PERIODIC SAFETY FACTOR ASSESSMENT
391-3-4-.10(4) and 40 C.F.R. PART 257.73
PLANT BOWEN ASH POND (AP-1)
GEORGIA POWER COMPANY

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

The CCR surface impoundment AP-1 is located on Georgia Power Company's Plant Bowen property in southern Bartow County, approximately 7 miles west-southwest of the city of Cartersville. The Notification of Intent to Initiate Closure was placed in the Operating Record on 12/31/2020 and closure has been designed to have no negative impacts on the stability of the perimeter embankments. AP-1 was created by construction of the main dike, which bounds AP-1 on the east, south and west sides, and approximately two-thirds of the north dike. The remaining portions of the impoundment are contained by natural ground. Numerous slope stability analyses have been performed for the facility since 2002. These analyses have been revisited several times since and have shown that due to height of the embankment section and the characteristics of the foundation materials, the critical section of this CCR unit was located on the western side of the embankment on the north side of what is sometimes referred to as a "horseshoe" bend in the embankment. Under current conditions, this portion of the embankment remains the critical section.

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

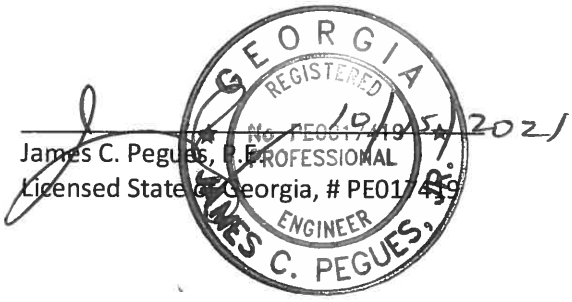
Loading Condition	Minimum Calculated Safety Factor	Minimum Required Safety Factor
Long-term Maximum Storage Pool (Static)	1.6	1.5
Maximum Surcharge Pool (Static)	1.5	1.4
Seismic	1.4	1.0

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

The embankments are constructed of silts and clays 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. § 257.73(e)(1).



10/15/2021

James C. Pegues, P.E.
Licensed State of Georgia, # PE017419

Southern Company

Technical and Project Solutions Calculation

Calculation Number: TV-BN-GPC1112895-001

Project/Plant: Plant Bowen	**Unit(s):** 1-4	**Discipline/Area:** Environmental 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 Jordan, P.E.	

Contents

Revision Record

Rev. No.	Description	Originator Initial / Date	Reviewer Initial / Date	Approver Initial / Date
0	Issued for Information	JAJ/06-02-21		

Notes:

Purpose of Calculation

Georgia Power Company's Plant Bowen is served by a single ash pond. Ash Pond 1 was commissioned in 1968, at the time of plant construction. The main portions of the ash pond dike are the western and southern embankments having a combined length of approximately 5400 feet. The west dike, about 3200 feet, is abruptly broken by a horseshoe-shaped segment containing several sharp bends.

The cross-section of the dike varies. North of the horseshoe, the west dike extends from a foundation elevation of about +672 feet MSL up to a crest elevation of +715 feet, MSL, and a crest width of approximately 15 feet. The downstream slopes are a uniform 2(H):1(V), and broken by a 15 to 20-foot wide bench at about Elevation 693. Proceeding south, the bench transitions away through the horseshoe to yield one long slope, as the foundation or toe elevation increases to about +690 feet. Through the southeast turn the foundation rises to about +700 feet with no bench. For the last 1200 feet and along the recycle pond (southern embankment), the downstream slope extends on a long 2:1 inclination way to a small creek at the toe some 35 feet below the crest elevation.

The ash pond dike is a homogeneous compacted silt/clay embankment founded on silty clay residuum, all overlying a bedrock limestone and dolomite formation. The purpose of this calculation is to check the stability of the dike of Ash Pond 1 at the critical section using current software and material properties.

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 factors of safety at Ash Pond 1 are above the required minimums.

Load Conditions	Computed Factor of Safety	Required Minimum Factor of Safety
Long-term Maximum Storage (Static)	1.6	1.5
Maximum Surcharge Pool (Static)	1.5	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. The Morgenstern-Price analytical method used for the analyses.

Strata (Version 0.8.0),University of Texas, Austin
.

Assumptions

The modeling and slope stability analyses were performed 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 0.050g for use as a horizontal acceleration in the stability analysis.
- 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 August 2002. The testing was performed according to ASTM D 2850, ASTM D 3080, and ASTM D 4767.
- Properties for ash were based on laboratory testing performed on undisturbed and remolded samples of ash from various plants and on engineering judgment.
- In September 2002, piezometers were installed in the dam and the foundation. These piezometers, in conjunction with survey data, were used to obtain current water elevations within the dam and the foundation soils.
- 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 and is considered conservative for the existing conditions.
- The critical section has been determined to be located on the western side of the Ash Pond.
- Maximum storage pool is at EL714.
- Maximum surcharge pool is at EL715, the top of dike elevation.

Criteria

The current required minimum criteria (factors of safety) were taken from the structural integrity criteria for existing CCR surface impoundments from 40 CFR 257.73, published April 17, 2015.

Design Inputs/References

The following soil properties were used in the analyses. This data was generally obtained from laboratory triaxial testing performed in October 2002 by Southern Company Central Laboratory and summarized in a slope stability analysis report by Southern Company Services, dated December 2003. The laboratory testing consisted of classification testing as well as unconsolidated undrained, consolidated undrained, and consolidated drained triaxial tests in order to provide total as well as effective shear strength parameters of the embankment and foundation soils. The effective stress parameters were used in the analyses.

Soil Description	Moist Unit Weight, pcf	Effective Stress Parameters	
		Cohesion, psf	Phi Angle, degrees
Embankment Fill	122	350	31
Residual	124	218	30
Weak Residual	117	100	20
Remediated Weak Residual	117	8000	0
Ash	85	0	15

Hydrologic Considerations

The following hydraulic information is based on the calculation package Inflow Design Control System Plan: Hydrologic and Hydraulic Calculation Summary for Plant Bowen Ash Pond by Southern Company Services. This calculation package states that the Ash Pond is capable of handling the 1000-year 24-hour storm event with a maximum surcharge pool elevation of 714. The stability calculations conservatively use a maximum surcharge pool elevation of 715.

Load Conditions

The impoundment dike at Plant Bowen Ash Pond was evaluated for the long-term maximum storage, maximum surcharge, and seismic loading conditions.

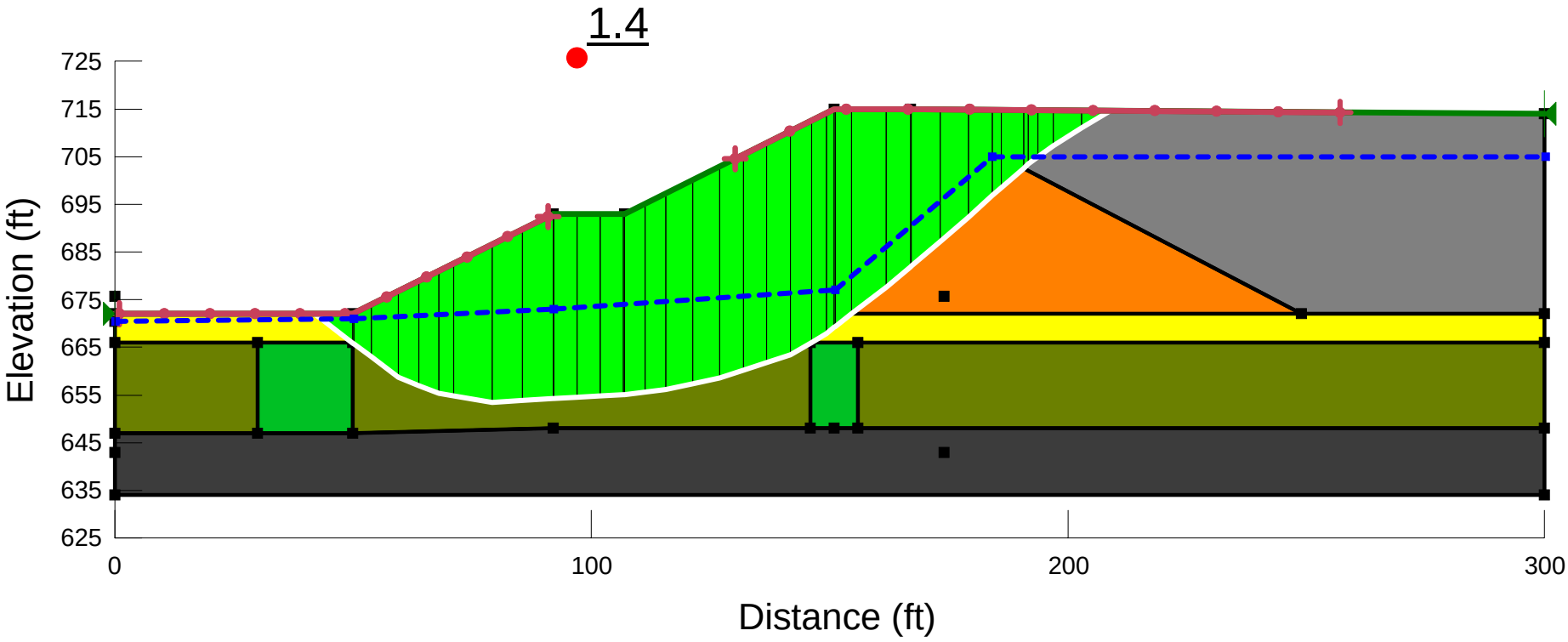
Body of Calculation

Calculations consists of Slope/W modeling and analysis, attached.

Attachments

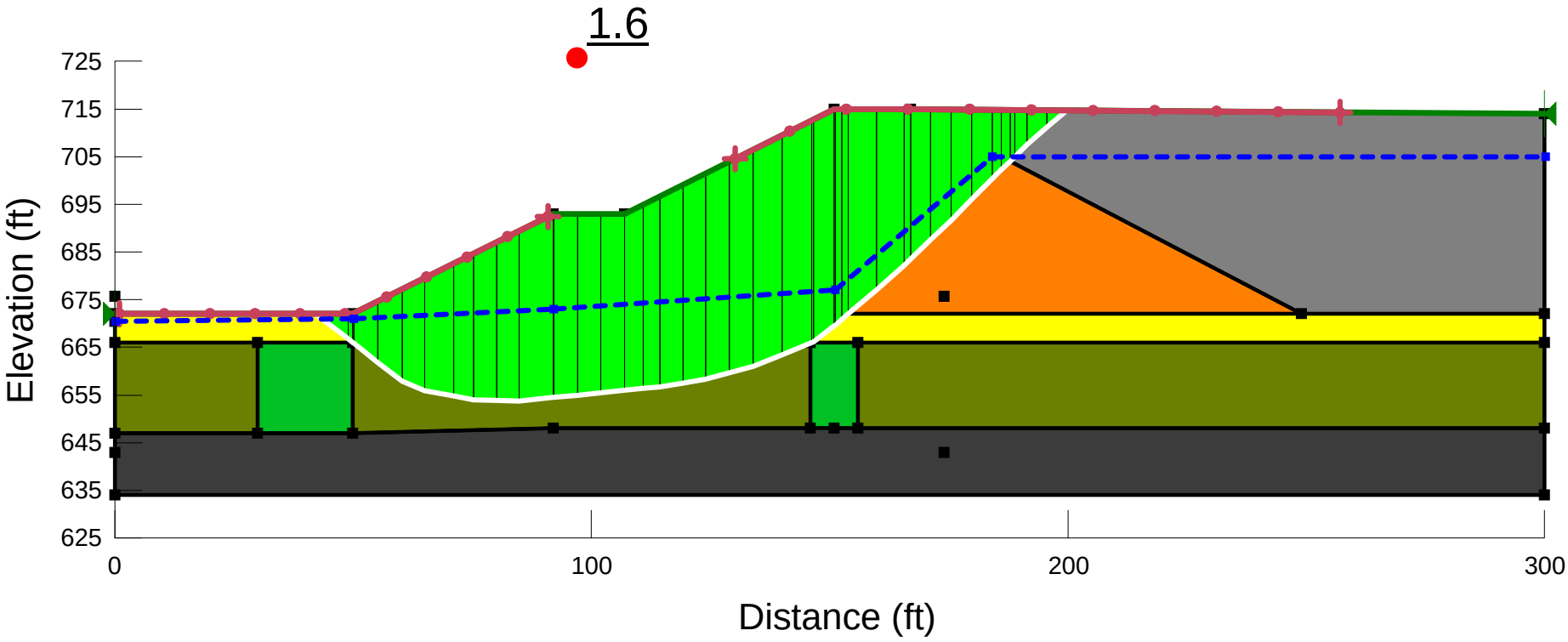
Bowen Ash Pond Dike
Stability Analysis
Seismic Loading

Color	Name	Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	Ash	Mohr-Coulomb	85	0	15
	Bedrock	Bedrock (Impenetrable)			
	Embankment Fill	Mohr-Coulomb	122	350	31
	Remediated Weak Residual	Mohr-Coulomb	117	8,000	0
	Residual	Mohr-Coulomb	124	218	30
	Weak Residual	Mohr-Coulomb	117	100	20



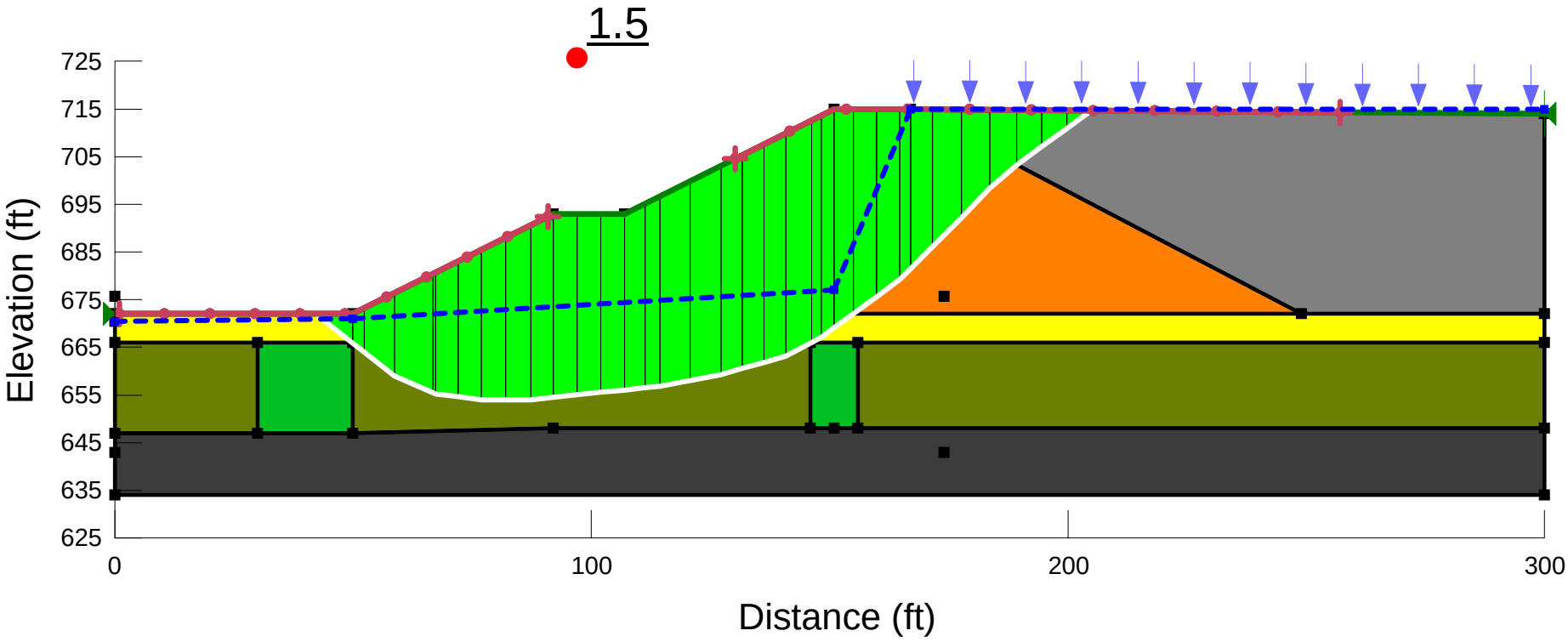
Bowen Ash Pond Dike
Stability Analysis
Maximum Surcharge

Color	Name	Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	Ash	Mohr-Coulomb	85	0	15
	Bedrock	Bedrock (Impenetrable)			
	Embankment Fill	Mohr-Coulomb	122	350	31
	Remediated Weak Residual	Mohr-Coulomb	117	8,000	0
	Residual	Mohr-Coulomb	124	218	30
	Weak Residual	Mohr-Coulomb	117	100	20



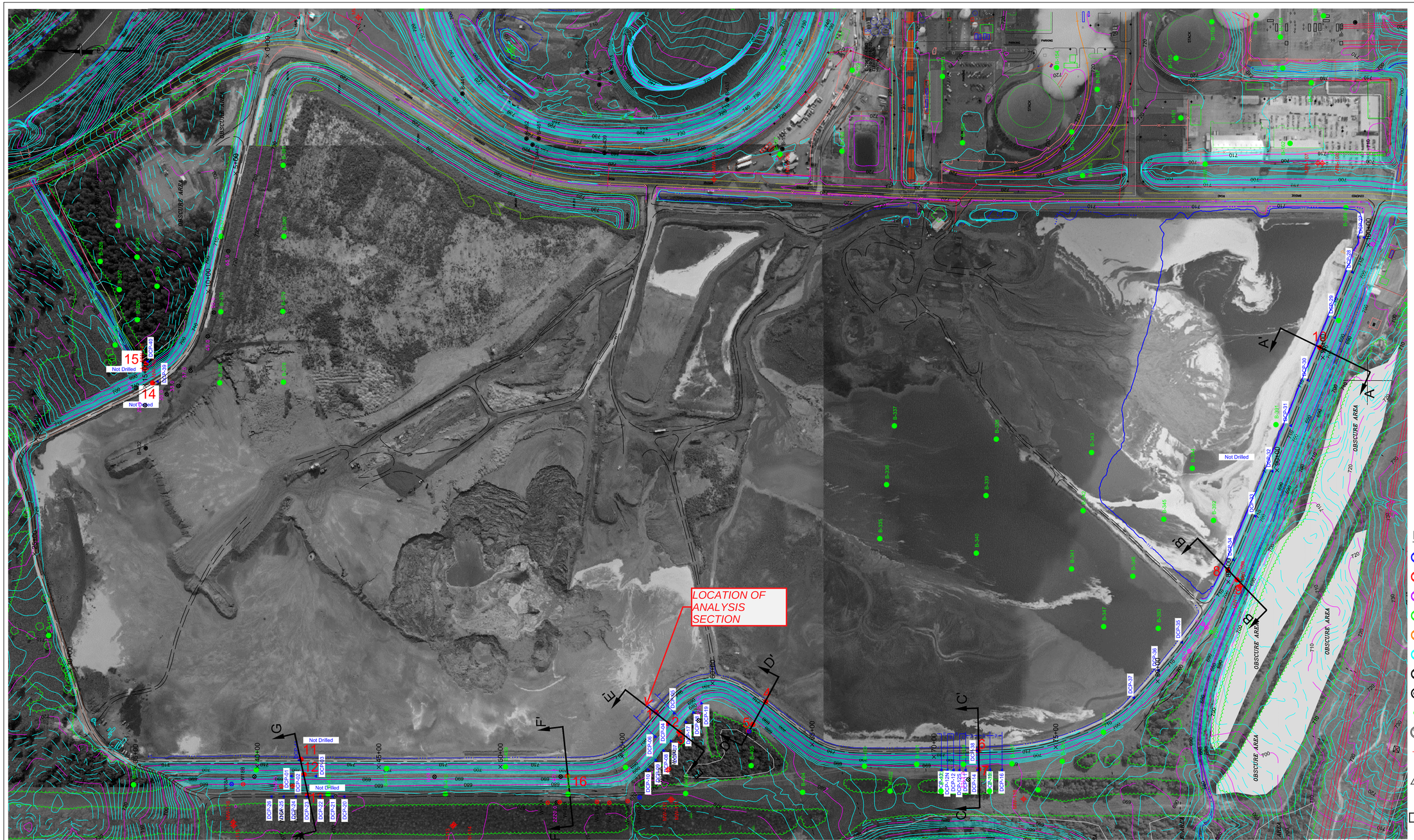
Bowen Ash Pond Dike Stability Analysis Maximum Storage

Color	Name	Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	Ash	Mohr-Coulomb	85	0	15
	Bedrock	Bedrock (Impenetrable)			
	Embankment Fill	Mohr-Coulomb	122	350	31
	Remediated Weak Residual	Mohr-Coulomb	117	8,000	0
	Residual	Mohr-Coulomb	124	218	30
	Weak Residual	Mohr-Coulomb	117	100	20



Attachment A

Figure – Site Plan



SAMPLING LEGEND:

- FLY ASH
- SEDIMENT
- PRIVATE WELL
- TEMPORARY WELL
- SURFACE WATER
- SUBSURFACE SOIL
- SURFACE SOIL
- PZ3R (35.4-65.9) SELECT BORING DEPTH OF CAVITY INTERVAL

LEGEND:

- RIVER WATER PIEZOMETER
- ASH POND INFLUENCE PIEZOMETER
- MIXED WATER PIEZOMETER
- GROUNDWATER PIEZOMETER
- SHALLOW ROCK PIEZOMETER
- UNIT 1 AQUITARD PIEZOMETER
- PIEZOMETER
- TYPICAL GEOTECHNICAL BORING
- PRECONSTRUCTION BORING
- WELL #1 - POTABLE WATER WELL
- PROPOSED MONITOR WELL LOCATION
- A-33 ENVIRONMENTAL WELL/ MONITORING WELL
- WEIR (FLOW MEASUREMENT)

Legend:

- Boring Location
- Dutch Cone Penetrometer Soundings

NOTE:
Borings 11, 13, 14, 15, were not drilled

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for

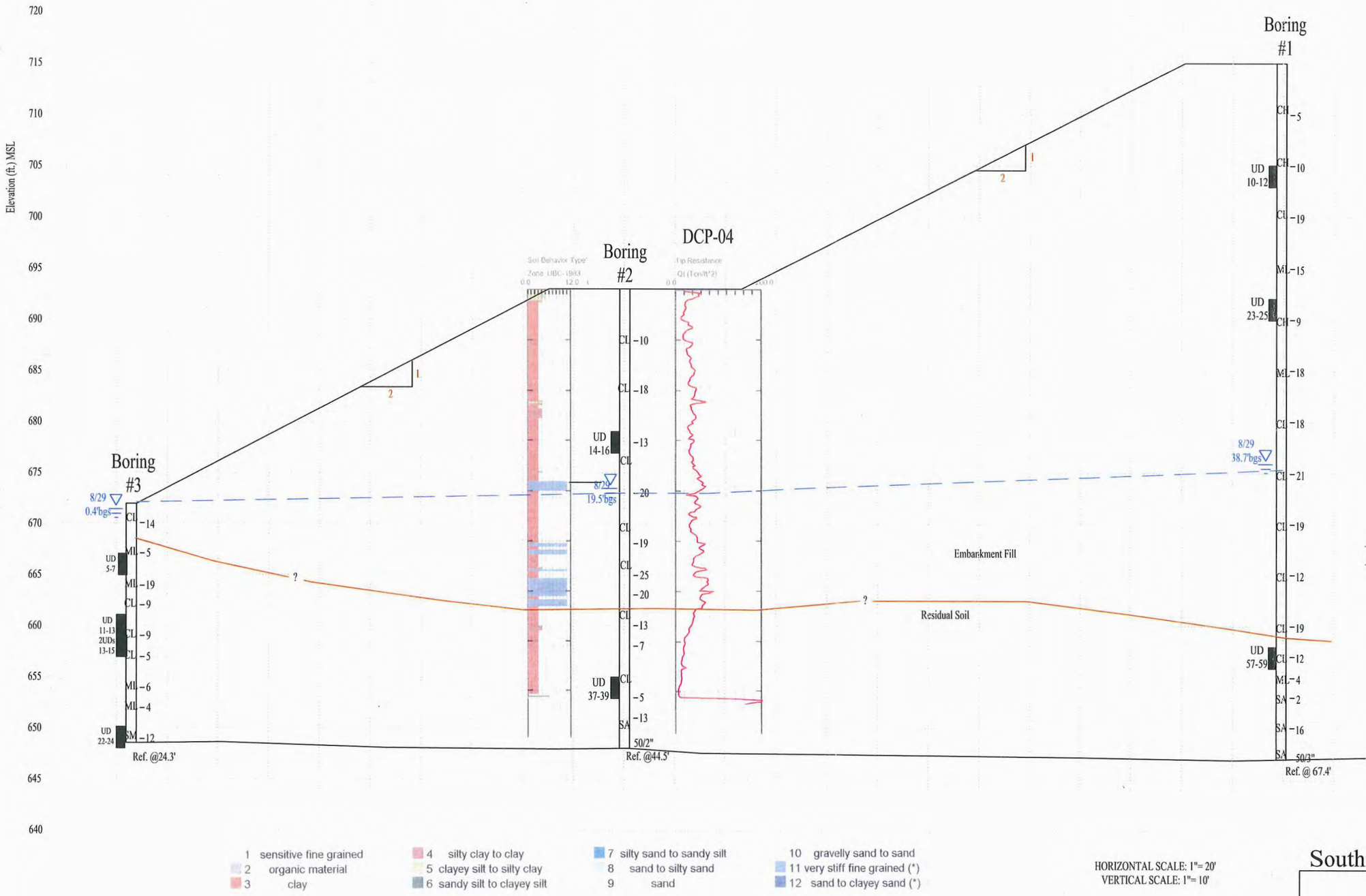
Rev. C	10-23-02	Rev. B	8-22-02	Rev. A	8-15-02
Dutch cone Locations		1. Numbered test boring locations. 2. Added test boring #16 3. Relocated test borings #6, 7, 14, 15 4. Test boring designation is BO-STA-02-*number*		Proposal for site investigation	

FIGURE 1
Plant Bowen Ash Pond
Embankment Investigation
August 2002

SCALE: 1" = 200' ES1179topopho

Attachment B

Figure – Cross Section



HORIZONTAL SCALE: 1"= 20'
VERTICAL SCALE: 1"= 10'

LEGEND:

UD = Undisturbed Sample
▽ Water Table
CL Uniform Soil Class Symbol
-12 N - value resulting from SPT test (ASTM 1586) with Automatic Hammer
WOR = Wt. of Rod as SPT result
WOH = Wt. of Hammer as SPT result

BT No RK = Boring Terminated No Rock

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Figure 6
Plant Bowen
Dike Stability Study
SECTION E-E'
North Horseshoe

Attachment C

Soil Borings

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GEOLOGICAL SERVICES

Hole No. BO-STA-02-1
Sheet 1 of 3

SITE **Plant Bowen** HOLE DEPTH **67.4'** SURF.ELEV. **~715'**

LOCATION Ash Pond Dike COORDINATES N _____ E _____

ANGLE _____ BEARING _____ CONTRACTOR SCS DRILL NO. CME 550

Drilling Method Hollow Stem Auger NO. PENT. TESTS 16 NO. U.D. SAMPLES 3

CASING SIZE _____ LENGTH _____ CORE BOXES _____ TOTAL % REC. _____

WATER TABLE DEPTH 38.7' ELEV. _____ TIME AFTER COMP. _____ DATE TAKEN 8/29/2002

TYPE GROUT _____ QUANTITY _____ MIX _____ DRILLING START DATE 8/20/2002

DRILLER O.Cole RECORDER J. Miller APPROVED _____ DRILLING COMP. DATE 8/21/2002

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Pen. Test from to	Blows	N	Sample No.	Fluid Chg. %	Rec. %	comment
	0									
	1									
	2									
	3									
	4									
	5		Red/brown Silty CLAY (CH)	3.5-5.0	1-1-4	5	1			
	6									
	7									
	8									
	9		Yellow/brown Silty CLAY (CL-CH)							
	10			8.5-10.0	1-4-6	10	2			
	11									UD 10' - 12'
	12									
	13									
	14		SAA with slight amount of fine SAND (CL)							
	15			13.5-15.0	4-8-11	19	3			
	16									
	17									
	18									
	19		Red/brown/yellow silty CLAY to Clayey Silt with few small							
	20		rock fragments (CL-ML)	18.5-20.0	3-6-9	15	4			
	21									
	22									
	23									
	24		Red/brown silty CLAY with few small rock fragments							UD 23' - 25'

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GEOLOGICAL SERVICES

Hole No. BO-STA-02-1
Sheet 2 of 3

SITE **Plant Bowen** TOTAL DEPTH **67.4'** SURF.ELEV. **~715'**

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Pen. Test From to	Blows	N	Sample No.	Fluid Chg. %	Rec. %	comment
	25		Red/brown silty CLAY with few small rock fragments (CL/CH)	23.5-25.0	1-4-5	9	5			UD 23' - 25'
	26									
	27									
	28									
	29		Red/brown/tan Slightly Sandy Clayey Silt (ML) with very few small fragments							
	30			28.5-30.0	4-8-10	18	6			
	31									
	32									
	33									
	34		Red/brown Silty CLAY (CL,CH)							
	35			33.5-35.0	2-5-13	18	7			
	36									
	37									
	38									
	39		SAA with small rock fragments							
	40		(sample moist only)	38.5-40.0	4-9-12	21	8			
	41									
	42									
	43									
	44		Red/brown/tan silty CLAY to Clayey SILT (CL-ML)							
	45		(sample still only moist)	43.5-45.0	4-8-11	19	9			
	46									
	47									
	48									
	49		SAA							
	50			48.5-50.0	2-5-7	12	10			
	51									
52.0	52		Residual Soil							
	53									
	54		Brown/tan/Lt. Gray , Silty CLAY (CL,CH)							
	55			53.5-55.0	4-8-11	19	11			
	56									

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BO-STA-02-1

Sheet 3 of 3

SITE **Plant Bowen** TOTAL DEPTH **67.4'** SURF.ELEV. **~715'**

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Pen. Test From to	Blows	N	Sample No.	Fluid Chg. %	Rec. %	comment
	57									
	58		Medium brown, Silty CLAY with very few small rock fragments (CL, CH)	57.0-58.5	3-5-7	12	12			UD 57' - 59'
	59		Medium brown, Clayey Silt with few small rock fragments (ML,CL) to Silty Clay (Cl,CH) with several 1/16" to 1/4" size rock fragments	58.5-60.0	WOH 2-2	4	13			
	60									
	61									
	62		Medium gray silty/clayey, fine to medium SAND to slightly silty fine to medium sand. Portions show some relic structure of Sandstone/Dolomite. Tan to Medium gray to beige probably highly weathered Sandstone lenses.	61.0-62.5	WOH 1-1	2	14			
	63									
	64		Medium gray / Tan Slightly Clayey to Silty, fine to medium SAND. Probably highly weathered SandStone. Similar to above	63.5-65.0	9-11-5	16	15			
	65									
	66									
	67		SAA - Medium gray Silty Sand (weathered Sandstone) with Limestone/Dolomite pieces	66.0-67.5	50/3"	50/3"	16			
67.4										
	68		Auger Refusal @ 67.4'. Boring terminated							
	69									
	70									
	71									
	72									
	73									
	74									
	75									
	76									
	77									
	78									
	79									
	80									
	81									
	82									
	83									
	84									
	85									
	86									
	87									
	88									

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BO-STA-02-2
Sheet 1 of 2

SITE **Plant Bowen** HOLE DEPTH **44.5'** SURF.ELEV. **~693'**

OCATION Ash Pond Dike COORDINATES N _____ E _____

ANGLE _____ BEARING _____ CONTRACTOR SCS DRILL NO. CME 550

Drilling Method Hollow Stem Auger NO. PENT. TESTS 12 NO. U.D. SAMPLES 2

CASING SIZE _____ LENGTH _____ CORE BOXES _____ TOTAL % REC. _____

WATER TABLE DEPTH 25.9' 19.5' ELEV. _____ TIME AFTER COMP. 24 hrs. 9 days DATE TAKEN 8/21/2002 8/29/2002

TYPE GROUT _____ QUANTITY _____ MIX _____ DRILLING START DATE 8/20/2002

DRILLER O. Cole RECORDER H. Hill APPROVED _____ DRILLING COMP. DATE 8/20/2002

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Pen. Test from to	Blows	N	Sample No.	Fluid Chg. %	Rec. %	comment
	0									
	1									
	2									
	3									
	4									
	5		Reddish brown silty CLAY - dry - FILL							
	6			4.5-6.0	3-4-6	10	1			
	7									
	8									
	9									
	10		Reddish brown and gray mottled silty CLAY - dry - FILL							
	11			9.5-11.0	4-8-10	18	2			
	12									
	13									
	14									
	15		Light brown fat clay (CH)							UD 14'-16' OFFSET 4' TO NORTH FOR SAMPLE
	16			14.5-16.0	4-6-7	13	3			
	17									
	18									
	19									
	20									
	21		SAA	19.5-21.0	4-8-12	20	4			
	22									
	23									
	24									

