Saturation*, %	100.0	100.0	100.0
	Void Ratio	0.586	0.583	0.579
	Back Press., psi	90.	92.	78.
	Ver. Eff. Cons. Stress, psi	14.	28.	42.01
	Shear Strength, psi	12.05	16.52	19.5
	Strain at Failure, %	1.98	3.95	4.76
	Strain Rate, %/min	0.022	0.022	0.022
	B-Value	0.96	0.97	0.97
	Measured Specific Gravity	2.76	2.76	2.76
	Liquid Limit	46	46	46
	Plastic Limit	20	20	20

MACTEC	Project: STP Units 3&4	
	Location: U4-3A UD-1	
	Project No.: 6234084660	
	Boring No.: U4-3A	
	Sample Type: Undisturbed	
	Description: Light Reddish Brown to Light Olive Gray Lean Clay (CL)	
Remarks: ASTM D4767-04.		

Phase calculations based on start and end of test.

* Saturation is set to 100% for phase calculations.

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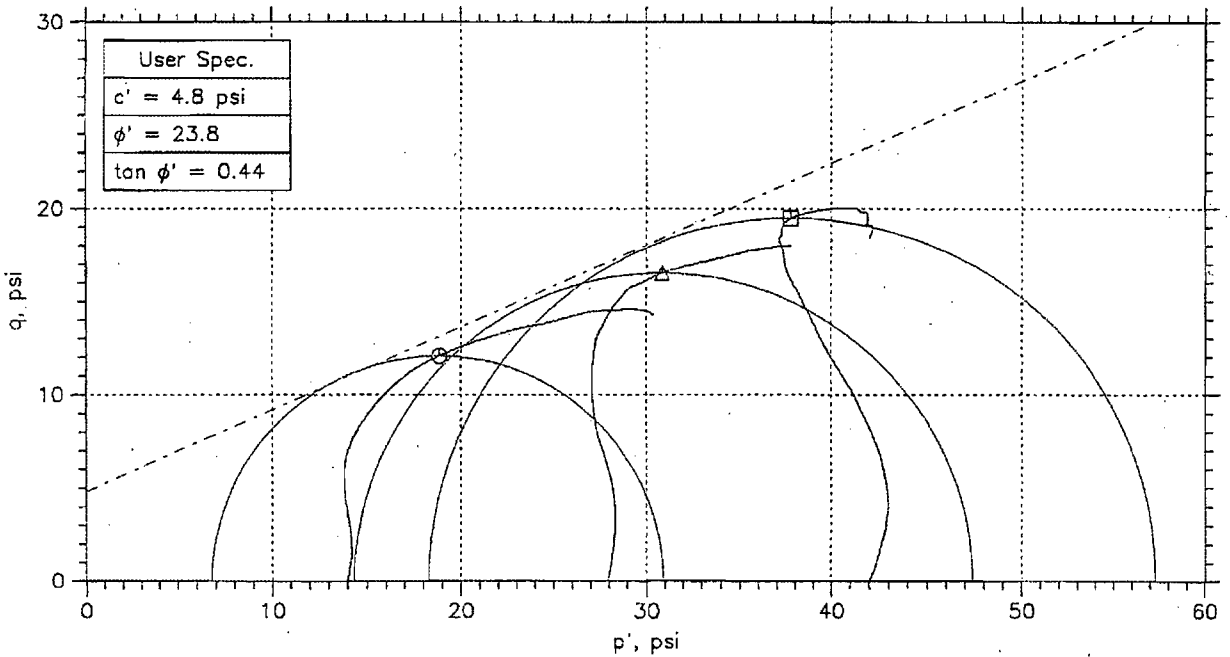
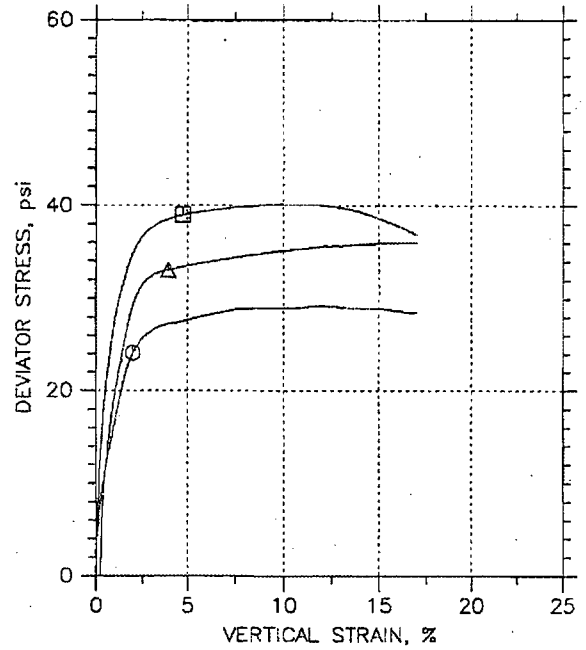
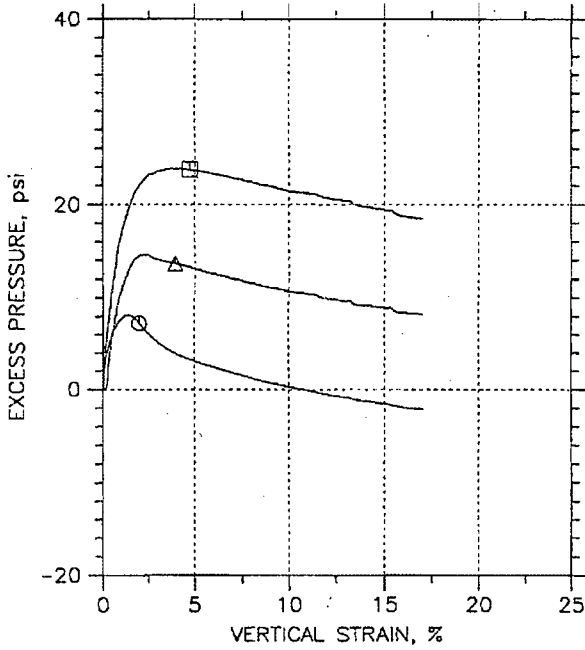
TOSHIBA CORPORATION

Nuclear Energy Systems & Services Division

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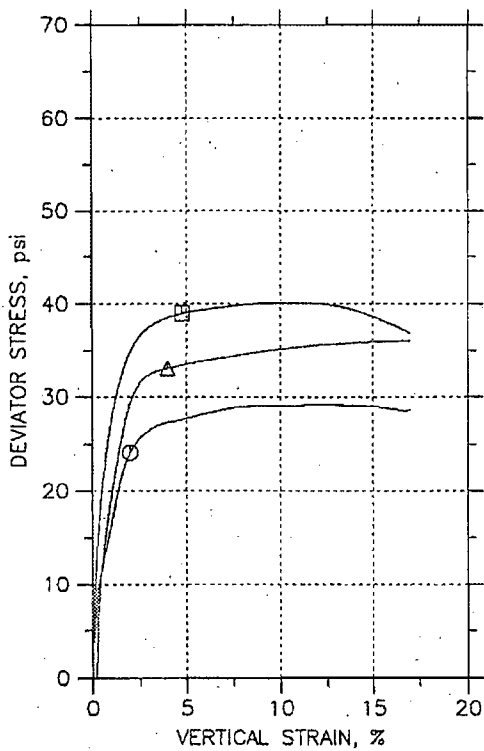
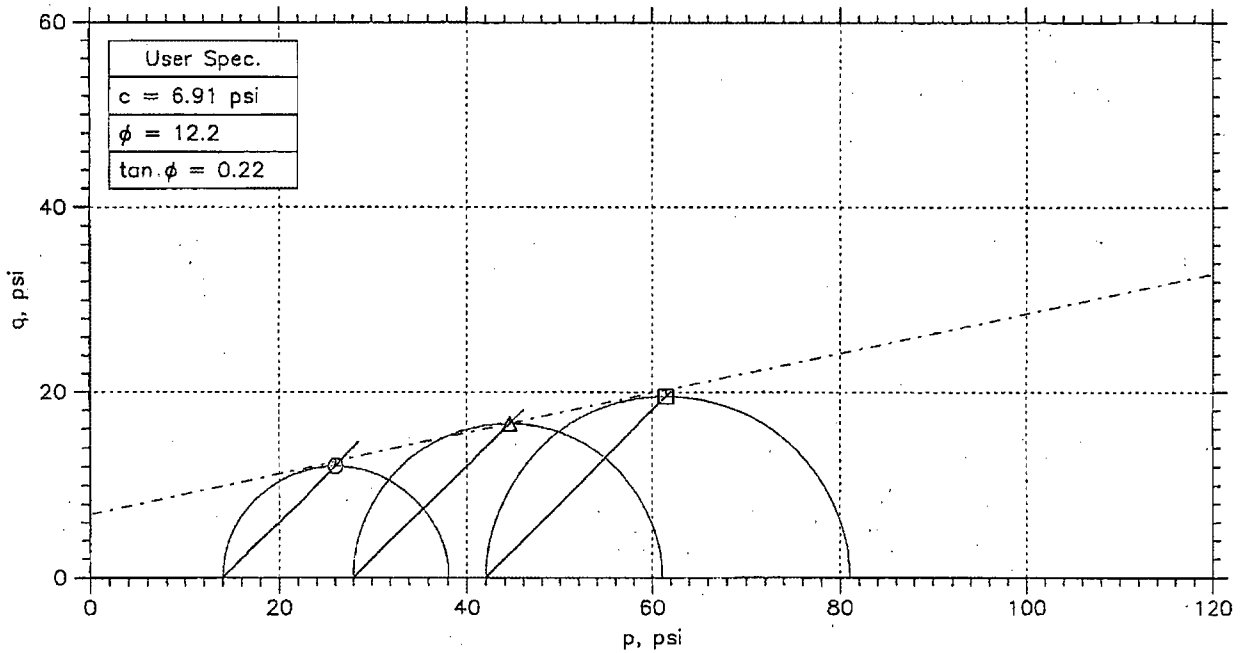
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
○	UD-1	8959.1	52-54 ft	HJ	10/8/08		8959.1_2581.dat
△	UD-1	8959.2	52-54 ft	HJ	10/8/08	<i>HJ 11/20/08</i>	8959.2_2582.dat
□	UD-1	8959.3	52-54 ft	HJ	10/8/08		8959.3_2583.dat

MACTEC	Project: STP Units 3&4		Location: U4-3A UD-1		Project No.: 6234084660	
	Boring No.: U4-3A		Sample Type: Undisturbed			
	Description: Light Reddish Brown to Light Olive Gray Lean Clay (CL)					
	Remarks: ASTM D4767-04					

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Symbol	○	△	□	
Sample No.	UD-1	UD-1	UD-1	
Test No.	8959.1	8959.2	8959.3	
Depth	52-54 ft	52-54 ft	52-54 ft	
Initial	Diameter, in	2.872	2.864	2.863
	Height, in	6	6	6
	Water Content, %	21.2	21.7	21.9
	Dry Density, pcf	106.1	105.3	104.1
	Saturation, %	93.6	94.1	92.3
Before Shear	Void Ratio	0.625	0.638	0.656
	Water Content, %	21.2	21.1	21.0
	Dry Density, pcf	108.7	108.9	109.2
	Saturation*, %	100.0	100.0	100.0
	Void Ratio	0.586	0.583	0.579
	Back Press., psi	90.	92.	78.
	Ver. Eff. Cons. Stress, psi	14.	28.	42.01
	Shear Strength, psi	12.05	16.52	19.5
	Strain at Failure, %	1.98	3.95	4.76
	Strain Rate, %/min	0.022	0.022	0.022
	B-Value	0.96	0.97	0.97
	Measured Specific Gravity	2.76	2.76	2.76
	Liquid Limit	46	46	46
	Plastic Limit	20	20	20

MACTEC	Project: STP Units 3&4	
	Location: U4-3A UD-1	
	Project No.: 6234084660	
	Boring No.: U4-3A	
	Sample Type: Undisturbed	
	Description: Light Reddish Brown to Light Olive Gray Lean Clay (CL)	
Remarks: ASTM D4767-04		

Phase calculations based on start and end of test.

* Saturation is set to 100% for phase calculations.

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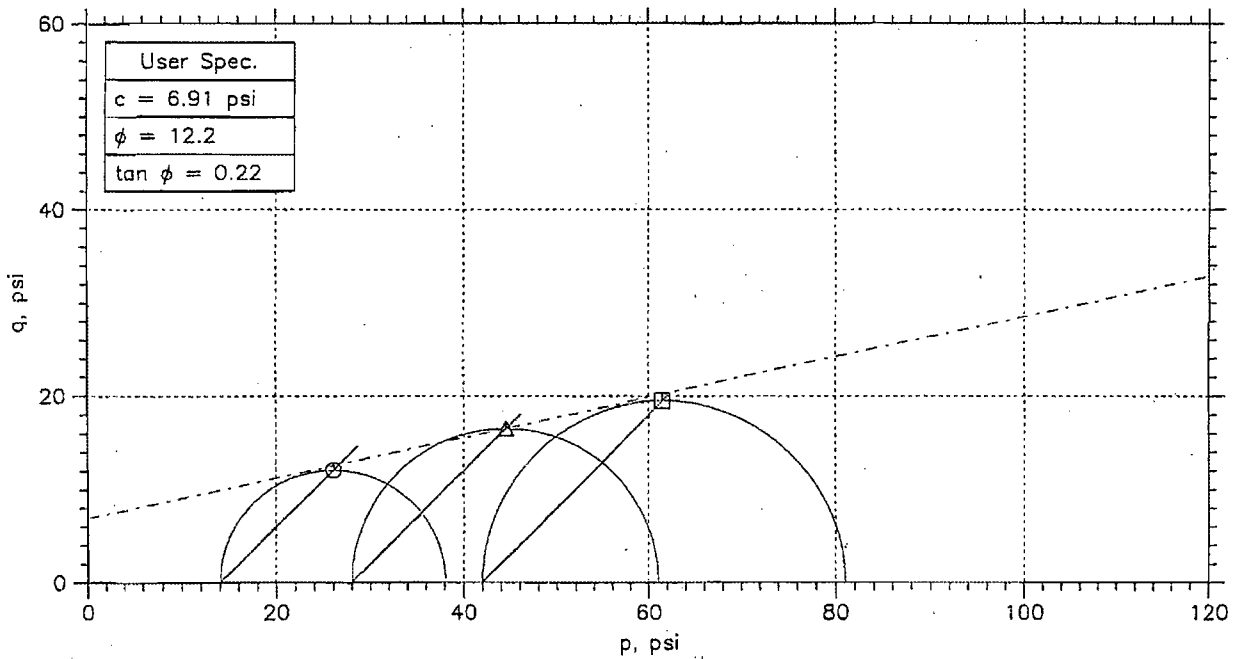
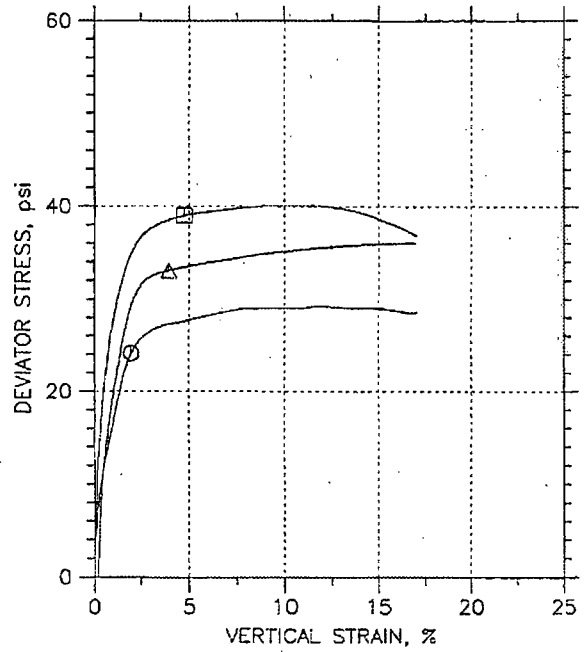
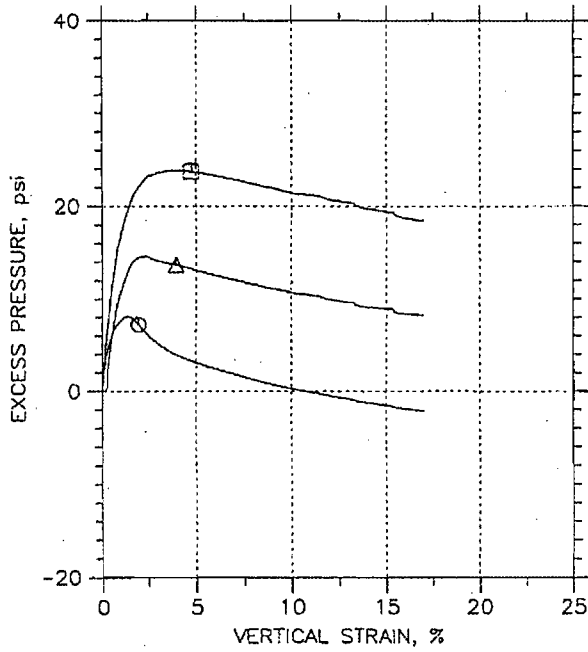
TOSHIBA CORPORATION

Nuclear Energy Systems & Services Division

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DCN 617-817

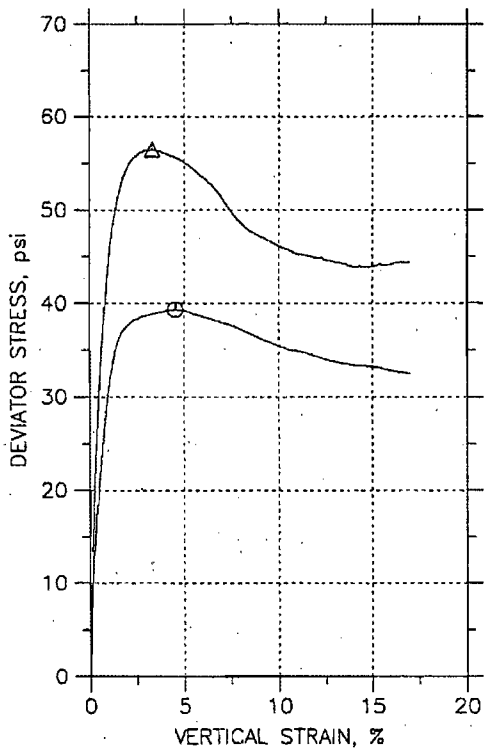
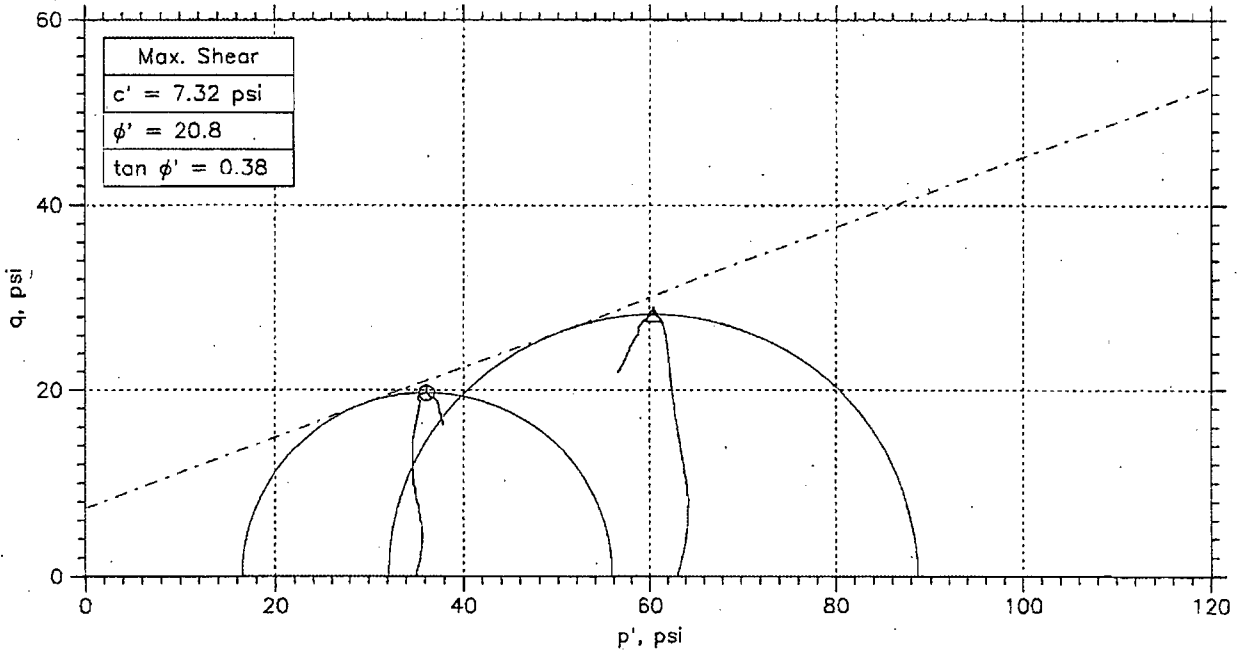
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
○	UD-1	8959.1	52-54 ft	HJ	10/8/08		8959.1_2581.dat
△	UD-1	8959.2	52-54 ft	HJ	10/8/08	JW 11/29/08	8959.2_2582.dat
□	UD-1	8959.3	52-54 ft	HJ	10/8/08		8959.3_2583.dat

MACTEC	Project: STP Units 3&4		Location: U4-3A UD-1		Project No.: 6234084660	
	Boring No.: U4-3A		Sample Type: Undisturbed			
	Description: Light Reddish Brown to Light Olive Gray Lean Clay (CL)					
	Remarks: ASTM D4767-04					

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



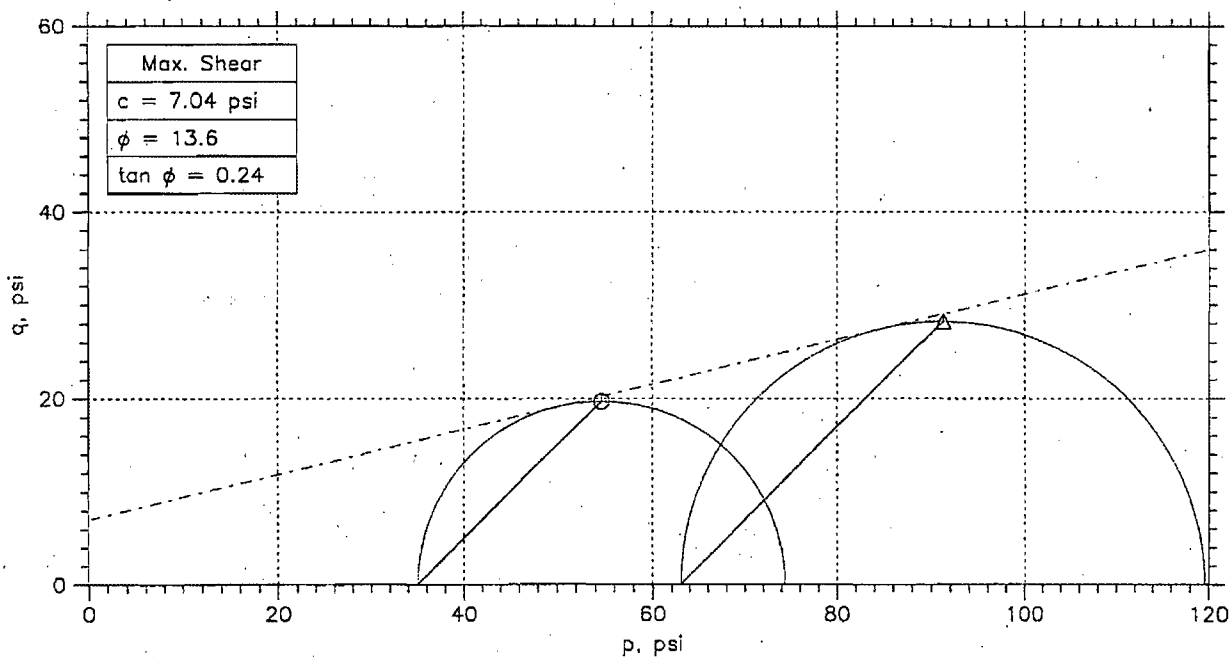
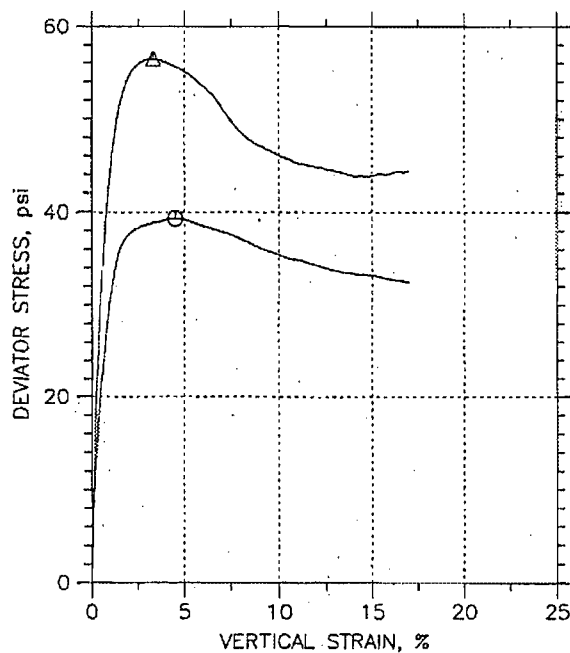
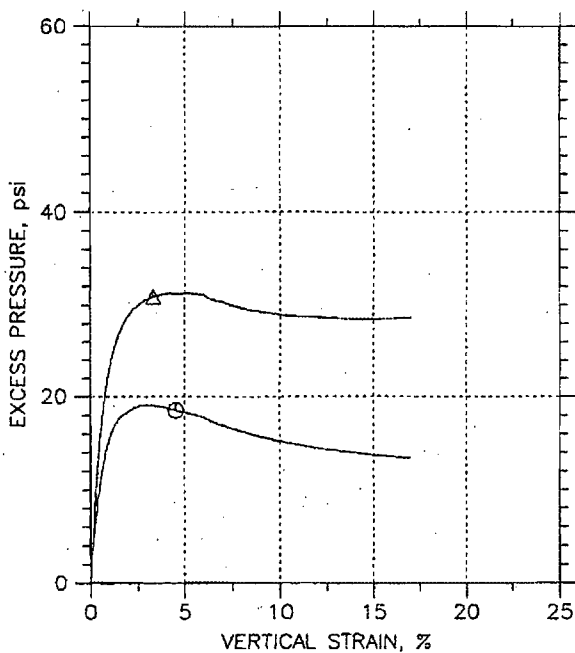
Symbol	○	△		
Sample No.	UD-4	UD-4		
Test No.	8960.1	8960.3		
Depth	98-100 ft	98-100 ft		
Initial	Diameter, in	2.817	2.756	
	Height, in	5.998	6.002	
	Water Content, %	26.2	29.1	
	Dry Density, pcf	99.11	95.66	
	Saturation, %	98.0	100.6	
Before Shear	Void Ratio	0.735	0.797	
	Water Content, %	25.3	27.9	
	Dry Density, pcf	101.3	97.17	
	Saturation*, %	100.0	100.0	
	Void Ratio	0.697	0.769	
	Back Press., psi	113.9	118.	
Ver. Eff. Cons. Stress, psi	35.01	63.03		
Shear Strength, psi	19.66	28.24		
Strain at Failure, %	4.52	3.32		
Strain Rate, %/min	0.0095	0.0095		
B-Value	0.96	0.97		
Measured Specific Gravity	2.75	2.75		
Liquid Limit	55	55		
Plastic Limit	25	25		

MACTEC	Project: STP Units 3&4	
	Location: T3-5B UD-4	
	Project No.: 6234084660	
	Boring No.: T3-5B	
	Sample Type: Undisturbed	
	Description: Brown Fat Clay (CH)	
Remarks: ASTM D4767-04.		

Phase calculations based on start and end of test.

* Saturation is set to 100% for phase calculations.

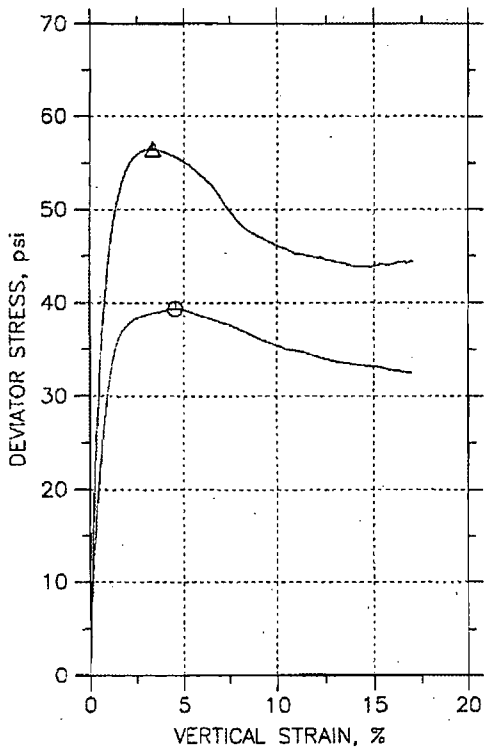
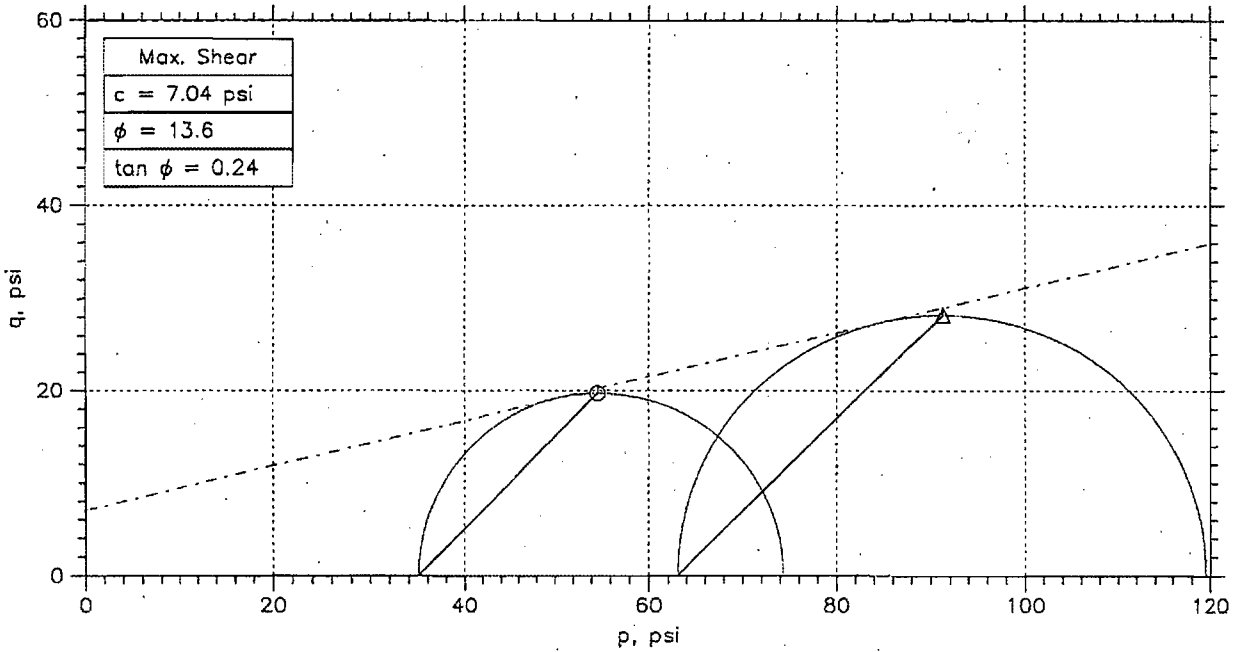
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
○	UD-4	8960.1	HJ	11/12/08			8960.1_2546.dat
△	UD-4	8960.3	HJ	11/12/08	<i>JW</i>	<i>11/25/08</i>	8960.3_2580.dat

MACTEC	Project: STP Units 3&4	Location: T3-5B UD-4	Project No.: 6234084660
	Boring No.: T3-5B	Sample Type: Undisturbed	
	Description: Brown Fat Clay (CH)		
	Remarks: ASTM D4767-04		

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



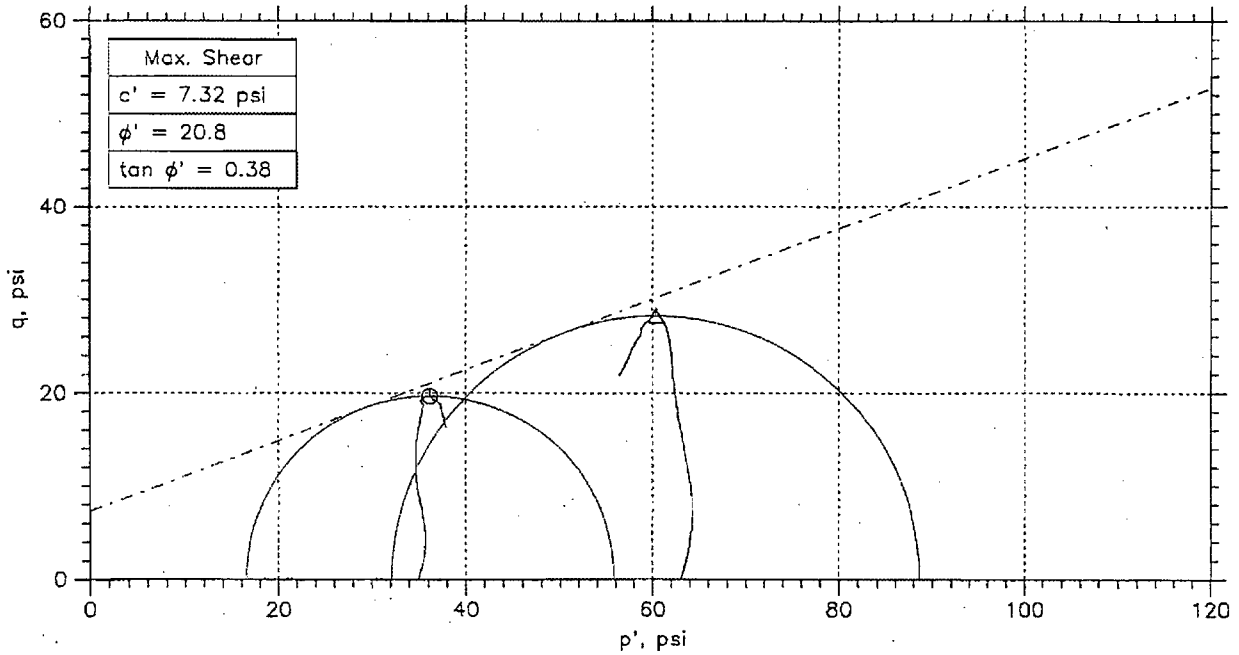
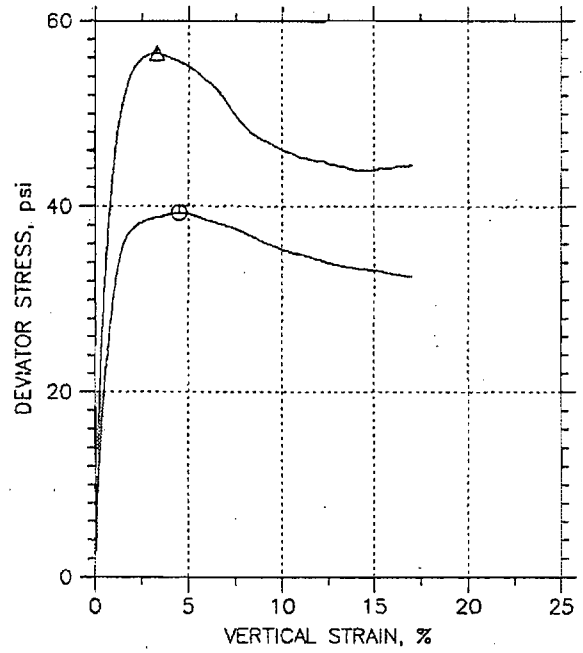
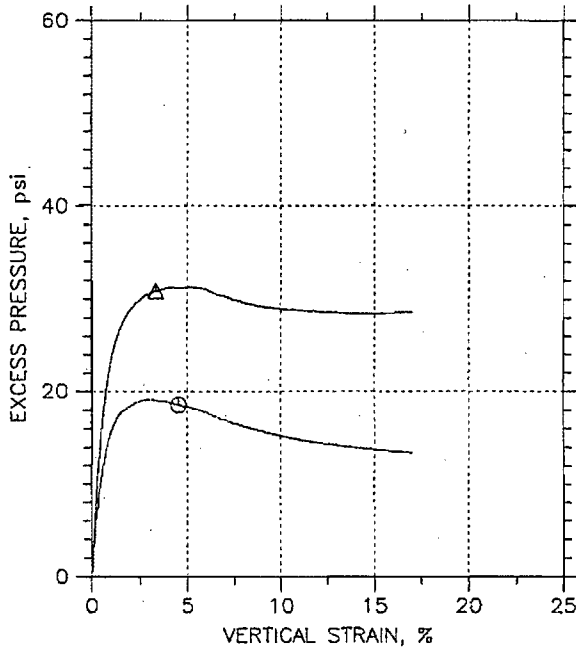
Symbol	⊙	△	
Sample No.	UD-4	UD-4	
Test No.	8960.1	8960.3	
Depth	98-100 ft	98-100 ft	
Initial	Diameter, in	2.817	2.756
	Height, in	5.998	6.002
	Water Content, %	26.2	29.1
	Dry Density, pcf	99.11	95.66
	Saturation, %	98.0	100.6
Before Shear	Void Ratio	0.735	0.797
	Water Content, %	25.3	27.9
	Dry Density, pcf	101.3	97.17
	Saturation*, %	100.0	100.0
	Void Ratio	0.697	0.769
	Back Press., psi	113.9	118.
	Ver. Eff. Cons. Stress, psi	35.01	63.03
	Shear Strength, psi	19.66	28.24
	Strain at Failure, %	4.52	3.32
	Strain Rate, %/min	0.0095	0.0095
	B-Value	0.96	0.97
	Measured Specific Gravity	2.75	2.75
	Liquid Limit	55	55
	Plastic Limit	25	25

MACTEC	Project: STP Units 3&4	
	Location: T3-5B UD-4	
	Project No.: 6234084660	
	Boring No.: T3-5B	
	Sample Type: Undisturbed	
	Description: Brown Fat Clay (CH)	
Remarks: ASTM D4767-04		

Phase calculations based on start and end of test.

* Saturation is set to 100% for phase calculations.

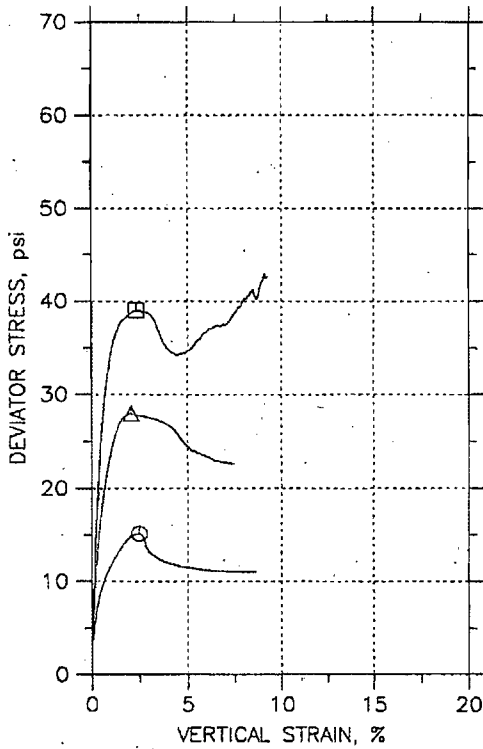
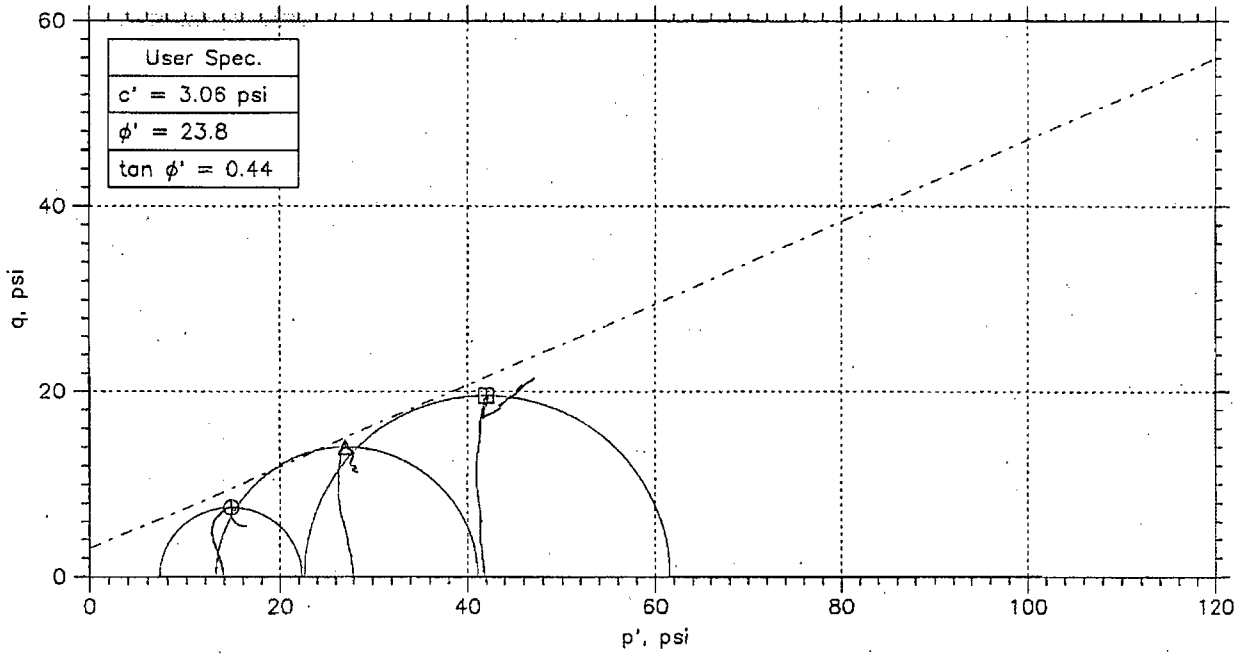
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
○	UD-4	8960.1	HJ	11/12/08			8960.1_2546.dat
△	UD-4	8960.3	HJ	11/12/08	<i>JW</i>	<i>11/25/08</i>	8960.3_2580.dat

MACTEC	Project: STP Units 3&4	Location: T3-5B UD-4	Project No.: 6234084660
	Boring No.: T3-5B	Sample Type: Undisturbed	
	Description: Brown Fat Clay (CH)		
	Remarks: ASTM D4767-04		

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



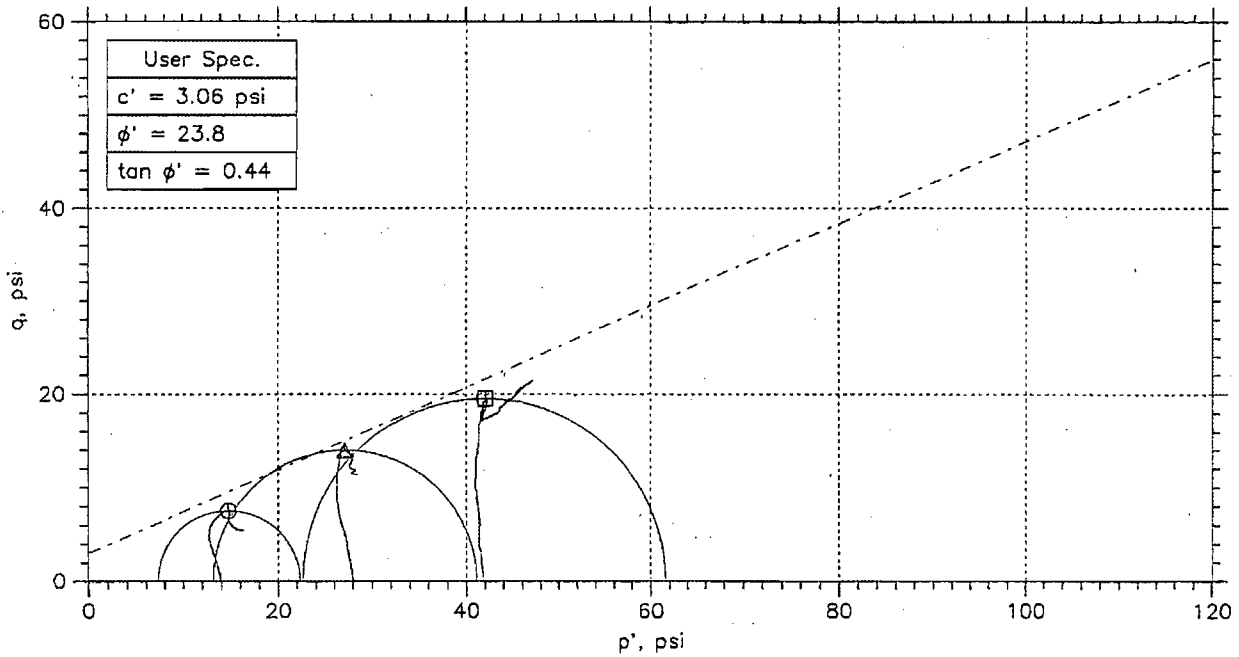
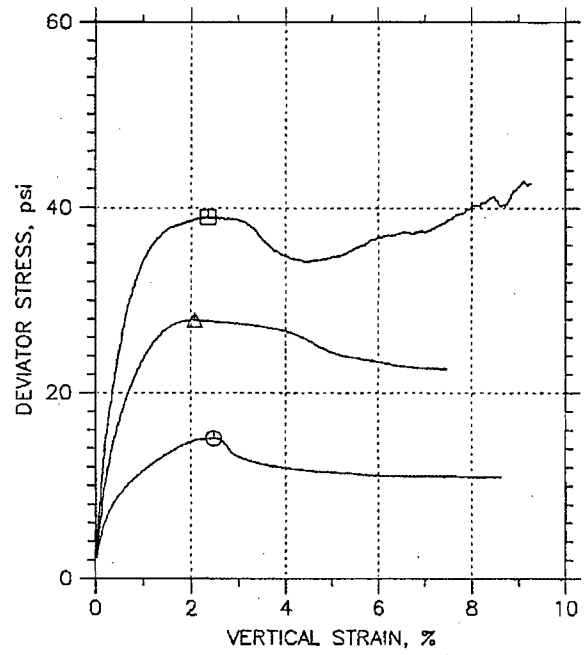
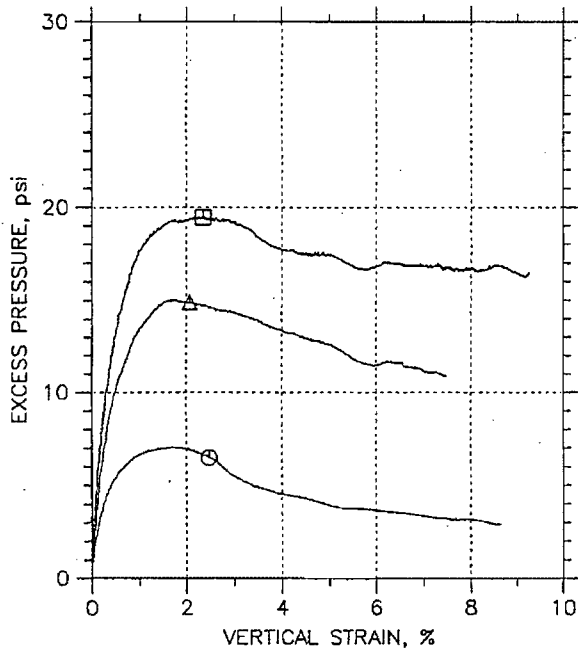
Symbol	○	△	□	
Sample No.	UD-1	UD-1	UD-1	
Test No.	8961.1	8961.2	8961.3	
Depth	48-50 ft	48-50 ft	48-50 ft	
Initial	Diameter, in	2.874	2.881	2.855
	Height, in	5.965	5.957	5.965
	Water Content, %	32.5	32.8	29.0
	Dry Density, pcf	87.14	88.51	94.91
	Saturation, %	91.0	95.0	97.4
Before Shear	Void Ratio	0.992	0.961	0.829
	Water Content, %	34.7	32.6	28.3
	Dry Density, pcf	88.38	91.05	97.2
	Saturation*, %	100.0	100.0	100.0
	Void Ratio	0.964	0.906	0.786
	Back Press., psi	128.	138.	98.
	Ver. Eff. Cons. Stress, psi	14.	28.01	41.99
	Shear Strength, psi	7.536	13.96	19.5
	Strain at Failure, %	2.47	2.08	2.36
	Strain Rate, %/min	0.0013	0.0013	0.0013
	B-Value	0.95	0.94	0.88
	Measured Specific Gravity	2.78	2.78	2.78
	Liquid Limit	60	60	60
	Plastic Limit	20	20	20

MACTEC	Project: STP Units 3&4	
	Location: D3-1A UD-1	
	Project No.: 6234084660	
	Boring No.: D3-1A	
	Sample Type: Undisturbed	
	Description: Reddish Brown and Light Greenish Gray Fat Clay (CH)	
Remarks: ASTM D4767-04		

Phase calculations based on start and end of test.

* Saturation is set to 100% for phase calculations.

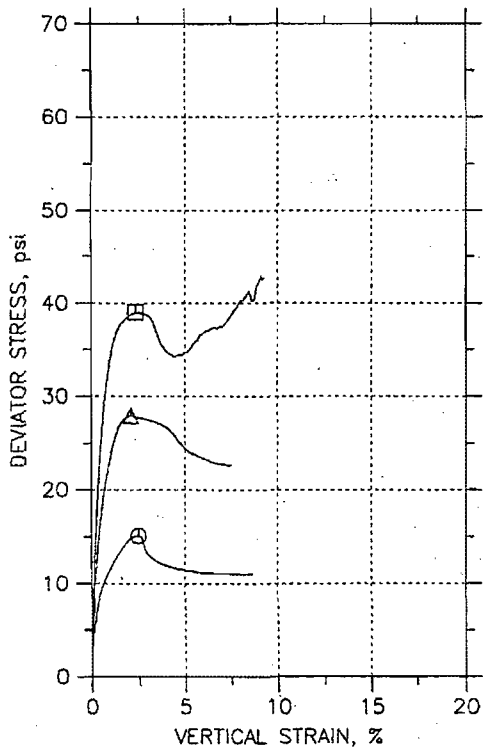
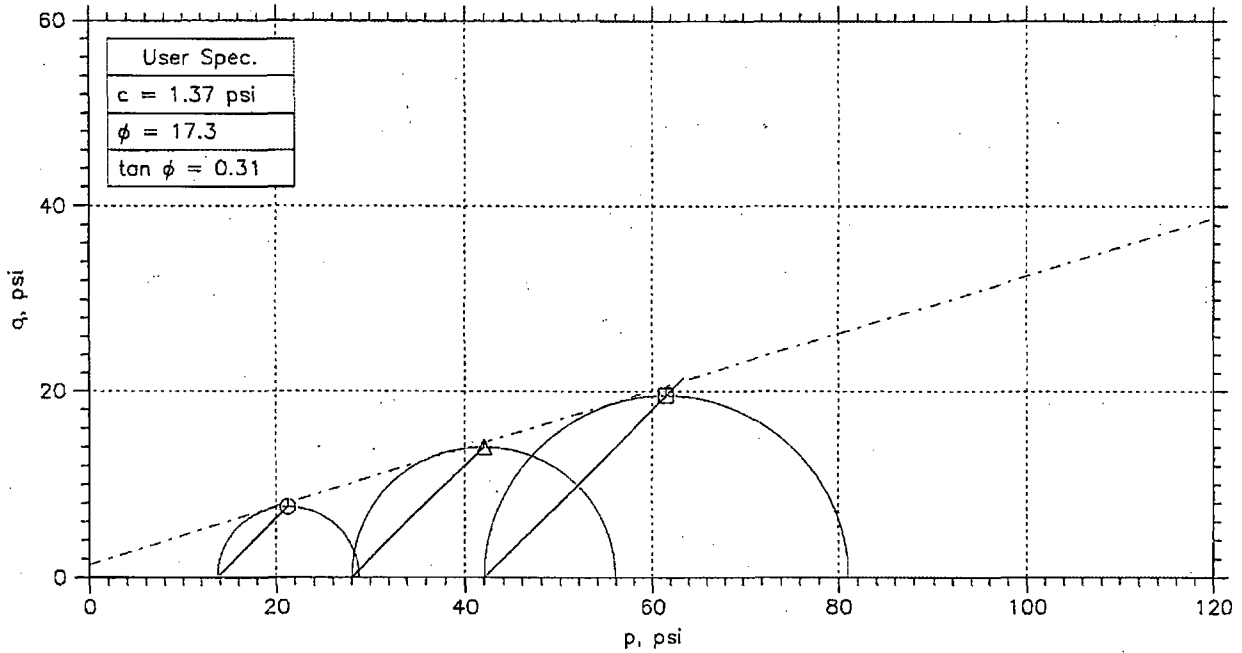
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
○	UD-1	8961.1	48-50 ft	JW	10/17/08		8961.1_2581a.dat
△	UD-1	8961.2	48-50 ft	JW	10/17/08	<i>MS 11/20/08</i>	8961.2_2547_a.dat
□	UD-1	8961.3	48-50 ft	JW	10/17/08		8961.3_2582.dat

MACTEC	Project: STP Units 3&4	Location: D3-1A UD-1	Project No.: 6234084660
	Boring No.: D3-1A	Sample Type: Undisturbed	
	Description: Reddish Brown and Light Greenish Gray Fat Clay (CH)		
	Remarks: ASTM D4767-04		

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Symbol	⊙	△	⊠	
Sample No.	UD-1	UD-1	UD-1	
Test No.	8961.1	8961.2	8961.3	
Depth	48-50 ft	48-50 ft	48-50 ft	
Initial	Diameter, in	2.874	2.881	2.855
	Height, in	5.965	5.957	5.965
	Water Content, %	32.5	32.8	29.0
	Dry Density, pcf	87.14	88.51	94.91
	Saturation, %	91.0	95.0	97.4
Before Shear	Void Ratio	0.992	0.961	0.829
	Water Content, %	34.7	32.6	28.3
	Dry Density, pcf	88.38	91.05	97.2
	Saturation*, %	100.0	100.0	100.0
	Void Ratio	0.964	0.906	0.786
Back Press., psi	128.	138.	98.	
Ver. Eff. Cons. Stress, psi	14.	28.01	41.99	
Shear Strength, psi	7.536	13.96	19.5	
Strain at Failure, %	2.47	2.08	2.36	
Strain Rate, %/min	0.0013	0.0013	0.0013	
B-Value	0.95	0.94	0.88	
Measured Specific Gravity	2.78	2.78	2.78	
Liquid Limit	60	60	60	
Plastic Limit	20	20	20	

MACTEC	Project: STP Units 3&4	
	Location: D3-1A UD-1	
	Project No.: 6234084660	
	Boring No.: D3-1A	
	Sample Type: Undisturbed	
Description: Reddish Brown and Light Greenish Gray Fat Clay (CH)		
Remarks: ASTM D4767-04		

Phase calculations based on start and end of test.

Thu, 20-NOV-2008 13:31:34

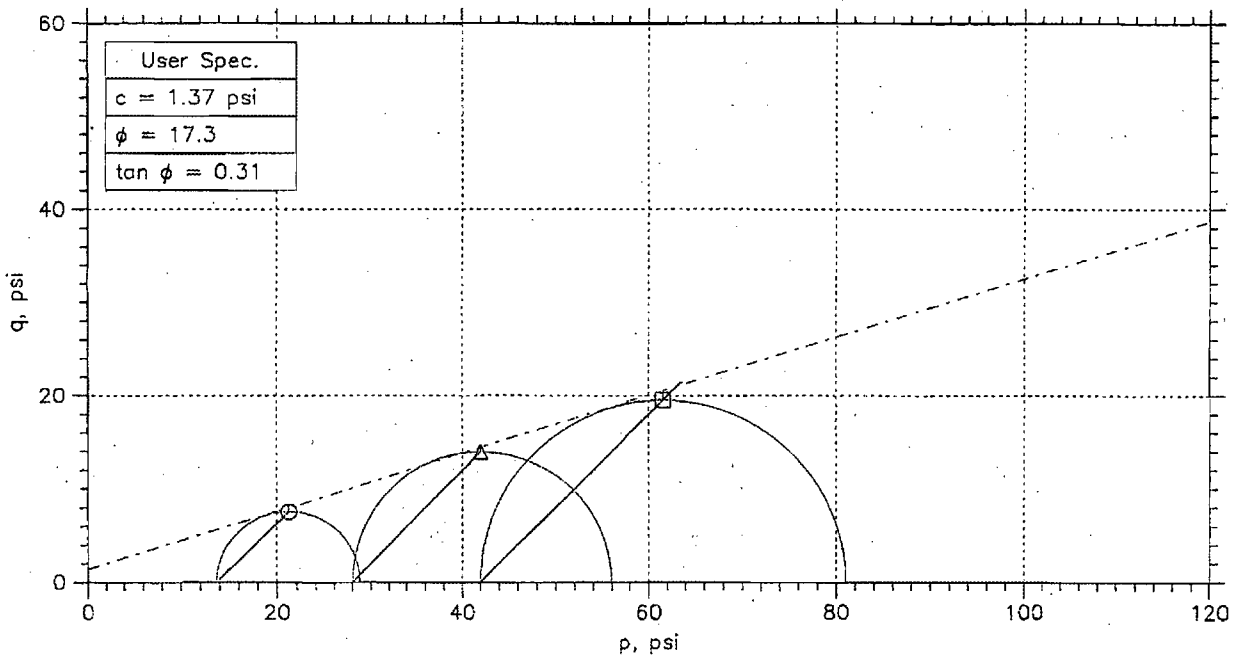
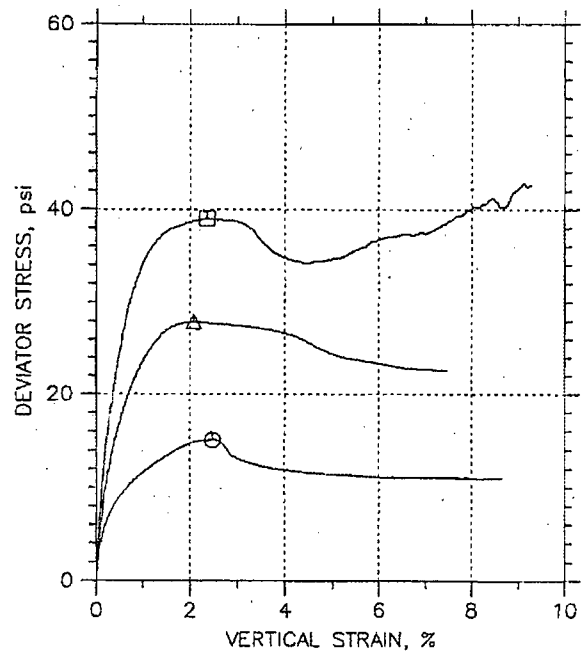
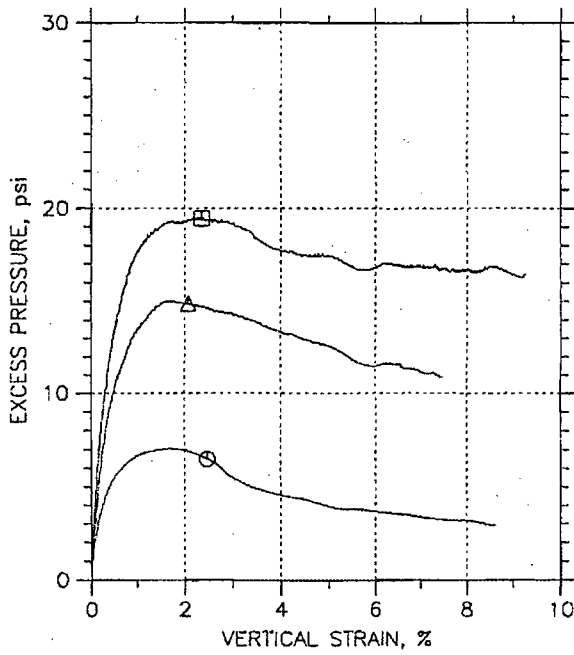
TOSHIBA CORPORATION
Nuclear Energy Systems & Services Division

* Saturation is set to 100% for phase calculations.

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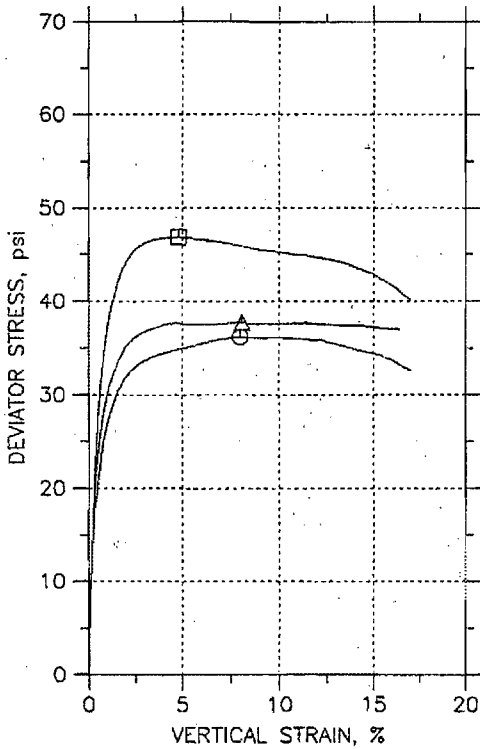
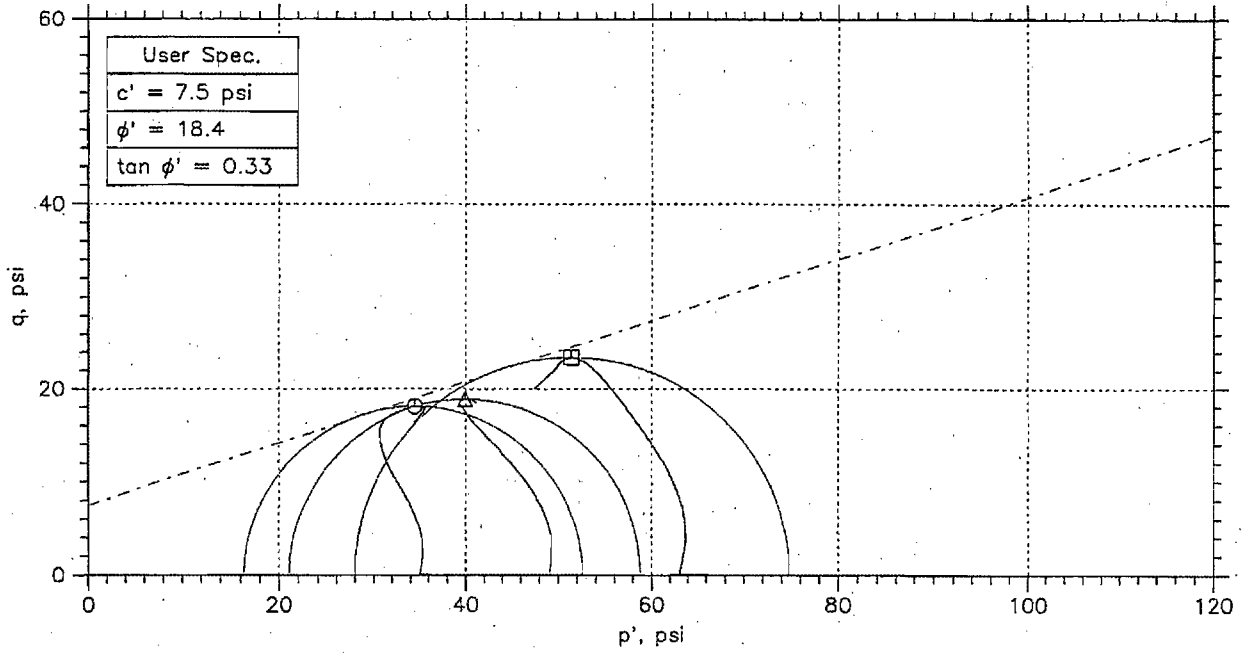
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊙	UD-1	8961.1	JW	10/17/08			8961.1_2581a.dat
△	UD-1	8961.2	JW	10/17/08	<i>JW</i>	<i>11/20/08</i>	8961.2_2547_a.dat
⊠	UD-1	8961.3	JW	10/17/08			8961.3_2582.dat

MACTEC	Project: STP Units 3&4	Location: D3-1A UD-1	Project No.: 6234084660
	Boring No.: D3-1A	Sample Type: Undisturbed	
	Description: Reddish Brown and Light Greenish Gray Fat Clay (CH)		
	Remarks: ASTM D4767-04		

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



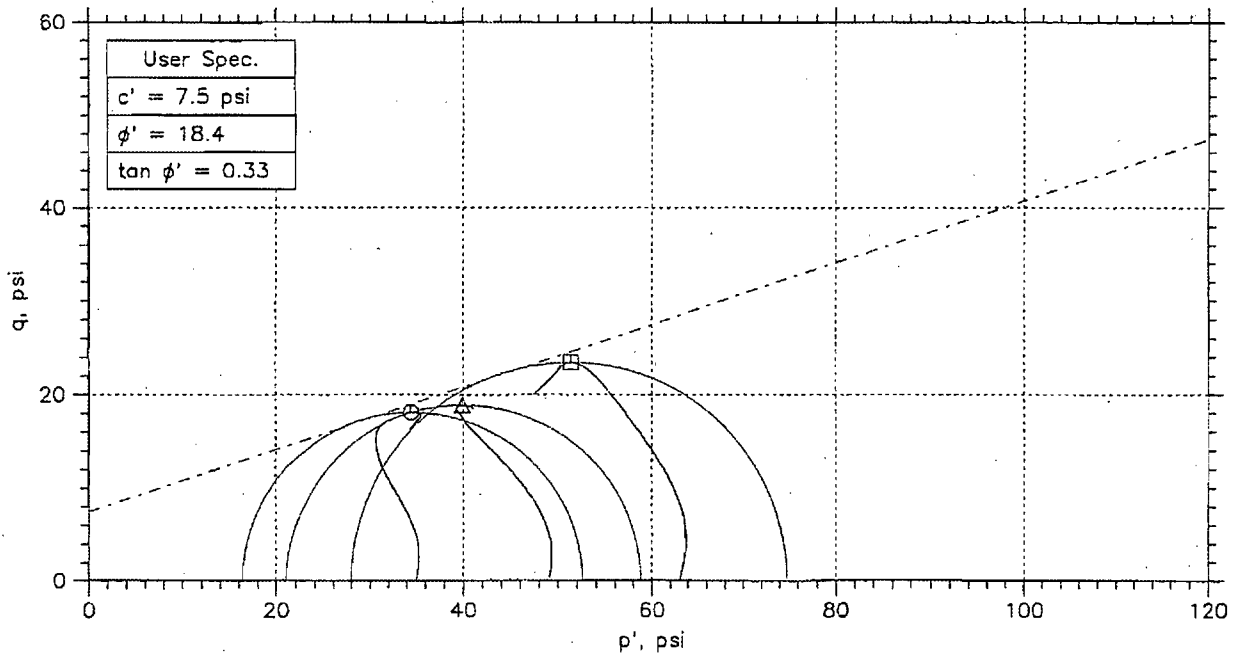
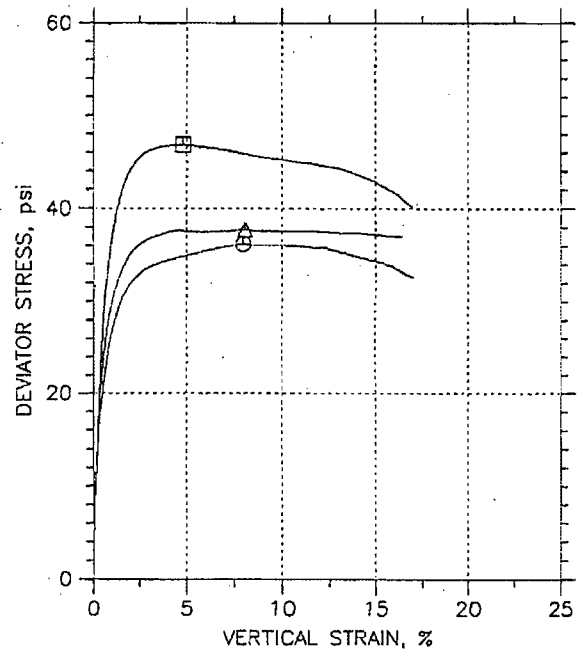
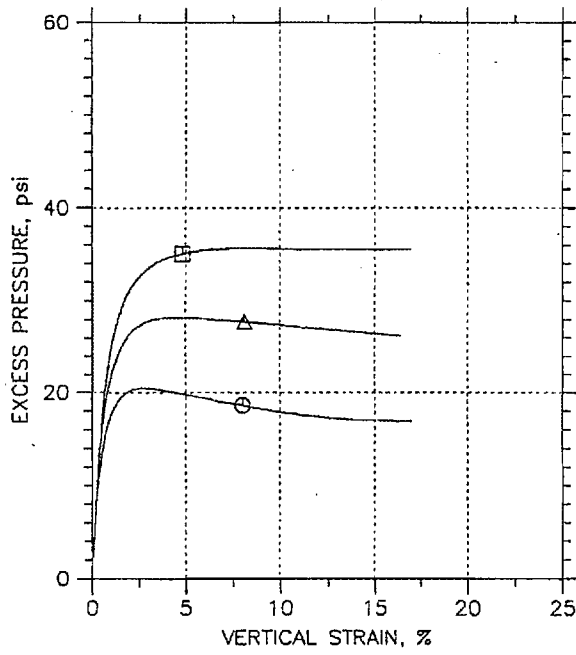
Symbol	⊙	△	□	
Sample No.	UD-2	UD-2	UD-2	
Test No.	8962.1	8962.2	8962.3	
Depth	98-100 ft	98-100 ft	98-100 ft	
Initial	Diameter, in	2.847	2.874	2.843
	Height, in	5.95	5.595	5.944
	Water Content, %	24.5	23.1	24.6
	Dry Density, pcf	100.	96.67	99.1
	Saturation, %	96.8	84.3	95.1
	Void Ratio	0.68	0.738	0.696
Before Shear	Water Content, %	23.5	23.9	23.8
	Dry Density, pcf	103.	102.3	102.5
	Saturation*, %	100.0	100.0	100.0
	Void Ratio	0.632	0.643	0.639
Back Press., psi	124.	118.	99.99	
Ver. Eff. Cons. Stress, psi	35.	48.98	63.	
Shear Strength, psi	18.09	18.86	23.41	
Strain at Failure, %	8.01	8.1	4.83	
Strain Rate, %/min	0.018	0.018	0.018	
B-Value	0.96	0.96	0.96	
Measured Specific Gravity	2.69	2.69	2.69	
Liquid Limit	44	44	44	
Plastic Limit	18	18	18	

MACTEC	Project: STP Units 3&4	
	Location: D3-1A UD-2	
	Project No.: 6234084660	
	Boring No.: D3-1A	
	Sample Type: Undisturbed	
	Description: Brown Lean Clay with Sand	
Remarks: ASTM D4767-04		

Phase calculations based on start and end of test.

* Saturation is set to 100% for phase calculations.

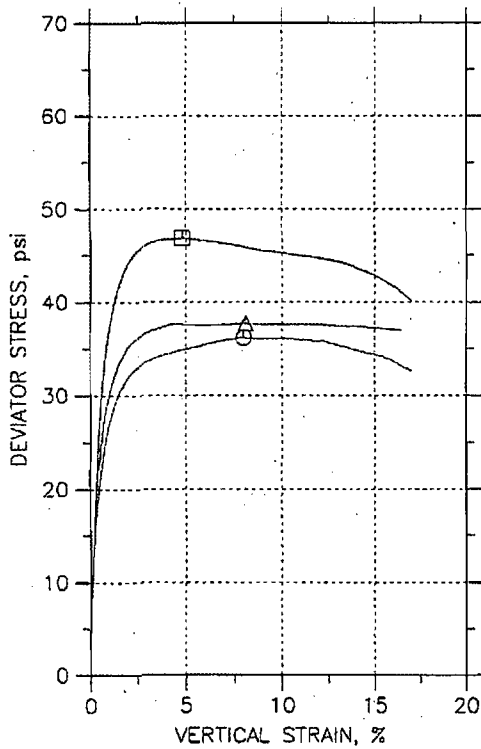
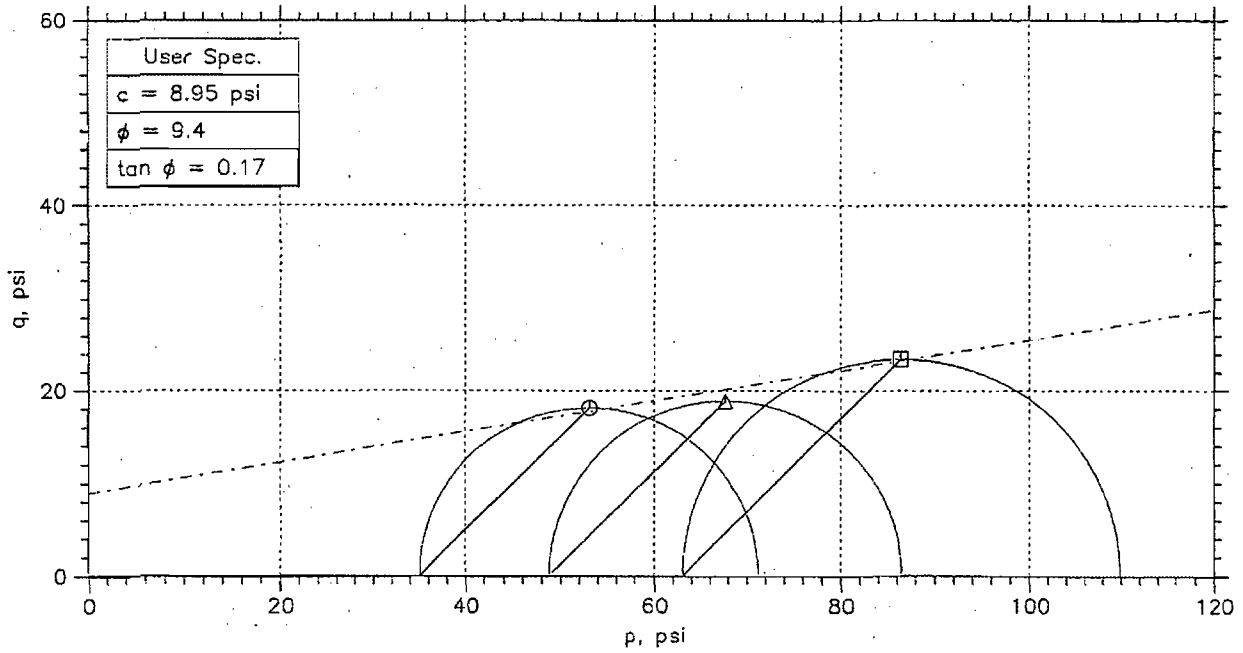
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
○	UD-2	8962.1	JW	10/31/08			8962.1_2547.dat
△	UD-2	8962.2	JW	10/31/08	<i>[Signature]</i>	11/25/08	8962.2_2546o.dat
□	UD-2	8962.3	JW	10/31/08			8962.3_2580.dat

MACTEC	Project: STP Units 3&4		Location: D3-1A UD-2		Project No.: 6234084660	
	Boring No.: D3-1A		Sample Type: Undisturbed			
	Description: Brown Lean Clay with Sand					
	Remarks: ASTM D4767-04					

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Symbol	○	△	□	
Sample No.	UD-2	UD-2	UD-2	
Test No.	8962.1	8962.2	8962.3	
Depth	98-100 ft	98-100 ft	98-100 ft	
Initial	Diameter, in	2.847	2.874	2.843
	Height, in	5.95	5.595	5.944
	Water Content, %	24.5	23.1	24.6
	Dry Density, pcf	100.	96.67	99.1
	Saturation, %	96.8	84.3	95.1
	Void Ratio	0.68	0.738	0.696
Before Shear	Water Content, %	23.5	23.9	23.8
	Dry Density, pcf	103.	102.3	102.5
	Saturation*, %	100.0	100.0	100.0
	Void Ratio	0.632	0.643	0.639
Back Press., psi	124.	118.	99.99	
Ver. Eff. Cons. Stress, psi	35.	48.98	63.	
Shear Strength, psi	18.09	18.86	23.41	
Strain at Failure, %	8.01	8.1	4.83	
Strain Rate, %/min	0.018	0.018	0.018	
B-Value	0.96	0.96	0.96	
Measured Specific Gravity	2.69	2.69	2.69	
Liquid Limit	44	44	44	
Plastic Limit	18	18	18	

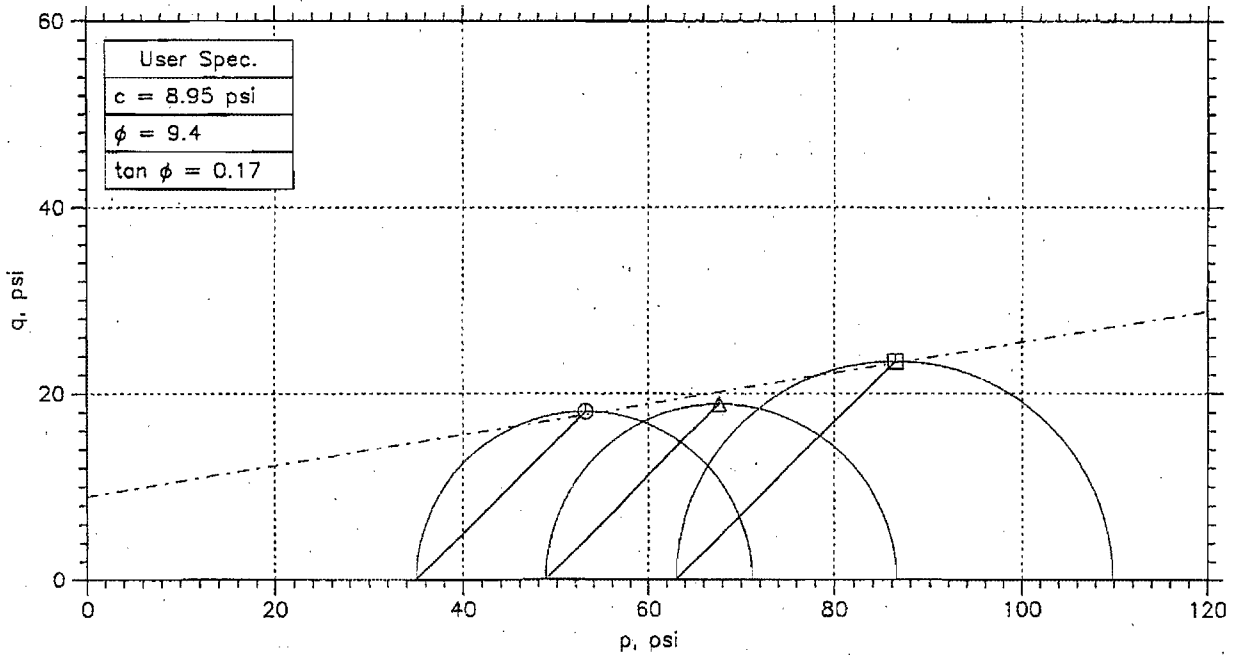
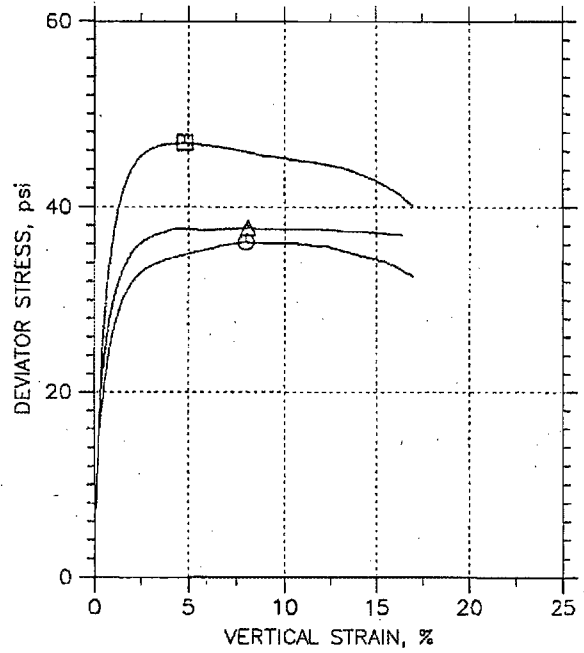
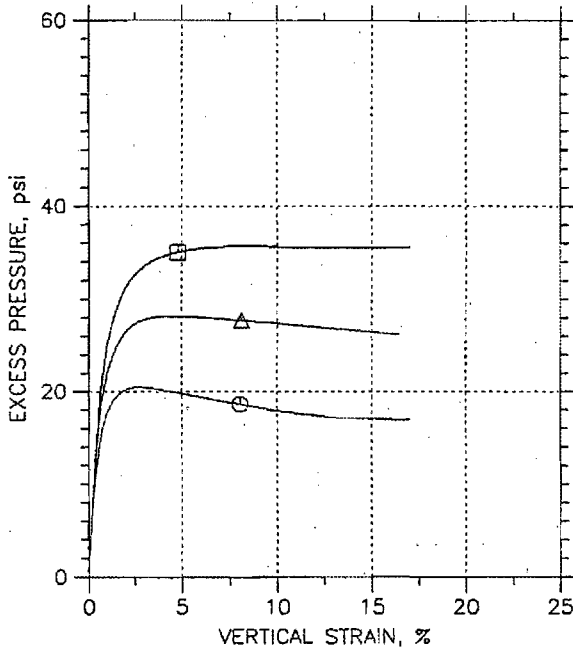
MACTEC	Project: STP Units 3&4	
	Location: D3-1A UD-2	
	Project No.: 6234084660	
	Boring No.: D3-1A	
	Sample Type: Undisturbed	
	Description: Brown Lean Clay with Sand	
Remarks: ASTM D4767-04		

Phase calculations based on start and end of test.

Tue, 25-NOV-2008 08:35:14

* Saturation is set to 100% for phase calculations.

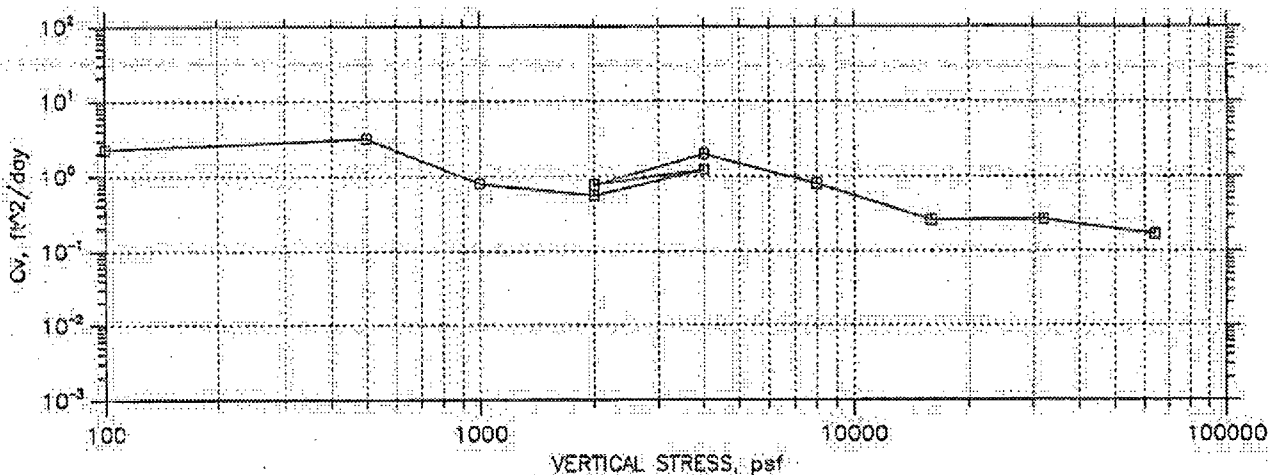
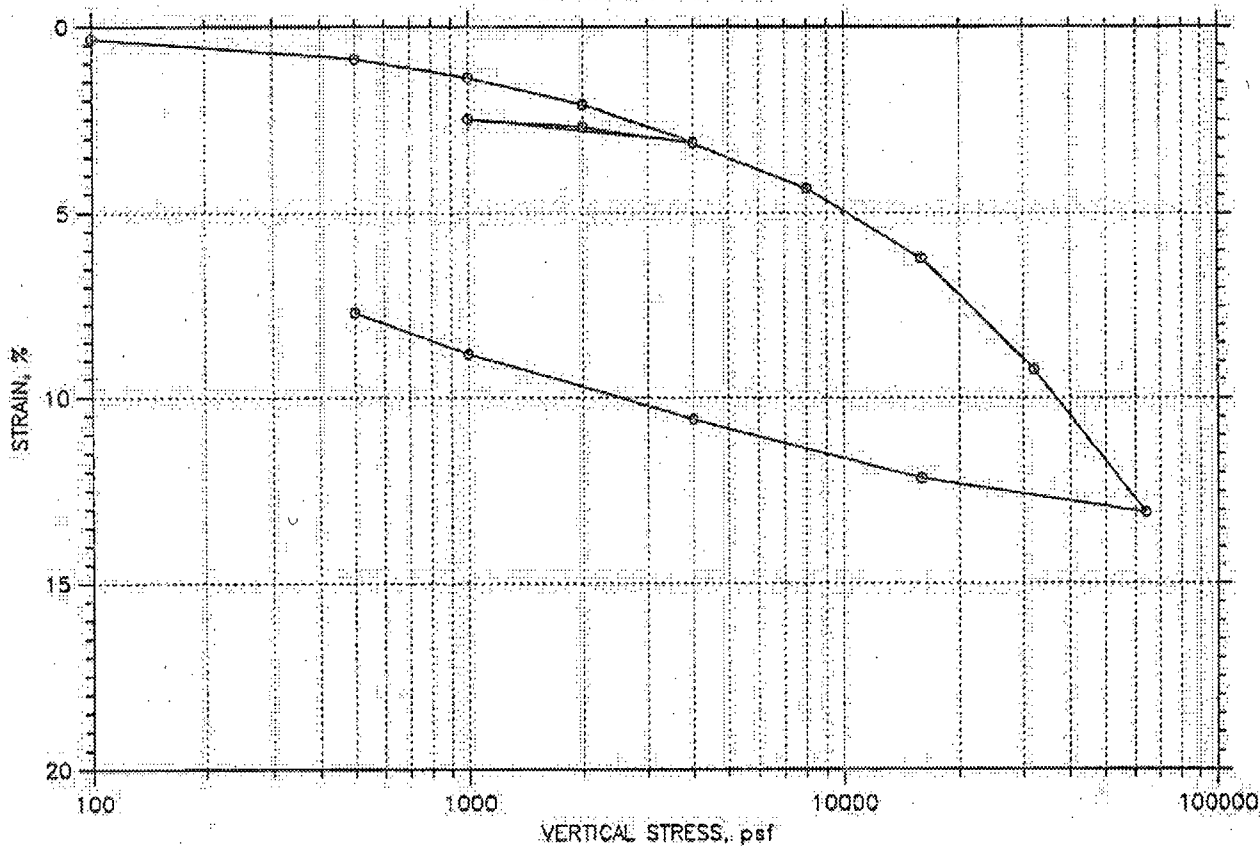
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
○	UD-2	8962.1	98-100 ft	JW	10/31/08		8962.1_2547.dat
△	UD-2	8962.2	98-100 ft	JW	10/31/08	<i>JW 11/25/08</i>	8962.2_2546a.dat
□	UD-2	8962.3	98-100 ft	JW	10/31/08		8962.3_2580.dat

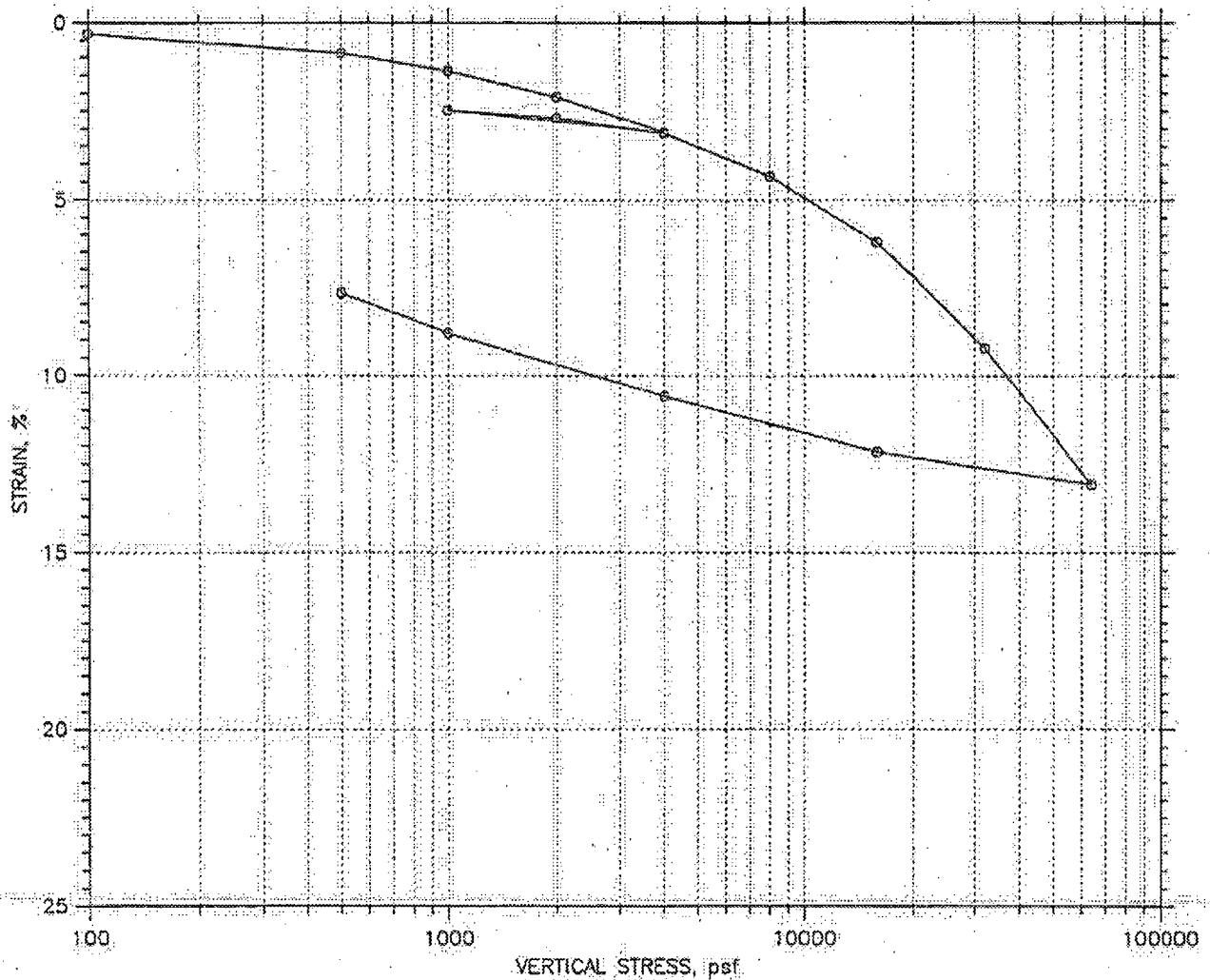
MACTEC	Project: STP Units 3&4		Location: D3-1A UD-2		Project No.: 6234084660	
	Boring No.: D3-1A		Sample Type: Undisturbed			
	Description: Brown Lean Clay with Sand					
	Remarks: ASTM D4767-04					

CONSOLIDATION TEST DATA SUMMARY REPORT



MACTEC	Project: STP Units 3 & 4	Location: U3-3A UD-3	Project No.: 6234084660	
	Boring No.: U3-3A	Tested By: BM	Checked By: JW	
	Sample No.: UD-3	Test Date: 08/26/08	Depth: 60-62 ft	
	Test No.: 8951	Sample Type: Undisturbed	Elevation: -31.2/-33.2	
	Description: Strong Brown Lean Clay (CL)		Cr=0.017	
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05).			Task 1.2

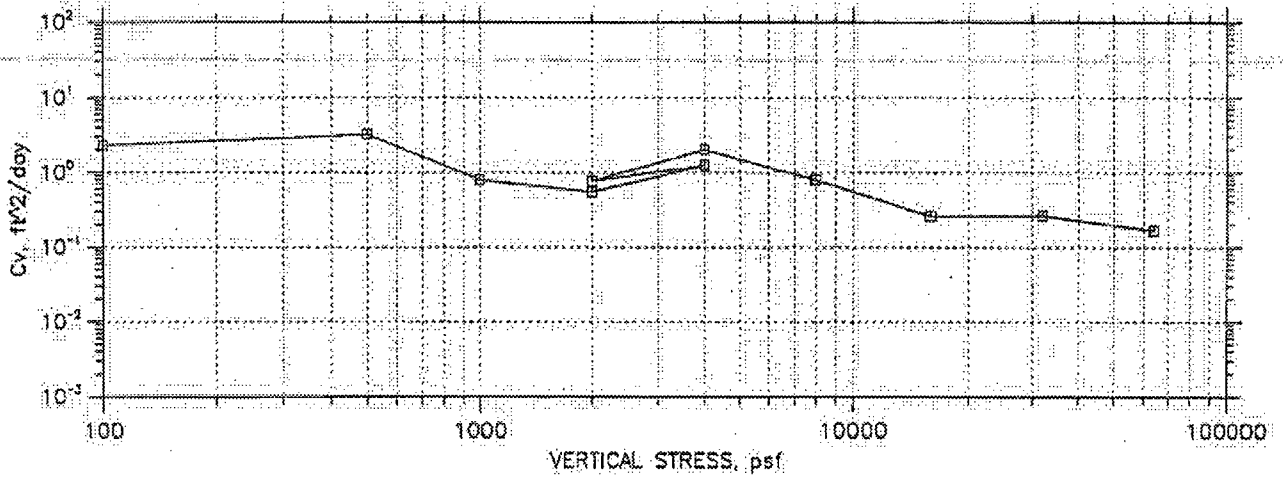
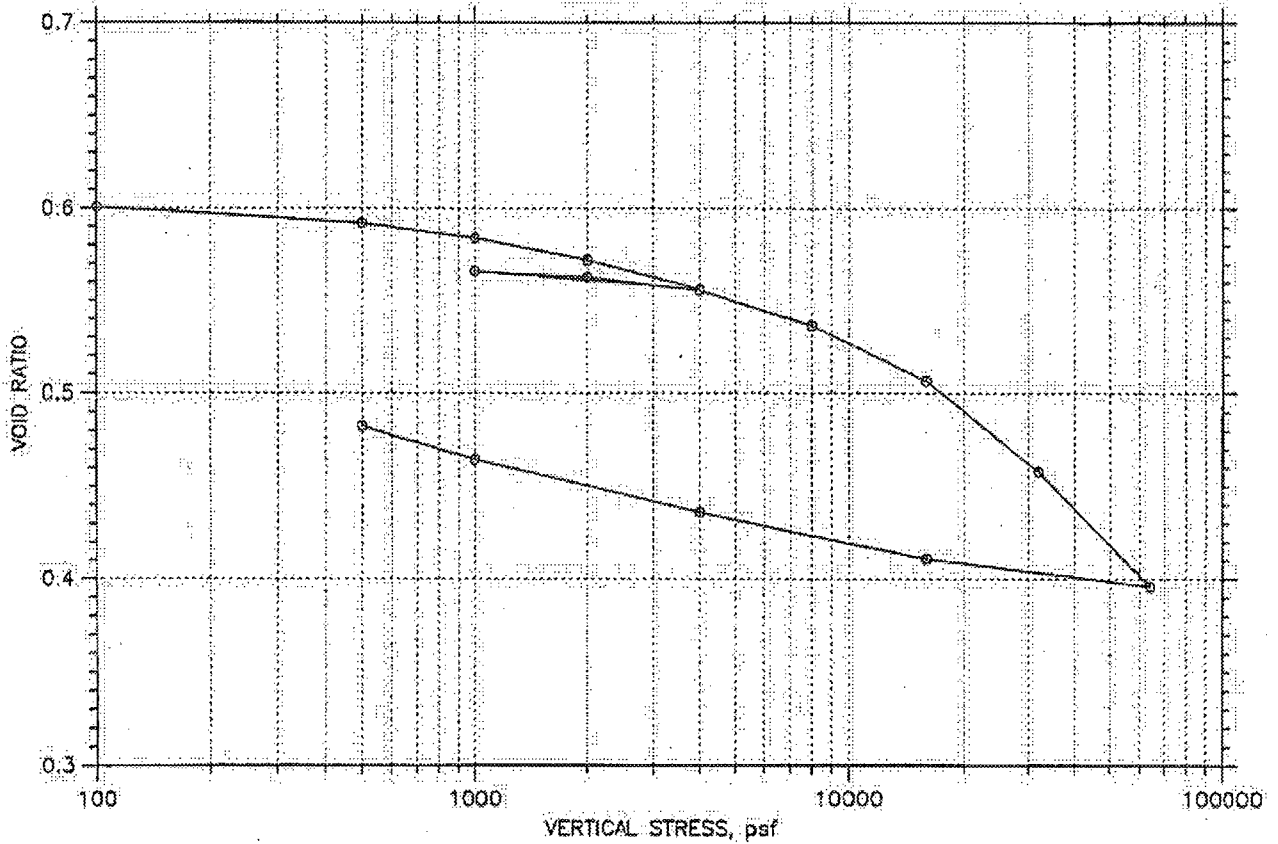
CONSOLIDATION TEST DATA SUMMARY REPORT



		Before Test	After Test
Overburden Pressure: 3900 psf		20.36	16.61
Preconsolidation Pressure: 1.754e+004 psf		107.3	115.2
Compression Index: 0.206		92.74	95.04
Diameter: 2.499 in. Height: 0.997 in.		0.61	0.48
LE: 35	PL: 16 PR: 19 GS: 2.76		

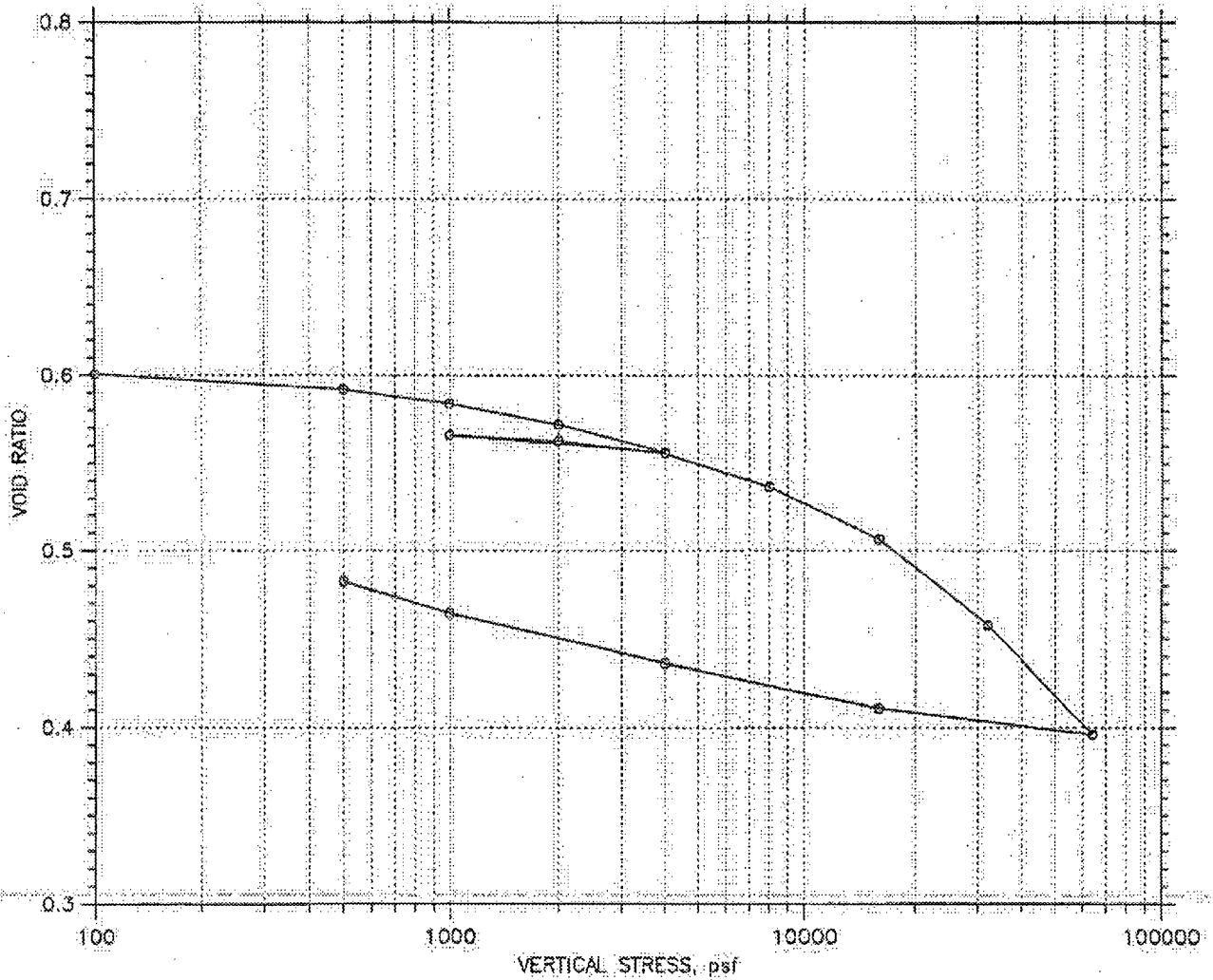
MACTEC	Project: STP Units 3 & 4	Location: U3-3A UD-3	Project No.: 6234084660
	Boring No.: U3-3A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 08/26/08	Depth: 60-62 ft.
	Test No.: 8951	Sample Type: Undisturbed	Elevation: -31.2/-33.2
	Description: Strong Brown Lean Clay (CL)		Cr=0.017
Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05).			Task 1,2

CONSOLIDATION TEST DATA SUMMARY REPORT



MACTEC	Project: STP Units 3 & 4	Location: U3-3A UD-3	Project No.: 6234084660
	Boring No.: U3-3A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 08/26/08	Depth: 60-62 ft
	Test No.: 8951	Sample Type: Undisturbed	Elevation: -31.2/-33.2
	Description: Strong Brown Lean Clay (CL)		Cr=0.017
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05).		

