

PERIODIC SAFETY FACTOR ASSESSMENT
391-3-4-.10(4) and 40 C.F.R. PART 257.73
PLANT YATES ASH POND B' (AP-B')
GEORGIA POWER COMPANY

The Federal CCR Rule, and, for Existing Surface Impoundments where applicable, the Georgia CCR Rule (391-3-4-.10) require the owner or operator of a CCR surface impoundment to conduct initial and periodic safety factor assessments. See 40 C.F.R. § 257.73(e); Ga. Comp. R. & Regs. r. 391.3-4-.10(4)(b)¹. The owner or operator must conduct an assessment of the CCR unit and document that the minimum safety factors outlined in § 257.73(e)(1)(i) through (iv) for the critical embankment section are achieved. In addition, the Rules require a subsequent assessment be performed within 5 years of the previous assessment. See 40 C.F.R. § 257.73(f)(3); Ga. Comp. R. & Regs. r. 391.3-4-.10(4)(b)¹.

The CCR surface impoundment known as Plant Yates AP-B' is located on Plant Yates property, northwest of Newnan, Georgia. AP-B' is formed by an engineered cross-valley embankment. The critical section of AP-B' was previously determined to be at the midpoint of the cross-valley embankment. Under current conditions, the critical section remains at the midpoint of the embankment. The Notification of Intent to Initiate Closure was placed in the Operating Record on 04/20/2018 and closure has been designed to have no negative impacts on the stability of the embankment. Closure construction is underway, and the unit no longer has the ability to impound water. Therefore, a surcharge pool loading condition was not applicable for the factor of safety assessment.

The analyses used to determine the minimum safety factor for the critical section resulted in the following minimum safety factors:

Loading Condition	Minimum Calculated Safety Factor	Minimum Required Safety Factor
Long-term Maximum Storage Pool (Static)	2.7	1.5
Seismic	2.3	1.0

The embankment of AP-B' is constructed of compacted clayey sands that are not susceptible to liquefaction. Therefore, a minimum liquefaction safety factor determination was not required. This assessment is supported by appropriate engineering calculations which are attached.

^[1] In a typographical error, 391.3-4.10(4)(b) references the "structural integrity criteria in 40 CFR 247.73," when the reference to such criteria should be 40 CFR 257.73.

I hereby certify that the safety factor assessment was conducted in accordance with 40 C.F.R. § 257.73 (e)(1).



JAMES C. PEGUES, JR.
James C. Pegues, P.E.
Licensed State of Georgia, PE No. 17419

1/15/2021



Technical and Project Solutions Calculation

Calculation Number:
TV-YT-GPC1142841-003

Project/Plant: Plant Yates	Unit(s): 6-7	Discipline/Area: Env. Solutions
Title/Subject: Periodic Factor of Safety Assessment for CCR Rule		
Purpose/Objective: Determine the Factor of Safety of the Ash Pond B' Dam		
System or Equipment Tag Numbers: n/a	Originator: Jacob A. Jordan, P.E.	

Contents

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Total # of pages including cover sheet & attachments:	69		

Revision Record

Rev. No.	Description	Originator Initial / Date	Reviewer Initial / Date	Approver Initial / Date
0	Issued for Information	JAJ/06-18-21	JCP/06-18-21	JCP/06-18-21

Notes:

Purpose of Calculation

The Eugene A. Yates Power Plant (Plant Yates) was once a seven-unit, coal fired, power generation facility. Units 1-5 have been demolished and Units 6 and 7 have been converted to natural gas. AP-B' was designed to receive and store coal combustion residuals produced during the electric power generating process at Plant Yates. In 1977, the southern portion of AP-B' began to be used as an ash dewatering facility for coal combustion residuals dredged from Ash Pond 2. In 2015, B' ceased operation as a dewatering facility and ash was removed for placement in the dry ash landfill. No ash has been removed since October 2015, and the pond is dormant.

The purpose of this calculation is to provide an updated slope stability factor of safety assessment of the Plant Yates Ash Pond B' dam under conditions prescribed by the EPA CCR rule.

Summary of Conclusions

The following table summarizes the factors of safety resulting from the slope stability analyses. The results indicate the safety factors of the Ash Pond B' dam meet or exceed the minimum criteria set forth in the structural integrity criteria for existing CCR surface impoundments, 40 CFR 257.73.

Factor of Safety Summary Table

Loading Condition	Minimum Calculated Safety Factor	Minimum Required Safety Factor
Maximum Storage Pool (Static)	2.7	1.4
Seismic	2.3	1.0

Methodology

The calculation was performed using the following methods and software:

- GeoStudio 2021 R2 version 11.1.1.22085 Copyright 1991-2021, GEO-SLOPE International, Ltd.
- Strata (Version 0.8.0), University of Texas, Austin
- Morgenstern-Price analytical method

Criteria and Assumptions

The slope stability models were run using the following assumptions and design criteria:

- Seismic site response was determined using a one-dimensional equivalent linear site response analysis. The analysis was performed using Strata and utilizing random vibration theory. The input motion consisted of the USGS published 2014 Uniform Hazard Response Spectrum (UHRS) for Site Class B/C at a 2% Probability of Exceedance in 50 years. The UHRS was converted to a Fourier Amplitude Spectrum, and propagated through a

representative one-dimensional soil column using linear wave propagation with strain-dependent dynamic soil properties. The input soil properties and layer thickness were randomized based on defined statistical distributions to perform Monte Carlo simulations for 100 realizations, which were used to generate a median estimate of the surface ground motions.

- The median surface ground motions were then used to calculate a pseudostatic seismic coefficient for utilization in the stability analysis using the approach suggested by Bray and Tavasrou (2009). The procedure calculates the seismic coefficient for an allowable seismic displacement and a probability exceedance of the displacement. For this analysis, an allowable displacement of 0.5 ft, and a probability of exceedance of 16% were conservatively selected, providing a seismic coefficient of 0.043g for use as a horizontal acceleration in the stability analysis.
- The current required minimum criteria (factors of safety) were taken from the Structural Integrity Criteria for existing CCR surface impoundment from 40 CFR 257.73, published April 17, 2015.
- During March 2010, two borings were performed at the top of the dike, and one was performed at the downstream bench.
- The soil properties used for the analysis (unit weight, phi angle, and cohesion) were obtained from triaxial shear testing performed on undisturbed Shelby tube samples of the dam fill and foundation soils obtained during drilling. Soil testing was performed according to applicable ASTM standards.
- The ash properties used for the analysis (unit weight, phi angle, and cohesion) were based on laboratory testing performed on undisturbed and remolded samples of ash from various plants and on engineering judgment.
- Piezometer readings were used to obtain water elevations within the dike and the foundation soils.
- The ash pond is no longer designed to impound stormwater. Therefore, the maximum surcharge condition was not evaluated for this analysis.
 - 1) The critical section was selected at location having the apparent maximum dam height. The cross-section of the Ash Pond B' dam was modeled using a 2010 level profile survey extending from the pond surface on the upstream face of the dam to the river surface on the downstream face of the dam performed by Southern Company Services (SCS).

Input Data

Ash Pond AP-B'

- **Soil Properties:** Three consolidated, undrained triaxial tests were performed on Shelby tube samples recovered from borings performed at Ash Pond B' to provide total and effective shear strength values of embankment and foundation soils. Soil classification testing, and unit weight and moisture content determination were also performed on the samples. The results of the laboratory analyses are included in attachments to this calculation. A compacted ash sample obtained from the B' dike for triaxial testing was judged too disturbed to provide accurate test results. Ash properties were instead based on laboratory

testing performed on remolded samples of ash from various plants and on past experience. The following effective stress values were used in the analyses.

Soil Description	Unit Weight, pcf	Effective Stress Parameters	
		Cohesion, psf	Phi Angle, degrees
Compacted Ash	105	0	28
Clayey Sand Fill	125	115	33
Residuum	127	72	35
Ash	98	0	28

- Phreatic Surface: Piezometers were installed at the following locations:
 - Dike Crest – Two piezometers were installed in the borings performed at the top of the dike.
 - Lower Bench – One piezometer was installed at the lower downstream bench in foundation soils.

Loading Conditions

The Plant Yates Ash Pond B' Dike was evaluated for the maximum storage and seismic loading conditions.

Design Inputs/References

- SCS Calculation TV-YT-GPC603884-003
- Idriss and Boulanger, *Semi-empirical procedures for evaluating liquefaction potential during earthquakes*, 2004
- Youd and Idriss, *Liquefaction Resistance of Soils: Summary report from the 1996 NCEER and 1998 NCEER/NSF Workshops on evaluation of liquefaction resistance of soils*, 2001
- Bray, J. D. and Travasarou, T., *Pseudostatic Coefficient for Use in Simplified Seismic Slope Stability Evaluation*, Journal of Geotechnical and Environmental Engineering, American Society of Civil Engineers, September 2009
- Atlanta Testing & Engineering Report, *Subsurface Exploration Modifications to B' Dike and Pond*, April 19, 1977
- SCS Drawing ES1836S1A - Pond and Cross-section Layouts
- SCS Drawing ES1836S1B – Plant Yates Ash Pond Dike Cross-Sections
- SCS ES1836S2 Piezometer and Boring Layout
- SCS 2010 Boring and Piezometer Logs
- 2010 Laboratory Analyses

Body of Calculation

Slope/W analysis attached.

**PLANT YATES
ASH POND B'**

Maximum Storage

- Materials**
- Ash
 - Bedrock
 - Clayey Sand Fill
 - Compacted Ash
 - Residuum

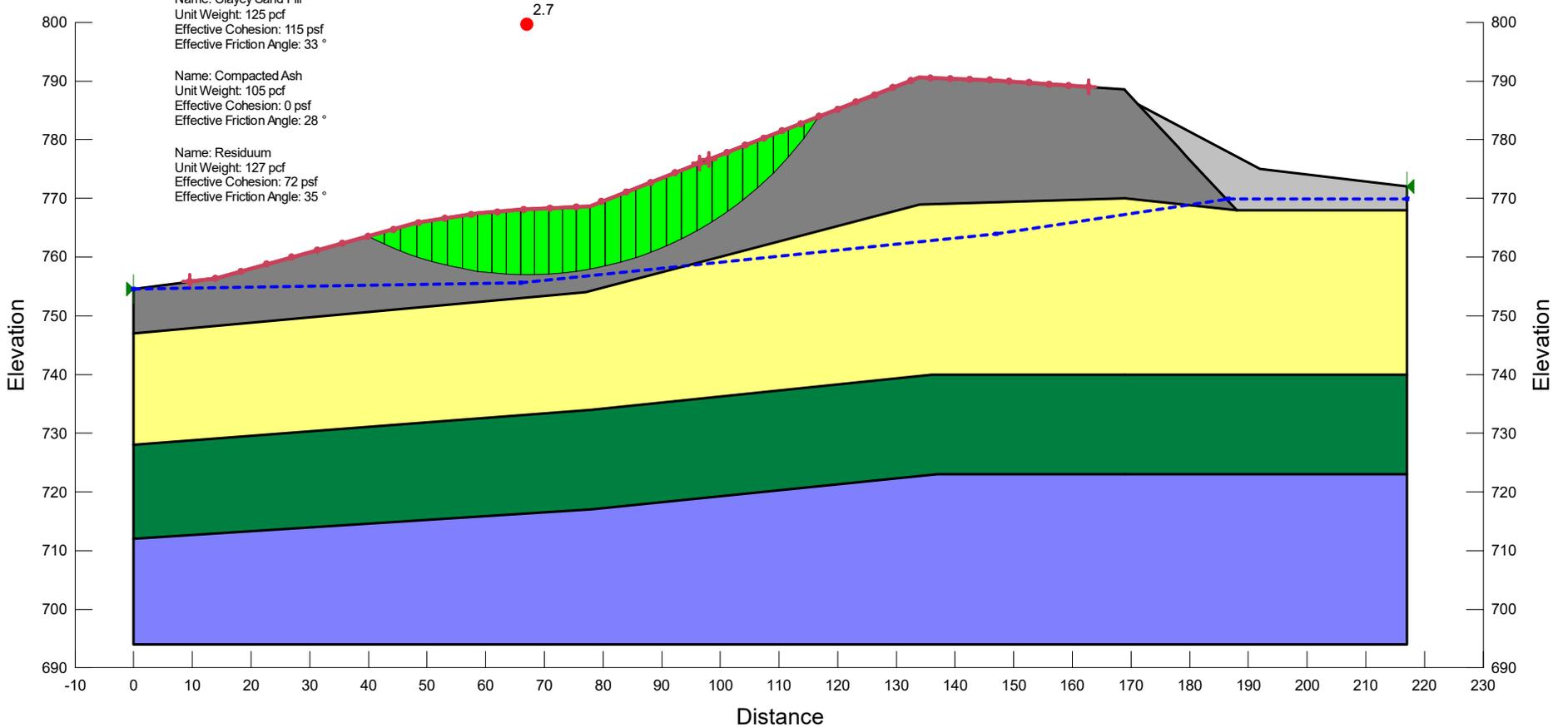
Name: Ash
 Unit Weight: 98 pcf
 Effective Cohesion: 0 psf
 Effective Friction Angle: 28 °

Name: Bedrock

Name: Clayey Sand Fill
 Unit Weight: 125 pcf
 Effective Cohesion: 115 psf
 Effective Friction Angle: 33 °

Name: Compacted Ash
 Unit Weight: 105 pcf
 Effective Cohesion: 0 psf
 Effective Friction Angle: 28 °

Name: Residuum
 Unit Weight: 127 pcf
 Effective Cohesion: 72 psf
 Effective Friction Angle: 35 °



PLANT YATES ASH POND B'

Seismic
Horizontal Coefficient: 0.043g

- Materials
- Ash
 - Bedrock
 - Clayey Sand Fill
 - Compacted Ash
 - Residuum

Name: Ash
Unit Weight: 98 pcf
Effective Cohesion: 0 psf
Effective Friction Angle: 28 °

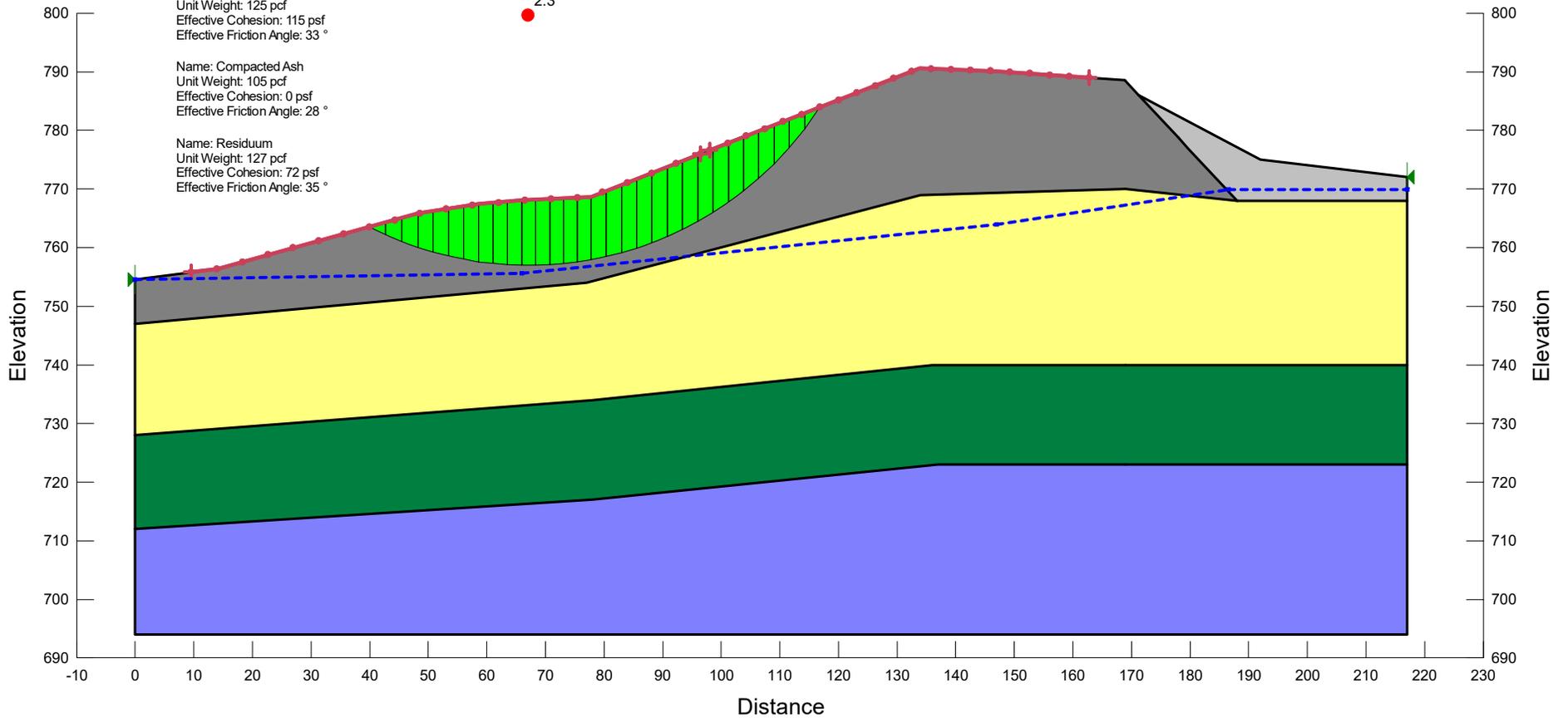
Name: Bedrock

Name: Clayey Sand Fill
Unit Weight: 125 pcf
Effective Cohesion: 115 psf
Effective Friction Angle: 33 °

Name: Compacted Ash
Unit Weight: 105 pcf
Effective Cohesion: 0 psf
Effective Friction Angle: 28 °

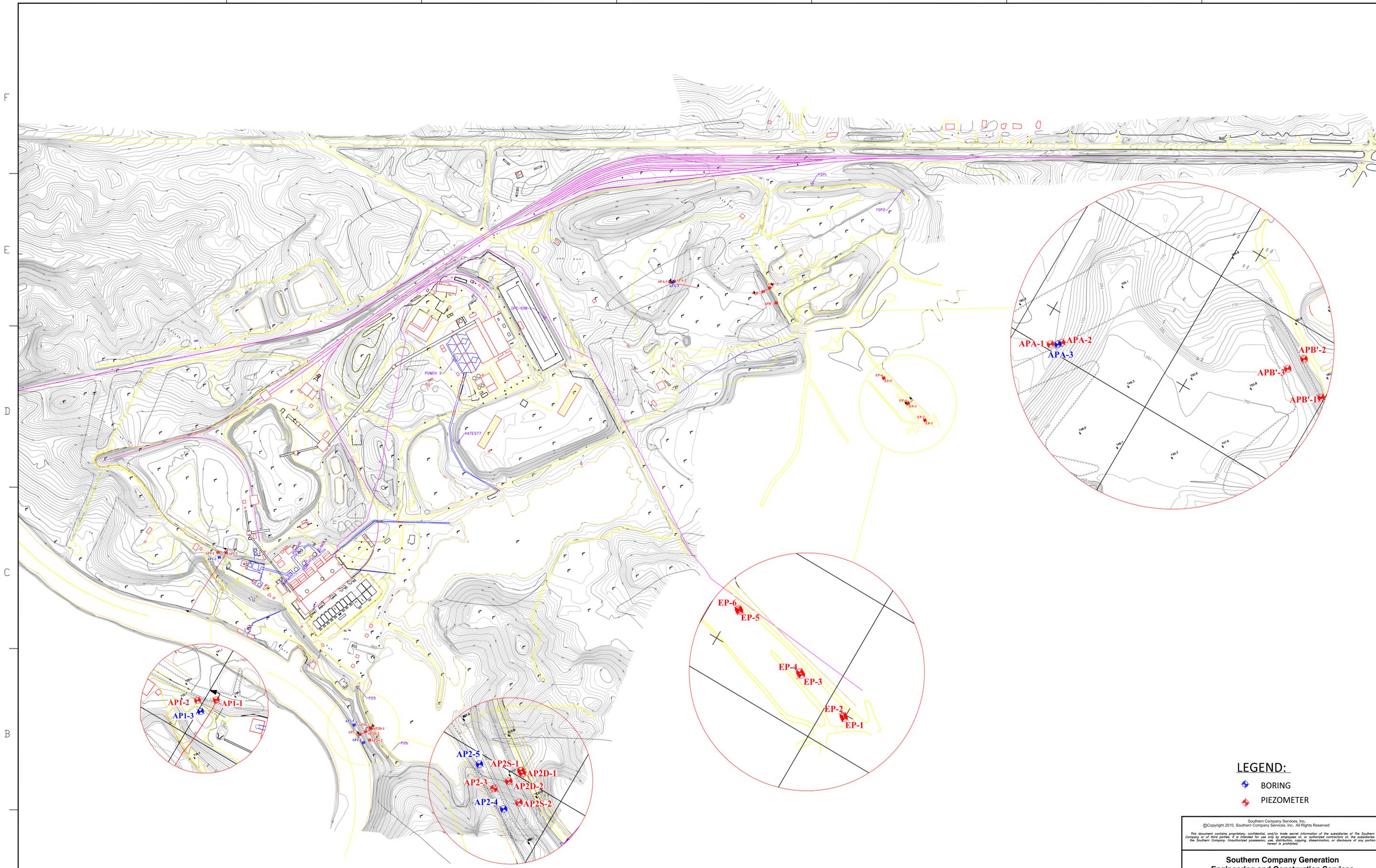
Name: Residuum
Unit Weight: 127 pcf
Effective Cohesion: 72 psf
Effective Friction Angle: 35 °

2.3



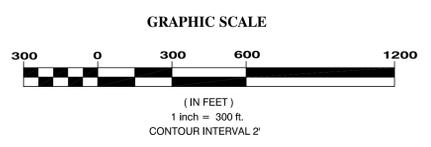
Attachment A

Boring Location Plan



LEGEND:

- ⊕ BORING
- ⊕ PIEZOMETER



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Southern Company Generation Engineering and Construction Services FOR				
Georgia Power Company				
PLANT YATES PIEZOMETER & BORING LOCATIONS				
SCALE	PROJ. I.D.	DRAWING NUMBER	SHEET	CENT'D
AS SHOWN		ES1836S2	2	FINAL

ANSI F: 48x28 Acad2004

Attachment B
Boring and Piezometer Logs



LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Yates Ash Pond Dikes
LOCATION Plant Yates

DATE STARTED 3/16/2010 COMPLETED 3/16/2010 SURF. ELEV. 789.2 COORDINATES: N 1,258,084.49 E 2,075,198.96

CONTRACTOR SCS Field Services EQUIPMENT CME 55 METHOD Hollow Stem Auger

DRILLED BY T. Milam LOGGED BY R. Mudd CHECKED BY _____ ANGLE _____ BEARING _____

BORING DEPTH 66 ft. GROUND WATER DEPTH: DURING _____ COMP. _____ DELAYED 32.7 ft. after 48 hrs.

NOTES Top of Ash Pond B' Dike, South Side Well installed. Refer to well data sheet.

GEOTECH ENGINEERING LOGS - ESEE DATABASE.GDT - 5/4/10 14:57 - T:\ESEE MAJOR PROJECTS\PROJECTS\YATES\YATES 2010\EPA ASH POND INSPECTIONS\BORING INFORMATION\YATES ASH POND DIKES.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
5		ML - gray, moist, soft, low plasticity, ASH		SS -1	4.5-6.0	WH-1-1 (2)		(MC = 27.9%; PL=NP; FC = 77.8%; Gravel = 0.2%)
10				SS -2	9.5-11.0	2-2-1 (3)		
15				SS -3	14.5-16.0	2-1-1 (2)		
20				SS -4	19.5-21.0	2-3-3 (6)		
25		SM - red and medium and dark gray, moist, low plasticity, fine to medium grain, probable fill material	769.7					(MC = 17.6%; LL = 46; PI=17; FC = 42.8%; Gravel = 2.4%)
							100	



LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Yates Ash Pond Dikes

LOCATION Plant Yates

GEOTECH ENGINEERING LOGS - ESEE DATABASE.GDT - 5/4/10 14:57 - T:\ESEE MAJOR PROJECTS\PROJECTS\YATES\YATES 2010\IEPA ASH POND INSPECTIONS\BORING INFORMATION\YATES ASH POND DIKES.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		SM - red and medium and dark gray, moist, low plasticity, fine to medium grain, probable fill material (<i>Con't</i>)		UD -1	24.5- 26.5		100	(MC = 20.9%; FC = 41%)
30				SS -5	29.5- 31.0	3-3-3 (6)		
35				SS -6	34.5- 36.0	3-4-8 (12)		
40				SS -7	39.5- 41.0	4-4-4 (8)		
45				SS -8	44.5- 46.0	2-4-4 (8)		
50		SM - light orange and gray presenting in layers, moist, medium dense, fine to medium grain, residuum	739.7	SS -9	49.5- 51.0	4-5-9 (14)		Beginning of residuum material. (MC = 54.7%; FC = 32.4%; Gravel = 0.9%)
55		SM - light gray and medium orange and white.						Possible water table.

(Continued Next Page)



LOG OF TEST BORING

BORING APB'-2
PAGE 1 OF 2

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Yates Ash Pond Dikes
LOCATION Plant Yates

DATE STARTED 3/16/2010 COMPLETED 3/16/2010 SURF. ELEV. 789.0 COORDINATES: N 1,258,197.60 E 2,075,279.61

CONTRACTOR SCS Field Services EQUIPMENT CME 55 METHOD Hollow Stem Auger

DRILLED BY T. Milam LOGGED BY R. Mudd CHECKED BY _____ ANGLE _____ BEARING _____

BORING DEPTH 46 ft. GROUND WATER DEPTH: DURING _____ COMP. _____ DELAYED 25.1 ft. after 48 hrs.

NOTES Top of Ash Pond B', North Side Well installed. Refer to well data sheet.

GEOTECH ENGINEERING LOGS - ESEE DATABASE.GDT - 5/4/10 14:57 - T:\ESEE MAJOR PROJECTS\PROJECTS\YATES\YATES 2010\IEPA ASH POND INSPECTIONS\BORING INFORMATION\YATES ASH POND DIKES.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS	
5		ML - dark gray, moist, no plasticity, fill, ASH		SS -1	4.5-6.0	3-2-2 (4)		(MC = 20.6%; PL=NP; FC = 56.2%; Gravel = 4.8%)	
10				UD -1	7.5-9.5		100	(MC = 25.7%; PL=NP; FC = 56.4%; Gravel = 3.9%)	
				SS -2	9.5-11.0	2-1-1 (2)			
15				UD -2	12.5-14.5		100		
		SC - orange and yellow and tan, moist, fine to medium grain, fill	774.0	SS -3	14.5-16.0	1-1-3 (4)			
20				SS -4	19.5-21.0	1-3-3 (6)			
				UD -3	22.5-24.5		100		
25		SC - gray with some tan and mottled black							

(Continued Next Page)



LOG OF TEST BORING

BORING APB'-3
PAGE 1 OF 2

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Yates Ash Pond Dikes
LOCATION Plant Yates

DATE STARTED 3/16/2010 COMPLETED 3/17/2010 SURF. ELEV. 768.6 COORDINATES: N 1,258,228.40 E 2,075,224.62

CONTRACTOR SCS Field Services EQUIPMENT CME 55 METHOD Hollow Stem Auger

DRILLED BY T. Milam LOGGED BY R. Mudd CHECKED BY _____ ANGLE _____ BEARING _____

BORING DEPTH 51 ft. GROUND WATER DEPTH: DURING _____ COMP. _____ DELAYED 13.2 ft. after 24 hrs.

NOTES Toe of Ash Pond B' Well installed. Refer to well data sheet.

GEO TECH ENGINEERING LOGS - ESEE DATABASE.GDT - 5/4/10 14:57 - T:\ESEE MAJOR PROJECTS\PROJECTS\YATES\YATES 2010\IEPA ASH POND INSPECTIONS\BORING INFORMATION\YATES ASH POND DIKES.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
5		ML - dark gray, moist, no plasticity, ASH		SS -1	4.5-6.0	1-1-2 (3)		
10		ML - very wet, very soft, ASH		SS -2	9.5-11.0	WH-WH-WH (0)		(MC = 35.1%; PL=NP; FC = 89%; Gravel = 0.2%)
15		SC - red, orange and gray, wet, medium grain, Probable fill	754.1	SS -3	14.5-16.0	2-2-2 (4)		(MC = 24.1%; LL = 54; PI=23; FC = 34.8%; Gravel = 0.4%)
20		SC - tan, red and gray, very wet, loose, medium to fine grain, Possible residuum, layers of CH in sample		UD -1	17.5-19.5		100	
				SS -4	19.5-21.0	WH-2-2 (4)		
25		SC - red, yellow, and orange mottled, moist,						

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LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Yates Ash Pond Dikes

LOCATION Plant Yates

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
30		medium dense, fine grain, very high clay content, plastic fines SC - red, orange and gray, wet, medium grain, Probable fill (<i>Con't</i>)		SS-5	24.5-26.0	1-4-5 (9)		(MC = 20.3%; LL = 45; PI=24; FC = 39.7%; Gravel = 6.2%)
		SC - gray, wet, loose, medium to high plasticity, fine to medium grain, high clay content, fines have medium to high plasticity		SS-6	29.5-31.0	1-2-4 (6)		
35		SP - light tan and white with dark brown veins, moist, medium dense, fine to medium grain, parent rock structure evident	734.1	SS-7	34.5-36.0	8-9-5 (14)		(MC = 29.3%; FC = 27.2%)
40		SP - predominately white with dark brown veins		SS-8	39.5-41.0	3-6-8 (14)		
45		SP - dense, one orange-red clayey sand seam running vertically through sample		SS-9	44.5-46.0	7-16-14 (30)		
50		SP - tan and medium brown, very dense	717.6	SS-10	49.5-51.0	8-18-27 (45)		Boring Terminated.
		Bottom of borehole at 51.0 feet.						
55								

GEOTECH ENGINEERING LOGS - ESEE DATABASE.GDT - 5/4/10 14:57 - T:\ESEE MAJOR PROJECTS\PROJECTS\YATES\YATES 2010\IEPA ASH POND INSPECTIONS\BORING INFORMATION\YATES ASH POND DIKES.GPJ



LOG OF TEST BORING AND WELL

BORING APB'-1
PAGE 1 OF 3

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Yates Ash Pond Dikes
LOCATION Plant Yates

DATE STARTED 3/16/2010 COMPLETED 3/16/2010 SURF. ELEV. 789.2 COORDINATES: N 1,258,084.49 E 2,075,198.96

CONTRACTOR SCS Field Services EQUIPMENT CME 55 METHOD Hollow Stem Auger

DRILLED BY T. Milam LOGGED BY R. Mudd CHECKED BY _____ ANGLE _____ BEARING _____

BORING DEPTH 66 ft. GROUND WATER DEPTH: DURING _____ COMP. _____ DELAYED 32.7 ft. after 48 hrs.

NOTES Top of Ash Pond B' Dike, South Side Well installed. Refer to well data sheet.

GEOTECH WITH WELL LOG - ESEE DATABASE.GDT - 5/4/10 16:28 - T:\ESEE MAJOR PROJECTS\PROJECTS\YATES\2010\EPA ASH POND INSPECTIONS\BORING INFORMATION\YATES ASH POND DIKES.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	GROUNDWATER OBSERVATIONS	WELL DATA
5		ML - gray, moist, soft, low plasticity, ASH			-Riser only, no protector -Single piezometer -Top of Casing Elev.=792.74
10					
15					
20		SM - red and medium and dark gray, moist, low plasticity, fine to medium grain, probable fill material			
25					← Bentonite chips

(Continued Next Page)



LOG OF TEST BORING AND WELL

BORING APB'-1
PAGE 2 OF 3

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Yates Ash Pond Dikes
LOCATION Plant Yates

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	GROUNDWATER OBSERVATIONS	WELL DATA
					-Riser only, no protector -Single piezometer -Top of Casing Elev.=792.74 (CONTINUED)
30		SM - red and medium and dark gray, moist, low plasticity, fine to medium grain, probable fill material (<i>Con't</i>)		3/18/2010 ●	
35					
40					
45					
50		SM - light orange and gray presenting in layers, moist, medium dense, fine to medium grain, residuum			
55		SM - light gray and medium orange and white, wet, dense, fine grain,			

GEOTECH WITH WELL LOG - ESEE DATABASE.GDT - 5/4/10 16:28 - T:\ESEE MAJOR PROJECTS\PROJECTS\YATES\2010\EPA ASH POND INSPECTIONS\BORING INFORMATION\YATES ASH POND DIKES.GPJ

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LOG OF TEST BORING AND WELL

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Yates Ash Pond Dikes

LOCATION Plant Yates

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	GROUNDWATER OBSERVATIONS	WELL DATA
					-Riser only, no protector -Single piezometer -Top of Casing Elev.=792.74 (CONTINUED)
60		weathered in place parent rock structure evident, white section less weathered than rest of sample, several medium angular pebbles in sample, especially in white portion, probable water table SM - light orange and gray presenting in layers, moist, medium dense, fine to medium grain, residuum (<i>Cont</i>) SM - very dense, very fine grain, no pebbles, predominantly gray and dark tan, with some white			Silica sand filter 2" ID PVC Screen (SCH 40)
65		SM - light orange and white, moist, very dense, very fine grain, parent rock structure evident			
Bottom of borehole at 66.0 feet.					
70					
75					
80					
85					

GEOTECH WITH WELL LOG - ESEE DATABASE.GDT - 5/4/10 16:28 - T:\ESEE MAJOR PROJECTS\PROJECTS\BORING INFORMATION\YATES ASH POND DIKES.GPJ



LOG OF TEST BORING AND WELL

BORING APB'-2
PAGE 1 OF 2

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Yates Ash Pond Dikes
LOCATION Plant Yates

DATE STARTED 3/16/2010 COMPLETED 3/16/2010 SURF. ELEV. 789.0 COORDINATES: N 1,258,197.60 E 2,075,279.61

CONTRACTOR SCS Field Services EQUIPMENT CME 55 METHOD Hollow Stem Auger

DRILLED BY T. Milam LOGGED BY R. Mudd CHECKED BY _____ ANGLE _____ BEARING _____

BORING DEPTH 46 ft. GROUND WATER DEPTH: DURING _____ COMP. _____ DELAYED 25.1 ft. after 48 hrs.

