INITIAL SAFETY FACTOR ASSESSMENT
40 C.F.R. PART 257.73
PLANT YATES ASH POND B' (AP-B')
GEORGIA POWER COMPANY

EPA's "Disposal of Coal Combustion Residuals from Electric Utilities" Final Rule (40 C.F.R. Part 257 and Part 261), §257.73(e), requires the owner or operator of an existing CCR surface impoundment to conduct initial and periodic safety factor assessments. The owner or operator of the CCR unit must conduct an assessment and document whether the minimum safety factors outlined in §257.73(e)(1)(i) through (iv) for the critical cross section of the embankment are achieved.

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' has been determined to be at the midpoint of the cross-valley embankment.

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
Maximum Surcharge Pool (Static)	2.7	1.4
Seismic	2.3	1.0

The embankments of AP-B' are 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.

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

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

SOUTHERN COMPANY

Engineering and Construction Services Calculation

Calculation Number: TV-YT-GPC603884-003

Project/Plant: Plant Yates Ash Pond B'	**Unit(s):** Units 6-7	**Discipline/Area:** ESFS
Title/Subject: Slope Stability Analyses of Ash Pond B' Dam		
Purpose/Objective: Analyze slope stability of the Ash Pond B' Dam		
System or Equipment Tag Numbers: NA	**Originator:** Stacey H. Simpson, P.E.	

Contents

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Total # of pages including cover sheet & attachments:	72		

Revision Record

Rev. No.	Description	Originator Initial / Date	Reviewer Initial / Date	Approver Initial / Date
0	Issued for Information	SHS 10/05/16	JAL 10/10/16	JCP 10/10/16

Notes:

Purpose of Calculation

The Eugene A. Yates Power Plant (Plant Yates) was once a seven unit, coal fired, power generation facility. Currently Plant Yates Units 1-5 are in the process of demolition and Plant Yates 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 a slope stability assessment of the Plant Yates Ash Pond B' dam under conditions prescribed by the EPA CCR rule.

Methodology

The calculation was performed using the following methods and software:

GeoStudio 2012 (Version 8.15.5.11777), August 2015 Release, Copyright 1991-2016, GEO-SLOPE International, Ltd.

Strata (Version alpha, Revision 0.2.0), Geotechnical Engineering Center, Department of Civil, Architectural, and Environmental Engineering, University of Texas.

The Morgenstern-Price analytical method with an entry-exit slip surface was used for slope stability calculation.

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 2008 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 Tavasarou (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.

- 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 Corps of Engineers (COE) EM 1110-2-1902 standard, October 2003, allows the use of the phreatic surface established for the maximum storage condition (normal pool) in the analysis for the maximum surcharge loading condition. This is based on the short term duration of the surcharge loading relative to the permeability of the embankment and the foundation materials. This method is used in the analysis for the impoundments at this facility with surcharge loading.

- The current required minimum criteria (factors of safety) were taken from the Structural Integrity Criteria for Existing CCR Surface Impoundments, 40 CFR 257.73, published April 17, 2015.

- 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 the following sources:
    1) 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

- 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.

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

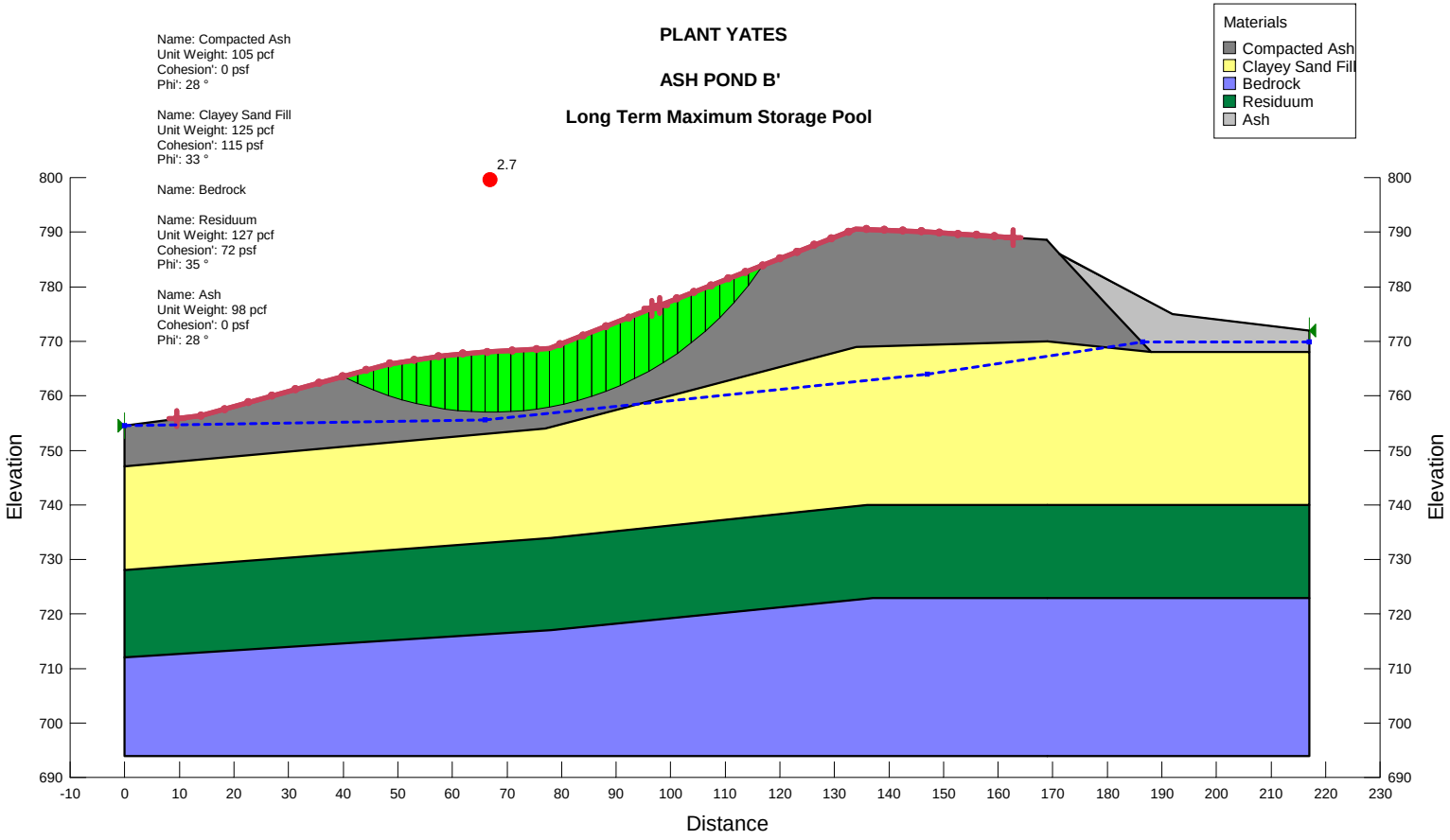
Loading Condition	Minimum Calculated Safety Factor	Minimum Required Safety Factor
Long-term Maximum Storage Pool (Static)	2.7	1.5
Maximum Surcharge Pool (Static)	2.7	1.4
Seismic	2.3	1.0

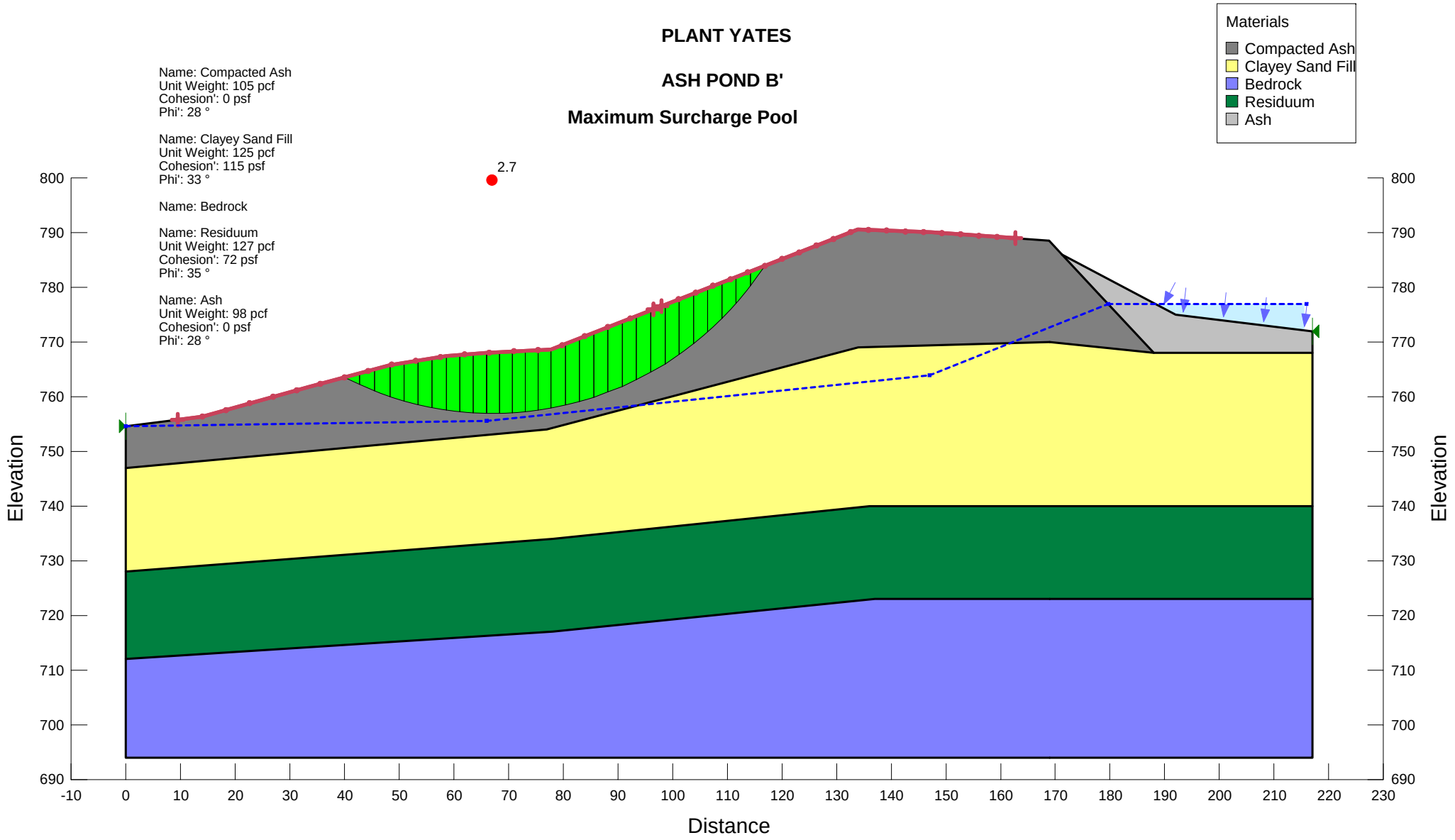
Design Inputs/References

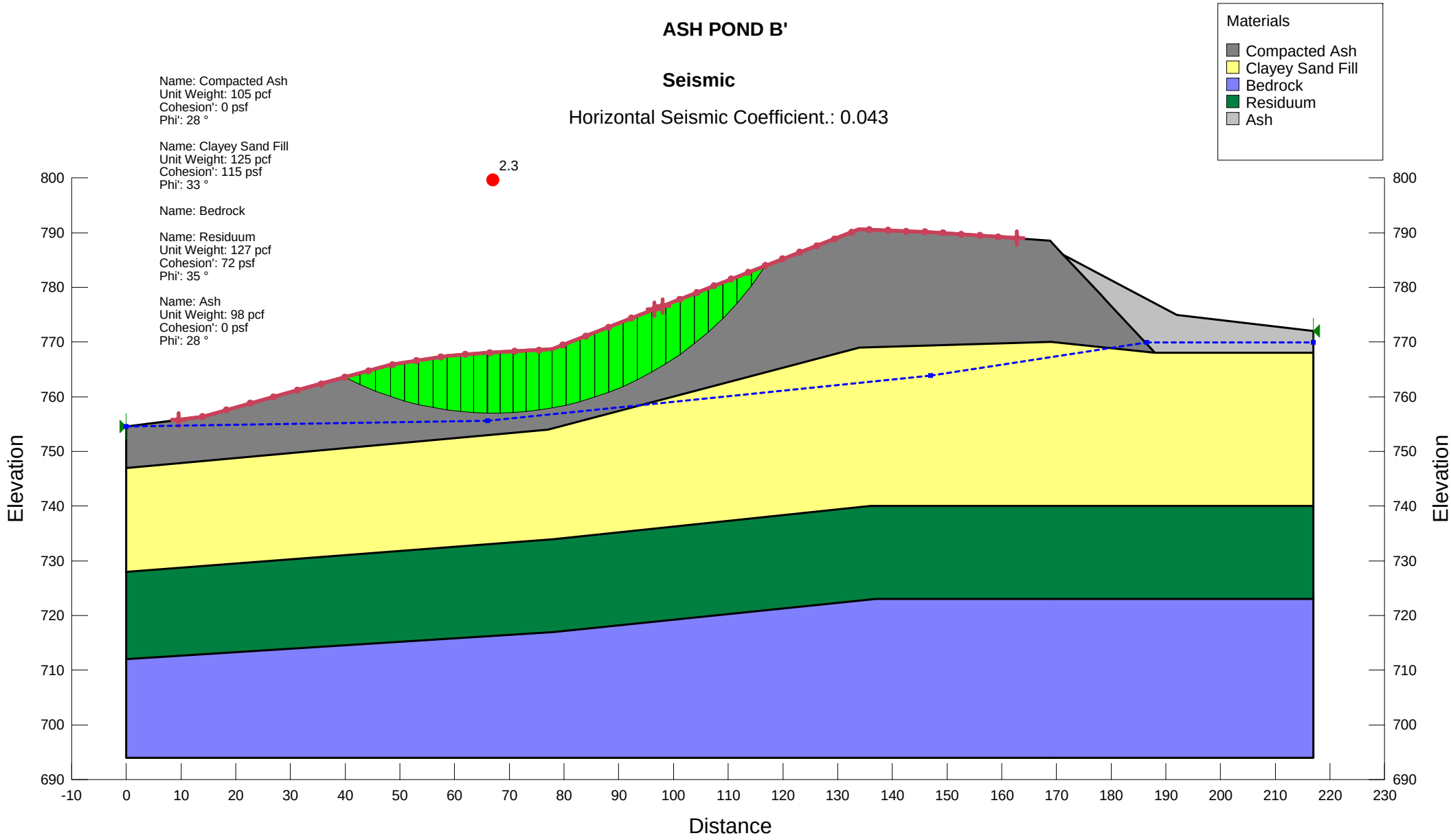
- Bray, J. D. and Travasarou, T., Pseudostatic Coefficient for Use in Simplified Seismic Slope Stability Evaluation, Journal of Geotechnical and Environmental Engineering, American Society of Civil Engineers, September 2009
- Atlanta Testing & Engineering Report, *Subsurface Exploration Modifications 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

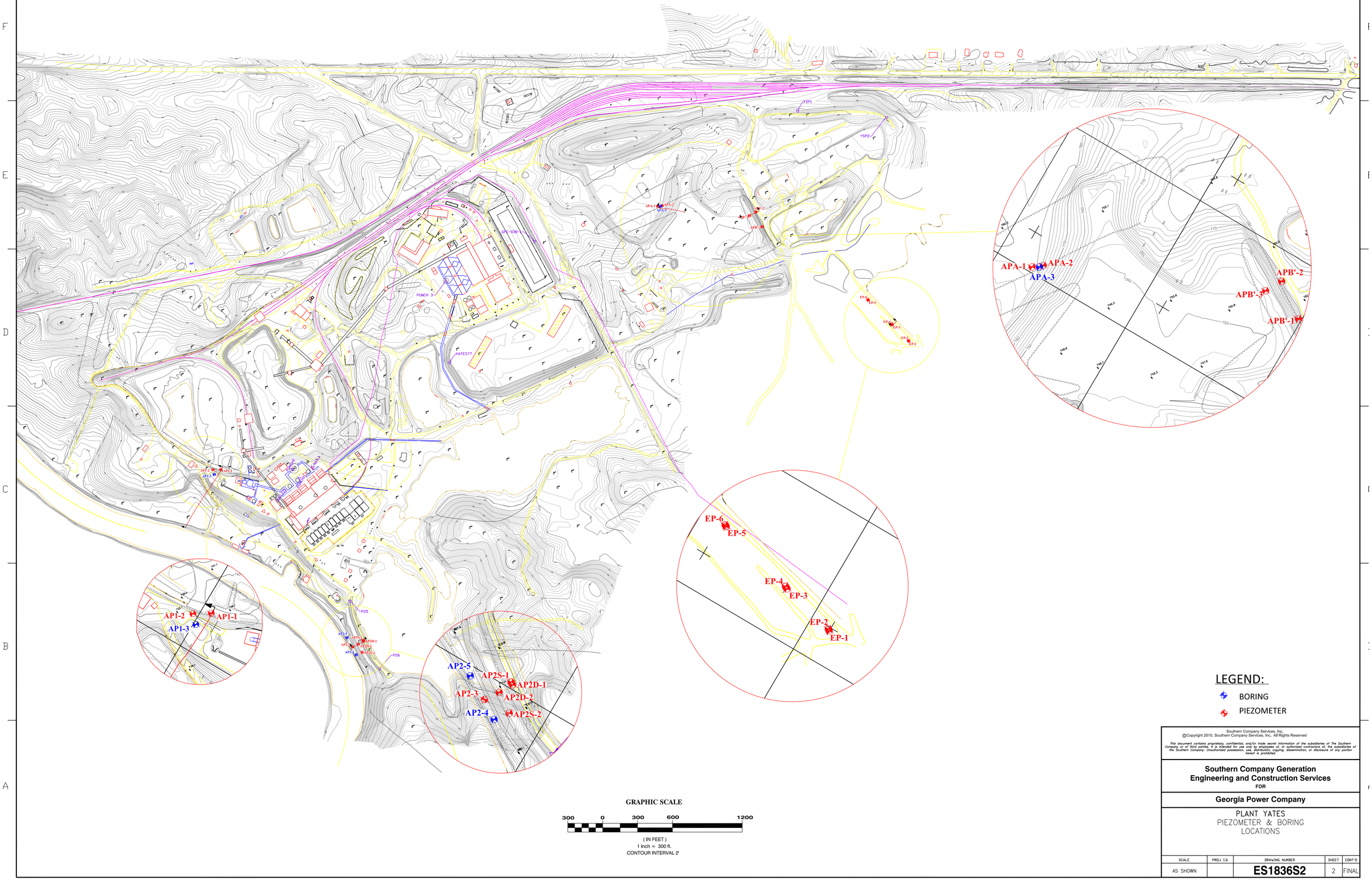

PLANT YATES
ASH POND B'
Long Term Maximum Storage Pool
Name: Compacted Ash
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 28 °
Name: Clayey Sand Fill
Unit Weight: 125 pcf
Cohesion': 115 psf
Phi': 33 °
Name: Bedrock
Name: Residuum
Unit Weight: 127 pcf
Cohesion': 72 psf
Phi': 35 °
Name: Ash
Unit Weight: 98 pcf
Cohesion': 0 psf
Phi': 28 °
Materials
Compacted Ash
Clayey Sand Fill
Bedrock
Residuum
Ash
2.7
Elevation
Distance
800
790
780
770
760
750
740
730
720
710
700
690
-10
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
210
220
230


PLANT YATES
ASH POND B'
Maximum Surcharge Pool
Materials
Compacted Ash
Clayey Sand Fill
Bedrock
Residuum
Ash
Name: Compacted Ash
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 28 °
Name: Clayey Sand Fill
Unit Weight: 125 pcf
Cohesion': 115 psf
Phi': 33 °
Name: Bedrock
Name: Residuum
Unit Weight: 127 pcf
Cohesion': 72 psf
Phi': 35 °
Name: Ash
Unit Weight: 98 pcf
Cohesion': 0 psf
Phi': 28 °
2.7
Elevation
Distance
800
790
780
770
760
750
740
730
720
710
700
690
-10
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
210
220
230


ASH POND B'
Seismic
Horizontal Seismic Coefficient.: 0.043
Materials
Compacted Ash
Clayey Sand Fill
Bedrock
Residuum
Ash
Name: Compacted Ash
Unit Weight: 105 pcf
Cohesion': 0 psf
Phi': 28 °
Name: Clayey Sand Fill
Unit Weight: 125 pcf
Cohesion': 115 psf
Phi': 33 °
Name: Bedrock
Name: Residuum
Unit Weight: 127 pcf
Cohesion': 72 psf
Phi': 35 °
Name: Ash
Unit Weight: 98 pcf
Cohesion': 0 psf
Phi': 28 °
2.3
Elevation
Distance
800
790
780
770
760
750
740
730
720
710
700
690
-10
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
210
220
230

ATTACHMENTS

Attachment A - Boring Location Plan



GRAPHIC SCALE

300 0 300 600 1200

(IN FEET)
1 inch = 300 ft.
CONTOUR INTERVAL 2'

LEGEND:

- BORING
- PIEZOMETER

Southern Company Generation
Engineering and Construction Services
FOR

Georgia Power Company

PLANT YATES
PIEZOMETER & BORING
LOCATIONS

SCALE	PROJ I.D.	DRAWING NUMBER	SHEET	CONT'D
AS SHOWN		**ES1836S2**	2	FINAL

ANSI F: 40x28 Acad2004

Attachment B - Boring and Piezometer Logs

SOUTHERN COMPANY

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.

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

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SOUTHERN COMPANY

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
		SM - red and medium and dark gray, moist, low plasticity, fine to medium grain, probable fill material *(Con't)*		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)		More clay, slightly darker in color, more grays and black, silver mica. (MC = 28.3%; FC = 55.4%; Gravel = 0.2%)
			739.7					Beginning of residuum material.
50		**SM** - light orange and gray presenting in layers, moist, medium dense, fine to medium grain, residuum		SS -9	49.5-51.0	4-5-9 (14)		(MC = 54.7%; FC = 32.4%; Gravel = 0.9%)
								Possible water table.
55		**SM** - light gray and medium orange and white,						

(Continued Next Page)

LOG OF TEST BORING

SOUTHERN COMPANY

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
		wet, dense, fine grain, 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 *(Con't)*		SS -10	54.5-56.0	4-9-17 (26)		(MC = 13.3%; FC = 31%)
60		**SM** - very dense, very fine grain, no pebbles, predominantly gray and dark tan, with some white		SS -11	59.5-60.9	18-30-50/5" (100+)	50	
65		**SM** - light orange and white, moist, very dense, very fine grain, parent rock structure evident	723.2	SS -12	64.5-64.8	50/4" (100+)		
		Bottom of borehole at 66.0 feet.						
70								
75								
80								
85								

SOUTHERN COMPANY

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.** 789.0 **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.

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		ML - dark gray, moist, no plasticity, *fill*, ASH						
5				SS -1	4.5-6.0	3-2-2 (4)		(MC = 20.6%; PL=NP; FC = 56.2%; Gravel = 4.8%)
				UD -1	7.5-9.5		100	
10				SS -2	9.5-11.0	2-1-1 (2)		(MC = 25.7%; PL=NP; FC = 56.4%; Gravel = 3.9%)
				UD -2	12.5-14.5		100	
15			774.0	SS -3	14.5-16.0	1-1-3 (4)		
		SC - orange and yellow and tan, moist, fine to medium grain, *fill*						
20		**SC** - light tan, gray and red, *fill*, isolated layers of sandy CLAY (CL) that is stiff		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						

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SOUTHERN COMPANY

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
		throughout, moist, fine grain, *fill*, less clay, isolated layers of (SP-SC) **SC** - orange and yellow and tan, moist, fine to medium grain, *fill (Con't)*		SS -5	24.5-26.0	3-5-5 (10)		
30		**SC** - orange and tannish gray, moist, fine to medium grain, *fill*, micaceous, very clayey		SS -6	29.5-31.0	4-5-5 (10)		(MC = 16.6%; LL = 50; PI=23; FC = 45.5%; Gravel = 0.2%)
35		**SC** - *fill*, slightly less clayey		SS -7	34.5-36.0	3-3-4 (7)		
40				SS -8	39.5-41.0	1-3-3 (6)		(MC = 26%; LL = 55; PI=25; FC = 47.2%)
45			743.0	SS -9	44.5-46.0	2-3-5 (8)		
		Bottom of borehole at 46.0 feet.						
50								
55								

SOUTHERN COMPANY

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** 3/17/2010 **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.

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%)
			754.1					
15		**SC** - red, orange and gray, wet, medium grain, Probable fill		SS -3	14.5-16.0	2-2-2 (4)		(MC = 24.1%; LL = 54; PI=23; FC = 34.8%; Gravel = 0.4%)
				UD -1	17.5-19.5		100	
20		**SC** - tan, red and gray, very wet, loose, medium to fine grain, Possible residuum, layers of CH in sample		SS -4	19.5-21.0	WH-2-2 (4)		
25		**SC** - red, yellow, and orange mottled, moist,						

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SOUTHERN COMPANY

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
		medium dense, fine grain, very high clay content, plastic fines		SS -5	24.5-26.0	1-4-5 (9)		
		SC - red, orange and gray, wet, medium grain, Probable fill *(Con't)*						
30		**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)		(MC = 20.3%; LL = 45; PI=24; FC = 39.7%; Gravel = 6.2%)
			734.1					
35		**SP** - light tan and white with dark brown veins, moist, medium dense, fine to medium grain, parent rock structure evident		SS -7	34.5-36.0	8-9-5 (14)		
40		**SP** - predominately white with dark brown veins		SS -8	39.5-41.0	3-6-8 (14)		(MC = 29.3%; FC = 27.2%)
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** - tand 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								

SOUTHERN COMPANY

LOG OF TEST BORING AND WELL

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.

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

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SOUTHERN COMPANY

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
		SM - red and medium and dark gray, moist, low plasticity, fine to medium grain, probable fill material *(Con't)*			-Riser only, no protector -Single piezometer -Top of Casing Elev.=792.74 (CONTINUED)
30					
				3/18/2010	
35					
40					2" ID PVC Riser (SCH 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,			

(Continued Next Page)

SOUTHERN COMPANY

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
		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 *(Con't)*			-Riser only, no protector -Single piezometer -Top of Casing Elev.=792.74 (CONTINUED) Silica sand filter 2" ID PVC Screen (SCH 40)
60		**SM** - very dense, very fine grain, no pebbles, predominantly gray and dark tan, with some white			
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\YATES\YATES 2010\EPA ASH POND INSPECTIONS\BORING INFORMATION\YATES ASH POND DIKES.GPJ

SOUTHERN COMPANY

LOG OF TEST BORING AND WELL

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.

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

(Continued Next Page)

SOUTHERN COMPANY

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
		grain, *fill*, less clay, isolated layers of (SP-SC)		3/18/2010	-Riser only, no protector -Single piezometer -Top of Casing Elev.=793.21
		SC - orange and yellow and tan, moist, fine to medium grain, *fill (Con't)*			(CONTINUED)
30		**SC** - orange and tannish gray, moist, fine to medium grain, *fill*, micaceous, very clayey			
					9 bags silica sand filter
35		**SC** - *fill*, slightly less clayey			
					2" ID PVC Screen (SCH 40)
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\YATES 2010\EPA ASH POND INSPECTIONS\BORING INFORMATION\YATES ASH POND DIKES.GPJ

SOUTHERN COMPANY

LOG OF TEST BORING AND WELL

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.