CONSOLIDATION TEST DATA SUMMARY REPORT



		Before Test	After Test
Overburden Pressure: 3900 psf		20.36	16.61
Preconsolidation Pressure: 1.754e+004 psf		107.3	116.2
Compression Index: 0.206		92.74	95.04
Diameter: 2.499 in	Height: 0.997 in	0.51	0.48
LL: 35	PL: 16		
PI: 19	GS: 2.76		

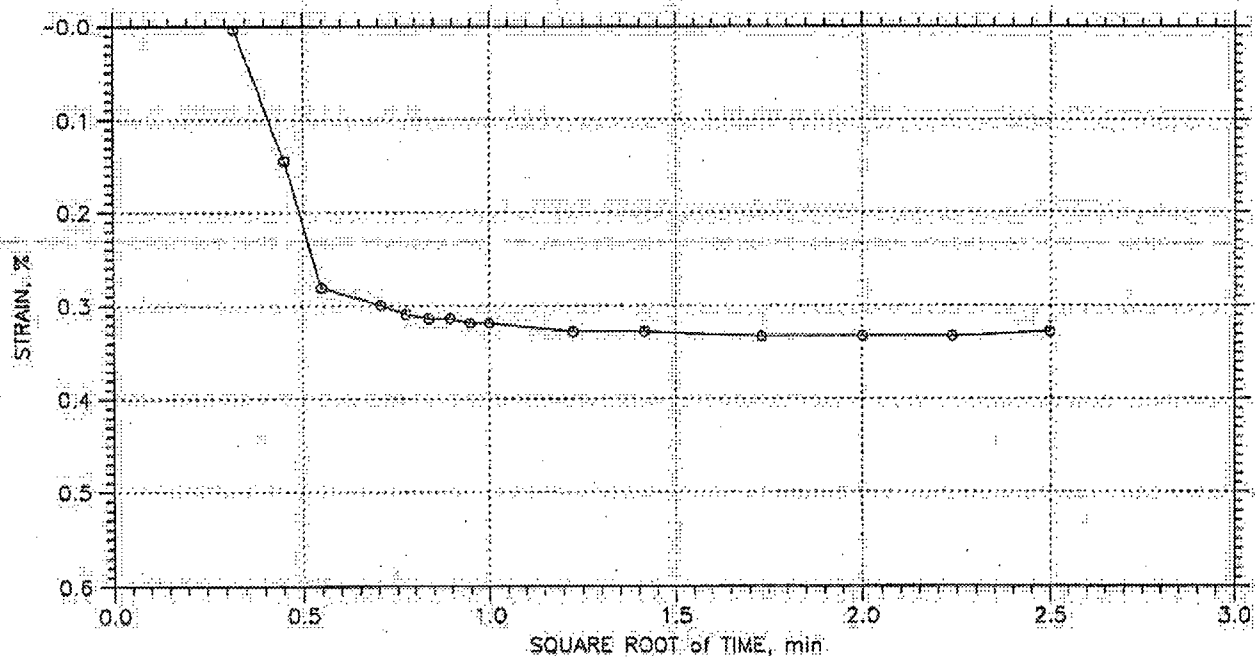
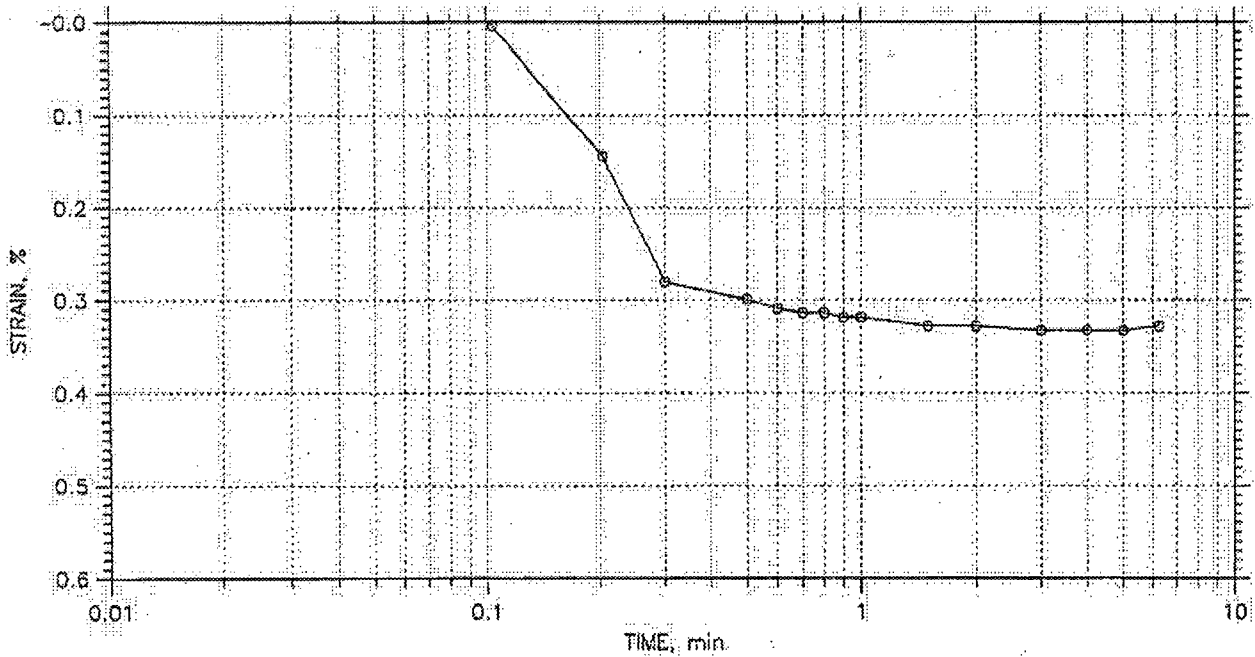
MACTEC	Project: STP Units 3 & 4	Location: U3-3A UD-3	Project No.: 6234084660
	Boring No.: U3-3A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 08/26/08	Depth: 60-62 ft
	Test No.: 8951	Sample Type: Undisturbed	Elevation: -31.2/-33.2
	Description: Strong Brown Lean Clay (CL)		Cr=0.017
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05).		Task 1.2

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 1 of 16

Stress: 100. psf



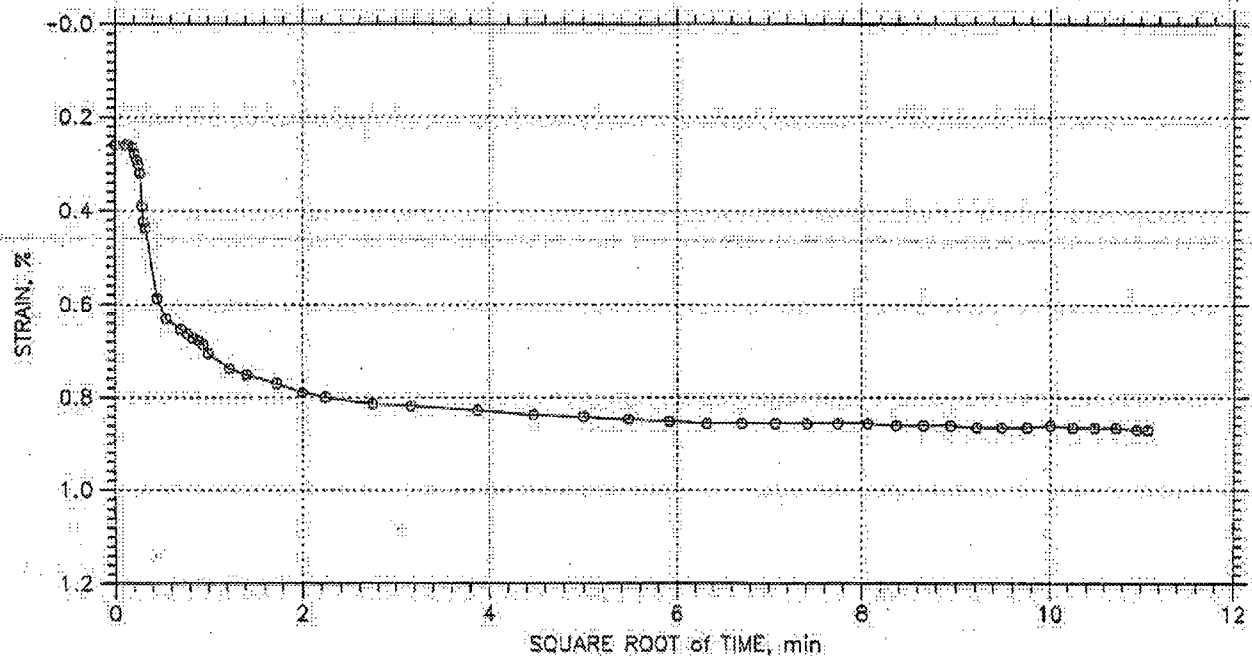
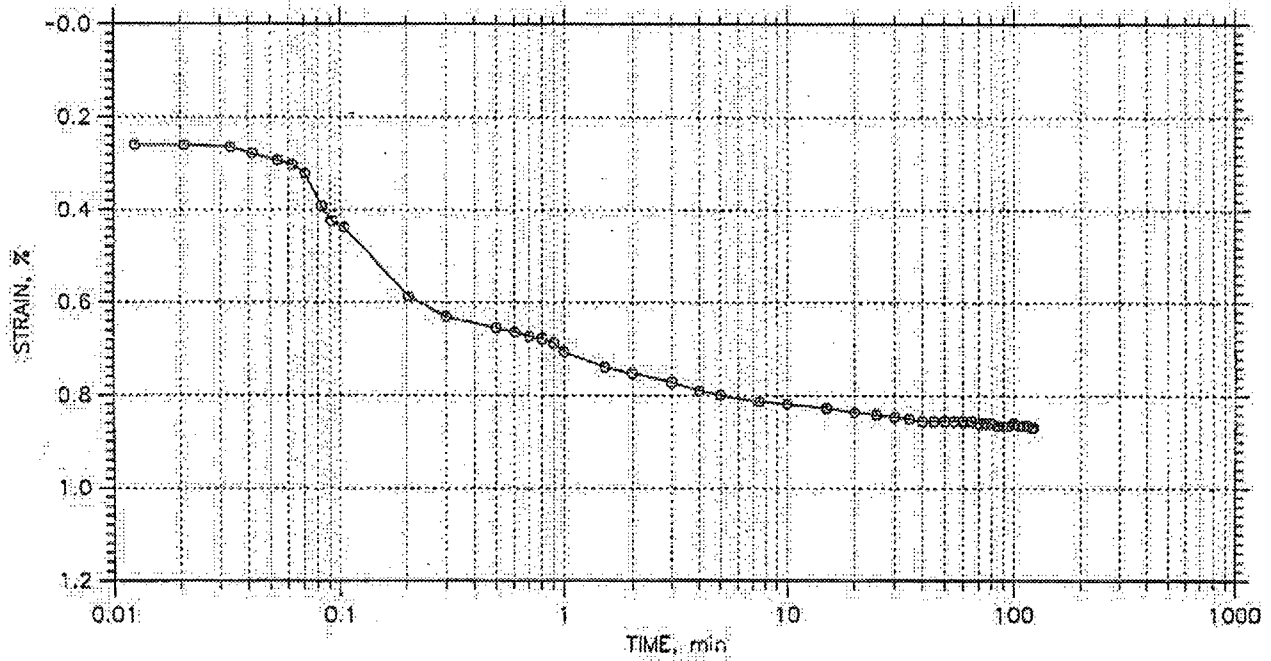
MACTEC	Project: STP Units 3 & 4	Location: U3-3A UD-3	Project No.: 6234084660
	Boring No.: U3-3A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 08/26/08	Depth: 60-62 ft
	Test No.: 8951	Sample Type: Undisturbed	Elevation: -31.2/-33.2
	Description: Strong Brown Lean Clay (CL)		Cr=0.017
	Remarks: ASTM D2435-04 Method B; SG (ASTM D854-06); PI (ASTM D4318-05).		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 2 of 16

Stress: 500. psf



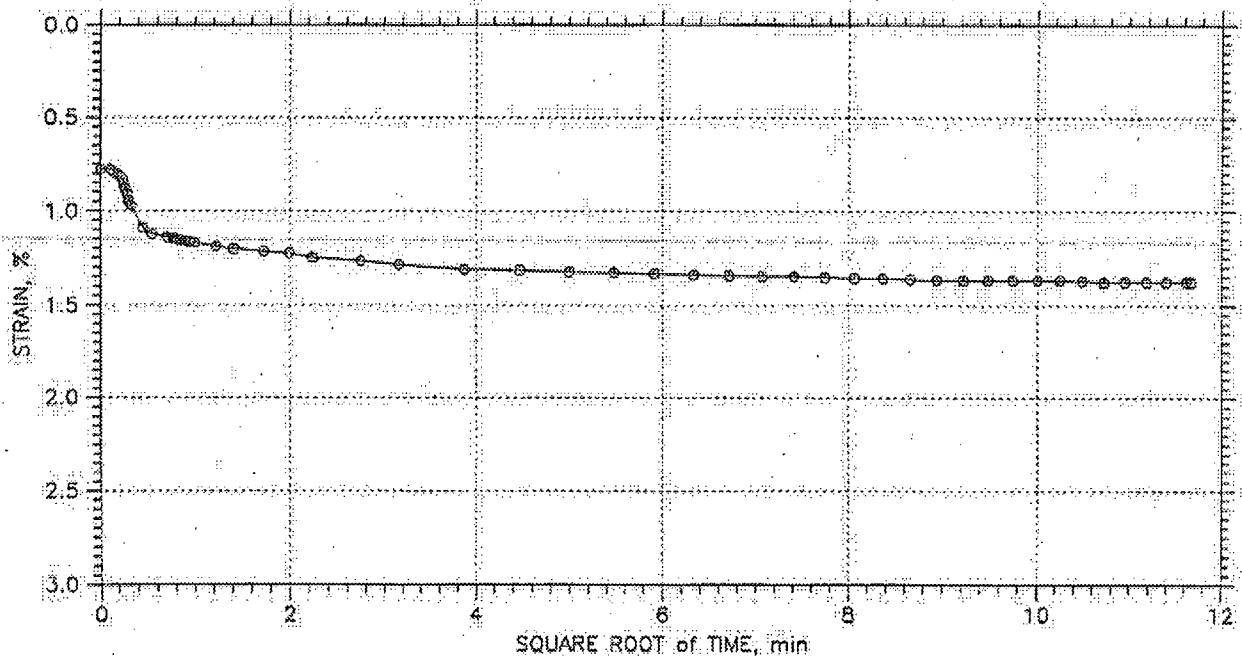
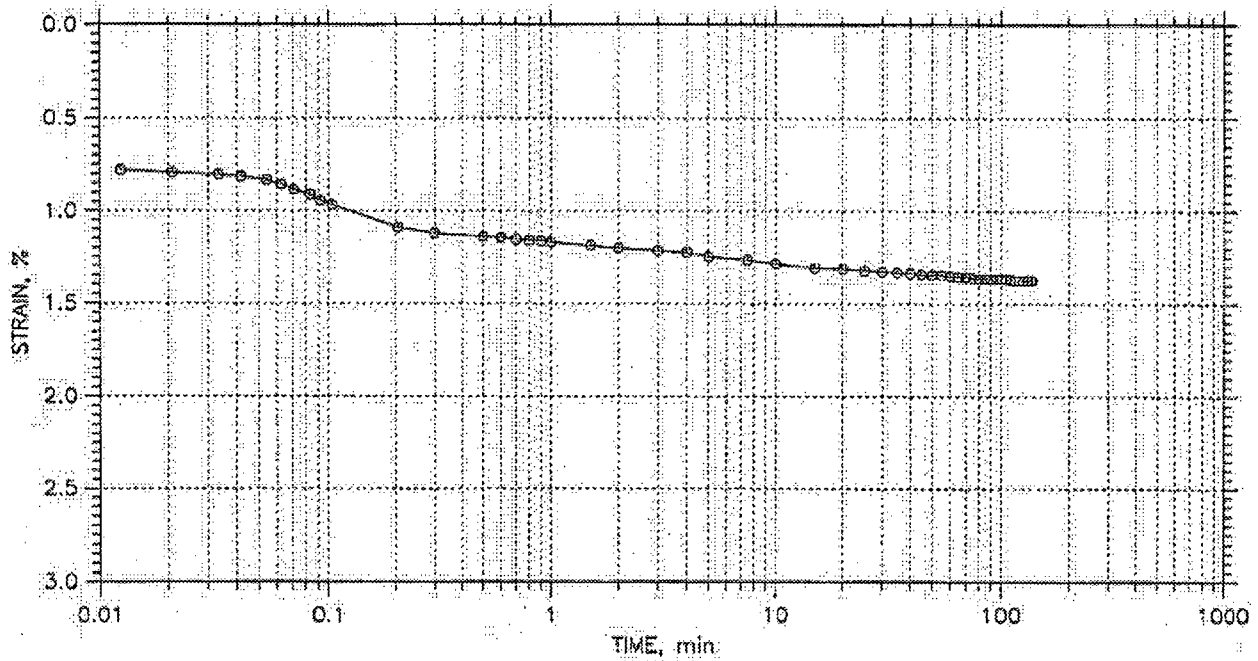
MACTEC	Project: STP Units 3 & 4	Location: U3-3A UD-3	Project No.: 6234084660
	Boring No.: U3-3A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 08/25/08	Depth: 60-62 ft
	Test No.: 8951	Sample Type: Undisturbed	Elevation: -31.2/-33.2
	Description: Strong Brown Lean Clay (CL)		Cr=0.017
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05).		Task 1.2

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 3 of 16

Stress: 1000. psf



MACTEC	Project: STP Units 3 & 4	Location: U3-3A UD-3	Project No.: 6234084660
	Boring No.: U3-3A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 08/26/08	Depth: 60-62 ft
	Test No.: 8951	Sample Type: Undisturbed	Elevation: -31.2/-33.2
	Description: Strong Brown Lean Clay (CL)		Cr=0.017
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05)		Task 1.2

Mon, 13-OCT-2008 15:25:53

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Nuclear Energy Systems & Services Division

637/763

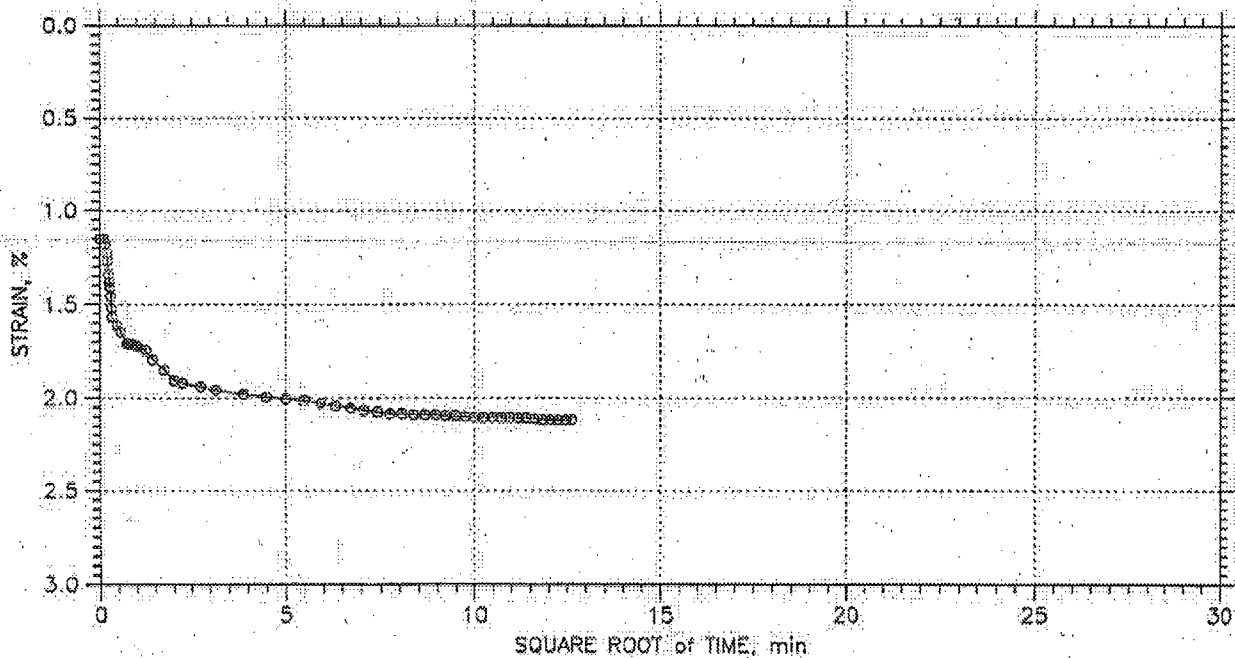
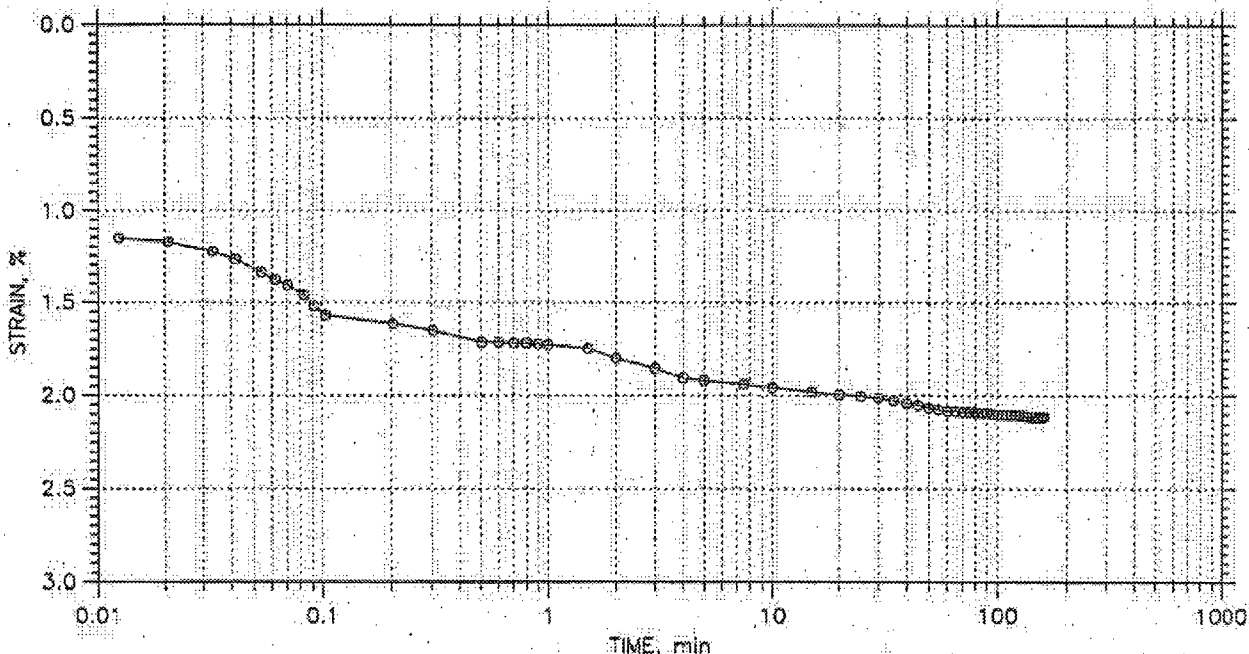
DCN 61R-817

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 4 of 16

Stress: 2000 psf



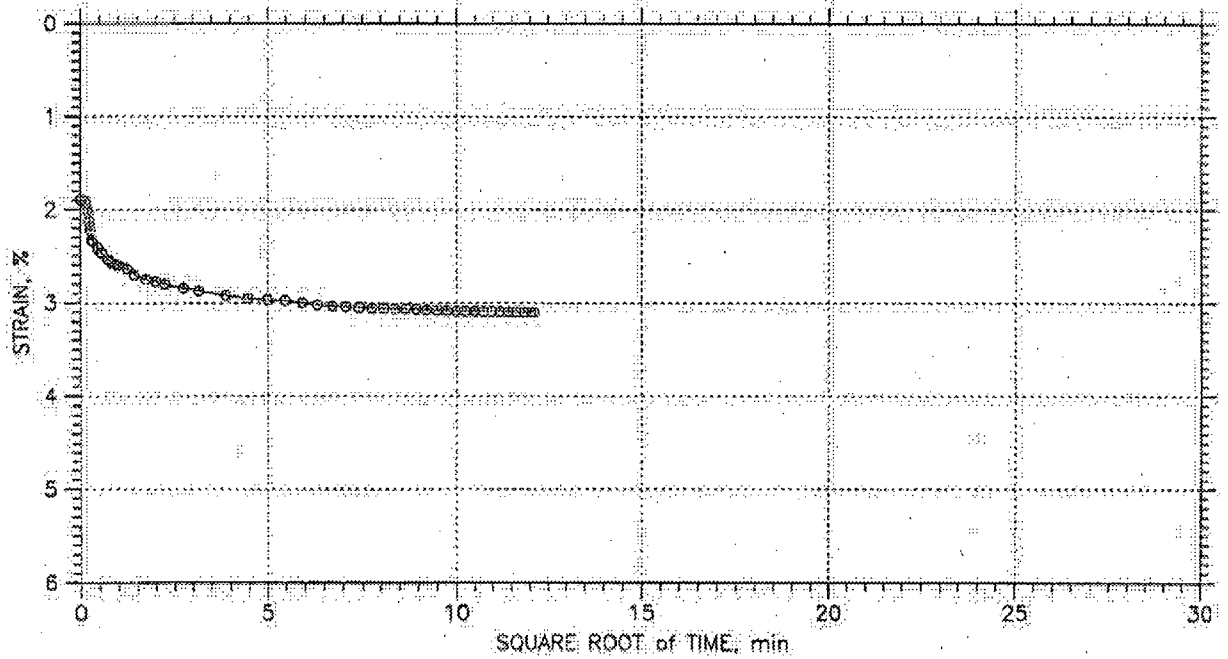
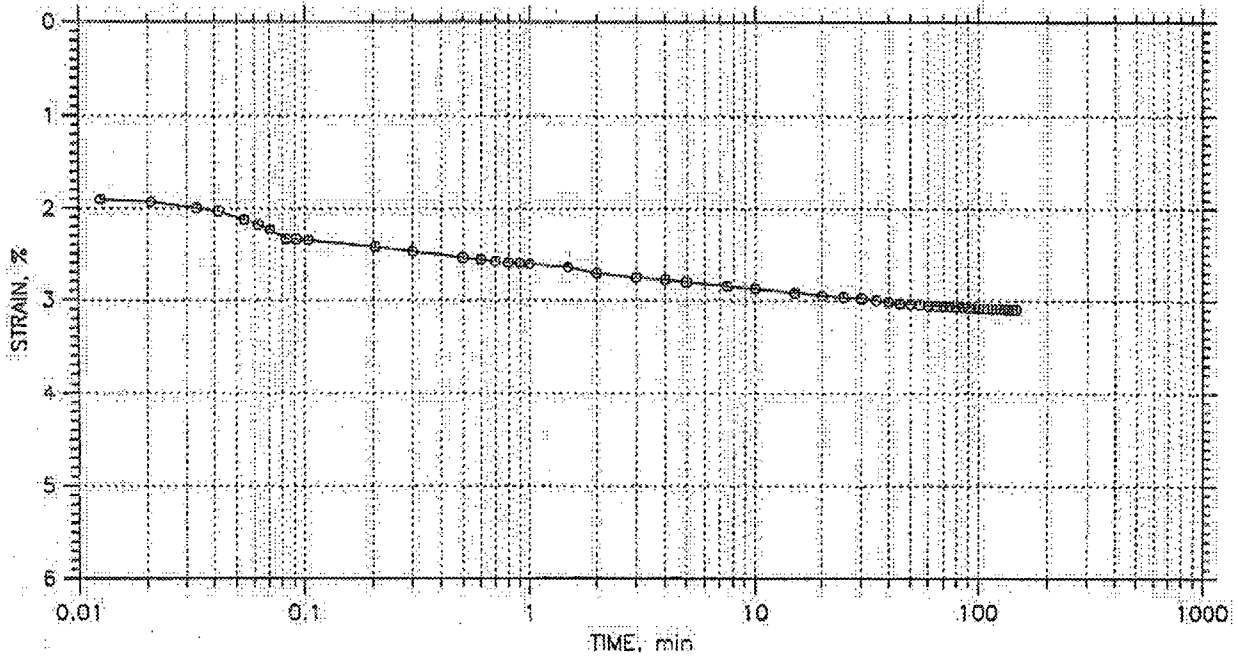
MACTEC	Project: STP Units 3 & 4	Location: U3-3A UD-3	Project No.: 6234084660	
	Boring No.: U3-3A	Tested By: BM	Checked By: JW	
	Sample No.: UD-3	Test Date: 08/28/08	Depth: 60-62 ft	
	Test No.: 8951	Sample Type: Undisturbed	Elevation: -31.2/-33.2	
	Description: Strong Brown Lean Clay (CL)		Cr=0.017	
	Remarks: ASTM D2435-04 Method B; SG (ASTM D854-06), PI (ASTM D4318-05).			Task 1.2

CONSOLIDATION TEST DATA

TIME CURVES

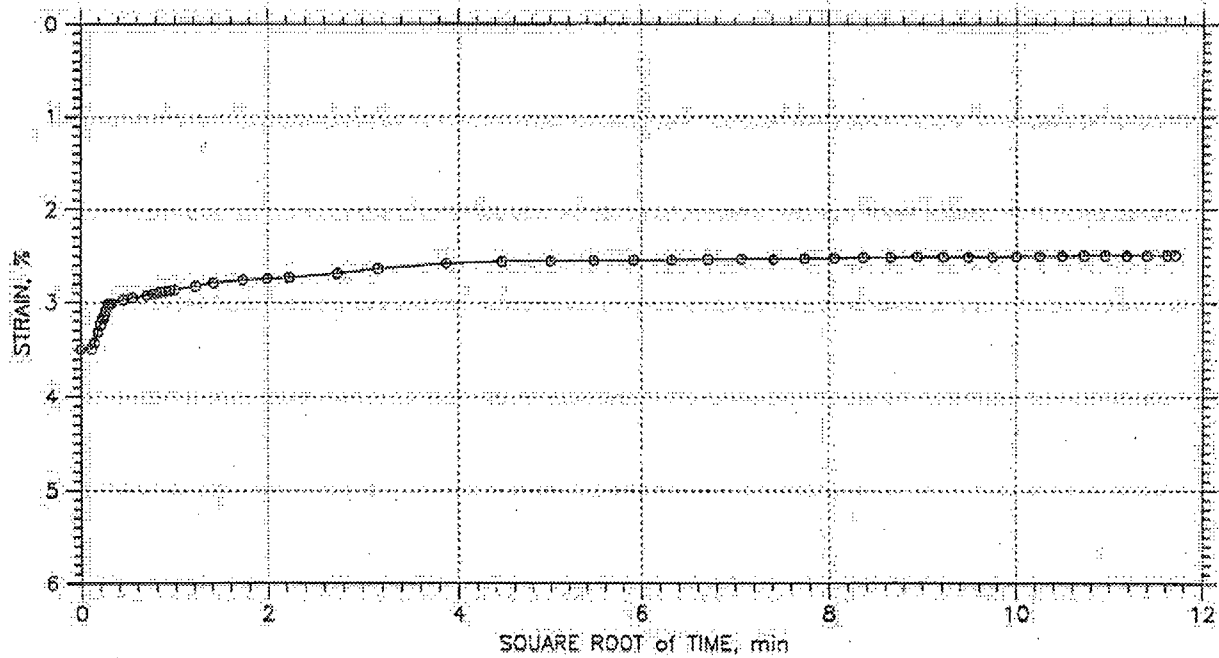
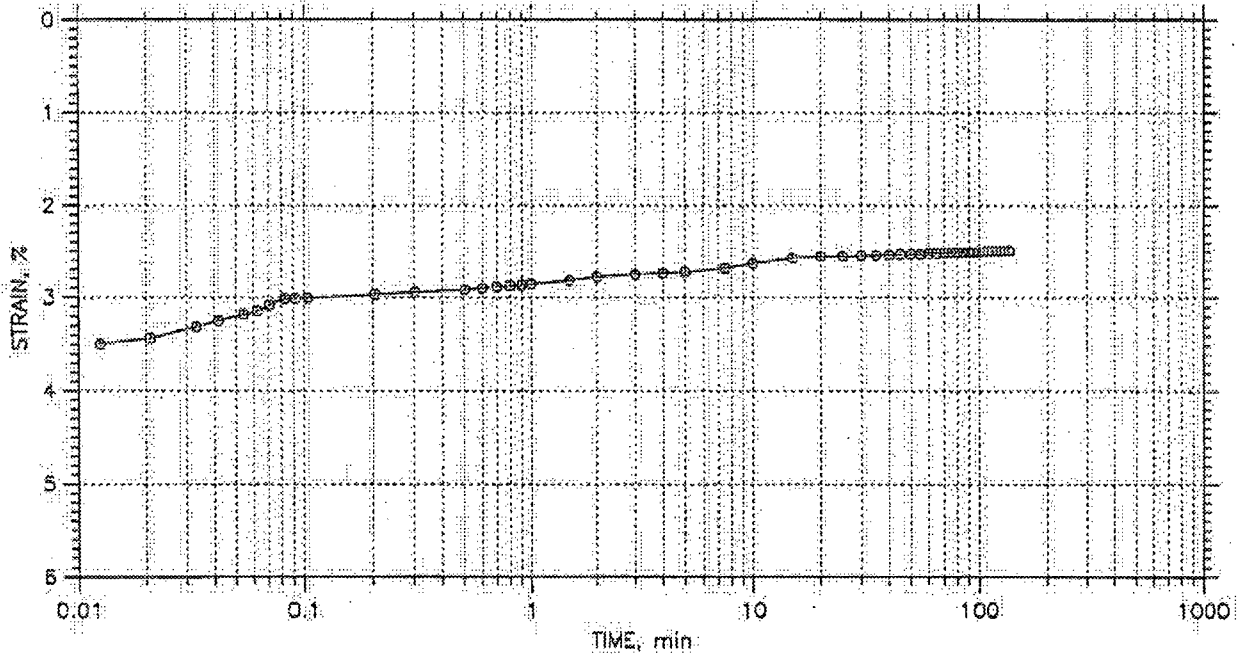
Constant Load Step: 5 of 16

Stress: 4000. psf



MACTEC	Project: STP Units 3 & 4	Location: U3-3A UD-3	Project No.: 6234084680
	Boring No.: U3-3A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 08/26/08	Depth: 60-62 ft
	Test No.: 8951	Sample Type: Undisturbed	Elevation: -31.2/-33.2
	Description: Strong Brown Lean Clay (CL)	Cr=0.017	
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), Pi (ASTM D4318-05)	Task 1.2	

CONSOLIDATION TEST DATA
TIME CURVES
 Constant Load Step: 6 of 16
 Stress: 1000 psf



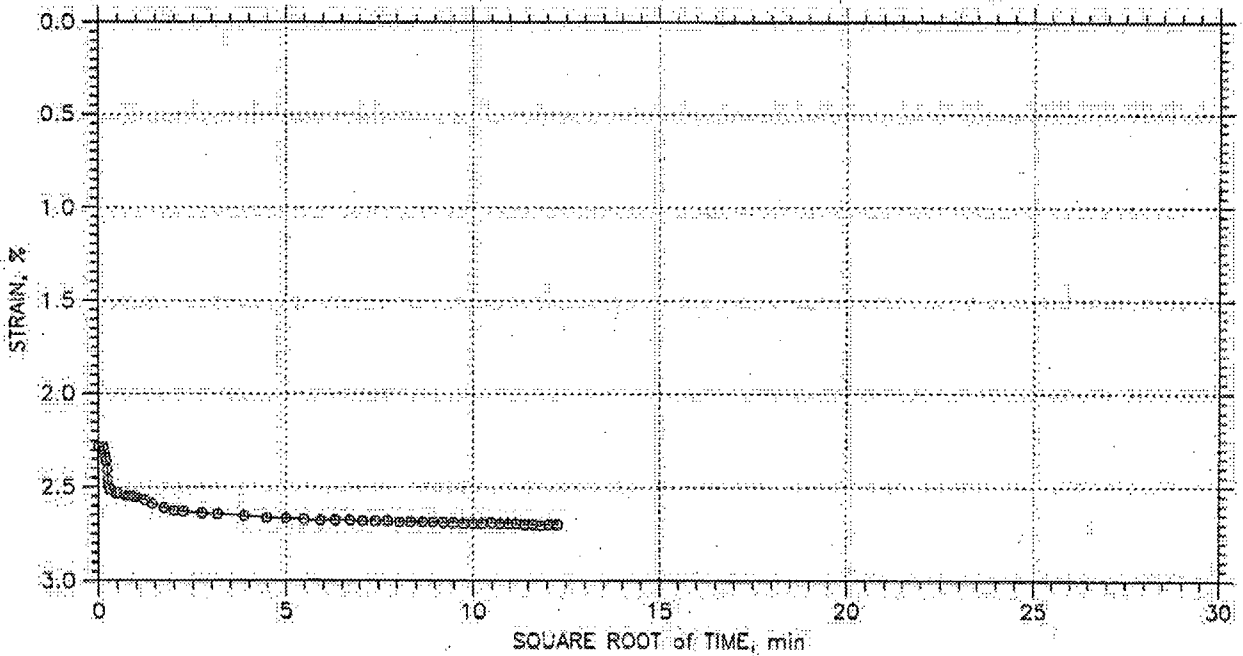
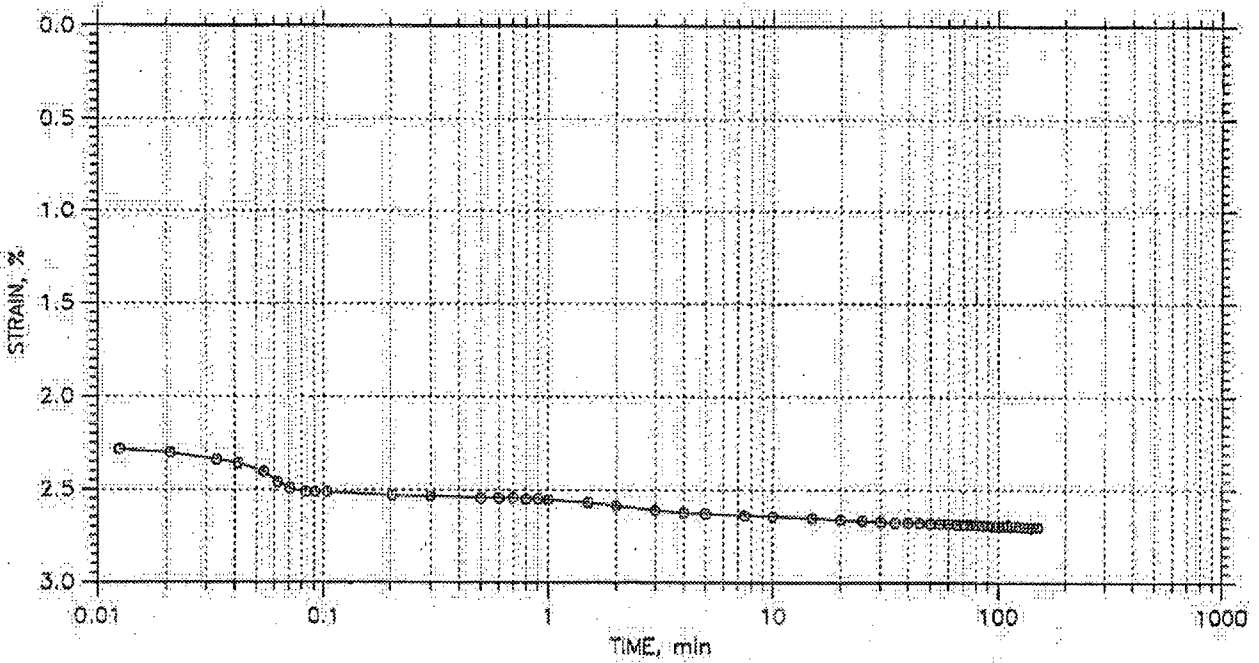
MACTEC	Project: STP Units 3 & 4	Location: U3-3A UD-3	Project No.: 6234084660
	Boring No.: U3-3A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 08/26/08	Depth: 60-62 ft.
	Test No.: 8951	Sample Type: Undisturbed	Elevation: -31.2/-33.2
	Description: Strong Brown Lean Clay (CL)		Cr=0.017
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05).		Task 1.2

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 7 of 16

Stress: 2000. psf



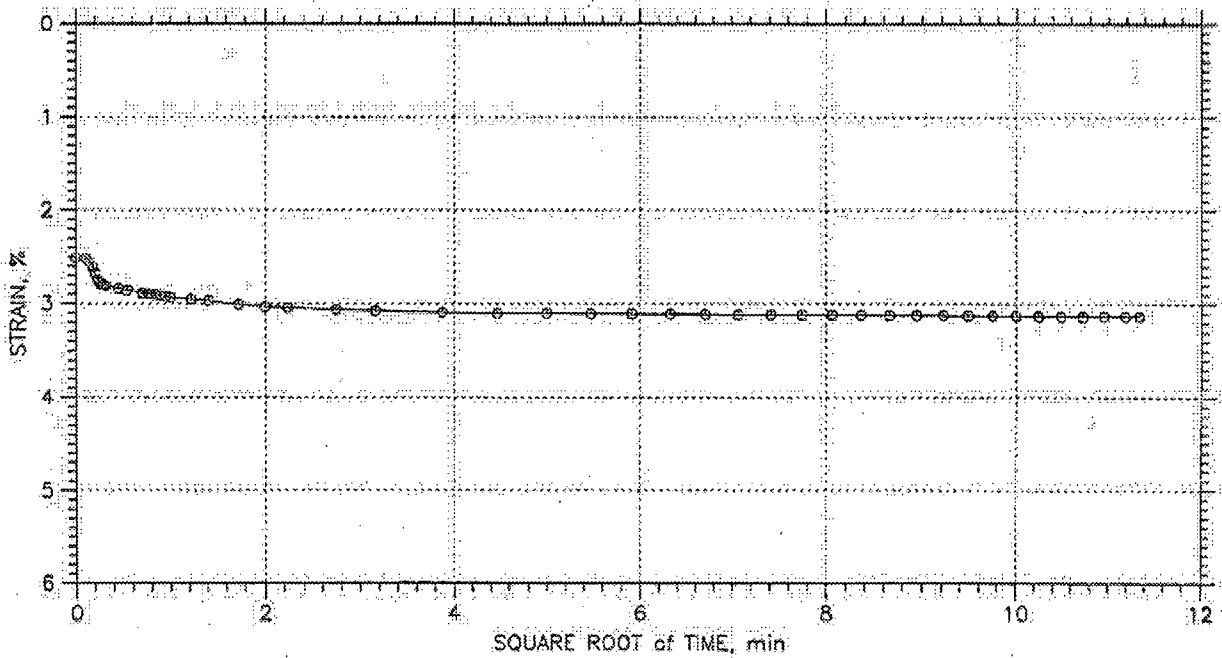
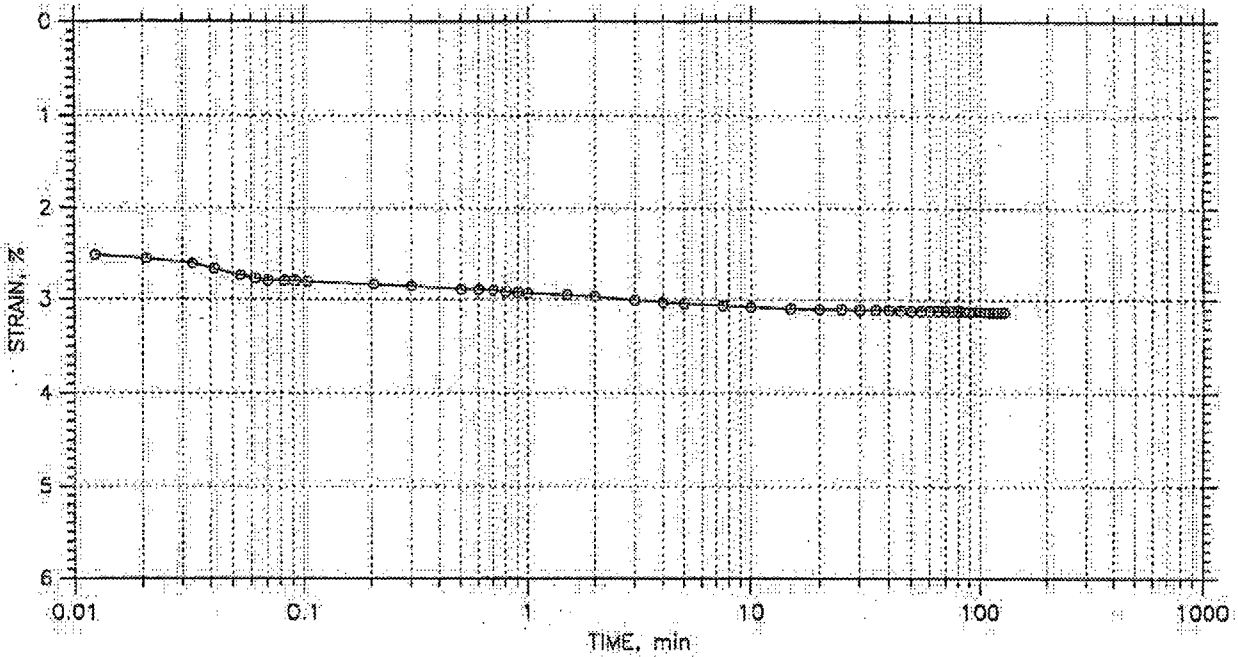
MACTEC	Project: STP Units 3 & 4	Location: U3-3A UD-3	Project No.: 6234084660
	Boring No.: U3-3A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 08/26/08	Depth: 60-62 ft
	Test No.: 8951	Sample Type: Undisturbed	Elevation: -31.2/-33.2
	Description: Strong Brown Lean Clay (CL)		Cr=0.017
	Remarks: ASTM D2435-04 Method B. SG (ASTM D854-06), PI (ASTM D4318-05)		Task 1.2

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 8 of 16

Stress: 4000. psf



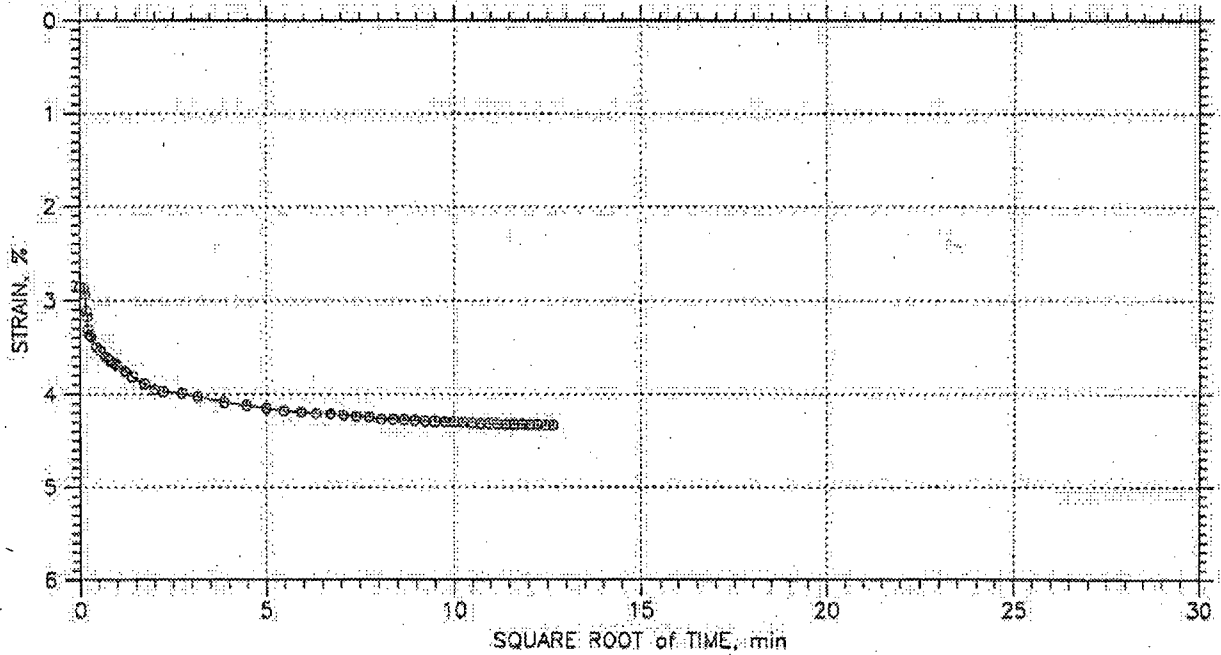
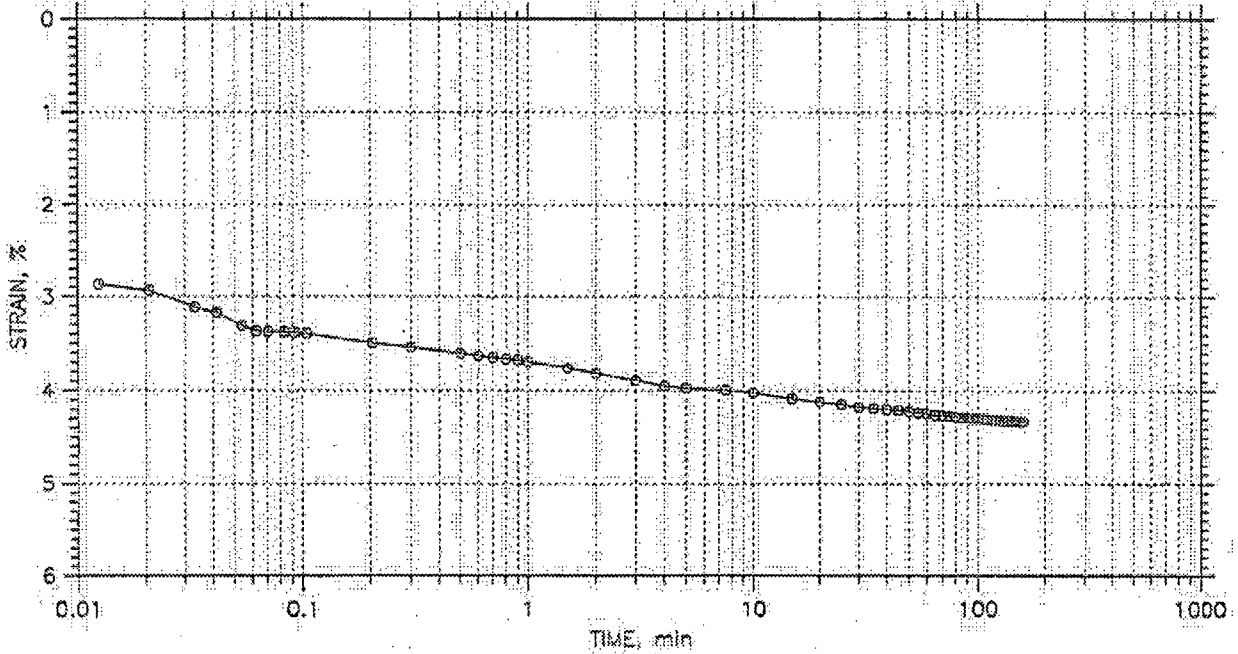
MACTEC	Project: STP Units 3 & 4	Location: U3-3A UD-3	Project No.: 6234084660
	Boring No.: U3-3A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 08/26/08	Depth: 60-62 ft
	Test No.: 8951	Sample Type: Undisturbed	Elevation: -31.2/-33.2
	Description: Strong Brown Lean Clay (CL)		Cr=0.017
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05)		Task 1.2

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 9 of 16

Stress: 8000. psf



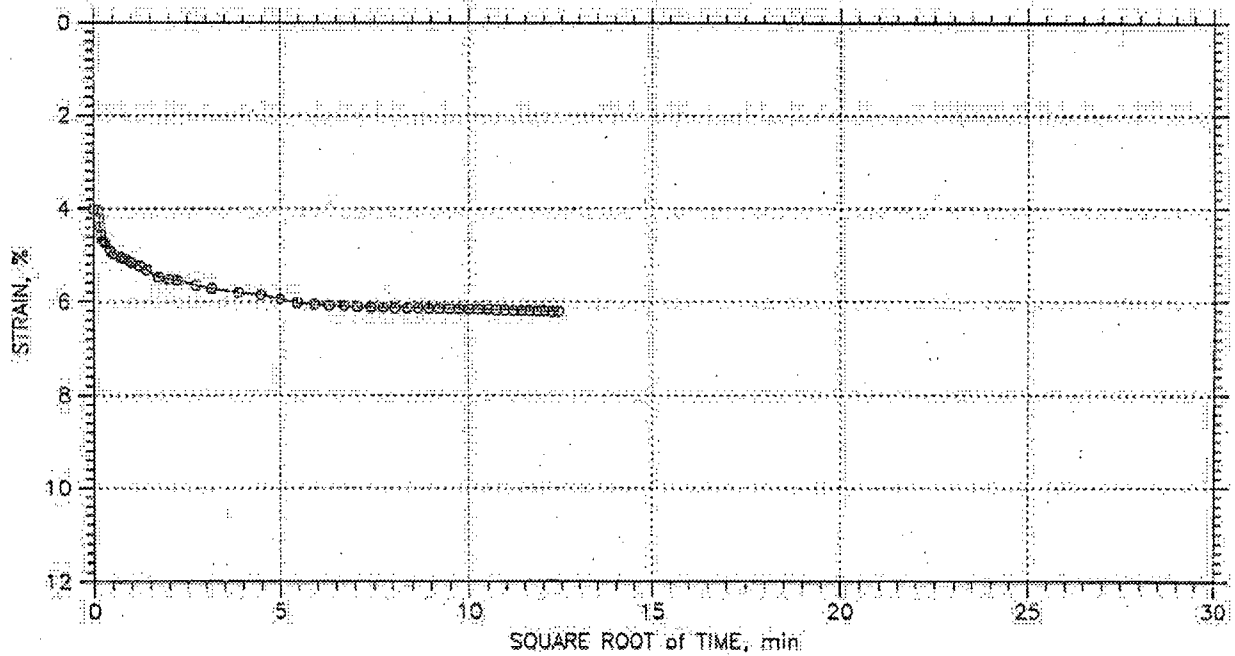
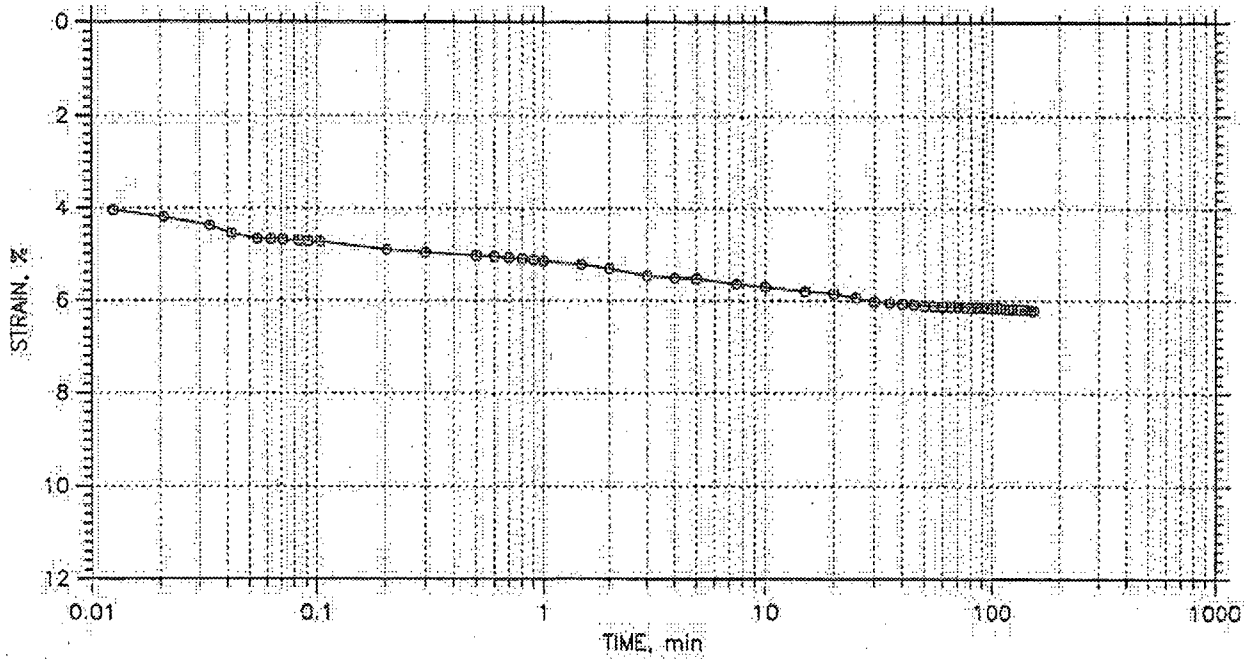
MACTEC	Project: STP Units 3 & 4	Location: U3-3A UD-3	Project No.: 6234084660
	Boring No.: U3-3A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 08/26/08	Depth: 60-62 ft
	Test No.: 8951	Sample Type: Undisturbed	Elevation: -31.2/-33.2
	Description: Strong Brown Lean Clay (CL)		Cr=0.017
	Remarks: ASTM D2435-04 Method B; SG (ASTM D854-06), PI (ASTM D4318-05)		Task 1.2

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 10 of 16

Stress: 16000 psf



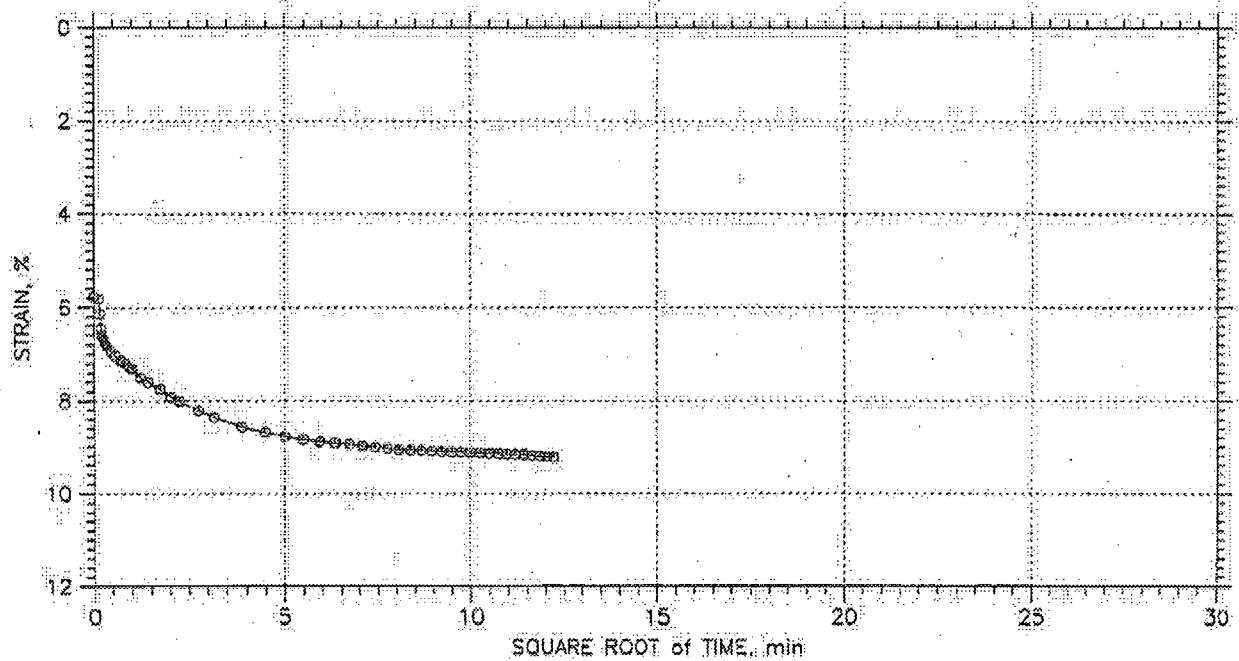
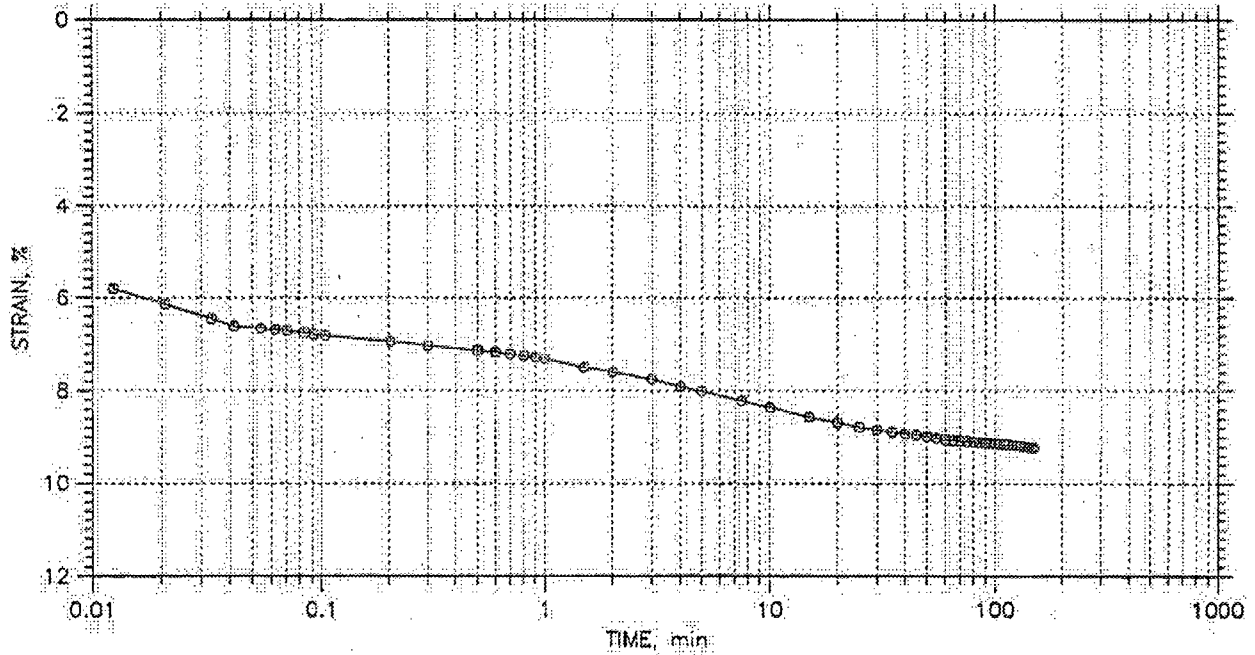
MACTEC	Project: STP Units 3 & 4	Location: U3-3A UD-3	Project No.: 6234084660
	Boring No.: U3-3A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 08/26/08	Depth: 60-62 ft
	Test No.: 8951	Sample Type: Undisturbed	Elevation: -31.2/-33.2
	Description: Strong Brown Lean Clay (CL)		Cr=0.017
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05)		Task 1.2

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 11 of 16

Stress: 32000 psf



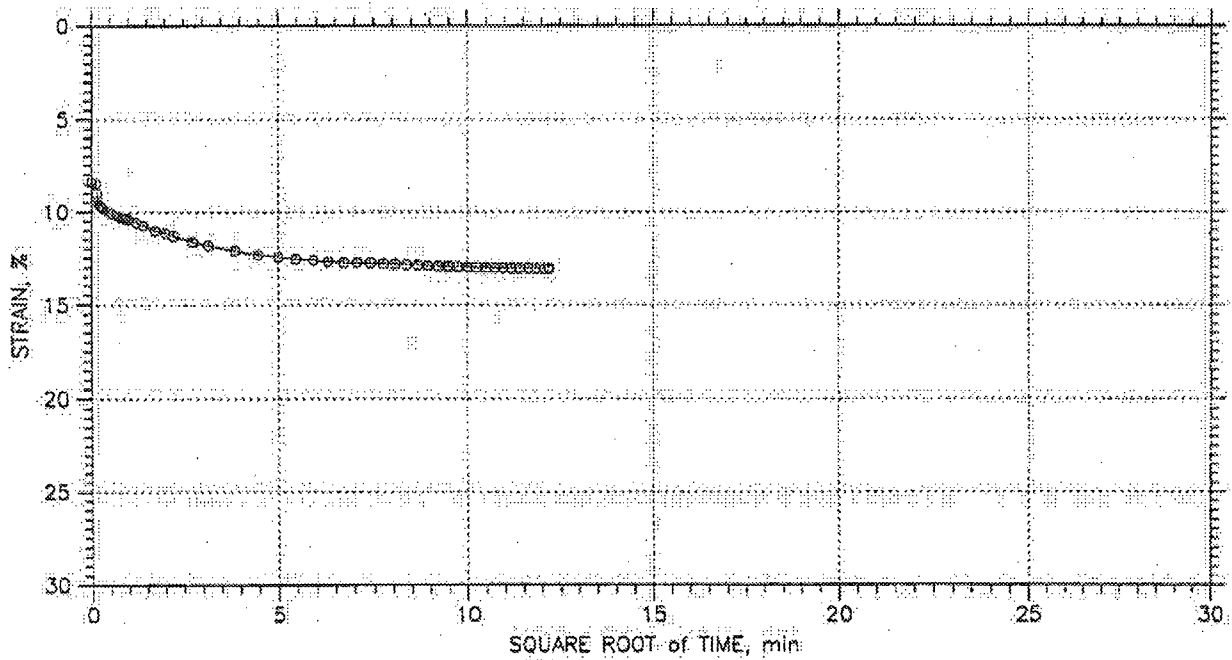
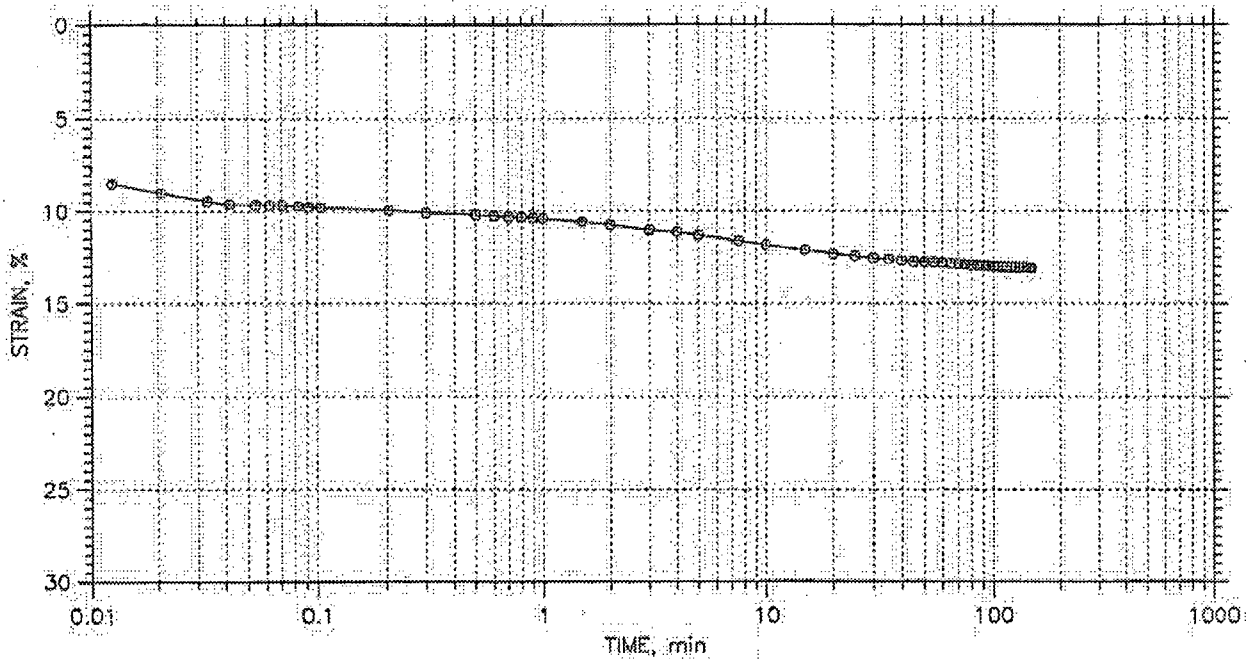
MACTEC	Project: STP Units 3 & 4	Location: U3-3A UD-3	Project No.: 6234084660
	Boring No.: U3-3A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 08/26/08	Depth: 60-62 ft
	Test No.: 8951	Sample Type: Undisturbed	Elevation: -31.2/-33.2
	Description: Strong Brown Lean Clay (CL)	Cr=0.017	
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05)	Task 1.2	

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 12 of 16

Stress: 64000 psf



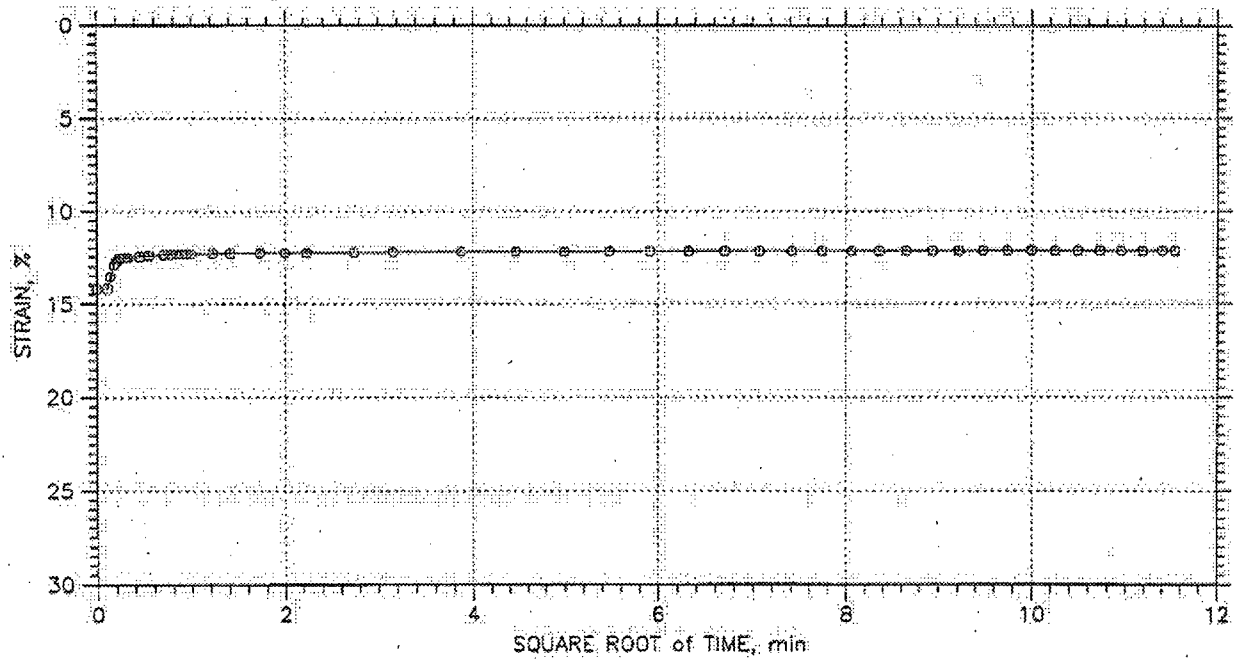
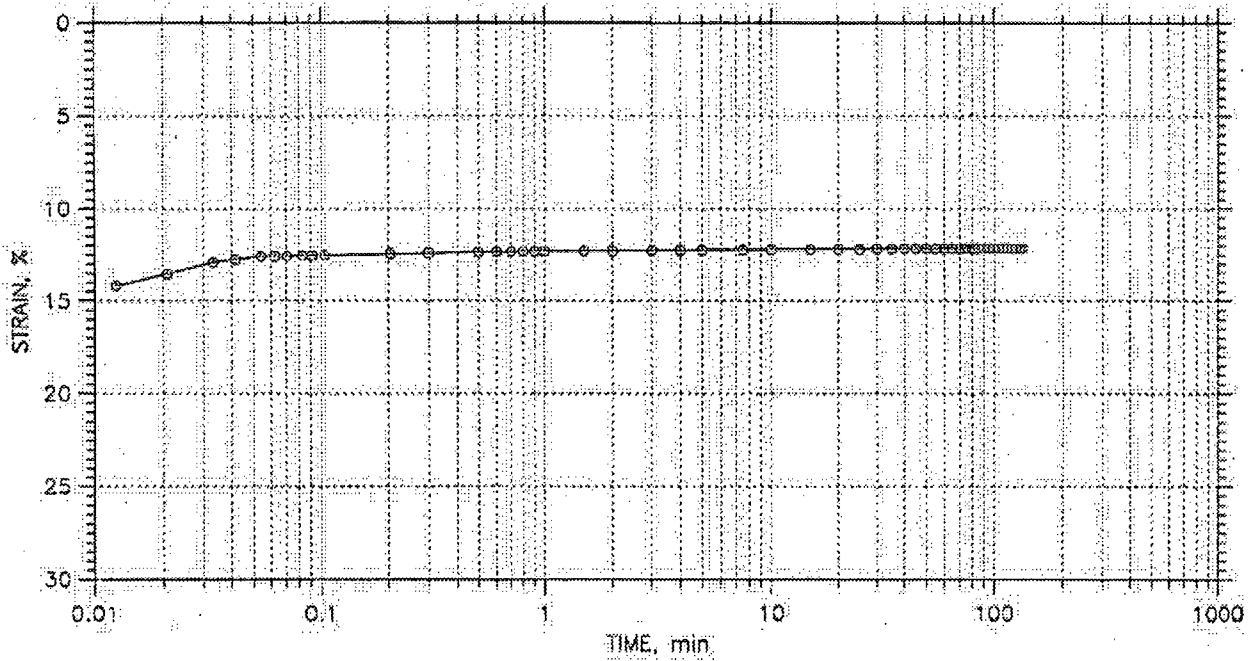
MACTEC	Project: STP Units 3 & 4	Location: U3-3A UD-3	Project No.: 6234084660
	Boring No.: U3-3A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 08/26/08	Depth: 60-62 ft
	Test No.: 8951	Sample Type: Undisturbed	Elevation: -31.2/-33.2
	Description: Strong Brown Lean Clay (CL)		Cr=0.017
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05).		Task 1.2

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 13 of 16

Stress: 16000 psf



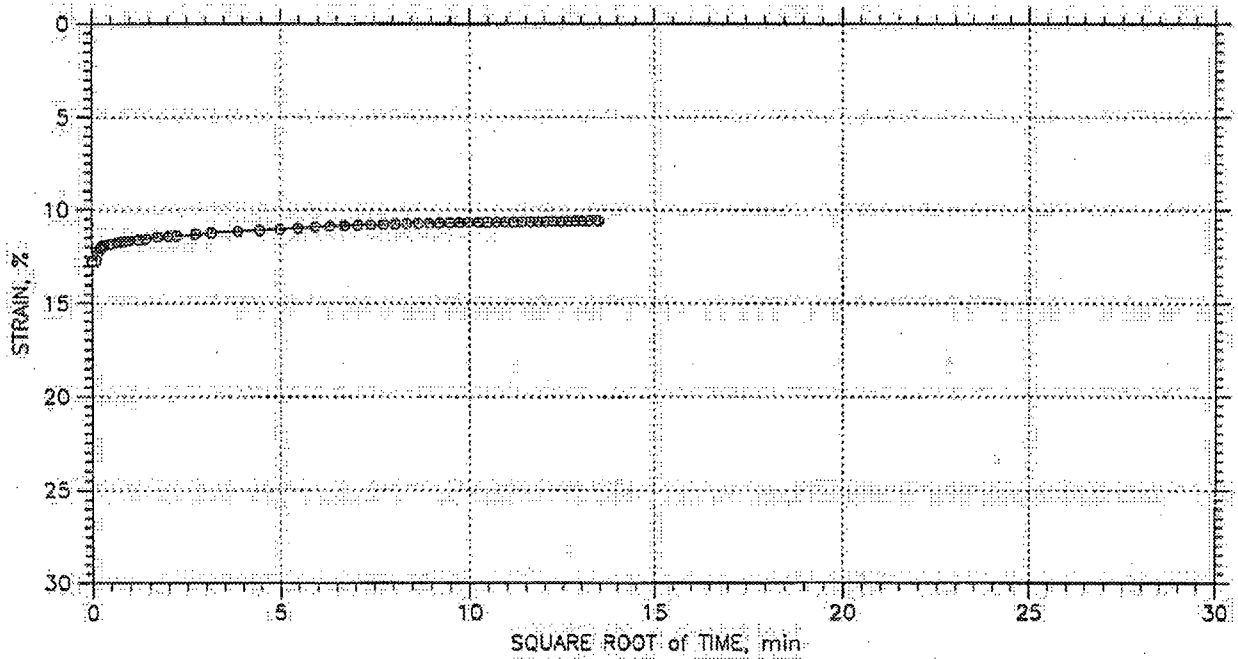
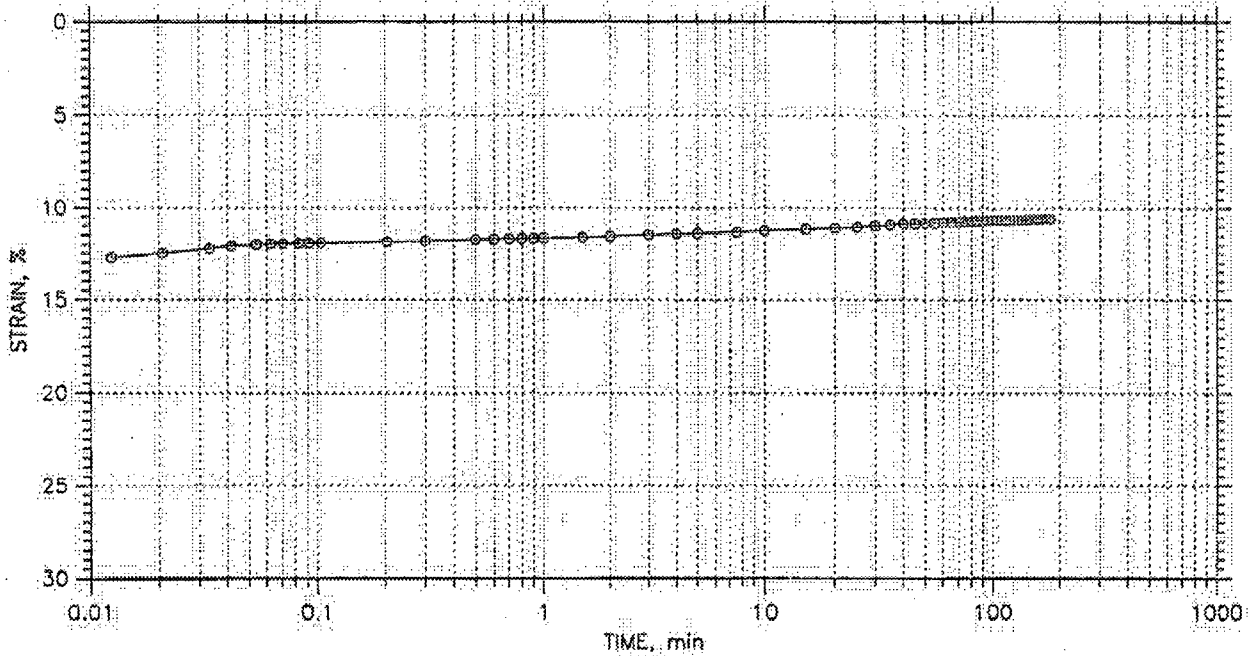
MACTEC	Project: STP Units 3 & 4	Location: U3-3A UD-3	Project No.: 6234084660
	Boring No.: U3-3A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 08/26/08	Depth: 60-62 ft
	Test No.: 8951	Sample Type: Undisturbed	Elevation: -31.2/-33.2
	Description: Strong Brown Lean Clay (CL)	Cr=0.017	
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05).	Task 1.2	

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 14 of 16

Stress: 4000 psf



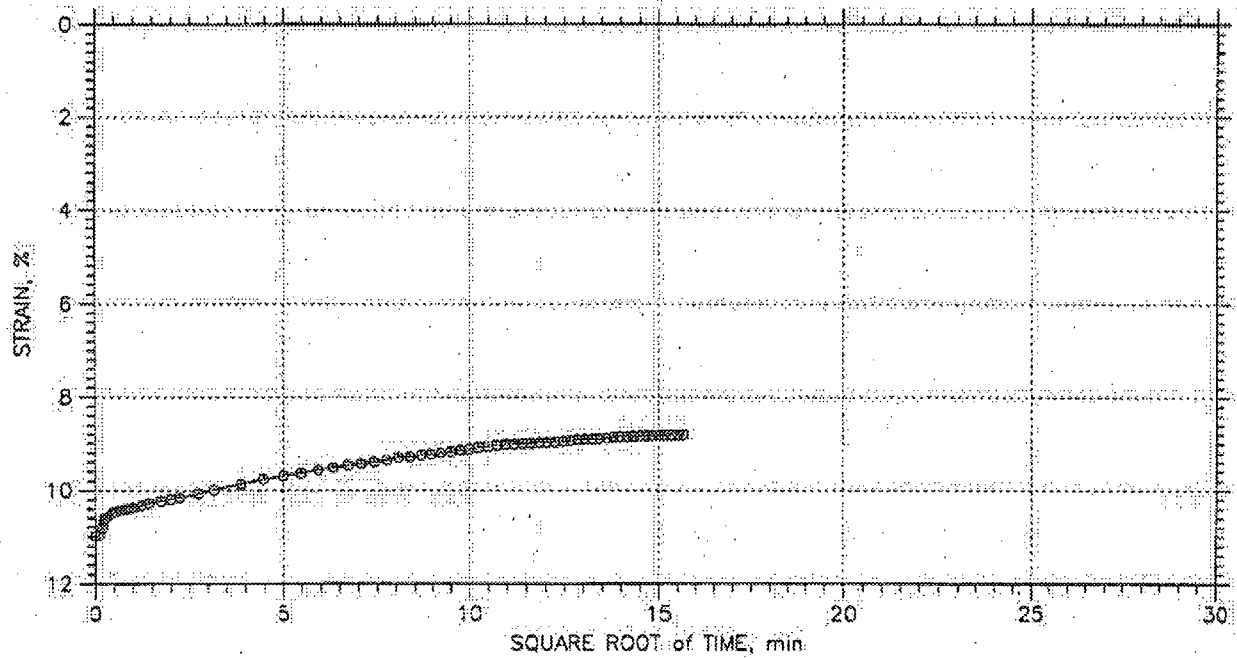
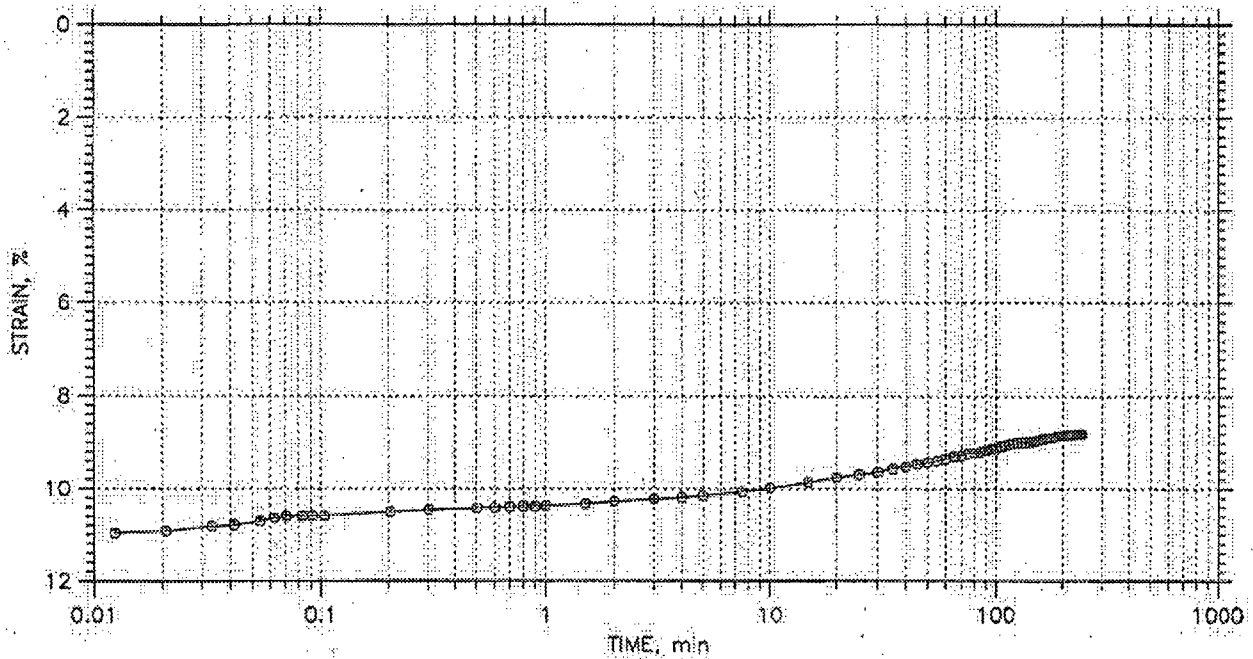
MACTEC	Project: STP Units 3 & 4	Location: U3-3A UD-3	Project No.: 6234084660
	Boring No.: U3-3A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 08/26/08	Depth: 60-62 ft
	Test No.: 8951	Sample Type: Undisturbed	Elevation: -31.2/-33.2
	Description: Strong Brown Lean Clay (CL)	Cr=0.017	
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05).	Task 1.2	

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 15 of 16

Stress: 1000. psf



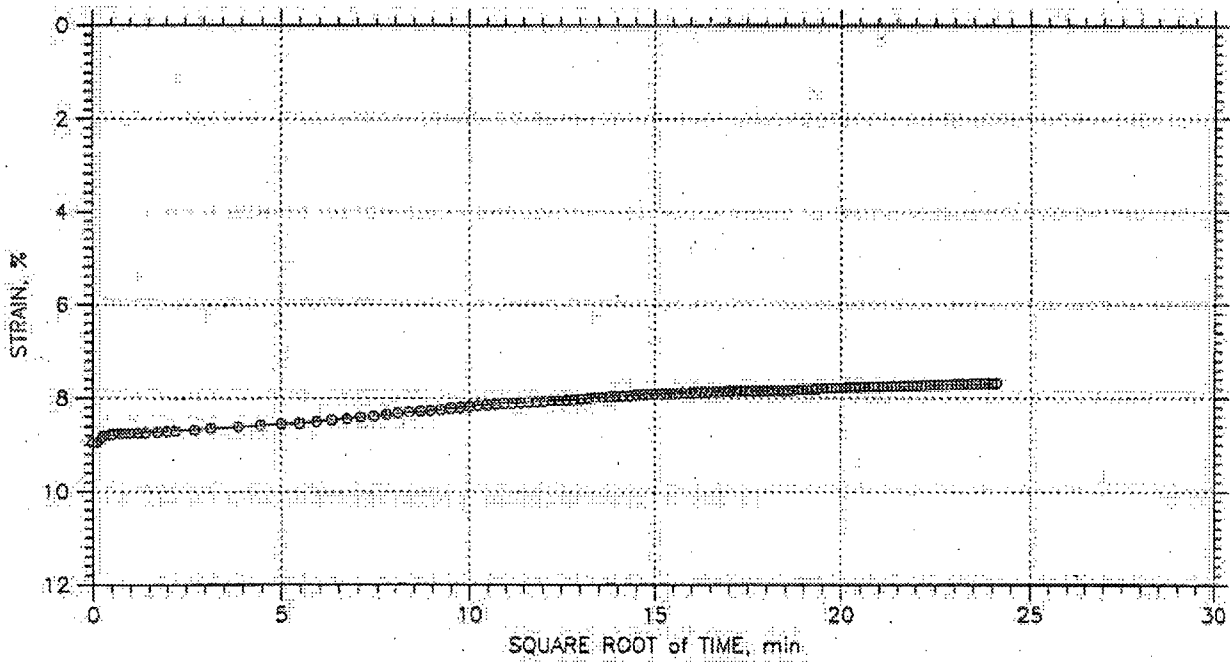
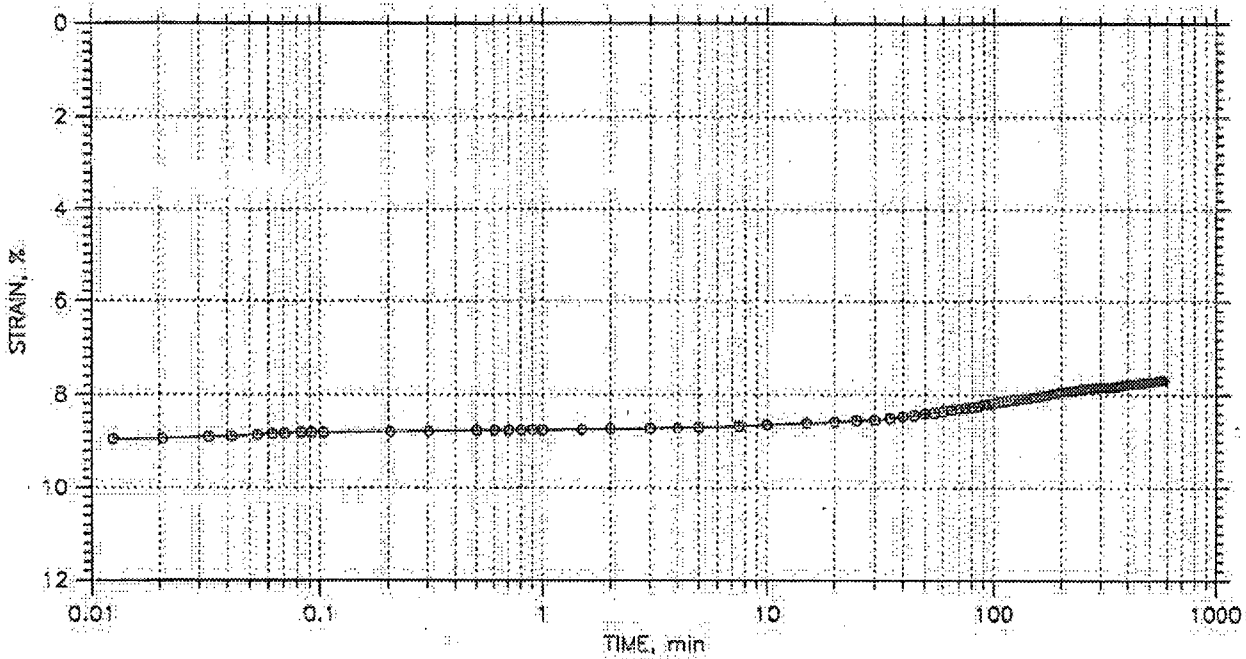
MACTEC	Project: STP Units 3 & 4	Location: U3-3A UD-3	Project No.: 6234084660
	Boring No.: U3-3A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 08/26/08	Depth: 60-62 ft
	Test No.: 8951	Sample Type: Undisturbed	Elevation: -31.2/-33.2
	Description: Strong Brown Lean Clay (CL)		Cr=0.017
	Remarks: ASTM D2435-04 Method B, SC (ASTM D854-06), PI (ASTM D4318-05).		Task 1.2

CONSOLIDATION TEST DATA

TIME CURVES

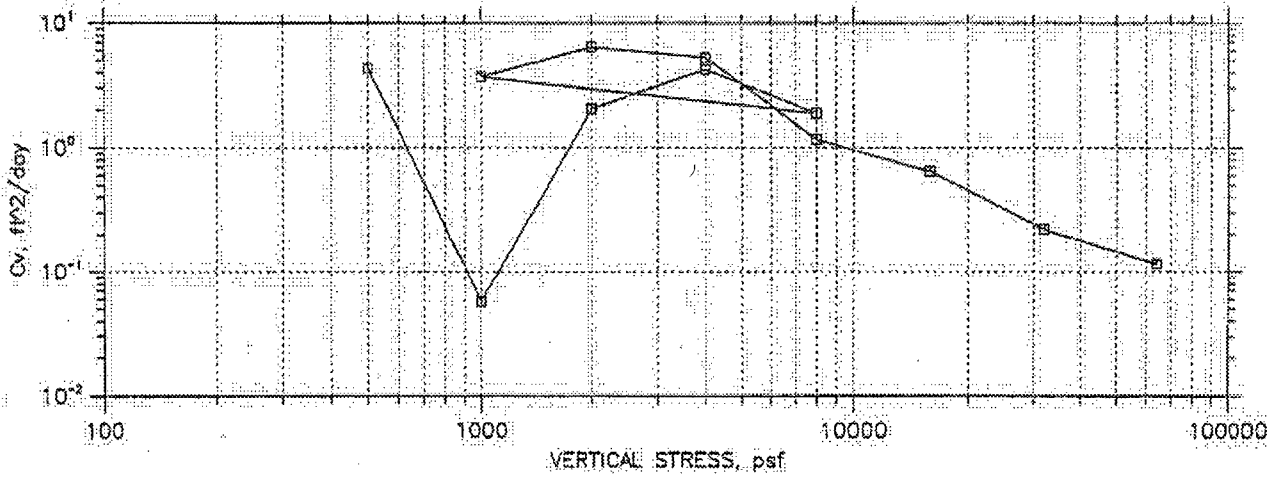
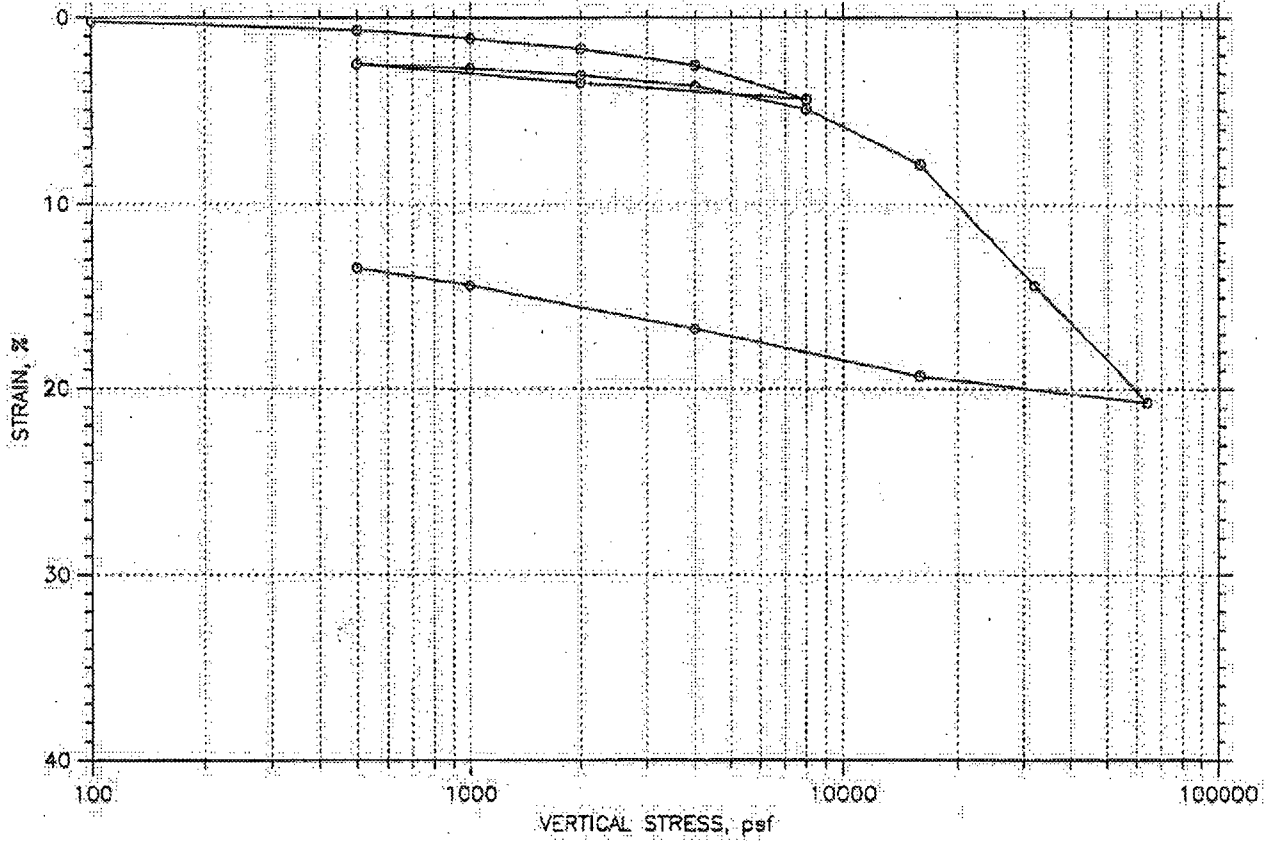
Constant Load Step: 16 of 16

Stress: 500 psf



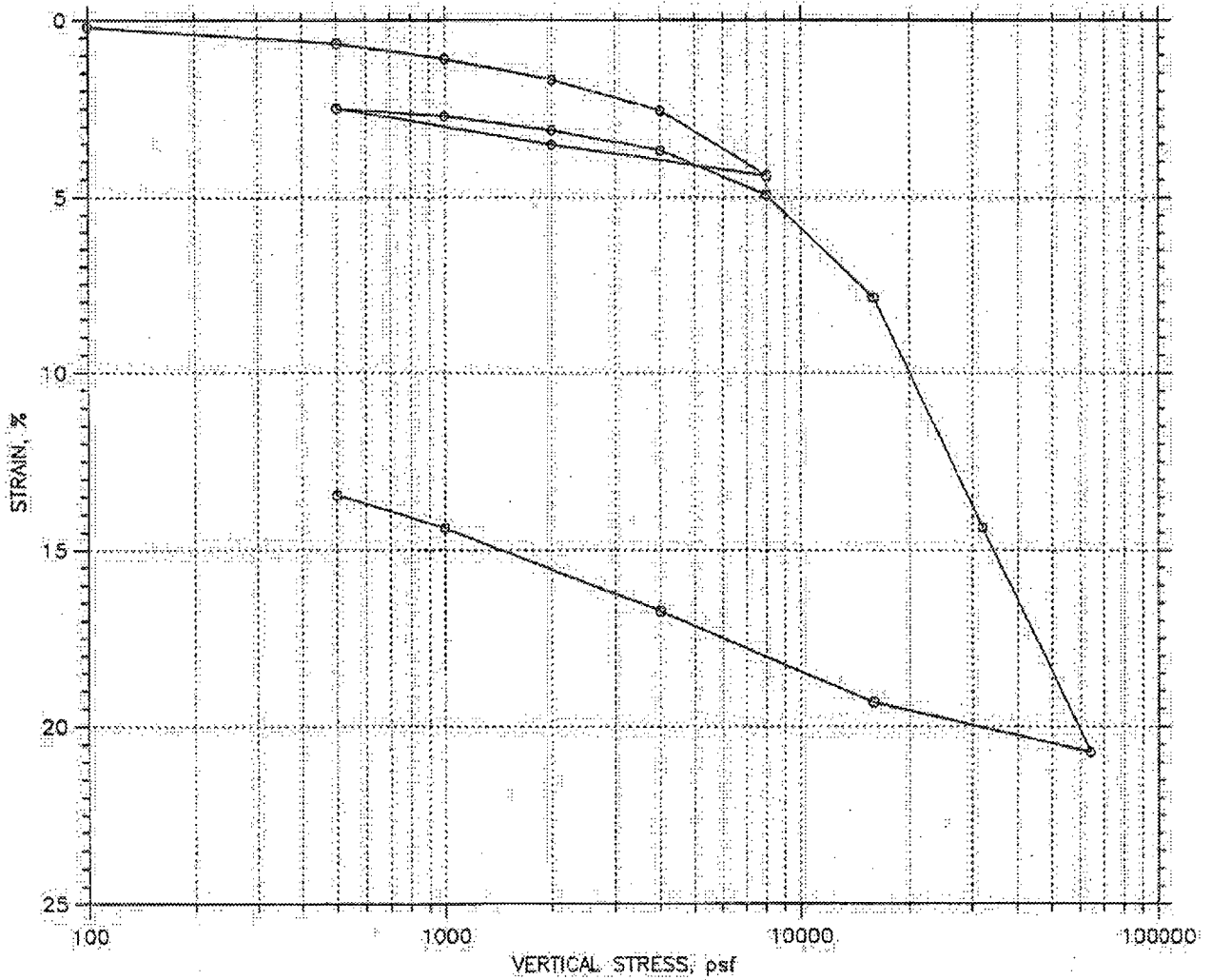
IMACTEC	Project: STP Units 3 & 4	Location: U3-3A UD-3	Project No.: 6234084660
	Boring No.: U3-3A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 08/26/08	Depth: 60-62 ft
	Test No.: 8951	Sample Type: Undisturbed	Elevation: -31.2/-33.2
	Description: Strong Brown Lean Clay (CL)		Cr=0.017
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05).		Task 1.2

CONSOLIDATION TEST DATA SUMMARY REPORT



MACTEC	Project: STP Units 3 & 4	Location: U3-6A UD-3	Project No.: 6234084660
	Boring No.: U3-6A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 9/17/08	Depth: 100-102 ft
	Test No.: 8957	Sample Type: Undisturbed	Elevation: -71.2/-73.2
	Description: Brown and Light Brownish Gray Lean Clay (CL)		Cr = 0.029
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05). Task 1.2		

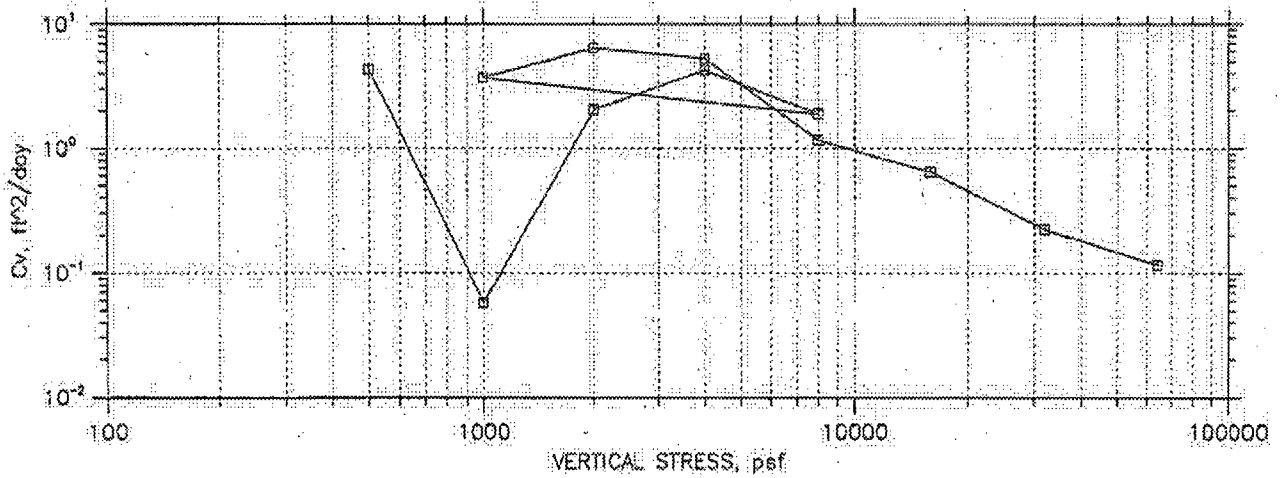
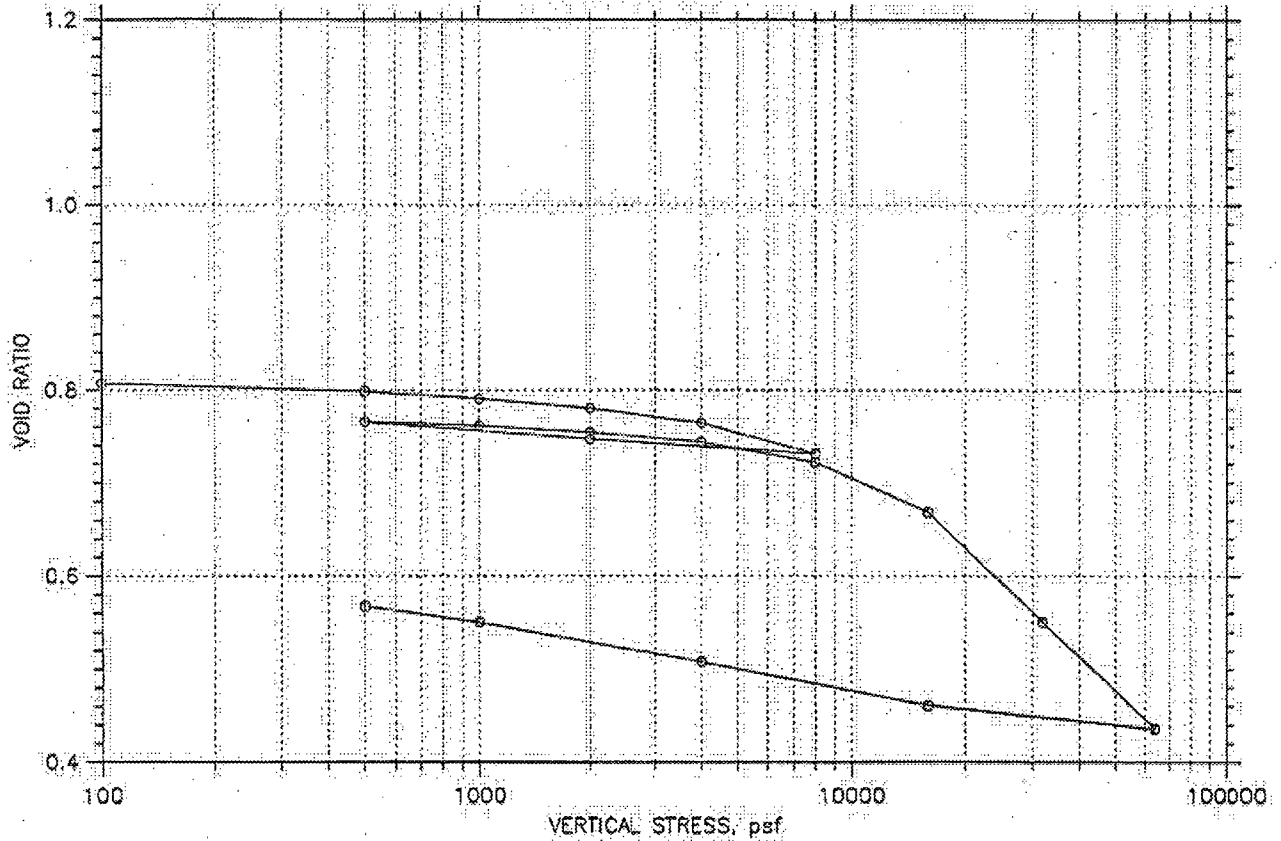
CONSOLIDATION TEST DATA SUMMARY REPORT



		Before Test	After Test
Overburden Pressure: 6800 psf		27.10	19.90
Preconsolidation Pressure: 1.172e+004 psf		95.84	110.7
Compression index: 0.382		92.91	97.50
Diameter: 2.5 in	Height: 1.004 in	0.81	0.57
LL: 43	PL: 18		
	PI: 25		
	CS: 2.78		

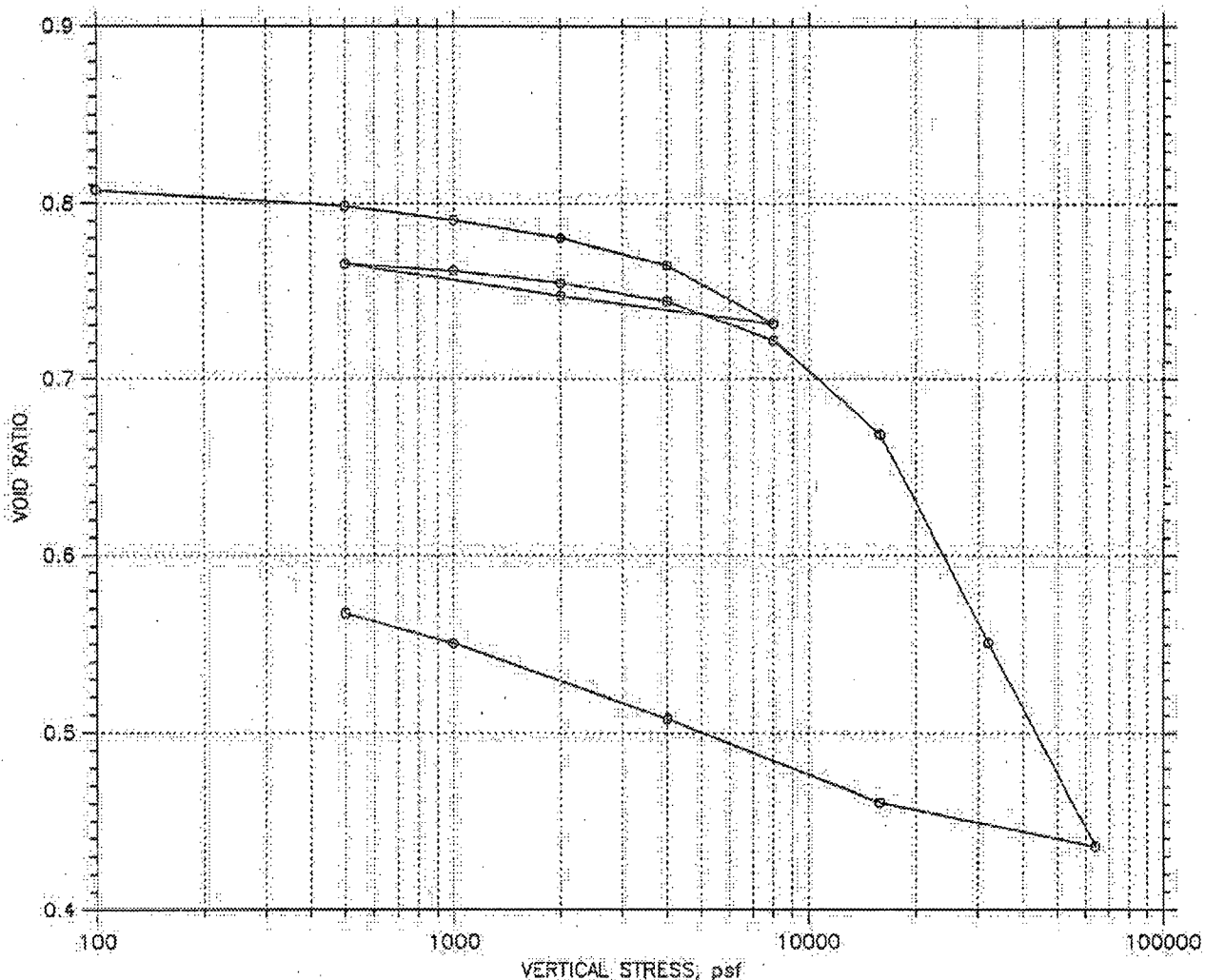
MACTEC	Project: STP Units 3 & 4	Location: U3-6A UD-3	Project No.: 6234084660
	Boring No.: U3-6A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 9/17/08	Depth: 100-102 ft
	Test No.: 8957	Sample Type: Undisturbed	Elevation: -71.2/-73.2
	Description: Brown and Light Brownish Gray Lean Clay (CL)		Cr = 0.029
	Remarks: ASTM D2435-04 Method B; SG (ASTM D854-06), PI (ASTM D4318-05); Task 1.2		

CONSOLIDATION TEST DATA SUMMARY REPORT



MACTEC	Project: STP Units 3 & 4	Location: U3-6A UD-3	Project No.: 6234084560
	Boring No.: U3-6A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 9/17/08	Depth: 100-102 ft
	Test No.: 8957	Sample Type: Undisturbed	Elevation: -71.2/-73.2
	Description: Brown and Light Brownish-Gray Lean Clay (CL)	Cr = 0.029	
	Remarks: ASTM D2435-04 Method B, SC (ASTM D854-06), PI (ASTM D4318-05). Task 1.2.		