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BO-STA-02-2
Sheet 2 of 2

SITE **Plant Bowen** TOTAL DEPTH **44.5'** SURF.ELEV. **~693'**

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Pen. Test From to	Blows	N	Sample No.	Fluid Chg. %	Rec. %	comment
	25									
	26		SAA - FILL	24.5-26.0	4-9-10	19	5			
	27									
	28									
	29		SAA - with chert and Limestone fragments - Fill	27.5-29.0	5-12-13	25	6			
	30		SAA	29.0-30.5	4-6-14	20	7			
	31									
	32									
	33									
33.5			Residual Soil							
	34		Wet							
	35		Reddish brown clay with Limestone-residual, with some white/gray clay	33.5-35.0	4-7-6	13	8			
	36									
	37		SAA	35.5-37.0	3-3-4	7	9			
	38		Brown fat clay (CH)							UD 37'-39' OFFSET 4' TO NORTH FOR SAMPLE
	39		Reddish brown to brown soft clay with weathered Limestone pieces - wet	38.0-39.5	3-3-2	5	10			
	40									
	41									
	42		SAA Gray silty fine SAND	40.5-42.0	14-6-7	13	11			
	43									
	44			43.0-44.5	29-50/2"	50/2"	12			
44.5			SAA with residual chert/Limestone pieces							
	45		Auger Refusal @44.5'. Boring Terminated							
	46									
	47									
	48									
	49									
	50									
	51									
	52									
	53									
	54									
	55									
	56									

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BO-STA-02-3
Sheet 1 of 2

SITE: Plant Bowen | HOLE DEPTH: 24.3' | SURF.ELEV.: 671.773
LOCATION: Ash Pond Dike | COORDINATES N: 20729.09 | E: 15966.36
ANGLE: | BEARING: | CONTRACTOR: SCS | DRILL NO.: CME 550
Drilling Method: Hollow Stem Auger | NO. PENT. TESTS: 9 | NO. U.D. SAMPLES: 2
CASING SIZE: | LENGTH: | CORE BOXES: | TOTAL % REC.:
WATER TABLE DEPTH: 1.5', 0.40' | ELEV.: | TIME AFTER COMP.: tod, 24 hrs. | DATE TAKEN: 8/29/2002
TYPE GROUT: | QUANTITY: | MIX: | DRILLING START DATE: 8/28/2002
DRILLER: O.Cole | RECORDER: S. Braswell | APPROVED: | DRILLING COMP. DATE: 8/28/2002

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Pen. Test from to	Blows	N	Sample No.	Fluid Chg. %	Rec. %	comment
	0		Ground Surface and Gravel							
	1		Gravel and Ash							
	2		Groundwater Encountered at 2.0'							
	3		Stiff, Mottled gray, yellowish brown and reddish brown, silty clay (CL), or clayey silt (ML), occasional thin, weathered chert deposits	2.5-4.0	6-7-7	14	1			
	4									
	5		Soft, yellowish brown, clayey silt (ML), moist, occasional rock fragments of fine gravel size, traces of oxidation on few breaking soil surfaces (black in color)	4.5-6.0	3-2-3	5	2			UD 5'-7'
	6									
	7									
	8		SAA - no oxidation observed, slightly moist	7.5-9.0	4-8-11	19	3			
	9									
	10		Stiff, yellowish brown, clayey silt (ML) to silty clay (CL) slightly moist	9.5-11.0	4-3-6	9	4			
	11									
	12									
	13		SAA - occasional very dark brown fine rock fragments of various sizes	12.5-14.0	3-3-6	9	5			
14.0	14		Residual Soil							UD 13'-15'
	15		SAA - numerous oxidized fragments, medium stiff, wet at bottom of spoon	14.5-16.0	4-3-2	5	6			
	16									
	17									
	18		Medium stiff, reddish brown, very moist clayey silt (ML), numerous (20%) oxidized dark brown rock fragments of various sizes	17.5-19.0	2-3-3	6	7			
	19									
	20		Yellowish brown very moist soft to medium stiff, clayey silt (ML) few dark gray, limestone fragments, occasional gray silty intervals	19.5-21.0	3-2-2	4	8			
	21									
	22									
	23		SAA to 23'							
	24		Light gray and brown sandy silt to silty sand (SM to ML) possibly weathered rock, stiff to medium dense	22.5-24.0	2-4-8	12	9			

Form GS9901 4/24/2000

SOUTHERN COMPANY
Energy to Serve Your World™

DRILLING LOG

GEOLOGICAL SERVICES

Hole No. BO-STA-02-3

Sheet 2 of 2

SITE **Plant Bowen** TOTAL DEPTH **24.3'** SURF.ELEV. **671.773**

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Pen. Test From to	Blows	N	Sample No.	Fluid Chg. %	Rec. %	comment
24.3			Auger Refusal @ 24.3' Boring Terminated							
	25									
	26									
	27									
	28									
	29									
	30									
	31									
	32									
	33									
	34									
	35									
	36									
	37									
	38									
	39									
	40									
	41									
	42									
	43									
	44									
	45									
	46									
	47									
	48									
	49									
	50									
	51									
	52									
	53									
	54									
	55									
	56									

Attachment D

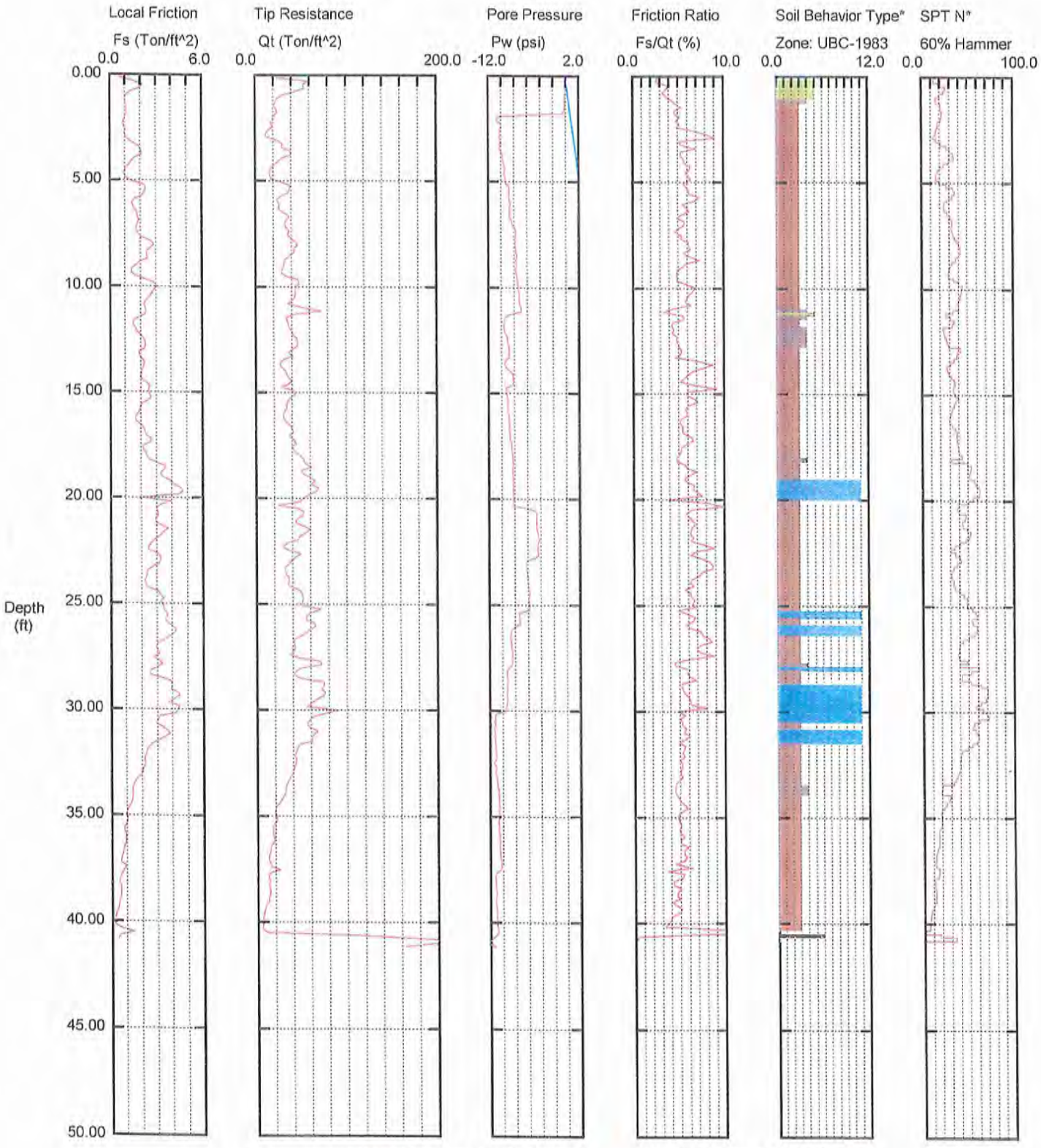
Dutch Cone Soundings

*Soil behavior type and SPT based on data from UBC-1983

Southern Earth Sciences Inc

Operator: DH
Sounding: 241-04
Cone Used: 5T4CH

CPT Date/Time: 09-03-02 13:20
Location: PLANT BOWEN
Job Number: 02-241



Maximum Depth = 41.17 feet

Depth Increment = 0.16 feet

1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

Attachment E

Laboratory Test Results

Text from prior section deleted for clarity

D. Selection of Soil Strength Parameters

The primary soil engineering properties and parameters important to slope stability analyses are cohesion, c, angle of internal friction, ϕ, the unit weight of the soil, γ, and the presence of any excess pore water pressures. Soil strength values can vary significantly depending upon the drainage conditions under which the samples are tested in laboratory triaxial tests. Unit weight values vary primarily by water content and whether or not the soil is submerged or beneath the phreatic surface.

As the field test data (boring and CPT findings) were being plotted onto cross sections of the dike, it became apparent that there was significant uniformity of the dike material, and to some lesser extent the foundation soils. Therefore, rather than attempt to construct section-specific soil parameters, we considered it more appropriate to target zones of representative materials for sampling and testing, and then apply selected representative soil parameters from those banks of tests to each section. The paragraphs which follow describe how the data were interpreted and representative parameters chosen to apply to the generalized layer

stratifications.

For the embankment soils, we conducted primarily consolidated undrained (CU or R) and consolidated drained (CD or S) triaxial shear tests, consolidating the soils prior to shearing, and measuring pore water pressures in the CU test. Computer programs are used to graph and calculate parameters from the raw laboratory test data, and the resulting c′ and ϕ′ values are given on the data sheets. We assembled other graphs of results, however, based on the geotechnical engineer's construction of the strength envelopes taken from the stress paths leading to shear failure. These were determined from p'-q diagrams of effective stress failure points. In this interpretation of the p'-q data, it was our tendency to draw the strength envelopes through the points yielding the lesser effective cohesion and greater effective friction angle. This trend would be expected for parameters of a compacted silty clay soil. The S tests usually exhibit slightly lower strengths at lower confining stresses, with a slightly higher friction angle. Our S-test results displayed the higher friction angle. Some analyses combine the S and R envelopes to form a composite "broken-back" curve as a strength envelope for the embankment soils. However, since the permeability of this soil is relatively low (1.4×10^{-7} cm/sec) and drainage possibly not complete for true S-test results, we elected to use primarily the R data for analysis, which should be conservative.

The undisturbed samples of the dike material were tested at the moisture contents at which they were sampled. It is often times the practice to backpressure saturate samples prior to triaxial testing to simulate submergence and/or diminish the effects of apparent cohesion in the test results. However, standpipe piezometer measurements to determine the phreatic surface in the dike indicated that the dike is not saturated downstream of the crest to the extent that a conventional flownet construction would indicate. Piezometric levels instead suggest that there is a high mass permeability to the foundation which is allowing the vast majority of seepage to pass under the embankment, such that little of the dike has ever become saturated. For those samples taken in the dike and not naturally saturated, backpressure saturation may yield excess strength indications in the CU test, especially at low confining stresses. We therefore conducted the shear testing at insitu moisture contents, with the assumption that some component of measured strength would be due to matric suction in the non-saturated soils.

The embankment soils appear to be quite uniform in strength and texture or composition, as demonstrated by the consistency in the SPT-N values and CPT data. Using the insitu testing as a guide, we were able to recover and test representative samples with a relatively high degree of confidence that the resulting triaxial test data covers the mid to lower range of soil strength. Then, statistically, the lower portion of that data was chosen to model the soil strength that must be exceeded through the entire embankment to experience failure. We consider this a very conservative approach for the compacted embankment soils.

Figure 14 shows all of the R and S envelopes for the embankment soils based on adjusted effective stress data. From this data, we selected an envelope considered to represent the

lower 1/3 of the strengths. This data is also presented in Table 2 as a summary in numerical form. The result is an effective cohesion of 350 psf and friction angle of about 31°.

Table 2
Summary of Triaxial R and S Tests
Embankment and Foundation Soils

Lab Test No.		Test	Parameters*	
			c (psf)	ϕ (degrees)
Embankment Soils	3	S	450	34
	8	R	345	29
	33	S	370	35
	34	R	310	28.5
	10A	R	560	28
	11A	R	375	31
	12A	R	360	31
Values used in Analyses			**350**	**31**
Foundation Soils	3A	R	75	34
	2A	R	175	24.5
	5A	R	340	32
	6A	R	121	34
	7A	R	355	29
	9A	R	240	29
Values used in Analyses				
Firmer Residuum			**218**	**30**
Weak Zone			**100**	**20**

* Effective Stress Parameters

Stress path data reduction and construction was also carried out for the R data from testing of the foundation soils, represented on Figure 15. For sake of conservatism, the strength values for analysis for the firmer residuum were taken as the approximate average of the strengths tested for all foundation soils, including those samples considered to be from the weaker zone. As seen in Table 2 and Figure 15, the result was an effective cohesion of 218 psf and

ϕ=30 degrees for the firm residuum.

Final selection of strength values for the weaker foundation soils involved a different approach from that of the embankment, however. In selecting strength parameters for the weaker foundation soils, it was judged that we could not rely solely on triaxial data from the initial set of undisturbed samples. Inspection of Dutch Cone (CPT) soundings indicated that there were more extensive areas of weaker material near the limestone interface that our first UD sampling may not have adequately sampled. Laboratory testing provided about seven sets of Q test results, but it appeared that more R test data, targeting the weaker zones, were needed for effective stress analysis. Therefore, using CPT data as a guide to locating the weaker zones, another UD sampling event was conducted, yielding six additional R-bar test results for the softer soils.

Even with the additional data, we could not be certain the data set for the foundation soils bracketed the strengths for the weakest soils, therefore we chose to use presumptive values of c'=100 psf and ϕ'=20 degrees for the weakest of foundation soils, considering this to be very conservative.

For the potential uplift loading, as in a subsequent underwash event, it is necessary to predict and model the excess pore pressures in order to conduct an analysis using effective stress parameters. This was done for the embankment soils, since there is little doubt that those soils are not consolidated, and the effective stress strength envelopes are consistent and well-defined. If, however, there is a chance that the weaker foundation soils have not been fully consolidated, then the effective stress approach would attribute greater strength to that layer in the analyses, by virtue of heavy overburden stress computed by the SLOPE/W program. Therefore, we considered it prudent to conduct additional analyses of the uplift situations using a total stress strength for the weak zone. Obtaining total stress parameters which could be used with confidence for the weaker zone required looking to two sources of information, both laboratory results and insitu testing. There was significant scatter to the results of the initial laboratory Q tests, as seen in Figure 16. Since we could not be assured that all of the samples were from the weakest material, we applied the lower bound values from this data set, which yielded an undrained cohesion of about 700 psf.

For confirmation of these total stress test data, we looked to the undrained shear strength values generated from the Dutch Cone data and other sources. A summary of those findings is as follows:

- In the area of Section 1-2-3, two zones of weakness were depicted by ten cone (CPT) soundings: 1) an upper zone relative thin and discontinuous yielding Su (undrained shear strength) values of about 675 psf, on average, and 2) a lower weak zone about 20 feet beneath the toe, with an average strength on the order of 770 psf.
- Around Section 6-7, nine cone soundings encountered soft conditions about 30 feet beneath the toe. Occasional Su values were as low as 300 or 400 psf, but the average values for a continuous plane through the weak zone was a calculated 740 psf.

- At Section 8-9, thin discontinuous weak zones down near el. 660, some 55 feet below the crest, yielded lower bound Su values at about 600 psf. However, thicker higher-consistency clay interspersed with the weaker soils had values on the order of 1,000 to 1,100 psf. Thus, the average strength across a more continuous weak plane would be about 800 psf.

- For Section 10 the geometry was much like that of Section 8-9, with the weaker material tested by cone soundings having an Su of about 690 psf.

- For Section 11-12-13, two weaker zones were identified by ten cone soundings: 1) a thin upper zone only about 5 feet beneath the toe with strengths in the range of 600 to 900 psf, and 2) a mixed lower layer with some zones having Su = 400 psf and others up in the range of 700 to 900 psf.

One could make the case for a potential weak plane propagating along the weathered rock and weak residuum interface choosing a path of lesser resistance through the very weakest of soils. However, plotting the cone readings according to their spatial distribution shows that a weak plane would have to cut through a significant amount of firm clay to connect with the weakest zones. As a result, we judge that the strength along this mixed interface would have a composite strength on the order of 700 psf, or slightly greater. For these reasons, we elected to use an undrained shear strength of 700 psf for the weak zone material as lower bound for the static loading cases for all sections.

As another check on probable undrained strength of the weaker foundation soils, the grouting engineer for the project, Mr. B.E. Williams, was consulted and shared grout take and distribution information from work already performed at Section 1-2-3. In addition to providing more information on the probable thickness on the weaker zone above the rock foundation, we also discussed the consistency of the material in that zone. Mr. Williams stated that the displacement of that material, along with the pressures used, the amount of overburden, and especially the grout take volume per foot, were very similar to that of another project where the strength of the weaker material had been measured prior to the grouting. In reviewing our records of that project, we found that measured strengths in that weaker material were on the order of 640 psf for undrained cohesion. This tends to confirm our 700 psf value based on many CPT results.

The effective stress parameters were modified for the seismic analysis using information reported by the U.S. Corps of Engineers Waterways Experiment Station (Ref. 2). Those studies showed that proper modification of strength parameters justified the use of a pseudostatic analysis to evaluate safety under seismic loading, in lieu of more extensive modeling which involves transient response analysis and estimated dynamic shear stresses. The key to this methodology is the observation that the soils exhibit essentially elastic behavior, even under many cycles of loading, if stresses do not exceed about 80% of the soils' undrained strength. They therefore recommend the use of 80 percent of the undrained

strength as the dynamic yield strength for soils that exhibit small increases in pore pressure during cyclic loading, such as clayey materials. The resulting suggested procedure was stated as:

a) Carry out the conventional pseudostatic stability analyses using a seismic coefficient equal to one-third to one-half of predicted peak bedrock acceleration, or PGA
b) For clays, use a degraded value of strength equal to 80% of the soil's undrained shear strength
c) Use a minimum factor of safety of 1.0.

This procedure assumes that the materials in the foundation are not subject to liquefaction. We judged that this is the case at this site because: 1) all samples had fines contents greater than about 60 percent, and 2) only 3 samples had liquid limits (LL) of less than 35, and of those, none had liquidity indices greater than, or even approaching, a value of $I_L = 0.9$, which is necessary for liquefaction under the Chinese Criteria (Ref. 2). Therefore, liquefaction is deemed highly unlikely at this site. For the seismic analysis, the R-bar values for the embankment soils were thus degraded by 20%, yielding the following effective stress parameters:

Embankment Soils:	$c' = 280$ psf $\phi' = 25°$
Firm Residuum Soils	$c' = 175$ psf $\phi' = 24°$

Effective stress parameters for the weakest foundation soils were <u>not</u> degraded, however, for the following reasons. The parameters of c'=100 psf and ϕ'=20 degrees were assigned as very low initially, below the lower bound of the data set, in an effort to simulate the weaker soils above the limestone. CPT testing indicates this zone as very irregular, to the point that a slip plane of failure propagating primarily through the weakest soils would probably have to pass through some rock pinnacles as well. We therefore considered these parameters already sufficiently conservative. Conversely, if these lower bound values were to be increased by 20 percent, they would still fall below the lowest-measured value which we obtained from UD sampling and triaxial testing for the weaker foundation soil; i.e., Sample 2A with c' = 170 psf and ϕ' = 24°.

Strength parameters for the ash inside the pond were taken from our experience with testing for the engineering properties of ash at many of our plant sites. Our analyses assumed fly ash with a conservative unit weight of 85 pcf, no cohesive strength, and an internal angle of friction of 15°. In the first trial seismic analyses we used various degraded values of friction angle for the ponded ash above and below the inboard water level, depending on assumptions of either full or partial liquefaction. These trial runs indicated very little or no effect on the downstream stability of the dike section; therefore, strength values for the ash became an

essentially moot point and we defaulted to a zero strength under seismic loading for sake of ease, conservatism, and reduced number of cases to investigate.

Selection of the pseudostatic seismic horizontal thrust coefficient was based on the peak ground acceleration estimated for this site. This information was taken from the United States Geological Service Earthquake Hazards Program website. The nearest grid point of seismic data is Latitude 34.1° south and Longitude 85.0° west (about two miles away from the ash pond). Entering the zip code for Taylorsville, Georgia of 30178, we obtained a peak ground acceleration (PGA) of 0.06g (See Figure 17). This value corresponds to a seismic event having a 10 percent probability of exceedence (PE) in the next 50 years. For a portion of our analyses, we thus used a coefficient of horizontal thrust of 50% of that value, or 0.03g. Information from the Hydro Projects Department also indicated, however, that the Georgia DNR Safe Dams Program administration has a seismic level criterion linked to a 2% PE in 50 years. This yields a PGA of approximately 0.15g. (See Figure 18). Therefore, we conducted analyses using both sets of criteria.

For the post-remediation load cases, the strength improvement within the weaker zone was modeled by increasing the parameters according to the expected strength gain from compaction grouting in that zone. Mr B.E. Williams, project grouting engineer, has recommended that the improved strength value for the grouted zones be set at a cohesion of 8000 psf. This cohesion value appears reasonable and corresponds to a shear strength of 4 tsf, or that of a clay on the borderline of consistency between very stiff and hard.

Text from subsequent section deleted for clarity

SOUTHERN COMPANY
CENTRAL LABORATORY

Southern Company Services
Georgia Power Company – Plant Bowen Ash Pond Dike
Soil Testing Report

October 15, 2002

Ms. Heather Hill

Mr. Ray Halbert
Southern Company

Enclosed are the test results for the soil samples delivered to the Southern Company, Central Laboratory on August 29, 2002. Performed test included Gradation with Hydrometer (ASTM D-422), Atterberg Limits (ASTM D-4318), Specific Gravity (ASTM D854), Natural Moisture Content (ASTM D-2216), Density (D-4718), Classification (ASTM D-2487), Unconsolidated-Undrained (Q) Triaxial Test, Consolidated-Undrained (R) Triaxial Test, Consolidated-Drained (S) Triaxial Test, and Falling-Head Permeability Testing (COE)

Laboratory sample #1, represents a UD soil sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 9 from a depth of 9.0-11.0 feet. This sample was classified as a light brown lean clay with sand material or a CL by the United Soil Classification System or an A-6 (13) by the AASHTO System. Liquid Limit was 38 with a Plasticity Limit was 18 with a Plasticity Index of 21. Specific Gravity was 2.69. For Unconsolidated-Undrained (Q) Triaxial Test, see attached report. Gradation is as follows:

Sieve Analysis

Sieve Size:	% Passing
.75 inch	100.0
.375 inch	98.5
#4	98.0
#8	97.4
#10	97.2
#16	96.4
#30	94.6
#40	91.6
#50	88.1
#100	80.1
#200	70.5

Laboratory sample #2, represents a UD soil sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 9 from a depth of 24.0-26.0 feet. This sample was classified as a light brown sandy lean clay material or a CL by the United Soil Classification System or an A-6 (13) by the AASHTO System. Liquid Limit was 39 with a Plasticity Limit was 18 with a Plasticity Index of 21. Specific Gravity was 2.73. For Unconsolidated-Undrained (Q) Triaxial Test, see attached report. Gradation is as follows:

Sieve Analysis

Sieve Size:	% Passing
.75 inch	100.0
.375 inch	98.2
#4	97.9
#8	97.6
#10	95.0
#16	94.3
#30	92.6
#40	89.9
#50	86.7
#100	79.4
#200	69.6

Laboratory sample #3, represents a UD soil sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 10 from a depth of 13.5-15.5 feet. This sample was classified as a light brown fat clay material or a CH by the United Soil Classification System or an A-7-6 (32) by the AASHTO System. Liquid Limit was 58 with a Plasticity Limit was 26 with a Plasticity Index of 32. Specific Gravity was 2.71. For Consolidated-Drained (S) Triaxial Test, see attached report. Gradation is as follows:

Sieve Analysis

Sieve Size:	% Passing
.75 inch	100.0
.375 inch	99.9
#4	99.4
#8	99.0
#10	99.0
#16	98.2
#30	97.5
#40	96.4
#50	95.3
#100	92.5
#200	88.7

Laboratory sample #4, represents a UD soil sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 2 from a depth of 37.0-39.0 feet. This sample was classified as a brown fat clay material or a CH by the United Soil Classification System or an A-7-6 (36) by the AASHTO System. Liquid Limit was 65 with a Plasticity Limit was 29 with a Plasticity Index of 36. Specific Gravity was 2.87. For Unconsolidated-Undrained (Q) Triaxial Test, see attached report. Gradation is as follows:

Sieve Analysis

Sieve Size:	% Passing
.75 inch	100.0
.375 inch	99.1
#4	98.6
#8	97.7
#10	97.6
#16	96.1
#30	94.2
#40	93.1
#50	92.0
#100	89.7
#200	86.8

Laboratory sample #5, represents a UD soil sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 6 from a depth of 45.0-47.0 feet. This sample was classified as a light reddish brown elastic silt with sand material or an MH by the United Soil Classification System or an A-7-6-5 (27) by the AASHTO System. Liquid Limit was 60 with a Plasticity Limit was 33 with a Plasticity Index of 27. Specific Gravity was 2.61. For Unconsolidated-Undrained (Q) Triaxial Test, see attached report. Gradation is as follows:

Sieve Analysis

Sieve Size:	% Passing
1.5 inch	100.0
.75 inch	99.1
.375 inch	96.1
#4	94.7
#8	94.0
#10	94.0
#16	93.0
#30	91.9
#40	91.2
#50	90.5
#100	88.7
#200	84.8

Laboratory sample #6, represents a UD soil sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 12 from a depth of 8.0-10.0 feet. This sample was classified as a dark reddish brown fat clay with sand material or a CH by the United Soil Classification System or an A-7-6 (20) by the AASHTO System. Liquid Limit was 52 with a Plasticity Limit was 27 with a Plasticity Index of 25. Specific Gravity was 2.73. Gradation is as follows:

Sieve Analysis

Sieve Size:	% Passing
.75 inch	100.0
.375 inch	100.0
#4	99.5
#8	98.7
#10	98.4
#16	97.9
#30	96.5
#40	92.8
#50	88.8
#100	82.7
#200	76.3

Laboratory sample #7, represents a UD soil sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 8 from a depth of 21.0-23.0 feet. This sample was classified as a reddish brown lean clay with sand material or a CL by the United Soil Classification System or an A-6 (12) by the AASHTO System. Liquid Limit was 39 with a Plasticity Limit was 21 with a Plasticity Index of 18. Specific Gravity was 2.62. For Unconsolidated-Undrained (Q) Triaxial Test, see attached report. The Coefficient of Permeability using the Falling-Head Method averaged 1.4 x 10-7 cm. per sec. Wet density was 133.1 pcf, Dry density was 112.0 pcf, with a Moisture content of 18.9%. Gradation is as follows:

Sieve Analysis

Sieve Size:	% Passing
.75 inch	100.0
.375 inch	99.9
#4	99.6
#8	99.3
#10	99.2
#16	98.6
#30	97.0
#40	93.9
#50	90.4
#100	82.2
#200	73.0

Laboratory sample #8, represents a UD soil sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 8 from a depth of 7.0-9.0 feet. This sample was classified as a reddish brown elastic silt with sand material or an MH by the United Soil Classification System or an A-7-5 (24) by the AASHTO System. Liquid Limit was 57 with a Plasticity Limit was 31with a Plasticity 'ndex of 26. Specific Gravity was 2.67. Natural Moisture content was 24.6% with a Dry density of 100.5 pcf, Saturation was 100%. or Consolidated-Undrained (R) Triaxial Test, see attached report. Gradation is as follows:

Sieve Analysis

Sieve Size:	% Passing
.75 inch	100.0
.375 inch	98.5
#4	97.8
#8	96.3
#10	95.9
#16	95.4
#30	94.1
#40	92.4
#50	90.8
#100	87.1
#200	82.5

Laboratory sample #9, represents a UD soil sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 7 from a depth of 21.0-23.0 feet. This sample was classified as a light brown silt with sand material or an ML by the United Soil Classification System or an A-7-6 (14) by the AASHTO System. Liquid Limit was 44 with a Plasticity Limit was 29 with a Plasticity Index of 15. Specific Gravity was 2.67. For Unconsolidated-Undrained (Q) Triaxial Test, see attached report. Gradation is as follows:

Sieve Analysis

Sieve Size:	% Passing
.75 inch	100.0
.375 inch	98.8
#4	97.6
#8	96.9
#10	96.8
#16	95.0
#30	92.5
#40	91.1
#50	89.8
#100	86.7
#200	82.0

Laboratory sample #10, represents a UD soil sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 6 from a depth of 28.5-30.0 feet. This sample was classified as a tan fat clay with sand material or a CH by the United Soil Classification System or an A-7-6 (26) by the AASHTO System. Liquid Limit was 56 with a Plasticity Limit was 23 with a Plasticity Index of 33. Specific Gravity was 2.69. For Unconsolidated-Undrained (Q) Triaxial Test, see attached report. Gradation is as follows:

Sieve Analysis

Sieve Size:	% Passing
.75 inch	100.0
.375 inch	99.6
#4	98.7
#8	97.4
#10	97.3
#16	94.9
#30	92.3
#40	89.5
#50	87.4
#100	82.6
#200	77.0

Laboratory sample #11, represents a jar soil sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 6, Sample 5, from a depth of 23.5-25.0 feet. This sample was classified as a light reddish brown fat clay material or a CH by the United Soil Classification System or an A-7-5 (40) by the AASHTO System. Liquid Limit was 70 with a Plasticity Limit was 33 with a Plasticity Index of 37. Estimated Specific Gravity was 2.65. Natural Moisture content was 25.9%. Gradation is as follows:

Sieve Analysis

Sieve Size:	% Passing
.75 inch	100.0
.375 inch	100.0
#4	99.7
#8	99.5
#10	99.3
#16	98.1
#30	97.0
#40	96.1
#50	95.1
#100	93.0
#200	89.5

Laboratory sample #12, represents a jar soil sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 6, Sample 10, from a depth of 48.5-50.0 feet. This sample was classified as a light brown elastic silt material or an MH by the United Soil Classification System or an A-7-5 (54) by the AASHTO System. Liquid Limit was 81 with a Plasticity Limit was 37 with a Plasticity Index of 44. Estimated Specific Gravity was 2.65. Natural Moisture content was 71.5%. Gradation is as follows:

Sieve Analysis

Sieve Size:	% Passing
.75 inch	100.0
.375 inch	100.0
#4	100.0
#8	100.0
#10	100.0
#16	99.9
#30	99.6
#40	99.5
#50	99.2
#100	98.7
#200	97.8

Laboratory sample #13, represents a jar soil sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 6, Sample 9, from a depth of 43.5-45.0 feet. Natural Moisture content was 24.7%.

Laboratory sample #14, represents a jar soil sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 6, Sample 4, from a depth of 18.5-20.0 feet. Natural Moisture content was 32.1%.

Laboratory sample #15, represents a bag soil sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 7, Sample 1, from a depth of 4.5-6.0 feet. Natural Moisture content was 18.8%.

Laboratory sample #16, represents a bag soil sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 7, Sample 2, from a depth of 9.5-11.0 feet. Natural Moisture content was 24.4%.

Laboratory sample #17, represents a UD soil sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 7, from a depth of 9.0-11.0 feet. This sample was classified as a light brown fat clay with sand material or a CH by the United Soil Classification System or an A-7-6 (23) by the AASHTO System. Liquid Limit was 50 with a Plasticity Limit was 24 with a Plasticity Index of 26. Specific Gravity was 2.70. Natural Moisture content was 23.1% with a Dry density of 104.1 pcf, Saturation was 100%. Gradation is as follows:

Sieve Analysis

Sieve Size:	% Passing
.75 inch	100.0
.375 inch	100.0
#4	99.2
#8	97.8
#10	97.4
#16	96.1
#30	94.2
#40	93.0
#50	91.8
#100	88.7
#200	84.3

Laboratory sample #18, represents a bag soil sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 7, Sample 3, from a depth of 14.5-16.0 feet. Natural Moisture content was 32.0%.

Laboratory sample #19, represents a bag soil sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 7, Sample 8, from a depth of 27.0-28.5 feet. Natural Moisture content was 52.6%.

Laboratory sample #20, represents a jar soil sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 8, Sample 4, from a depth of 18.5-20.0 feet. This sample was classified as a brown sandy lean clay material or a CL by the United Soil Classification System or an A-6 (4) by the AASHTO System. Liquid Limit was 26 with a Plasticity Limit was 13 with a Plasticity Index of 13. Estimated Specific Gravity was 2.65. Natural Moisture content was 16.0%. Gradation is as follows:

Sieve Analysis

Sieve Size:	% Passing
.75 inch	100.0
.375 inch	100.0
#4	100.0
#8	97.9
#10	97.6
#16	97.2
#30	95.0
#40	90.8
#50	86.2
#100	74.4
#200	57.2

Laboratory sample #21, represents a jar soil sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 8, Sample 7, from a depth of 26.0-27.5 feet. Natural Moisture content was 19.6%.