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			
				3/18/2010	
15		**SC** - red, orange and gray, wet, medium grain, Probable fill			Bentonite chips
20		**SC** - tan, red and gray, very wet, loose, medium to fine grain, Possible residuum, layers of CH in sample			2" ID PVC Riser (SCH 40)
25		**SC** - red, yellow, and orange mottled, moist, medium dense, fine grain,			

(Continued Next Page)

SOUTHERN COMPANY

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

Attachment C - Laboratory Analyses

Project: Plant Yates Ash Pond

Project Number 6189-10-9008

Date Performed 4/2/2010

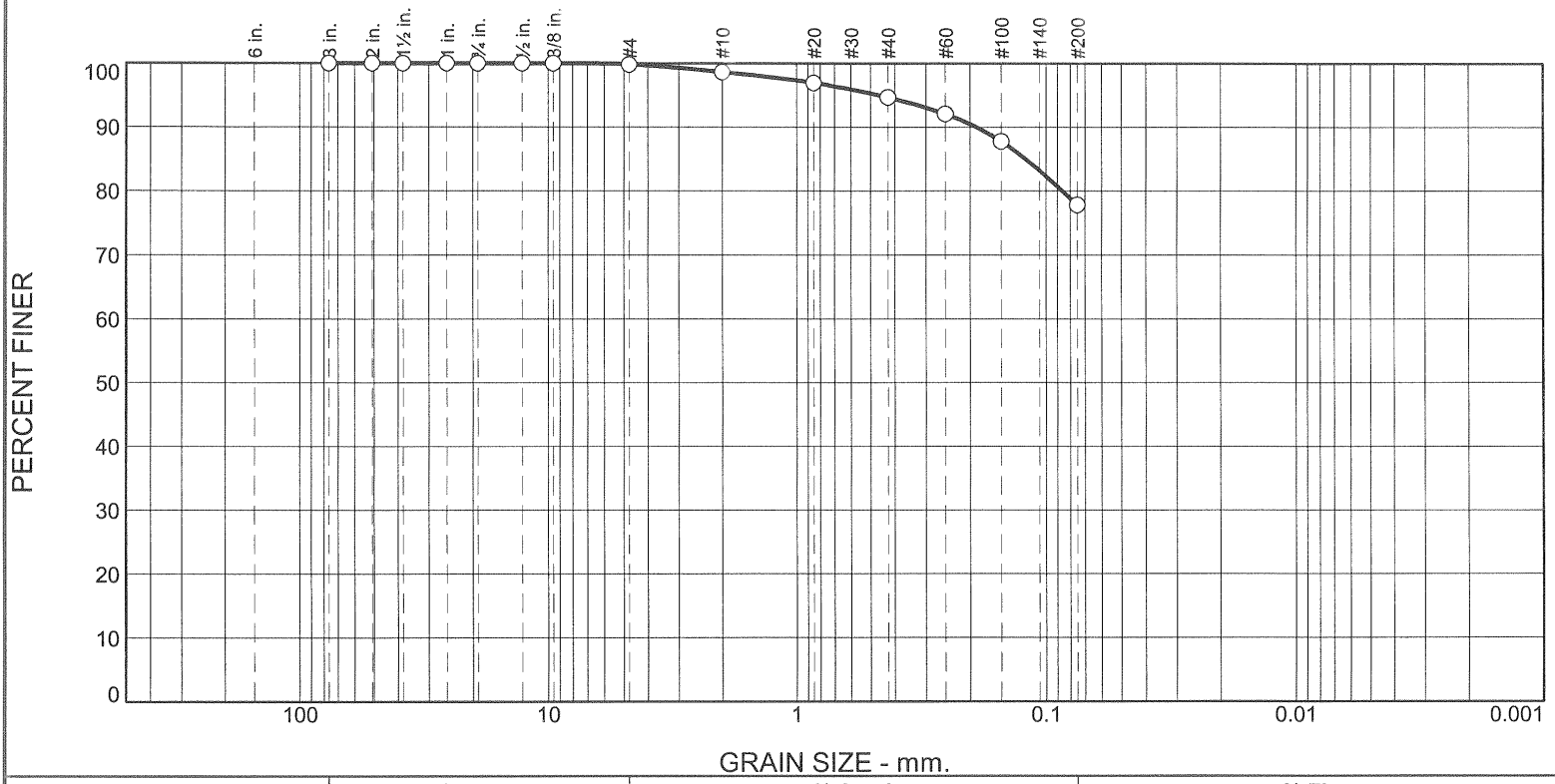
Date Sampled

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		

* (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

D_{90}= 0.1887 D_{85}= 0.1204 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= 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 **Depth:** 9.5'-11.0' **Date Sampled:**

Sample Number: 2

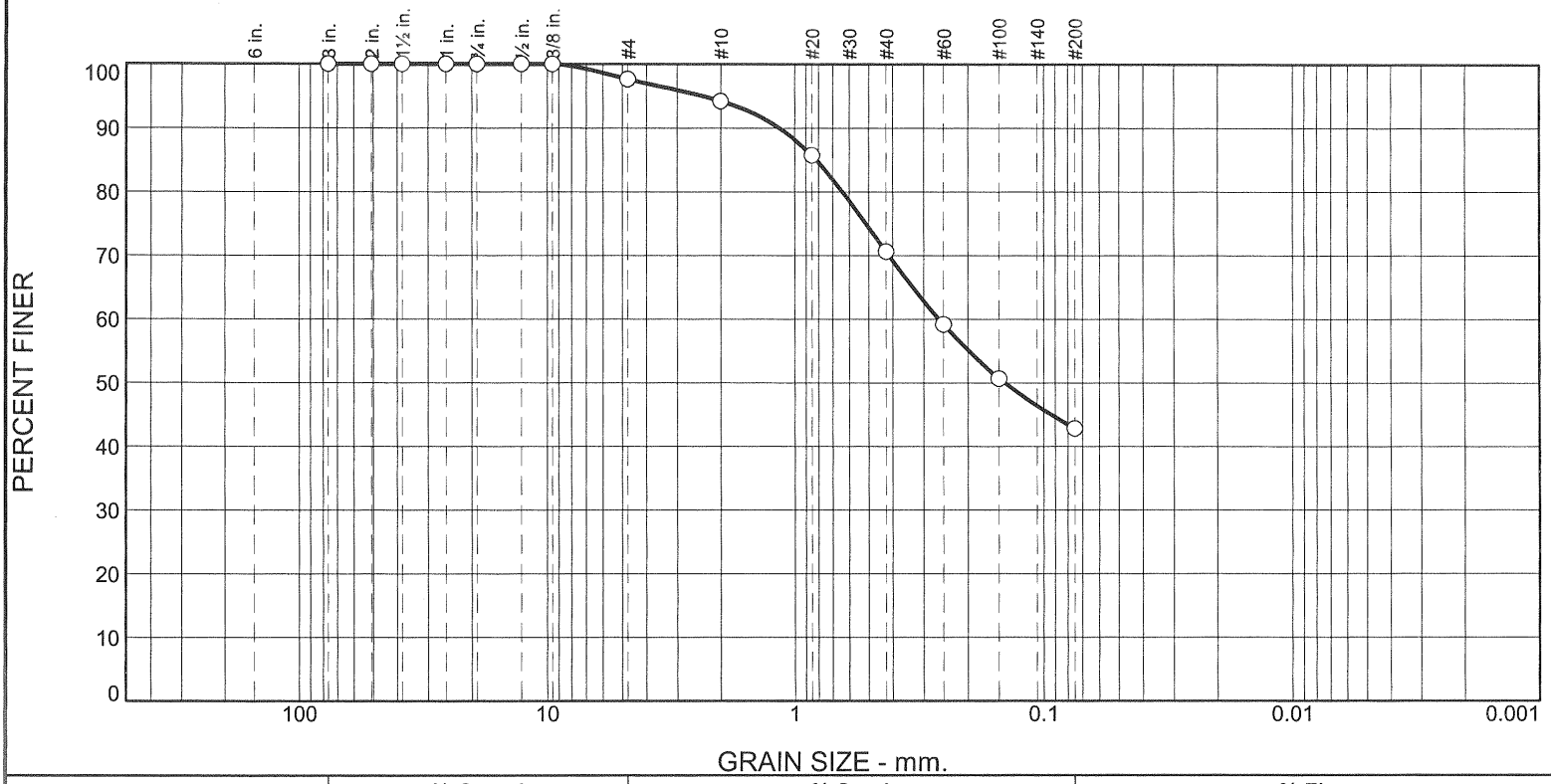
MACTEC ENGINEERING. AND CONSULTING, INC.

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	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		

* (no specification provided)

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

D_{90}= 1.1532 D_{85}= 0.8159 D_{60}= 0.2608
D_{50}= 0.1425 D_{30}= D_{15}=
D_{10}= 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 **Depth:** 19.5'-21.0' **Date Sampled:**

Sample Number: 4

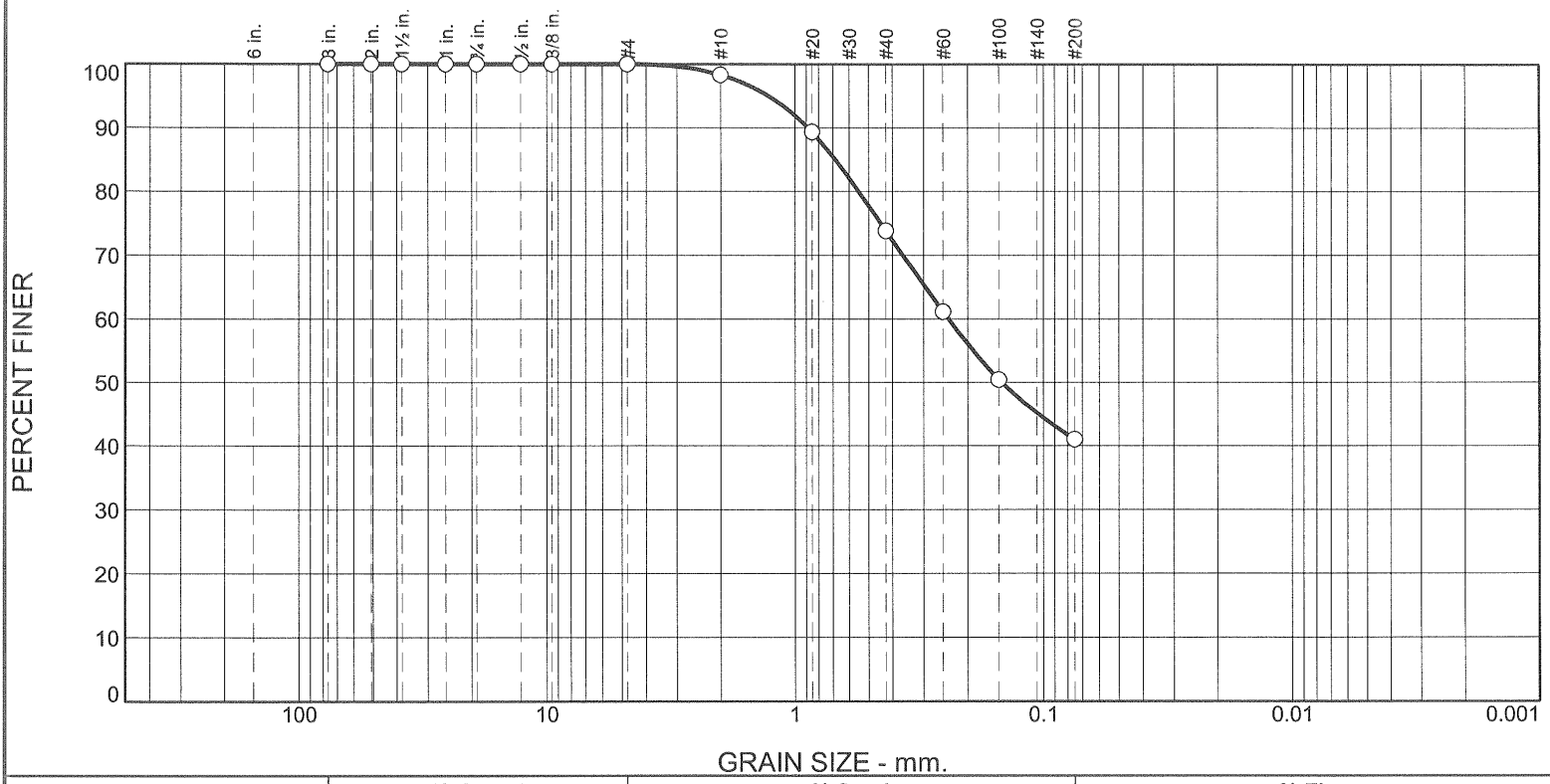
MACTEC ENGINEERING. AND CONSULTING, INC.

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		

* (no specification provided)

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

D_{90}= 0.8835 D_{85}= 0.6829 D_{60}= 0.2378
D_{50}= 0.1465 D_{30}= D_{15}=
D_{10}= 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 **Depth:** 29.5'-31.0' **Date Sampled:**

Sample Number: 5

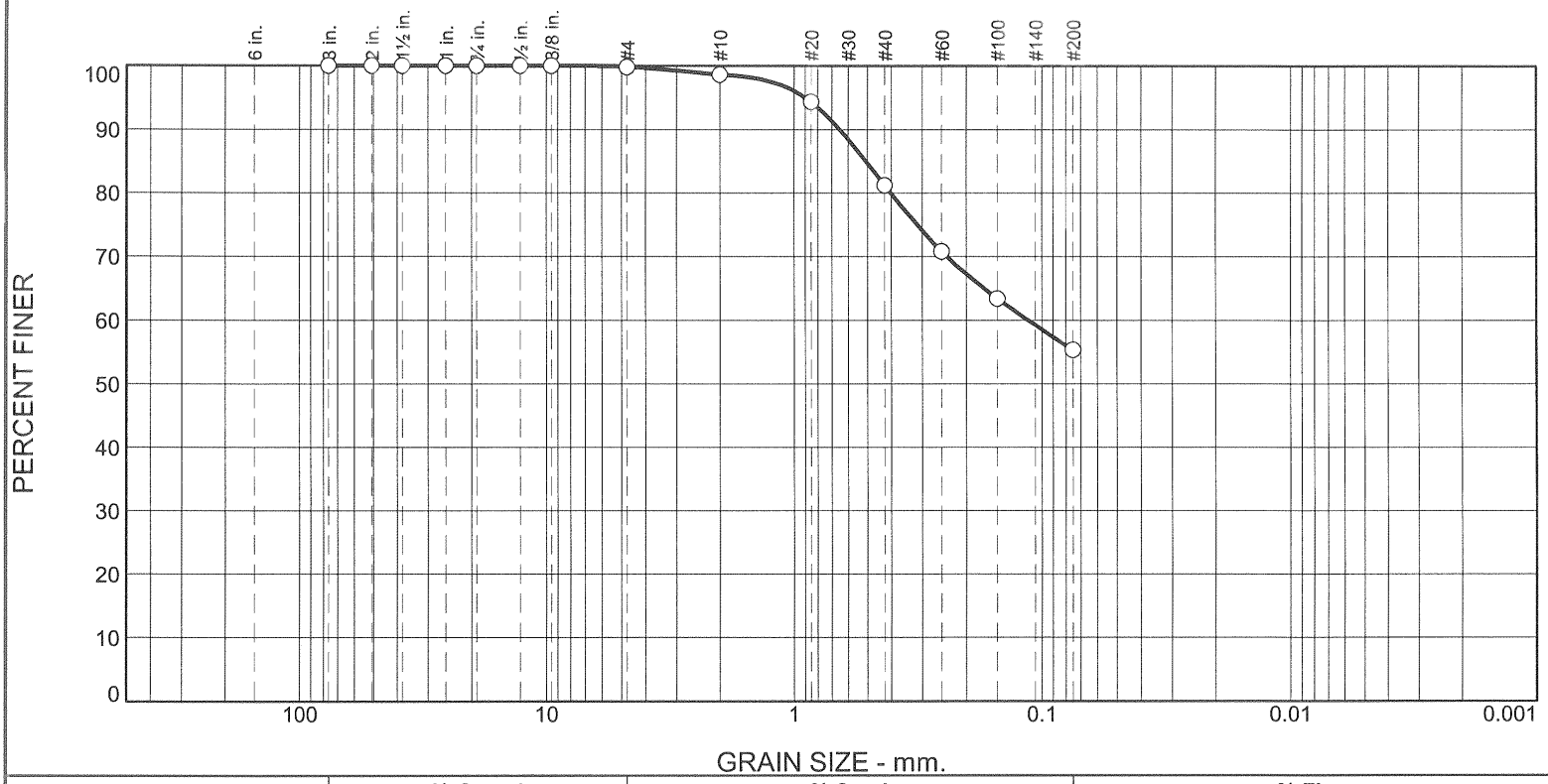
MACTEC ENGINEERING. AND CONSULTING, INC.

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		

* (no specification provided)

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

D_{90}= 0.6484 D_{85}= 0.5070 D_{60}= 0.1132
D_{50}= D_{30}= D_{15}=
D_{10}= 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 **Depth:** 44.5'-46.0' **Date Sampled:**

Sample Number: 8

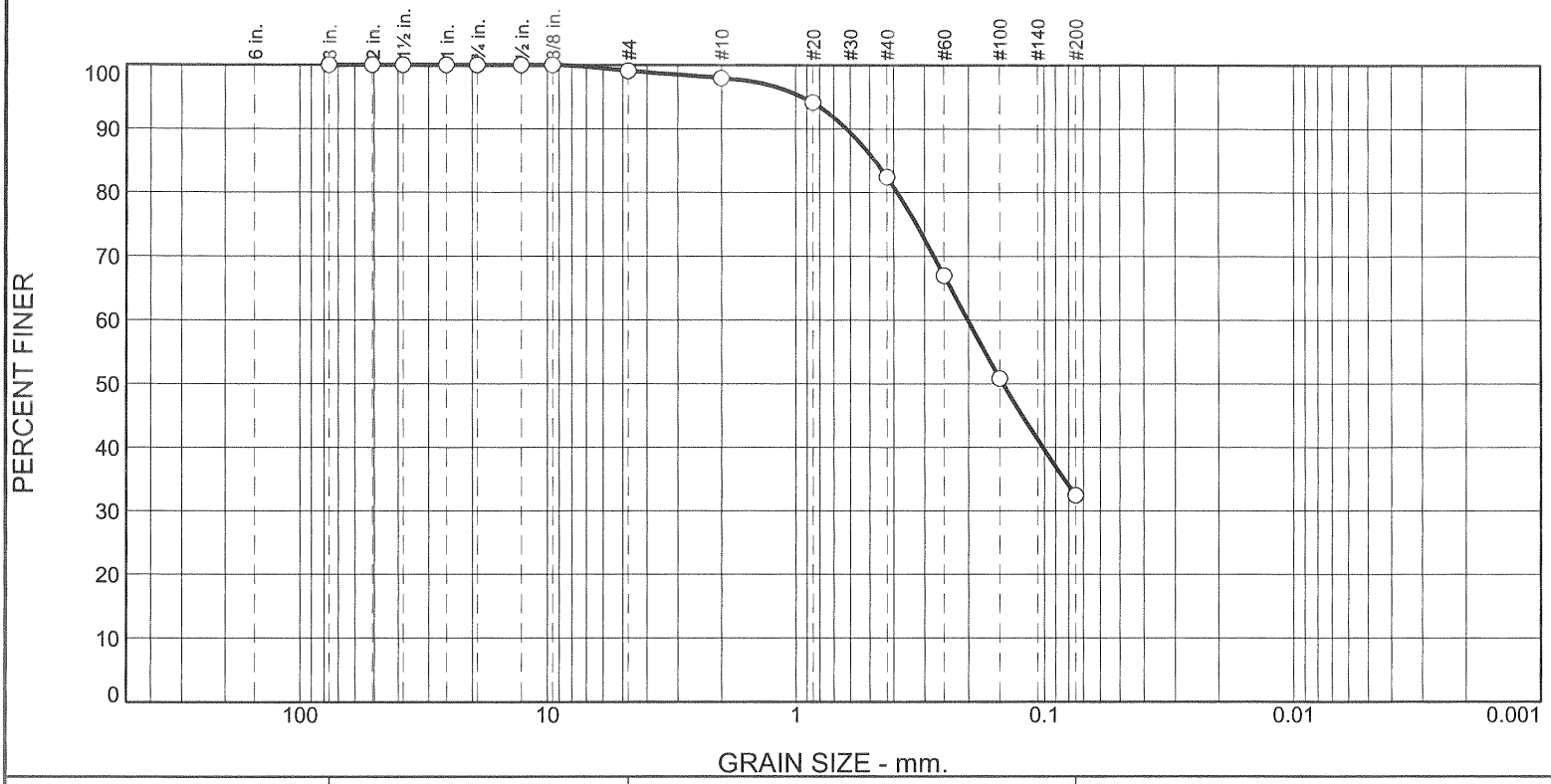
MACTEC ENGINEERING. AND CONSULTING, INC.

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	0.9	1.1	15.6	50.0	32.4	

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	99.1		
#10	98.0		
#20	94.1		
#40	82.4		
#60	67.0		
#100	50.8		
#200	32.4		

* (no specification provided)

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

D_{90}= 0.6186 D_{85}= 0.4753 D_{60}= 0.2014
D_{50}= 0.1460 D_{30}= D_{15}=
D_{10}= 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 **Depth:** 49.5'-51.0' **Date Sampled:**

Sample Number: 9

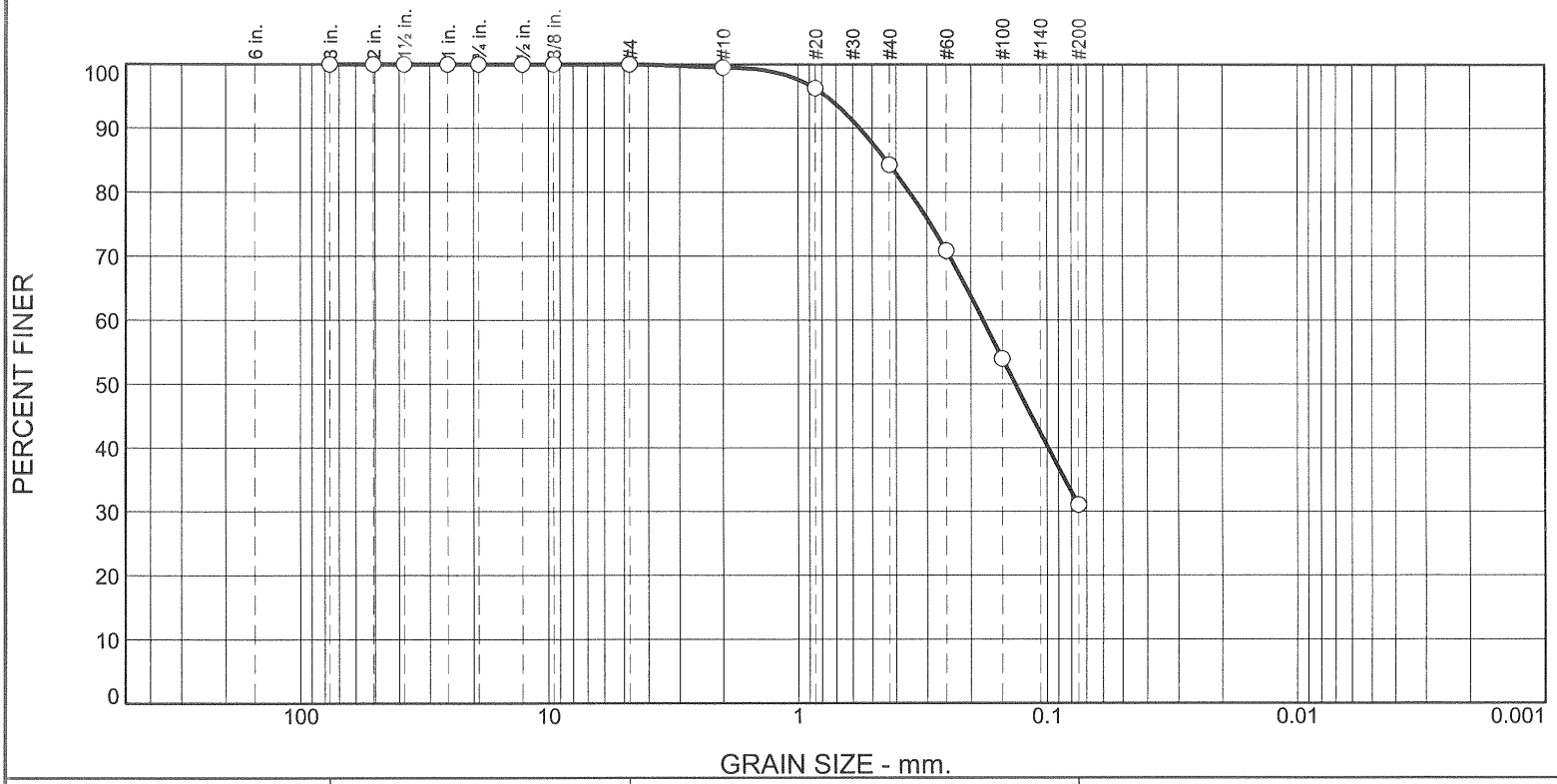
MACTEC ENGINEERING. AND CONSULTING, INC.

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	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

D_{90}= 0.5615 D_{85}= 0.4394 D_{60}= 0.1791
D_{50}= 0.1335 D_{30}= D_{15}=
D_{10}= 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 **Depth:** 59.5'-61.0' **Date Sampled:**

Sample Number: 11

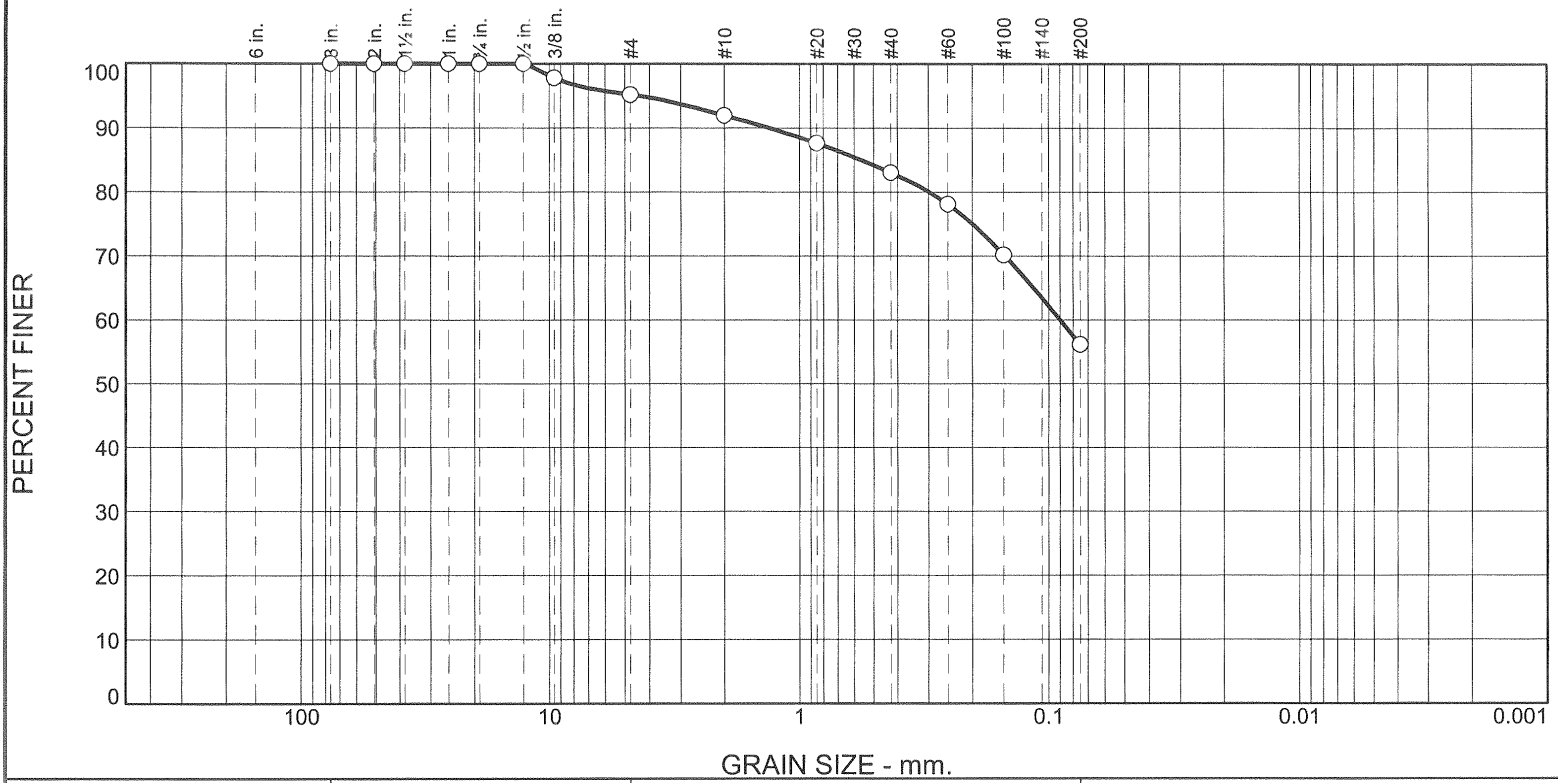
MACTEC ENGINEERING. AND CONSULTING, INC.