CONSOLIDATION TEST DATA SUMMARY REPORT



		Before Test	After Test
Overburden Pressure: 6800 psf		27.10	19.90
Preconsolidation Pressure: 1.172e+004 psf		95.84	110.7
Compression Index: 0.382		92.91	97.50
Diameter: 2.5 in	Height: 1.004 in	0.81	0.57
LL: 43	PL: 18		
PI: 25	GS: 2.75		

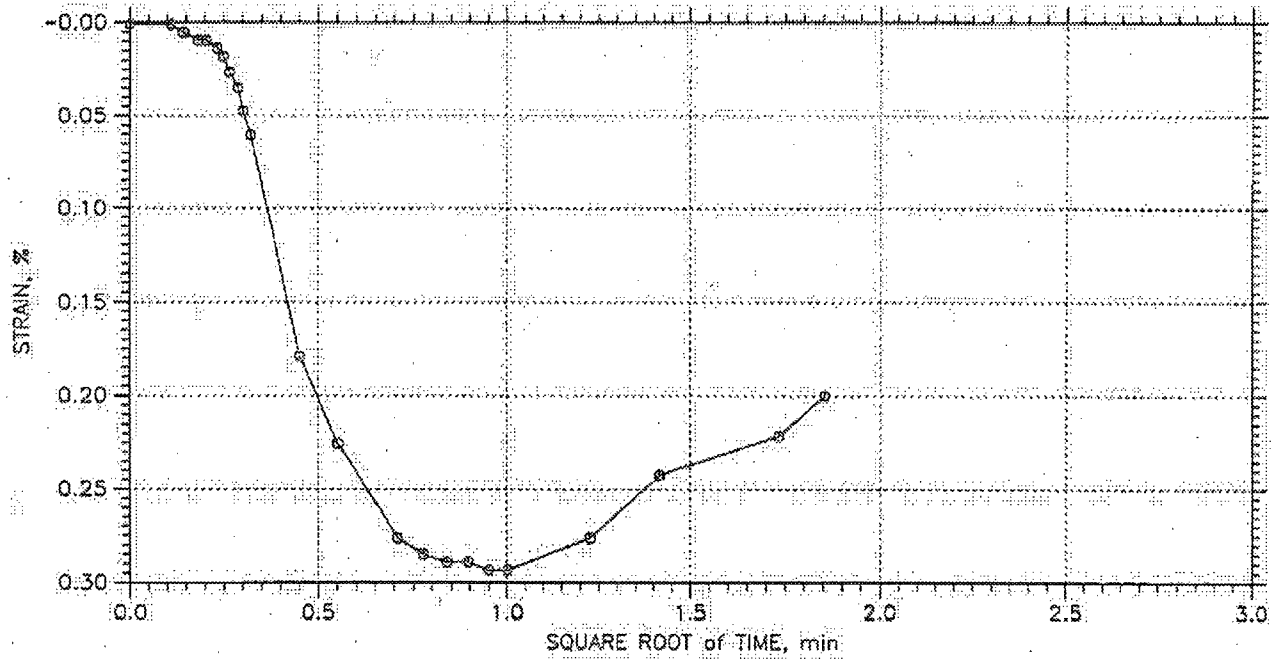
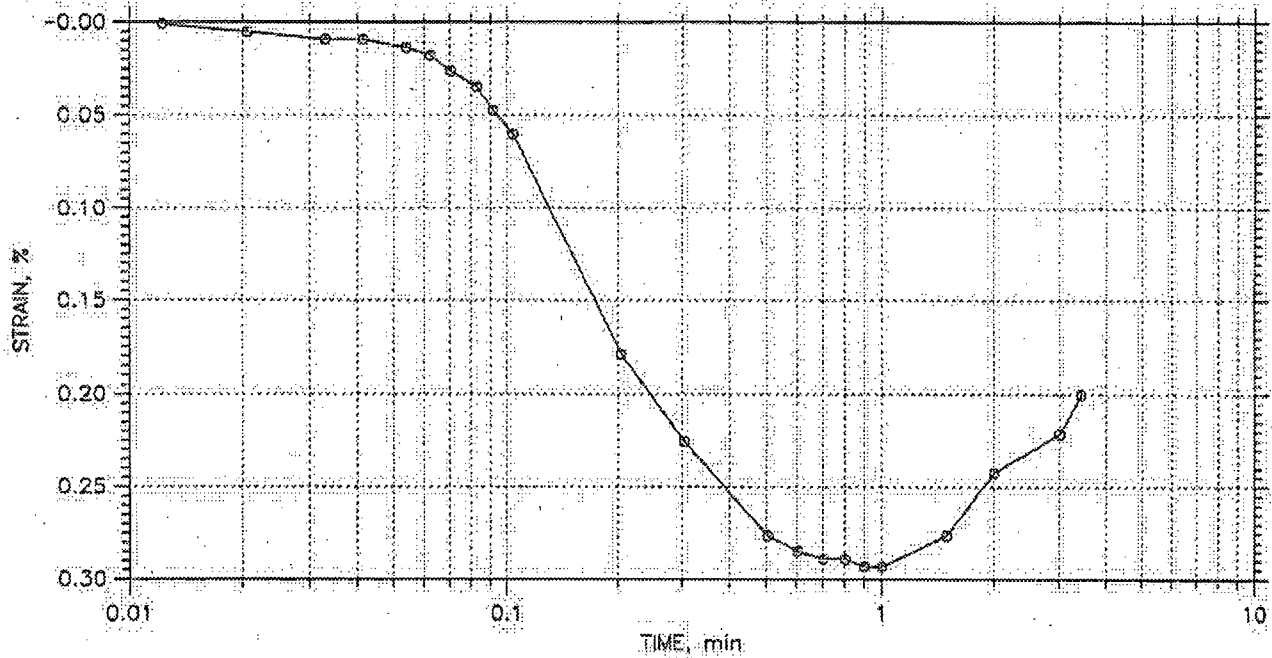
MACTEC	Project: STP Units 3 & 4	Location: U3-6A UD-3	Project No.: 6234084660
	Boring No.: U3-6A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 9/17/08	Depth: 100-102 ft
	Test No.: 8957	Sample Type: Undisturbed	Elevation: -71.2/-73.2
	Description: Brown and Light Brownish Gray Lean Clay (CL)		Cr = 0.029
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05)		

CONSOLIDATION TEST DATA

TIME CURVES

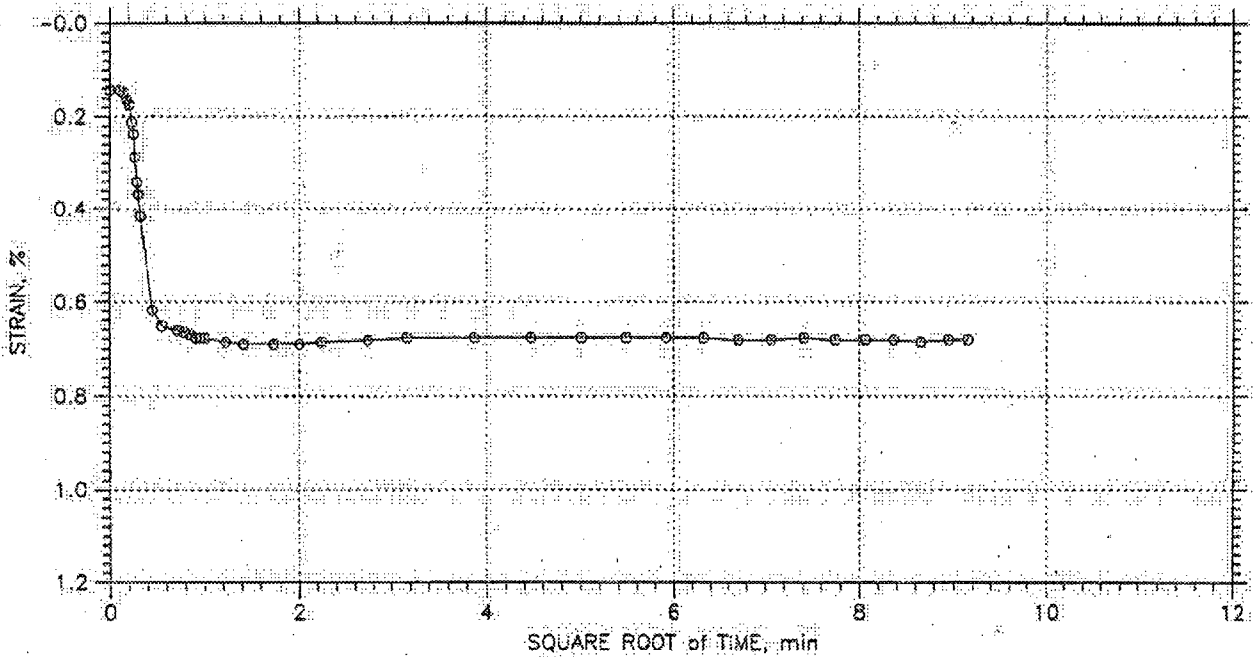
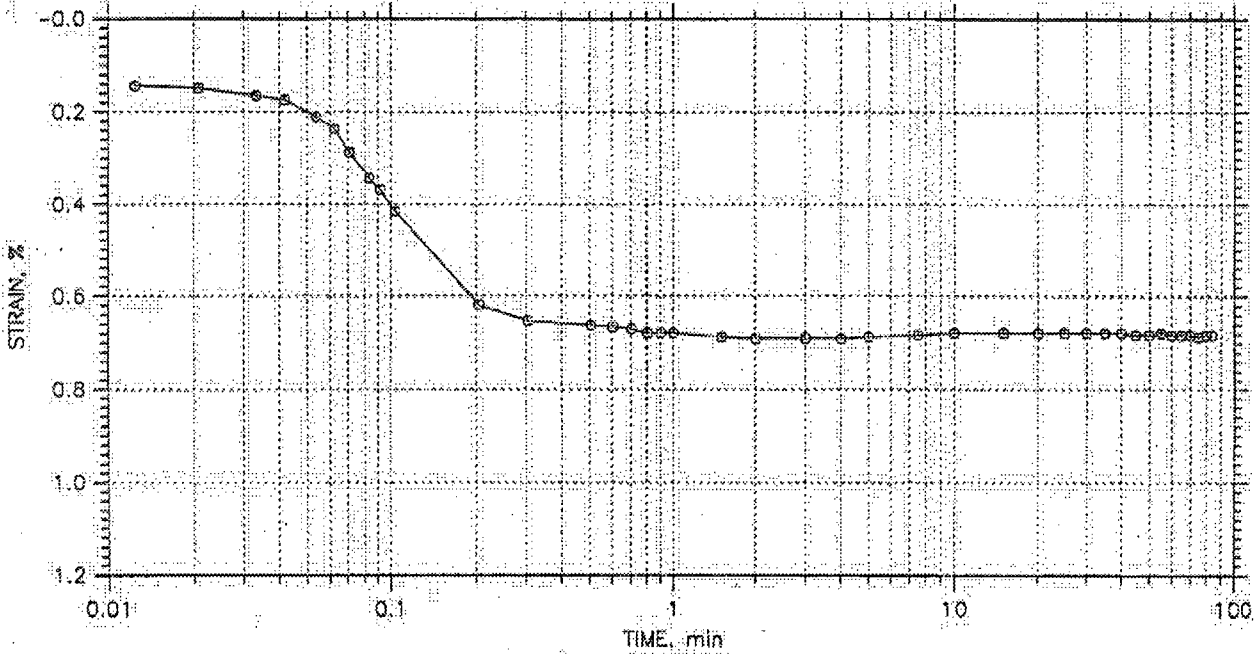
Constant Load Step: 1 of 19

Stress: 100. psf



MACTEC	Project: STP Units 3 & 4	Location: U3-6A UD-3	Project No.: 6234084660
	Boring No.: U3-6A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 9/17/08	Depth: 100-102 ft
	Test No.: 8957	Sample Type: Undisturbed	Elevation: -71.2/-73.2
	Description: Brown and Light Brownish Gray Lean Clay (CL)	Cr = 0.029	
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05). Task: 1.2		

CONSOLIDATION TEST DATA
TIME CURVES
 Constant Load Step: 2 of 19
 Stress: 500. psf



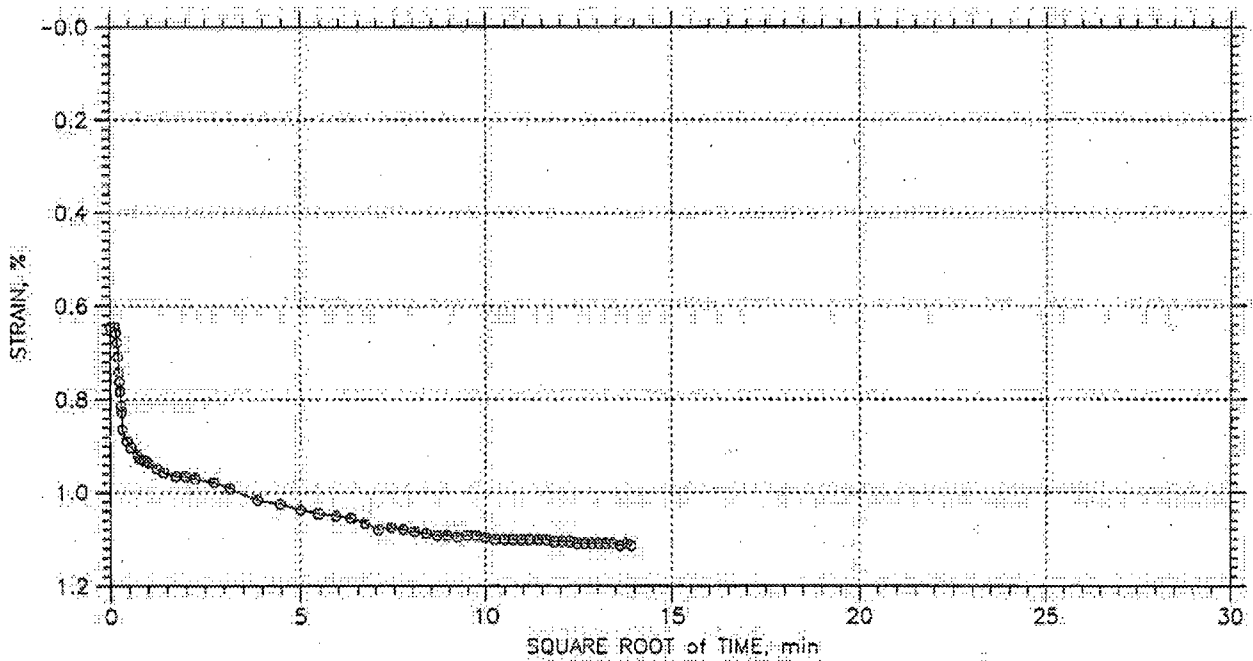
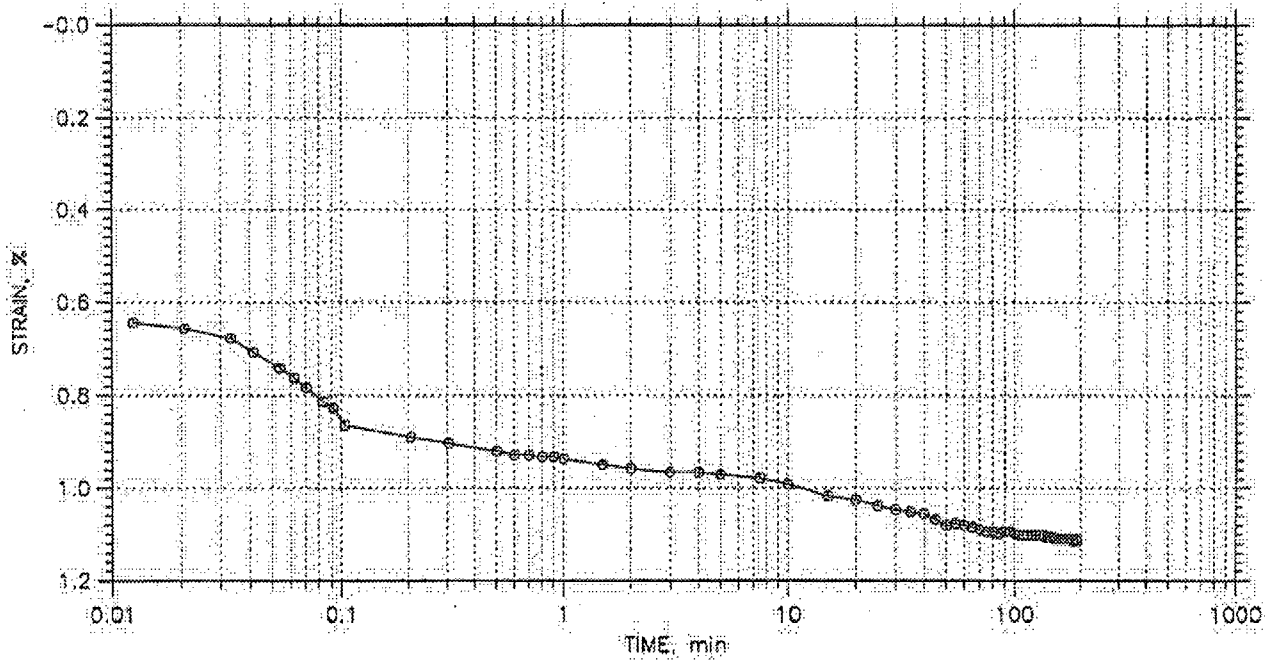
IMACTEC	Project: STP Units 3 & 4	Location: U3-6A UD-3	Project No.: 6234084660
	Boring No.: U3-6A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 9/17/08	Depth: 100-102 ft
	Test No.: 8957	Sample Type: Undisturbed	Elevation: -71.2/-73.2
	Description: Brown and Light Brownish Gray Lean Clay (CL)		Cr = 0.029
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05), Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 3 of 19

Stress: 1000. psf



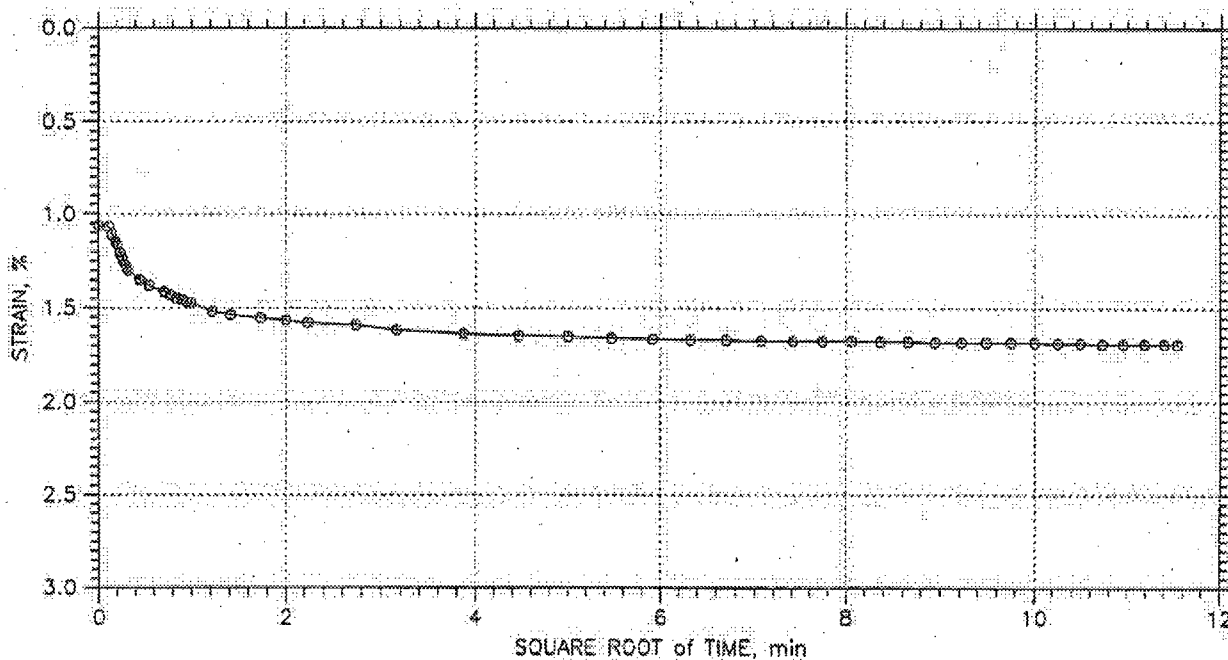
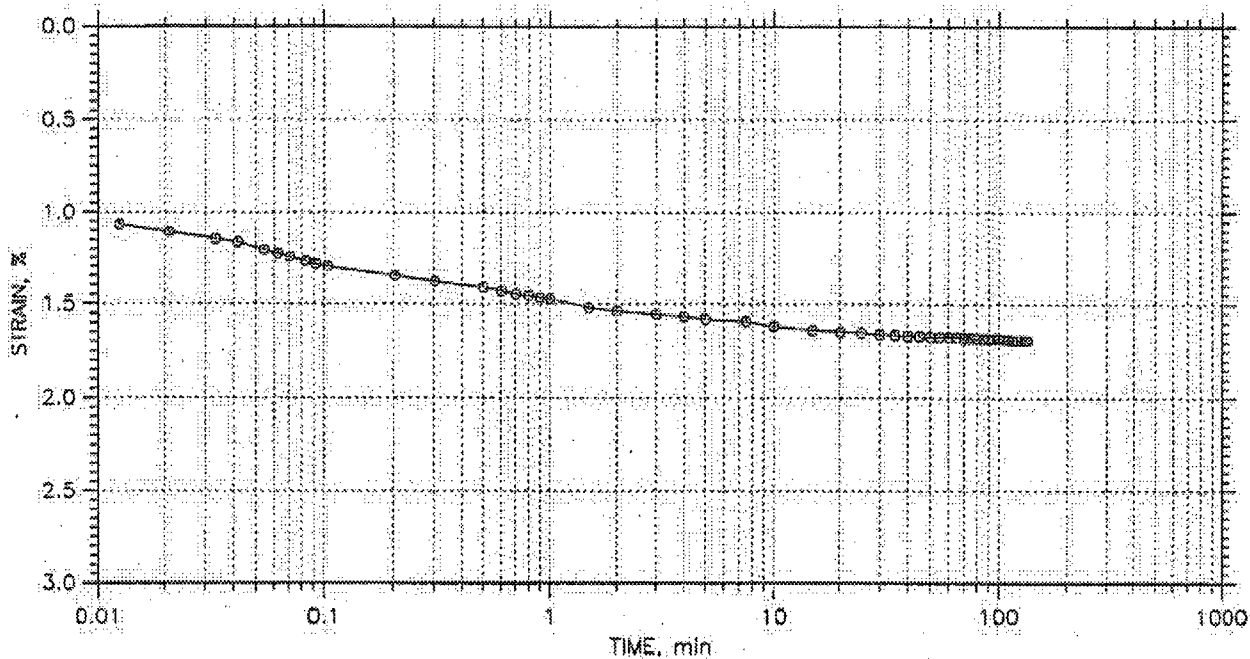
MACTEC	Project: STP Units 3 & 4	Location: U3-6A UD-3	Project No.: 6234084660
	Boring No.: U3-6A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 9/17/08	Depth: 100-102 ft
	Test No.: 8957	Sample Type: Undisturbed	Elevation: -71.2/-73.2
	Description: Brown and Light Brownish Gray Lean Clay (CL)	Cr = 0.029	
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05); Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 4 of 19

Stress: 2000. psf



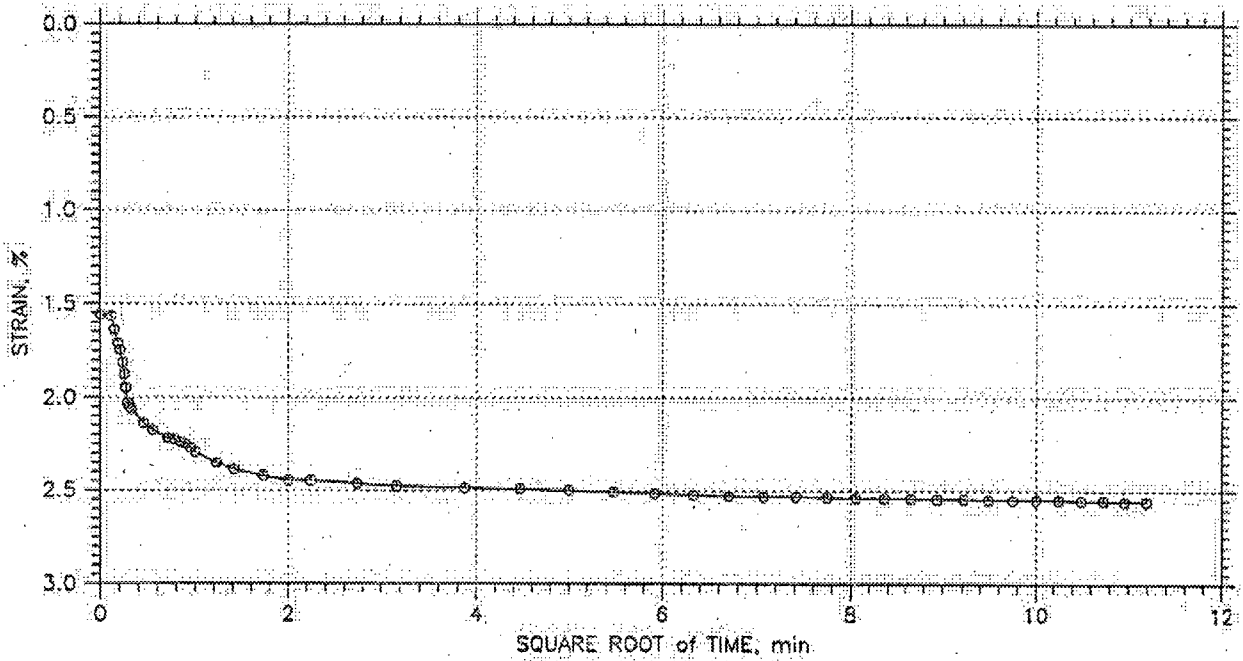
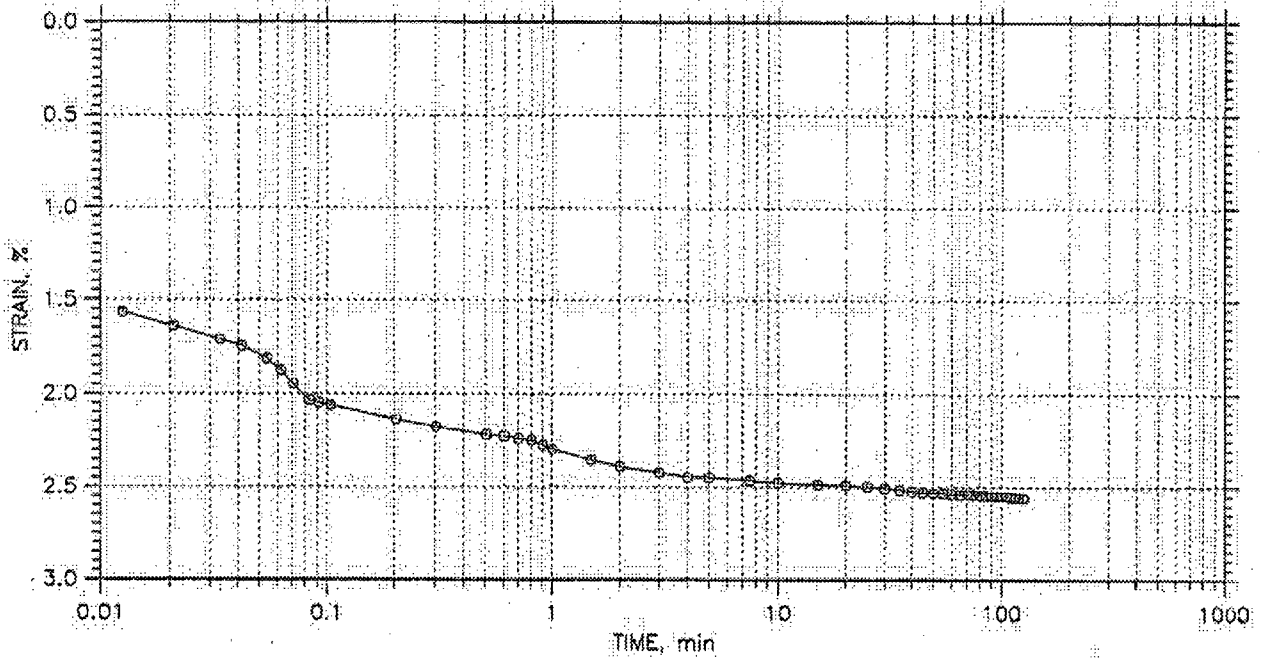
MACTEC	Project: STP Units 3 & 4	Location: U3-6A UD-3	Project No.: 6234084660
	Boring No.: U3-6A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 9/17/08	Depth: 100-102 ft
	Test No.: 8957	Sample Type: Undisturbed	Elevation: -71.2/-73.2
	Description: Brown and Light Brownish Gray Lean Clay (CL)	Cr = 0.028	
	Remarks: ASTM D2435-04 Method B; SG (ASTM D854-06); PI (ASTM D4318-05); Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 5 of 19

Stress: 4000. psf



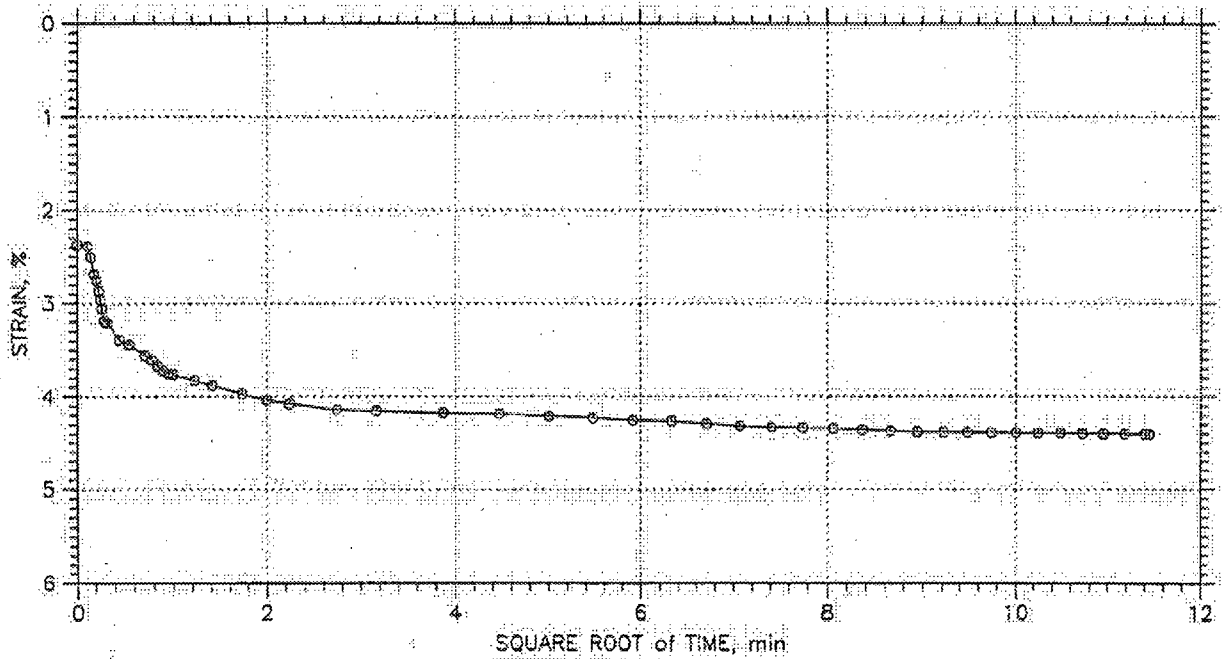
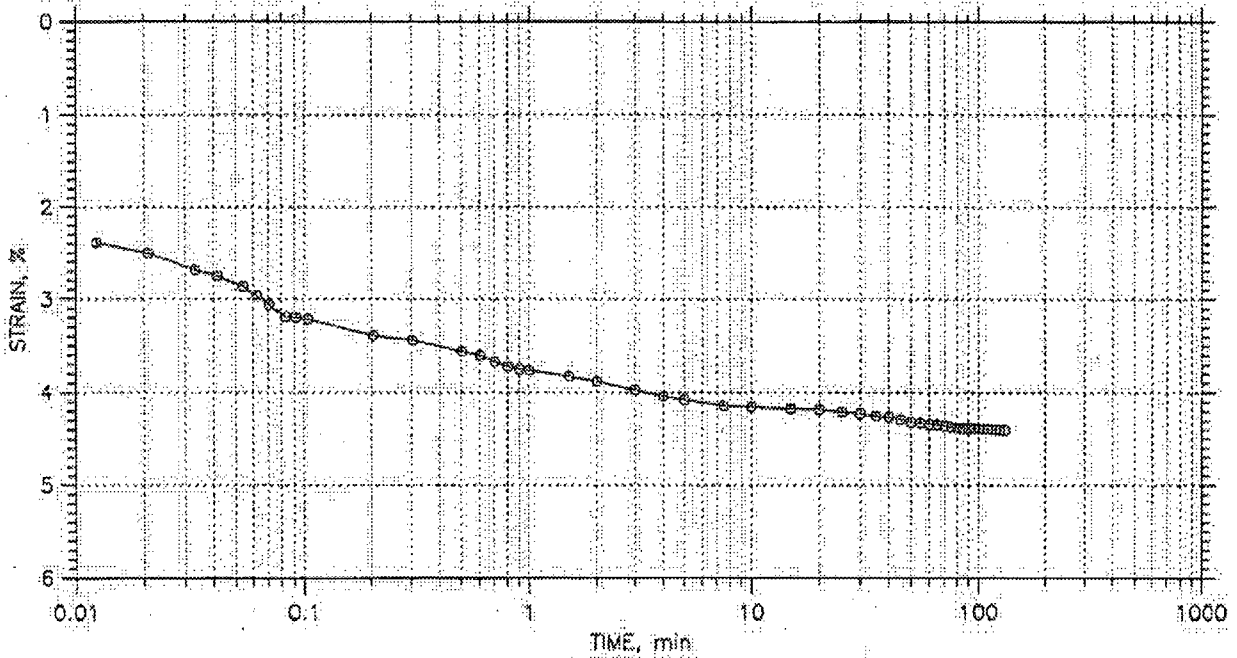
MACTEC	Project: STP Units 3 & 4	Location: U3-6A UD-3	Project No.: 6234084660	
	Boring No.: U3-6A	Tested By: BM	Checked By: JW	
	Sample No.: UD-3	Test Date: 9/17/08	Depth: 100-102 ft	
	Test No.: 8957	Sample Type: Undisturbed	Elevation: -71.2/-73.2	
	Description: Brown and Light Brownish Gray Lean Clay (CL)	Cr = 0.029		
	Remarks: ASTM D2435-04 Method B, SC (ASTM D854-06), PI (ASTM D4318-05)			Task 1.2

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 6 of 19

Stress: 8000. psf



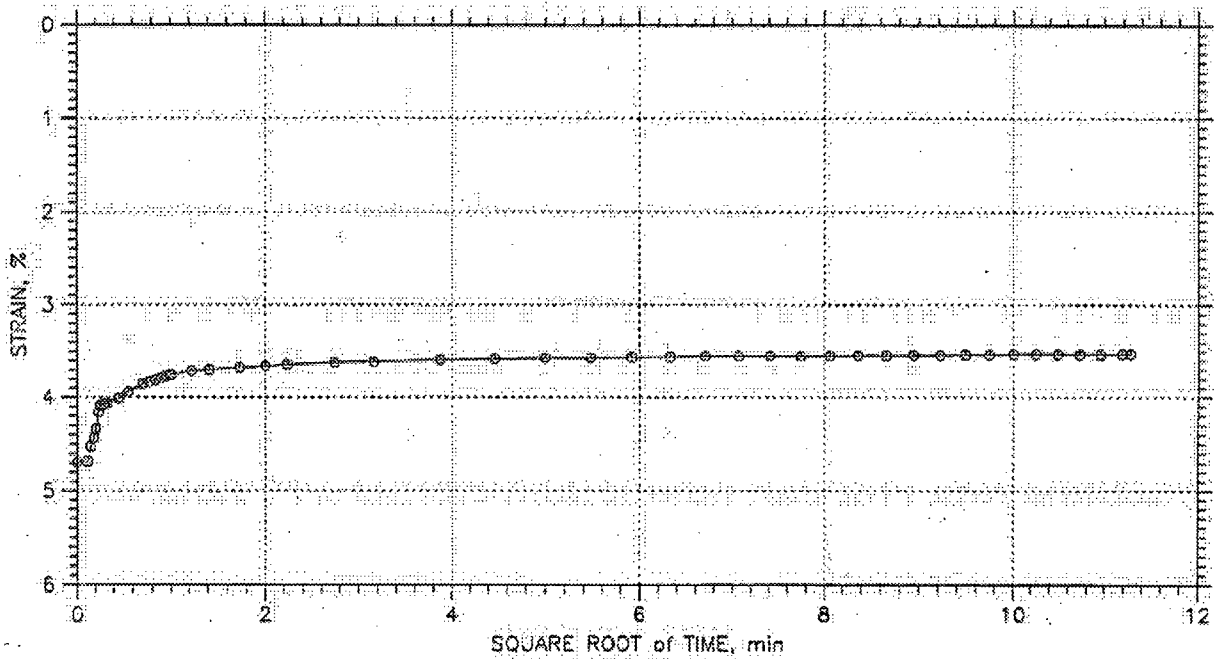
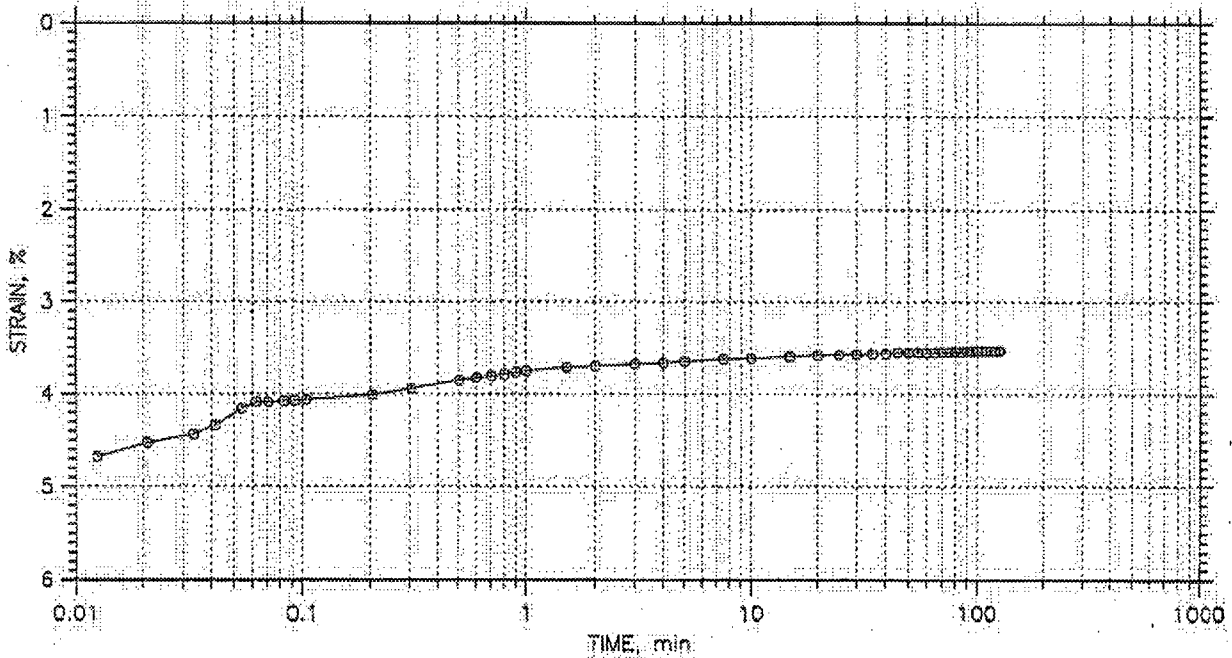
MACTEC	Project: STP Units 3 & 4	Location: U3-6A UD-3	Project No.: 6234084660
	Boring No.: U3-6A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 9/17/08	Depth: 100-102 ft
	Test No.: 8957	Sample Type: Undisturbed	Elevation: -71.2/-73.2
	Description: Brown and Light Brownish Gray Lean Clay (CL)	Cr = 0.029	
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05), Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 7 of 19

Stress: 2000. psf



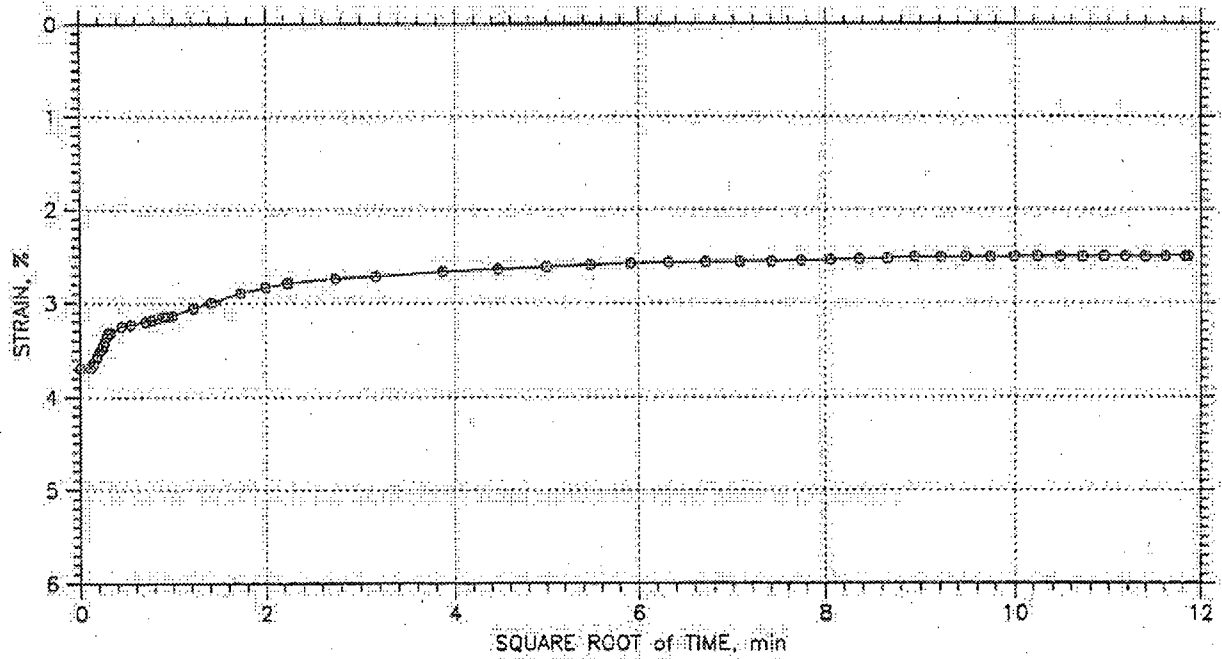
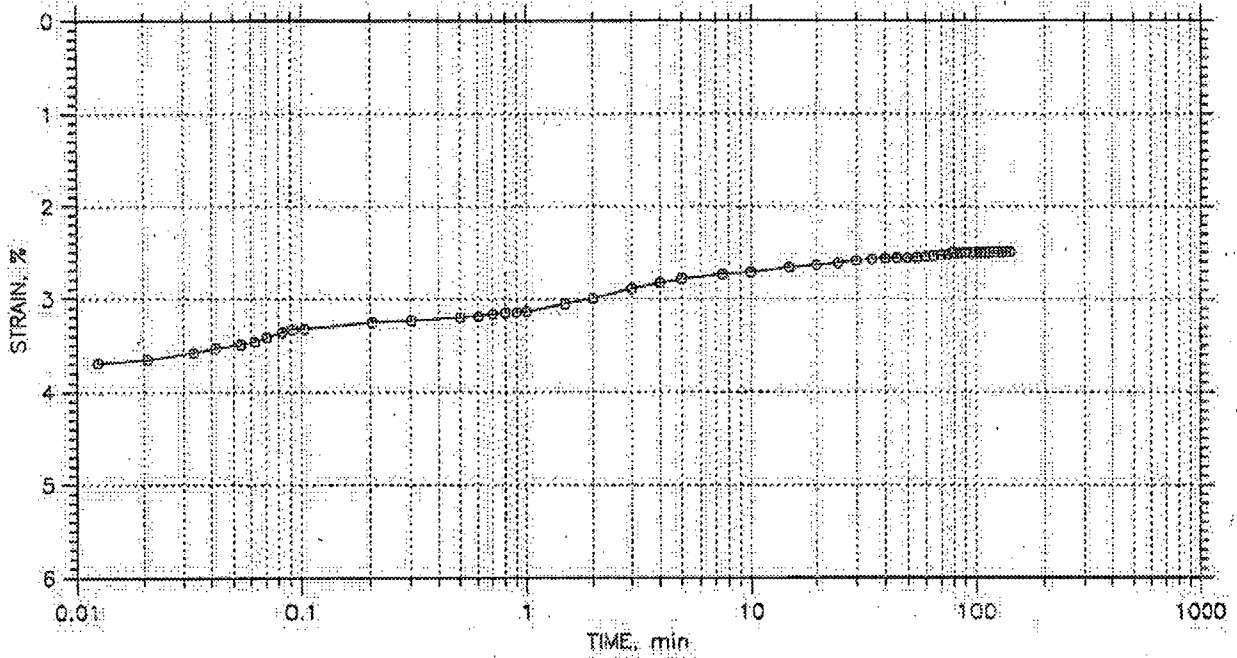
MACTEC	Project: STP Units 3 & 4	Location: U3-6A UD-3	Project No.: 6234084660
	Boring No.: U3-6A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 9/17/08	Depth: 100-102 ft
	Test No.: 8957	Sample Type: Undisturbed	Elevation: -71.2/-73.2
	Description: Brown and Light Brownish Gray Lean Clay (CL)	Cr = 0.029	
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05), Test 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 8 of 19

Stress: 500. psf



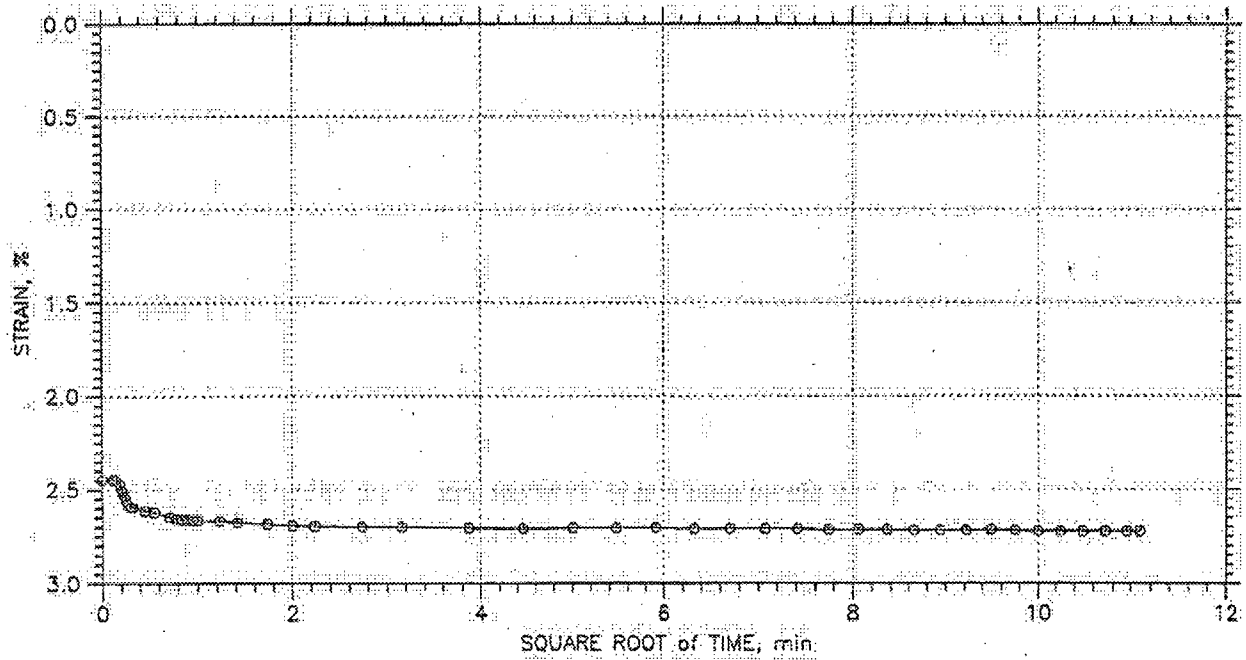
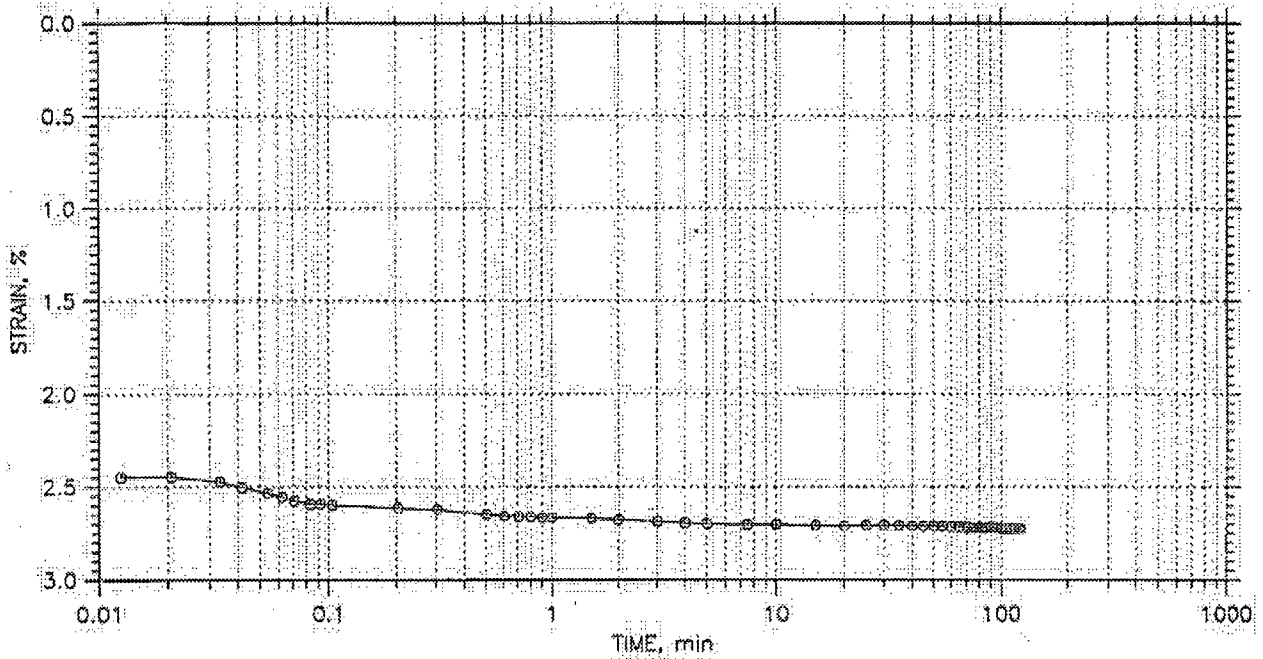
MACTEC	Project: STP Units 3 & 4	Location: U3-6A UD-3	Project No.: 6234084660
	Boring No.: U3-6A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 9/17/08	Depth: 100-102 ft
	Test No.: 8957	Sample Type: Undisturbed	Elevation: -71.2/-73.2
	Description: Brown and Light Brownish Gray Lean Clay (CL)	Cr = 0.029	
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05), Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 9 of 19

Stress: 1000 psf



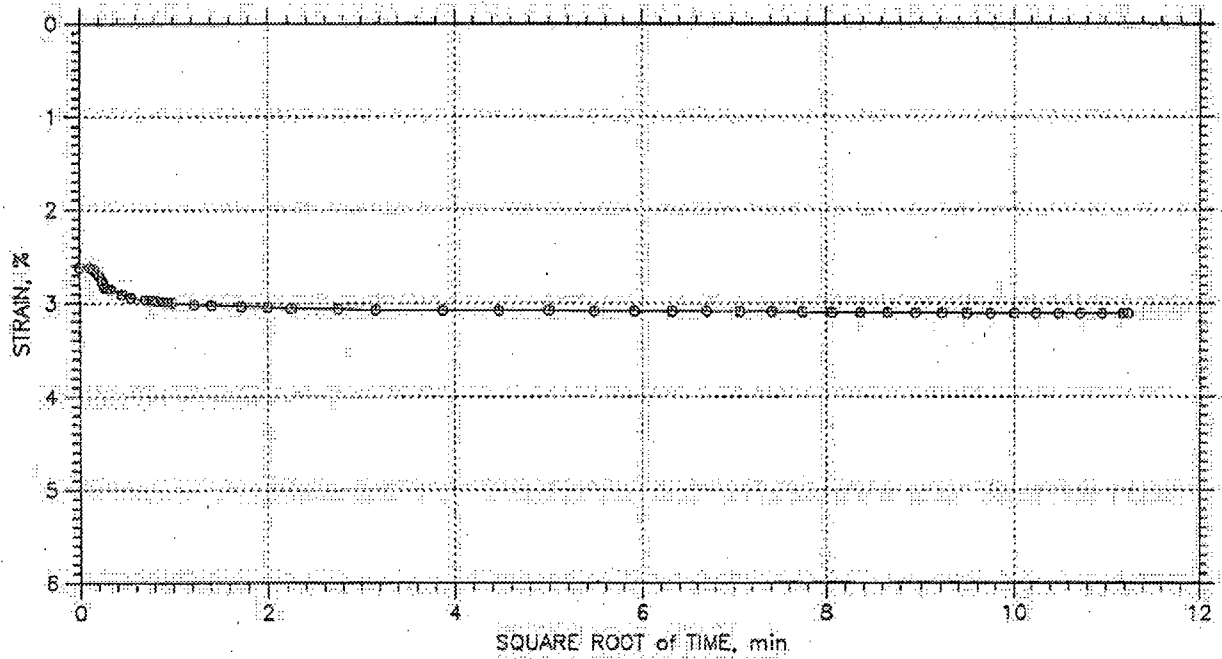
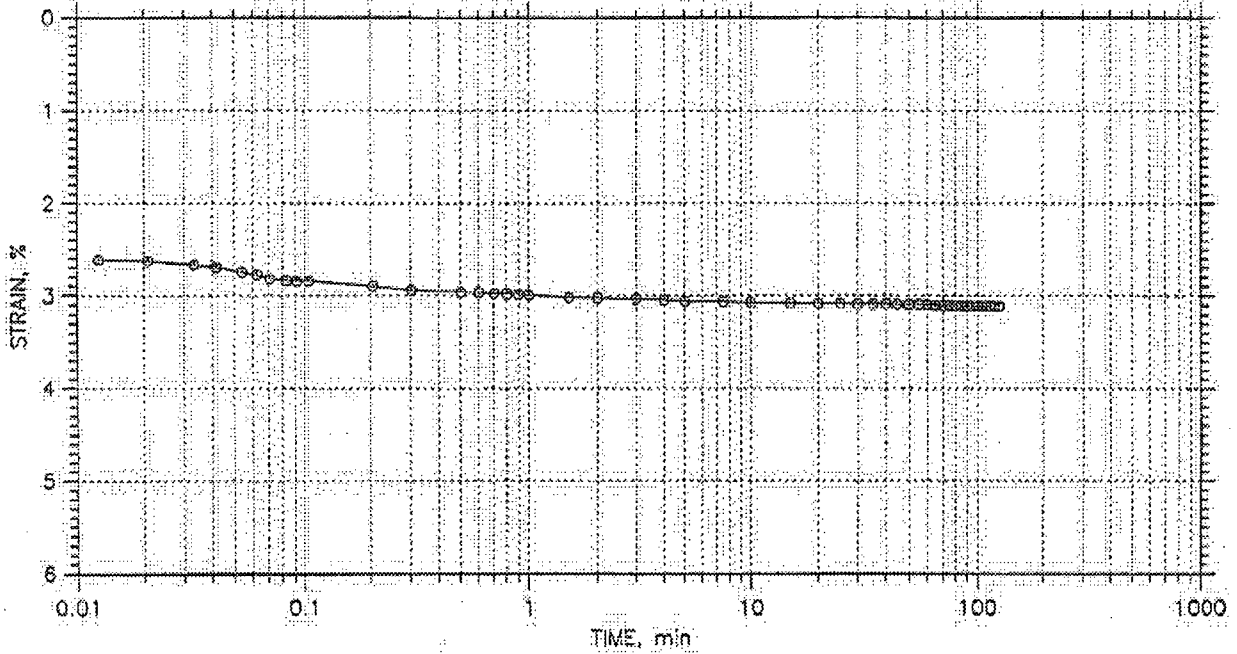
MACTEC	Project: STP Units 3 & 4	Location: U3-6A UD-3	Project No.: 6234084660
	Boring No.: U3-6A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 9/17/08	Depth: 100-102 ft
	Test No.: 8957	Sample Type: Undisturbed	Elevation: -71.2/-73.2
	Description: Brown and Light Brownish Gray Lean Clay (CL)		Cr = 0.029
	Remarks: ASTM D2435-04 Method B, SC (ASTM D854-06), PI (ASTM D4318-05). Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 10 of 19

Stress: 2000. psf



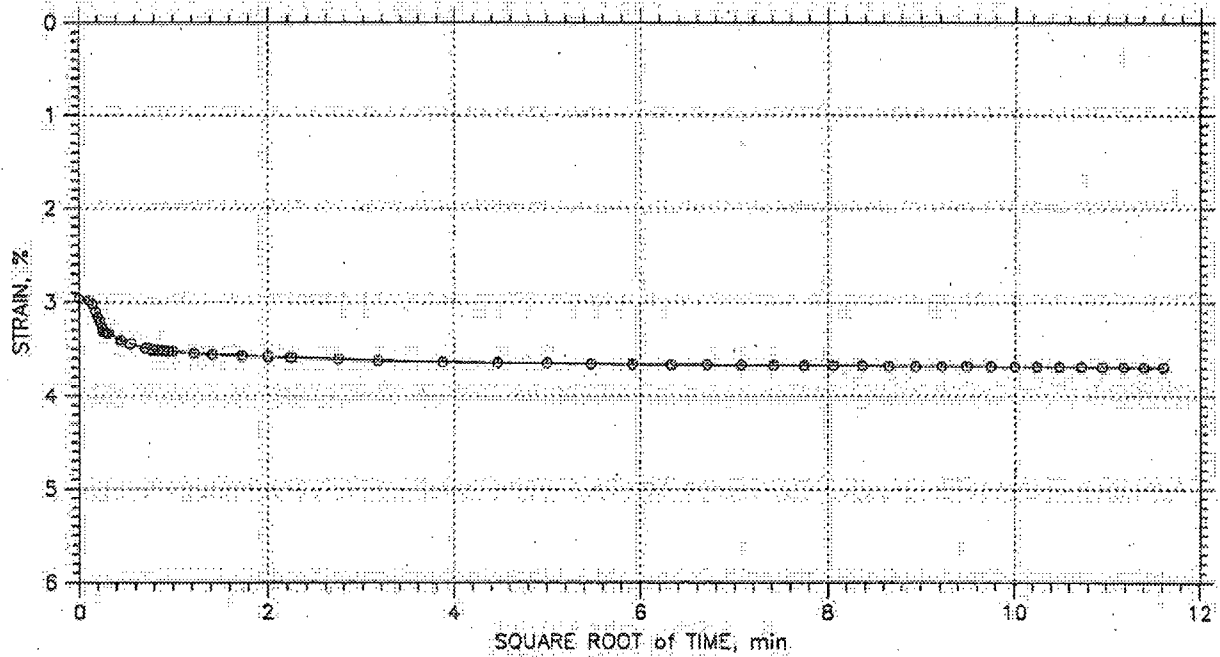
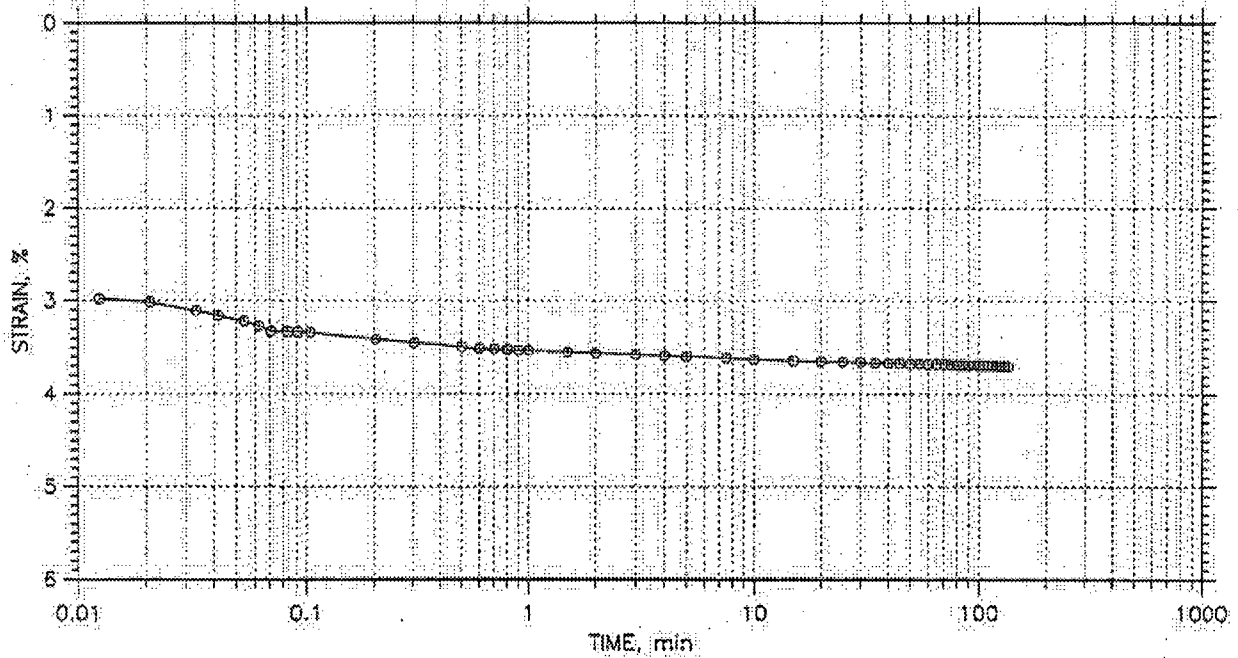
MACTEC	Project: STP Units 3 & 4	Location: U3-6A UD-3	Project No.: 6234084660
	Boring No.: U3-6A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 9/17/08	Depth: 100-102 ft
	Test No.: 8957	Sample Type: Undisturbed	Elevation: -71.2/-73.2
	Description: Brown and Light Brownish Gray Lean Clay (CL)	Cr = 0.029	
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05), Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 11 of 19

Stress: 4000. psf



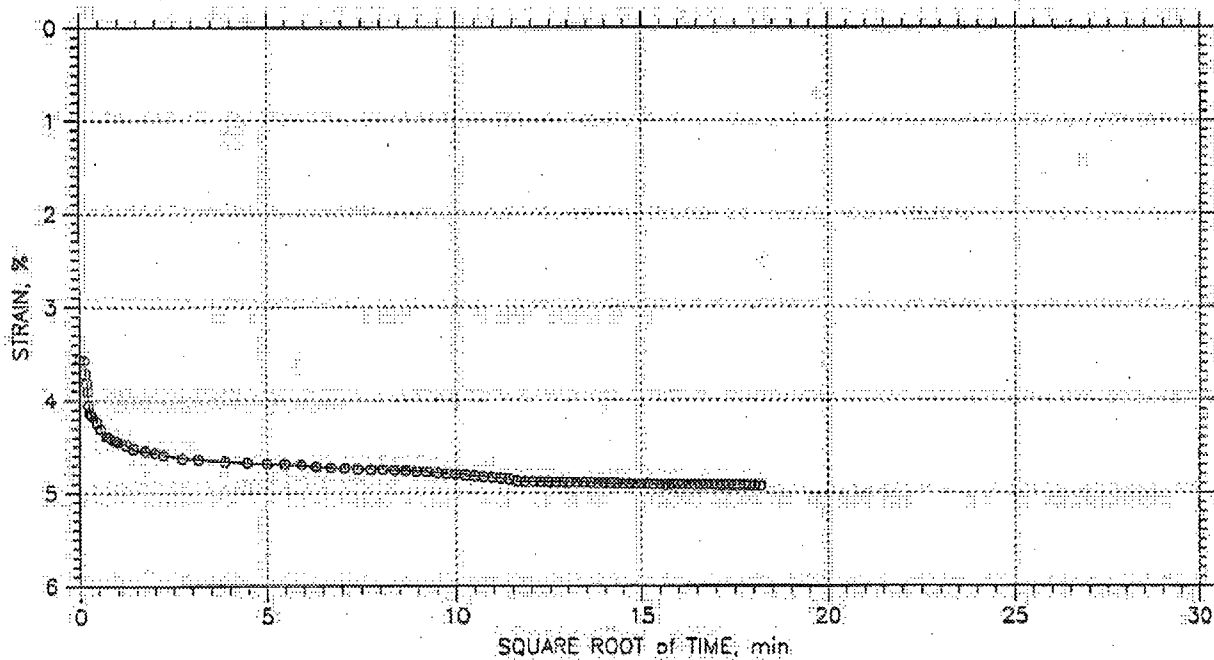
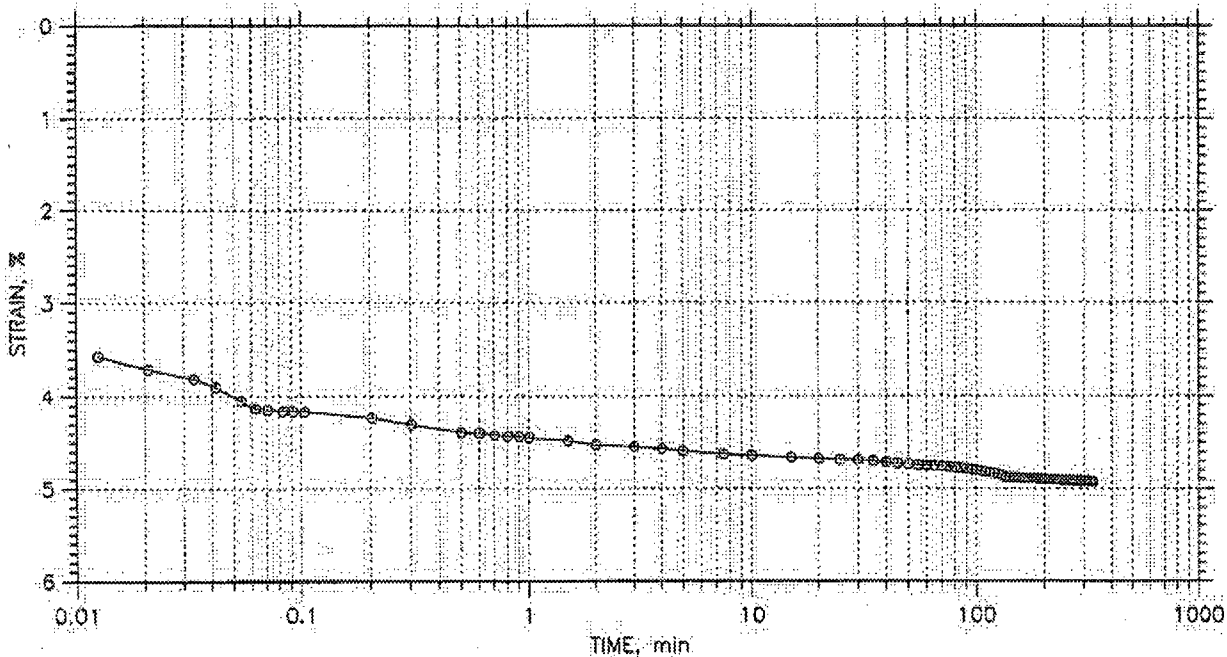
MACTEC	Project: STP Units 3 & 4	Location: U3-6A UD-3	Project No.: 6234084660
	Boring No.: U3-6A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 9/17/08	Depth: 100-102 ft.
	Test No.: 8957	Sample Type: Undisturbed	Elevation: -71.2/-73.2
	Description: Brown and Light Brownish Gray Lean Clay (CL)	Cr = 0.029	
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05). Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 12 of 19

Stress: 8000. psf



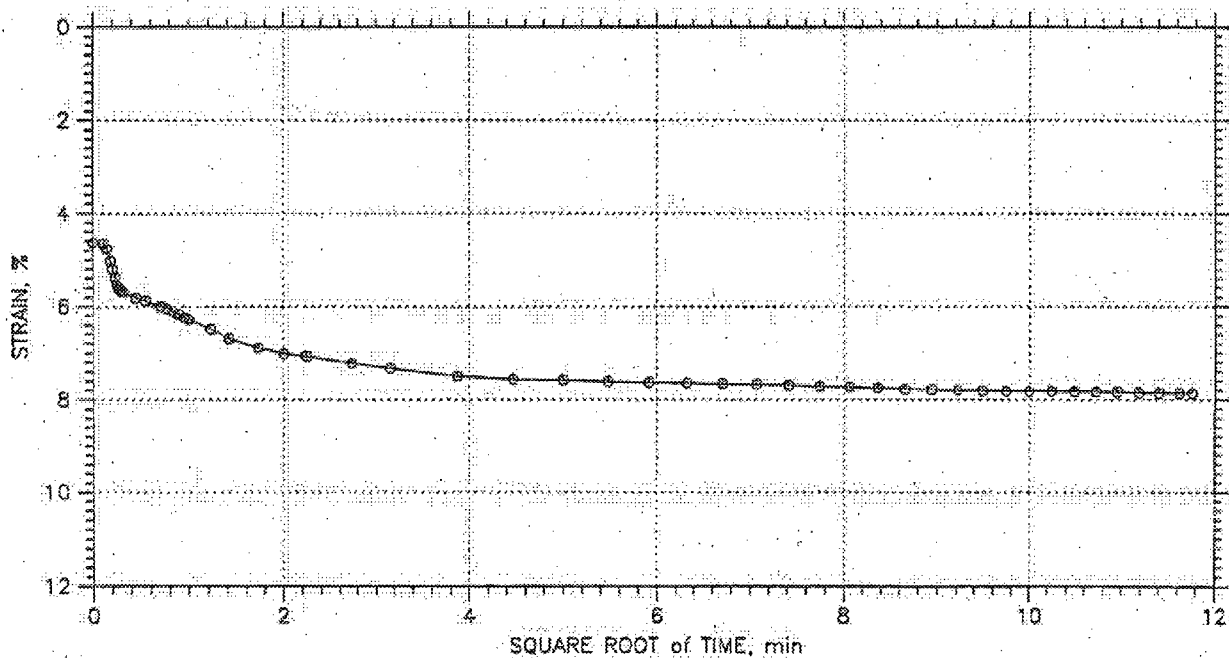
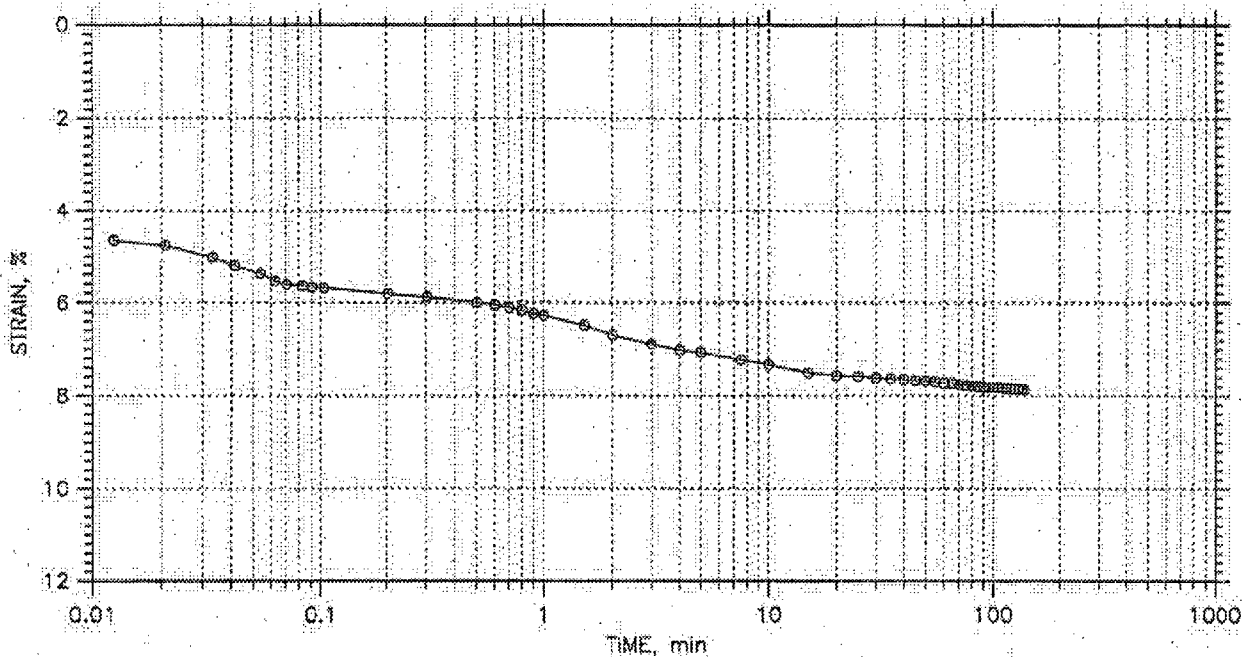
MACTEC	Project: STP Units 3 & 4	Location: U3-6A UD-3	Project No.: 6234084660
	Boring No.: U3-6A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 9/17/08	Depth: 100-102 ft
	Test No.: 8957	Sample Type: Undisturbed	Elevation: -71.2/-73.2
	Description: Brown and Light Brownish Gray Lean Clay (CL)	Cr = 0.029	
	Remarks: ASTM D2435-04 Method B; SG (ASTM D854-06), PI (ASTM D4318-05)	Task 1.2	

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 13 of 19

Stress: 16000 psf



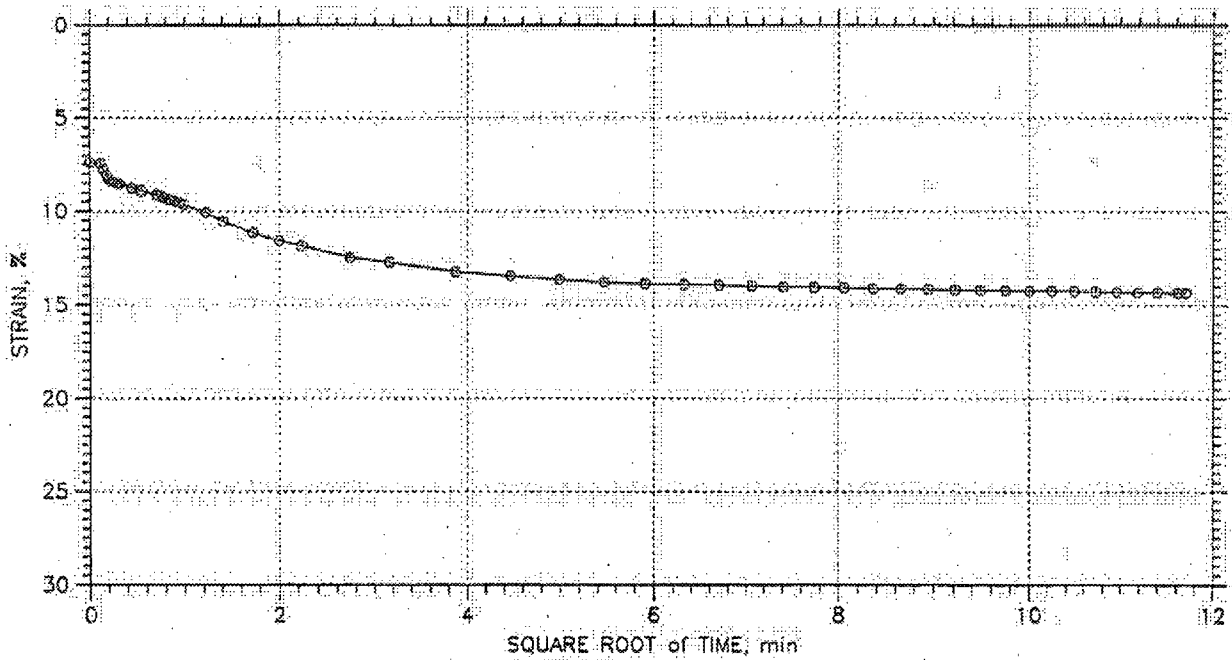
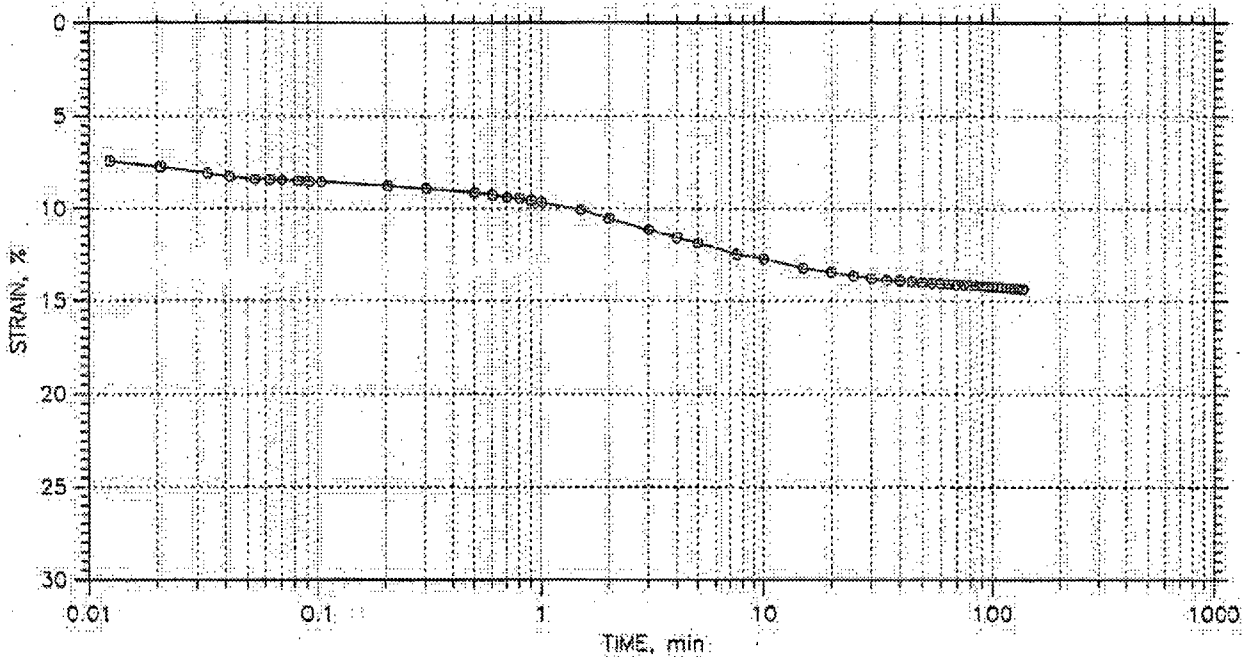
MACTEC	Project: STP Units 3 & 4	Location: U3-6A UD-3	Project No.: 6234084660
	Boring No.: U3-6A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 9/17/08	Depth: 100-102 ft.
	Test No.: 8957	Sample Type: Undisturbed	Elevation: -71.2/-73.2
	Description: Brown and Light Brownish Gray Lean Clay (CL)		Cr = 0.029
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05), Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 14 of 19

Stress: 32000 psf



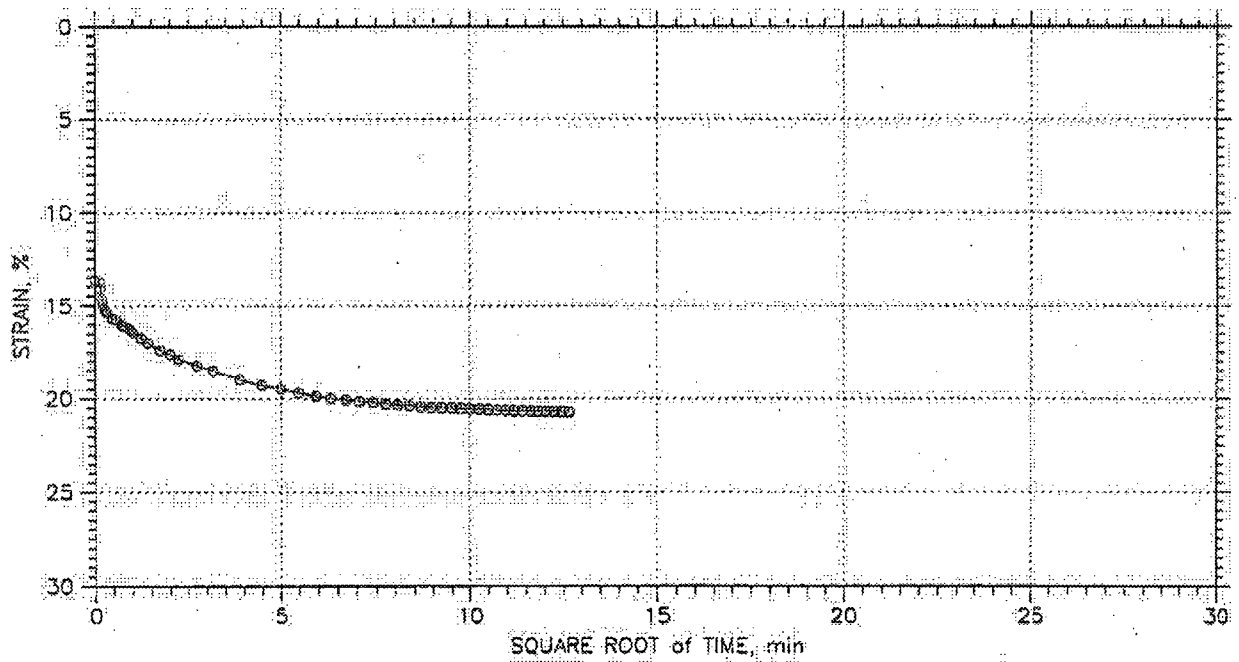
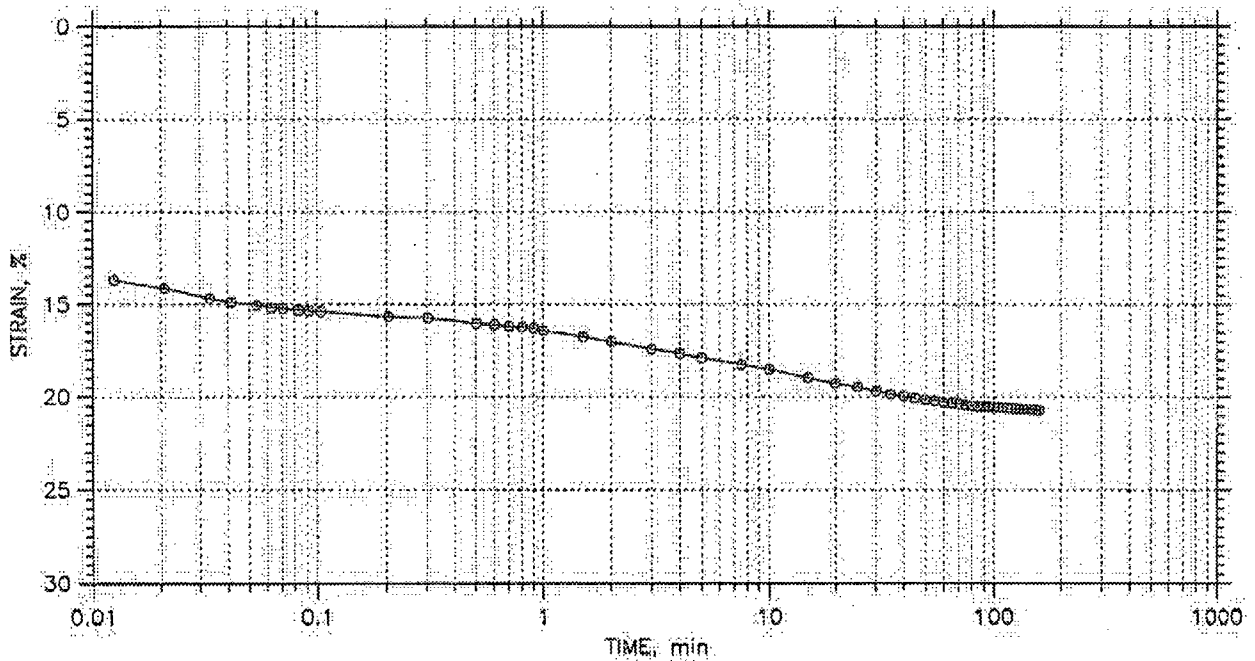
MACTEC	Project: STP Units 3 & 4	Location: U3-6A UD-3	Project No.: 6234084660
	Boring No.: U3-6A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 9/17/08	Depth: 100-102 ft
	Test No.: 8957	Sample Type: Undisturbed	Elevation: -71.2/-73.2
	Description: Brown and Light Brownish Gray Lean Clay (CL)		Cr = 0.029
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05)		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 15 of 19

Stress: 64000 psf



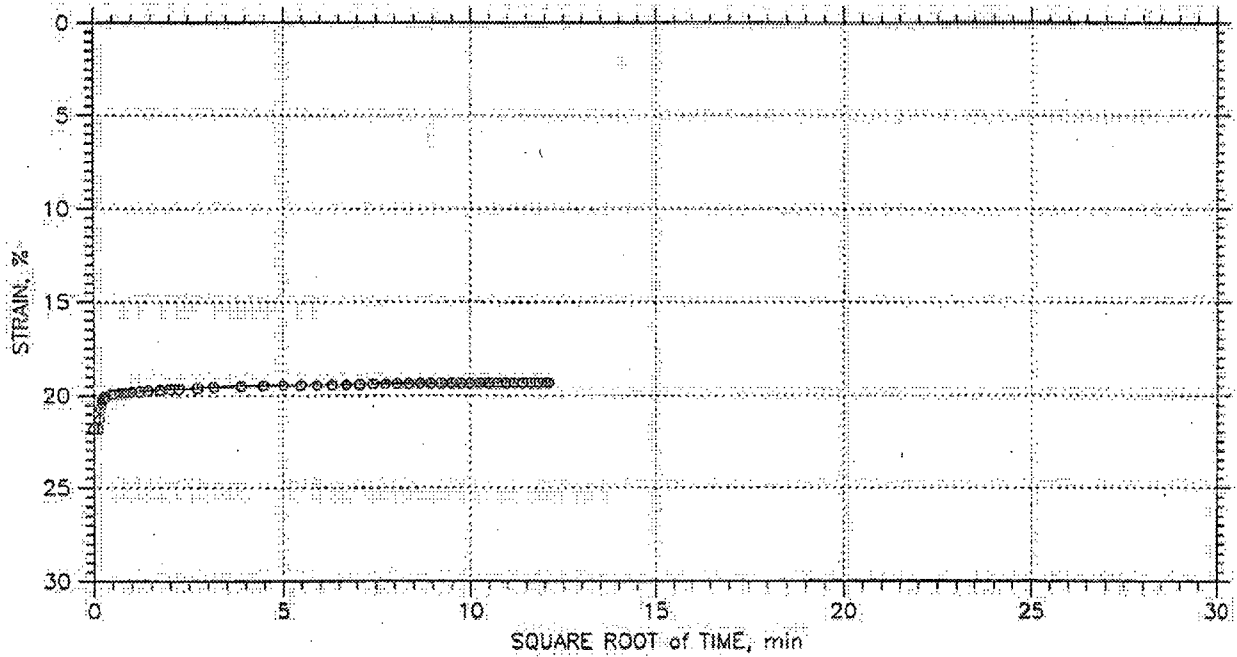
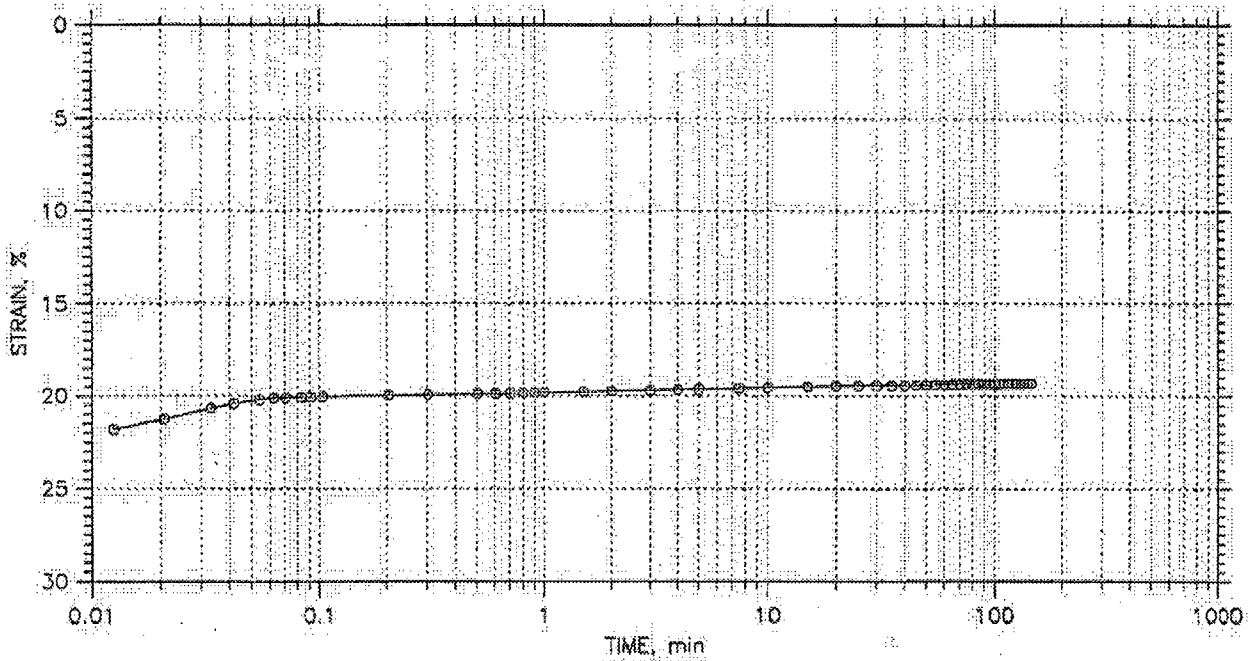
MACTEC	Project: STP Units 3 & 4	Location: U3-6A UD-3	Project No.: 6234084660
	Boring No.: U3-6A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 9/17/08	Depth: 100-102 ft
	Test No.: 8957	Sample Type: Undisturbed	Elevation: -71.2/-73.2
	Description: Brown and Light Brownish Gray Leon Clay (CL)		Cr = 0.029
	Remarks: ASTM D2435-D4 Method B, SG (ASTM D854-06), PI (ASTM D4318-05). Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 16 of 19

Stress: 16000 psf



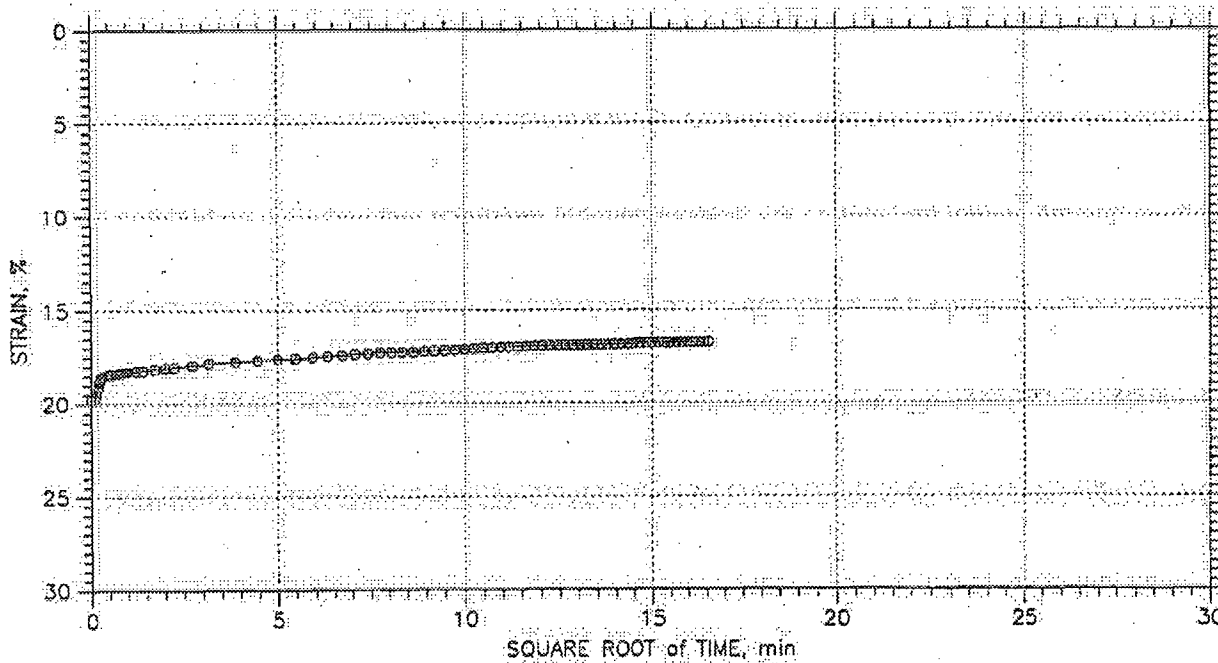
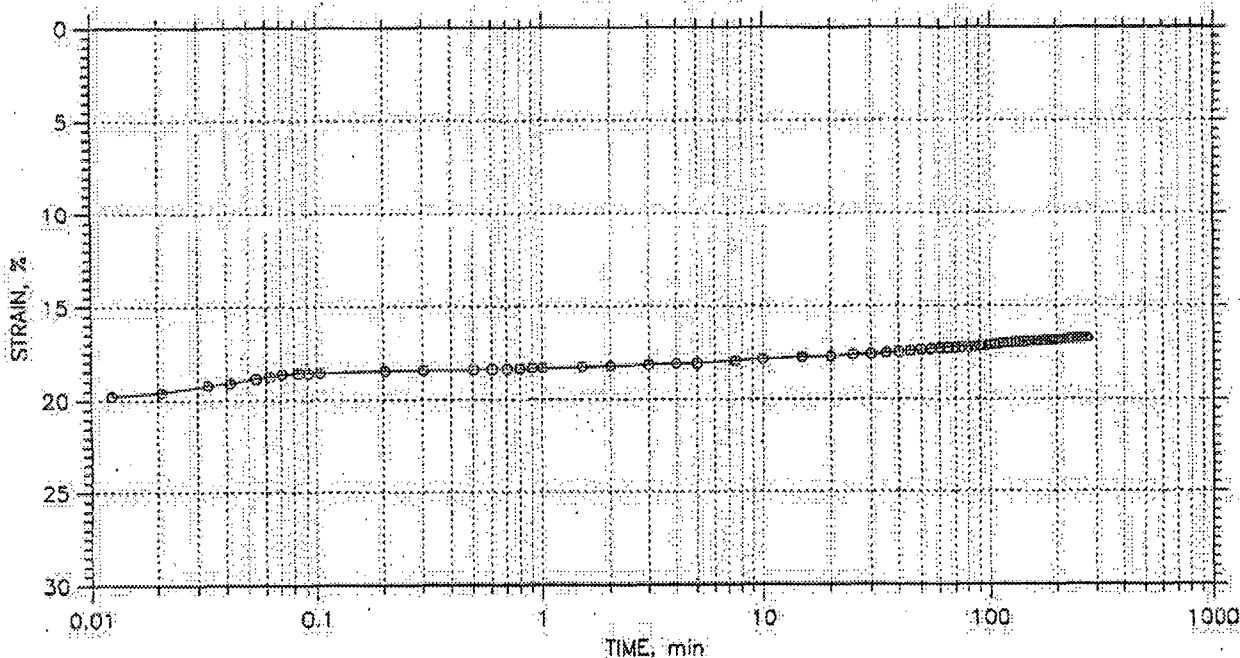
MACTEC	Project: STP Units 3 & 4	Location: U3-6A UD-3	Project No.: 6234084660
	Boring No.: U3-6A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 9/17/08	Depth: 100-102 ft
	Test No.: 8957	Sample Type: Undisturbed	Elevation: -71.2/-73.2
	Description: Brown and Light Brownish Gray Lean Clay (CL)	Cr = 0.029	
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05)	Task 1.2	