Laboratory sample #22, represents a bag soil sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 8, Sample 5, from a depth of 21.0-22.5 feet. Natural Moisture content was 20.4%.

Laboratory sample #23, represents bag soil sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 9, Sample 1, from a depth of 4.5-6.0 feet. This sample was classified as a brown sandy lean clay material or a CL by the United Soil Classification System or an A-6 (4) by the AASHTO System. Liquid Limit was 25 with a Plasticity Limit was 14 with a Plasticity Index of 11. Specific Gravity was 2.55. Natural Moisture content was 13.4%. Gradation is as follows:

Sieve Analysis

Sieve Size:	% Passing
.75 inch	100.0
.375 inch	100.0
#4	99.1
#8	97.8
#10	97.3
#16	96.3
#30	94.1
#40	89.9
#50	85.5
#100	75.3
#200	64.9

Laboratory sample #24, represents a bag soil sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 9, Sample 2, from a depth of 9.5-11.0 feet. Natural Moisture content was 21.3%.

Laboratory sample #25, represents a bag soil sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 9, Sample 3, from a depth of 14.5-16.0 feet. Natural Moisture content was 29.5%.

Laboratory sample #26, represents a bag soil sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 9, Sample 5, from a depth of 24.5-26.0 feet. Natural Moisture content was 29.6%.

Laboratory sample #27, represents a bag soil sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 9, Sample 6, from a depth of 27.0-28.5 feet. Natural Moisture content was 31.8%.

Laboratory sample #28, represents a jar soil sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 10, Sample 3, from a depth of 13.5-15.0 feet. Natural Moisture content was 26.3%.

Laboratory sample #29, represents a jar soil sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 10, Sample 9, from a depth of 36.0-37.5 feet. This sample was classified as a light elastic silt with sand material or an MH by the United Soil Classification System or an A-7-5 (26) by the AASHTO System. Liquid Limit was 69 with a Plasticity Limit was 36 with a Plasticity Index of 33. Estimated Specific Gravity was 2.65. Natural Moisture content was 32.2%. Gradation is as follows:

Sieve Analysis

Sieve Size:	% Passing
.375 inch	100.0
#4	100.0
#8	99.0
#10	98.6
#16	94.5
#30	90.3
#40	87.4
#50	84.9
#100	79.5

Laboratory sample #30, represents a UD soil sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 10, from a depth of 36.0-38.0 feet. This sample was classified as a light reddish brown elastic silt with sand material or an MH by the United Soil Classification System or an A-7-5 (44) by the AASHTO System. Liquid Limit was 83 with a Plasticity Limit was 38 with a Plasticity Index of 45. Specific Gravity was 2.60. Natural Moisture content was 34.0% with a Dry density of 87.3 pcf, Saturation was 100%. Gradation is as follows:

Sieve Analysis

Sieve Size:	% Passing
.75 inch	100.0
.375 inch	100.0
#4	98.7
#8	95.9
#10	94.6
#16	92.5
#30	89.6
#40	87.9
#50	86.4
#100	83.2
#200	82.8

Laboratory sample #31, represents a jar soil sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 10, Sample 11, from a depth of 41.0-42.5 feet. Natural Moisture content was 44.6%.

Laboratory sample #32, represents a jar soil sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 10, Sample 13, from a depth of 46.0-47.5 feet. Natural Moisture content was 44.4%.

Laboratory sample #33, represents a UD sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 2, from a depth of 14.0-16.0 feet. This sample was classified as a light brown fat clay material or an CH by the United Soil Classification System or an A-7-6 (31) by the AASHTO System. Liquid Limit was 58 with a Plasticity Limit was 26 with a Plasticity Index of 32. Specific Gravity was 2.64. Gradation is as follows:

Sieve Analysis

Sieve Size:	% Passing
.75 inch	100.0
.375 inch	99.3
#4	98.9
#8	98.7
#10	98.7
#16	97.7
#30	96.4
#40	95.1
#50	94.1
#100	91.7
#200	88.2

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Laboratory sample #34, represents a UD sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 4, from a depth of 19.0-21.0 feet. This sample was classified as a light brown fat clay material or an CH by the United Soil Classification System or an A-7-6 (39) by the AASHTO System. Liquid Limit was 66 with a Plasticity Limit was 27 with a Plasticity Index of 39. Specific Gravity was 2.67. Gradation is as follows:

Sieve Analysis

Sieve Size:	**% Passing**
.75 inch	100.0
.375 inch	99.0
#4	98.3
#8	97.9
#10	97.9
#16	97.0
#30	96.1
#40	95.3
#50	94.3
#100	92.2
#200	89.3

Laboratory sample #35, represents a UD sample material from the GPCo-Plant Bowen Ash Pond Dike Project, Boring 6, from a depth of 10.0-12.0 feet. This sample was classified as a light brown fat clay with sand material or an CH by the United Soil Classification System or an A-7-6 (23) by the AASHTO System. Liquid Limit was 50 with a Plasticity Limit was 22 with a Plasticity Index of 28. Specific Gravity was 2.76. Gradation is as follows:

Sieve Analysis

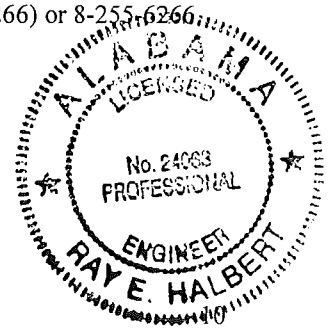
Sieve Size:	**% Passing**
1.5 inch	100.0
.75 inch	98.1
.375 inch	97.1
#4	96.7
#8	96.4
#10	96.3
#16	95.0
#30	93.3
#40	91.5
#50	89.9
#100	85.9
#200	80.3

Note: COE stands for the Corp. of Engineers Method.

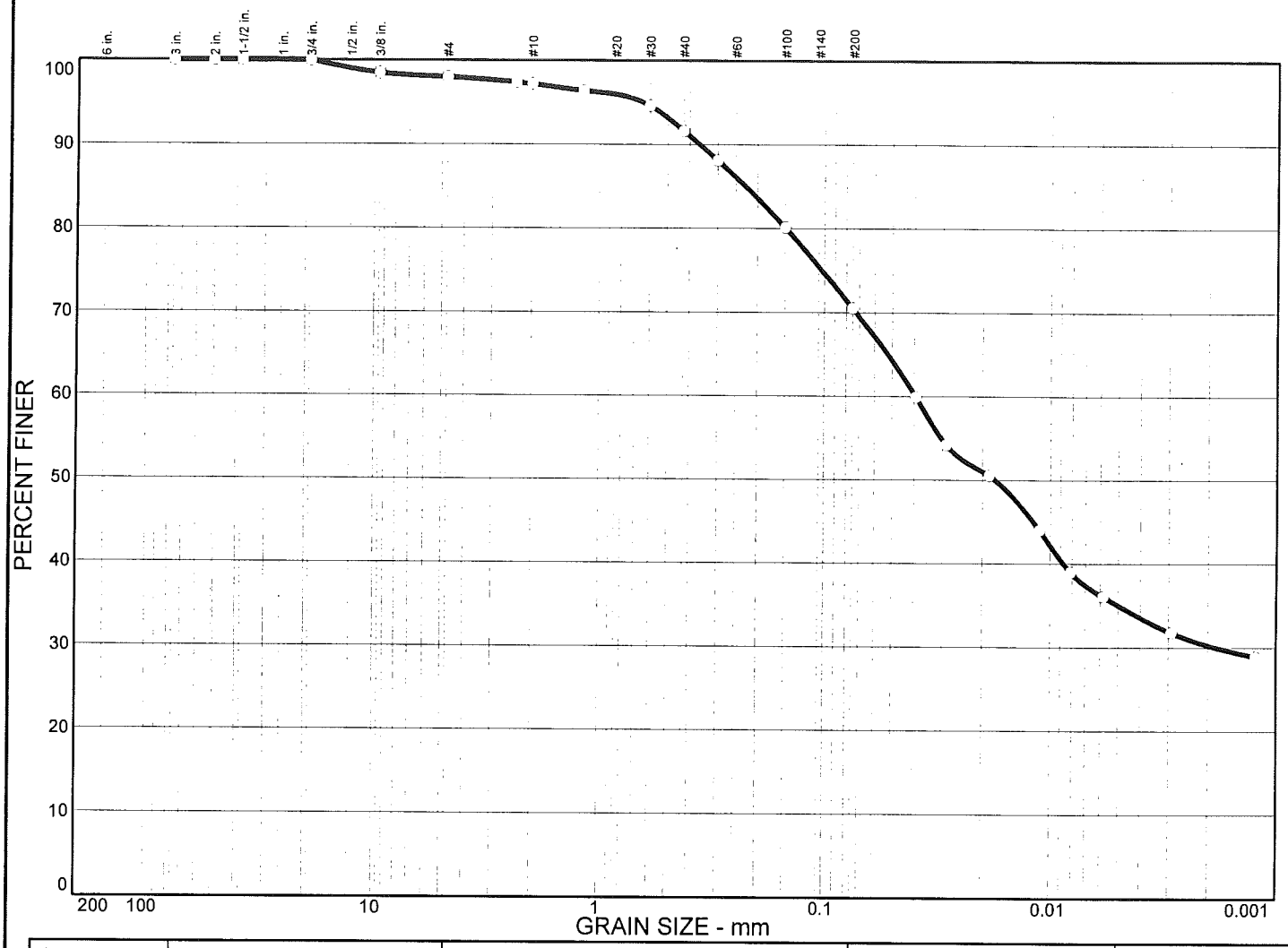
We appreciate the opportunity to assist you on this project. If there are any questions or if we can be of any further assistance, please call at extension (205/664-6266) or 8-255-6266.

Sincerely,

Ray Halbert, PE, CM
Southern Company



Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	2.0	27.5	35.4	35.1

LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
39	18	0.225	0.0395	0.0176	0.0018				

MATERIAL DESCRIPTION	USCS	AASHTO
Light Brown Lean clay with sand	CL	A-6(13)

Project No. 2051 **Client:** Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Source: Ash Pond Dike **Sample No.:** 1 **Elev./Depth:** 9-11 feet

Remarks:

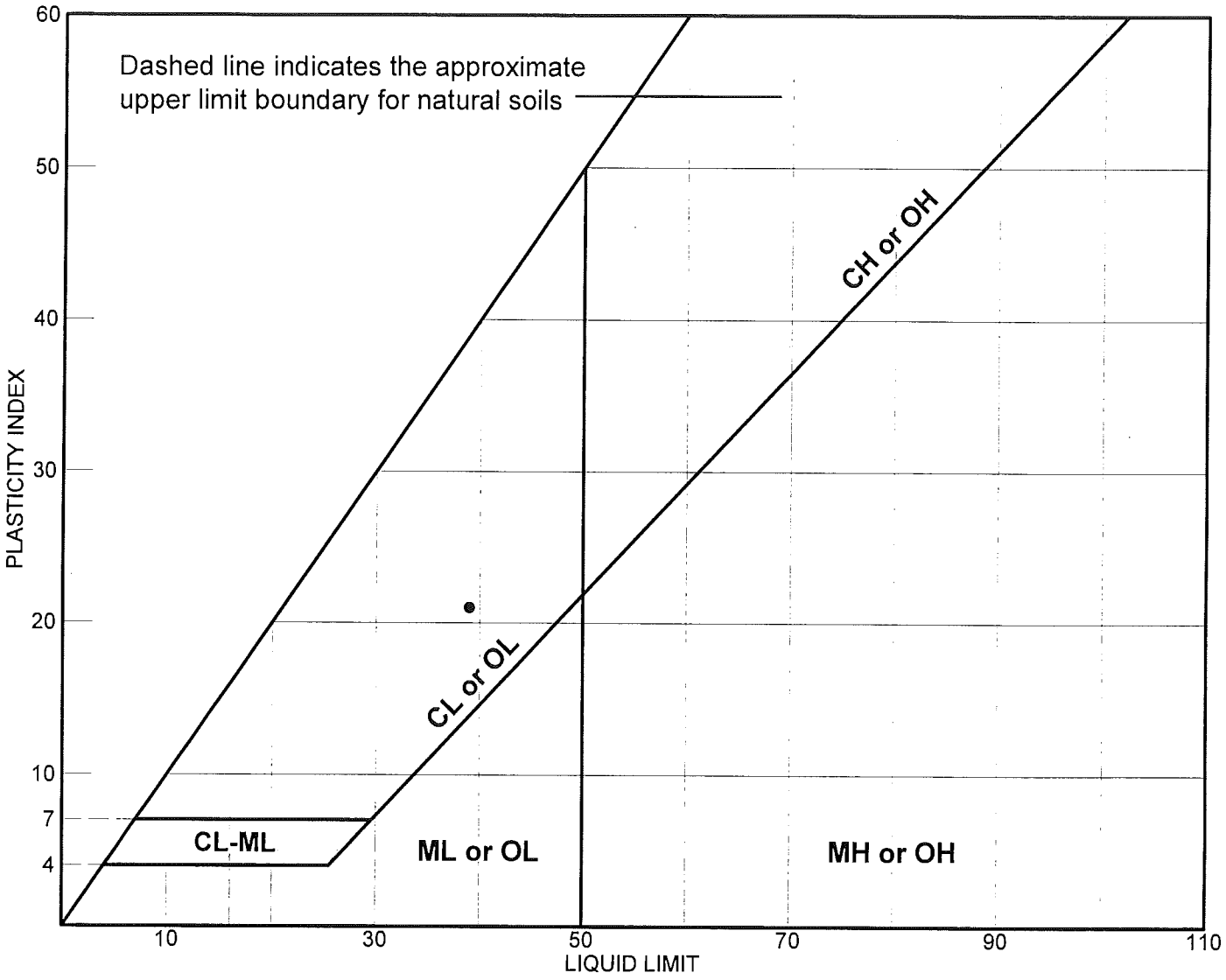
Boring No. 9

Particle Size Distribution Report

SOUTHERN COMPANY

Lab No. 1

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Ash Pond Dike	1	9-11 feet		18	39	21	CL

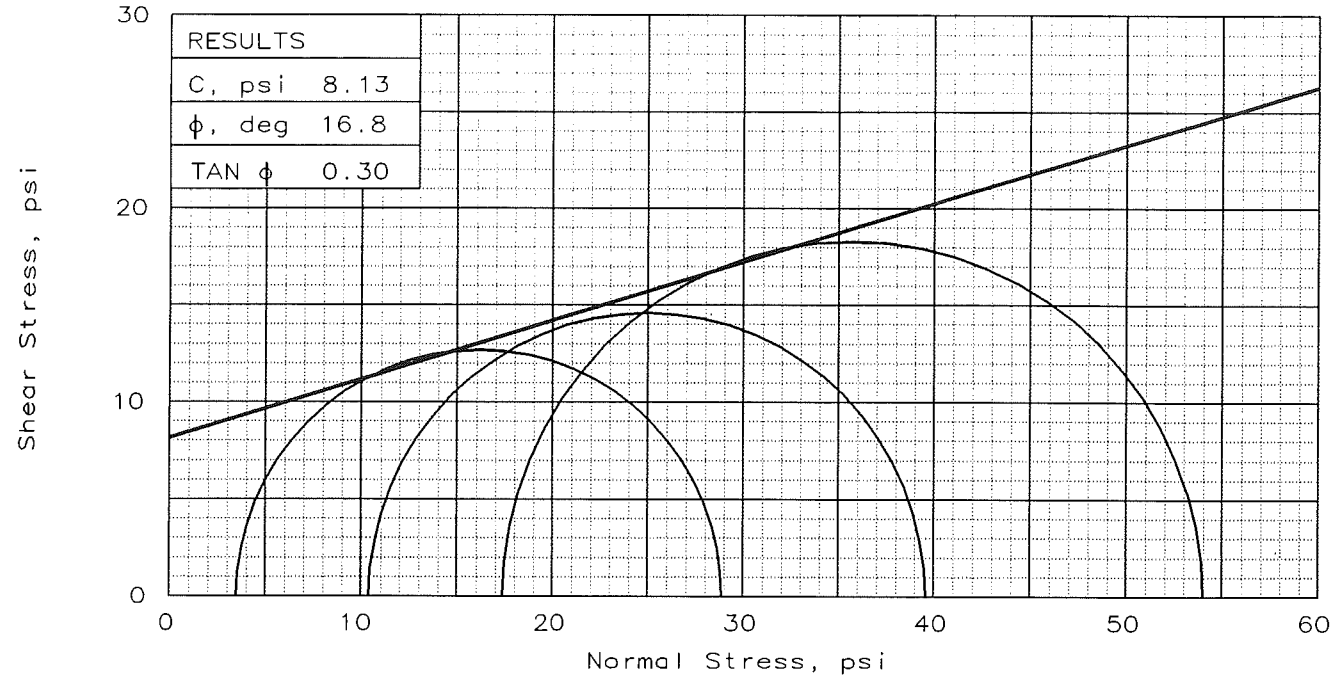
LIQUID AND PLASTIC LIMITS TEST REPORT

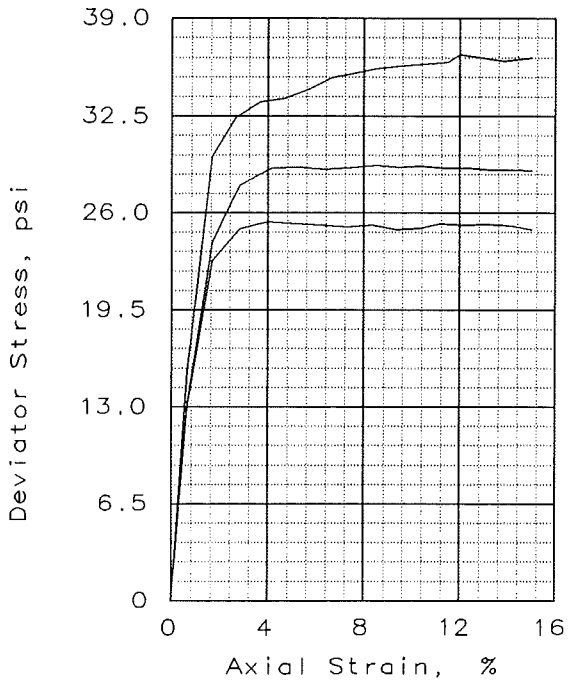
SOUTHERN COMPANY

Client: Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Project No.: 2051 **Lab No.** 1





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	19.3	19.4	20.0
	DRY DENSITY, pcf	105.9	106.0	105.7
	SATURATION, %	88.6	89.2	91.3
	VOID RATIO	0.586	0.584	0.589
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	3.00
AT TEST	WATER CONTENT, %	19.3	19.4	20.0
	DRY DENSITY, pcf	105.9	106.0	105.7
	SATURATION, %	88.6	89.2	91.3
	VOID RATIO	0.586	0.584	0.589
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	3.00
Strain rate, %/min		0.0010	0.0010	0.0010
BACK PRESSURE, psi		0.0	0.0	0.0
CELL PRESSURE, psi		3.5	10.4	17.4
FAIL. STRESS, psi		25.4	29.2	36.6
ULT. STRESS, psi				
σ_1 FAILURE, psi		28.9	39.6	54.0
σ_3 FAILURE, psi		3.5	10.4	17.4

TYPE OF TEST:
Unconsolidated Undrained
SAMPLE TYPE: UD
DESCRIPTION: Light brown lean clay with sand
LL= 39 PL= 18 PI= 21
SPECIFIC GRAVITY= 2.69
REMARKS:

Lob No: 1

CLIENT: Southern Company

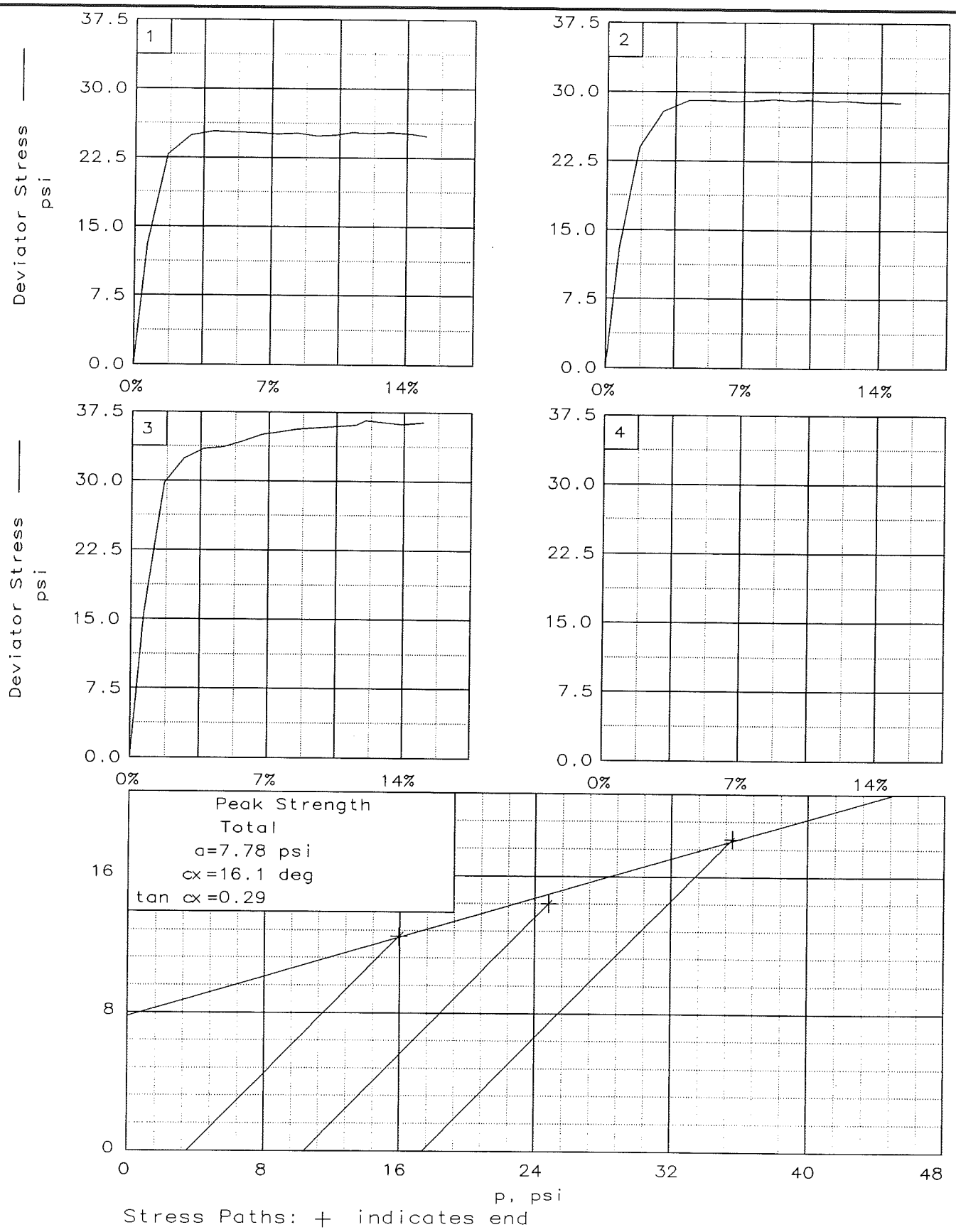
PROJECT: GPCo - Plant Bowen Ash Pond Dike

SAMPLE LOCATION: Boring #9
Depth: 9-11 feet

PROJ. NO.: 2051 DATE: 10/02/2002

TRIAXIAL SHEAR TEST REPORT

SOUTHERN COMPANY SERVICES



Client: Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Location: Boring #9 Depth: 9-11 feet

File: GPBAPD01 Project No.: 2051 Lab No: 1

Project and Sample Data

Date: 10/02/2002
Client: Southern Company
Project: GPCo - Plant Bowen Ash Pond Dike
Sample location: Boring #9 Depth: 9-11 feet
Sample description: Light brown lean clay with sand
Remarks:

Fig no.: 1 2nd page Fig no. (if applicable): 1
Type of sample: UD
Specific gravity= 2.69 LL= 39 PL= 18 PI= 21
Test method: ASTM - Method A

Specimen Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Final
Wt. moist soil and tare:	155.740		155.740
Wt. dry soil and tare:	135.400		135.400
Wt. of tare:	30.070		30.070
Weight, gms:	153.1		
Diameter, in:	1.400	1.400	
Area, in²:	1.539	1.539	
Height, in:	3.000	3.000	
Net decrease in height, in:		0.000	
% Moisture:	19.3	19.3	19.3
Wet density, pcf:	126.3	126.3	
Dry density, pcf:	105.9	105.9	
Void ratio:	0.5861	0.5861	
% Saturation:	88.6	88.6	

Test Readings Data for Specimen No. 1

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.3108 lbs per input unit
Secondary load ring constant= 0.77882 lbs per input unit
Crossover reading for secondary load ring= 474 input units
Cell pressure = 3.50 psi
Back pressure = 0.00 psi
Effective confining stress = 3.50 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 25.39 psi at reading no. 4
ULT. STRESS = not selected

Test Readings Data for Specimen No. 1

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Principal Stresses Minor psi	Major psi	1:3 Ratio	P psi	Q psi
	0.0	0.000	4.0	0.0	0.0	0.00	3.50	3.50	1.00	3.50	0.00
1	20.0	0.020	69.0	20.2	0.7	13.04	3.50	16.54	4.72	10.02	6.52
2	50.0	0.050	119.0	35.7	1.7	22.83	3.50	26.33	7.52	14.92	11.42
3	85.0	0.085	131.0	39.5	2.8	24.91	3.50	28.41	8.12	15.96	12.46
4	120.0	0.120	135.0	40.7	4.0	25.39	3.50	28.89	8.25	16.20	12.70
5	155.0	0.155	136.0	41.0	5.2	25.27	3.50	28.77	8.22	16.14	12.64
6	185.0	0.185	137.0	41.3	6.2	25.20	3.50	28.70	8.20	16.10	12.60
7	220.0	0.220	138.0	41.6	7.3	25.07	3.50	28.57	8.16	16.04	12.54
8	250.0	0.250	140.0	42.3	8.3	25.17	3.50	28.67	8.19	16.09	12.59
9	280.0	0.280	140.0	42.3	9.3	24.90	3.50	28.40	8.11	15.95	12.45
10	310.0	0.310	142.0	42.9	10.3	24.98	3.50	28.48	8.14	15.99	12.49
11	335.0	0.335	145.0	43.8	11.2	25.29	3.50	28.79	8.23	16.14	12.64
12	365.0	0.365	146.0	44.1	12.2	25.18	3.50	28.68	8.19	16.09	12.59
13	395.0	0.395	148.0	44.8	13.2	25.25	3.50	28.75	8.21	16.12	12.62
14	425.0	0.425	149.0	45.1	14.2	25.13	3.50	28.63	8.18	16.06	12.56
15	450.0	0.450	149.0	45.1	15.0	24.88	3.50	28.38	8.11	15.94	12.44

Specimen Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Final
Wt. moist soil and tare:	127.350		127.350
Wt. dry soil and tare:	111.610		111.610
Wt. of tare:	30.390		30.390
Weight, gms:	153.4		
Diameter, in:	1.400	1.400	
Area, in²:	1.539	1.539	
Height, in:	3.000	3.000	
Net decrease in height, in:		0.000	
% Moisture:	19.4	19.4	19.4
Wet density, pcf:	126.5	126.5	
Dry density, pcf:	106.0	106.0	
Void ratio:	0.5845	0.5845	
% Saturation:	89.2	89.2	

Test Readings Data for Specimen No. 2

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.3108 lbs per input unit
Secondary load ring constant= 0.77882 lbs per input unit
Crossover reading for secondary load ring= 474 input units
Cell pressure = 10.40 psi
Back pressure = 0.00 psi
Effective confining stress = 10.40 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 29.19 psi at reading no. 8
ULT. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Principal Stresses Minor psi	Major psi	1:3 Ratio	P psi	Q psi
0	0.0	0.000	9.0	0.0	0.0	0.00	10.40	10.40	1.00	10.40	0.00
1	20.0	0.020	75.0	20.5	0.7	13.24	10.40	23.64	2.27	17.02	6.62
2	50.0	0.050	130.0	37.6	1.7	24.02	10.40	34.42	3.31	22.41	12.01
3	85.0	0.085	151.0	44.1	2.8	27.86	10.40	38.26	3.68	24.33	13.93
4	125.0	0.125	159.0	46.6	4.2	29.02	10.40	39.42	3.79	24.91	14.51
5	160.0	0.160	161.0	47.2	5.3	29.05	10.40	39.45	3.79	24.93	14.53
6	190.0	0.190	162.0	47.6	6.3	28.93	10.40	39.33	3.78	24.87	14.47
7	220.0	0.220	164.0	48.2	7.3	29.00	10.40	39.40	3.79	24.90	14.50
8	255.0	0.255	167.0	49.1	8.5	29.19	10.40	39.59	3.81	24.99	14.59
9	285.0	0.285	168.0	49.4	9.5	29.05	10.40	39.45	3.79	24.93	14.53
10	310.0	0.310	170.0	50.0	10.3	29.15	10.40	39.55	3.80	24.97	14.57
11	340.0	0.340	171.0	50.3	11.3	29.00	10.40	39.40	3.79	24.90	14.50
12	370.0	0.370	173.0	51.0	12.3	29.03	10.40	39.43	3.79	24.91	14.51
13	400.0	0.400	174.0	51.3	13.3	28.87	10.40	39.27	3.78	24.84	14.44
14	430.0	0.430	176.0	51.9	14.3	28.88	10.40	39.28	3.78	24.84	14.44
15	450.0	0.450	177.0	52.2	15.0	28.83	10.40	39.23	3.77	24.82	14.42

Specimen Parameters for Specimen No. 3

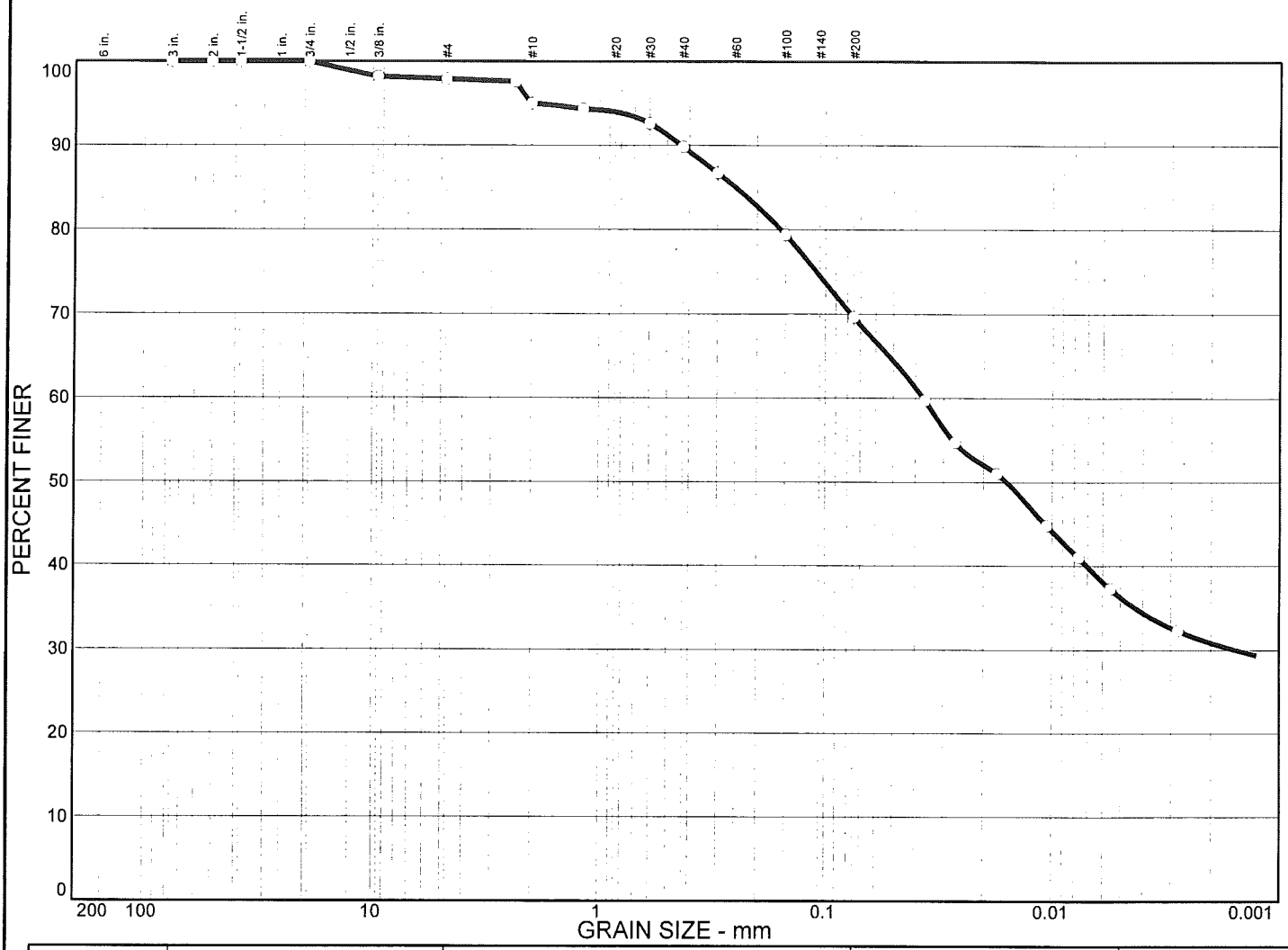
Specimen Parameter	Initial	Saturated	Final
moist soil and tare:	129.890		129.890
dry soil and tare:	113.280		113.280
Wt. of tare:	30.160		30.160
Weight, gms:	153.8		
Diameter, in:	1.400	1.400	
Area, in²:	1.539	1.539	
Height, in:	3.000	3.000	
Net decrease in height, in:		0.000	
% Moisture:	20.0	20.0	20.0
Wet density, pcf:	126.8	126.8	
Dry density, pcf:	105.7	105.7	
Void ratio:	0.5886	0.5886	
% Saturation:	91.3	91.3	