NOTES Top of Ash Pond B', North Side Well installed. Refer to well data sheet.

GEOTECH WITH WELL LOG - ESEE DATABASE.GDT - 5/4/10 16:28 - T:\ESEE MAJOR PROJECTS\PROJECTS\YATES\YATES 2010\IEPA ASH POND INSPECTIONS\BORING INFORMATION\YATES ASH POND DIKES.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	GROUNDWATER OBSERVATIONS	WELL DATA
..... 5 10 15 20 25		<p>ML - dark gray, moist, no plasticity, <i>fill</i>, ASH</p> <hr style="border-top: 1px dashed black;"/> <p>SC - orange and yellow and tan, moist, fine to medium grain, <i>fill</i></p> <p>SC - light tan, gray and red, <i>fill</i>, isolated layers of sandy CLAY (CL) that is stiff</p> <p>SC - gray with some tan and mottled black throughout, moist, fine</p>			<p>-Riser only, no protector -Single piezometer -Top of Casing Elev.=793.21</p> <p>← Bentonite chips ← 2" ID PVC Riser (SCH 40)</p>

(Continued Next Page)



LOG OF TEST BORING AND WELL

BORING APB'-2
PAGE 2 OF 2

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Yates Ash Pond Dikes
LOCATION Plant Yates

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	GROUNDWATER OBSERVATIONS	WELL DATA
		grain, <i>fill</i> , less clay, isolated layers of (SP-SC) SC - orange and yellow and tan, moist, fine to medium grain, <i>fill</i> (Cont')		3/16/2010	-Riser only, no protector -Single piezometer -Top of Casing Elev.=793.21 (CONTINUED)
30		SC - orange and tannish gray, moist, fine to medium grain, <i>fill</i> , micaceous, very clayey			
35		SC - <i>fill</i> , slightly less clayey			
40					← 9 bags silica sand filter ← 2" ID PVC Screen (SCH 40)
45					
Bottom of borehole at 46.0 feet.					
50					
55					

GEOTECH WITH WELL LOG - ESEE DATABASE.GDT - 5/4/10 16:28 - T:\ESEE MAJOR PROJECTS\PROJECTS\YATES\2010\EPA ASH POND INSPECTIONS\BORING INFORMATION\YATES ASH POND DIKES.GPJ



LOG OF TEST BORING AND WELL

BORING APB'-3
PAGE 1 OF 2

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Yates Ash Pond Dikes
LOCATION Plant Yates

DATE STARTED 3/16/2010 COMPLETED 3/17/2010 SURF. ELEV. 768.6 COORDINATES: N 1,258,228.40 E 2,075,224.62

CONTRACTOR SCS Field Services EQUIPMENT CME 55 METHOD Hollow Stem Auger

DRILLED BY T. Milam LOGGED BY R. Mudd CHECKED BY _____ ANGLE _____ BEARING _____

BORING DEPTH 51 ft. GROUND WATER DEPTH: DURING _____ COMP. _____ DELAYED 13.2 ft. after 24 hrs.

NOTES Toe of Ash Pond B' Well installed. Refer to well data sheet.

GEOTECH WITH WELL LOG - ESEE DATABASE.GDT - 5/4/10 16:28 - T:\ESEE MAJOR PROJECTS\PROJECTS\YATES\YATES 2010\EPA ASH POND INSPECTIONS\BORING INFORMATION\YATES ASH POND DIKES.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	GROUNDWATER OBSERVATIONS	WELL DATA
5		ML - dark gray, moist, no plasticity, ASH			-Riser only, no protector -Single piezometer -Top of Casing Elev.=770.73
10		ML - very wet, very soft, ASH			
15	▼	SC - red, orange and gray, wet, medium grain, Probable fill		3/18/2010 ●	
20	▼	SC - tan, red and gray, very wet, loose, medium to fine grain, Possible residuum, layers of CH in sample			← Bentonite chips
25	▼	SC - red, yellow, and orange mottled, moist, medium dense, fine grain,			← 2" ID PVC Riser (SCH 40)

(Continued Next Page)



LOG OF TEST BORING AND WELL

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Yates Ash Pond Dikes
LOCATION Plant Yates

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	GROUNDWATER OBSERVATIONS	WELL DATA
					-Riser only, no protector -Single piezometer -Top of Casing Elev.=770.73 (CONTINUED)
30		very high clay content, plastic fines SC - red, orange and gray, wet, medium grain, Probable fill (<i>Con't</i>)			
35		SC - gray, wet, loose, medium to high plasticity, fine to medium grain, high clay content, fines have medium to high plasticity			
40		SP - light tan and white with dark brown veins, moist, medium dense, fine to medium grain, parent rock structure evident			
45		SP - predominately white with dark brown veins			← Silica sand filter
50		SP - dense, one orange-red clayey sand seam running vertically through sample			← 2" ID ABS Screen (SCH 40)
55		SP - tan and medium brown, very dense			
Bottom of borehole at 51.0 feet.					

GEOTECH WITH WELL LOG - ESEE DATABASE.GDT - 5/4/10 16:28 - T:\ESEE MAJOR PROJECTS\PROJECTS\YATES\2010\EPA ASH POND INSPECTIONS\BORING INFORMATION\YATES ASH POND DIKES.GPJ

Attachment C
Laboratory Analyses

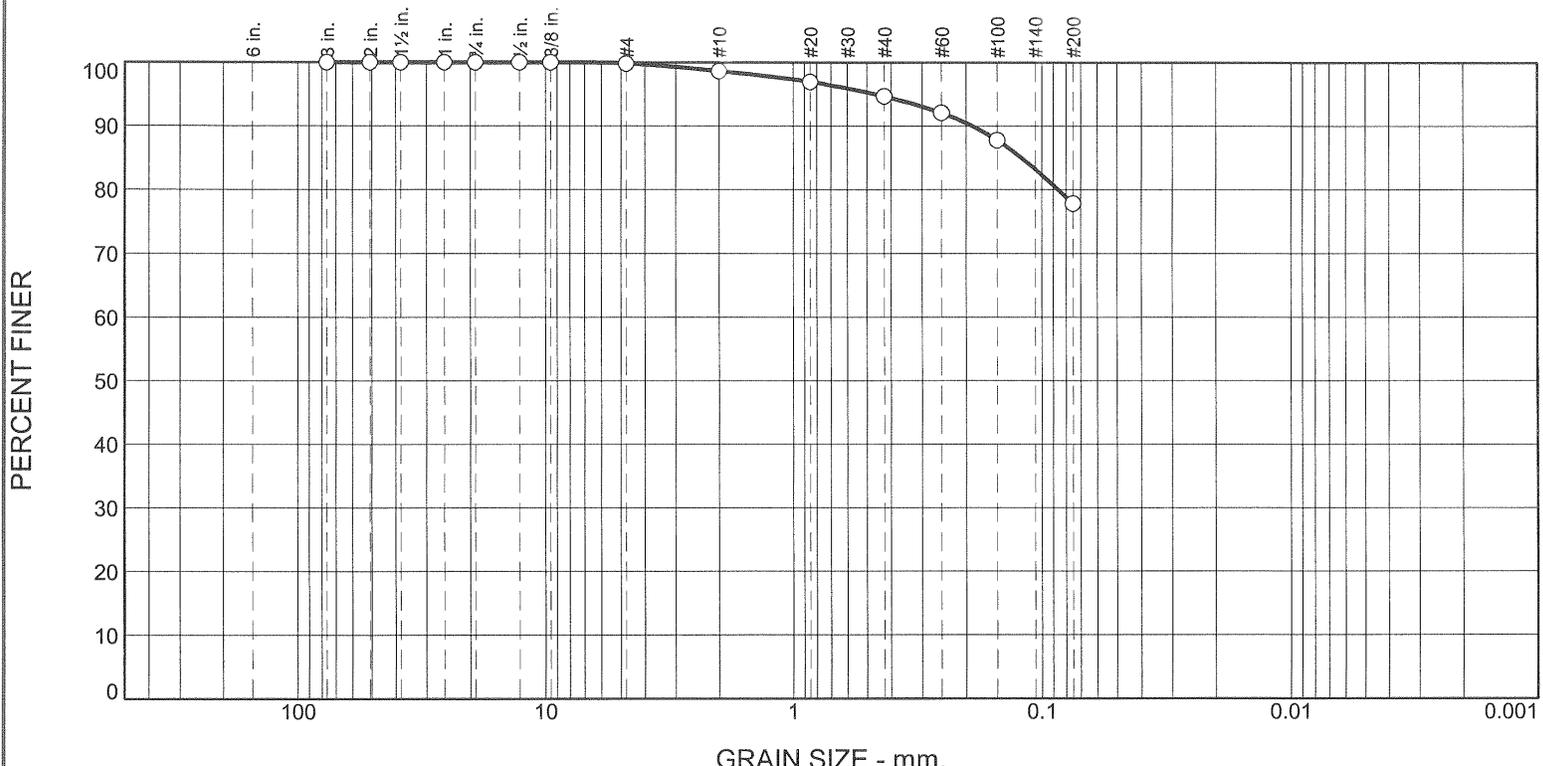
Project: Plant Yates Ash Pond
 Project Number: 6189-10-9008
 Date Performed: 4/2/2010
 Date Sampled:

Moisture Content Calculation: $(WetWt - DryWt) / (DryWt - can\ wt)$

Boring Number	APA-2	APA-2	APA-2	APA-2	APB-1	APB-1	APB-1	APB-1	APB-1	APB-1
Sample Number	4	5	6	8	2	4	5	8	9	11
Depth	19.5-21	24.5-26	29.5-31	39.5-41	9.5-11	19.5-21	29.5-31	44.5-46	49.5-51	59.5-61
Can Number										
Can Weight	55.6	54.57	55.68	54.94	50.18	54.38	54.75	52.08	54.86	54.72
Wet wt w/ Can	165.36	218.03	223.21	228.36	171.67	208.71	197.61	170.79	197.96	166.95
Dry wt. W/ Can	140.95	171.67	179.27	191.37	145.14	185.56	172.91	144.58	174.33	153.78
Percent Moisture	28.6%	39.6%	35.6%	27.1%	27.9%	17.6%	20.9%	28.3%	54.7%	13.3%

Boring Number	APB-2	APB-2	APB-2	APB-2	APB-3	APB-3	APB-3	APB-3		
Sample Number	1	2	6	8	2	3	6	8		
Depth	4.5-6	9.5-11	29.5-31	39.5-41	9.5-11	14.5-16	29.5-31	39.5-41		
Can Number										
Can Weight	50.78	49.08	51.91	50.67	56.07	54.6	57.02	52.67		
Wet wt w/ Can	158.56	168.62	168.74	166.87	114.61	192.13	201.87	145.59		
Dry wt. W/ Can	140.15	144.2	152.15	142.89	99.41	165.42	177.47	124.54		
Percent Moisture	20.6%	25.7%	16.6%	26.0%	35.1%	24.1%	20.3%	29.3%		

Grain Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	1.2	3.9	16.9	77.8	

Test Results (ASTM D 422 & ASTM D 1140)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
2"	100.0		
1.5"	100.0		
1"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
#4	99.8		
#10	98.6		
#20	96.9		
#40	94.7		
#60	92.0		
#100	87.8		
#200	77.8		

Material Description

Dark Gray Fly Ash

Atterberg Limits (ASTM D 4318)

PL= NP LL= NP PI= NP

Classification

USCS (D 2487)= ML AASHTO (M 145)= A-4(0)

Coefficients

D₉₀= 0.1887 D₈₅= 0.1204 D₆₀=

D₅₀= D₃₀= D₁₅=

D₁₀= C_u= C_c=

Remarks

Date Received: 4-2-10 Date Tested: 4-8-10

Tested By: MC

Checked By: _____

Title: _____

* (no specification provided)

Source of Sample: Boring No.: APB-1
 Sample Number: 2

Depth: 9.5'-11.0'

Date Sampled:

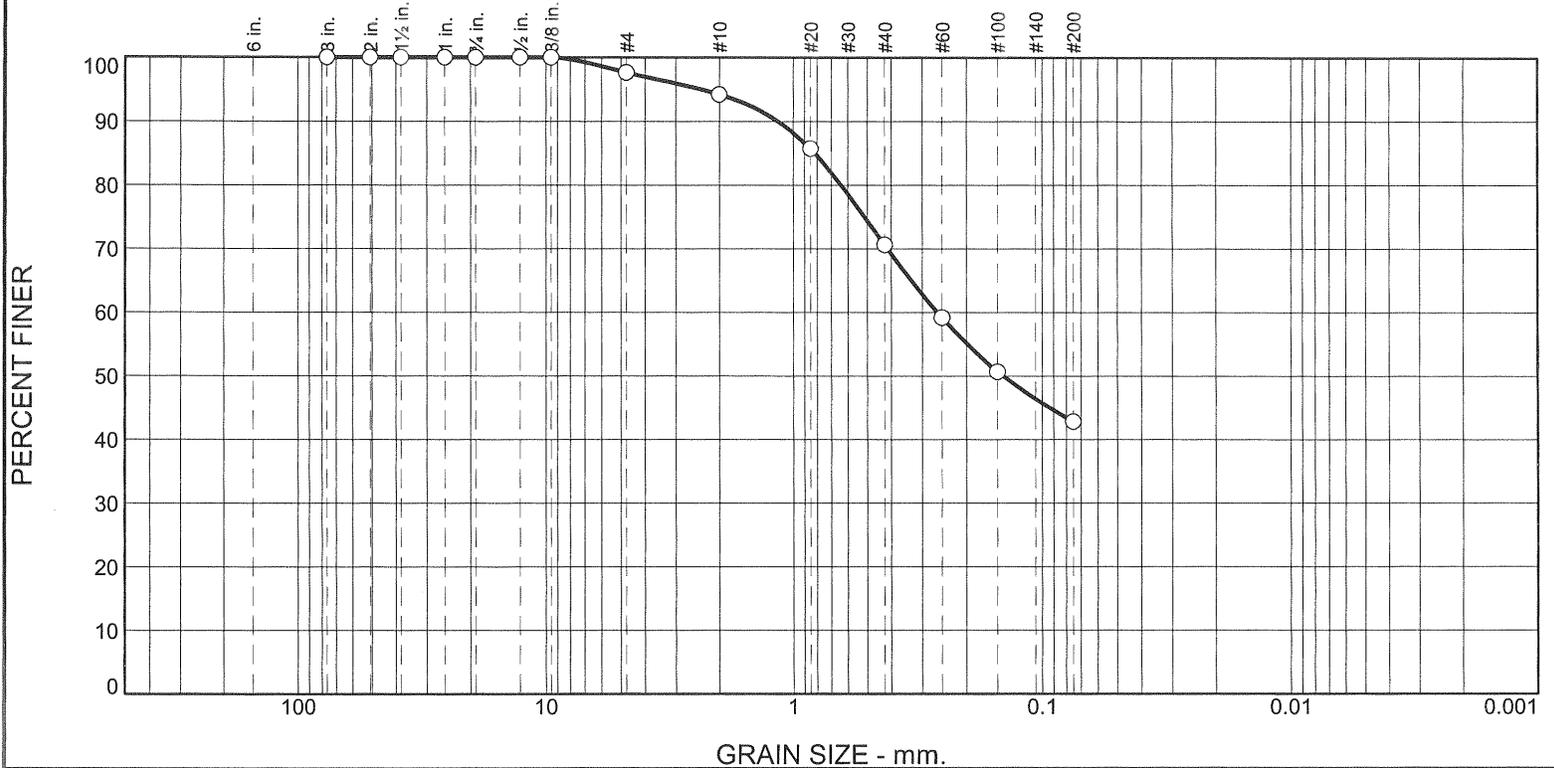
**MACTEC ENGINEERING.
 AND CONSULTING, INC.**

Client: Southern Company
 Project: Plant Yates Ash Pond

Project No: 6189109008

Jax FL.

Grain Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.4	3.4	23.6	27.8	42.8	

Test Results (ASTM D 422 & ASTM D 1140)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
2"	100.0		
1.5"	100.0		
1"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
#4	97.6		
#10	94.2		
#20	85.7		
#40	70.6		
#60	59.2		
#100	50.7		
#200	42.8		

Material Description

Light Reddish Brown Medium to Fine SAND with Silt

Atterberg Limits (ASTM D 4318)

PL= 29 LL= 46 PI= 17

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-7-6(4)

Coefficients

D₉₀= 1.1532 D₈₅= 0.8159 D₆₀= 0.2608
D₅₀= 0.1425 D₃₀= D₁₅=
D₁₀= C_u= C_c=

Remarks

Date Received: 4-2-10 Date Tested: 4-8-10

Tested By: MC _____

Checked By: _____

Title: _____

* (no specification provided)

Source of Sample: Boring No.: APB-1
Sample Number: 4

Depth: 19.5'-21.0'

Date Sampled:

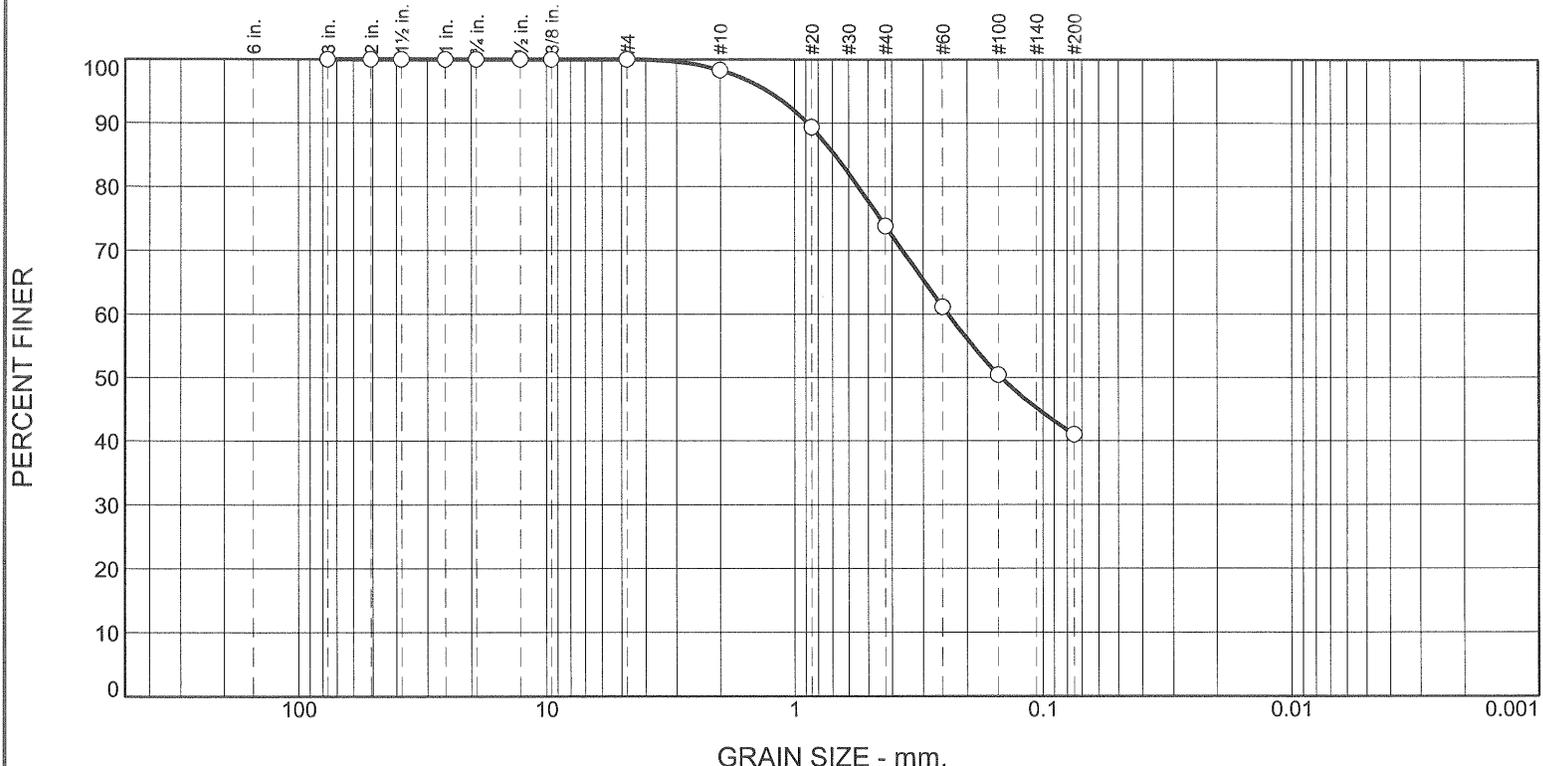
**MACTEC ENGINEERING.
AND CONSULTING, INC.**

Client: Southern Company
Project: Plant Yates Ash Pond

Project No: 6189109008

Jax FL.

Grain Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	1.7	24.5	32.8	41.0	

Test Results (ASTM D 422 & ASTM D 1140)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
2"	100.0		
1.5"	100.0		
1"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
#4	100.0		
#10	98.3		
#20	89.3		
#40	73.8		
#60	61.2		
#100	50.4		
#200	41.0		

Material Description

Light Reddish Brown Medium to Fine SAND with Silt

Atterberg Limits (ASTM D 4318)

PL= _____ LL= _____ PI= _____

Classification

USCS (D 2487)= SM AASHTO (M 145)= _____

Coefficients

D₉₀= 0.8835 D₈₅= 0.6829 D₆₀= 0.2378
D₅₀= 0.1465 D₃₀= _____ D₁₅= _____
D₁₀= _____ C_u= _____ C_c= _____

Remarks

Date Received: 4-2-10 Date Tested: 4-8-10

Tested By: MC

Checked By: _____

Title: _____

* (no specification provided)

Source of Sample: Boring No.: APB-1
Sample Number: 5

Depth: 29.5'-31.0'

Date Sampled:

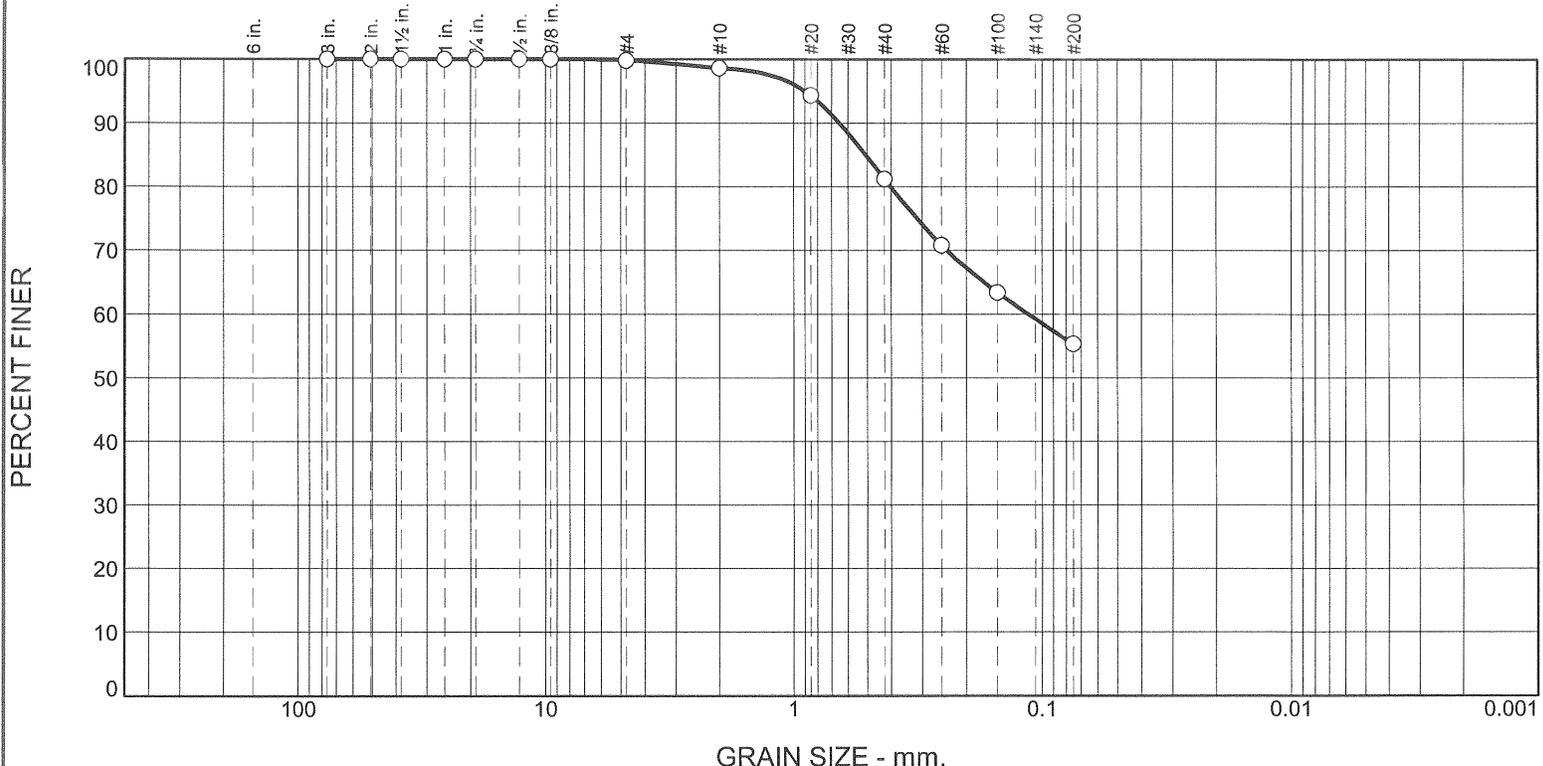
**MACTEC ENGINEERING.
AND CONSULTING, INC.**

Client: Southern Company
Project: Plant Yates Ash Pond

Project No: 6189109008

Jax FL.

Grain Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	1.2	17.4	25.8	55.4	

Test Results (ASTM D 422 & ASTM D 1140)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
2"	100.0		
1.5"	100.0		
1"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
#4	99.8		
#10	98.6		
#20	94.4		
#40	81.2		
#60	70.8		
#100	63.4		
#200	55.4		

Material Description

Light Reddish Brown SILT with Medium to Fine SAND

Atterberg Limits (ASTM D 4318)

PL= _____ LL= _____ PI= _____

Classification

USCS (D 2487)= ML AASHTO (M 145)= _____

Coefficients

D₉₀= 0.6484 D₈₅= 0.5070 D₆₀= 0.1132
D₅₀= _____ D₃₀= _____ D₁₅= _____
D₁₀= _____ C_u= _____ C_c= _____

Remarks

Date Received: 4-2-10 Date Tested: 4-8-10
Tested By: MC
Checked By: _____
Title: _____

* (no specification provided)

Source of Sample: Boring No.: APB-1
Sample Number: 8

Depth: 44.5'-46.0'

Date Sampled:

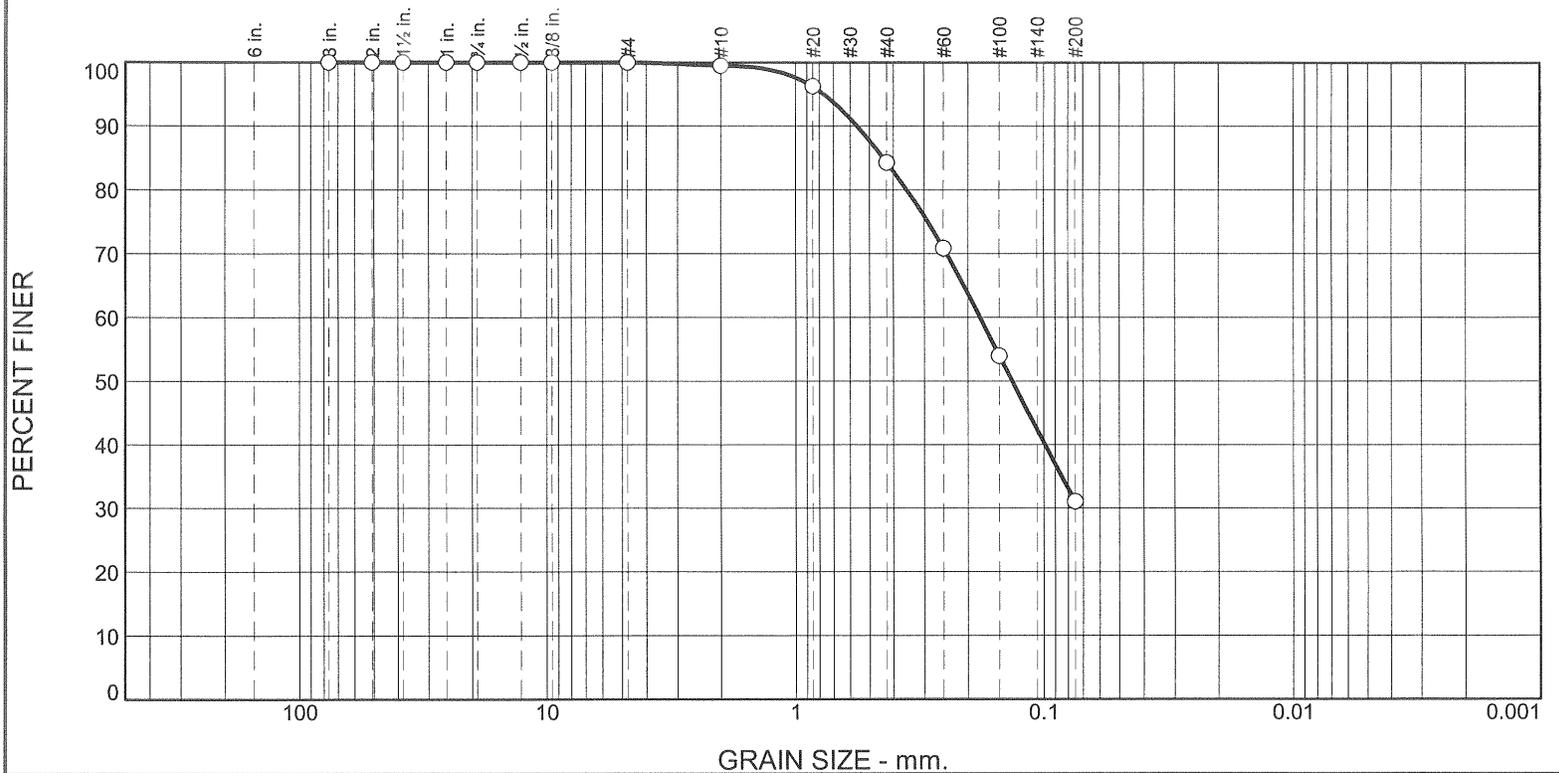
**MACTEC ENGINEERING.
AND CONSULTING, INC.**

Client: Southern Company
Project: Plant Yates Ash Pond

Project No: 6189109008

Jax FL.