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

D_{90}= 1.3231 D_{85}= 0.5602 D_{60}= 0.0899
D_{50}= D_{30}= D_{15}=
D_{10}= 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 **Depth:** 4.5'-6.0' **Date Sampled:**

Sample Number: 1

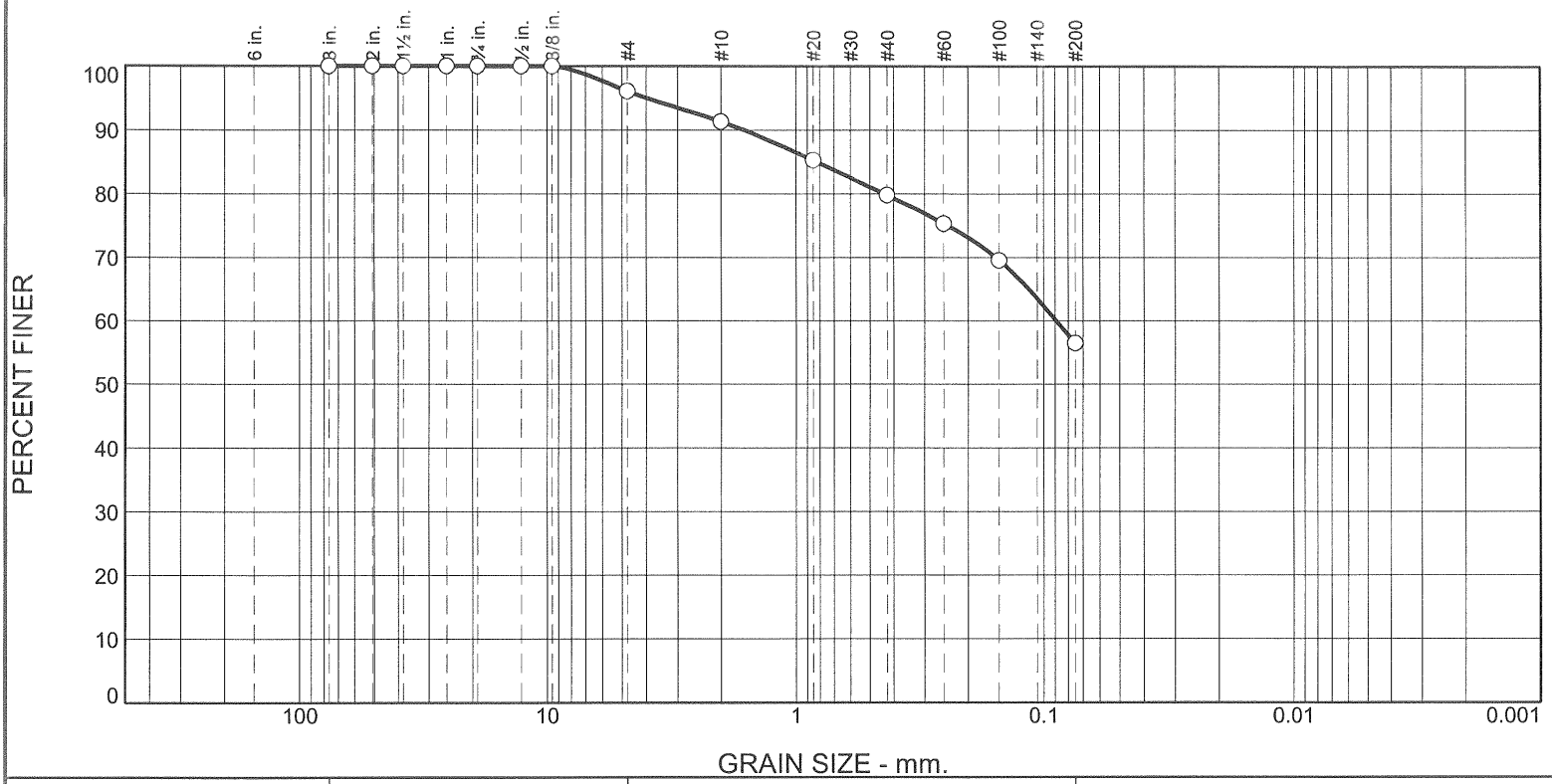
MACTEC ENGINEERING. AND CONSULTING, INC.

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		

* (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

D_{90}= 1.6176 D_{85}= 0.8210 D_{60}= 0.0889
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

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

Tested By: MC

Checked By:

Title:

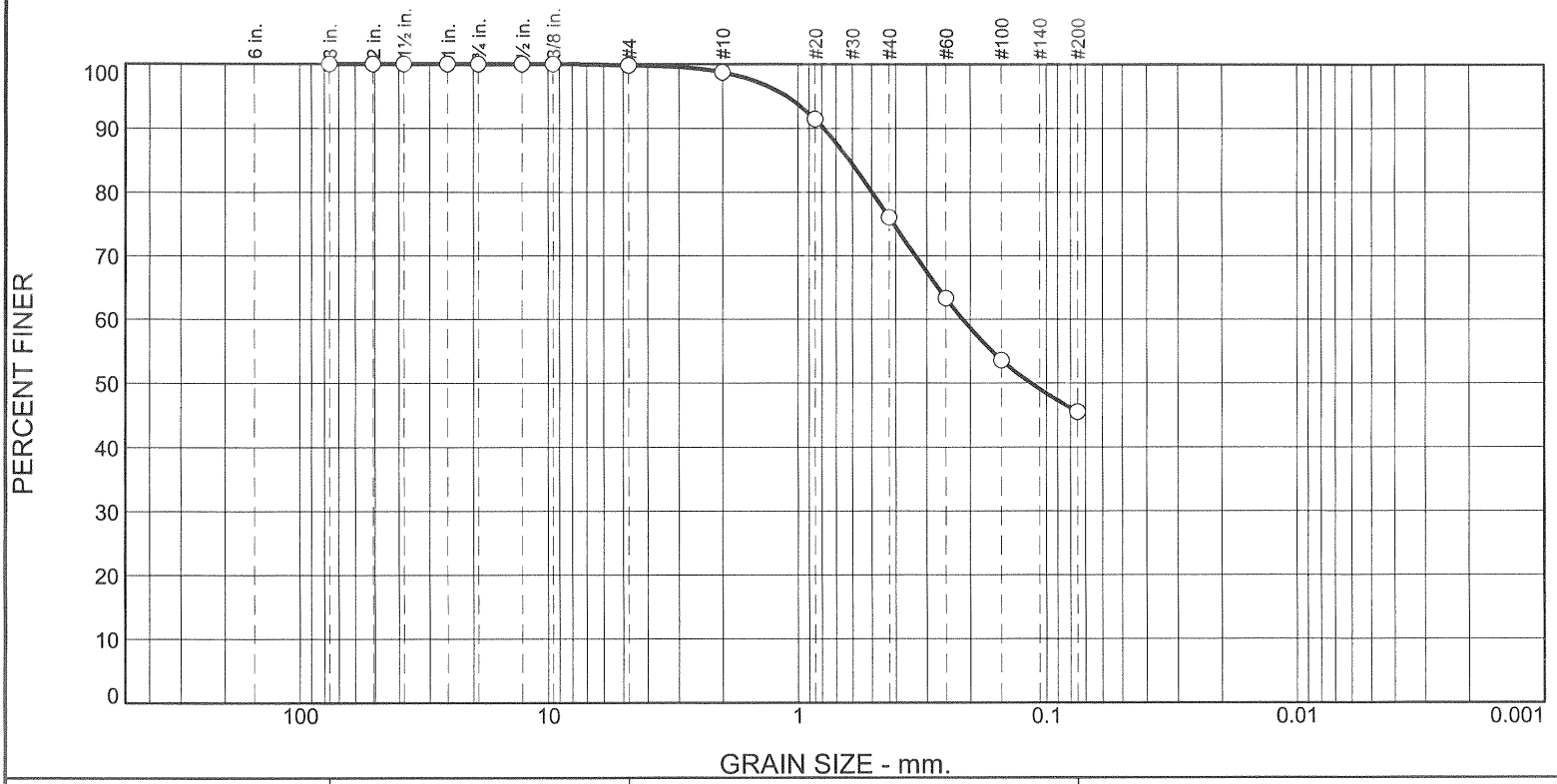
Source of Sample: Boring No.: APB-2 **Depth:** 9.5'-11.0' **Date Sampled:**
Sample Number: 2

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		

* (no specification provided)

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

D_{90}= 0.7831 D_{85}= 0.6148 D_{60}= 0.2144
D_{50}= 0.1151 D_{30}= D_{15}=
D_{10}= 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 **Depth:** 29.5'-31.0' **Date Sampled:**

Sample Number: 6

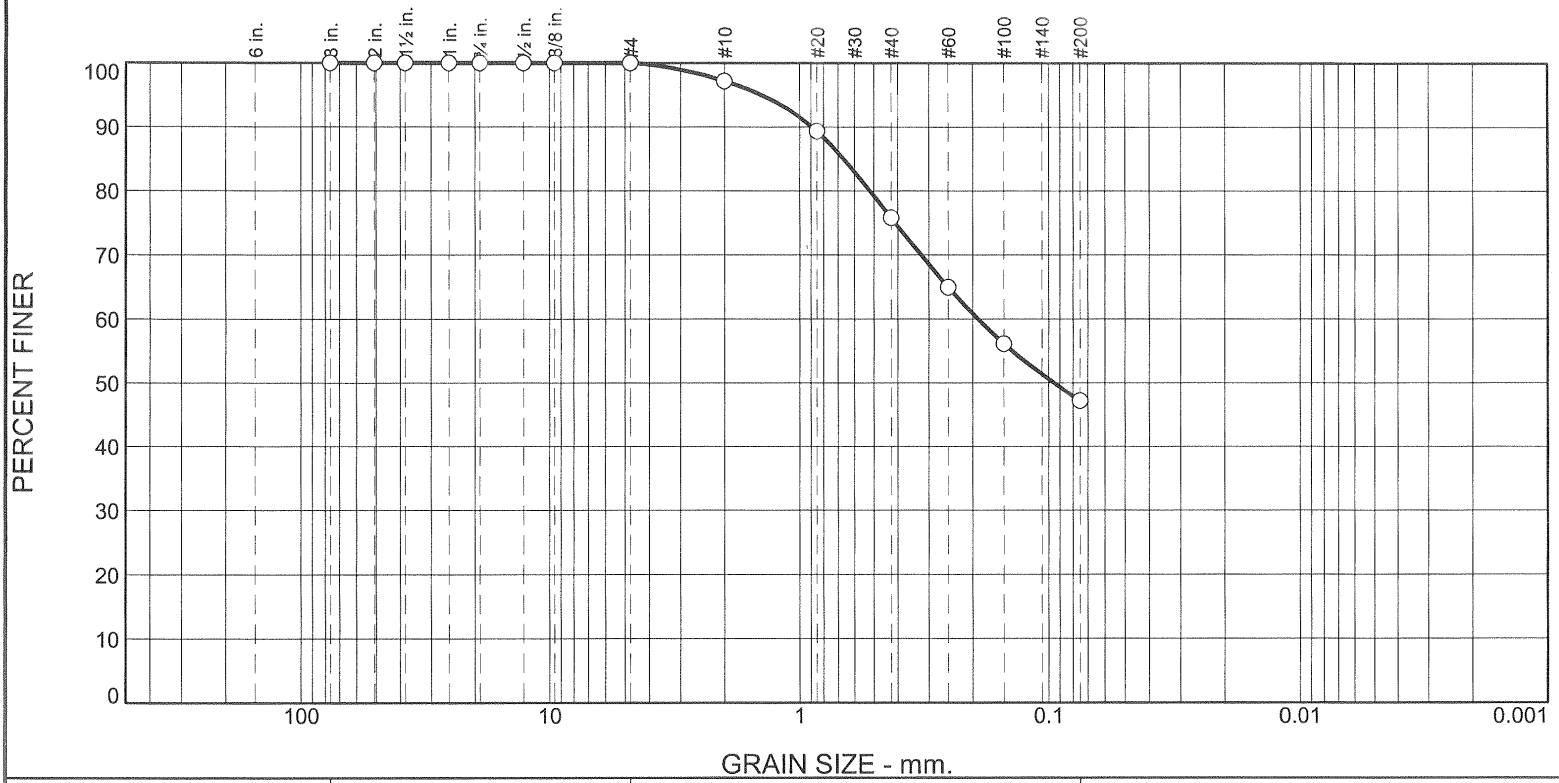
MACTEC ENGINEERING. AND CONSULTING, INC.

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		

* (no specification provided)

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

D_{90}= 0.8905 D_{85}= 0.6634 D_{60}= 0.1906
D_{50}= 0.0950 D_{30}= D_{15}=
D_{10}= 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 **Date Sampled:**

Sample Number: 8

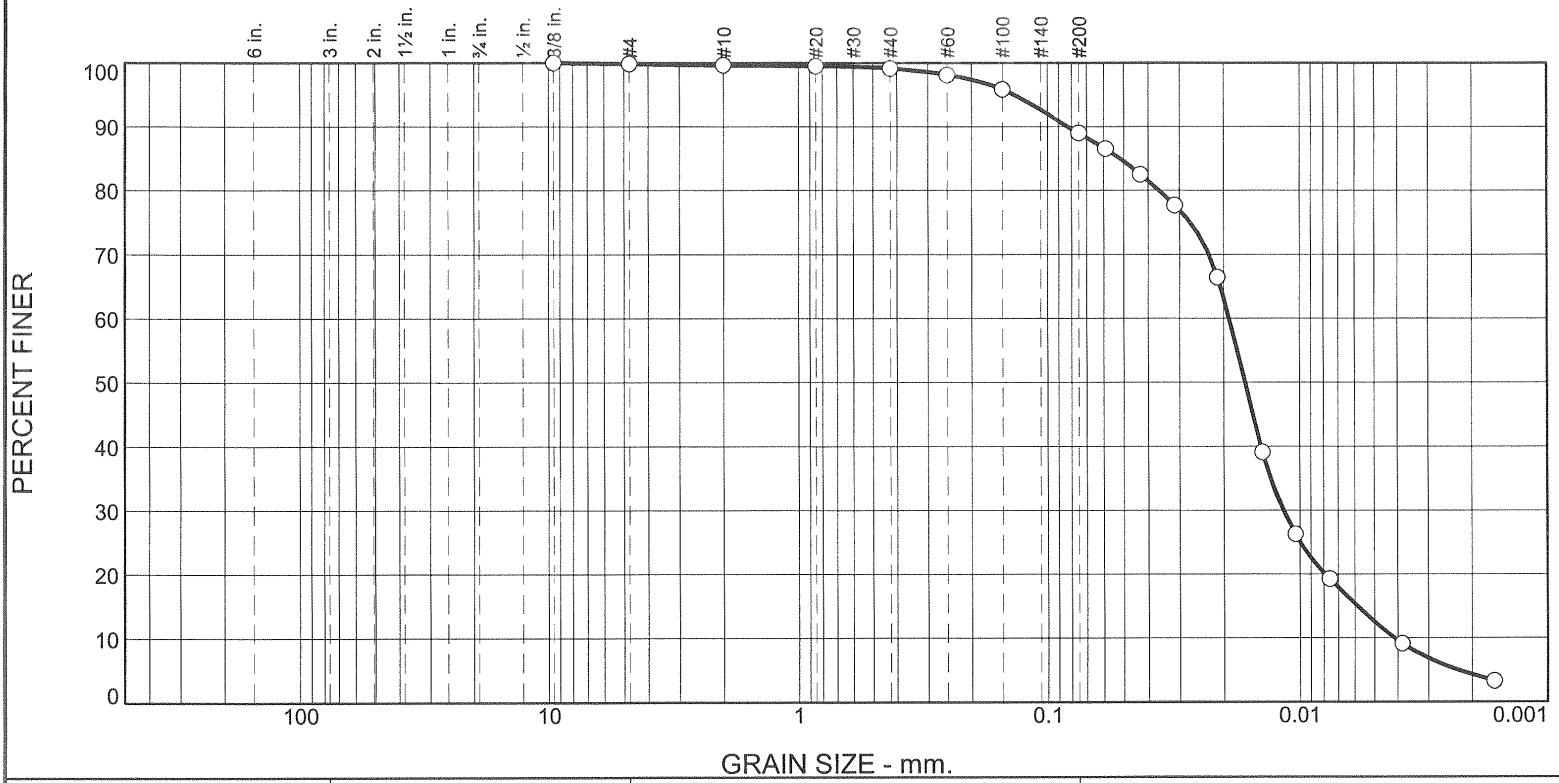
MACTEC ENGINEERING. AND CONSULTING, INC.

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		

* (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

D_{90}= 0.0830 D_{85}= 0.0517 D_{60}= 0.0190
D_{50}= 0.0165 D_{30}= 0.0116 D_{15}= 0.0059
D_{10}= 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

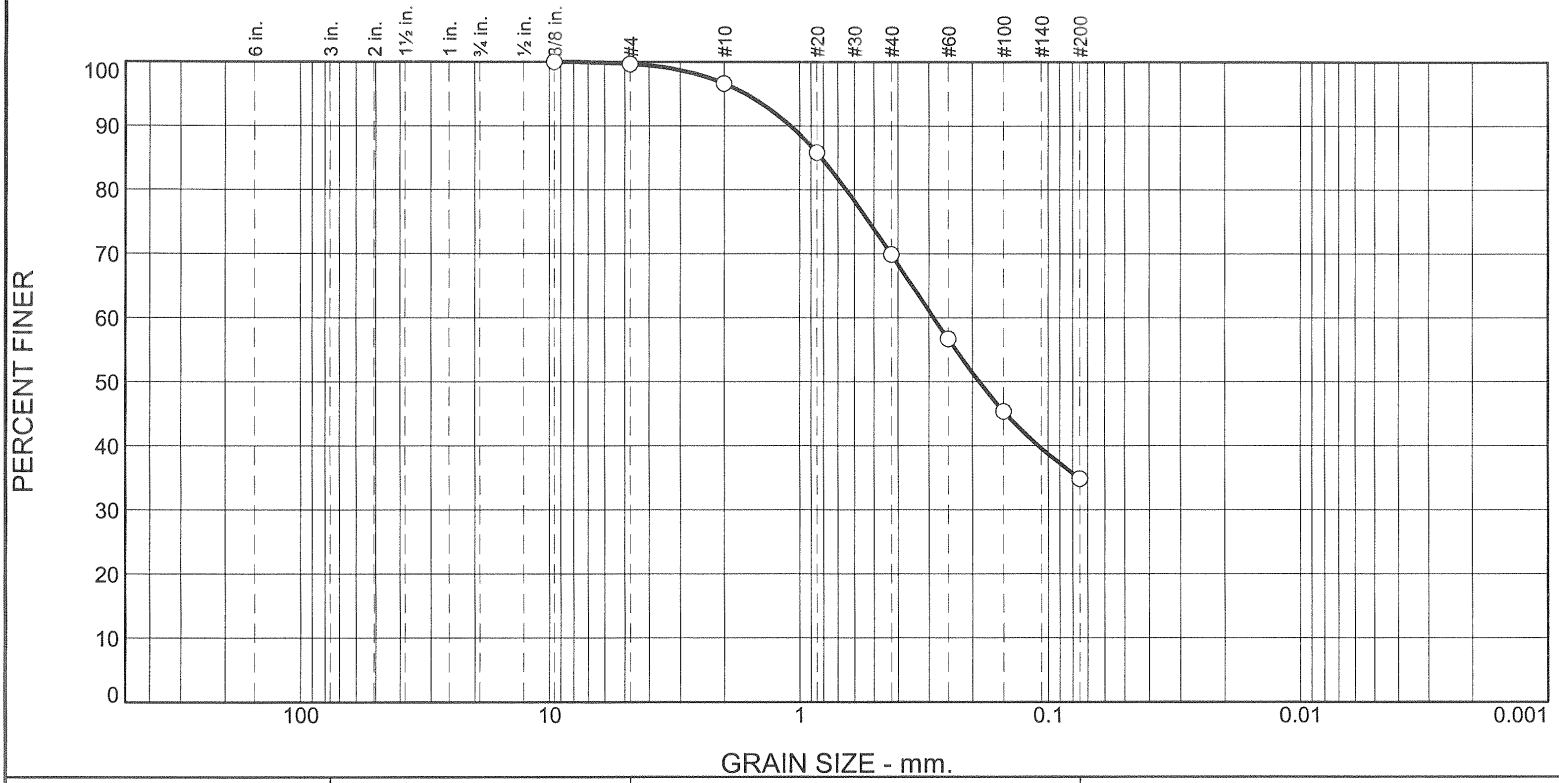
MACTEC ENGINEERING. AND CONSULTING, INC.

Client: Southern Company

Project: Plant Yates Ash Pond

Project No: 6189109008 **Jax FL.**

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		

* (no specification provided)

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

D_{90}= 1.0875 D_{85}= 0.8158 D_{60}= 0.2865
D_{50}= 0.1879 D_{30}= D_{15}=
D_{10}= 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-3 **Depth:** 14.5'-16.0' **Date Sampled:**

Sample Number: 3

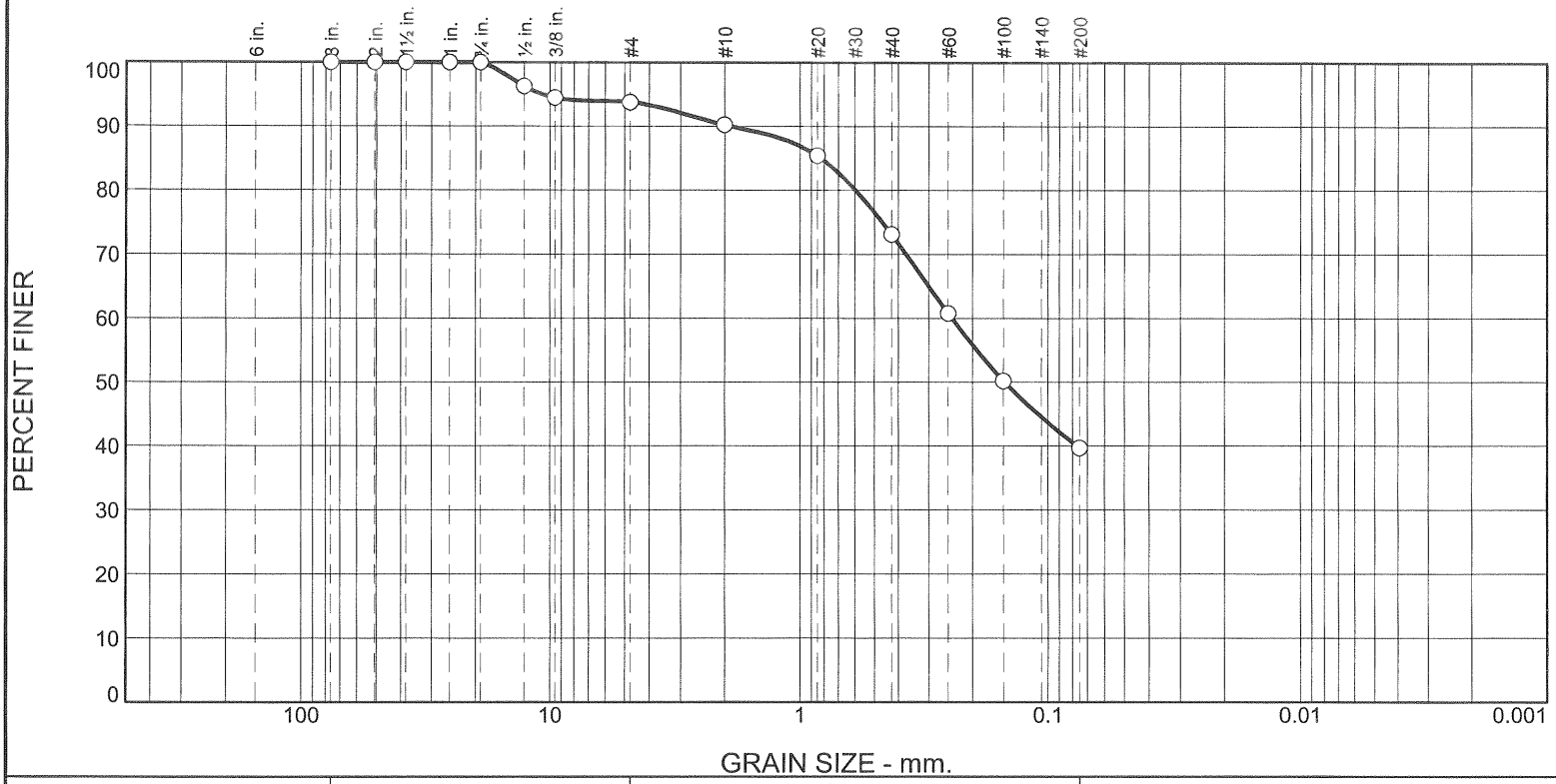
MACTEC ENGINEERING. AND CONSULTING, INC.

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		

* (no specification provided)

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

D_{90}= 1.9069 D_{85}= 0.8241 D_{60}= 0.2415
D_{50}= 0.1485 D_{30}= D_{15}=
D_{10}= 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-3 **Depth:** 29.5'-31.0' **Date Sampled:**

Sample Number: 6

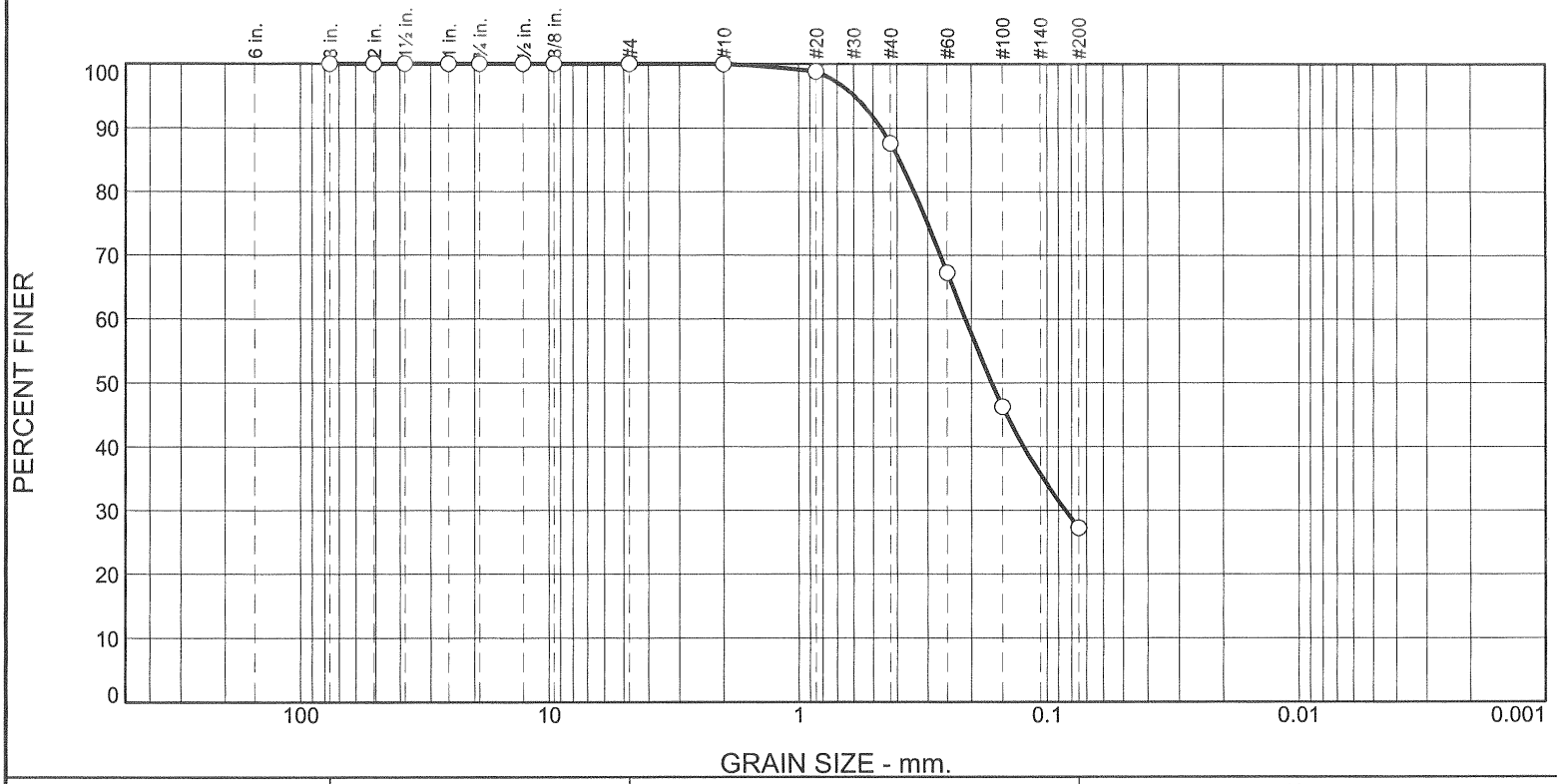
MACTEC ENGINEERING. AND CONSULTING, INC.

