PERIODIC SAFETY FACTOR ASSESSMENT
PLANT BARRY ASH POND
ALABAMA POWER COMPANY

EPA's "Disposal of Coal Combustion Residuals from Electric Utilities" Final Rule (40 C.F.R. Part 257 and Part 261) and the State of Alabama's ADEM Admin. Code Chapter 335-13-15 , require the owner or operator of an existing CCR surface impoundment to conduct periodic safety factor assessments. Per §257.73(e) and ADEM Admin. Code r. 335-13-15-.04(4)(e), the owner or operator must document that the minimum safety factors outlined in §257.73(e)(1)(i) through (iv) and ADEM Admin. Code r. 335-13-15-.04(4)(e)(1)(i) through (iv) for the critical embankment section are achieved. In addition, §257.73(f)(3) and ADEM Admin. Code r. 335-13-15-.04(4)(f)3. require a subsequent assessment be performed within 5 years of the previous assessment.

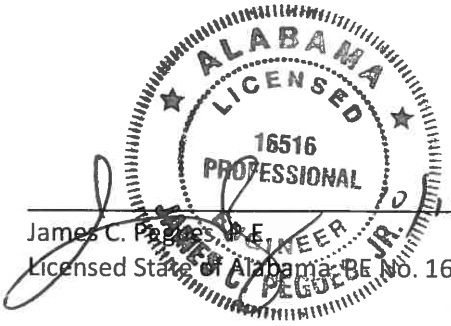
The CCR surface impoundment located at Alabama Power Company's Plant Barry also referred to as the Plant Ash Pond is located on Plant Barry property, near Bucks, Alabama. The CCR surface impoundment is formed by an engineered perimeter embankment. The critical section of this CCR unit had previously been determined to be located on the east side of the northern portion of the ash pond embankment. The surface impoundment is currently undergoing closure and some CCR relocation as a part of the planned CCR footprint consolidation has begun. A review of recent changes within the impoundment has determined that the critical section remains on the east side of the northern portion of the 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)	1.5	1.5
Maximum Surcharge Pool (Static)	1.4	1.4
Seismic	1.4	1.0

The embankments are constructed of clays and clayey sands that are not susceptible to liquefaction. Therefore, a minimum liquefaction safety factor determination was not required.

I hereby certify that the safety factor assessment was conducted in accordance with 40 C.F.R. §257.73 (e)(1) and ADEM Admin. Code r. 335-13-15-.04(4)(e)(1).



01/5/2021

James C. Pegues, P.E.
Licensed State of Alabama: PE No. 16516

Southern Company

Technical and Project Solutions Calculation

Calculation Number: TV-BA-APC881952-001

Project/Plant: Plant Barry Ash Pond	**Unit(s):** 1-5	**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 Dike		
System or Equipment Tag Numbers: n/a	**Originator:** Jacob A. Jordan, P.E.	

Contents

Topic	Page	Attachments (Computer Printouts, Tech. Papers, Sketches, Correspondence)	# of Pages
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Total # of pages including cover sheet & attachments:	37		

Revision Record

Rev. No.	Description	Originator Initial / Date	Reviewer Initial / Date	Approver Initial / Date
0	Issued for Information	JAJ/06-24-21	JCP/06-24-21	JCP/06-24-21

Notes:

Purpose of Calculation

Barry Steam Plant is owned and operated by Alabama Power Company and located 30 miles north of Mobile, Alabama, off of Hwy 43 near Bucks, Alabama. Plant Barry is a seven unit generating facility, including two natural gas fired combined cycle units and five coal fired units. The five coal units produce approximately 220,000 tons of coal combustion products per year, including bottom ash and fly ash. The ash is sluiced to the on-site ash pond for storage.

In 1992, the east and west dikes were raised three feet to obtain additional storage capacity. Again, in 1998, the portions of these dikes that are located north of the existing diversion dike were raised an additional four feet on the inboard side. During this modification, the diversion dike was also added to the pond. The diversion dike acts as a buffer by creating an additional stilling basin for the ash before water is discharged. It was constructed on top of the existing fly ash deposits using bottom ash as the dike fill. In 2004, the South main dike was raised approximately three feet, again with inboard construction methods, to its current geometry and elevation. In 2021, the perimeter road on the outboard side of the north dike was raised to equal the level of the roadway on the inboard side.

Stability analyses were previously performed to support each embankment, in conjunction with the EPA site inspection in 2010, and in 2016 for the CCR Rule. The purpose of this calculation is to update the 2016 stability analysis of the Ash Pond Dike.

Summary of Conclusions

The following table lists the factors of safety for various slope stability failure conditions. All conditions are steady state except where noted. Construction cases were not considered. The analyses indicate that in all cases the factor of safety is at or above the require minimum.

Load Conditions	Computed Factor of Safety	Required Minimum Factor of Safety
Long-term Maximum Storage (Static)	1.5	1.5
Maximum Surcharge Pool (Static)	1.4	1.4
Seismic	1.4	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 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 0.008g 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.
- The soil properties of unit weight, phi angle, and cohesion were obtained from triaxial shear testing performed on UD samples of the fill and foundation soils obtained during drilling in March 2010. The testing was performed according to ASTM D 4767.
- Soil stratigraphy and piezometric data was estimated from the historical boring logs.
- Properties for ash were based on laboratory testing performed on undisturbed and remolded samples of ash from various plants and on engineering judgment.
- The COE EM 1110-2-1902, 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 Cross-Section and materials used in this survey calculation were generally gathered from historical Barry ash pond stability reports: Ash pond south dike and diversion dike slope stability report, September 2004 Plant Barry Report of ash pond dike proposed modifications, January 1998, and Slope Stability Analysis of Main Ash Pond Dike, July 2010. The critical section for Barry was identified to be located along the North East Main Dike.

<u>North East Main Dike</u>

- The cross-section was built by referencing Figure 3 of the *Plant Barry Report of Ash Pond Dike Proposed Modification, January 1998,* and an unpublished LiDAR topo from January 2021, conducted by the pond closure project.
- Soil properties were obtained from the Dilatometer test No. BA-19 from the *Plant Barry Report of Ash Pond Dike Proposed Modification, January 1998.*

Input Data

The following soil properties were used in the analyses.

North East Main Dike			
	γ (pcf)	c (psf)	Φ(deg)
Bottom Ash	95	0	35
Fly Ash	90	90	2
Dike Clayey Sand	102.9	0	30
Dike Clay	102	500	0
Organic Clay	90	444	0
Sand	107	0	35

Hydrologic Considerations

The following hydraulic information is based on the calculation package Inflow Design Control System Plan: Hydrologic and Hydraulic Calculation Summary for Plant Barry Ash Pond by Southern Company Services, was used in the analyses. This calculation states that the Ash Pond is capable of handling the 1000-year 24-hour storm event with a maximum surcharge pool elevation of 20.26. However, a maximum surcharge pool elevation of 24 was used in the stability analysis to match the top of the dike cross section.

Load Conditions

The impoundment dike at Plant Barry Ash Pond was evaluated for the maximum storage, maximum surcharge pool, and seismic loading conditions.

Design Inputs/References

- SCS Calculation TV-BA-APC387586-591-001
- 2021 LiDAR topo, unpublished
- USGS Earthquake Hazards website, *earthquake.usgs.gov/hazards/interactive*
- US Corps of Engineers Manual EM 1110-2-1902, October 2003
- Sothern Company Services, Inflow Design Control System Plan: Hydrologic and Hydraulic Calculation Summary for Plant Barry Ash Pond, October, 2016
- Southern Company Services, Slope Stability Analysis of Main Ash Pond Dike, July 2010
- Southern Company Services, Ash Pond South Dike and Diversion Dike Slope Stability Report, September 2004
- Southern Company Services, Plant Barry Report of Ash Pond Dike Proposed Modifications, January 1998.
- 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

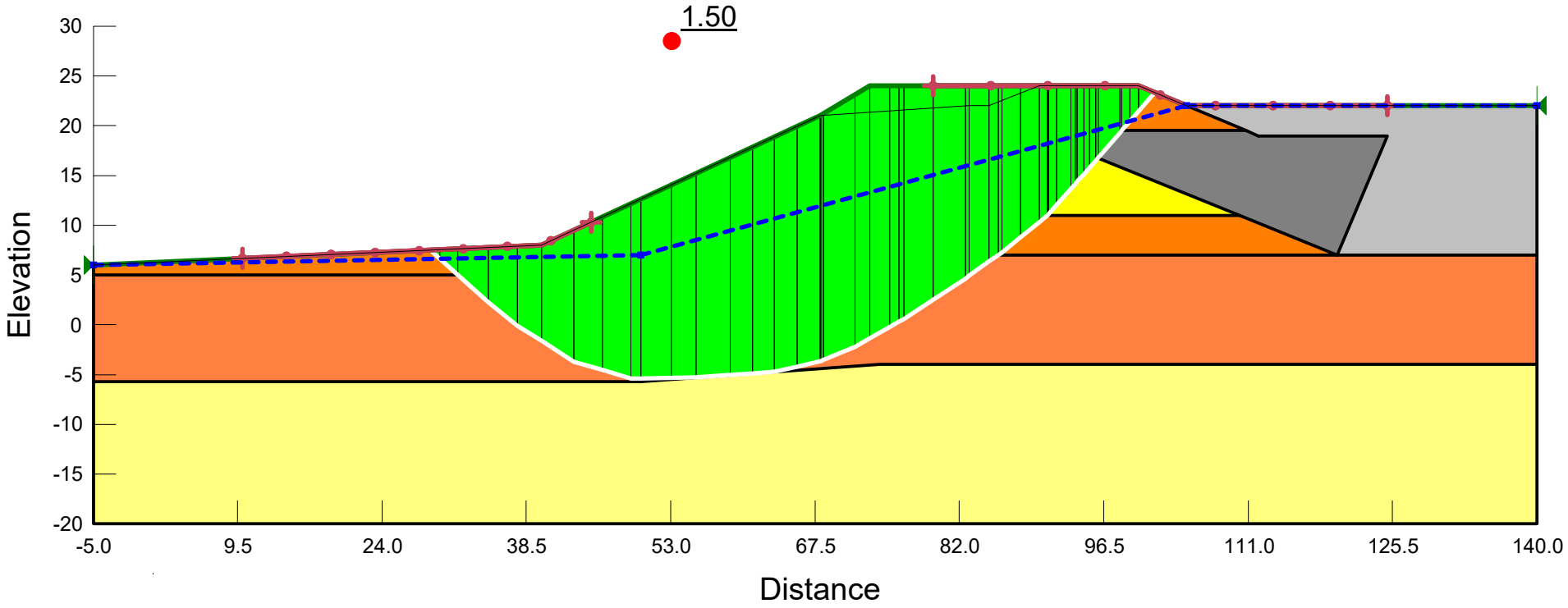
Body of Calculation

SLOPE/W modeling attached.

Plant Barry Ash Pond
North East Dike

Maximum Storage

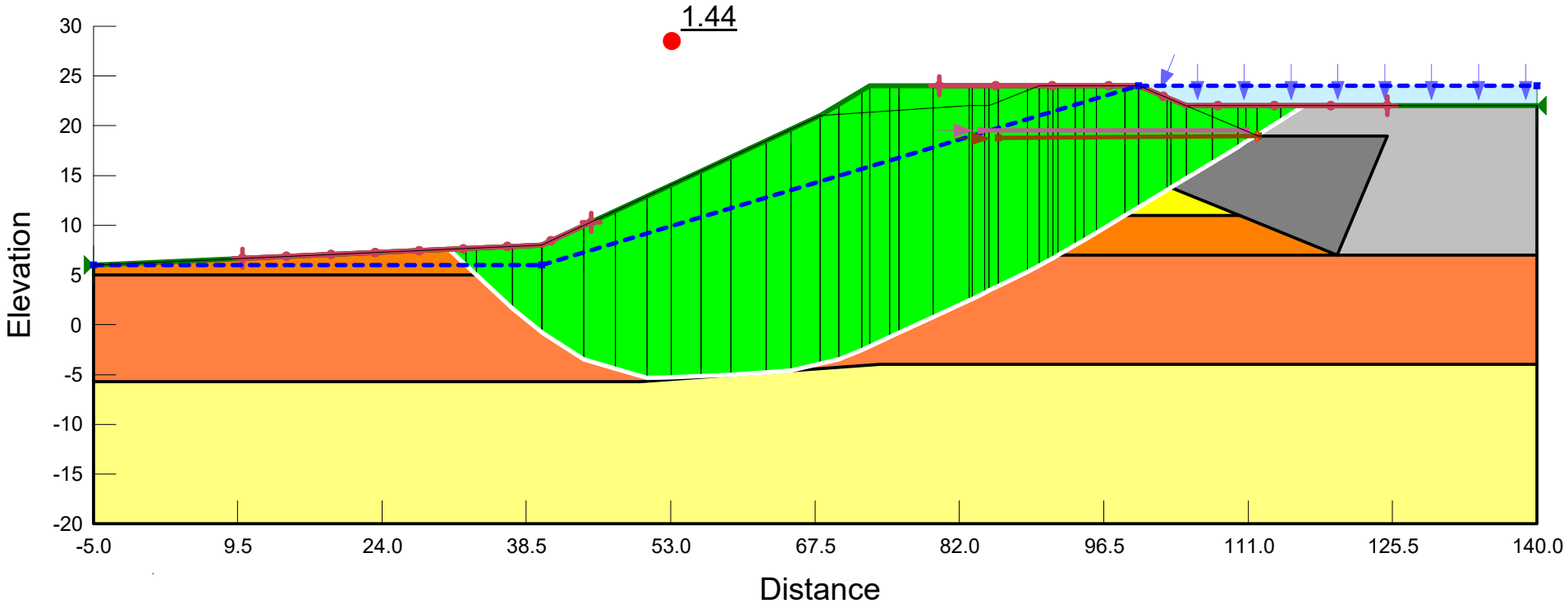
Color	Name	Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	Bottom Ash	Mohr-Coulomb	95	0	35
	Dike Clay	Mohr-Coulomb	102	500	0
	Dike Clayey Sand	Mohr-Coulomb	102.9	0	30
	Fly ash	Mohr-Coulomb	90	90	2
	Organic Clay	Mohr-Coulomb	90	444	0
	Sands	Mohr-Coulomb	107	0	35