Grain Size Distribution Report



GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.5	15.2	53.3	31.0	

Test Results (ASTM D 422 & ASTM D 1140)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
2"	100.0		
1.5"	100.0		
1"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
#4	100.0		
#10	99.5		
#20	96.2		
#40	84.3		
#60	70.8		
#100	53.9		
#200	31.0		

* (no specification provided)

Material Description

Light Brown medium to fine SAND with silt

Atterberg Limits (ASTM D 4318)

PL= _____ LL= _____ PI= _____

Classification

USCS (D 2487)= SM AASHTO (M 145)= _____

Coefficients

D₉₀= 0.5615 D₈₅= 0.4394 D₆₀= 0.1791
D₅₀= 0.1335 D₃₀= _____ D₁₅= _____
D₁₀= _____ C_u= _____ C_c= _____

Remarks

Date Received: 4-2-10 Date Tested: 4-8-10
Tested By: MC
Checked By: _____
Title: _____

Source of Sample: Boring No.: APB-1
Sample Number: 11

Depth: 59.5'-61.0'

Date Sampled:

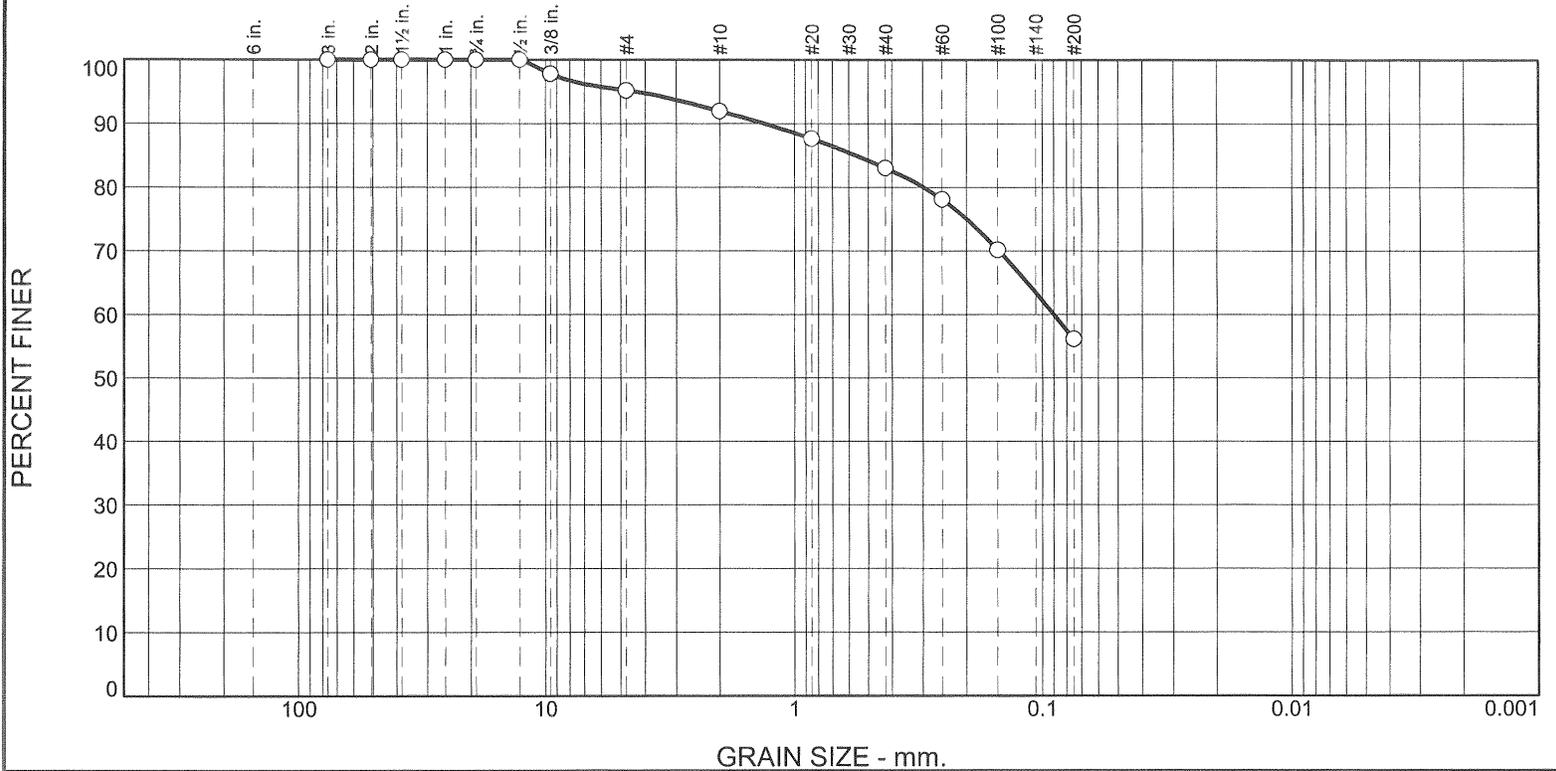
**MACTEC ENGINEERING.
AND CONSULTING, INC.**

Client: Southern Company
Project: Plant Yates Ash Pond

Project No: 6189109008

Jax FL.

Grain Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.8	3.2	9.0	26.8	56.2	

Test Results (ASTM D 422 & ASTM D 1140)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
2"	100.0		
1.5"	100.0		
1"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	97.8		
#4	95.2		
#10	92.0		
#20	87.6		
#40	83.0		
#60	78.1		
#100	70.2		
#200	56.2		

* (no specification provided)

Material Description

Dark Gray Fly Ash

Atterberg Limits (ASTM D 4318)

PL= NP LL= NP PI= NP

Classification

USCS (D 2487)= ML AASHTO (M 145)= A-4(0)

Coefficients

D₉₀= 1.3231 D₈₅= 0.5602 D₆₀= 0.0899
D₅₀= D₃₀= D₁₅=
D₁₀= C_u= C_c=

Remarks

Date Received: 4-2-10 Date Tested: 4-8-10
Tested By: MC
Checked By: _____
Title: _____

Source of Sample: Boring No.: APB-2
Sample Number: 1

Depth: 4.5'-6.0'

Date Sampled:

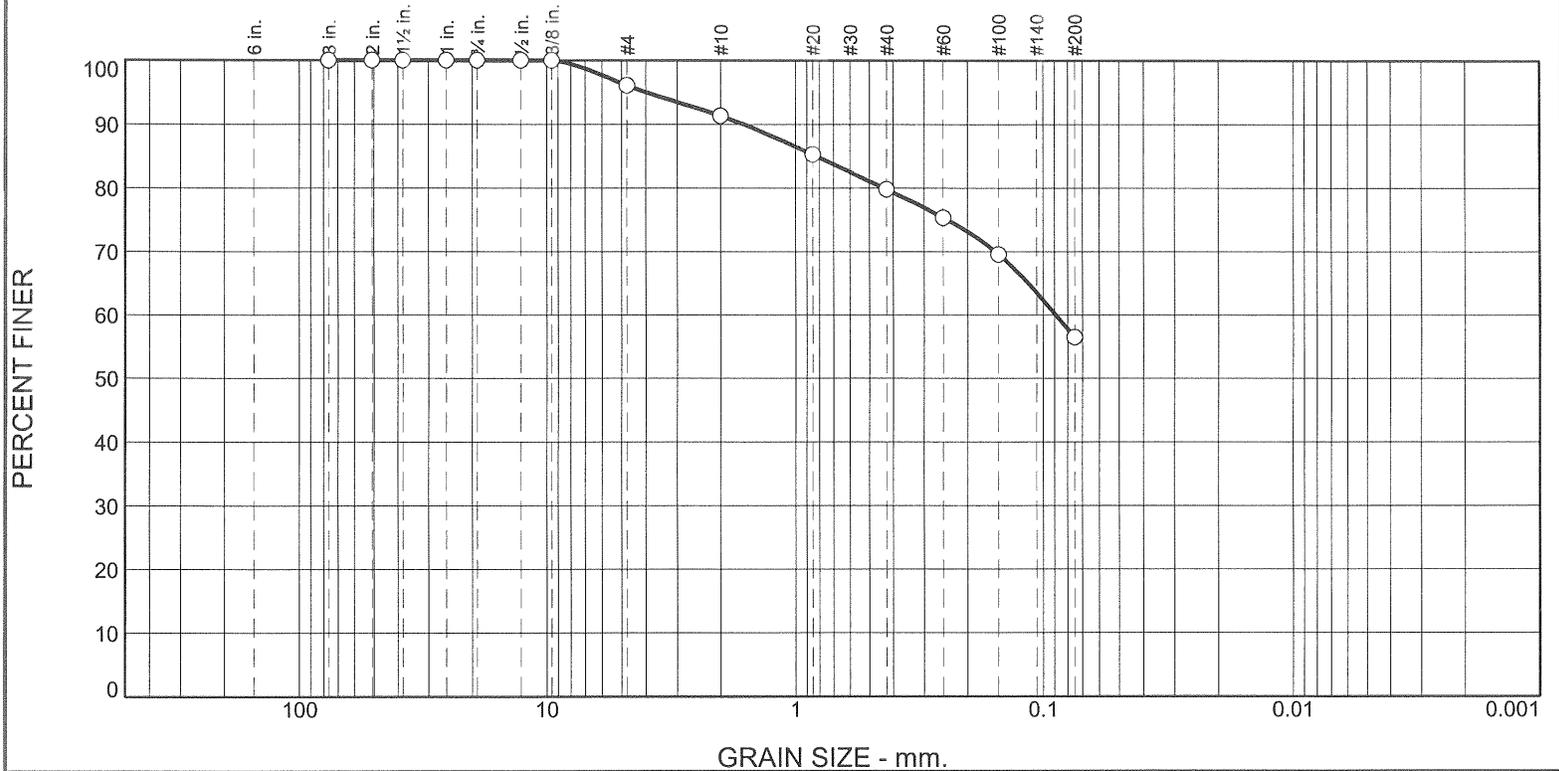
**MACTEC ENGINEERING.
AND CONSULTING, INC.**

Client: Southern Company
Project: Plant Yates Ash Pond

Project No: 6189109008

Jax FL.

Grain Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.9	4.8	11.5	23.4	56.4	

Test Results (ASTM D 422 & ASTM D 1140)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
2"	100.0		
1.5"	100.0		
1"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
#4	96.1		
#10	91.3		
#20	85.3		
#40	79.8		
#60	75.4		
#100	69.6		
#200	56.4		

Material Description

Dark Gray Fly Ash

Atterberg Limits (ASTM D 4318)

PL= NP LL= NP PI= NP

Classification

USCS (D 2487)= ML AASHTO (M 145)= A-4(0)

Coefficients

D₉₀= 1.6176 D₈₅= 0.8210 D₆₀= 0.0889

D₅₀= D₃₀= D₁₅=

D₁₀= C_u= C_c=

Remarks

Date Received: 4-2-10 Date Tested: 4-8-10

Tested By: MC

Checked By: _____

Title: _____

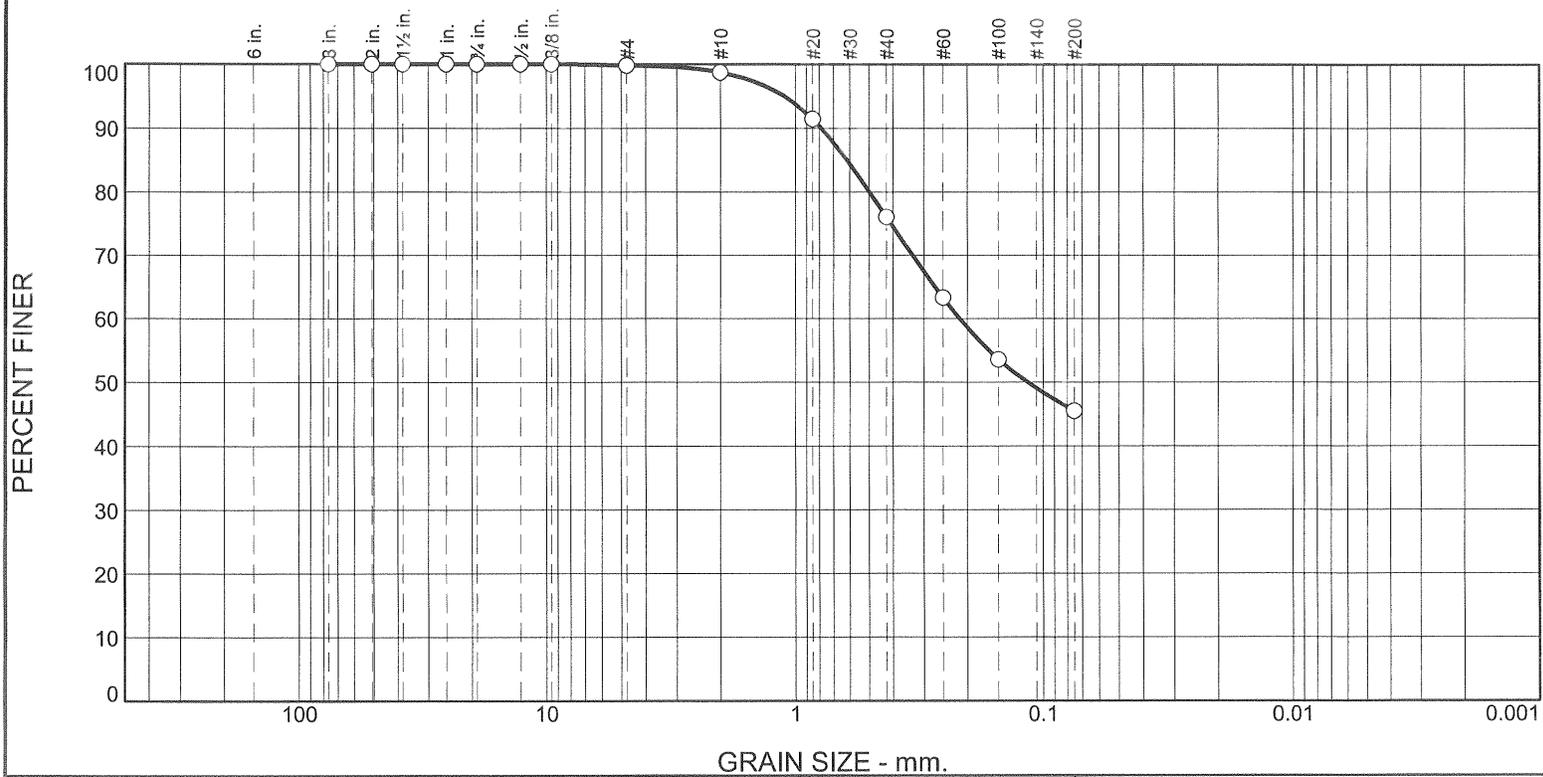
* (no specification provided)

Source of Sample: Boring No.: APB-2 Depth: 9.5'-11.0' Date Sampled:

Sample Number: 2

MACTEC ENGINEERING AND CONSULTING, INC.	Client: Southern Company Project: Plant Yates Ash Pond	Project No: 6189109008 Jax FL.
--	---	-----------------------------------

Grain Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	1.1	22.6	30.6	45.5	

Test Results (ASTM D 422 & ASTM D 1140)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
2"	100.0		
1.5"	100.0		
1"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
#4	99.8		
#10	98.7		
#20	91.4		
#40	76.1		
#60	63.3		
#100	53.6		
#200	45.5		

Material Description

Light Brown Medium to Fine SAND with Clay

Atterberg Limits (ASTM D 4318)

PL= 27 LL= 50 PI= 23

Classification

USCS (D 2487)= SC AASHTO (M 145)= A-7-6(7)

Coefficients

D₉₀= 0.7831 D₈₅= 0.6148 D₆₀= 0.2144

D₅₀= 0.1151 D₃₀= D₁₅=

D₁₀= C_u= C_c=

Remarks

Date Received: 4-2-10 Date Tested: 4-8-10

Tested By: MC

Checked By: _____

Title: _____

* (no specification provided)

Source of Sample: Boring No.: APB-2
Sample Number: 6

Depth: 29.5'-31.0'

Date Sampled:

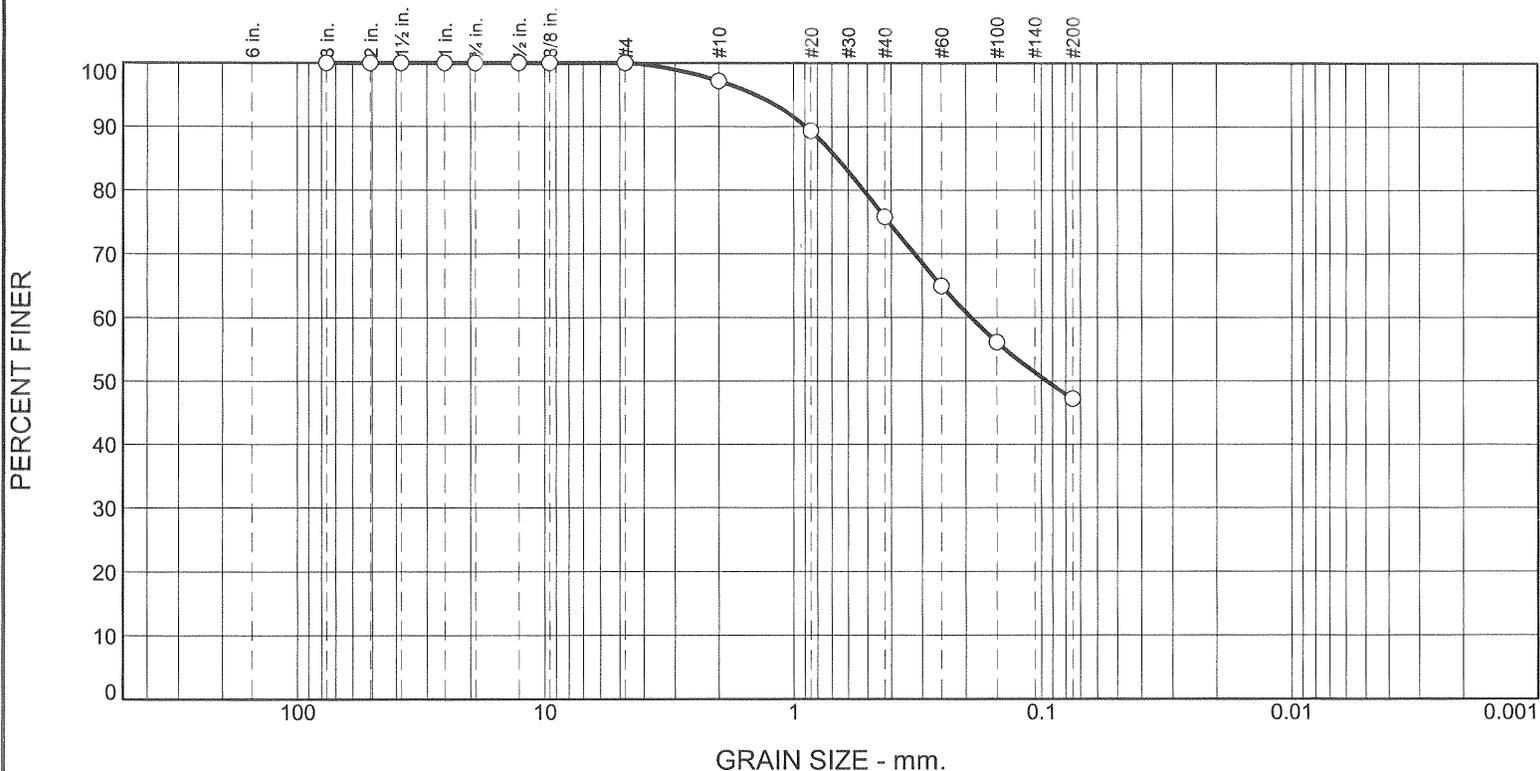
**MACTEC ENGINEERING.
AND CONSULTING, INC.**

Client: Southern Company
Project: Plant Yates Ash Pond

Project No: 6189109008

Jax FL.

Grain Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	2.8	21.4	28.6	47.2	

Test Results (ASTM D 422 & ASTM D 1140)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
2"	100.0		
1.5"	100.0		
1"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
#4	100.0		
#10	97.2		
#20	89.3		
#40	75.8		
#60	65.0		
#100	56.1		
#200	47.2		

Material Description

Orange Brown Medium to Fine SAND with Silt

Atterberg Limits (ASTM D 4318)

PL= 30 LL= 55 PI= 25

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-7-5(8)

Coefficients

D₉₀= 0.8905 D₈₅= 0.6634 D₆₀= 0.1906
D₅₀= 0.0950 D₃₀= D₁₅=
D₁₀= C_u= C_c=

Remarks

Date Received: 4-2-10 Date Tested: 4-8-10

Tested By: MC

Checked By: _____

Title: _____

* (no specification provided)

Source of Sample: Boring No.: APB-2
Sample Number: 8

Date Sampled:

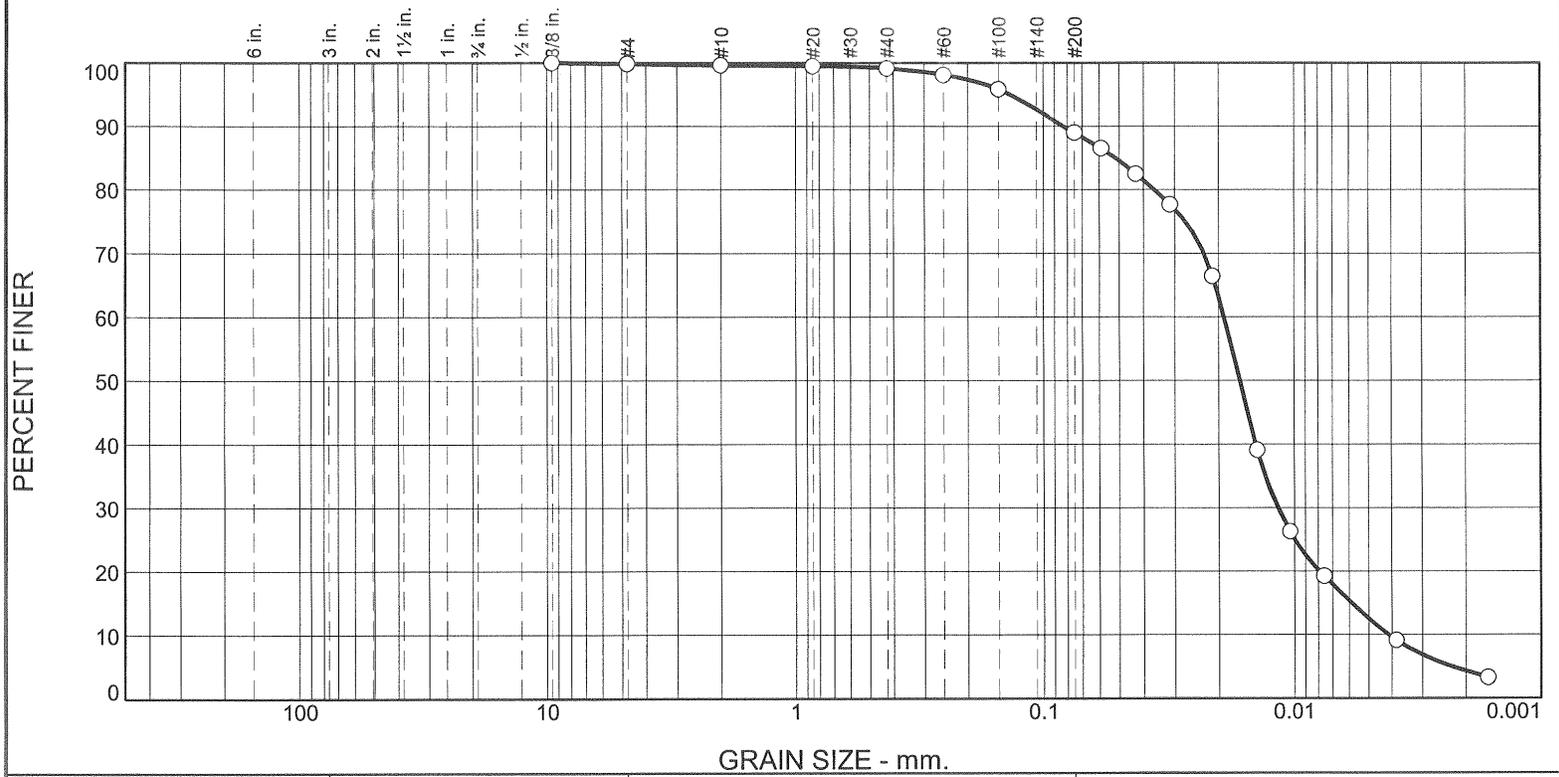
**MACTEC ENGINEERING.
AND CONSULTING, INC.**

Client: Southern Company
Project: Plant Yates Ash Pond

Project No: 6189109008

Jax FL.

Grain Size Distribution Report



GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	0.2	0.5	10.1	76.4	12.6

Test Results (ASTM D 422 & ASTM D 1140)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8"	100.0		
#4	99.8		
#10	99.6		
#20	99.5		
#40	99.1		
#60	98.1		
#100	95.8		
#200	89.0		
0.0588 mm.	86.5		
0.0428 mm.	82.5		
0.0313 mm.	77.6		
0.0212 mm.	66.4		
0.0140 mm.	39.1		
0.0104 mm.	26.3		
0.0075 mm.	19.2		
0.0038 mm.	9.1		
0.0016 mm.	3.3		

* (no specification provided)

Material Description

Dark Gray Fly Ash

Atterberg Limits (ASTM D 4318)

PL= NP LL= NP PI= NP

Classification

USCS (D 2487)= ML AASHTO (M 145)= A-4(0)

Coefficients

D₉₀= 0.0830 D₈₅= 0.0517 D₆₀= 0.0190
 D₅₀= 0.0165 D₃₀= 0.0116 D₁₅= 0.0059
 D₁₀= 0.0041 C_u= 4.61 C_c= 1.72

Remarks

Specific gravity: 2.174

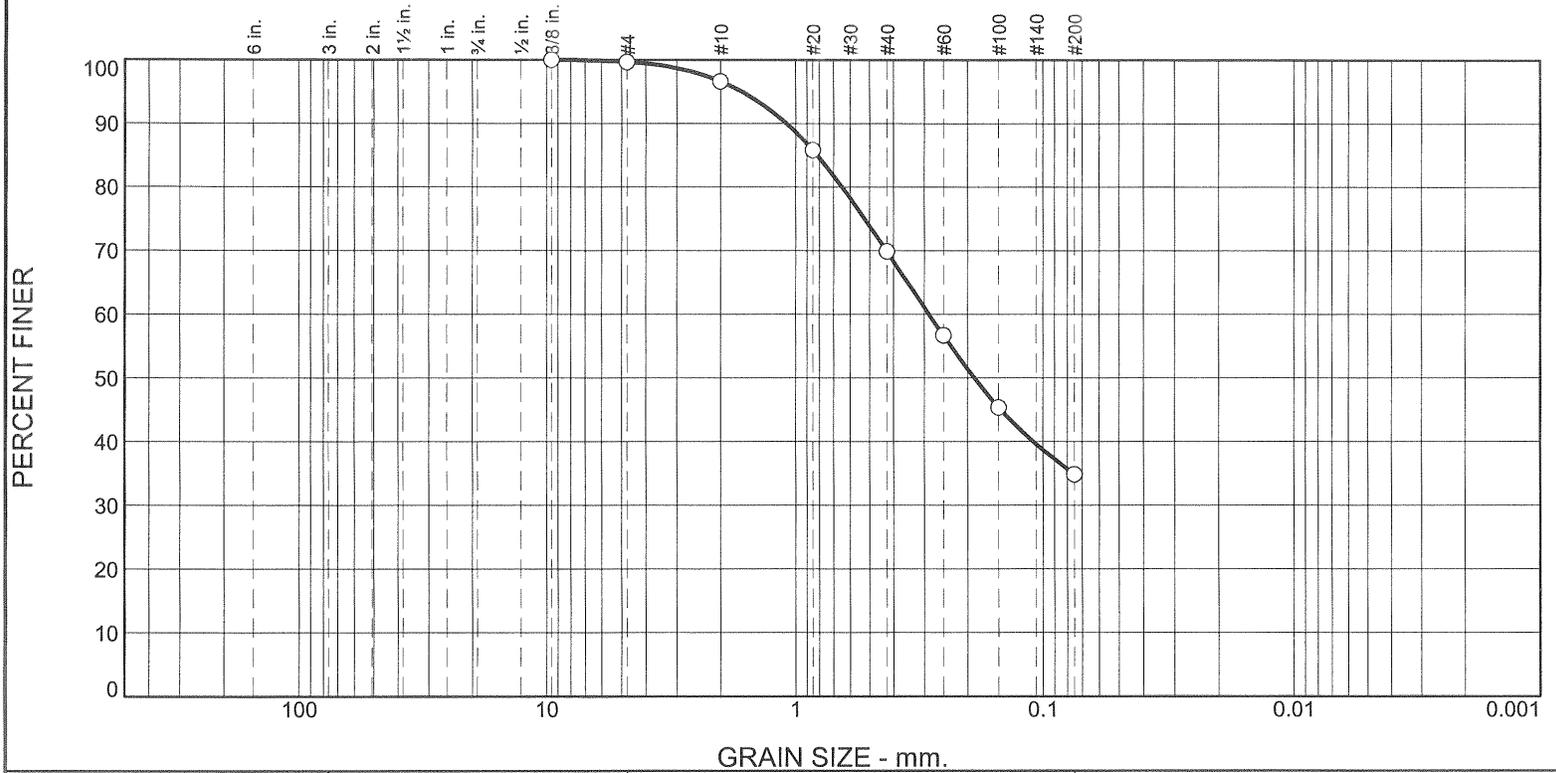
Date Received: 4-2-10 **Date Tested:** 4-8-10
Tested By: MC
Checked By: _____
Title: _____

Source of Sample: Boring No.: APB-3 **Depth:** 9.5'-11.0' **Date Sampled:**

Sample Number: 2

MACTEC ENGINEERING AND CONSULTING, INC.	Client: Southern Company Project: Plant Yates Ash Pond Project No: 6189109008	Jax FL.
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Grain Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.4	3.0	26.8	35.0	34.8	

Test Results (ASTM D 422 & ASTM D 1140)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8"	100.0		
#4	99.6		
#10	96.6		
#20	85.8		
#40	69.8		
#60	56.7		
#100	45.3		
#200	34.8		

Material Description

Light Brown Medium to Fine SAND with Silt

Atterberg Limits (ASTM D 4318)

PL= 31 LL= 54 PI= 23

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-7(3)

Coefficients

D₉₀= 1.0875 D₈₅= 0.8158 D₆₀= 0.2865
D₅₀= 0.1879 D₃₀= D₁₅=
D₁₀= C_u= C_c=

Remarks

Date Received: 4-2-10 Date Tested: 4-8-10

Tested By: MC

Checked By: _____

Title: _____

* (no specification provided)

Source of Sample: Boring No.: APB-3
Sample Number: 3

Depth: 14.5'-16.0'

Date Sampled:

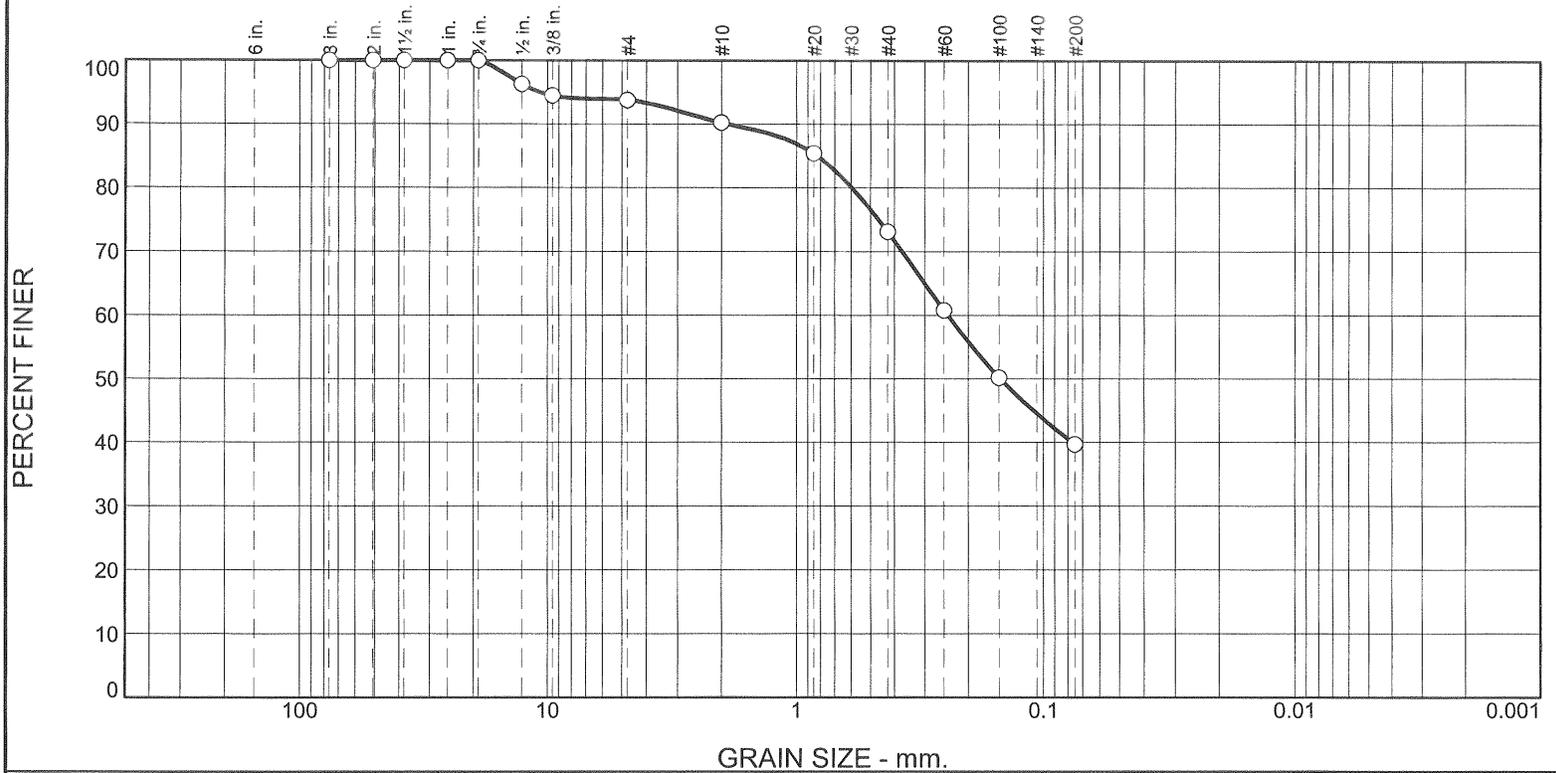
**MACTEC ENGINEERING.
AND CONSULTING, INC.**

Client: Southern Company
Project: Plant Yates Ash Pond

Project No: 6189109008

Jax FL.