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	0.0	12.4	60.4	27.2	

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	100.0		
#20	98.8		
#40	87.6		
#60	67.3		
#100	46.3		
#200	27.2		

* (no specification provided)

Material Description

Tan Medium to Fine SAND with Silt

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

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

Coefficients

D_{90}= 0.4642 D_{85}= 0.3913 D_{60}= 0.2114
D_{50}= 0.1659 D_{30}= 0.0844 D_{15}=
D_{10}= 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-3 **Depth:** 39.5'-41.0' **Date Sampled:**

Sample Number: 8

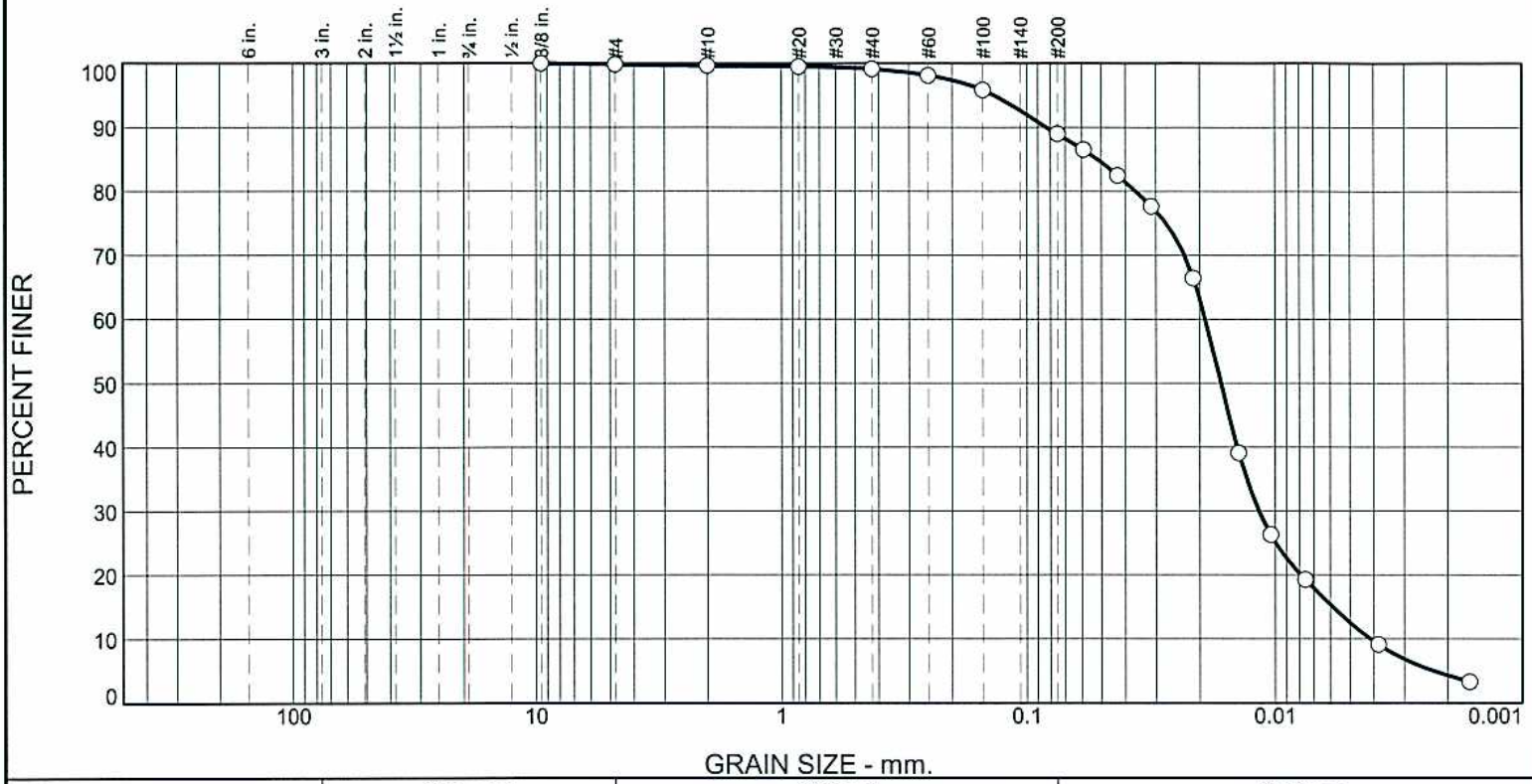
MACTEC ENGINEERING. AND CONSULTING, INC.

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		

* (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

D_{90}= 0.0830 D_{85}= 0.0517 D_{60}= 0.0190
D_{50}= 0.0165 D_{30}= 0.0116 D_{15}= 0.0059
D_{10}= 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

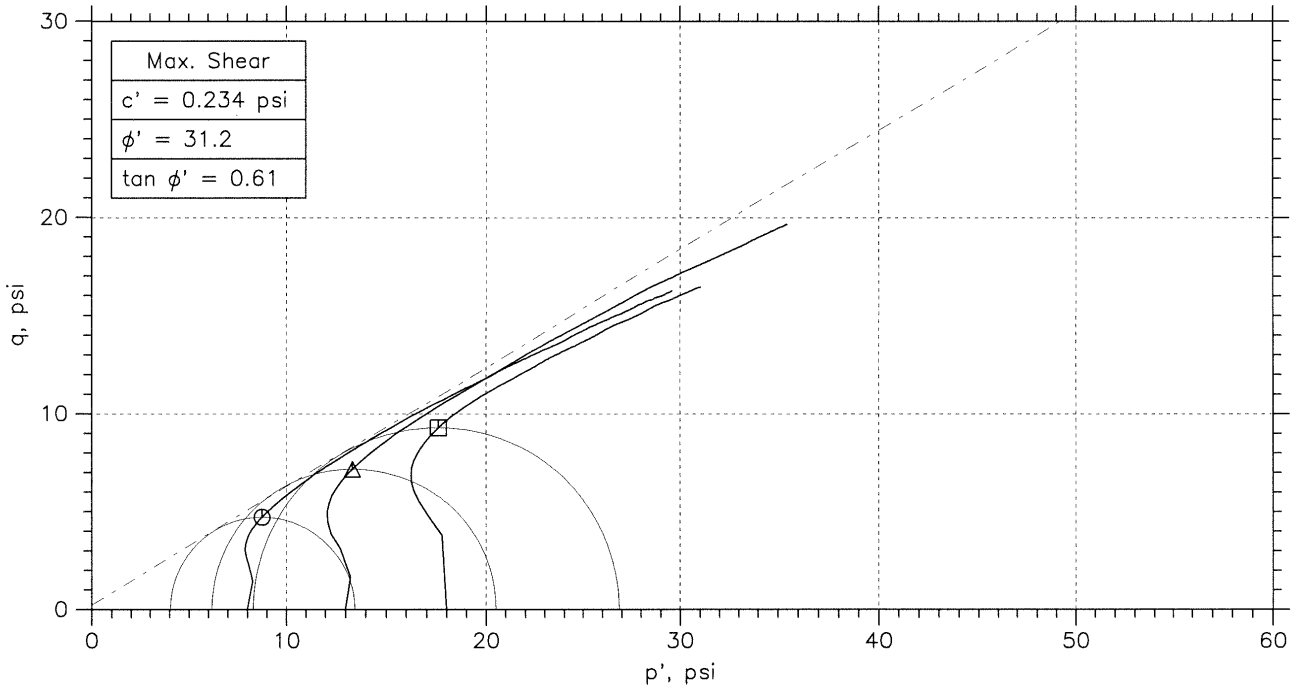
MACTEC ENGINEERING. AND CONSULTING, INC.

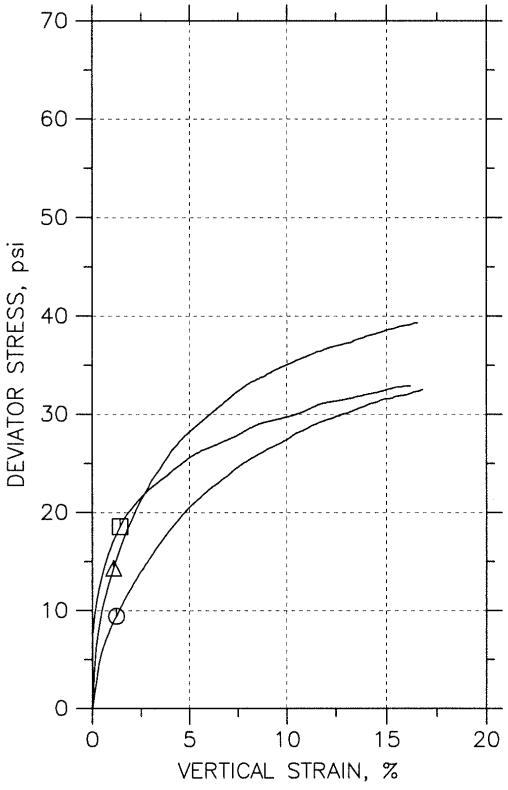
Client: Southern Company

Project: Plant Yates Ash Pond

Project No: 6189109008 **Jax FL.**

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

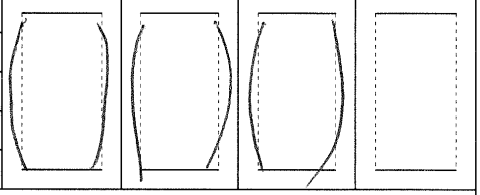
Project: Plant Yates Ash Pond

Location: APB-1

Project No.: 6189109008

Boring No.: APB-1

Sample Type: Undisturbed



Description: Brown Clayey Sand

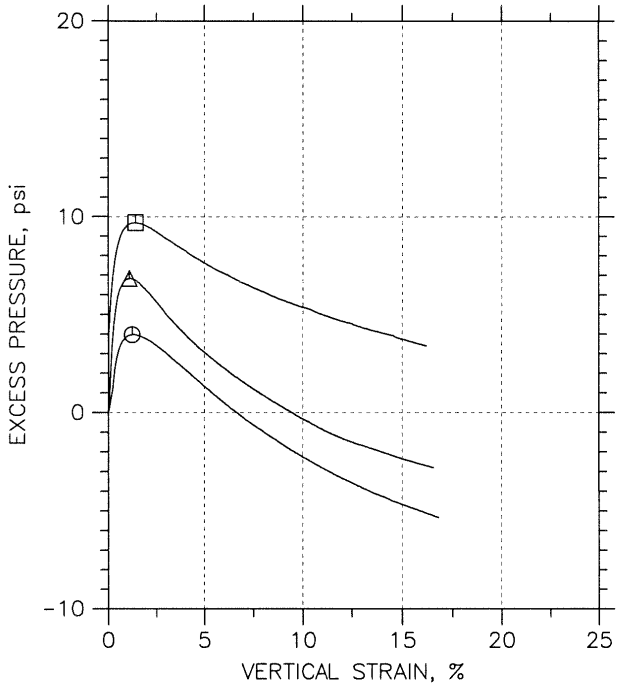
Remarks: ASTM D4767-04. Strain at failure based on peak excess pore pressure.

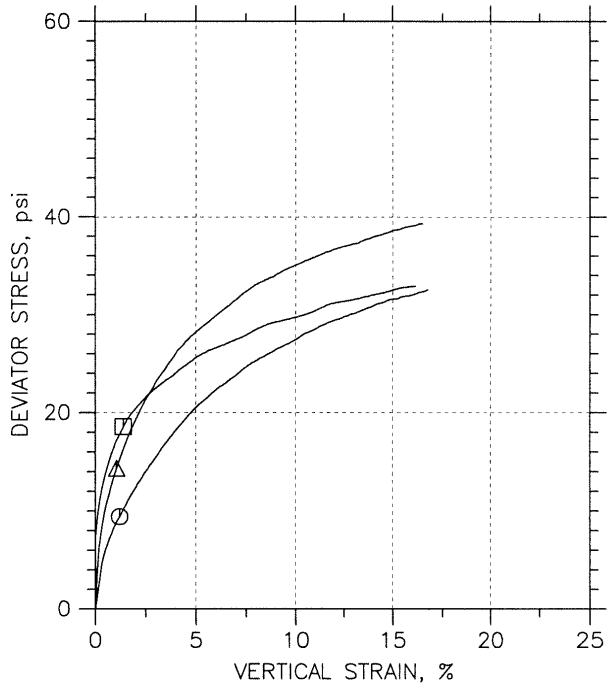
Phase calculations based on start and end of test.

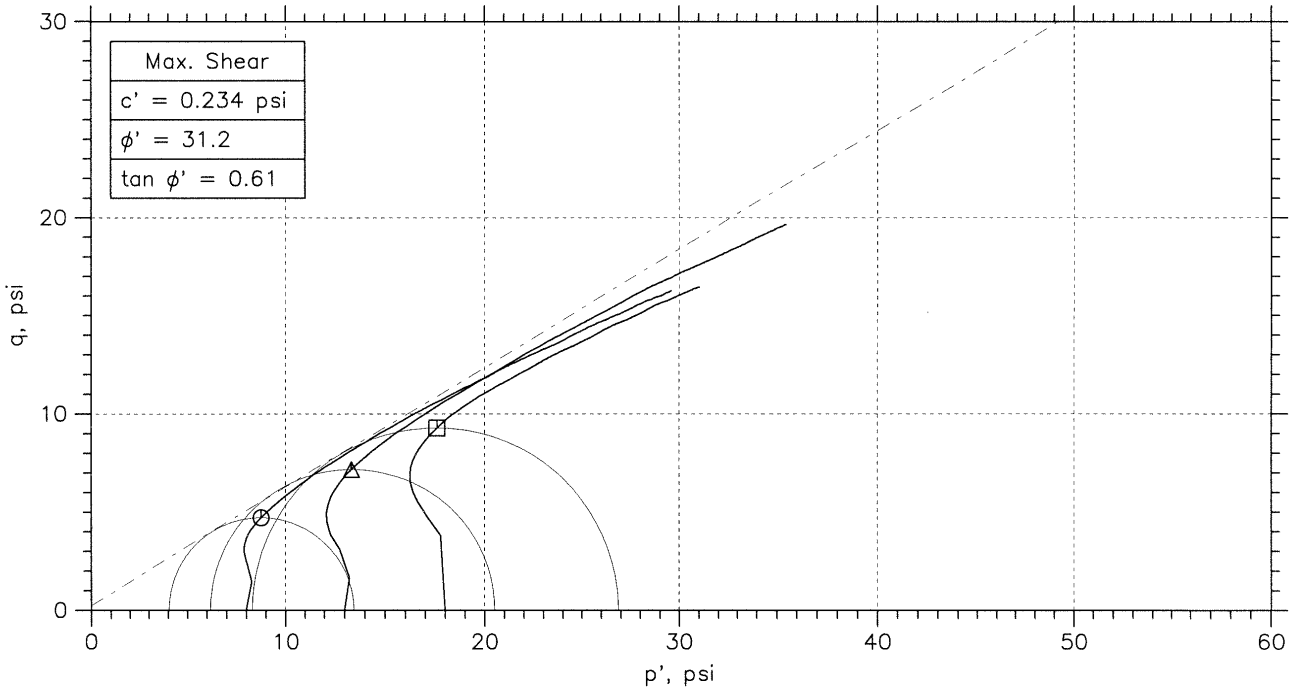
* Saturation is set to 100% for phase calculations.

Wed, 19-MAY-2010 11:22:36

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767







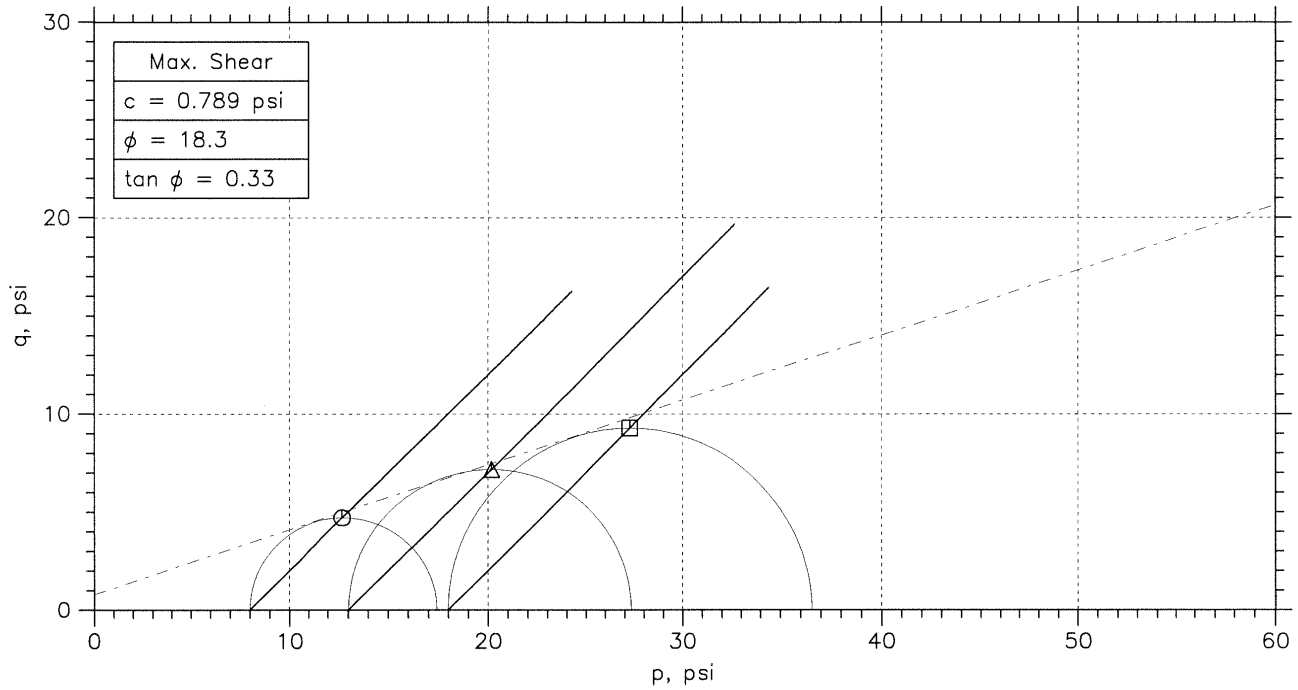
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊙	IS-1	10101.1	24.5-26.5ft	JW	4/2/10			10101.1a_2580.dat
△	IS-1	10101.2	24.5-26.5ft	JW	4/2/10			10101.2a_2547.dat
⊡	IS-1	10101.3	24.5-26.5ft	JW	4/2/10			10101.3a_2546.dat

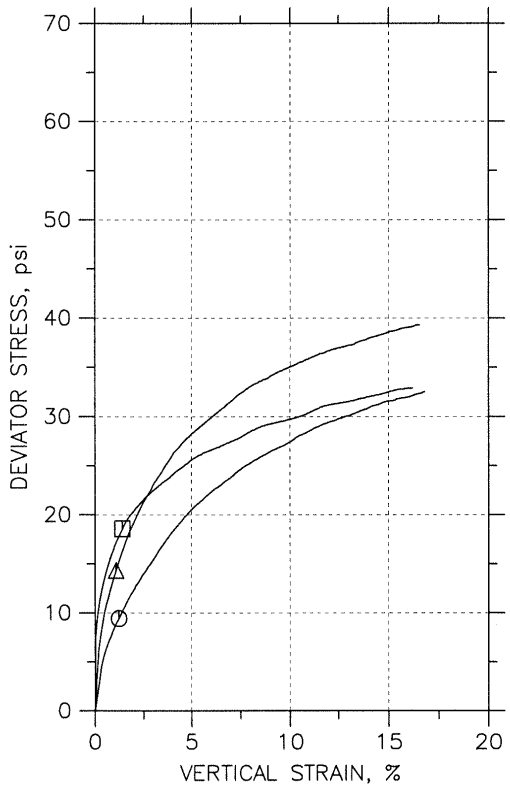
MACTEC

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.		

Wed, 19-MAY-2010 11:22:36

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

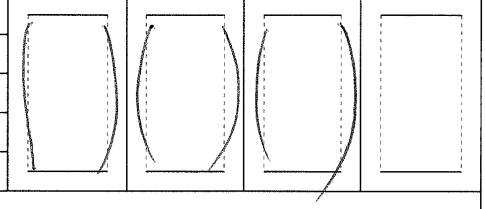
Project: Plant Yates Ash Pond

Location: APB-1

Project No.: 6189109008

Boring No.: APB-1

Sample Type: Undisturbed



Description: Brown Clayey Sand

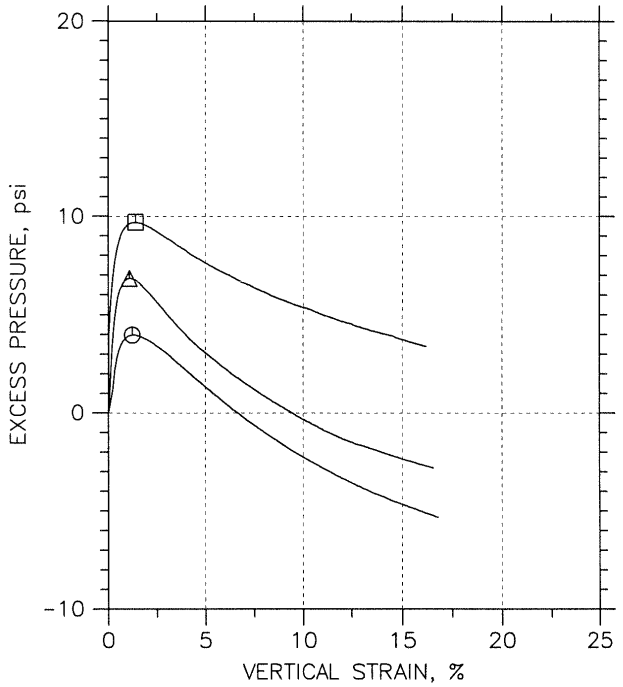
Remarks: ASTM D4767-04. Strain at failure based on peak excess pore pressure.

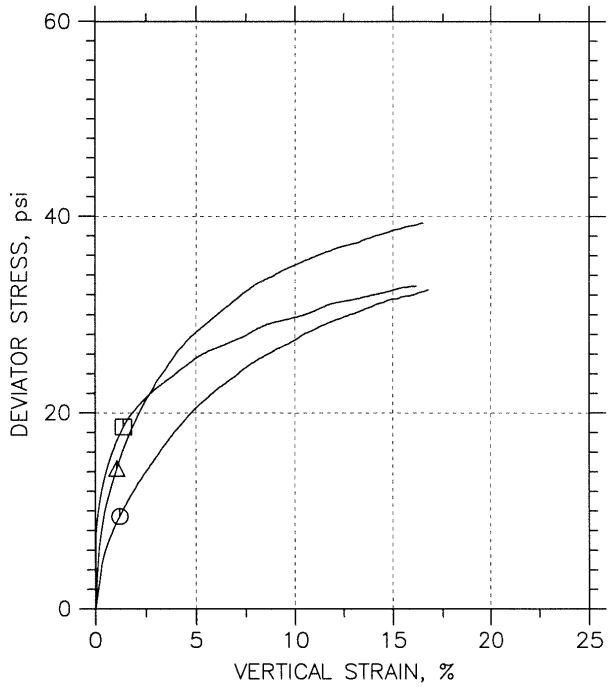
Phase calculations based on start and end of test.

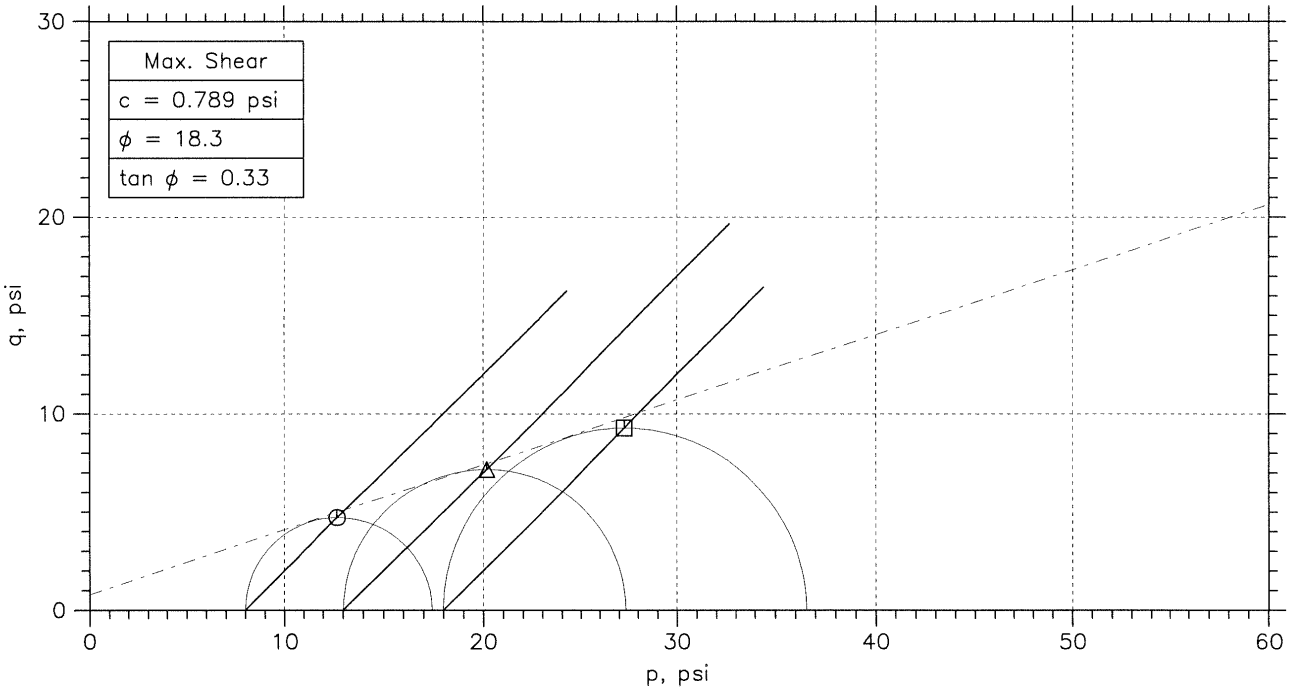
* Saturation is set to 100% for phase calculations.

Wed, 19-MAY-2010 11:22:50

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767







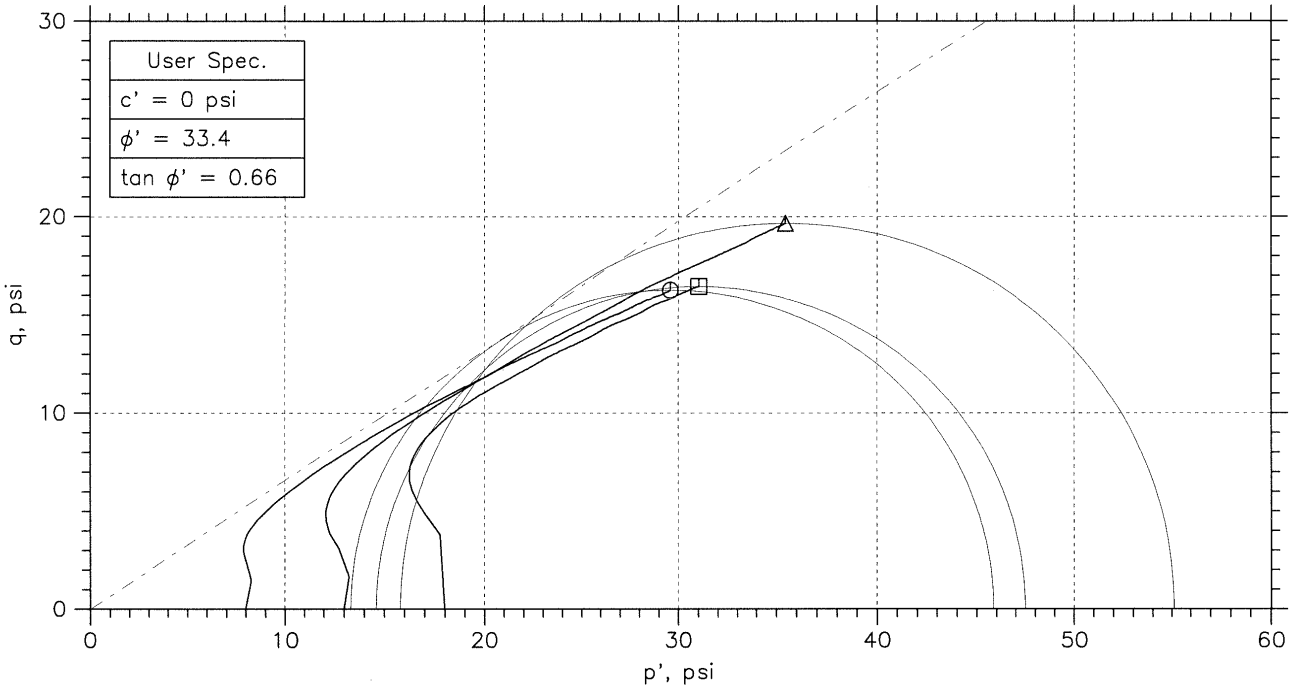
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊙	IS-1	10101.1	24.5-26.5ft	JW	4/2/10			10101.1a_2580.dat
△	IS-1	10101.2	24.5-26.5ft	JW	4/2/10			10101.2a_2547.dat
⊡	IS-1	10101.3	24.5-26.5ft	JW	4/2/10			10101.3a_2546.dat

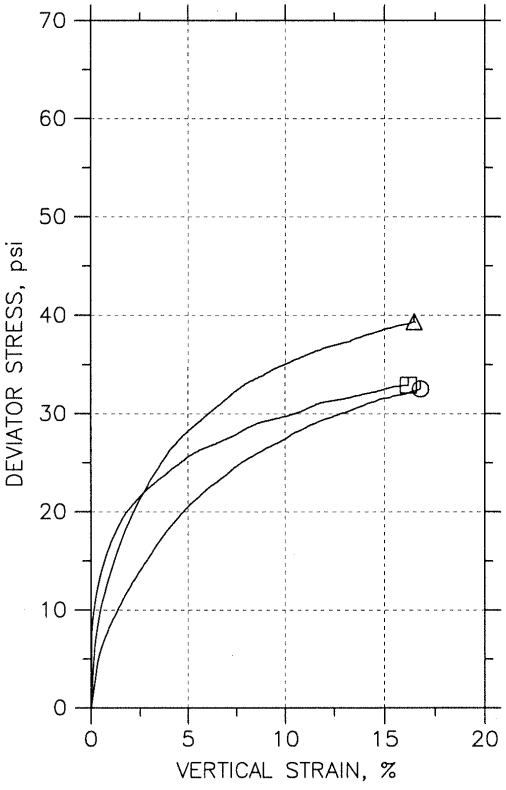
MACTEC

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.		