Plant Barry Ash Pond
North East Dike

Full Surcharge Pool

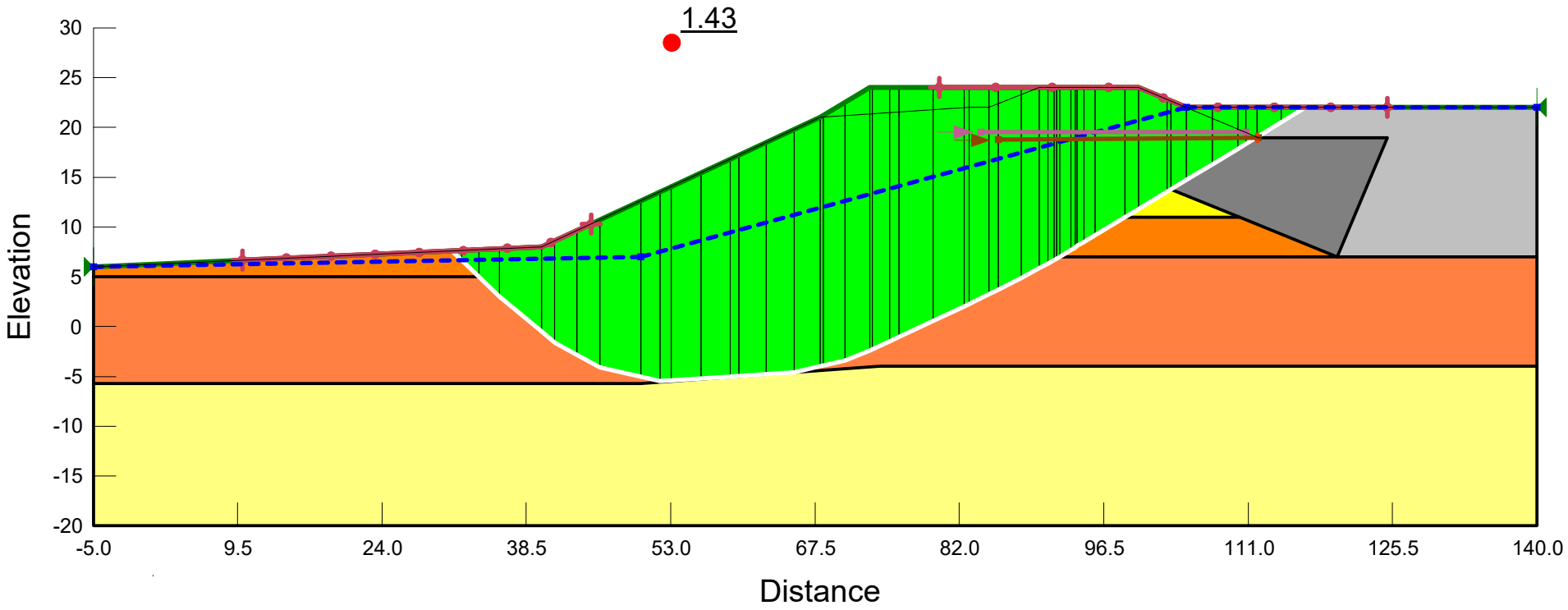
Color	Name	Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	Bottom Ash	Mohr-Coulomb	95	0	35
	Dike Clay	Mohr-Coulomb	102	500	0
	Dike Clayey Sand	Mohr-Coulomb	102.9	0	30
	Fly ash	Mohr-Coulomb	90	90	2
	Organic Clay	Mohr-Coulomb	90	444	0
	Sands	Mohr-Coulomb	107	0	35



Plant Barry Ash Pond
North East Dike

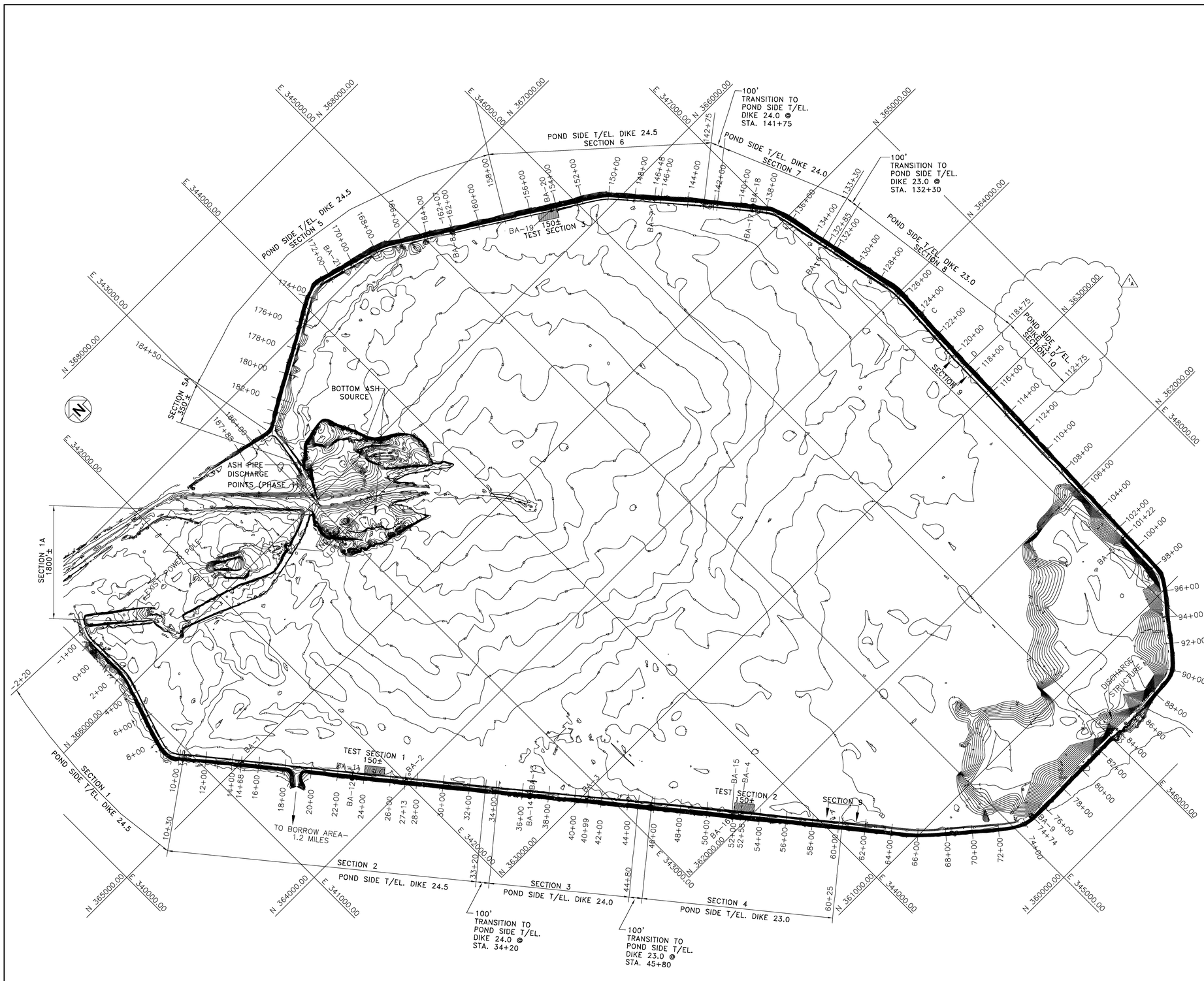
Seismic Loading
Horizontal Coefficient: 0.008g

Color	Name	Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	Bottom Ash	Mohr-Coulomb	95	0	35
	Dike Clay	Mohr-Coulomb	102	500	0
	Dike Clayey Sand	Mohr-Coulomb	102.9	0	30
	Fly ash	Mohr-Coulomb	90	90	2
	Organic Clay	Mohr-Coulomb	90	444	0
	Sands	Mohr-Coulomb	107	0	35



Attachment A

Site Plan



BORINGS	COORDINATES	
BORINGS TAKEN IN 1992		
BORING LABEL	N	E
BA-1	364999.880	341219.875
BA-2	364031.549	342004.128
BA-3	362956.461	342880.725
BA-4	362057.826	343612.863
BA-5	361495.708	347138.361
BA-6	364639.958	347102.821
BA-7	365796.094	346427.798
BA-8	364999.880	341219.875
BA-9	360500.824	345152.338
BORINGS TAKEN IN 1998		
BORING LABEL	N	E
BA-11	364345.412	341755.029
BA-12	364327.948	341734.096
BA-13	363301.329	342606.115
BA-14	363282.545	342582.682
BA-15	362111.456	343573.883
BA-16	362092.553	343553.482
BA-17	365223.403	346902.569
BA-18	365240.613	346922.842
BA-19	366298.340	345828.767
BA-20	366319.529	345844.607
BA-21	367088.602	344388.258

NOTES:

1. STATIONS WERE TAPED OFF OF THE 1992 BORING LOCATIONS BA-1 THRU BA-9. SEE TABLES FOR COORDINATES OF THE BORINGS.
2. FOR ELEVATIONS OF NEW DIKE SECTIONS SEE DWGS. D-521372, D-521373, AND D-521374 DIKE CREST MODIFICATION SECTIONS.
3. TEST SECTIONS NO. 1, 2, AND 3 SHALL STAY IN PLACE. TIE NEW DIKE MODIFICATIONS TO THE TEST SECTIONS.

REFERENCES:

D-521370 – MECHANICAL PIPING-REVISIONS TO ASH SLUICE LINES

D-521371 – MECHANICAL PIPING-REVISIONS TO UNITS 1-5 BLDG. , DEMIN. SUMP AND LAGOON POND B DISCHARGE PIPES

D-521372 – DIKE CREST MODIFICATIONS SECTIONS - WEST SIDE

D-521373 – DIKE CREST MODIFICATIONS SECTIONS - EAST SIDE

D-521374– PLAN AND SECTIONS 1A & 5A

D-521380 – BORROW PIT AREA

CMF	FDB	RMP

REV.	DATE	
1	8/16/99	1A, ADDED SECTION 10
0	7/23/98	ISSUED FOR CONSTRUCTION RJN FB-98001

CAD D521369 | ACAD14 | CAS-14

Southern Company Services, Inc.
for
ALABAMA POWER COMPANY

JOB BARRY ASH POND
DETAIL DIKE EXTENSION-PHASE 1 (1998)
GENERAL ARRANGEMENT

DRAWN CAS | CHECKED FDB | DESIGNED ~~TRACED~~ RCB
APPROVED FDB | DATE
APPROVED RMP | DATE

SCALE 1"=300' | B/M
SHEET OF SHEETS
SUPERSEDES
D-521369

Attachment B

Cross Section Geometry

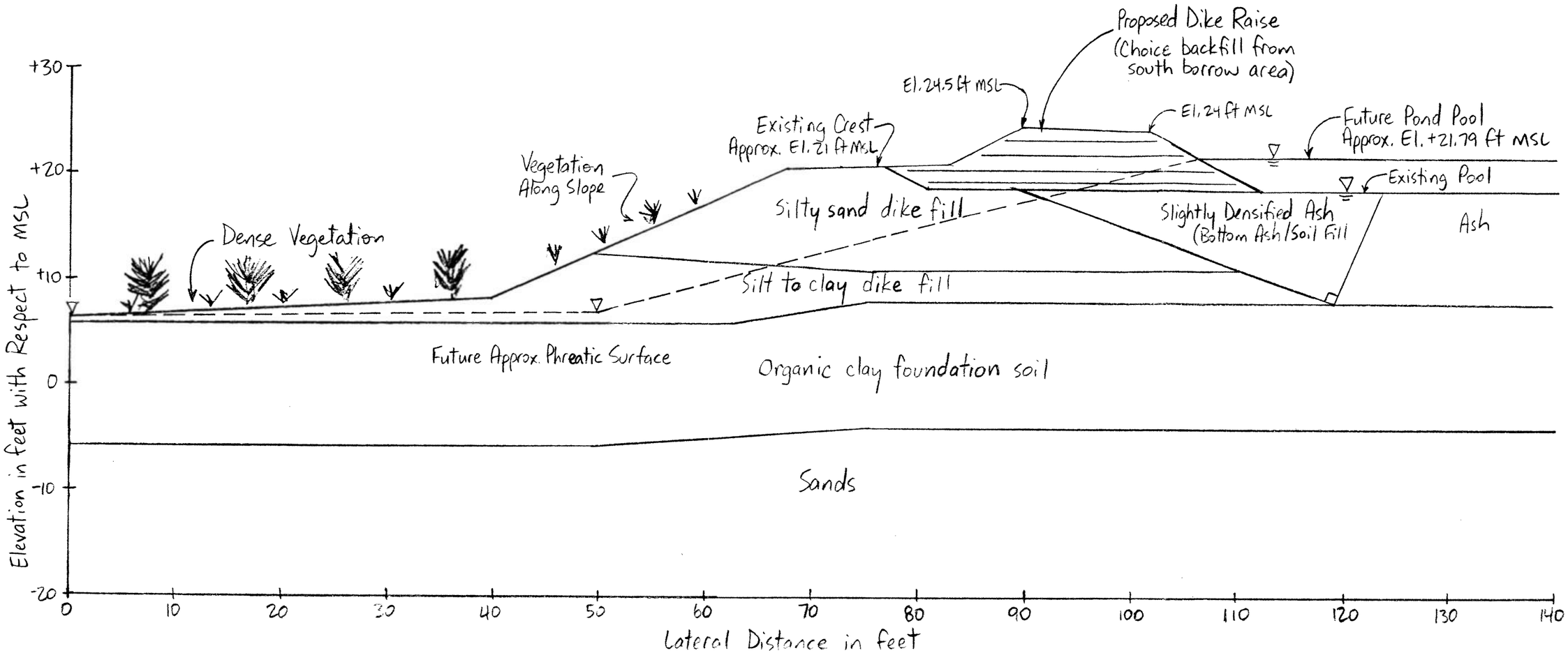


Figure 3
Cross-Section #5
Modified for Dike Raise
Upstream of Crest

Attachment C

Boring Location Plan

Legend

⌖ – Boring location

0 720

Scale: 1 in. = 720 ft.