CONSOLIDATION TEST DATA

TIME CURVES

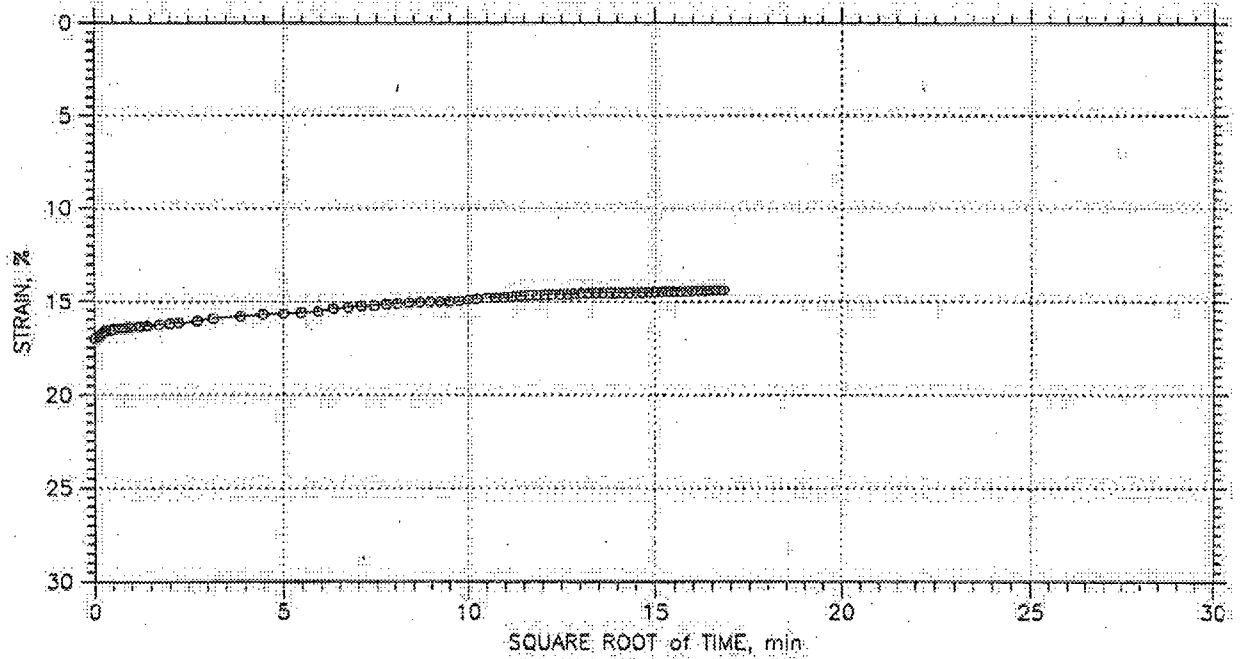
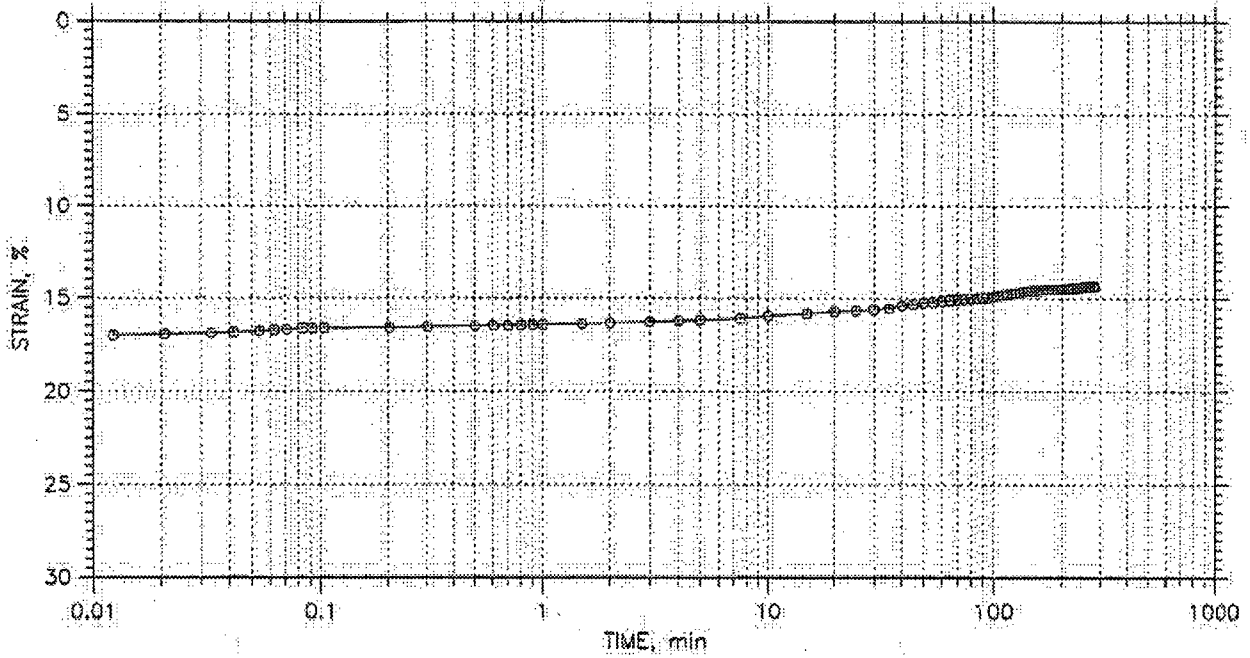
Constant Load Step: 17 of 19

Stress: 4000 psf



MACTEC	Project: STP Units 3 & 4	Location: U3-6A UD-3	Project No.: 6234084660
	Boring No.: U3-6A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 9/17/08	Depth: 100-102 ft
	Test No.: 8957	Sample Type: Undisturbed	Elevation: -71.2/-73.2
	Description: Brown and Light Brownish Gray Lean Clay (CL)		Cr = 0.029
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05)		
	Task 1.2		

CONSOLIDATION TEST DATA
 TIME CURVES
 Constant Load Step: 18 of 19
 Stress: 1000. psf



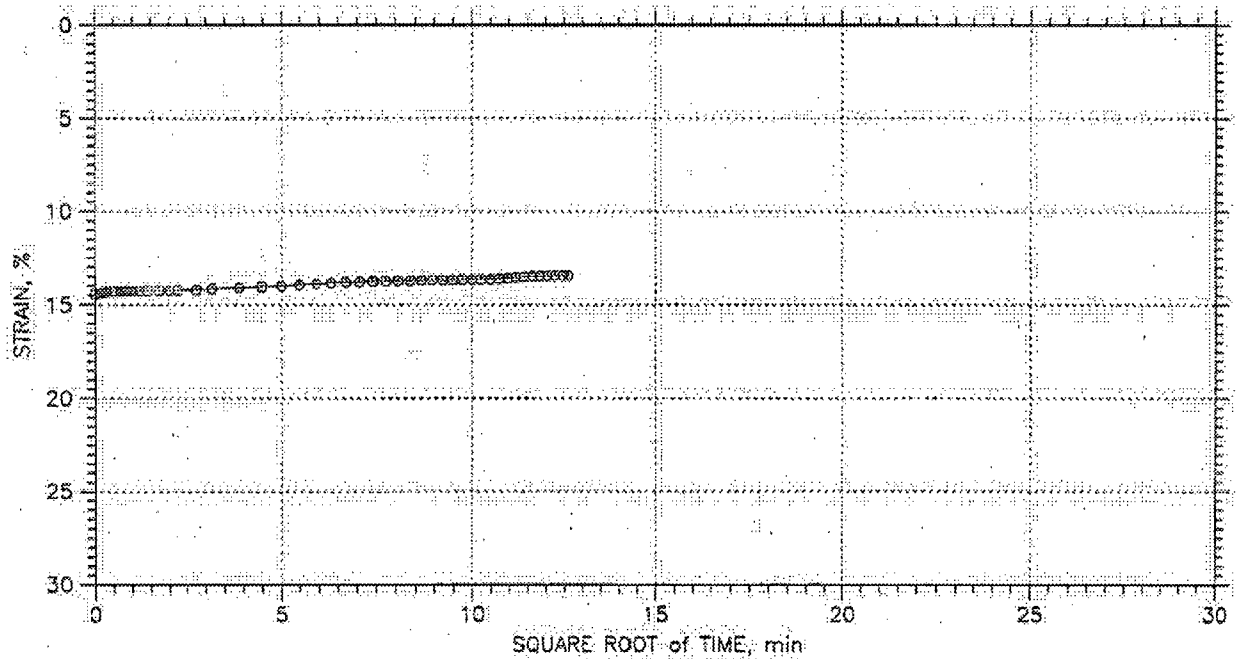
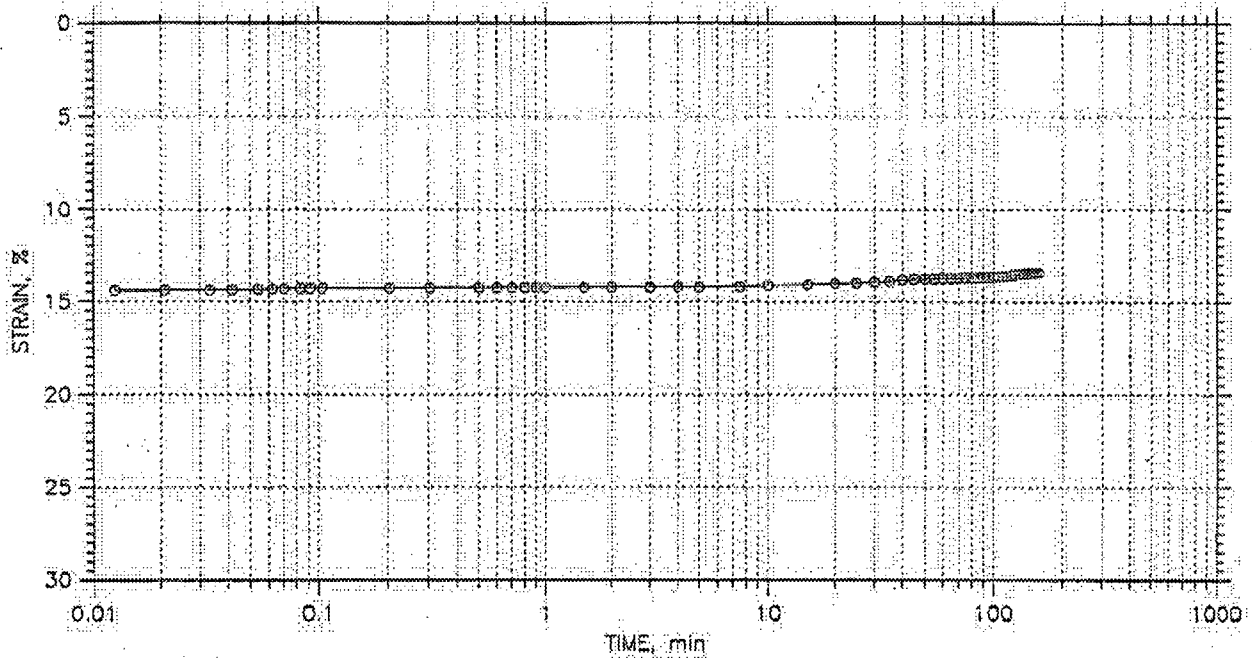
MACTEC	Project: STP Units 3 & 4	Location: U3-6A UD-3	Project No.: 6234084660
	Boring No.: U3-6A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 9/17/08	Depth: 100-102 ft
	Test No.: 8967	Sample Type: Undisturbed	Elevation: -71.2/-73.2
	Description: Brown and Light Brownish Gray Lean Clay (CL)	Cr = 0.029	
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05), Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

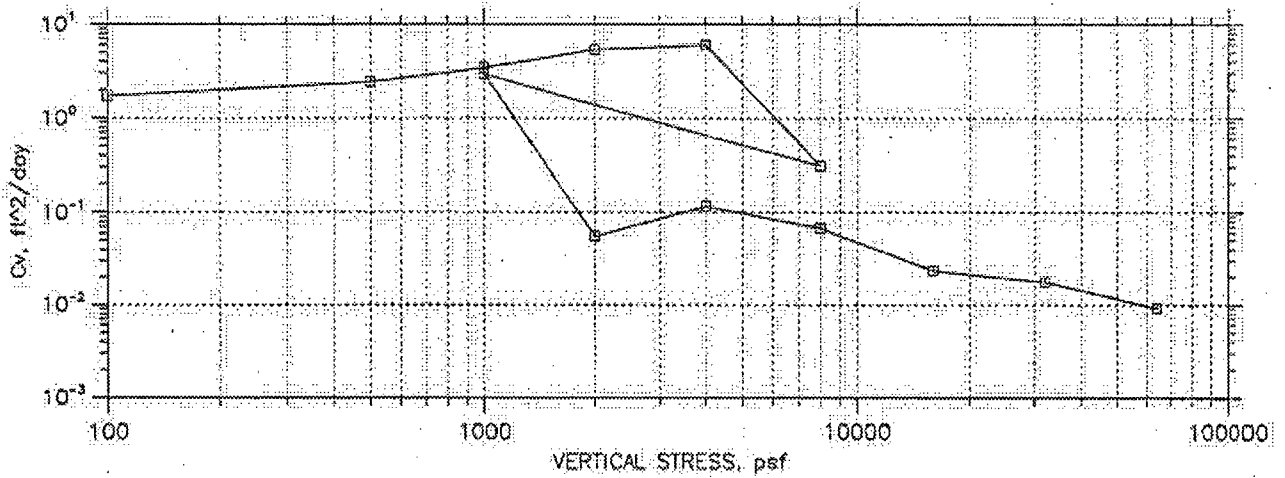
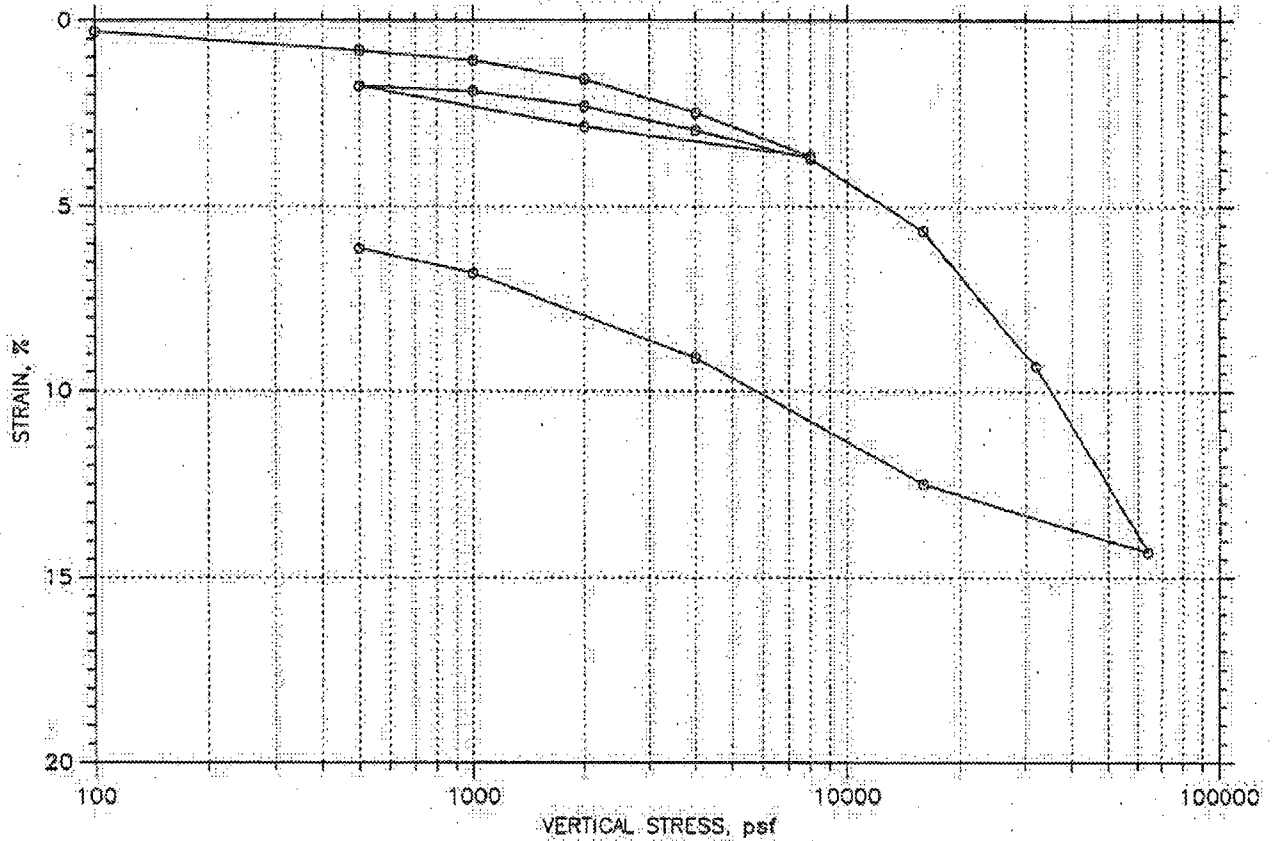
Constant Load Step: 19 of 19

Stress: 500 psf



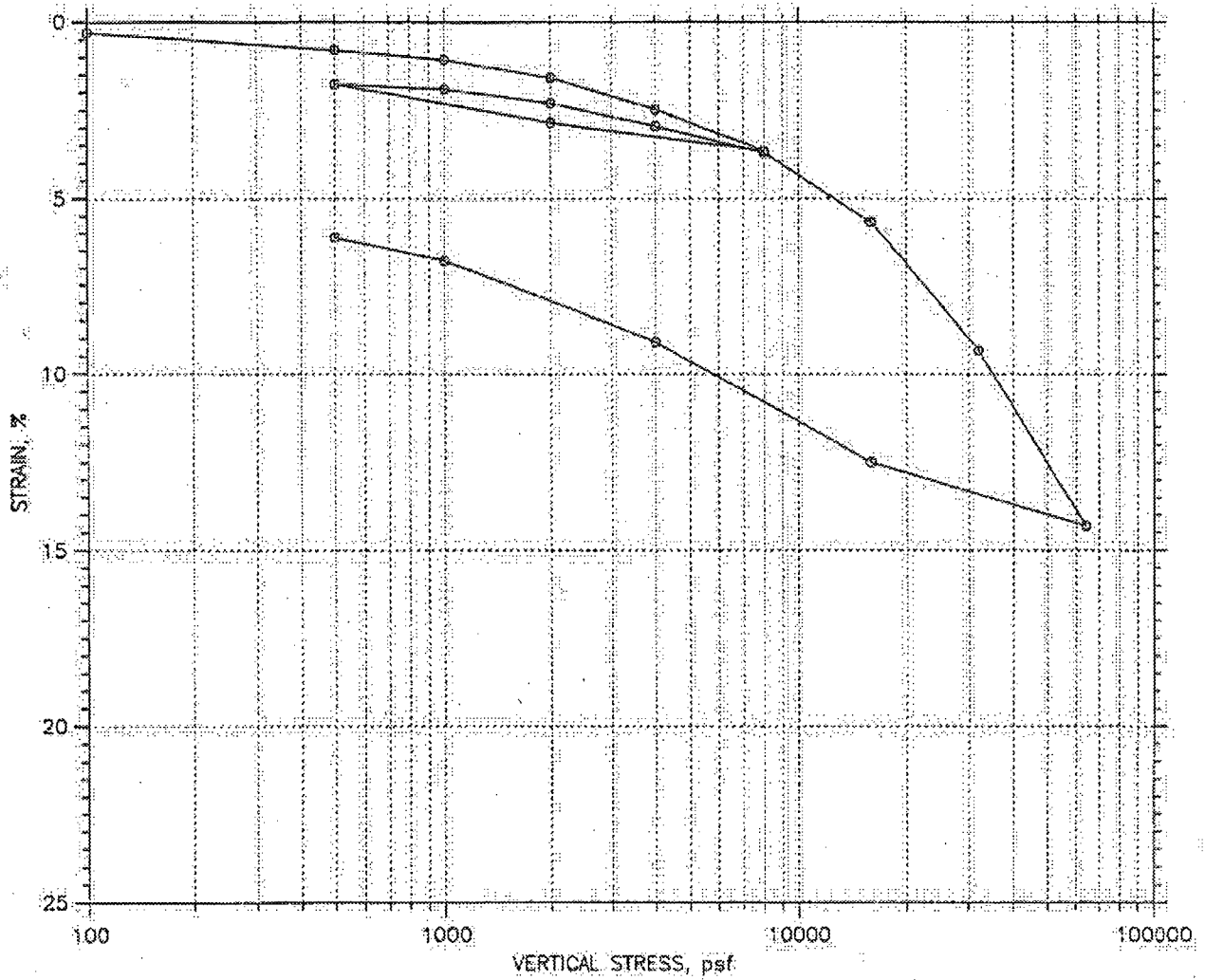
MACTEC	Project: STP Units 3 & 4	Location: U3-6A UD-3	Project No.: 623408466D
	Boring No.: U3-6A	Tested By: BM	Checked By: JW
	Sample No.: UD-3	Test Date: 9/17/08	Depth: 100-102 ft
	Test No.: 8957	Sample Type: Undisturbed	Elevation: -71.2/-73.2
	Description: Brown and Light Brownish Gray Lean Clay (CL)	Cr = 0.029	
	Remarks: ASTM D2435-04 Method B, SC (ASTM D854-06), PI (ASTM D4318-05). Task 1.2		

CONSOLIDATION TEST DATA SUMMARY REPORT



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-2	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-2	Test Date: 08/27/08	Depth: 108-110 ft.
	Test No.: 8963	Sample Type: Undisturbed	Elevation: -77.6/-79.6
	Description: Light Greenish Gray Fat Clay (CH)		Cr = 0.027
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05), Task 1.2		

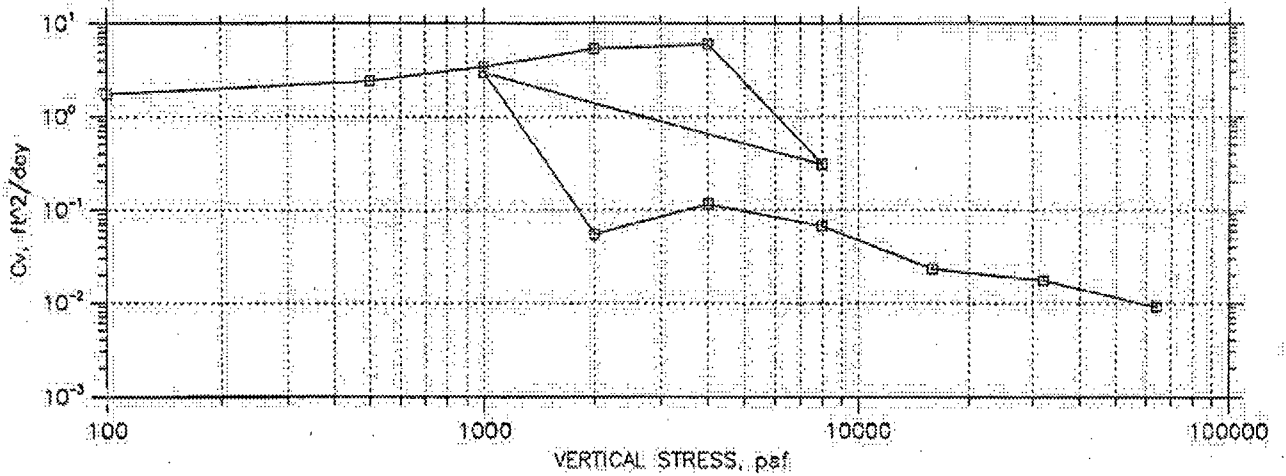
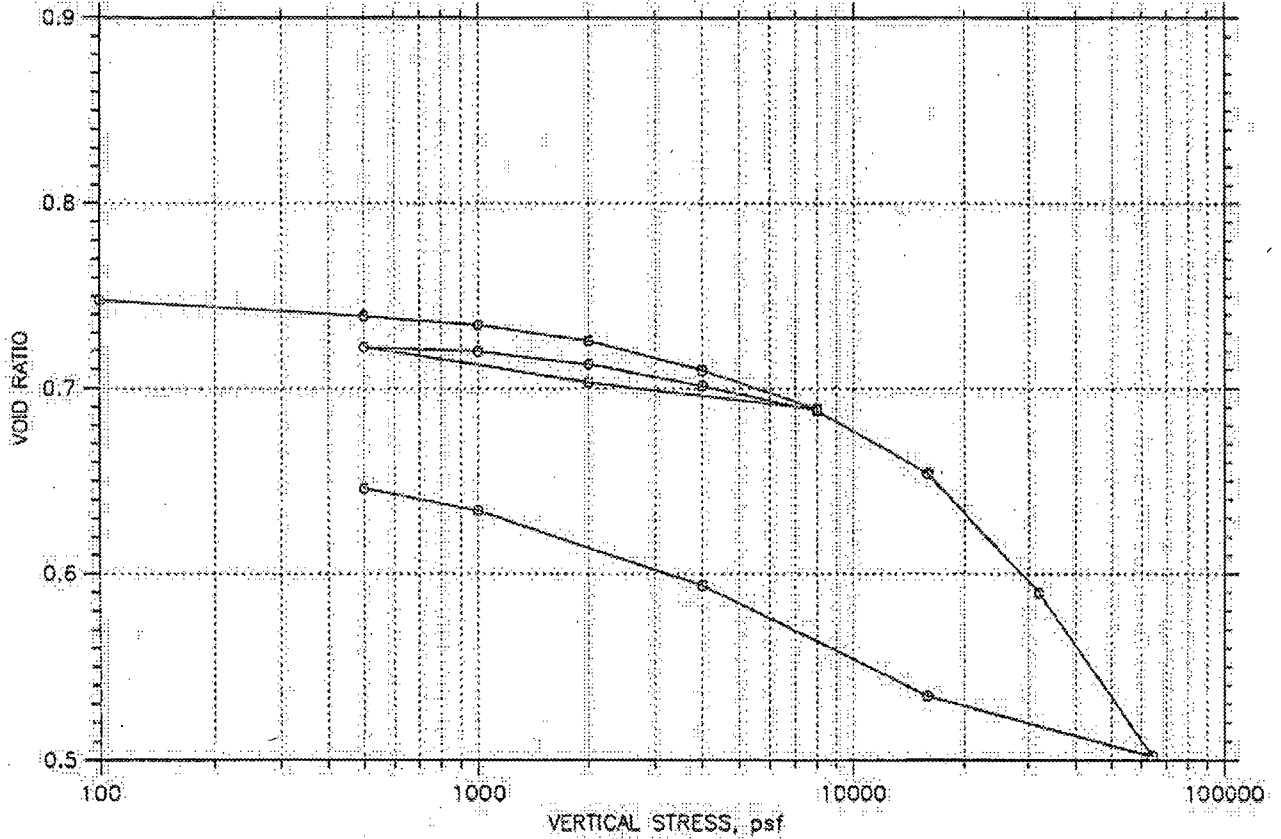
CONSOLIDATION TEST DATA SUMMARY REPORT



		Before Test	After Test
Overburden Pressure: 7400 psf		24.98	23.18
Preconsolidation Pressure: 1.848e+004 psf		97.57	103.9
Compression Index: 0.292		90.87	98.34
Diameter: 2.5 in	Height: 0.9965 in	0.75	0.65
LL: 60	PL: 22		
	PI: 38		
	OS: 2.74		

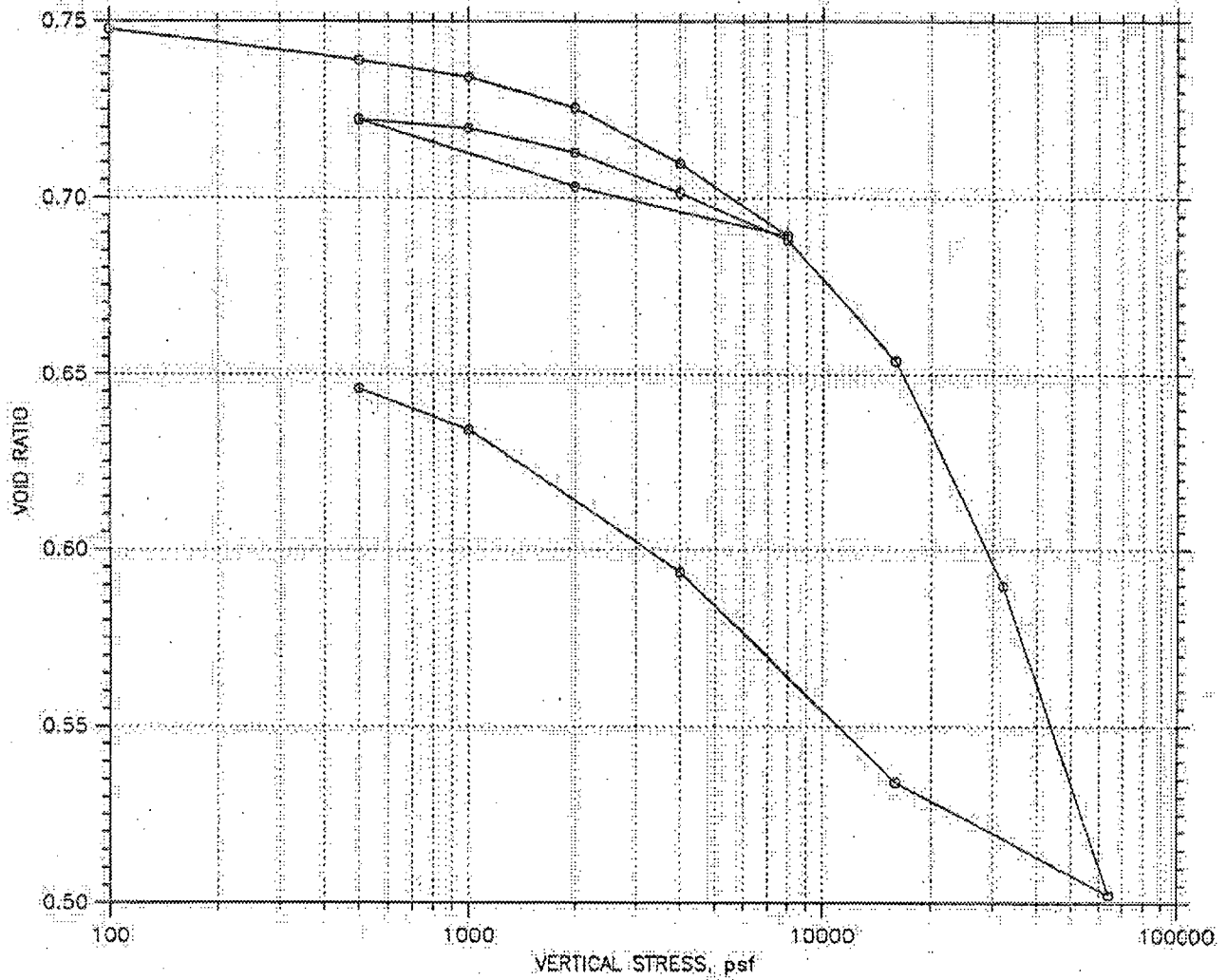
MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-2	Project No.: 6234084680
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-2	Test Date: 08/27/08	Depth: 108-110 ft
	Test No.: 8963	Sample Type: Undisturbed	Elevation: -77.6/-78.6
	Description: Light Greenish Gray Fat Clay (CH)		Cr = 0.027
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05) Task: 1.2		

CONSOLIDATION TEST DATA SUMMARY REPORT



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-2	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-2	Test Date: 08/27/08	Depth: 108-110 ft
	Test No.: 8963	Sample Type: Undisturbed	Elevation: -77.6/-79.6
	Description: Light Greenish Gray Fat Clay (CH)		Cr = 0.027
	Remarks: ASTM D2435-04 Method B, SC (ASTM D854-06), PI (ASTM D4318-05), Task 1.2		

CONSOLIDATION TEST DATA SUMMARY REPORT



		Before Test	After Test
Overburden Pressure: 7400 psf		24.98	23.18
Preconsolidation Pressure: 1.848e+004 psf		97.57	103.9
Compression Index: 0.292		90.87	98.34
Diameter: 2.5 in	Height: 0.9986 in	Void Ratio	
		0.75	0.55
LL: 60	PL: 22	PI: 38	GS: 2.74

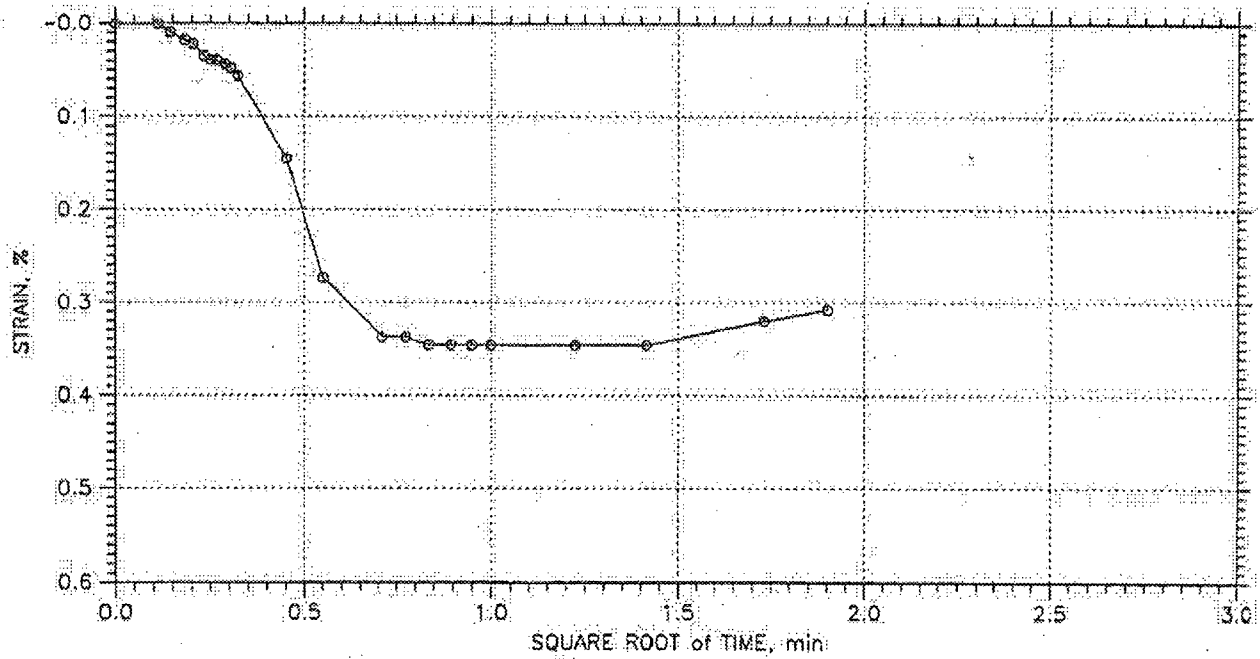
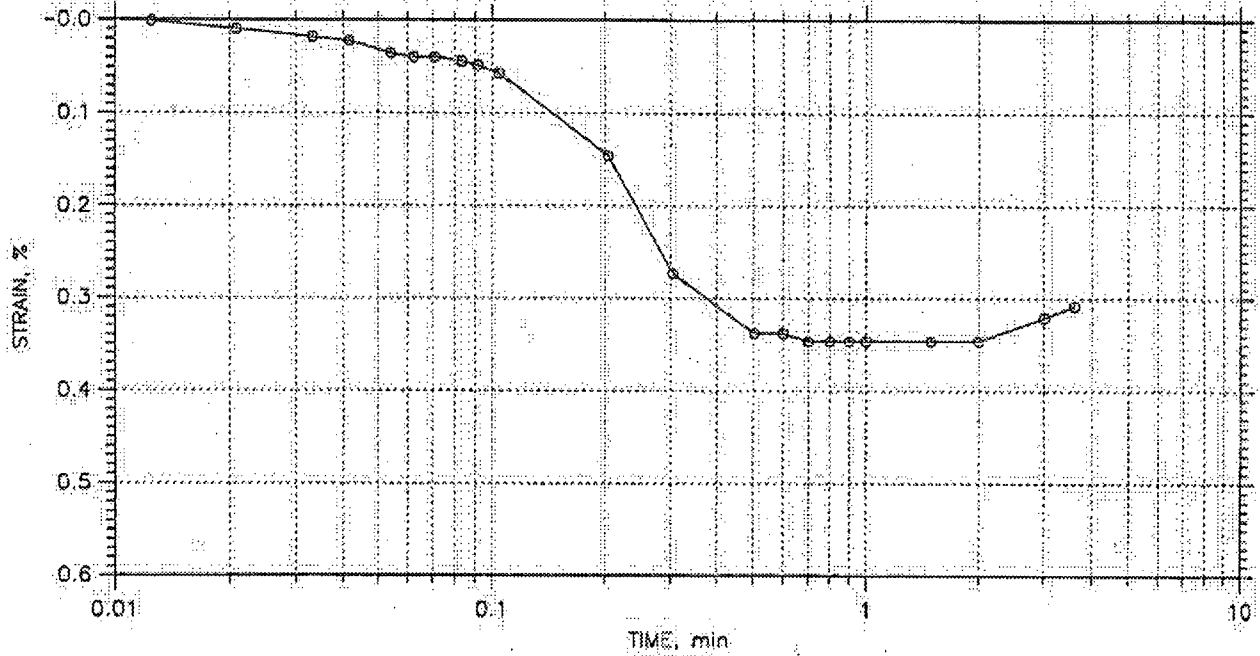
MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-2	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-2	Test Date: 08/27/08	Depth: 108-110 ft
	Test No.: 8963	Sample Type: Undisturbed	Elevation: -77.6/-79.6
	Description: Light Greenish Gray Fat Clay (CH)		Cr = 0.027
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05), Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 1 of 19

Stress: 100. psf



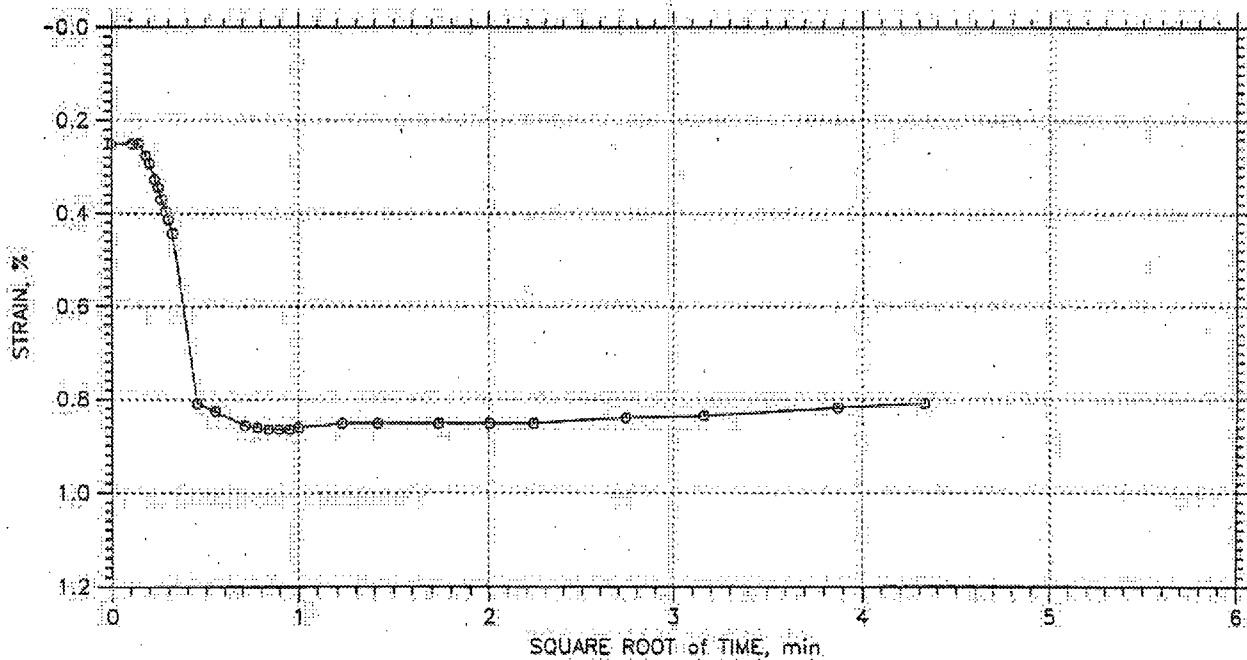
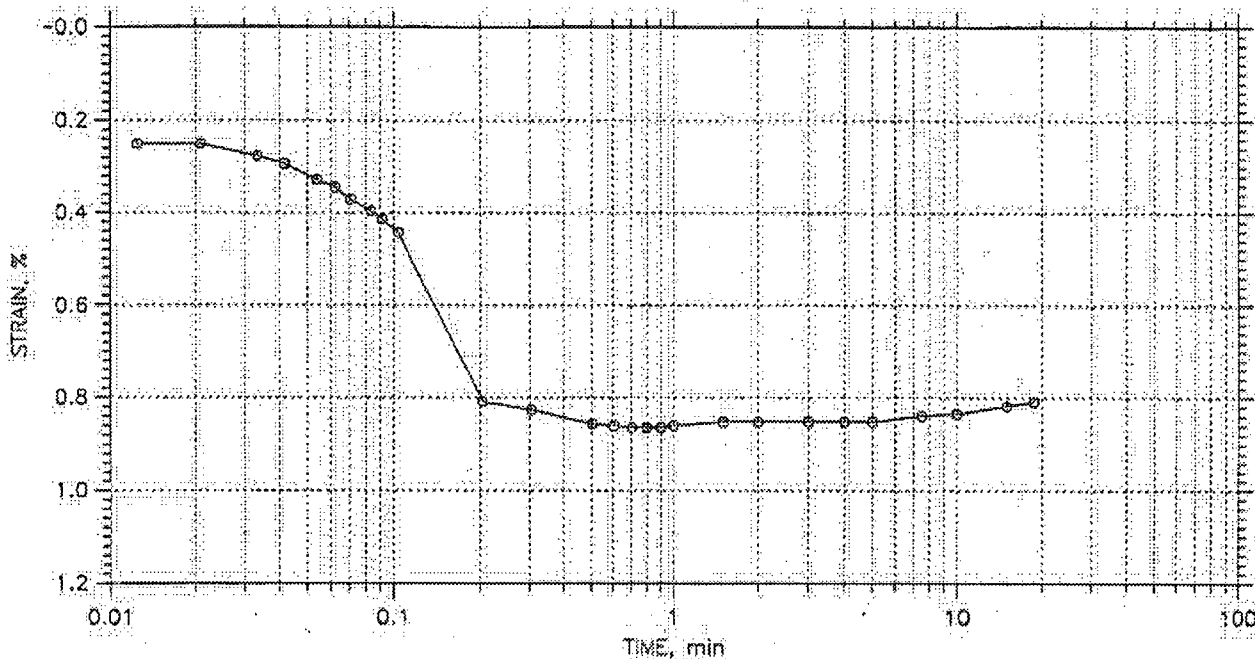
MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-2	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-2	Test Date: 08/27/08	Depth: 108-110 ft
	Test No.: 8963	Sample Type: Undisturbed	Elevation: -77.6/-79.6
	Description: Light Greenish Gray Fat Clay (CH)	Cr = 0.027	
	Remarks: ASTM D2435-04 Method B. SG (ASTM D854-06), PI (ASTM D4318-05). Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 2 of 19

Stress: 500. psf



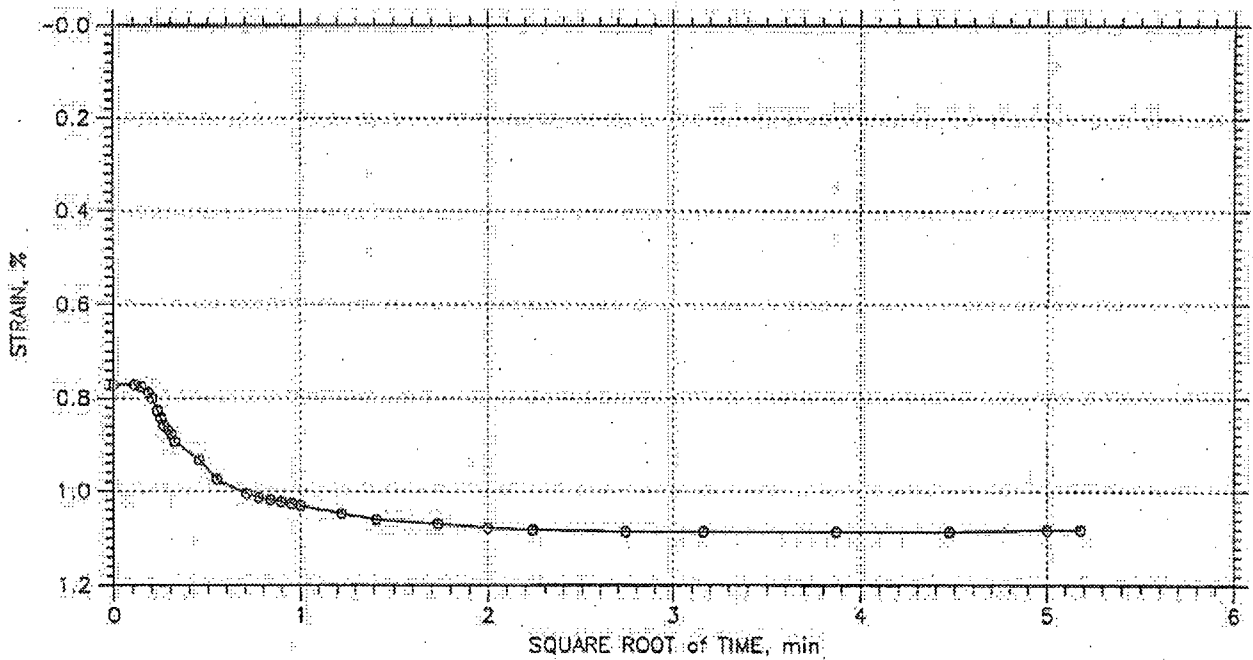
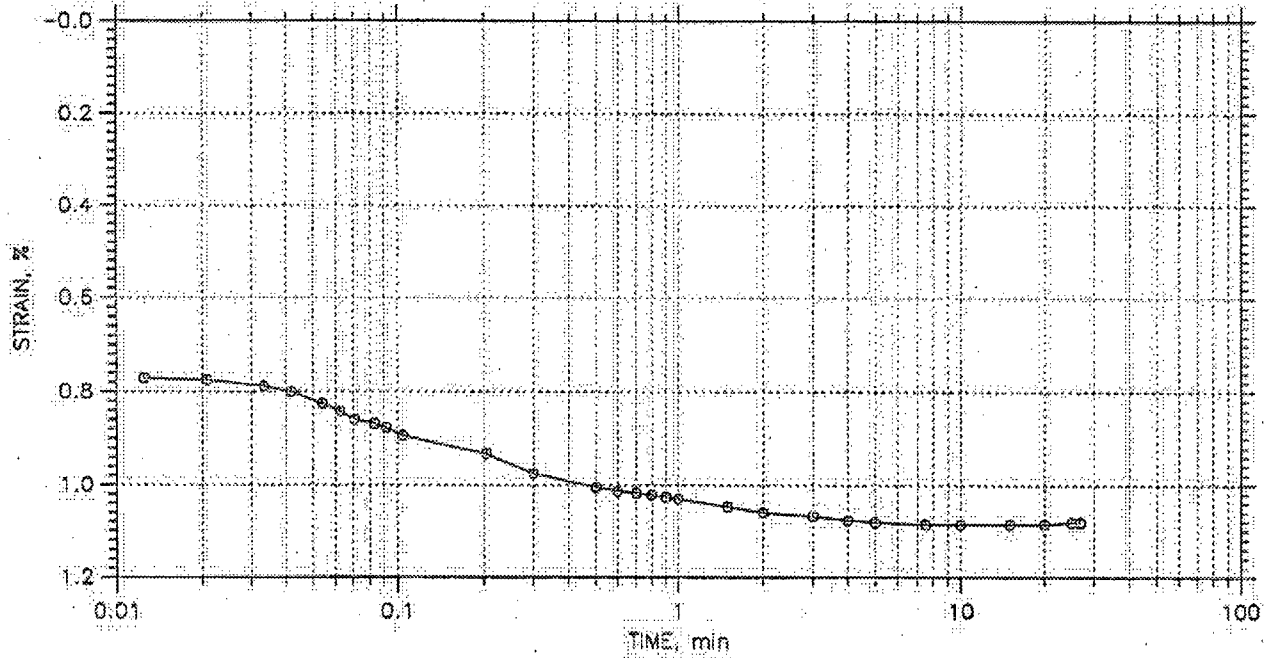
MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-2	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-2	Test Date: 08/27/08	Depth: 108-110 ft
	Test No.: B963	Sample Type: Undisturbed	Elevation: -77.6/-79.6
	Description: Light Greenish Gray Fat Clay (CH)	Cr = 0.027	
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05). Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 3 of 19

Stress: 1000. psf



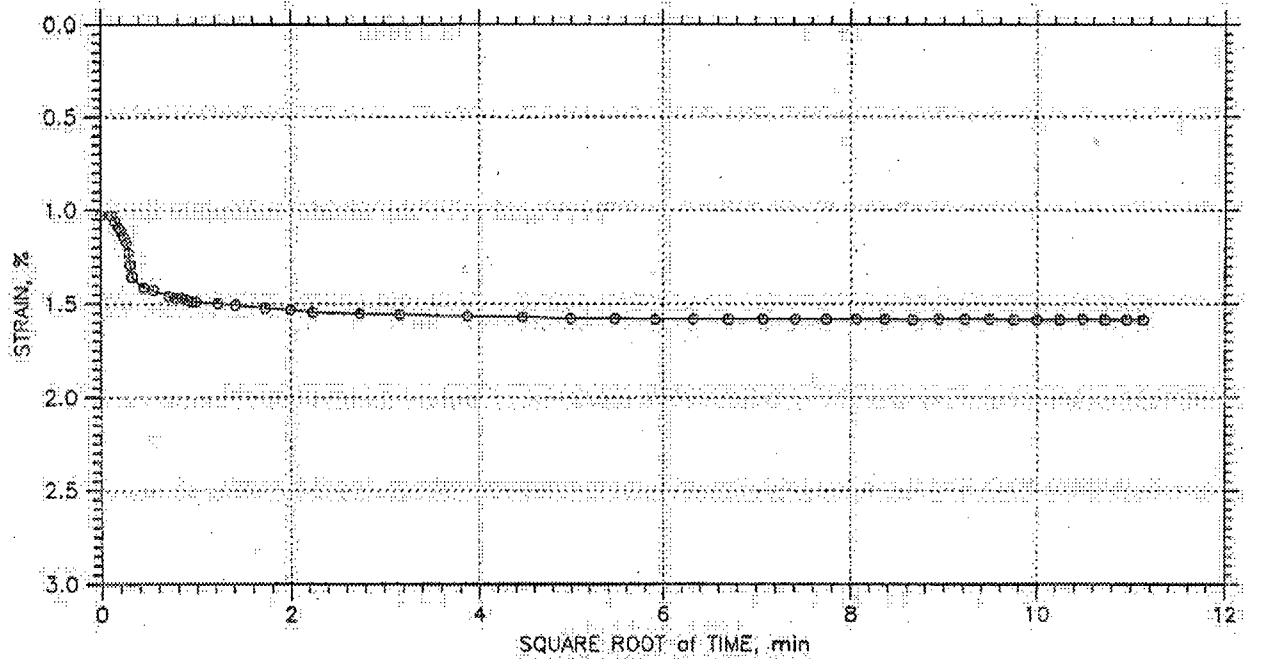
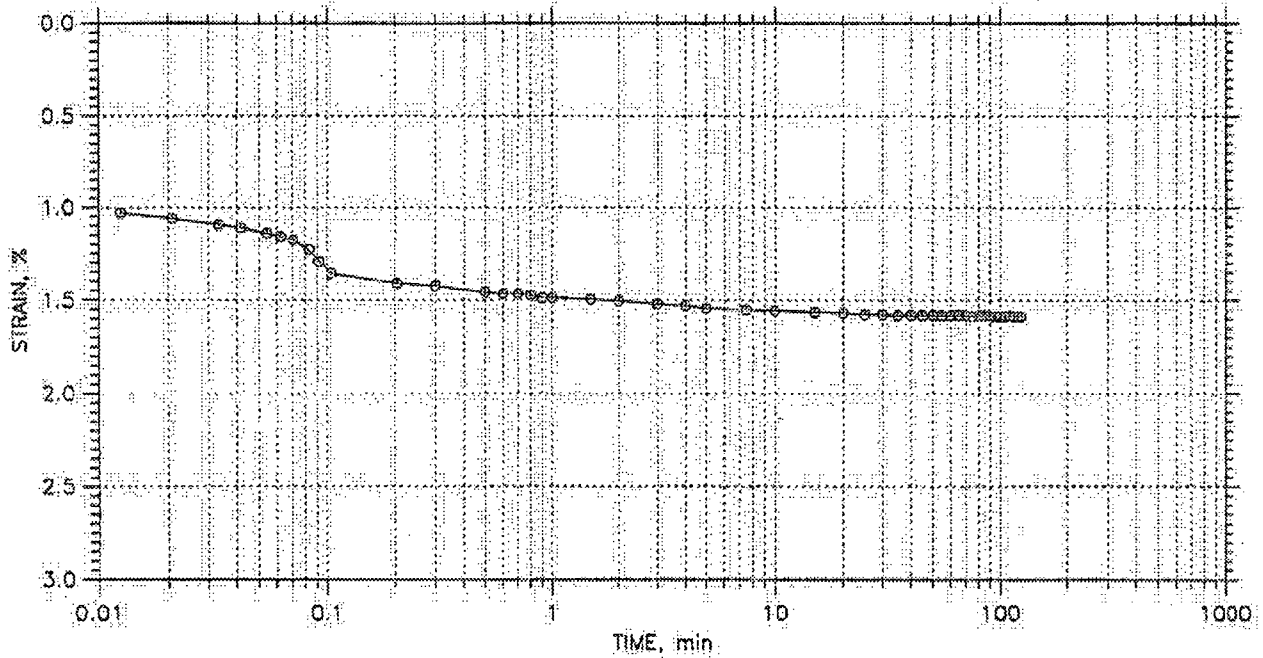
MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-2	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-2	Test Date: 08/27/08	Depth: 108-110 ft
	Test No.: 8963	Sample Type: Undisturbed	Elevation: -77.6/-79.6
	Description: Light Greenish Gray Fat Clay (CH)		Cr = 0.027
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05). Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 4 of 19

Stress: 2000. psf



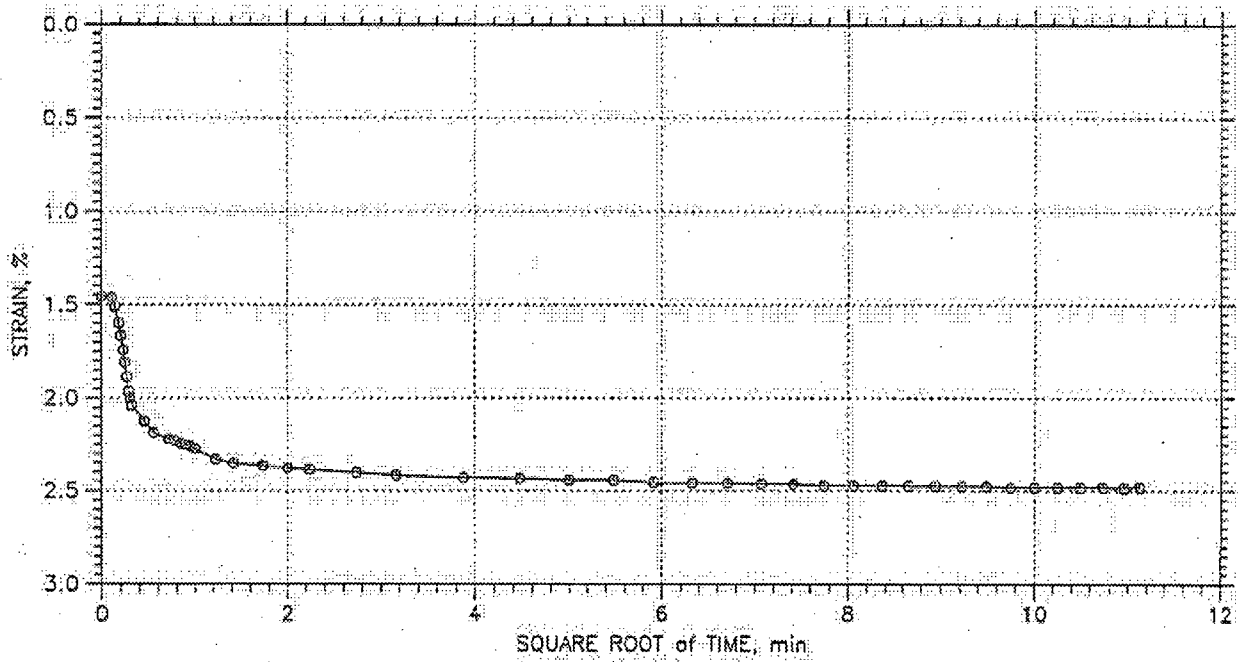
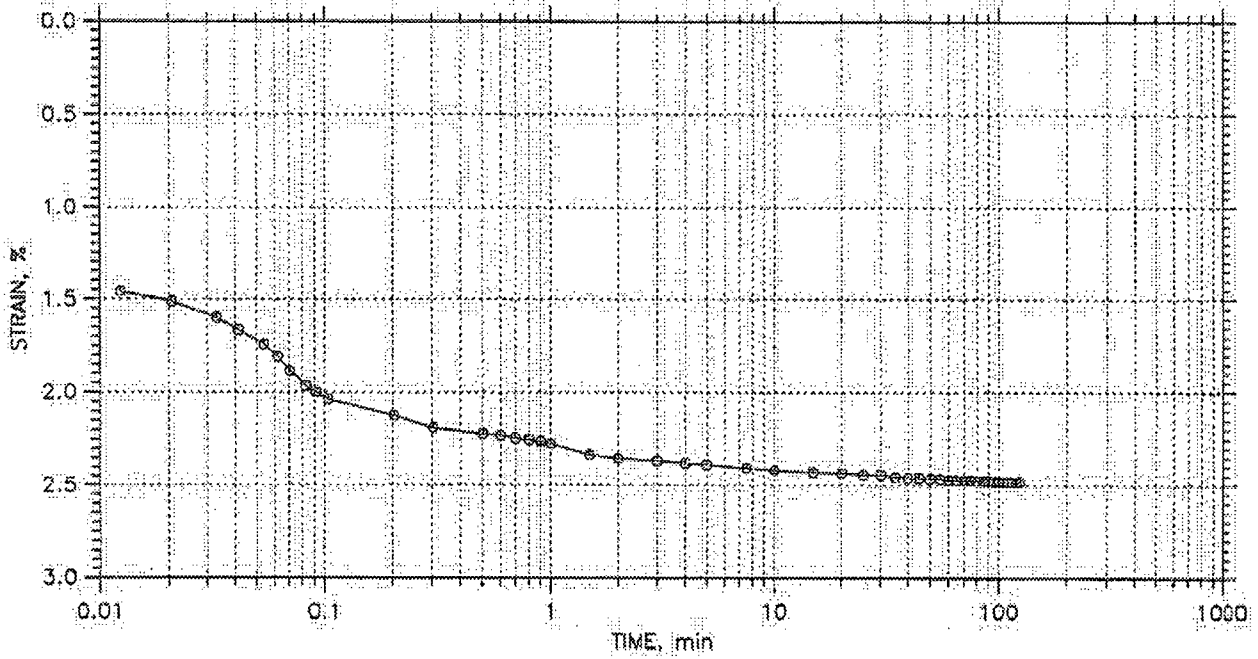
MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-2	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-2	Test Date: 08/27/08	Depth: 108-110 ft
	Test No.: 8963	Sample Type: Undisturbed	Elevation: -77.6/-79.6
	Description: Light Greenish Gray Fat Clay (CH)	Cr = 0.027	
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06); PI (ASTM D4318-05); Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 5 of 19

Stress: 4000. psf



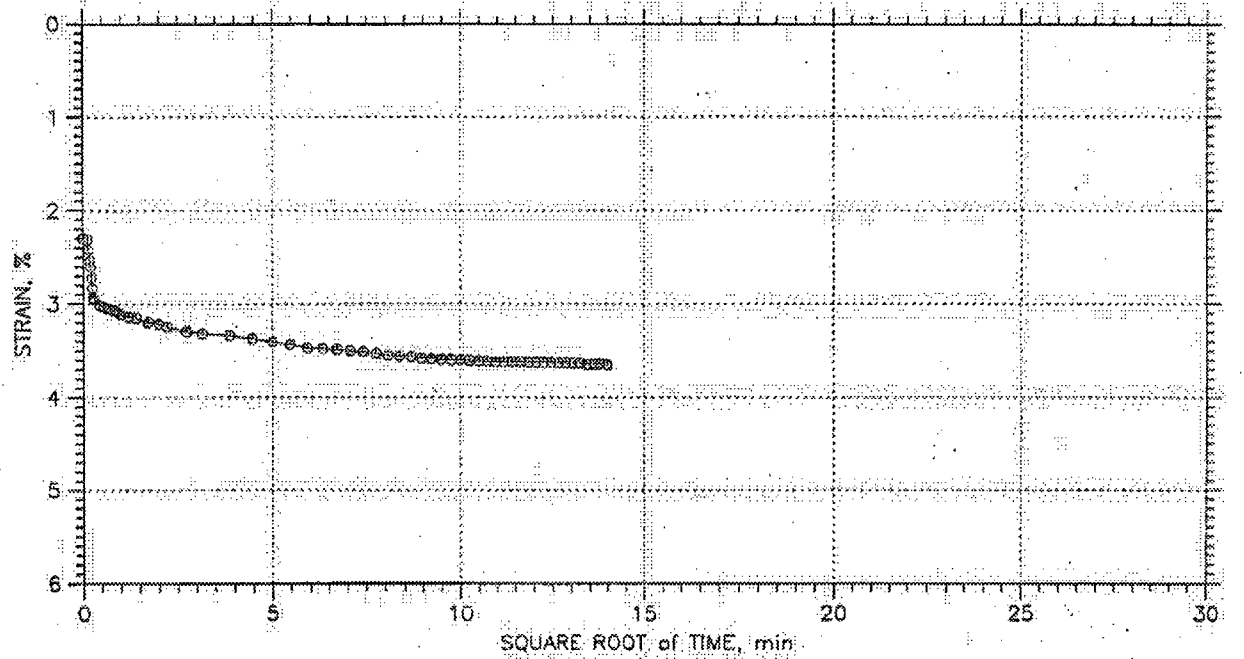
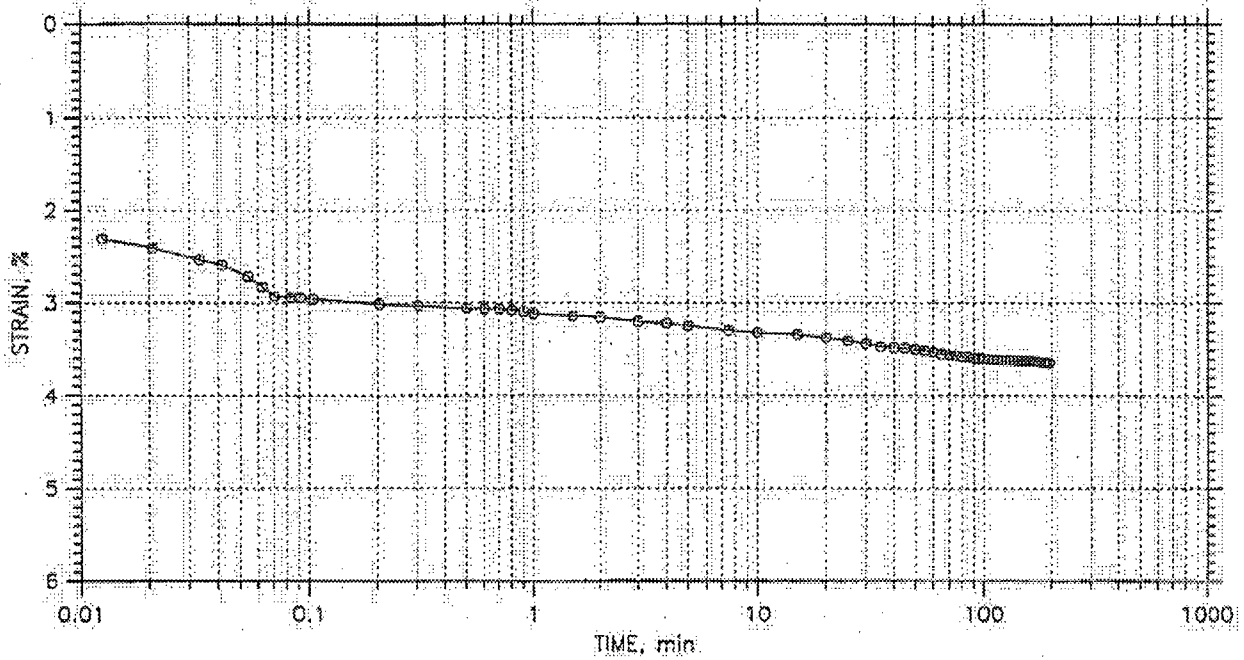
MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-2	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-2	Test Date: 08/27/08	Depth: 108-110 ft
	Test No.: 8963	Sample Type: Undisturbed	Elevation: -77.6/-79.6
	Description: Light Greenish Gray Fat Clay (CH)	Cr = 0.027	
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-08), Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 6 of 19

Stress: 8000. psf



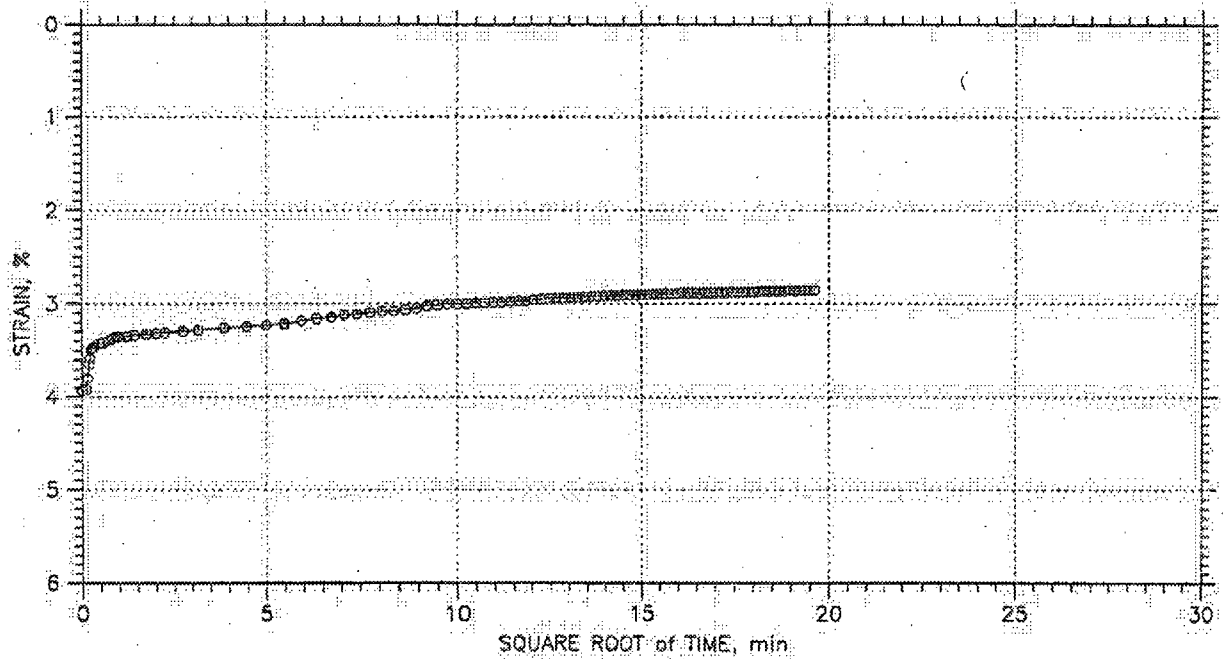
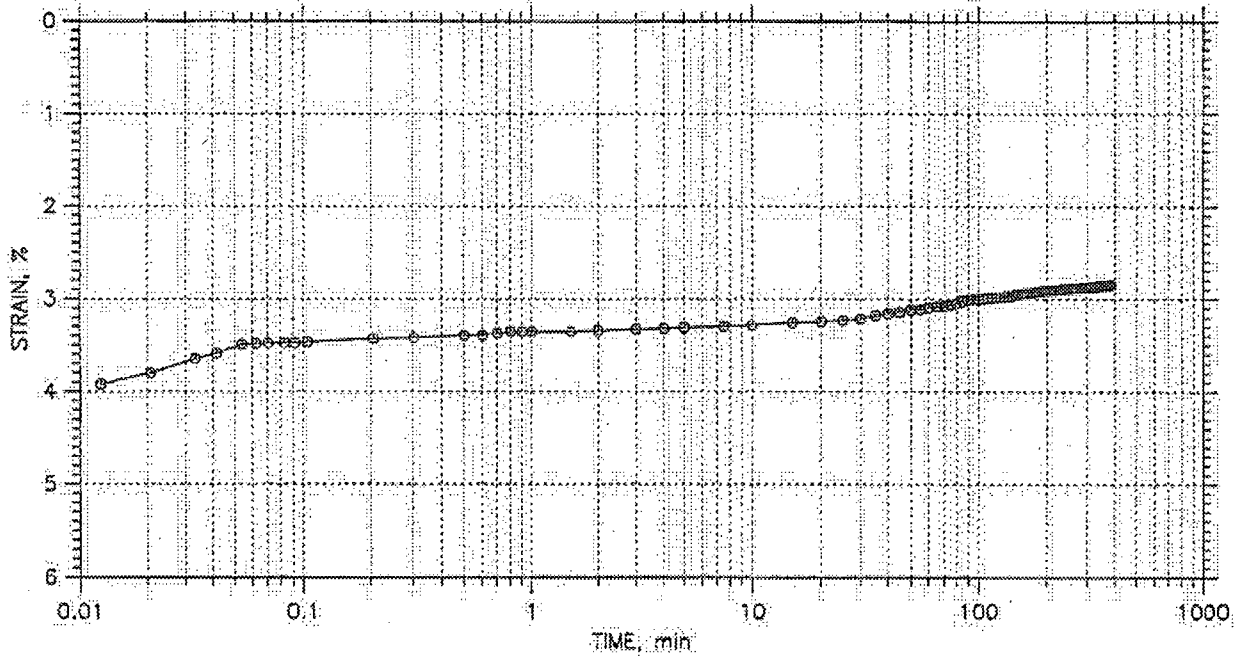
MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-2	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-2	Test Date: 08/27/08	Depth: 108-110 ft
	Test No.: B963	Sample Type: Undisturbed	Elevation: -77.6/-79.6
	Description: Light Greenish Gray Fat Clay (CH)	Cr = 0.027	
	Remarks: ASTM D2435-04 Method B; SG (ASTM D854-06), PI (ASTM D4318-05); Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 7 of 19

Stress: 2000. psf



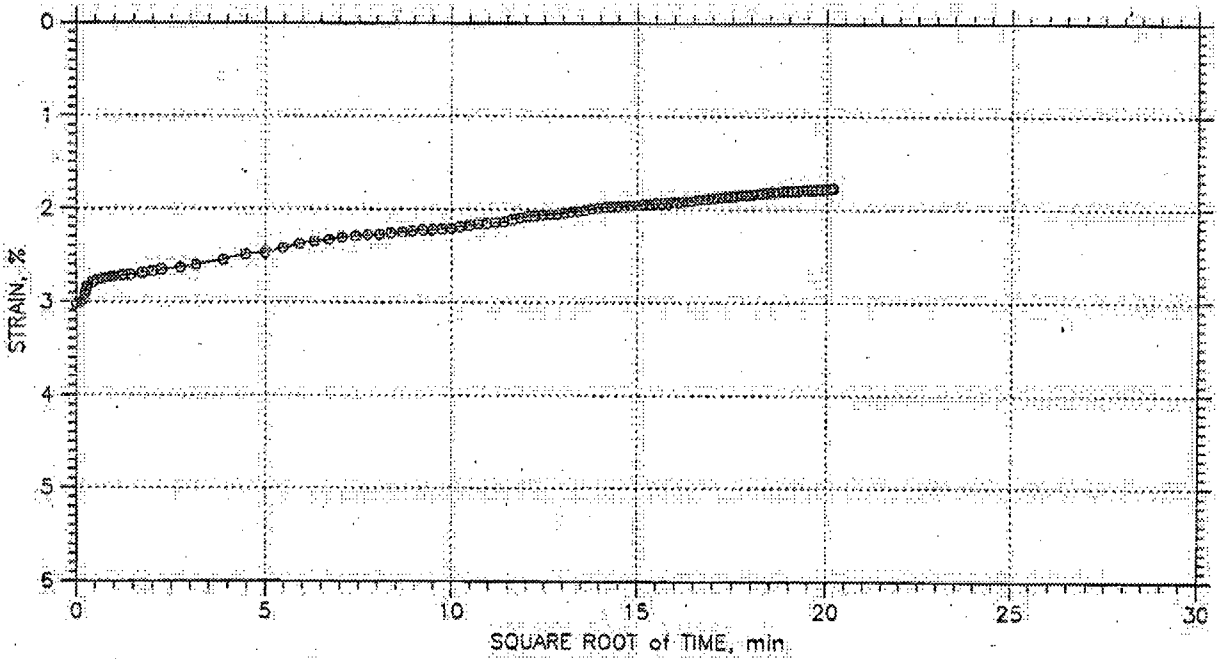
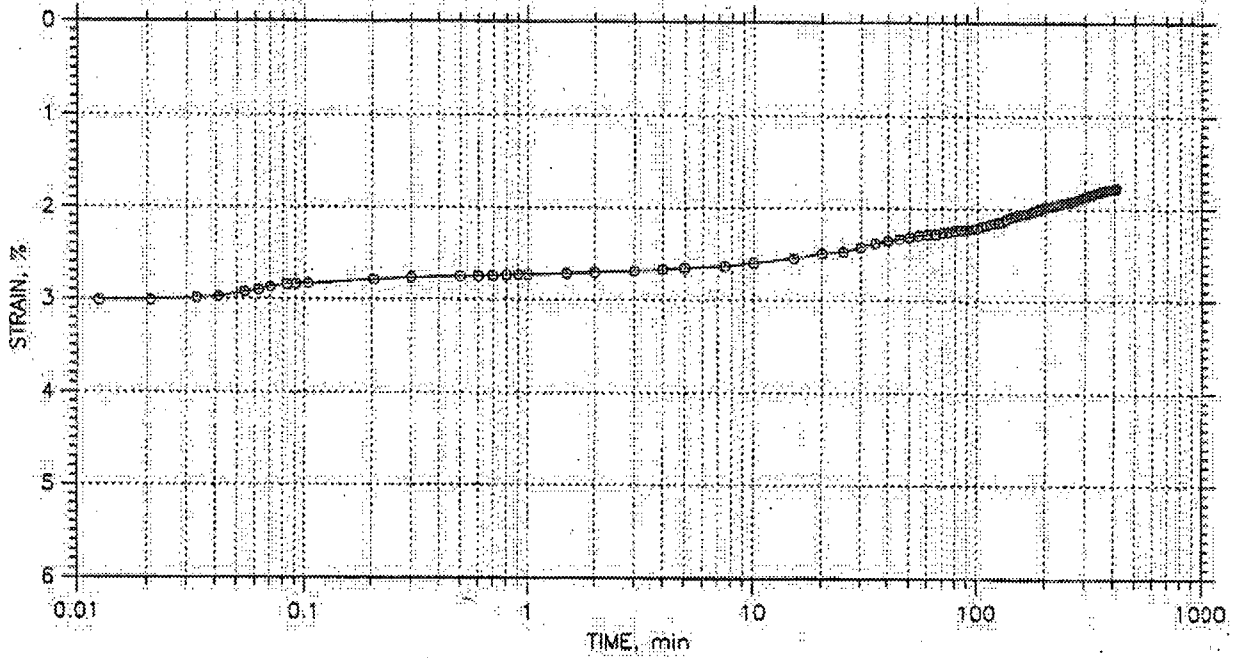
MACTEC	Project: STP Units 3 & 4.	Location: U4-1A UD-2	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-2	Test Date: 08/27/08	Depth: 108-110' ft
	Test No.: 8963	Sample Type: Undisturbed	Elevation: -77.6/-79.6
	Description: Light Greenish Gray Fat Clay (CH)		Cr = 0.027
	Remarks: ASTM D2435-04 Method B; SG (ASTM D854-06), PI (ASTM D4318-05). Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 8 of 19

Stress: 500. psf



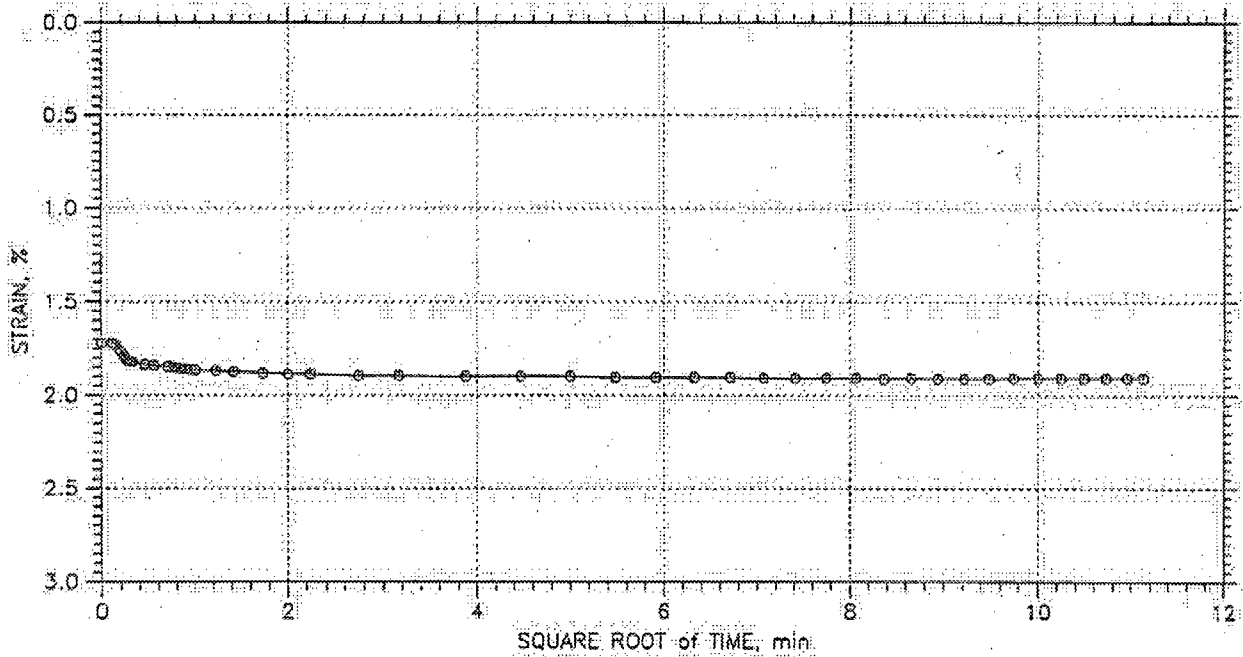
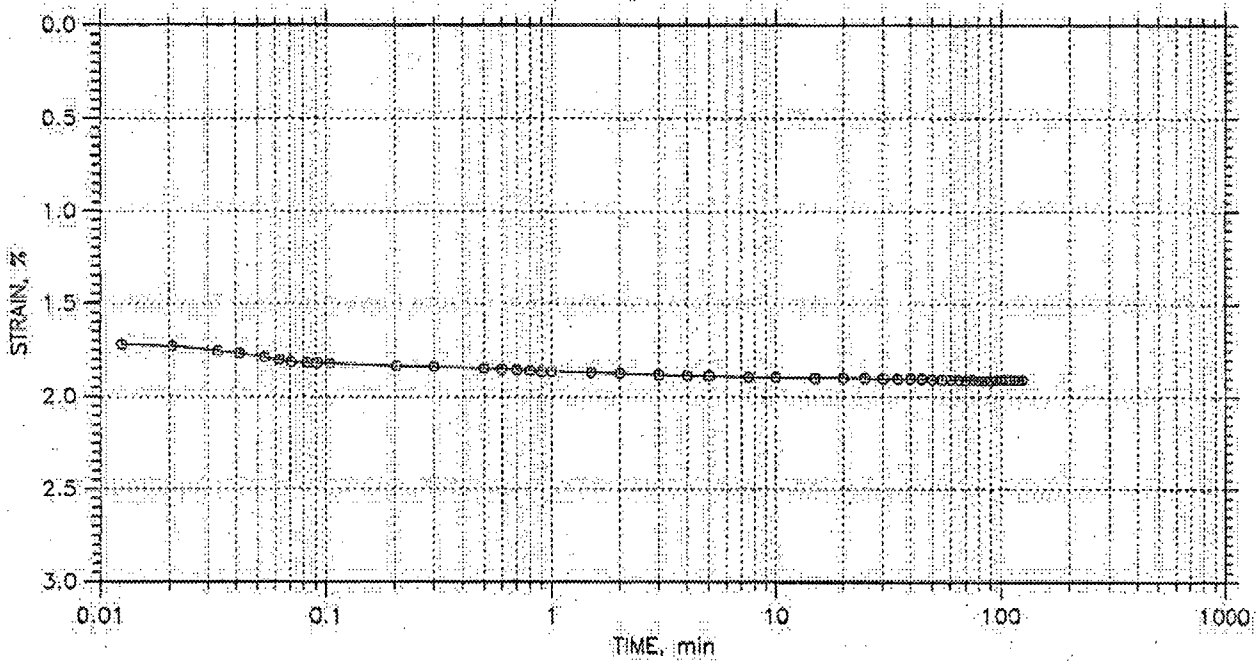
MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-2	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-2	Test Date: 08/27/08	Depth: 108-110 ft
	Test No.: 8963	Sample Type: Undisturbed	Elevation: -77.6/-79.6
	Description: Light Greenish Gray Fat Clay (CH)	Cr = 0.027	
	Remarks: ASTM D2435-04 Method B. SG (ASTM D854-06), PI (ASTM D4318-05). Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 9 of 19

Stress: 1000. psf



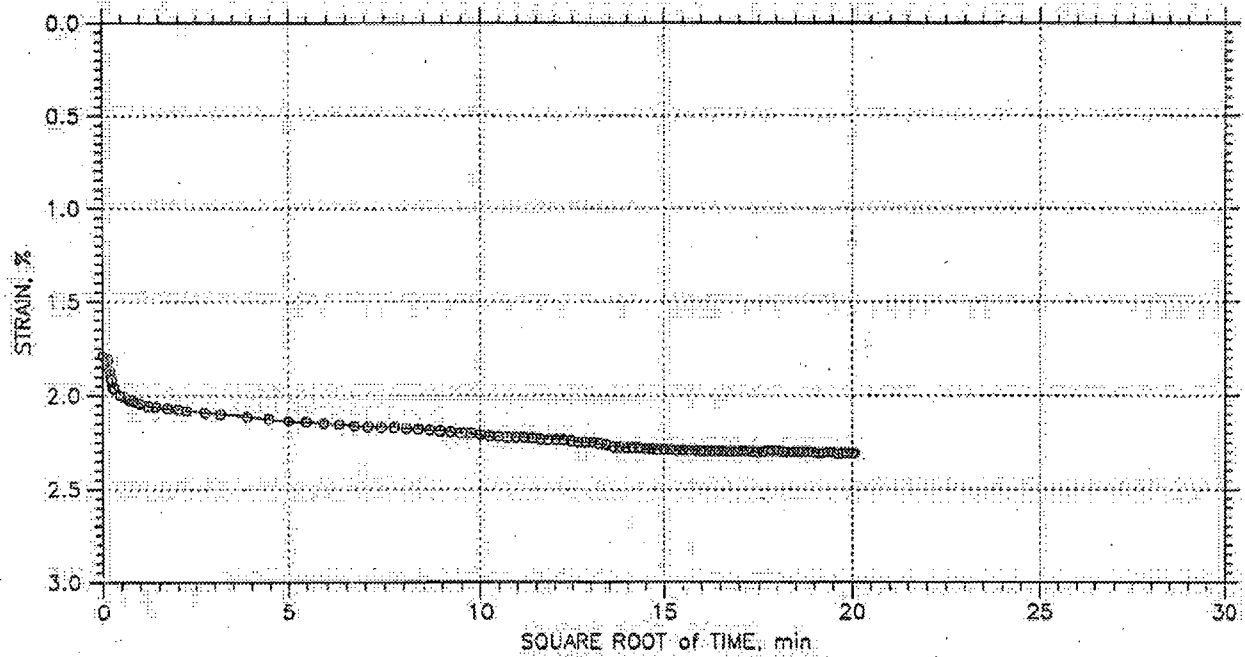
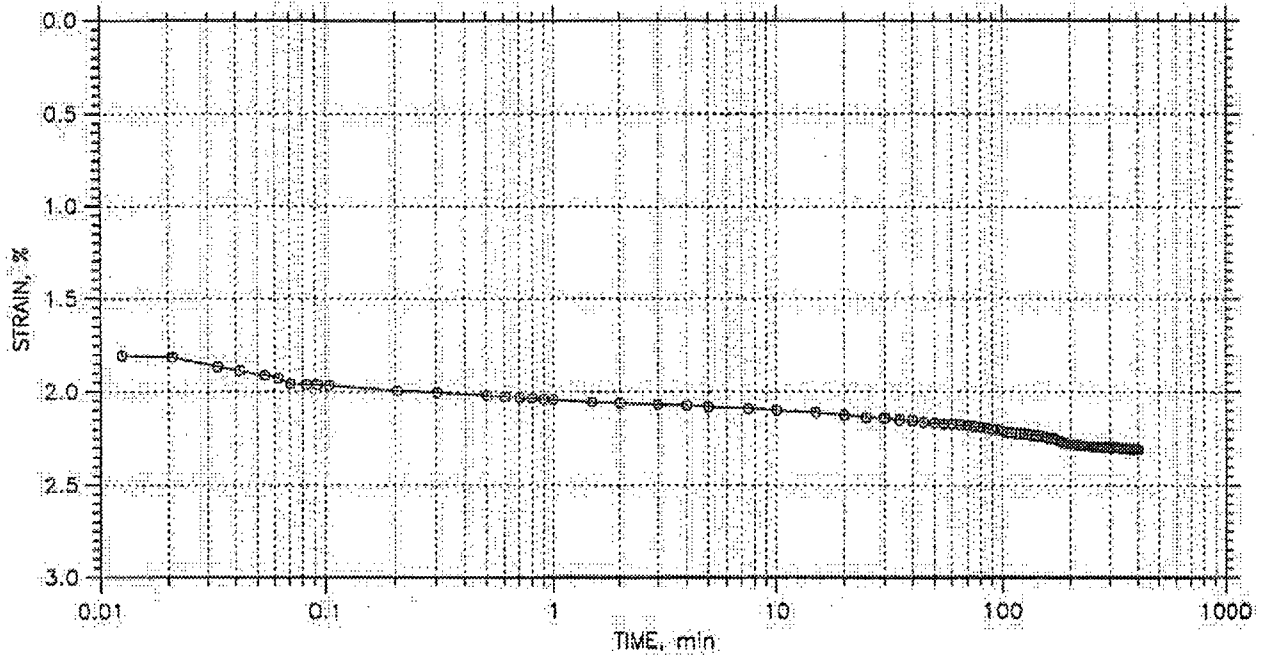
MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-2	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-2	Test Date: 08/27/08	Depth: 108-110 ft
	Test No.: 8963	Sample Type: Undisturbed	Elevation: -77.6/-79.6
	Description: Light Greenish Gray Fat Clay (CH)		Cr = 0.027
	Remarks: ASTM D2435-04 Method B. SG (ASTM D854-06), PI (ASTM D4318-05). Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 10 of 19

Stress: 2000 psf



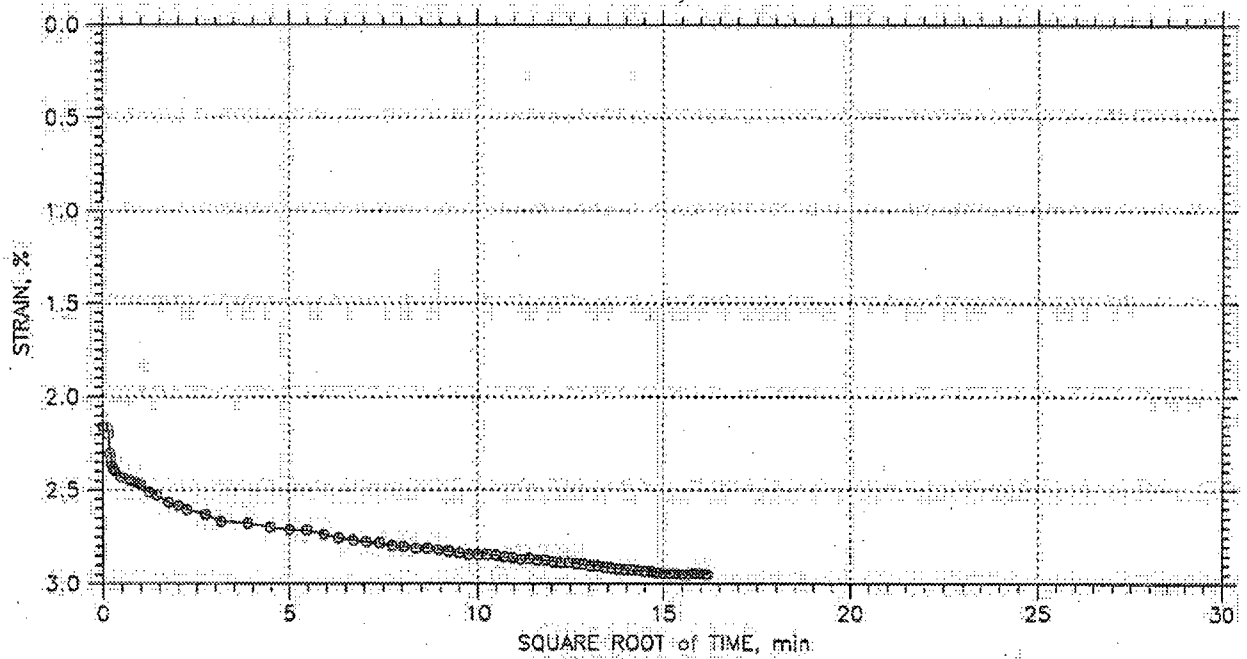
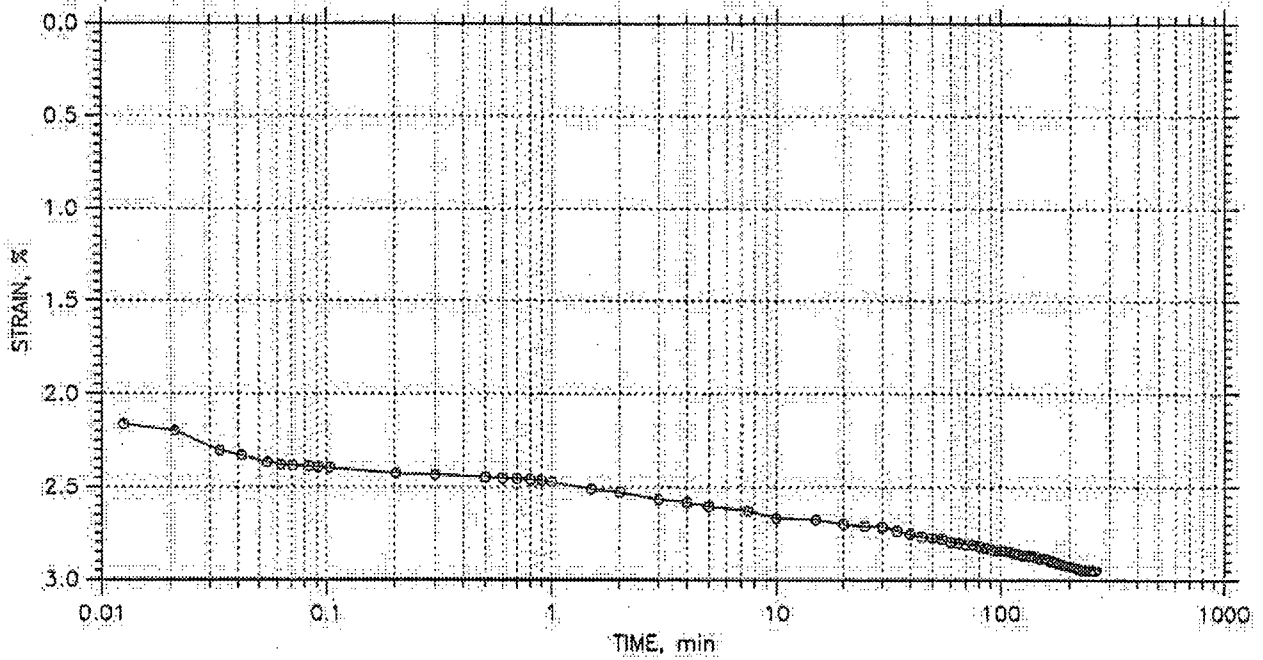
MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-2	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-2	Test Date: 08/27/08	Depth: 108-110 ft
	Test No.: 8963	Sample Type: Undisturbed	Elevation: -77.6/-79.6
	Description: Light Greenish Gray Fat Clay (CH)	Cr = 0.027	
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05), Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 11 of 19

Stress: 4000. psf



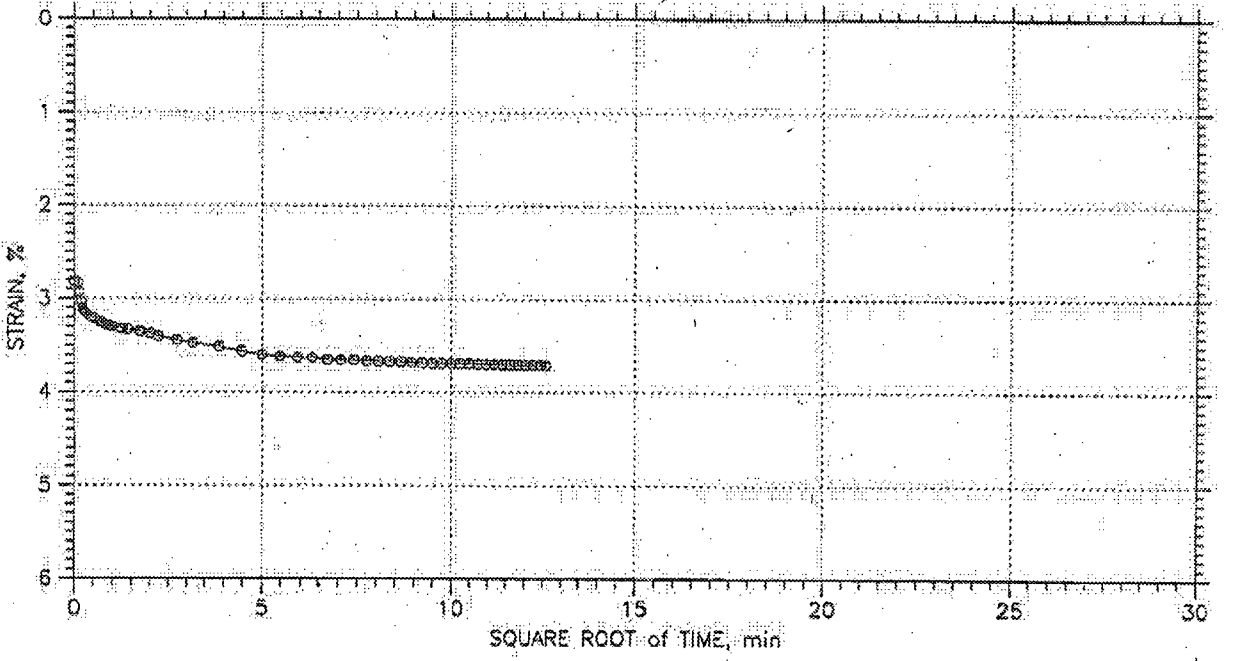
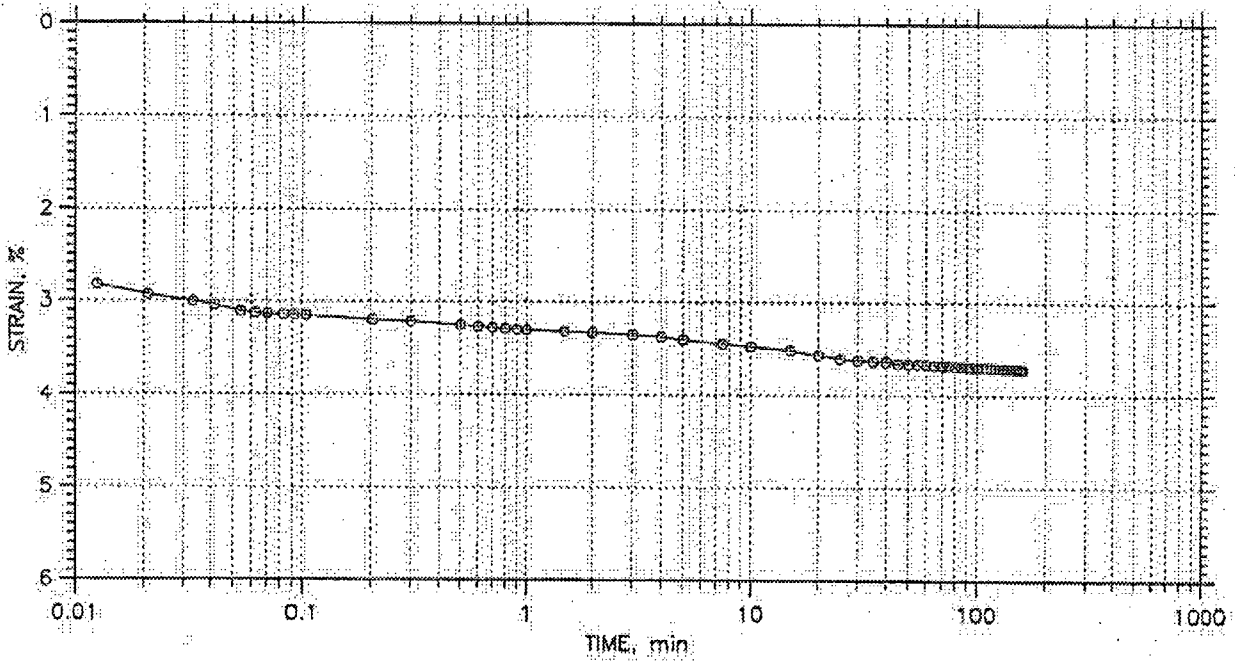
MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-2	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-2	Test Date: 08/27/08	Depth: 108-110 ft
	Test No.: 8963	Sample Type: Undisturbed	Elevation: -77.6/-79.6
	Description: Light Greenish Gray Fat Clay (CH)		Cr = 0.027
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05), Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

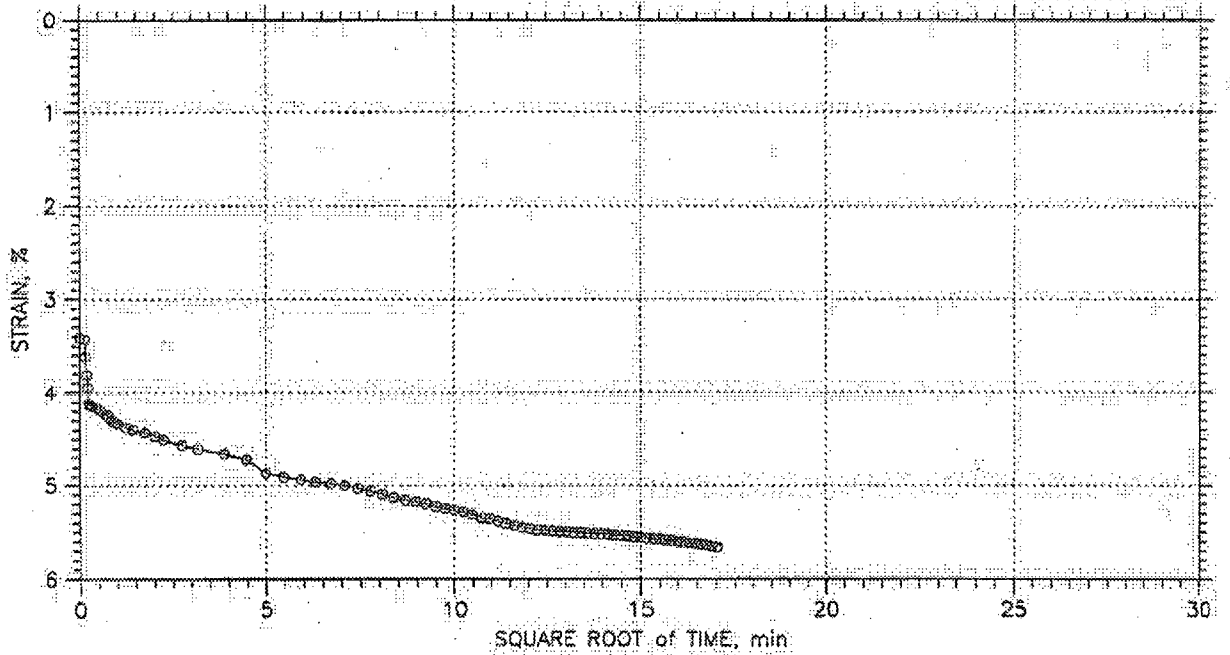
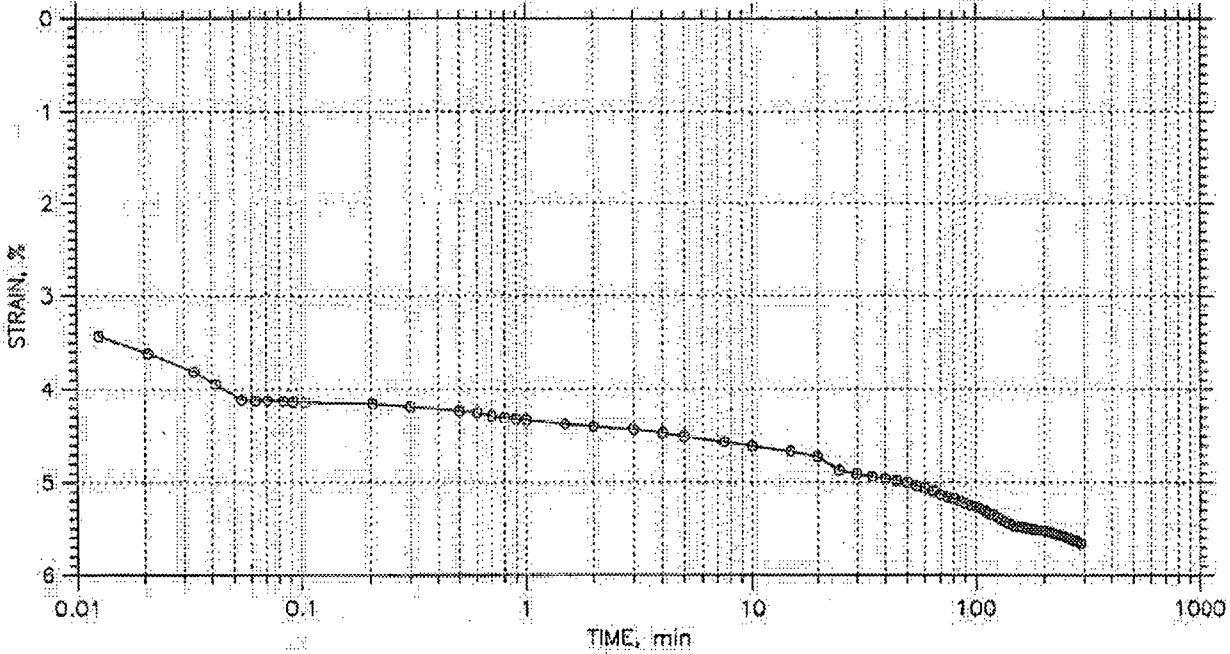
Constant Load Step: 12 of 19

Stress: 8000. psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-2	Project No. 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-2	Test Date: 08/27/08	Depth: 108-110 ft
	Test No.: 8963	Sample Type: Undisturbed	Elevation: -77.6/-79.6
	Description: Light Greenish Gray Fat Clay (CH)	Cr = 0.027	
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05). Task 1.2		

CONSOLIDATION TEST DATA
 TIME CURVES
 Constant Load Step: 13 of 19
 Stress: 16000 psf