Grain Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	6.2	3.6	17.1	33.4	39.7	

Test Results (ASTM C 136 & ASTM D 1140)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
2"	100.0		
1.5"	100.0		
1"	100.0		
3/4"	100.0		
1/2"	96.3		
3/8"	94.4		
#4	93.8		
#10	90.2		
#20	85.4		
#40	73.1		
#60	60.8		
#100	50.2		
#200	39.7		

Material Description

Light Brown Medium to Fine SAND with Clay

Atterberg Limits (ASTM D 4318)

PL= 21 LL= 45 PI= 24

Classification

USCS (D 2487)= SC AASHTO (M 145)= A-7-6(5)

Coefficients

D₉₀= 1.9069 D₈₅= 0.8241 D₆₀= 0.2415
D₅₀= 0.1485 D₃₀= D₁₅=
D₁₀= C_u= C_c=

Remarks

Date Received: 4-2-10 Date Tested: 4-8-10

Tested By: MC

Checked By: _____

Title: _____

* (no specification provided)

Source of Sample: Boring No.: APB-3
Sample Number: 6

Depth: 29.5'-31.0'

Date Sampled:

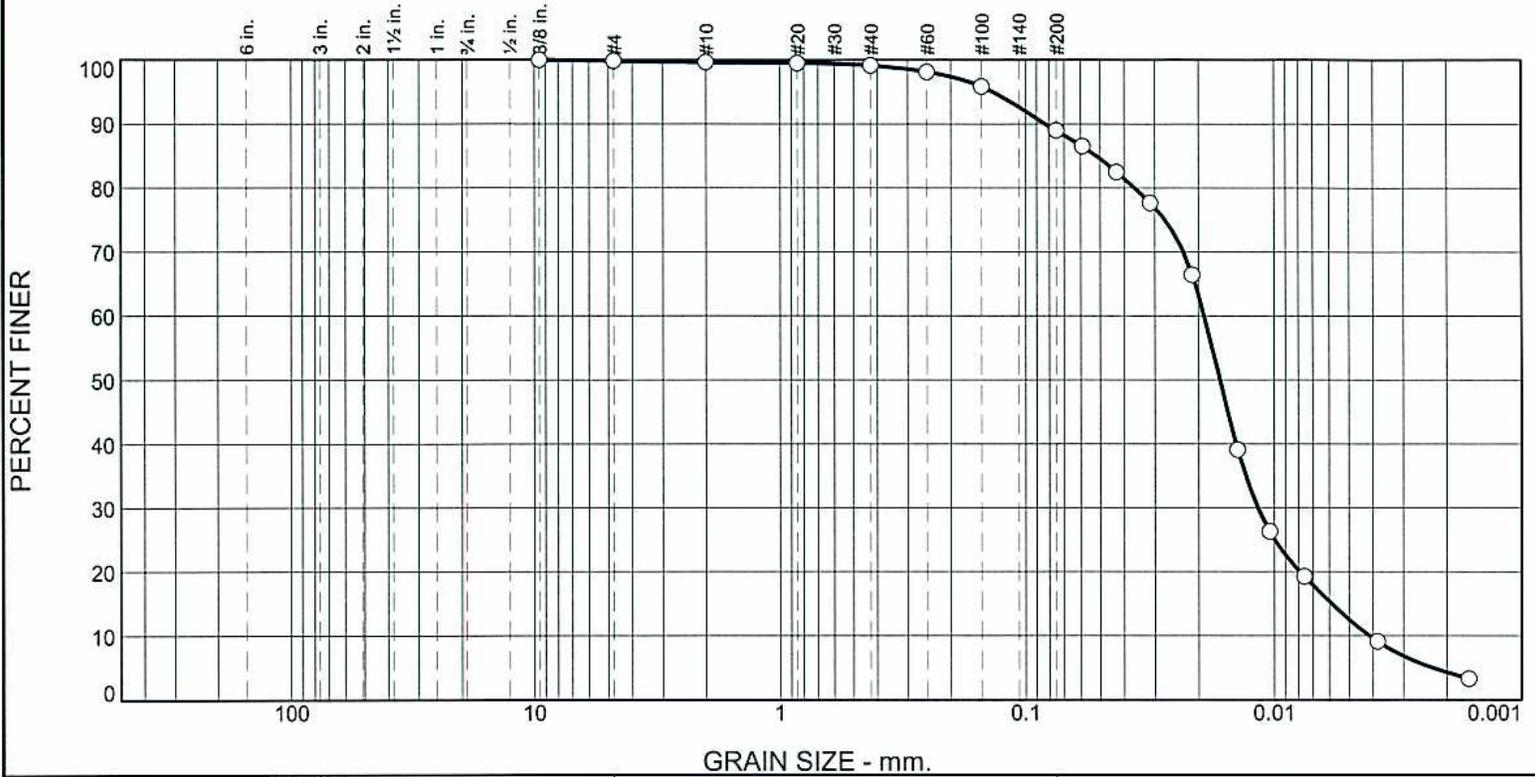
**MACTEC ENGINEERING.
AND CONSULTING, INC.**

Client: Southern Company
Project: Plant Yates Ash Pond

Project No: 6189109008

Jax FL.

Grain Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	0.2	0.5	10.1	76.4	12.6

Test Results (ASTM D 422 & ASTM D 1140)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8"	100.0		
#4	99.8		
#10	99.6		
#20	99.5		
#40	99.1		
#60	98.1		
#100	95.8		
#200	89.0		
0.0588 mm.	86.5		
0.0428 mm.	82.5		
0.0313 mm.	77.6		
0.0212 mm.	66.4		
0.0140 mm.	39.1		
0.0104 mm.	26.3		
0.0075 mm.	19.2		
0.0038 mm.	9.1		
0.0016 mm.	3.3		

Material Description

Dark Gray Fly Ash

Atterberg Limits (ASTM D 4318)

PL= NP LL= NP PI= NP

Classification

USCS (D 2487)= ML AASHTO (M 145)= A-4(0)

Coefficients

D₉₀= 0.0830 D₈₅= 0.0517 D₆₀= 0.0190
 D₅₀= 0.0165 D₃₀= 0.0116 D₁₅= 0.0059
 D₁₀= 0.0041 C_u= 4.61 C_c= 1.72

Remarks

Specific gravity: 2.174

Date Received: 4-2-10 **Date Tested:** 4-8-10
Tested By: MC
Checked By: _____
Title: _____

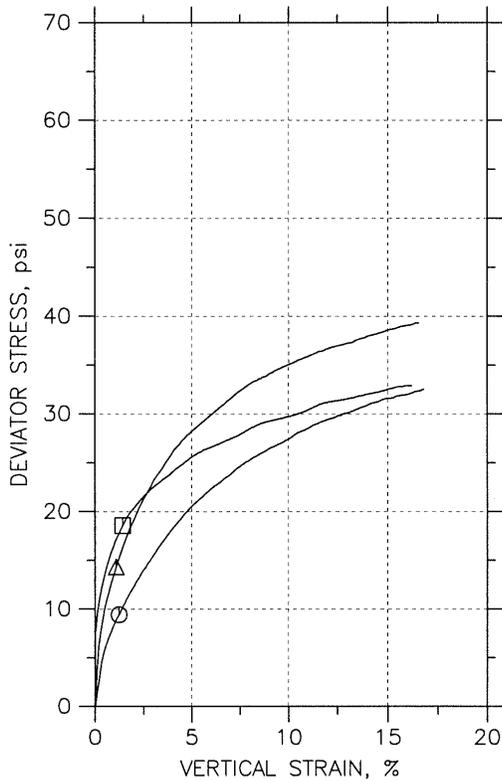
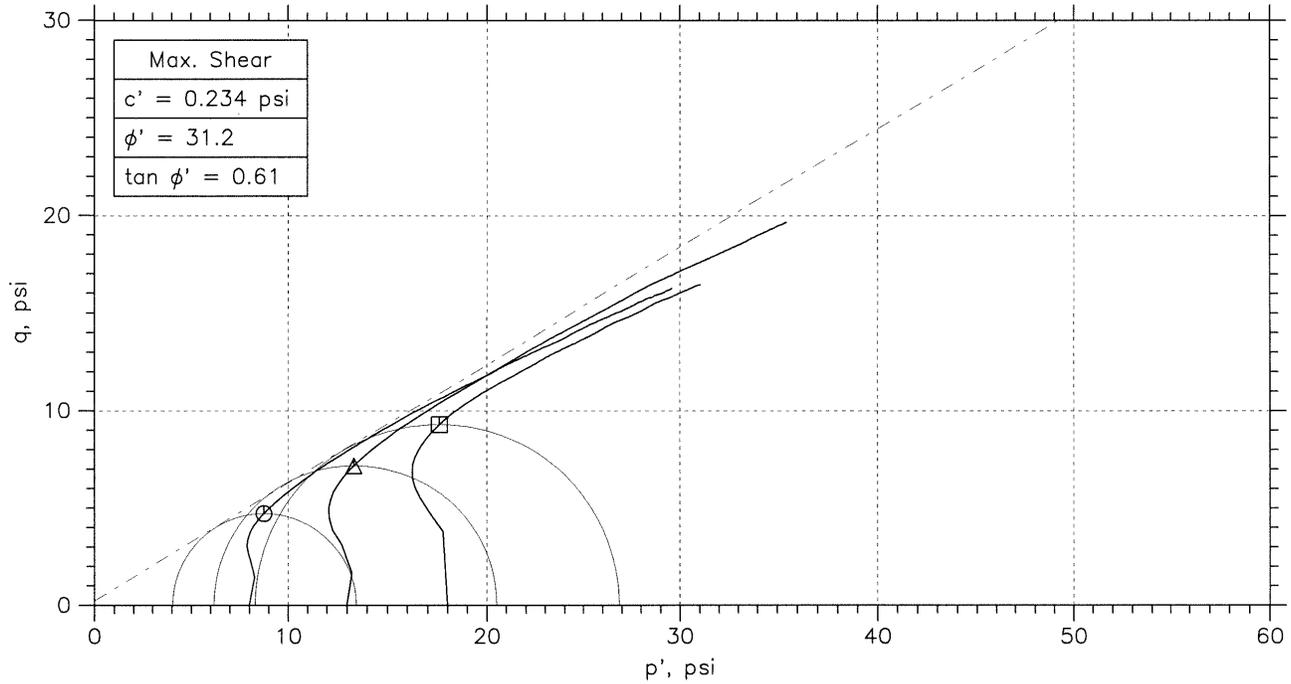
* (no specification provided)

Source of Sample: Boring No.: APB-3 Depth: 9.5'-11.0' Date Sampled:

Sample Number: 2

MACTEC ENGINEERING. AND CONSULTING, INC.	Client: Southern Company Project: Plant Yates Ash Pond Project No: 6189109008 Jax FL.
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CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



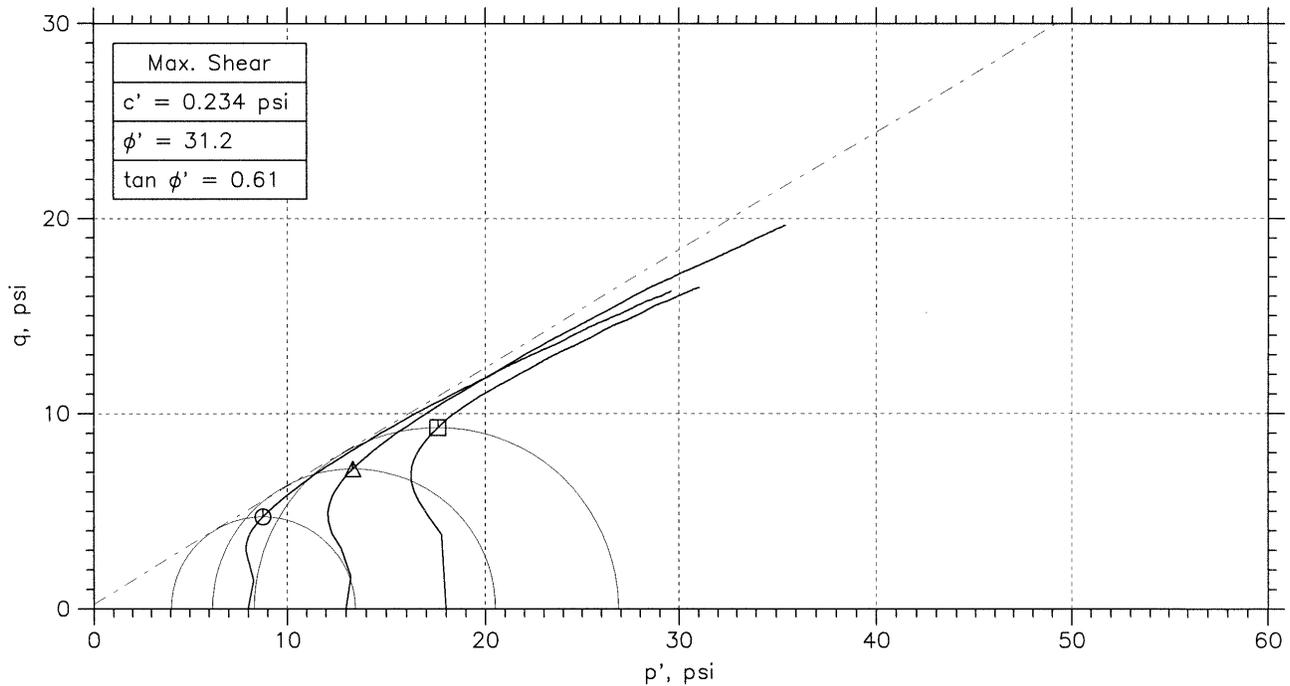
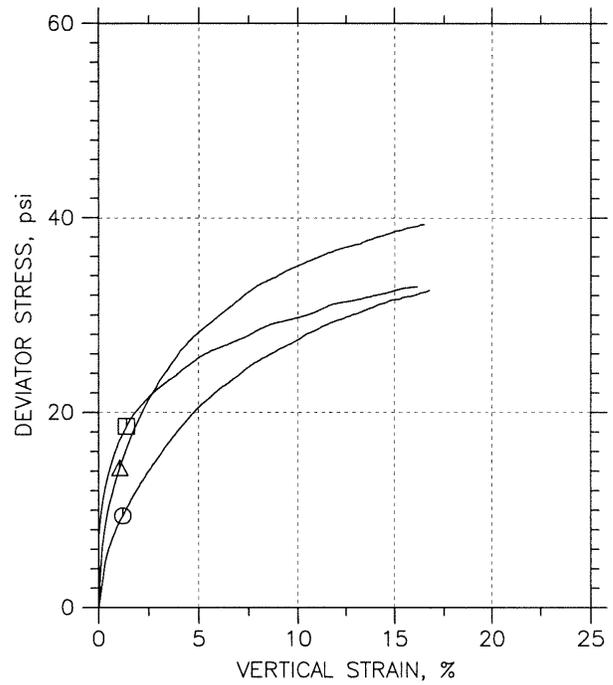
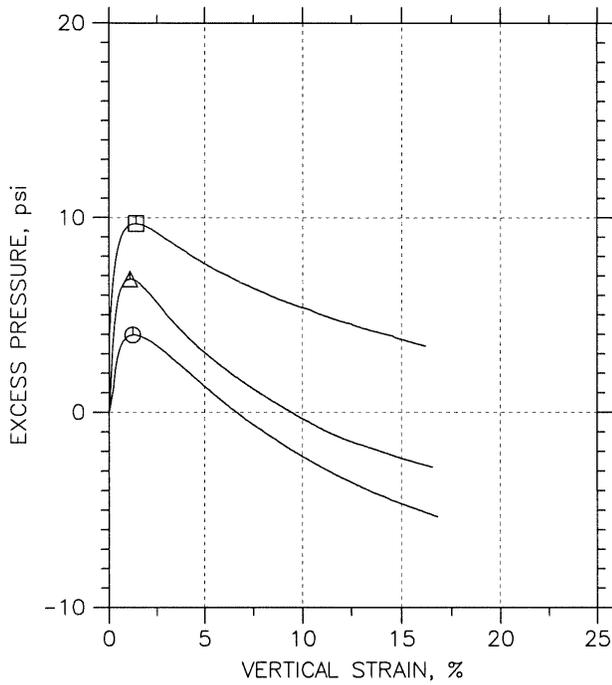
Symbol		⊙	△	□
Sample No.		IS-1	IS-1	IS-1
Test No.		10101.1	10101.2	10101.3
Depth		24.5-26.5ft	24.5-26.5ft	24.5-26.5ft
Initial	Diameter, in	2.87	2.866	2.879
	Height, in	5.967	5.962	5.962
	Water Content, %	17.6	15.8	21.3
	Dry Density, pcf	110.4	115.	104.7
	Saturation, %	94.3	96.2	97.9
	Void Ratio	0.492	0.433	0.575
Before Shear	Water Content, %	18.3	16.3	19.1
	Dry Density, pcf	111.2	115.1	109.6
	Saturation*, %	100.0	100.0	100.0
	Void Ratio	0.483	0.432	0.504
	Back Press., psi	99.99	120.	130.
Ver. Eff. Cons. Stress, psi		7.998	13.01	18.01
Shear Strength, psi		4.708	7.161	9.281
Strain at Failure, %		1.22	1.07	1.41
Strain Rate, %/min		0.05	0.05	0.05
B-Value		0.96	0.97	0.88
Measured Specific Gravity		2.64	2.64	2.64
Liquid Limit		43	43	43
Plastic Limit		21	21	21

MACTEC	Project: Plant Yates Ash Pond	
	Location: APB-1	
	Project No.: 6189109008	
	Boring No.: APB-1	
	Sample Type: Undisturbed	
	Description: Brown Clayey Sand	
Remarks: ASTM D4767-04. Strain at failure based on peak excess pore pressure.		

Phase calculations based on start and end of test.

* Saturation is set to 100% for phase calculations.

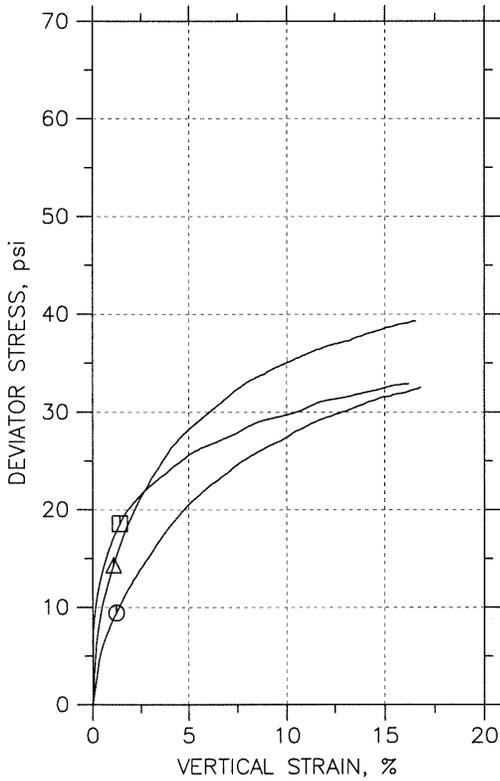
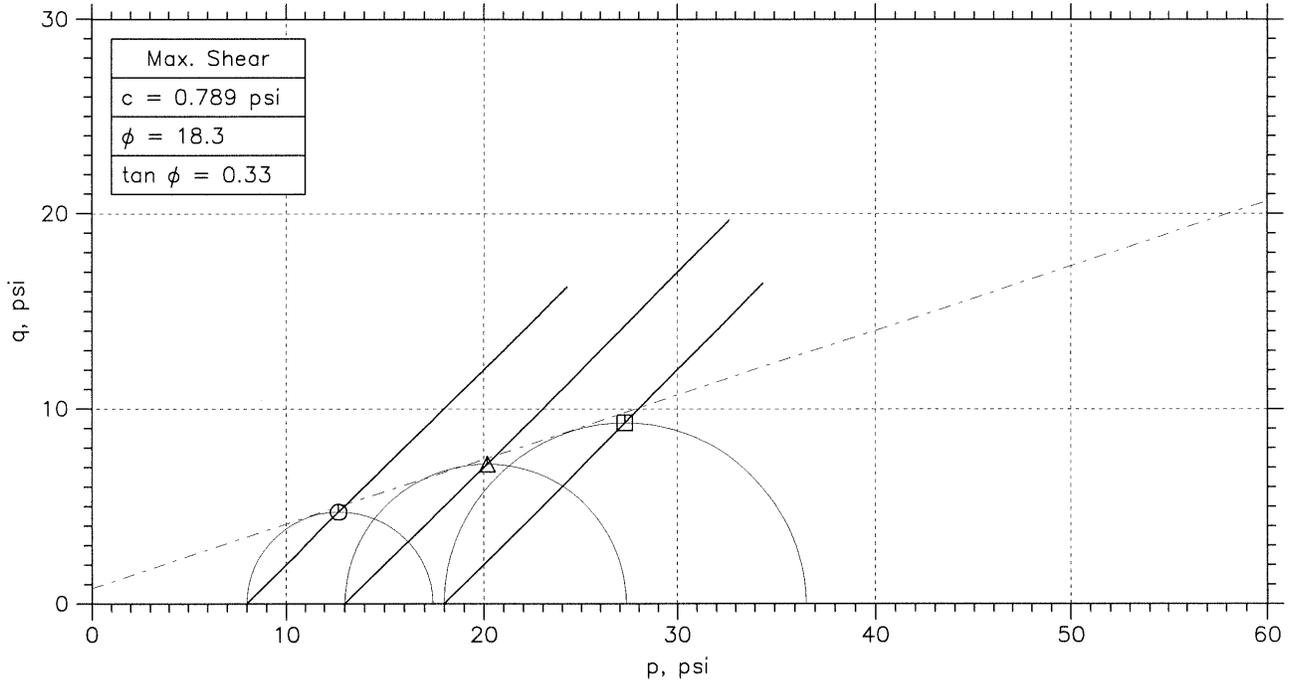
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
○	IS-1	10101.1	24.5-26.5ft	JW	4/2/10			10101.1a_2580.dat
△	IS-1	10101.2	24.5-26.5ft	JW	4/2/10			10101.2a_2547.dat
□	IS-1	10101.3	24.5-26.5ft	JW	4/2/10			10101.3a_2546.dat

MACTEC	Project: Plant Yates Ash Pond		Location: APB-1		Project No.: 6189109008	
	Boring No.: APB-1		Sample Type: Undisturbed			
	Description: Brown Clayey Sand					
	Remarks: ASTM D4767-04. Strain at failure based on peak excess pore pressure.					

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



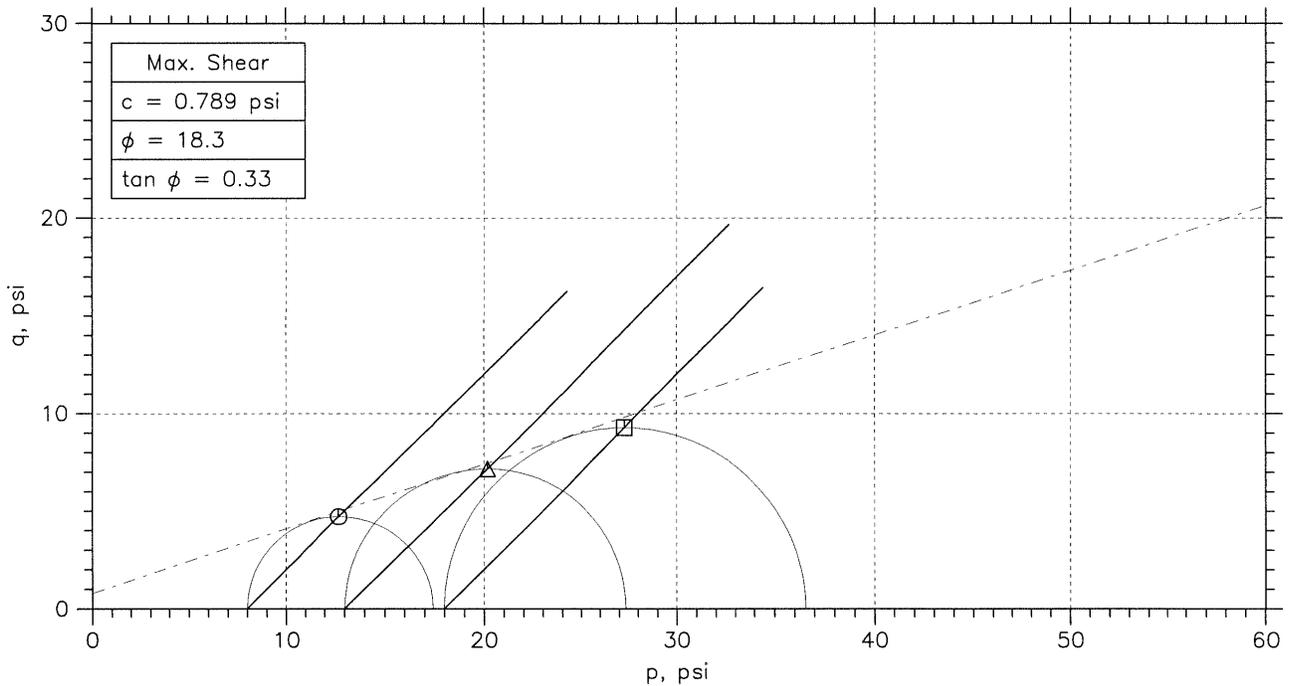
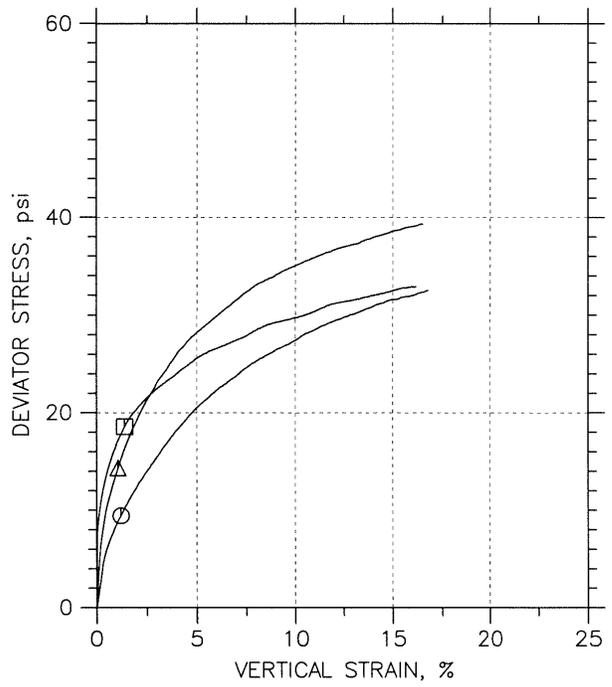
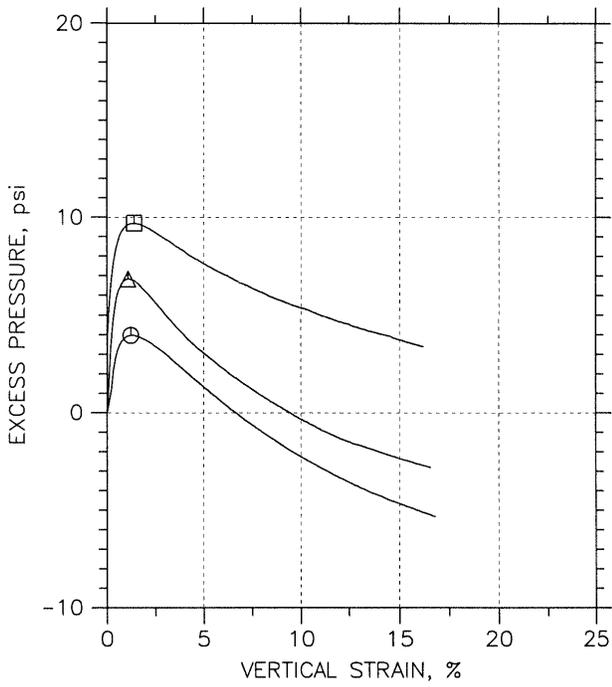
Symbol	⊙	△	□	
Sample No.	IS-1	IS-1	IS-1	
Test No.	10101.1	10101.2	10101.3	
Depth	24.5-26.5ft	24.5-26.5ft	24.5-26.5ft	
Initial	Diameter, in	2.87	2.866	2.879
	Height, in	5.967	5.962	5.962
	Water Content, %	17.6	15.8	21.3
	Dry Density, pcf	110.4	115.	104.7
	Saturation, %	94.3	96.2	97.9
	Void Ratio	0.492	0.433	0.575
Before Shear	Water Content, %	18.3	16.3	19.1
	Dry Density, pcf	111.2	115.1	109.6
	Saturation*, %	100.0	100.0	100.0
	Void Ratio	0.483	0.432	0.504
Back Press., psi	99.99	120.	130.	
Ver. Eff. Cons. Stress, psi	7.998	13.01	18.01	
Shear Strength, psi	4.708	7.161	9.281	
Strain at Failure, %	1.22	1.07	1.41	
Strain Rate, %/min	0.05	0.05	0.05	
B-Value	0.96	0.97	0.88	
Measured Specific Gravity	2.64	2.64	2.64	
Liquid Limit	43	43	43	
Plastic Limit	21	21	21	

MACTEC	Project: Plant Yates Ash Pond	
	Location: APB-1	
	Project No.: 6189109008	
	Boring No.: APB-1	
	Sample Type: Undisturbed	
	Description: Brown Clayey Sand	
Remarks: ASTM D4767-04. Strain at failure based on peak excess pore pressure.		

Phase calculations based on start and end of test.

* Saturation is set to 100% for phase calculations.

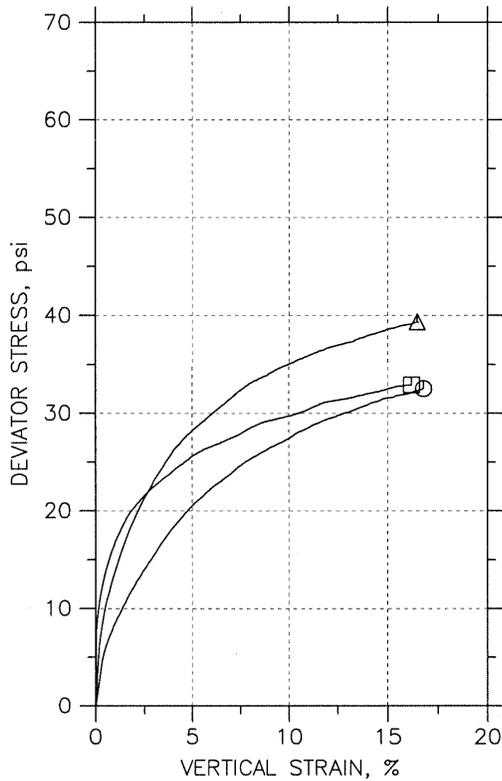
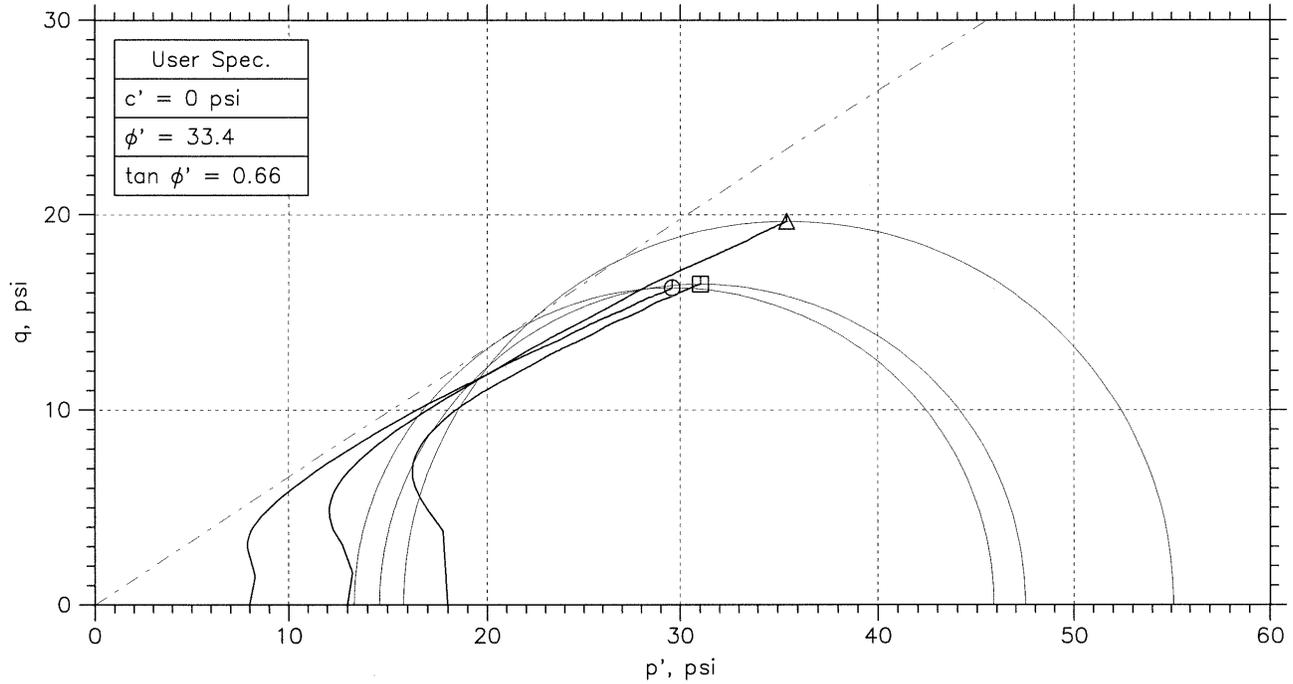
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
○	IS-1	10101.1	24.5-26.5ft	JW	4/2/10			10101.1a_2580.dat
△	IS-1	10101.2	24.5-26.5ft	JW	4/2/10			10101.2a_2547.dat
□	IS-1	10101.3	24.5-26.5ft	JW	4/2/10			10101.3a_2546.dat

MACTEC	Project: Plant Yates Ash Pond		Location: APB-1		Project No.: 6189109008	
	Boring No.: APB-1		Sample Type: Undisturbed			
	Description: Brown Clayey Sand					
	Remarks: ASTM D4767-04. Strain at failure based on peak excess pore pressure.					