FIGURE 1
BARRY STEAM PLANT
ASH POND DIKE
BORING LOCATIONS

APDIKE

Attachment D

Main Dike Borings and Dilatometers

SOUTHERN COMPANY SERVICES

PAGE 1 OF 1

PROJECT NO: _____ SITE NO: BAR BORING NO: BA-13 PROJECT NAME: Barry Steam Plant

ATE BEGAN: 10-27-97 DATE FINISHED: 10-27-97 FIELD GEOLOGIST: DeAnna Fields

DRILLER: R Hill NORTH: NA EAST: NA

GROUND SURFACE ELEV.: NA GWL DATE/TIME: _____ GWL DEPTH: _____

DRILLING METHOD: Hollow augers DRILL EQUIP: CME-75 GWL ELEV: NA

CONTRACTOR: APCo AREA: ASH POND/SW Leg of Dike Near Centerline CHECKED BY: WBG

ELEV (FT)	DEPTH (FT)	SAMPLE NO.	SPT BLOWS PER (0.5')	REC (FT)	PROFILE	DESCRIPTION	ROD
0.0	0.00					Reddish-brown to light-gray, firm to very firm, CLAYEY SAND (SC) Fill to 8.0'	
		S-1	N=11				
5.0	5.00	S-2	N=21				
		S-3	N=23				
10.0	10.00	S-4	N=8			Light-brown, fine to medium-grained, very firm, SILTY SAND (SM) Fill to 10.0'	
						Reddish-brown, clayey to silty, fine to medium-grain, SAND Fill with small amounts of scattered gravel to 19.5'	
15.0	15.00	S-5	N=9				
20.0	20.00	S-6	N=4			Reddish-brown SILTY CLAY Fill to 21.0'	
						Dark brown, soft, SILTY CLAY (CL) Fill to 27.5' Root at contact 21.0'	
25.0	25.00	S-7	N=2				
30.0	30.00	S-8	N=12			Light brown, firm, fine to medium-grained quartz SAND (SM-SP) with wood fragments to 34.0'	
35.0	35.00	S-9	N=19			Gray to light gray, fine to medium-grained, firm, SAND (SM-SP) to 36.0'	
						Gray to light gray, soft to very soft SILTY CLAY (CL) (Pen. 0.25 TSF) to 43.5'	
40.0	40.00	S-10	N=1				
45.0	45.00	S-11	N=14			Light brown to light gray, medium-grained, firm, quartz SAND to 51.0'	
50.0	50.00	S-12	N=13				
55.0	55.00					Bottom Of Hole.	
60.0	60.00					Standard Penetration Test S-1 2.5 to 4.0 4-4-7 N=11 S-2 5.0 to 6.5 3-8-13 N=21 S-3 7.5 to 9.0 6-11-12 N=23 S-4 10.0 to 11.5 4-4-4 N=8 S-5 14.5 to 16.0 3-3-3 N=6 S-6 19.5 to 21.0 0-1-3 N=4 S-7 24.5 to 26.0 0-1-1 N=2 S-8 29.5 to 31.0 6-8-4 N=12 S-9 34.5 to 36.0 6-11-8 N=19 S-10 39.5 to 41.0 0-0-1 N=1 S-11 44.5 to 46.0 6-6-8 N=14 S-12 49.5 to 51.0 5-6-7 N=13	
65.0	65.00						
0	70.00						
	75.00						

SOUTHERN COMPANY SERVICES

PAGE 1 OF 1

PROJECT NO: _____ SITE NO: BAR BORING NO: BA-14 PROJECT NAME: Barry Steam Plant

DATE BEGAN: 10-29-97 DATE FINISHED: 10-29-97 FIELD GEOLOGIST: W B Gilliam

DRILLER: R Hill NORTH: NA EAST: NA

GROUND SURFACE ELEV.: NA GWL DATE/TIME: GWL DEPTH:

DRILLING METHOD: Hollow augers DRILL EQUIP: CME-75 GWL ELEV: NA

CONTRACTOR: APCo AREA: ASH POND/21' from edge of dike CHECKED BY: WBG

ELEV (FT)	DEPTH (FT)	SAMPLE NO.	SPT BLOWS PER (0.5')	REC (FT)	PROFILE	DESCRIPTION	ROD
0.0	0.00					Light grayish-brown, SILTY SAND to 10.8'	
5.0	5.00						
10.0	10.00	S-1	N=5			Bottom of berm Top of dike fill	
		S-2	N=5			Reddish yellow to light gray, loose, CLAYEY SAND fill to 15.5'	
15.0	15.00	S-3	N=5				
		S-4	N=2			Gray, loose, CLAYEY SAND fill to 18.5'	
20.0	20.00	S-5	N=4			Gray to dark gray, CLAYEY SAND to CLAYEY SILT with roots and organic to 20.4'	
						Dark gray to dark grayish-brown, highly organic CLAYEY SILT to 24.0'	
25.0	25.00	S-6	N=1			Dark brown, very soft, plastic, organic CLAY 15 TSF to 29.5' Some scattered wood fragments	
30.0	30.00	S-7	N=2			Grayish-brown, fine to medium-grained loose SAND to ~~29.5'~~ 34'	
35.0	35.00	S-8	N=5			Medium gray, fine to medium-grained, loose quartz SAND with scattered thin clay layers Thin clay layers 35.8 to 36.0.	
40.0	40.00	S-9	N=3			Medium gray, soft, plastic SILTY CLAY with wood fragments .05 TSF to 42.0'	
45.0	45.00	S-10	N=12			Light gray, fine-grained, firm, silty, quartz SAND to 51.0'	
50.0	50.00	S-11	N=11				
						Bottom Of Hole.	
55.0	55.00						
60.0	60.00						
65.0	65.00						
70.0	70.00						
	75.00						

Standard Penetration Test
S-1 9.5 to 11.0 2-2-3 N=5
S-2 12.0 to 13.5 3-3-2 N=5
S-3 14.5 to 16.0 2-3-2 N=5
S-4 17.0 to 18.5 2-1-1 N=2
S-5 19.5 to 21.0 1-2-2 N=4
S-6 24.5 to 26.0 0-0-1 N=1
S-7 29.5 to 31.0 2-1-1 N=2
S-8 34.5 to 36.0 7-3-2 N=5
S-9 39.5 to 41.0 0-1-2 N=3
S-10 44.5 to 46.0 4-6-6 N=12
S-11 49.5 to 51.0 4-5-6 N=11

SOUTHERN COMPANY SERVICES

PAGE 1 OF 1

PROJECT NO: _____ SITE NO: BAR BORING NO: BA-17 PROJECT NAME: Barry Steam Plant

JATE BEGAN: 10-28-97 DATE FINISHED: 10-28-97 FIELD GEOLOGIST: W B Gilliam

DRILLER: R Hill NORTH: NA EAST: NA

GROUND SURFACE ELEV.: NA GWL DATE/TIME: _____ GWL DEPTH: _____

DRILLING METHOD: Hollow augers DRILL EQUIP: CME-75 GWL ELEV: NA

CONTRACTOR: APCo AREA: Centerline of Dike CHECKED BY: WBG

ELEV (FT)	DEPTH (FT)	SAMPLE NO.	SPT BLOWS PER (0.5')	REC (FT)	PROFILE	DESCRIPTION	ROD
0.0	0.00					GRAVEL fill to 0.5'	
		S-1	N=13			Reddish-yellow, stiff, SANDY CLAY to CLAYEY SAND fill to 4 5'	
5.0	5.00	S-2	N=15			Yellow-brown, stiff, SILTY CLAY fill to 10 0'	
		S-3	N=12			3.3-3.5 TSF	
10.0	10.00	S-4	N=10			Reddish-yellow to light-gray, loose, CLAYEY SAND fill to 18 0'	
15.0	15.00	S-5	N=13				
		S-6	N=3			Bottom of Fill	
20.0	20.00	S-6	~~N=3~~			Dark-gray, soft, SILTY CLAY to clay silt with scattered organic debris to 29.7'	
25.0	25.00	S-7	N=3				
30.0	30.00	S-8	N=11			Medium-gray, firm, clayey, medium-grained, SAND, scattered soft zones to 51.0'	
35.0	35.00	S-9	N=10			0.2' Gray soft silty clay layer at 35 0-35 2	
40.0	40.00	S-10	N=15				
45.0	45.00	S-11	N=10				
50.0	50.00	S-12	N=8				
						Bottom Of Hole	
55.0	55.00					Standard Penetration Test	
60.0	60.00					S-1 2.5 to 4 0 4-6-7 N=13	
65.0	65.00					S-2 5.0 to 6.5 4-6-9 N=15	
						S-3 7.5 to 9.0 4-6-6 N=12	
70.0	70.00					S-4 10.0 to 11.5 2-4-6 N=10	
						S-5 14 5 to 16.0 5-6-7 N=13	
						S-6 19.5 to 21.0 0-1-2 N=3	
						S-7 24.5 to 26.0 0-1-2 N=3	
						S-8 29.5 to 31.0 5-5-6 N=11	
						S-9 34.5 to 36.0 6-3-7 N=10	
						S-10 39.5 to 41.0 5-7-8 N=15	
						S-11 44 5 to 46.0 6-3-7 N=10	
						S-12 49.5 to 51.0 3-4-4 N=8	
	75.00						

SOUTHERN COMPANY SERVICES

PROJECT NO: _____ SITE NO: BAR BORING NO: BA-18 PAGE 1 OF 1

JATE BEGAN: 10-28-97 DATE FINISHED: _____ PROJECT NAME: Barry Steam Plant

DRILLER: R Hill NORTH: NA FIELD GEOLOGIST: W B Gilliam

GROUND SURFACE ELEV.: NA GWL DATE/TIME: _____ EAST: NA

DRILLING METHOD: Hollow augers GWL DEPTH: _____

CONTRACTOR: APCo AREA: Ash Pond/On Berm 25' from Edge of Dike DRILL EQUIP: CME-75 GWL ELEV: NA

CHECKED BY: WBG

ELEV (FT)	DEPTH (FT)	SAMPLE NO.	SPT BLOWS PER (0.5')	REC (FT)	PROFILE	DESCRIPTION	ROD
0.0	0.00					Berm Fill Light-gray SILTY SAND TO 10.0'	
5.0	5.00						
10.0	10.00	S-1	N=4			Reddish-yellow to light-gray, loose, CLAYEY SAND Fill to 18.0'	
		S-2	N=5				
15.0	15.00	S-3	N=9				
		S-4	N=3			Bottom of Fill	
20.0	20.00					Dark-gray, soft, SILTY CLAY to clay silt with scattered organic debris to 29.0'	
25.0	25.00	S-5	N=1				
30.0	30.00	S-6	N=10			Medium-gray, loose to firm, ~~clayey,~~ medium-grained, quartz SAND, with thin layers of soft silty ~~sand~~ clay to 51.0'	
35.0	35.00	S-7	N=14				
40.0	40.00	S-8	N=13				
45.0	45.00	S-9	N=12				
50.0	50.00	S-10	N=11			Some pea gravel at 50.0'.	
55.0	55.00					Bottom Of Hole.	
60.0	60.00						
65.0	65.00						
70.0	70.00						
	75.00						

Standard Penetration Test
S-1 9.5 to 11.0 2-2-2 N=4
S-2 12.0 to 13.5 3-2-3 N=5
S-3 14.5 to 16.0 3-4-5 N=9
S-4 17.0 to 18.5 1-1-2 N=3
S-5 24.5 to 26.0 0-0-1 N=1
S-6 29.5 to 31.0 4-5-5 N=10
S-7 34.5 to 36.0 5-7-7 N=14
S-8 39.5 to 41.0 6-6-7 N=13
S-9 44.5 to 46.0 5-6-6 N=12
S-10 49.5 to 51.0 4-5-6 N=11

Surface El. 21.29

SOUTHERN COMPANY
FILE NAME: PLANT BARRY ASH POND STUDY
FILE NUMBER: BA-11.DAT

TEST NO. BA11

RECORD OF DILATOMETER TEST NO. BA11
USING DATA REDUCTION PROCEDURES IN MARCHETTI (ASCE,J-GED,MARCH 80)
KO IN SANDS DETERMINED USING SCHMERTMANN METHOD (1983)
PHI ANGLE CALCULATION BASED ON DURGUNOGLU AND MITCHELL (ASCE,RALEIGH CONF,JUNE 75)
PHI ANGLE NORMALIZED TO 2.72 BARS USING BALIGH'S EXPRESSION (ASCE,J-GED,NOV 76)
MODIFIED MAYNE AND KULHAWY FORMULA USED FOR OCR IN SANDS (ASCE,J-GED,JUNE 82)

LOCATION: SOUNDING PUSHED BY CME 75
PERFORMED - DATE: 11 3 1997
BY: W. BARRY GILLIAM

CALIBRATION INFORMATION:
DELTA A = .15 BARS DELTA B = 1.75 BARS GAGE O = .10 BARS GWT DEPTH= 3.57 M = 11.71'
ROD DIA.= 3.60 CM FR.RED.DIA.= 5.40 CM ROD WT.= 6.50 KG/M DELTA/PHI= .50 BLADE T=15.00 MM