Test Readings Data for Specimen No. 3

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.3108 lbs per input unit
Secondary load ring constant= 0.77882 lbs per input unit
Crossover reading for secondary load ring= 474 input units
Cell pressure = 17.40 psi
Back pressure = 0.00 psi
Effective confining stress = 17.40 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 36.60 psi at reading no. 13
ULT. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Principal Stresses Minor psi	Major psi	1:3 Ratio	P psi	Q psi
0	0.0	0.000	14.0	0.0	0.0	0.00	17.40	17.40	1.00	17.40	0.00
1	20.0	0.020	91.0	23.9	0.7	15.44	17.40	32.84	1.89	25.12	7.72
2	50.0	0.050	164.0	46.6	1.7	29.78	17.40	47.18	2.71	32.29	14.89
3	80.0	0.080	179.0	51.3	2.7	32.43	17.40	49.83	2.86	33.61	16.21
4	110.0	0.110	186.0	53.5	3.7	33.45	17.40	50.85	2.92	34.13	16.73
5	140.0	0.140	189.0	54.4	4.7	33.68	17.40	51.08	2.94	34.24	16.84
6	170.0	0.170	194.0	55.9	5.7	34.28	17.40	51.68	2.97	34.54	17.14
7	200.0	0.200	200.0	57.8	6.7	35.05	17.40	52.45	3.01	34.92	17.52
8	225.0	0.225	203.0	58.7	7.5	35.30	17.40	52.70	3.03	35.05	17.65
9	255.0	0.255	207.0	60.0	8.5	35.65	17.40	53.05	3.05	35.23	17.83
10	285.0	0.285	210.0	60.9	9.5	35.81	17.40	53.21	3.06	35.31	17.91
11	315.0	0.315	213.0	61.8	10.5	35.96	17.40	53.36	3.07	35.38	17.98
12	345.0	0.345	216.0	62.8	11.5	36.09	17.40	53.49	3.07	35.45	18.05
13	360.0	0.360	220.0	64.0	12.0	36.60	17.40	54.00	3.10	35.70	18.30
14	415.0	0.415	222.0	64.6	13.8	36.19	17.40	53.59	3.08	35.49	18.09
15	450.0	0.450	226.0	65.9	15.0	36.38	17.40	53.78	3.09	35.59	18.19

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	2.1	28.3	33.3	36.3

LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
39	18	0.250	0.0370	0.0158	0.0016				

MATERIAL DESCRIPTION	USCS	AASHTO
Light Brown Sandy lean clay	CL	A-6(13)

Project No. 2051 **Client:** Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Source: Ash Pond Dike **Sample No.:** 2 **Elev./Depth:** 24-26 feet

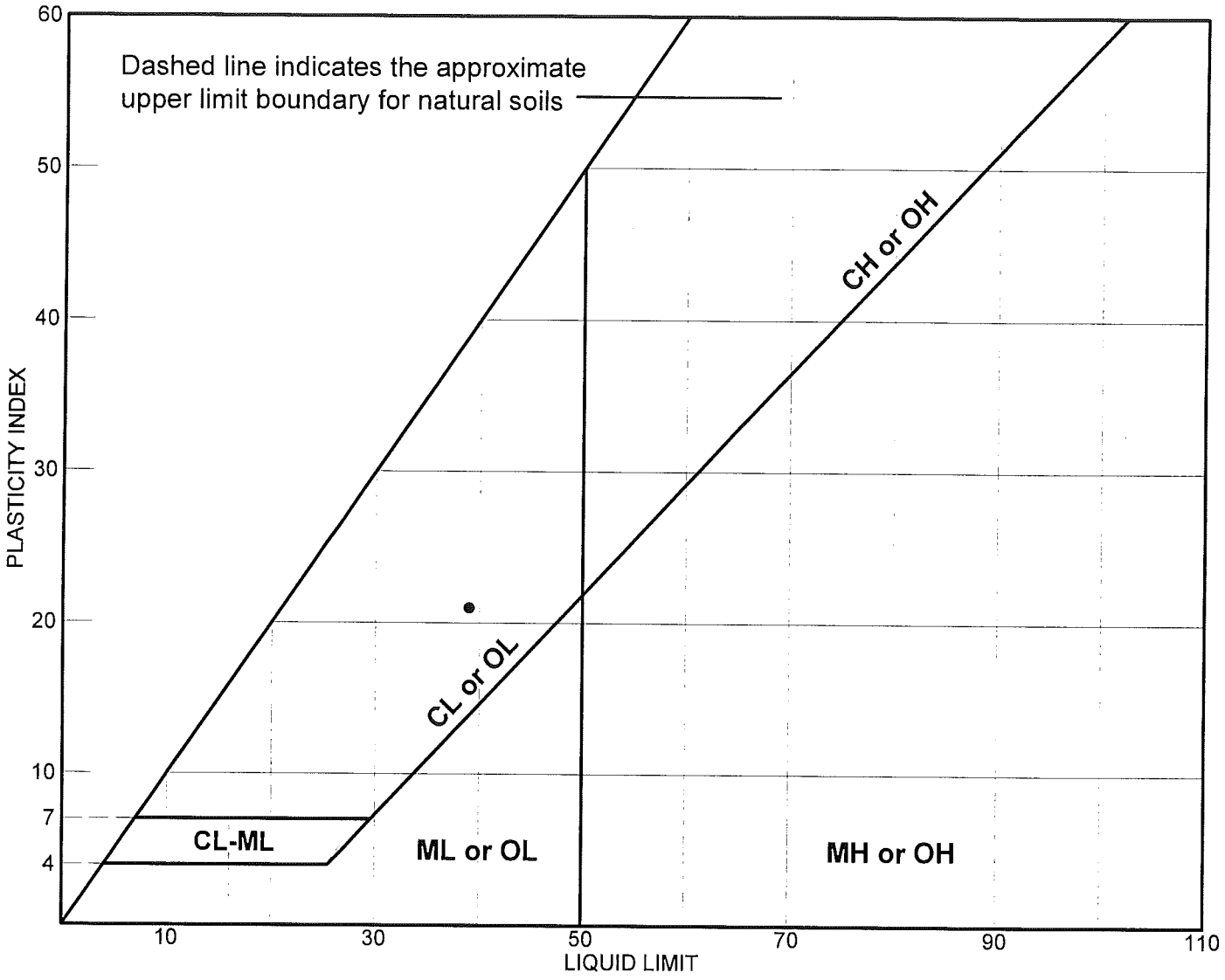
Remarks:
Boring No. 9

Particle Size Distribution Report

SOUTHERN COMPANY

Lab No. 2

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Ash Pond Dike	2	24-26 feet		18	39	21	CL

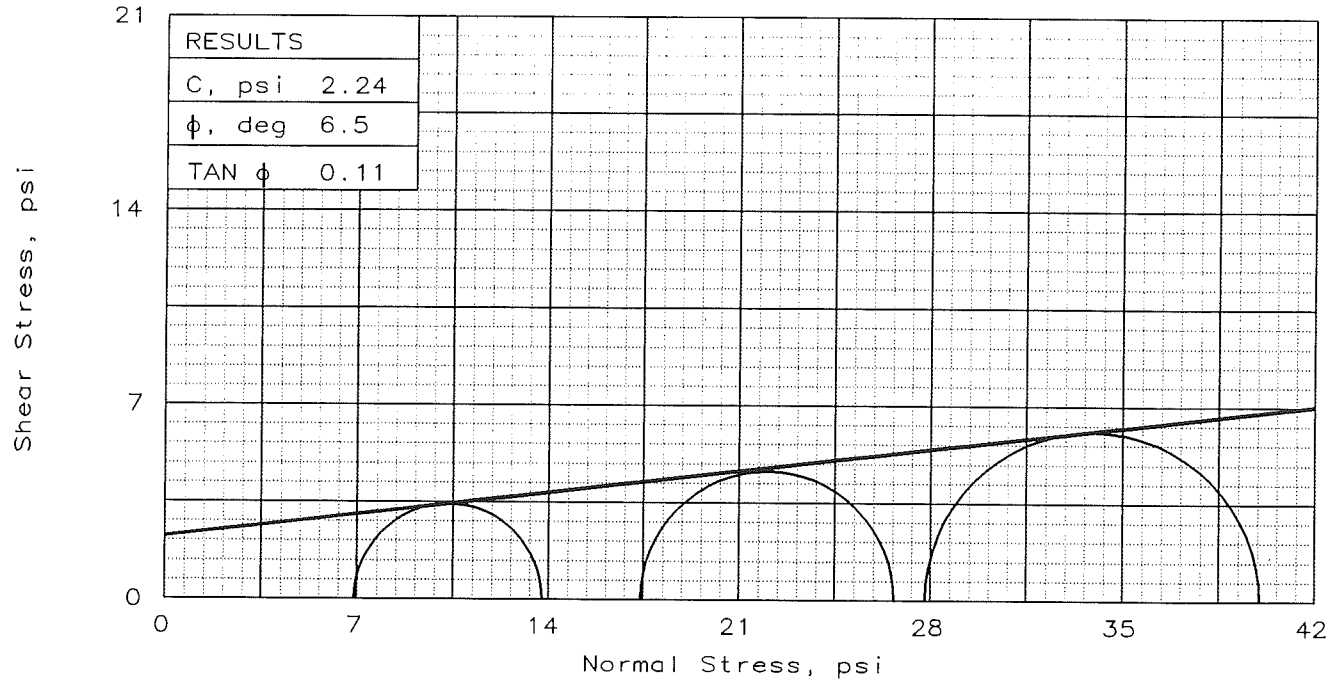
LIQUID AND PLASTIC LIMITS TEST REPORT

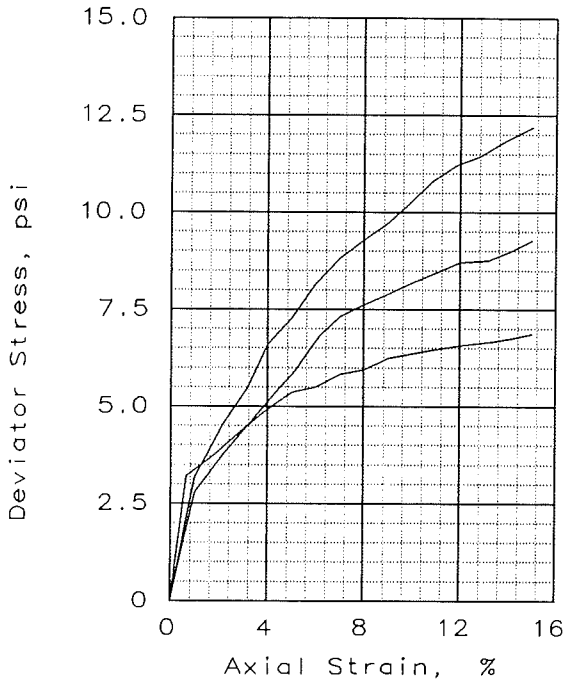
SOUTHERN COMPANY

Client: Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Project No.: 2051 **Lab No.** 2





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	22.5	21.2	20.2
	DRY DENSITY, pcf	100.7	104.4	107.1
	SATURATION, %	88.7	91.3	93.5
	VOID RATIO	0.692	0.633	0.591
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	3.00
AT TEST	WATER CONTENT, %	22.5	21.2	20.2
	DRY DENSITY, pcf	100.7	104.4	107.1
	SATURATION, %	88.7	91.3	93.5
	VOID RATIO	0.692	0.633	0.591
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	3.00
Strain rate, %/min		0.0010	0.0010	0.0010
BACK PRESSURE, psi		0.0	0.0	0.0
CELL PRESSURE, psi		6.9	17.4	27.8
FAIL. STRESS, psi		6.9	9.3	12.2
ULT. STRESS, psi				
σ_1 FAILURE, psi		13.8	26.7	40.0
σ_3 FAILURE, psi		6.9	17.4	27.8

TYPE OF TEST:
Unconsolidated Undrained
SAMPLE TYPE: UD
DESCRIPTION: Light brown sandy lean clay
LL= 39 PL= 18 PI= 21
SPECIFIC GRAVITY= 2.73
REMARKS:

Lab No: 2

CLIENT: Southern Company

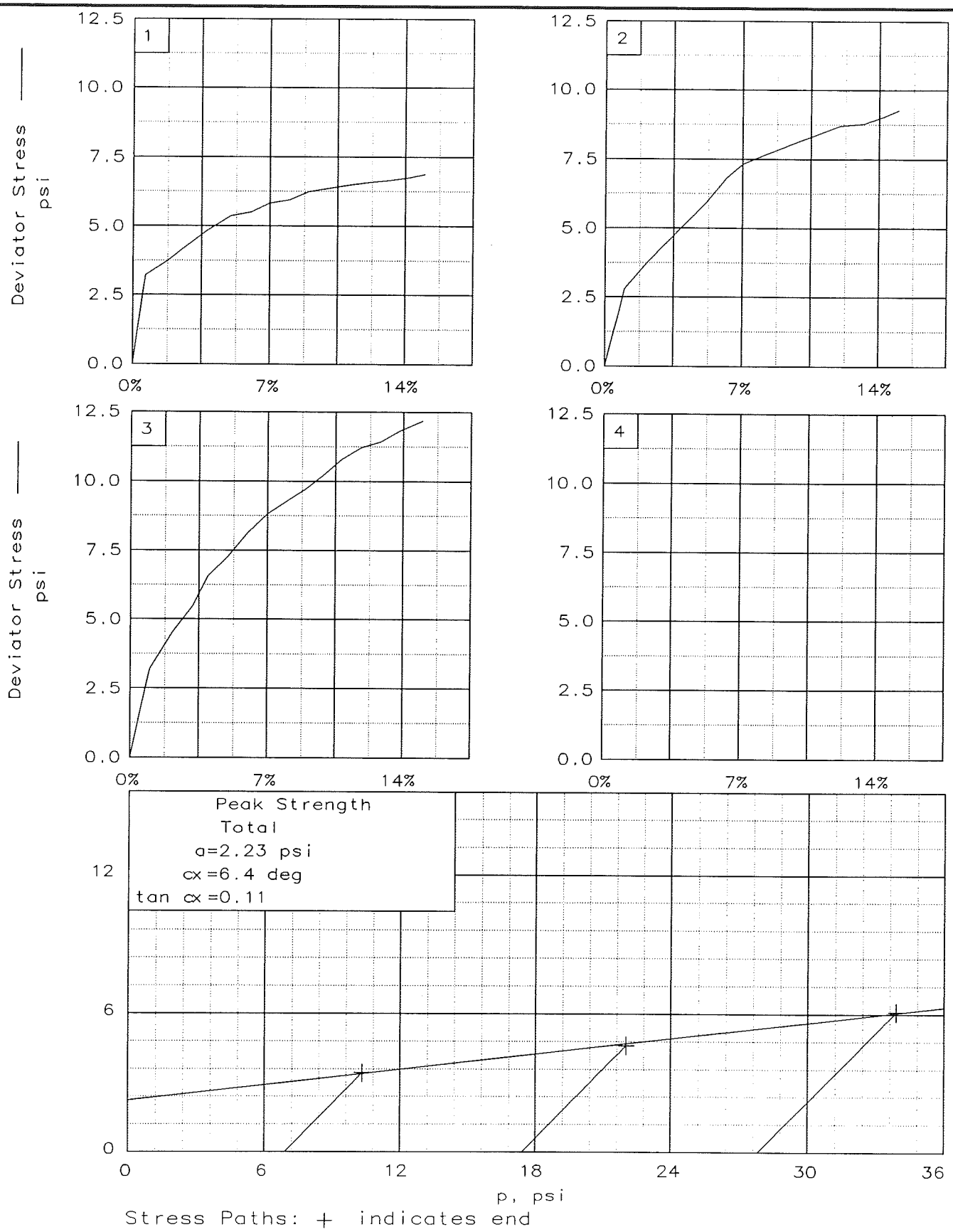
PROJECT: GPCo - Plant Bowen Ash Pond Dike

SAMPLE LOCATION: Boring #9
Depth: 24-26 feet

PROJ. NO.: 2051 DATE: 10/02/2002

TRIAXIAL SHEAR TEST REPORT

SOUTHERN COMPANY SERVICES



Client: Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Location: Boring #9 Depth: 24-26 feet

File: GPBAPD02 Project No.: 2051 Lab No: 2

Project and Sample Data

Date: 10/02/2002
Client: Southern Company
Project: GPCo - Plant Bowen Ash Pond Dike
Sample location: Boring #9 Depth: 24-26 feet
Sample description: Light brown sandy lean clay
Remarks:

Fig no.: 2 2nd page Fig no. (if applicable): 2
Type of sample: UD
Specific gravity= 2.73 LL= 39 PL= 18 PI= 21
Test method: ASTM - Method A

Specimen Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Final
Wt. moist soil and tare:	117.930		117.930
Wt. dry soil and tare:	101.840		101.840
Wt. of tare:	30.280		30.280
Weight, gms:	149.6		
Diameter, in:	1.400	1.400	
Area, in²:	1.539	1.539	
Height, in:	3.000	3.000	
Net decrease in height, in:		0.000	
% Moisture:	22.5	22.5	22.5
Wet density, pcf:	123.4	123.4	
Dry density, pcf:	100.7	100.7	
Void ratio:	0.6919	0.6919	
% Saturation:	88.7	88.7	

Test Readings Data for Specimen No. 1

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.3108 lbs per input unit
Secondary load ring constant= 0.77882 lbs per input unit
Crossover reading for secondary load ring= 474 input units
Cell pressure = 6.90 psi
Back pressure = 0.00 psi
Effective confining stress = 6.90 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 6.86 psi at reading no. 15
ULT. STRESS = not selected

Test Readings Data for Specimen No. 1

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Principal Stresses Minor psi	Major psi	1:3 Ratio	P psi	Q psi
	0.0	0.000	7.0	0.0	0.0	0.00	6.90	6.90	1.00	6.90	0.00
1	20.0	0.020	23.0	5.0	0.7	3.21	6.90	10.11	1.47	8.50	1.60
2	55.0	0.055	26.0	5.9	1.8	3.77	6.90	10.67	1.55	8.78	1.88
3	85.0	0.085	29.0	6.8	2.8	4.32	6.90	11.22	1.63	9.06	2.16
4	115.0	0.115	32.0	7.8	3.8	4.85	6.90	11.75	1.70	9.33	2.43
5	150.0	0.150	35.0	8.7	5.0	5.37	6.90	12.27	1.78	9.59	2.69
6	180.0	0.180	36.0	9.0	6.0	5.50	6.90	12.40	1.80	9.65	2.75
7	210.0	0.210	38.0	9.6	7.0	5.82	6.90	12.72	1.84	9.81	2.91
8	240.0	0.240	39.0	9.9	8.0	5.94	6.90	12.84	1.86	9.87	2.97
9	270.0	0.270	41.0	10.6	9.0	6.25	6.90	13.15	1.91	10.02	3.12
10	300.0	0.300	42.0	10.9	10.0	6.36	6.90	13.26	1.92	10.08	3.18
11	330.0	0.330	43.0	11.2	11.0	6.47	6.90	13.37	1.94	10.13	3.23
12	360.0	0.360	44.0	11.5	12.0	6.57	6.90	13.47	1.95	10.19	3.29
13	395.0	0.395	45.0	11.8	13.2	6.66	6.90	13.56	1.97	10.23	3.33
14	425.0	0.425	46.0	12.1	14.2	6.76	6.90	13.66	1.98	10.28	3.38
15	450.0	0.450	47.0	12.4	15.0	6.86	6.90	13.76	1.99	10.33	3.43

Specimen Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Final
moist soil and tare:	112.720		112.720
dry soil and tare:	98.330		98.330
Wt. of tare:	30.310		30.310
Weight, gms:	153.3		
Diameter, in:	1.400	1.400	
Area, in²:	1.539	1.539	
Height, in:	3.000	3.000	
Net decrease in height, in:		0.000	
% Moisture:	21.2	21.2	21.2
Wet density, pcf:	126.5	126.5	
Dry density, pcf:	104.4	104.4	
Void ratio:	0.6328	0.6328	
% Saturation:	91.3	91.3	

Test Readings Data for Specimen No. 2

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.3108 lbs per input unit
Secondary load ring constant= 0.778822 lbs per input unit
Crossover reading for secondary load ring= 474 input units
Cell pressure = 17.40 psi
Back pressure = 0.00 psi
Effective confining stress = 17.40 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 9.27 psi at reading no. 15
ULT. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Principal Stresses Minor psi	Major psi	1:3 Ratio	P psi	Q psi
0	0.0	0.000	14.0	0.0	0.0	0.00	17.40	17.40	1.00	17.40	0.00
1	30.0	0.030	28.0	4.4	1.0	2.80	17.40	20.20	1.16	18.80	1.40
2	65.0	0.065	33.0	5.9	2.2	3.75	17.40	21.15	1.22	19.28	1.88
3	95.0	0.095	37.0	7.1	3.2	4.50	17.40	21.90	1.26	19.65	2.25
4	125.0	0.125	41.0	8.4	4.2	5.22	17.40	22.62	1.30	20.01	2.61
5	155.0	0.155	45.0	9.6	5.2	5.94	17.40	23.34	1.34	20.37	2.97
6	185.0	0.185	50.0	11.2	6.2	6.82	17.40	24.22	1.39	20.81	3.41
7	210.0	0.210	53.0	12.1	7.0	7.32	17.40	24.72	1.42	21.06	3.66
8	240.0	0.240	55.0	12.7	8.0	7.62	17.40	25.02	1.44	21.21	3.81
9	270.0	0.270	57.0	13.4	9.0	7.90	17.40	25.30	1.45	21.35	3.95
10	300.0	0.300	59.0	14.0	10.0	8.18	17.40	25.58	1.47	21.49	4.09
11	330.0	0.330	61.0	14.6	11.0	8.45	17.40	25.85	1.49	21.62	4.22
12	360.0	0.360	63.0	15.2	12.0	8.71	17.40	26.11	1.50	21.75	4.35
13	395.0	0.395	64.0	15.5	13.2	8.77	17.40	26.17	1.50	21.78	4.38
14	425.0	0.425	66.0	16.2	14.2	9.01	17.40	26.41	1.52	21.91	4.51
15	450.0	0.450	68.0	16.8	15.0	9.27	17.40	26.67	1.53	22.03	4.63

Specimen Parameters for Specimen No. 3

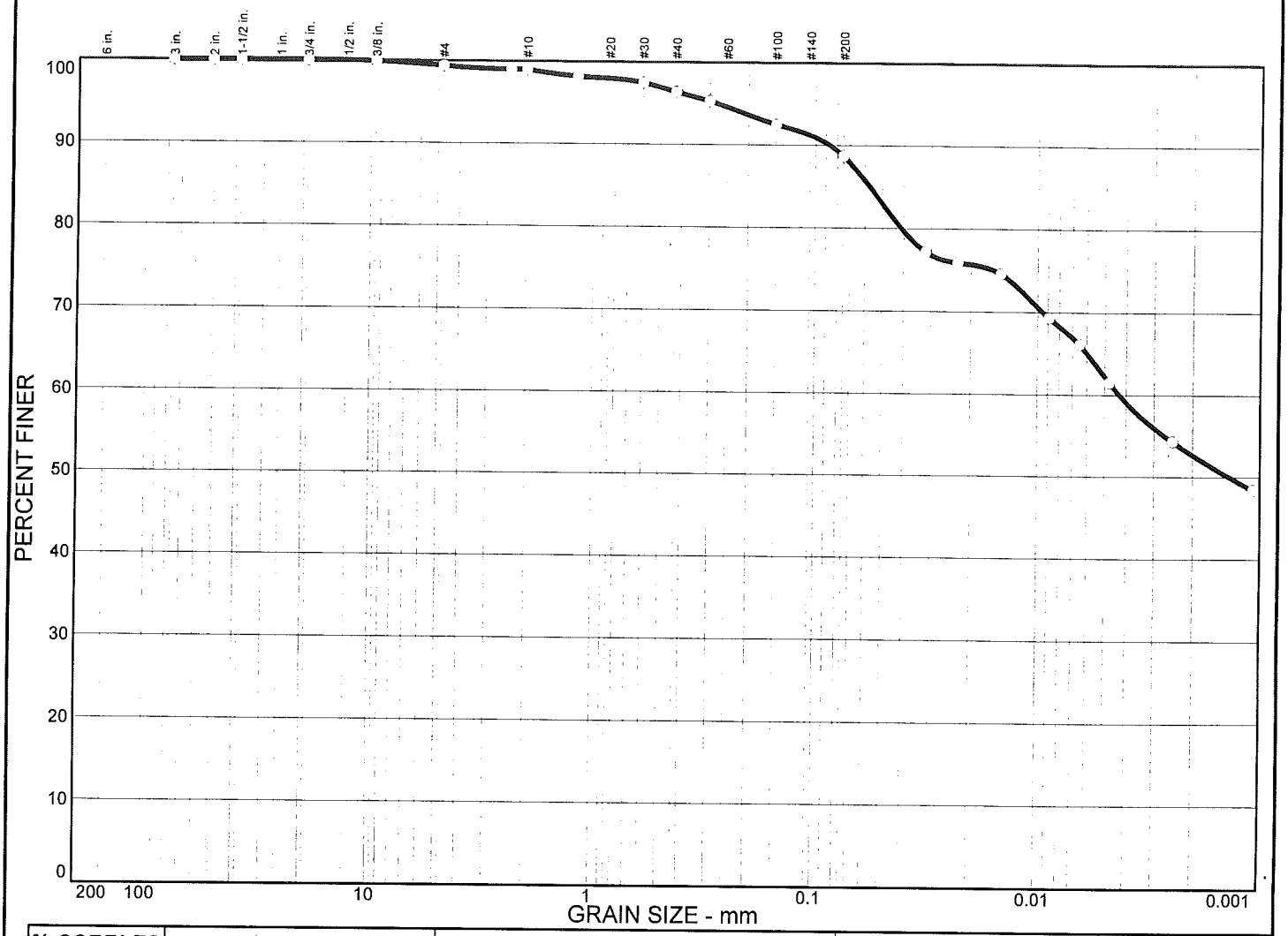
Specimen Parameter	Initial	Saturated	Final
W' moist soil and tare:	138.540		138.540
(dry soil and tare:	120.330		120.330
Wt. of tare:	30.370		30.370
Weight, gms:	156.2		
Diameter, in:	1.400	1.400	
Area, in²:	1.539	1.539	
Height, in:	3.000	3.000	
Net decrease in height, in:		0.000	
% Moisture:	20.2	20.2	20.2
Wet density, pcf:	128.8	128.8	
Dry density, pcf:	107.1	107.1	
Void ratio:	0.5909	0.5909	
% Saturation:	93.5	93.5	

Test Readings Data for Specimen No. 3

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.3108 lbs per input unit
Secondary load ring constant= 0.77882 lbs per input unit
Crossover reading for secondary load ring= 474 input units
Cell pressure = 27.80 psi
Back pressure = 0.00 psi
Effective confining stress = 27.80 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 12.18 psi at reading no. 15
ULT. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Principal Stresses Minor psi	Major psi	1:3 Ratio	P psi	Q psi
0	0.0	0.000	18.0	0.0	0.0	0.00	27.80	27.80	1.00	27.80	0.00
1	30.0	0.030	34.0	5.0	1.0	3.20	27.80	31.00	1.12	29.40	1.60
2	65.0	0.065	41.0	7.1	2.2	4.54	27.80	32.34	1.16	30.07	2.27
3	95.0	0.095	46.0	8.7	3.2	5.47	27.80	33.27	1.20	30.54	2.74
4	120.0	0.120	52.0	10.6	4.0	6.59	27.80	34.39	1.24	31.10	3.30
5	150.0	0.150	56.0	11.8	5.0	7.29	27.80	35.09	1.26	31.44	3.64
6	180.0	0.180	61.0	13.4	6.0	8.16	27.80	35.96	1.29	31.88	4.08
7	210.0	0.210	65.0	14.6	7.0	8.83	27.80	36.63	1.32	32.21	4.41
8	240.0	0.240	68.0	15.5	8.0	9.29	27.80	37.09	1.33	32.44	4.64
9	270.0	0.270	71.0	16.5	9.0	9.74	27.80	37.54	1.35	32.67	4.87
10	295.0	0.295	74.0	17.4	9.8	10.19	27.80	37.99	1.37	32.90	5.10
11	325.0	0.325	78.0	18.6	10.8	10.80	27.80	38.60	1.39	33.20	5.40
12	355.0	0.355	81.0	19.6	11.8	11.21	27.80	39.01	1.40	33.41	5.61
13	385.0	0.385	83.0	20.2	12.8	11.44	27.80	39.24	1.41	33.52	5.72
14	415.0	0.415	86.0	21.1	13.8	11.83	27.80	39.63	1.43	33.71	5.91
15	450.0	0.450	89.0	22.1	15.0	12.18	27.80	39.98	1.44	33.89	6.09

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.6	10.7	26.5	62.2

LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
58	26	0.0569	0.0043	0.0014					

MATERIAL DESCRIPTION	USCS	AASHTO
Light Brown Fat clay	CH	A-7-6(32)

Project No. 2051 **Client:** Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Source: Ash Pond Dike **Sample No.:** 3 **Elev./Depth:** 13.5-15.5 feet

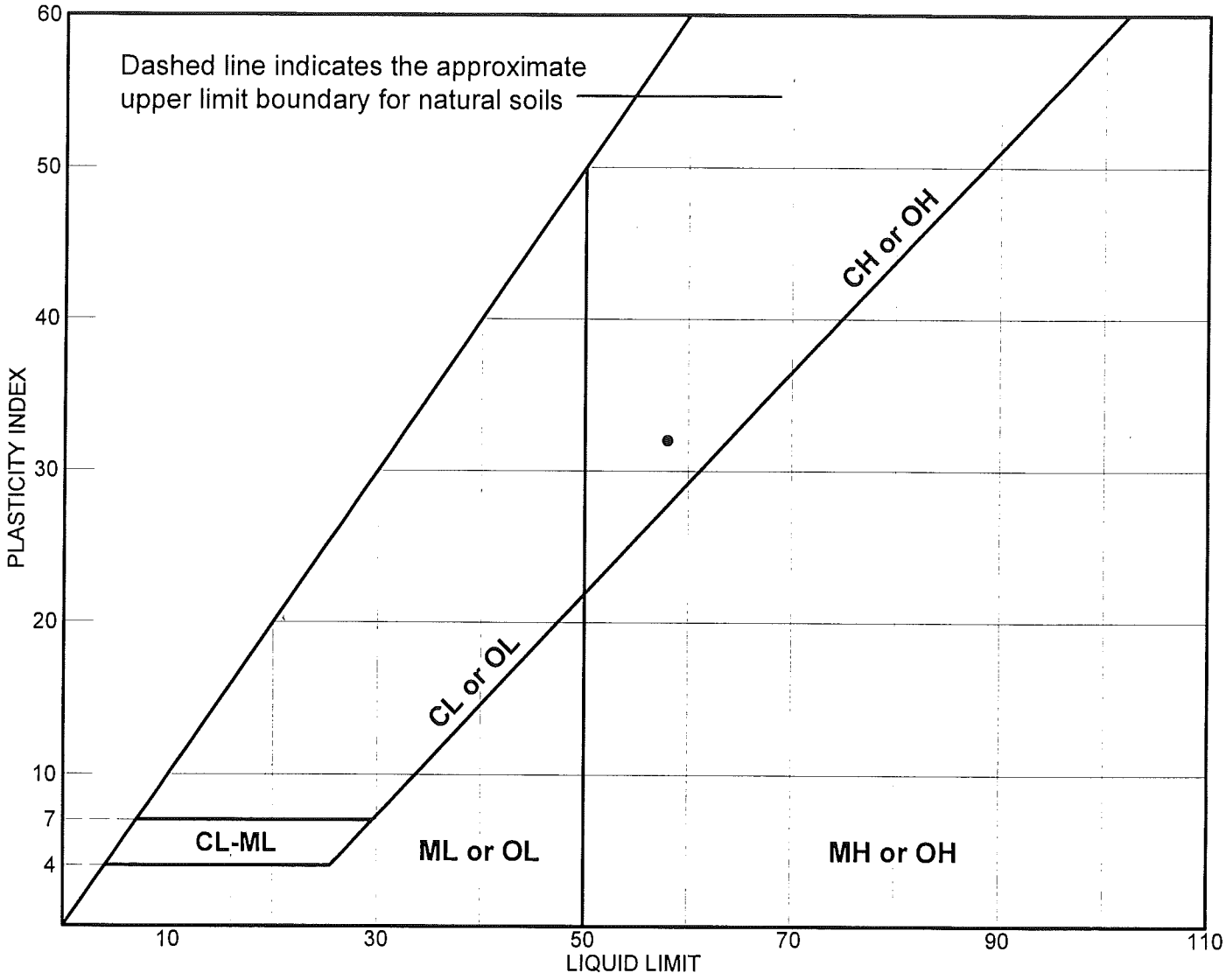
Remarks:
Boring No. 10

Particle Size Distribution Report

SOUTHERN COMPANY

Lab No. 3

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Ash Pond Dike	3	13.5-15.5 feet		26	58	32	CH