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



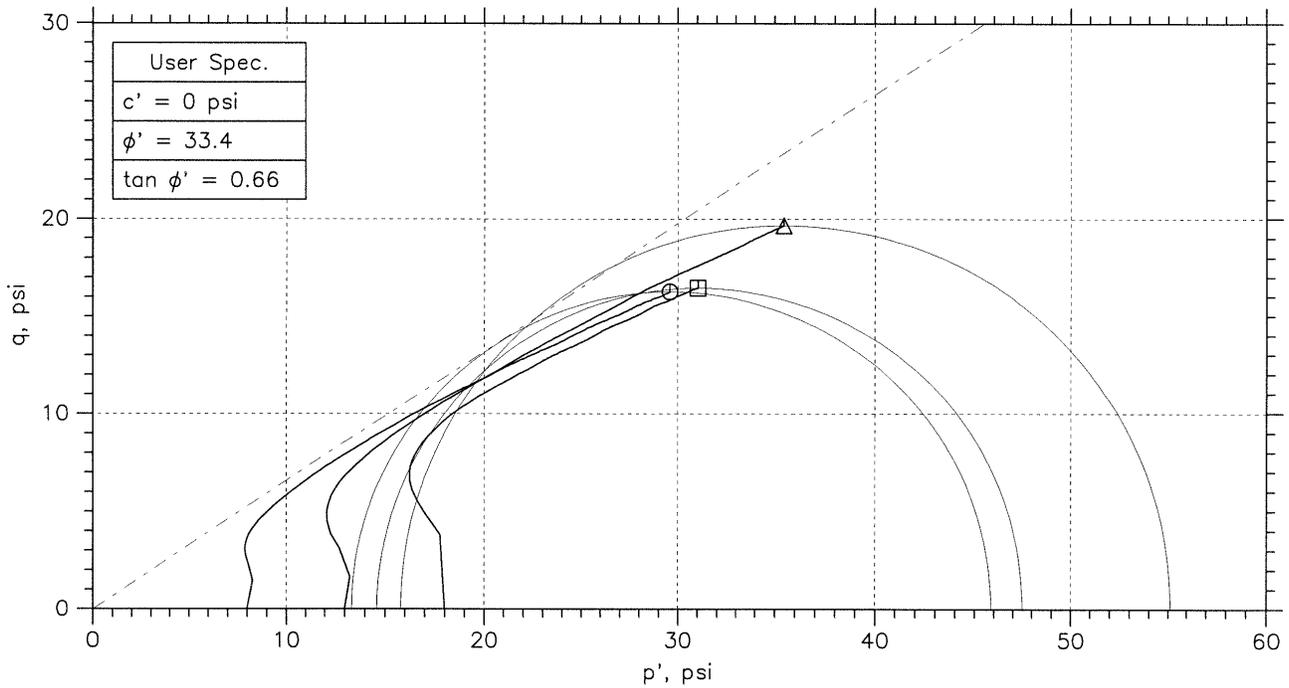
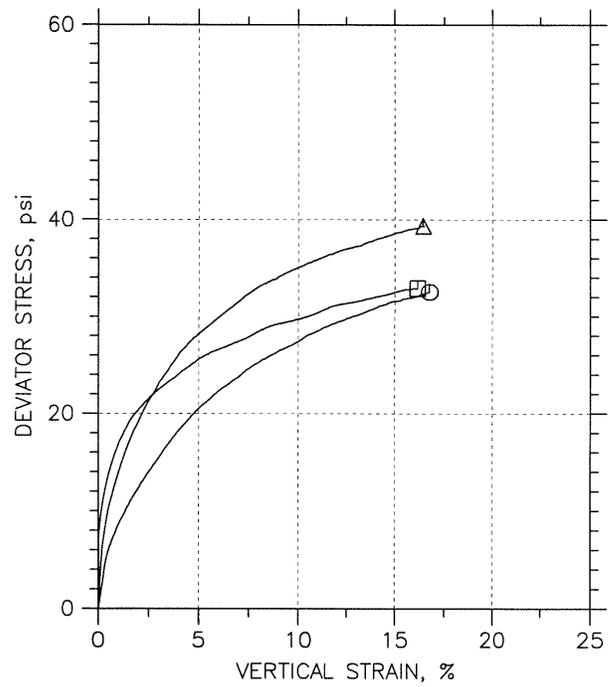
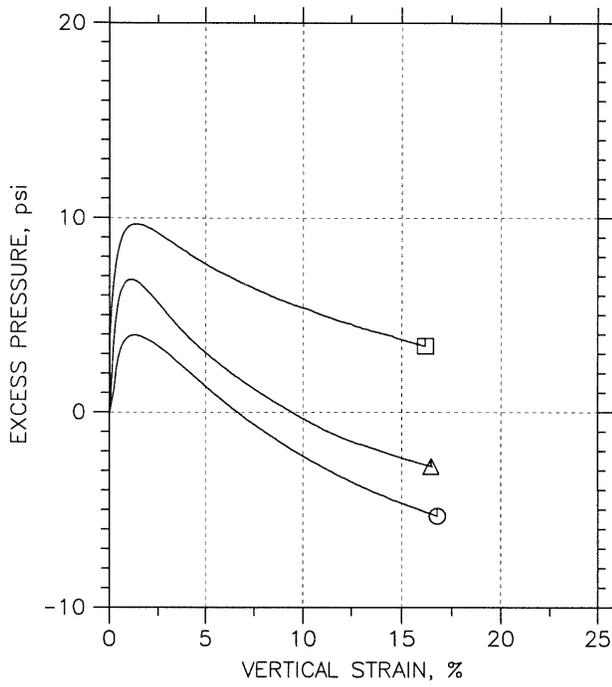
Symbol	⊙	△	□	
Sample No.	IS-1	IS-1	IS-1	
Test No.	10101.1	10101.2	10101.3	
Depth	24.5-26.5ft	24.5-26.5ft	24.5-26.5ft	
Initial	Diameter, in	2.87	2.866	2.879
	Height, in	5.967	5.962	5.962
	Water Content, %	17.6	15.8	21.3
	Dry Density, pcf	110.4	115.	104.7
	Saturation, %	94.3	96.2	97.9
	Void Ratio	0.492	0.433	0.575
Before Shear	Water Content, %	18.3	16.3	19.1
	Dry Density, pcf	111.2	115.1	109.6
	Saturation*, %	100.0	100.0	100.0
	Void Ratio	0.483	0.432	0.504
Back Press., psi	99.99	120.	130.	
Ver. Eff. Cons. Stress, psi	7.998	13.01	18.01	
Shear Strength, psi	16.26	19.66	16.45	
Strain at Failure, %	16.8	16.5	16.2	
Strain Rate, %/min	0.05	0.05	0.05	
B-Value	0.96	0.97	0.88	
Measured Specific Gravity	2.64	2.64	2.64	
Liquid Limit	43	43	43	
Plastic Limit	21	21	21	

MACTEC	Project: Plant Yates Ash Pond	
	Location: APB-1	
	Project No.: 6189109008	
	Boring No.: APB-1	
	Sample Type: Undisturbed	
	Description: Brown Clayey Sand	
Remarks: ASTM D4767-04.		

Phase calculations based on start and end of test.

* Saturation is set to 100% for phase calculations.

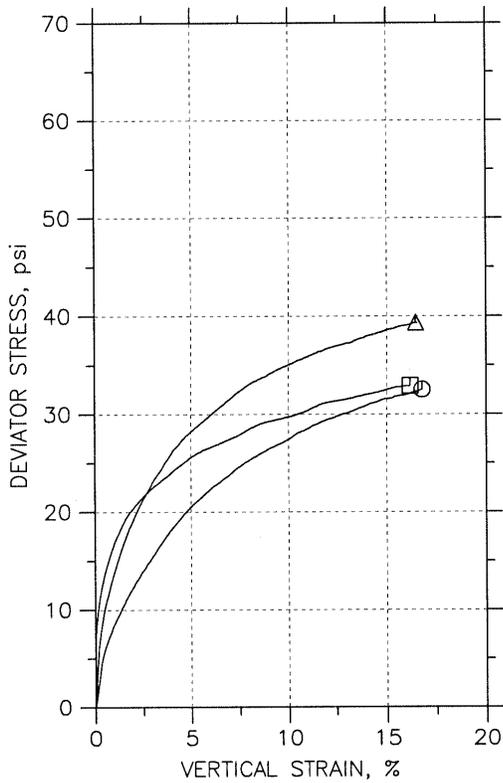
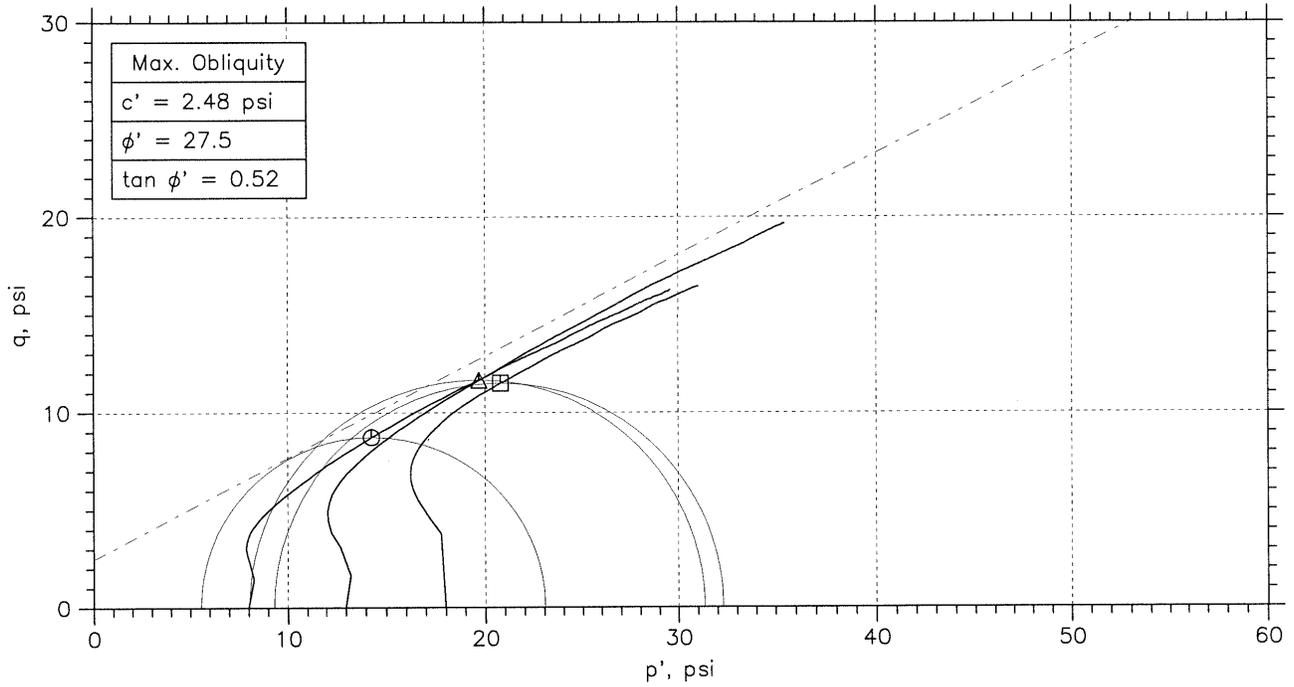
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Symbol	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
○	IS-1	10101.1	24.5-26.5ft	JW	4/2/10			10101.1a_2580.dat
△	IS-1	10101.2	24.5-26.5ft	JW	4/2/10			10101.2a_2547.dat
□	IS-1	10101.3	24.5-26.5ft	JW	4/2/10			10101.3a_2546.dat

MACTEC	Project: Plant Yates Ash Pond		Location: APB-1		Project No.: 6189109008	
	Boring No.: APB-1		Sample Type: Undisturbed			
	Description: Brown Clayey Sand					
	Remarks: ASTM D4767-04.					

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



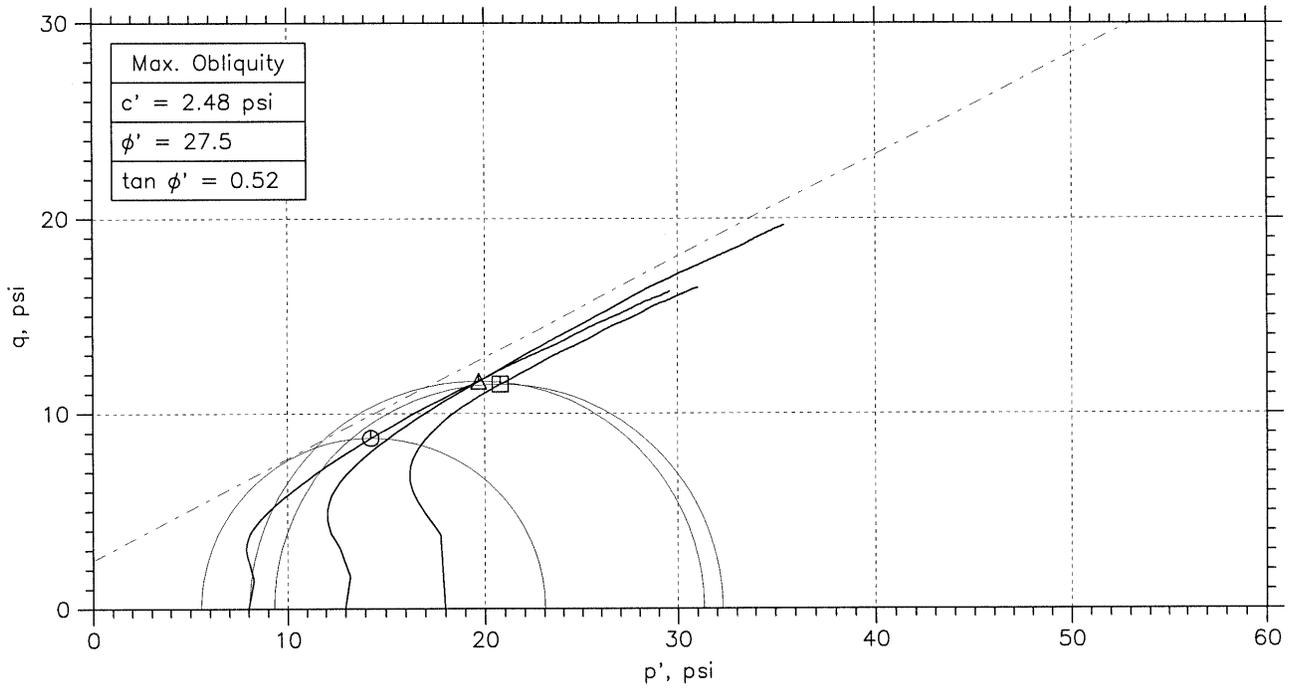
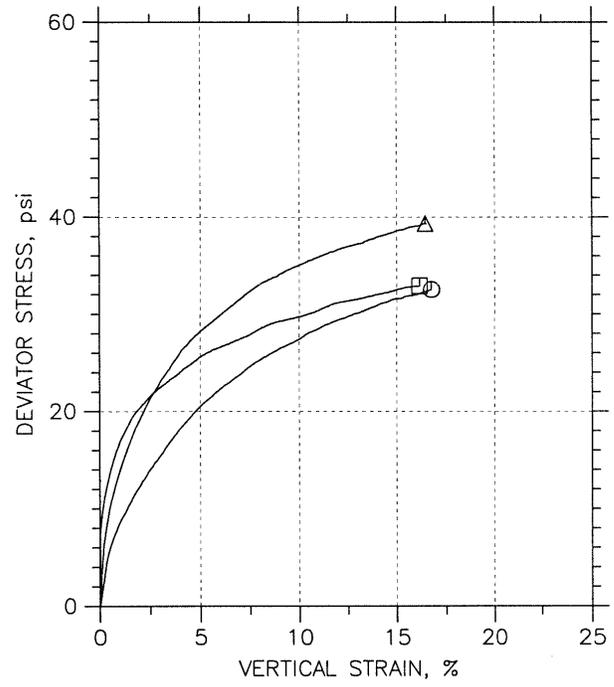
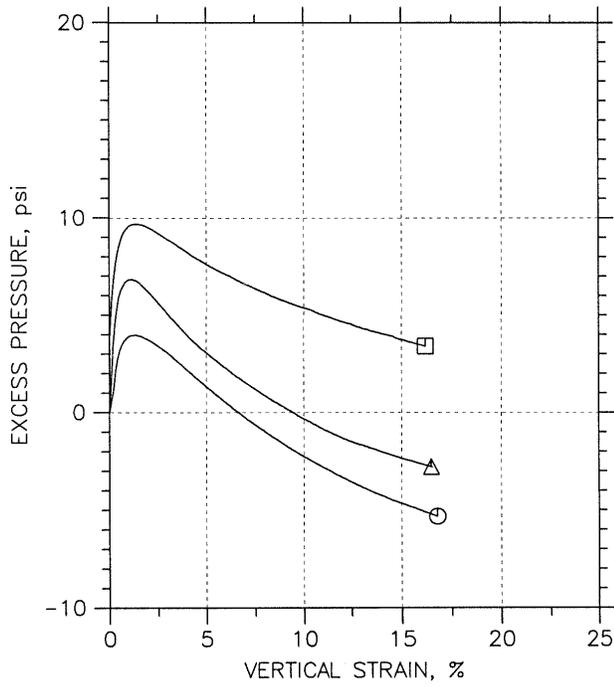
Symbol	⊙	△	□	
Sample No.	IS-1	IS-1	IS-1	
Test No.	10101.1	10101.2	10101.3	
Depth	24.5-26.5ft	24.5-26.5ft	24.5-26.5ft	
Initial	Diameter, in	2.87	2.866	2.879
	Height, in	5.967	5.962	5.962
	Water Content, %	17.6	15.8	21.3
	Dry Density, pcf	110.4	115.	104.7
	Saturation, %	94.3	96.2	97.9
	Void Ratio	0.492	0.433	0.575
Before Shear	Water Content, %	18.3	16.3	19.1
	Dry Density, pcf	111.2	115.1	109.6
	Saturation*, %	100.0	100.0	100.0
	Void Ratio	0.483	0.432	0.504
Back Press., psi	99.99	120.	130.	
Ver. Eff. Cons. Stress, psi	7.998	13.01	18.01	
Shear Strength, psi	16.26	19.66	16.45	
Strain at Failure, %	16.8	16.5	16.2	
Strain Rate, %/min	0.05	0.05	0.05	
B-Value	0.96	0.97	0.88	
Measured Specific Gravity	2.64	2.64	2.64	
Liquid Limit	43	43	43	
Plastic Limit	21	21	21	

MACTEC	Project: Plant Yates Ash Pond	
	Location: APB-1	
	Project No.: 6189109008	
	Boring No.: APB-1	
	Sample Type: Undisturbed	
	Description: Brown Clayey Sand	
Remarks: ASTM D4767-04		

Phase calculations based on start and end of test.

* Saturation is set to 100% for phase calculations.

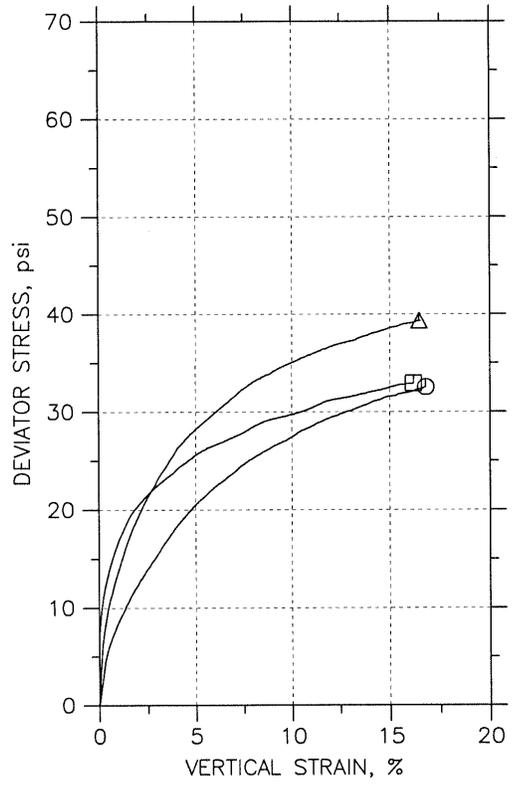
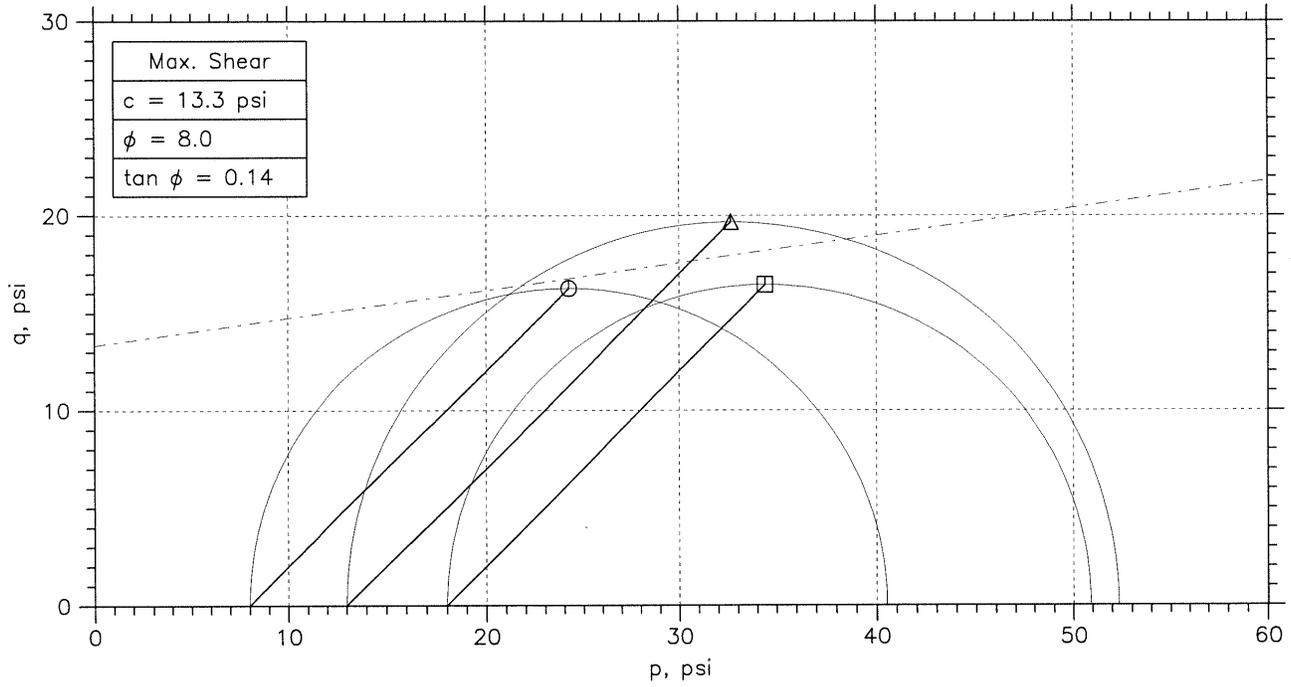
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
○	IS-1	10101.1	24.5-26.5ft	JW	4/2/10			10101.1a_2580.dat
△	IS-1	10101.2	24.5-26.5ft	JW	4/2/10			10101.2a_2547.dat
□	IS-1	10101.3	24.5-26.5ft	JW	4/2/10			10101.3a_2546.dat

MACTEC	Project: Plant Yates Ash Pond		Location: APB-1		Project No.: 6189109008	
	Boring No.: APB-1		Sample Type: Undisturbed			
	Description: Brown Clayey Sand					
	Remarks: ASTM D4767-04					

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767

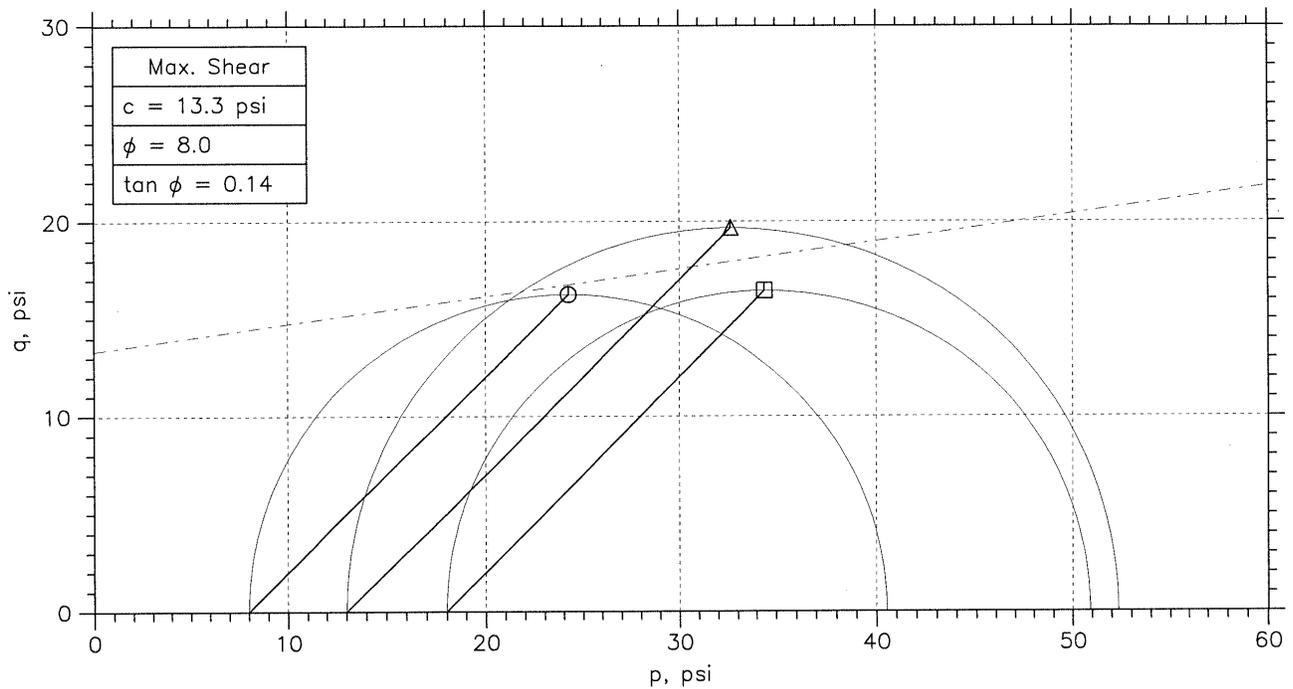
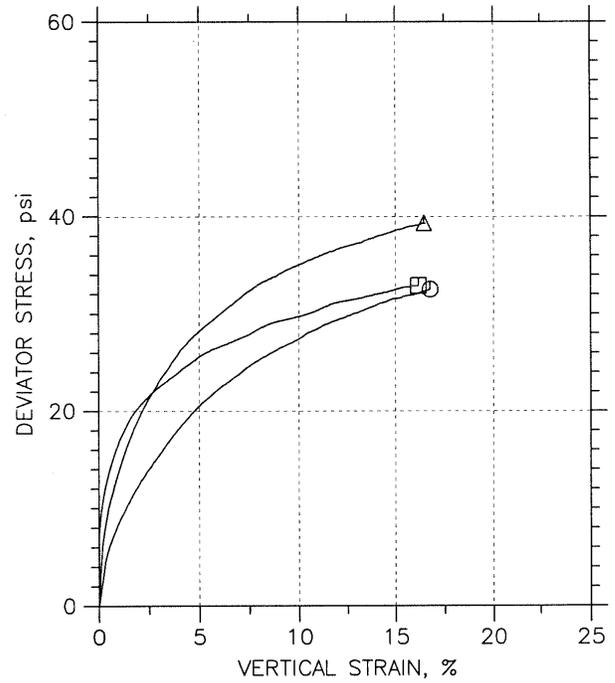
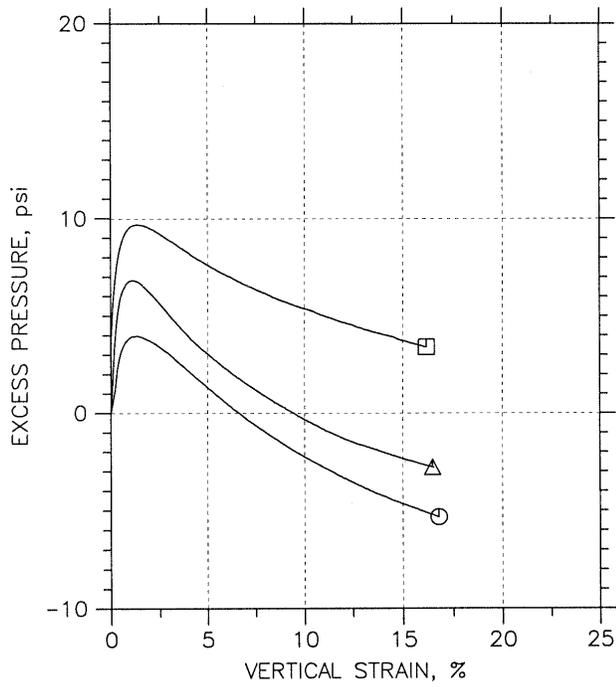


Symbol	⊙	△	□	
Sample No.	IS-1	IS-1	IS-1	
Test No.	10101.1	10101.2	10101.3	
Depth	24.5-26.5ft	24.5-26.5ft	24.5-26.5ft	
Initial	Diameter, in	2.87	2.866	2.879
	Height, in	5.967	5.962	5.962
	Water Content, %	17.6	15.8	21.3
	Dry Density, pcf	110.4	115.	104.7
	Saturation, %	94.3	96.2	97.9
	Void Ratio	0.492	0.433	0.575
Before Shear	Water Content, %	18.3	16.3	19.1
	Dry Density, pcf	111.2	115.1	109.6
	Saturation*, %	100.0	100.0	100.0
	Void Ratio	0.483	0.432	0.504
	Back Press., psi	99.99	120.	130.
	Ver. Eff. Cons. Stress, psi	7.998	13.01	18.01
	Shear Strength, psi	16.26	19.66	16.45
	Strain at Failure, %	16.8	16.5	16.2
	Strain Rate, %/min	0.05	0.05	0.05
	B-Value	0.96	0.97	0.88
	Measured Specific Gravity	2.64	2.64	2.64
	Liquid Limit	43	43	43
	Plastic Limit	21	21	21

MACTEC	Project: Plant Yates Ash Pond	
	Location: APB-1	
	Project No.: 6189109008	
	Boring No.: APB-1	
	Sample Type: Undisturbed	
	Description: Brown Clayey Sand	
Remarks: ASTM D4767-04		

Phase calculations based on start and end of test.
 * Saturation is set to 100% for phase calculations.