1 BAR = 1.019 KG/CM2 = 1.044 TSF = 14.51 PSI ANALYSIS USES H2O UNIT WEIGHT = 1.000 T/M3

Z (M)	THRUST (KG)	A (BAR)	B (BAR)	ED (BAR)	ID	KD	UO (BAR)	GAMMA (T/M3)	SV (BAR)	PC (BAR)	OCR	KO	CU (BAR)	PHI (DEG)	M (BAR)	SOIL TYPE
1.64'	.50	1250.	7.50	19.00	350.	1.43	78.56	.000	1.950	.090	89.88	*****	9.70		29.5	1557.0	SANDY SILT
3.28'	1.00	1925.	8.50	18.50	295.	1.04	43.87	.000	1.950	.186	22.95	*****	4.29			1150.9	SILT
4.92'	1.50	1650.	9.50	24.00	459.	1.48	31.70	.000	1.950	.281	42.64	*****	4.09		30.5	1649.2	SANDY SILT
6.56'	2.00	1550.	9.00	14.80	142.	.46	23.56	.000	1.900	.376	17.62	46.89	3.05	1.805		470.5	SILTY CLAY
8.20'	2.50	1150.	4.80	7.25	20.	.12	10.39	.000	1.700	.464	6.07	13.07	1.88	.801		50.8	CLAY
9.84'	3.00	3600.	11.00	29.50	605.	1.71	18.34	.000	2.100	.557	22.73	40.79	2.37		37.0	1859.2	SANDY SILT
11.48'	3.50	1625.	12.50	19.00	168.	.39	18.79	.000	1.900	.656	21.60	32.95	2.68	2.373		519.1	SILTY CLAY
13.12'	4.00	1600.	10.20	17.80	208.	.60	14.02	.042	1.950	.708	14.76	20.86	2.26	1.776		585.6	CLAYEY SILT
14.76'	4.50	1450.	8.50	14.20	138.	.48	10.98	.091	1.900	.753	10.73	14.25	1.95	1.392		358.4	SILTY CLAY
16.40'	5.00	750.	5.20	10.00	106.	.61	6.25	.140	1.800	.795	4.70	5.91	1.36	.726		213.2	CLAYEY SILT
18.04'	5.50	700.	2.80	5.30	22.	.24	3.17	.189	1.600	.829	1.70	2.05	.82	.325		28.9	CLAY
19.68'	6.00	200.	1.50	3.40	0.	.00	1.53	.238	1.500	.856	.56	.66	.41	.135		.0	MUD
21.32'	6.50	425.	1.80	5.25	56.	1.10	1.68	.288	1.600	.883	.67	.76	.46			48.0	SILT
22.96'	7.00	300.	1.65	4.40	31.	.68	1.45	.337	1.600	.913	.55	.60	.38	.134		26.3	CLAYEY SILT
24.60'	7.50	400.	1.90	4.75	35.	.66	1.61	.386	1.600	.942	.67	.71	.43	.158		29.4	CLAYEY SILT
26.24'	8.00	400.	1.80	4.50	29.	.61	1.42	.435	1.600	.972	.57	.58	.37	.139		24.8	CLAYEY SILT
27.88'	8.50	300.	1.60	4.35	31.	.79	1.12	.484	1.600	1.001	.41	.41	.27	.107		26.3	CLAYEY SILT
29.52'	9.00	275.	1.75	4.39	27.	.63	1.19	.533	1.600	1.030	.46	.45	.30	.119		22.9	CLAYEY SILT
31.16'	9.50	300.	2.30	4.30	4.	.06	1.67	.582	1.500	1.057	.80	.75	.45	.185		3.1	MUD
32.80'	10.00	240.	2.30	4.35	5.	.09	1.58	.631	1.500	1.082	.75	.69	.43	.178		4.6	MUD
34.44'	10.50	400.	1.90	4.50	26.	.60	1.11	.680	1.600	1.109	.44	.40	.27	.117		21.7	SILTY CLAY
36.08'	11.00	2200.	5.50	19.00	423.	2.87	3.69	.729	2.000	1.148	3.14	2.73	.68		35.3	687.5	SILTY SAND
37.72'	11.50	1500.	3.95	11.30	199.	1.94	2.47	.778	1.900	1.195	2.16	1.81	.59		32.8	236.0	SILTY SAND
39.36'	12.00	350.	4.30	7.50	47.	.39	2.80	.827	1.700	1.234	2.09	1.69	.74	.414		56.7	SILTY CLAY

over

	Z (M)	THRUST (KG)	A (BAR)	B (BAR)	ED (BAR)	ID	KD	UO (BAR)	GAMMA (T/M3)	SV (BAR)	PC (BAR)	OCR	KO	CU (BAR)	PHI (DEG)	M (BAR)	SOIL TYPE
	*****	******	*****	*****	*****	*****	*****	******	******	******	*****	*****	*****	*****	*****	******	**********
	41'	12.50	425.	3.80	6.50	29.	.29	2.31	.876	1.700	1.268	1.59	1.25	.63	.335	29.1	CLAY
	42.64'	13.00	400.	4.15	6.55	18.	.16	2.50	.925	1.600	1.300	1.84	1.42	.67	.378	19.7	CLAY
	44.28'	13.50	1200.	4.20	6.50	15.	.13	2.45	.974	1.600	1.330	1.82	1.37	.66	.377	15.4	CLAY
	45.92'	14.00	500.	3.50	6.25	31.	.36	1.82	1.024	1.700	1.362	1.18	.87	.50	.267	26.3	SILTY CLAY
	47.56'	14.50	2600.	6.60	10.20	62.	.32	3.93	1.073	1.800	1.398	4.01	2.87	.97	.715	95.5	CLAY
SP	49.20'	15.00	2500.	6.00	21.00	477.	3.22	2.96	1.122	2.000	1.443	2.94	2.04	.60	ϕ=35° 35.4	688.9	SILTY SAND
		END OF SOUNDING															

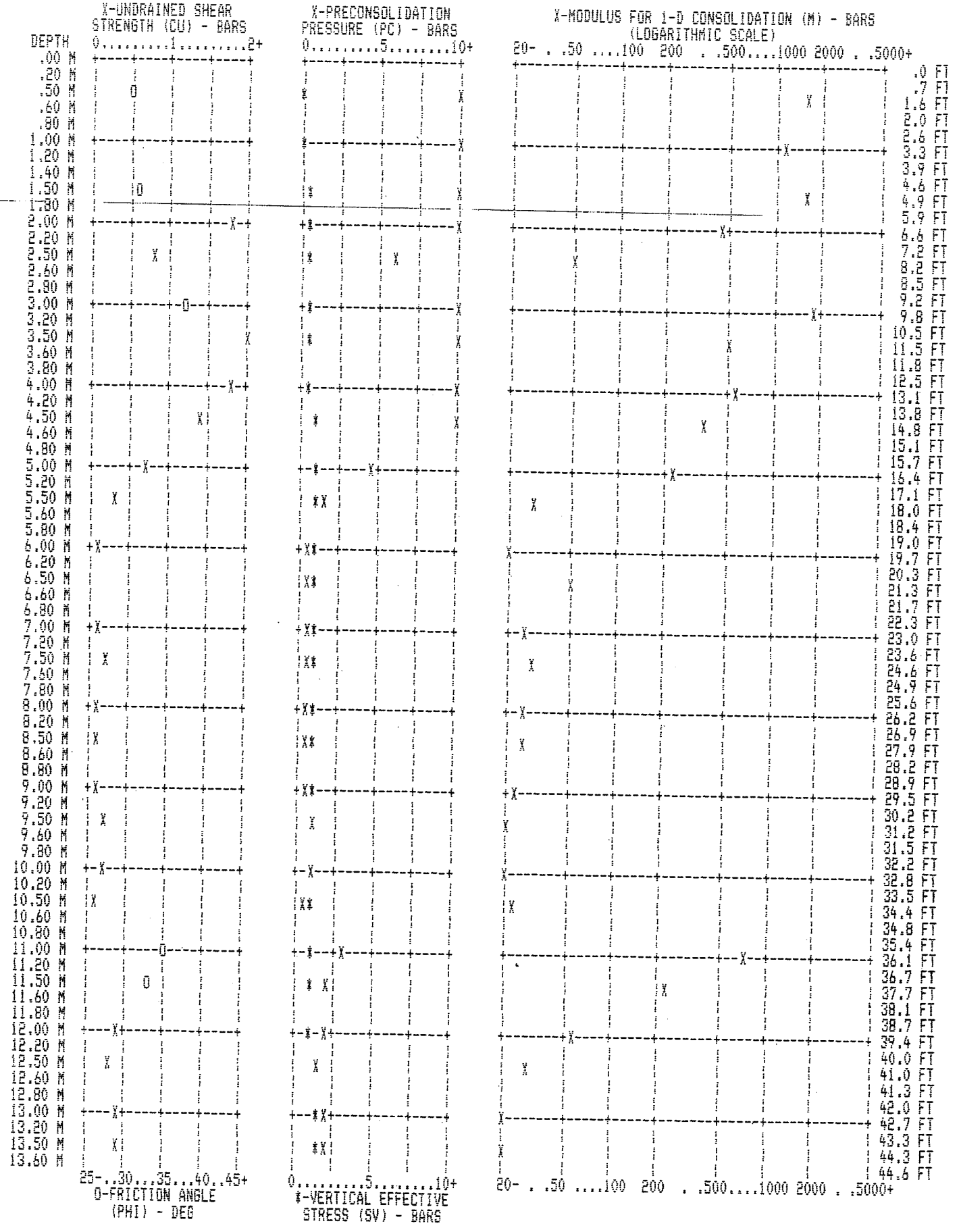
:0°
557 cf
=95 pcf
=35°
=0
m=113 pcf
s=118 pcf

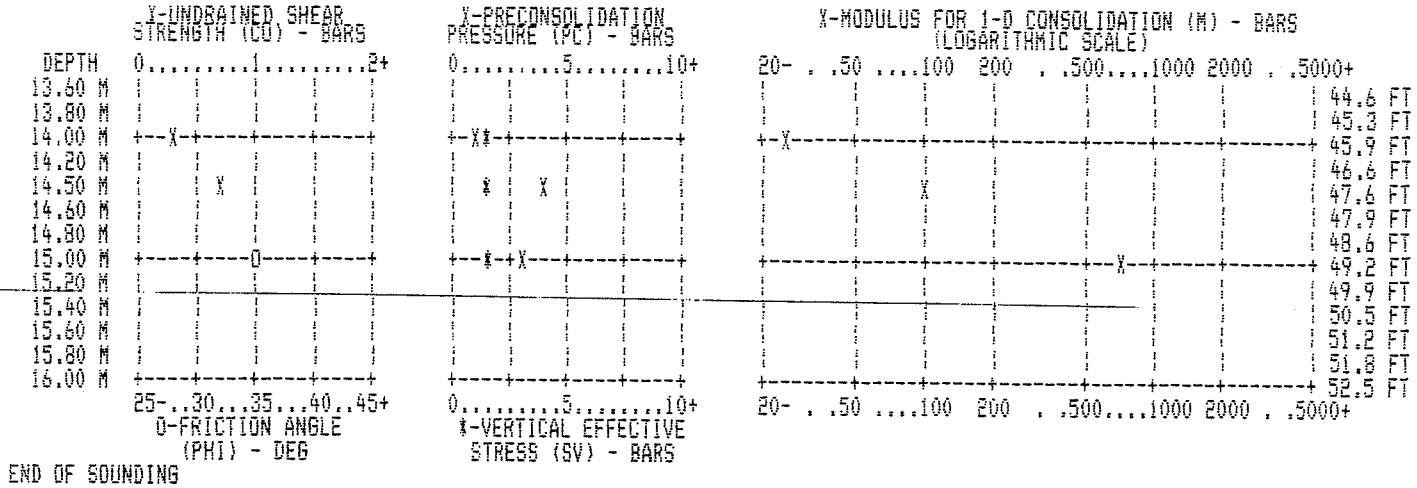
.361 lower 1/3 Cu

C=754 psf γ_m=90 pcf

48.5'

γ_m=113 pcf


X-UNDRAINED SHEAR STRENGTH (CU) - BARS
X-PRECONSOLIDATION PRESSURE (PC) - BARS
X-MODULUS FOR 1-D CONSOLIDATION (M) - BARS (LOGARITHMIC SCALE)
DEPTH
0-FRICTION ANGLE (PHI) - DEG
*-VERTICAL EFFECTIVE STRESS (SV) - BARS



END OF SOUNDING

Surface El. 18.7'