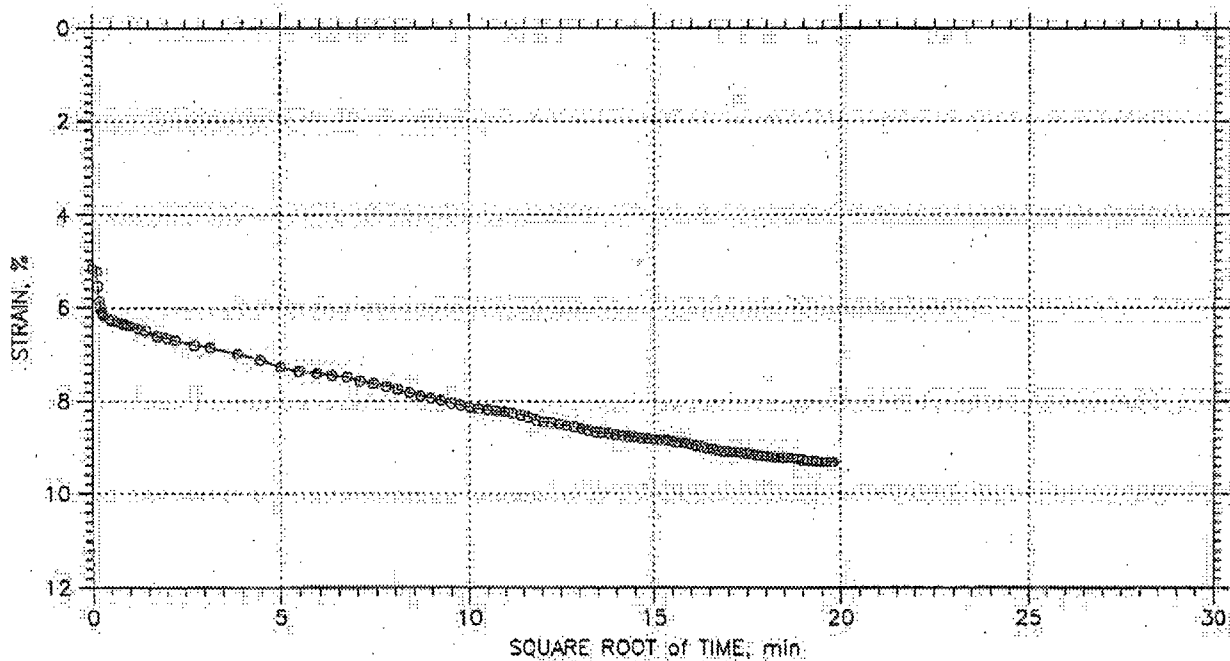
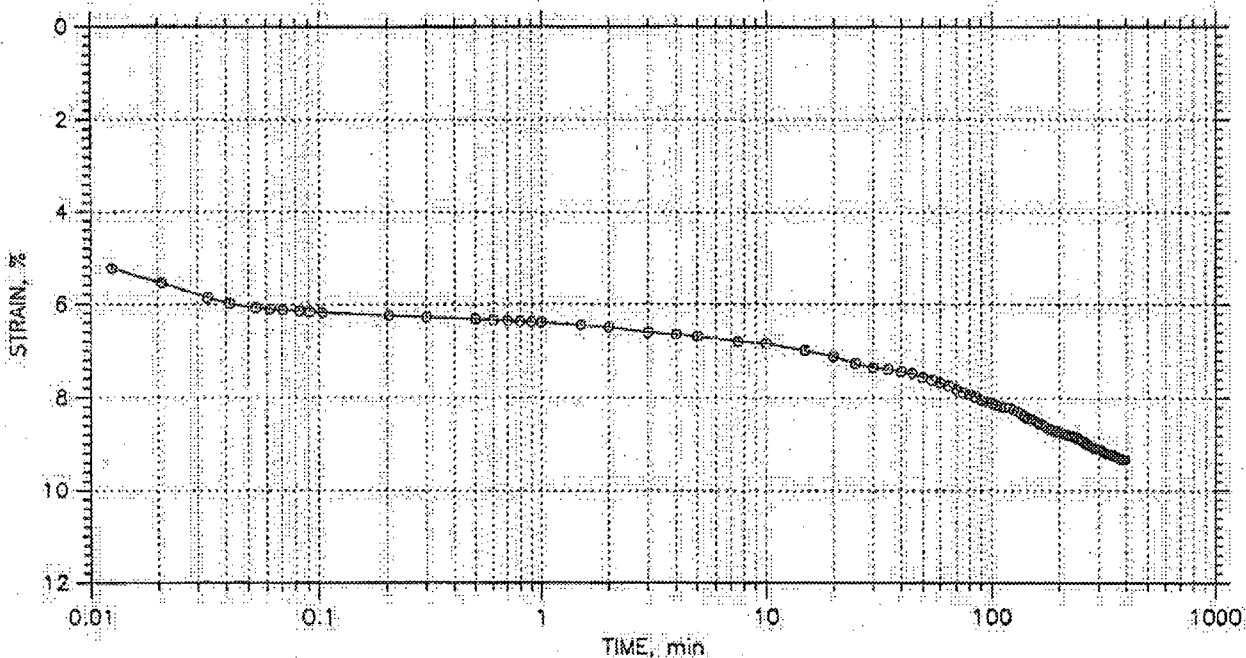
MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-2	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-2	Test Date: 08/27/08	Depth: 108-110 ft
	Test No.: B963	Sample Type: Undisturbed	Elevation: -77.6/-79.6
	Description: Light Greenish Gray Fat Clay (CH)	Cr = 0.027	
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05). Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

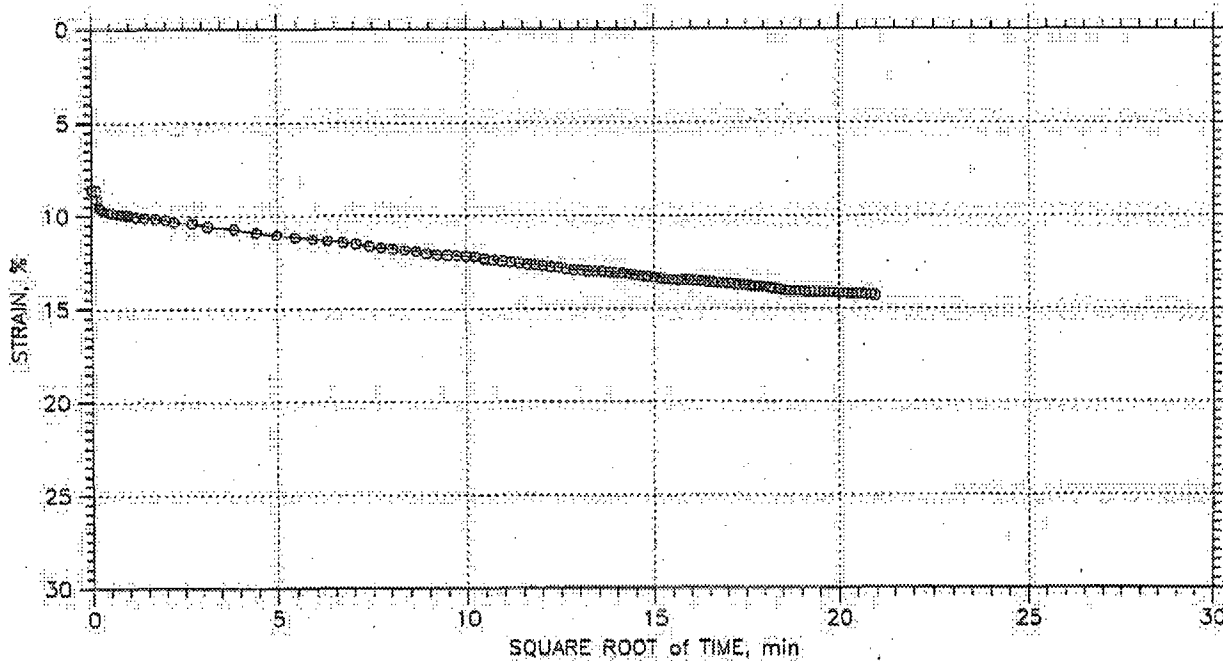
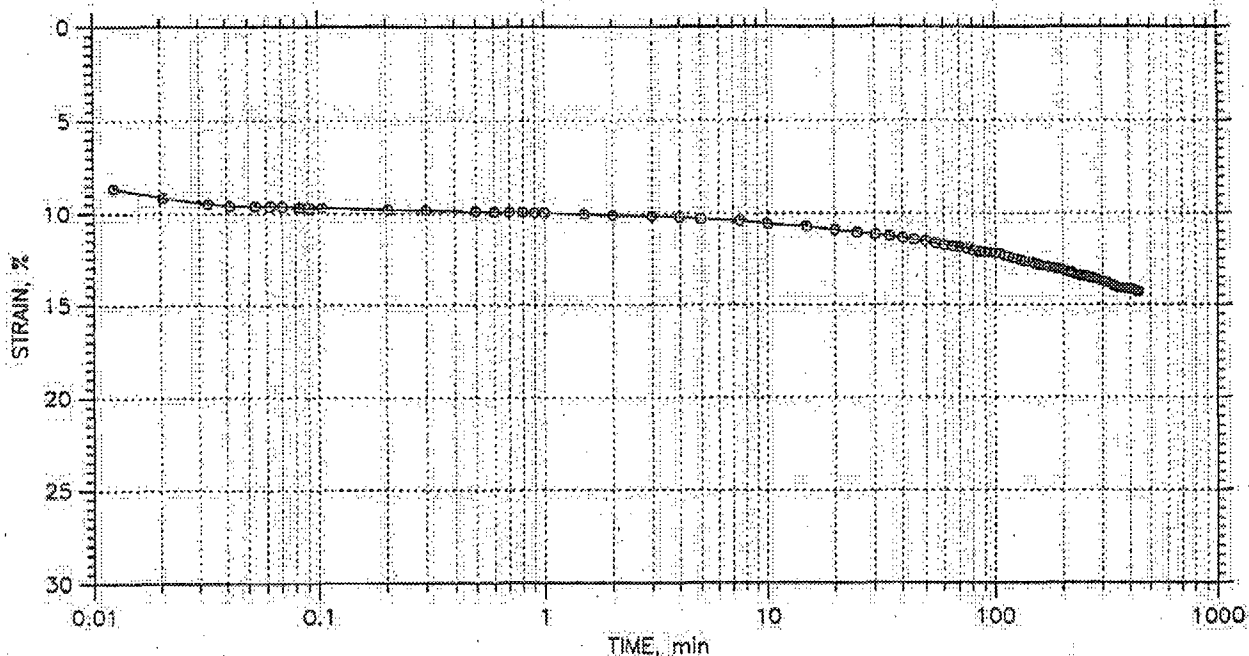
Constant Load Step: 14 of 19

Stress: 32000 psf



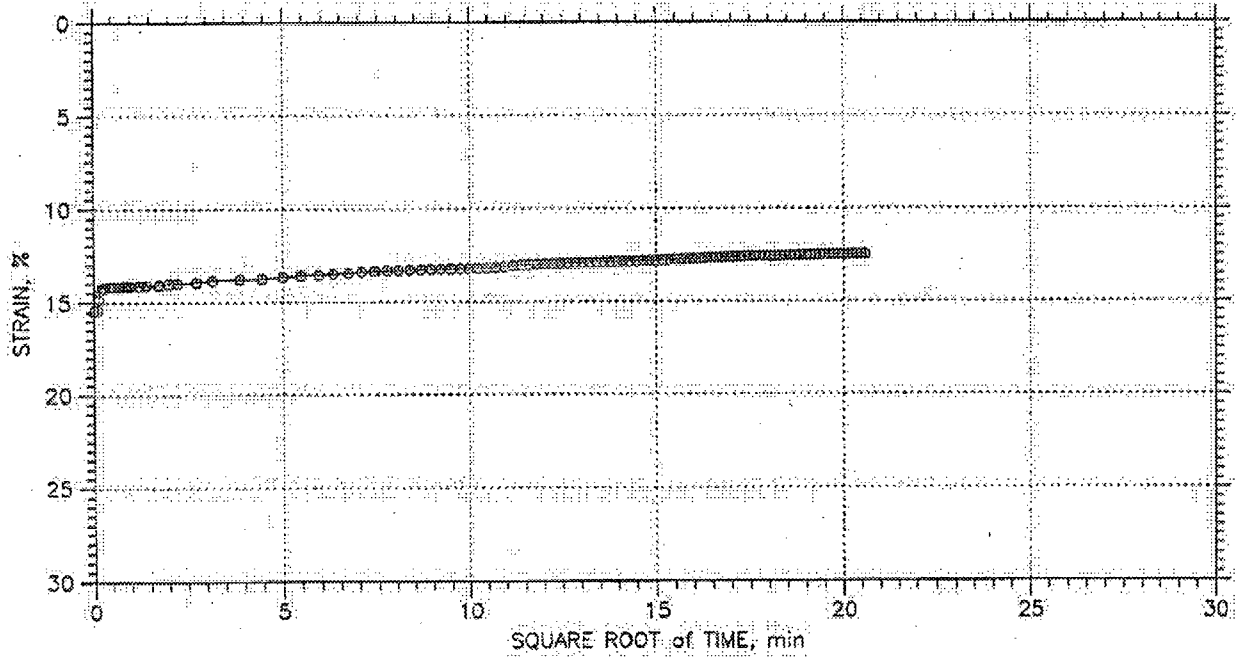
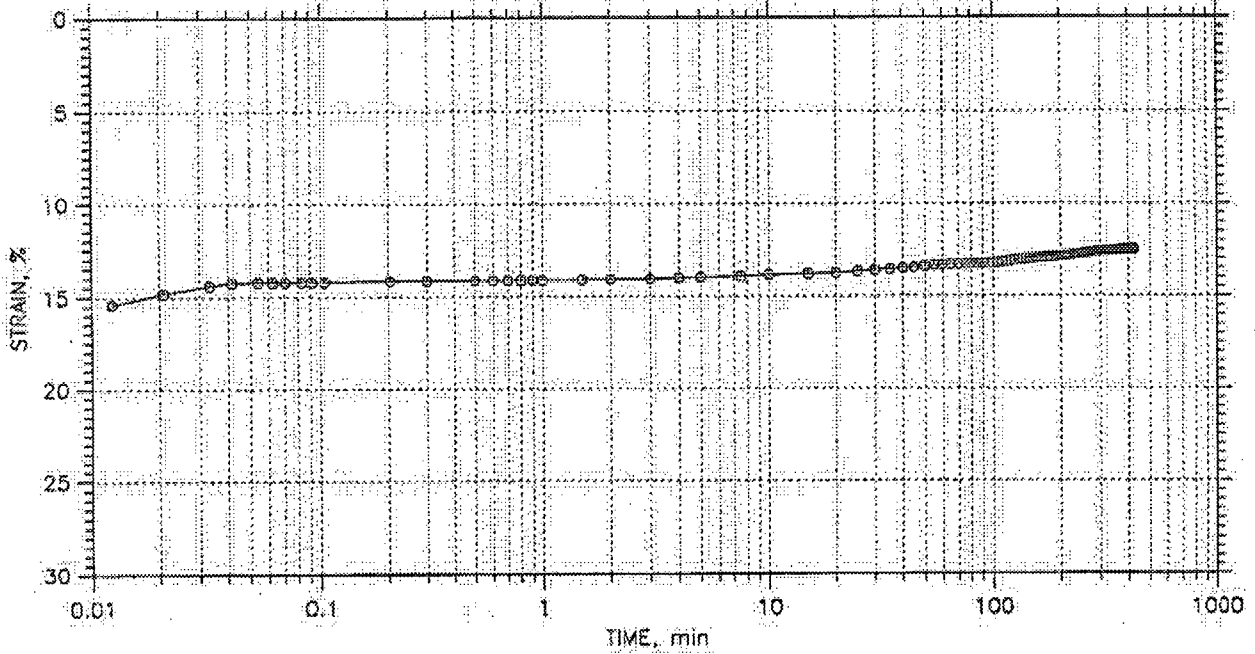
MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-2	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-2	Test Date: 08/27/08	Depth: 108-110 ft
	Test No.: 8963	Sample Type: Undisturbed	Elevation: -77.6/-79.6
	Description: Light Greenish Gray Fat Clay (CH)	Cr = 0.027	
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05), Task 1.2		

CONSOLIDATION TEST DATA
TIME CURVES
 Constant Load Step: 15 of 19
 Stress: 64000 psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-2	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-2	Test Date: 08/27/08	Depth: 108-110 ft
	Test No.: 8963	Sample Type: Undisturbed	Elevation: -77.6/-79.6
	Description: Light Greenish Gray Fat Clay (CH)	Cr = 0.027	
	Remarks: ASTM D2435-04 Method B; SG (ASTM D854-06), PI (ASTM D4318-05); Task 1.2		

CONSOLIDATION TEST DATA
TIME CURVES
 Constant Load Step: 16 of 19
 Stress: 16000 psf



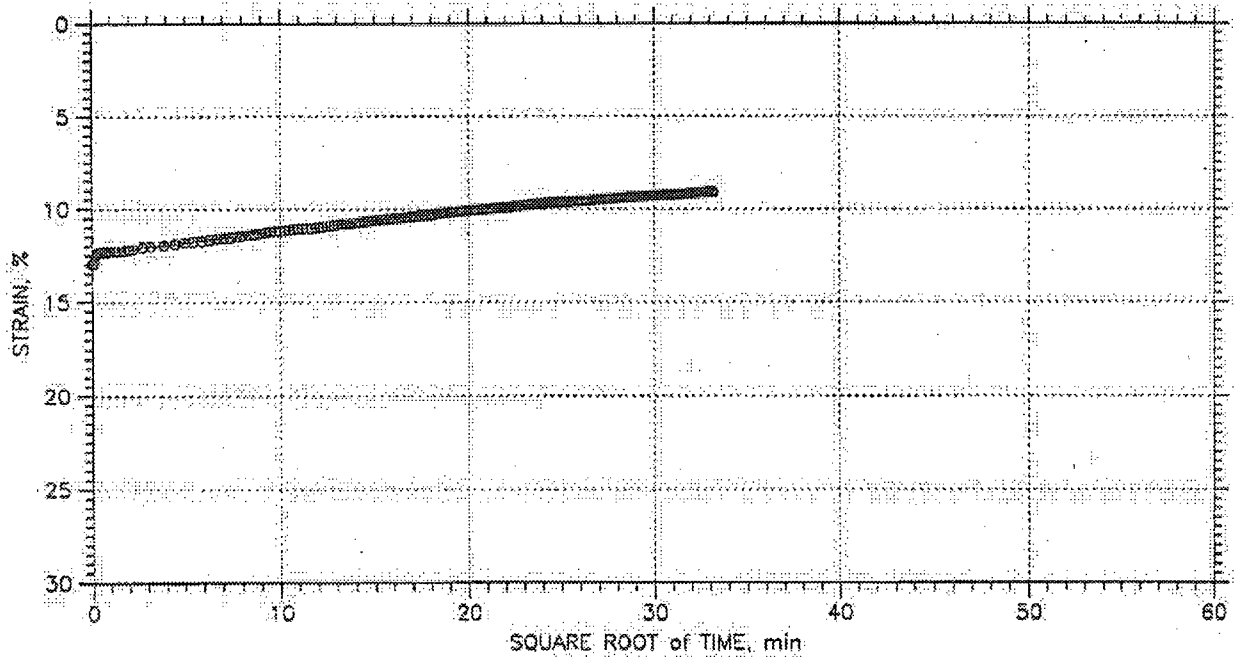
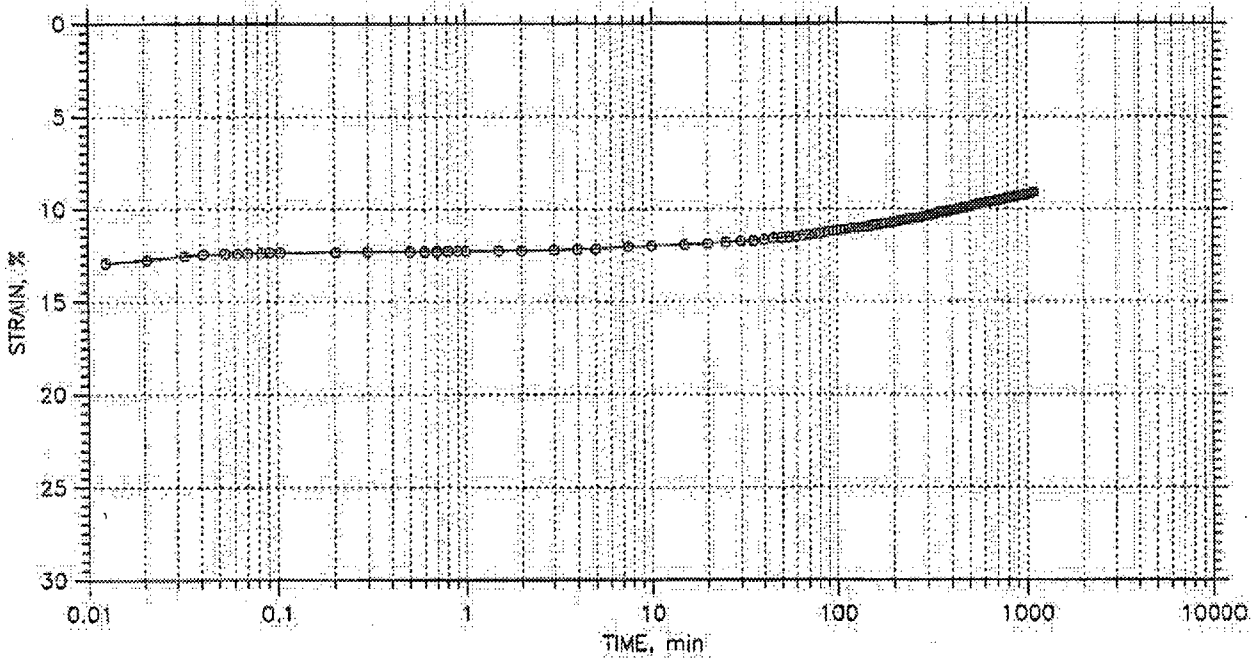
MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-2	Project No.: 6234084680
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-2	Test Date: 08/27/08	Depth: 108-110 ft
	Test No.: 8963	Sample Type: Undisturbed	Elevation: -77.6/-79.6
	Description: Light Greenish Gray Fat Clay (CH)	Cr = 0.027	
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05). Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

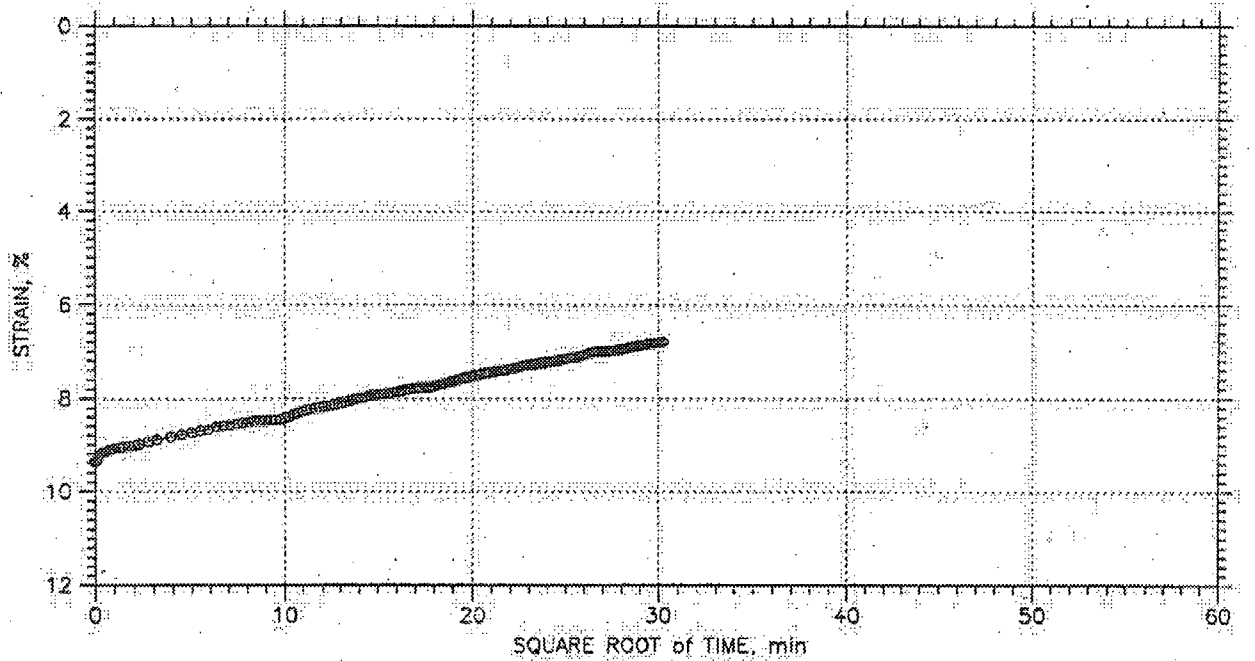
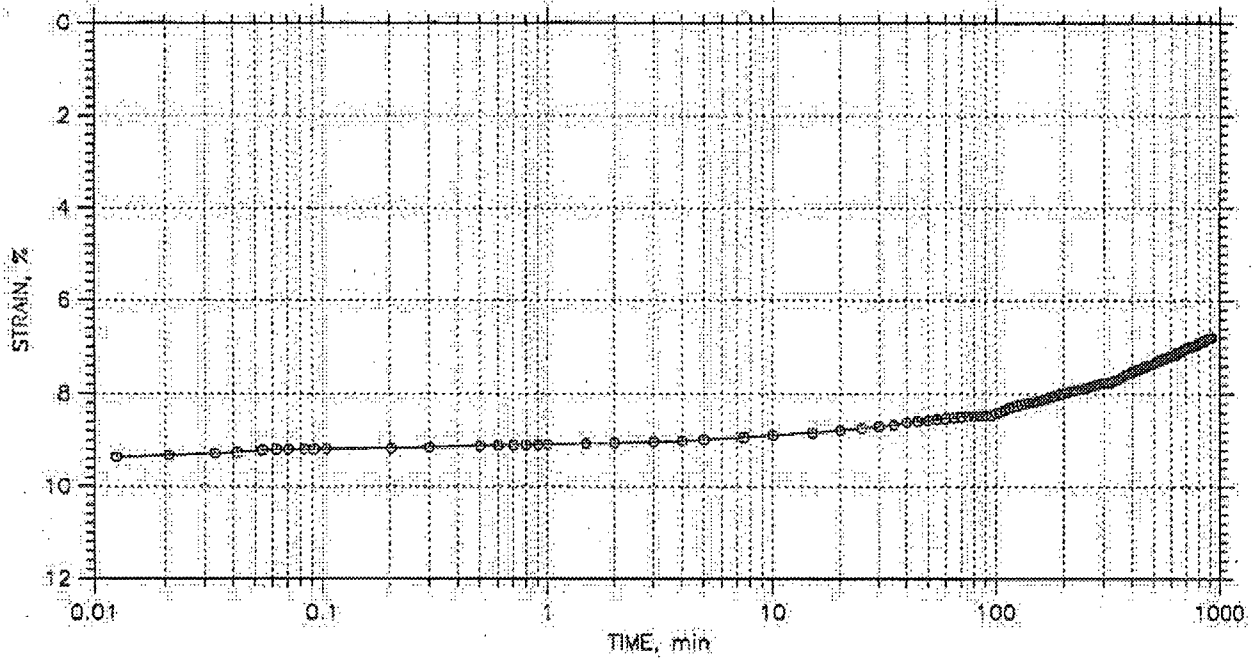
Constant Load Step: 17 of 19

Stress: 4000 psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-2	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-2	Test Date: 08/27/06	Depth: 108-110 ft
	Test No.: 8963	Sample Type: Undisturbed	Elevation: -77.6/-79.6
	Description: Light Greenish Gray Fat Clay (CH)		Cr = 0.027
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05). Task 1.2		

CONSOLIDATION TEST DATA
TIME CURVES
 Constant Load Step: 18 of 19
 Stress: 1000. psf



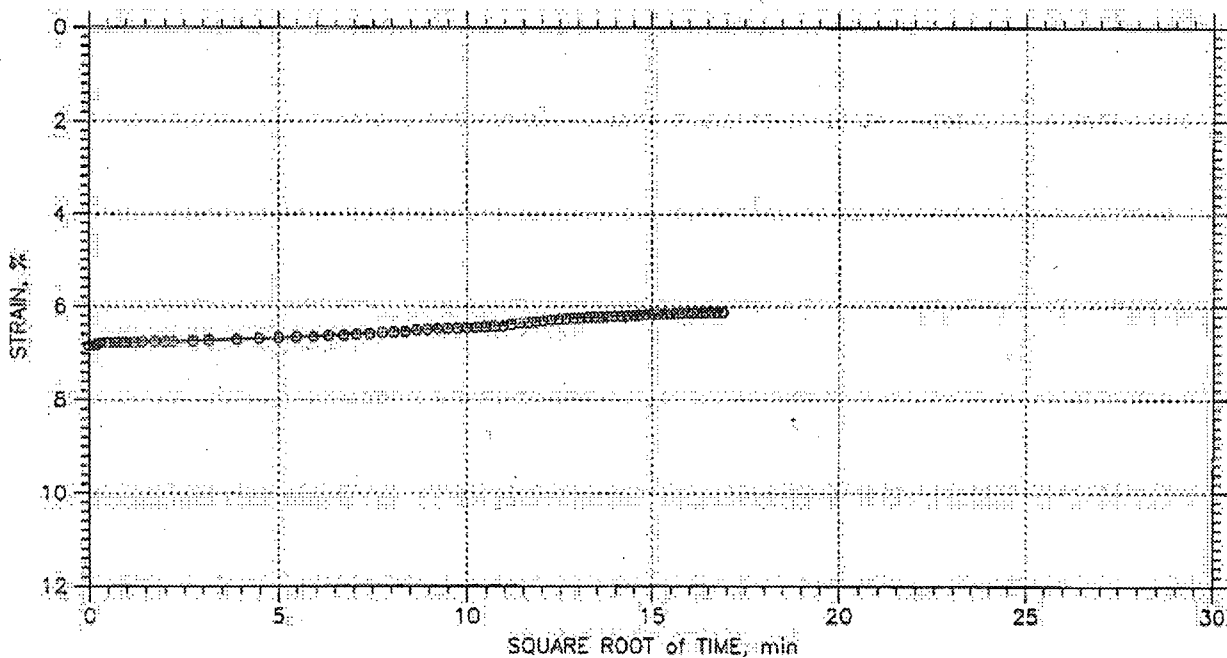
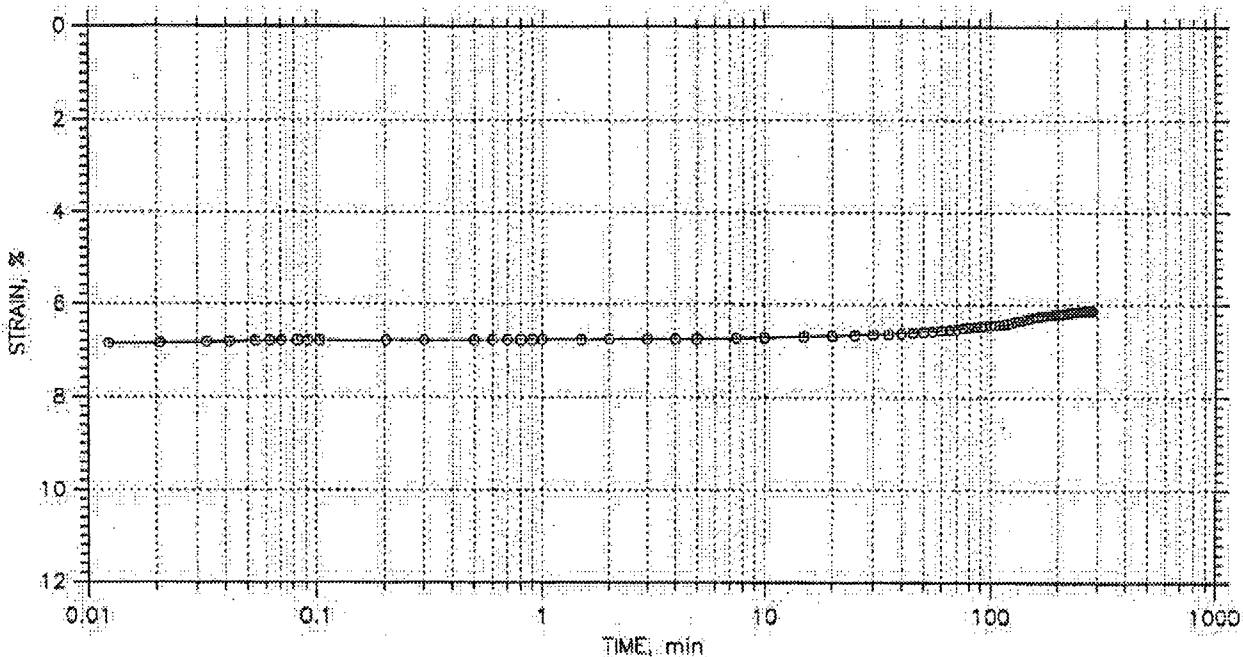
MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-2	Project No.: 6234084660
	Baring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-2	Test Date: 08/27/08	Depth: 108-110 ft
	Test No.: 8963	Sample Type: Undisturbed	Elevation: -77.6/-79.6
	Description: Light Greenish Gray Fat Clay (CH)		Cr = 0.027
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05) Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

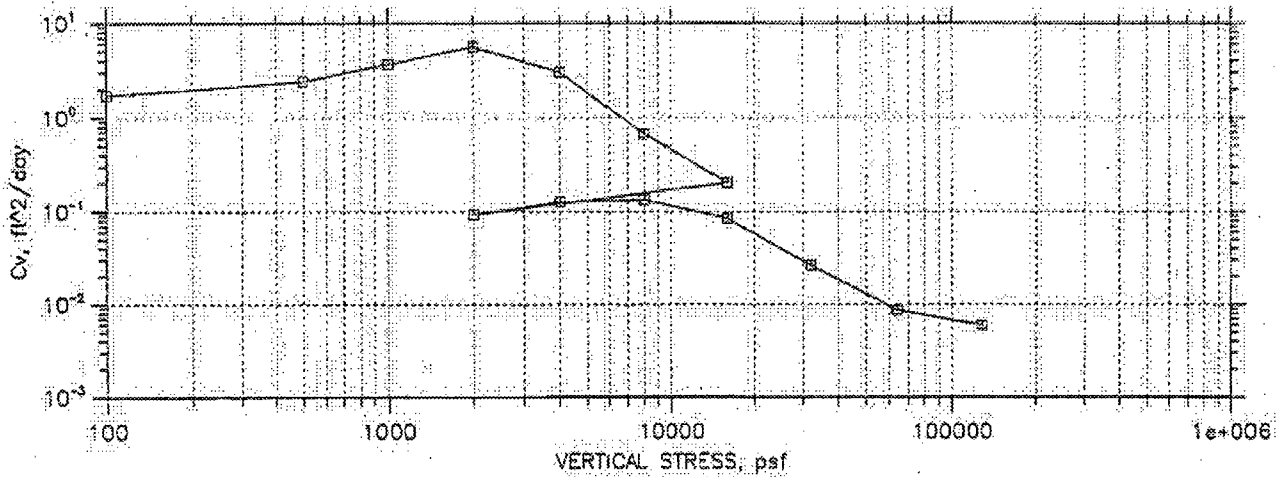
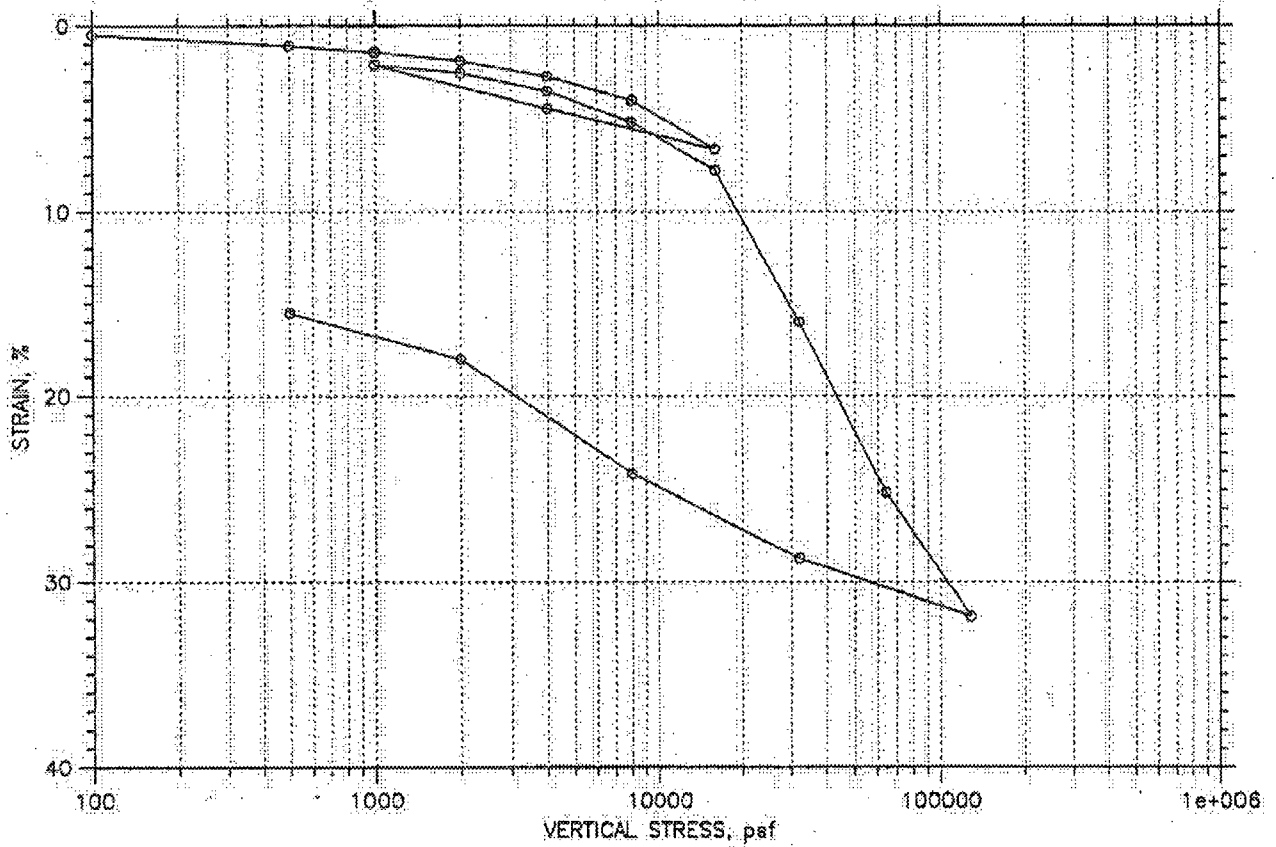
Constant Load Step: 19 of 19

Stress: 500. psf



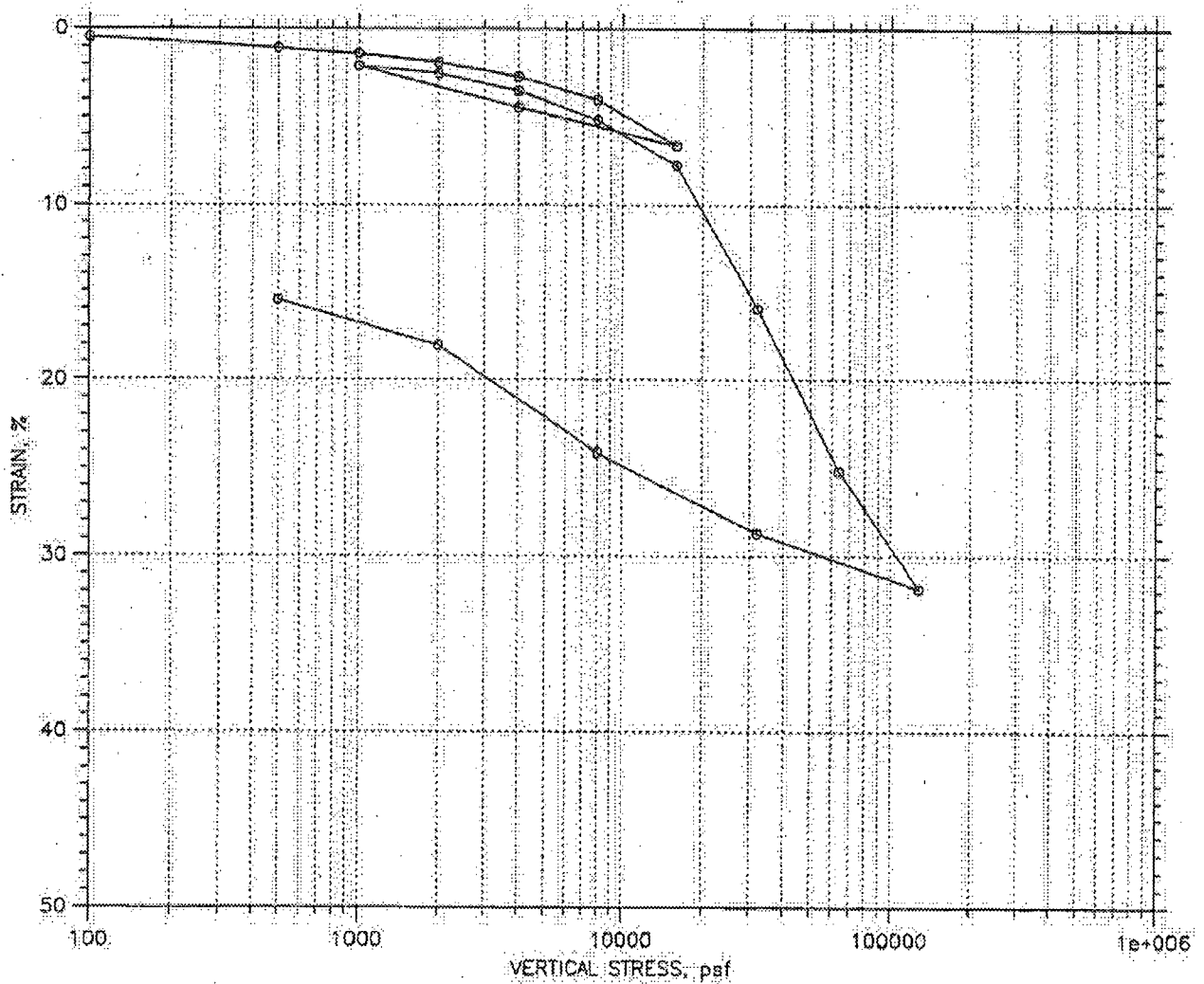
MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-2	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-2	Test Date: 08/27/08	Depth: 108-110 ft
	Test No.: 8963	Sample Type: Undisturbed	Elevation: -77.6/-79.6
	Description: Light Greenish Gray Fat Clay (CH)		Cr = 0.027
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05), Task 1.2		

CONSOLIDATION TEST DATA SUMMARY REPORT



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-5	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-5	Test Date: 08/29/08	Depth: 228-230 ft
	Test No.: 8964	Sample Type: Undisturbed	Elevation:
	Description: Very Dark Greenish Gray Fat Clay (CH) Cr = 0.082 (Elev -197.6/-199.6)		
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06); PI (ASTM D4318-05); Task 1.2		

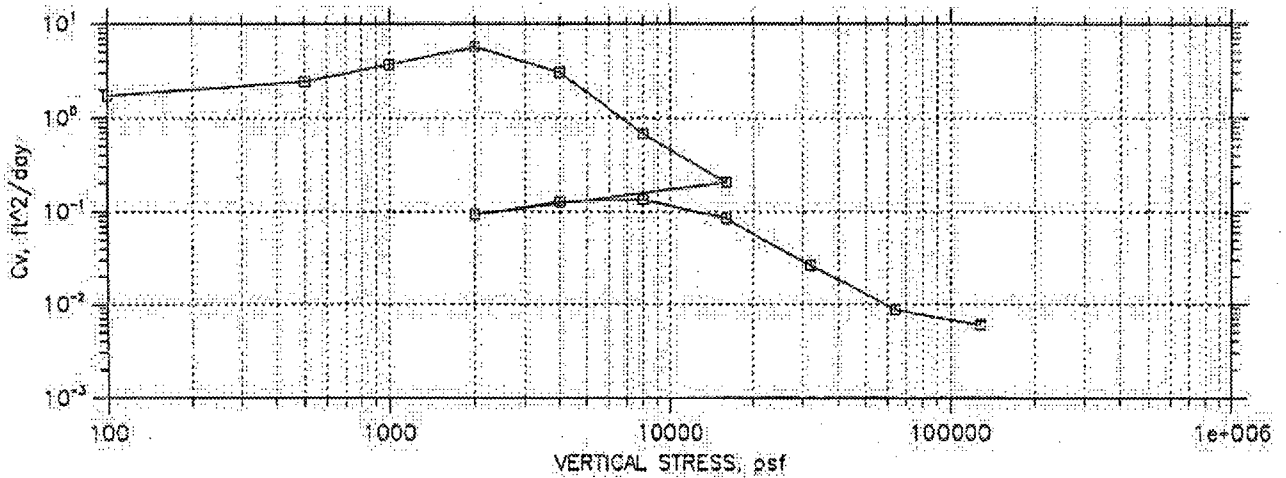
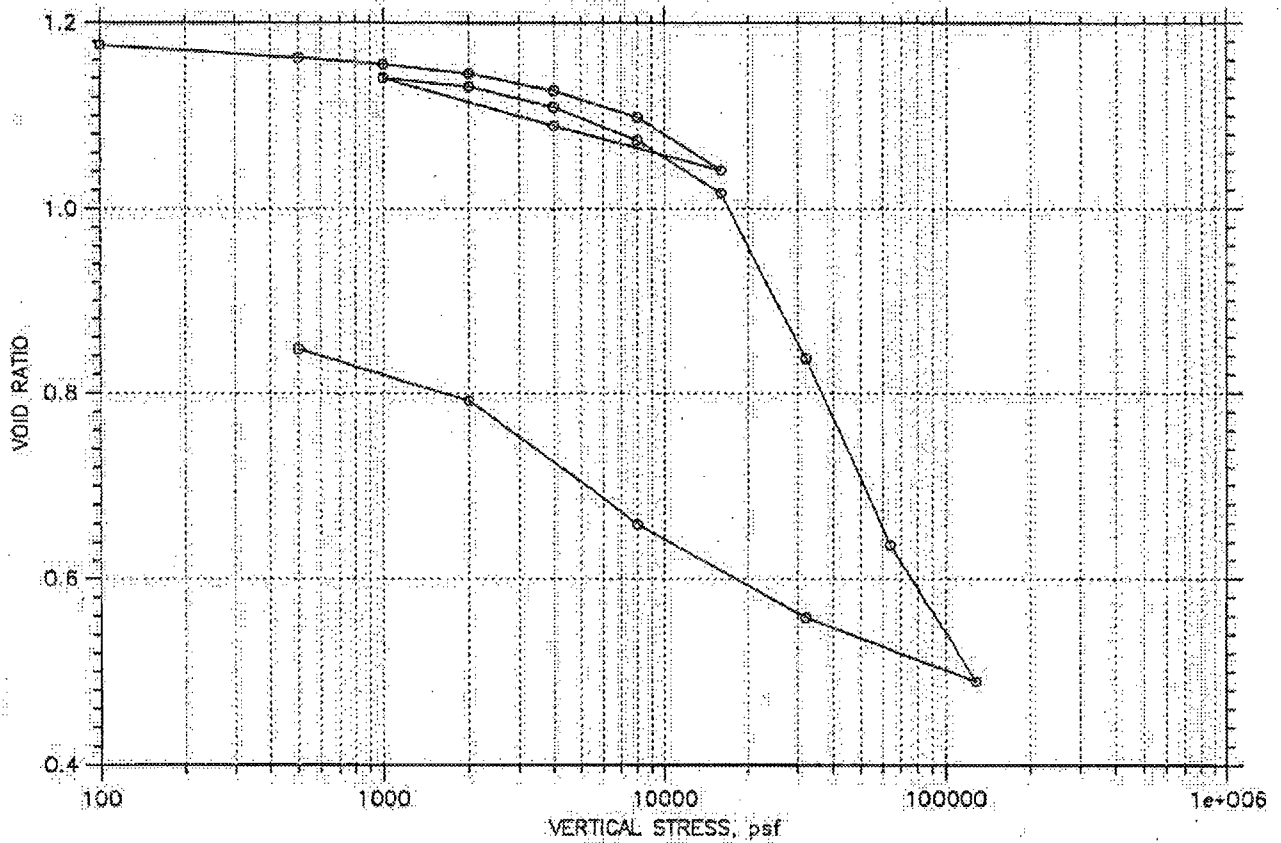
CONSOLIDATION TEST DATA SUMMARY REPORT



		Before Test	After Test
Overburden Pressure: 1.5e+004 psf		41.12	29.75
Preconsolidation Pressure: 1.453e+004 psf		79.66	94.29
Compression Index: 0.664		96.68	97.96
Diameter: 2.5 in	Height: 1.004 in	1.19	0.85
LL: 68	PL: 29		
PI: 39	CS: 2.79		

MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-5	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-5	Test Date: 08/29/08	Depth: 228-230 ft
	Test No.: 8964	Sample Type: Undisturbed	Elevation:
	Description: Very Dark Greenish Gray Fat Clay (CH) Cr= 0.082 (Ele -197.6/-199.6)		
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05) Task 1.2		

CONSOLIDATION TEST DATA
SUMMARY REPORT



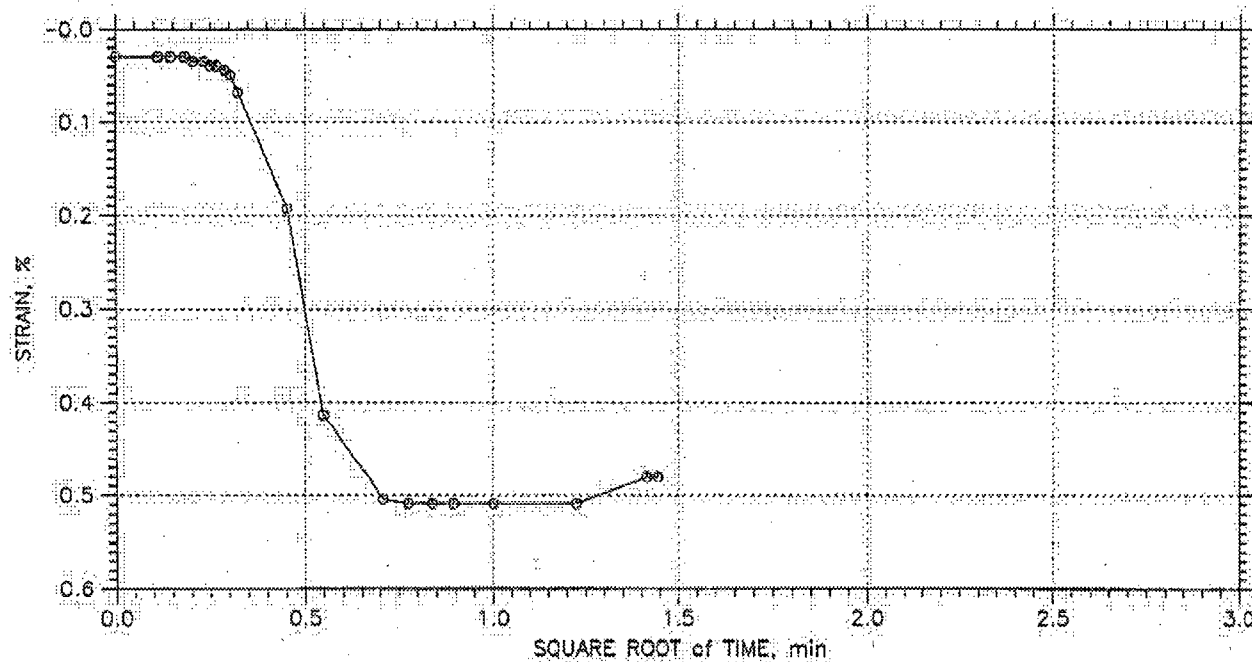
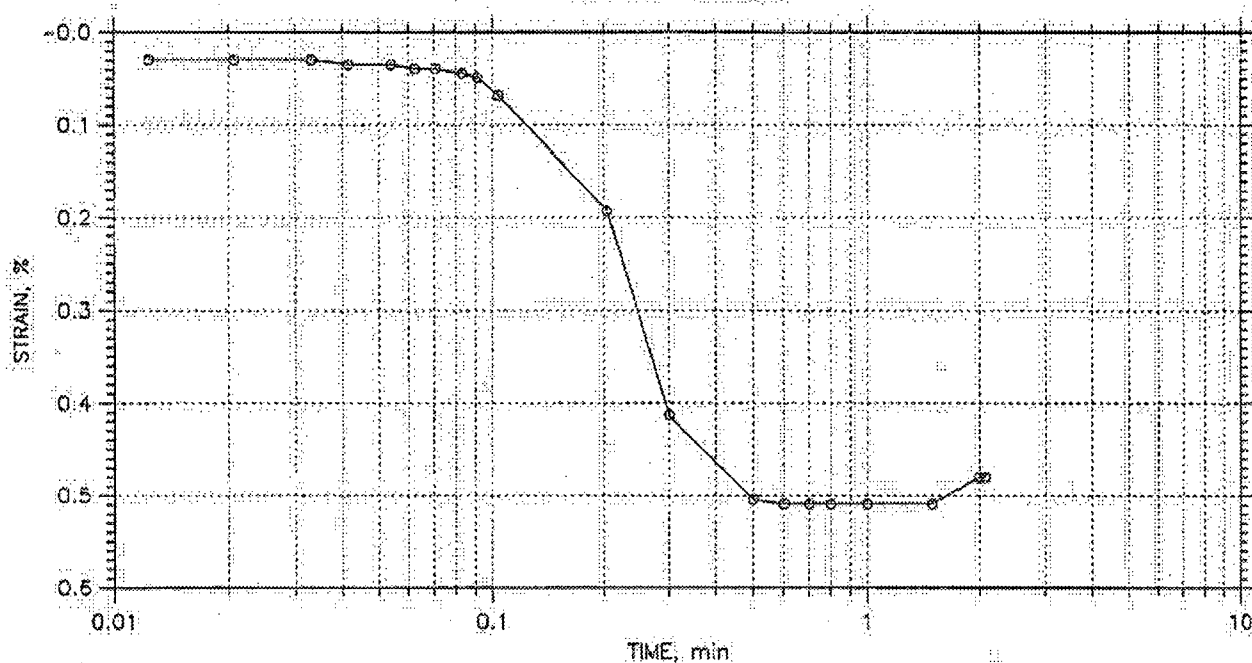
MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-5	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-5	Test Date: 08/29/08	Depth: 228-230 ft
	Test No.: 8964	Sample Type: Undisturbed	Elevation:
	Description: Very Dark Greenish Gray Fat Clay (CH) Cr= 0.082 (Ele -197.6/-199.6)		
	Remarks: ASTM D2435-04 Method B; SG (ASTM D854-06); PI (ASTM D4318-05); Task: 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 1 of 20

Stress: 100. psf



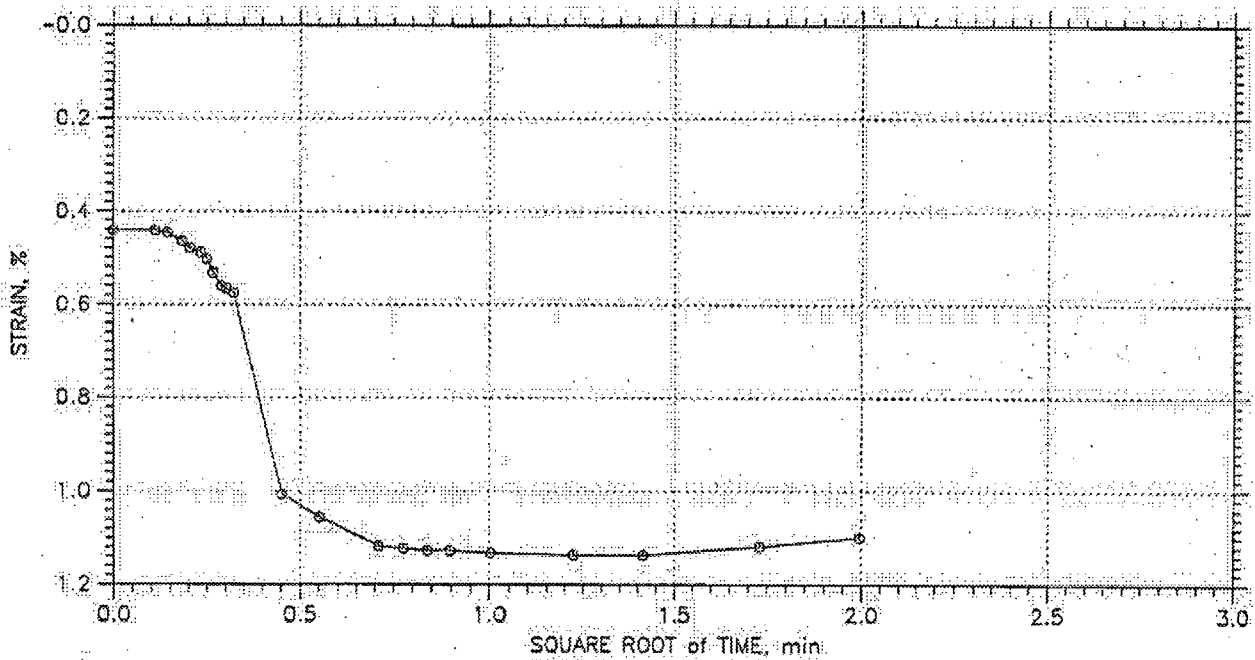
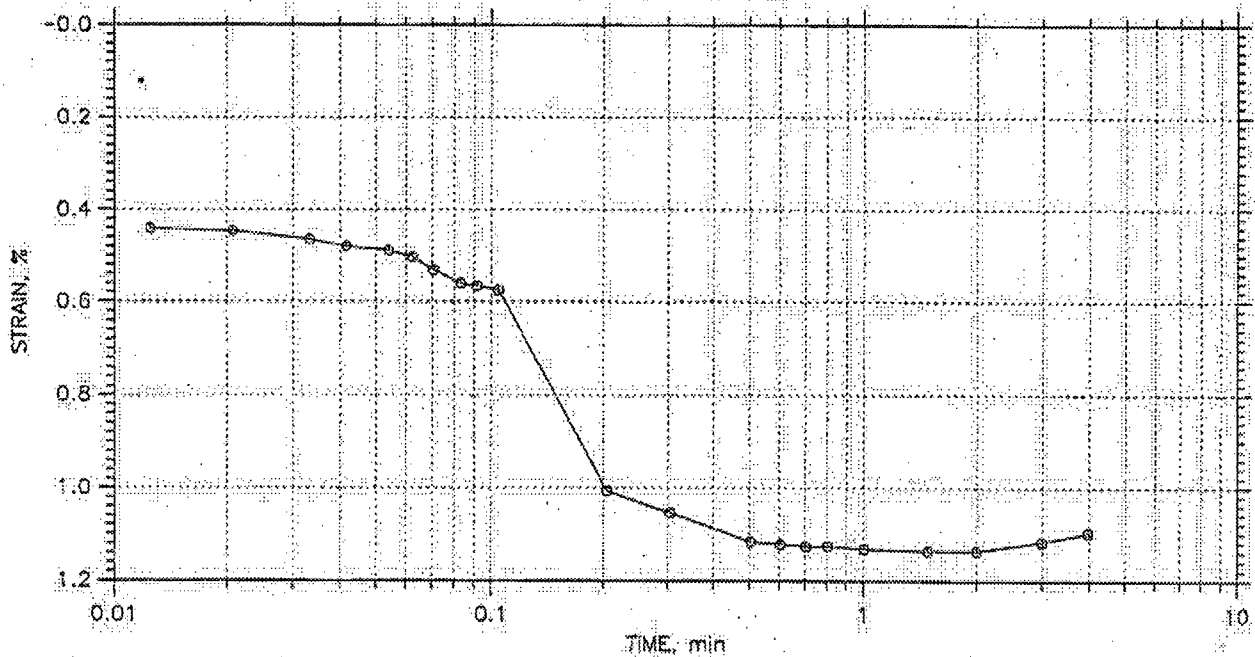
MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-5	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-5	Test Date: 08/29/08	Depth: 228-230 ft
	Test No.: 8984	Sample Type: Undisturbed	Elevation:
	Description: Very Dark Greenish Gray Fat Clay (CH) Cr= 0.082 (Els -197.6/-199.6)		
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05) Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 2 of 20

Stress: 500. psf



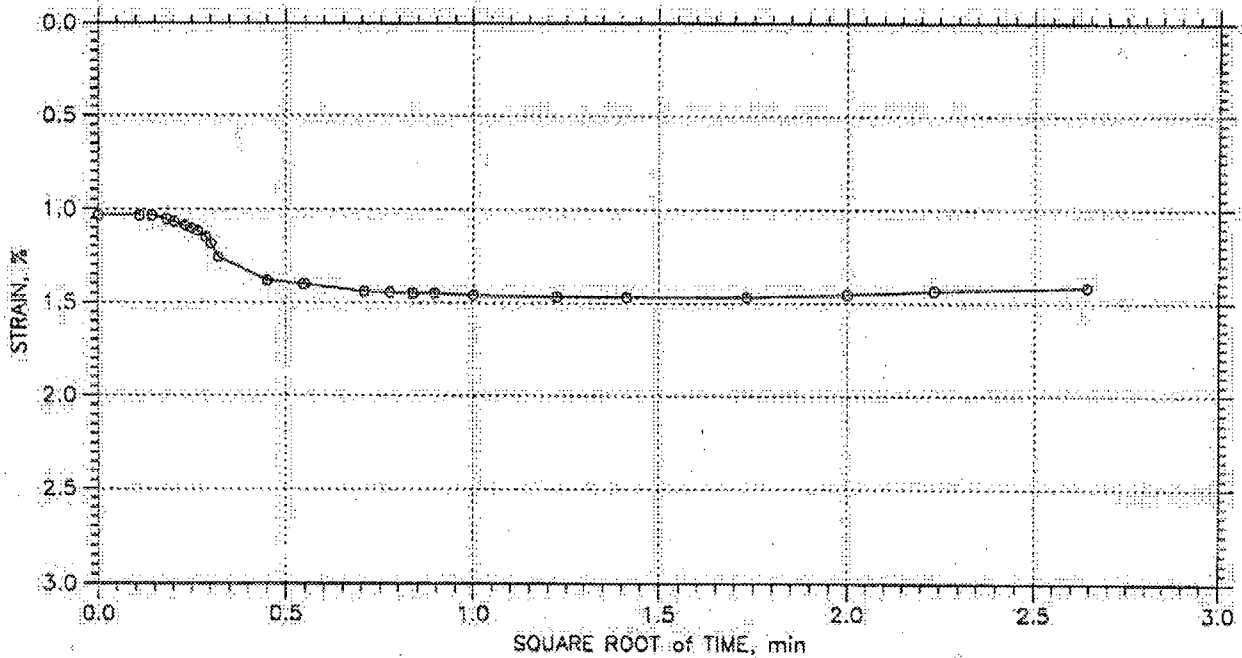
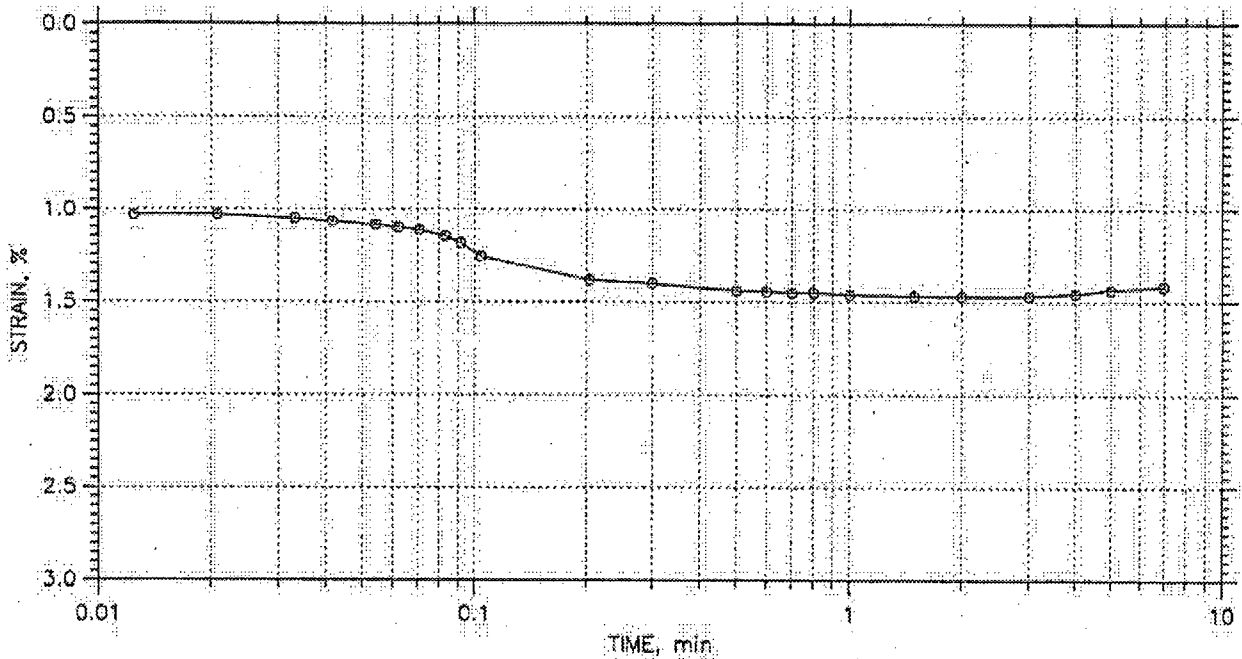
MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-5	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-5	Test Date: 08/29/08	Depth: 228-230 ft
	Test No.: 8964	Sample Type: Undisturbed	Elevation:
	Description: Very Dark Greenish Gray Fat Clay (CH) Cr= 0.082 (Ele -197.6/-199.6)		
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05) Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 3 of 20

Stress: 1000 psf



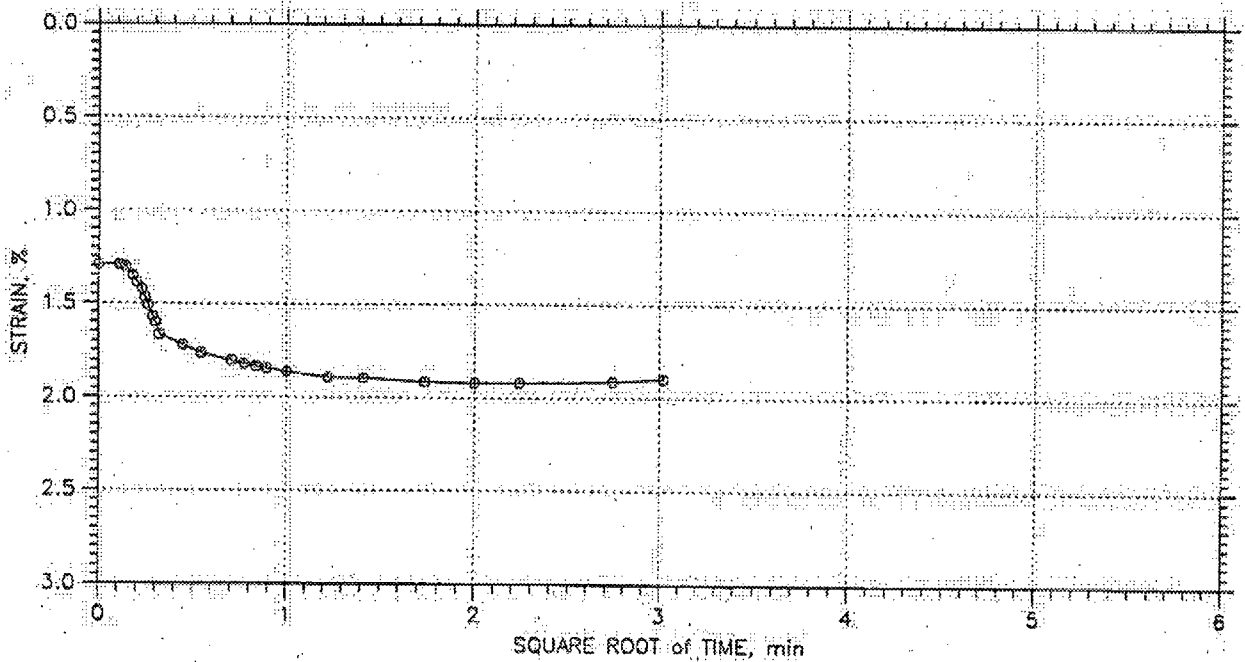
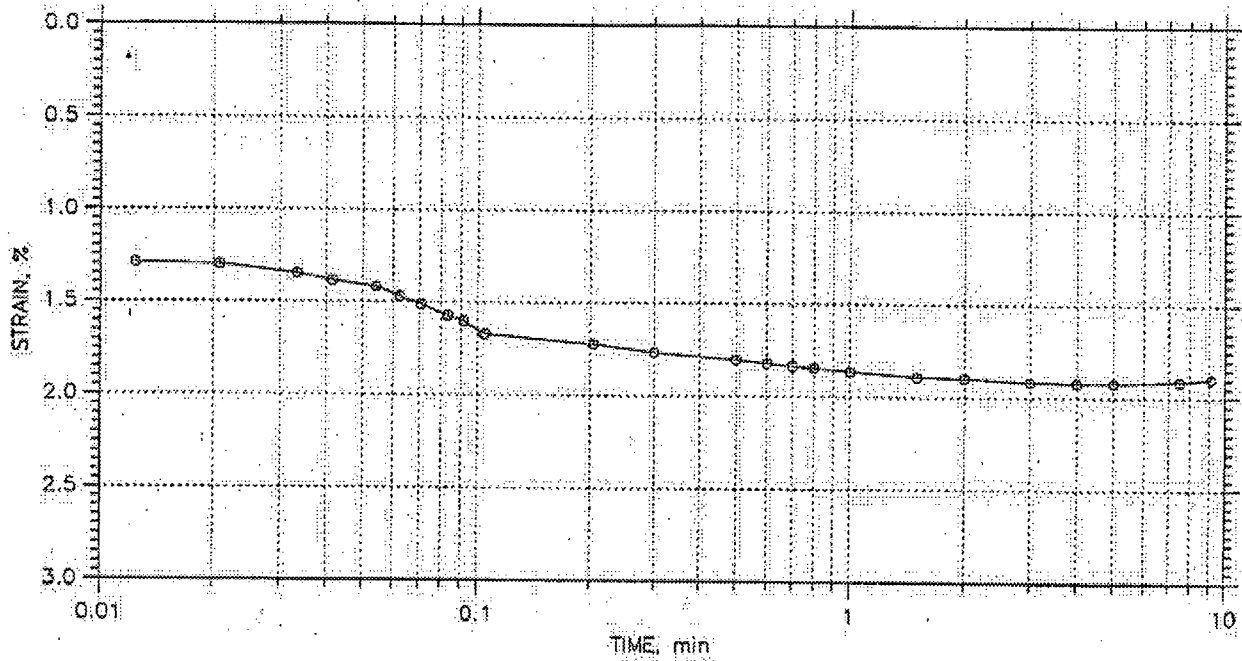
MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-5	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-5	Test Date: 08/29/08	Depth: 226-230 ft
	Test No.: 8964	Sample Type: Undisturbed	Elevation:
	Description: Very Dark Greenish Gray Fat Clay (CH) Cr= 0.082 (Ele -197.5/-199.6)		
	Remarks: ASTM D2435-04 Method B. SG (ASTM D854-06), PI (ASTM D4318-05), Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 4 of 20

Stress: 2000. psf



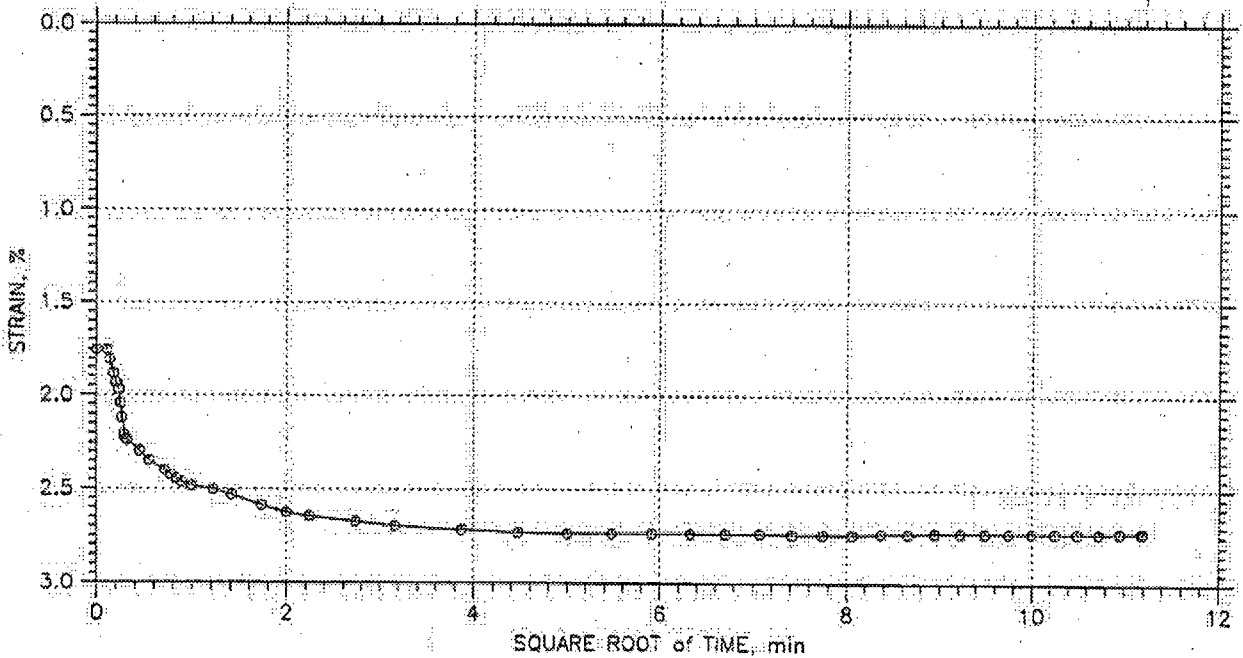
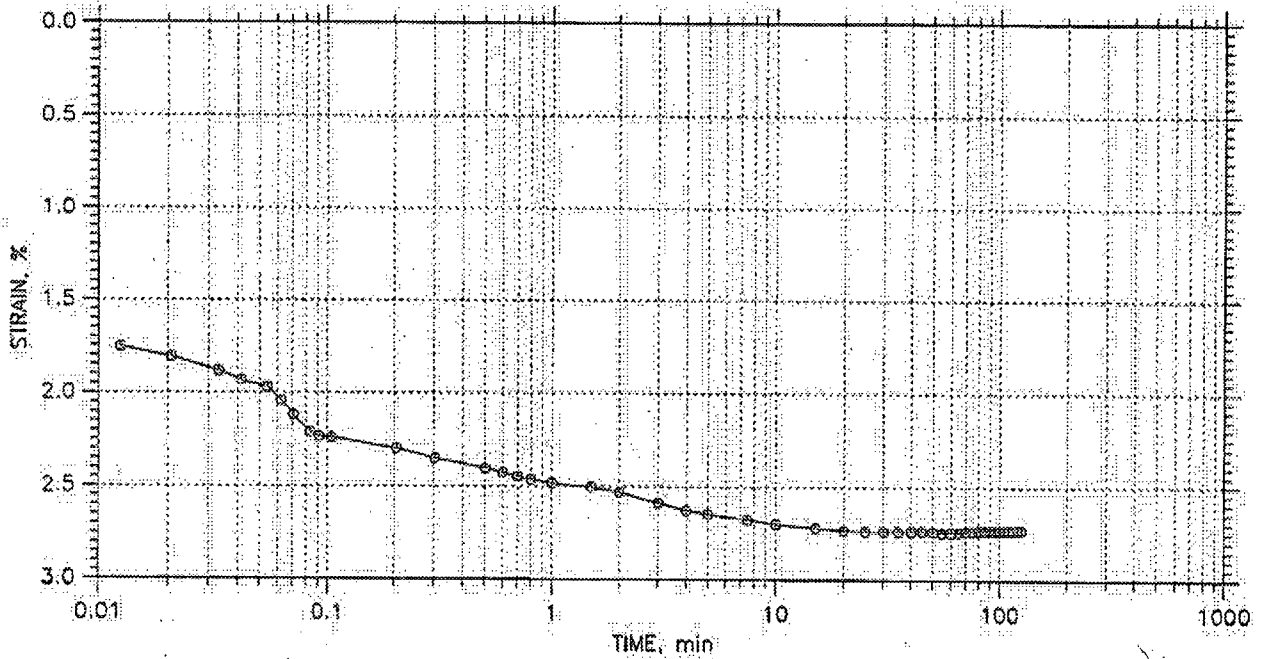
MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-5	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-5	Test Date: 05/29/08	Depth: 228-230 ft
	Test No.: 8964	Sample Type: Undisturbed	Elevation:
	Description: Very Dark Greenish Gray Fat Clay (CH) Cr = 0.082 (Ele -197.6/-199.6)		
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05). Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 5 of 20

Stress: 4000. psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-5	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-5	Test Date: 08/29/08	Depth: 228-230 ft
	Test No.: 8954	Sample Type: Undisturbed	Elevation:
	Description: Very Dark Greenish Gray Fat Clay (CH) Cr= 0.082 (Ele -197.6/-199.6)		
	Remarks: ASTM D2435-04 Method B. SG (ASTM D854-06), PI (ASTM D4318-05), Task 1.2		

Tue, 14-OCT-2008 16:24:48

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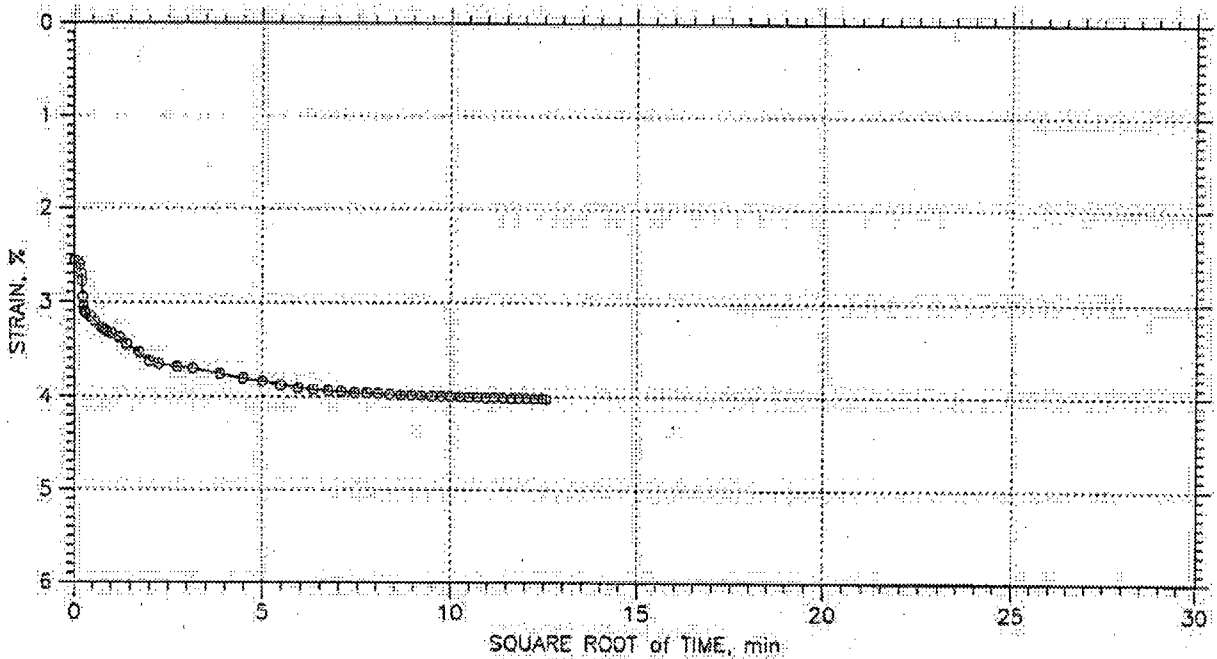
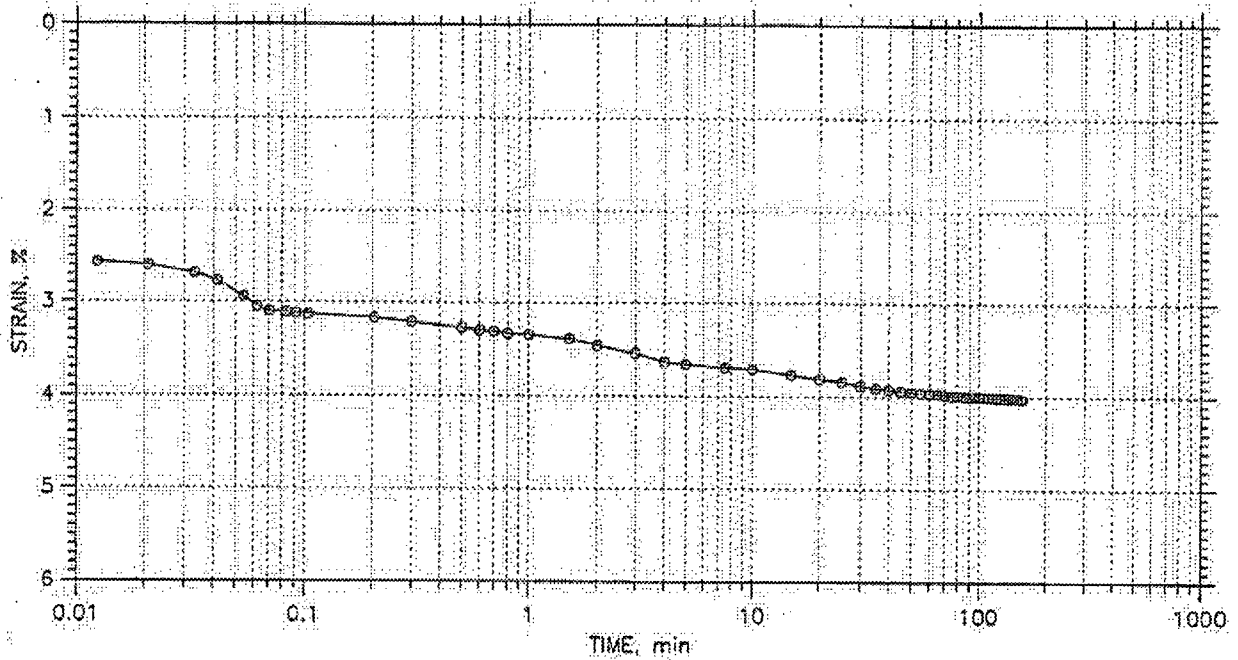
DCN 6117-817

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 6 of 20

Stress: 8000. psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-5	Project No.: 6234084650
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-5	Test Date: 08/29/08	Depth: 228-230 ft
	Test No.: 8964	Sample Type: Undisturbed	Elevation:
	Description: Very Dark Greenish Gray Fat Clay (CH) Cr= 0.082 (Ele -197.6/-199.8)		
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05), Task 1.2		

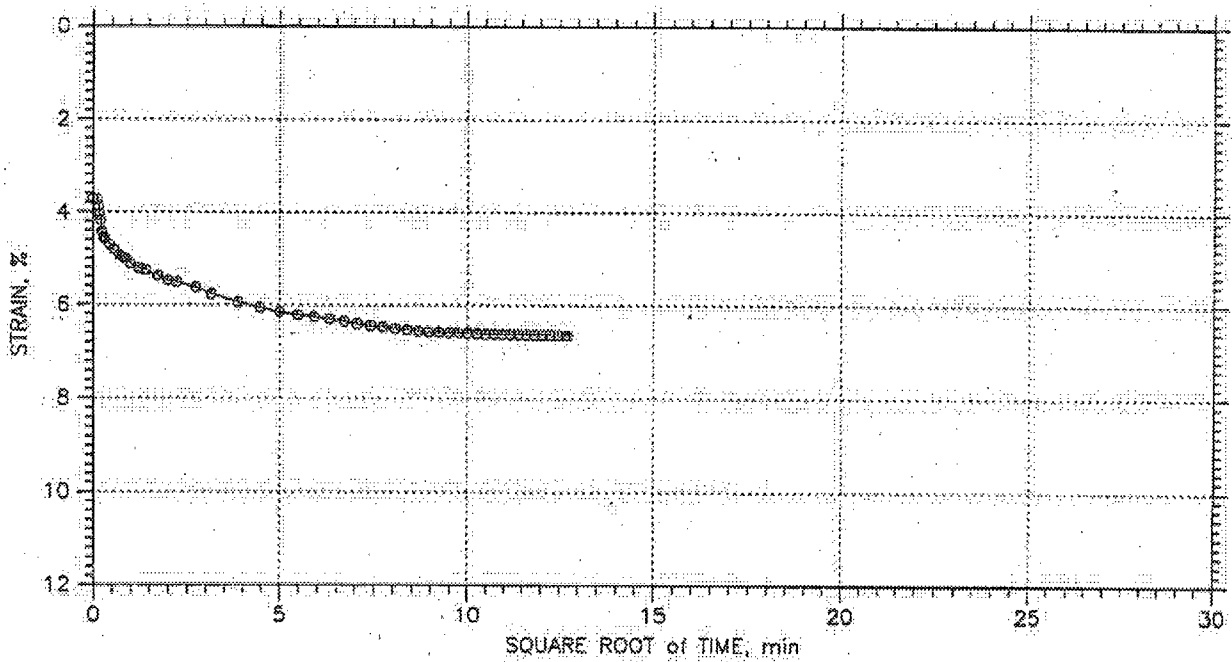
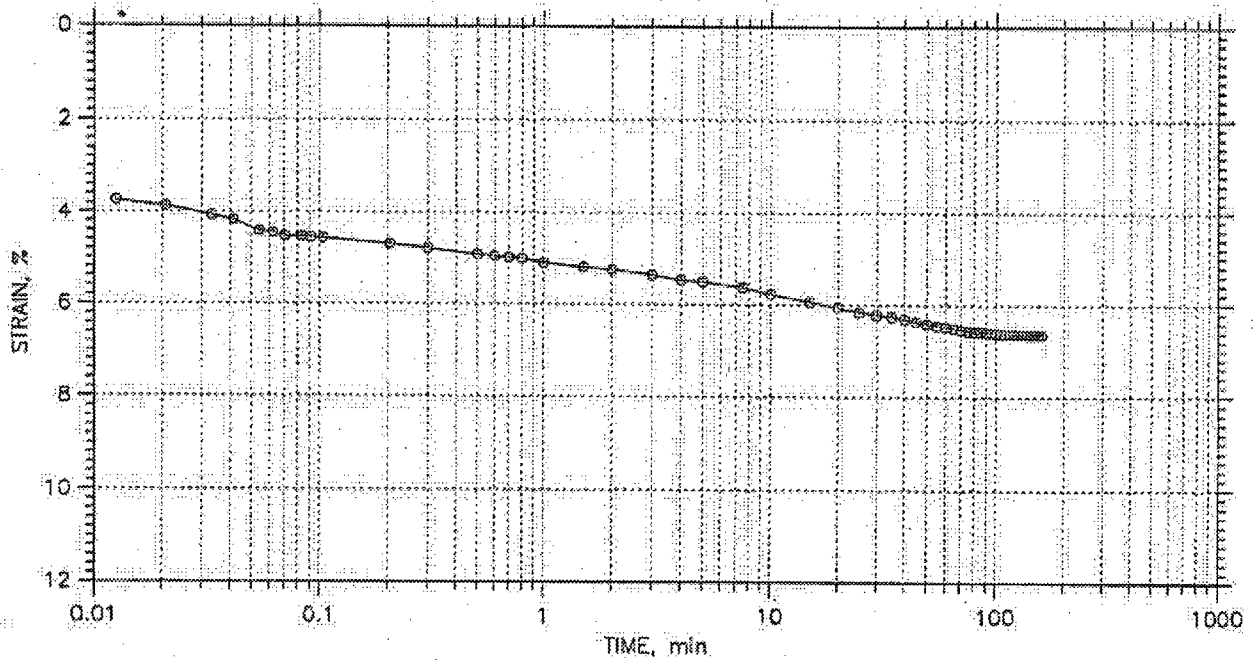
Tue, 14-OCT-2008 16:24:48

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 7 of 20

Stress: 16000 psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-5	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-5	Test Date: 08/29/08	Depth: 228-230 ft
	Test No.: 8964	Sample Type: Undisturbed	Elevation:
	Description: Vary Dark Greenish Gray Fat Clay (CH) Cr= 0.082 (Ele -197.6/-199.6)		
	Remarks: ASTM D2435-04 Method B. SG (ASTM D854-06); PI (ASTM D4318-05). Task: 1.2		

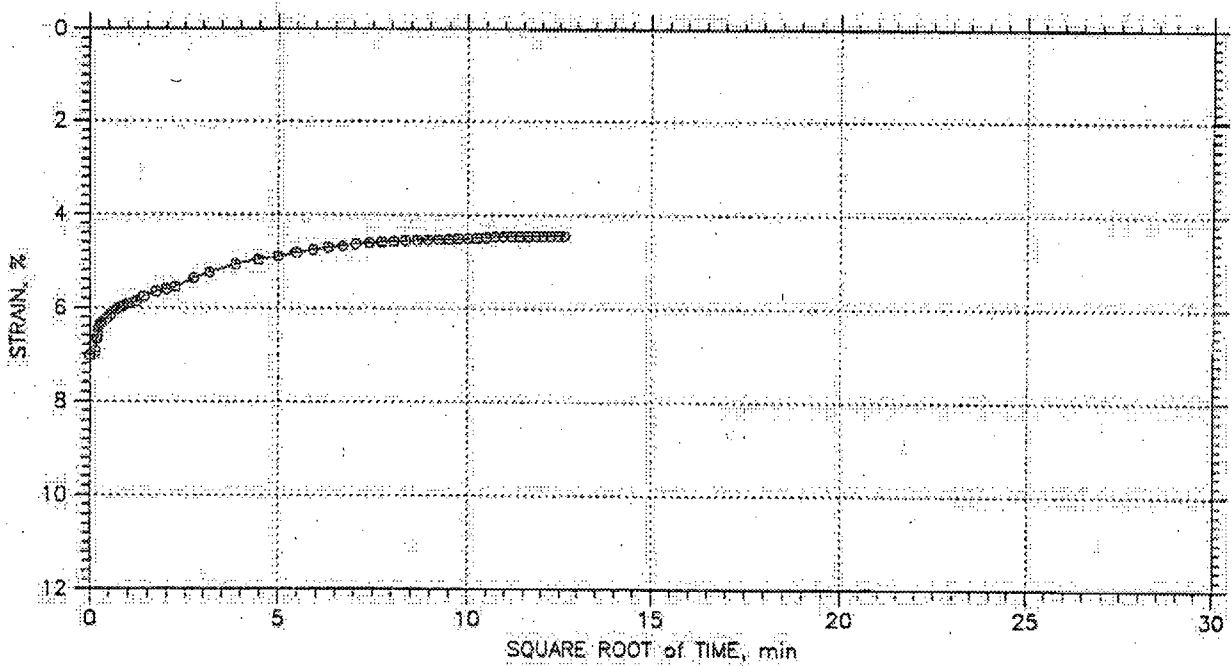
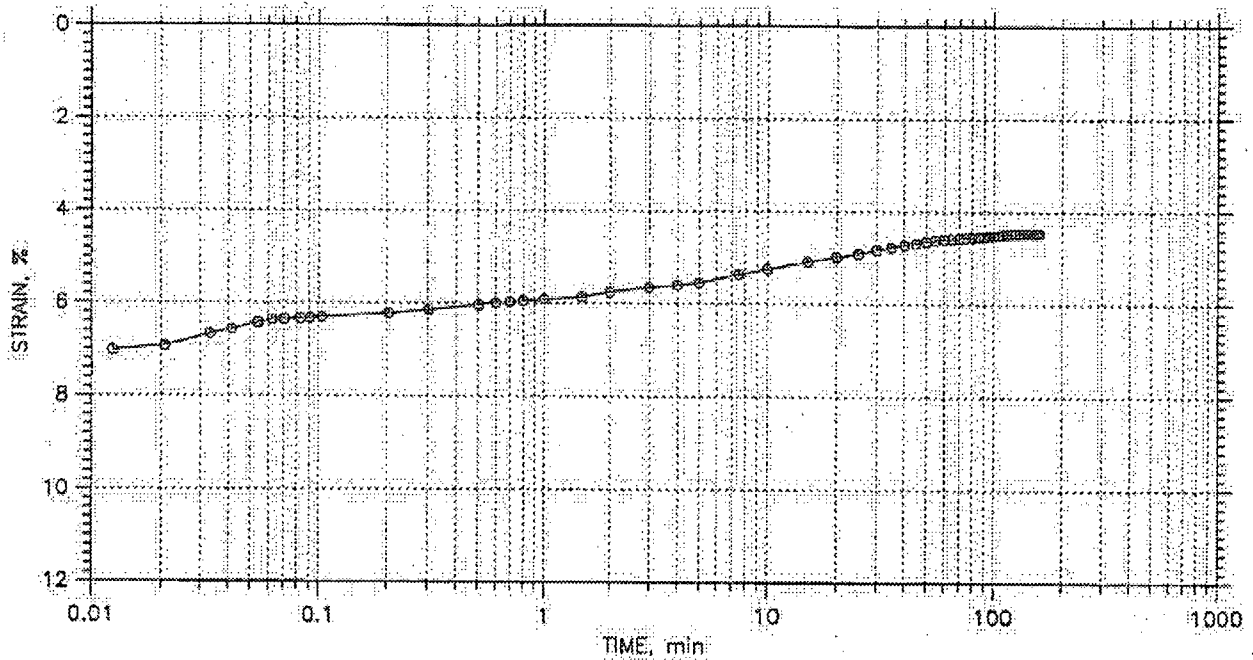
Tue, 14-OCT-2008 16:24:48

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 8 of 20

Stress: 4000. psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-5	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-5	Test Date: 08/29/08	Depth: 228-230 ft
	Test No.: 8964	Sample Type: Undisturbed	Elevation:
	Description: Very Dark Greenish Gray Fat Clay (CH) Cr= 0.082 (Ele -197.6/-199.6)		
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05) Task 1.2		

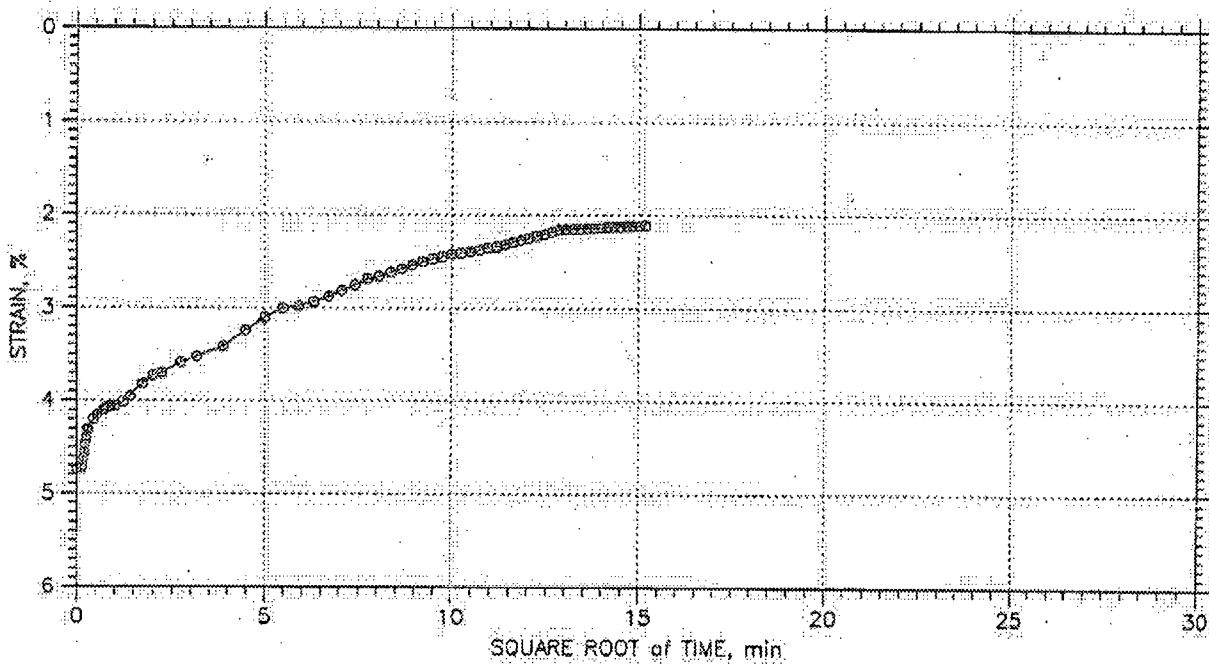
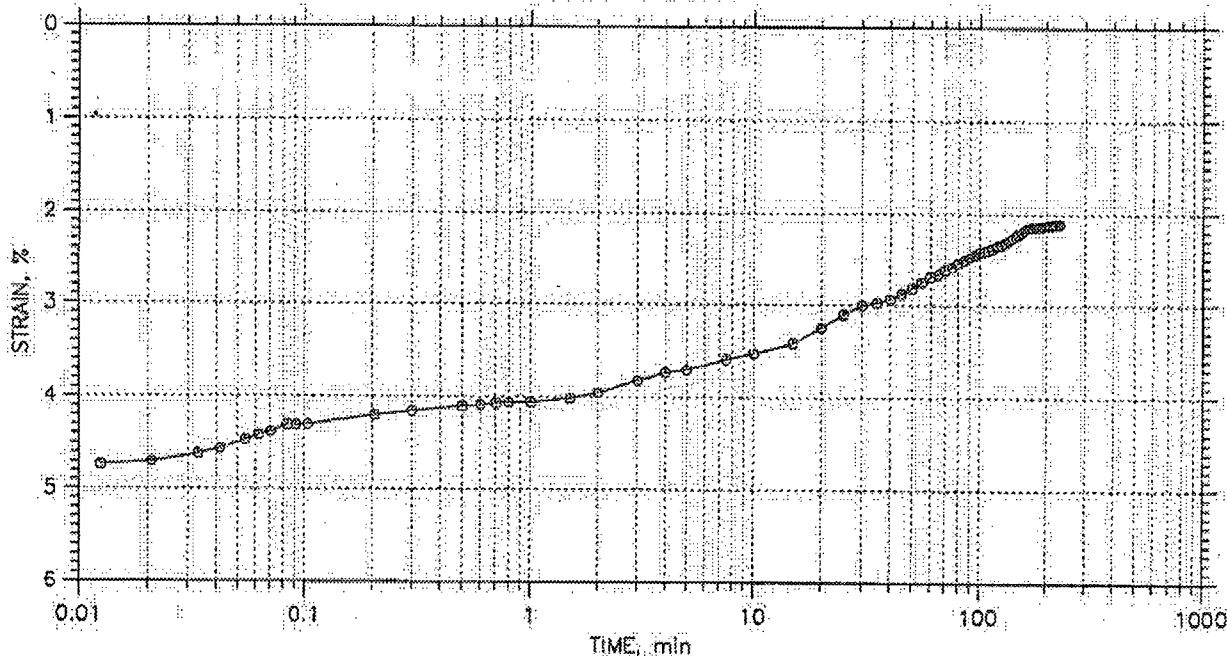
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CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 9 of 20

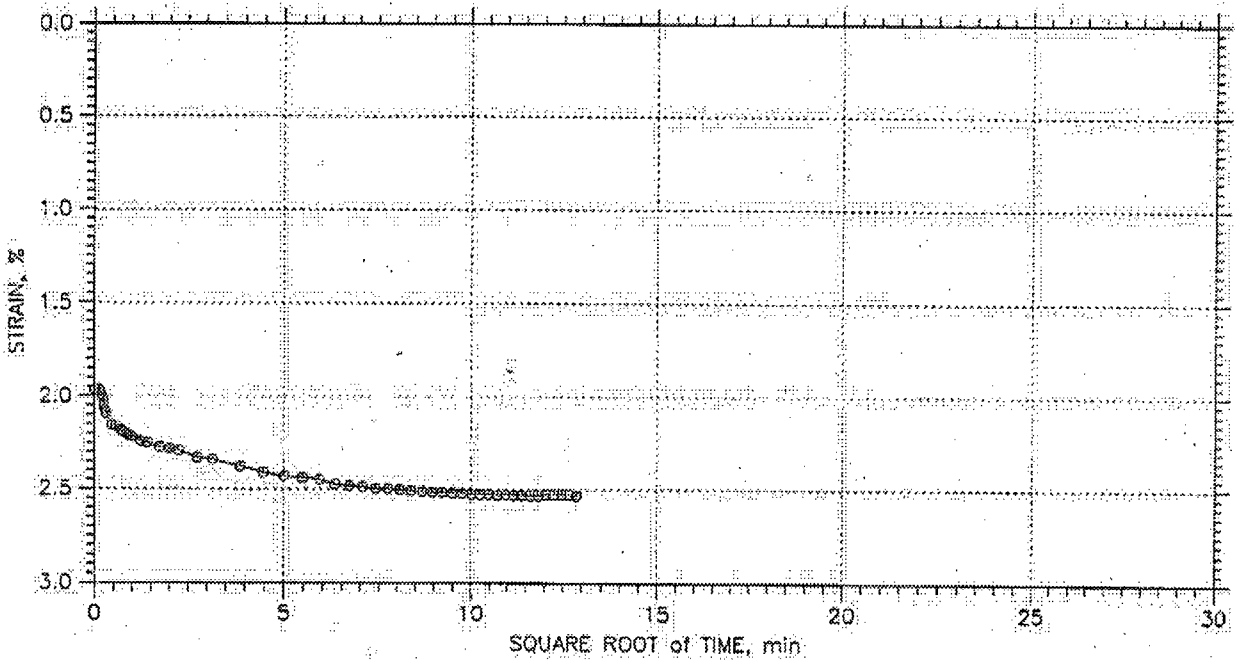
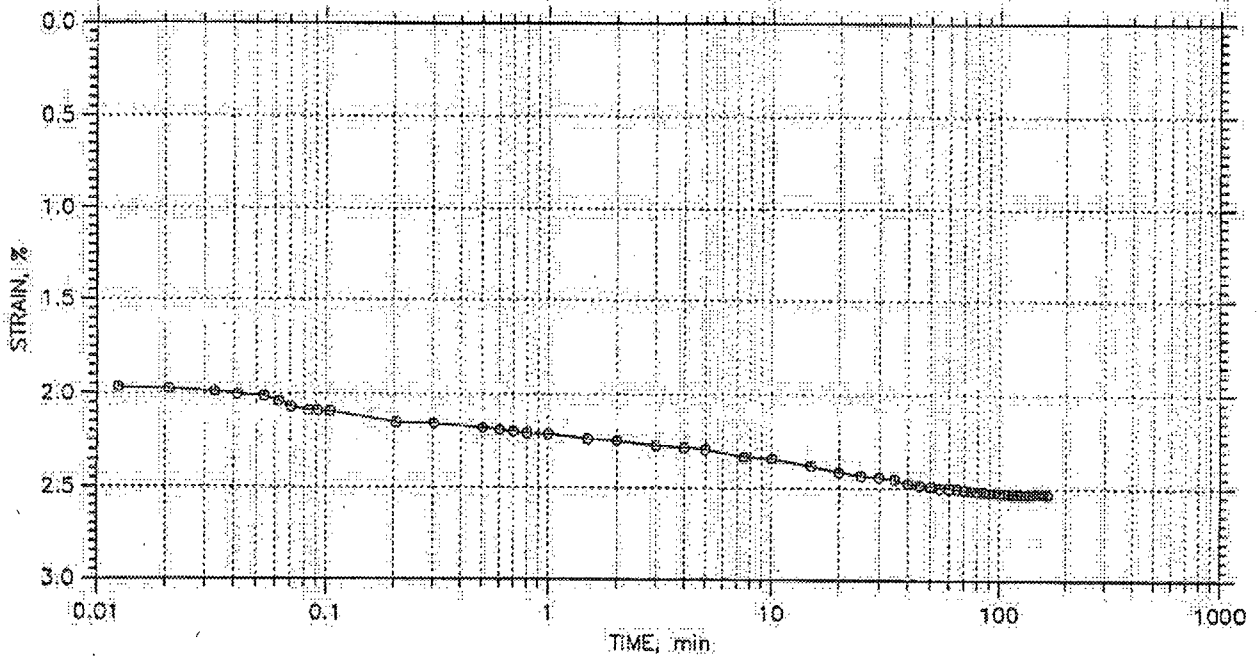
Stress: 1000. psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-5	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-5	Test Date: 08/29/08	Depth: 225-230 ft.
	Test No.: 8964	Sample Type: Undisturbed	Elevation:
	Description: Very Dark Greenish Gray Fat Clay (CH) Cr = 0.082 (Ele. -197.6/-199.6)		
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05). Task 1.2		