Wed, 19-MAY-2010 11:22:50

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

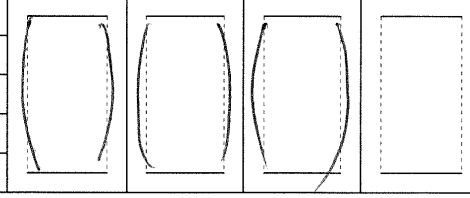
Project: Plant Yates Ash Pond

Location: APB-1

Project No.: 6189109008

Boring No.: APB-1

Sample Type: Undisturbed



Description: Brown Clayey Sand

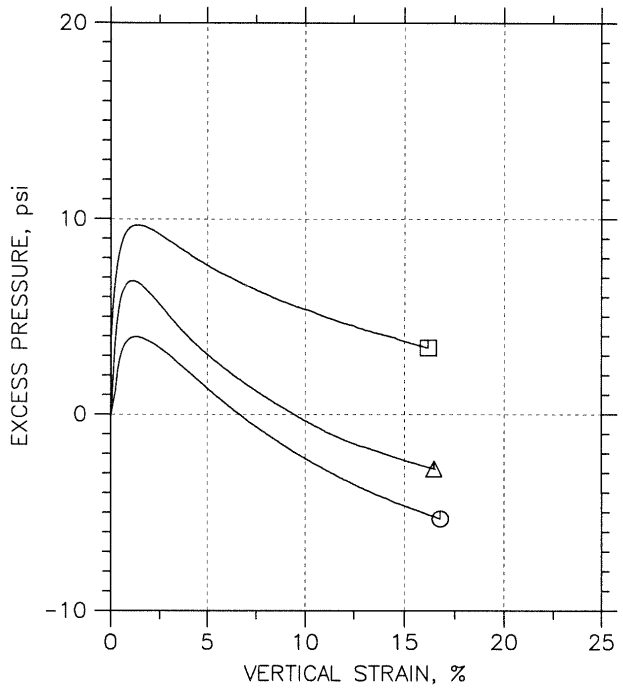
Remarks: ASTM D4767-04.

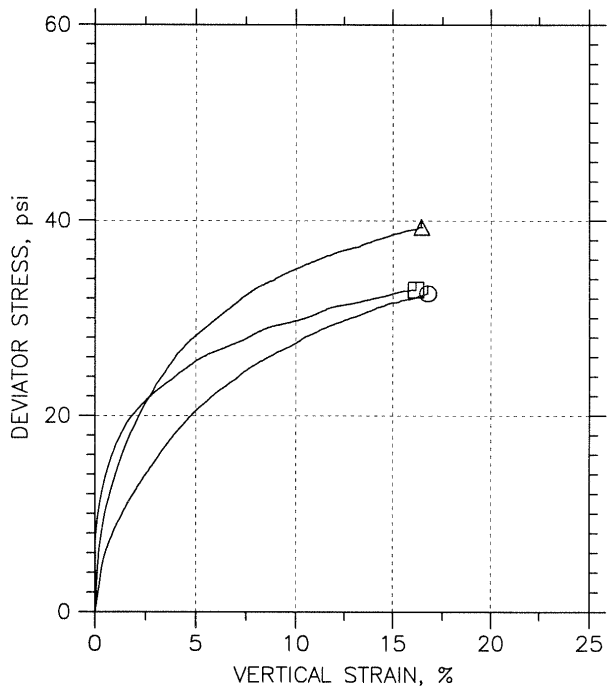
Phase calculations based on start and end of test.

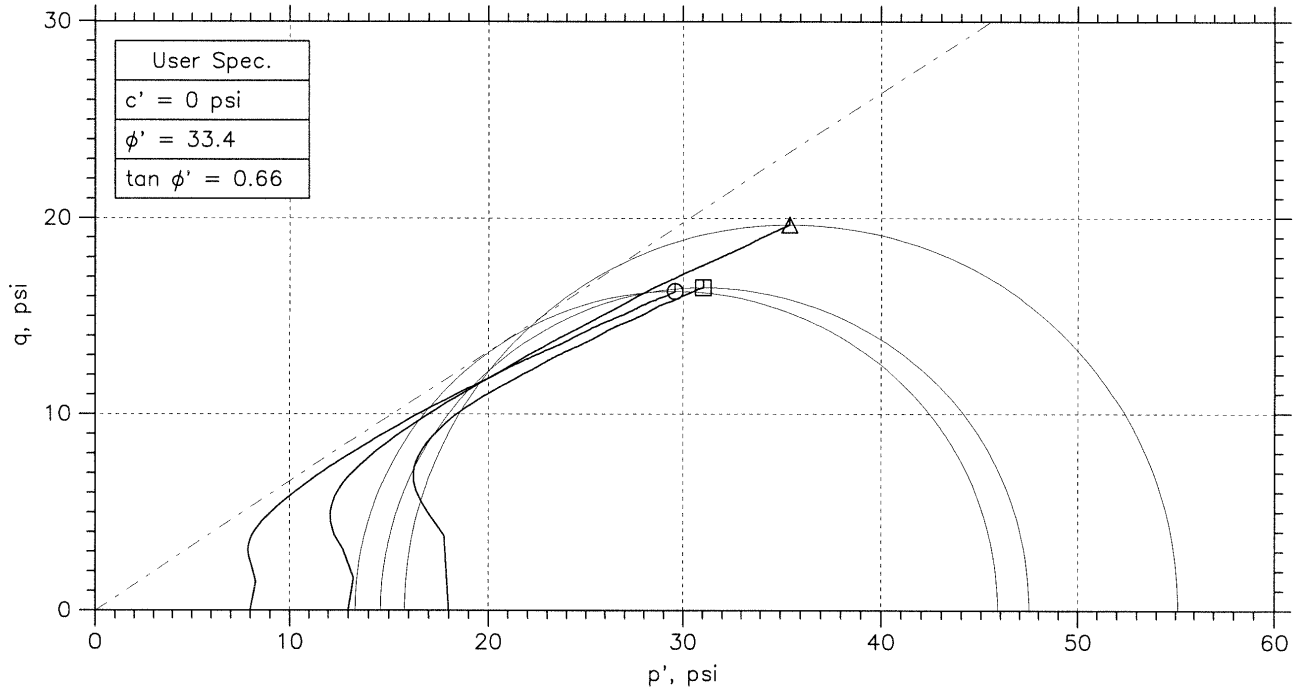
* Saturation is set to 100% for phase calculations.

Wed, 19-MAY-2010 11:27:44

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767







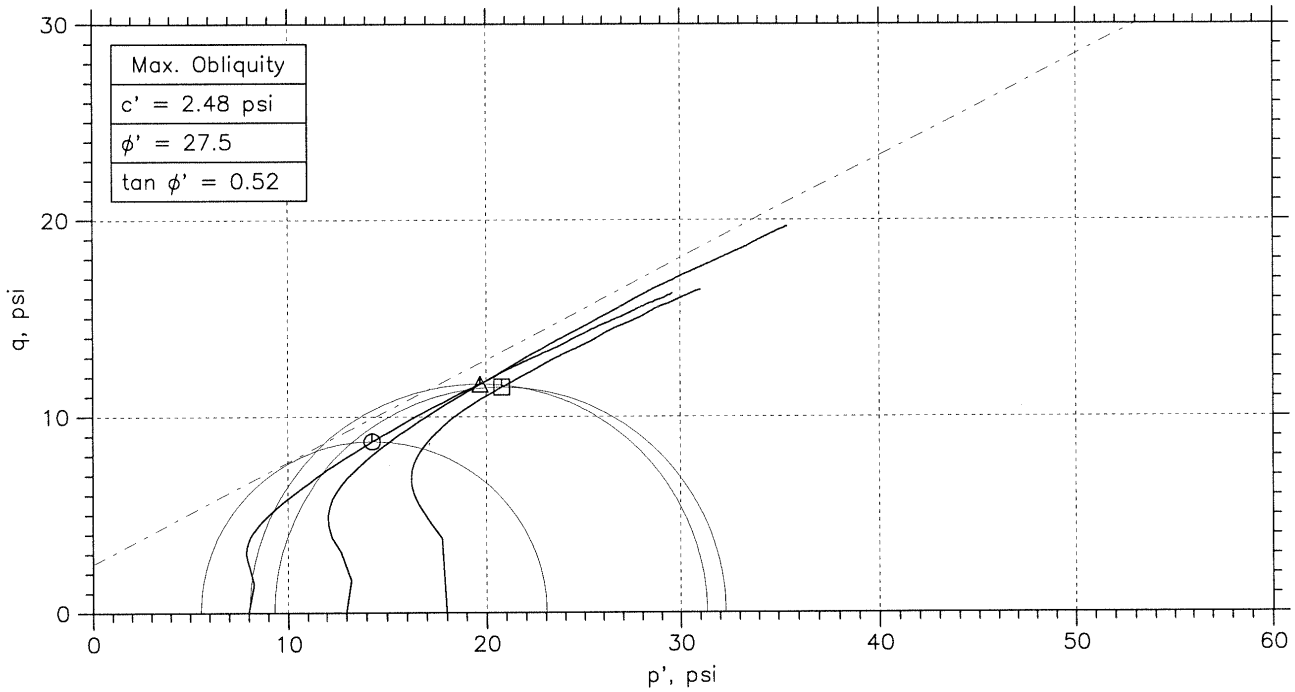
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊙	IS-1	10101.1	24.5-26.5ft	JW	4/2/10			10101.1a_2580.dat
△	IS-1	10101.2	24.5-26.5ft	JW	4/2/10			10101.2a_2547.dat
□	IS-1	10101.3	24.5-26.5ft	JW	4/2/10			10101.3a_2546.dat

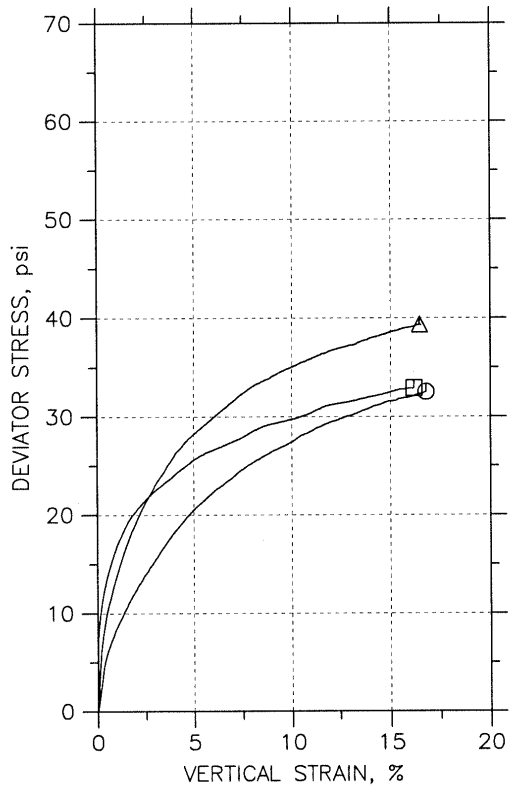
MACTEC

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.		

Wed, 19-MAY-2010 11:27:44

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

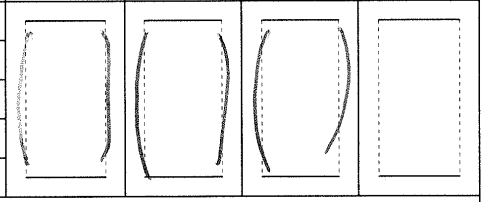
Project No.: 6189109008

Boring No.: APB-1

Sample Type: Undisturbed

Description: Brown Clayey Sand

Remarks: ASTM D4767-04

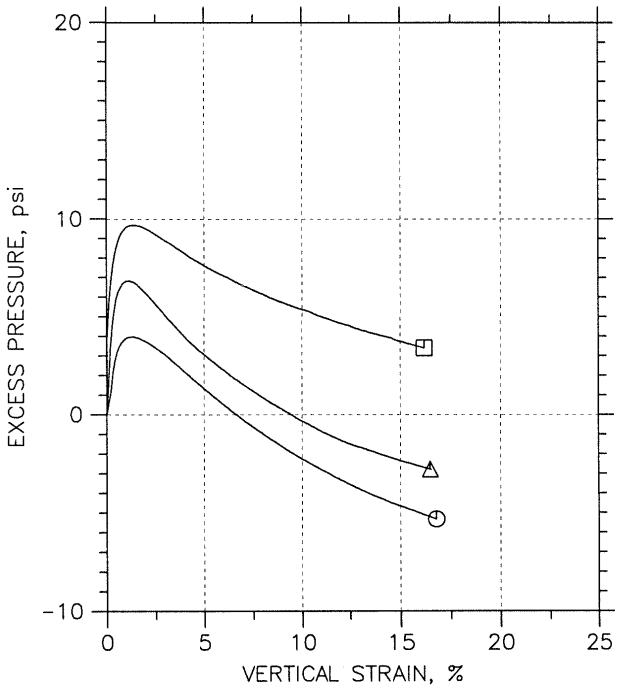


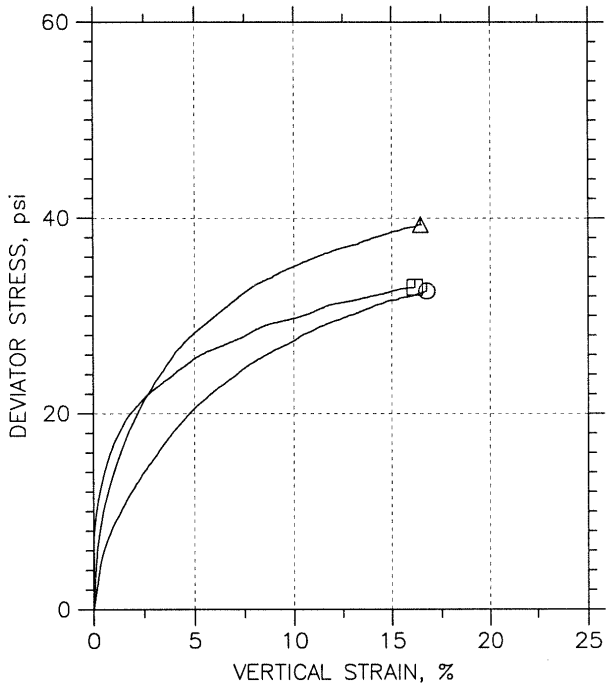
Phase calculations based on start and end of test.

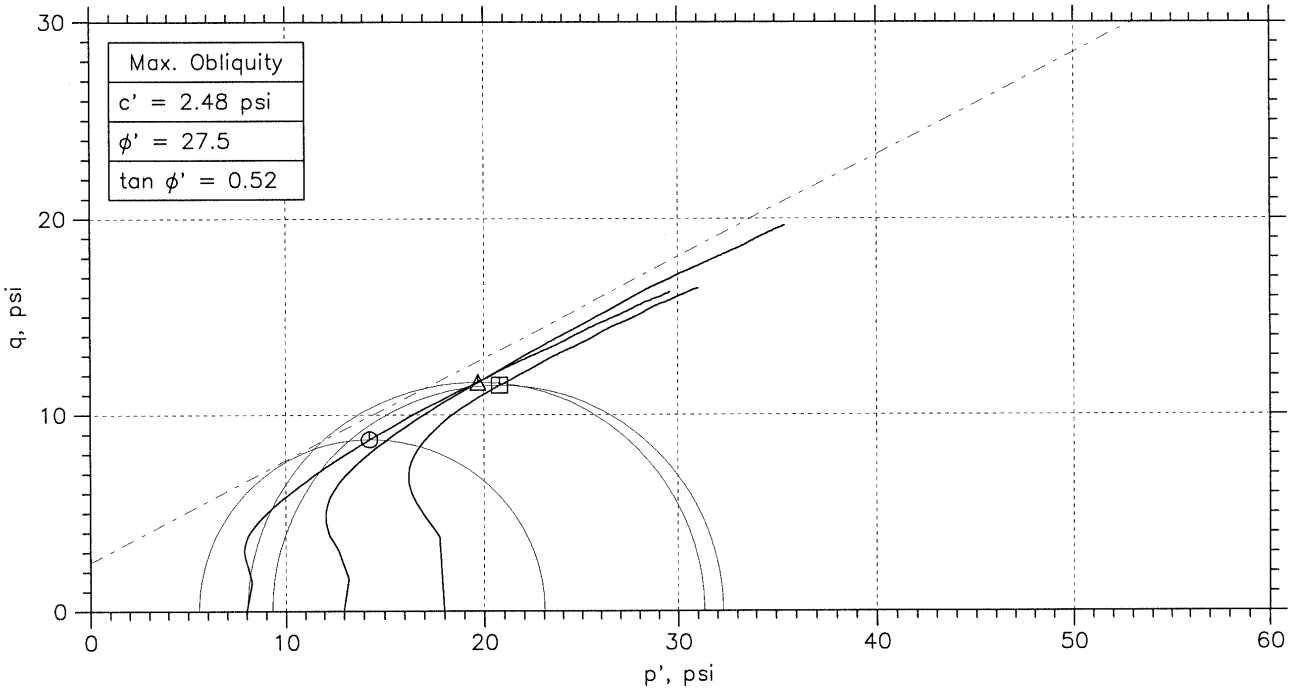
* Saturation is set to 100% for phase calculations.

Tue, 20-APR-2010 10:24:40

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767







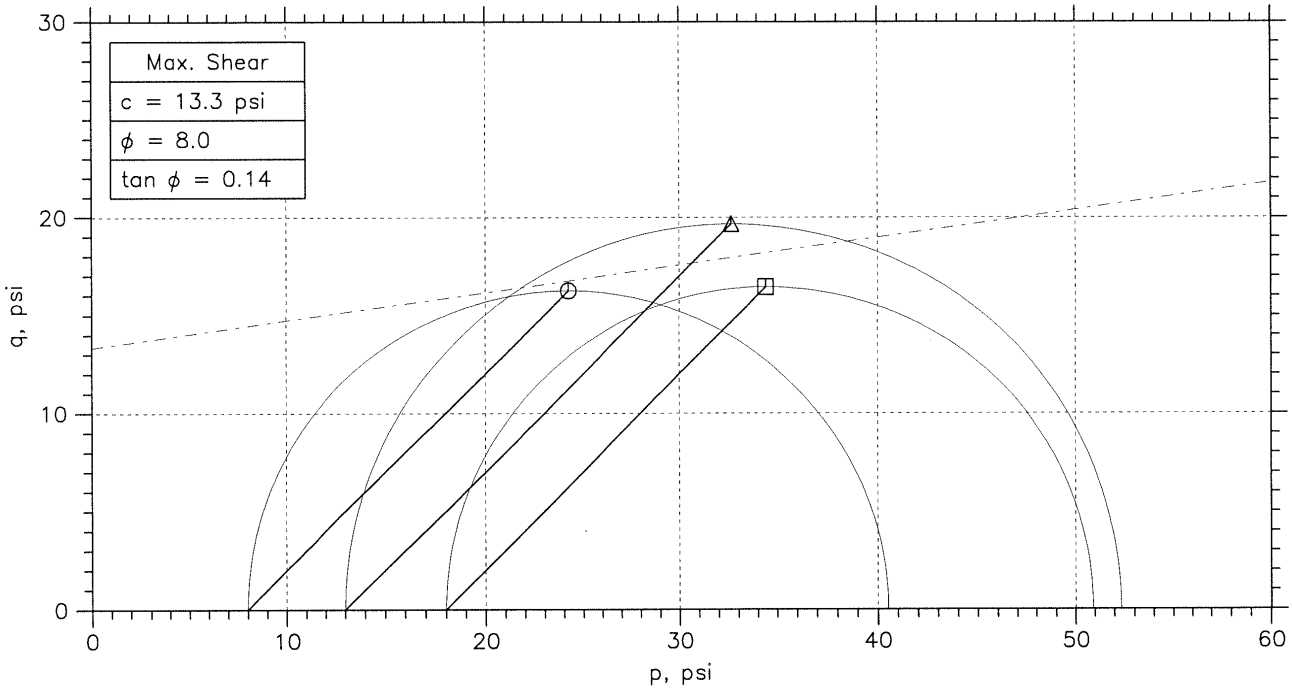
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊙	IS-1	10101.1	24.5-26.5ft	JW	4/2/10			10101.1a_2580.dat
△	IS-1	10101.2	24.5-26.5ft	JW	4/2/10			10101.2a_2547.dat
□	IS-1	10101.3	24.5-26.5ft	JW	4/2/10			10101.3a_2546.dat

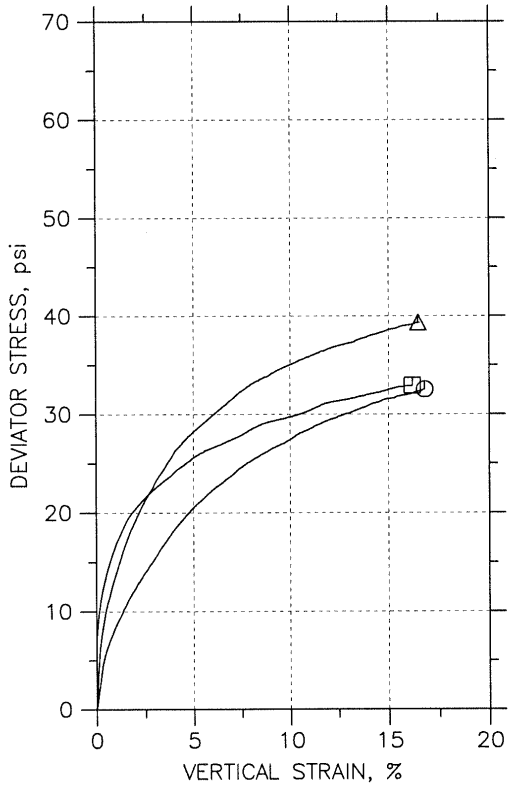
MACTEC

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		

Tue, 20-APR-2010 10:24:41

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

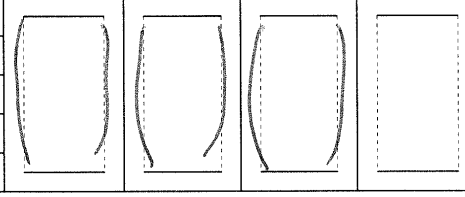
Project No.: 6189109008

Boring No.: APB-1

Sample Type: Undisturbed

Description: Brown Clayey Sand

Remarks: ASTM D4767-04

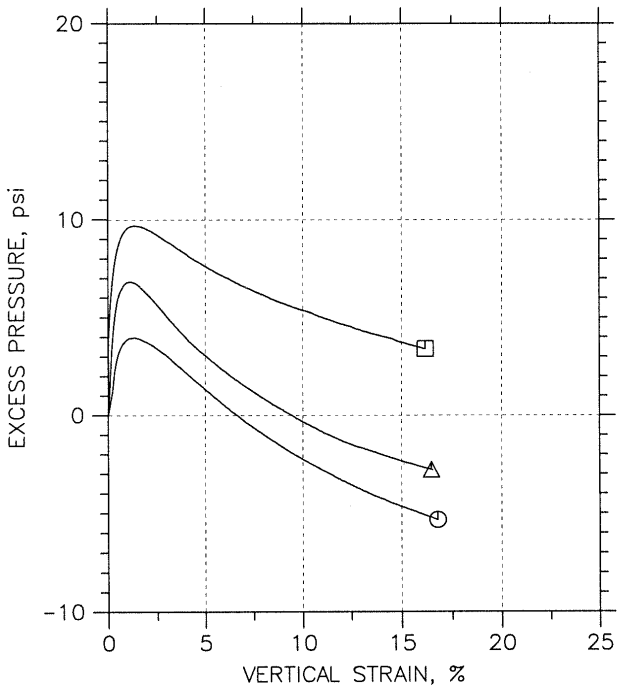


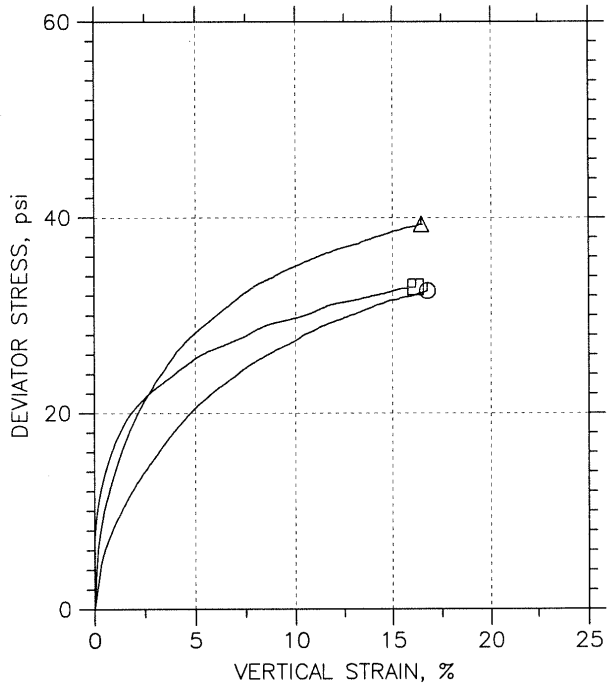
Phase calculations based on start and end of test.

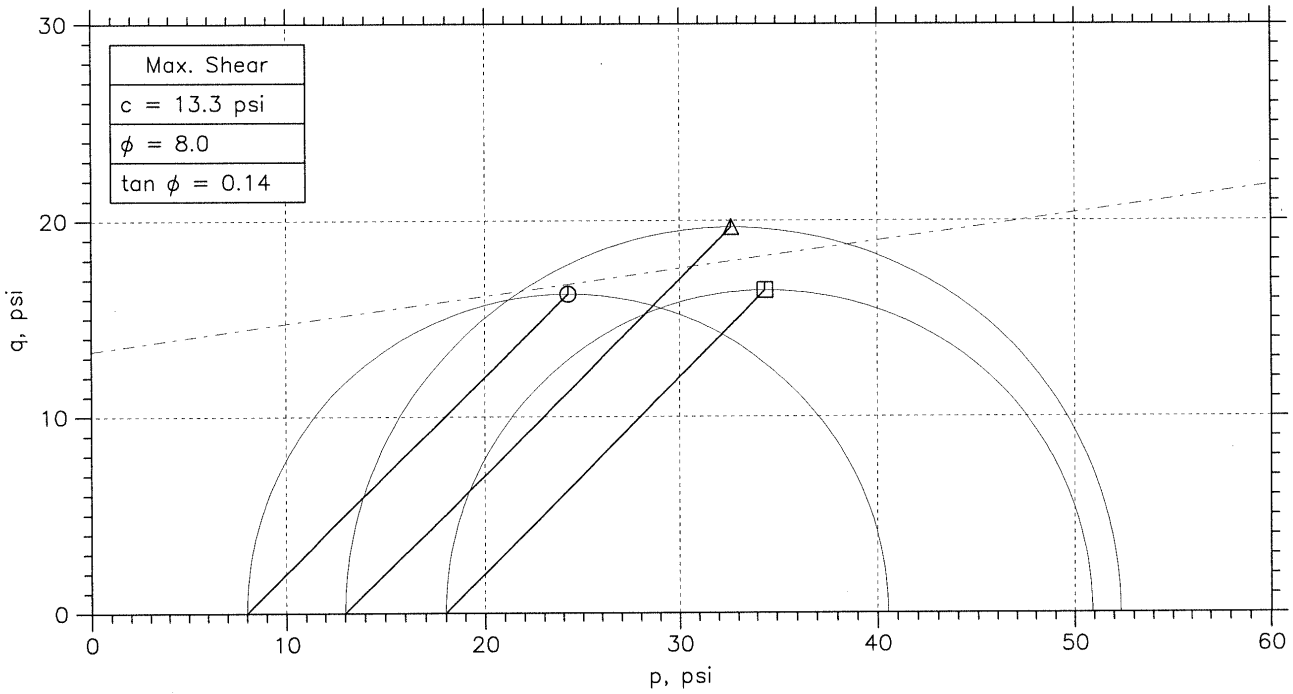
* Saturation is set to 100% for phase calculations.