TEST NO. BA-12

SOUTHERN COMPANY
FILE NAME: PLANT BARRY ASH POND STUDY
FILE NUMBER: BA-12.DAT

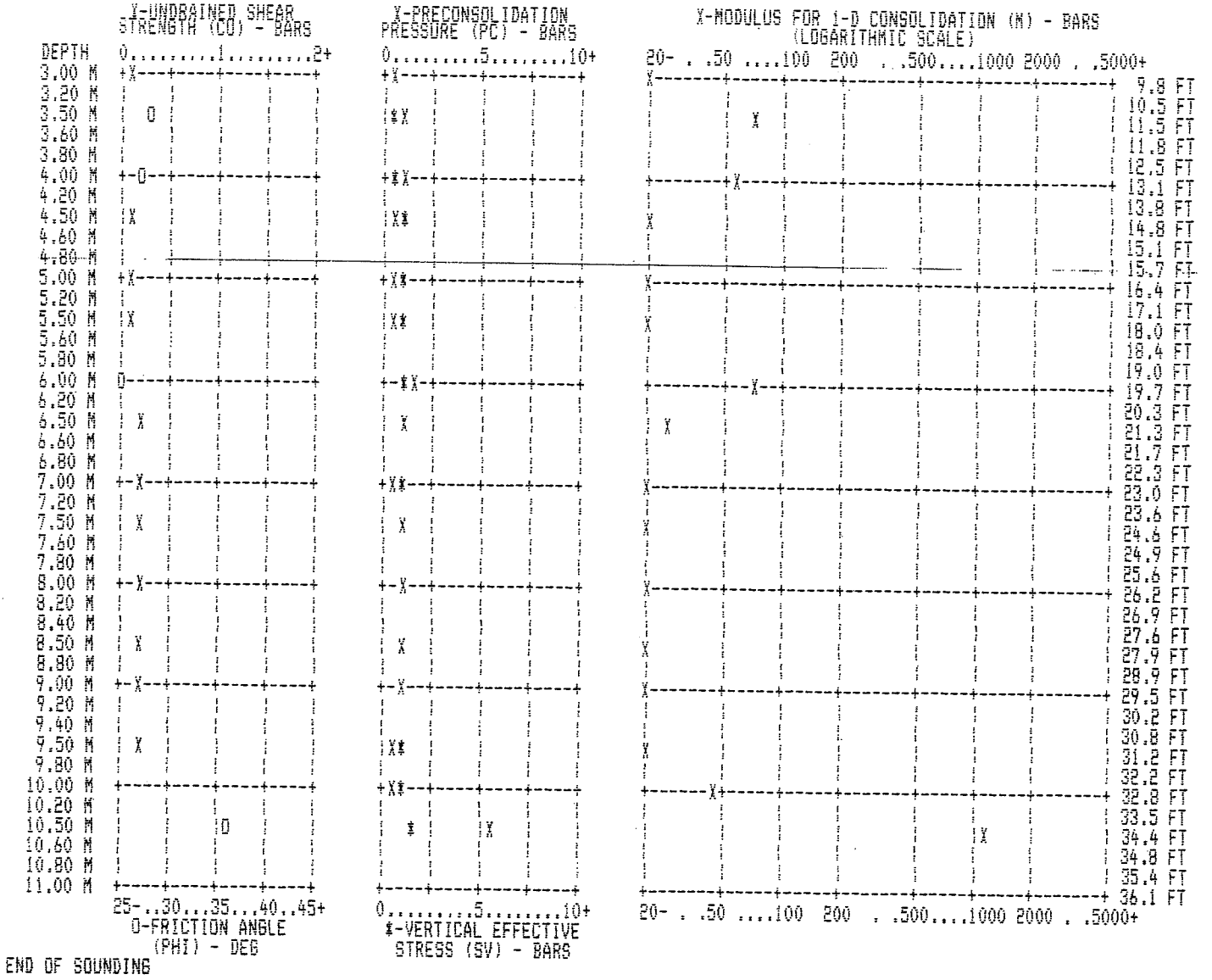
RECORD OF DILATOMETER TEST NO. BA-12
USING DATA REDUCTION PROCEDURES IN MARCHETTI (ASCE,J-GED,MARCH 80)
KO IN SANDS DETERMINED USING SCHMERTMANN METHOD (1983)
PHI ANGLE CALCULATION BASED ON DURGUNOGLU AND MITCHELL (ASCE,RALEIGH CONF,JUNE 75)
PHI ANGLE NORMALIZED TO 2.72 BARS USING BALIGH'S EXPRESSION (ASCE,J-GED,NOV 76)
MODIFIED MAYNE AND KULHAWY FORMULA USED FOR OCR IN SANDS (ASCE,J-GED,JUNE 82)

LOCATION: SOUNDING PUSHED BY CME 75 19'F/ EDGE OF DIKE
PERFORMED - DATE: 10-29-1997
BY: W. BARRY GILLIAM

CALIBRATION INFORMATION:
DELTA A = .10 BARS DELTA B = 1.01 BARS GAGE 0 = .10 BARS GWT DEPTH= 6.00 M=19.68'
ROD DIA.= 3.60 CM FR.RED.DIA.= 5.40 CM ROD WT.= 6.50 KG/M DELTA/PHI= .50 BLADE T=15.00 MM

1 BAR = 1.019 KG/CM2 = 1.044 TSF = 14.51 PSI ANALYSIS USES H2O UNIT WEIGHT = 1.000 T/M3

	Z (M)	THRUST (KG)	A (BAR)	B (BAR)	ED (BAR)	ID	KD	UO (BAR)	GAMMA (T/M3)	SV (BAR)	PC (BAR)	OCR	KO	CU (BAR)	PHI (DEG)	M (BAR)	SOIL TYPE
	9.84'	3.00	300.	.75	2.20	12.	.49	1.35	.000	1.600	.542	.29	.54	.35	.073	10.5	SILTY CLAY
	11.48'	3.50	450.	1.05	4.35	80.	2.44	1.51	.000	1.700	.623	.84	1.34	.56		27.7	67.8	SILTY SAND
	13.12'	4.00	475.	1.20	4.20	69.	1.80	1.57	.000	1.600	.704	1.01	1.44	.59		27.2	58.5	SANDY SILT
	14.76'	4.50	275.	1.30	2.85	16.	.36	1.63	.000	1.600	.782	.57	.73	.44	.134		13.6	SILTY CLAY
	16.40'	5.00	200.	1.35	2.90	16.	.35	1.54	.000	1.600	.861	.57	.67	.41	.137		13.6	CLAY
	18.04'	5.50	175.	1.05	2.20	1.	.04	1.12	.000	1.500	.937	.38	.40	.27	.100		1.2	MUD
	19.68'	6.00	350.	1.55	5.05	87.	1.75	1.41	.000	1.700	1.016	1.67	1.65	.71		21.8	74.0	SANDY SILT
	21.32'	6.50	325.	1.80	3.70	29.	.48	1.63	.049	1.600	1.047	.76	.73	.44	.179		24.5	SILTY CLAY
	22.96'	7.00	174.	1.75	3.25	14.	.25	1.52	.098	1.600	1.077	.70	.65	.40	.168		12.1	CLAY
	24.60'	7.50	150.	1.90	3.50	18.	.30	1.56	.147	1.600	1.106	.75	.68	.42	.179		15.2367	CLAY
	26.24'	8.00	150.	2.15	3.55	11.	.16	1.71	.196	1.500	1.133	.89	.78	.46	.205		9.0	MUD
	27.88'	8.50	150.	2.25	3.80	16.	.23	1.71	.245	1.600	1.160	.91	.78	.46	.210		13.686	CLAY
	29.52'	9.00	200.	2.10	3.50	11.	.17	1.51	.294	1.500	1.187	.76	.64	.40	.184		9.0	MUD
	31.16'	9.50	200.	2.10	3.50	11.	.17	1.44	.343	1.500	1.212	.72	.60	.38	.176		9.0	MUD
	32.80'	10.00	375.	1.80	4.40	54.	1.17	1.08	.393	1.600	1.239	.47	.38	.26			46.1	SILT
	34.44'	10.50	3000.	7.80	25.20	594.	2.61	5.12	.442	2.000	1.278	5.60	4.38	.84		36.0	1128.7	SILTY SAND
		END OF SOUNDING																



END OF SOUNDING

Surface El. 21.90'

SOUTHERN COMPANY
FILE NAME: PLANT BARRY ASH POND STUDY
FILE NUMBER: BA-15.DAT

TEST NO. BA-15

RECORD OF DILATOMETER TEST NO. BA-15
USING DATA REDUCTION PROCEDURES IN MARCHETTI (ASCE,J-GED,MARCH 80)
KO IN SANDS DETERMINED USING SCHMERTMANN METHOD (1983)
PHI ANGLE CALCULATION BASED ON DURGUNOGLU AND MITCHELL (ASCE,RALEIGH CONF,JUNE 75)
PHI ANGLE NORMALIZED TO 2.72 BARS USING BALIGH'S EXPRESSION (ASCE,J-GED,NOV 76)
MODIFIED MAYNE AND KULHAWY FORMULA USED FOR OCR IN SANDS (ASCE,J-GED,JUNE 82)

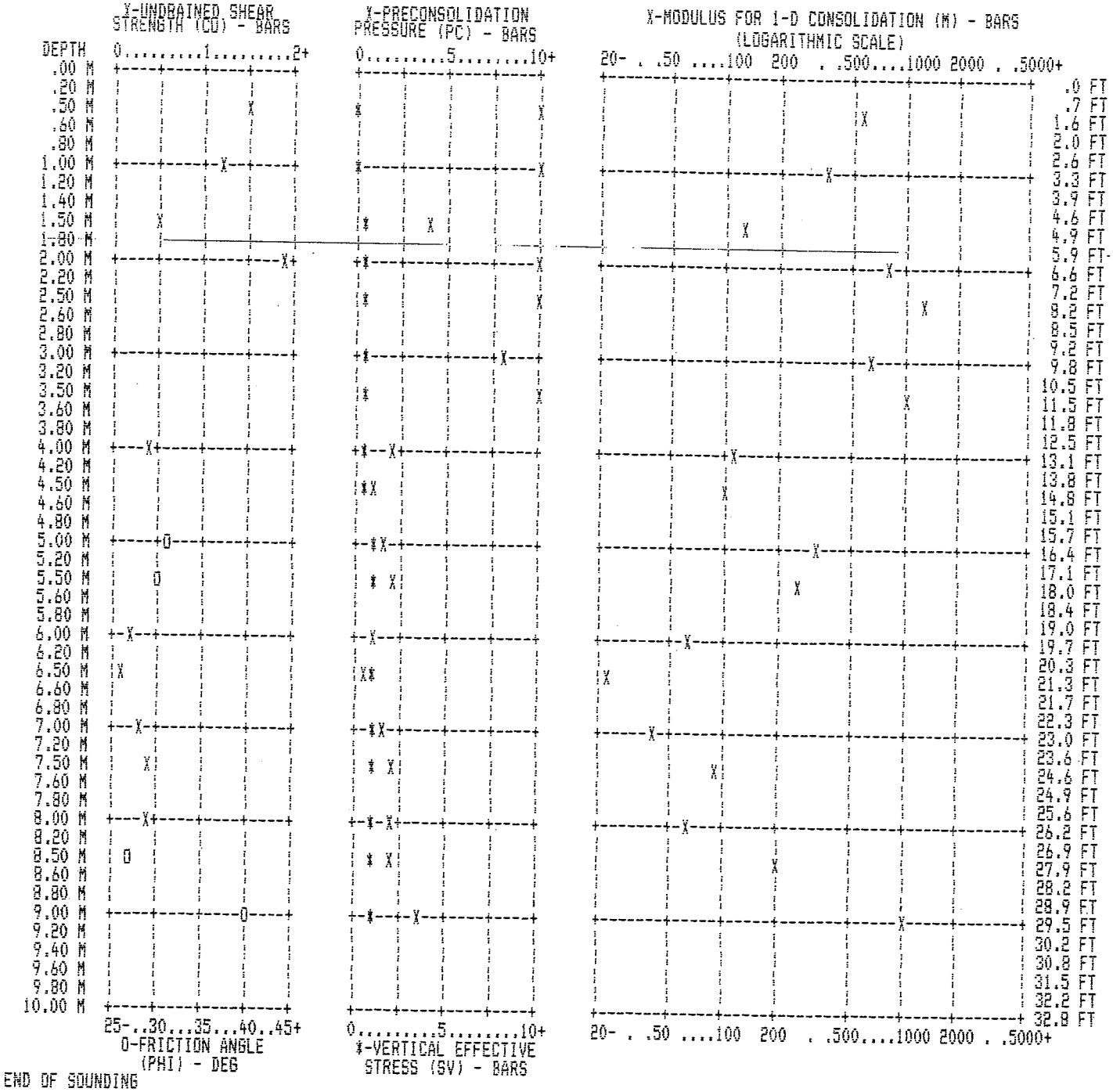
LOCATION: SOUNDING PUSHED BY CME 75
PERFORMED - DATE: 10-30-1997
BY: W. BARRY GILLIAM

CALIBRATION INFORMATION:
DELTA A = .05 BARS DELTA B = .35 BARS GAGE O = .10 BARS GWT DEPTH= 3.44 M = 11.28'
ROD DIA.= 3.60 CM FR.RED.DIA.= 5.40 CM ROD WT.= 6.50 KG/M DELTA/PHI= .50 BLADE T=15.00 MM

1 BAR = 1.019 KG/CM2 = 1.044 TSF = 14.51 PSI ANALYSIS USES H2O UNIT WEIGHT = 1.000 T/M3

Z (M)	THRUST (KG)	A (BAR)	B (BAR)	ED (BAR)	ID	KD	UO (BAR)	GAMMA (T/M3)	SV (BAR)	PC (BAR)	OCR	KO	CU (BAR)	PHI (DEG)	M (BAR)	SOIL TYPE
1.64'	.50	1250.	6.10	10.30	138.	.68	65.11	.000	1.800	.090	20.60	*****	5.28	1.540		591.7	CLAYEY SILT
3.28'	1.00	1000.	5.80	9.05	104.	.53	31.45	.000	1.800	.178	13.12	73.55	3.58	1.228	.976 lower 1/3 Cu	372.2	SILTY CLAY
4.92'	1.50	525.	3.20	4.95	49.	.46	11.67	.000	1.700	.264	4.14	15.66	2.02	.527		130.2	SILTY CLAY
6.56'	2.00	1075.	9.40	16.50	244.	.78	25.48	.000	1.950	.354	18.74	52.99	3.19	1.874	1.783 lower 1/3	826.5	CLAYEY SILT
8.20'	2.50	2400.	11.05	21.80	377.	1.04	23.14	.000	2.100	.453	20.65	45.57	3.02			1242.2	SILT
9.84'	3.00	3000.	6.50	13.80	251.	1.19	11.05	.000	1.950	.552	7.95	14.39	1.96			652.3	SILT
11.48'	3.50	1650.	11.50	21.50	350.	.92	16.97	.006	2.100	.646	18.16	28.11	2.53			1049.7	SILT
13.12'	4.00	750.	3.00	5.25	67.	.69	4.06	.055	1.700	.690	2.08	3.02	1.00	.368	C=768 psf	106.6	CLAYEY SILT
14.76'	4.50	400.	2.25	4.90	82.	1.19	2.74	.104	1.700	.724	1.18	1.63	.73			100.2	SILT
16.40'	5.00	850.	2.50	9.35	235.	3.43	2.59	.153	1.900	.764	1.53	2.00	.63			311.4	SAND
18.04'	5.50	850.	2.95	8.05	171.	2.00	3.05	.202	1.900	.808	2.07	2.56	.71			238.2	SILTY SAND
19.68'	6.00	600.	2.50	4.40	55.	.74	2.51	.251	1.700	.847	1.21	1.42	.67	.247		59.8	CLAYEY SILT
21.32'	6.50	250.	1.65	2.75	26.	.58	1.44	.300	1.600	.879	.53	.60	.38	.128	.212 lower 1/3 Cu	21.7	SILTY CLAY
22.96'	7.00	300.	2.70	4.10	36.	.47	2.47	.349	1.700	.911	1.27	1.39	.66	.261		38.9	SILTY CLAY
24.60'	7.50	375.	3.60	5.75	64.	.60	3.24	.398	1.700	.945	2.01	2.12	.84	.380	C=442 psf	85.8	SILTY CLAY
26.24'	8.00	375.	3.50	5.30	51.	.50	2.99	.447	1.700	.980	1.84	1.88	.78	.357		64.5	SILTY CLAY
27.88'	8.50	700.	3.10	8.50	182.	2.28	2.26	.497	1.900	1.019	2.12	2.08	.69			207.4	SILTY SAND
29.52'	9.00	4000.	6.60	21.10	514.	2.79	4.97	.546	2.000	1.065	3.66	3.44	.71			967.9	SILTY SAND