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CONSOLIDATION TEST DATA
 TIME CURVES
 Constant Load Step: 10 of 20
 Stress: 2000. psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-5	Project No.: 6234064660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-5	Test Date: 08/29/08	Depth: 226-230 ft
	Test No.: 8964	Sample Type: Undisturbed	Elevation:
	Description: Very Dark Greenish Gray Fat Clay (CH) Cr= 0.082 (Ele -197.6/-199.6)		
	Remarks: ASTM D2435-04 Method B; SG (ASTM D854-06); PI (ASTM D4318-05); Task 1.2		

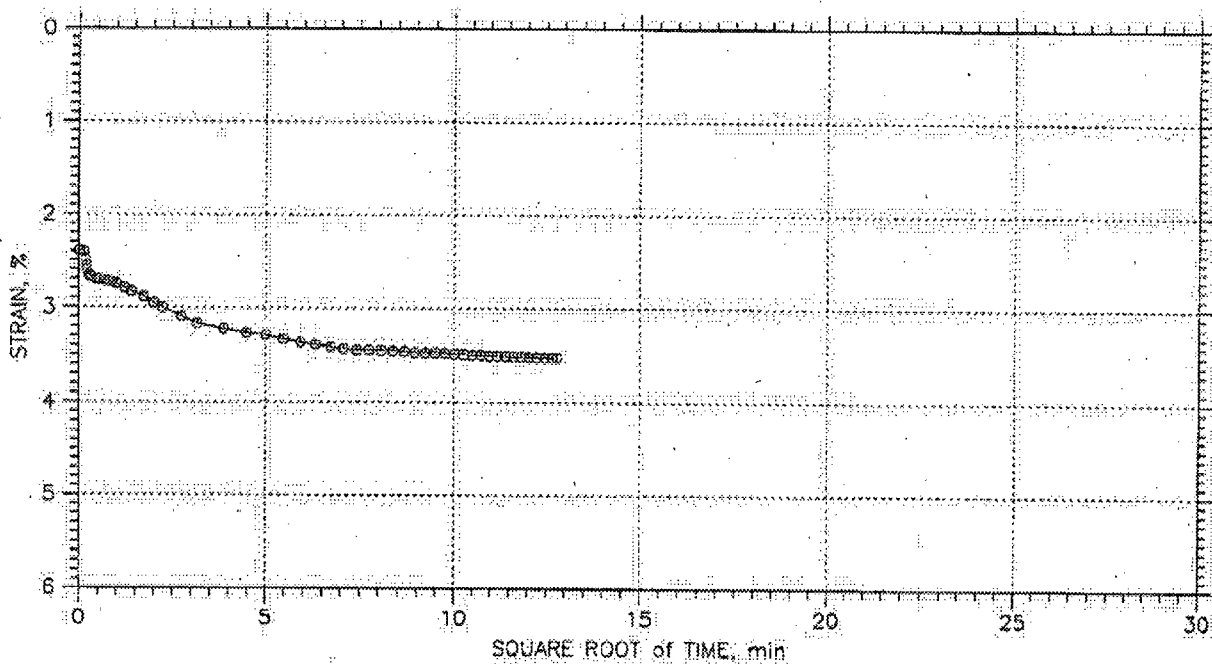
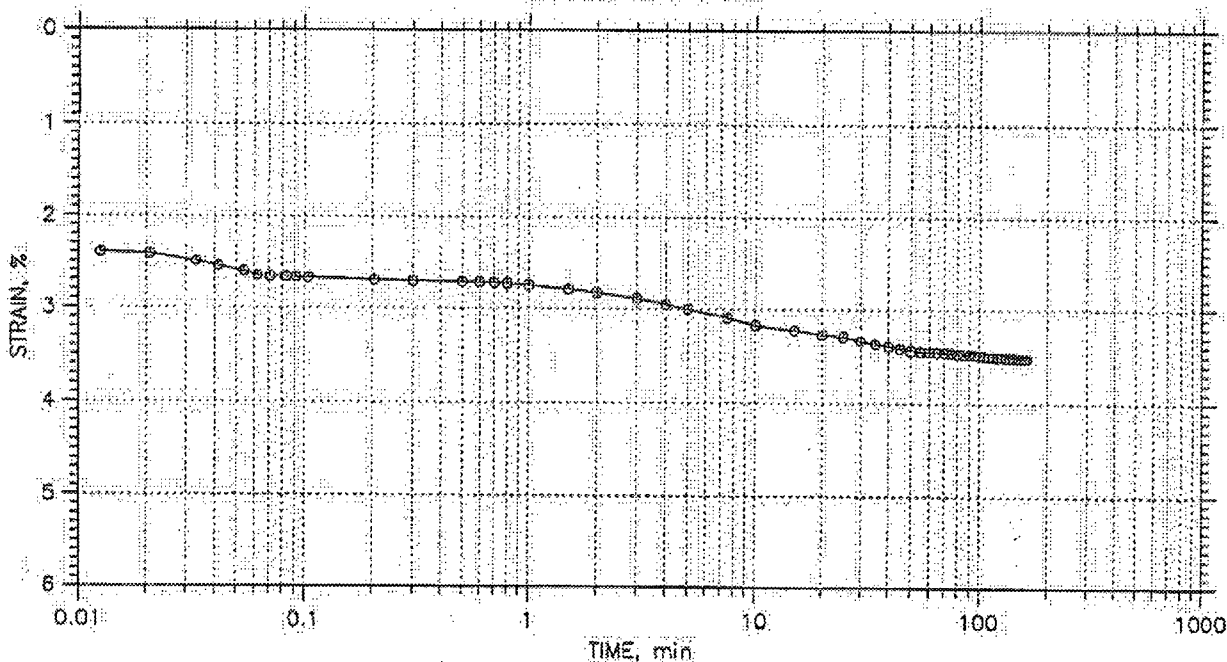
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CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 11 of 20

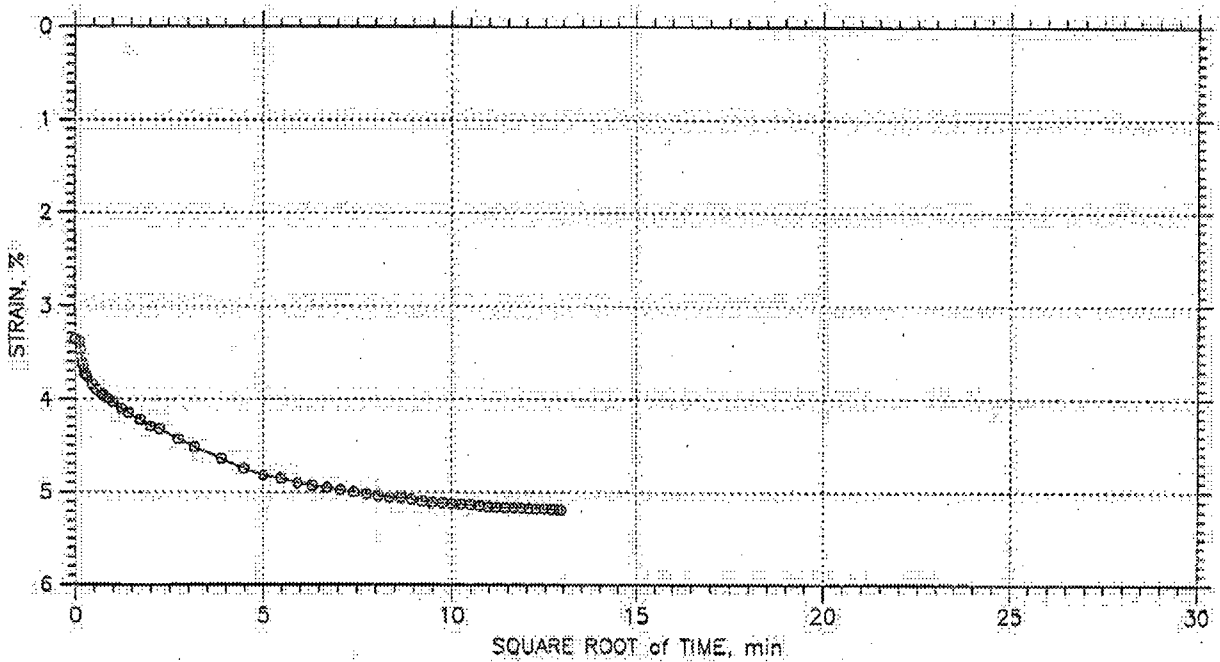
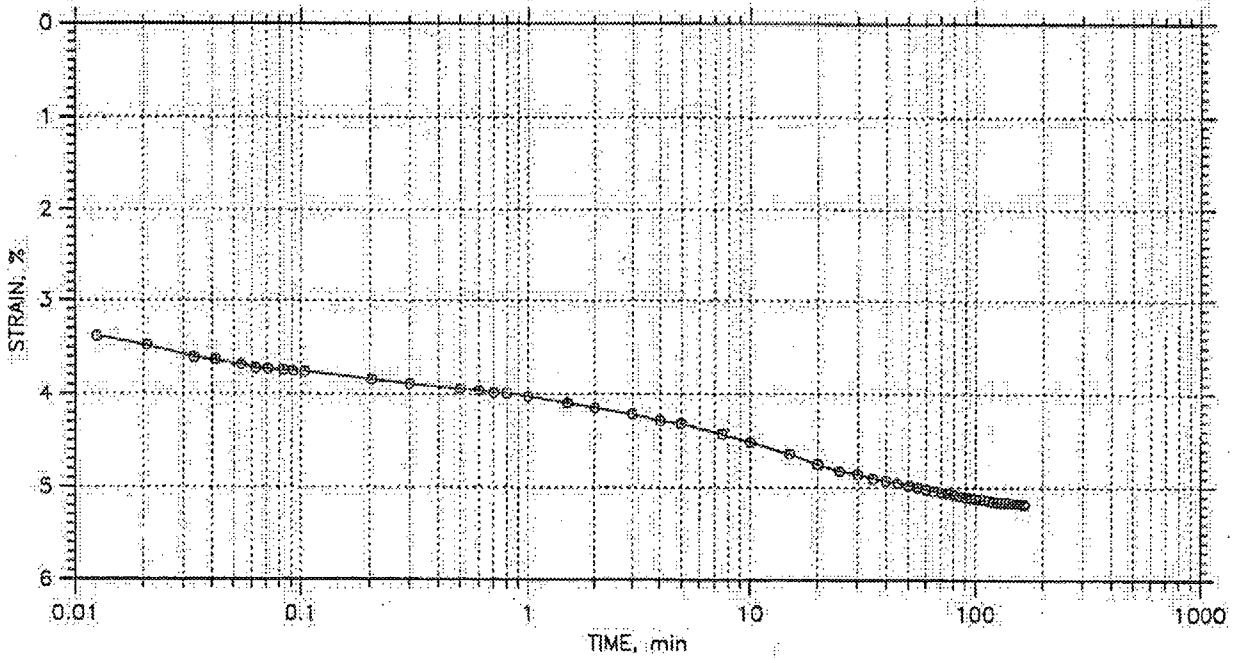
Stress: 4000. psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-5	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-5	Test Date: 08/29/08	Depth: 228-230 ft.
	Test No.: 8964	Sample Type: Undisturbed	Elevation:
	Description: Very Dark Greenish Gray Fat Clay (CH) Cr= 0.082 (Elev -197.6/-199.6)		
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05), Task 1.2		

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CONSOLIDATION TEST DATA
 TIME CURVES
 Constant Load Step: 12 of 20
 Stress: 8000. psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-5	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-5	Test Date: 08/29/08	Depth: 228-230 ft
	Test No.: 8964	Sample Type: Undisturbed	Elevation:
	Description: Very Dark Greenish Gray Fat Clay (CH) Cr= 0.082 (Elev -197.6/-199.6)		
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05) Task 1.2		

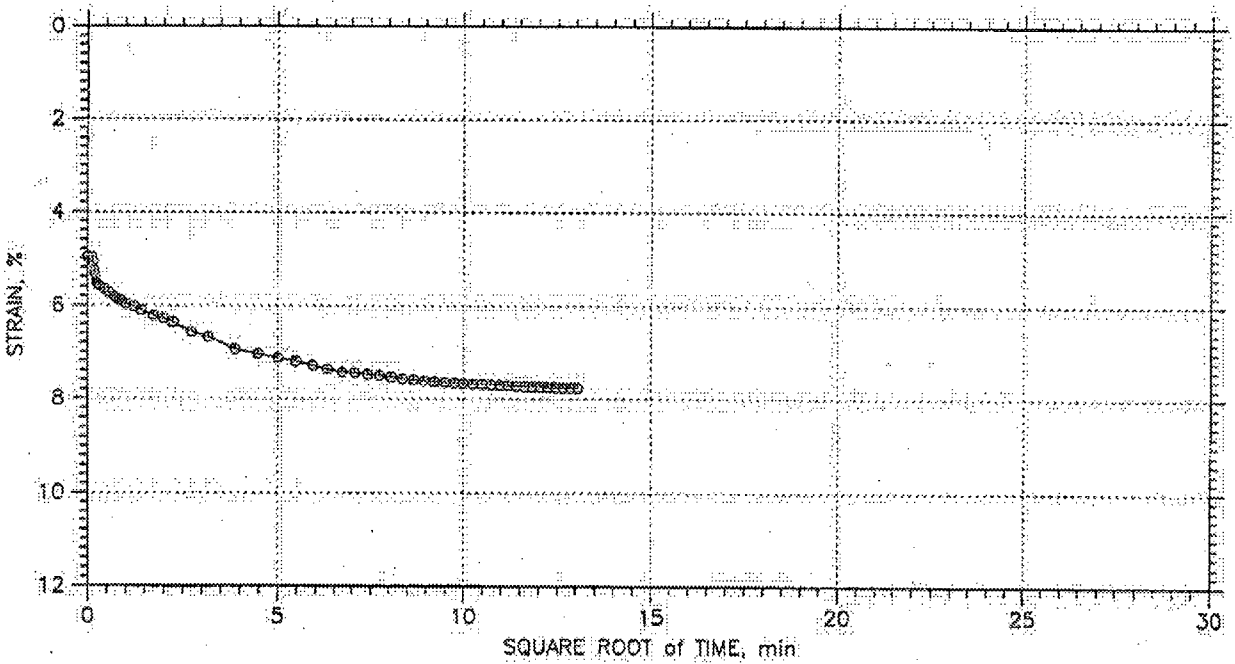
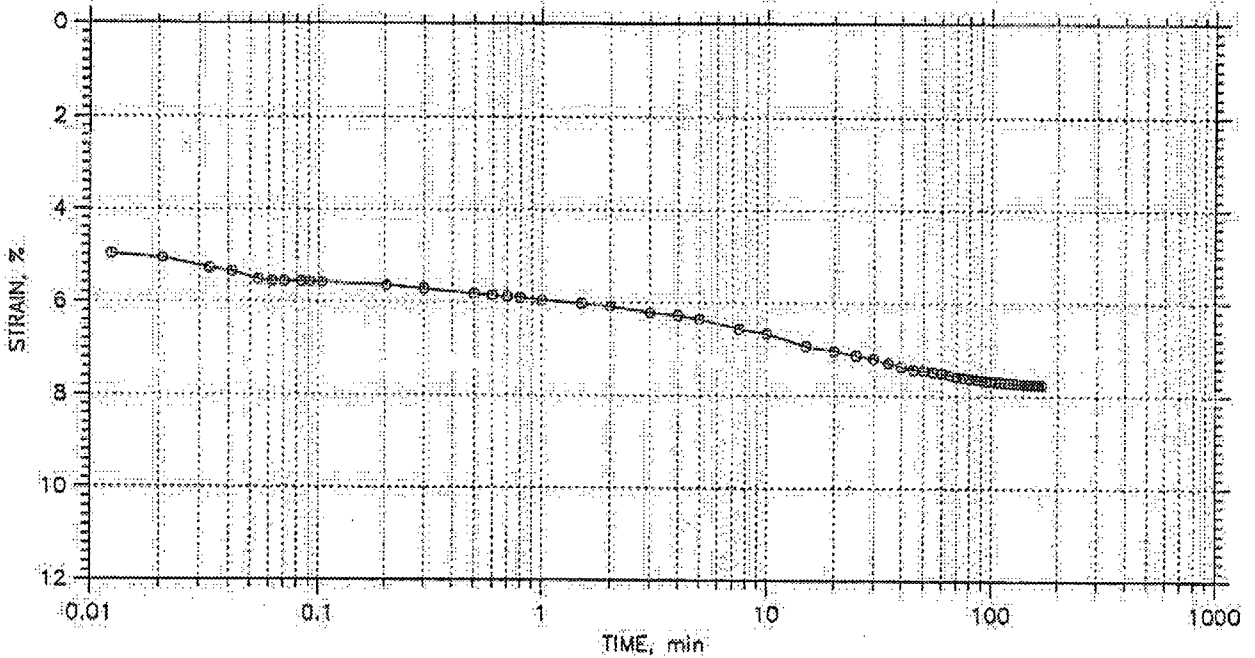
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CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 13 of 20

Stress: 16000 psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-5	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-5	Test Date: 08/29/08	Depth: 228-230 ft
	Test No.: 8964	Sample Type: Undisturbed	Elevation:
	Description: Very Dark Greenish Gray Fat Clay (CH) Cr= 0.082 (Ele -197.6/-199.6)		
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05) Task 1.2		

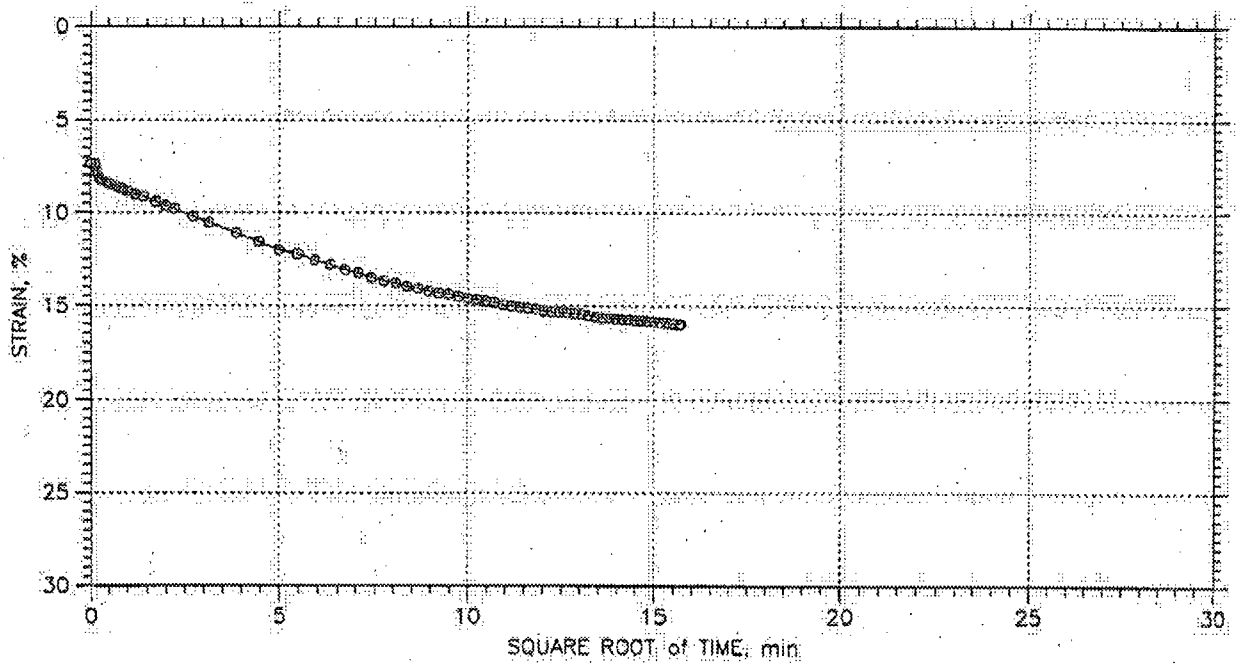
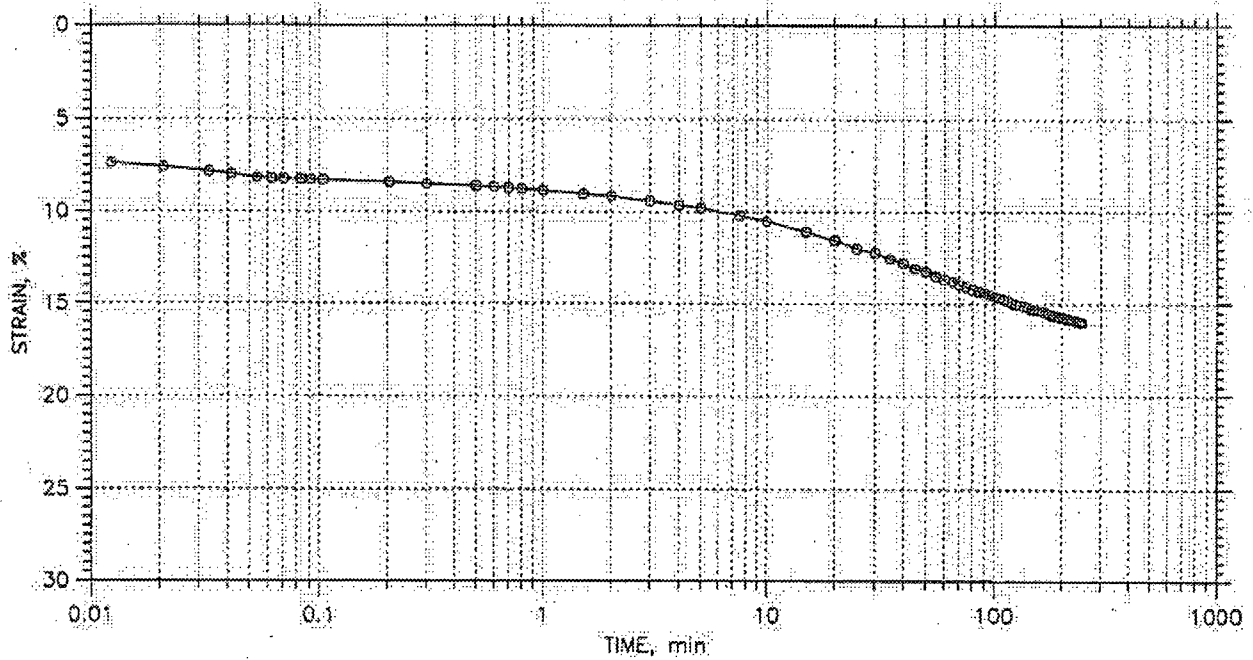
Tue, 14-OCT-2008 16:24:49

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 14 of 20

Stress: 32000 psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A: UD-5	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-5	Test Date: 08/29/08	Depth: 228-230 ft
	Test No.: 8964	Sample Type: Undisturbed	Elevation:
	Description: Very Dark Greenish Gray Fat Clay (CH) Cr= 0.082 (Ele -197.6/-199.6)		
	Remarks: ASTM D2435-04 Method B; SG (ASTM D854-06); PI (ASTM D4318-05) Task 1.2		

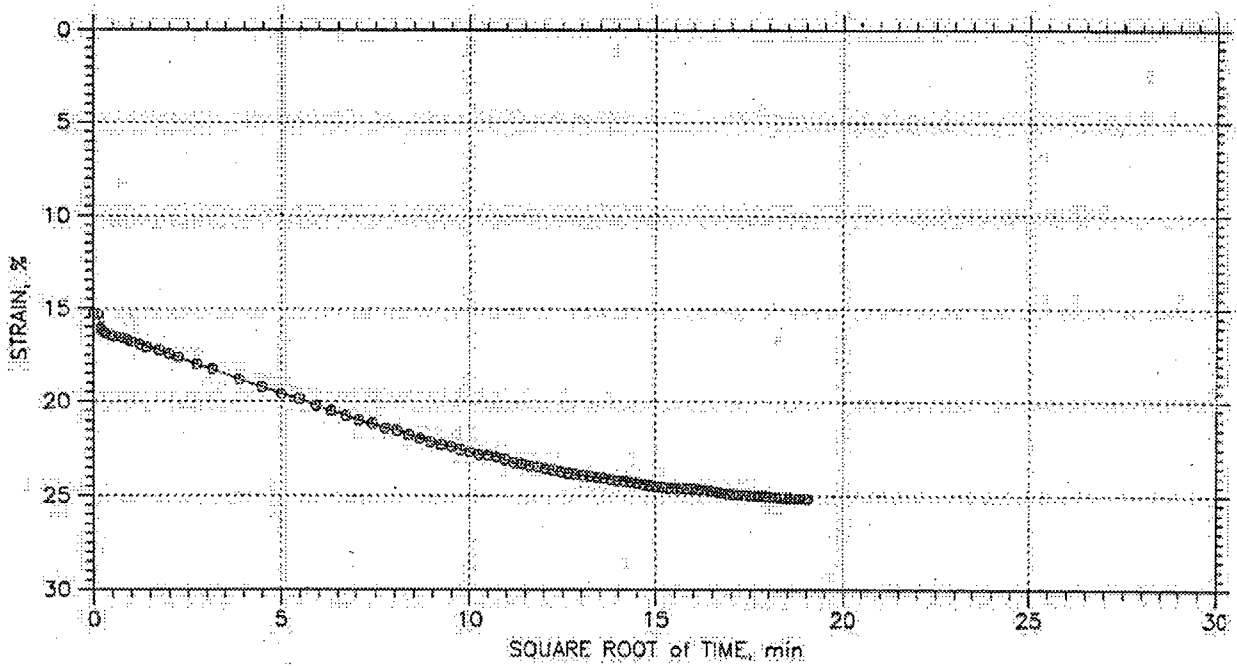
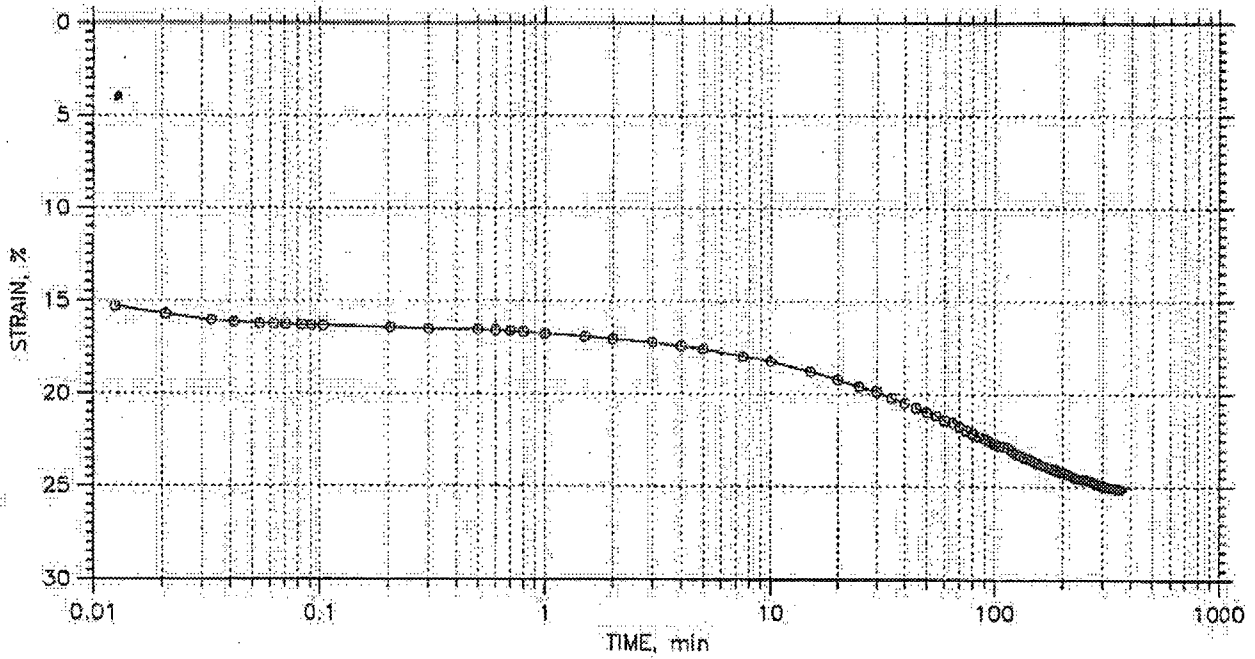
Tue, 14-OCT-2008 16:24:49

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 15 of 20

Stress: 64000 psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-5	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-5	Test Date: 08/29/08	Depth: 228-230 ft
	Test No.: B964	Sample Type: Undisturbed	Elevation:
	Description: Very Dark Greenish Gray Fat Clay (CH) Cr= 0.082 (Ele -197.5/-199.6)		
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05). Task 1.2		

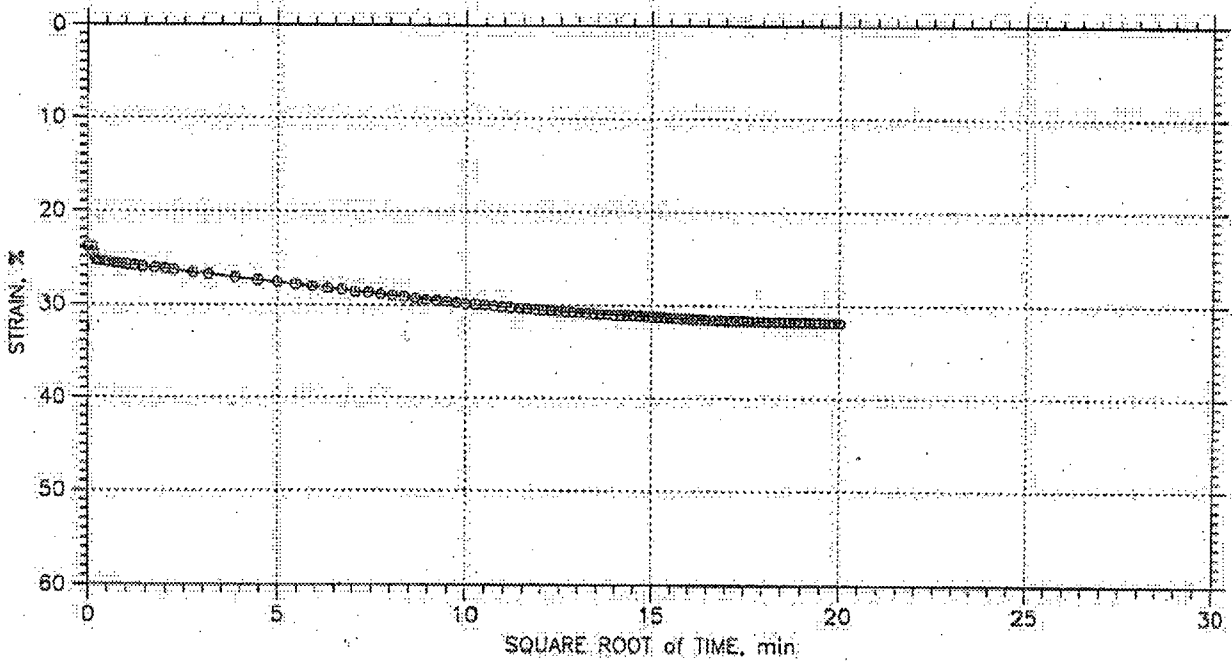
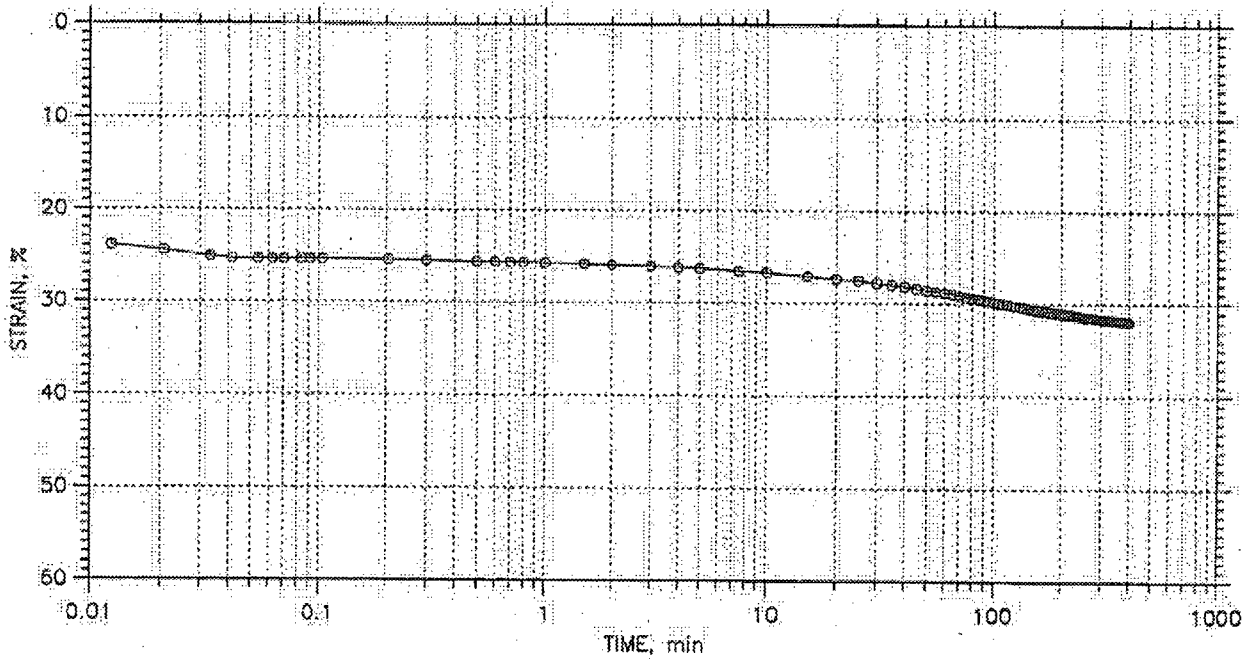
Tue, 14-OCT-2008 16:24:49

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 16 of 20

Stress: 1.28e+005 psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-5	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-5	Test Date: 08/29/08	Depth: 228-230 ft.
	Test No.: 8964	Sample Type: Undisturbed	Elevation:
	Description: Very Dark Greenish Gray Fat Clay (CH) Cr= 0.082 (Ele -197.6/-199.6)		
	Remarks: ASTM D2435-04 Method B; SG (ASTM D854-06), PI (ASTM D4318-05). Task 1.2		

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Nuclear Energy Systems & Services Division

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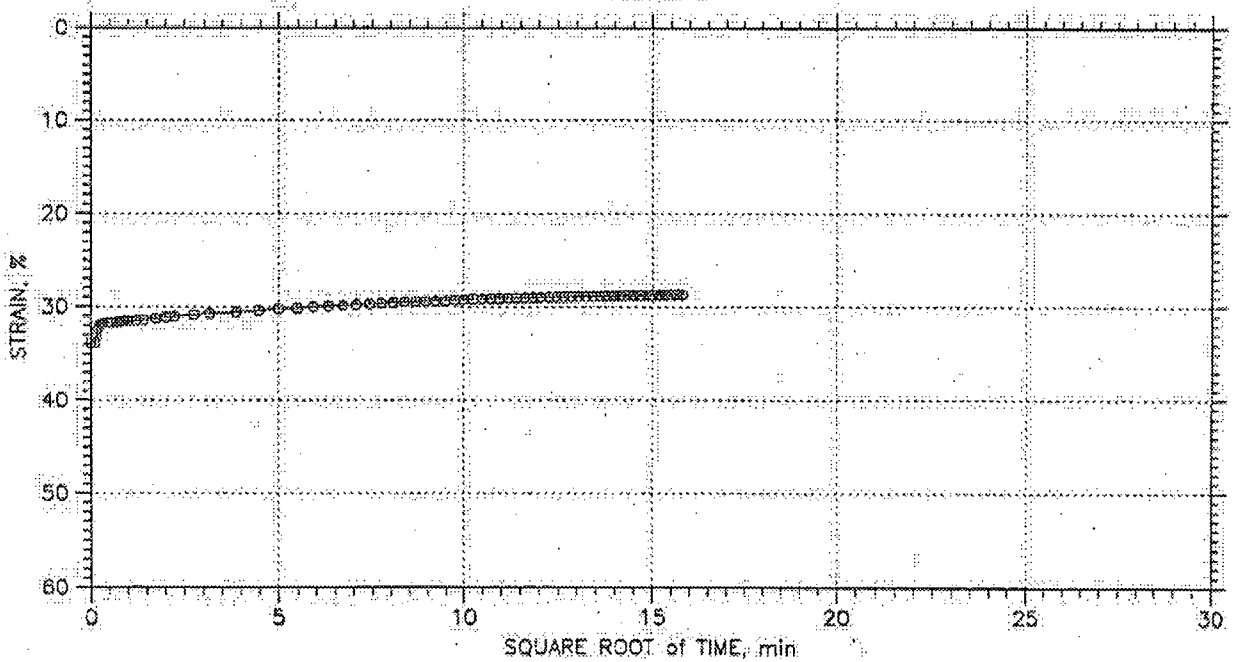
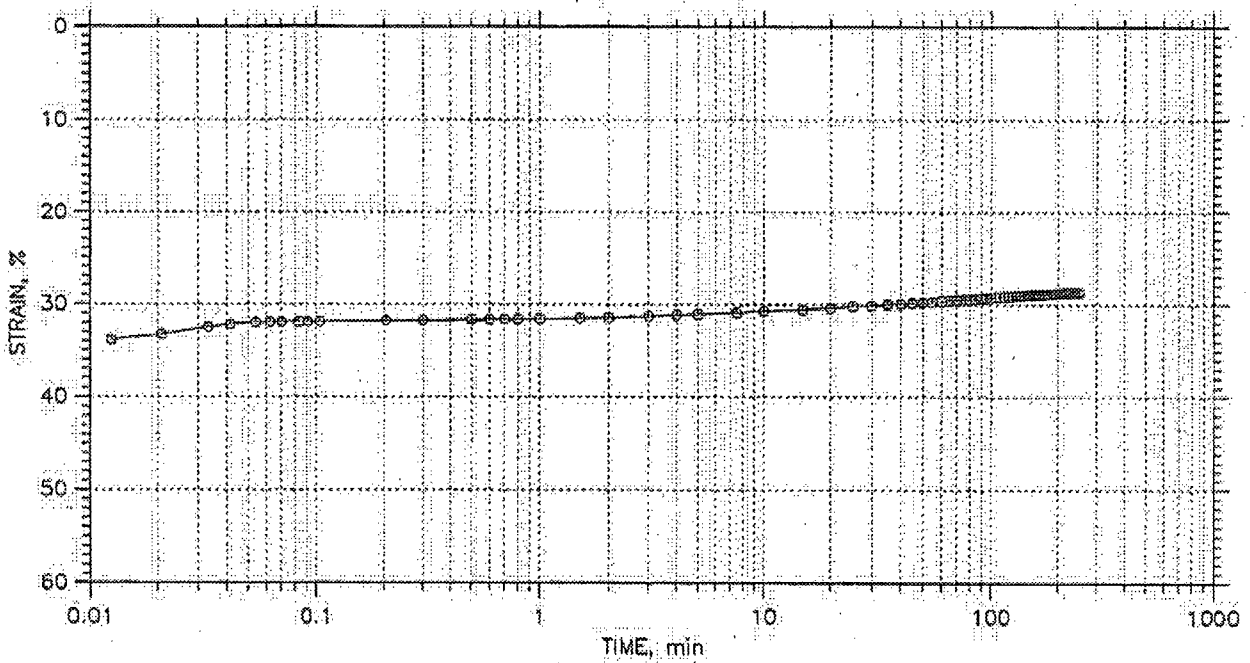
DCN-FLR-817

CONSOLIDATION TEST DATA

TIME CURVES

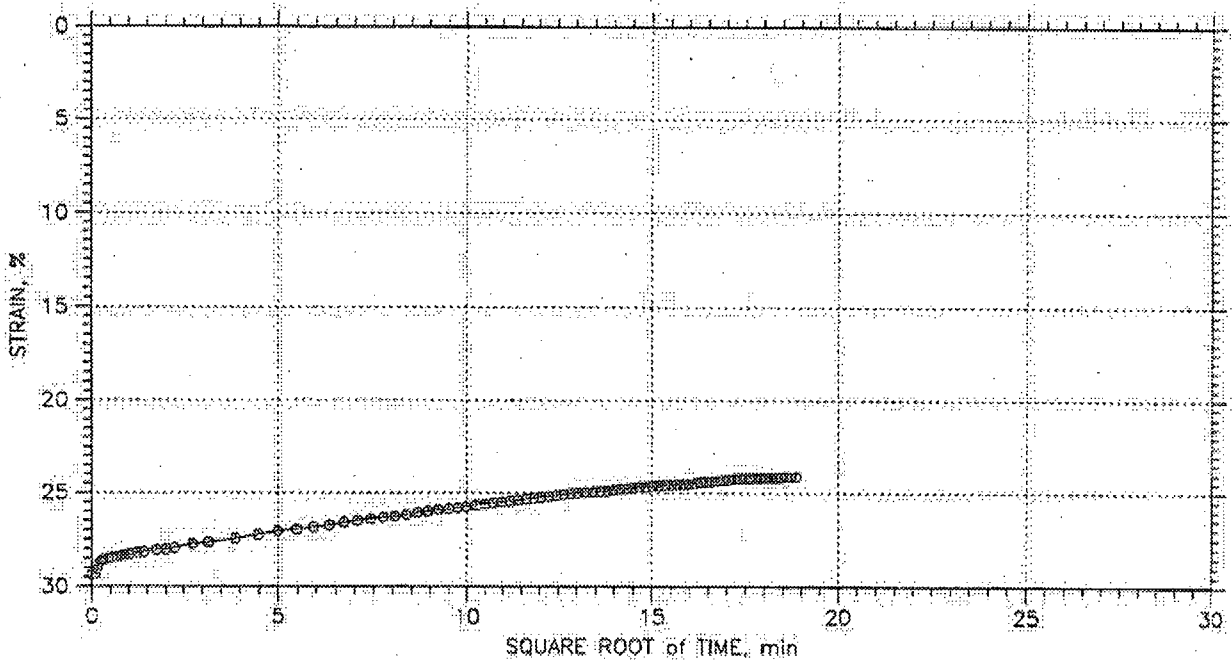
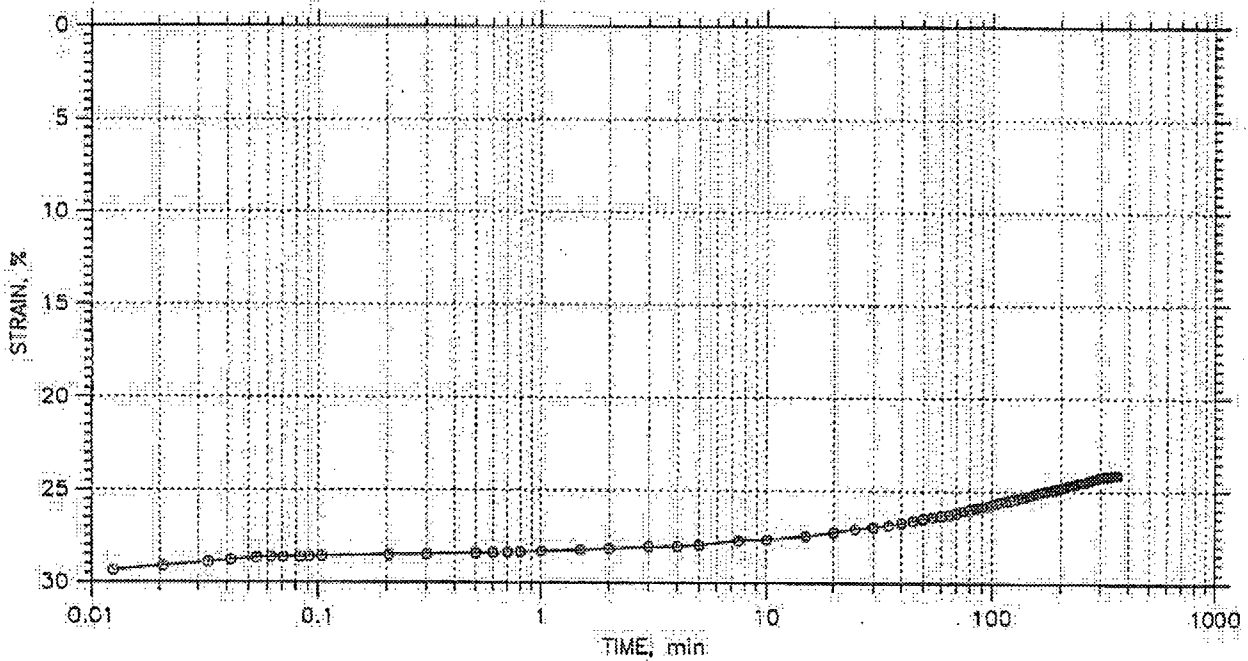
Constant Load Step: 17 of 20

Stress: 32000 psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-5	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-5	Test Date: 08/29/08	Depth: 226-230 ft
	Test No.: 8954	Sample Type: Undisturbed	Elevation:
	Description: Very Dark Greenish Gray Fat Clay (Ch) Cr= 0.082 (Ele -197.6/-199.6)		
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05) Task 1.2		

CONSOLIDATION TEST DATA
TIME CURVES
 Constant Load Step: 18 of 20
 Stress: 8000. psf



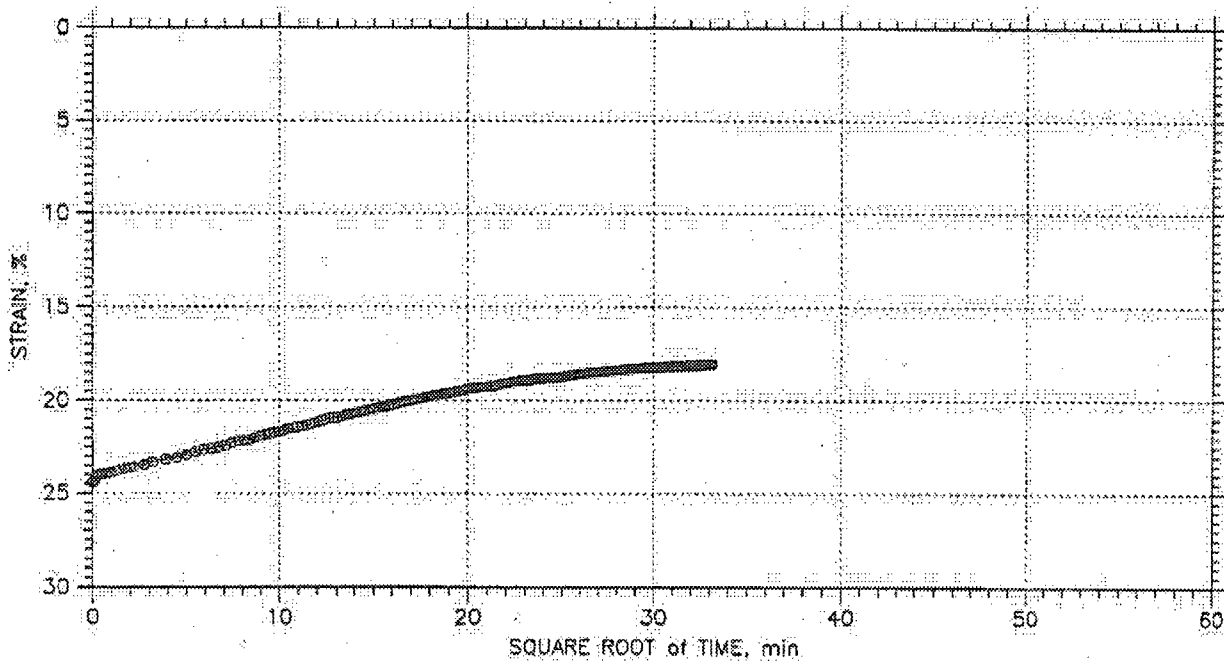
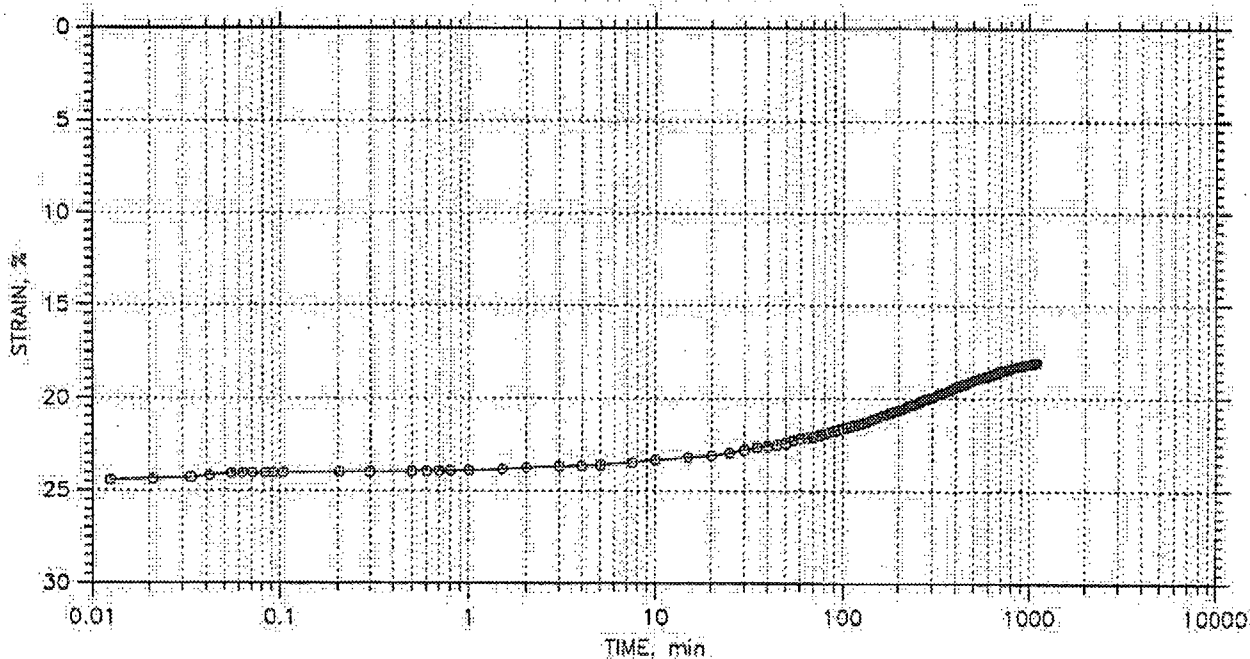
MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-5	Project No.: 6234084650
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-5	Test Date: 08/29/08	Depth: 228-230 ft
	Test No.: 8964	Sample Type: Undisturbed	Elevation:
	Description: Very Dark Greenish Gray Fat Clay (CH) Cr= 0.082 (Ele -197.6/-199.6)		
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05), Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 19 of 20

Stress: 2000, psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-5	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-5	Test Date: 08/29/08	Depth: 228-230 ft
	Test No.: 8964	Sample Type: Undisturbed	Elevation:
	Description: Very Dark Greenish Gray Fat Clay (CH) Cr= 0.082 (Ele. -197.6/-199.6)		
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05) Task 1.2		

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Nuclear Energy Systems & Services Division

718/763

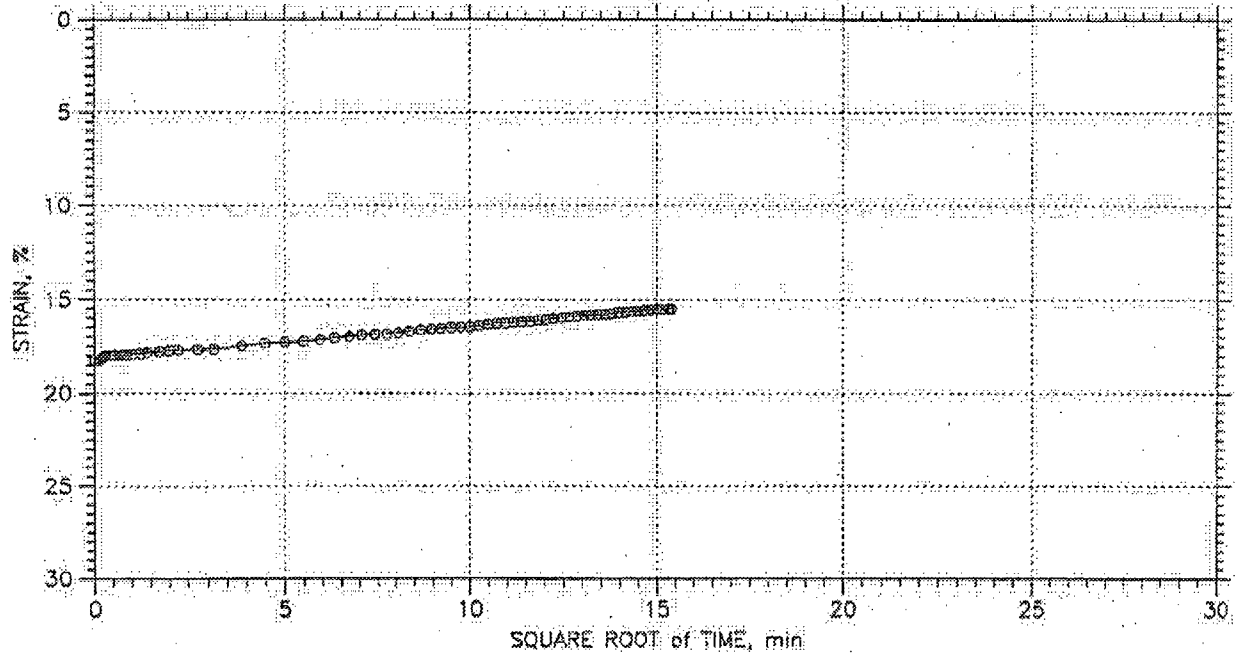
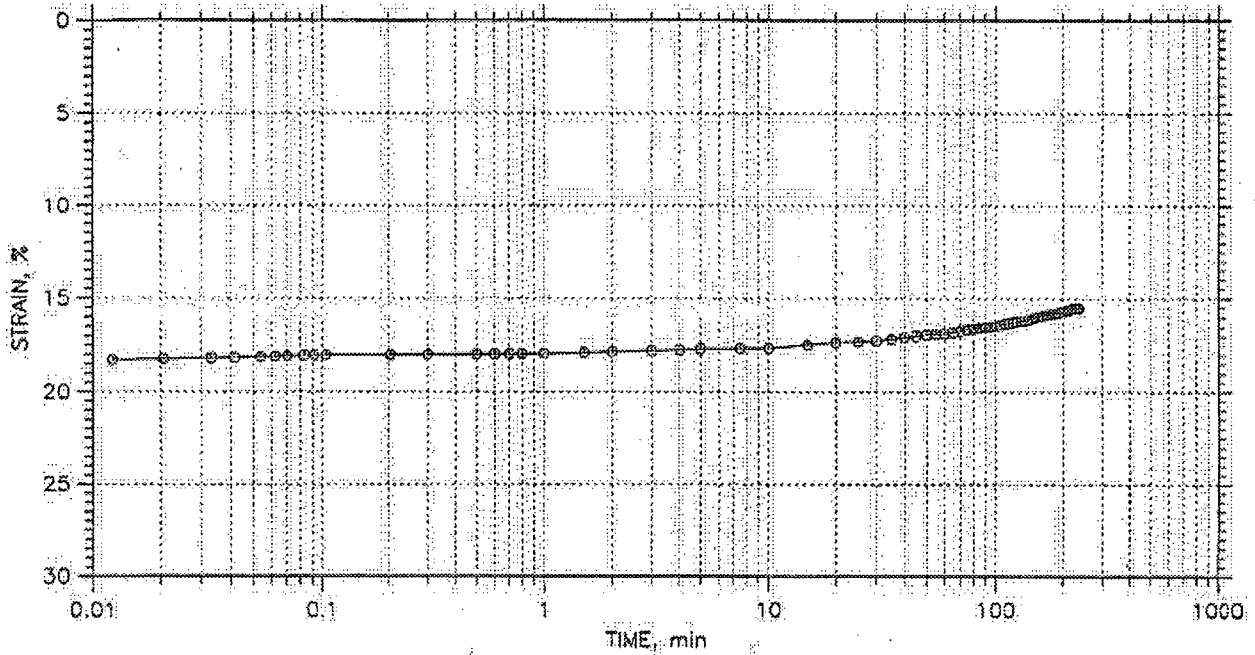
DCN 6LR-817

CONSOLIDATION TEST DATA

TIME CURVES

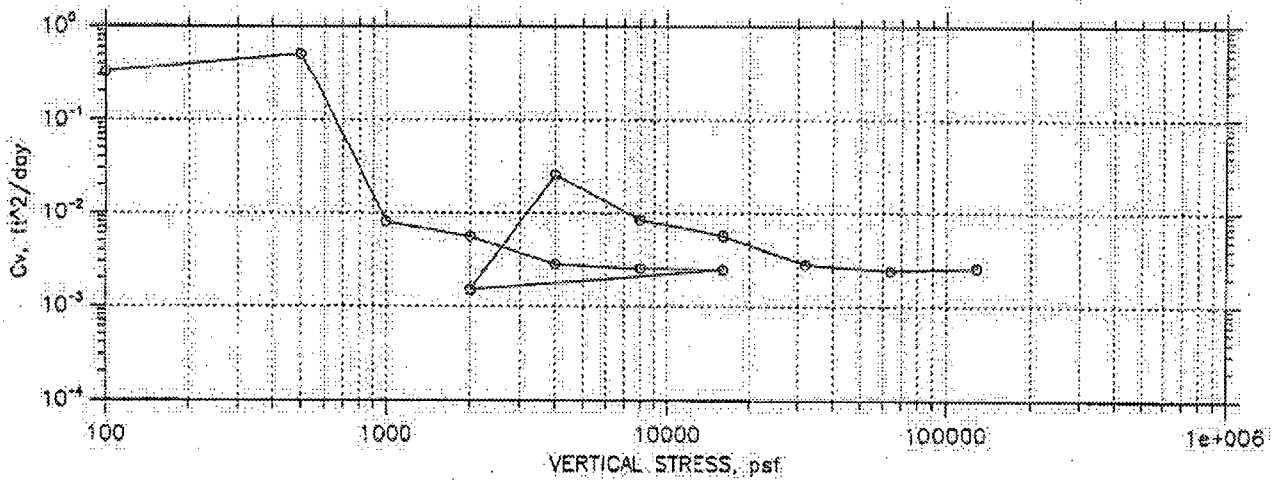
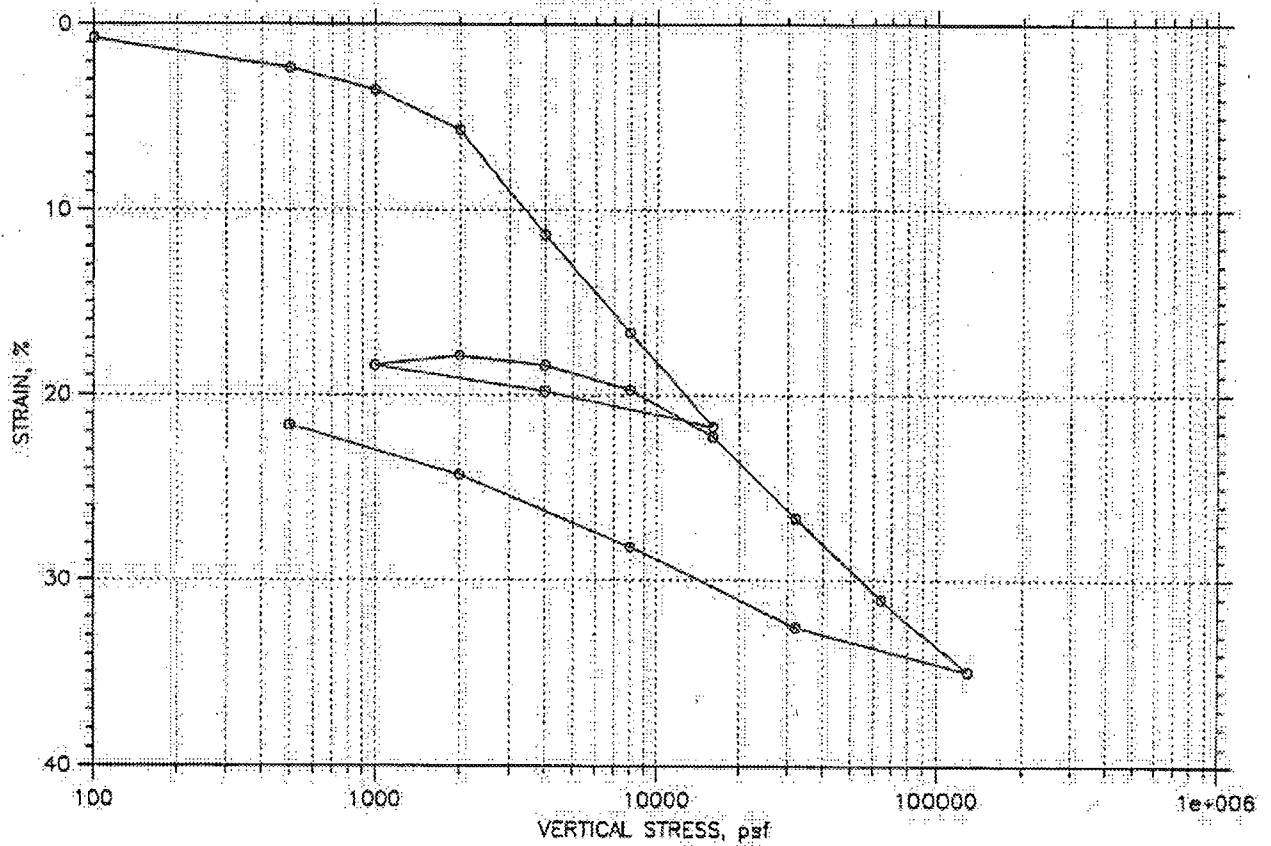
Constant Load Step: 20 of 20

Stress: 500 psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-5	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-5	Test Date: 08/29/08	Depth: 228-230 ft
	Test No.: 8964	Sample Type: Undisturbed	Elevation:
	Description: Very Dark Greenish Gray Fat Clay (CH) Cr= 0.082 (Ele -197.6/-199.6)		
	Remarks: ASTM D2435-04 Method B; SG (ASTM D854-06), PI (ASTM D4318-05). Task 1.2		

CONSOLIDATION TEST DATA SUMMARY REPORT



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-6	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-6	Test Date: 08/28/08	Depth: 268.5-270.5
	Test No.: 8965	Sample Type: Undisturbed	Elevation:
	Description: Greenish Gray Fat Clay (CH) Cr= 0.060		(Ele. -238.1/-240.1)
	Remarks: ASTM D2435-04 Method B, SG(ASTM D854-06), PI(ASTM D4318-05); Task 1.2		

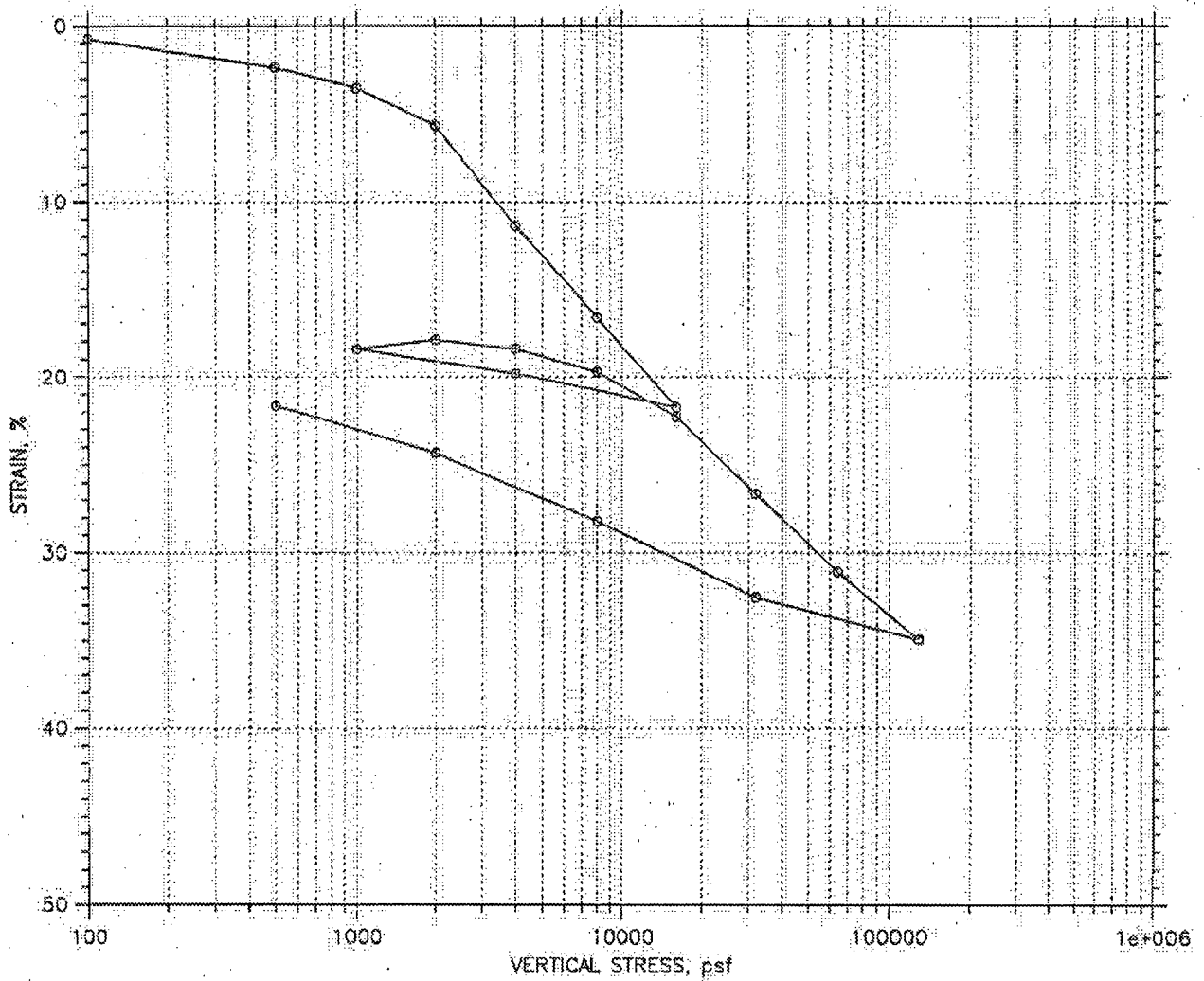
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Nuclear Energy Systems & Services Division

720/763

DCN 6LR-817

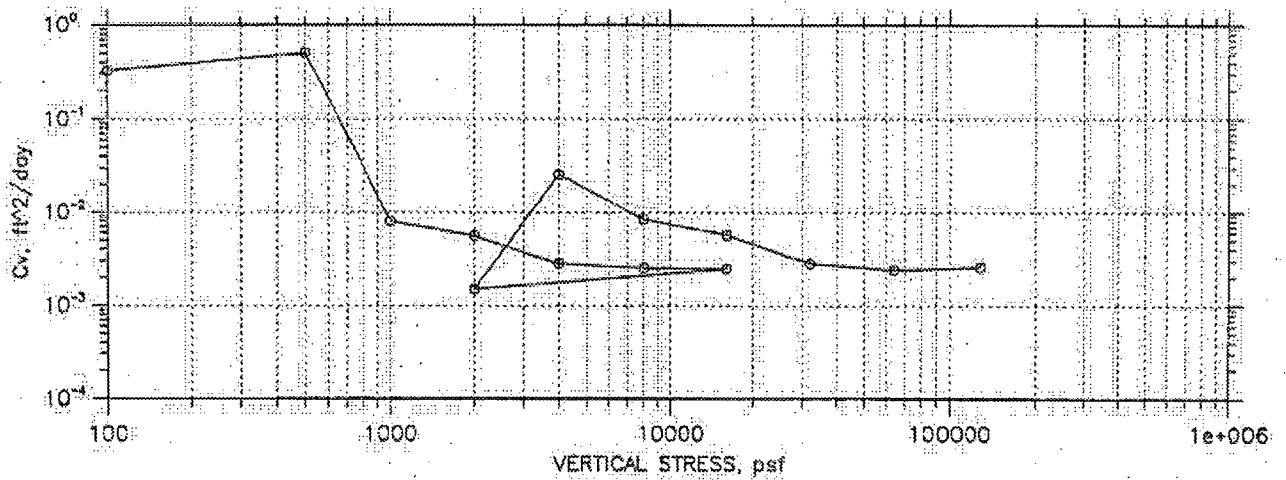
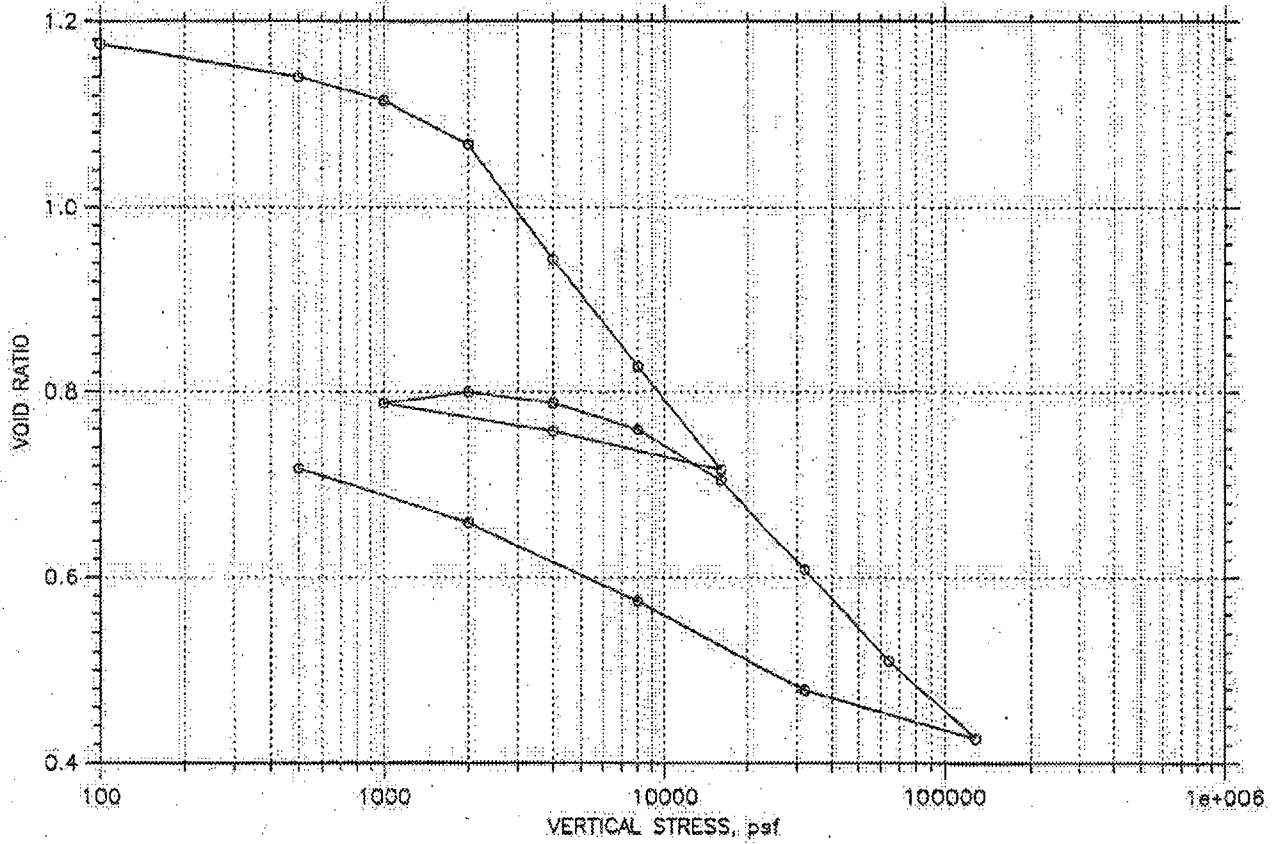
CONSOLIDATION TEST DATA SUMMARY REPORT



		Before Test	After Test
Overburden Pressure: 1.77e+004 psf		42.99	26.15
Preconsolidation Pressure: 1.17e+004 psf		78.32	99.95
Compression Index: 0.322		99.18	100.23
Diameter: 2.5 in	Height: 1.001 in	Void Ratio	1.19
LL: 74	PL: 24	PI: 50	SS: 2.75

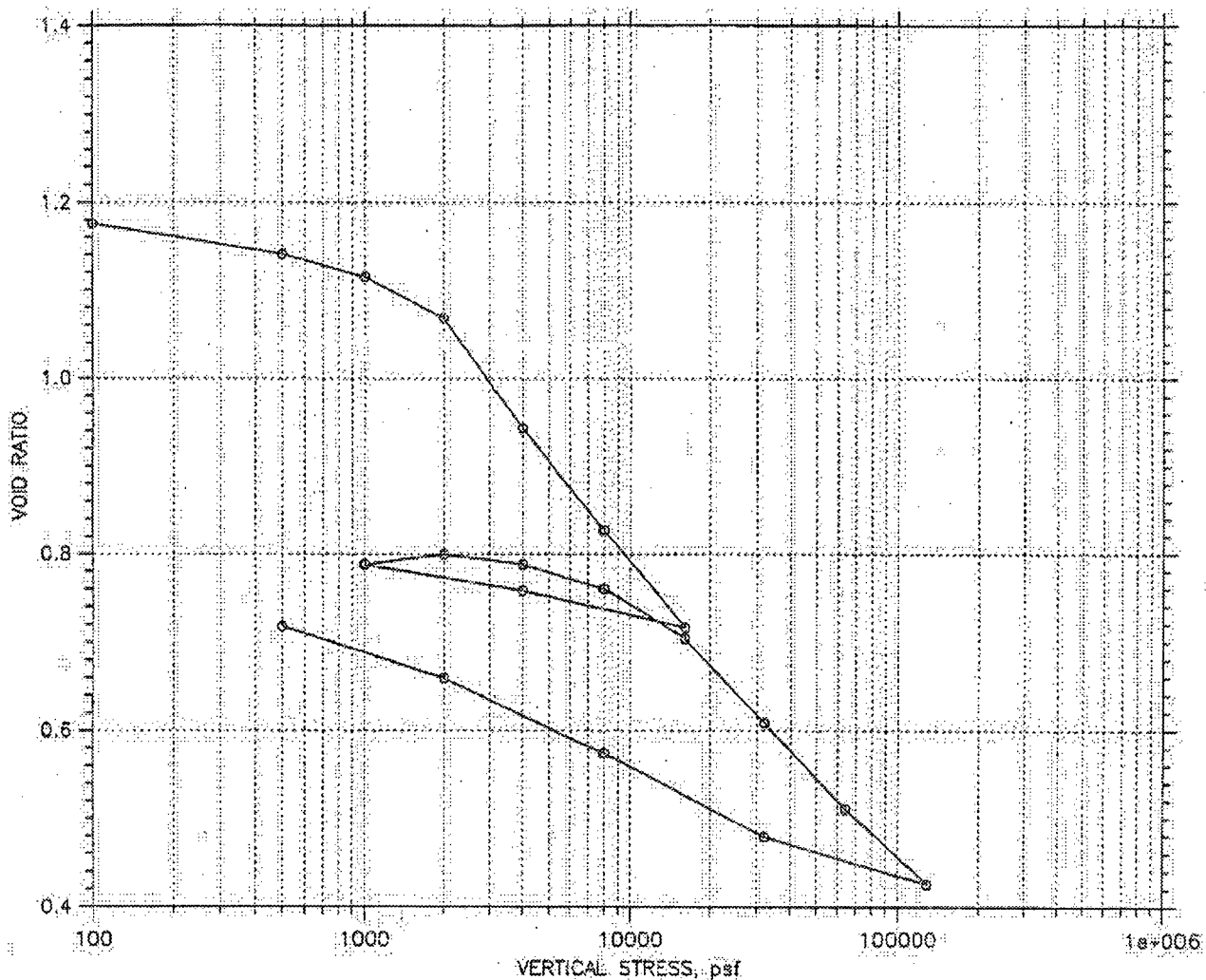
MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-6	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-6	Test Date: 08/28/08	Depth: 268.5-270.5
	Test No.: 8955	Sample Type: Undisturbed	Elevation:
	Description: Greenish Gray Fat Clay (CH) Gr= 0.060 (Elev. -238.1/-240.1)		
	Remarks: ASTM D2435-04 Method B, SG(ASTM D854-06), PI(ASTM D4318-05), Task 1.2		

CONSOLIDATION TEST DATA SUMMARY REPORT



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-6	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-6	Test Date: 08/28/08	Depth: 268.5-270.5
	Test No.: 8965	Sample Type: Undisturbed	Elevation:
	Description: Greenish Gray Fat Clay (CH)		Cr= 0.060 (Ele. -238.1/-240.1)
	Remarks: ASTM D2435-04 Method B; SG(ASTM D854-06); PI(ASTM D4318-05); Task 1.2		

CONSOLIDATION TEST DATA SUMMARY REPORT



		Before Test	After Test
Overburden Pressure: 1.77e+004 psf		42.99	26.15
Preconsolidation Pressure: 1.17e+004 psf		78.32	99.95
Compression index: 0.322		99.18	100.23
Diameter: 2.5 in		Void Ratio	
Height: 1.001 in			
LL: 74	PI: 24	1.19	0.72
PI: 50	GS: 2.75		

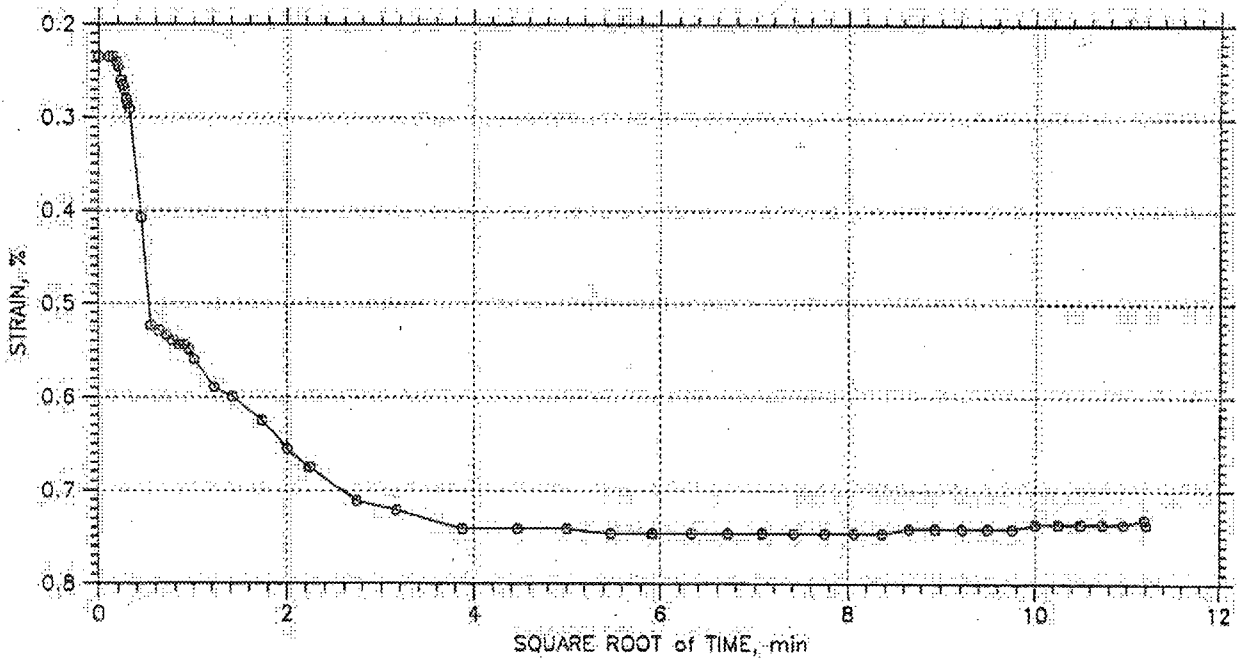
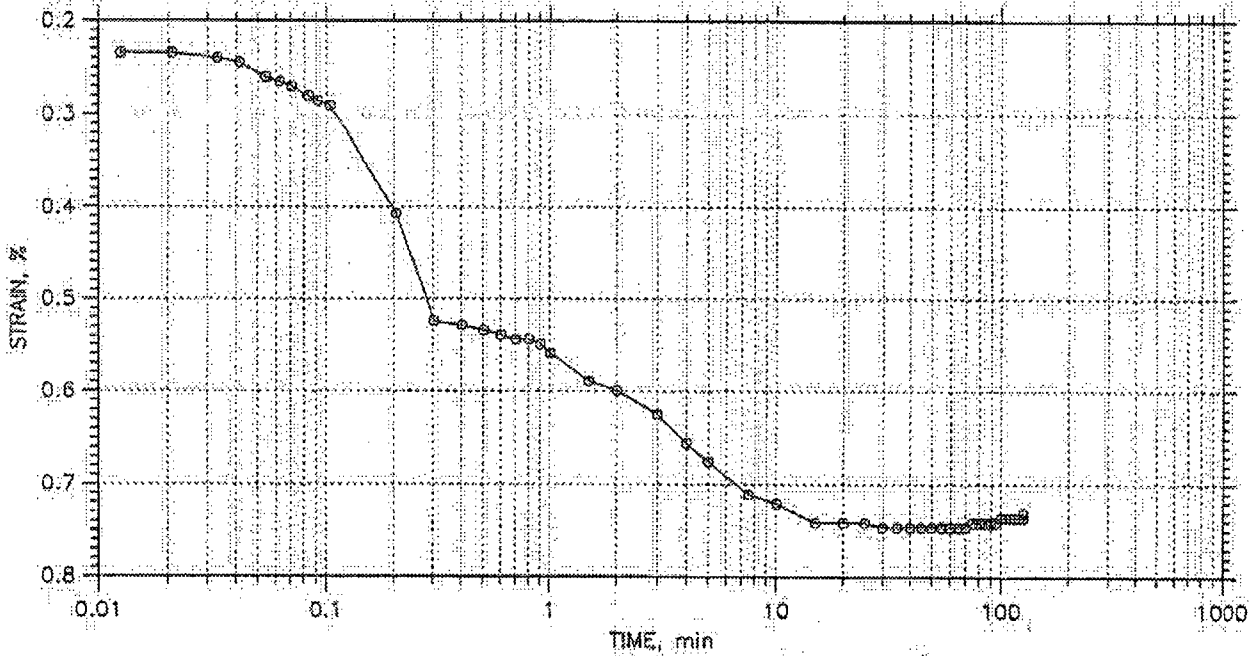
MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-6	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-6	Test Date: 08/28/08	Depth: 268.5-270.5
	Test No.: 8985	Sample Type: Undisturbed	Elevation:
	Description: Greenish Gray Fat Clay (CH) Cr= 0.060 (Ele. -238.1/-240.1)		
	Remarks: ASTM D2435-04 Method B, SG(ASTM D854-06), PI(ASTM D4318-05), Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 1 of 20

Stress: 100. psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-6	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-6	Test Date: 08/28/08	Depth: 268.5-270.5
	Test No.: 8965	Sample Type: Undisturbed	Elevation:
	Description: Greenish Gray Fat Clay (CH) Cr= 0.060		(Ele. -238.1/-240.1)
	Remarks: ASTM D2435-04 Method B, SG(ASTM D854-06), PI(ASTM D4318-05):		

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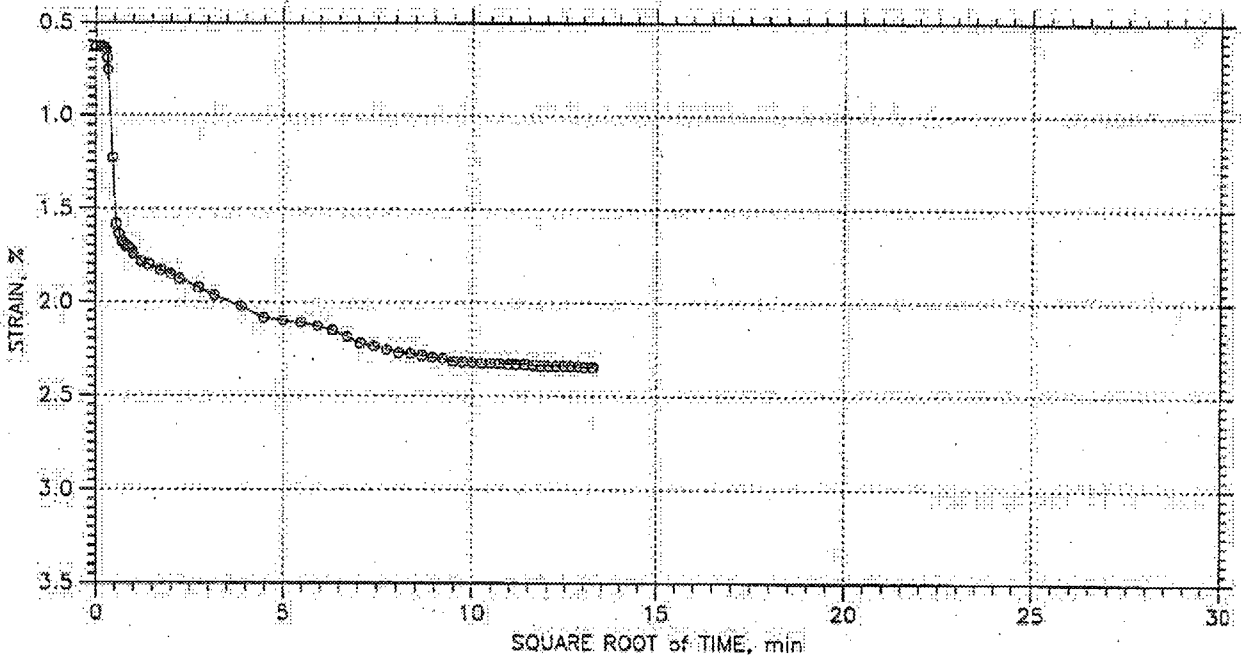
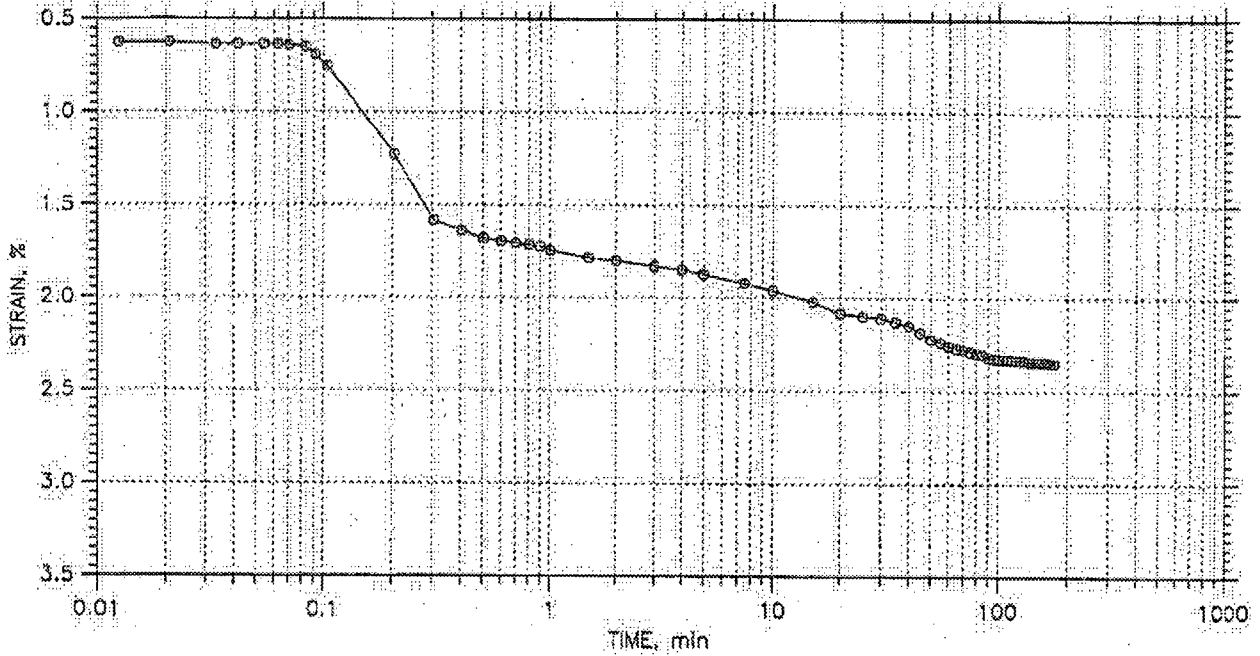
DCN 6LR-817

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 2 of 20

Stress: 500. psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-6	Project No.: 6234084660	
	Boring No.: U4-1A	Tested By: BM	Checked By: JW	
	Sample No.: UD-6	Test Date: 08/28/08	Depth: 268.5-270.5	
	Test No.: 8965	Sample Type: Undisturbed	Elevation:	
	Description: Greenish Gray Fat Clay (CH) Cr= 0.060		(Ele. -238.1/-240.1)	
	Remarks: ASTM D2435-04 Method B, SG(ASTM D854-06), PI(ASTM D4318-05).			Task1.2

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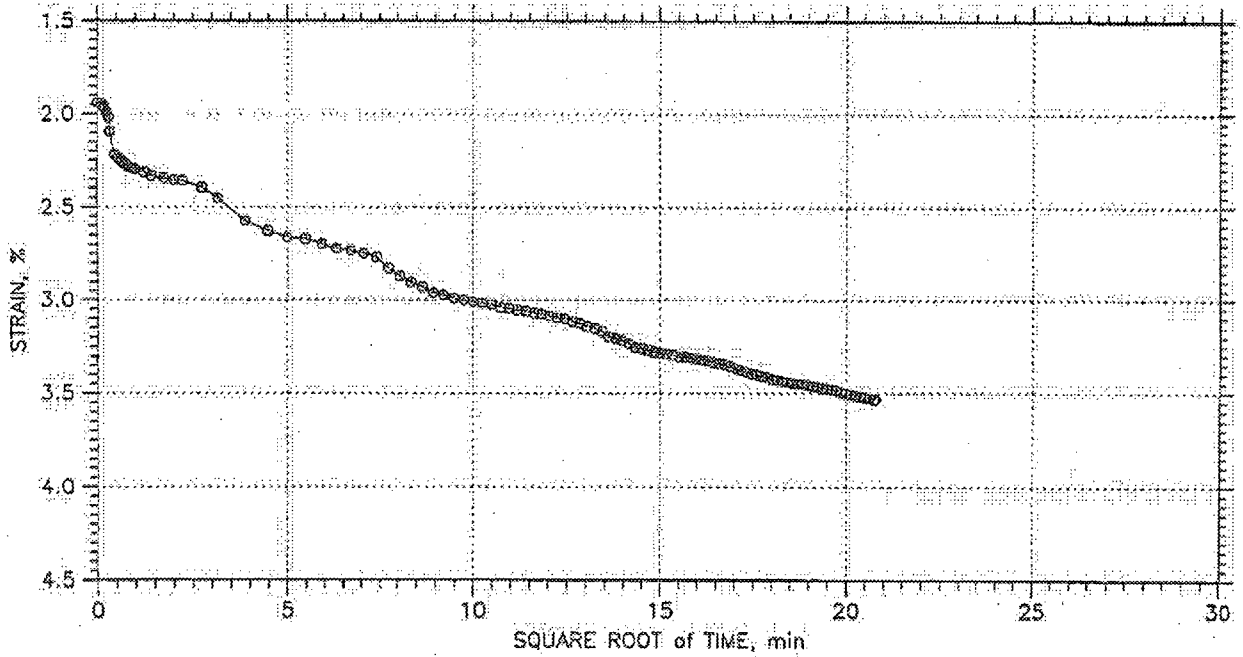
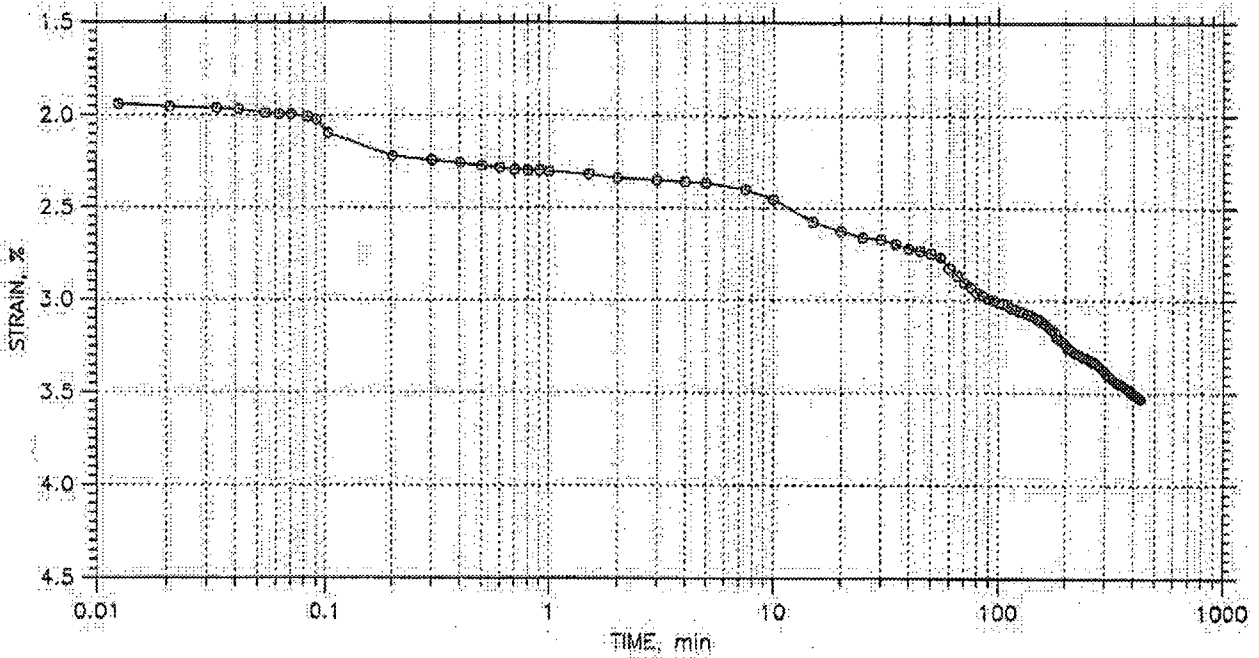
DCN06LR-817

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 3 of 20

Stress: 1000. psf



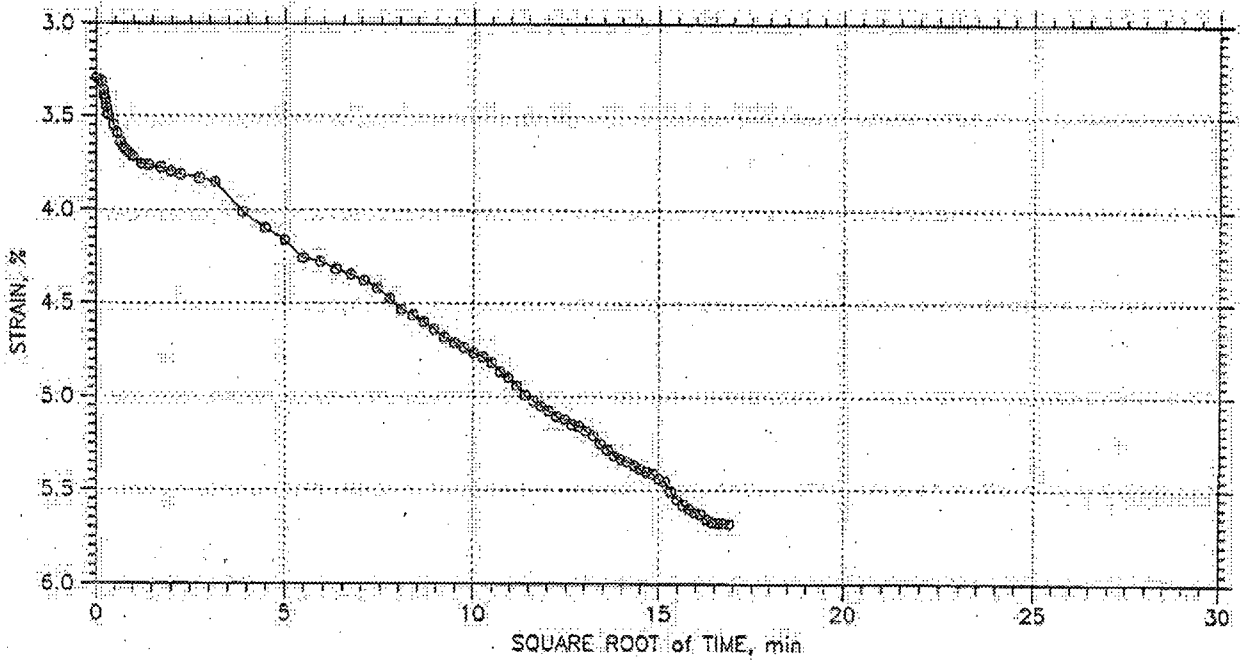
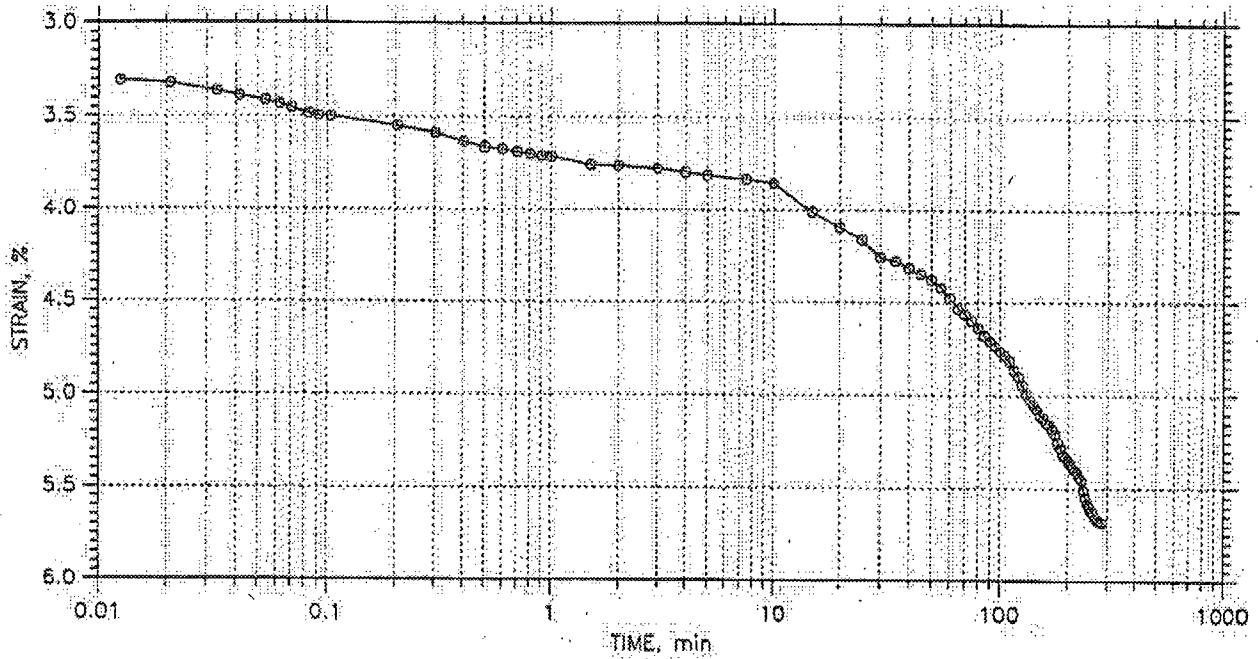
MACTEC	Project: STP Units 3 & 4	Location: U4-1A, UD-6	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-6	Test Date: 08/28/08	Depth: 268.5-270.5
	Test No.: 8965	Sample Type: Undisturbed	Elevation:
	Description: Greenish Gray Fat Clay (CH)	Cr= 0.060	(Ele. -238.1/-240.1)
	Remarks: ASTM D2435-04 Method B, SG(ASTM D854-05), PI(ASTM D4318-05)	Task 1.2	

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 4 of 20

Stress: 2000. psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-6	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-6	Test Date: 08/28/08	Depth: 268.5-270.5
	Test No.: 8965	Sample Type: Undisturbed	Elevation:
	Description: Greenish Gray Fat Clay (CH)	Cr= 0.060	(Ele. -238.1/-240.1)
	Remarks: ASTM D2435-04 Method B, SG(ASTM D854-06), PI(ASTM D4318-05).	Task1.2.	