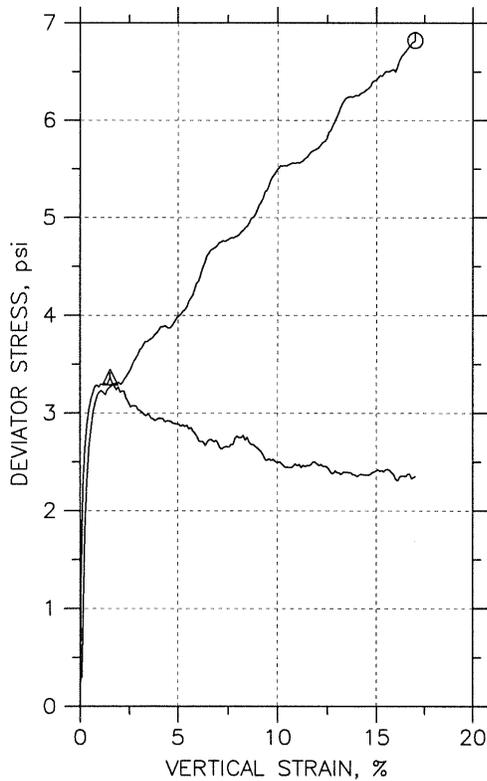
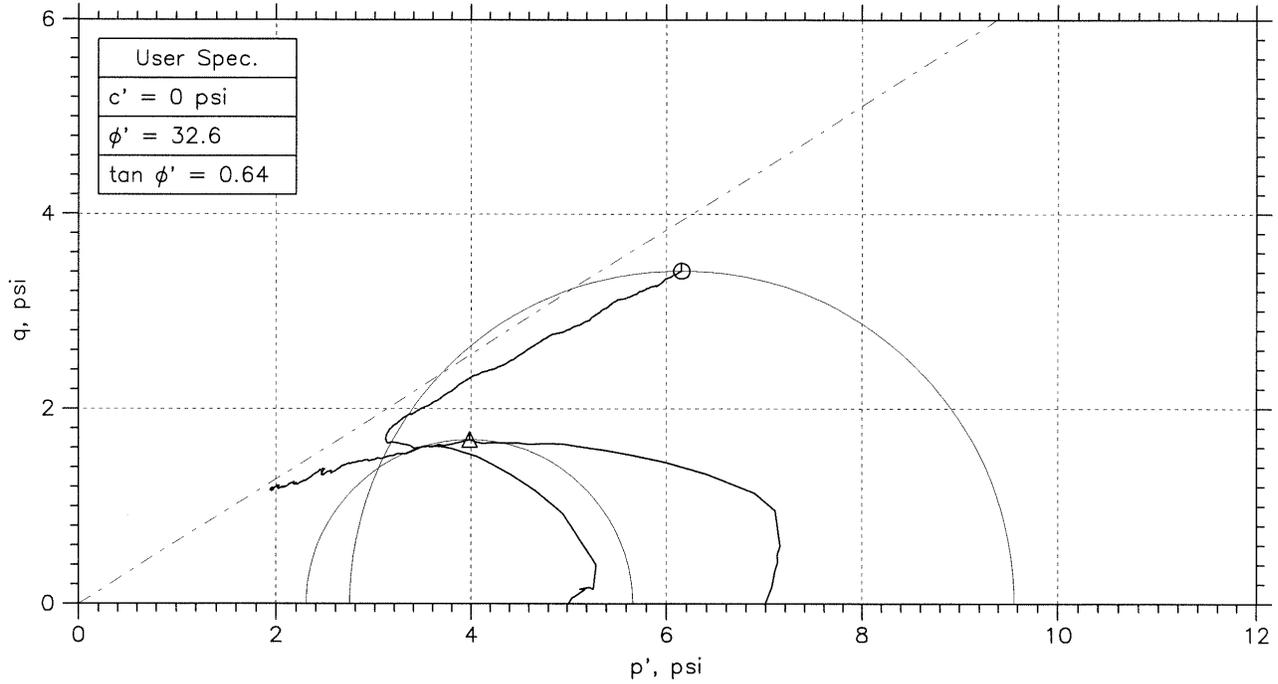
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
○	IS-1	10101.1	24.5-26.5ft	JW	4/2/10		10101.1a_2580.dat
△	IS-1	10101.2	24.5-26.5ft	JW	4/2/10		10101.2a_2547.dat
□	IS-1	10101.3	24.5-26.5ft	JW	4/2/10		10101.3a_2546.dat

MACTEC	Project: Plant Yates Ash Pond		Location: APB-1		Project No.: 6189109008	
	Boring No.: APB-1		Sample Type: Undisturbed			
	Description: Brown Clayey Sand					
	Remarks: ASTM D4767-04					

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



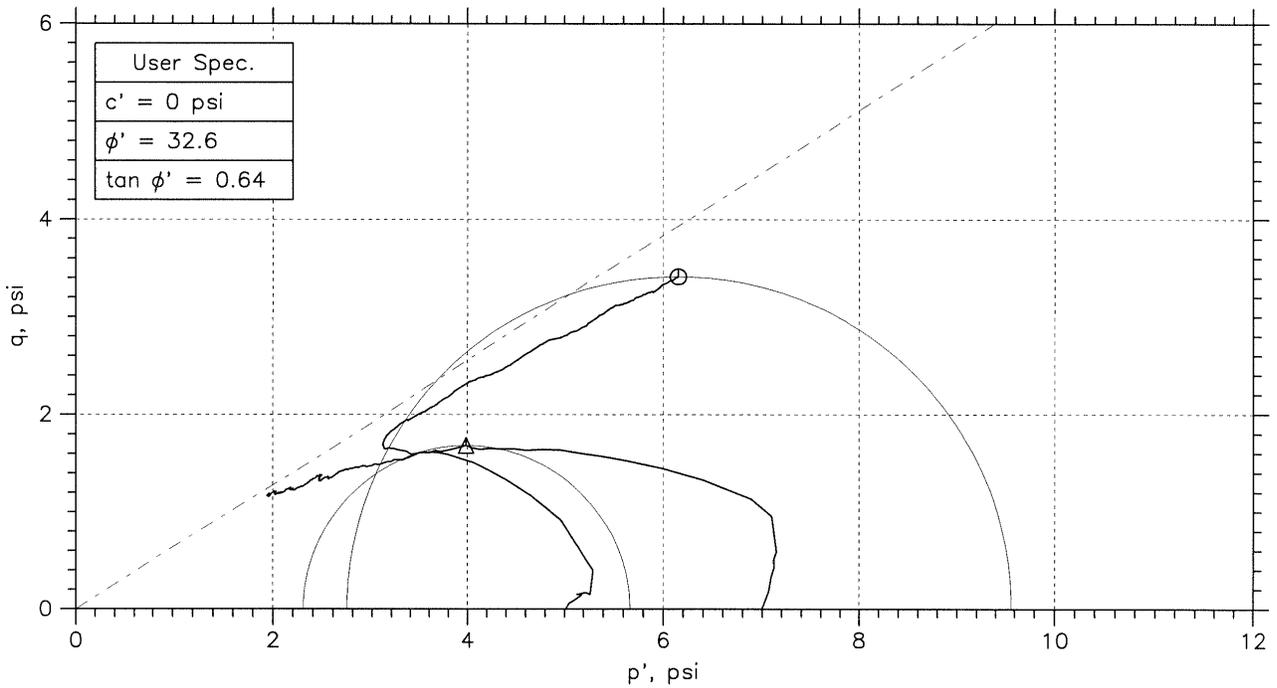
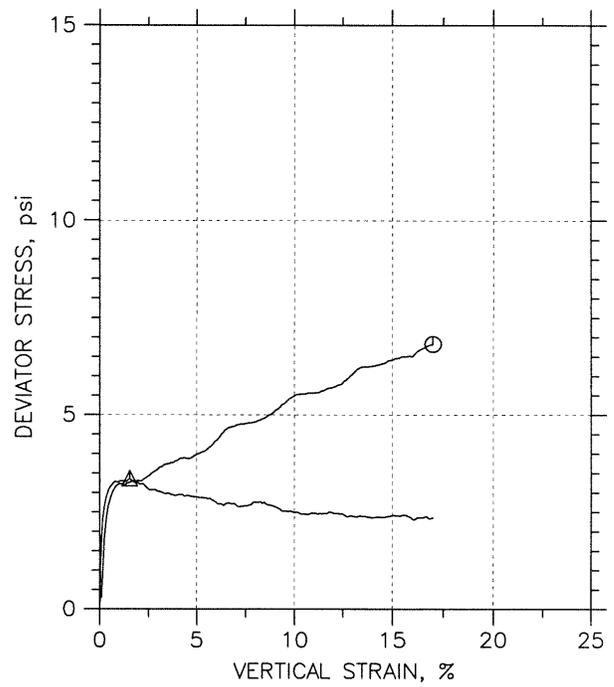
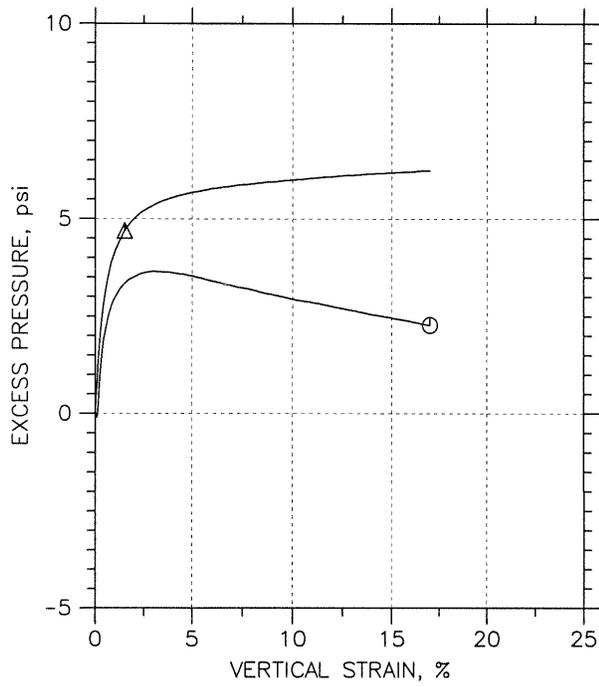
Symbol	⊙	△		
Sample No.	IS-1	IS-1		
Test No.	10102.2	10102.3		
Depth	7.9-9.5 ft	7.5-9.5 ft		
Initial	Diameter, in	2.846	2.866	
	Height, in	5.995	5.934	
	Water Content, %	30.3	33.9	
	Dry Density, pcf	62.58	56.72	
	Saturation, %	55.5	52.1	
Before Shear	Void Ratio	1.21	1.44	
	Water Content, %	49.9	51.7	
	Dry Density, pcf	65.73	64.52	
	Saturation*, %	100.0	100.0	
	Void Ratio	1.11	1.15	
Back Press., psi	140.	134.		
Ver. Eff. Cons. Stress, psi	5.014	7.		
Shear Strength, psi	3.41	1.682		
Strain at Failure, %	17	1.52		
Strain Rate, %/min	0.05	0.05		
B-Value	0.86	0.95		
Measured Specific Gravity	2.22	2.22		
Liquid Limit	NP	NP		
Plastic Limit	NP	NP		

MACTEC	Project: Plant Yates Ash Pond	
	Location: APB-2	
	Project No.: 6189109008	
	Boring No.: APB-2	
	Sample Type: Undisturbed	
	Description: Dark Gray Sandy Silt (Fly Ash)	
Remarks: ASTM D4767-04		

Phase calculations based on start and end of test.

* Saturation is set to 100% for phase calculations.

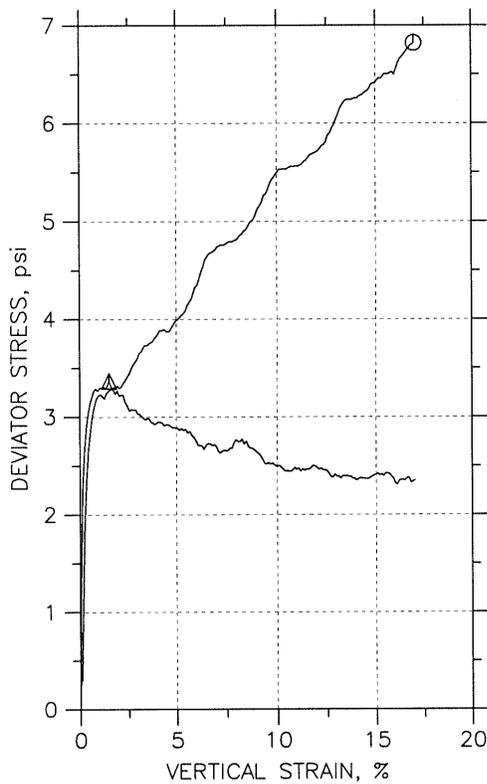
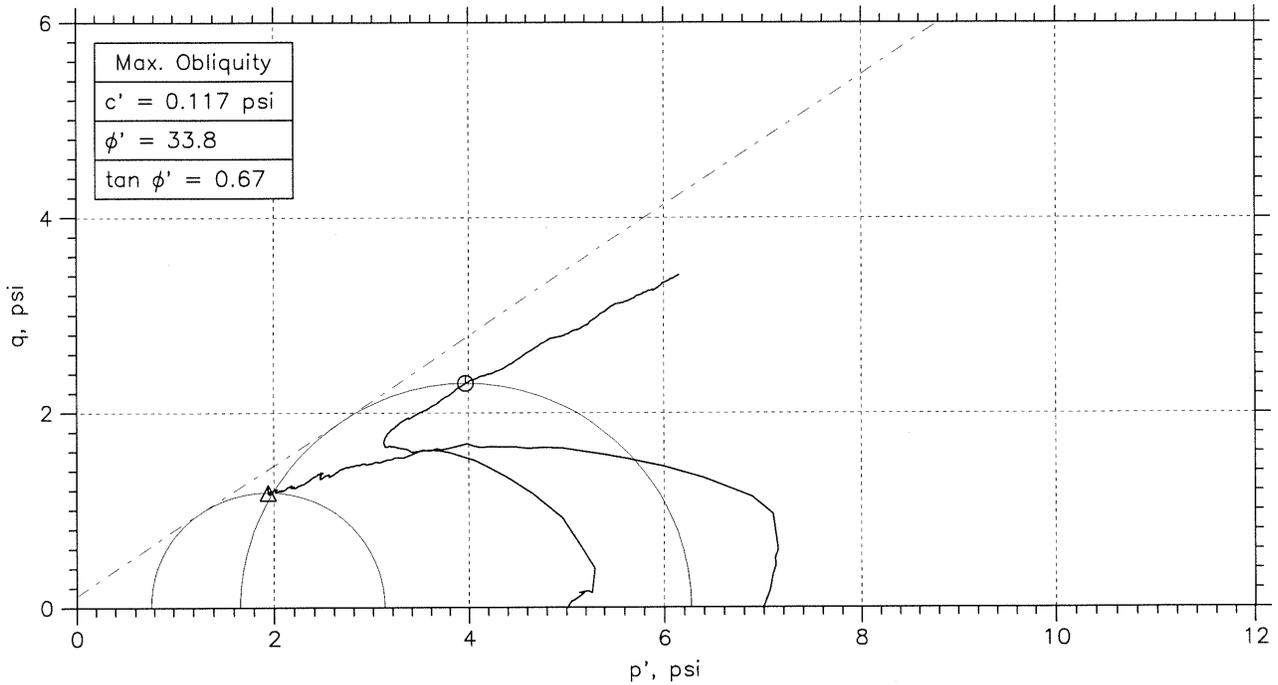
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Symbol	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊙	IS-1	10102.2	7.9-9.5 ft	JW	4/6/10			10102.2_2546.dat
△	IS-1	10102.3	7.5-9.5 ft	JW	4/6/10			10102.3_2547.dat

MACTEC	Project: Plant Yates Ash Pond		Location: APB-2		Project No.: 6189109008	
	Boring No.: APB-2		Sample Type: Undisturbed			
	Description: Dark Gray Sandy Silt (Fly Ash)					
	Remarks: ASTM D4767-04					

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



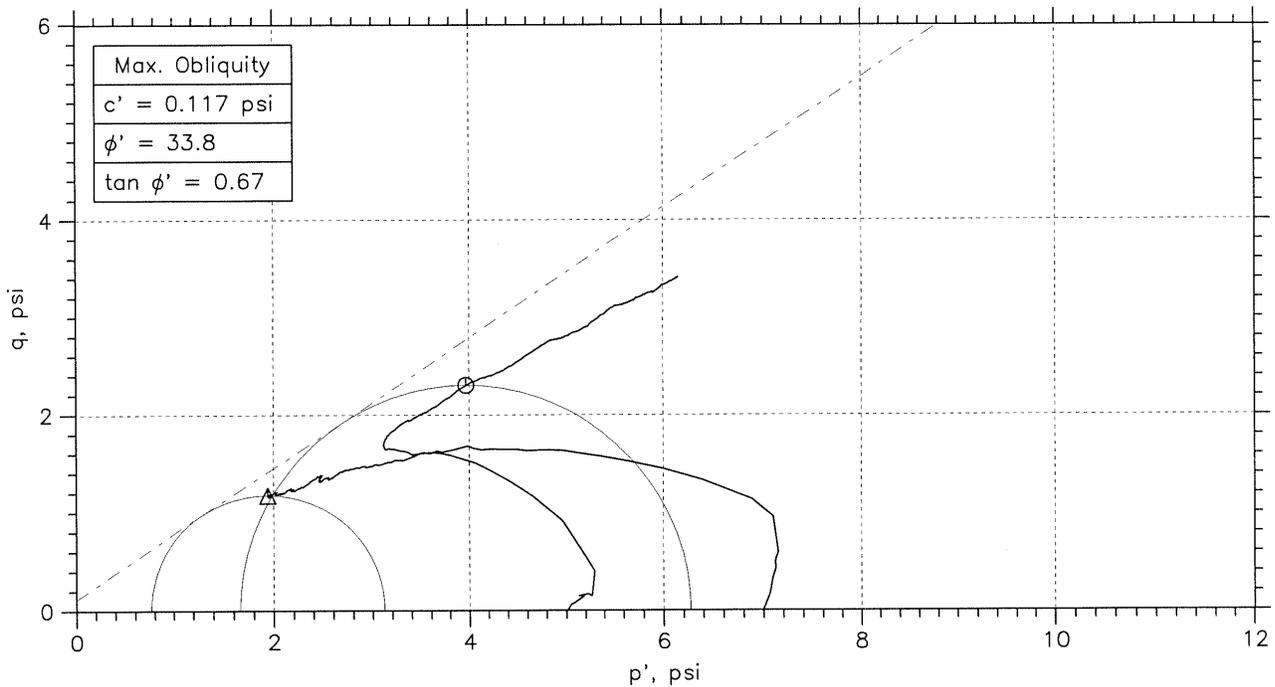
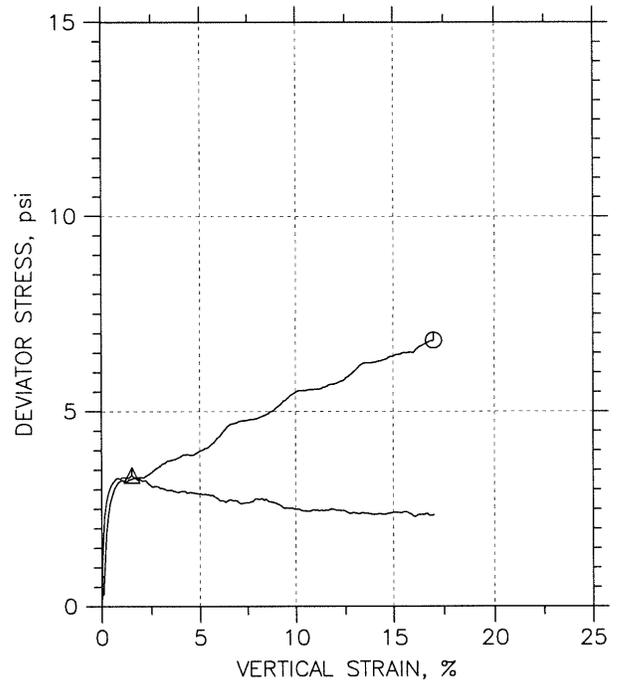
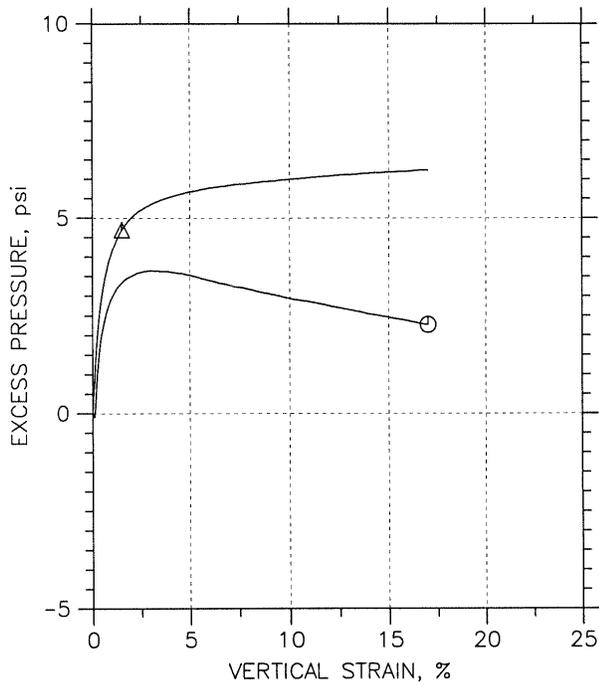
Symbol	⊙	△		
Sample No.	IS-1	IS-1		
Test No.	10102.2	10102.3		
Depth	7.9-9.5 ft	7.5-9.5 ft		
Initial	Diameter, in	2.846	2.866	
	Height, in	5.995	5.934	
	Water Content, %	30.3	33.9	
	Dry Density, pcf	62.58	56.72	
	Saturation, %	55.5	52.1	
Before Shear	Void Ratio	1.21	1.44	
	Water Content, %	49.9	51.7	
	Dry Density, pcf	65.73	64.52	
	Saturation*, %	100.0	100.0	
	Void Ratio	1.11	1.15	
	Back Press., psi	140.	134.	
	Ver. Eff. Cons. Stress, psi	5.014	7.	
	Shear Strength, psi	3.41	1.682	
	Strain at Failure, %	17	1.52	
	Strain Rate, %/min	0.05	0.05	
	B-Value	0.86	0.95	
	Measured Specific Gravity	2.22	2.22	
	Liquid Limit	NP	NP	
	Plastic Limit	NP	NP	

MACTEC	Project: Plant Yates Ash Pond	
	Location: APB-2	
	Project No.: 6189109008	
	Boring No.: APB-2	
	Sample Type: Undisturbed	
	Description: Dark Gray Sandy Silt (Fly Ash)	
Remarks: ASTM D4767-04		

Phase calculations based on start and end of test.

* Saturation is set to 100% for phase calculations.

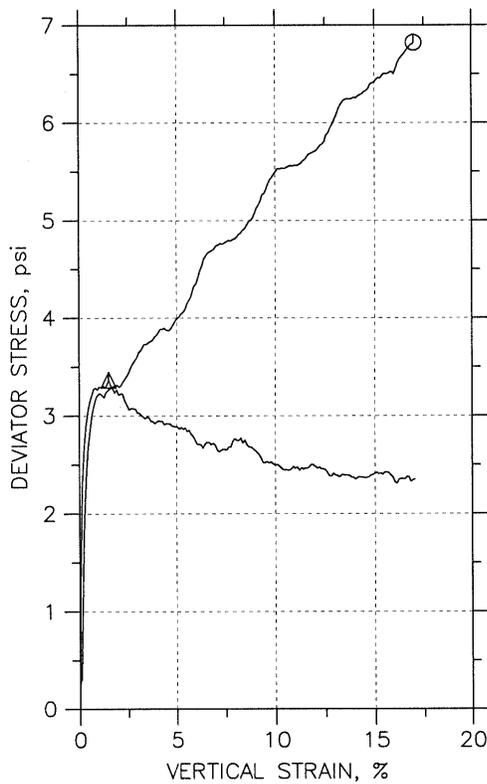
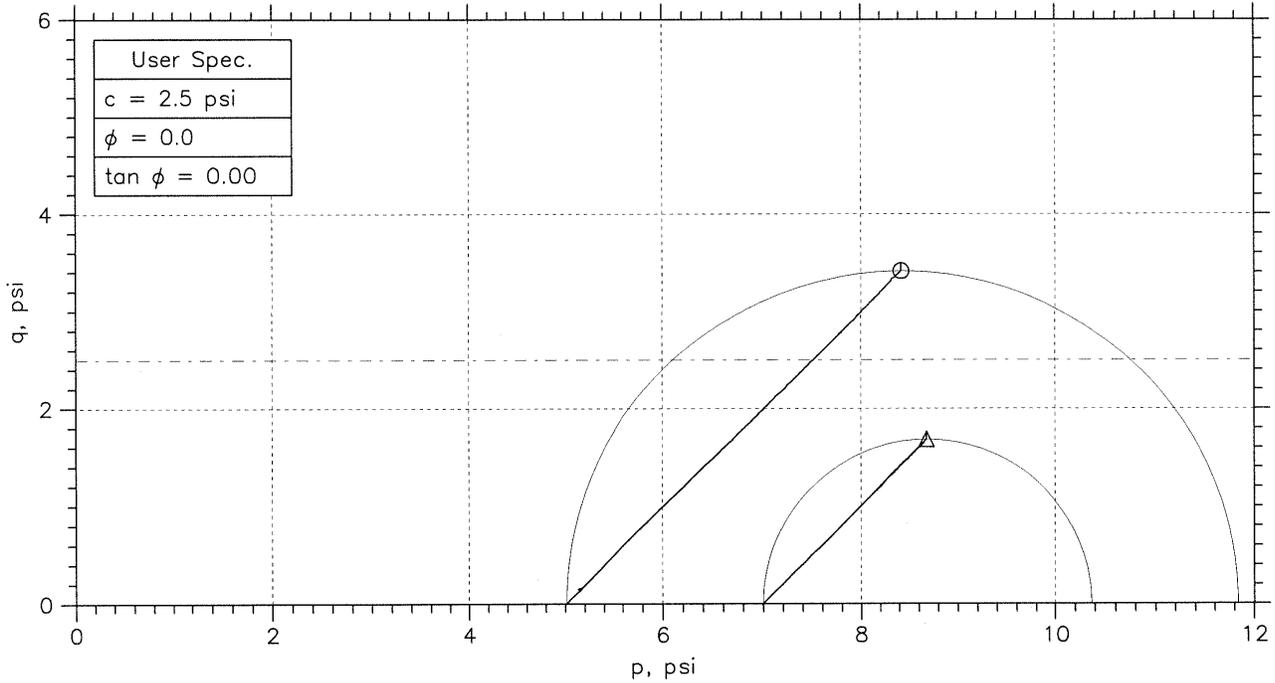
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊙	IS-1	10102.2	JW	4/6/10			10102.2_2546.dat
△	IS-1	10102.3	JW	4/6/10			10102.3_2547.dat

MACTEC	Project: Plant Yates Ash Pond		Location: APB-2		Project No.: 6189109008	
	Boring No.: APB-2		Sample Type: Undisturbed			
	Description: Dark Gray Sandy Silt (Fly Ash)					
	Remarks: ASTM D4767-04					

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



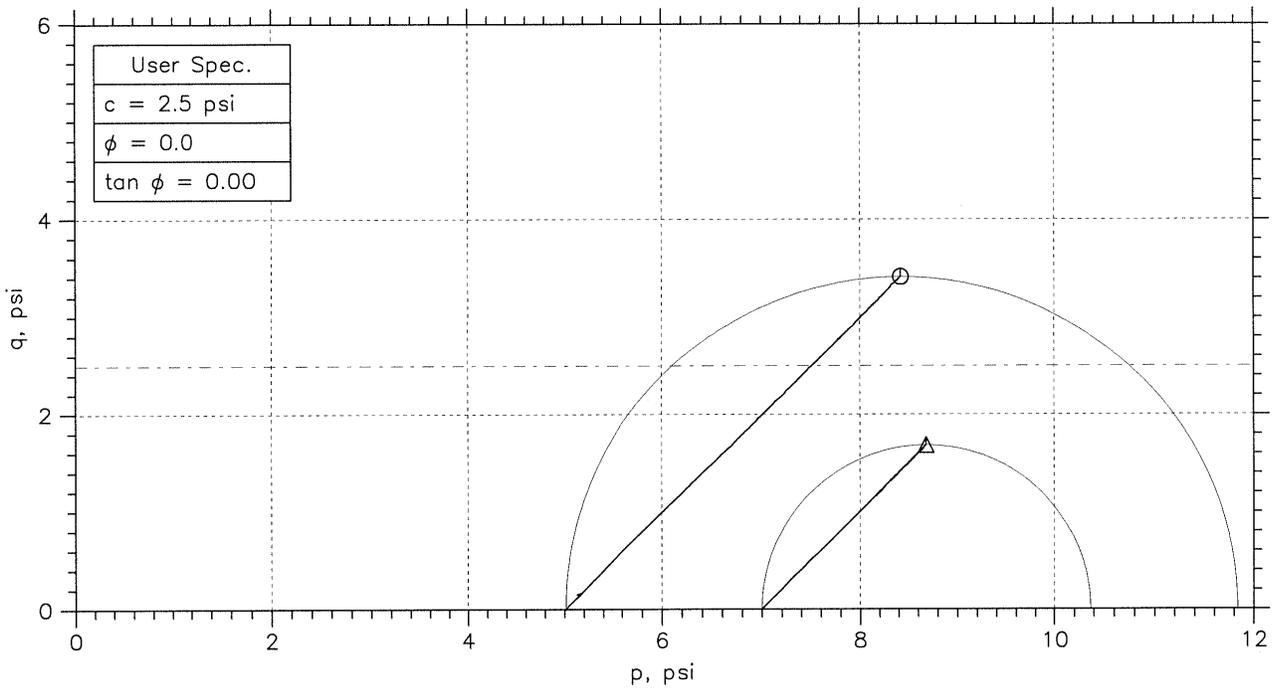
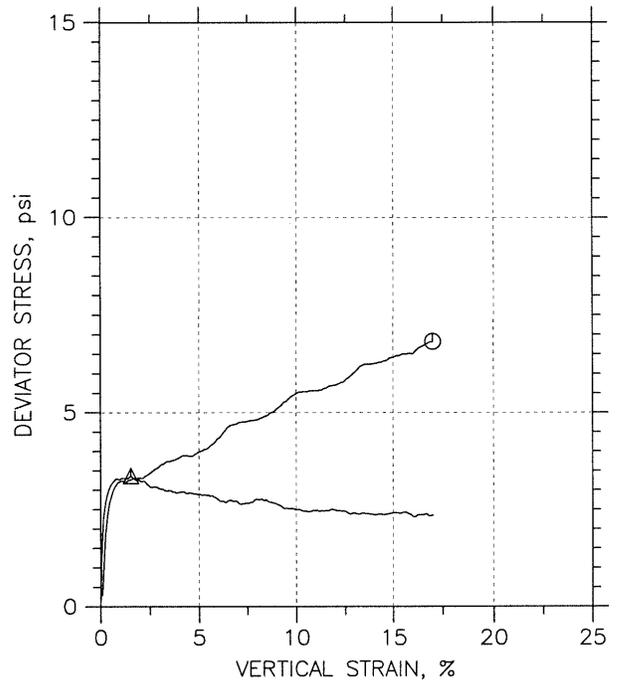
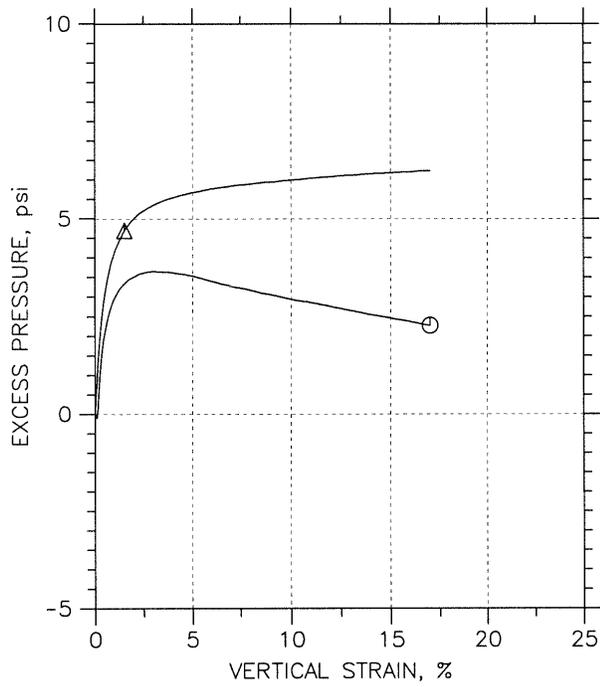
Symbol	⊙	△		
Sample No.	IS-1	IS-1		
Test No.	10102.2	10102.3		
Depth	7.9-9.5 ft	7.5-9.5 ft		
Initial	Diameter, in	2.846	2.866	
	Height, in	5.995	5.934	
	Water Content, %	30.3	33.9	
	Dry Density, pcf	62.58	56.72	
	Saturation, %	55.5	52.1	
Before Shear	Void Ratio	1.21	1.44	
	Water Content, %	49.9	51.7	
	Dry Density, pcf	65.73	64.52	
	Saturation*, %	100.0	100.0	
	Void Ratio	1.11	1.15	
	Back Press., psi	140.	134.	
Ver. Eff. Cons. Stress, psi	5.014	7.		
Shear Strength, psi	3.41	1.682		
Strain at Failure, %	17	1.52		
Strain Rate, %/min	0.05	0.05		
B-Value	0.86	0.95		
Measured Specific Gravity	2.22	2.22		
Liquid Limit	NP	NP		
Plastic Limit	NP	NP		

MACTEC	Project: Plant Yates Ash Pond			
	Location: APB-2			
	Project No.: 6189109008			
	Boring No.: APB-2			
	Sample Type: Undisturbed			
	Description: Dark Gray Sandy Silt (Fly Ash)			
	Remarks: ASTM D4767-04			

Phase calculations based on start and end of test.