END OF SOUNDING



END OF SOUNDING

Surface El. 19.85'

SOUTHERN COMPANY
FILE NAME: PLANT BARRY ASH POND STUDY
FILE NUMBER: BA-16.DAT

TEST NO. BA-16

RECORD OF DILATOMETER TEST NO. BA-16
USING DATA REDUCTION PROCEDURES IN MARCHETTI (ASCE,J-GED,MARCH 80)
KO IN SANDS DETERMINED USING SCHMERTMANN METHOD (1983)
PHI ANGLE CALCULATION BASED ON DURGUNOGLU AND MITCHELL (ASCE,RALEIGH CONF,JUNE 75)
PHI ANGLE NORMALIZED TO 2.72 BARS USING BALIGH'S EXPRESSION (ASCE,J-GED,NOV 76)
MODIFIED MAYNE AND KULHAWY FORMULA USED FOR OCR IN SANDS (ASCE,J-GED,JUNE 82)

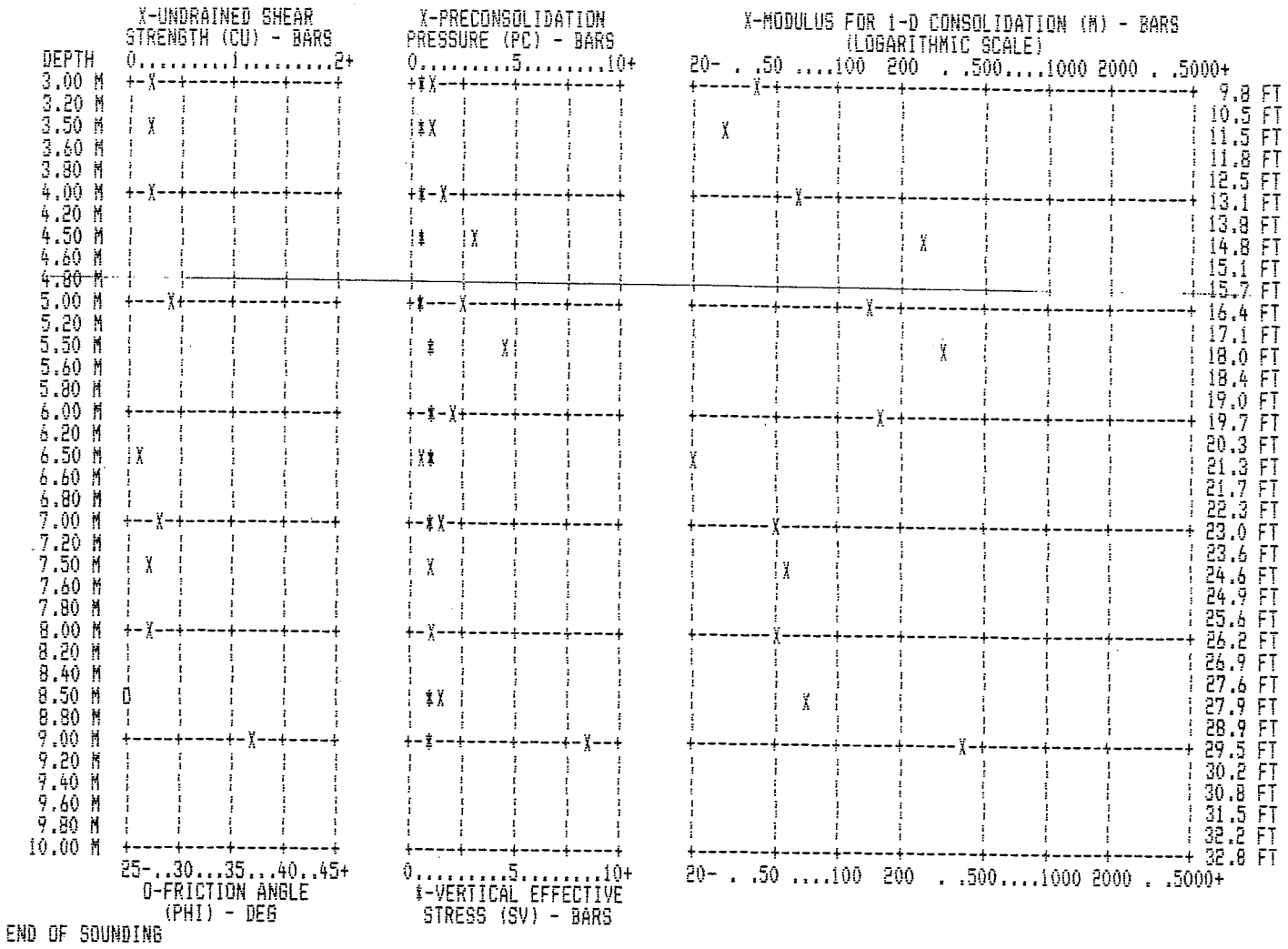
LOCATION: SOUNDING PUSHED BY CME 75 19'F/ EDGE OF DIKE
PERFORMED - DATE: 10-30-1997
BY: W. BARRY GILLIAM

CALIBRATION INFORMATION:
DELTA A = .05 BARS DELTA B = .35 BARS GAGE O = .10 BARS GWT DEPTH= 3.44 M=11.28'
ROD DIA.= 3.60 CM FR.RED.DIA.= 5.40 CM ROD WT.= 6.50 KG/M DELTA/PHI= .50 BLADE T=15.00 MM

1 BAR = 1.019 KG/CM2 = 1.044 TSF = 14.51 PSI ANALYSIS USES H2O UNIT WEIGHT = 1.000 T/M3

	Z (M)	THRUST (KG)	A (BAR)	B (BAR)	ED (BAR)	ID	KD	UO (BAR)	GAMMA (T/M3)	SV (BAR)	PC (BAR)	OCR	KO	CU (BAR)	PHI (DEG)	M (BAR)	SOIL TYPE
	9.84'	3.00	325.	1.50	2.85	35.	.71	2.59	.000	1.600	.542	.81	1.49	.69	.165		38.9	CLAYEY SILT
	11.48'	3.50	275.	1.50	2.70	29.	.60	2.28	.006	1.600	.615	.76	1.23	.62	.160		28.8	SILTY CLAY
	13.12'	4.00	350.	2.20	3.95	49.	.70	3.14	.055	1.700	.647	1.30	2.02	.81	.250		64.9	CLAYEY SILT
	14.76'	4.50	400.	4.05	8.30	140.	1.09	5.42	.104	1.800	.683	3.24	4.74	1.23			263.4	SILT
	16.40'	5.00	560.	3.55	6.15	80.	.71	4.49	.153	1.700	.720	2.55	3.54	1.08	.406		135.2	CLAYEY SILT
	18.04'	5.50	800.	5.20	9.90	157.	.95	6.25	.202	1.800	.757	4.48	5.92	1.36			318.0	SILT
	19.68'	6.00	625.	3.20	6.65	111.	1.17	3.46	.251	1.700	.794	1.87	2.35	.88			161.3	SILT
	21.32'	6.50	250.	1.70	2.60	18.	.40	1.60	.300	1.600	.826	.59	.71	.43	.138		15.5	SILTY CLAY
	22.96'	7.00	210.	2.85	4.35	40.	.48	2.79	.349	1.700	.858	1.44	1.68	.74	.286		47.8	SILTY CLAY
	24.60'	7.50	275.	2.45	4.40	56.	.85	2.16	.398	1.700	.892	1.00	1.13	.59	.216		53.8	CLAYEY SILT
	26.24'	8.00	275.	2.60	4.40	51.	.72	2.19	.447	1.700	.926	1.07	1.16	.60	.229		48.9	CLAYEY SILT
	27.88'	8.50	450.	2.10	4.75	82.	1.64	1.50	.497	1.700	.961	1.50	1.56	.65			69.7	SANDY SILT
	29.52'	9.00	3200.	8.80	14.10	179.	.65	7.95	.546	1.950	1.001	8.62	8.61	1.59	1.236		404.5	CLAYEY SILT

END OF SOUNDING



END OF SOUNDING

SOUTHERN COMPANY
FILE NAME: PLANT BARRY ASH POND STUDY
FILE NUMBER: BA-19.DAT

TEST NO. BA-19

RECORD OF DILATOMETER TEST NO. BA-19
USING DATA REDUCTION PROCEDURES IN MARCHETTI (ASCE,J-GED,MARCH 80)
KO IN SANDS DETERMINED USING SCHMERTMANN METHOD (1983)
PHI ANGLE CALCULATION BASED ON DURGUNOGLU AND MITCHELL (ASCE,RALEIGH CONF,JUNE 75)
PHI ANGLE NORMALIZED TO 2.72 BARS USING BALIGH'S EXPRESSION (ASCE,J-GED,NOV 76)
MODIFIED MAYNE AND KULHAWY FORMULA USED FOR OCR IN SANDS (ASCE,J-GED,JUNE 82)

LOCATION: SOUNDING PUSHED BY CME 75
PERFORMED - DATE: 11 3 1997
BY: W. BARRY GILLIAM

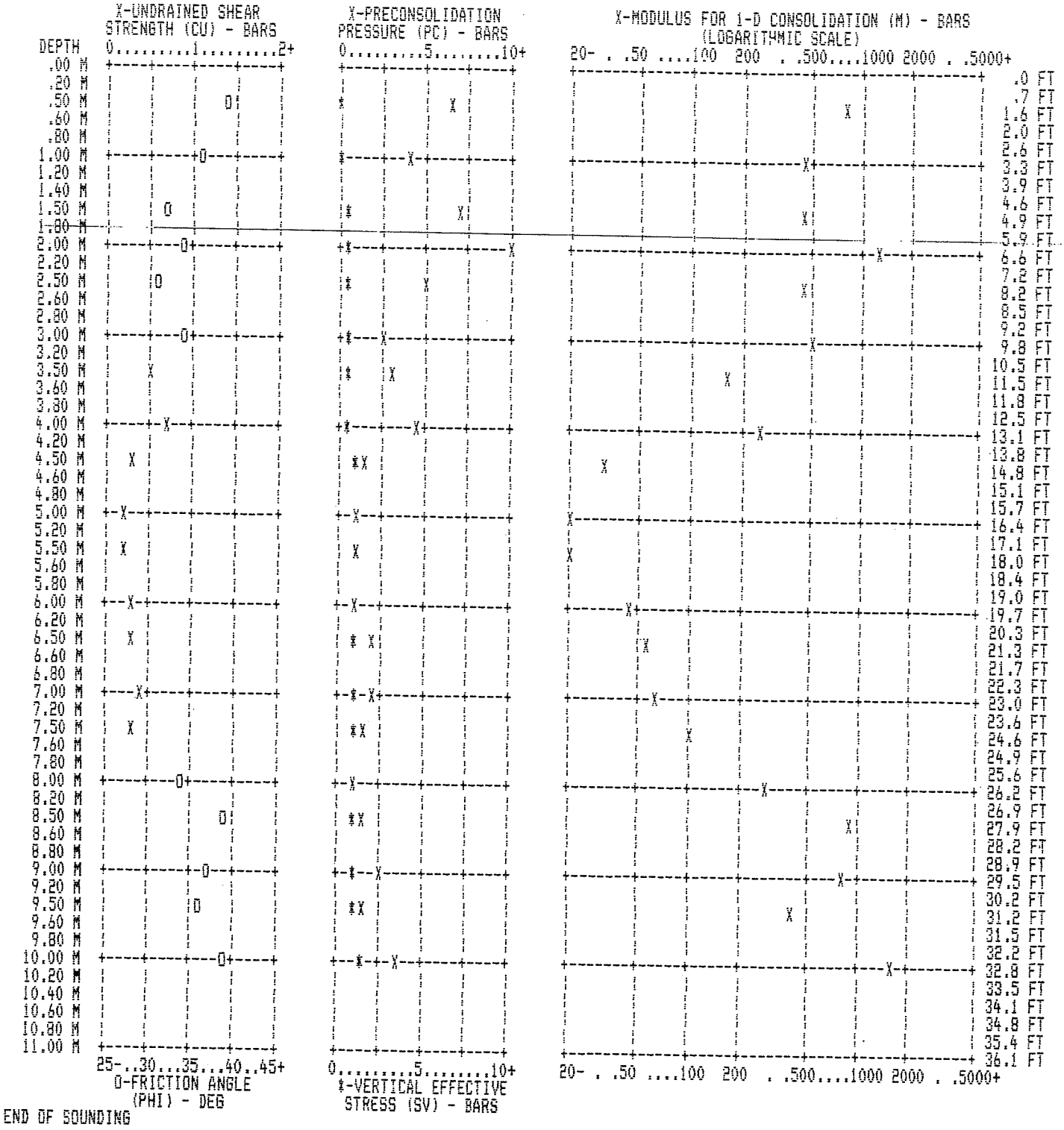
CALIBRATION INFORMATION:
DELTA A = .15 BARS DELTA B = 1.75 BARS GAGE 0 = .10 BARS GWT DEPTH= 4.90 M = 16.07'
ROD DIA.= 3.60 CM FR.RED.DIA.= 5.40 CM ROD WT.= 6.50 KG/M DELTA/PHI= .50 BLADE T=15.00