Tue, 20-APR-2010 10:25:03

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767







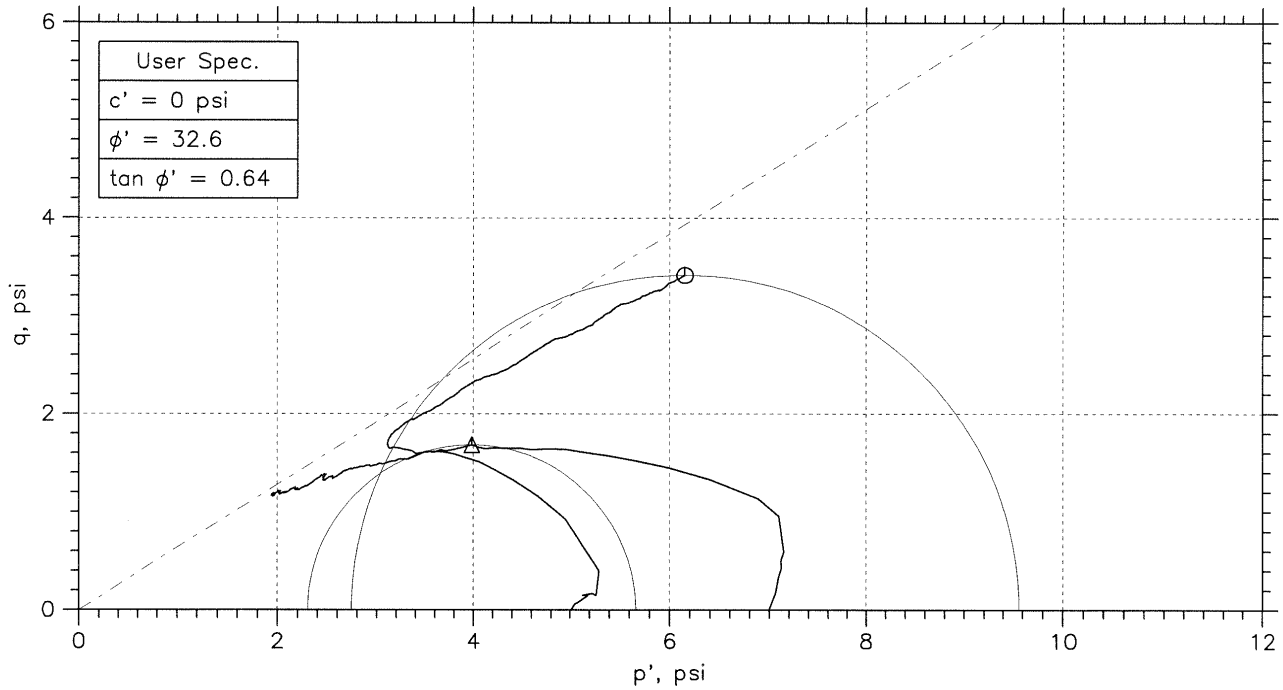
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊙	IS-1	10101.1	24.5-26.5ft	JW	4/2/10			10101.1a_2580.dat
△	IS-1	10101.2	24.5-26.5ft	JW	4/2/10			10101.2a_2547.dat
⊡	IS-1	10101.3	24.5-26.5ft	JW	4/2/10			10101.3a_2546.dat

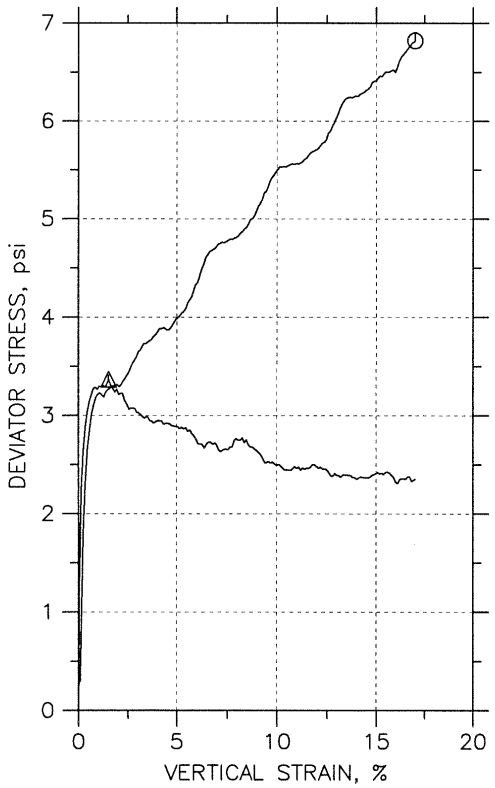
MACTEC

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		

Tue, 20-APR-2010 10:25:03

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		
	Void Ratio	1.21	1.44		
Before Shear	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

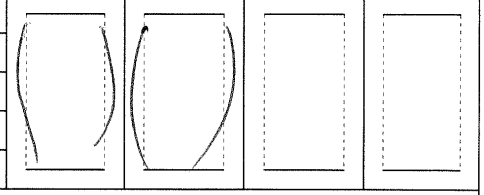
Project: Plant Yates Ash Pond

Location: APB-2

Project No.: 6189109008

Boring No.: APB-2

Sample Type: Undisturbed



Description: Dark Gray Sandy Silt (Fly Ash)

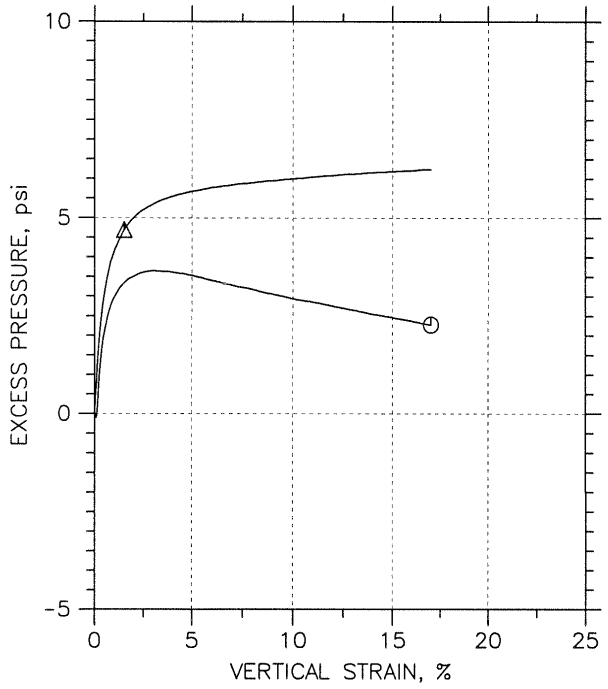
Remarks: ASTM D4767-04

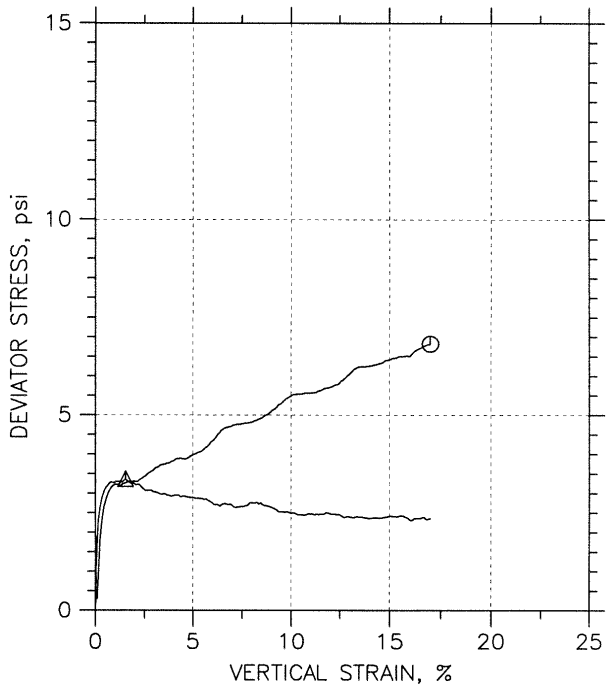
Phase calculations based on start and end of test.

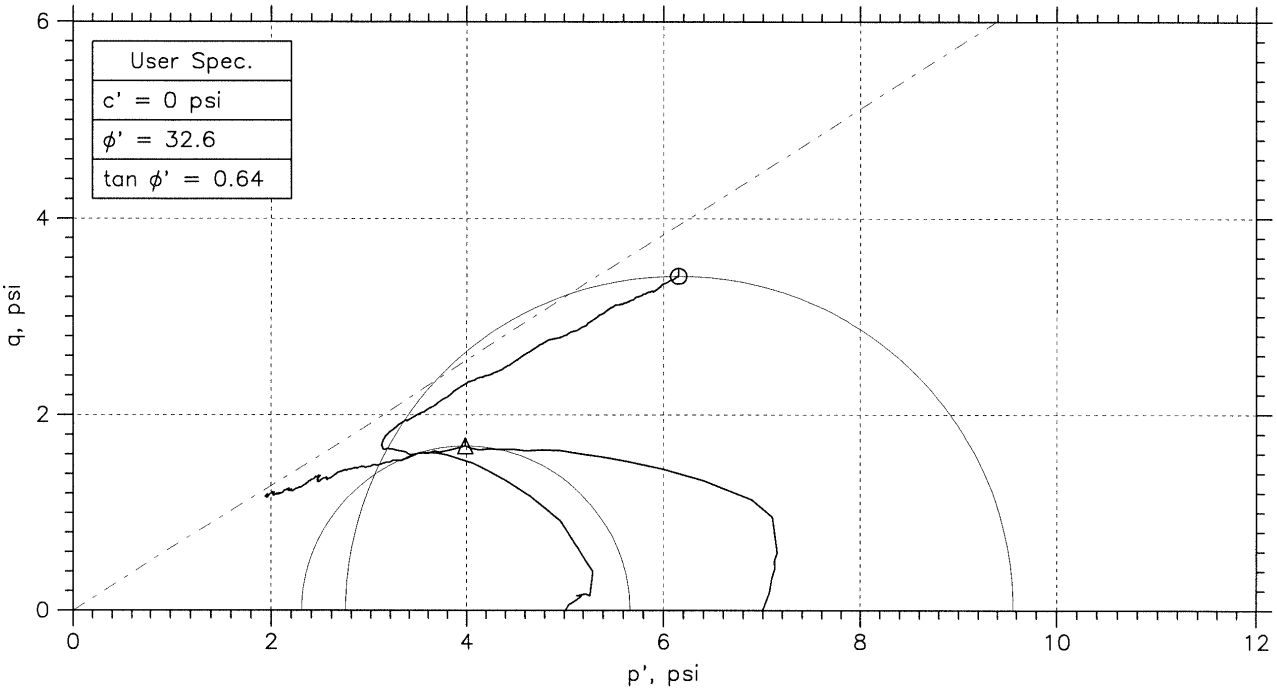
* Saturation is set to 100% for phase calculations.

Wed, 19-MAY-2010 14:52:33

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767







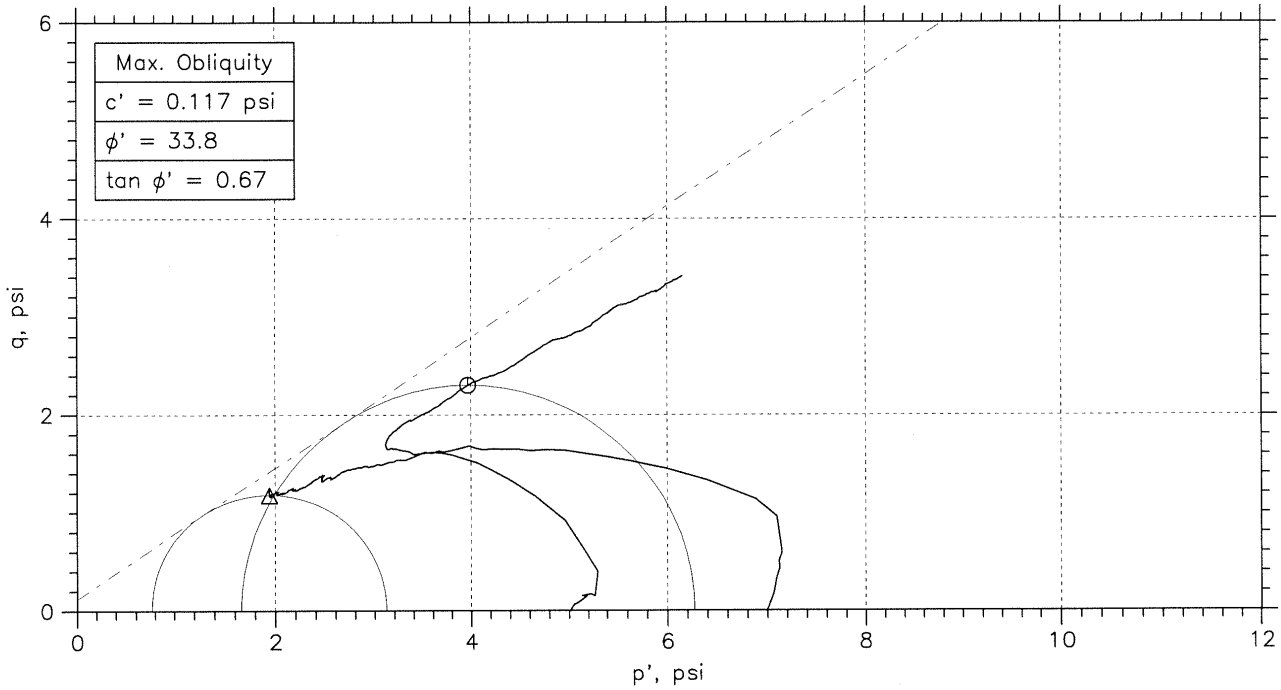
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⏲	IS-1	10102.2	7.9-9.5 ft	JW	4/6/10			10102.2_2546.dat
△	IS-1	10102.3	7.5-9.5 ft	JW	4/6/10			10102.3_2547.dat

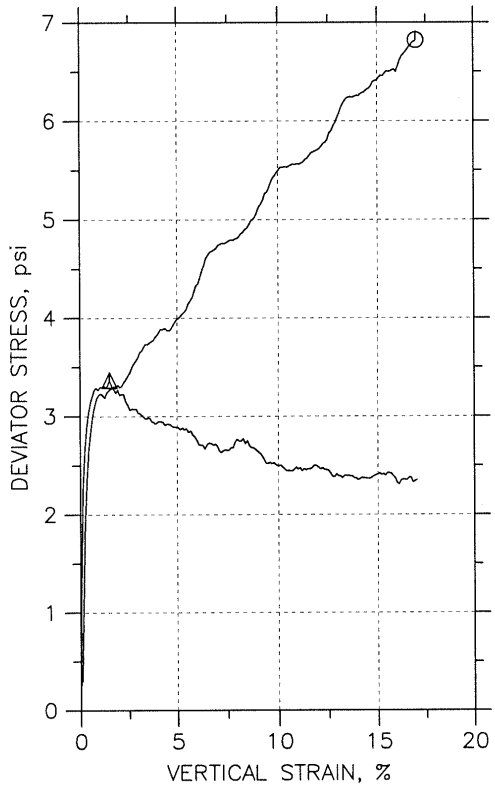
MACTEC

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		

Wed, 19-MAY-2010 14:52:33

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		
	Void Ratio	1.21	1.44		
Before Shear	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

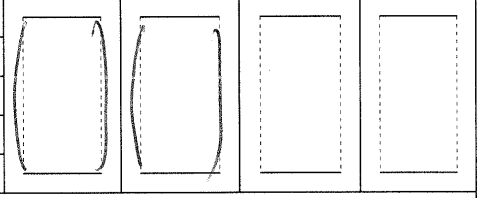
Project: Plant Yates Ash Pond

Location: APB-2

Project No.: 6189109008

Boring No.: APB-2

Sample Type: Undisturbed



Description: Dark Gray Sandy Silt (Fly Ash)

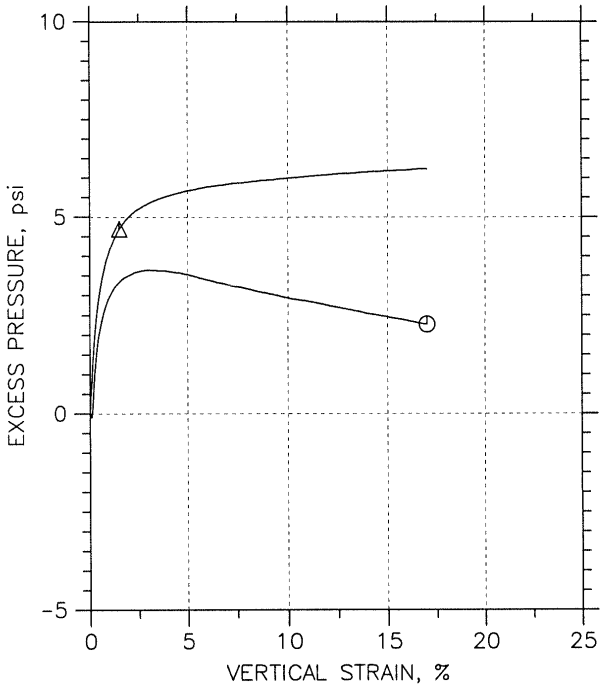
Remarks: ASTM D4767-04

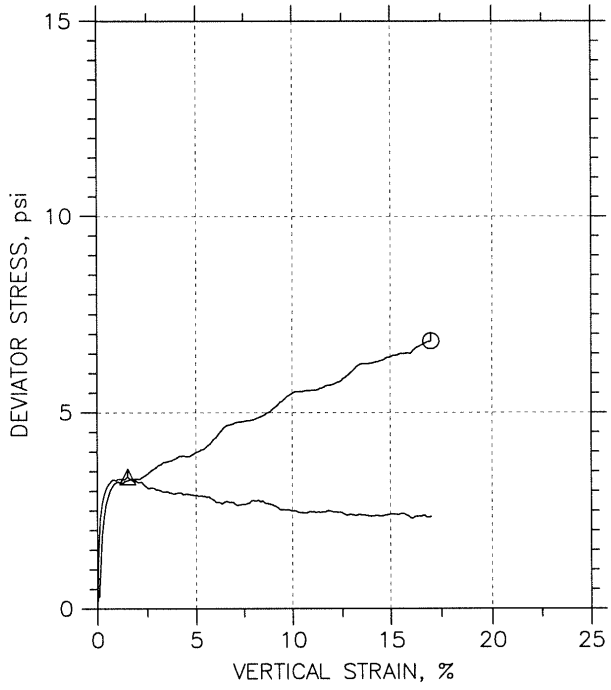
Phase calculations based on start and end of test.

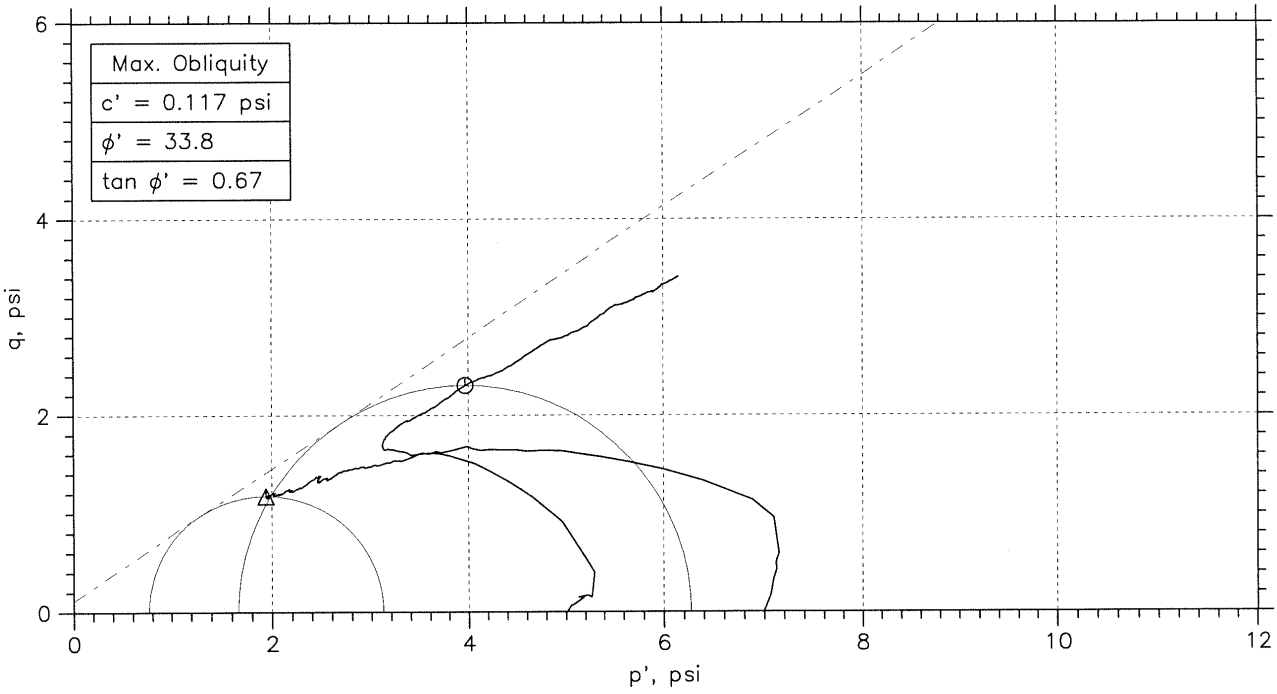
* Saturation is set to 100% for phase calculations.

Tue, 20-APR-2010 10:26:07

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767







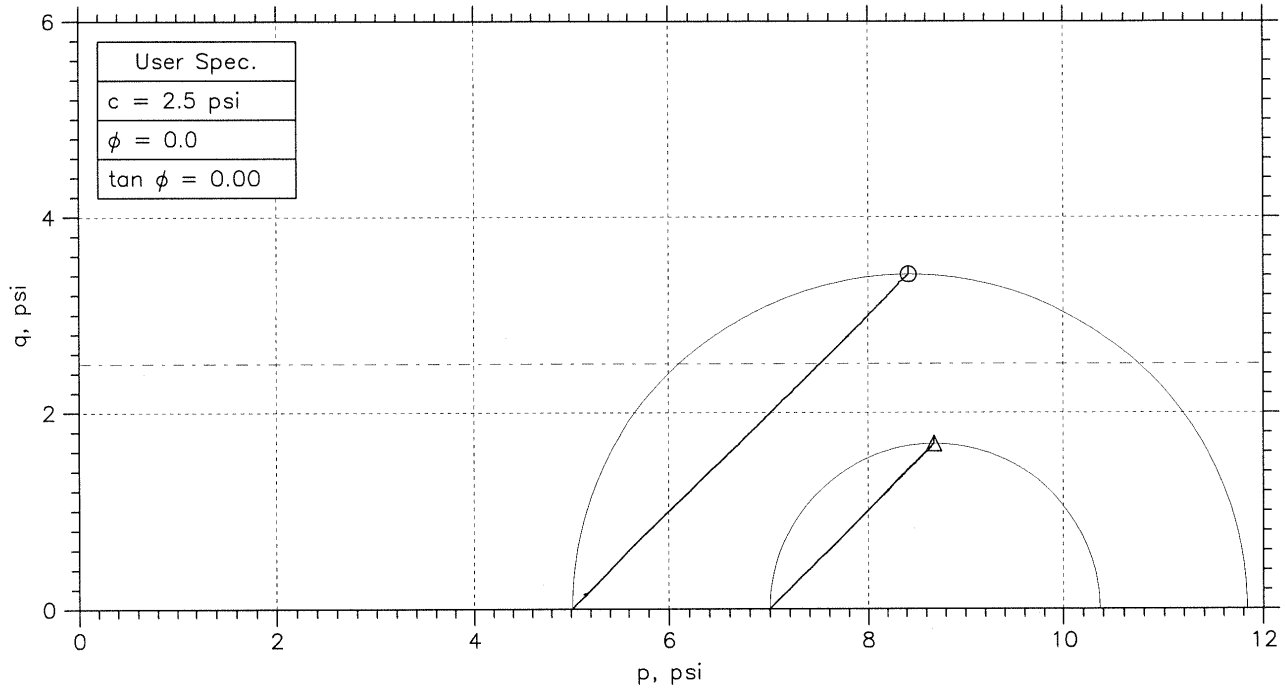
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊙	IS-1	10102.2	7.9-9.5 ft	JW	4/6/10			10102.2_2546.dat
△	IS-1	10102.3	7.5-9.5 ft	JW	4/6/10			10102.3_2547.dat

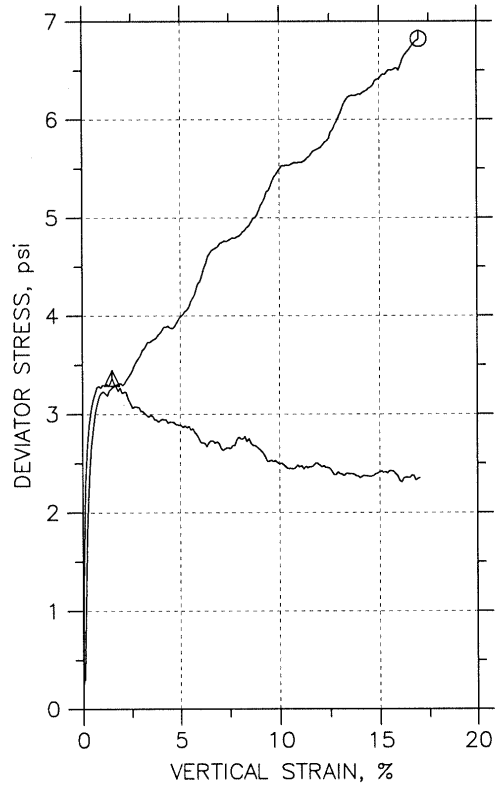
MACTEC

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		

Tue, 20-APR-2010 10:26:07

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767





Symbol		⏀	Δ		
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		
	Void Ratio	1.21	1.44		
Before Shear	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

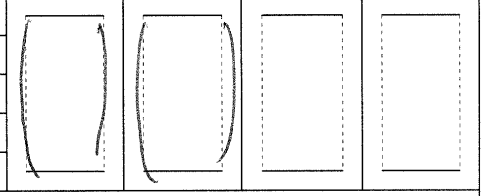
Project: Plant Yates Ash Pond

Location: APB-2

Project No.: 6189109008

Boring No.: APB-2

Sample Type: Undisturbed



Description: Dark Gray Sandy Silt (Fly Ash)

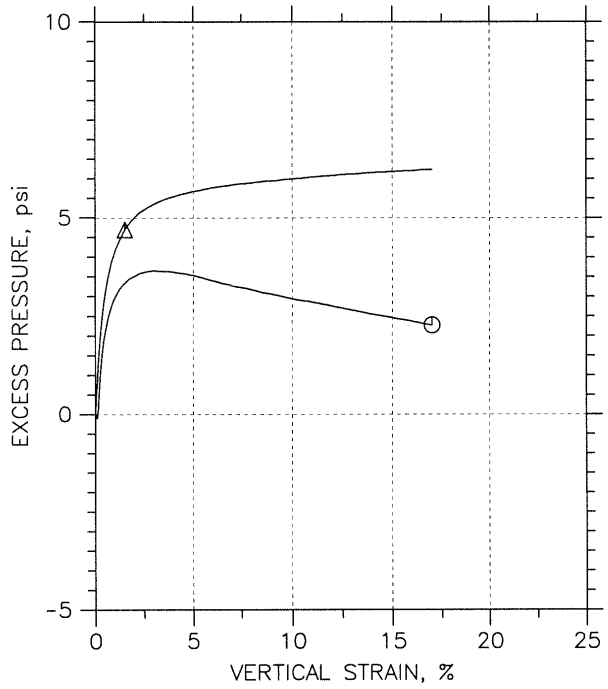
Remarks: ASTM D4767-04

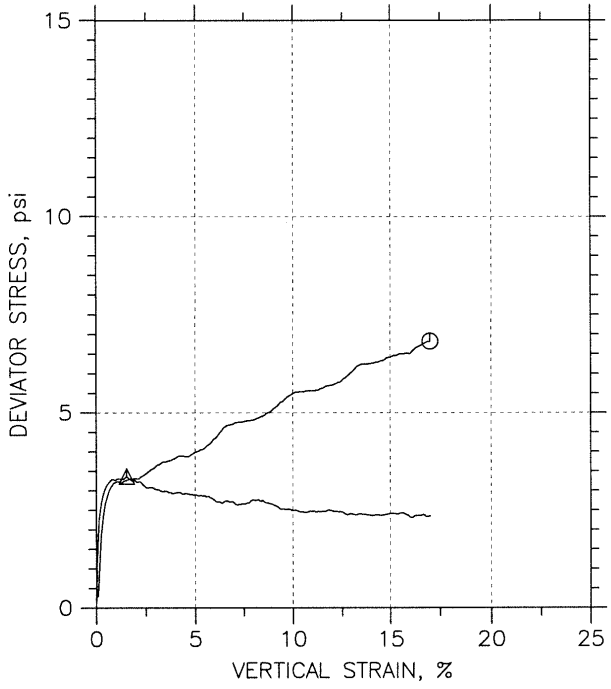
Phase calculations based on start and end of test.

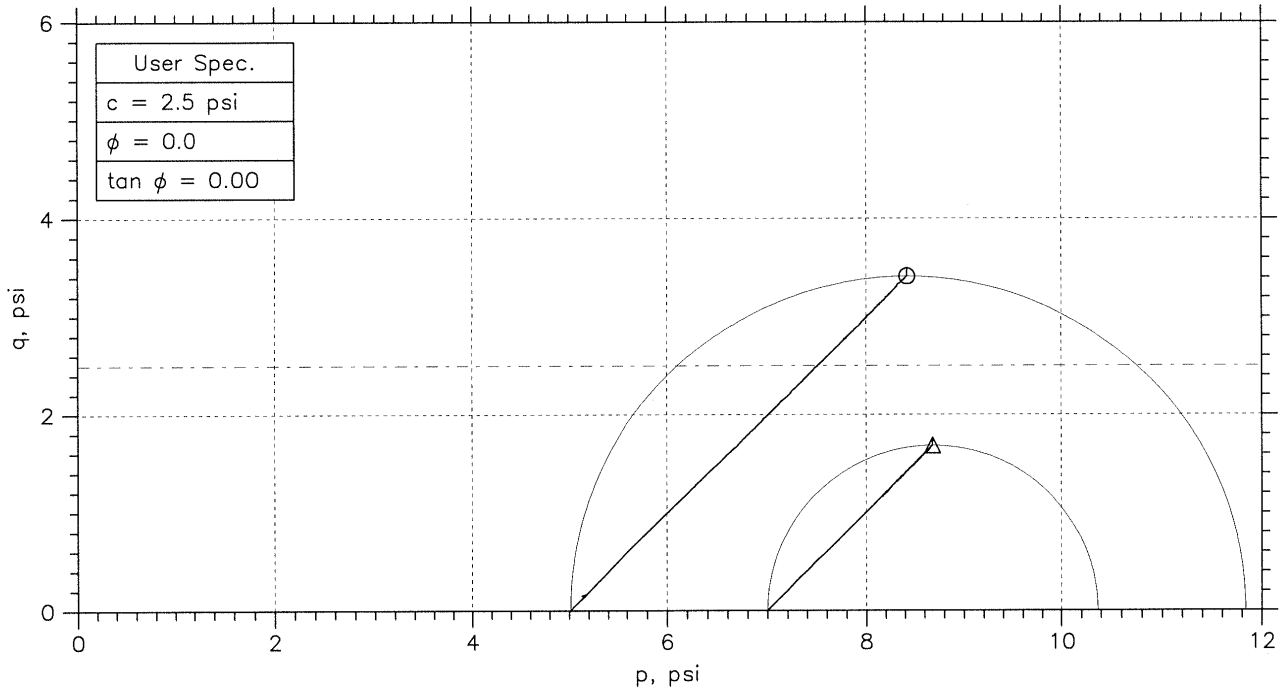
* Saturation is set to 100% for phase calculations.