* Saturation is set to 100% for phase calculations.

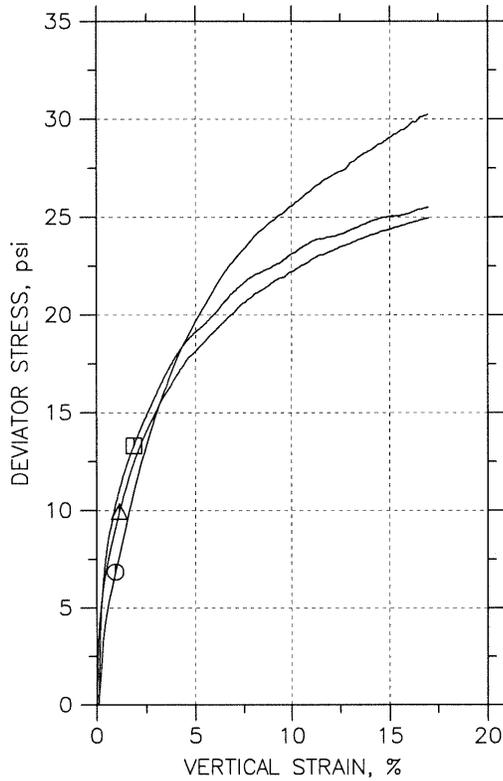
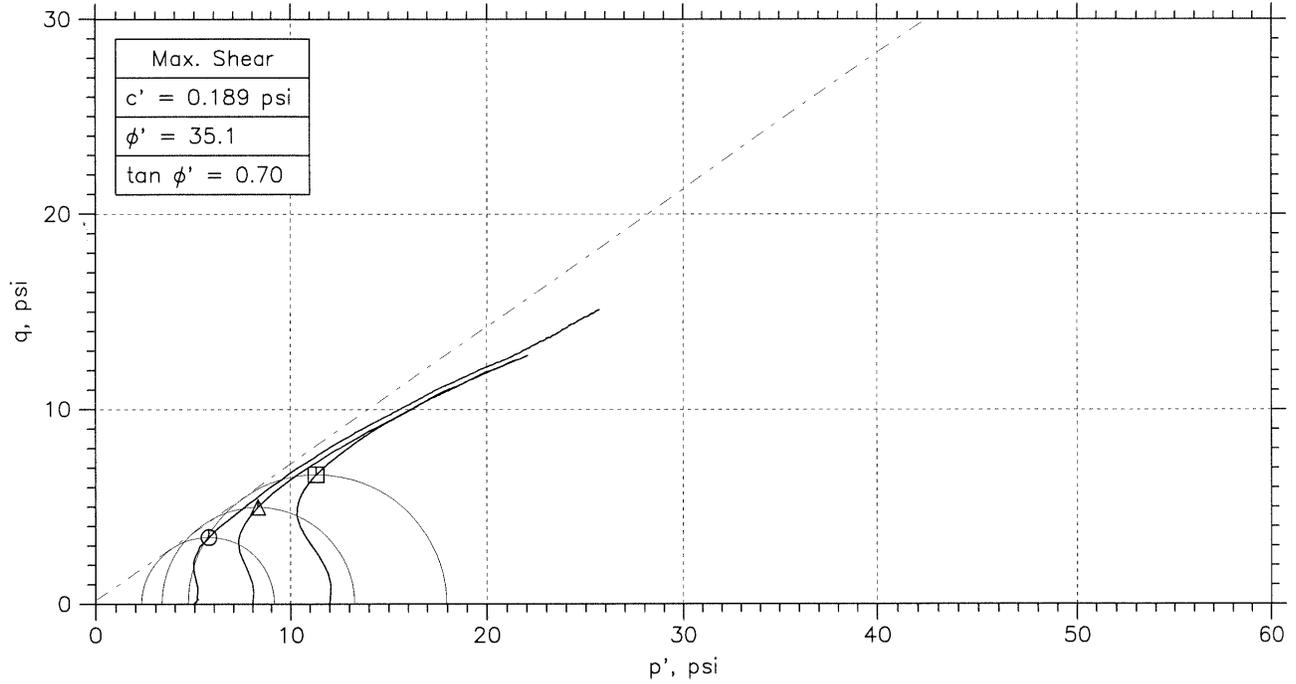
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊙	IS-1	10102.2	7.9-9.5 ft	JW	4/6/10			10102.2_2546.dat
Δ	IS-1	10102.3	7.5-9.5 ft	JW	4/6/10			10102.3_2547.dat

MACTEC	Project: Plant Yates Ash Pond		Location: APB-2		Project No.: 6189109008	
	Boring No.: APB-2		Sample Type: Undisturbed			
	Description: Dark Gray Sandy Silt (Fly Ash)					
	Remarks: ASTM D4767-04					

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



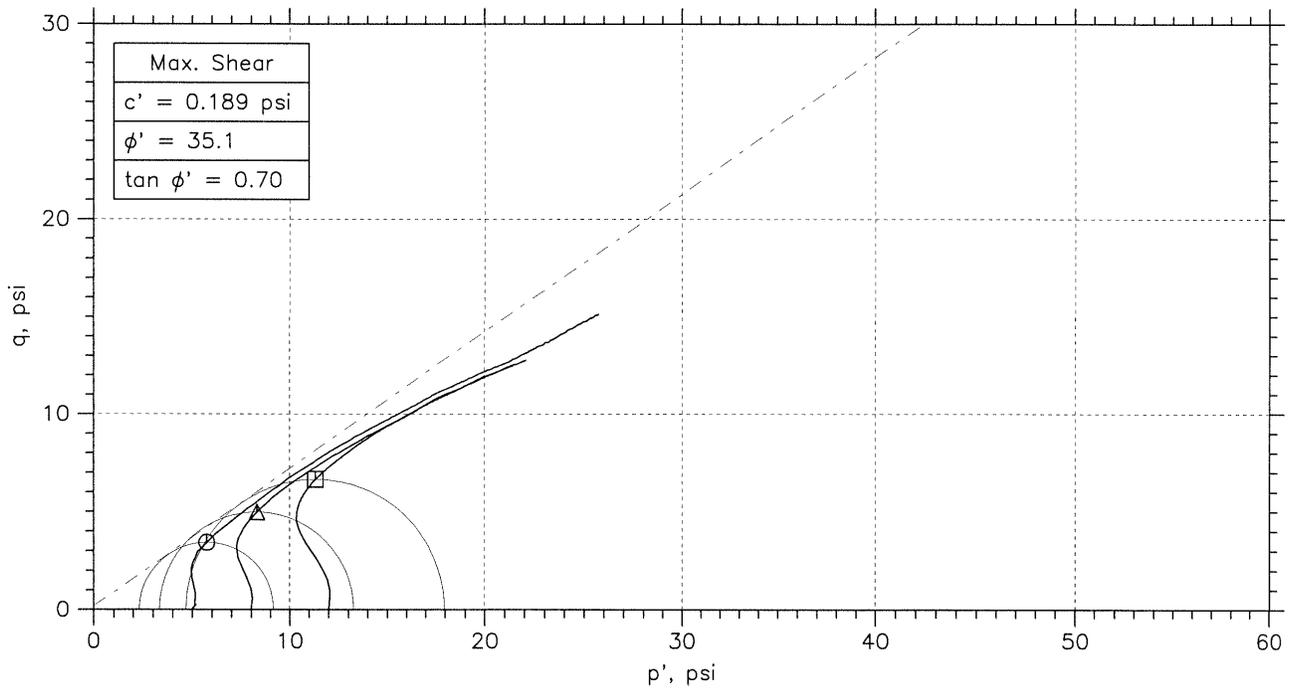
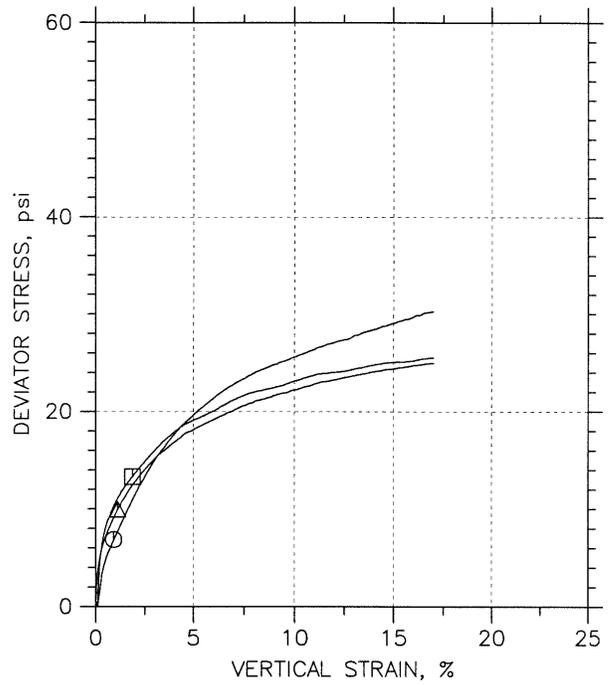
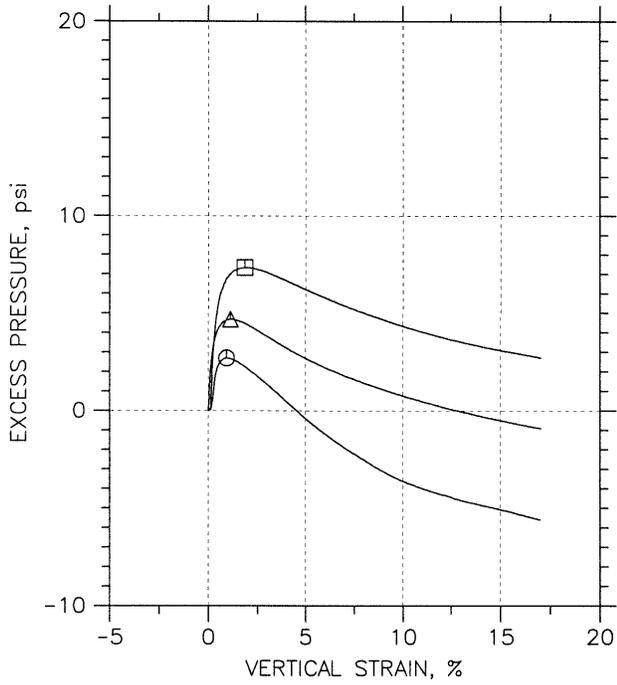
Symbol	⊙	△	□	
Sample No.	IS-1	IS-1	IS-1	
Test No.	10103.1	10103.2	10103.3	
Depth	7.5-19.5ft	7.5-19.5ft	7.5-19.5ft	
Initial	Diameter, in	2.875	2.864	2.857
	Height, in	5.958	5.958	5.953
	Water Content, %	20.7	21.8	27.4
	Dry Density, pcf	101.1	103.1	95.56
	Saturation, %	87.9	97.6	100.7
	Void Ratio	0.618	0.586	0.712
Before Shear	Water Content, %	22.4	22.1	27.0
	Dry Density, pcf	103.1	103.6	95.74
	Saturation*, %	100.0	100.0	100.0
	Void Ratio	0.587	0.579	0.708
Back Press., psi	140.	116.	108.	
Ver. Eff. Cons. Stress, psi	4.996	7.996	12.	
Shear Strength, psi	3.423	4.974	6.643	
Strain at Failure, %	0.93	1.13	1.87	
Strain Rate, %/min	0.05	0.05	0.05	
B-Value	0.97	0.96	0.97	
Measured Specific Gravity	2.62	2.62	2.62	
Liquid Limit	42	42	42	
Plastic Limit	25	25	25	

MACTEC	Project: Plant Yates Ash Pond	
	Location: APB-3	
	Project No.: 6189109008	
	Boring No.: APB-3	
	Sample Type: Undisturbed	
	Description: Brown Clayey Sand	
Remarks: ASTM D4767-04. Strains at failure based on peak excess pore pressure.		

Phase calculations based on start and end of test.

* Saturation is set to 100% for phase calculations.

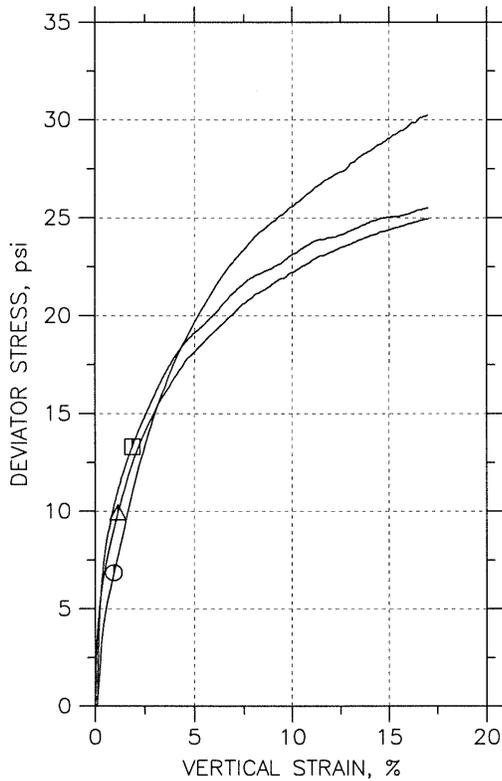
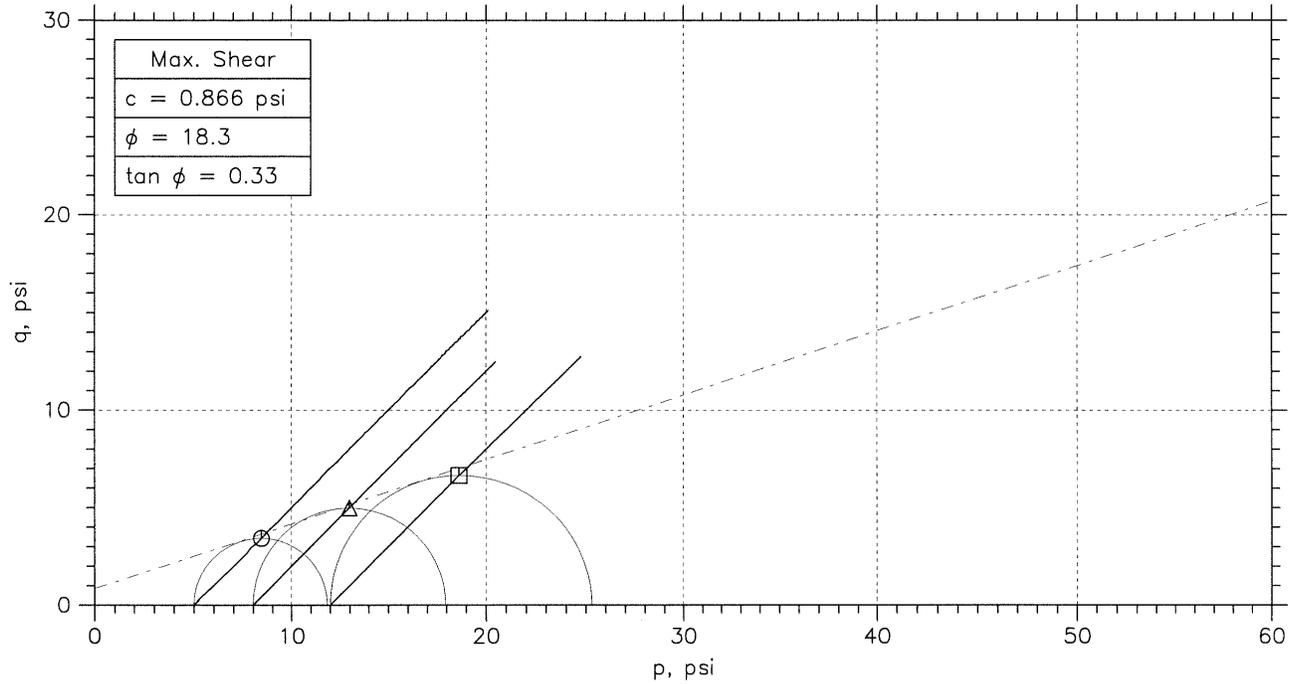
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
○	IS-1	10103.1	17.5-19.5ft	JW	4/8/10			10103.1_2581.dat
△	IS-1	10103.2	17.5-19.5ft	JW	4/8/10			10103.2_2582.dat
□	IS-1	10103.3	17.5-19.5ft	JW	4/8/10			10103.3_2583.dat

MACTEC	Project: Plant Yates Ash Pond		Location: APB-3		Project No.: 6189109008	
	Boring No.: APB-3		Sample Type: Undisturbed			
	Description: Brown Clayey Sand					
	Remarks: ASTM D4767-04. Strains at failure based on peak excess pore pressure.					

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



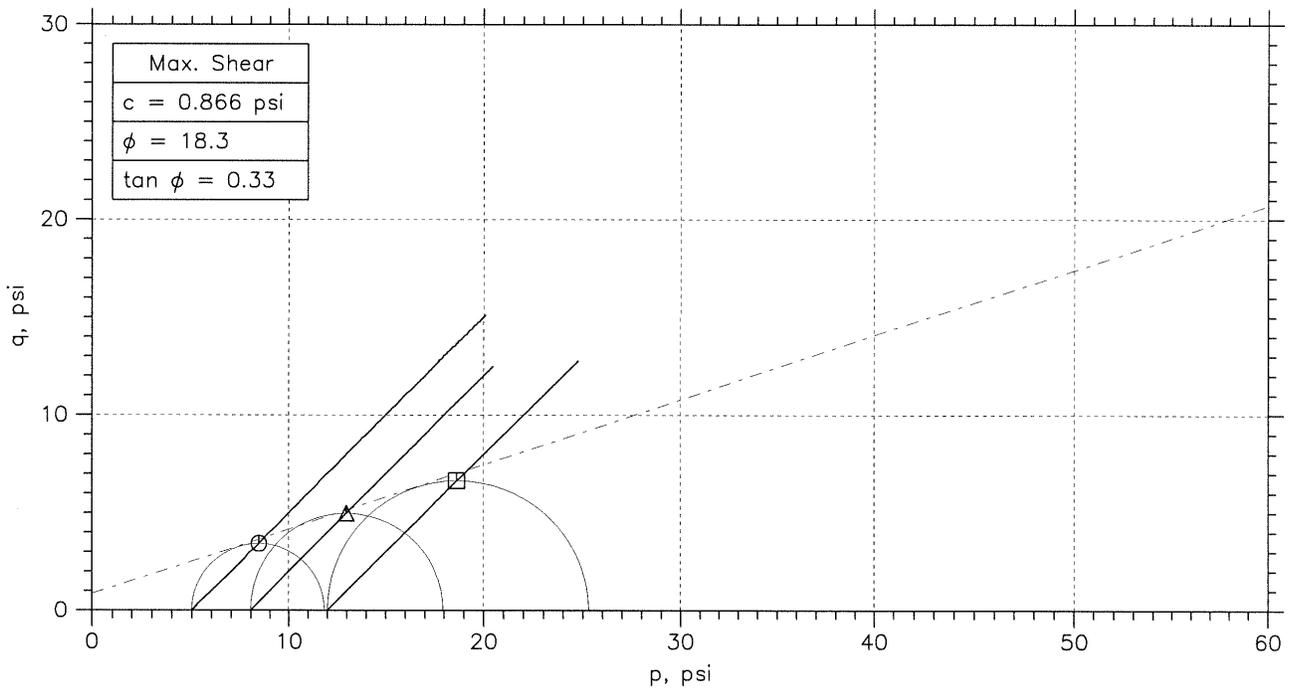
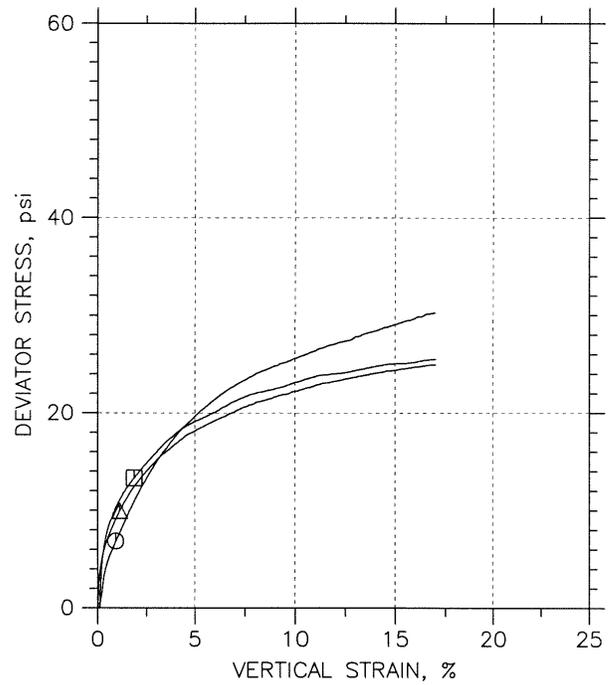
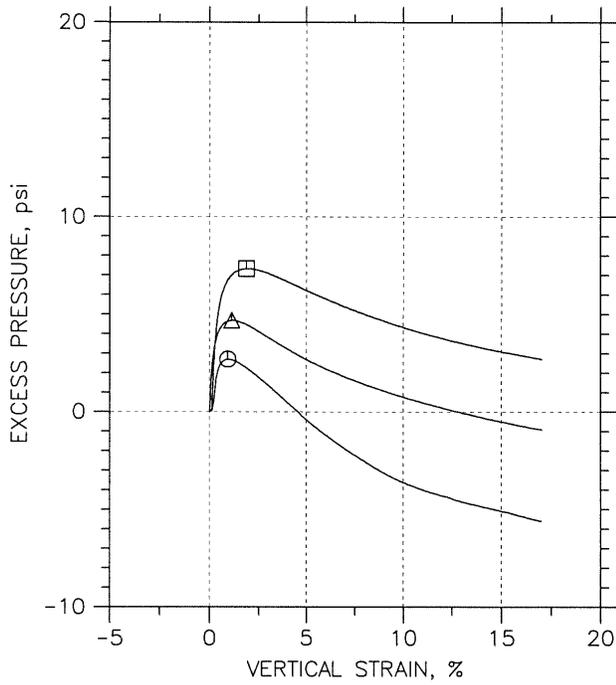
Symbol		⊕	△	□	
Sample No.		IS-1	IS-1	IS-1	
Test No.		10103.1	10103.2	10103.3	
Depth		7.5-19.5ft	7.5-19.5ft	7.5-19.5ft	
Initial	Diameter, in	2.875	2.864	2.857	
	Height, in	5.958	5.958	5.953	
	Water Content, %	20.7	21.8	27.4	
	Dry Density, pcf	101.1	103.1	95.56	
	Saturation, %	87.9	97.6	100.7	
	Void Ratio	0.618	0.586	0.712	
Before Shear	Water Content, %	22.4	22.1	27.0	
	Dry Density, pcf	103.1	103.6	95.74	
	Saturation*, %	100.0	100.0	100.0	
	Void Ratio	0.587	0.579	0.708	
Back Press., psi		140.	116.	108.	
Ver. Eff. Cons. Stress, psi		4.996	7.996	12.	
Shear Strength, psi		3.423	4.974	6.643	
Strain at Failure, %		0.93	1.13	1.87	
Strain Rate, %/min		0.05	0.05	0.05	
B-Value		0.97	0.96	0.97	
Measured Specific Gravity		2.62	2.62	2.62	
Liquid Limit		42	42	42	
Plastic Limit		25	25	25	

MACTEC	Project: Plant Yates Ash Pond	
	Location: APB-3	
	Project No.: 6189109008	
	Boring No.: APB-3	
	Sample Type: Undisturbed	
	Description: Brown Clayey Sand	
Remarks: ASTM D4767-04. Strains at failure based on peak excess pore pressure.		

Phase calculations based on start and end of test.

* Saturation is set to 100% for phase calculations.

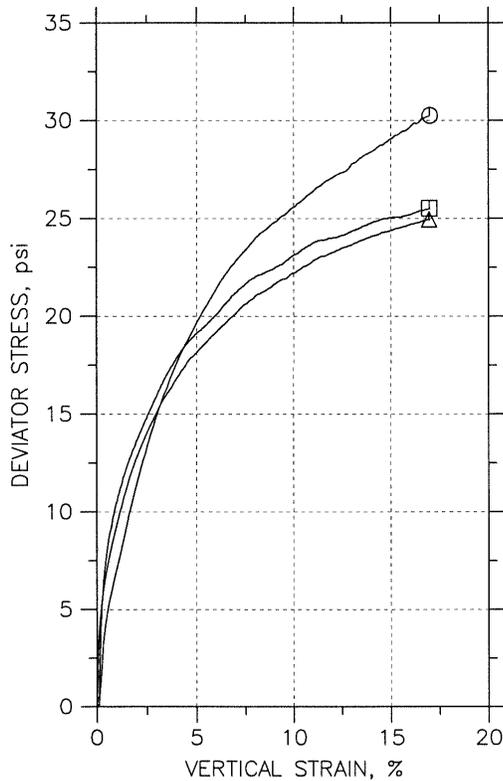
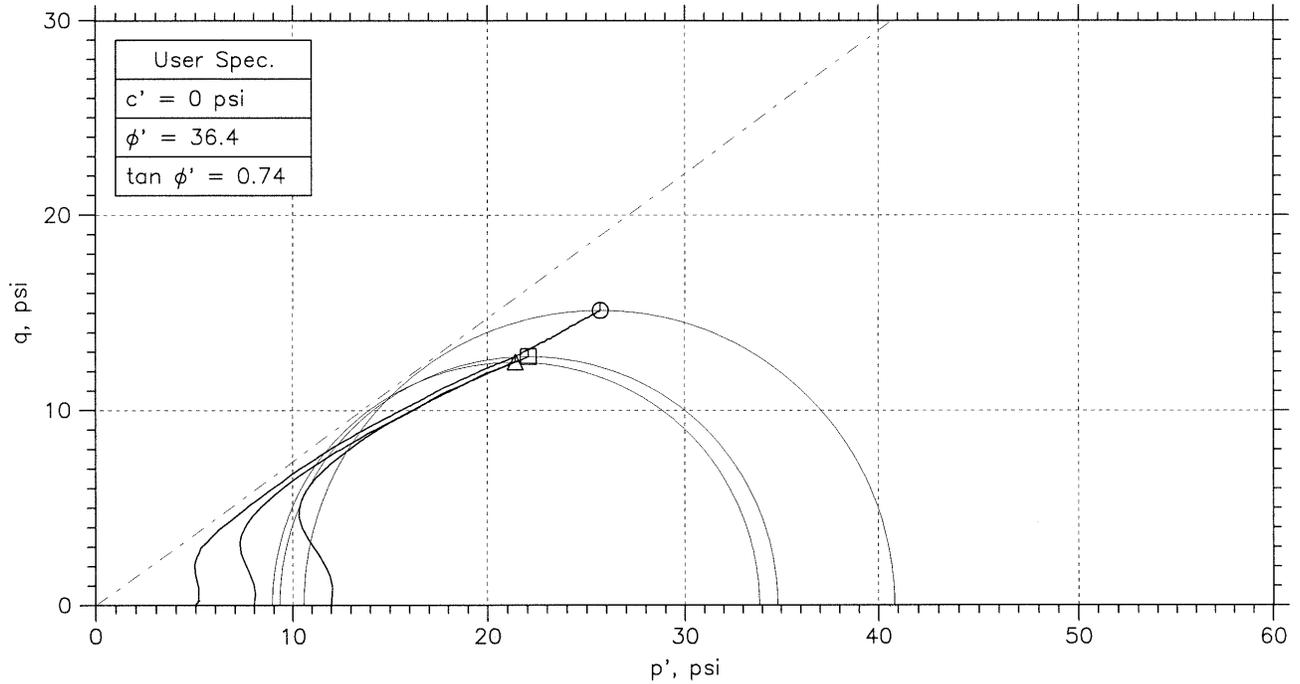
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
○	IS-1	10103.1	17.5-19.5ft	JW	4/8/10			10103.1_2581.dat
△	IS-1	10103.2	17.5-19.5ft	JW	4/8/10			10103.2_2582.dat
□	IS-1	10103.3	17.5-19.5ft	JW	4/8/10			10103.3_2583.dat

MACTEC	Project: Plant Yates Ash Pond		Location: APB-3		Project No.: 6189109008	
	Boring No.: APB-3		Sample Type: Undisturbed			
	Description: Brown Clayey Sand					
	Remarks: ASTM D4767-04. Strains at failure based on peak excess pore pressure.					

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



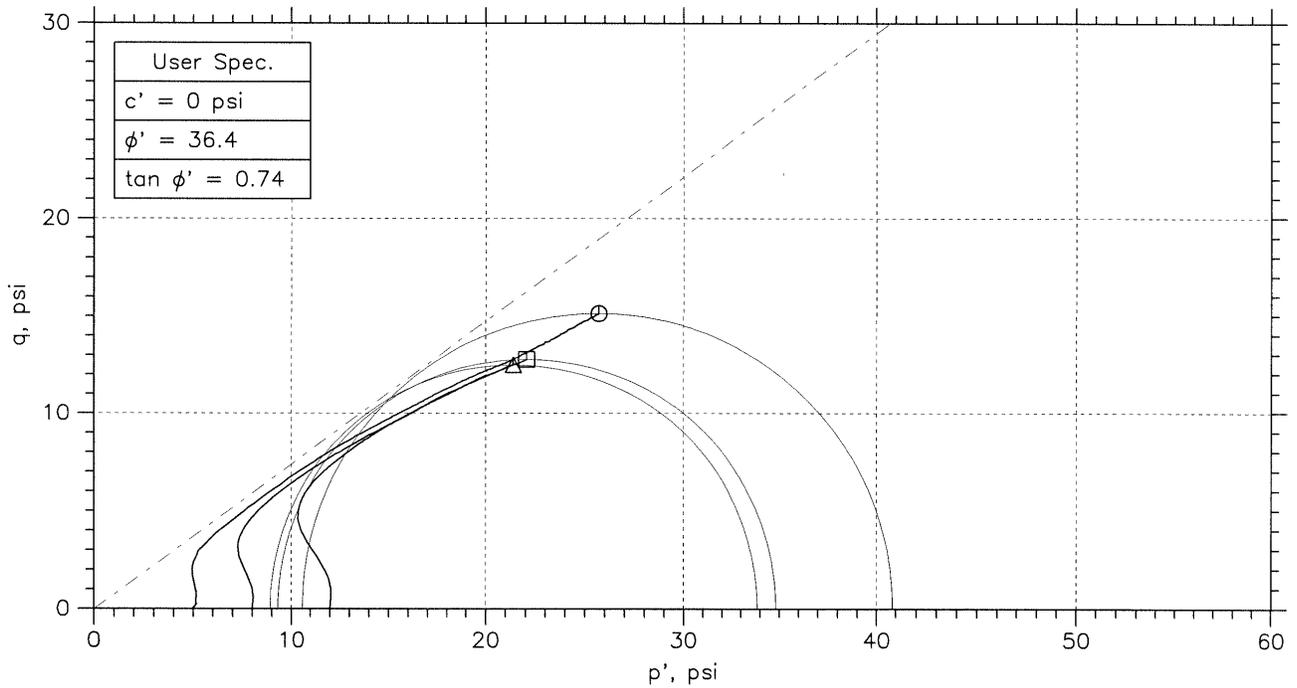
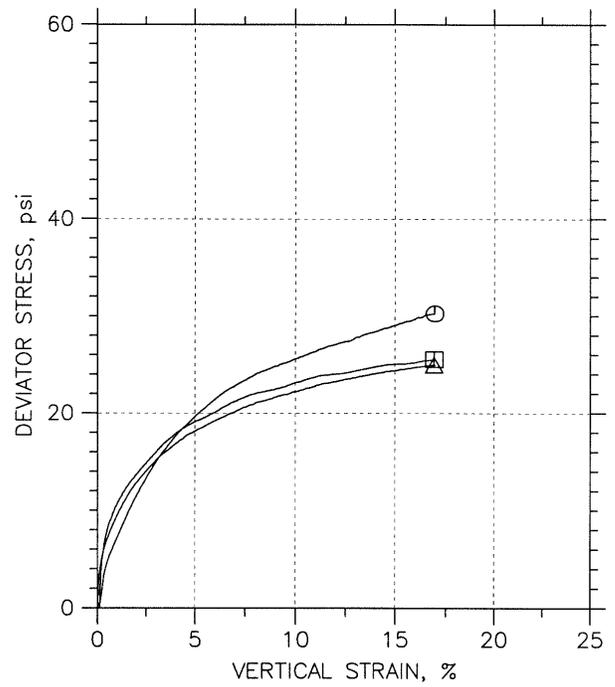
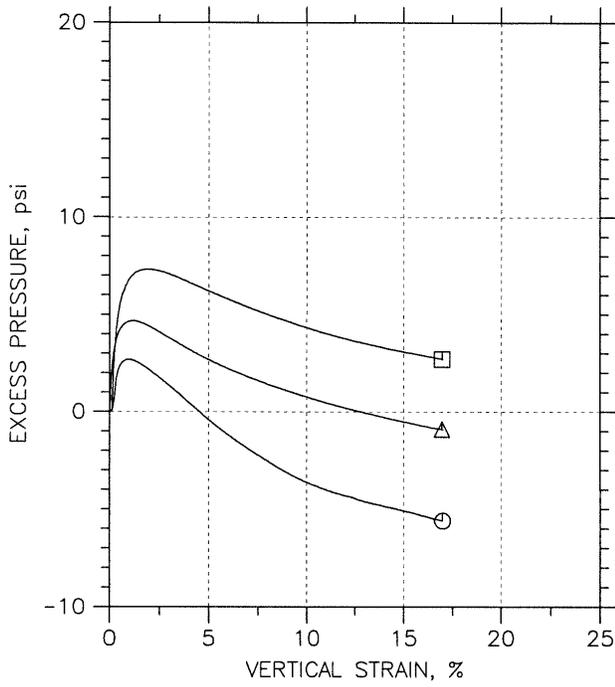
Symbol	⊙	△	□	
Sample No.	IS-1	IS-1	IS-1	
Test No.	10103.1	10103.2	10103.3	
Depth	7.5-19.5ft	7.5-19.5ft	7.5-19.5ft	
Initial	Diameter, in	2.875	2.864	2.857
	Height, in	5.958	5.958	5.953
	Water Content, %	20.7	21.8	27.4
	Dry Density, pcf	101.1	103.1	95.56
	Saturation, %	87.9	97.6	100.7
Before Shear	Void Ratio	0.618	0.586	0.712
	Water Content, %	22.4	22.1	27.0
	Dry Density, pcf	103.1	103.6	95.74
	Saturation*, %	100.0	100.0	100.0
Void Ratio	0.587	0.579	0.708	
Back Press., psi	140.	116.	108.	
Ver. Eff. Cons. Stress, psi	4.996	7.996	12.	
Shear Strength, psi	15.12	12.47	12.76	
Strain at Failure, %	17	17	17	
Strain Rate, %/min	0.05	0.05	0.05	
B-Value	0.97	0.96	0.97	
Measured Specific Gravity	2.62	2.62	2.62	
Liquid Limit	42	42	42	
Plastic Limit	25	25	25	

MACTEC	Project: Plant Yates Ash Pond	
	Location: APB-3	
	Project No.: 6189109008	
	Boring No.: APB-3	
	Sample Type: Undisturbed	
	Description: Brown Clayey Sand	
Remarks: ASTM D4767-04.		