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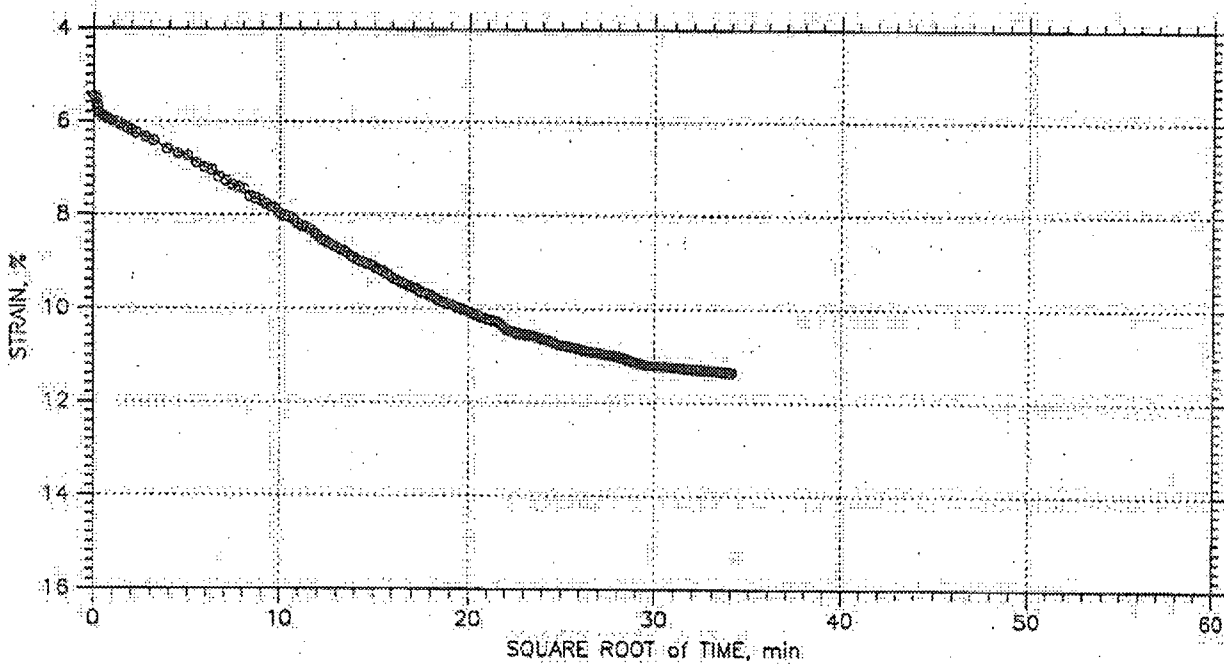
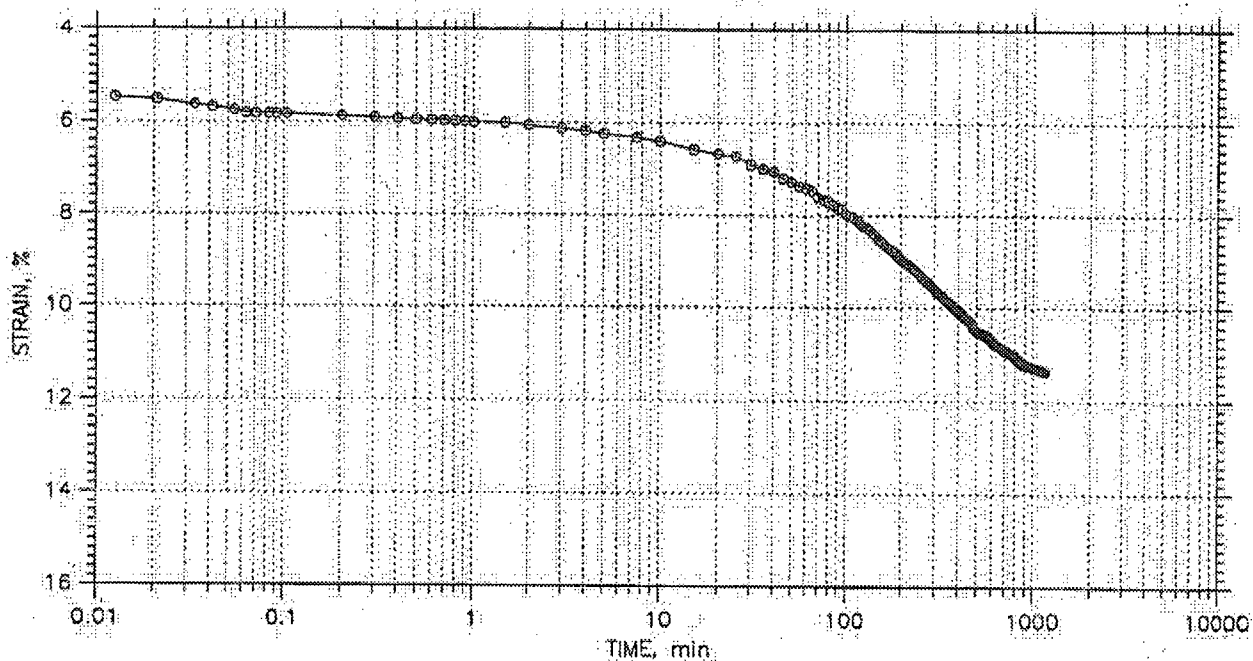
DCN06LR0817

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 5 of 20

Stress: 4000. psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-6	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-6	Test Date: 08/28/08	Depth: 268.5-270.5
	Test No.: 8965	Sample Type: Undisturbed	Elevation:
	Description: Greenish Gray Fat Clay (CH) Cr= 0.060 (Ele. -238.1/-240.1)		
	Remarks: ASTM D2435-04 Method B, SG(ASTM D854-06), PI(ASTM D4318-05). Task 1.2		

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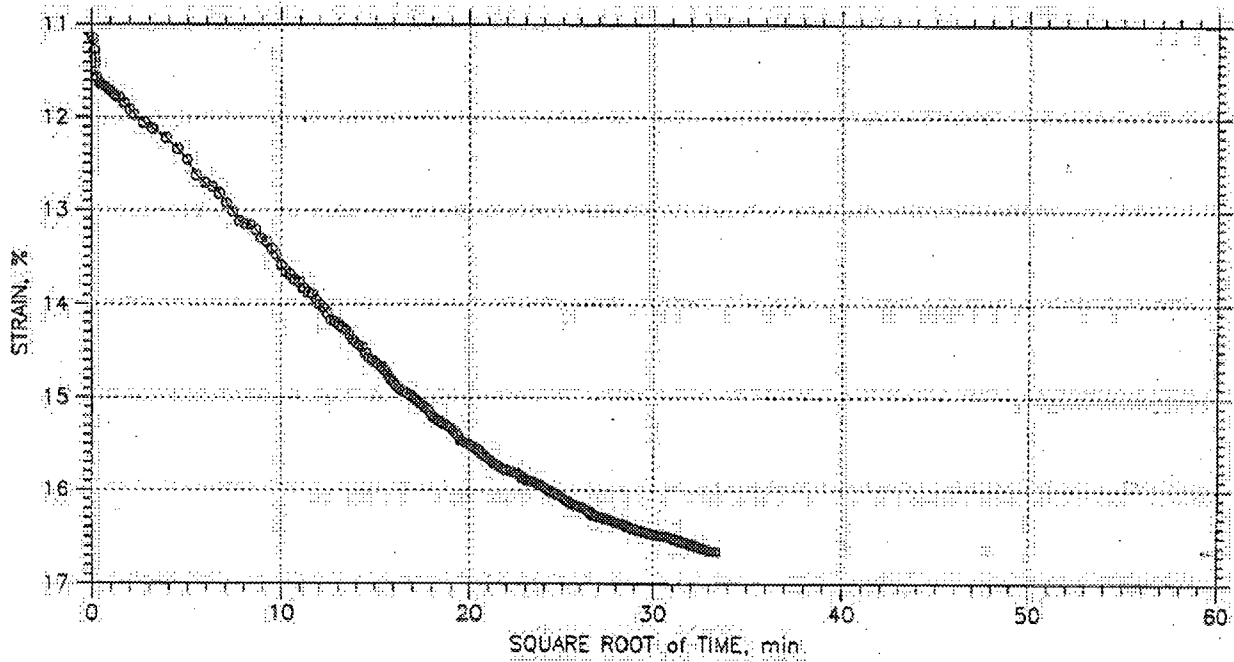
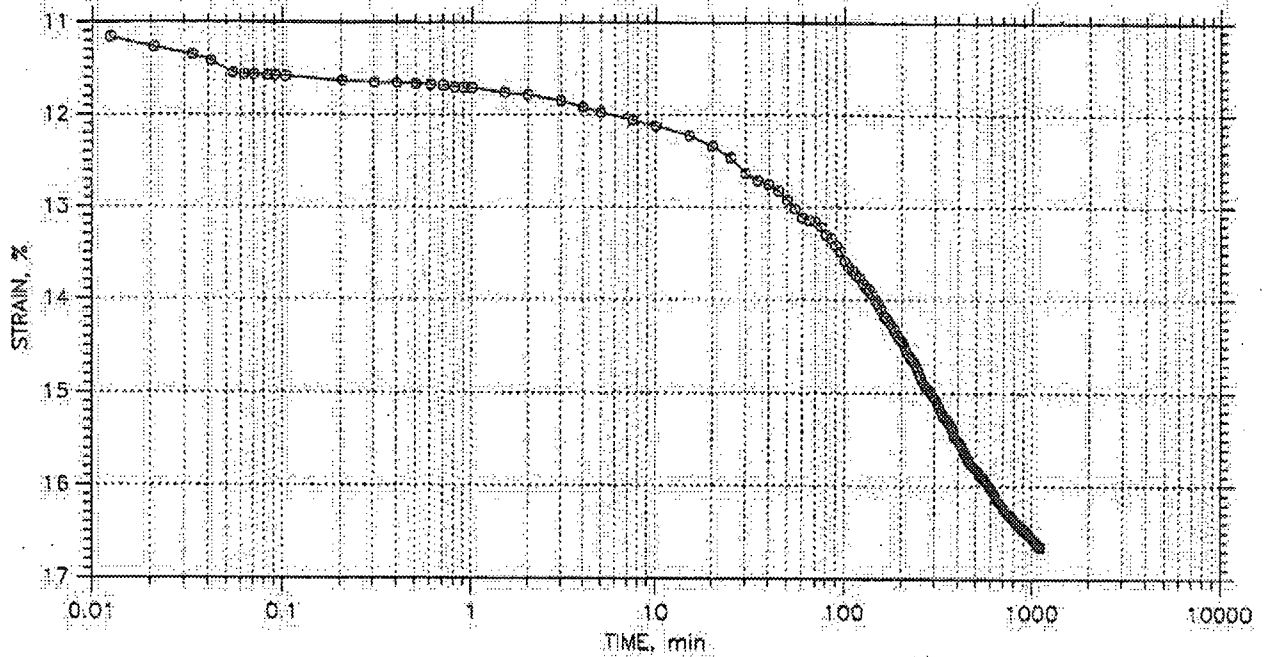
DCN 6LR-817

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 6 of 20

Stress: 8000. psf



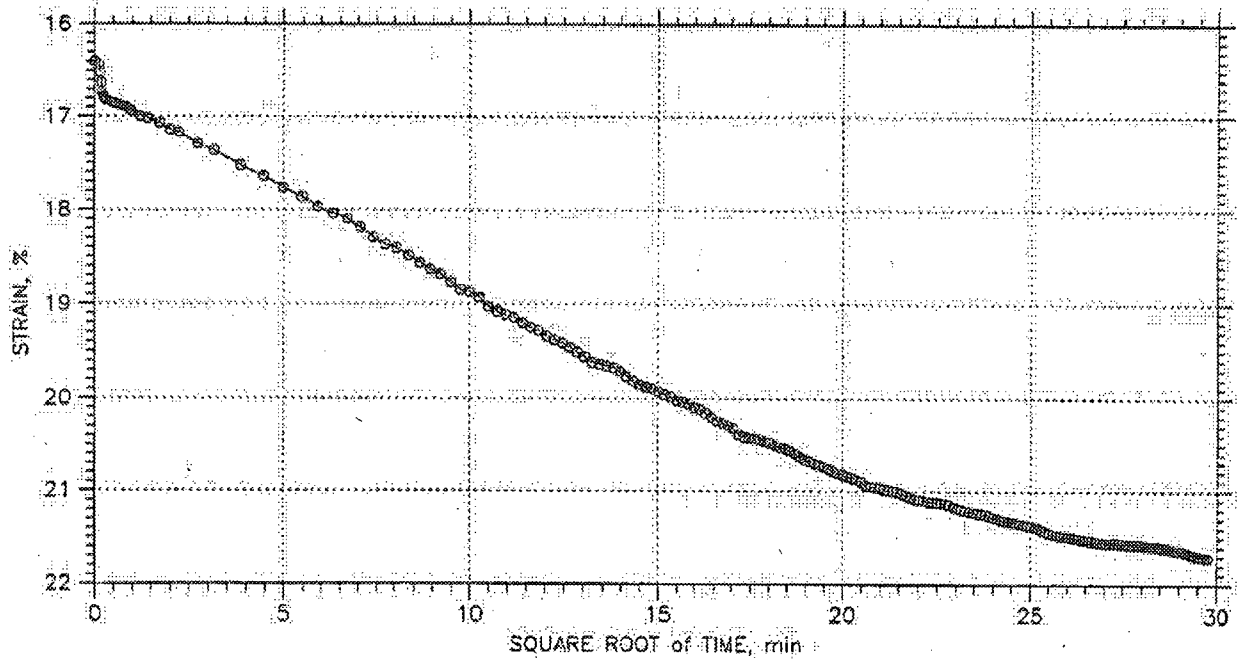
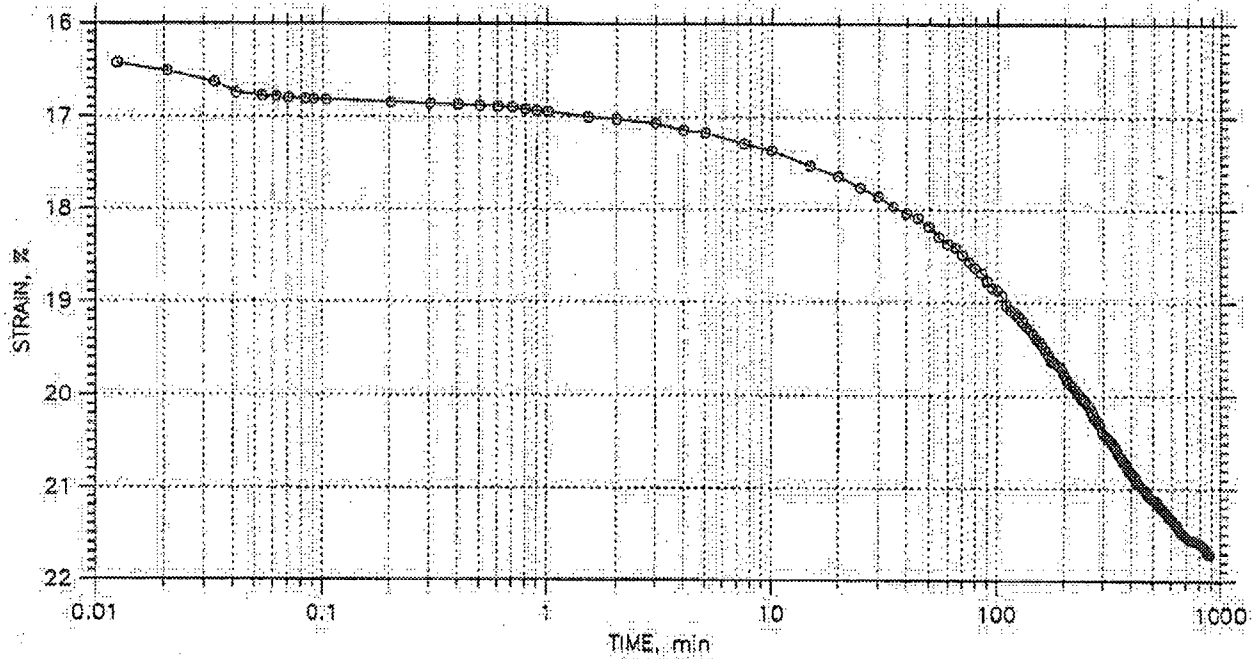
MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-6	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-6	Test Date: 08/28/08	Depth: 268.5-270.5
	Test No.: 8965	Sample Type: Undisturbed	Elevation:
	Description: Greenish Gray Fat Clay (CH)	Cr= 0.060	(Ele. -238.1/-240.1)
	Remarks: ASTM D2435-04 Method B, SG(ASTM D854-06), PI(ASTM D4318-05).	Task 1.2	

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 7 of 20

Stress: 16000 psf



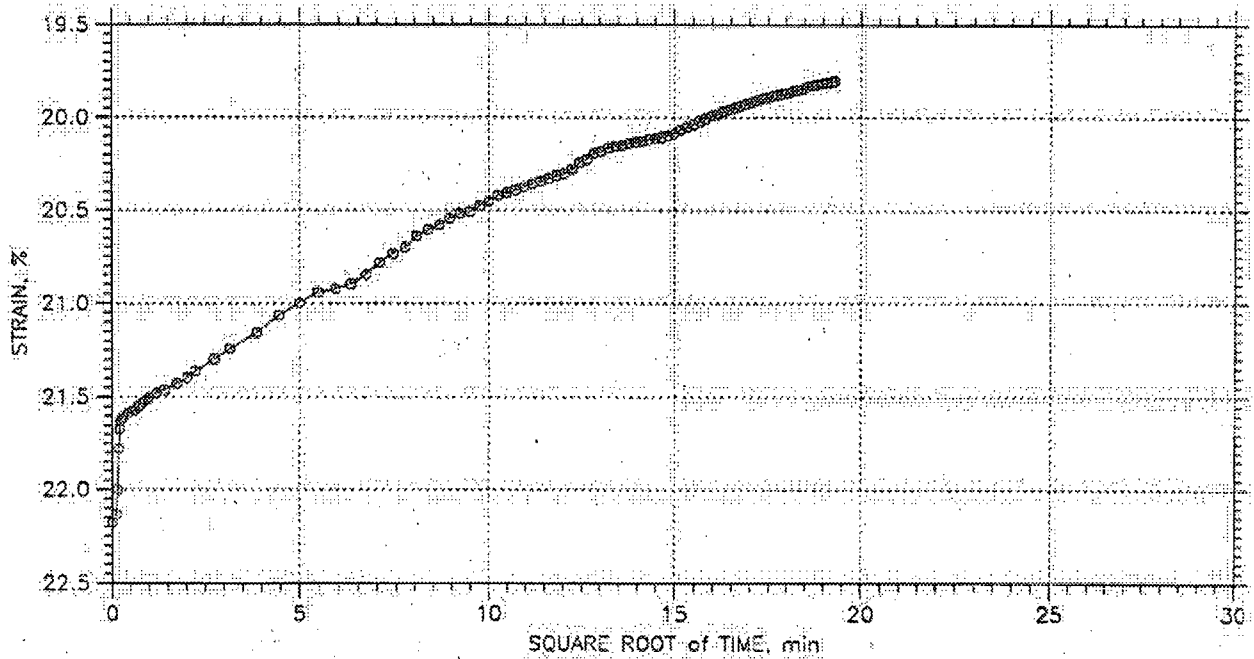
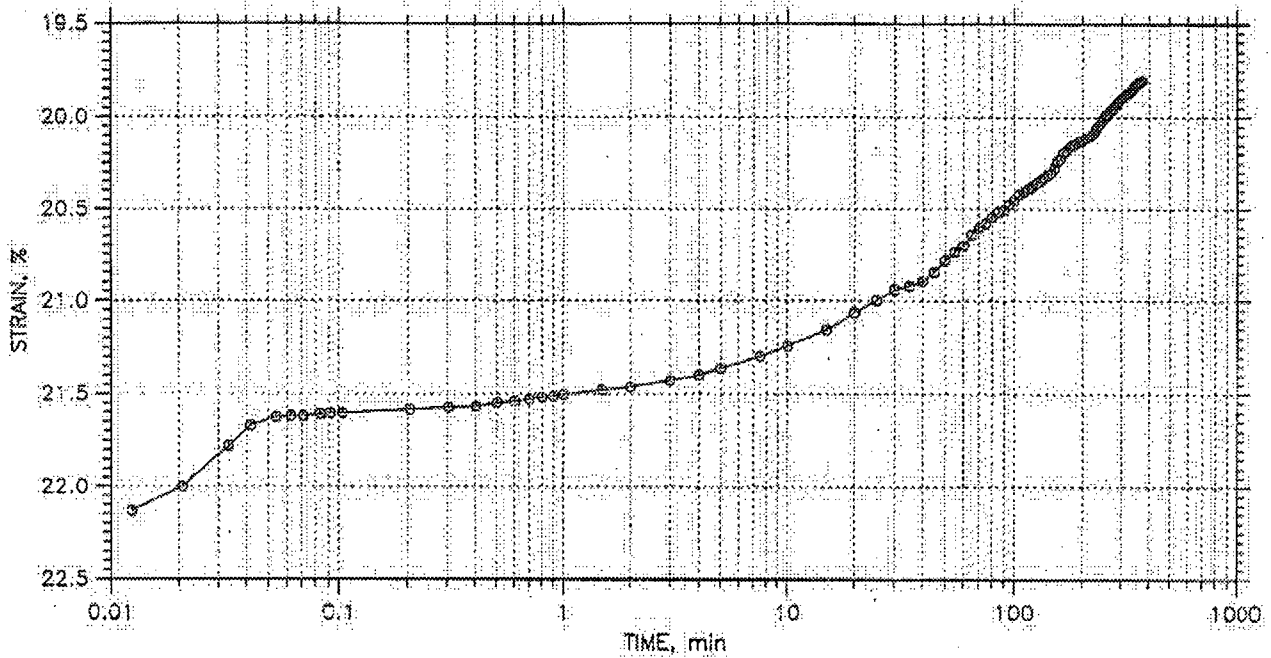
MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-6	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-6	Test Date: 08/28/08	Depth: 268.5-270.5
	Test No.: 8965	Sample Type: Undisturbed	Elevation:
	Description: Greenish Gray Fat Clay (CH)	Cr= 0.060	(Ele. -238.1/-240.1)
Remarks: ASTM D2435-04 Method B, SG(ASTM D854-06), PI(ASTM D4318-05)			Task 1.2

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 8 of 20

Stress: 4000. psf



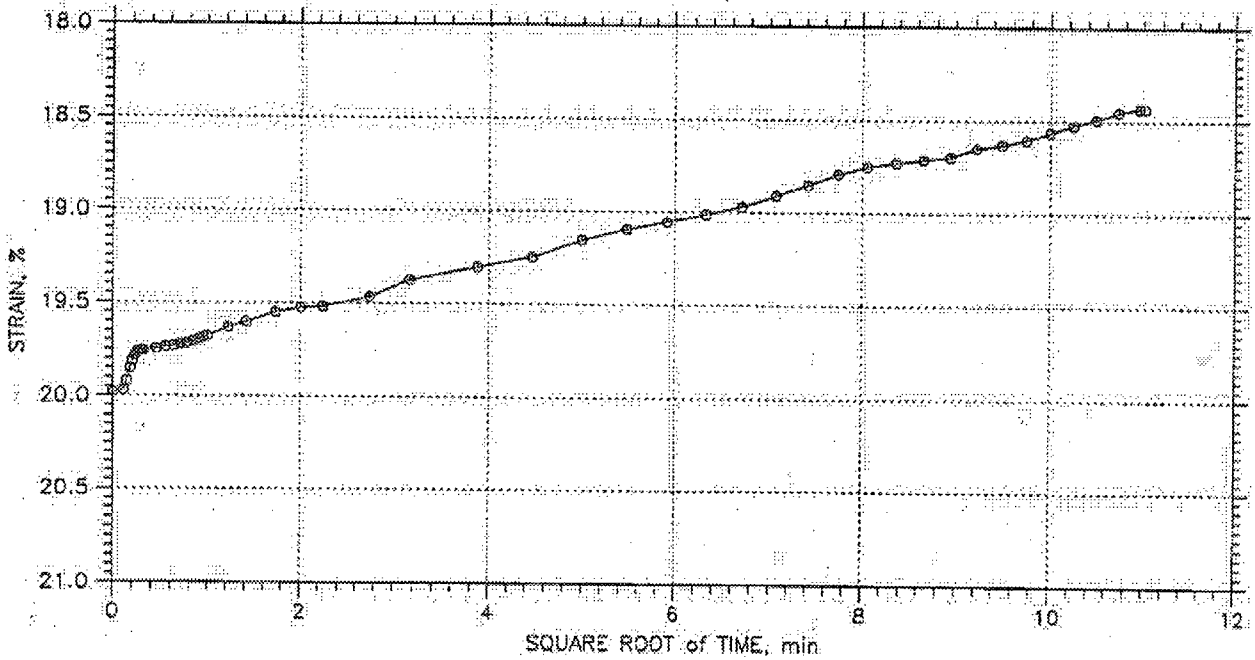
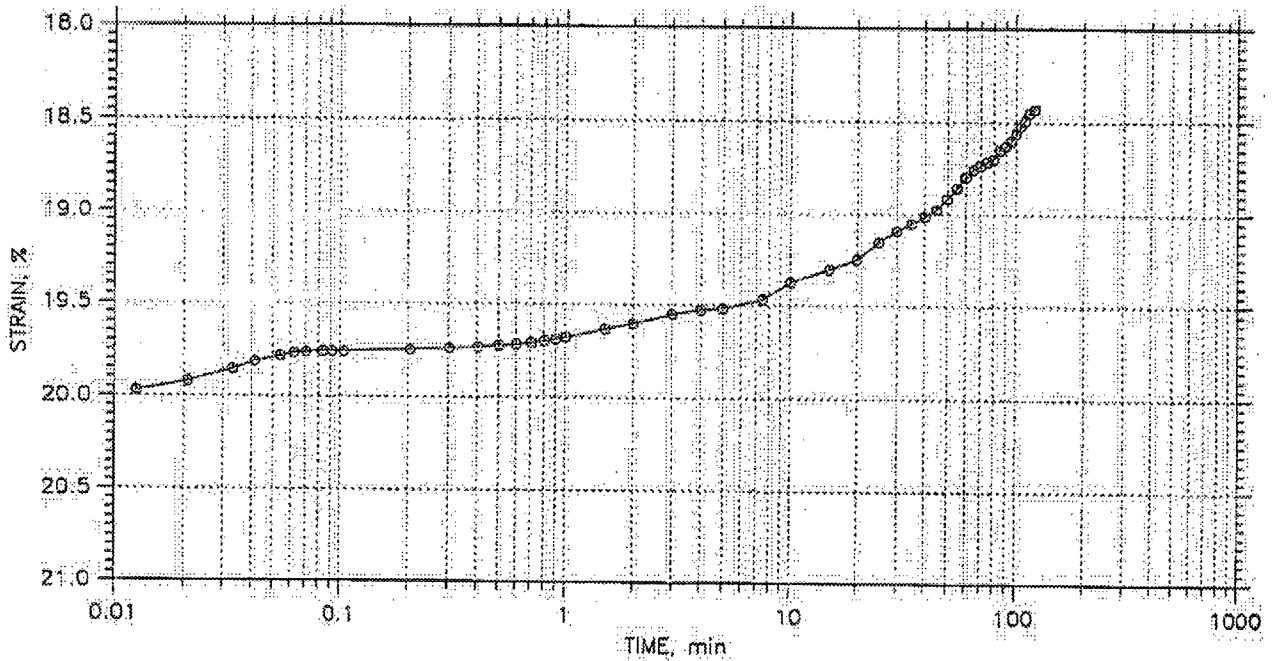
MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-5	Project No.: 6234084860
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-6	Test Date: 08/28/08	Depth: 268.5-270.5
	Test No.: 8965	Sample Type: Undisturbed	Elevation:
	Description: Greenish Grey Fat Clay (CH)	Cr= 0.060	(Ele. -238.1/-240.1)
	Remarks: ASTM D2435-04 Method B; SG(ASTM D854-06), PI(ASTM D4318-05);	Task 1.2	

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 9 of 20

Stress: 1000. psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-6	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-6	Test Date: 08/28/08	Depth: 268.5-270.5
	Test No.: 8965	Sample Type: Undisturbed	Elevation:
	Description: Greenish Gray Fat Clay (CH)	Cr= 0.060	(Ele. -238.1/-240.1)
	Remarks: ASTM D2435-04 Method B, SG(ASTM D854-06), PI(ASTM D4318-05),	Task 1-2	

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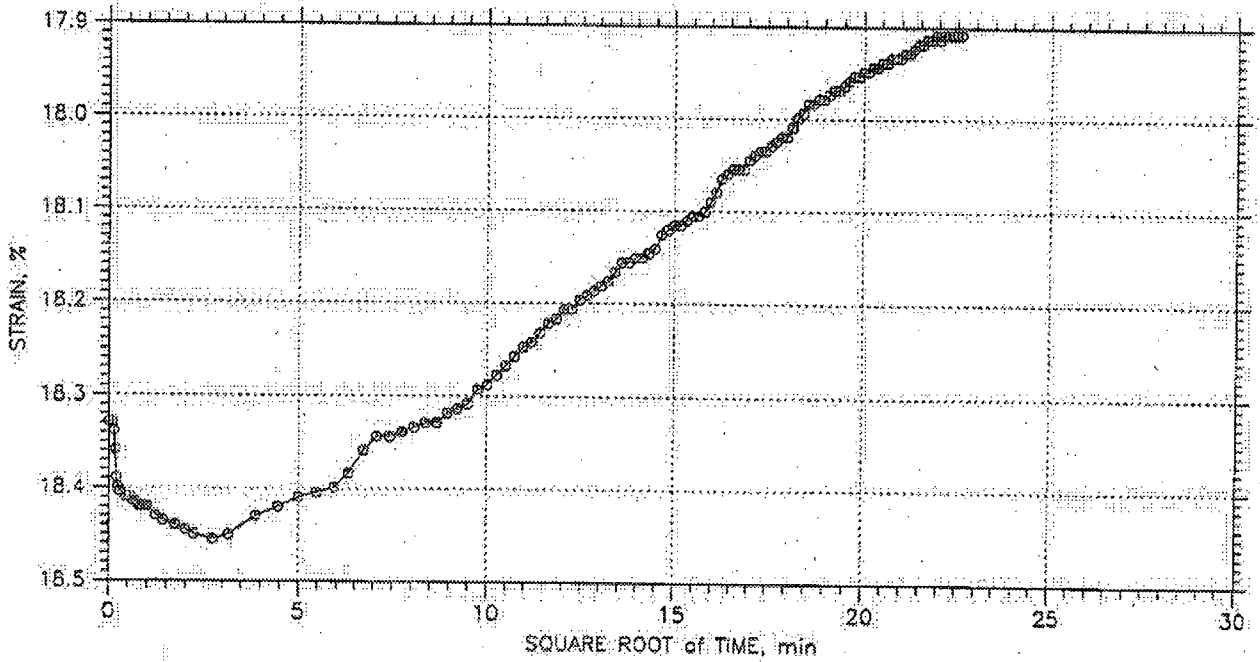
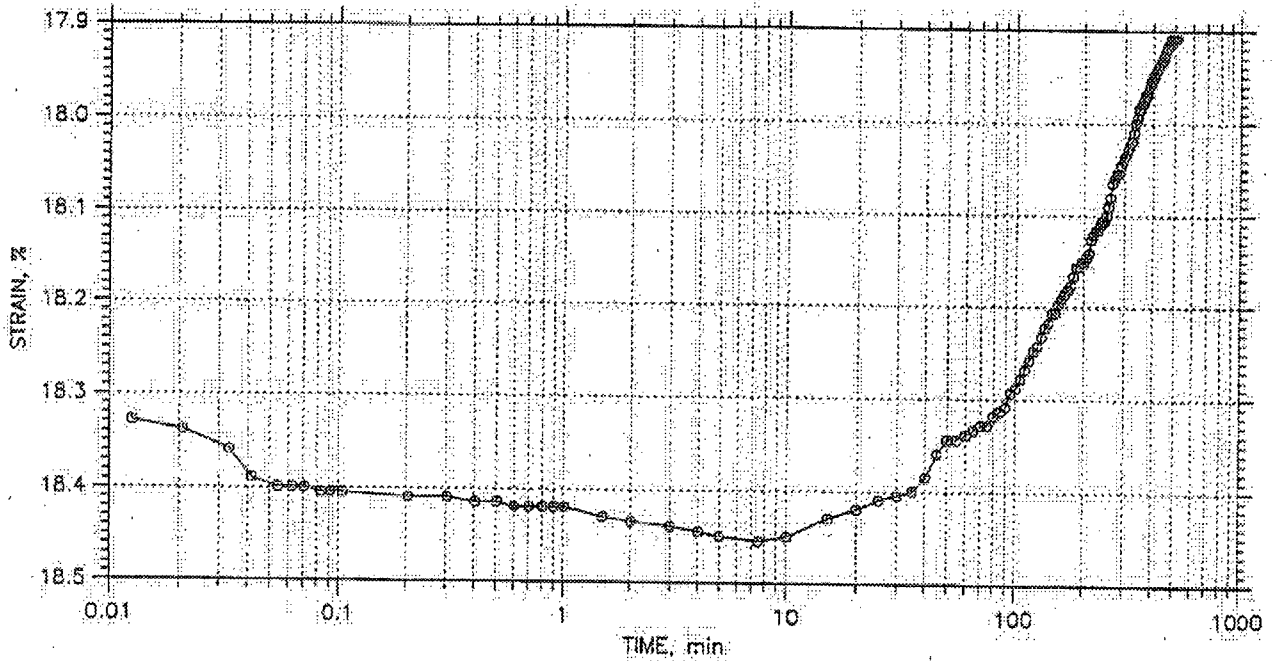
DCN/FLR-817

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 10 of 20

Stress: 2000. psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-6	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-6	Test Date: 08/28/08	Depth: 268.5-270.5
	Test No.: 8965	Sample Type: Undisturbed	Elevation:
	Description: Greenish Gray Fat Clay (CH) Cr= 0.060		(Ele. -238.1/-240.1)
	Remarks: ASTM D2435-04 Method B. SG(ASTM D854-06), PI(ASTM D4318-05). Task 1.2		

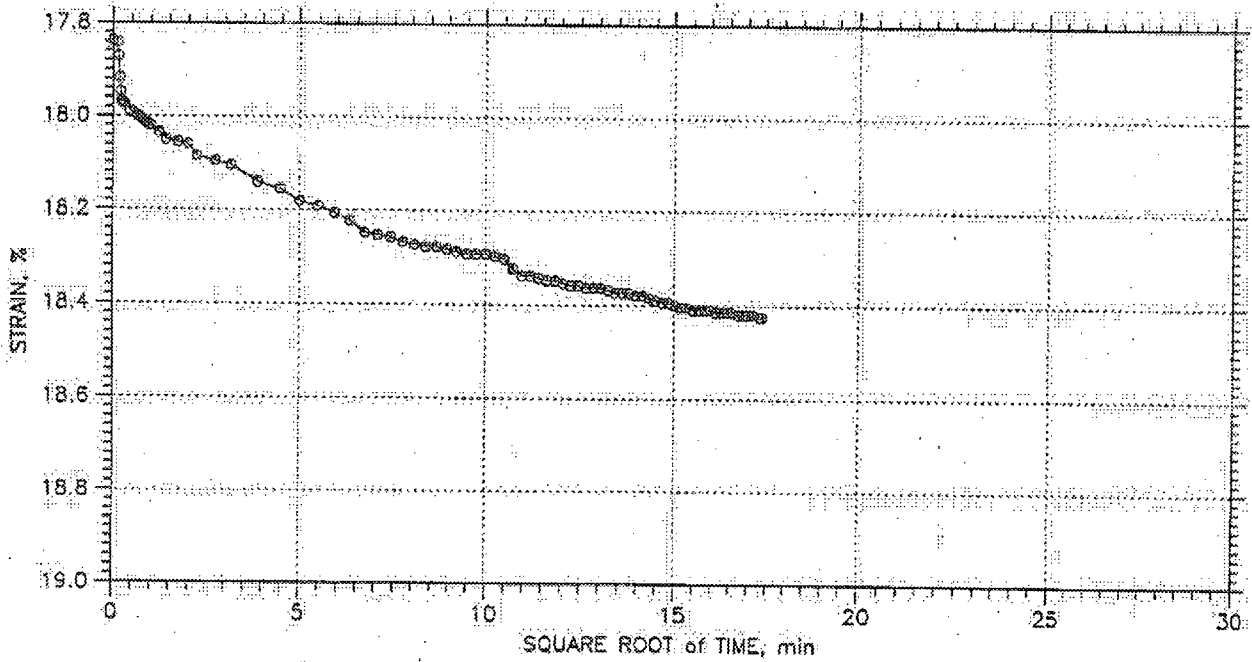
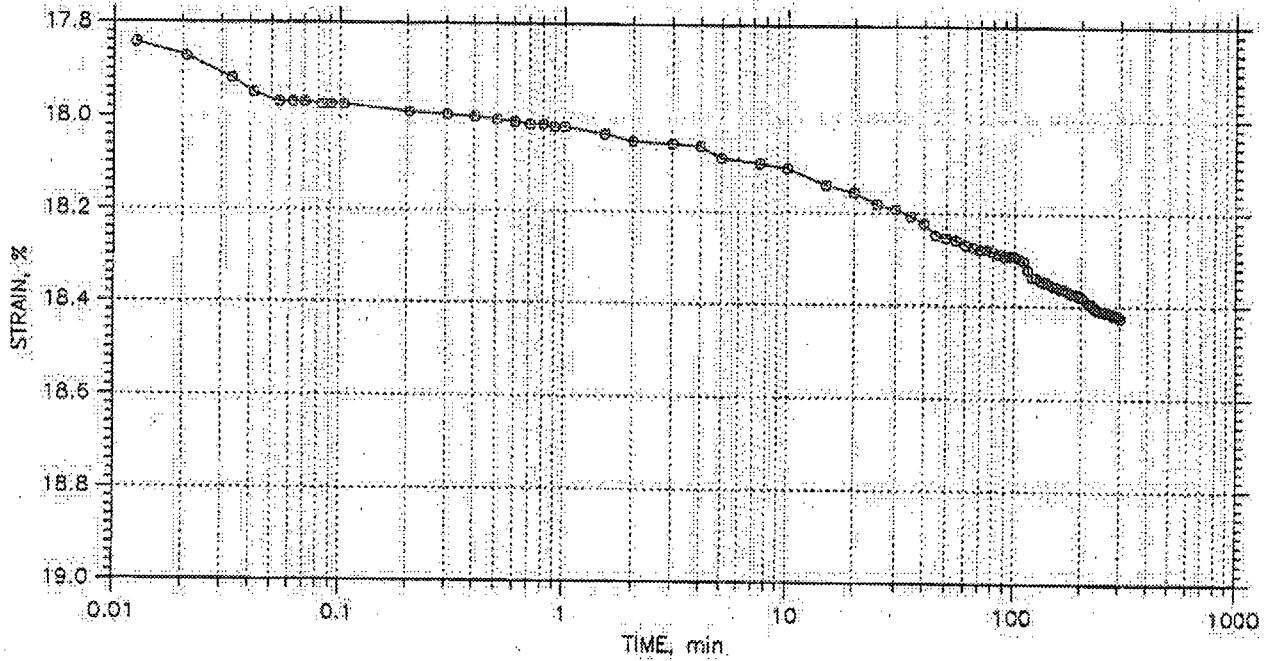
Tue, 14-OCT-2008 16:19:05

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 11 of 20

Stress: 4000. psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-6	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-6	Test Date: 08/28/08	Depth: 268.5-270.5
	Test No.: 8965	Sample Type: Undisturbed	Elevation:
	Description: Greenish Gray Fat Clay (CH) Cr = 0.060		(Ele. -238.1/-240.1)
	Remarks: ASTM D2435-04 Method B. SG(ASTM D854-06), PI(ASTM D4318-05). Task 1.2		

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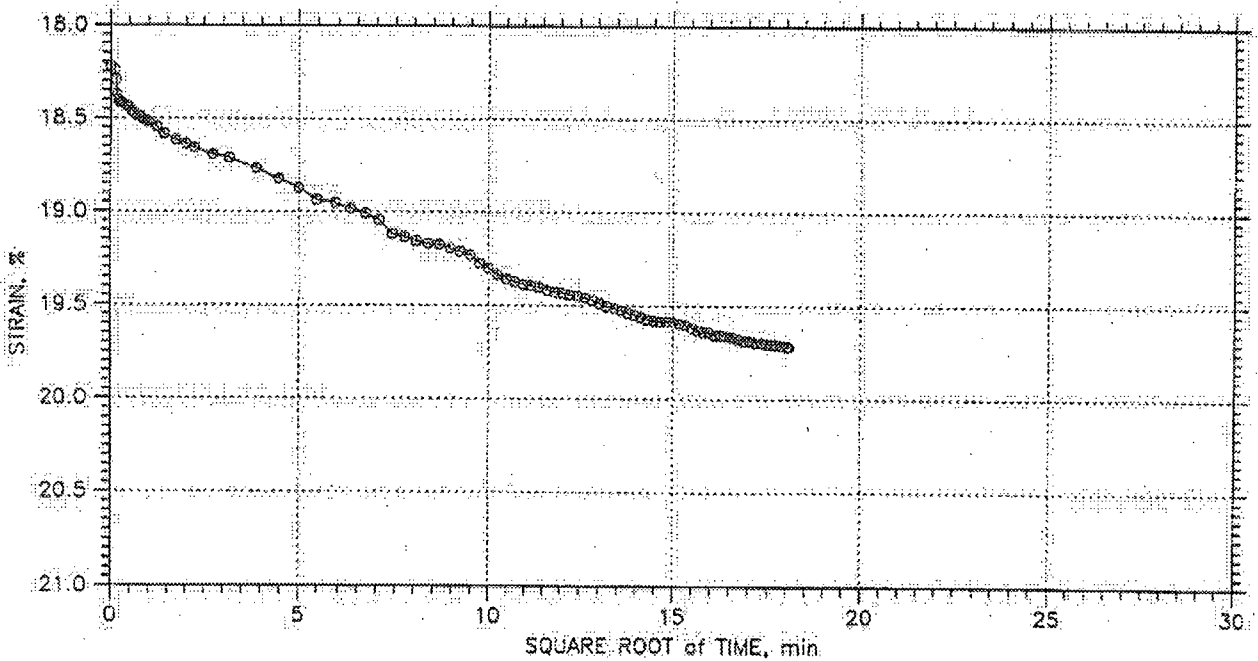
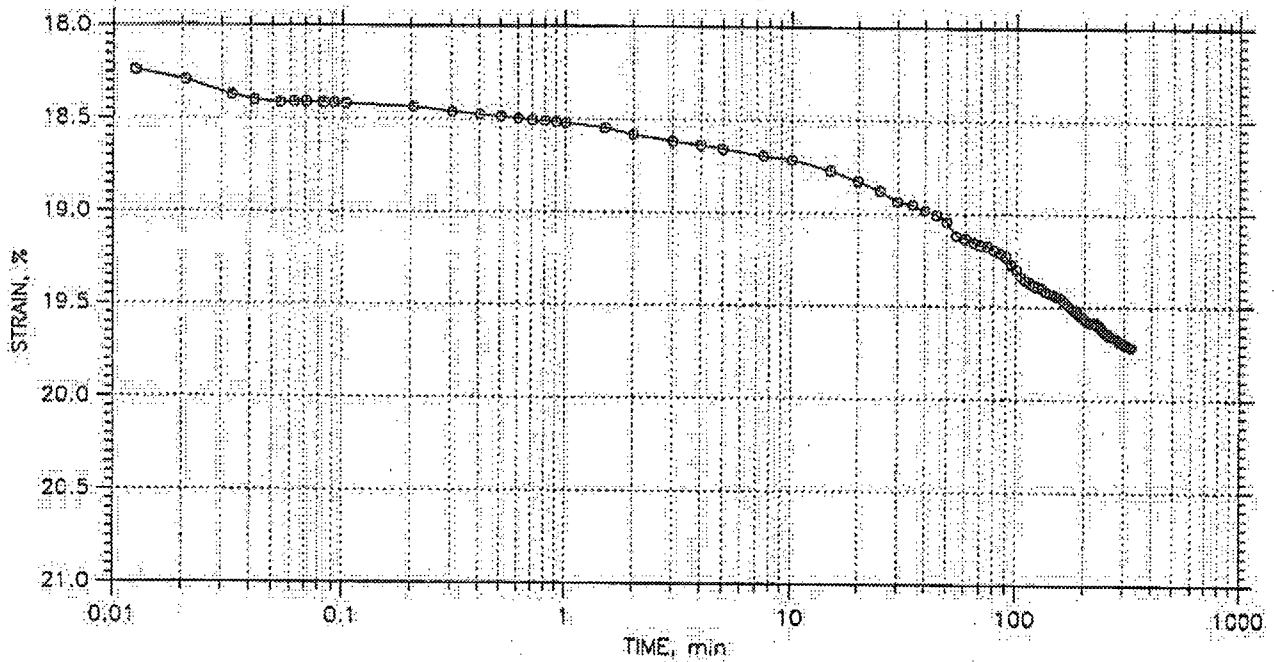
DCN 6LR-817

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 12 of 20

Stress: 8000 psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-6	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-6	Test Date: 08/28/08	Depth: 268.5-270.5
	Test No.: 8965	Sample Type: Undisturbed	Elevation:
	Description: Greenish Gray Fat Clay (CH)	Cr= 0.060	(Ele. -238.1/-240.1)
	Remarks: ASTM D2435-04 Method B; SG(ASTM D854-06); PI(ASTM D4318-05); Task 1.2		

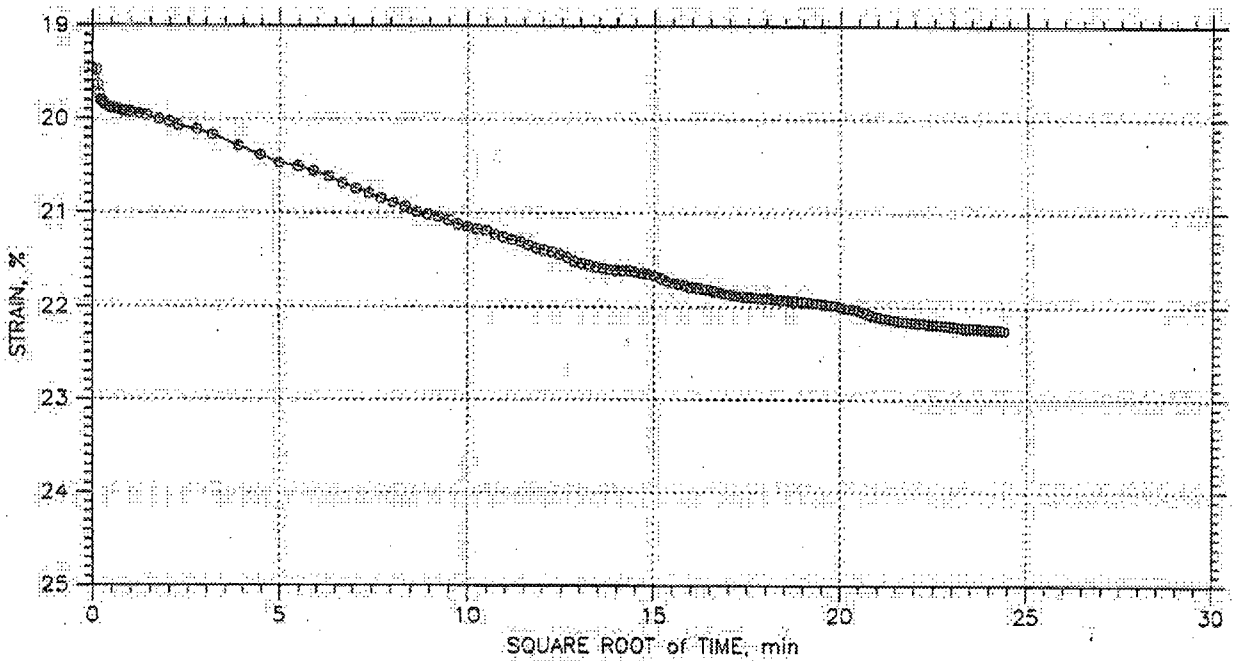
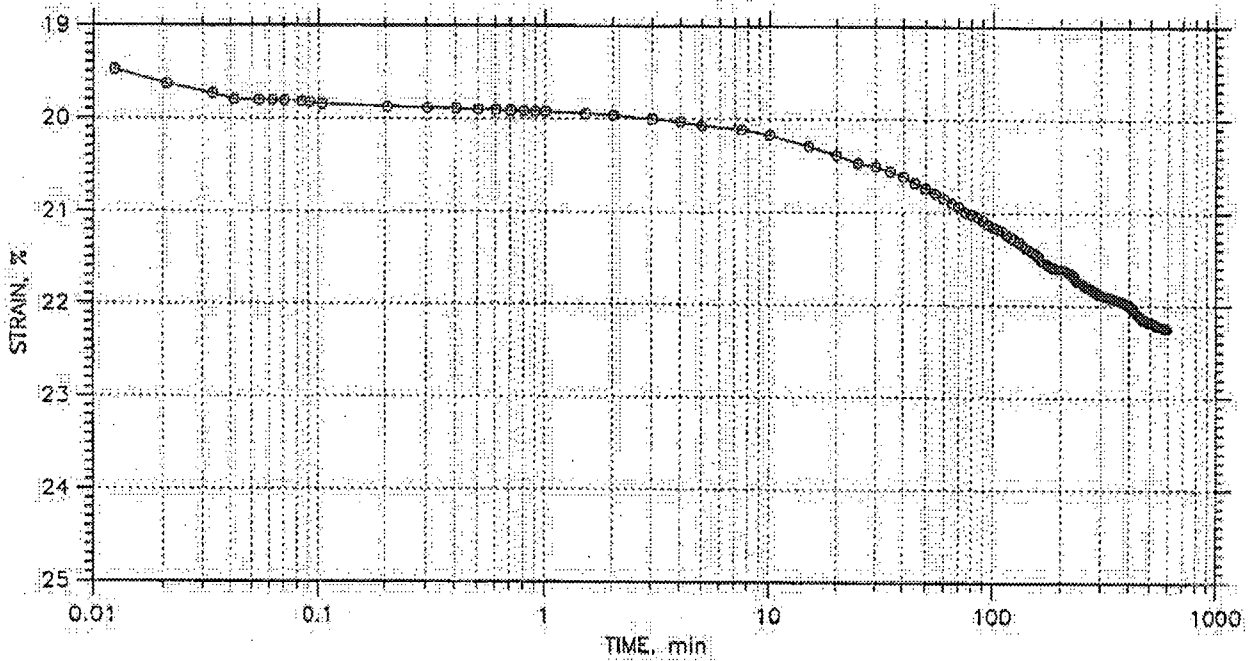
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CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 13 of 20

Stress: 16000 psf



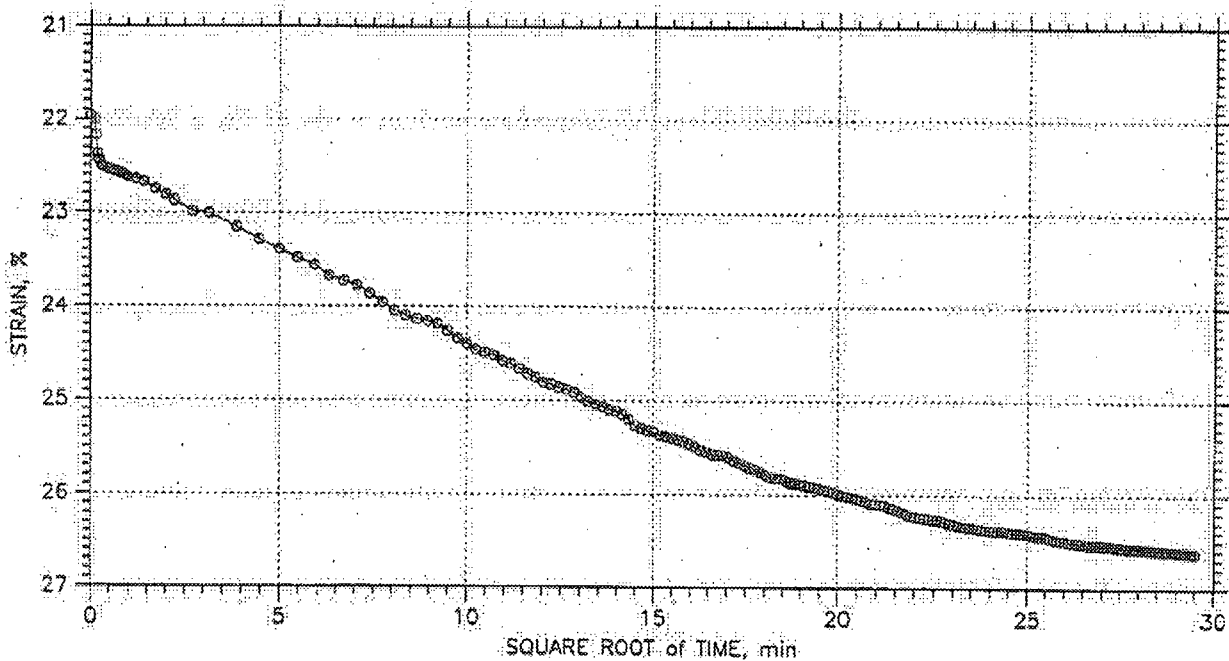
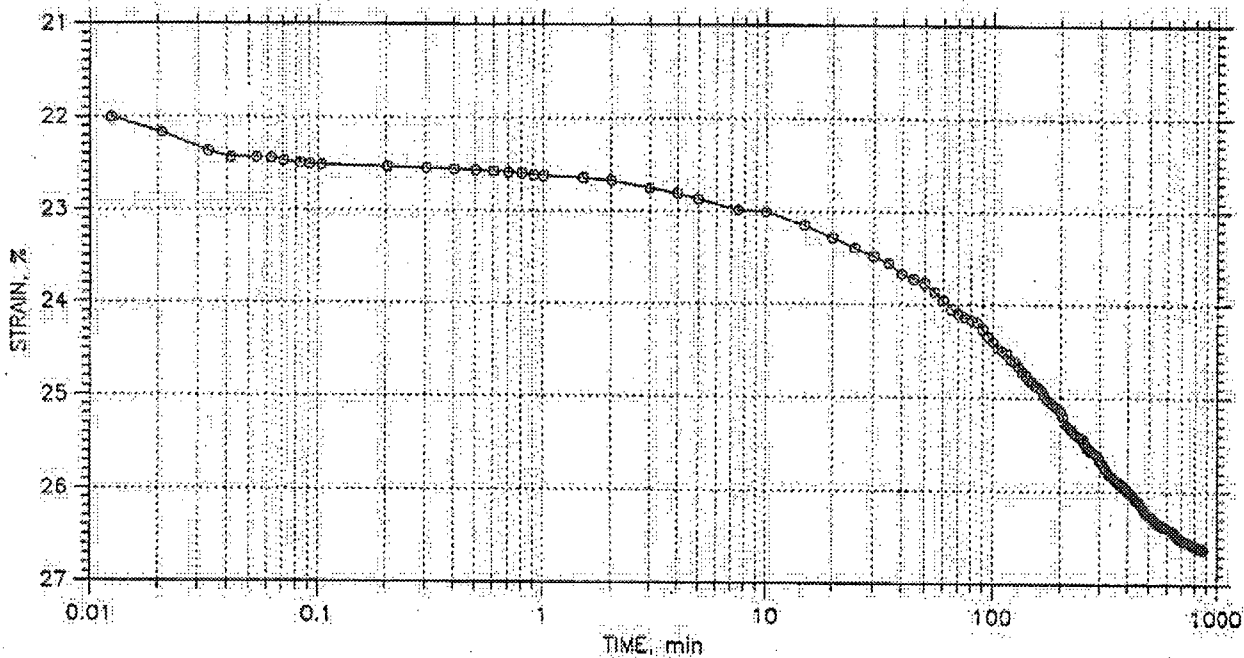
MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-6	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-6	Test Date: 08/28/08	Depth: 268.5-270.5
	Test No.: 8985	Sample Type: Undisturbed	Elevation:
	Description: Greenish Gray Fat Clay (CH)	Cr= 0.060	(Ele -238.1/-240.1)
	Remarks: ASTM D2435-04 Method B, SG(ASTM D854-06), PI(ASTM D4318-05)	Task 1.2	

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 14 of 20

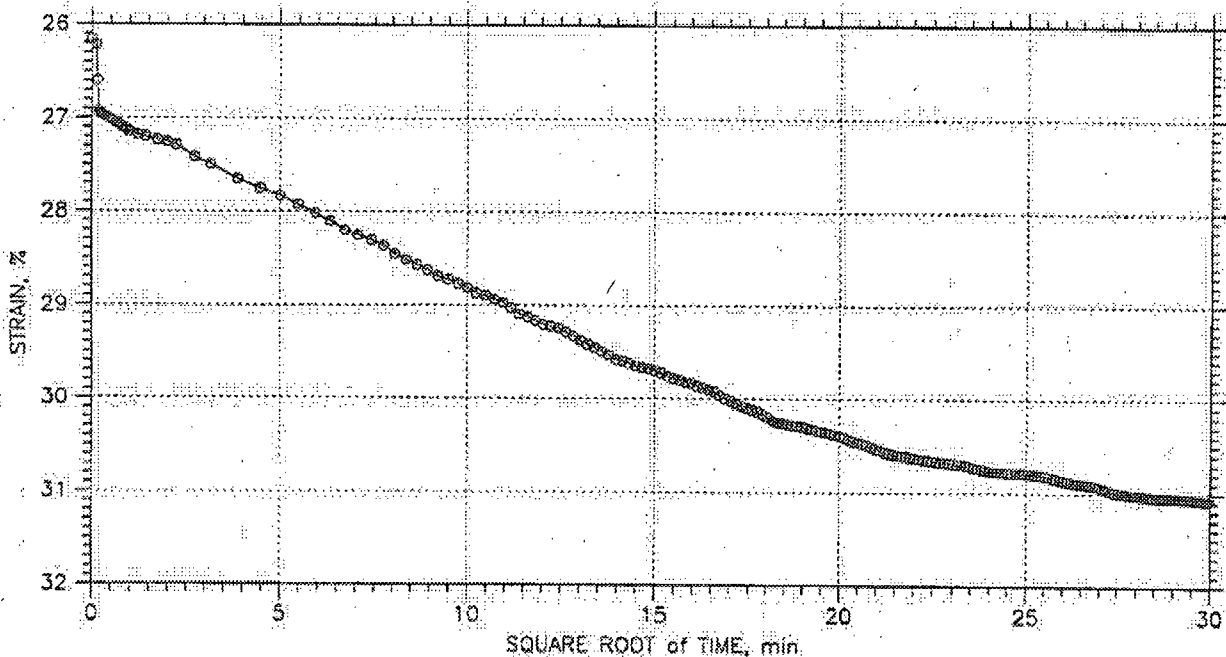
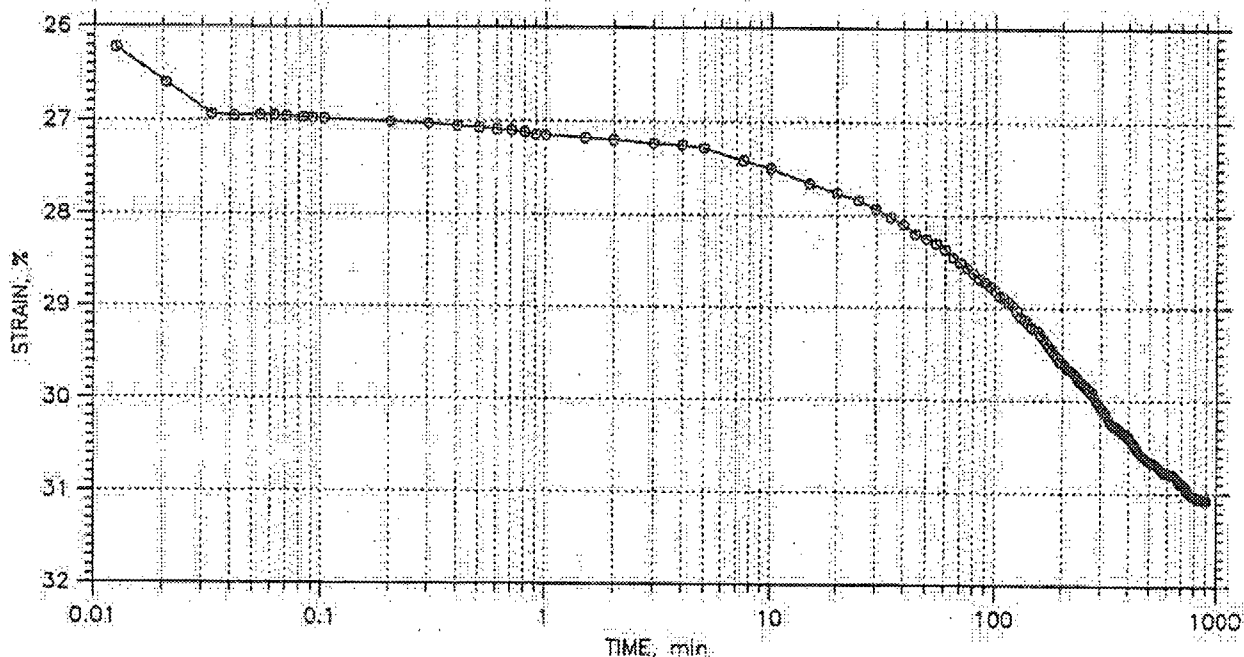
Stress: 32000 psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-6	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-6	Test Date: 08/28/08	Depth: 268.5-270.5
	Test No.: 8965	Sample Type: Undisturbed	Elevation:
	Description: Greenish Gray Fat Clay (CH)	Cr= 0.060	(Ele. -238.1/-240.1)
	Remarks: ASTM D2435-04 Method B, SG(ASTM D854-05), PI(ASTM D4318-05).	Task 1.2	

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CONSOLIDATION TEST DATA
TIME CURVES
 Constant Load Step: 15 of 20
 Stress: 64000 psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-6	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-6	Test Date: 08/28/08	Depth: 268.5-270.5
	Test No.: 8965	Sample Type: Undisturbed	Elevation:
	Description: Greenish Gray Fat Clay (CH)	Cr= 0.060	(Ele. -238.1/-240.1)
	Remarks: ASTM D2435-04 Method B, SG(ASTM D854-06), PI(ASTM D4318-05).		

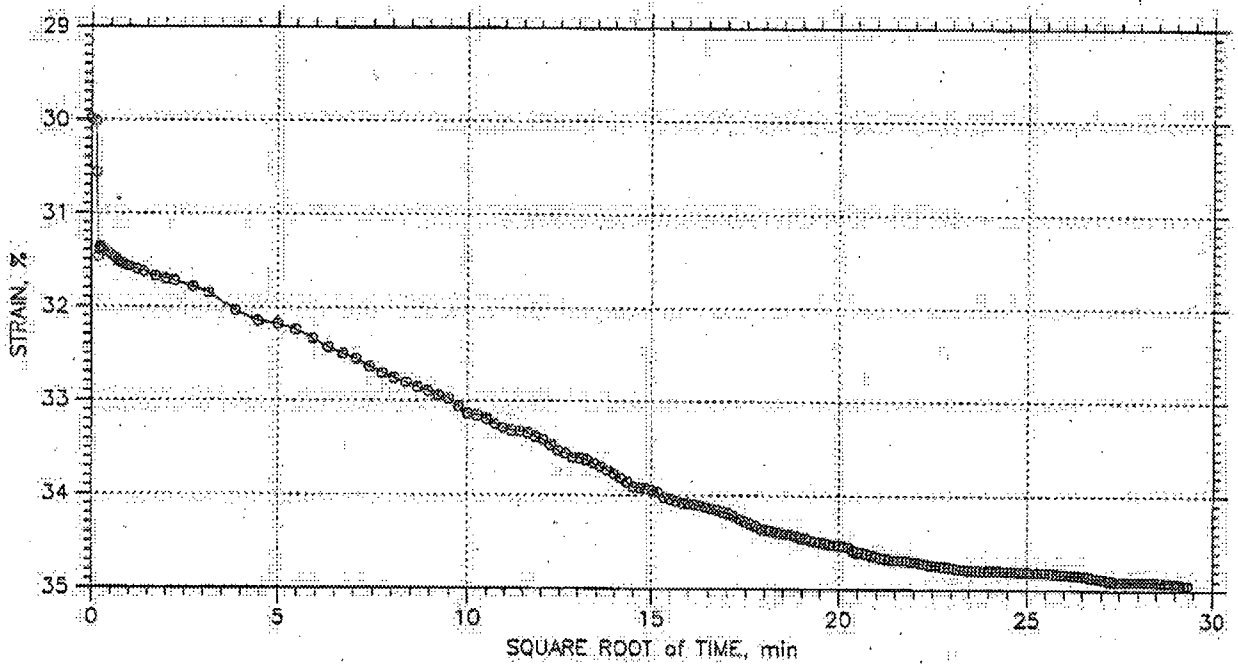
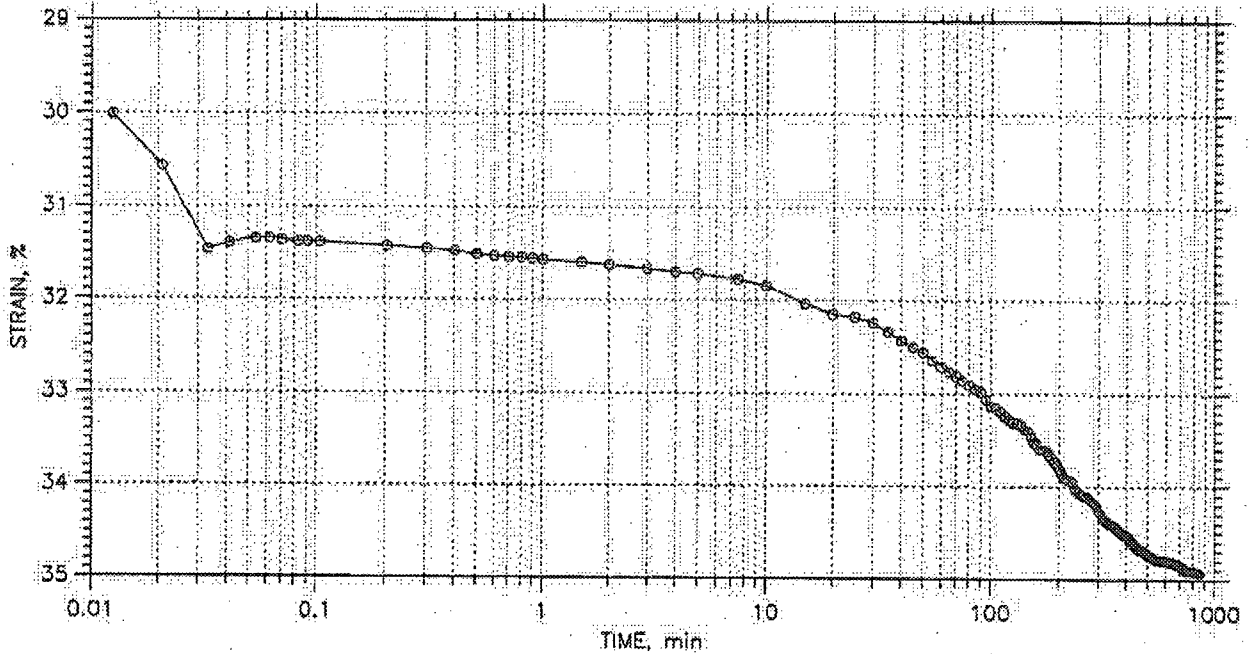
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CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 16 of 20

Stress: 1.28e+005 psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-6	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-6	Test Date: 08/28/08	Depth: 268.5-270.5
	Test No.: 8985	Sample Type: Undisturbed	Elevation:
	Description: Greenish Gray Fat Clay (CH) Cr= 0.060 (Ele. -238.1/-240.1)		
	Remarks: ASTM D2435-04 Method B, SG(ASTM 0854-06), PI(ASTM D4318-05). Task 1.2		

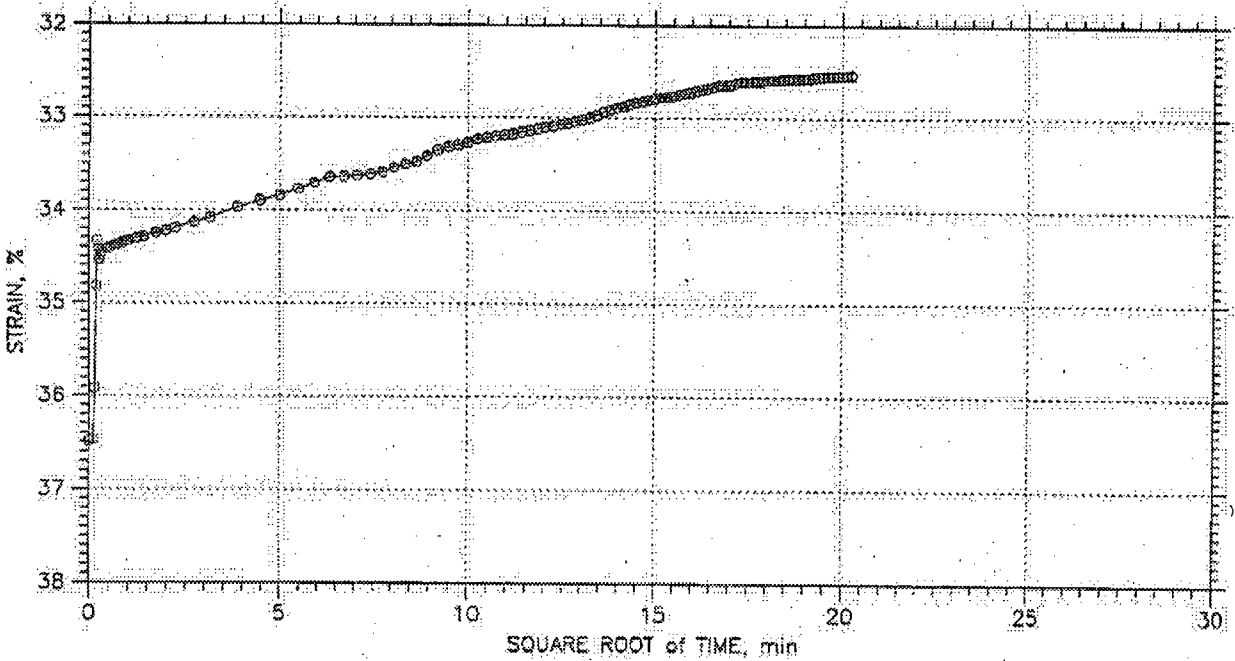
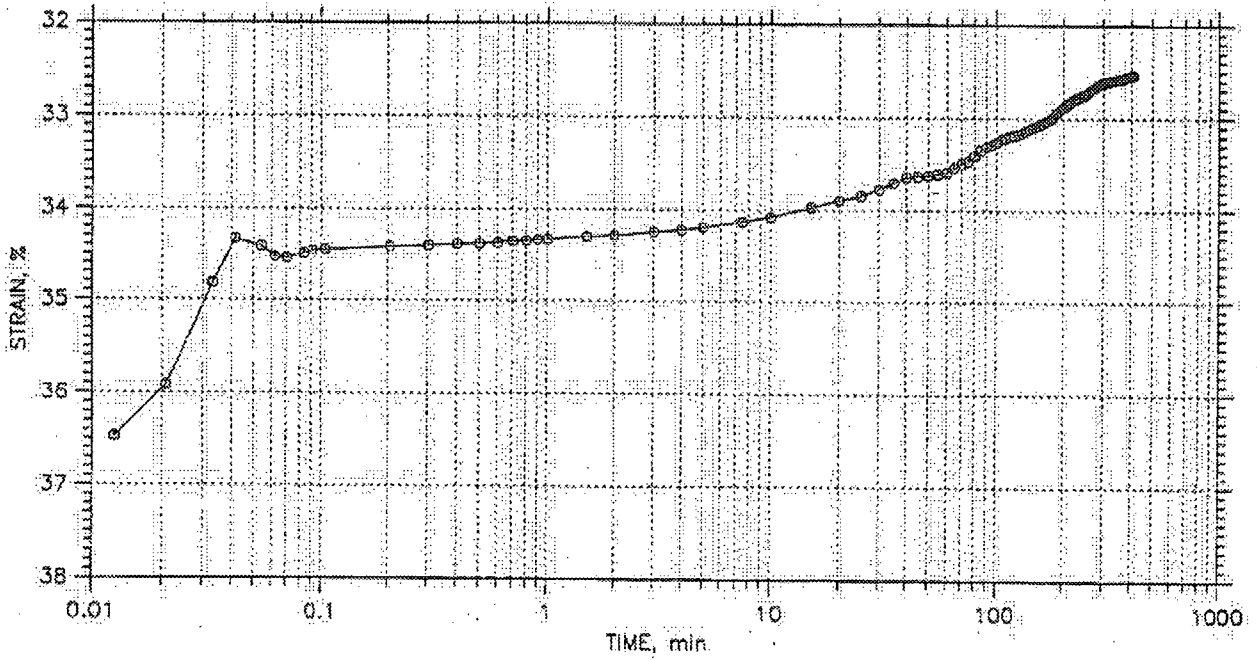
Tue, 14-OCT-2008 16:19:06

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 17 of 20

Stress: 32000 psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-6	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-6	Test Date: 08/28/08	Depth: 268.5-270.5
	Test No.: 8965	Sample Type: Undisturbed	Elevation:
	Description: Greenish Gray Fat Clay (CH)	Cr= 0.060	(Ele. -238.1/-240.1)
	Remarks: ASTM D2435-04 Method B, SG(ASTM D854-06), PI(ASTM D4318-05), Task1.2		

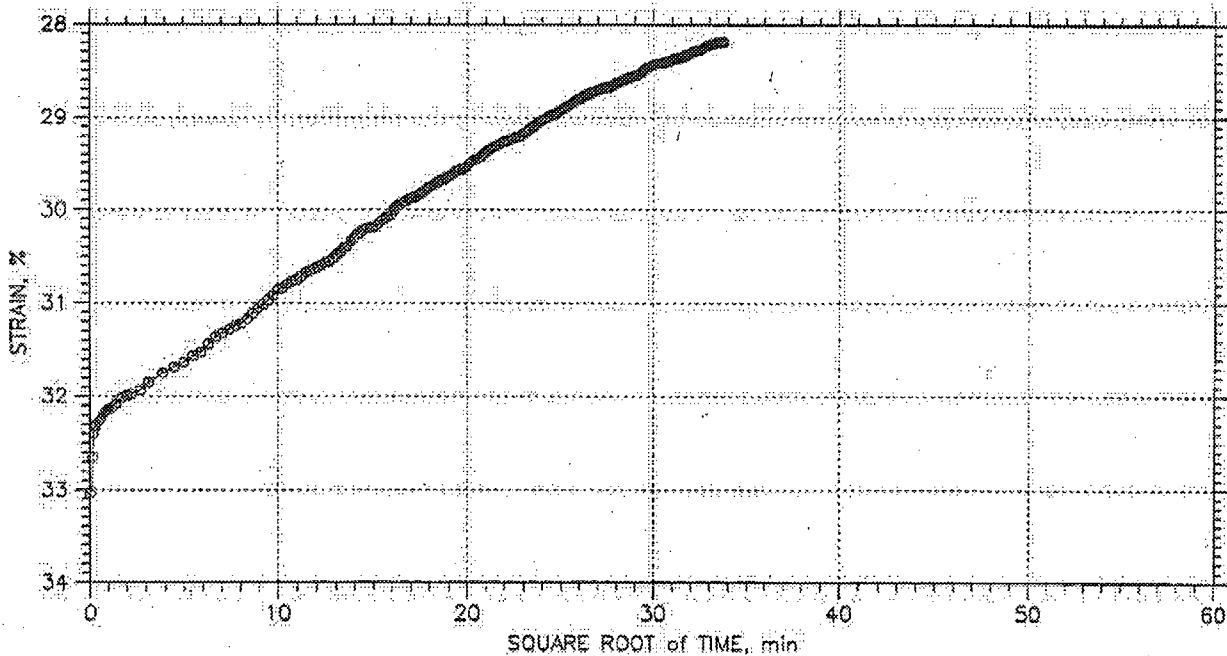
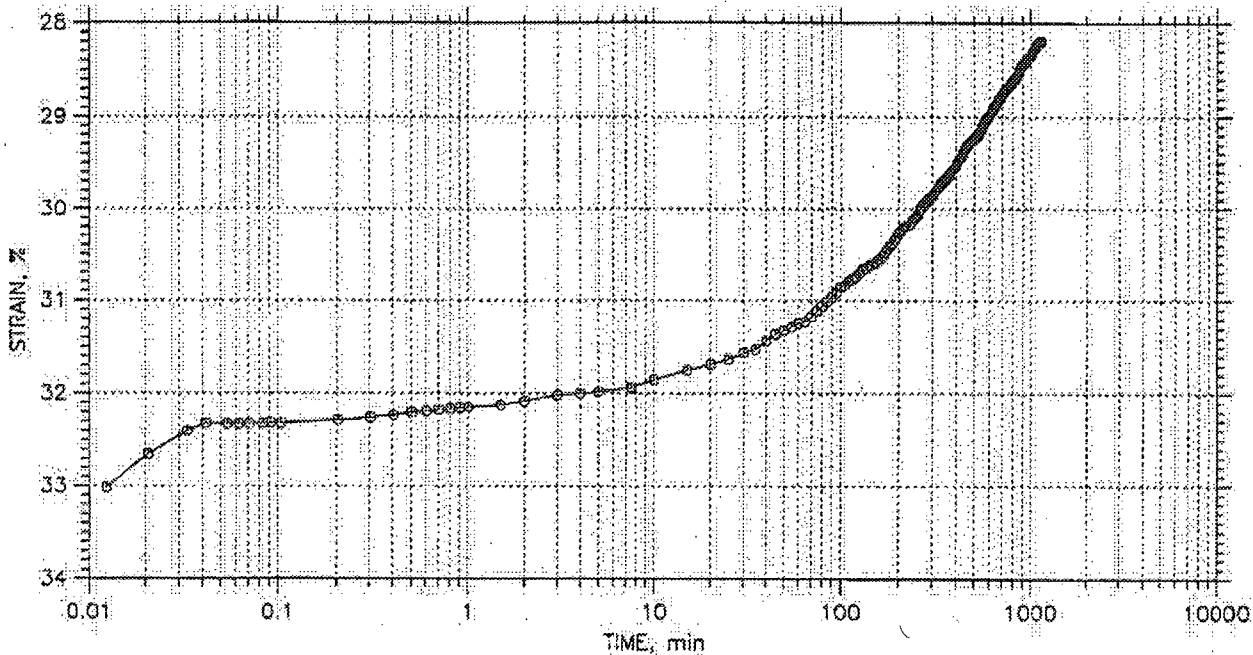
Tue, 14-OCT-2008 16:19:06

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 18 of 20

Stress: 8000. psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-6	Project No.: 6234084660	
	Boring No.: U4-1A	Tested By: BM	Checked By: JW	
	Sample No.: UD-6	Test Date: 08/28/08	Depth: 268.5-270.5	
	Test No.: 8965	Sample Type: Undisturbed	Elevation:	
	Description: Greenish Gray Fat Clay (CH)		Cr= 0.060	(Ele. -238.1/-240.1)
	Remarks: ASTM D2435-04 Method B; SG(ASTM D854-06), PI(ASTM D4318-05);			Task 1.2

Tue, 14-OCT-2008 16:19:06

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Nuclear Energy Systems & Services Division

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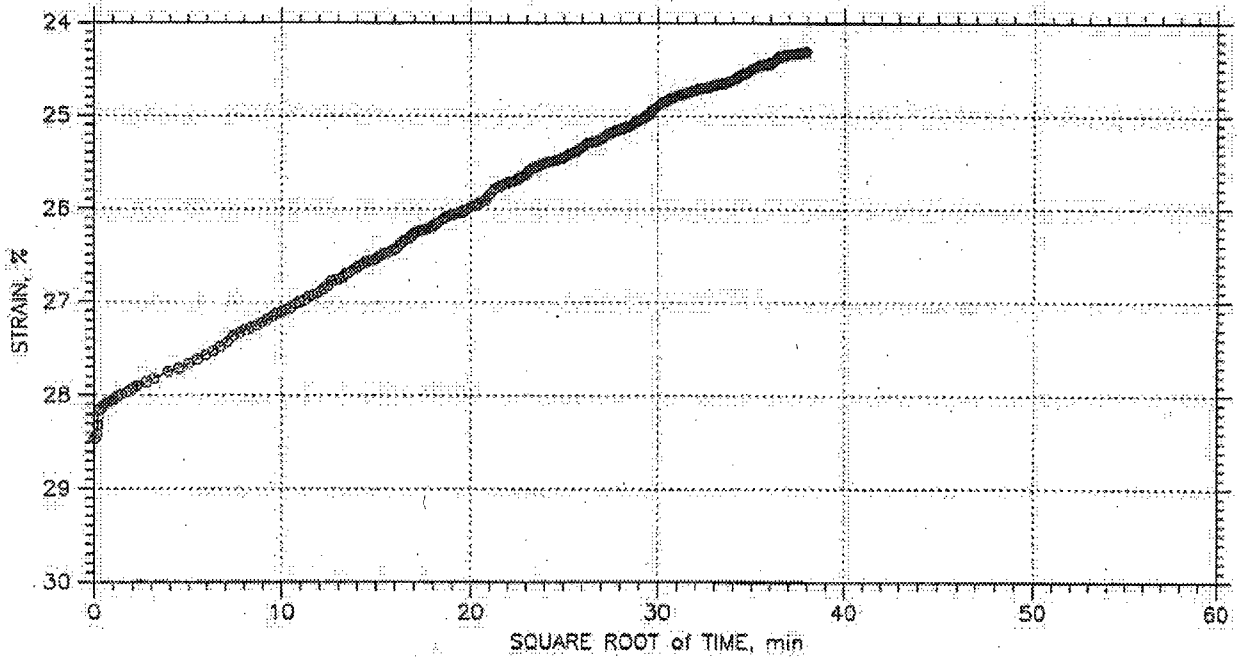
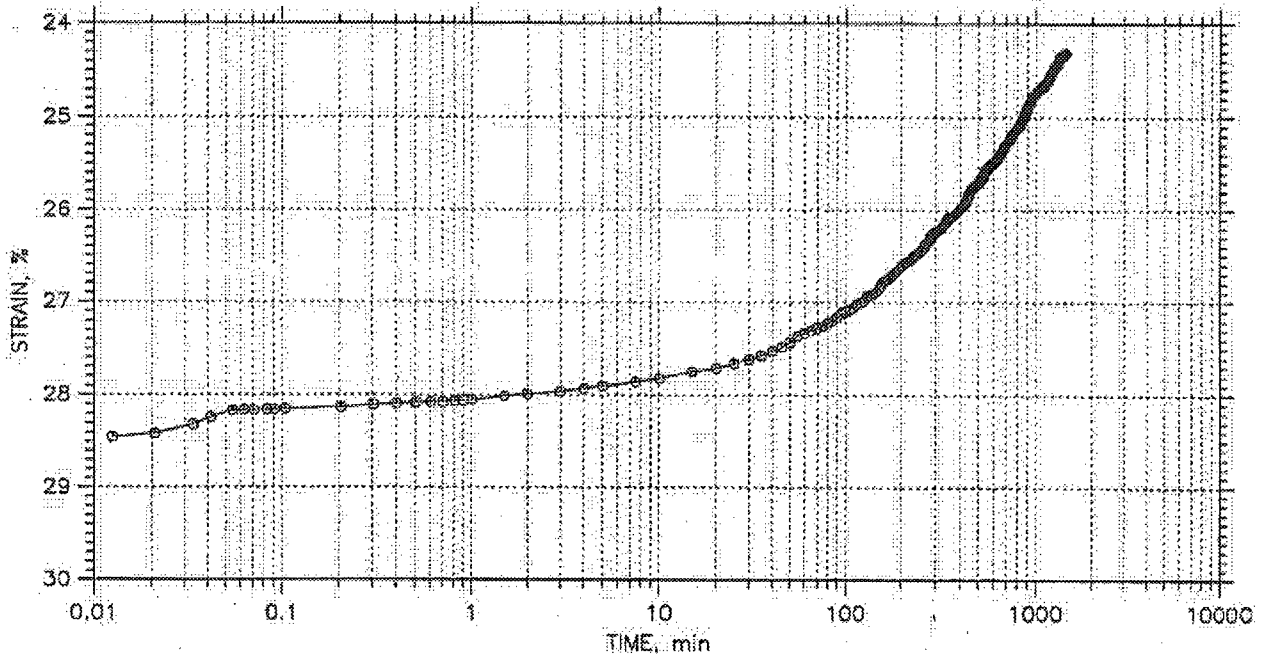
DCN06LR-817

CONSOLIDATION TEST DATA

TIME CURVES

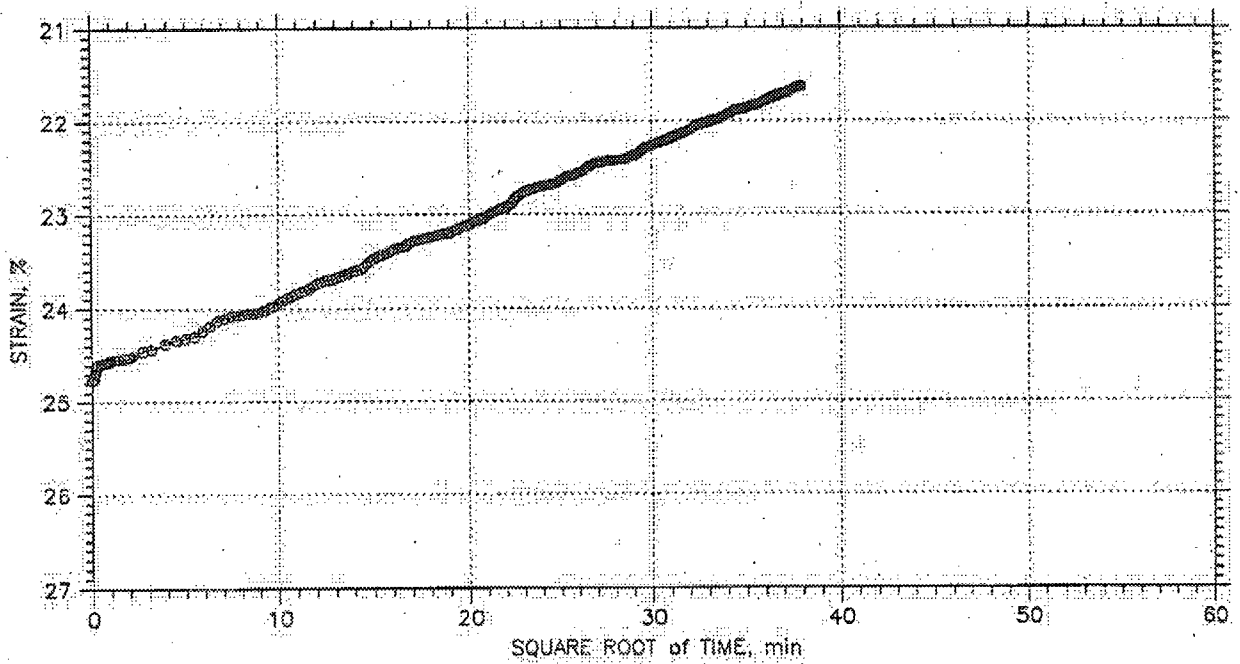
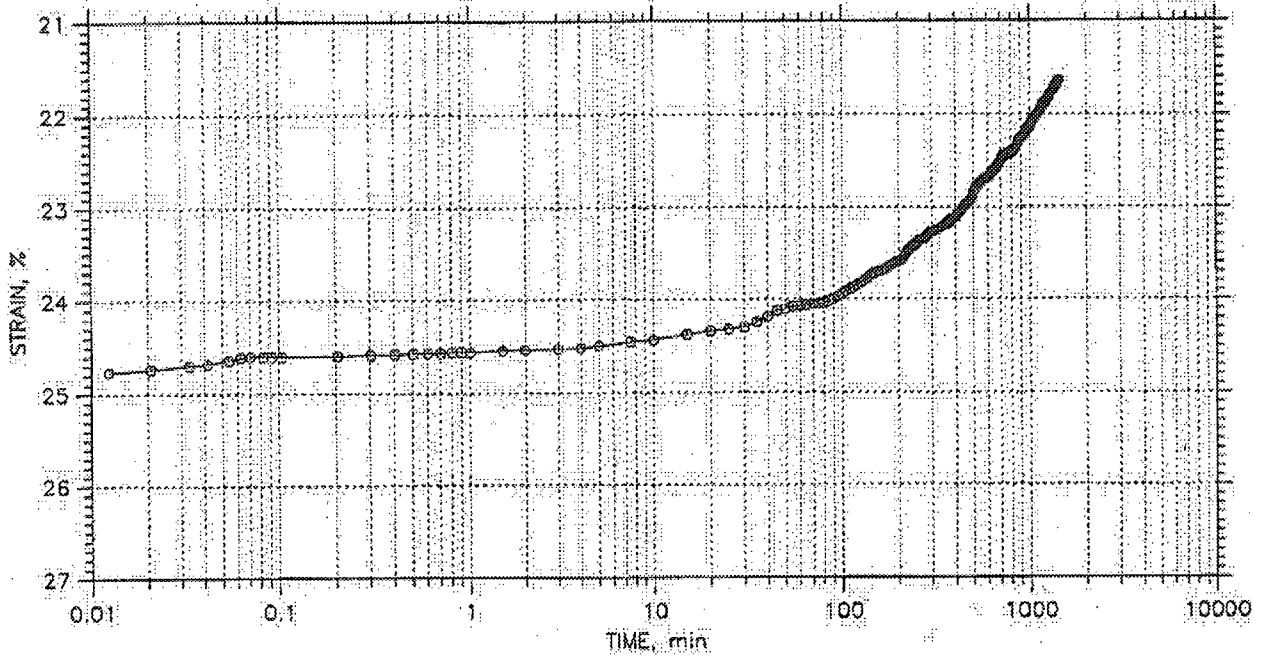
Constant Load Step: 19 of 20

Stress: 2000. psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-6	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-6	Test Date: 08/28/08	Depth: 268.5-270.5
	Test No.: 8965	Sample Type: Undisturbed	Elevation:
	Description: Greenish Gray Fat Clay (CH) Cr= 0.060 (Ele. -238.1/-240.1)		
	Remarks: ASTM D2435-04 Method B, SG(ASTM D854-06), PI(ASTM D4318-05) Task 1.2		

CONSOLIDATION TEST DATA
 TIME CURVES
 Constant Load Step: 20 of 20
 Stress: 500. psf



MACTEC	Project: STP Units 3 & 4	Location: U4-1A UD-6	Project No.: 6234084660
	Boring No.: U4-1A	Tested By: BM	Checked By: JW
	Sample No.: UD-6	Test Date: 06/28/08	Depth: 268.5-270.5
	Test No.: B965	Sample Type: Undisturbed	Elevation:
	Description: Greenish Gray Fat Clay (CH)	Cr= 0.060	(Elev. -238.1/-240.1)
	Remarks: ASTM D2435-04 Method B, SG(ASTM D854-06), PI(ASTM D4318-05)	Task 1.2	

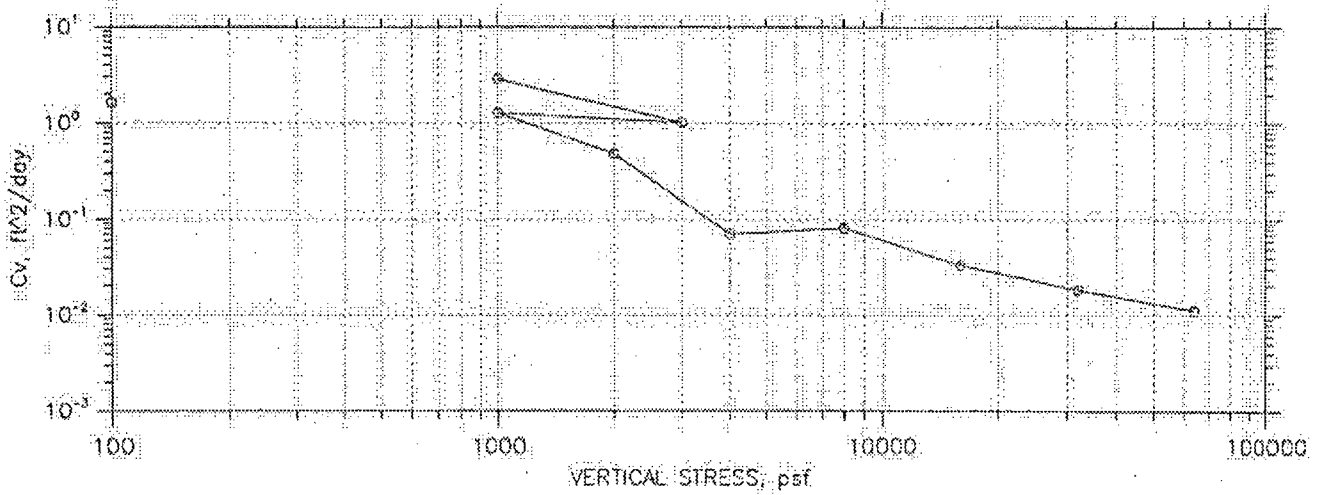
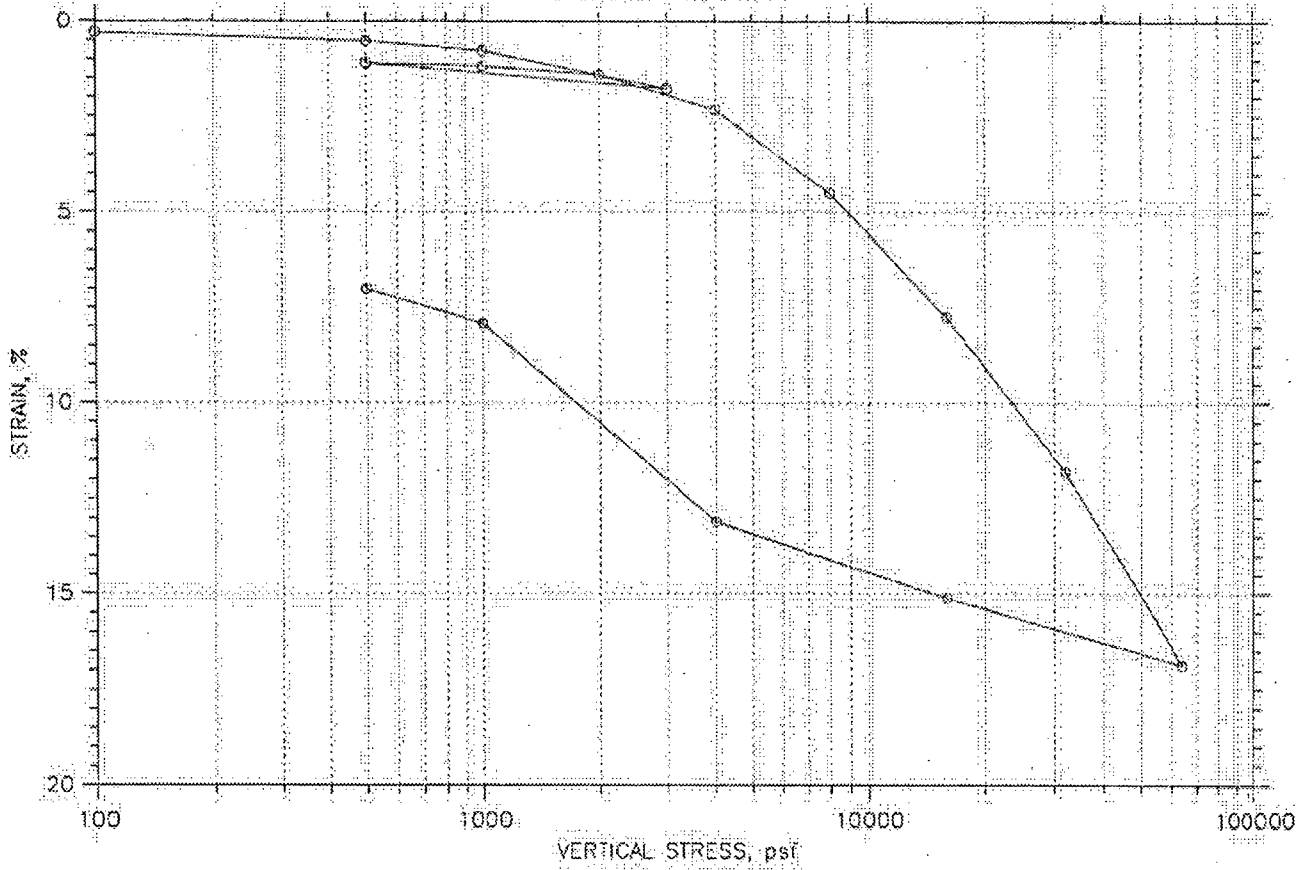
Tue, 14-OCT-2008 16:19:07

TOSHIBA CORPORATION
 Nuclear Energy Systems & Services Division

743/763

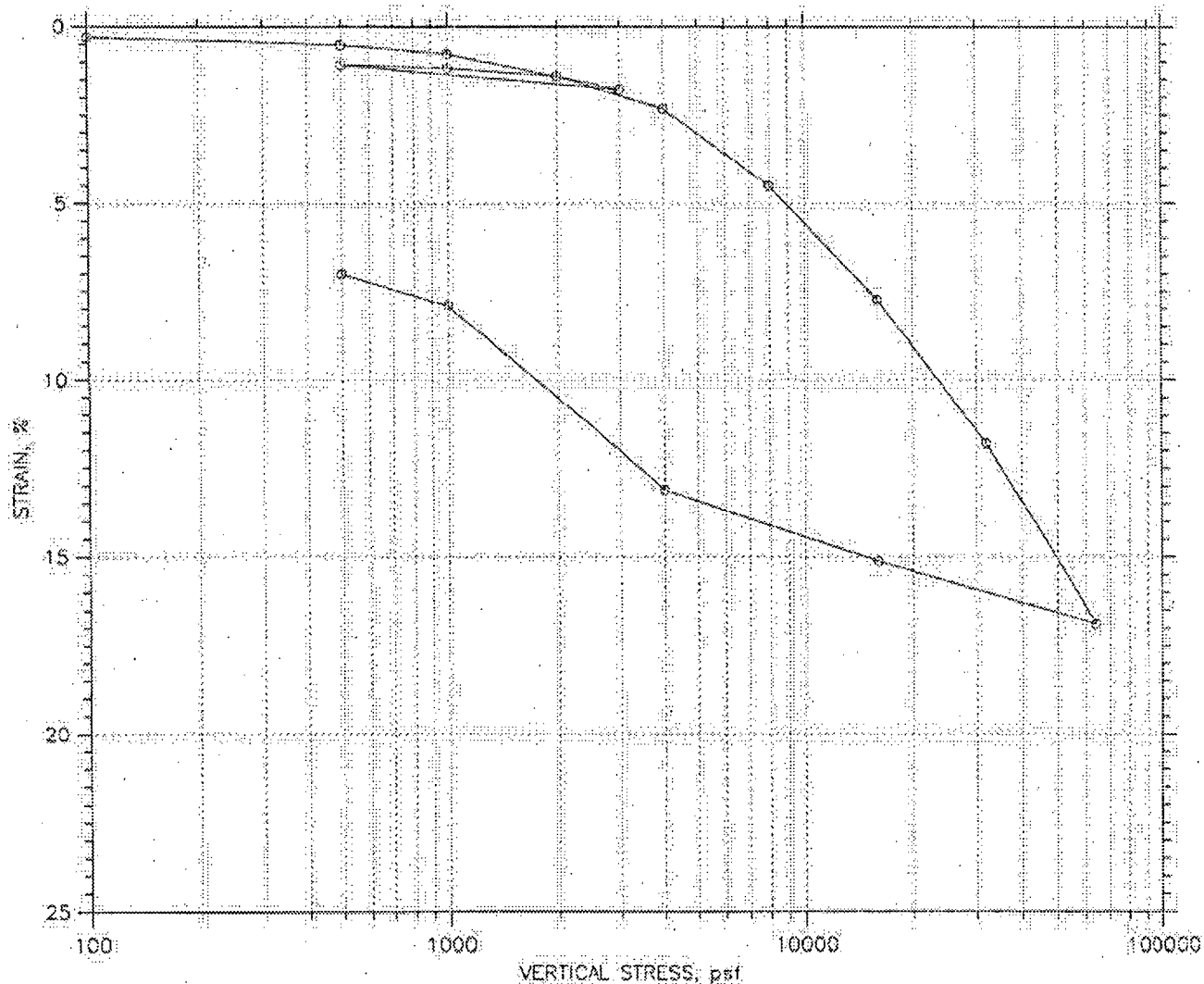
DCN 6LR-817

CONSOLIDATION TEST DATA SUMMARY REPORT



MACTEC	Project: STP Units 3 & 4	Location: DJ-1A UD-1	Project No.: 6234084660
	Boring No.: DJ-1A	Tested By: JW	Checked By: HJ
	Sample No.: UD-1	Test Date: 9/17/08	Depth: 48-50 ft
	Test No.: 896	Sample Type: Undisturbed	Elevation: -19.4/-21.4
	Description: Reddish Brown and Light Greenish Gray Fat Clay (CH)		Cr=0.008
	Remarks: ASTM D2435-04 Method B, SC (ASTM D854-06), PI (ASTM D4318-05). Task 1.2		

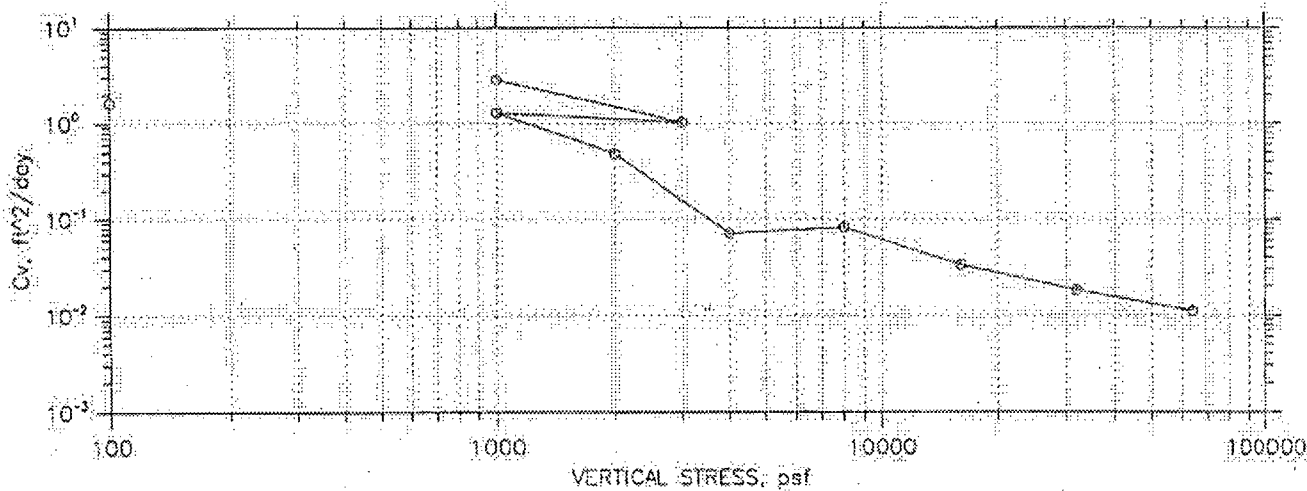
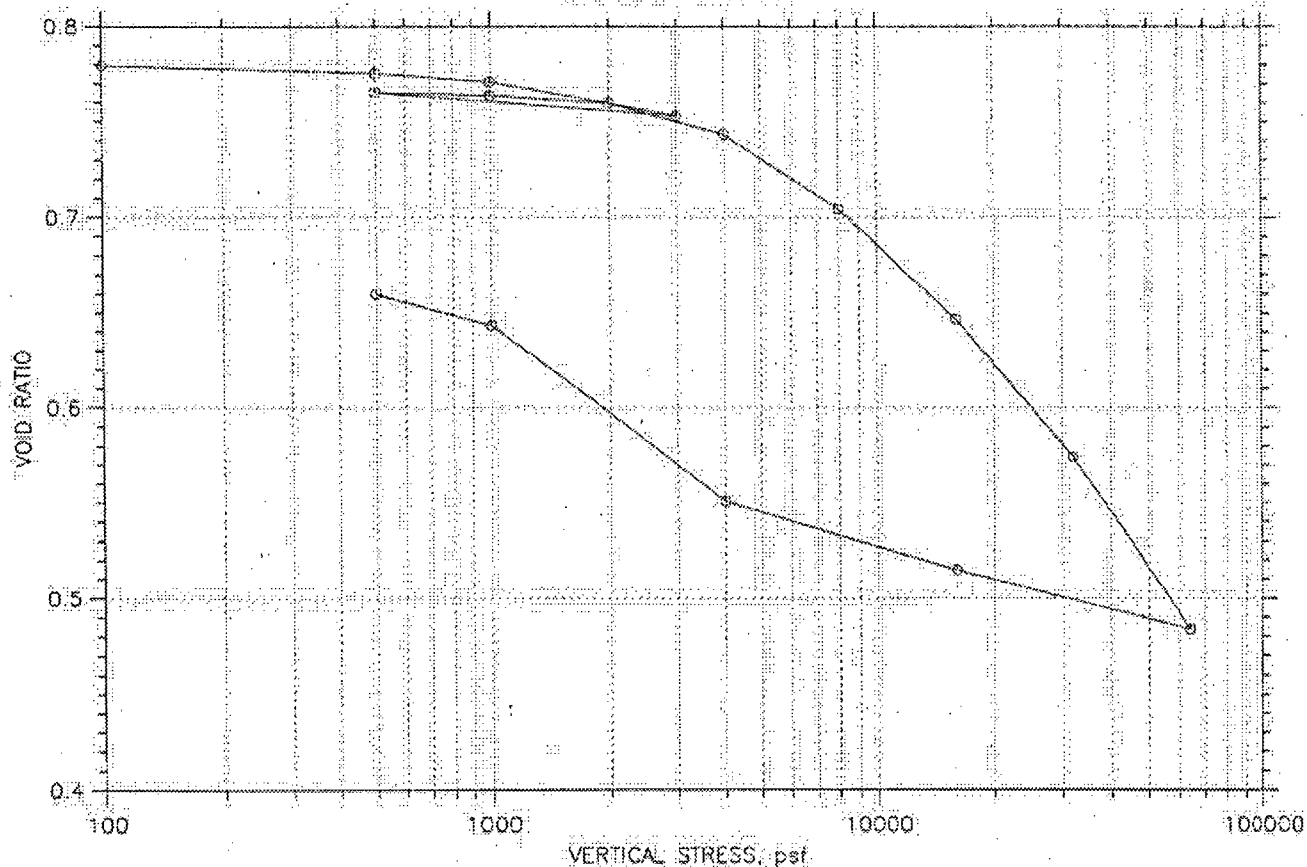
CONSOLIDATION TEST DATA SUMMARY REPORT



		Before Test	After Test
Overburden Pressure: 3028 psf		23.38	22.23
Preconsolidation Pressure: 1.004e+004 psf		97.24	104.6
Compression Index: 0.299		82.81	93.67
Diameter: 2.499 in	Height: 0.998 in	0.78	0.66
LL: 60	PL: 20	PI: 40	GS: 2.78