1 BAR = 1.019 KG/CM2 = 1.044 TSF = 14.51 PSI ANALYSIS USES H2O UNIT WEIGHT = 1.000 T/M3

Z (M)	THRUST (KG)	A (BAR)	B (BAR)	ED (BAR)	ID	KD	UO (BAR)	GAMMA (T/M3)	SV (BAR)	PC (BAR)	OCR	KO	CU (BAR)	PHI (DEG)	M (BAR)	SOIL
1.64'	.50	1150.	2.65	10.80	228.	2.75	26.53	.000	1.900	.090	6.41	71.20	3.19		38.9	779.6	SILTY SAND
3.28'	1.00	975.	2.65	8.95	160.	1.86	13.54	.000	1.900	.183	4.09	22.32	1.78		35.6	446.7	SILTY SAND
4.92'	1.50	925.	3.80	10.00	157.	1.24	13.27	.000	1.800	.274	6.76	24.66	1.85		31.8	433.6	SANDY SILT
6.56'	2.00	1775.	6.50	19.50	404.	1.94	16.32	.000	2.000	.367	12.67	34.50	2.17		34.5	1198.7	SILTY SAND
8.20'	2.50	950.	4.05	11.40	199.	1.50	8.31	.000	1.800	.460	5.10	11.07	1.30		30.6	460.9	SANDY SILT
9.84'	3.00	1200.	3.10	12.50	273.	2.84	5.03	.000	1.900	.551	2.40	4.35	.84		34.0	518.3	SILTY SAND
11.48'	3.50	1000.	3.35	7.75	91.	.80	5.10	.000	1.800	.642	2.77	4.31	1.18	.455	.536 lower 1/3 Cu	C=1119 psf 165.7	CLAYEY SILT
13.12'	4.00	800.	4.85	10.00	118.	.72	6.49	.000	1.800	.730	4.58	6.27	1.39	.699		243.9	CLAYEY SILT
14.76'	4.50	400.	2.25	4.90	27.	.35	2.78	.000	1.600	.814	1.36	1.67	.74	.270		32.5	CLAY
16.40'	5.00	200.	1.65	3.60	2.	.03	1.92	.010	1.500	.880	.82	.94	.52	.184		1.5	MUD
18.04'	5.50	250.	1.90	4.25	16.	.25	2.06	.059	1.600	.907	.95	1.05	.56	.207		14.4	CLAY
19.68'	6.00	400.	2.35	5.40	42.	.54	2.38	.108	1.700	.939	1.23	1.31	.64	.257		43.1	SILTY CLAY
21.32'	6.50	500.	3.05	6.15	44.	.44	2.96	.157	1.700	.973	1.80	1.85	.78	.350	.224 lower 1/3 Cu	C=467 psf 54.8	SILTY CLAY
22.96'	7.00	750.	3.35	6.60	49.	.45	3.10	.206	1.700	1.008	2.00	1.98	.81	.384		64.0	SILTY CLAY
24.60'	7.50	725.	3.15	7.35	84.	.85	2.72	.255	1.700	1.042	1.68	1.61	.72	.336	1.6 lower 1/3 γm	99.4	CLAYEY SILT
26.24'	8.00	1475.	2.45	12.10	282.	4.50	1.67	.304	1.900	1.081	1.20	1.11	.46		34.1	267.3	SAND
27.88'	8.50	3000.	4.35	23.20	618.	5.56	2.84	.353	2.000	1.128	1.73	1.53	.49		38.5	868.1	SAND
29.52'	9.00	2700.	4.90	22.00	554.	4.21	3.22	.402	2.000	1.177	2.40	2.04	.58		37.1	839.2	SAND
31.16'	9.50	2125.	3.50	15.30	361.	3.99	2.13	.451	1.900	1.223	1.59	1.30	.48		35.9	417.0	SAND
32.80'	10.00	4100.	7.25	33.55	889.	4.59	4.39	.500	2.000	1.270	3.73	2.94	.67		39.1	1587.4	SAND

END OF SOUNDING

φ = 33° (lower 1/3 value)
γm = 105 pcf
1.8666 lower 1/3 γm
10.5
13.5
25.5
φ = 35° (lower 1/3 value)
1.9233 lower 1/3 γm
γm = 107 pcf



END OF SOUNDING

SOUTHERN COMPANY
FILE NAME: PLANT BARRY ASH POND STUDY
FILE NUMBER: BA-20.DAT

TEST NO. BA-20

RECORD OF DILATOMETER TEST NO. BA-20
USING DATA REDUCTION PROCEDURES IN MARCHETTI (ASCE,J-GED,MARCH 80)
KO IN SANDS DETERMINED USING SCHMERTMANN METHOD (1983)
PHI ANGLE CALCULATION BASED ON DURGUNOGLU AND MITCHELL (ASCE,RALEIGH CONF,JUNE 75)
PHI ANGLE NORMALIZED TO 2.72 BARS USING BALIGH'S EXPRESSION (ASCE,J-GED,NOV 76)
MODIFIED MAYNE AND KULHAWY FORMULA USED FOR OCR IN SANDS (ASCE,J-GED,JUNE 82)

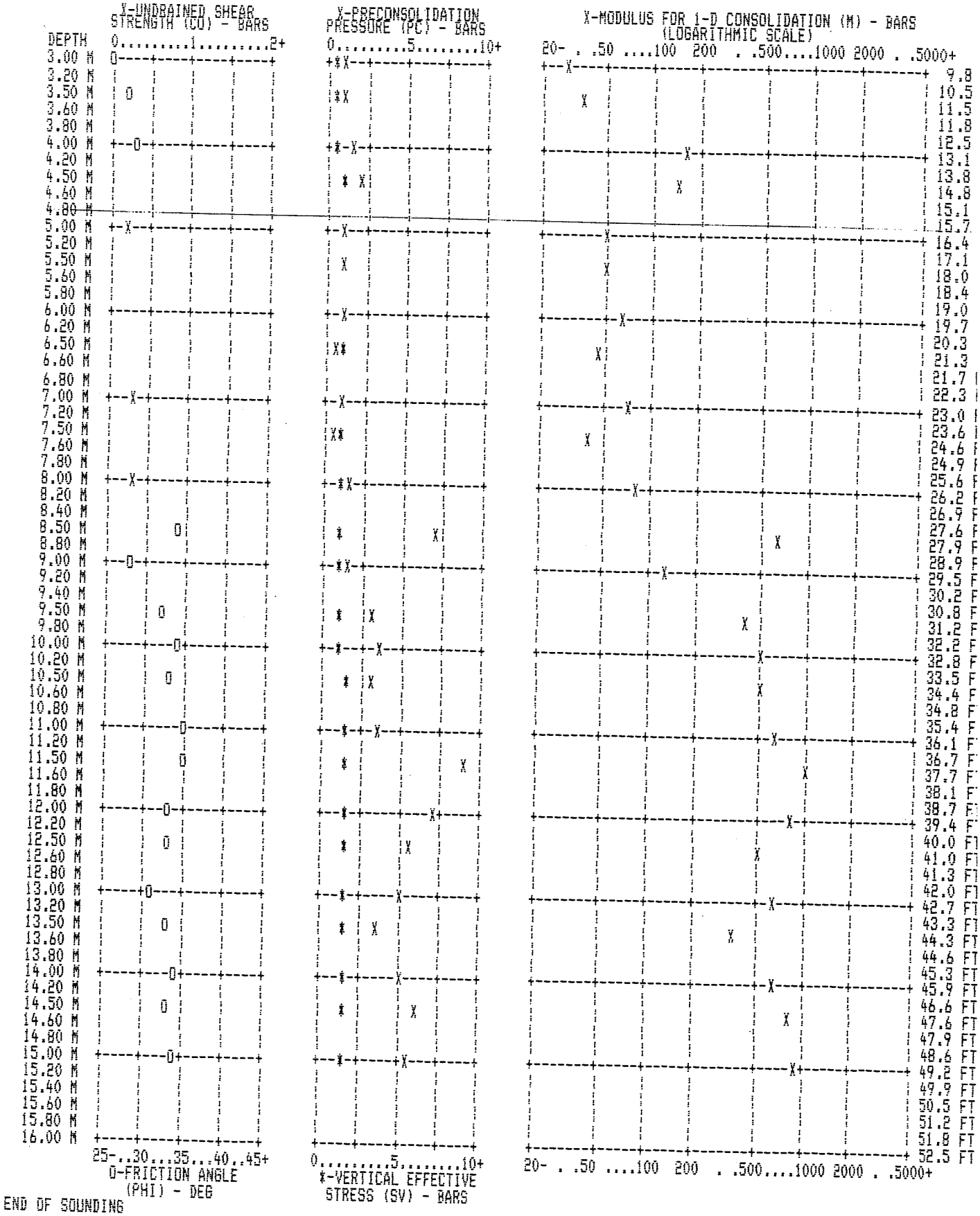
LOCATION: SOUNDING PUSHED BY CME 75 18.5'F/ EDGE OF DIKE
PERFORMED DATE: 10-30-1997
BY: W. BARRY GILLIAM

CALIBRATION INFORMATION:
DELTA A = .05 BARS DELTA B = .35 BARS GAGE O = .10 BARS GWT DEPTH= 4.91 M = 16.10'
ROD DIA.= 3.60 CM FR.RED.DIA.= 5.40 CM ROD WT.= 6.50 KG/M DELTA/PHI= .50 BLADE T=15.00 MM

1 BAR = 1.019 KG/CM2 = 1.044 TSF = 14.51 PSI ANALYSIS USES H2O UNIT WEIGHT = 1.000 T/M3

Z (M)	THRUST (KG)	A (BAR)	B (BAR)	ED (BAR)	ID	KD	UO (BAR)	GAMMA (T/M3)	SV (BAR)	PC (BAR)	OCR	KO	CU (BAR)	PHI (DEG)	M (BAR)	SOIL TYPE
9.84'	3.00	275.	.90	2.25	35.	1.24	1.48	.000	1.600	.542	.82	1.51	.64			
11.48'	3.50	390.	1.00	2.50	40.	1.29	1.44	.000	1.600	.621	.85	1.37	.59	24.2	29.4	SANDY SILT
13.12'	4.00	600.	2.00	6.10	135.	2.20	2.51	.000	1.800	.704	1.52	2.17	.68	26.5	34.1	SANDY SILT
14.76'	4.50	650.	3.10	6.15	97.	.95	3.69	.000	1.700	.790	2.06	2.60	.93	28.1	165.3	SILTY SAND
16.40'	5.00	500.	1.95	3.85	55.	.87	2.10	.009	1.700	.864	.93	1.08	.57	.202	92	145.0	SILT
18.04'	5.50	350.	1.80	3.80	58.	1.04	1.79	.058	1.700	.899	.76	.84	.49			50.7	CLAYEY SILT
19.68'	6.00	350.	2.25	4.45	66.	.94	2.15	.107	1.700	.933	1.04	1.12	.58			49.6	SILT
21.32'	6.50	350.	1.80	3.60	51.	.96	1.58	.156	1.600	.965	.67	.69	.42			62.8	SILT
22.96'	7.00	400.	2.65	4.95	69.	.87	2.31	.205	1.700	.997	1.25	1.25	.62	.262		43.4	SILT
24.60'	7.50	350.	1.80	3.45	46.	.92	1.39	.254	1.600	1.029	.59	.57	.37			70.8	CLAYEY SILT
26.24'	8.00	455.	3.05	5.55	77.	.85	2.44	.303	1.700	1.061	1.45	1.37	.66	.300		38.7	SILT
27.88'	8.50	2250.	7.50	16.50	313.	1.35	6.06	.352	1.950	1.101	6.77	6.15	1.00			82.5	CLAYEY SILT
29.52'	9.00	700.	2.10	6.65	151.	3.02	1.26	.401	1.800	1.144	1.41	1.23	.56		33.8	630.0	SANDY SIL
31.16'	9.50	1400.	4.40	12.50	281.	2.30	2.96	.450	1.900	1.186	2.79	2.35	.67		27.9	128.5	SILTY SAN
32.80'	10.00	2000.	5.50	15.10	335.	2.15	3.64	.500	2.000	1.232	3.51	2.85	.71		31.7	389.5	SILTY SAN
34.44'	10.50	1700.	5.00	14.50	332.	2.42	3.09	.549	1.900	1.279	3.06	2.39	.67		34.0	525.4	SILTY SAN
36.08'	11.00	2350.	5.90	17.60	412.	2.53	3.54	.598	2.000	1.326	3.49	2.64	.68		32.8	475.6	SILTY SAN
37.72'	11.50	3000.	10.00	24.50	514.	1.72	6.26	.647	1.950	1.373	8.79	6.40	1.01		34.9	644.5	SILTY SAN
39.36'	12.00	2300.	8.50	20.50	423.	1.70	5.05	.696	1.950	1.420	6.82	4.81	.90		34.7	1055.3	SANDY SIL
41'	12.50	2100.	7.50	16.00	295.	1.35	4.30	.745	1.950	1.467	5.61	3.82	.82		32.9	781.5	SANDY SIL.
42.64'	13.00	1775.	7.00	17.80	379.	1.94	3.72	.794	2.000	1.515	4.96	3.28	.78		32.5	494.4	SANDY SILT
44.28'	13.50	1950.	5.90	13.60	266.	1.65	2.98	.843	1.800	1.559	3.62	2.32	.66		31.3	596.0	SILTY SAND
45.92'	14.00	2375.	7.50	19.30	415.	2.00	3.74	.892	2.000	1.603	4.88	3.05	.74		32.7	356.8	SANDY SILT
47.56'	14.50	2300.	8.45	22.00	479.	2.03	4.12	.941	2.000	1.652	5.96	3.61	.80		33.5	656.5	SILTY SAND
49.20'															32.7	801.6	SILTY SAND

	Z (M) *****	THRUST (KG) ******	A (BAR) *****	B (BAR) *****	ED (BAR) *****	ID *****	KD *****	UO (BAR) ******	GAMMA (T/M3) ******	SV (BAR) ******	PC (BAR) *****	OCR *****	KO *****	CU (BAR) *****	PHI (DEG) *****	M (BAR) ******	SOIL TYPE **********
49.20'	15.00	2800.	8.50	23.70	539.	2.31	3.95	.990	2.000	1.701	5.46	3.21	.75		34.4	890.7	SILTY SAN
	END OF SOUNDING																