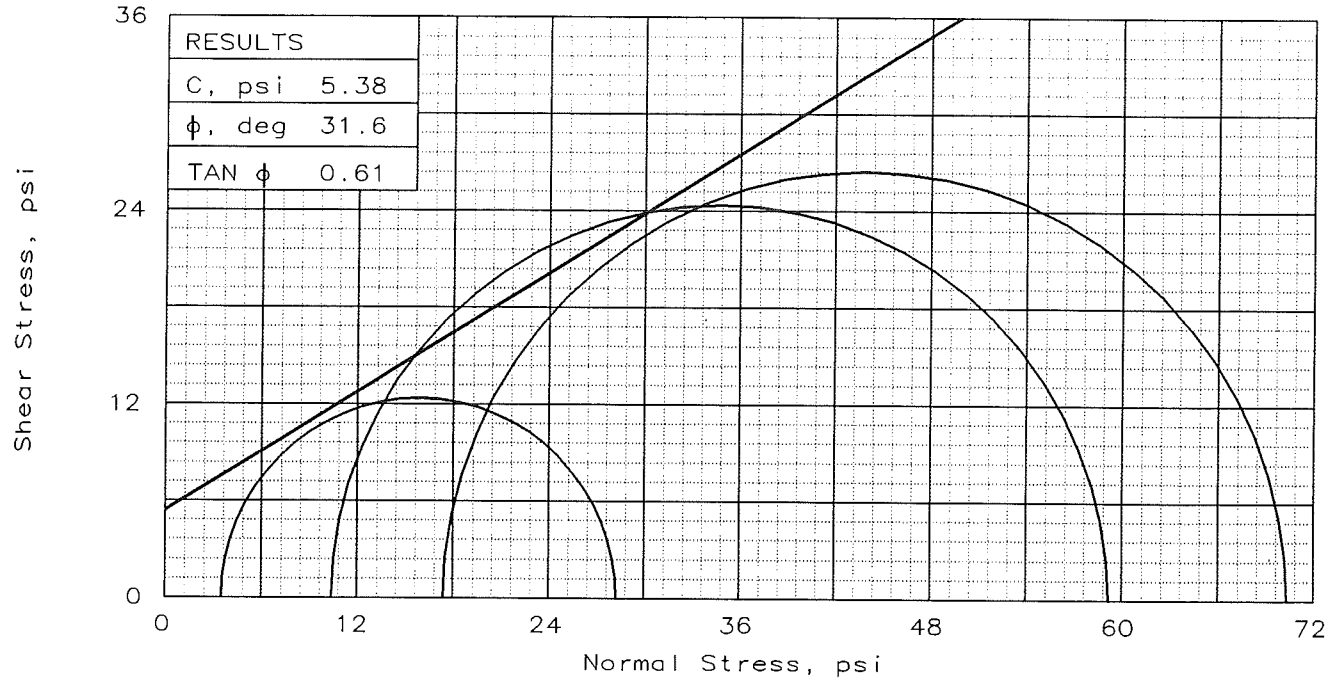
LIQUID AND PLASTIC LIMITS TEST REPORT

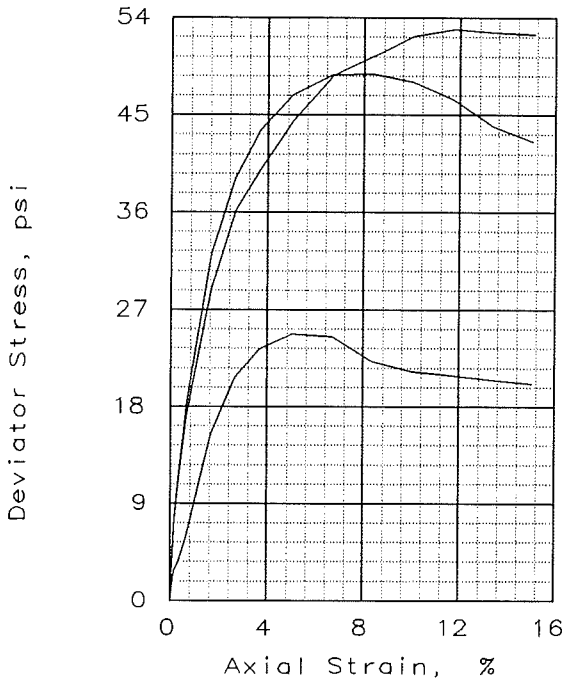
SOUTHERN COMPANY

Client: Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Project No.: 2051 **Lab No.** 3





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	27.4	26.8	22.4
	DRY DENSITY, pcf	92.1	95.0	101.7
	SATURATION, %	88.8	93.2	91.6
	VOID RATIO	0.838	0.780	0.663
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	3.00
AT TEST	WATER CONTENT, %	27.4	26.8	22.4
	DRY DENSITY, pcf	92.8	96.2	103.8
	SATURATION, %	90.3	95.8	96.4
	VOID RATIO	0.823	0.759	0.630
	DIAMETER, in	1.40	1.39	1.39
	HEIGHT, in	3.00	2.99	2.98
Strain rate, %/min		0.0010	0.0010	0.0010
BACK PRESSURE, psi		0.0	0.0	0.0
CELL PRESSURE, psi		3.5	10.4	17.4
FAIL. STRESS, psi		24.7	48.7	52.9
ULT. STRESS, psi				
σ_1 FAILURE, psi		28.2	59.1	70.3
σ_3 FAILURE, psi		3.5	10.4	17.4

TYPE OF TEST:
Consolidated Drained
SAMPLE TYPE: UD
DESCRIPTION: Light brown fat clay
LL= 58 PL= 26 PI= 32
SPECIFIC GRAVITY= 2.71
REMARKS:

Lob No: 3

CLIENT: Southern Company

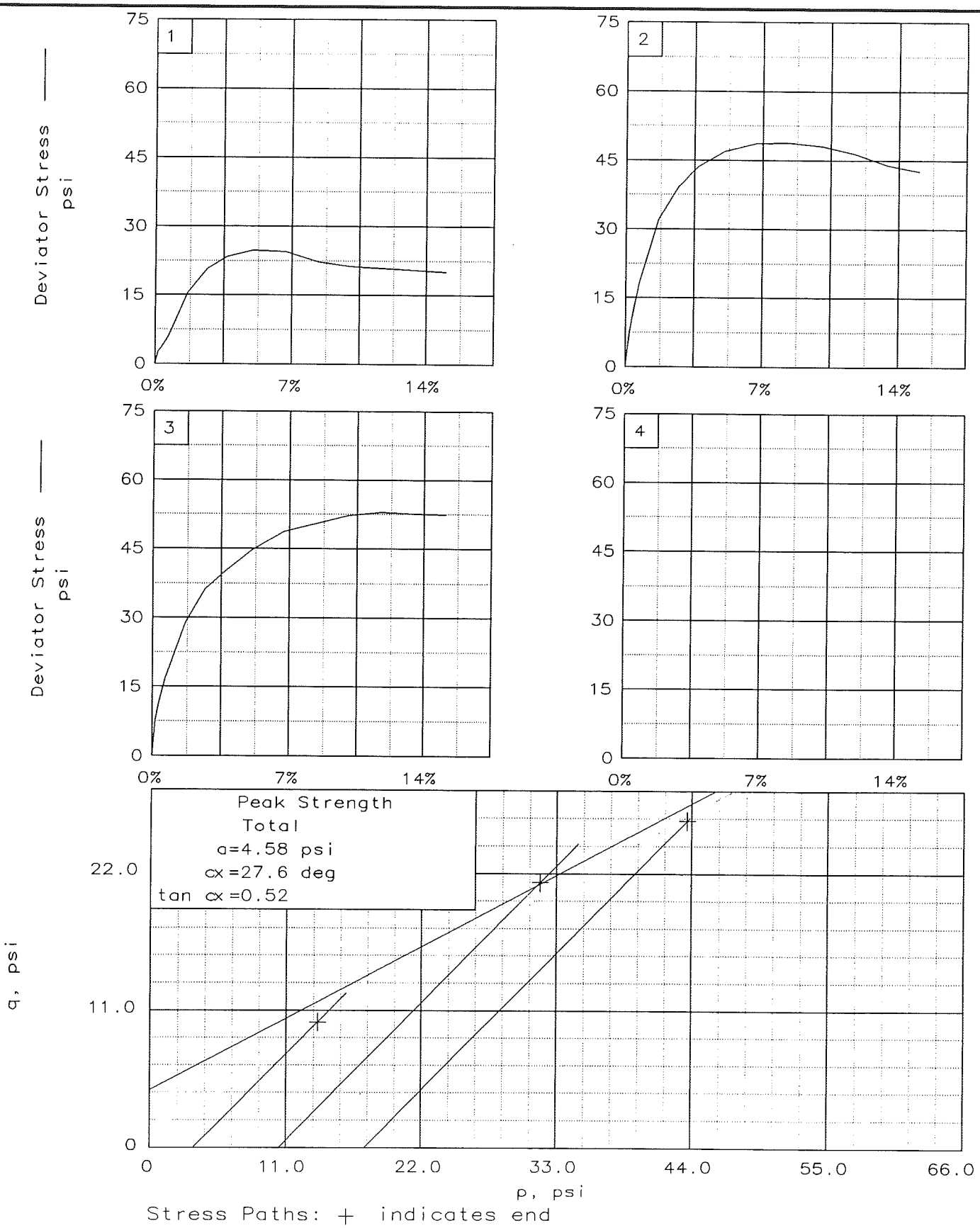
PROJECT: GPCo - Plant Bowen Ash Pond Dike

SAMPLE LOCATION: Boring #10
Depth: 13.5 - 15.5 feet

PROJ. NO.: 2051 DATE: 10/02/2002

TRIAXIAL SHEAR TEST REPORT

SOUTHERN COMPANY SERVICES



Client: Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Locotion: Boring #10 Depth: 13.5 - 15.5 feet

File: GPBAPD03 Project No.: 2051 Lab No: 3

Project and Sample Data

Date: 10/02/2002
Client: Southern Company
Project: GPCo - Plant Bowen Ash Pond Dike
Sample location: Boring #10 Depth: 13.5 - 15.5 feet
Sample description: Light brown fat clay
Remarks:

Fig no.: 3 2nd page Fig no. (if applicable): 3
Type of sample: UD
Specific gravity= 2.71 LL= 58 PL= 26 PI= 32
Test method: ASTM - Method A

Specimen Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Wt. moist soil and tare:	111.230			111.230
Wt. dry soil and tare:	93.820			93.820
Wt. of tare:	30.360			30.360
Weight, gms:	142.2			
Diameter, in:	1.400	1.400	1.396	
Area, in²:	1.539	1.539	1.530	
Height, in:	3.000	3.000	2.995	
Net decrease in height, in:		0.000	0.005	
Net decrease in water volume, cc:			0.600	
% Moisture:	27.4	28.0	27.4	27.4
Wet density, pcf:	117.3	117.8	118.3	
Dry density, pcf:	92.1	92.1	92.8	
Void ratio:	0.8377	0.8377	0.8231	
% Saturation:	88.8	90.5	90.3	

Test Readings Data for Specimen No. 1

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.30179 lbs per input unit
Secondary load ring constant= 0.72586 lbs per input unit
Crossover reading for secondary load ring= 462 input units
Consolidation cell pressure = 3.50 psi
Consolidation back pressure = 0.00 psi
Consolidation effective confining stress = 3.50 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 24.74 psi at reading no. 7
ULT. STRESS = not selected

Test Readings Data for Specimen No. 1

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Principal Stresses Minor psi	Major psi	1:3 Ratio	P psi	Q psi
	0.0	0.000	6.0	0.0	0.0	0.00	3.50	3.50	1.00	3.50	0.00
1	5.0	0.005	20.0	4.2	0.2	2.76	3.50	6.26	1.79	4.88	1.38
2	10.0	0.010	24.0	5.4	0.3	3.54	3.50	7.04	2.01	5.27	1.77
3	20.0	0.020	36.0	9.1	0.7	5.88	3.50	9.38	2.68	6.44	2.94
4	50.0	0.050	86.0	24.1	1.7	15.52	3.50	19.02	5.43	11.26	7.76
5	80.0	0.080	114.0	32.6	2.7	20.74	3.50	24.24	6.93	13.87	10.37
6	110.0	0.110	129.0	37.1	3.7	23.37	3.50	26.87	7.68	15.19	11.69
7	150.0	0.150	138.0	39.8	5.0	24.74	3.50	28.24	8.07	15.87	12.37
8	200.0	0.200	139.0	40.1	6.7	24.49	3.50	27.99	8.00	15.74	12.24
9	250.0	0.250	129.0	37.1	8.3	22.24	3.50	25.74	7.35	14.62	11.12
10	300.0	0.300	126.0	36.2	10.0	21.30	3.50	24.80	7.09	14.15	10.65
11	350.0	0.350	126.0	36.2	11.7	20.91	3.50	24.41	6.97	13.95	10.45
12	400.0	0.400	126.0	36.2	13.4	20.51	3.50	24.01	6.86	13.76	10.26
13	450.0	0.450	126.0	36.2	15.0	20.12	3.50	23.62	6.75	13.56	10.06

Specimen Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Consolidated	Final
moist soil and tare:	128.020			128.020
dry soil and tare:	107.370			107.370
Wt. of tare:	30.410			30.410
Weight, gms:	146.1			
Diameter, in:	1.400	1.400	1.394	
Area, in²:	1.539	1.539	1.525	
Height, in:	3.000	3.000	2.992	
Net decrease in height, in:		0.000	0.008	
Net decrease in water volume, cc:			0.900	
% Moisture:	26.8	27.6	26.8	26.8
Wet density, pcf:	120.5	121.3	122.0	
Dry density, pcf:	95.0	95.0	96.2	
Void ratio:	0.7800	0.7800	0.7589	
% Saturation:	93.2	95.9	95.8	

Test Readings Data for Specimen No. 2

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.311999 lbs per input unit
Secondary load ring constant= 0.728246 lbs per input unit
Crossover reading for secondary load ring= 480 input units
Consolidation cell pressure = 10.40 psi
Consolidation back pressure = 0.00 psi
Consolidation effective confining stress = 10.40 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 48.74 psi at reading no. 9
. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Principal Stresses Minor psi	Principal Stresses Major psi	Principal Stresses 1:3 Ratio	P psi	Q psi
0	0.0	0.000	9.0	0.0	0.0	0.00	10.40	10.40	1.00	10.40	0.00
1	5.0	0.005	43.0	10.6	0.2	6.94	10.40	17.34	1.67	13.87	3.47
2	10.0	0.010	64.0	17.2	0.3	11.21	10.40	21.61	2.08	16.01	5.61
3	20.0	0.020	98.0	27.8	0.7	18.09	10.40	28.49	2.74	19.44	9.04
4	50.0	0.050	169.0	49.9	1.7	32.18	10.40	42.58	4.09	26.49	16.09
5	80.0	0.080	206.0	61.5	2.7	39.22	10.40	49.62	4.77	30.01	19.61
6	110.0	0.110	230.0	69.0	3.7	43.55	10.40	53.95	5.19	32.17	21.77
7	150.0	0.150	250.0	75.2	5.0	46.83	10.40	57.23	5.50	33.82	23.42
8	200.0	0.200	264.0	79.6	6.7	48.68	10.40	59.08	5.68	34.74	24.34
9	250.0	0.250	269.0	81.1	8.4	48.74	10.40	59.14	5.69	34.77	24.37
10	300.0	0.300	270.0	81.4	10.0	48.04	10.40	58.44	5.62	34.42	24.02
11	350.0	0.350	266.0	80.2	11.7	46.42	10.40	56.82	5.46	33.61	23.21
12	400.0	0.400	257.0	77.4	13.4	43.95	10.40	54.35	5.23	32.38	21.98
13	450.0	0.450	254.0	76.4	15.0	42.58	10.40	52.98	5.09	31.69	21.29

Specimen Parameters for Specimen No. 3

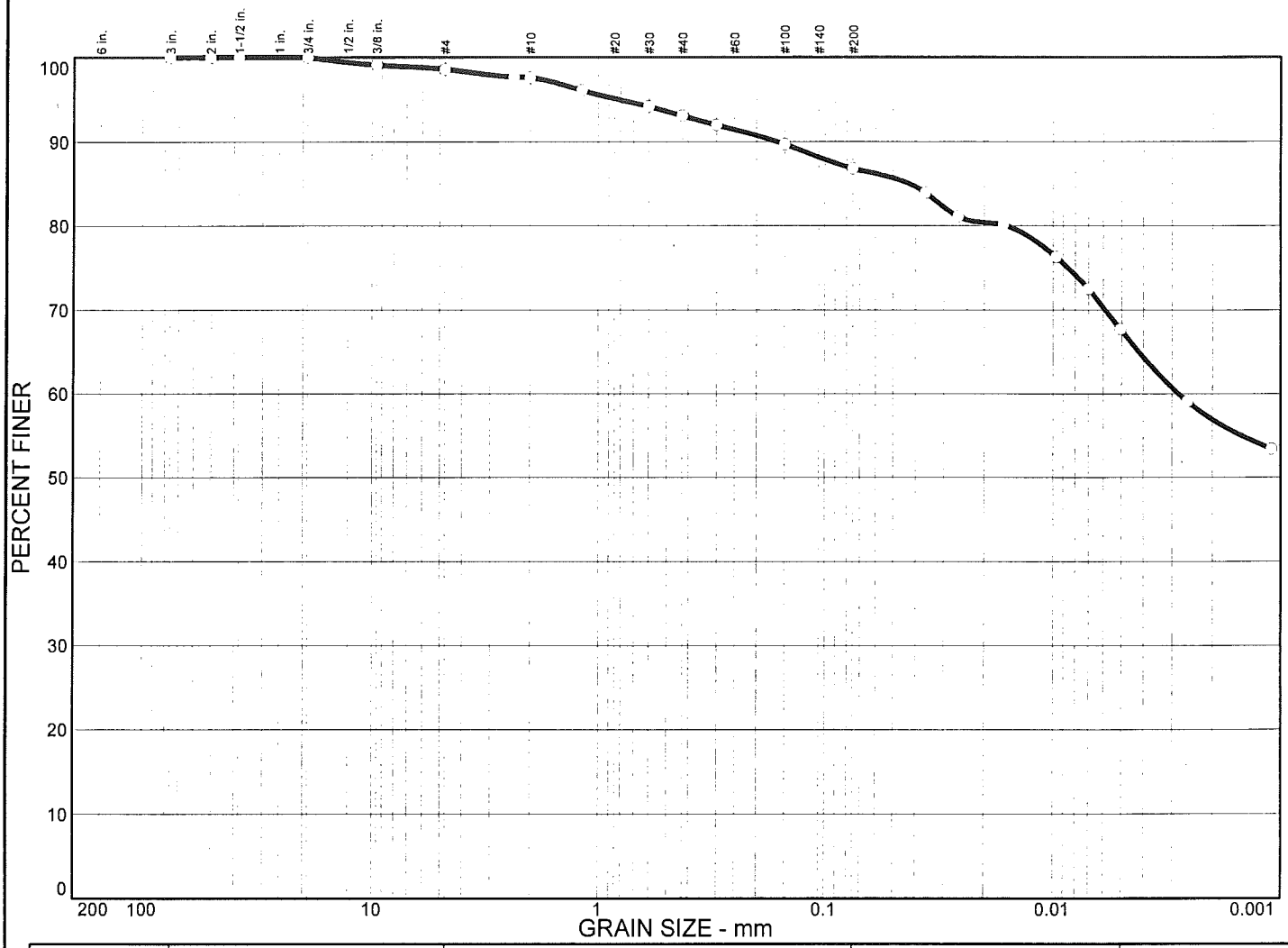
Specimen Parameter	Initial	Saturated	Consolidated	Final
moist soil and tare:	119.800			119.800
dry soil and tare:	103.410			103.410
Wt. of tare:	30.300			30.300
Weight, gms:	151.0			
Diameter, in:	1.400	1.400	1.391	
Area, in²:	1.539	1.539	1.519	
Height, in:	3.000	3.000	2.980	
Net decrease in height, in:		0.000	0.020	
Net decrease in water volume, cc:			1.500	
% Moisture:	22.4	23.6	22.4	22.4
Wet density, pcf:	124.5	125.8	127.1	
Dry density, pcf:	101.7	101.7	103.8	
Void ratio:	0.6629	0.6629	0.6299	
% Saturation:	91.6	96.6	96.4	

Test Readings Data for Specimen No. 3

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.310809 lbs per input unit
Secondary load ring constant= 0.778824 lbs per input unit
Crossover reading for secondary load ring= 474 input units
Consolidation cell pressure = 17.40 psi
Consolidation back pressure = 0.00 psi
Consolidation effective confining stress = 17.40 psi
Strain rate, %/min = 0.00
F^TL. STRESS = 52.91 psi at reading no. 11
. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Principal Stresses Minor psi	Principal Stresses Major psi	1:3 Ratio	P psi	Q psi
0	0.0	0.000	20.0	0.0	0.0	0.00	17.40	17.40	1.00	17.40	0.00
1	5.0	0.005	58.0	11.8	0.2	7.76	17.40	25.16	1.45	21.28	3.88
2	10.0	0.010	76.0	17.4	0.3	11.42	17.40	28.82	1.66	23.11	5.71
3	20.0	0.020	104.0	26.1	0.7	17.07	17.40	34.47	1.98	25.94	8.54
4	50.0	0.050	164.0	44.8	1.7	28.97	17.40	46.37	2.66	31.89	14.49
5	80.0	0.080	202.0	56.6	2.7	36.24	17.40	53.64	3.08	35.52	18.12
6	110.0	0.110	223.0	63.1	3.7	40.00	17.40	57.40	3.30	37.40	20.00
7	150.0	0.150	249.0	71.2	5.0	44.50	17.40	61.90	3.56	39.65	22.25
8	200.0	0.200	275.0	79.3	6.7	48.68	17.40	66.08	3.80	41.74	24.34
9	250.0	0.250	289.0	83.6	8.4	50.42	17.40	67.82	3.90	42.61	25.21
10	300.0	0.300	304.0	88.3	10.1	52.26	17.40	69.66	4.00	43.53	26.13
11	350.0	0.350	313.0	91.1	11.7	52.91	17.40	70.31	4.04	43.86	26.46
12	400.0	0.400	317.0	92.3	13.4	52.61	17.40	70.01	4.02	43.71	26.31
13	450.0	0.450	322.0	93.9	15.1	52.46	17.40	69.86	4.02	43.63	26.23

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	1.4	11.8	19.3	67.5

LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
65	29	0.0427	0.0028						

MATERIAL DESCRIPTION	USCS	AASHTO
Brown Fat clay	CH	A-7-6(36)

Project No. 2051 **Client:** Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Source: Ash Pond Dike **Sample No.:** 4 **Elev./Depth:** 37-39 feet

Remarks:

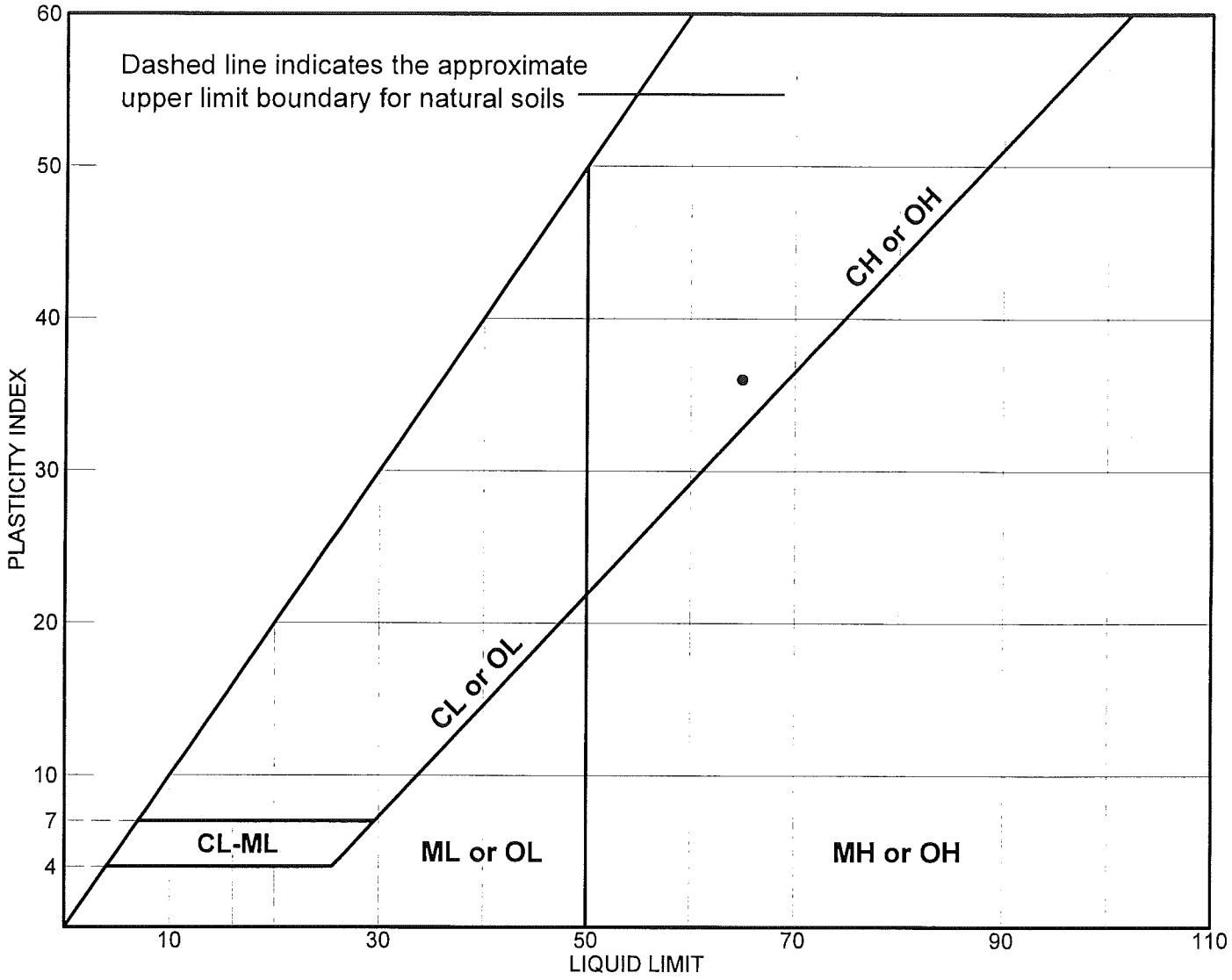
Boring No. 2

Particle Size Distribution Report

SOUTHERN COMPANY

Lab No. 4

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Ash Pond Dike	4	37-39 feet		29	65	36	CH

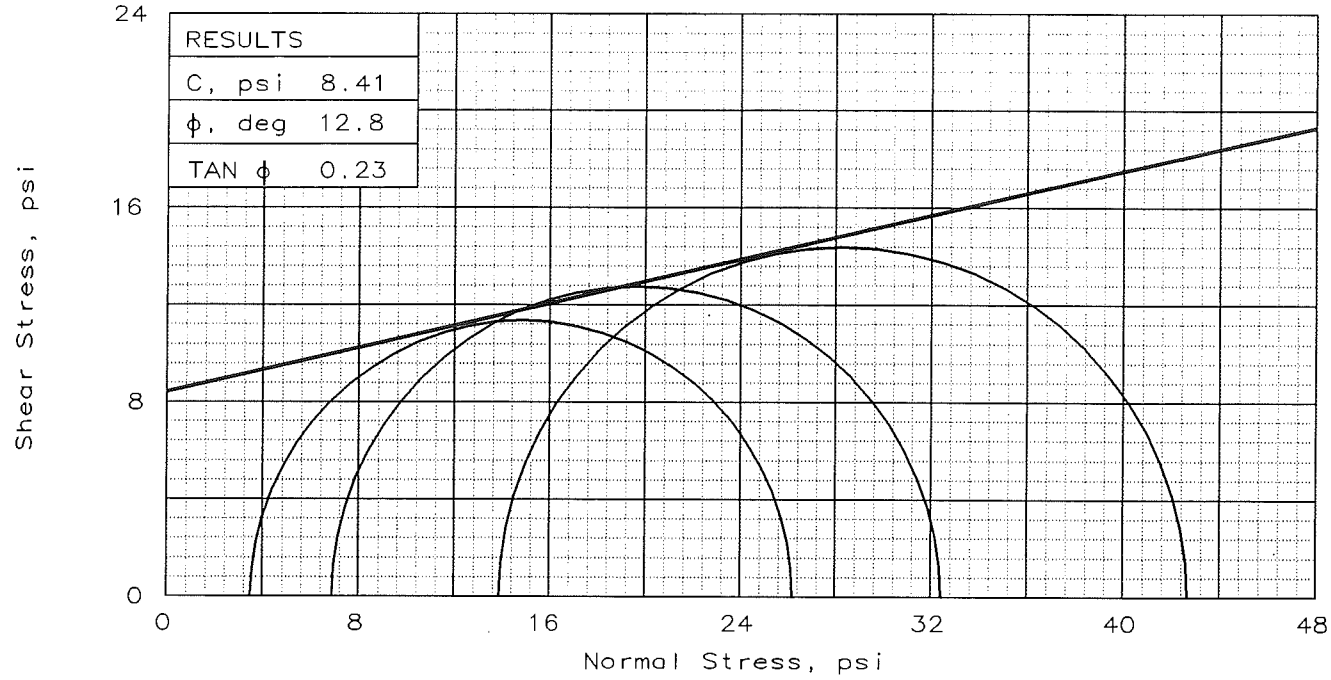
LIQUID AND PLASTIC LIMITS TEST REPORT

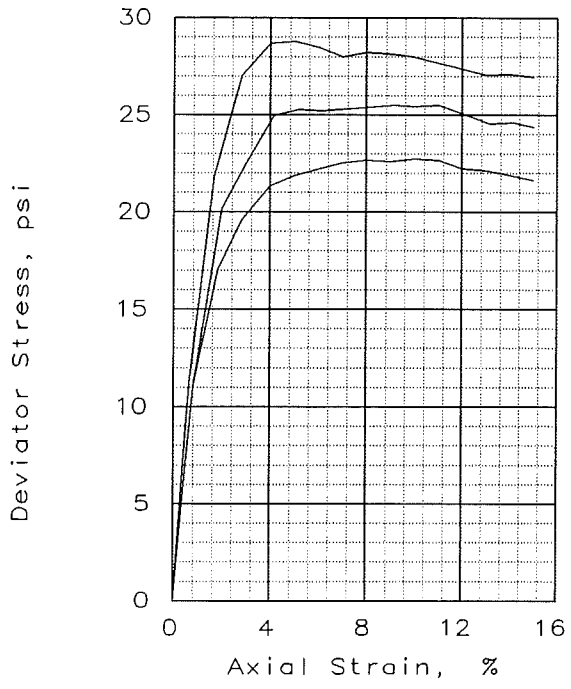
SOUTHERN COMPANY

Client: Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Project No.: 2051 **Lab No.** 4





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	37.4	39.2	36.5
	DRY DENSITY, pcf	84.3	84.3	85.9
	SATURATION, %	95.2	100.0	96.6
	VOID RATIO	1.126	1.126	1.086
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	3.00
AT TEST	WATER CONTENT, %	37.4	39.2	36.5
	DRY DENSITY, pcf	84.3	84.3	85.9
	SATURATION, %	95.2	100.0	96.6
	VOID RATIO	1.126	1.126	1.086
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	3.00
Strain rate, %/min		0.0010	0.0010	0.0010
BACK PRESSURE, psi		0.0	0.0	0.0
CELL PRESSURE, psi		3.5	6.9	13.9
FAIL. STRESS, psi		22.7	25.5	28.8
ULT. STRESS, psi				
σ_1 FAILURE, psi		26.2	32.4	42.7
σ_3 FAILURE, psi		3.5	6.9	13.9

TYPE OF TEST:
Unconsolidated Undrained
SAMPLE TYPE: UD
DESCRIPTION: Brown fat clay

LL= 65 PL= 29 PI= 36
SPECIFIC GRAVITY= 2.87
REMARKS:

Lab No: 4

CLIENT: Southern Company

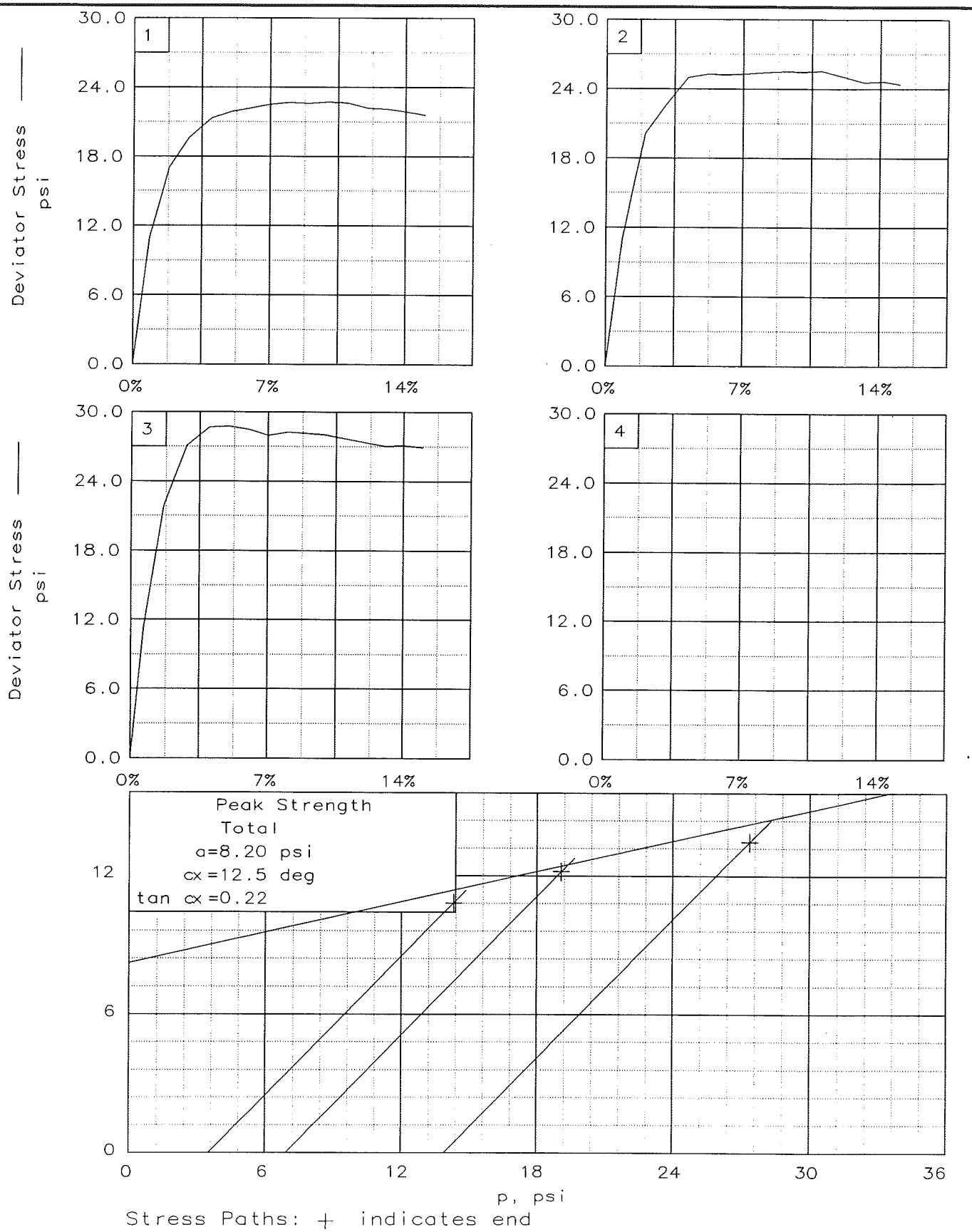
PROJECT: GPCo - Plant Bowen Ash Pond Dike

SAMPLE LOCATION: Boring #2
Depth: 37 - 39 feet

PROJ. NO.: 2051 DATE: 10/02/2002

TRIAXIAL SHEAR TEST REPORT

SOUTHERN COMPANY SERVICES



Client: Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Location: Boring #2 Depth: 37 - 39 feet

File: GPBAPD04 Project No.: 2051 Lab No: 4

Project and Sample Data

Date: 10/02/2002
Client: Southern Company
Project: GPCo - Plant Bowen Ash Pond Dike
Sample location: Boring #2 Depth: 37 - 39 feet
Sample description: Brown fat clay
Remarks:

Fig no.: 4 2nd page Fig no. (if applicable): 4
Type of sample: UD
Specific gravity= 2.87 LL= 65 PL= 29 PI= 36
Test method: ASTM - Method A

Specimen Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Final
Wt. moist soil and tare:	119.040		119.040
Wt. dry soil and tare:	94.900		94.900
Wt. of tare:	30.300		30.300
Weight, gms:	140.3		
Diameter, in:	1.400	1.400	
Area, in²:	1.539	1.539	
Height, in:	3.000	3.000	
Net decrease in height, in:		0.000	
% Moisture:	37.4	37.4	37.4
Wet density, pcf:	115.8	115.8	
Dry density, pcf:	84.3	84.3	
Void ratio:	1.1260	1.1260	
% Saturation:	95.2	95.2	

Test Readings Data for Specimen No. 1

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.3108 lbs per input unit
Secondary load ring constant= 0.77882 lbs per input unit
Crossover reading for secondary load ring= 474 input units
Cell pressure = 3.50 psi
Back pressure = 0.00 psi
Effective confining stress = 3.50 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 22.71 psi at reading no. 10
ULT. STRESS = not selected

Test Readings Data for Specimen No. 1

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Principal Stresses Minor psi	Principal Stresses Major psi	1:3 Ratio	P psi	Q psi
	0.0	0.000	4.0	0.0	0.0	0.00	3.50	3.50	1.00	3.50	0.00
1	25.0	0.025	59.0	17.1	0.8	11.01	3.50	14.51	4.15	9.01	5.51
2	55.0	0.055	90.0	26.7	1.8	17.05	3.50	20.55	5.87	12.02	8.52
3	85.0	0.085	104.0	31.1	2.8	19.62	3.50	23.12	6.61	13.31	9.81
4	120.0	0.120	114.0	34.2	4.0	21.32	3.50	24.82	7.09	14.16	10.66
5	150.0	0.150	118.0	35.4	5.0	21.87	3.50	25.37	7.25	14.43	10.93
6	180.0	0.180	121.0	36.4	6.0	22.20	3.50	25.70	7.34	14.60	11.10
7	210.0	0.210	124.0	37.3	7.0	22.53	3.50	26.03	7.44	14.77	11.27
8	240.0	0.240	126.0	37.9	8.0	22.66	3.50	26.16	7.47	14.83	11.33
9	270.0	0.270	127.0	38.2	9.0	22.60	3.50	26.10	7.46	14.80	11.30
10	300.0	0.300	129.0	38.9	10.0	22.71	3.50	26.21	7.49	14.86	11.36
11	330.0	0.330	130.0	39.2	11.0	22.64	3.50	26.14	7.47	14.82	11.32
12	360.0	0.360	129.0	38.9	12.0	22.21	3.50	25.71	7.35	14.60	11.10
13	390.0	0.390	130.0	39.2	13.0	22.13	3.50	25.63	7.32	14.57	11.07
14	415.0	0.415	130.0	39.2	13.8	21.92	3.50	25.42	7.26	14.46	10.96
15	450.0	0.450	130.0	39.2	15.0	21.62	3.50	25.12	7.18	14.31	10.81

Specimen Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Final
moist soil and tare:	127.820		127.820
dry soil and tare:	100.300		100.300
Wt. of tare:	30.160		30.160
Weight, gms:	142.2		
Diameter, in:	1.400	1.400	
Area, in²:	1.539	1.539	
Height, in:	3.000	3.000	
Net decrease in height, in:		0.000	
% Moisture:	39.2	39.2	39.2
Wet density, pcf:	117.3	117.3	
Dry density, pcf:	84.3	84.3	
Void ratio:	1.1262	1.1262	
% Saturation:	100.0	100.0	

Test Readings Data for Specimen No. 2

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.3108 lbs per input unit
Secondary load ring constant= 0.77882 lbs per input unit
Crossover reading for secondary load ring= 474 input units
Cell pressure = 6.90 psi
Back pressure = 0.00 psi
Effective confining stress = 6.90 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 25.52 psi at reading no. 11
ULT. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Principal Stresses Minor psi	Major psi	1:3 Ratio	P psi	Q psi
0	0.0	0.000	7.0	0.0	0.0	0.00	6.90	6.90	1.00	6.90	0.00
1	25.0	0.025	62.0	17.1	0.8	11.01	6.90	17.91	2.60	12.41	5.51
2	60.0	0.060	109.0	31.7	2.0	20.18	6.90	27.08	3.92	16.99	10.09
3	90.0	0.090	122.0	35.7	3.0	22.52	6.90	29.42	4.26	18.16	11.26
4	125.0	0.125	136.0	40.1	4.2	24.96	6.90	31.86	4.62	19.38	12.48
5	155.0	0.155	139.0	41.0	5.2	25.27	6.90	32.17	4.66	19.54	12.64
6	185.0	0.185	140.0	41.3	6.2	25.20	6.90	32.10	4.65	19.50	12.60
7	215.0	0.215	142.0	42.0	7.2	25.30	6.90	32.20	4.67	19.55	12.65
8	245.0	0.245	144.0	42.6	8.2	25.40	6.90	32.30	4.68	19.60	12.70
9	275.0	0.275	146.0	43.2	9.2	25.49	6.90	32.39	4.69	19.65	12.75
10	300.0	0.300	147.0	43.5	10.0	25.44	6.90	32.34	4.69	19.62	12.72
11	330.0	0.330	149.0	44.1	11.0	25.52	6.90	32.42	4.70	19.66	12.76
12	365.0	0.365	148.0	43.8	12.2	25.00	6.90	31.90	4.62	19.40	12.50
13	395.0	0.395	147.0	43.5	13.2	24.54	6.90	31.44	4.56	19.17	12.27
14	425.0	0.425	149.0	44.1	14.2	24.61	6.90	31.51	4.57	19.20	12.30
15	450.0	0.450	149.0	44.1	15.0	24.37	6.90	31.27	4.53	19.08	12.18

Specimen Parameters for Specimen No. 3

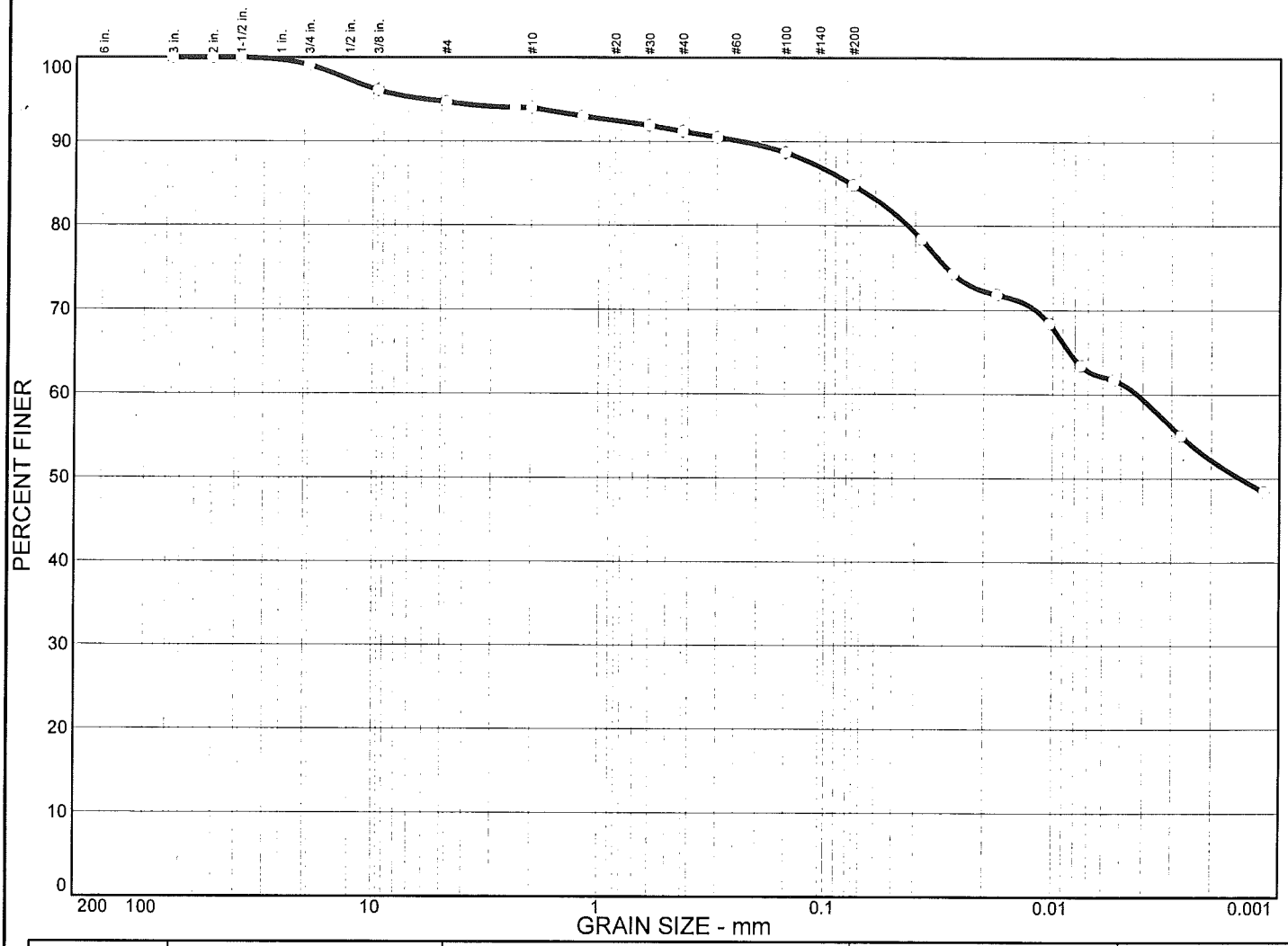
Specimen Parameter	Initial	Saturated	Final
moist soil and tare:	131.420		131.420
dry soil and tare:	104.380		104.380
Wt. of tare:	30.390		30.390
Weight, gms:	142.2		
Diameter, in:	1.400	1.400	
Area, in²:	1.539	1.539	
Height, in:	3.000	3.000	
Net decrease in height, in:		0.000	
% Moisture:	36.5	36.5	36.5
Wet density, pcf:	117.3	117.3	
Dry density, pcf:	85.9	85.9	
Void ratio:	1.0856	1.0856	
% Saturation:	96.6	96.6	

Test Readings Data for Specimen No. 3

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.3108 lbs per input unit
Secondary load ring constant= 0.77882 lbs per input unit
Crossover reading for secondary load ring= 474 input units
Cell pressure = 13.90 psi
Back pressure = 0.00 psi
Effective confining stress = 13.90 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 28.77 psi at reading no. 5
ULT. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Principal Stresses Minor psi	Major psi	1:3 Ratio	P psi	Q psi
0	0.0	0.000	11.0	0.0	0.0	0.00	13.90	13.90	1.00	13.90	0.00
1	20.0	0.020	67.0	17.4	0.7	11.23	13.90	25.13	1.81	19.52	5.62
2	50.0	0.050	121.0	34.2	1.7	21.84	13.90	35.74	2.57	24.82	10.92
3	85.0	0.085	149.0	42.9	2.8	27.07	13.90	40.97	2.95	27.44	13.54
4	120.0	0.120	159.0	46.0	4.0	28.69	13.90	42.59	3.06	28.24	14.34
5	150.0	0.150	161.0	46.6	5.0	28.77	13.90	42.67	3.07	28.29	14.39
6	180.0	0.180	161.0	46.6	6.0	28.47	13.90	42.37	3.05	28.13	14.23
7	210.0	0.210	160.0	46.3	7.0	27.98	13.90	41.88	3.01	27.89	13.99
8	240.0	0.240	163.0	47.2	8.0	28.23	13.90	42.13	3.03	28.02	14.12
9	265.0	0.265	164.0	47.6	8.8	28.16	13.90	42.06	3.03	27.98	14.08
10	295.0	0.295	165.0	47.9	9.8	28.04	13.90	41.94	3.02	27.92	14.02
11	325.0	0.325	165.0	47.9	10.8	27.72	13.90	41.62	2.99	27.76	13.86
12	355.0	0.355	165.0	47.9	11.8	27.41	13.90	41.31	2.97	27.61	13.71
13	390.0	0.390	165.0	47.9	13.0	27.05	13.90	40.95	2.95	27.43	13.53
14	420.0	0.420	167.0	48.5	14.0	27.09	13.90	40.99	2.95	27.44	13.54
15	450.0	0.450	168.0	48.8	15.0	26.94	13.90	40.84	2.94	27.37	13.47

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	5.3	9.9	23.5	61.3

LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
60	33	0.0772	0.0042	0.0015					

MATERIAL DESCRIPTION	USCS	AASHTO
Light Reddish Brown Elastic silt with sand	MH	A-7-5(27)

Project No. 2051 **Client:** Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Source: Ash Pond Dike **Sample No.:** 5 **Elev./Depth:** 45-47 feet

Remarks:

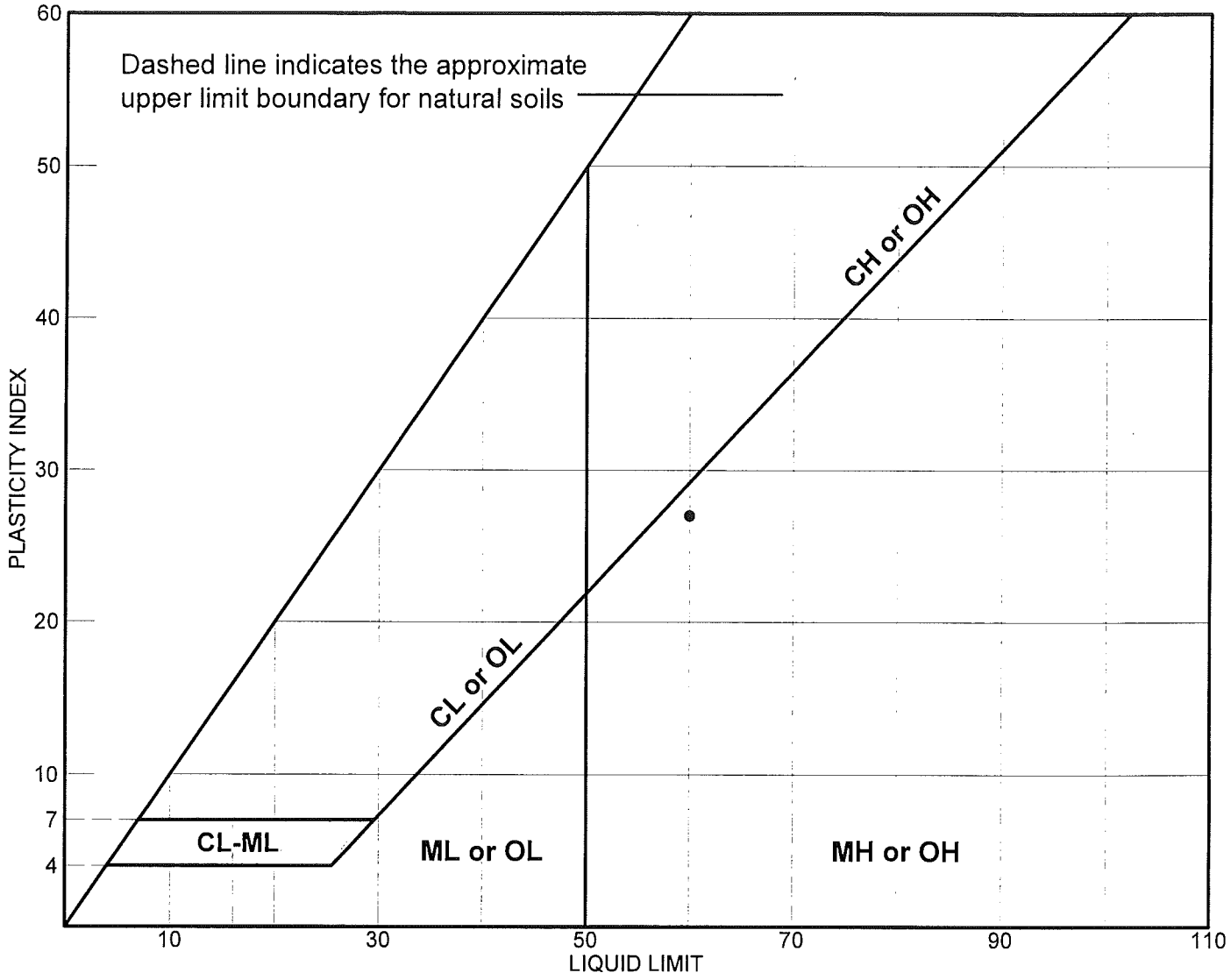
Boring No. 6

Particle Size Distribution Report

SOUTHERN COMPANY

Lab No. 5

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Ash Pond Dike	5	45-47 feet		33	60	27	MH

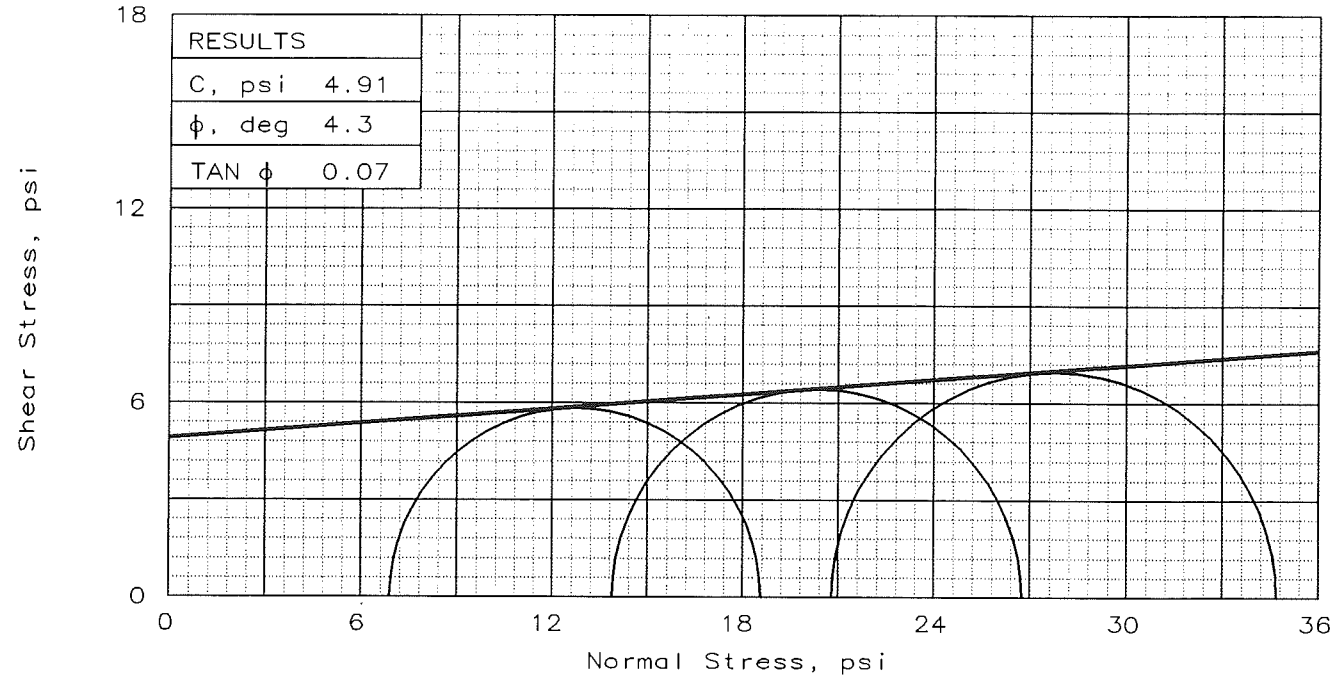
LIQUID AND PLASTIC LIMITS TEST REPORT

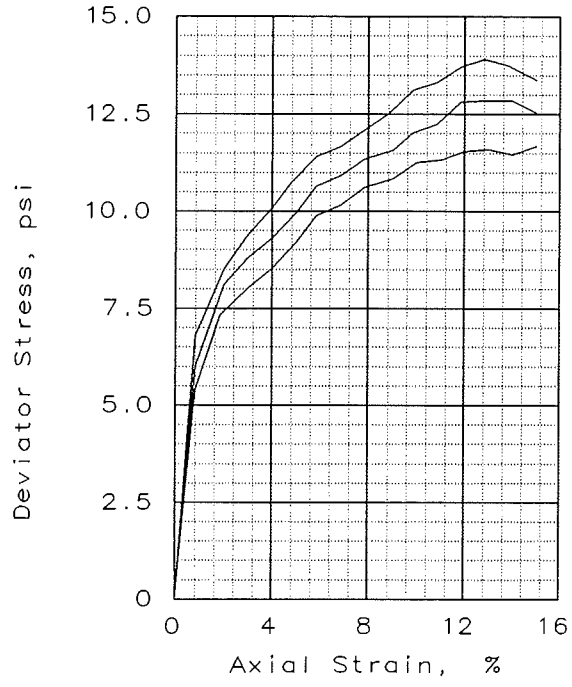
SOUTHERN COMPANY

Client: Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Project No.: 2051 **Lab No.** 5





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	46.1	44.5	43.2
	DRY DENSITY, pcf	73.6	74.6	75.3
	SATURATION, %	99.1	98.0	96.9
	VOID RATIO	1.214	1.185	1.165
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	3.00
AT TEST	WATER CONTENT, %	46.1	44.5	43.2
	DRY DENSITY, pcf	73.6	74.6	75.3
	SATURATION, %	99.1	98.0	96.9
	VOID RATIO	1.214	1.185	1.165
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	3.00
Strain rate, %/min		0.0010	0.0010	0.0010
BACK PRESSURE, psi		0.0	0.0	0.0
CELL PRESSURE, psi		6.9	13.9	20.8
FAIL. STRESS, psi		11.7	12.8	13.9
ULT. STRESS, psi				
σ_1 FAILURE, psi		18.6	26.7	34.7
σ_3 FAILURE, psi		6.9	13.9	20.8

TYPE OF TEST:
Unconsolidated Undrained
SAMPLE TYPE: UD
DESCRIPTION: Light reddish brown elastic silt with sand
LL= 60 PL= 33 PI= 27
SPECIFIC GRAVITY= 2.61
REMARKS:

Lab No: 5

CLIENT: Southern Company

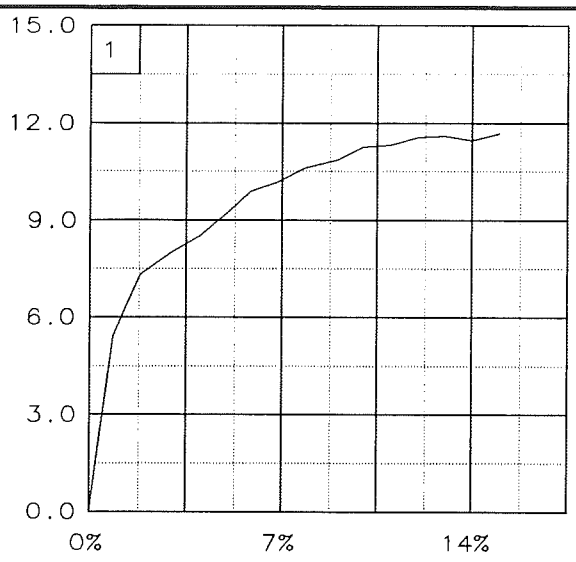
PROJECT: GPCo - Plant Bowen Ash Pond Dike

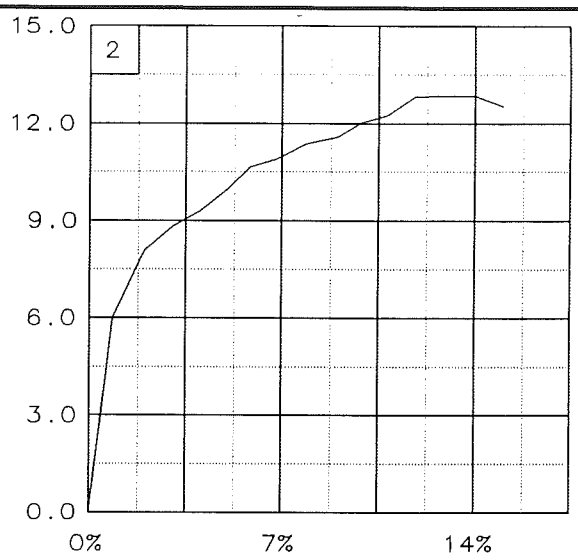
SAMPLE LOCATION: Boring #6
Depth: 45 - 47 feet

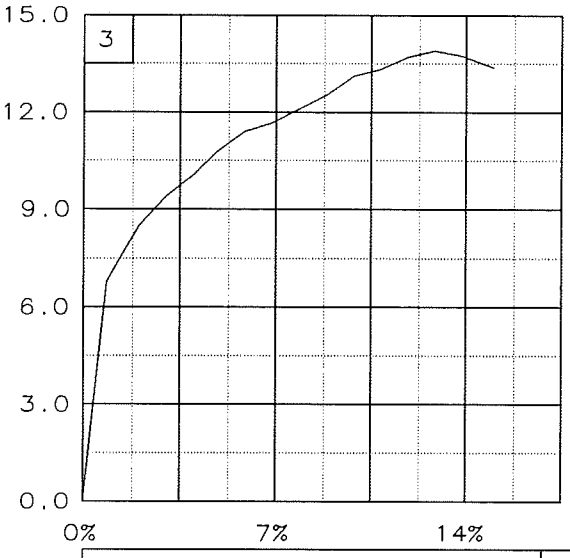
PROJ. NO.: 2051 DATE: 10/02/2002

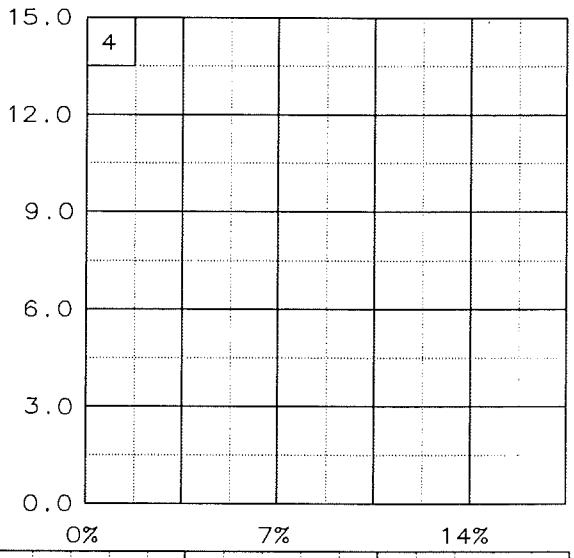
TRIAXIAL SHEAR TEST REPORT

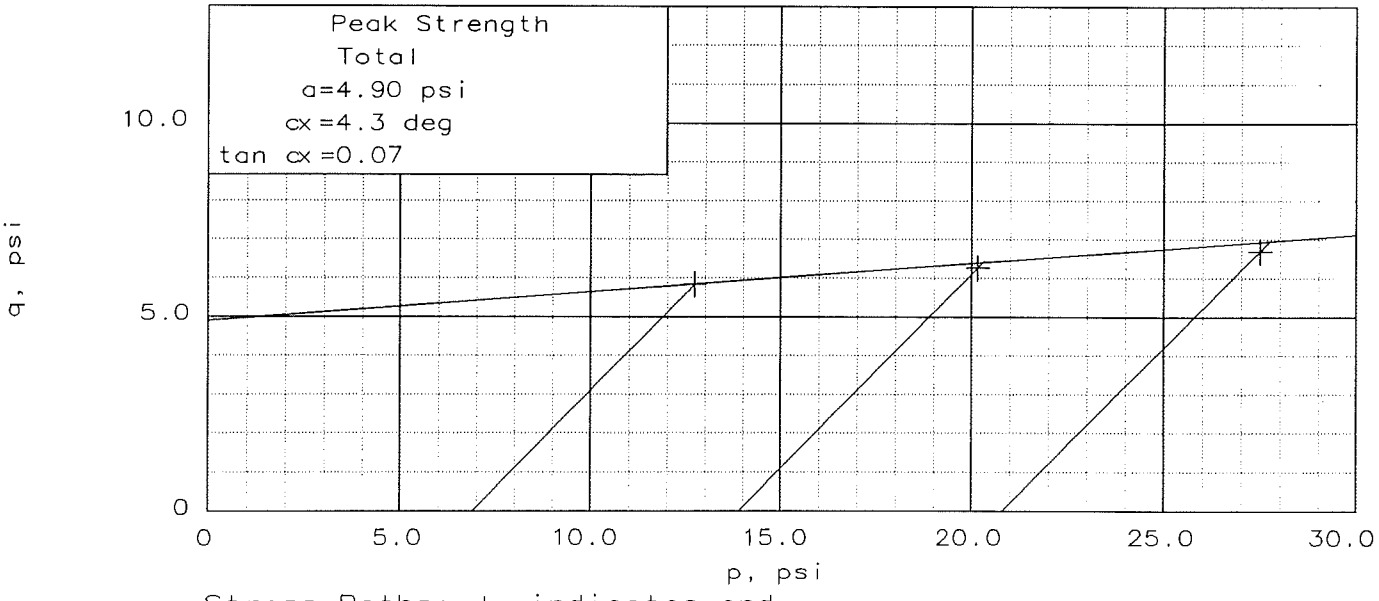
SOUTHERN COMPANY SERVICES











Stress Paths: + indicates end

Client: Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Location: Boring #6 Depth: 45 - 47 feet

File: GPBAPD05 Project No.: 2051 Lab No: 5

Project and Sample Data

Date: 10/02/2002
Client: Southern Company
Project: GPCo - Plant Bowen Ash Pond Dike
Sample location: Boring #6 Depth: 45 - 47 feet
Sample description: Light reddish brown elastic silt with sand
Remarks:

Fig no.: 5 2nd page Fig no. (if applicable): 5
Type of sample: UD
Specific gravity= 2.61 LL= 60 PL= 33 PI= 27
Test method: ASTM - Method A

Specimen Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Final
Wt. moist soil and tare:	101.810		101.810
Wt. dry soil and tare:	79.170		79.170
Wt. of tare:	30.070		30.070
Weight, gms:	130.3		
Diameter, in:	1.400	1.400	
Area, in²:	1.539	1.539	
Height, in:	3.000	3.000	
Net decrease in height, in:		0.000	
% Moisture:	46.1	46.1	46.1
density, pcf:	107.5	107.5	
Dry density, pcf:	73.6	73.6	
Void ratio:	1.2143	1.2143	
% Saturation:	99.1	99.1	

Test Readings Data for Specimen No. 1

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.3108 lbs per input unit
Secondary load ring constant= 0.77882 lbs per input unit
Crossover reading for secondary load ring= 474 input units
Cell pressure = 6.90 psi
Back pressure = 0.00 psi
Effective confining stress = 6.90 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 11.67 psi at reading no. 15
ULT. STRESS = not selected