Tue, 20-APR-2010 10:26:36

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767







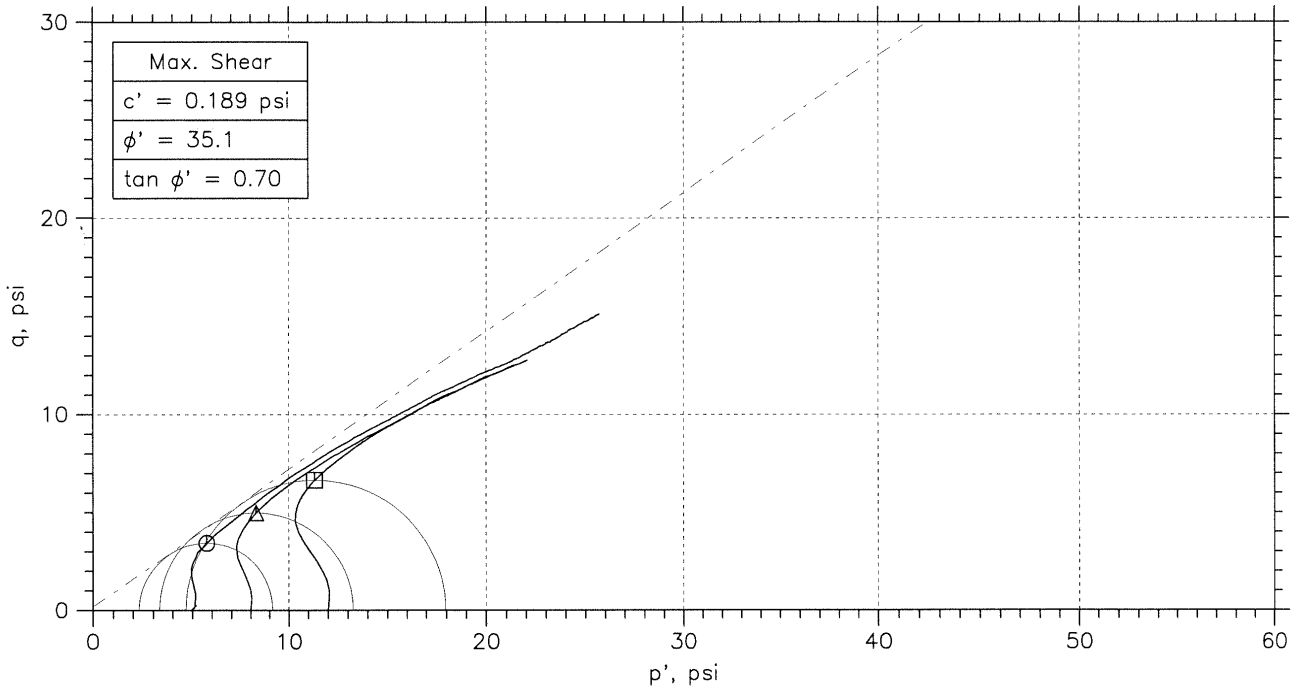
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⏲	IS-1	10102.2	7.9-9.5 ft	JW	4/6/10			10102.2_2546.dat
△	IS-1	10102.3	7.5-9.5 ft	JW	4/6/10			10102.3_2547.dat

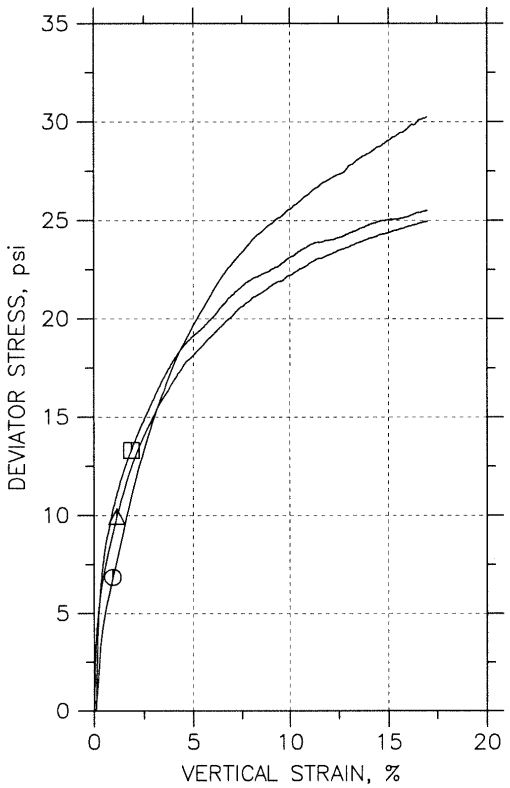
MACTEC

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		

Tue, 20-APR-2010 10:26:36

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		17.5-19.5ft	17.5-19.5ft	17.5-19.5ft	
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

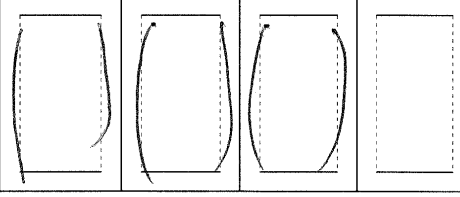
Project: Plant Yates Ash Pond

Location: APB-3

Project No.: 6189109008

Boring No.: APB-3

Sample Type: Undisturbed



Description: Brown Clayey Sand

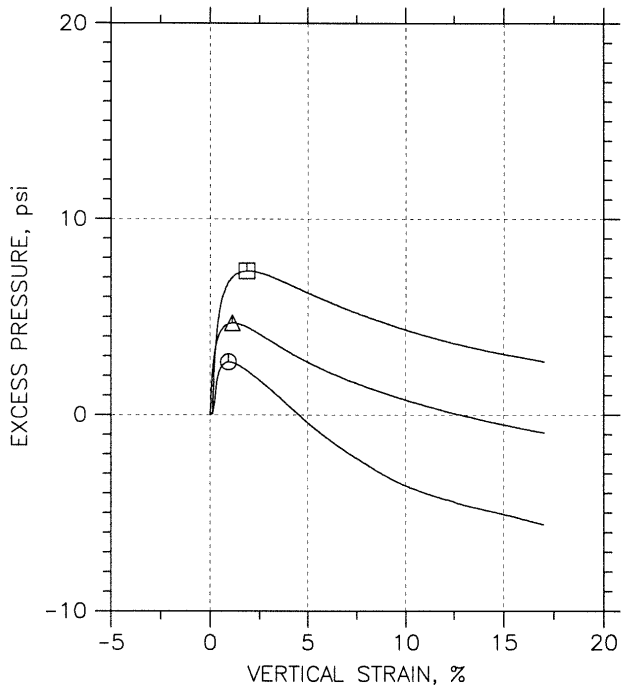
Remarks: ASTM D4767-04. Strains at failure based on peak excess pore pressure.

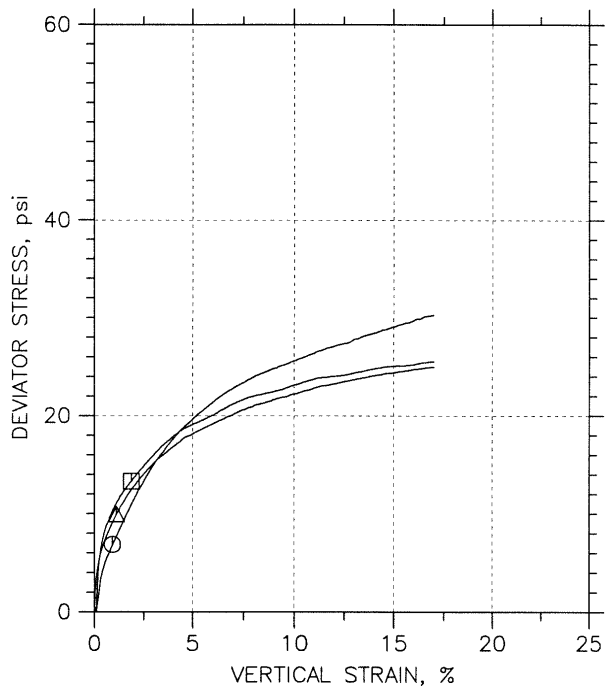
Phase calculations based on start and end of test.

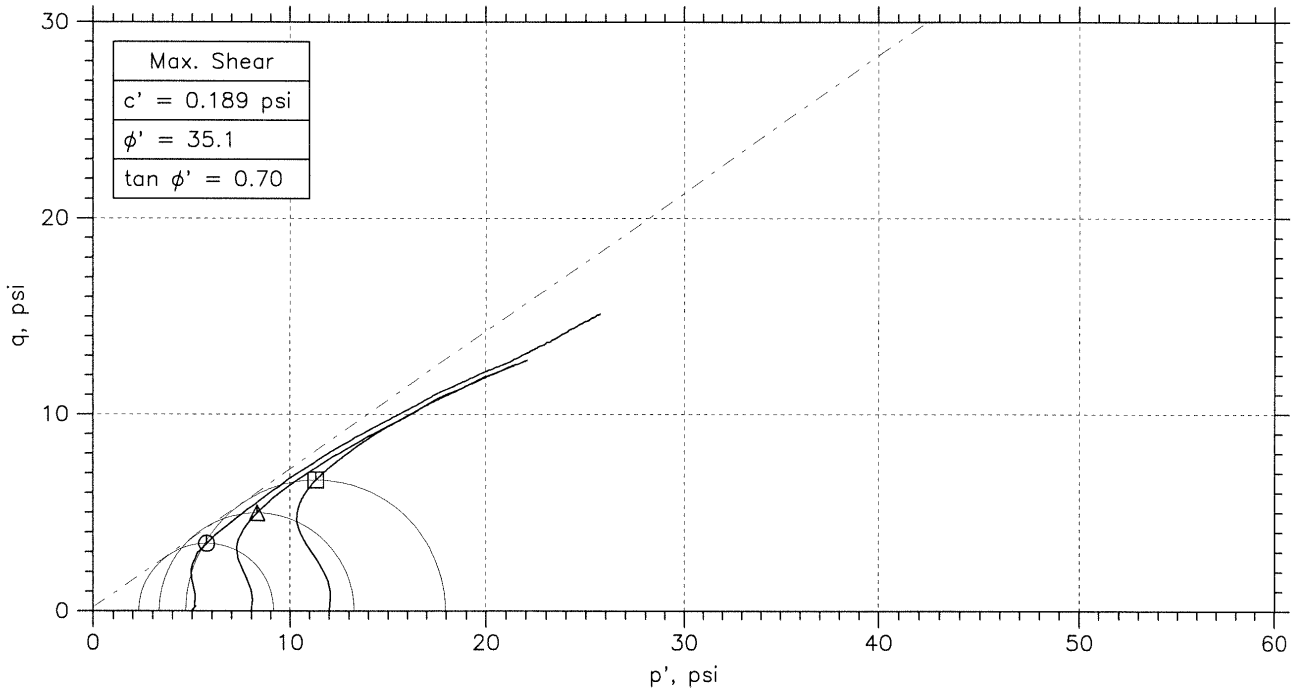
* Saturation is set to 100% for phase calculations.

Wed, 19-MAY-2010 10:34:00

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767







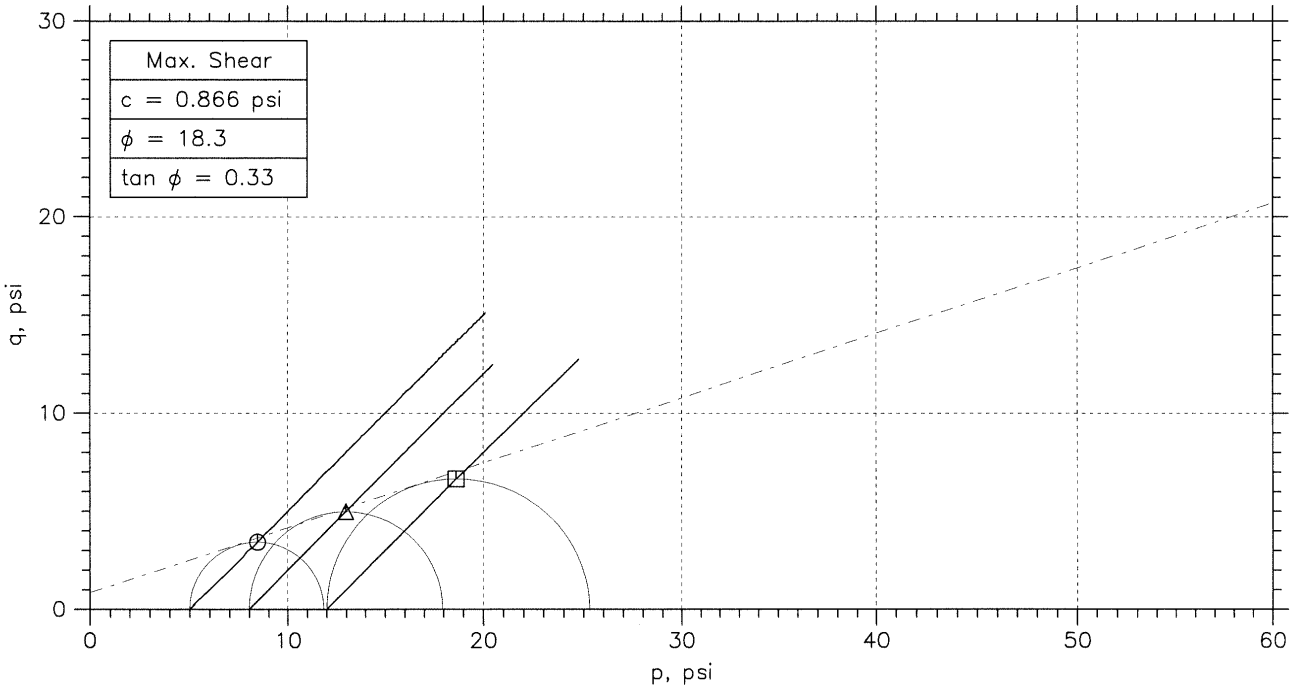
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊙	IS-1	10103.1	17.5-19.5ft	JW	4/8/10			10103.1_2581.dat
△	IS-1	10103.2	17.5-19.5ft	JW	4/8/10			10103.2_2582.dat
⊡	IS-1	10103.3	17.5-19.5ft	JW	4/8/10			10103.3_2583.dat

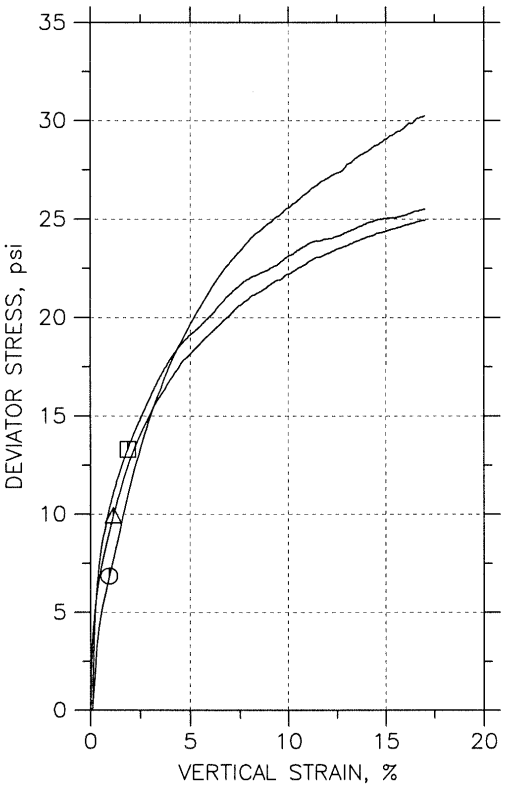
MACTEC

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.		

Wed, 19-MAY-2010 10:34:00

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		17.5-19.5ft	17.5-19.5ft	17.5-19.5ft	
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

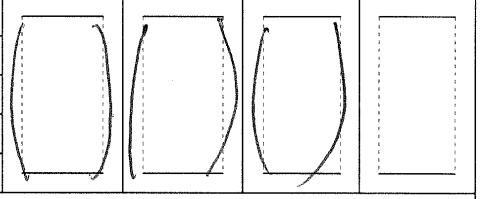
Project: Plant Yates Ash Pond

Location: APB-3

Project No.: 6189109008

Boring No.: APB-3

Sample Type: Undisturbed



Description: Brown Clayey Sand

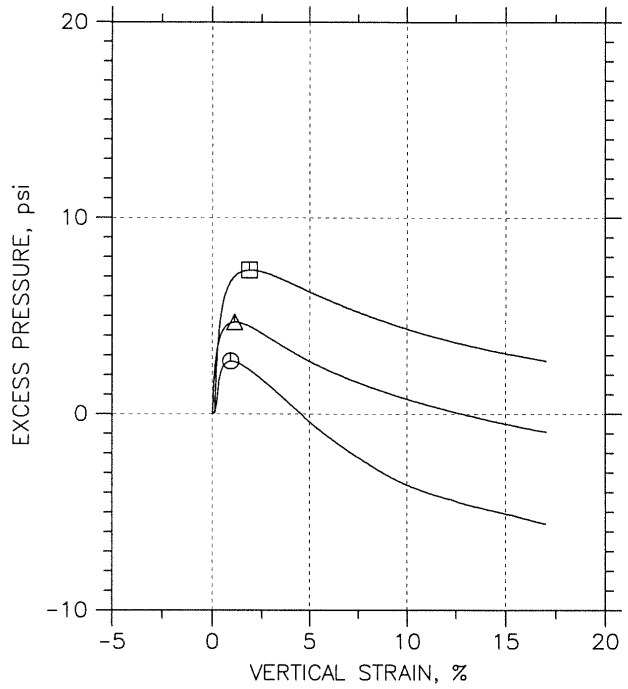
Remarks: ASTM D4767-04. Strains at failure based on peak excess pore pressure.

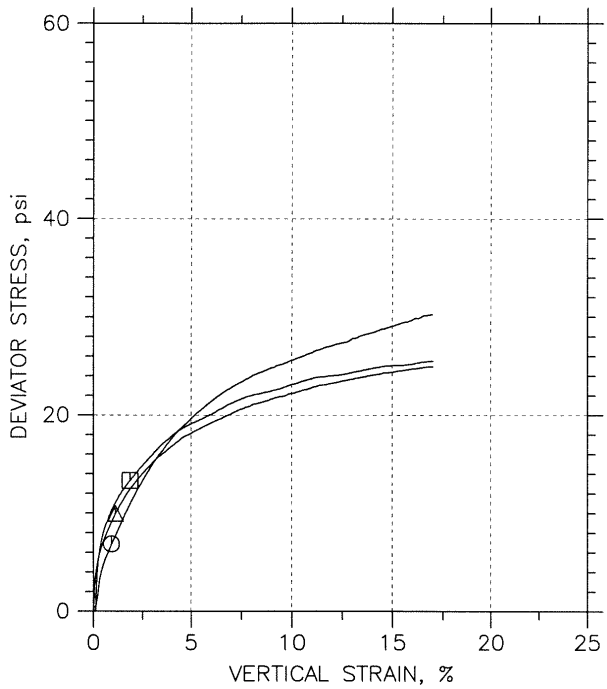
Wed, 19-MAY-2010 10:34:20

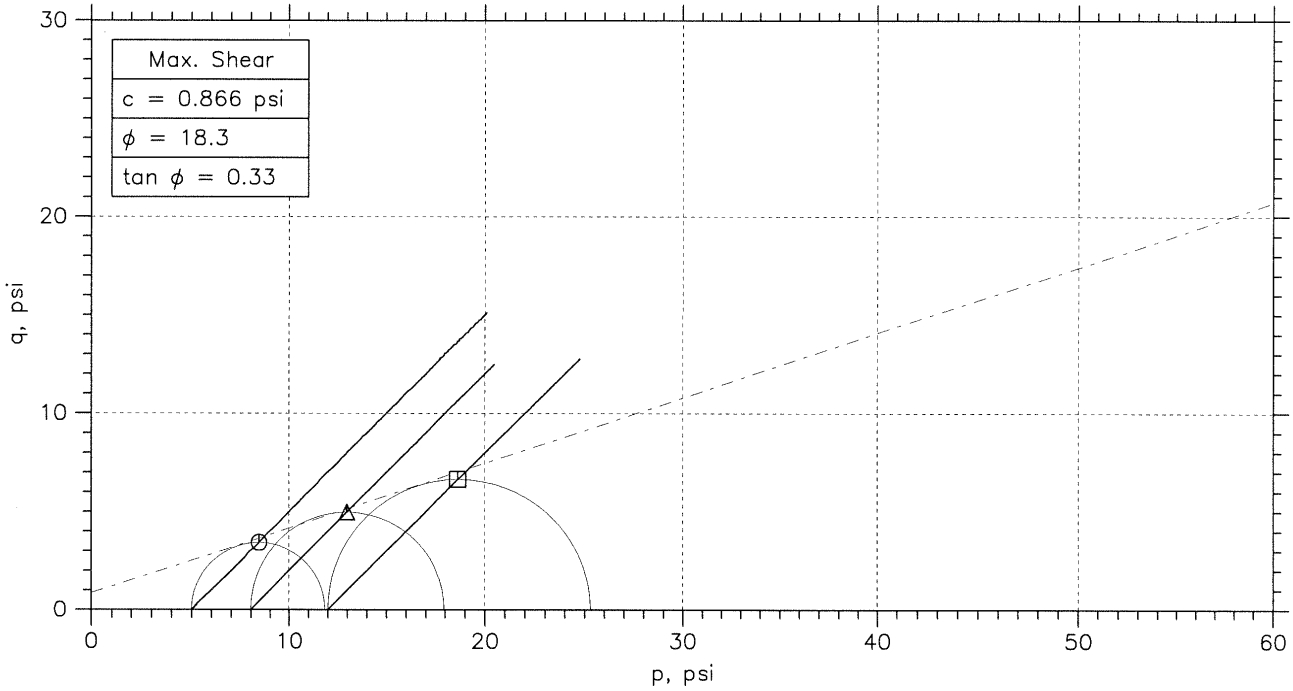
Phase calculations based on start and end of test.

* Saturation is set to 100% for phase calculations.

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767







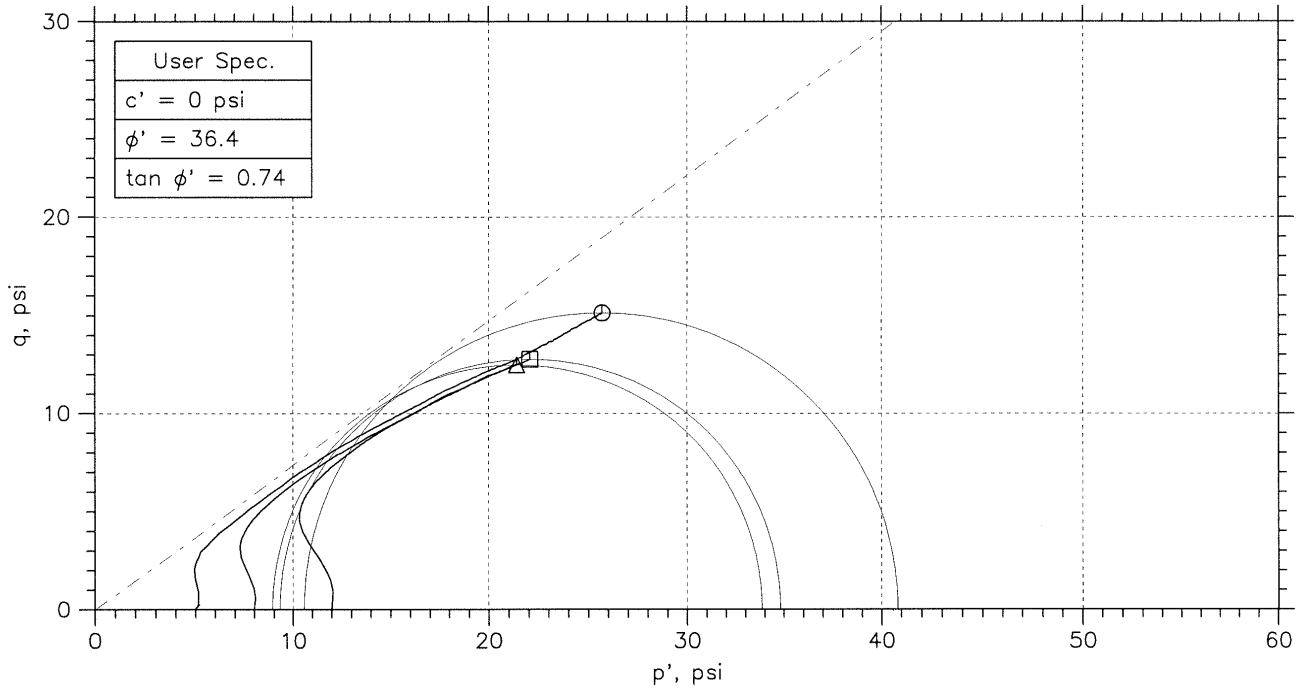
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊙	IS-1	10103.1	17.5-19.5ft	JW	4/8/10			10103.1_2581.dat
△	IS-1	10103.2	17.5-19.5ft	JW	4/8/10			10103.2_2582.dat
⊡	IS-1	10103.3	17.5-19.5ft	JW	4/8/10			10103.3_2583.dat

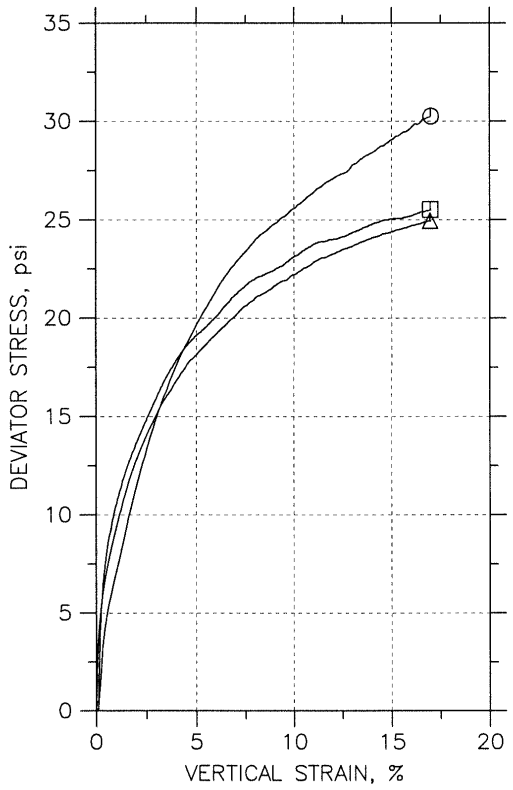
MACTEC

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.		

Wed, 19-MAY-2010 10:34:20

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		17.5-19.5ft	17.5-19.5ft	17.5-19.5ft	
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		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

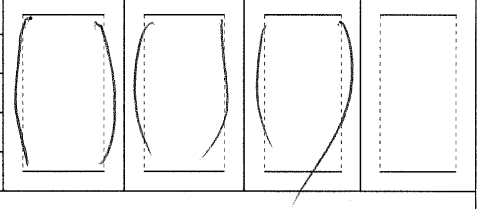
Project: Plant Yates Ash Pond

Location: APB-3

Project No.: 6189109008

Boring No.: APB-3

Sample Type: Undisturbed



Description: Brown Clayey Sand

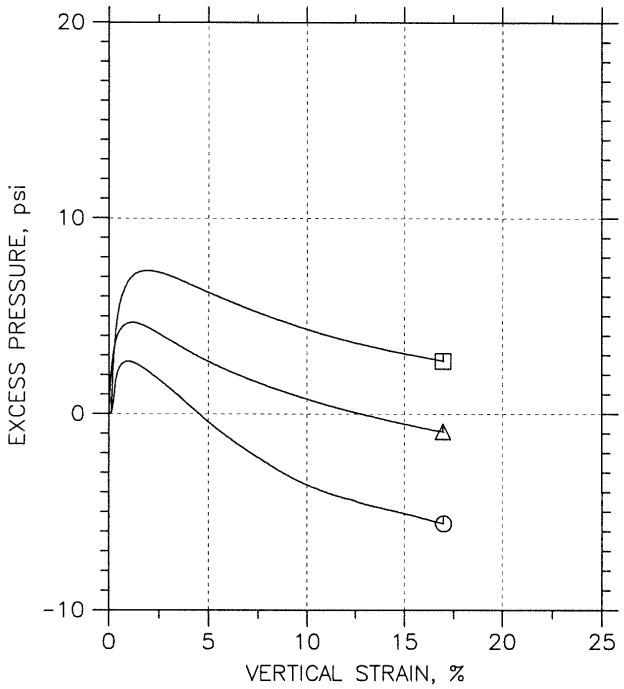
Remarks: ASTM D4767-04.