END OF SOUNDING

SOUTHERN COMPANY
FILE NAME: PLANT BARRY ASH POND STUDY
FILE NUMBER: BA-21.DAT

TEST NO. BA-21

RECORD OF DILATOMETER TEST NO. BA-21
USING DATA REDUCTION PROCEDURES IN MARCHETTI (ASCE,J-GED,MARCH 80)
KO IN SANDS DETERMINED USING SCHMERTMANN METHOD (1983)
PHI ANGLE CALCULATION BASED ON DURGUNOGLU AND MITCHELL (ASCE,RALEIGH CONF,JUNE 75)
PHI ANGLE NORMALIZED TO 2.72 BARS USING BALIGH'S EXPRESSION (ASCE,J-GED,NOV 76)
MODIFIED MAYNE AND KULHAWY FORMULA USED FOR OCR IN SANDS (ASCE,J-GED,JUNE 82)

LOCATION: SOUNDING PUSHED BY CME 75
PERFORMED - DATE: 11 3 1997
BY: W. BARRY GILLIAM

CALIBRATION INFORMATION:
DELTA A = .15 BARS DELTA B = 1.75 BARS GAGE 0 = .10 BARS GWT DEPTH= 2.90 M = 9.51'
ROD DIA.= 3.60 CM FR.RED.DIA.= 5.40 CM ROD WT.= 6.50 KG/M DELTA/PHI= .50 BLADE T=15.00 MM

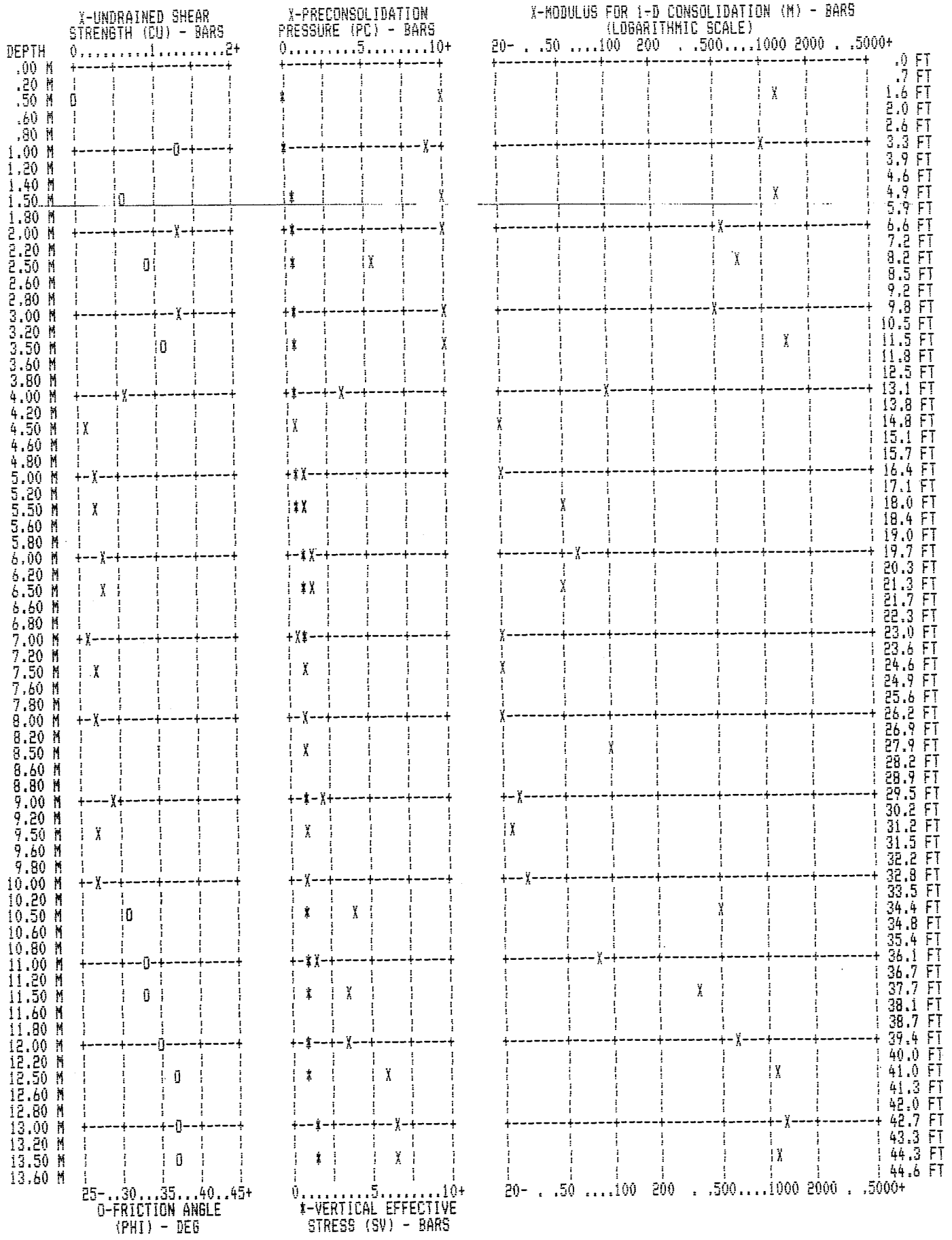
1 BAR = 1.019 KG/CM2 = 1.044 TSF = 14.51 PSI ANALYSIS USES H2O UNIT WEIGHT = 1.000 T/M3

Z (M)	THRUST (KG)	A (BAR)	B (BAR)	ED (BAR)	ID	KD	UO (BAR)	GAMMA (T/M3)	SV (BAR)	PC (BAR)	OCR	KO	CU (BAR)	PHI (DEG)	M (BAR)	SOIL TYPE
.50	750.	6.10	16.20	299.	1.50	63.78	.000	1.950	.090	82.92	*****	8.02		24.7	1271.0	SANDY SILT
1.00	1650.	4.25	15.10	326.	2.44	20.89	.000	1.900	.184	8.97	48.62	2.60		37.5	1042.6	SILTY SAND
1.50	1495.	7.75	19.70	366.	1.45	26.16	.000	1.950	.279	27.27	97.76	3.41		31.4	1248.9	SANDY SILT
2.00	1100.	7.00	14.00	186.	.79	18.14	.000	1.950	.375	11.68	31.18	2.63	1.297		569.3	CLAYEY SILT
2.50	1400.	4.50	14.20	284.	1.97	8.87	.000	1.900	.469	5.28	11.26	1.30		34.0	678.6	SILTY SAND
3.00	1100.	7.40	14.60	193.	.78	12.96	.010	1.950	.554	10.22	18.45	2.16	1.259		530.2	CLAYEY SILT
3.50	2600.	8.50	24.80	525.	1.95	12.92	.059	2.000	.602	13.08	21.74	1.75		35.7	1438.9	SILTY SAND
4.00	600.	4.10	7.40	51.	.37	6.18	.108	1.700	.643	3.73	5.80	1.34	.579		102.3	SILTY CLAY
4.50	200.	1.10	3.45	16.	.49	1.44	.157	1.600	.675	.40	.60	.38	.098		13.9	SILTY CLAY
5.00	400.	2.05	4.00	2.	.03	2.69	.206	1.500	.702	1.12	1.59	.72	.224		2.1	MUD
5.50	500.	2.30	5.35	42.	.59	2.78	.255	1.700	.732	1.23	1.68	.74	.243		49.9	SILTY CLAY
6.00	600.	2.80	6.05	49.	.57	3.24	.304	1.700	.766	1.62	2.12	.84	.307		66.1	SILTY CLAY
6.50	400.	2.85	5.80	38.	.44	3.12	.353	1.700	.800	1.60	2.00	.81	.307		49.9	SILTY CLAY
7.00	350.	1.75	3.75	4.	.08	1.68	.402	1.500	.830	.63	.76	.45	.147		3.1	MUD
7.50	425.	2.15	4.45	15.	.24	2.02	.451	1.600	.857	.87	1.01	.55	.191		12.5	CLAY
8.00	500.	2.60	5.00	18.	.25	2.40	.500	1.600	.886	1.18	1.33	.65	.245		18.9	CLAY
8.50	700.	2.85	7.20	89.	1.15	2.43	.550	1.700	.918	1.24	1.35	.65			98.2	SILT
9.00	550.	3.50	5.96	20.	.20	3.08	.599	1.600	.950	1.86	1.96	.80	.358		26.4	CLAY
9.50	500.	2.40	5.00	26.	.42	1.80	.648	1.600	.979	.83	.85	.49	.189		21.7	SILTY CLAY
10.00	850.	2.55	5.35	33.	.51	1.84	.697	1.600	1.009	.89	.88	.50	.200		27.9	SILTY CLAY
10.50	1300.	5.50	15.20	284.	1.86	4.22	.746	1.900	1.046	4.06	3.88	.84		30.7	479.3	SILTY SAND
11.00	1250.	2.90	7.40	95.	1.35	1.87	.795	1.700	1.085	1.46	1.34	.52		32.6	81.6	SANDY SILT
11.50	1750.	5.50	13.50	222.	1.46	3.92	.844	1.800	1.122	3.61	3.22	.75		33.2	354.1	SANDY SILT
12.00	2300.	5.80	18.30	386.	2.51	3.80	.893	2.000	1.166	3.29	2.82	.69		35.5	628.9	SILTY SAND

SC
11.48'
13.12'
CL
32.80'
34.44'
SP

Z (M)	THRUST (KG)	A (BAR)	B (BAR)	ED (BAR)	ID	KD	UO (BAR)	GAMMA (T/M3)	SV (BAR)	PC (BAR)	OCR	KO	CU (BAR)	PHI (DEG)	M (BAR)	SOIL TYPE
12.50	3400.	8.50	26.80	598.	2.54	5.59	.942	2.000	1.215	5.84	4.81	.87		37.1	1181.2	SILTY SAND
13.00	3550.	9.00	27.60	608.	2.43	5.72	.991	2.000	1.264	6.33	5.01	.88		37.1	1212.8	SILTY SAND
13.50	3450.	9.10	27.20	590.	2.33	5.56	1.040	2.000	1.313	6.40	4.87	.88		36.7	1159.5	SILTY SAND
14.00	3400.	11.00	23.50	386.	1.18	6.93	1.089	1.950	1.361	9.46	6.95	1.45			825.7	SILT

END OF SOUNDING


X-UNDRAINED SHEAR STRENGTH (CU) - BARS
X-PRECONSOLIDATION PRESSURE (PC) - BARS
X-MODULUS FOR 1-D CONSOLIDATION (M) - BARS (LOGARITHMIC SCALE)
DEPTH
0.....1.....2+
0.....5.....10+
20- . .50 ....100 200 . .500....1000 2000 . .5000+
.00 M
.20 M
.50 M
.60 M
.80 M
1.00 M
1.20 M
1.40 M
1.50 M
1.80 M
2.00 M
2.20 M
2.50 M
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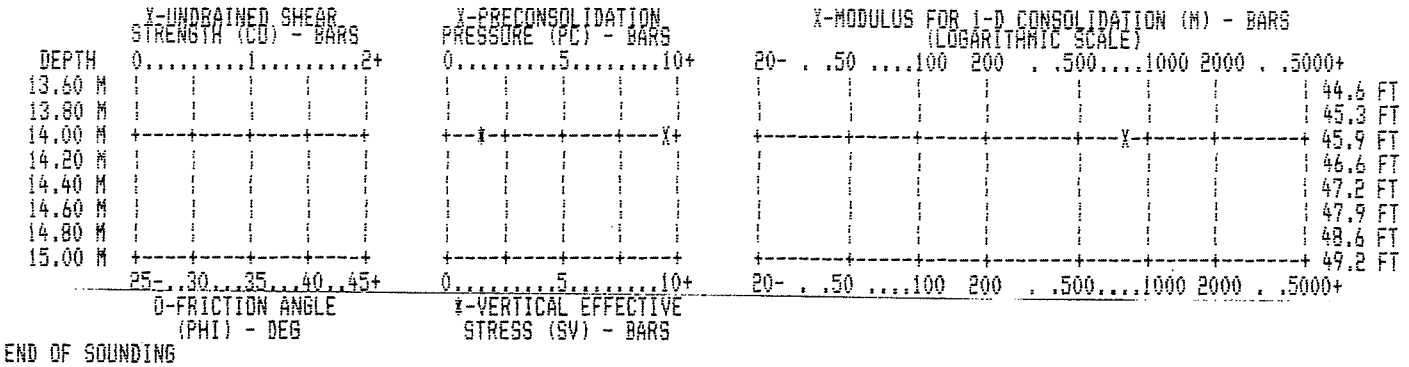
10.60 M
10.80 M
11.00 M
11.20 M
11.50 M
11.60 M
11.80 M
12.00 M
12.20 M
12.50 M
12.60 M
12.80 M
13.00 M
13.20 M
13.50 M
13.60 M
.0 FT
.7 FT
1.6 FT
2.0 FT
2.6 FT
3.3 FT
3.9 FT
4.6 FT
4.9 FT
5.9 FT
6.6 FT
7.2 FT
8.2 FT
8.5 FT
9.2 FT
9.8 FT
10.5 FT
11.5 FT
11.8 FT
12.5 FT
13.1 FT
13.8 FT
14.8 FT
15.1 FT
15.7 FT
16.4 FT
17.1 FT
18.0 FT
18.4 FT
19.0 FT
19.7 FT
20.3 FT
21.3 FT
21.7 FT
22.3 FT
23.0 FT
23.6 FT
24.6 FT
24.9 FT
25.6 FT
26.2 FT
26.9 FT
27.9 FT
28.2 FT
28.9 FT
29.5 FT
30.2 FT
31.2 FT
31.5 FT
32.2 FT
32.8 FT
33.5 FT
34.4 FT
34.8 FT
35.4 FT
36.1 FT
36.7 FT
37.7 FT
38.1 FT
38.7 FT
39.4 FT
40.0 FT
41.0 FT
41.3 FT
42.0 FT
42.7 FT
43.3 FT
44.3 FT
44.6 FT
25-..30...35...40..45+
O-FRICTION ANGLE (PHI) - DEG
0.....5.....10+
*-VERTICAL EFFECTIVE STRESS (SV) - BARS
20- . .50 ....100 200 . .500....1000 2000 . .5000+



END OF SOUNDING