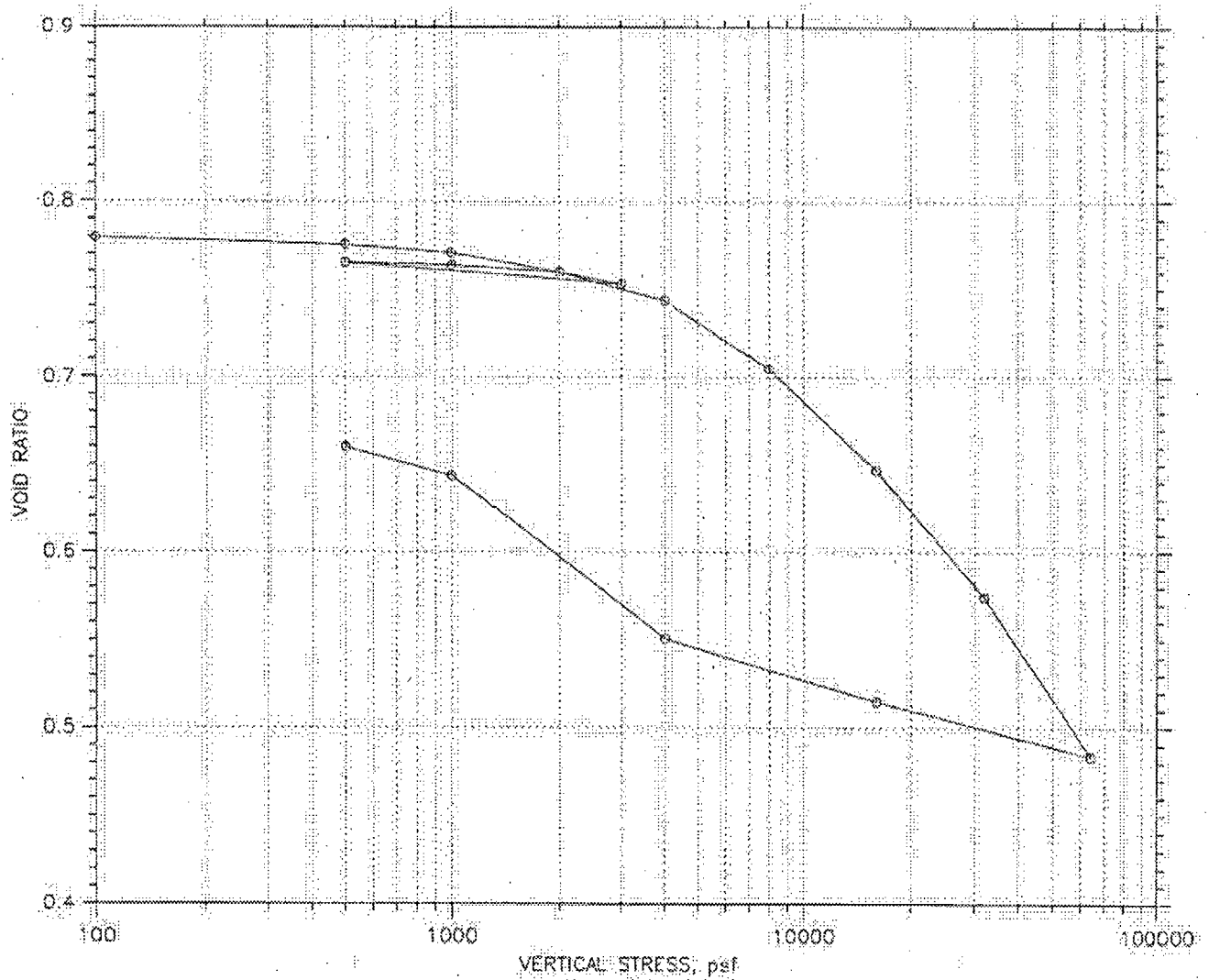
MACTEC	Project: STP Units 3 & 4	Location: D3-1A UD-1	Project No.: 6234084660
	Boring No.: D3-1A	Tested By: JW	Checked By: HJ
	Sample No.: UD-1	Test Date: 9/17/08	Depth: 48-50 ft
	Test No.: 8961	Sample Type: Undisturbed	Elevation: -19.4/-21.4
	Description: Reddish Brown and Light Greenish Gray Fat Clay (CH)		Cr=0.008
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05); Task 1.2		

CONSOLIDATION TEST DATA SUMMARY REPORT



MACTEC	Project: STP Units 3 & 4	Location: D3-1A UD-1	Project No.: 5234084660
	Boring No.: D3-1A	Tested By: JW	Checked By: HJ
	Sample No.: UD-1	Test Date: 9/17/08	Depth: 48-50 ft
	Test No.: 8961	Sample Type: Undisturbed	Elevation: ±19.4/-21.4
	Description: Reddish Brown and Light Greenish Gray Fat Clay (CH)		Cr=0.008
	Remarks: ASTM D2435-04 Method B; SG (ASTM D854-06); PI (ASTM D4318-05); Task 1.2		

CONSOLIDATION TEST DATA SUMMARY REPORT



				Before Test	After Test
Overburden Pressure: 3025 psf				23.38	22.23
Preconsolidation Pressure: 1.004e+004 psf				97.24	104.6
Compression Index: 0.299				82.81	93.67
Diameter: 2.499 in		Height: 0.998 in		0.78	0.66
LL: 60	PL: 20	PI: 40	GS: 2.78		

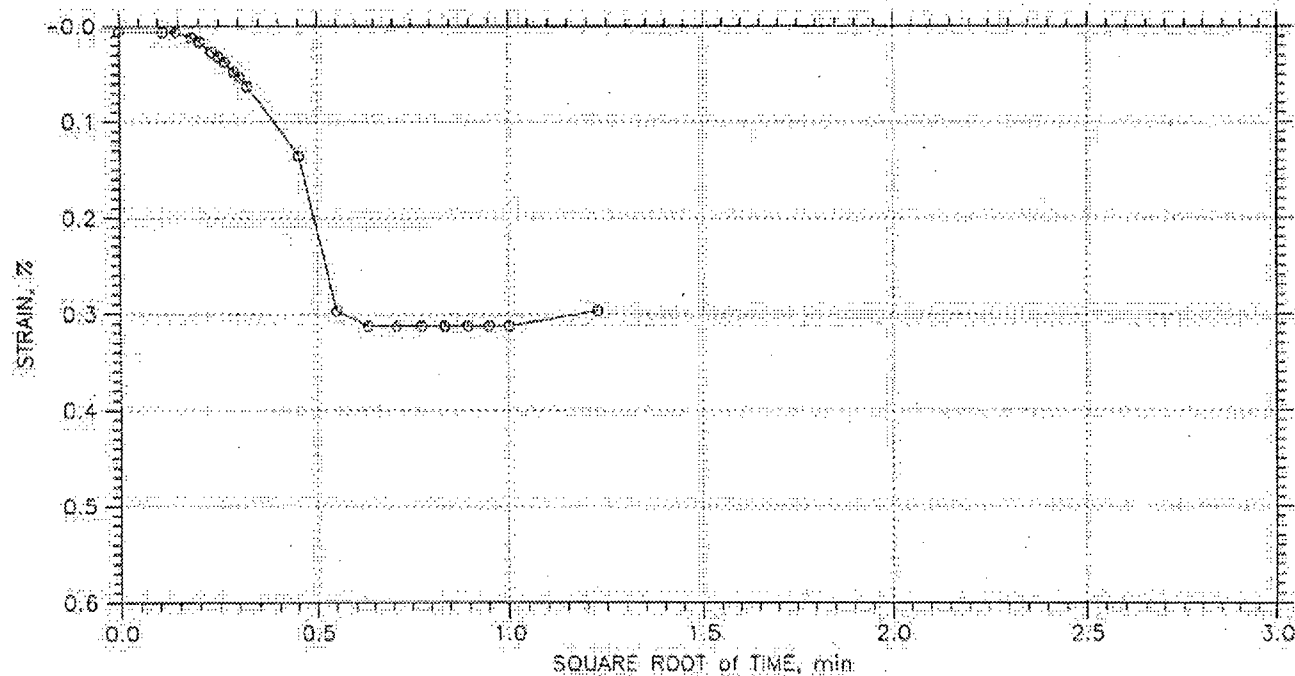
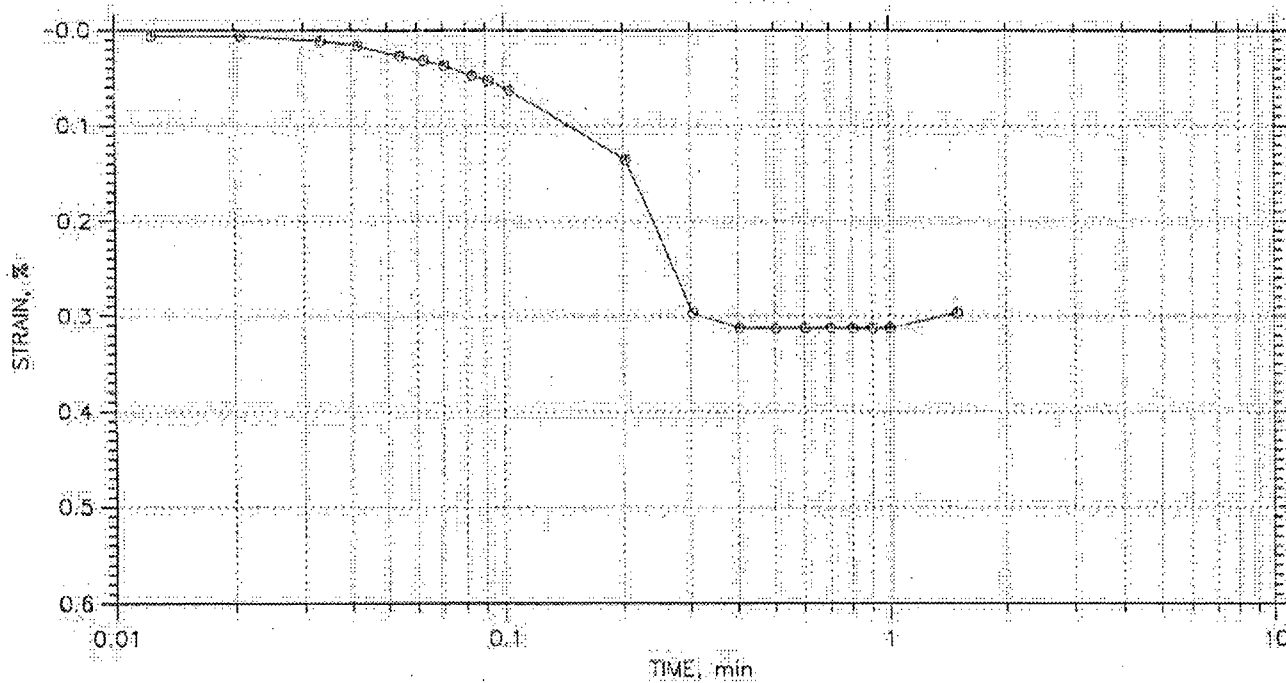
MACTEC	Project: SIP Units 3 & 4	Location: D3-1A UD-1	Project No.: 6234084660
	Boring No.: D3-1A	Tested By: JW	Checked By: HJ
	Sample No.: UD-1	Test Date: 9/17/08	Depth: 48-50 ft
	Test No.: 8961	Sample Type: Undisturbed	Elevation: -19.4/-21.4
	Description: Reddish Brown and Light Greenish Gray Fat Clay (CH)		Cr=0.008
	Remarks: ASTM D2435-04 Method B, 5G (ASTM D854-06), PI (ASTM D4318-05)		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 1 of 16

Stress: 100. psf



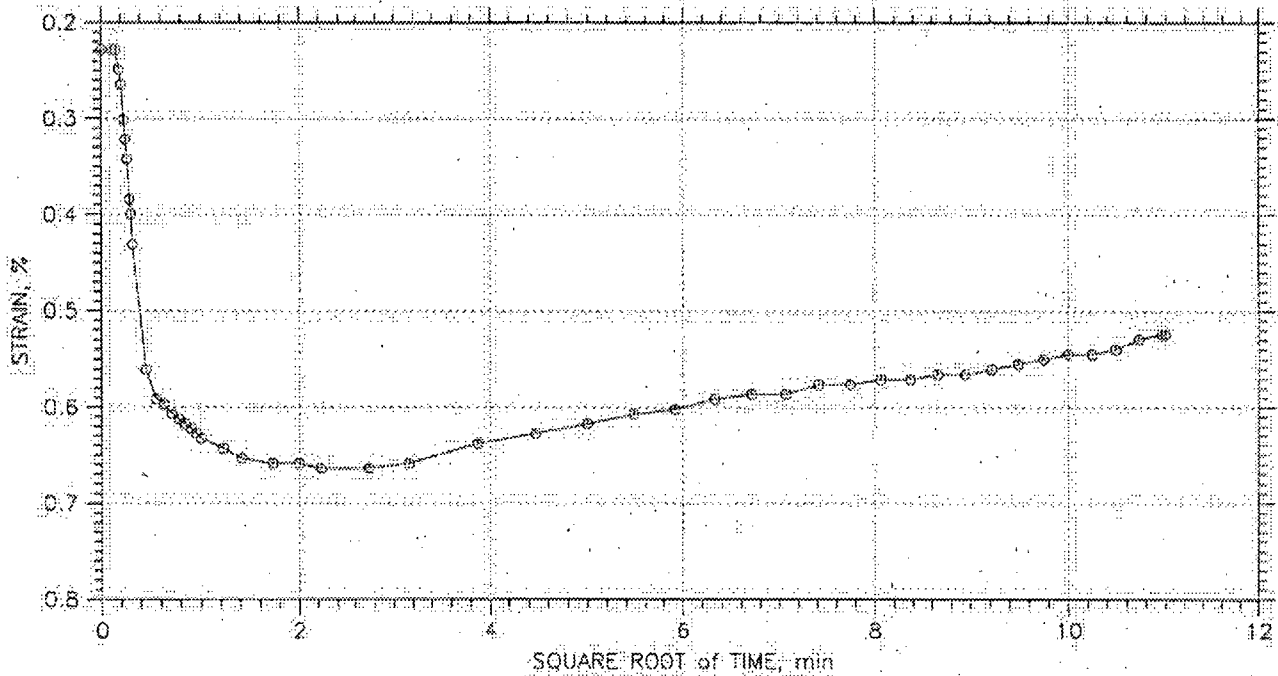
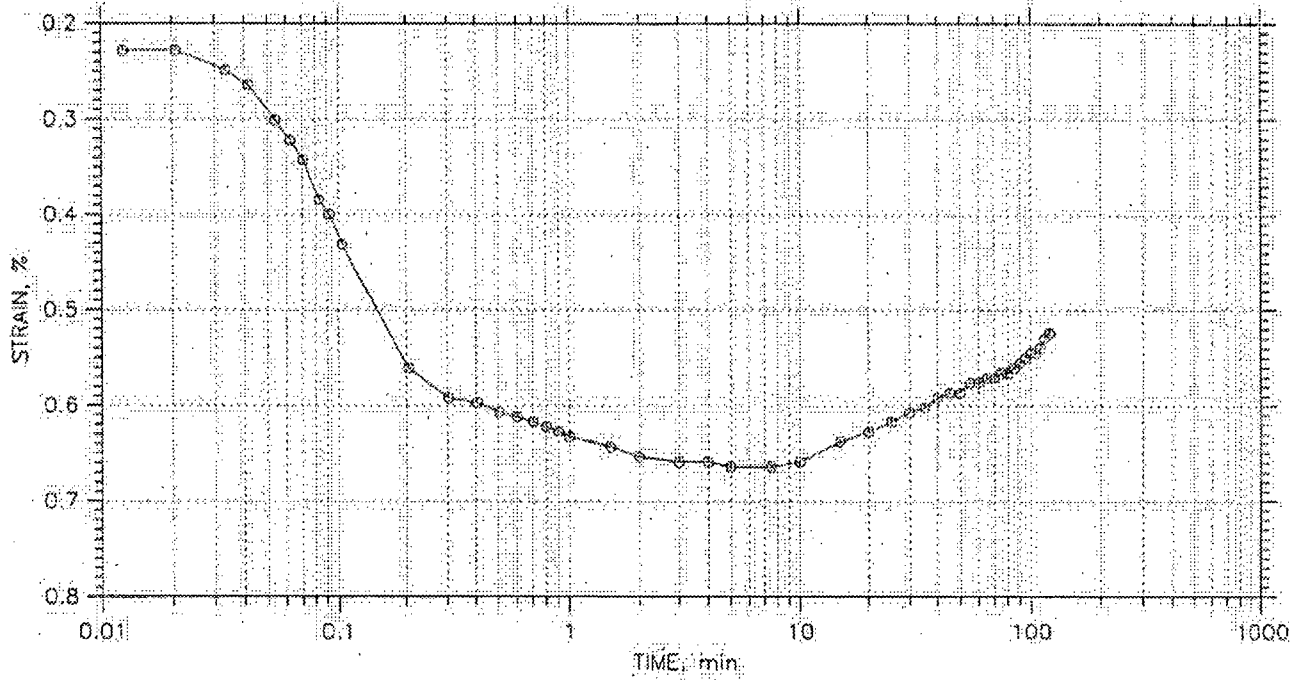
MACTEC	Project: STP Units 3 & 4	Location: D3-1A UD-1	Project No.: 6234084660
	Boring No.: D3-1A	Tested By: JW	Checked By: HJ
	Sample No.: UD-1	Test Date: 9/17/08	Depth: 48-50 ft
	Test No.: 8961	Sample Type: Undisturbed	Elevation: -19.4/-21.4
	Description: Reddish Brown and Light Greenish Gray Fat Clay (Cl)		Cr=0.008
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05) Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 2 of 16

Stress: 500. psf



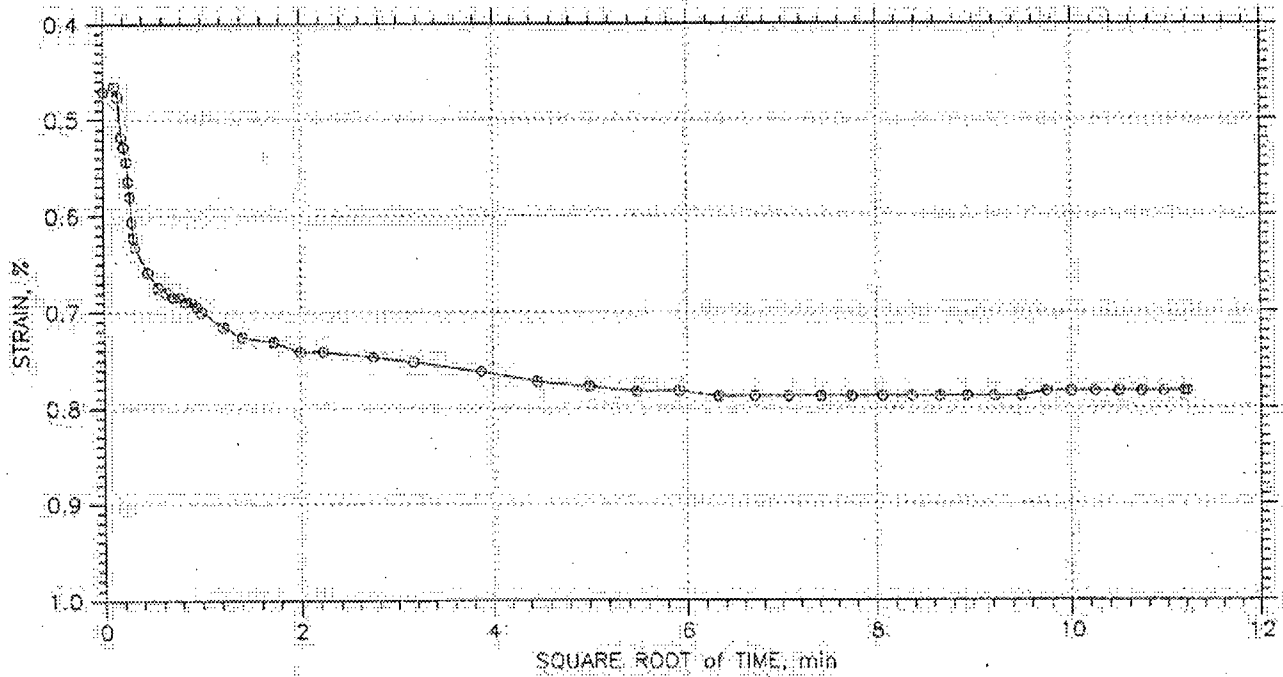
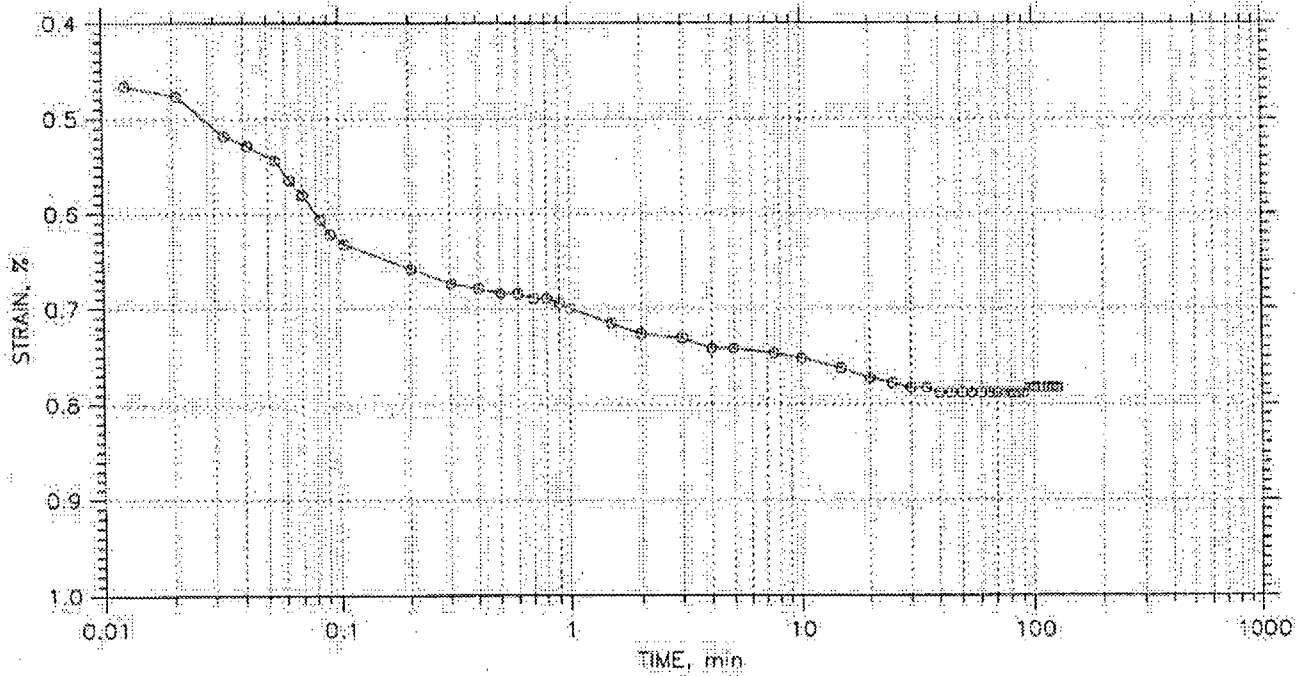
MACTEC	Project: STP Units 3 & 4	Location: D3-1A UD-1	Project No.: 6234084660	
	Boring No.: D3-1A	Tested By: JW	Checked By: HJ	
	Sample No.: UD-1	Test Date: 9/17/08	Depth: 48-50 ft	
	Test No.: 8961	Sample Type: Undisturbed	Elevation: -19.4/-21.4	
	Description: Reddish Brown and Light Greenish Gray Fat Clay (CH)		Cr=0.008	
	Remarks: ASTM D2435-04 Method B; SG (ASTM D854-06); PI (ASTM D4318-05)			Task 1.2

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 3 of 16

Stress: 1000 psf



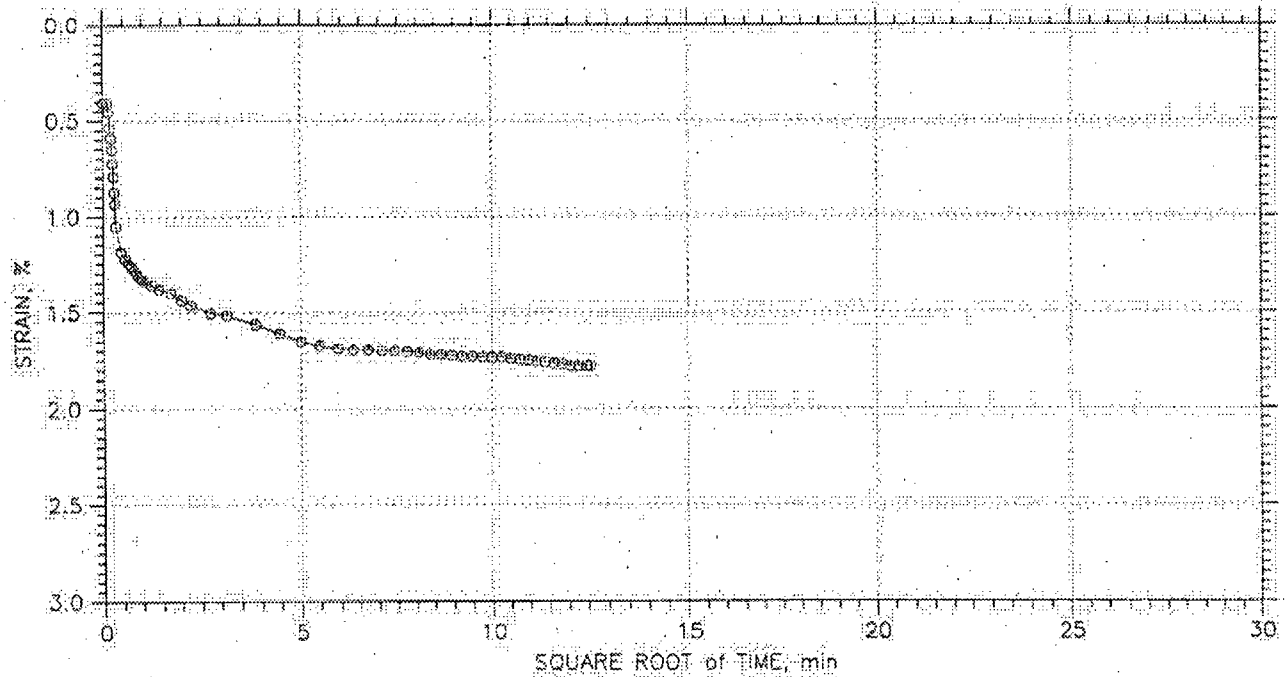
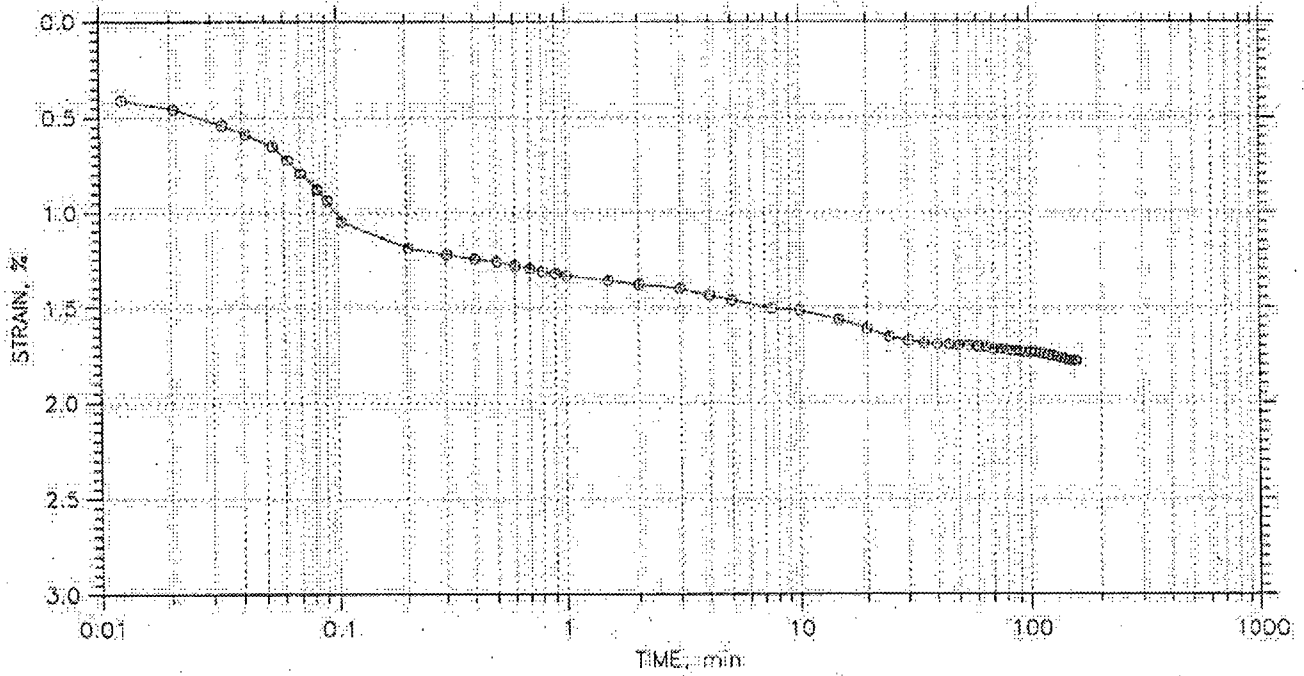
MACTEC	Project: STP Units 3 & 4	Location: D3-1A UD-1	Project No.: 6234084660
	Boring No.: D3-1A	Tested By: JW	Checked By: HJ
	Sample No.: UD-1	Test Date: 9/17/08	Depth: 48-50 ft
	Test No.: 8961	Sample Type: Undisturbed	Elevation: -19.4/-21.4
	Description: Reddish Brown and Light Greenish Gray Fat Clay (CH)		Cr=0.008
	Remarks: ASTM D2435-04 Method B, SC (ASTM D854-06), PI (ASTM D4318-05) Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 4 of 16

Stress: 3000. psf



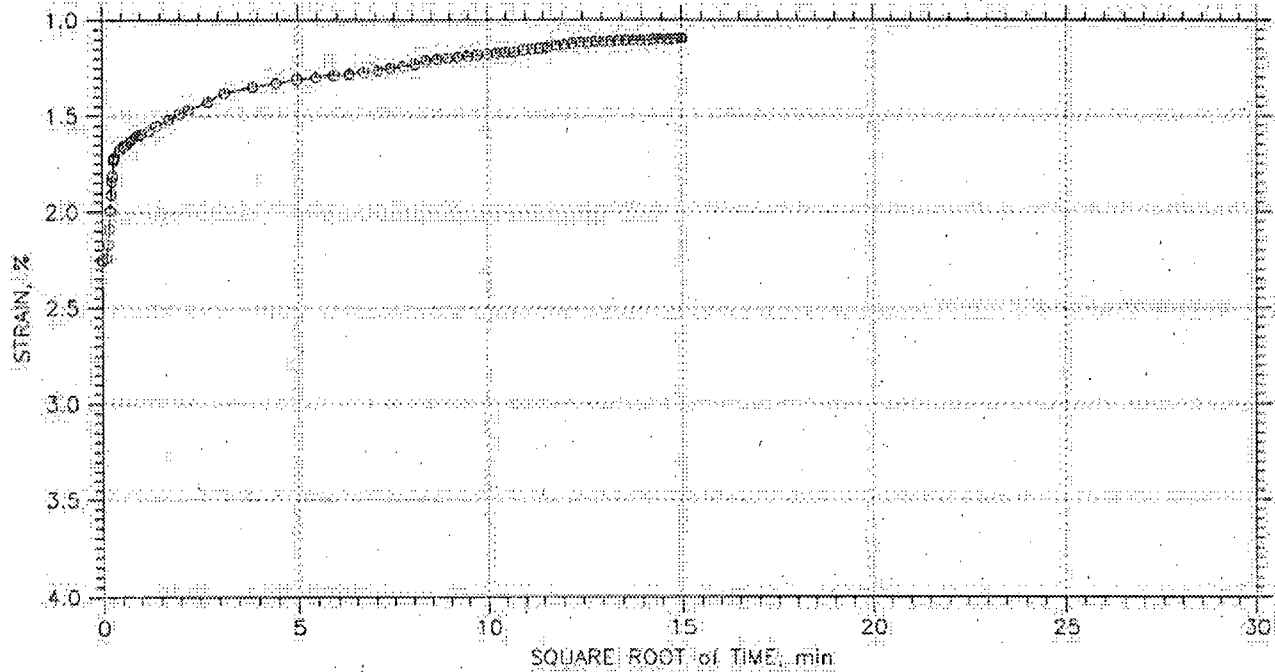
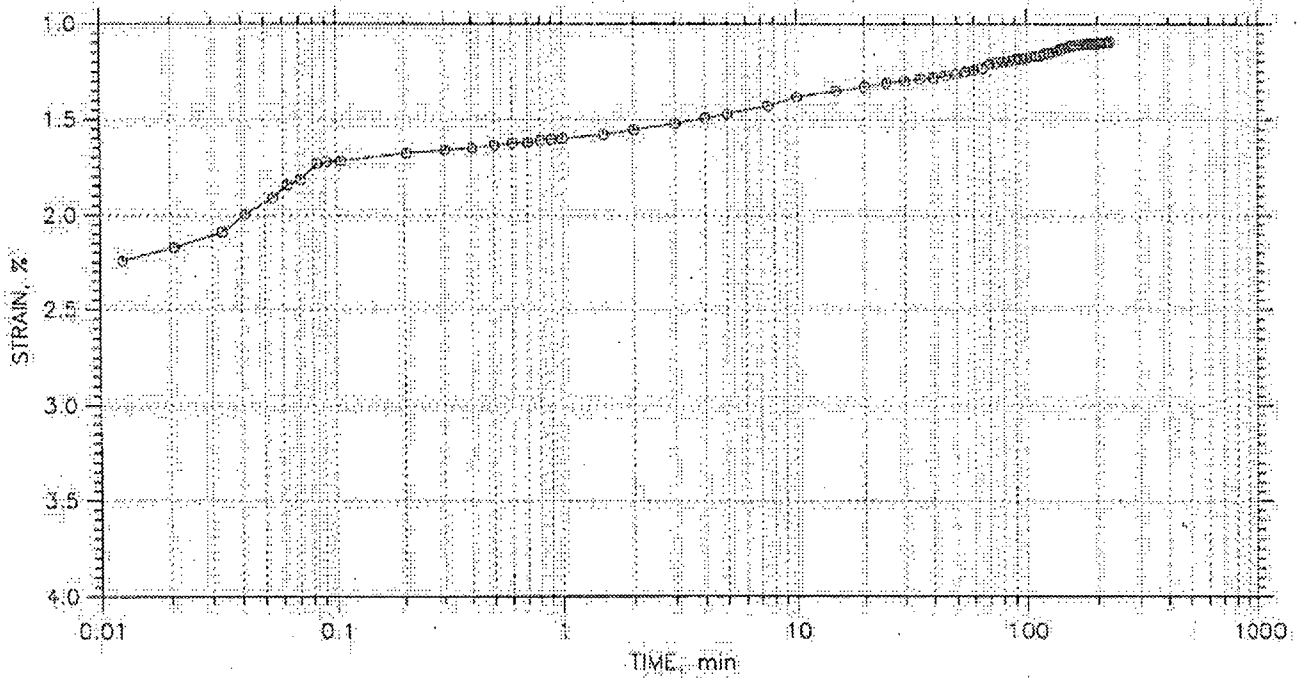
MACTEC	Project: STP Units 3 & 4	Location: D3-1A UD-1	Project No.: 6234084660
	Boring No.: D3-1A	Tested By: JW	Checked By: HJ
	Sample No.: UD-1	Test Date: 9/17/08	Depth: 48-50 ft
	Test No.: 8961	Sample Type: Undisturbed	Elevation: -19.4/-21.4
	Description: Reddish Brown and Light Greenish Gray Fat Clay (CH)		Cr=0.005
	Remarks: ASTM D2435-04 Method B; SG (ASTM D854-06); PI (ASTM D4318-05); Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 5 of 16

Stress: 500. psf



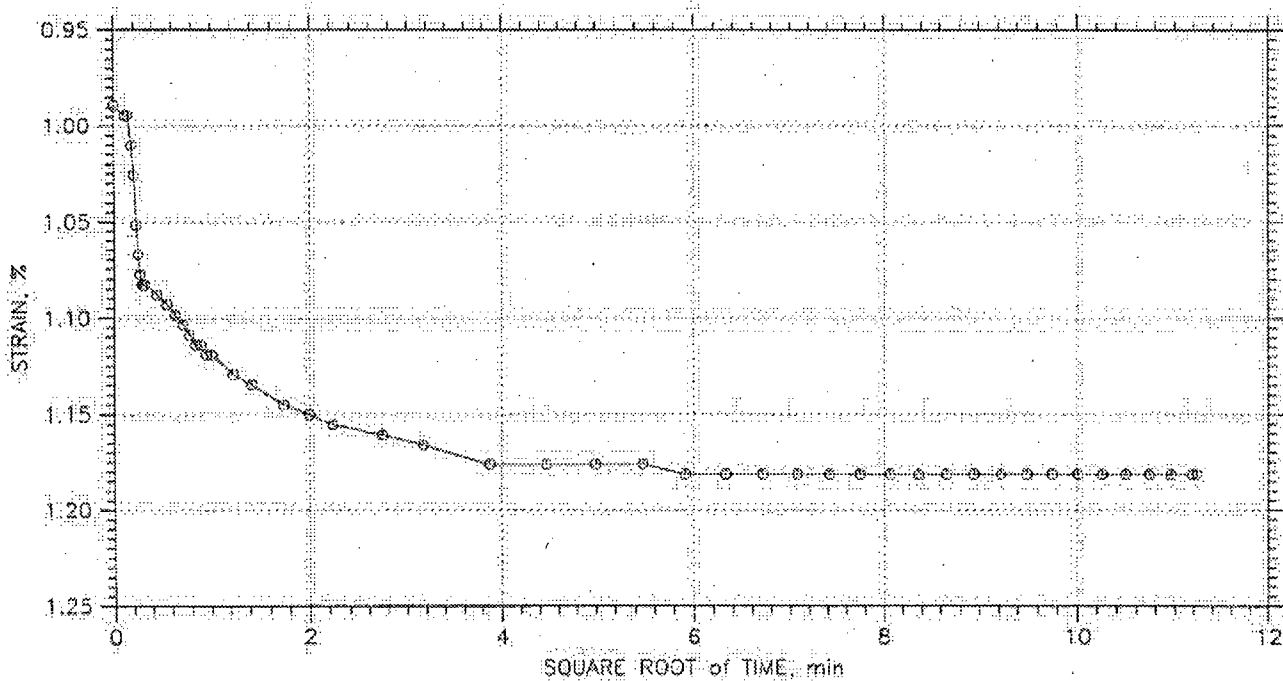
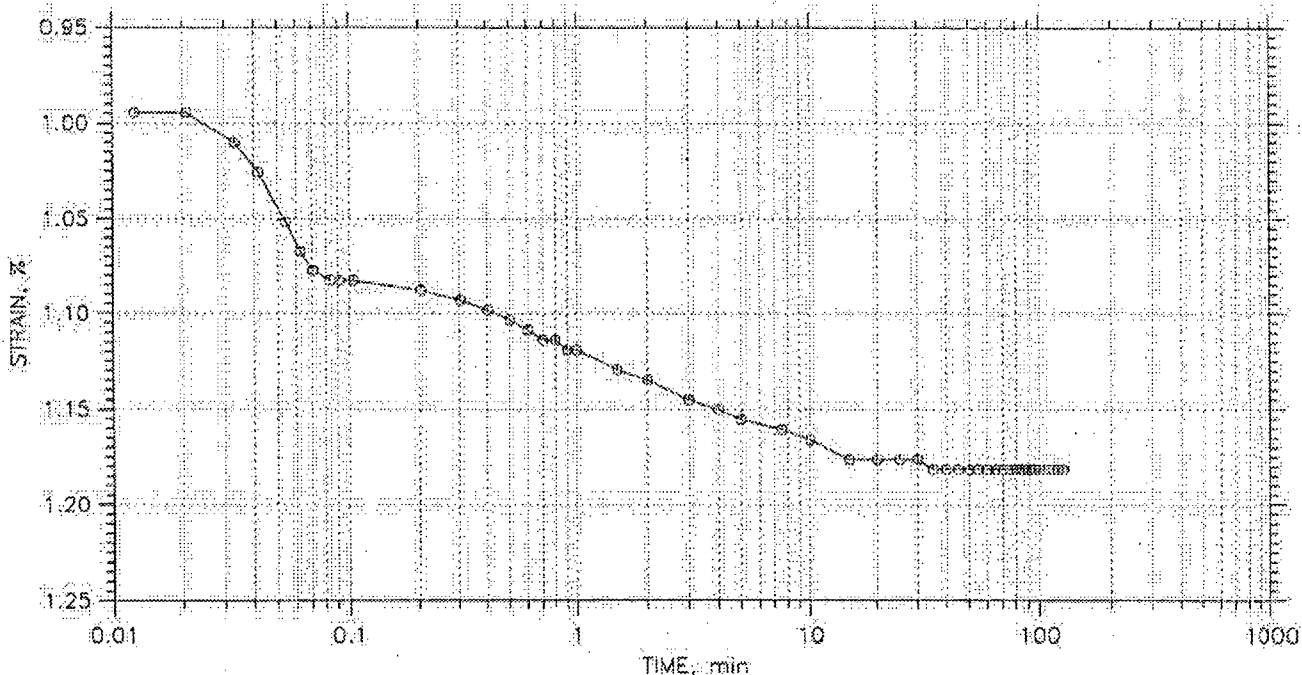
MACTEC	Project: STP Units 3 & 4	Location: D3-1A UD-1	Project No.: 6234084660
	Boring No.: D3-1A	Tested By: JW	Checked By: HJ
	Sample No.: UD-1	Test Date: 9/17/08	Depth: 48-50 ft
	Test No.: 8961	Sample Type: Undisturbed	Elevation: -19.4/-21.4
	Description: Reddish Brown and Light Greenish Gray Fat Clay (CH)		Cr=0.008
	Remarks: ASTM D2435-04 Method B, SC (ASTM D854-06), PI (ASTM D4318-05) Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 6 of 16

Stress: 1000. psf



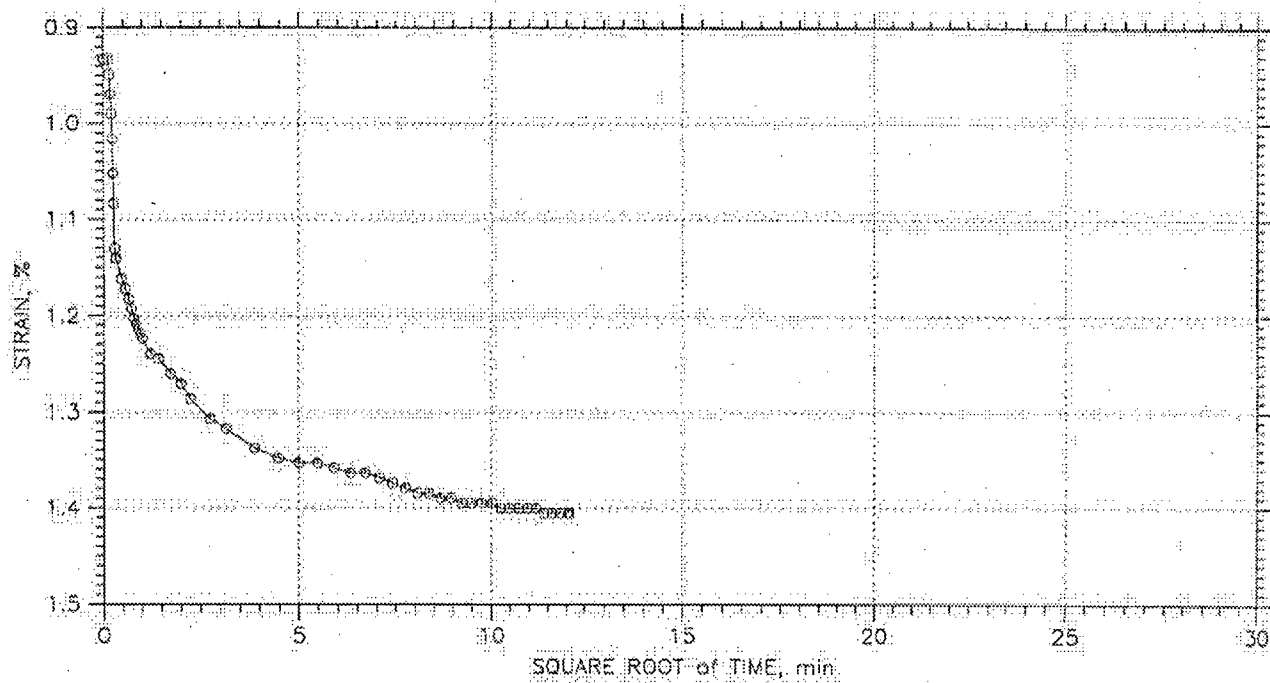
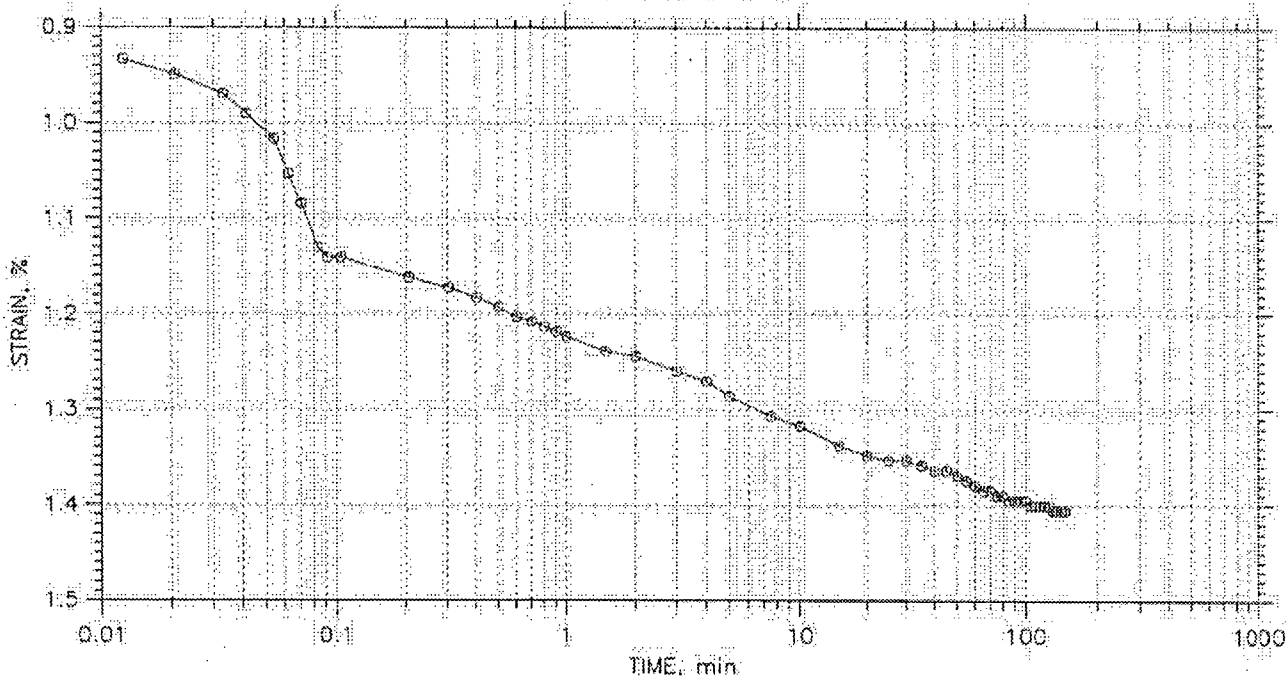
MACTEC	Project: STP Units 3 & 4	Location: D3-1A UD-1	Project No.: 6234084660
	Boring No.: D3-1A	Tested By: JW	Checked By: HJ
	Sample No.: UD-1	Test Date: 9/17/08	Depth: 48-50 ft
	Test No.: 8961	Sample Type: Undisturbed	Elevation: -19.4/-21.4'
	Description: Reddish Brown and Light Greenish Gray Fat Clay (CH)		Cr=0.008
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05) Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 7 of 16

Stress: 2000 psf



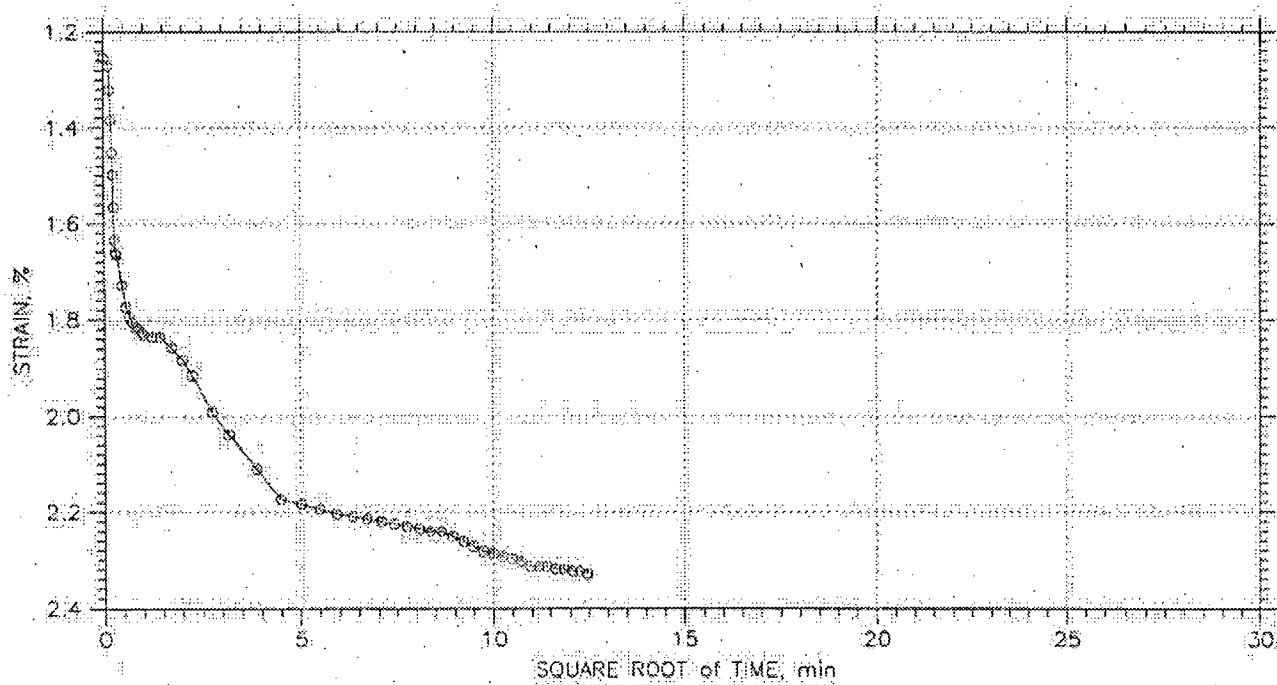
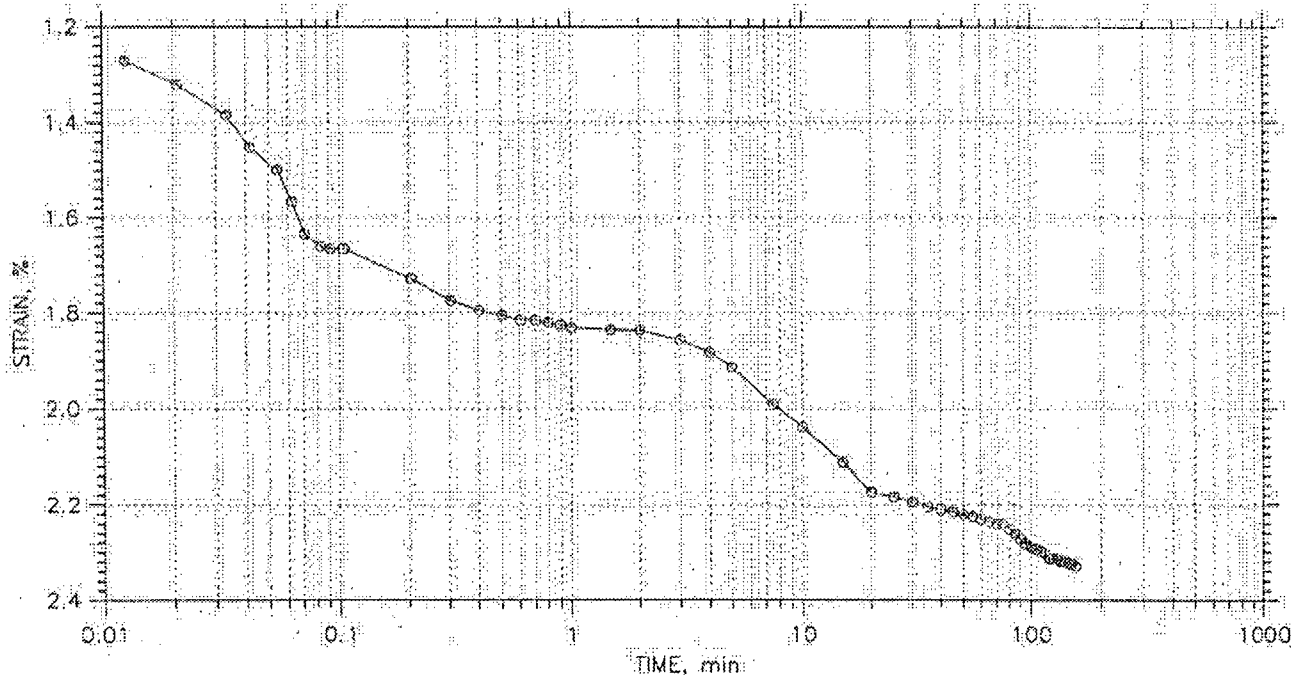
MACTEC	Project: STP Units 3 & 4	Location: D3-1A UD-1	Project No.: 6234084680
	Boring No.: D3-1A	Tested By: JW	Checked By: HJ
	Sample No.: UD-1	Test Date: 9/17/08	Depth: 48-50 ft
	Test No.: 8961	Sample Type: Undisturbed	Elevation: -19.4/-21.4
	Description: Reddish Brown and Light Greenish Gray Fat Clay (CH)		Cr=0.008
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05)		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 8 of 16

Stress: 4000 psf



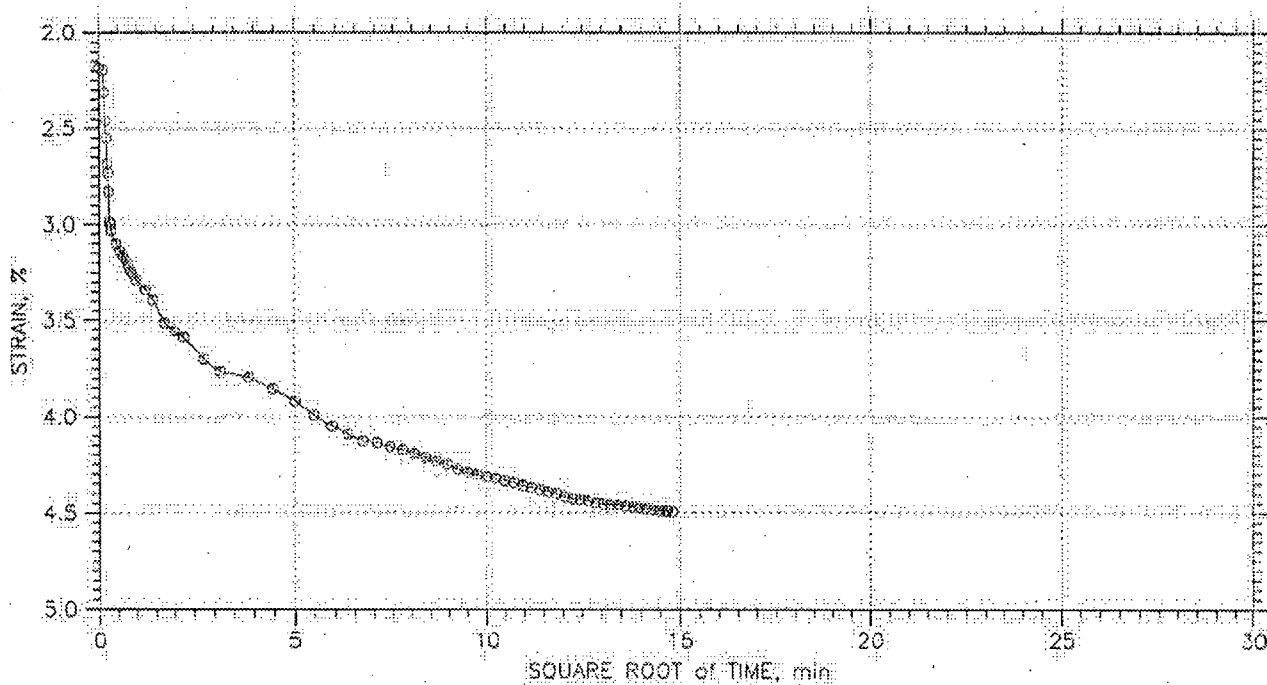
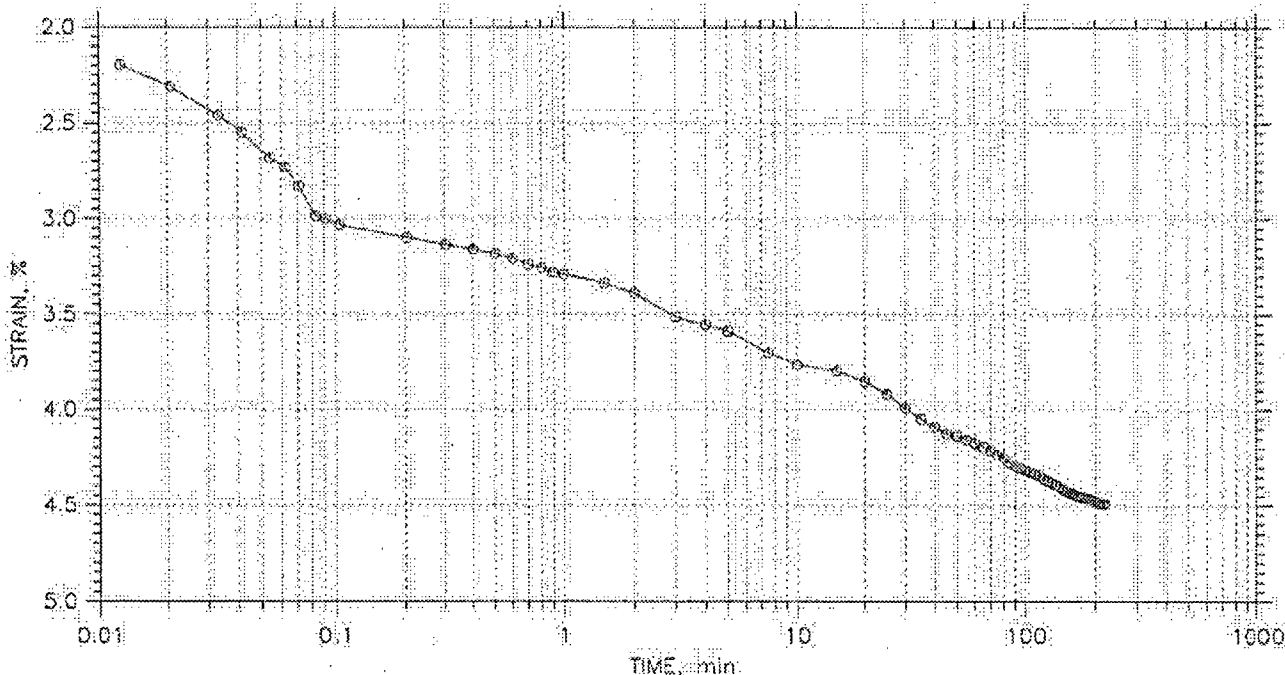
MACTEC	Project: STP Units 3 & 4	Location: D3-1A UD-1	Project No.: 6234084660
	Boring No.: D3-1A	Tested By: JW	Checked By: HJ
	Sample No.: UD-1	Test Date: 9/17/08	Depth: 48-50 ft
	Test No.: 8961	Sample Type: Undisturbed	Elevation: -19.4/-21.4
	Description: Reddish Brown and Light Greenish Gray Fat Clay (CH)		Cr=0.008
	Remarks: ASTM D2435-04 Method B, SC (ASTM D854-05), PI (ASTM D4318-05), Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 9 of 16

Stress: 8000 psf



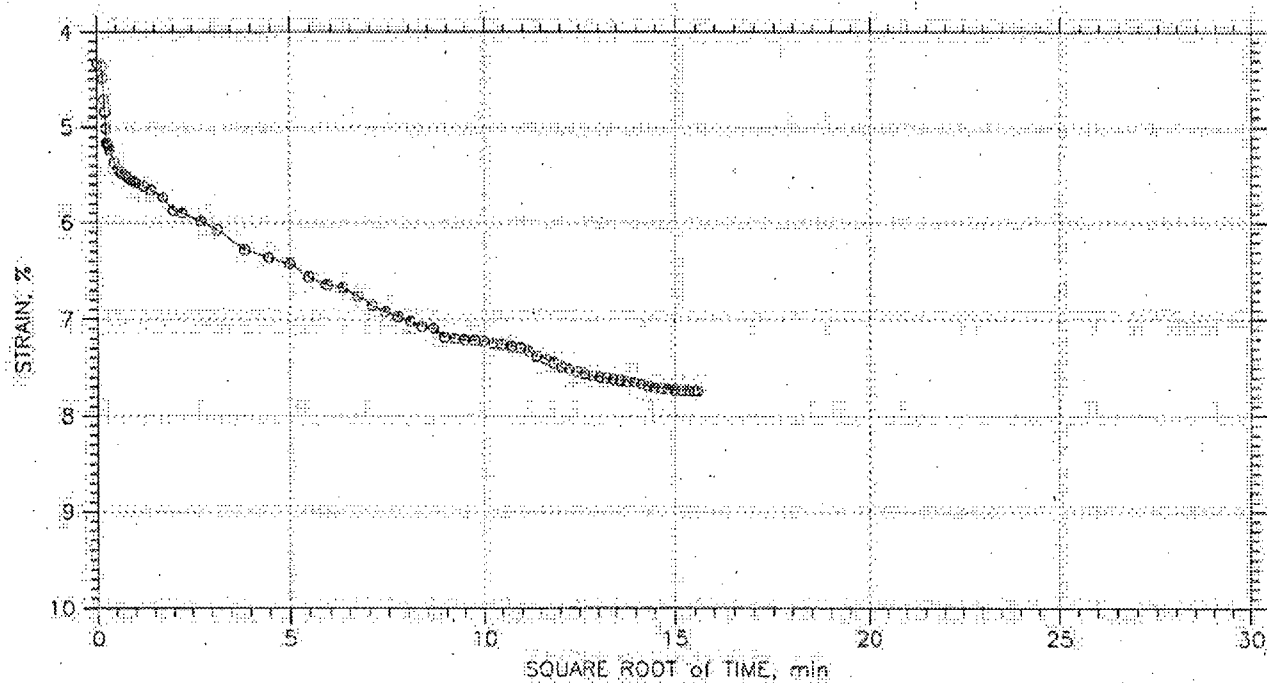
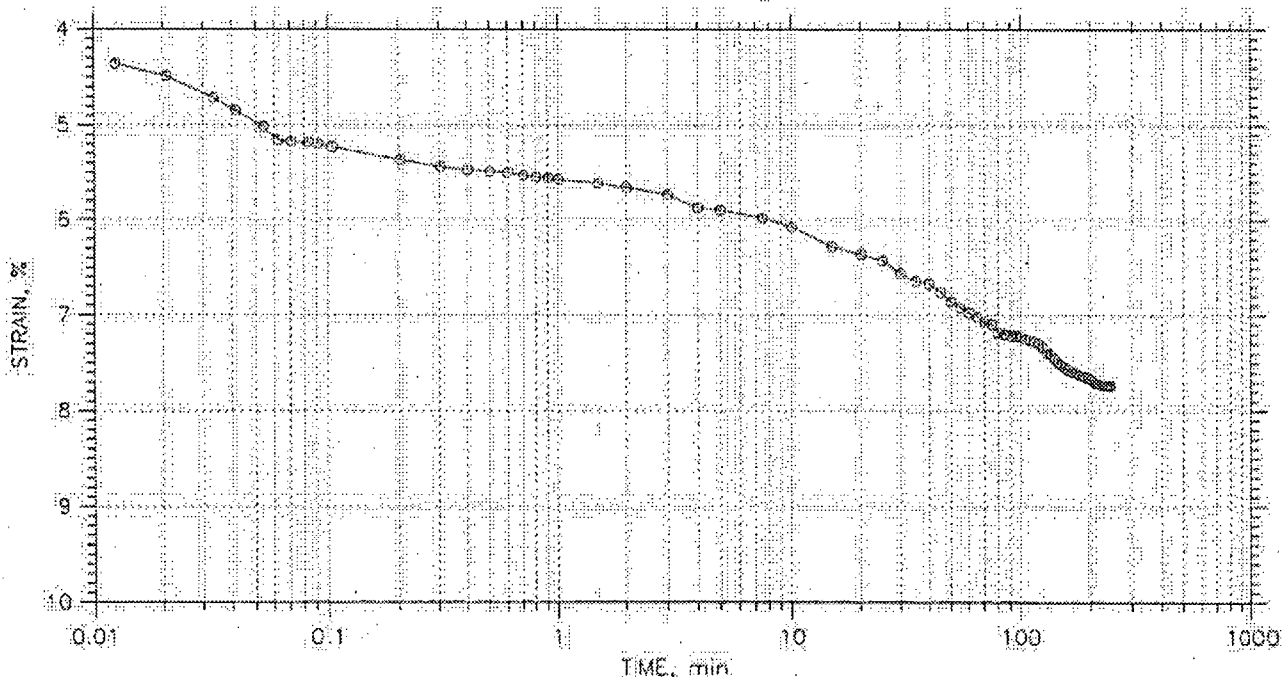
MACTEC	Project: STP Units 3 & 4	Location: D3-1A UD-1	Project No.: 6234084660
	Boring No.: D3-1A	Tested By: UW	Checked By: HJ
	Sample No.: UD-1	Test Date: 9/17/08	Depth: 48-50 ft
	Test No.: 8961	Sample Type: Undisturbed	Elevation: -19.4/-21.4
	Description: Reddish Brown and Light Greenish Gray Fat Clay (CH)		Cr=0.008
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05), Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 10 of 16

Stress: 16000 psf



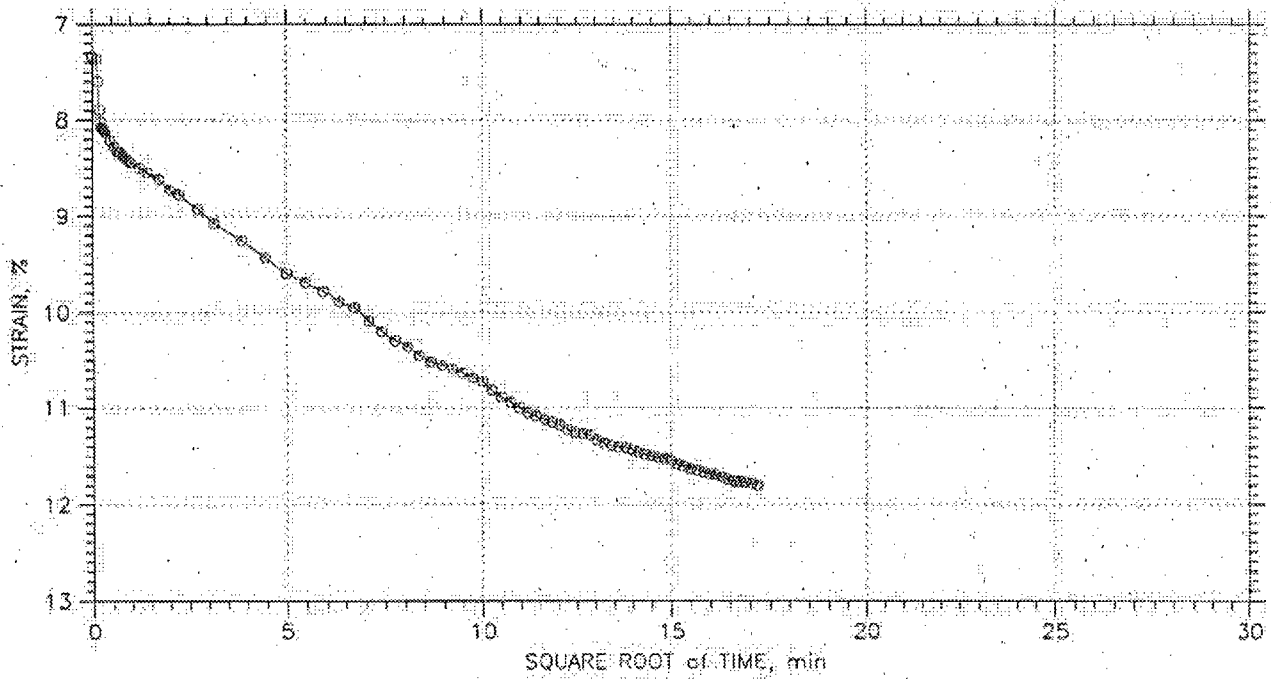
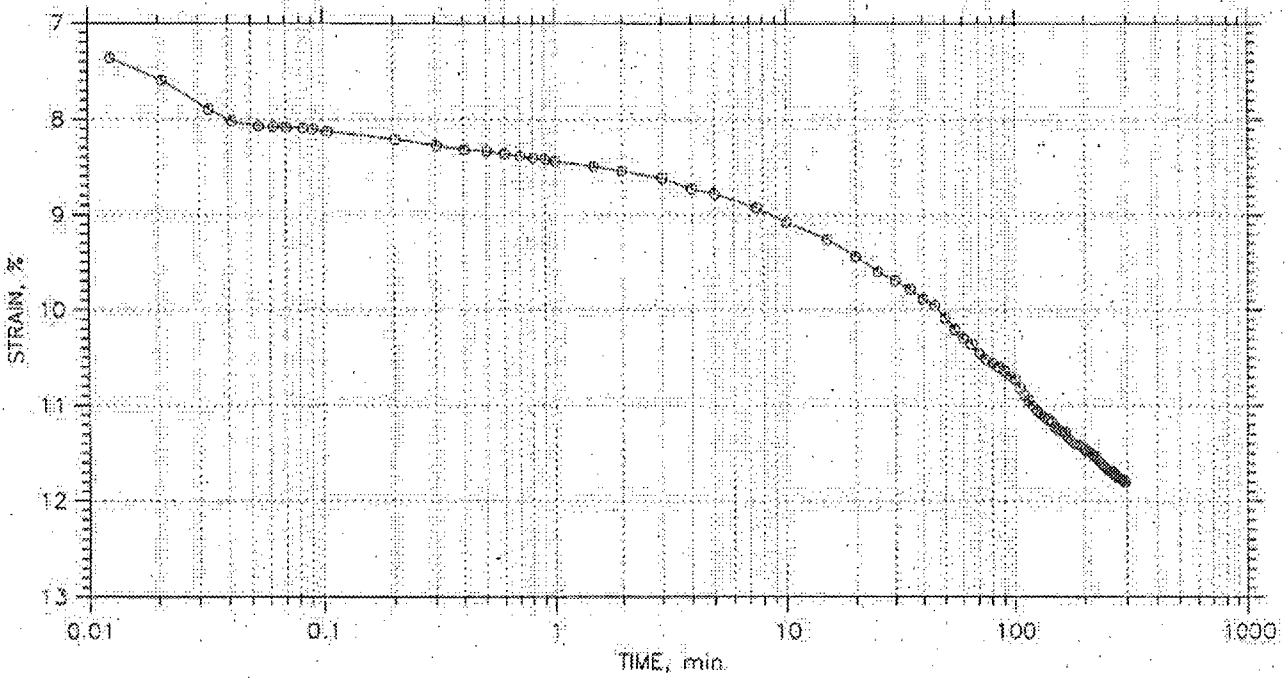
MACTEC	Project: STP Units 3 & 4	Location: D3-1A UD-1	Project No.: 6234084660
	Boring No.: DJ-1A	Tested By: JW	Checked By: HJ
	Sample No.: UD-1	Test Date: 9/17/08	Depth: 48-50 ft
	Test No.: 8961	Sample Type: Undisturbed	Elevation: -19.4/-21.4
	Description: Reddish Brown and Light Greenish Gray Fat Clay (CH)		Cr=0.008
	Remarks: ASTM D2435-04 Method B, SC (ASTM D854-06), PI (ASTM D4318-05), Task 1/2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 11 of 16

Stress: 32000 psf



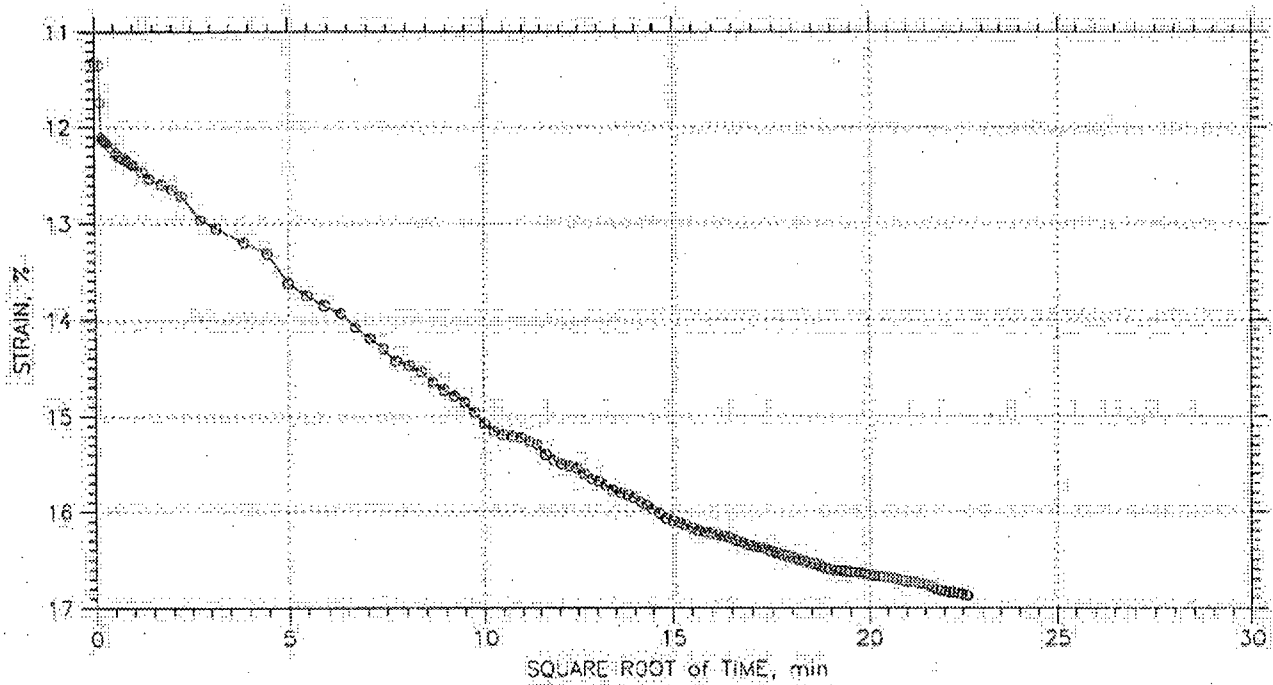
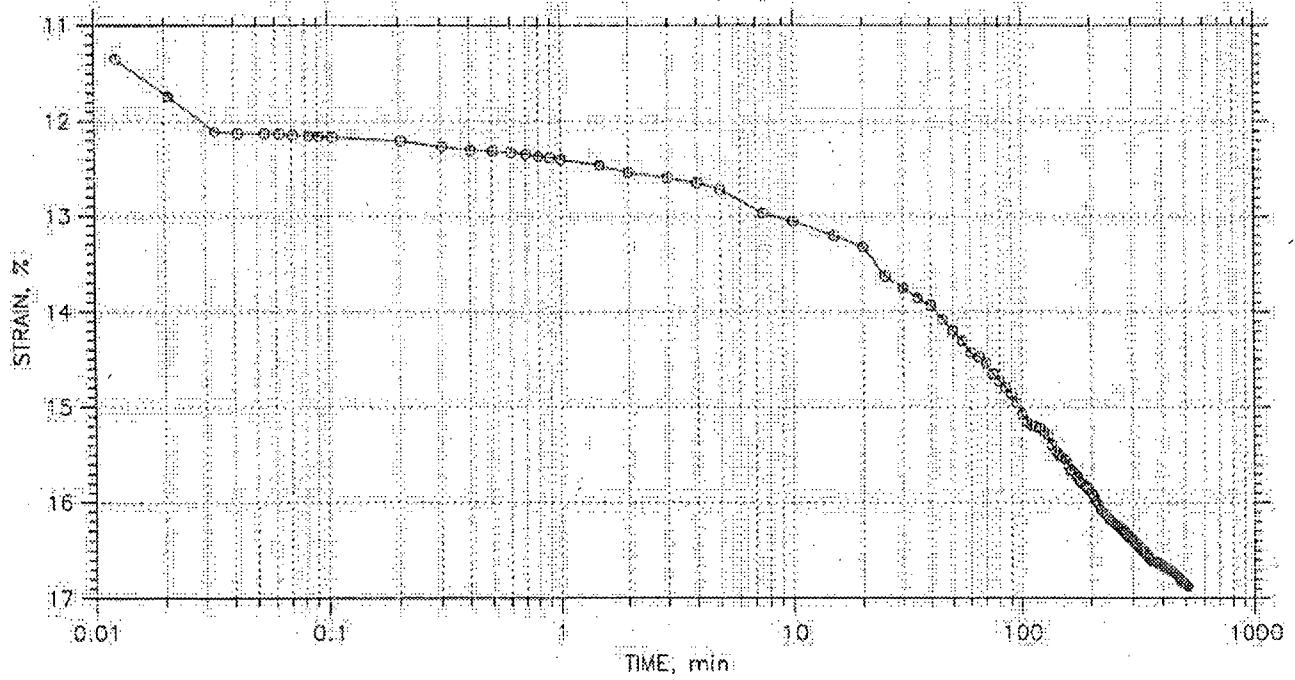
MACTEC	Project: STP Units 3 & 4	Location: D3-1A UD-1	Project No.: 6234084660
	Boring No.: D3-1A	Tested By: JW	Checked By: HJ
	Sample No.: UD-1	Test Date: 9/17/08	Depth: 48-50 ft
	Test No.: 8961	Sample Type: Undisturbed	Elevation: +19.4/-21.4
	Description: Reddish Brown and Light Greenish Gray Fat Clay (CH)		Cr=0.005
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05), Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 12 of 16

Stress: 64000 psf



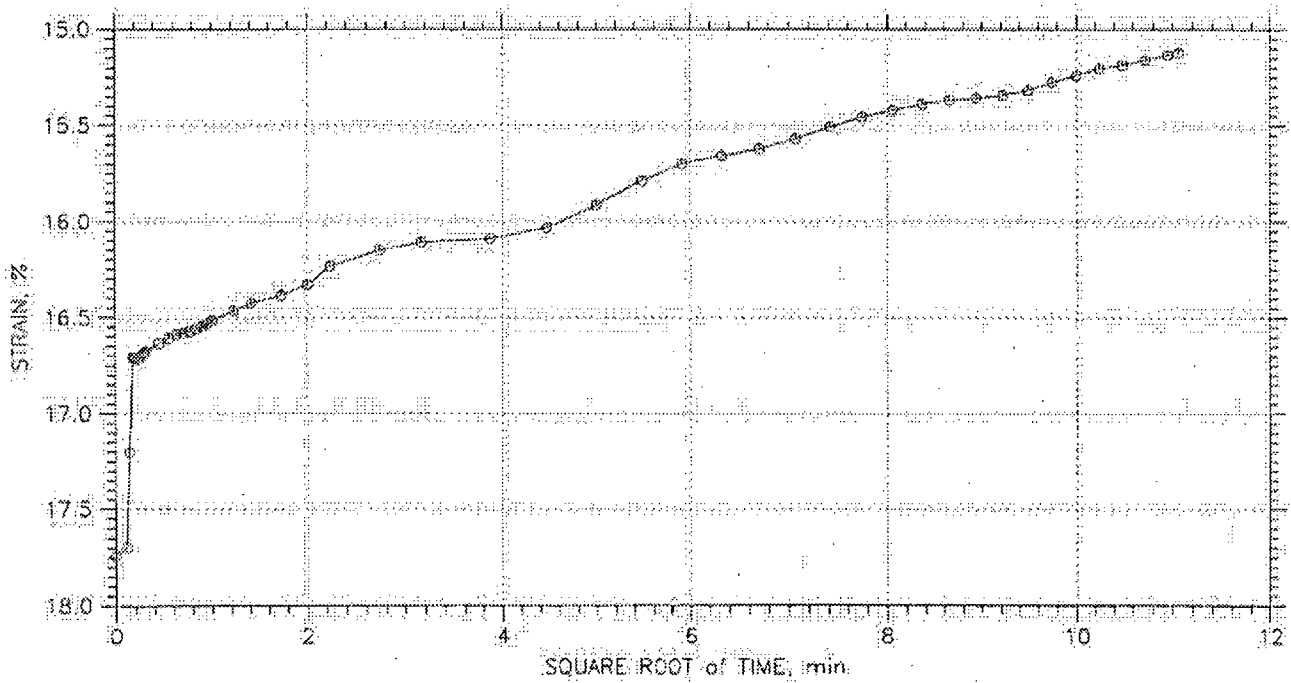
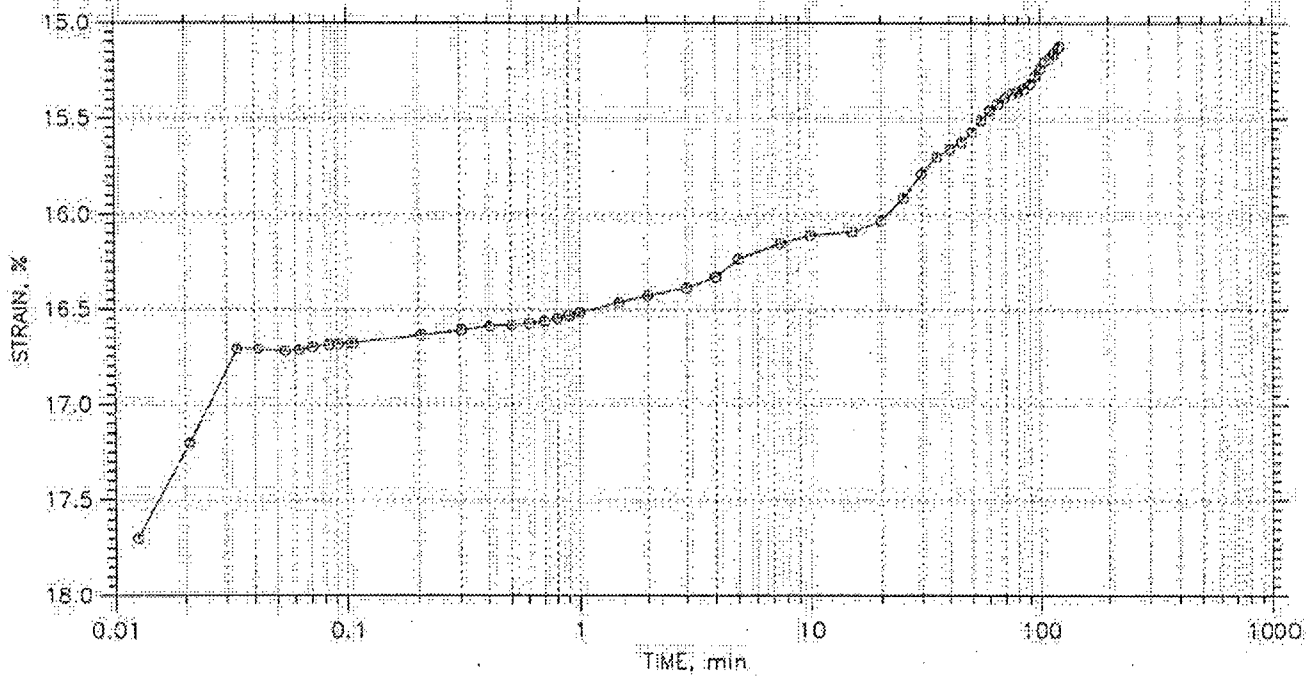
MACTEC	Project: STP Units 3 & 4	Location: D3-1A UD-1	Project No.: 6234084660
	Boring No.: D3-1A	Tested By: JW	Checked By: HJ
	Sample No.: UD-1	Test Date: 9/17/08	Depth: 48-50 ft
	Test No.: 8961	Sample Type: Undisturbed	Elevation: -19.4/-21.4
	Description: Reddish Brown and Light Greenish Gray Fat Clay (Cl)		Cr=0.008
	Remarks: ASTM D2435-04 Method B, SC (ASTM D854-06); PI (ASTM D4318-05); Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 13 of 16

Stress: 16000 psf



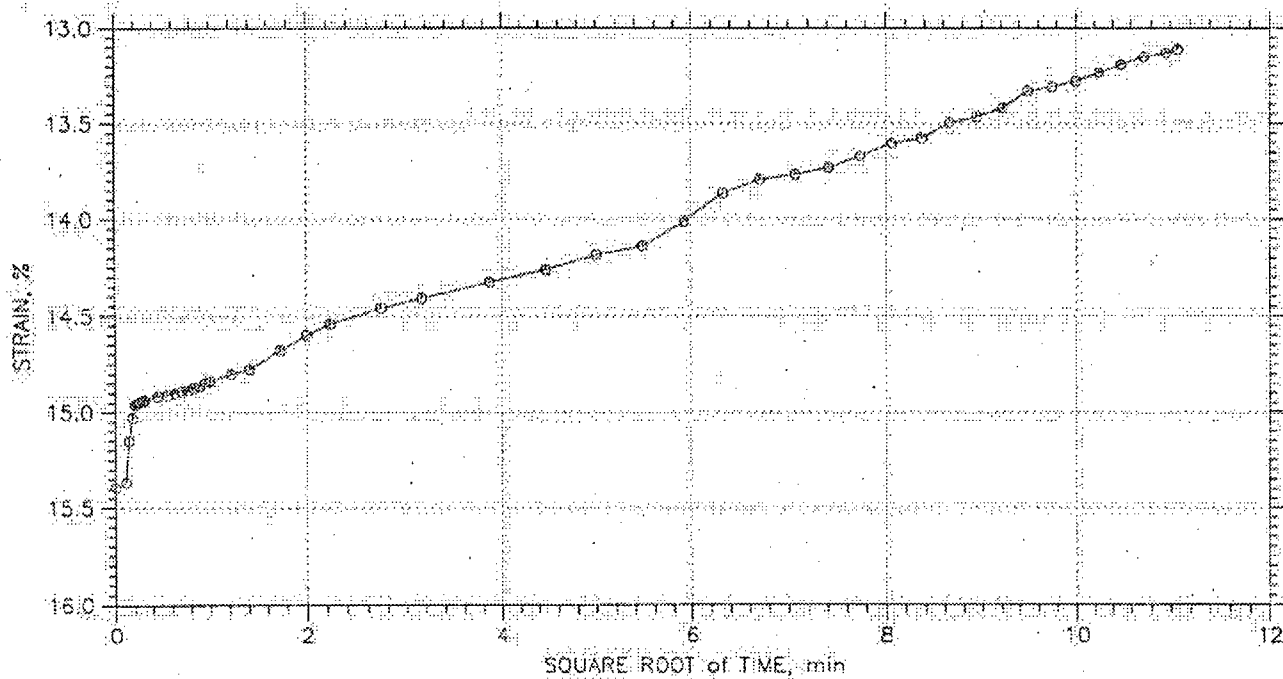
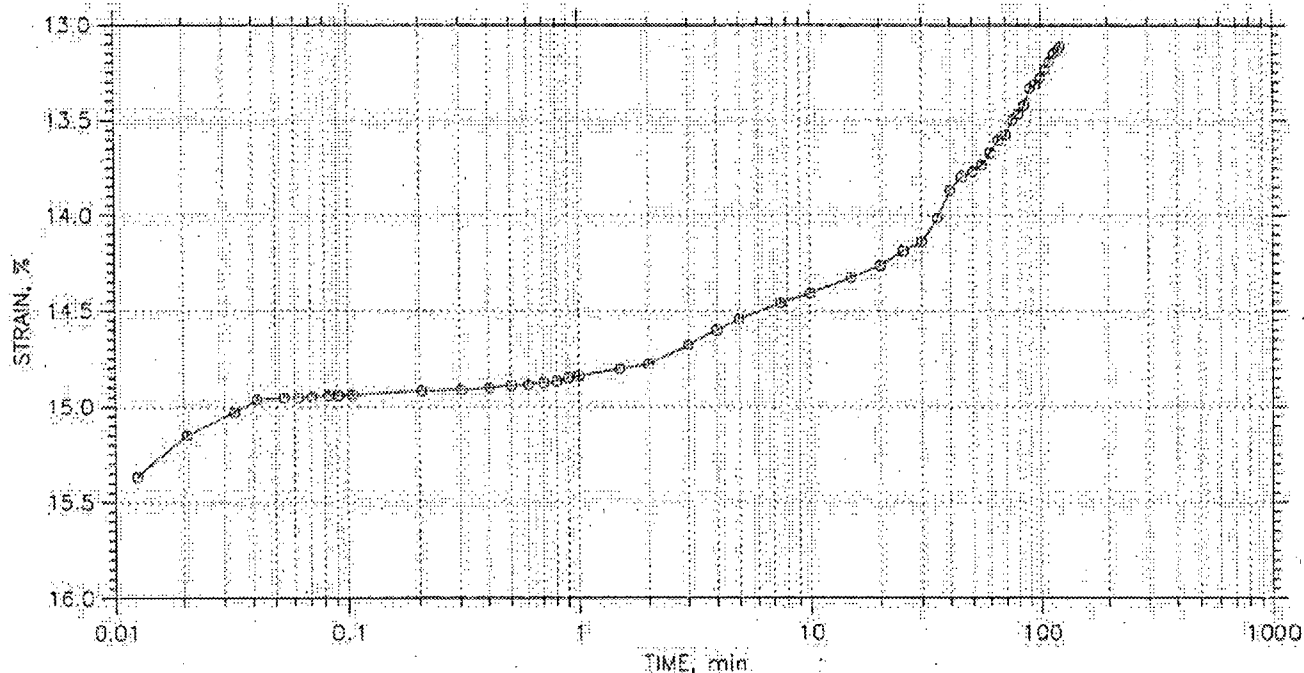
MACTEC	Project: STP Units 3 & 4	Location: 03-1A UD-1	Project No.: 6234084660
	Boring No.: 03-1A	Tested By: JW	Checked By: MJ
	Sample No.: UD-1	Test Date: 9/17/08	Depth: 48-50 ft
	Test No.: 8961	Sample Type: Undisturbed	Elevation: -19.4/-21.4
	Description: Reddish Brown and Light Greenish Gray Fat Clay (CH)		Cr=0.008
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05), Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 14 of 16

Stress: 4000. psf



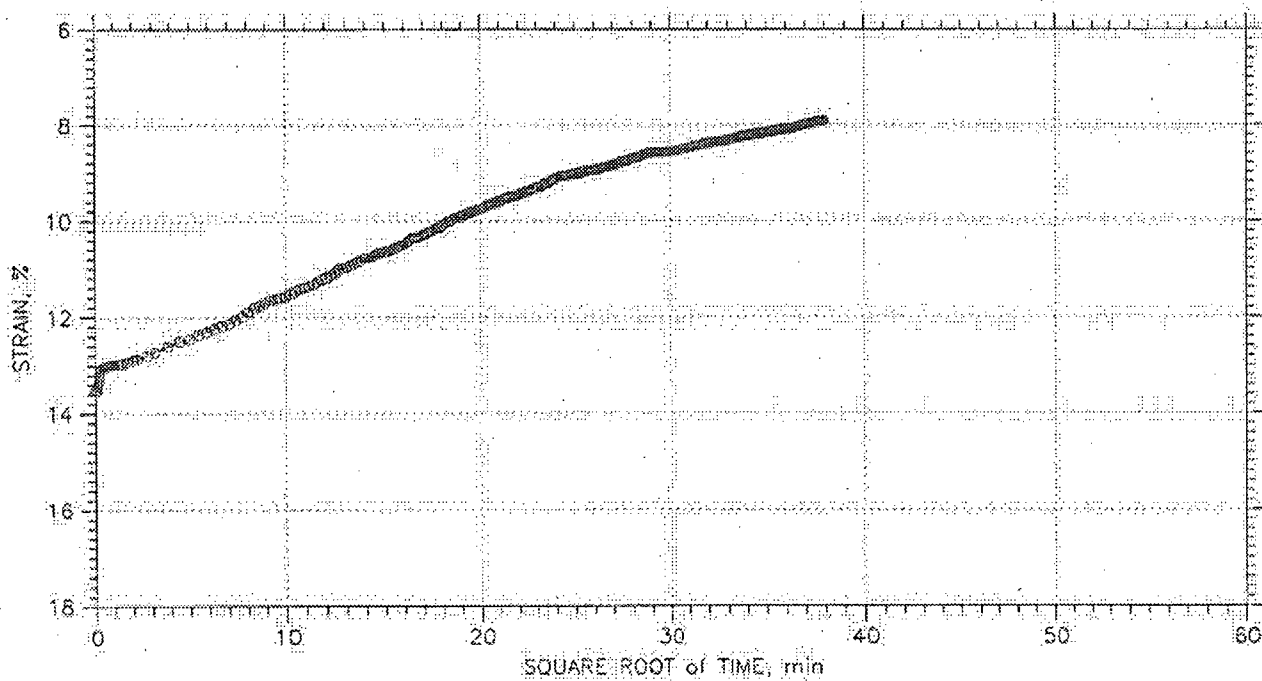
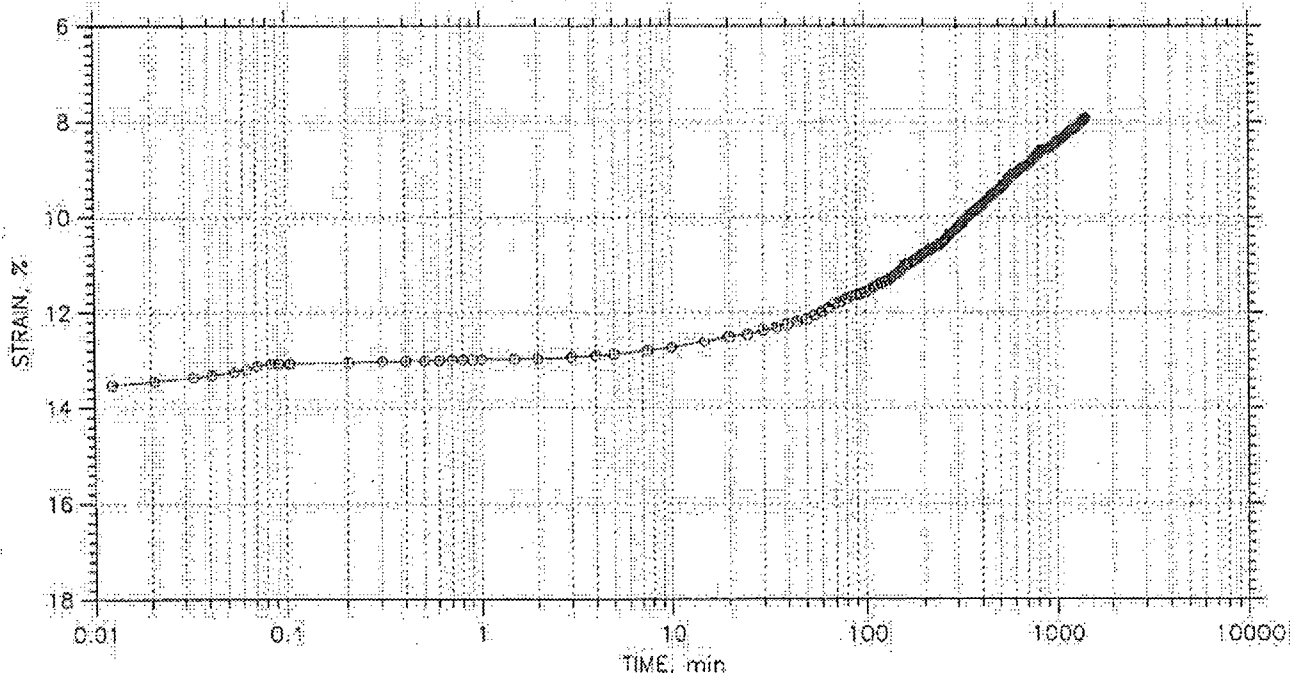
MACTEC	Project: STP Units 3 & 4	Location: D3-1A UD-1	Project No.: 6234084660
	Boring No.: D3-1A	Tested By: JW	Checked By: HJ
	Sample No.: UD-1	Test Date: 9/17/08	Depth: 48-50 ft
	Test No.: 8961	Sample Type: Undisturbed	Elevation: -19.4/-21.4
	Description: Reddish Brown and Light Greenish Gray Fat Clay (CH)		Cr=0.005
	Remarks: ASTM D2435-04 Method B; SG (ASTM D854-06); PI (ASTM D4318-05)		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 15 of 16

Stress: 1000 psf



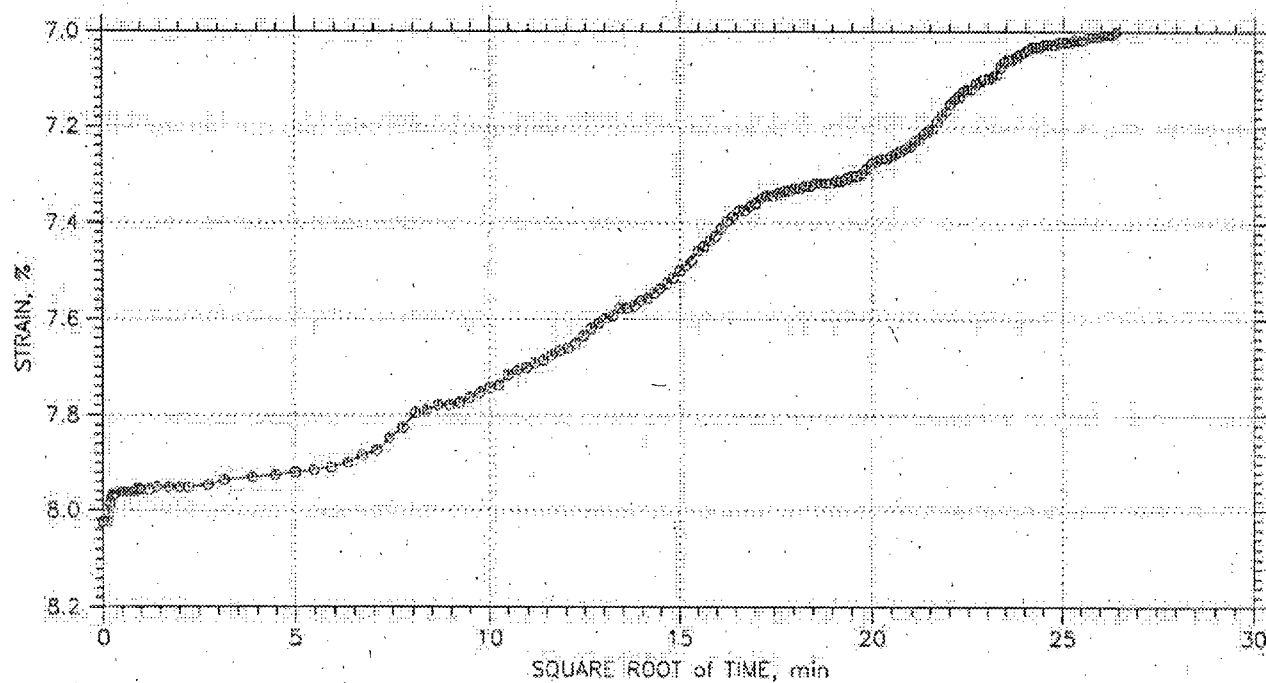
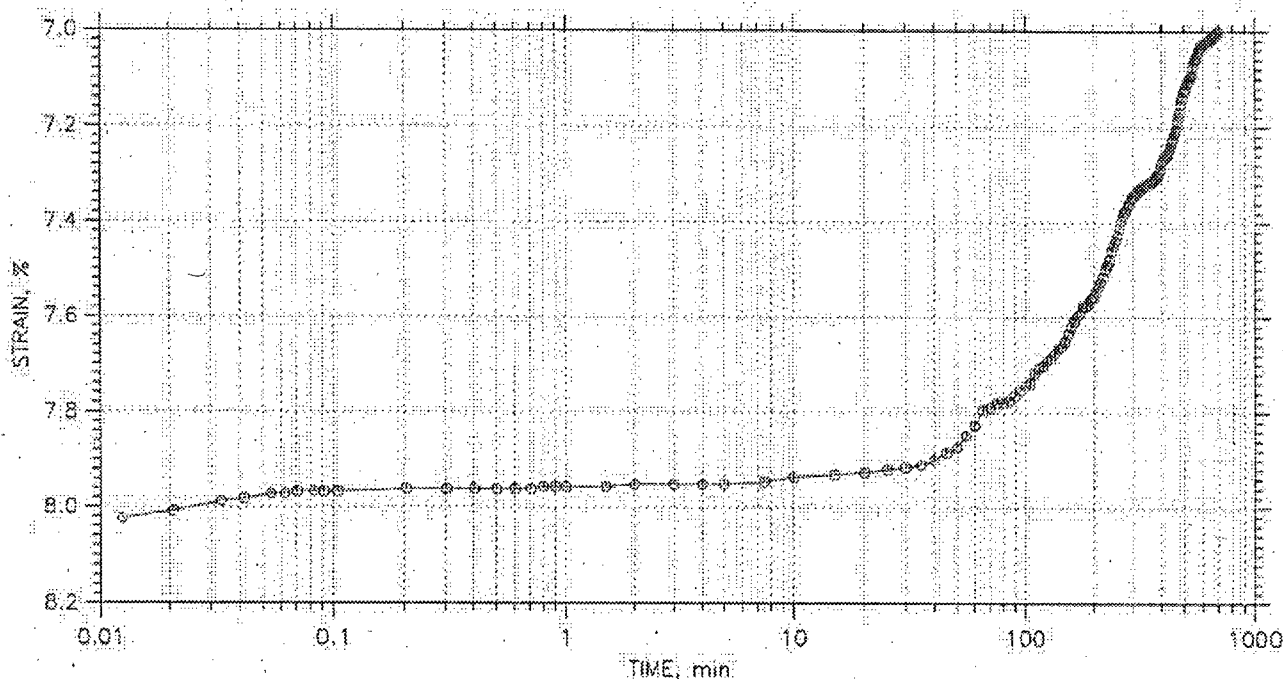
MACTEC	Project: STP Units 3 & 4	Location: D3-1A UD-1	Project No.: 6234084660
	Boring No.: D3-1A	Tested By: JW	Checked By: HJ
	Sample No.: UD-1	Test Date: 9/17/08	Depth: 48-50 ft
	Test No.: 8961	Sample Type: Undisturbed	Elevation: -19.4/-21.4
	Description: Reddish Brown and Light Greenish Gray Fat Clay (CH)		Cr=0.008
	Remarks: ASTM D2435-04 Method B, SG (ASTM D854-06), PI (ASTM D4318-05), Task 1.2		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 16 of 16

Stress: 500. psf



MACTEC	Project: STP Units 3 & 4	Location: D3-1A UD-1	Project No.: 6234084660
	Boring No.: D3-1A	Tested By: JW	Checked By: HJ
	Sample No.: UD-1	Test Date: 9/17/08	Depth: 48-50 ft
	Test No.: 8961	Sample Type: Undisturbed	Elevation: -19.4/-21.4
	Description: Reddish Brown and Light Greenish Gray Fat Clay (CH)		Cr=0.008
	Remarks: ASTM D2435-04 Method B; SG (ASTM D854-06), PI (ASTM D4318-05)		