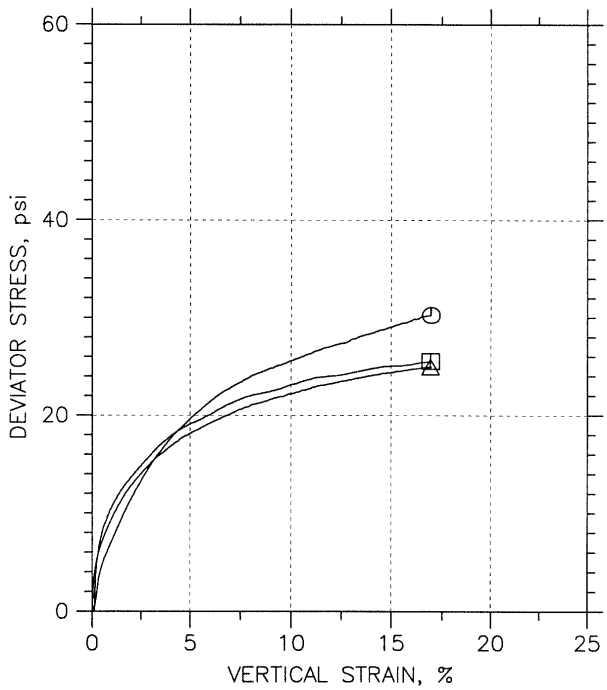
Phase calculations based on start and end of test.

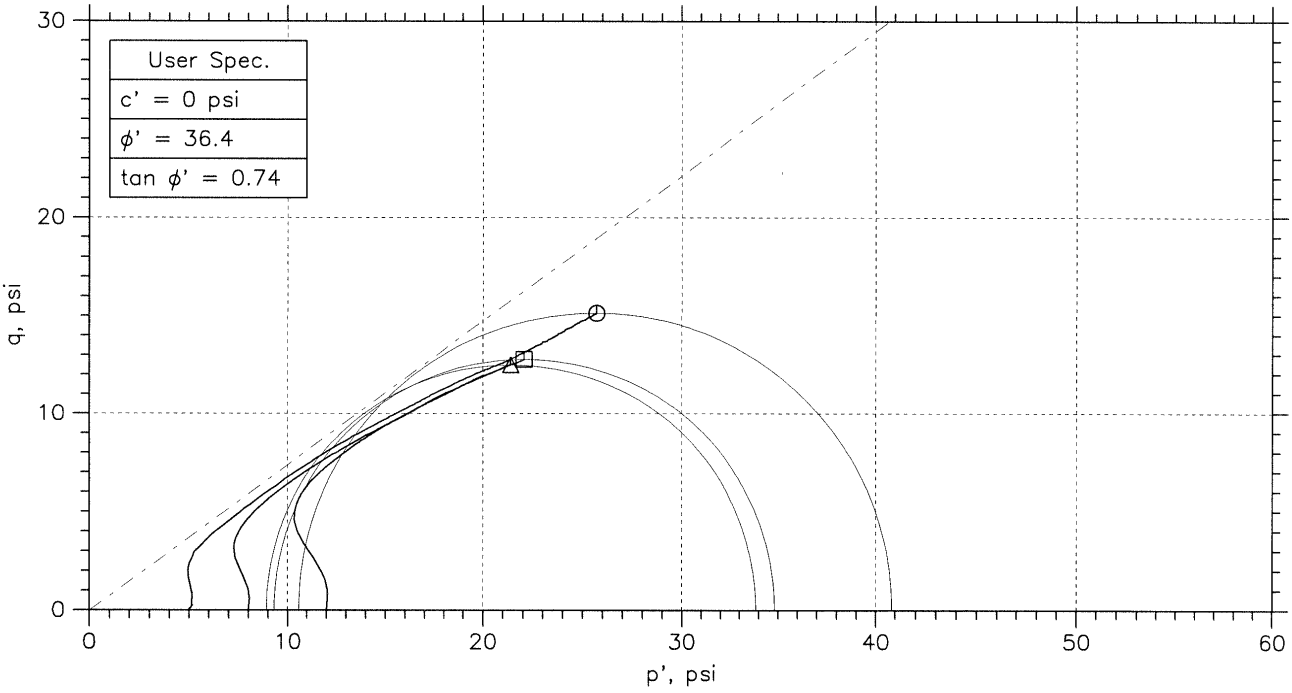
* Saturation is set to 100% for phase calculations.

Wed, 19-MAY-2010 10:44:06

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767







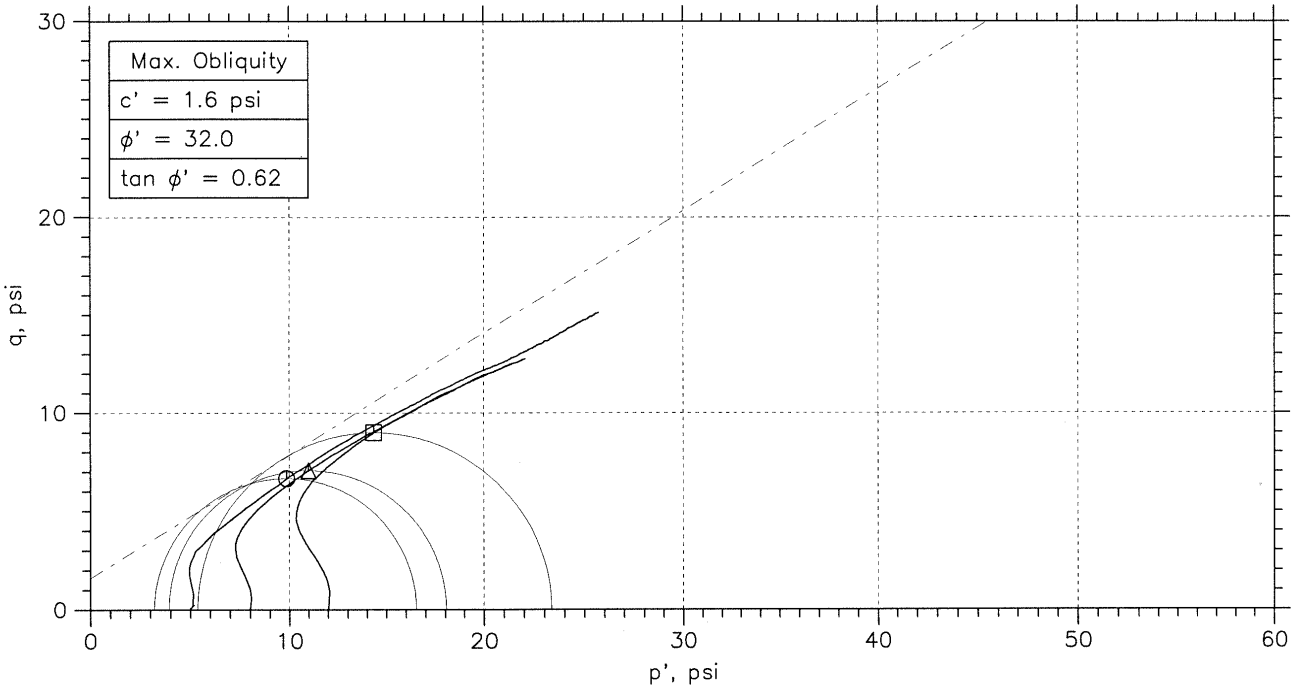
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊙	IS-1	10103.1	17.5-19.5ft	JW	4/8/10			10103.1_2581.dat
△	IS-1	10103.2	17.5-19.5ft	JW	4/8/10			10103.2_2582.dat
⊡	IS-1	10103.3	17.5-19.5ft	JW	4/8/10			10103.3_2583.dat

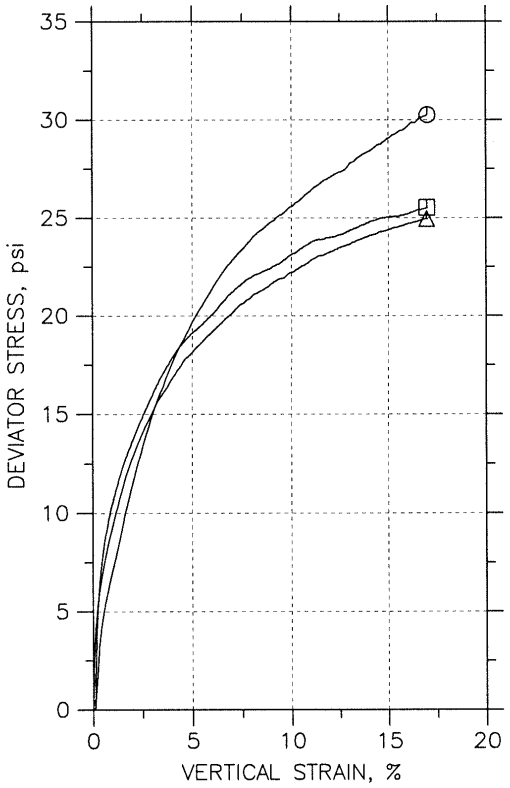
MACTEC

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.		

Wed, 19-MAY-2010 10:44:06

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		17.5-19.5ft	17.5-19.5ft	17.5-19.5ft	
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		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

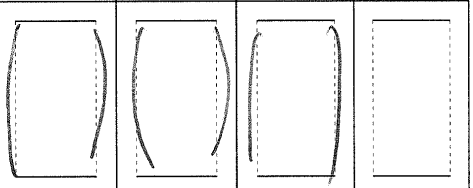
Project No.: 6189109008

Boring No.: APB-3

Sample Type: Undisturbed

Description: Brown Clayey Sand

Remarks: ASTM D4767-04

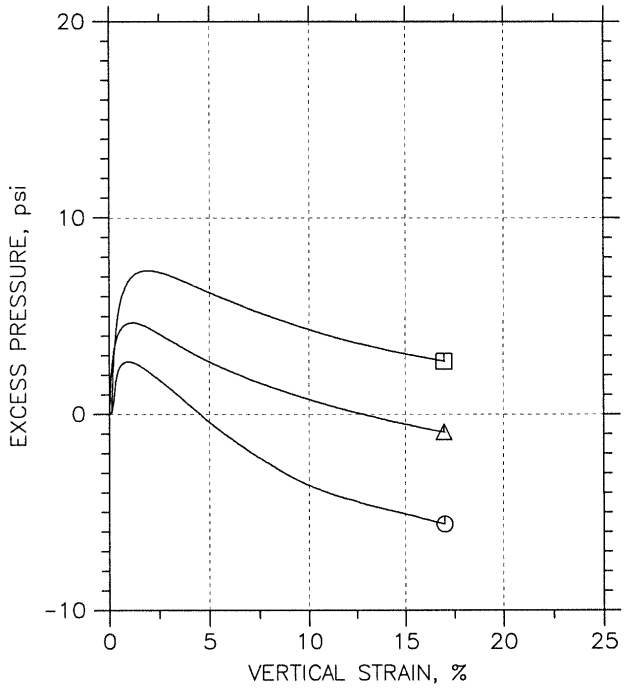


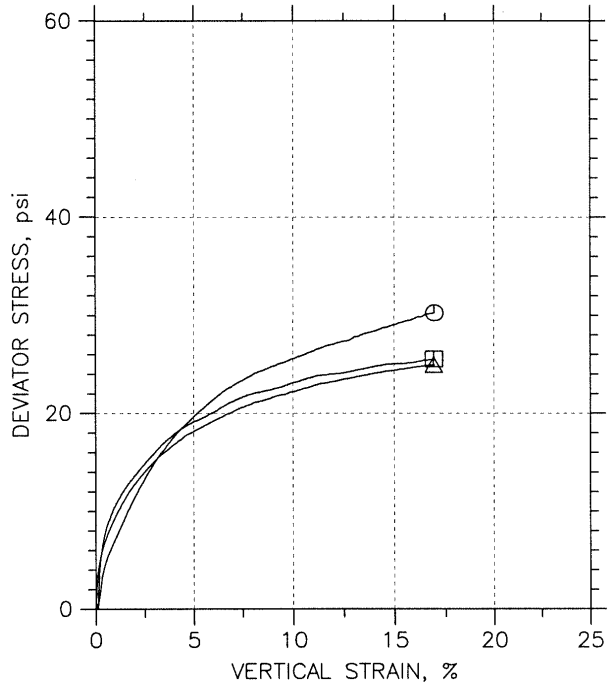
Phase calculations based on start and end of test.

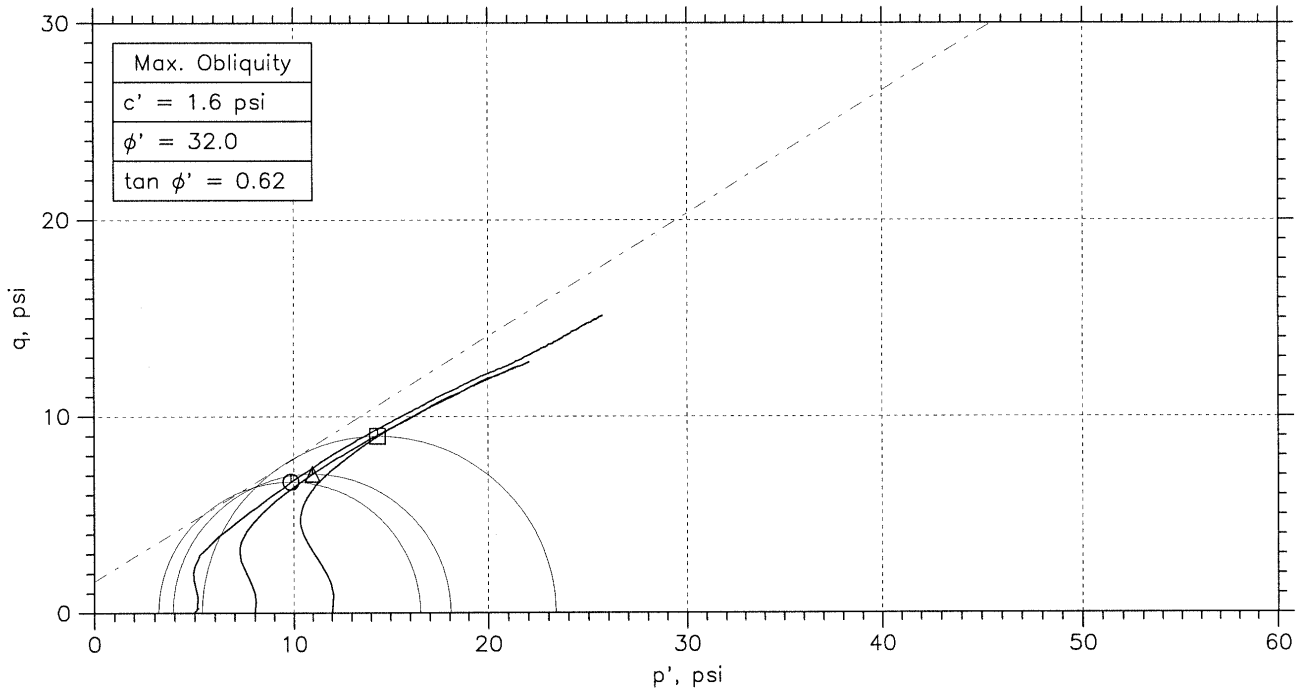
* Saturation is set to 100% for phase calculations.

Tue, 13-APR-2010 11:50:32

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767







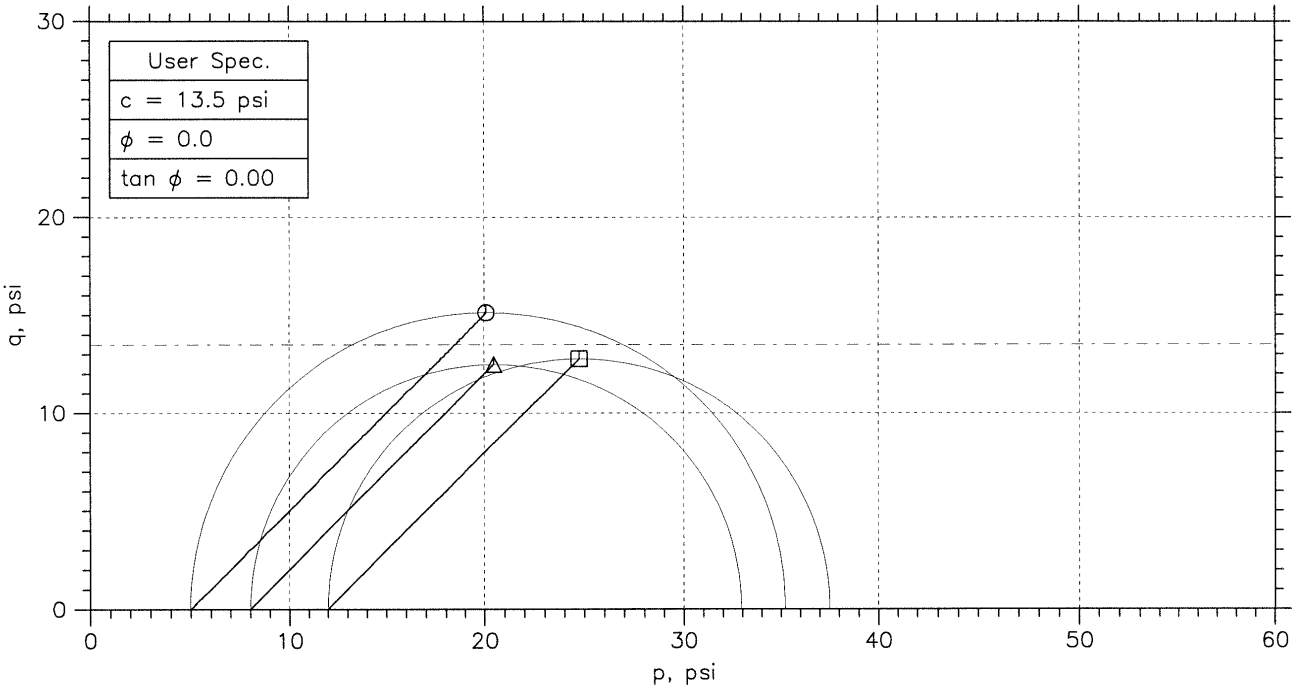
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊙	IS-1	10103.1	17.5-19.5ft	JW	4/8/10			10103.1_2581.dat
△	IS-1	10103.2	17.5-19.5ft	JW	4/8/10			10103.2_2582.dat
□	IS-1	10103.3	17.5-19.5ft	JW	4/8/10			10103.3_2583.dat

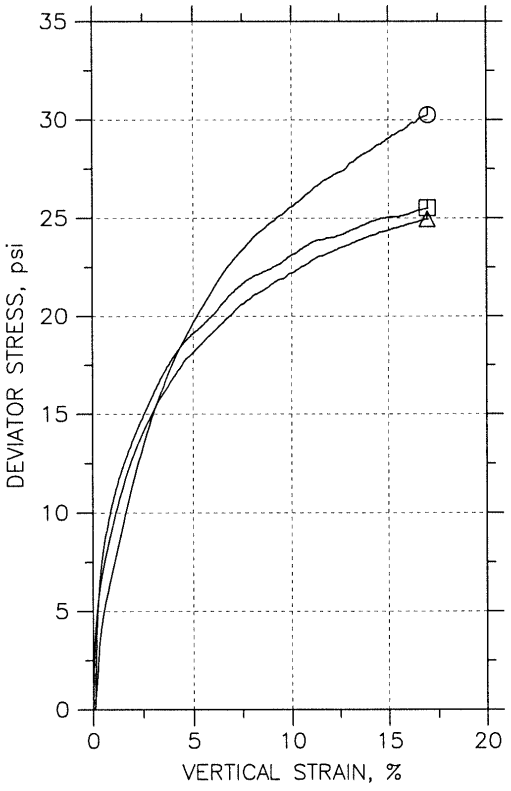
MACTEC

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		

Tue, 13-APR-2010 11:50:32

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		17.5-19.5ft	17.5-19.5ft	17.5-19.5ft	
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		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

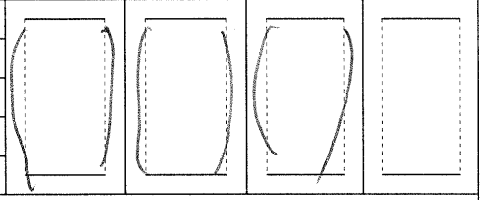
Project No.: 6189109008

Boring No.: APB-3

Sample Type: Undisturbed

Description: Brown Clayey Sand

Remarks: ASTM D4767-04

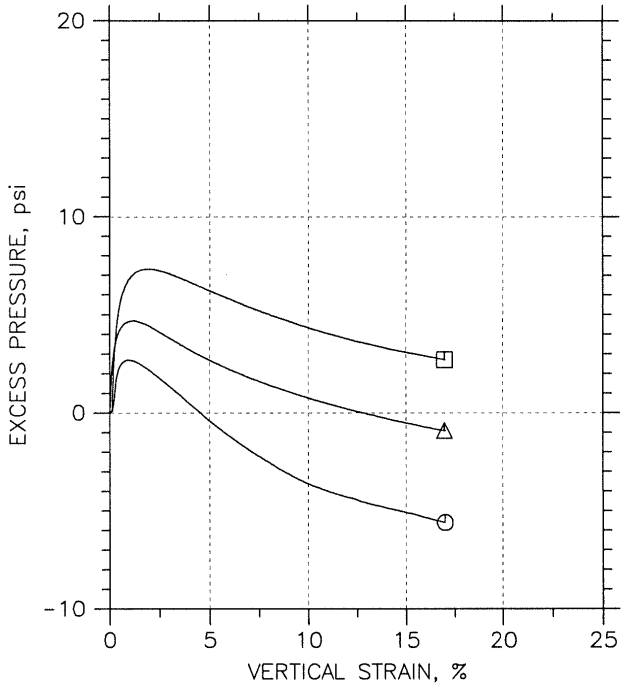


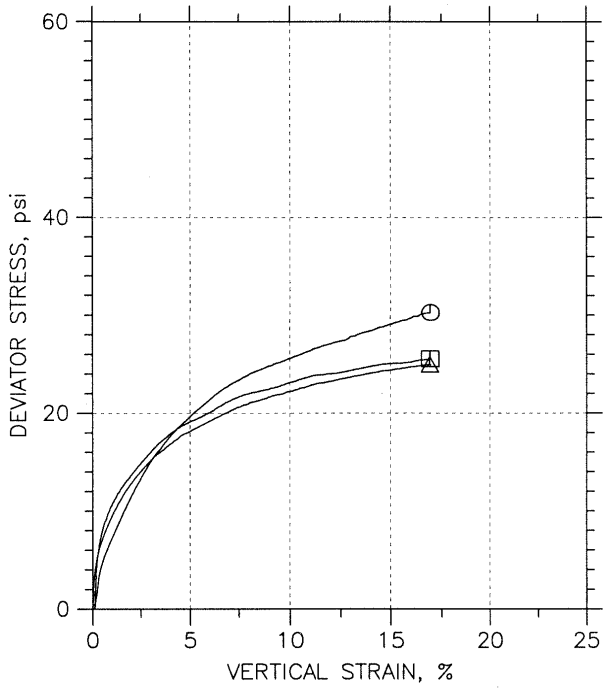
Phase calculations based on start and end of test.

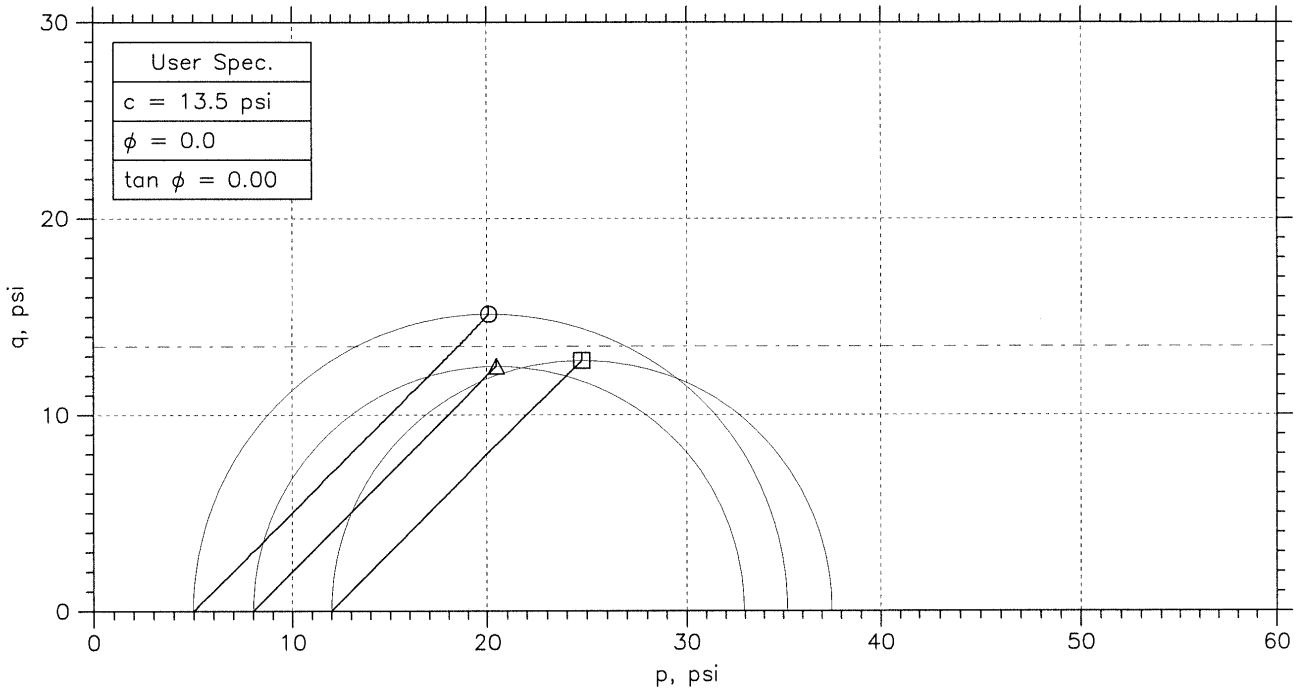
* Saturation is set to 100% for phase calculations.

Tue, 13-APR-2010 11:50:58

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		

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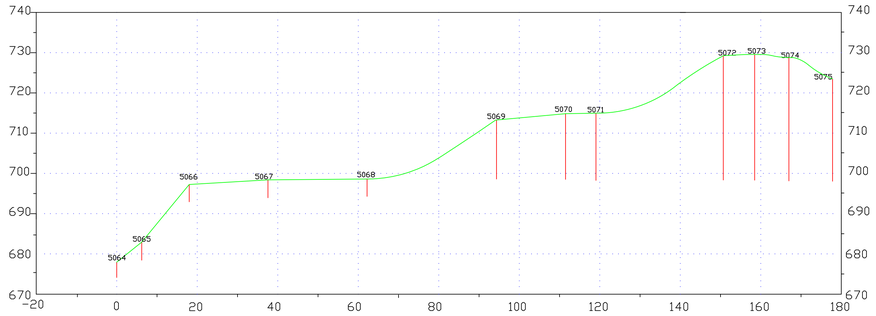
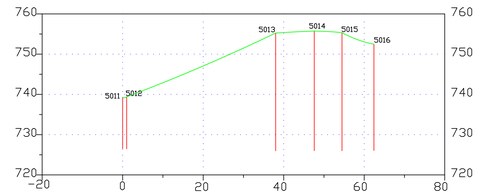
Attachment D – Critical Section Profile Used in Analysis

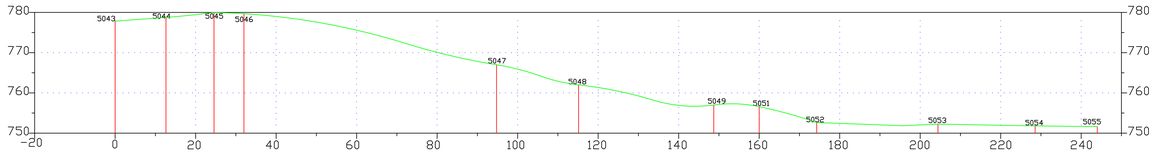
SECTION A-Ash Pond 1
Vertical Scale: 1" = 20'
Horizontal Scale: 1" = 100'



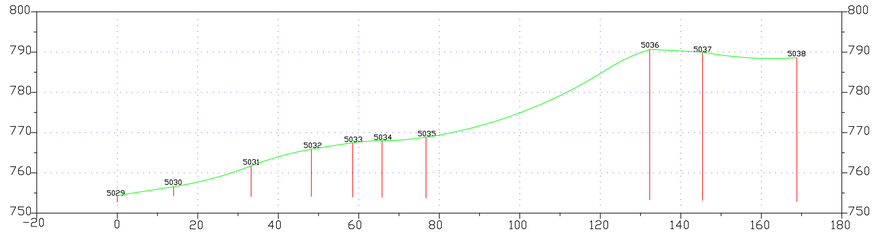
SECTION B-Ash Pond 2
Vertical Scale: 1" = 20'
Horizontal Scale: 1" = 20'



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'

Southern Company Generation
Engineering and Construction Services
FOR

Georgia Power Company

PLANT YATES
ASH POND DIKE
CROSS SECTIONS

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

ANSI F: 40x28 Acad2004