Phase calculations based on start and end of test.

* Saturation is set to 100% for phase calculations.

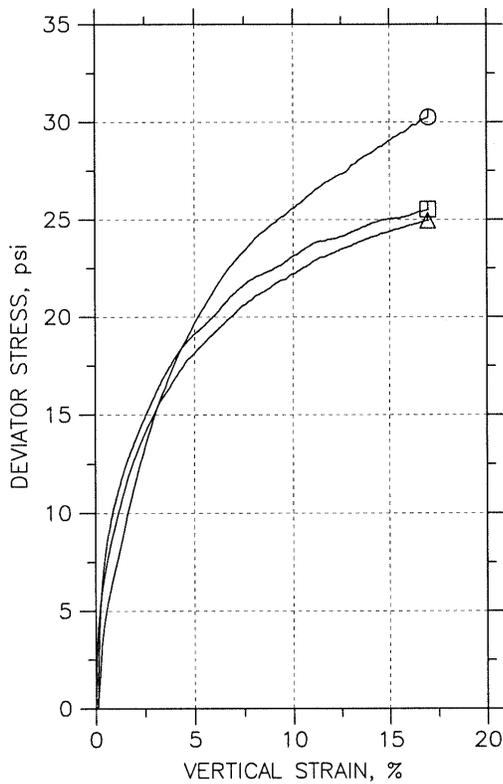
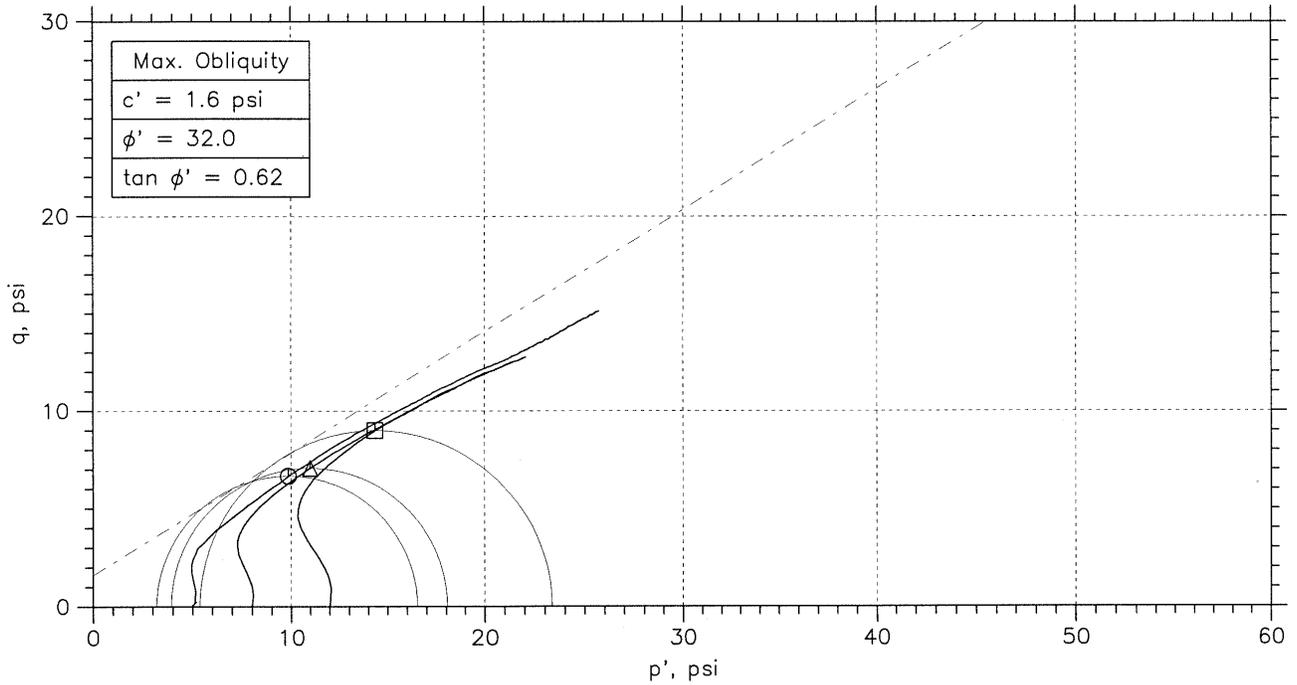
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Symbol	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
○	IS-1	10103.1	17.5-19.5ft	JW	4/8/10			10103.1_2581.dat
△	IS-1	10103.2	17.5-19.5ft	JW	4/8/10			10103.2_2582.dat
□	IS-1	10103.3	17.5-19.5ft	JW	4/8/10			10103.3_2583.dat

MACTEC	Project: Plant Yates Ash Pond	Location: APB-3	Project No.: 6189109008
	Boring No.: APB-3	Sample Type: Undisturbed	
	Description: Brown Clayey Sand		
	Remarks: ASTM D4767-04.		

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



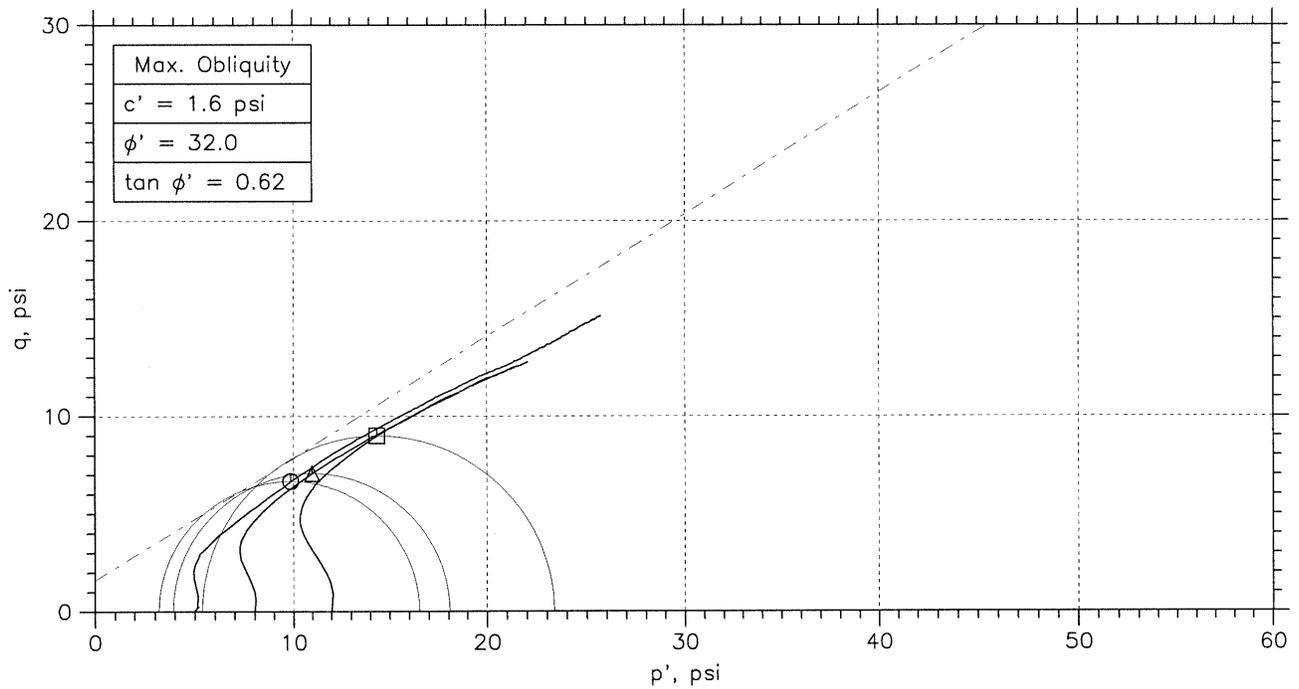
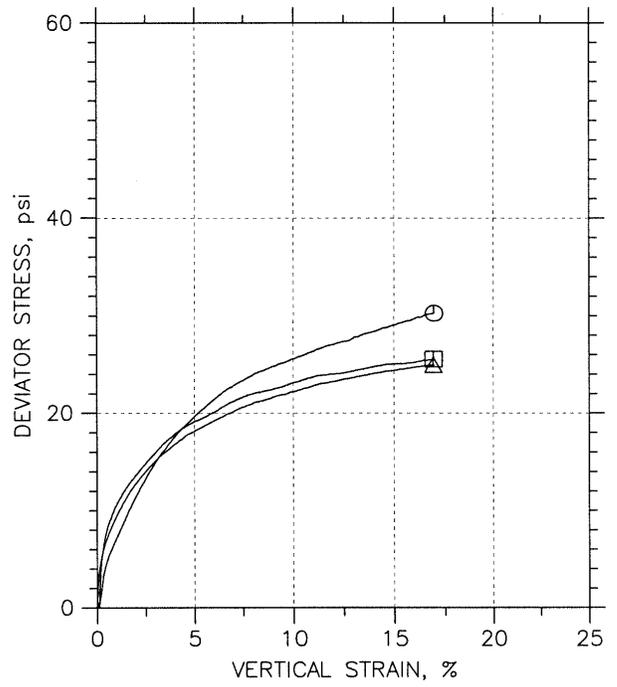
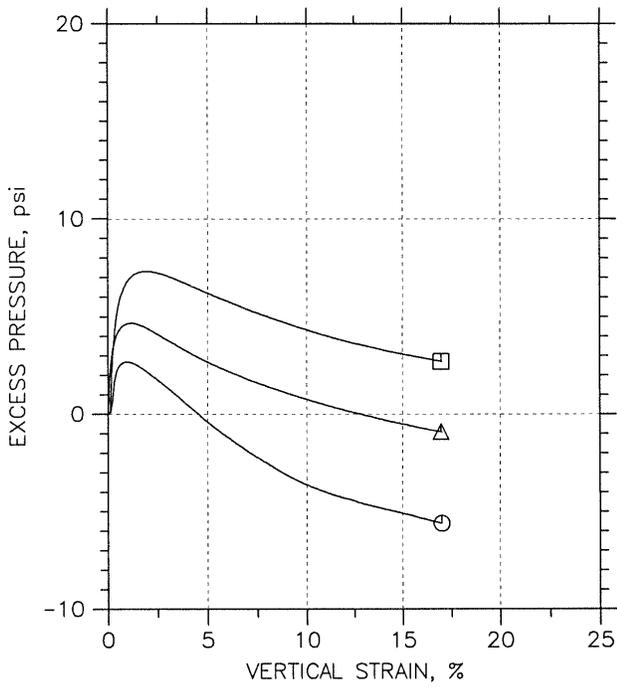
Symbol	⊙	△	□	
Sample No.	IS-1	IS-1	IS-1	
Test No.	10103.1	10103.2	10103.3	
Depth	7.5-19.5ft	7.5-19.5ft	7.5-19.5ft	
Initial	Diameter, in	2.875	2.864	2.857
	Height, in	5.958	5.958	5.953
	Water Content, %	20.7	21.8	27.4
	Dry Density, pcf	101.1	103.1	95.56
	Saturation, %	87.9	97.6	100.7
Before Shear	Void Ratio	0.618	0.586	0.712
	Water Content, %	22.4	22.1	27.0
	Dry Density, pcf	103.1	103.6	95.74
	Saturation*, %	100.0	100.0	100.0
	Void Ratio	0.587	0.579	0.708
	Back Press., psi	140.	116.	108.
Ver. Eff. Cons. Stress, psi	4.996	7.996	12.	
Shear Strength, psi	15.12	12.47	12.76	
Strain at Failure, %	17	17	17	
Strain Rate, %/min	0.05	0.05	0.05	
B-Value	0.97	0.96	0.97	
Measured Specific Gravity	2.62	2.62	2.62	
Liquid Limit	42	42	42	
Plastic Limit	25	25	25	

MACTEC	Project: Plant Yates Ash Pond			
	Location: APB-3			
	Project No.: 6189109008			
	Boring No.: APB-3			
	Sample Type: Undisturbed			
	Description: Brown Clayey Sand			
Remarks: ASTM D4767-04				

Phase calculations based on start and end of test.

* Saturation is set to 100% for phase calculations.

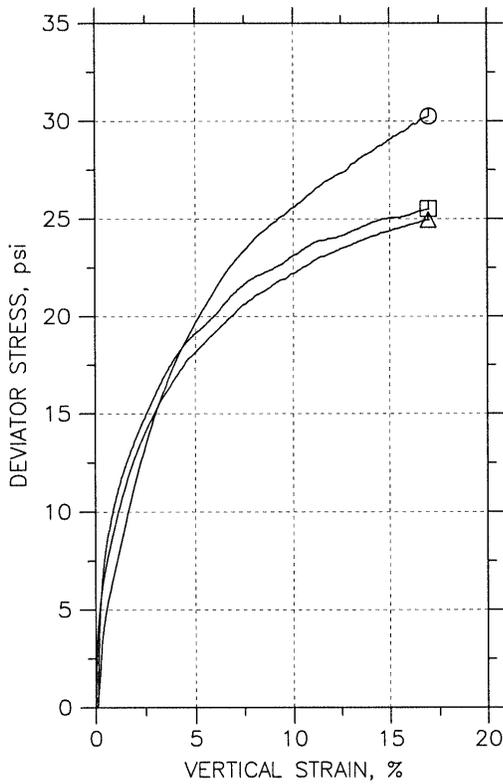
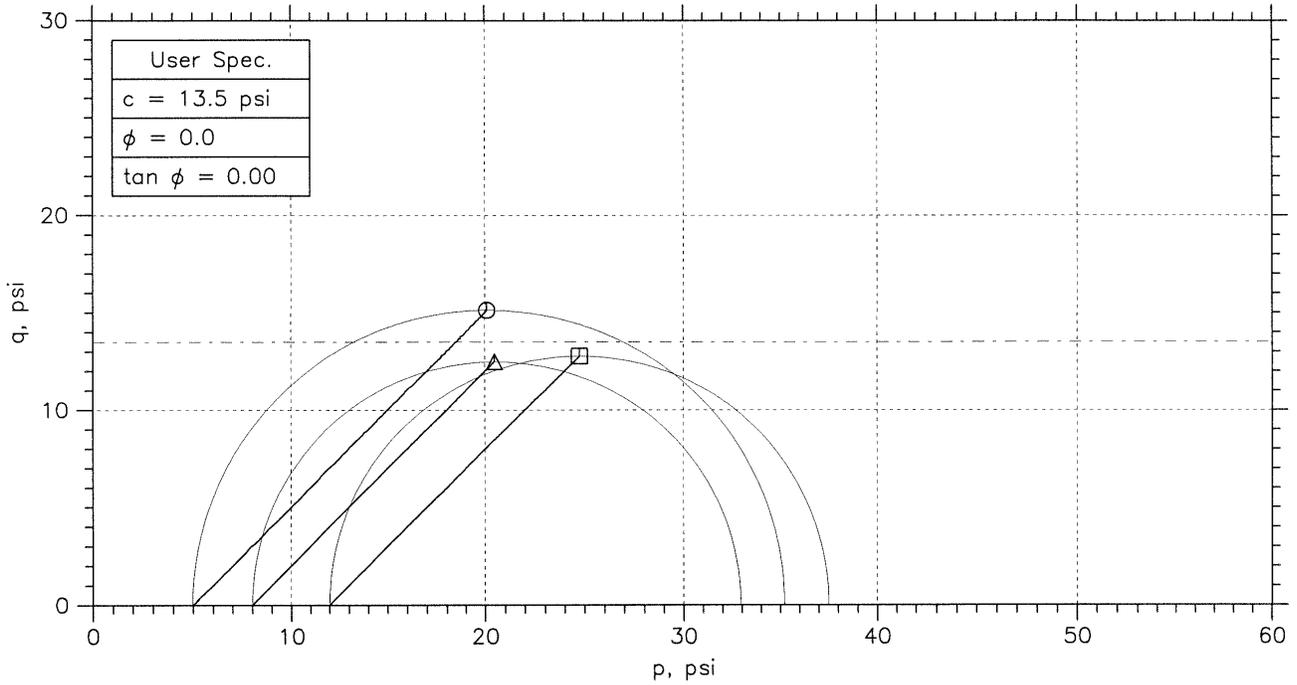
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊙	IS-1	10103.1	JW	4/8/10			10103.1_2581.dat
△	IS-1	10103.2	JW	4/8/10			10103.2_2582.dat
□	IS-1	10103.3	JW	4/8/10			10103.3_2583.dat

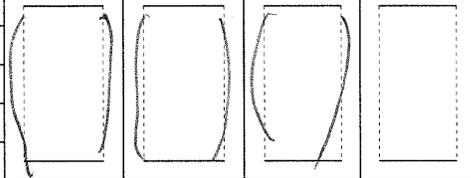
MACTEC	Project: Plant Yates Ash Pond		Location: APB-3		Project No.: 6189109008	
	Boring No.: APB-3		Sample Type: Undisturbed			
	Description: Brown Clayey Sand					
	Remarks: ASTM D4767-04					

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Symbol	⊙	△	□	
Sample No.	IS-1	IS-1	IS-1	
Test No.	10103.1	10103.2	10103.3	
Depth	7.5-19.5ft	7.5-19.5ft	7.5-19.5ft	
Initial	Diameter, in	2.875	2.864	2.857
	Height, in	5.958	5.958	5.953
	Water Content, %	20.7	21.8	27.4
	Dry Density, pcf	101.1	103.1	95.56
	Saturation, %	87.9	97.6	100.7
Before Shear	Void Ratio	0.618	0.586	0.712
	Water Content, %	22.4	22.1	27.0
	Dry Density, pcf	103.1	103.6	95.74
	Saturation*, %	100.0	100.0	100.0
	Void Ratio	0.587	0.579	0.708
	Back Press., psi	140.	116.	108.
Ver. Eff. Cons. Stress, psi	4.996	7.996	12.	
Shear Strength, psi	15.12	12.47	12.76	
Strain at Failure, %	17	17	17	
Strain Rate, %/min	0.05	0.05	0.05	
B-Value	0.97	0.96	0.97	
Measured Specific Gravity	2.62	2.62	2.62	
Liquid Limit	42	42	42	
Plastic Limit	25	25	25	

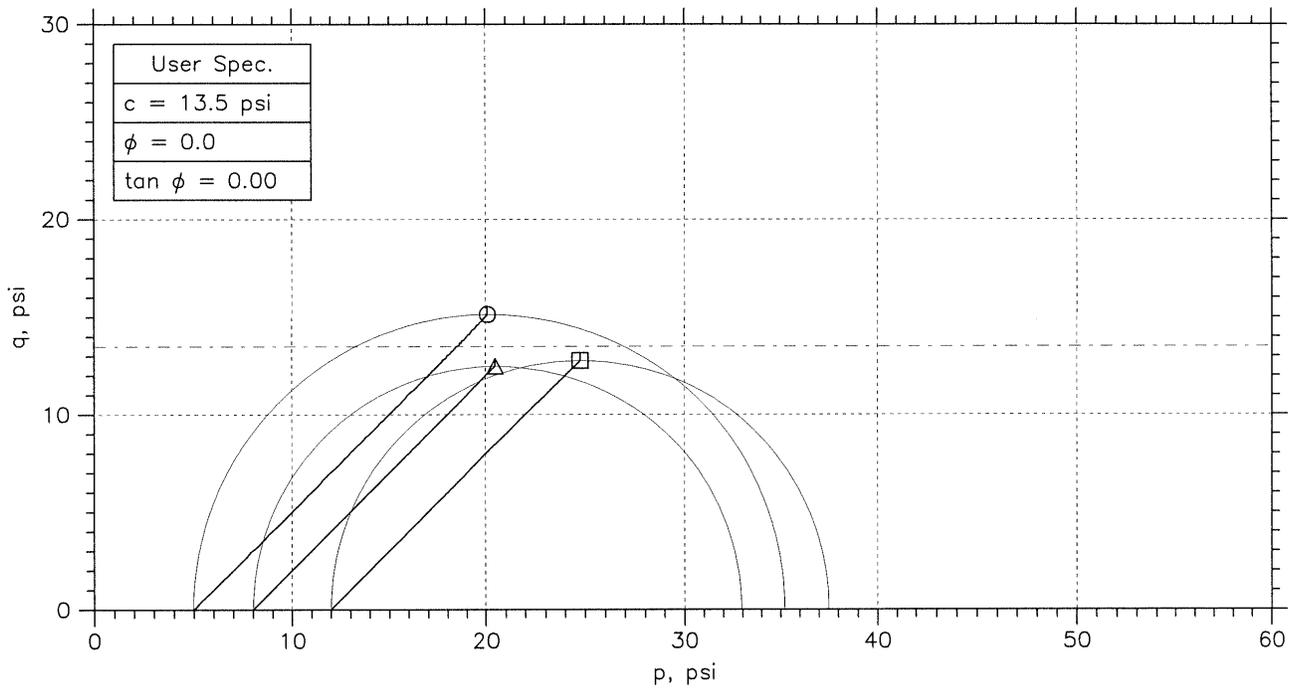
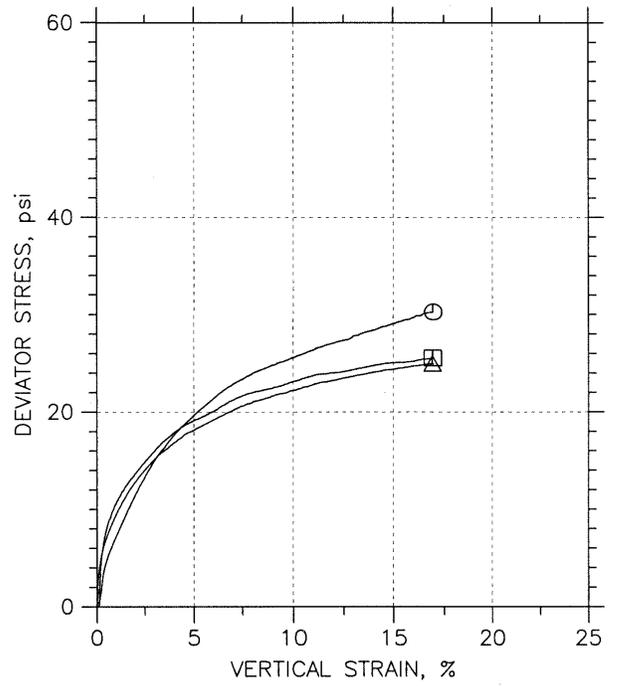
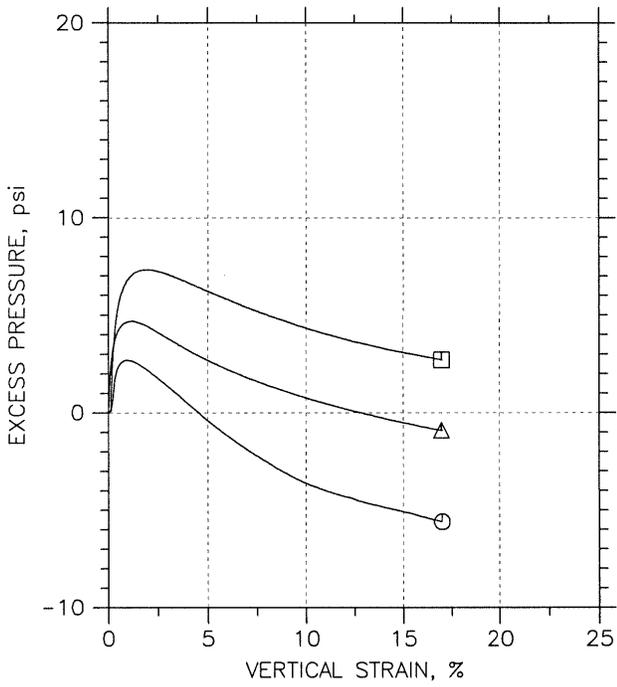
MACTEC	Project: Plant Yates Ash Pond			
	Location: APB-3			
	Project No.: 6189109008			
	Boring No.: APB-3			
	Sample Type: Undisturbed			
	Description: Brown Clayey Sand			
Remarks: ASTM D4767-04				



Phase calculations based on start and end of test.

* Saturation is set to 100% for phase calculations.

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Symbol	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊙	IS-1	10103.1	17.5-19.5ft	JW	4/8/10			10103.1_2581.dat
△	IS-1	10103.2	17.5-19.5ft	JW	4/8/10			10103.2_2582.dat
□	IS-1	10103.3	17.5-19.5ft	JW	4/8/10			10103.3_2583.dat

MACTEC	Project: Plant Yates Ash Pond		Location: APB-3		Project No.: 6189109008	
	Boring No.: APB-3		Sample Type: Undisturbed			
	Description: Brown Clayey Sand					
	Remarks: ASTM D4767-04					

Attachment D
Critical Section Profile

F

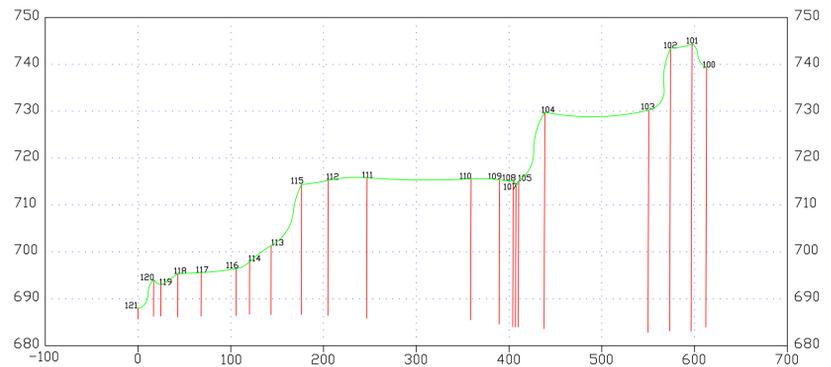
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D

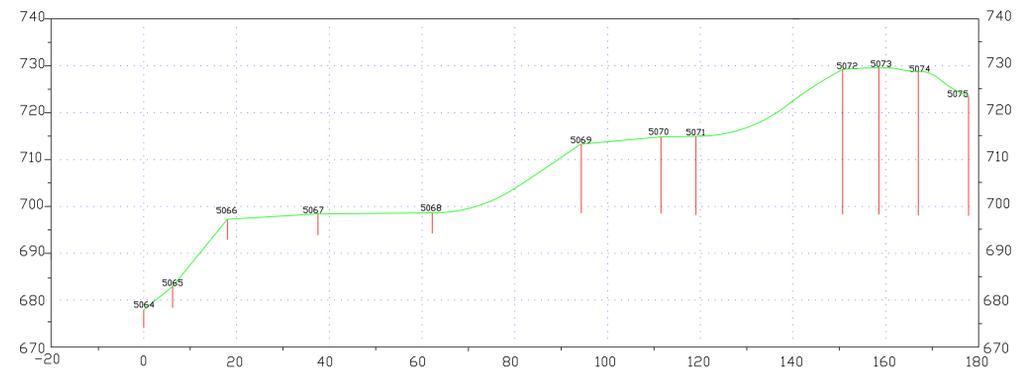
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B

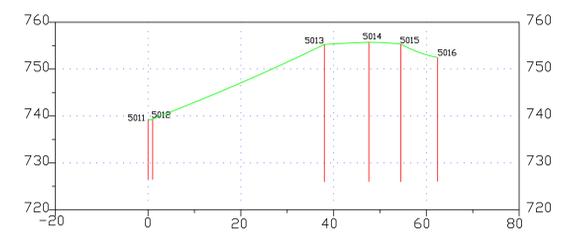
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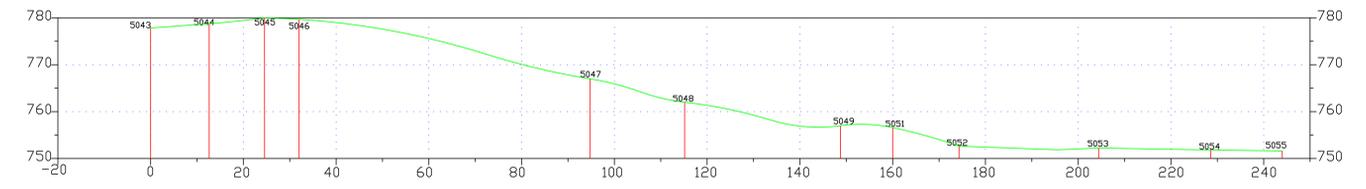
SECTION A-Ash Pond 1
 Vertical Scale: 1" = 20'
 Horizontal Scale: 1" = 100'



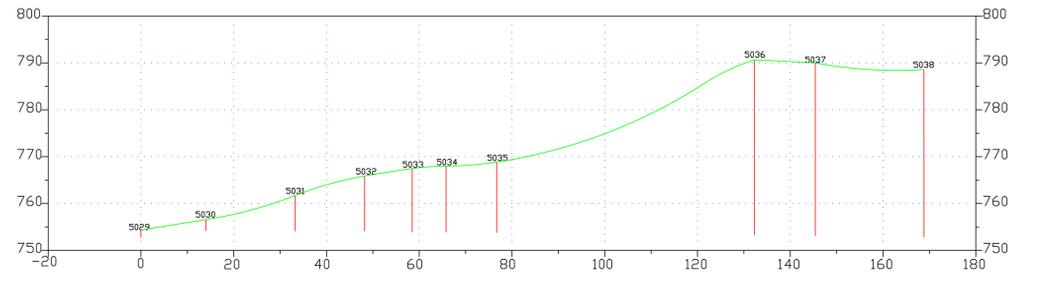
SECTION B-Ash Pond 2
 Vertical Scale: 1" = 20'
 Horizontal Scale: 1" = 20'



SECTION C-Ash Pond 3
 Vertical Scale: 1" = 20'
 Horizontal Scale: 1" = 20'



SECTION D-Ash Pond A
 Vertical Scale: 1" = 20'
 Horizontal Scale: 1" = 20'



SECTION E-Ash Pond B'
 Vertical Scale: 1" = 20'
 Horizontal Scale: 1" = 20'

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Southern Company Generation
Engineering and Construction Services
 FOR

Georgia Power Company

PLANT YATES
 ASH POND DIKE
 CROSS SECTIONS

SCALE	PRJ.D. I.D.	DRAWING NUMBER	SHEET	CONT'D
AS SHOWN		ES1836S1B	1B	FINAL