Test Readings Data for Specimen No. 1

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Principal Stresses Minor psi	Major psi	1:3 Ratio	P psi	Q psi
	0.0	0.000	7.0	0.0	0.0	0.00	6.90	6.90	1.00	6.90	0.00
1	25.0	0.025	34.0	8.4	0.8	5.41	6.90	12.31	1.78	9.60	2.70
2	55.0	0.055	44.0	11.5	1.8	7.33	6.90	14.23	2.06	10.57	3.67
3	90.0	0.090	48.0	12.7	3.0	8.03	6.90	14.93	2.16	10.91	4.01
4	120.0	0.120	51.0	13.7	4.0	8.53	6.90	15.43	2.24	11.16	4.26
5	150.0	0.150	55.0	14.9	5.0	9.21	6.90	16.11	2.33	11.50	4.60
6	175.0	0.175	59.0	16.2	5.8	9.89	6.90	16.79	2.43	11.84	4.94
7	205.0	0.205	61.0	16.8	6.8	10.16	6.90	17.06	2.47	11.98	5.08
8	235.0	0.235	64.0	17.7	7.8	10.61	6.90	17.51	2.54	12.20	5.30
9	270.0	0.270	66.0	18.3	9.0	10.84	6.90	17.74	2.57	12.32	5.42
10	300.0	0.300	69.0	19.3	10.0	11.27	6.90	18.17	2.63	12.53	5.63
11	330.0	0.330	70.0	19.6	11.0	11.32	6.90	18.22	2.64	12.56	5.66
12	360.0	0.360	72.0	20.2	12.0	11.55	6.90	18.45	2.67	12.67	5.77
13	390.0	0.390	73.0	20.5	13.0	11.59	6.90	18.49	2.68	12.70	5.80
14	420.0	0.420	73.0	20.5	14.0	11.46	6.90	18.36	2.66	12.63	5.73
15	450.0	0.450	75.0	21.1	15.0	11.67	6.90	18.57	2.69	12.73	5.83

Specimen Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Final
Wt. moist soil and tare:	103.800		103.800
Wt. dry soil and tare:	81.160		81.160
Wt. of tare:	30.280		30.280
Weight, gms:	130.6		
Diameter, in:	1.400	1.400	
Area, in²:	1.539	1.539	
Height, in:	3.000	3.000	
Net decrease in height, in:		0.000	
% Moisture:	44.5	44.5	44.5
Wet density, pcf:	107.8	107.8	
Dry density, pcf:	74.6	74.6	
Void ratio:	1.1850	1.1850	
% Saturation:	98.0	98.0	

Test Readings Data for Specimen No. 2

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.3108 lbs per input unit
Secondary load ring constant= 0.77882 lbs per input unit
Crossover reading for secondary load ring= 474 input units
Cell pressure = 13.90 psi
Back pressure = 0.00 psi
Effective confining stress = 13.90 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 12.85 psi at reading no. 14
ULT. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Principal Stresses Minor psi	Major psi	1:3 Ratio	P psi	Q psi
0	0.0	0.000	11.0	0.0	0.0	0.00	13.90	13.90	1.00	13.90	0.00
1	25.0	0.025	41.0	9.3	0.8	6.01	13.90	19.91	1.43	16.90	3.00
2	60.0	0.060	52.0	12.7	2.0	8.11	13.90	22.01	1.58	17.96	4.06
3	90.0	0.090	56.0	14.0	3.0	8.81	13.90	22.71	1.63	18.31	4.41
4	120.0	0.120	59.0	14.9	4.0	9.30	13.90	23.20	1.67	18.55	4.65
5	150.0	0.150	63.0	16.2	5.0	9.97	13.90	23.87	1.72	18.89	4.99
6	175.0	0.175	67.0	17.4	5.8	10.65	13.90	24.55	1.77	19.22	5.32
7	205.0	0.205	69.0	18.0	6.8	10.91	13.90	24.81	1.78	19.36	5.46
8	235.0	0.235	72.0	19.0	7.8	11.35	13.90	25.25	1.82	19.58	5.68
9	270.0	0.270	74.0	19.6	9.0	11.57	13.90	25.47	1.83	19.69	5.79
10	295.0	0.295	77.0	20.5	9.8	12.02	13.90	25.92	1.86	19.91	6.01
11	325.0	0.325	79.0	21.1	10.8	12.24	13.90	26.14	1.88	20.02	6.12
12	355.0	0.355	83.0	22.4	11.8	12.82	13.90	26.72	1.92	20.31	6.41
13	385.0	0.385	84.0	22.7	12.8	12.85	13.90	26.75	1.92	20.32	6.42
14	420.0	0.420	85.0	23.0	14.0	12.85	13.90	26.75	1.92	20.32	6.42
15	450.0	0.450	84.0	22.7	15.0	12.53	13.90	26.43	1.90	20.16	6.26

Specimen Parameters for Specimen No. 3

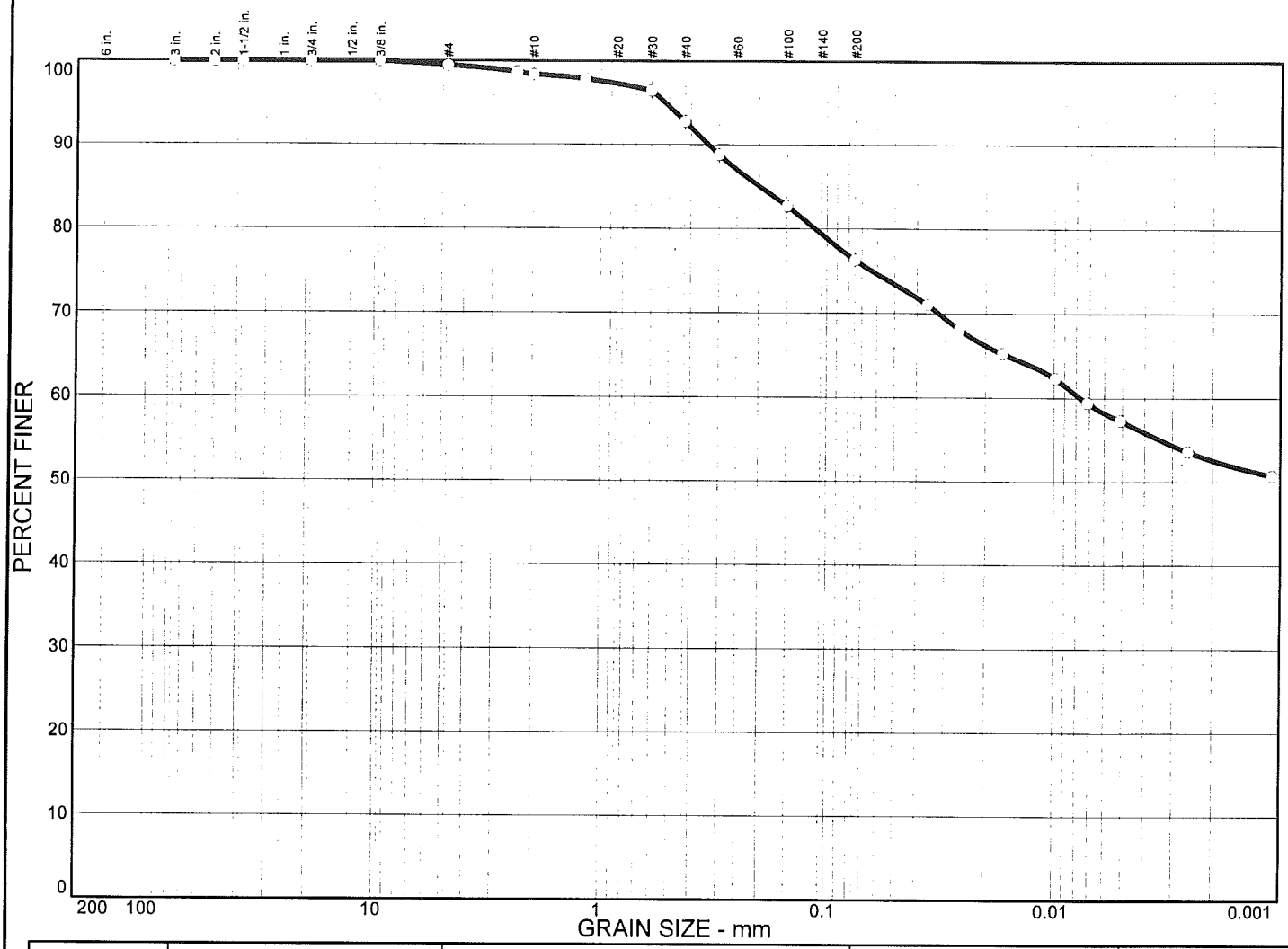
Specimen Parameter	Initial	Saturated	Final
moist soil and tare:	113.630		113.630
dry soil and tare:	88.480		88.480
Wt. of tare:	30.310		30.310
Weight, gms:	130.7		
Diameter, in:	1.400	1.400	
Area, in²:	1.539	1.539	
Height, in:	3.000	3.000	
Net decrease in height, in:		0.000	
% Moisture:	43.2	43.2	43.2
Wet density, pcf:	107.8	107.8	
Dry density, pcf:	75.3	75.3	
Void ratio:	1.1650	1.1650	
% Saturation:	96.9	96.9	

Test Readings Data for Specimen No. 3

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.3108 lbs per input unit
Secondary load ring constant= 0.77882 lbs per input unit
Crossover reading for secondary load ring= 474 input units
Cell pressure = 20.80 psi
Back pressure = 0.00 psi
Effective confining stress = 20.80 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 13.90 psi at reading no. 13
ULT. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Principal Stresses Minor psi	Major psi	1:3 Ratio	P psi	Q psi
0	0.0	0.000	14.0	0.0	0.0	0.00	20.80	20.80	1.00	20.80	0.00
1	25.0	0.025	48.0	10.6	0.8	6.81	20.80	27.61	1.33	24.20	3.40
2	60.0	0.060	57.0	13.4	2.0	8.51	20.80	29.31	1.41	25.05	4.25
3	90.0	0.090	62.0	14.9	3.0	9.40	20.80	30.20	1.45	25.50	4.70
4	120.0	0.120	66.0	16.2	4.0	10.08	20.80	30.88	1.48	25.84	5.04
5	145.0	0.145	70.0	17.4	4.8	10.76	20.80	31.56	1.52	26.18	5.38
6	175.0	0.175	74.0	18.6	5.8	11.41	20.80	32.21	1.55	26.50	5.70
7	205.0	0.205	76.0	19.3	6.8	11.66	20.80	32.46	1.56	26.63	5.83
8	235.0	0.235	79.0	20.2	7.8	12.10	20.80	32.90	1.58	26.85	6.05
9	265.0	0.265	82.0	21.1	8.8	12.52	20.80	33.32	1.60	27.06	6.26
10	295.0	0.295	86.0	22.4	9.8	13.11	20.80	33.91	1.63	27.35	6.55
11	325.0	0.325	88.0	23.0	10.8	13.32	20.80	34.12	1.64	27.46	6.66
12	355.0	0.355	91.0	23.9	11.8	13.71	20.80	34.51	1.66	27.65	6.85
13	385.0	0.385	93.0	24.6	12.8	13.90	20.80	34.70	1.67	27.75	6.95
14	415.0	0.415	93.0	24.6	13.8	13.74	20.80	34.54	1.66	27.67	6.87
15	450.0	0.450	92.0	24.2	15.0	13.39	20.80	34.19	1.64	27.49	6.69

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.5	23.2	19.1	57.2

LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
52	27	0.197	0.0077						

MATERIAL DESCRIPTION	USCS	AASHTO
Dark Reddish Brown Fat clay with sand	CH	A-7-6(20)

Project No. 2051 **Client:** Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Source: Ash Pond Dike **Sample No.:** 6 **Elev./Depth:** 8-10 feet

Remarks:

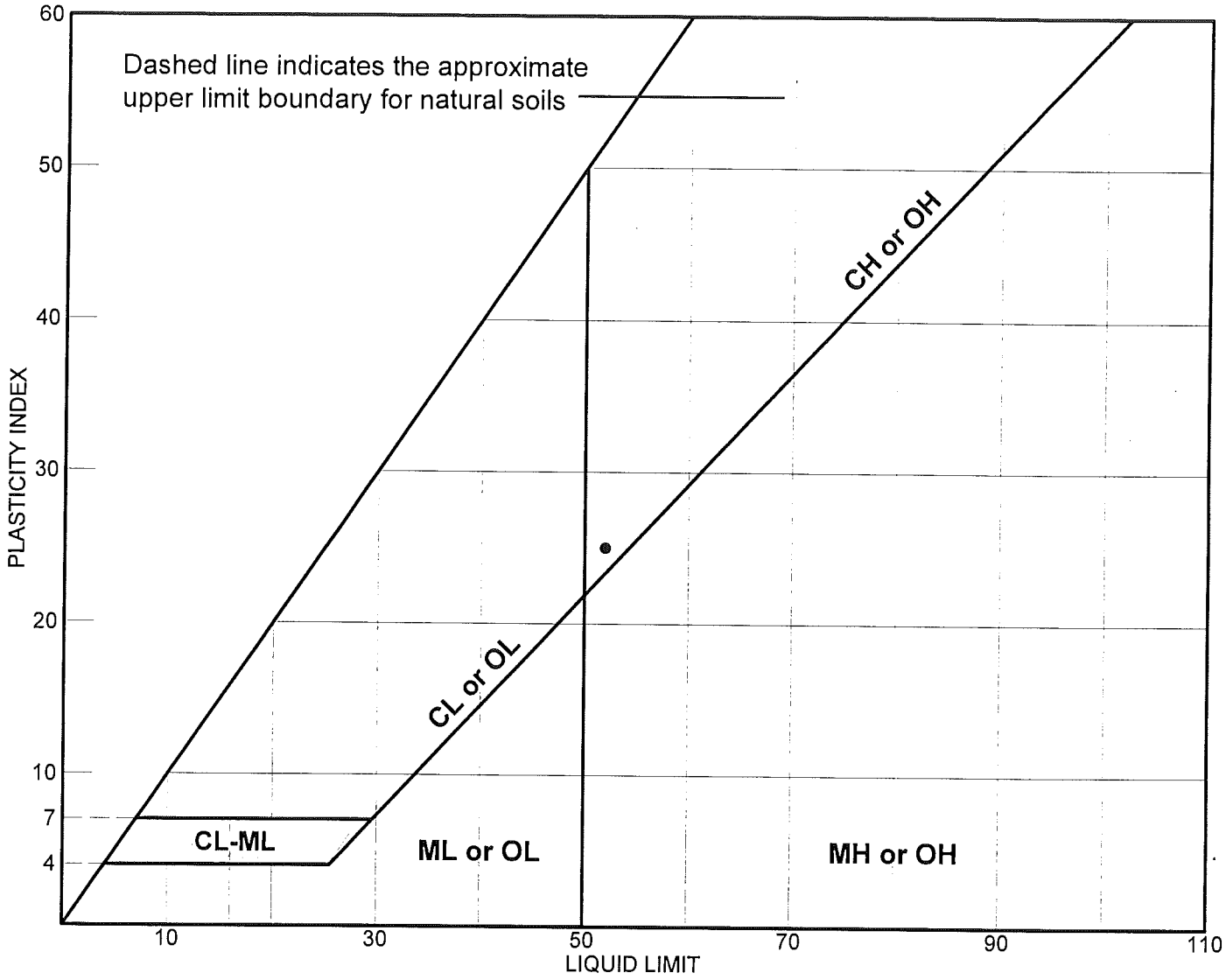
Boring No. 12

Particle Size Distribution Report

SOUTHERN COMPANY

Lab No. 6

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Ash Pond Dike	6	8-10 feet		27	52	25	CH

LIQUID AND PLASTIC LIMITS TEST REPORT

SOUTHERN COMPANY

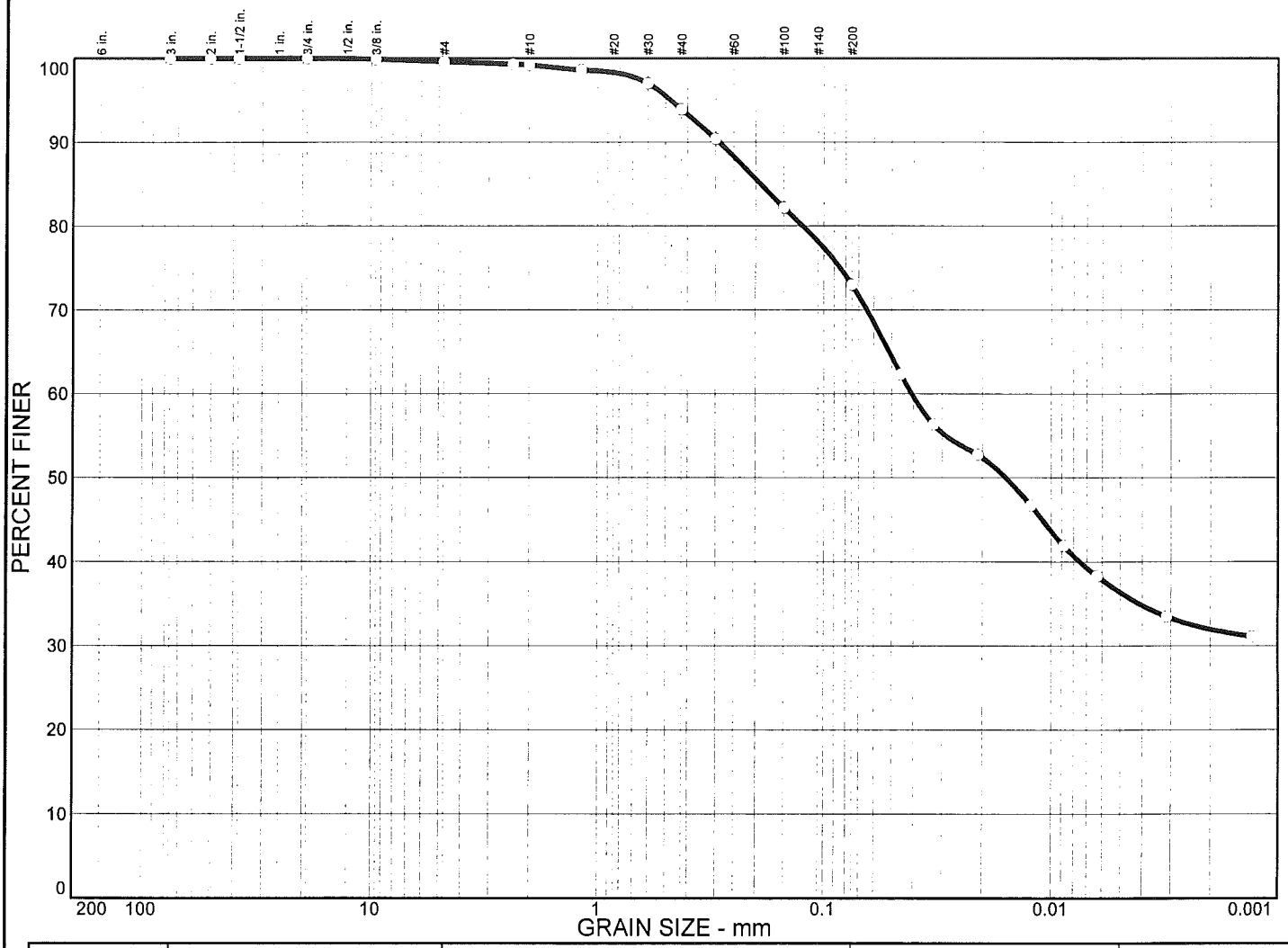
Client: Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Project No.: 2051

Lab No. 6

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.4	26.6	36.6	36.4

LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
39	21	0.190	0.0407	0.0158					

MATERIAL DESCRIPTION	USCS	AASHTO
Reddish Brown Lean clay with sand	CL	A-6(12)

Project No. 2051 **Client:** Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Source: Ash Pond Dike **Sample No.:** 7 **Elev./Depth:** 21-23 feet

Remarks:

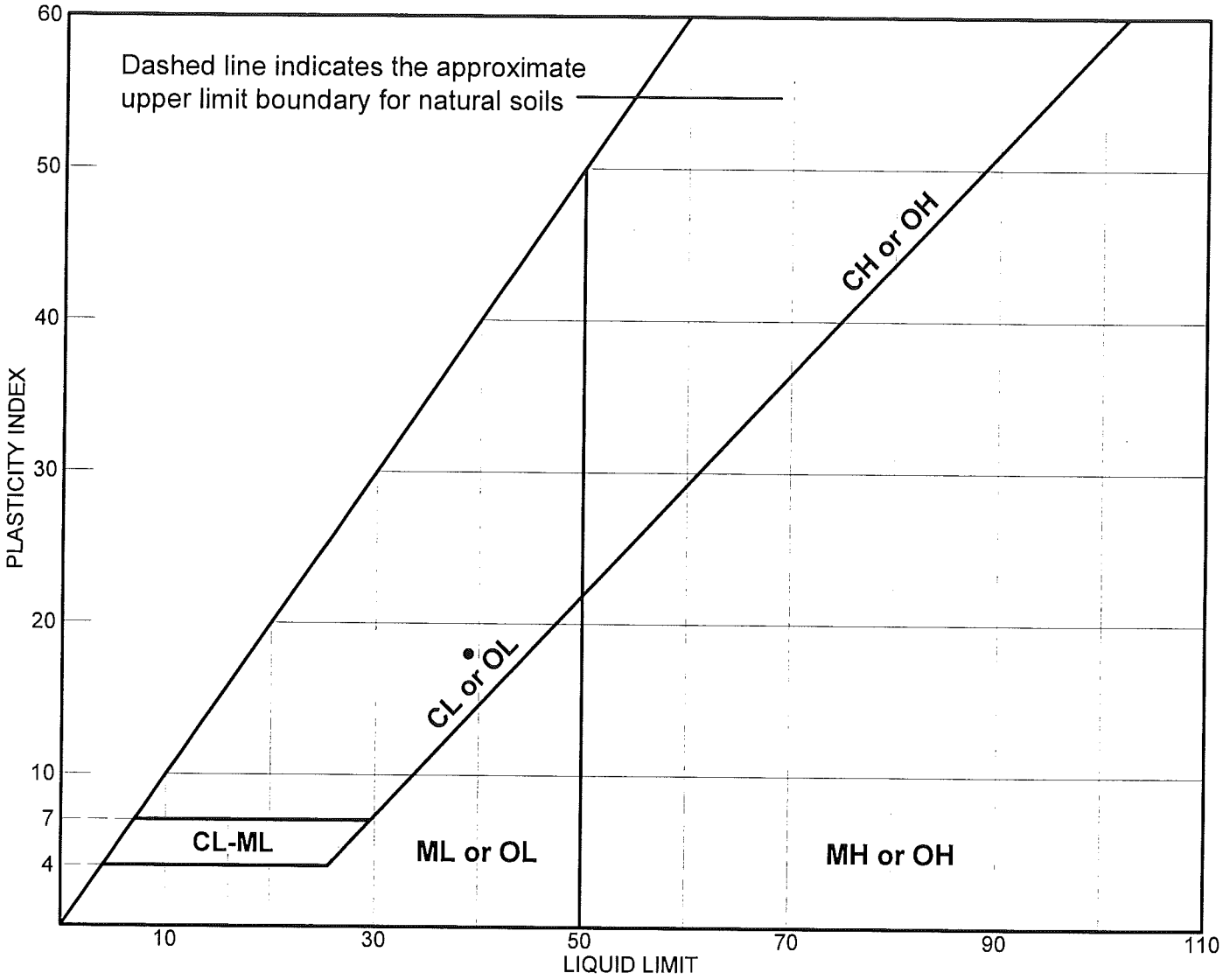
Boring No. 8

Particle Size Distribution Report

SOUTHERN COMPANY

Lab No. 7

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Ash Pond Dike	7	21-23 feet		21	39	18	CL

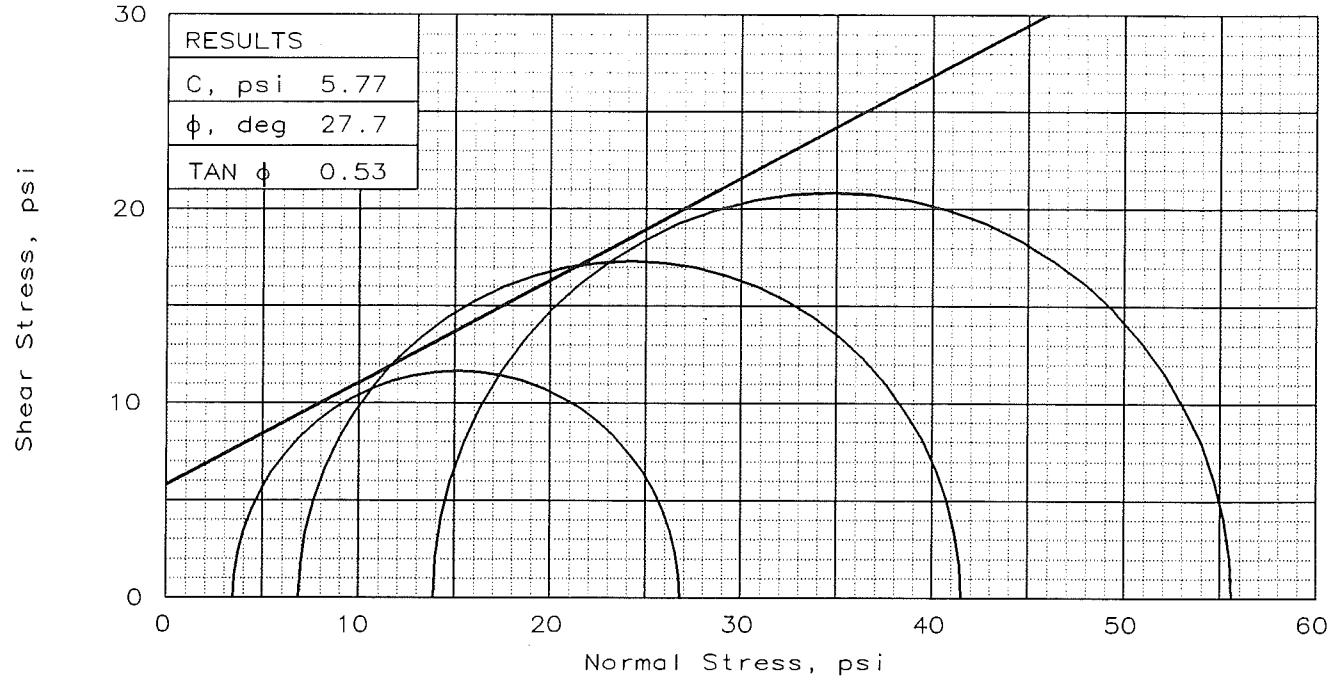
LIQUID AND PLASTIC LIMITS TEST REPORT

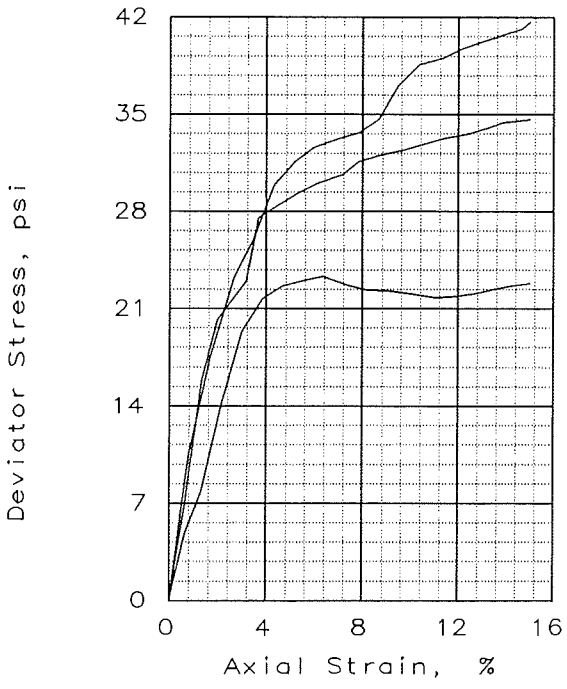
SOUTHERN COMPANY

Client: Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Project No.: 2051 **Lab No.** 7





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	18.2	18.9	17.6
	DRY DENSITY, pcf	109.6	109.1	110.4
	SATURATION, %	96.7	99.3	95.7
	VOID RATIO	0.492	0.499	0.481
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	3.00
AT TEST	WATER CONTENT, %	18.8	19.0	18.4
	DRY DENSITY, pcf	109.6	109.1	110.4
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.492	0.499	0.481
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	3.00
Strain rate, %/min		0.0010	0.0010	0.0010
BACK PRESSURE, psi		0.0	0.0	0.0
CELL PRESSURE, psi		3.5	6.9	13.9
FAIL. STRESS, psi		23.3	34.6	41.7
ULT. STRESS, psi				
σ_1 FAILURE, psi		26.8	41.5	55.6
σ_3 FAILURE, psi		3.5	6.9	13.9

TYPE OF TEST:
Unconsolidated Undrained
SAMPLE TYPE: UD
DESCRIPTION: Reddish brown lean clay with sand
LL= 39 PL= 21 PI= 18
SPECIFIC GRAVITY= 2.62
REMARKS:

Lab No: 7

CLIENT: Southern Company

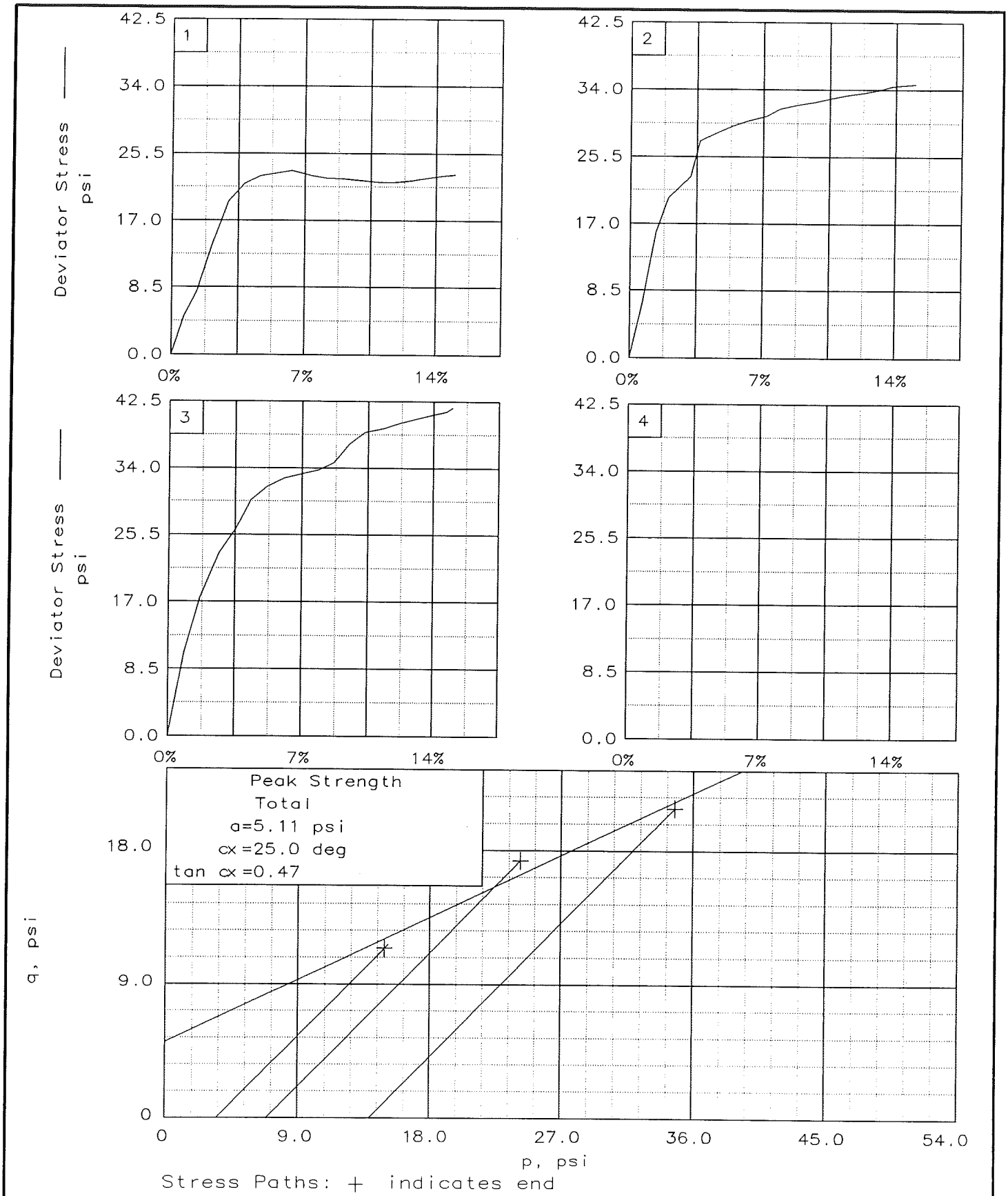
PROJECT: GPCo - Plant Bowen Ash Pond Dike

SAMPLE LOCATION: Boring #8
Depth: 21 - 23 feet

PROJ. NO.: 2051 DATE: 10/02/2002

TRIAXIAL SHEAR TEST REPORT

SOUTHERN COMPANY SERVICES



Client: Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Location: Boring #8 Depth: 21 - 23 feet

File: GPBAPD07 Project No.: 2051 Lab No: 7

Project and Sample Data

Date: 10/02/2002
Client: Southern Company
Project: GPCo - Plant Bowen Ash Pond Dike
Sample location: Boring #8 Depth: 21 - 23 feet
Sample description: Reddish brown lean clay with sand
Remarks:

Fig no.: 7 2nd page Fig no. (if applicable): 7
Type of sample: UD
Specific gravity= 2.62 LL= 39 PL= 21 PI= 18
Test method: ASTM - Method A

Specimen Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Final
Wt. moist soil and tare:	120.980		160.050
Wt. dry soil and tare:	107.060		134.730
Wt. of tare:	30.430		0.000
Weight, gms:	157.0		
Diameter, in:	1.400	1.400	
Area, in²:	1.539	1.539	
Height, in:	3.000	3.000	
Net decrease in height, in:		0.000	
% Moisture:	18.2	18.8	18.8
[illegible] density, pcf:	129.5	130.2	
Dry density, pcf:	109.6	109.6	
Void ratio:	0.4923	0.4923	
% Saturation:	96.7	100.0	

Test Readings Data for Specimen No. 1

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.30179 lbs per input unit
Secondary load ring constant= 0.72586 lbs per input unit
Crossover reading for secondary load ring= 462 input units
Cell pressure = 3.50 psi
Back pressure = 0.00 psi
Effective confining stress = 3.50 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 23.32 psi at reading no. 8
ULT. STRESS = not selected

Test Readings Data for Specimen No. 1

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Principal Stresses Minor psi	Major psi	1:3 Ratio	P psi	Q psi
	0.0	0.000	70.0	0.0	0.0	0.00	3.50	3.50	1.00	3.50	0.00
1	20.0	0.020	95.0	7.5	0.7	4.87	3.50	8.37	2.39	5.93	2.43
2	40.0	0.040	111.0	12.4	1.3	7.93	3.50	11.43	3.27	7.47	3.97
3	65.0	0.065	144.0	22.3	2.2	14.19	3.50	17.69	5.06	10.60	7.10
4	90.0	0.090	172.0	30.8	3.0	19.40	3.50	22.90	6.54	13.20	9.70
5	115.0	0.115	185.0	34.7	3.8	21.68	3.50	25.18	7.19	14.34	10.84
6	140.0	0.140	191.0	36.5	4.7	22.61	3.50	26.11	7.46	14.81	11.31
7	165.0	0.165	194.0	37.4	5.5	22.97	3.50	26.47	7.56	14.99	11.49
8	190.0	0.190	197.0	38.3	6.3	23.32	3.50	26.82	7.66	15.16	11.66
9	220.0	0.220	195.0	37.7	7.3	22.71	3.50	26.21	7.49	14.85	11.35
10	245.0	0.245	194.0	37.4	8.2	22.32	3.50	25.82	7.38	14.66	11.16
11	270.0	0.270	195.0	37.7	9.0	22.30	3.50	25.80	7.37	14.65	11.15
12	300.0	0.300	195.0	37.7	10.0	22.06	3.50	25.56	7.30	14.53	11.03
13	330.0	0.330	195.0	37.7	11.0	21.81	3.50	25.31	7.23	14.41	10.91
14	350.0	0.350	196.0	38.0	11.7	21.82	3.50	25.32	7.23	14.41	10.91
15	380.0	0.380	199.0	38.9	12.7	22.09	3.50	25.59	7.31	14.54	11.04
16	405.0	0.405	202.0	39.8	13.5	22.38	3.50	25.88	7.40	14.69	11.19
17	430.0	0.430	205.0	40.7	14.3	22.67	3.50	26.17	7.48	14.84	11.34
18	450.0	0.450	207.0	41.3	15.0	22.83	3.50	26.33	7.52	14.91	11.41

Specimen Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Final
moist soil and tare:	134.030		158.550
dry soil and tare:	117.570		133.180
Wt. of tare:	30.510		0.000
Weight, gms:	157.3		
Diameter, in:	1.400	1.400	
Area, in²:	1.539	1.539	
Height, in:	3.000	3.000	
Net decrease in height, in:		0.000	
% Moisture:	18.9	19.0	19.0
Wet density, pcf:	129.7	129.9	
Dry density, pcf:	109.1	109.1	
Void ratio:	0.4990	0.4990	
% Saturation:	99.3	100.0	

Test Readings Data for Specimen No. 2

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.31199 lbs per input unit
Secondary load ring constant= 0.728246 lbs per input unit
Crossover reading for secondary load ring= 480 input units
Cell pressure = 6.90 psi
Back pressure = 0.00 psi
Effective confining stress = 6.90 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 34.63 psi at reading no. 18
ULT. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Principal Stresses Minor psi	Major psi	1:3 Ratio	P psi	Q psi
0	0.0	0.000	68.0	0.0	0.0	0.00	6.90	6.90	1.00	6.90	0.00
1	20.0	0.020	103.0	10.9	0.7	7.05	6.90	13.95	2.02	10.42	3.52
2	40.0	0.040	147.0	24.6	1.3	15.80	6.90	22.70	3.29	14.80	7.90
3	60.0	0.060	170.0	31.8	2.0	20.26	6.90	27.16	3.94	17.03	10.13
4	95.0	0.095	185.0	36.5	3.2	22.96	6.90	29.86	4.33	18.38	11.48
5	110.0	0.110	209.0	44.0	3.7	27.53	6.90	34.43	4.99	20.66	13.76
6	135.0	0.135	215.0	45.9	4.5	28.45	6.90	35.35	5.12	21.13	14.23
7	160.0	0.160	221.0	47.7	5.3	29.36	6.90	36.26	5.25	21.58	14.68
8	185.0	0.185	226.0	49.3	6.2	30.05	6.90	36.95	5.35	21.92	15.02
9	215.0	0.215	231.0	50.9	7.2	30.67	6.90	37.57	5.44	22.23	15.33
10	235.0	0.235	237.0	52.7	7.8	31.57	6.90	38.47	5.58	22.68	15.78
11	260.0	0.260	241.0	54.0	8.7	32.02	6.90	38.92	5.64	22.91	16.01
12	290.0	0.290	245.0	55.2	9.7	32.41	6.90	39.31	5.70	23.10	16.20
13	315.0	0.315	249.0	56.5	10.5	32.83	6.90	39.73	5.76	23.32	16.42
14	340.0	0.340	253.0	57.7	11.3	33.25	6.90	40.15	5.82	23.52	16.62
15	370.0	0.370	257.0	59.0	12.3	33.58	6.90	40.48	5.87	23.69	16.79
16	395.0	0.395	261.0	60.2	13.2	33.97	6.90	40.87	5.92	23.88	16.98
17	415.0	0.415	265.0	61.5	13.8	34.40	6.90	41.30	5.99	24.10	17.20
18	450.0	0.450	269.0	62.7	15.0	34.63	6.90	41.53	6.02	24.21	17.31

Specimen Parameters for Specimen No. 3

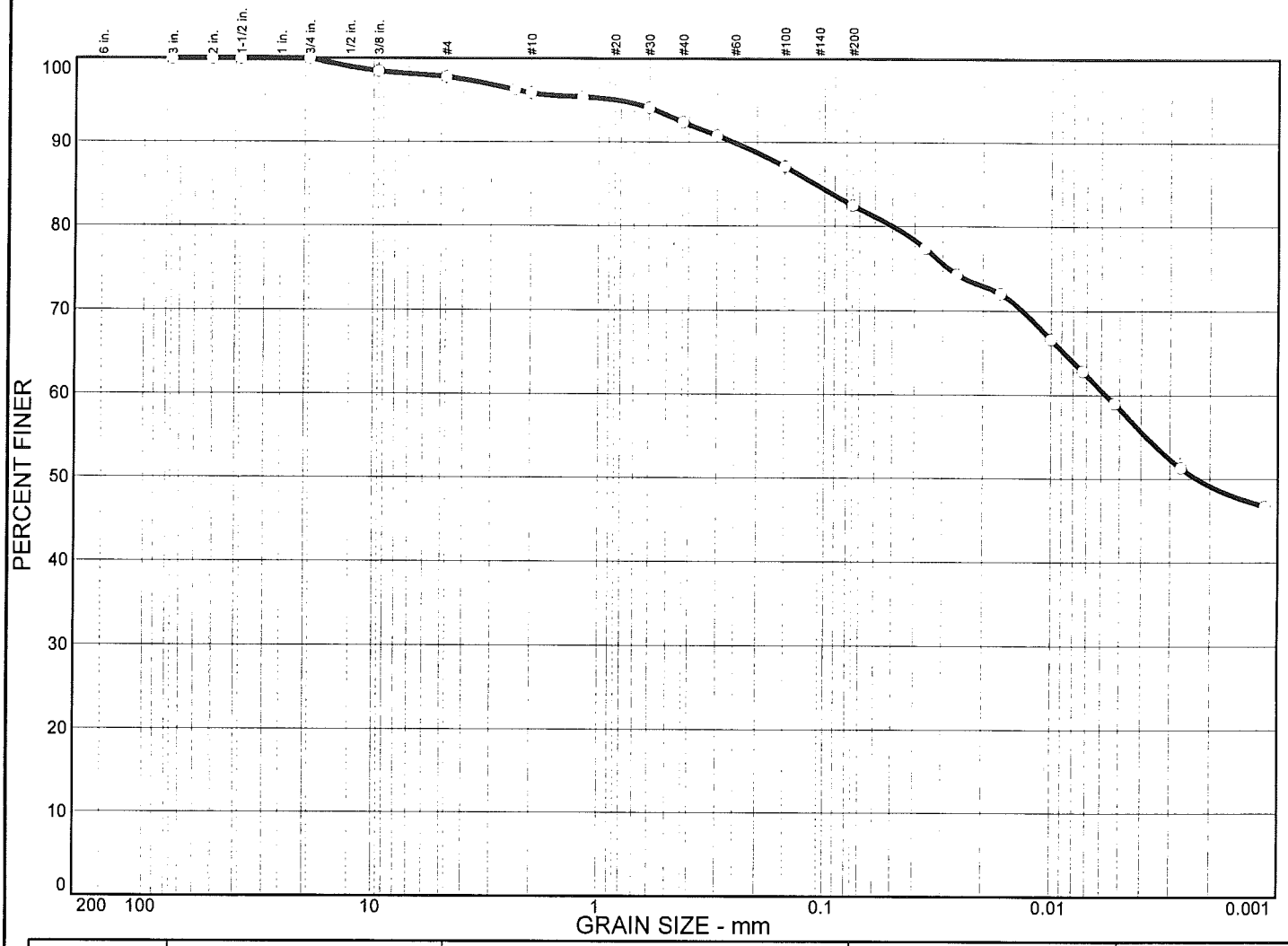
Specimen Parameter	Initial	Saturated	Final
moist soil and tare:	118.710		159.140
dry soil and tare:	105.500		134.450
Wt. of tare:	30.300		0.000
Weight, gms:	157.4		
Diameter, in:	1.400	1.400	
Area, in²:	1.539	1.539	
Height, in:	3.000	3.000	
Net decrease in height, in:		0.000	
% Moisture:	17.6	18.4	18.4
Wet density, pcf:	129.8	130.7	
Dry density, pcf:	110.4	110.4	
Void ratio:	0.4812	0.4812	
% Saturation:	95.7	100.0	

Test Readings Data for Specimen No. 3

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.3108 lbs per input unit
Secondary load ring constant= 0.77882 lbs per input unit
Crossover reading for secondary load ring= 474 input units
Cell pressure = 13.90 psi
Back pressure = 0.00 psi
Effective confining stress = 13.90 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 41.70 psi at reading no. 18
ULT. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Principal Stresses Minor psi	Major psi	1:3 Ratio	P psi	Q psi
0	0.0	0.000	75.0	0.0	0.0	0.00	13.90	13.90	1.00	13.90	0.00
1	25.0	0.025	128.0	16.5	0.8	10.61	13.90	24.51	1.76	19.21	5.31
2	50.0	0.050	163.0	27.4	1.7	17.47	13.90	31.37	2.26	22.64	8.74
3	80.0	0.080	193.0	36.7	2.7	23.19	13.90	37.09	2.67	25.49	11.59
4	105.0	0.105	209.0	41.6	3.5	26.11	13.90	40.01	2.88	26.95	13.05
5	130.0	0.130	230.0	48.2	4.3	29.94	13.90	43.84	3.15	28.87	14.97
6	155.0	0.155	240.0	51.3	5.2	31.59	13.90	45.49	3.27	29.70	15.80
7	180.0	0.180	247.0	53.5	6.0	32.64	13.90	46.54	3.35	30.22	16.32
8	210.0	0.210	252.0	55.0	7.0	33.23	13.90	47.13	3.39	30.52	16.62
9	235.0	0.235	256.0	56.3	7.8	33.68	13.90	47.58	3.42	30.74	16.84
10	260.0	0.260	263.0	58.4	8.7	34.67	13.90	48.57	3.49	31.23	17.33
11	285.0	0.285	278.0	63.1	9.5	37.09	13.90	50.99	3.67	32.45	18.55
12	310.0	0.310	288.0	66.2	10.3	38.56	13.90	52.46	3.77	33.18	19.28
13	340.0	0.340	293.0	67.8	11.3	39.03	13.90	52.93	3.81	33.41	19.51
14	365.0	0.365	299.0	69.6	12.2	39.72	13.90	53.62	3.86	33.76	19.86
15	390.0	0.390	304.0	71.2	13.0	40.22	13.90	54.12	3.89	34.01	20.11
16	415.0	0.415	309.0	72.7	13.8	40.71	13.90	54.61	3.93	34.25	20.35
17	440.0	0.440	314.0	74.3	14.7	41.18	13.90	55.08	3.96	34.49	20.59
18	450.0	0.450	318.0	75.5	15.0	41.70	13.90	55.60	4.00	34.75	20.85

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	2.2	15.3	24.1	58.4

LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
57	31	0.109	0.0057	0.0023					

MATERIAL DESCRIPTION	USCS	AASHTO
Reddish Brown Elastic silt with sand	MH	A-7-5(24)

Project No. 2051 **Client:** Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Source: Ash Pond Dike **Sample No.:** 8 **Elev./Depth:** 7-9 feet

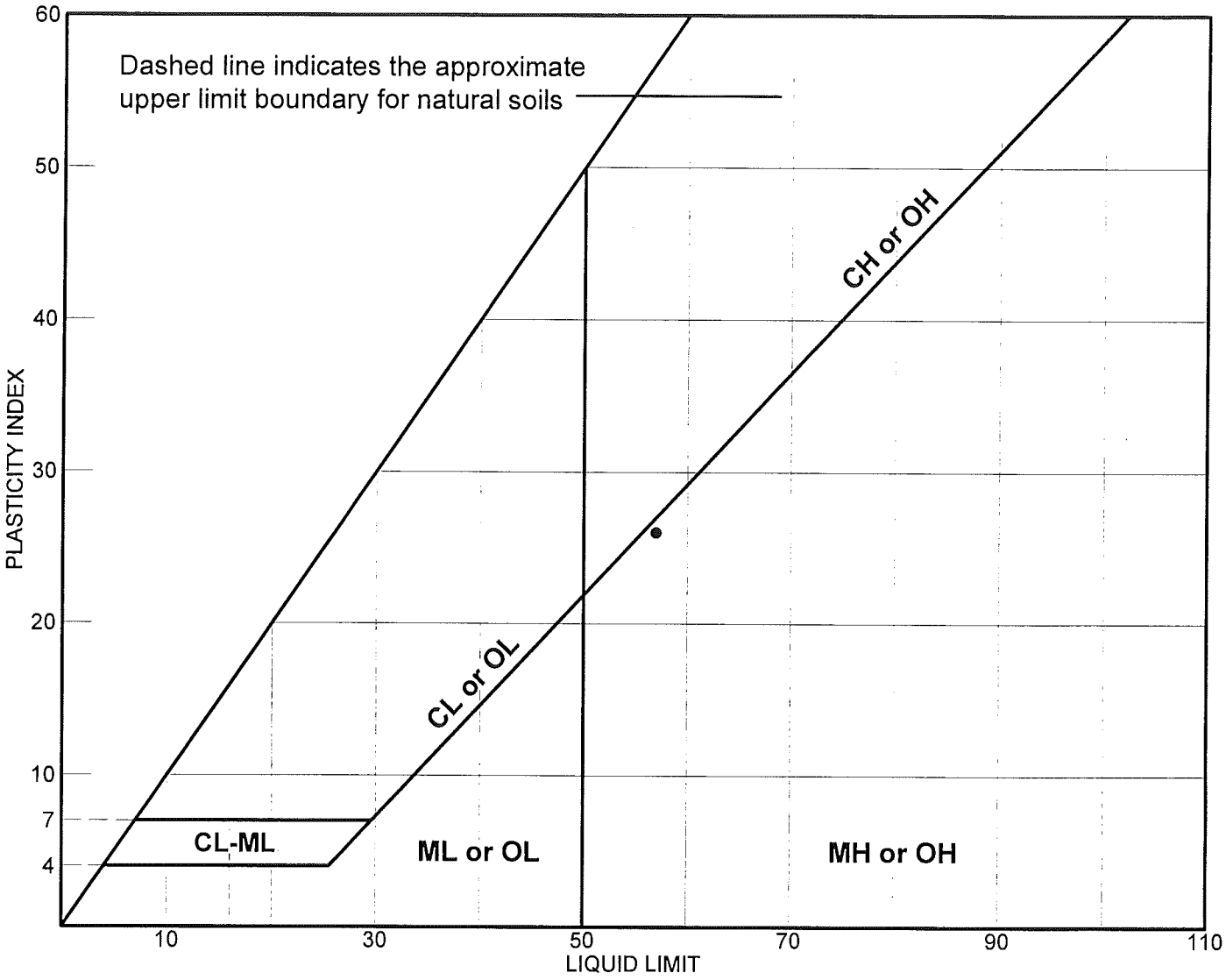
Remarks:
Boring No. 8

Particle Size Distribution Report

SOUTHERN COMPANY

Lab No. 8

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Ash Pond Dike	8	7-9 feet		31	57	26	MH

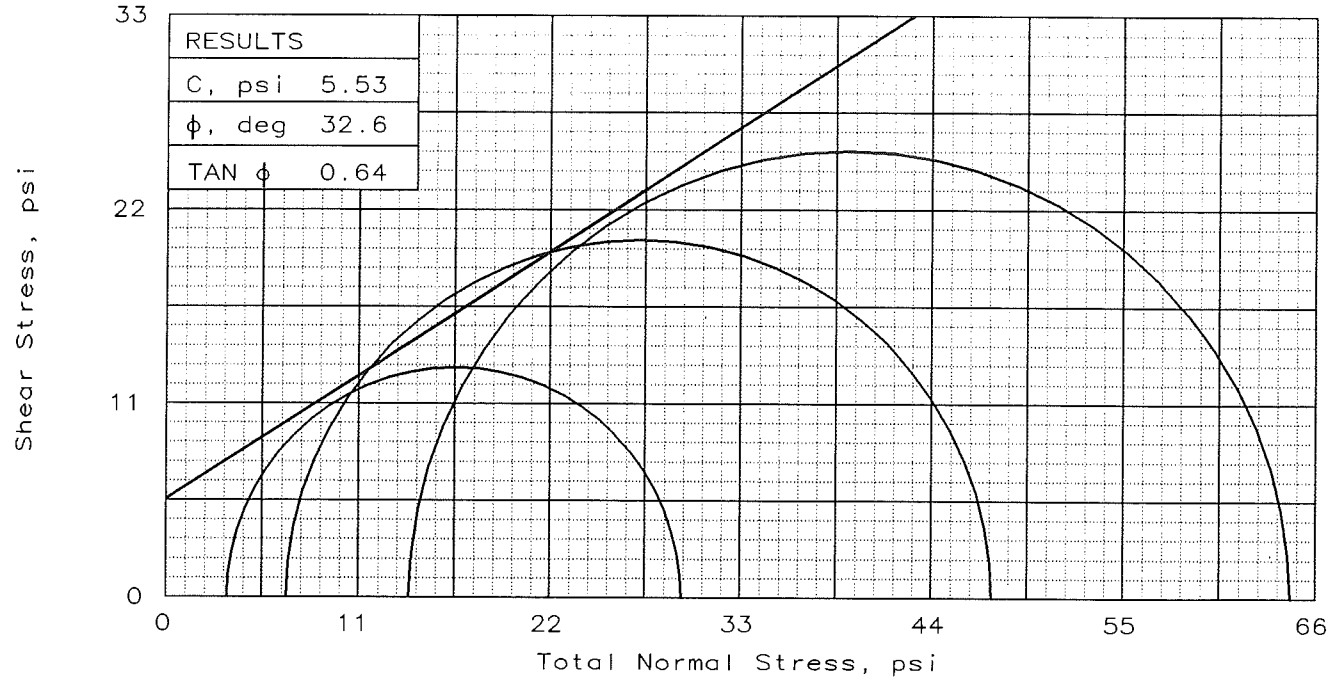
LIQUID AND PLASTIC LIMITS TEST REPORT

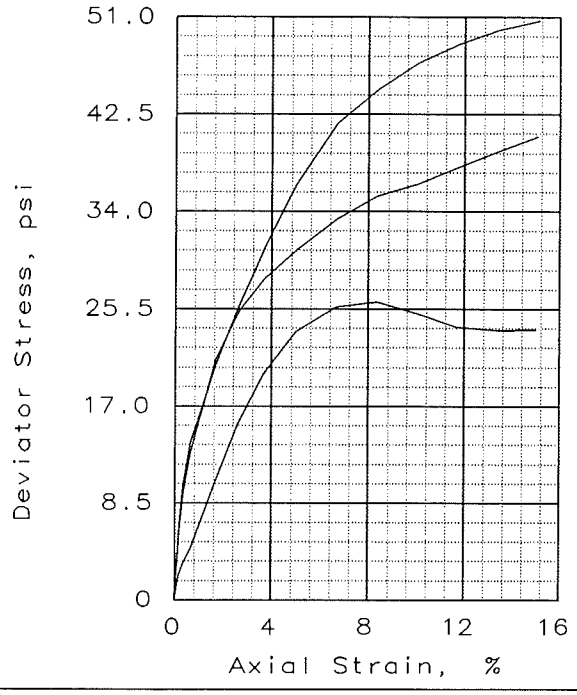
SOUTHERN COMPANY

Client: Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Project No.: 2051 **Lab No.** 8





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	29.1	24.8	25.0
	DRY DENSITY, pcf	92.1	98.0	98.6
	SATURATION, %	95.8	94.3	96.9
	VOID RATIO	0.810	0.701	0.690
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	3.00
AT TEST	WATER CONTENT, %	30.1	25.6	24.4
	DRY DENSITY, pcf	92.4	99.0	101.0
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.805	0.684	0.651
	DIAMETER, in	1.40	1.40	1.39
	HEIGHT, in	3.00	2.99	2.98
Strain rate, %/min		0.0010	0.0010	0.0010
BACK PRESSURE, psi		90.0	90.0	90.0
CELL PRESSURE, psi		93.5	96.9	103.9
FAIL. STRESS, psi		26.1	40.6	50.6
TOTAL PORE PR., psi		86.7	79.6	81.2
ULT. STRESS, psi				
TOTAL PORE PR., psi				
$\bar{\sigma}_1$ FAILURE, psi		32.9	57.9	73.3
$\bar{\sigma}_3$ FAILURE, psi		6.8	17.3	22.7

TYPE OF TEST:
CU with Pore Pressures
SAMPLE TYPE: UD
DESCRIPTION: Reddish brown
elastic silt with sand
LL= 57 PL= 31 PI= 26
SPECIFIC GRAVITY= 2.67
REMARKS:

Lab No: 8

CLIENT: Southern Company

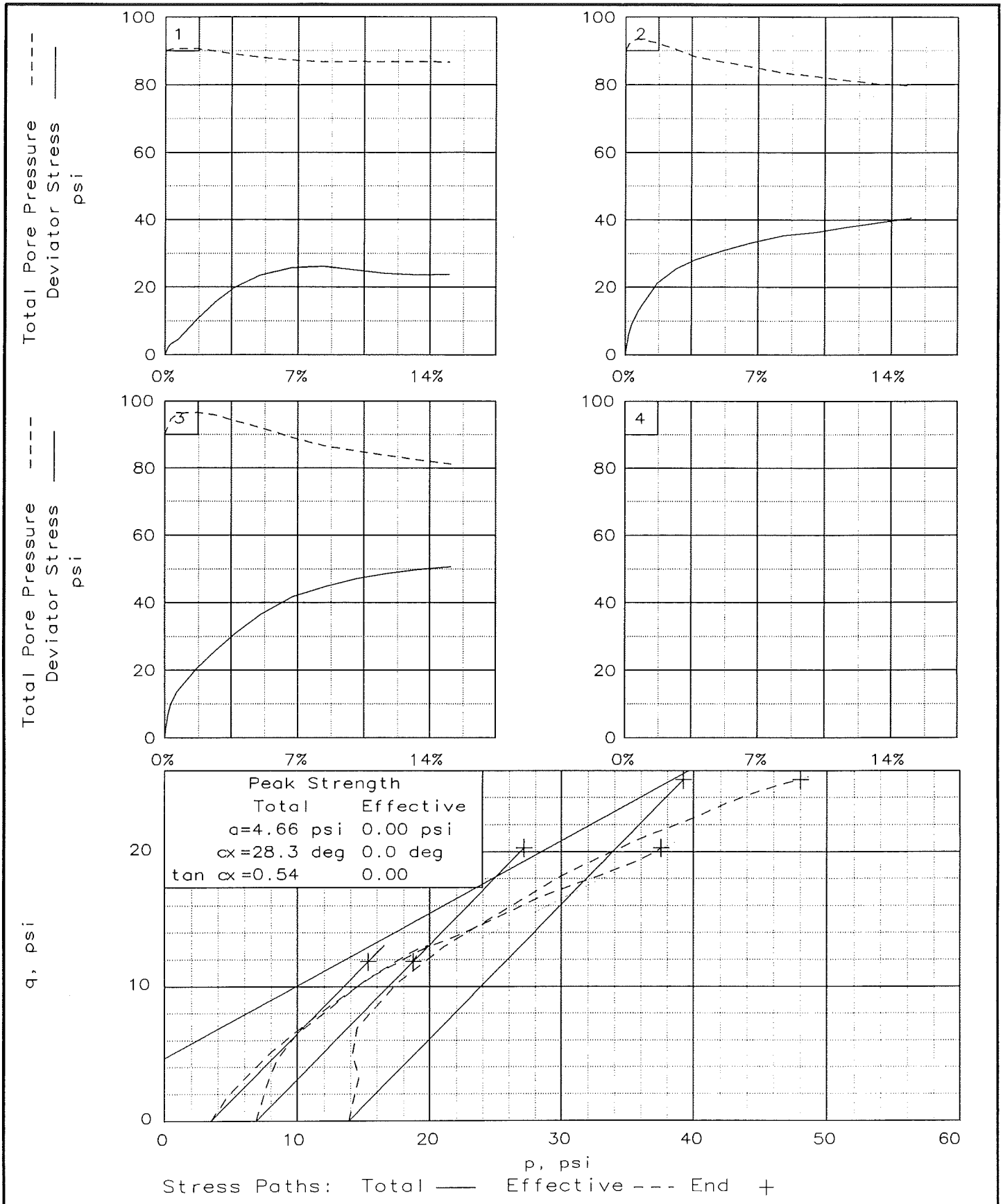
PROJECT: GPCo - Plant Bowen Ash Pond Dike

SAMPLE LOCATION: Boring #8

PROJ. NO.: 2051 DATE: 10/10/2002

TRIAXIAL SHEAR TEST REPORT

SOUTHERN COMPANY SERVICES



Client: Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Location: Boring #8

File: GPBAPD08 Project No.: 2051 Lab No: 8

Project and Sample Data

Date: 10/10/2002
Client: Southern Company
Project: GPCo - Plant Bowen Ash Pond Dike
Sample location: Boring #8
Sample description: Reddish brown elastic silt with sand
Remarks:

Fig no.: 8 2nd page Fig no. (if applicable): 8
Type of sample: UD
Specific gravity= 2.67 LL= 57 PL= 31 PI= 26
Test method: Corps of Eng. - uniform strain

Specimen Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Wt. moist soil and tare:	143.090			147.670
Wt. dry soil and tare:	117.700			110.290
Wt. of tare:	30.370			0.000
Weight, gms:	144.1			
Diameter, in:	1.400	1.400	1.399	
Area, in²:	1.539	1.538	1.536	
Height, in:	3.000	2.999	2.997	
Net decrease in height, in:		0.001	0.002	
Net decrease in water volume, cc:				
Moisture:	29.1	30.3	30.1	33.9
Wet density, pcf:	118.9	120.1	120.2	
Dry density, pcf:	92.1	92.2	92.4	
Void ratio:	0.8100	0.8082	0.8046	
% Saturation:	95.8	100.0	100.0	

Test Readings Data for Specimen No. 1

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.30179 lbs per input unit
Secondary load ring constant= 0.72586 lbs per input unit
Crossover reading for secondary load ring= 462 input units
Consolidation cell pressure = 93.50 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 3.50 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 26.11 psi at reading no. 9
ULT. STRESS = not selected

Test Readings Data for Specimen No. 1

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Effective Stresses Major psi	Effective Stresses 1:3 Ratio	Pore Pres. psi	P psi	Q psi
	0.0	0.000	69.0	0.0	0.0	0.00	3.50	3.50	1.00	90.00	3.50	0.00
1	5.0	0.005	80.0	3.3	0.2	2.16	3.20	5.36	1.67	90.30	4.28	1.08
2	10.0	0.010	85.3	4.9	0.3	3.19	3.00	6.19	2.06	90.50	4.60	1.60
3	20.0	0.020	92.0	6.9	0.7	4.49	2.90	7.39	2.55	90.60	5.14	2.24
4	50.0	0.050	123.0	16.3	1.7	10.43	2.90	13.33	4.60	90.60	8.12	5.22
5	80.0	0.080	151.0	24.7	2.7	15.68	3.60	19.28	5.36	89.90	11.44	7.84
6	110.0	0.110	174.0	31.7	3.7	19.87	4.50	24.37	5.42	89.00	14.43	9.93
7	150.0	0.150	195.0	38.0	5.0	23.51	5.50	29.01	5.28	88.00	17.26	11.76
8	200.0	0.200	209.0	42.3	6.7	25.67	6.30	31.97	5.07	87.20	19.13	12.83
9	250.0	0.250	214.0	43.8	8.3	26.11	6.80	32.91	4.84	86.70	19.85	13.05
10	300.0	0.300	211.0	42.9	10.0	25.10	6.70	31.80	4.75	86.80	19.25	12.55
11	350.0	0.350	207.0	41.6	11.7	23.94	6.80	30.74	4.52	86.70	18.77	11.97
12	400.0	0.400	208.0	41.9	13.3	23.66	6.80	30.46	4.48	86.70	18.63	11.83
13	450.0	0.450	211.0	42.9	15.0	23.71	6.90	30.61	4.44	86.60	18.75	11.85

Specimen Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Consolidated	Final
moist soil and tare:	124.750			151.030
dry soil and tare:	106.010			117.720
Wt. of tare:	30.350			0.000
Weight, gms:	148.2			
Diameter, in:	1.400	1.400	1.395	
Area, in²:	1.539	1.538	1.529	
Height, in:	3.000	2.999	2.990	
Net decrease in height, in:		0.001	0.009	
Net decrease in water volume, cc:				
% Moisture:	24.8	26.2	25.6	28.3
Wet density, pcf:	122.2	123.8	124.3	
Dry density, pcf:	98.0	98.1	99.0	
Void ratio:	0.7015	0.6998	0.6845	
% Saturation:	94.3	100.0	100.0	

Test Readings Data for Specimen No. 2

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.31199 lbs per input unit
Secondary load ring constant= 0.72824 lbs per input unit
Crossover reading for secondary load ring= 480 input units
Consolidation cell pressure = 96.90 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 6.90 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 40.56 psi at reading no. 13
[illegible]. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Effective Stresses Major psi	Effective Stresses 1:3 Ratio	Pore Pres. psi	P psi	Q psi
0	0.0	0.000	66.0	0.0	0.0	0.00	6.90	6.90	1.00	90.00	6.90	0.00
1	5.0	0.005	96.0	9.4	0.2	6.11	4.80	10.91	2.27	92.10	7.86	3.06
2	10.0	0.010	111.0	14.0	0.3	9.15	3.90	13.05	3.35	93.00	8.48	4.58
3	20.0	0.020	130.0	20.0	0.7	12.97	3.50	16.47	4.71	93.40	9.99	6.49
4	50.0	0.050	171.0	32.8	1.7	21.07	4.70	25.77	5.48	92.20	15.23	10.53
5	80.0	0.080	194.0	39.9	2.7	25.42	6.60	32.02	4.85	90.30	19.31	12.71
6	110.0	0.110	209.0	44.6	3.7	28.10	8.70	36.80	4.23	88.20	22.75	14.05
7	150.0	0.150	224.0	49.3	5.0	30.62	10.20	40.82	4.00	86.70	25.51	15.31
8	200.0	0.200	241.0	54.6	6.7	33.32	11.80	45.12	3.82	85.10	28.46	16.66
9	250.0	0.250	255.0	59.0	8.4	35.34	13.60	48.94	3.60	83.30	31.27	17.67
10	300.0	0.300	264.0	61.8	10.0	36.35	14.60	50.95	3.49	82.30	32.77	18.17
11	350.0	0.350	276.0	65.5	11.7	37.83	15.80	53.63	3.39	81.10	34.72	18.92
12	400.0	0.400	288.0	69.3	13.4	39.24	16.80	56.04	3.34	80.10	36.42	19.62
13	450.0	0.450	300.0	73.0	15.1	40.56	17.30	57.86	3.34	79.60	37.58	20.28

Specimen Parameters for Specimen No. 3

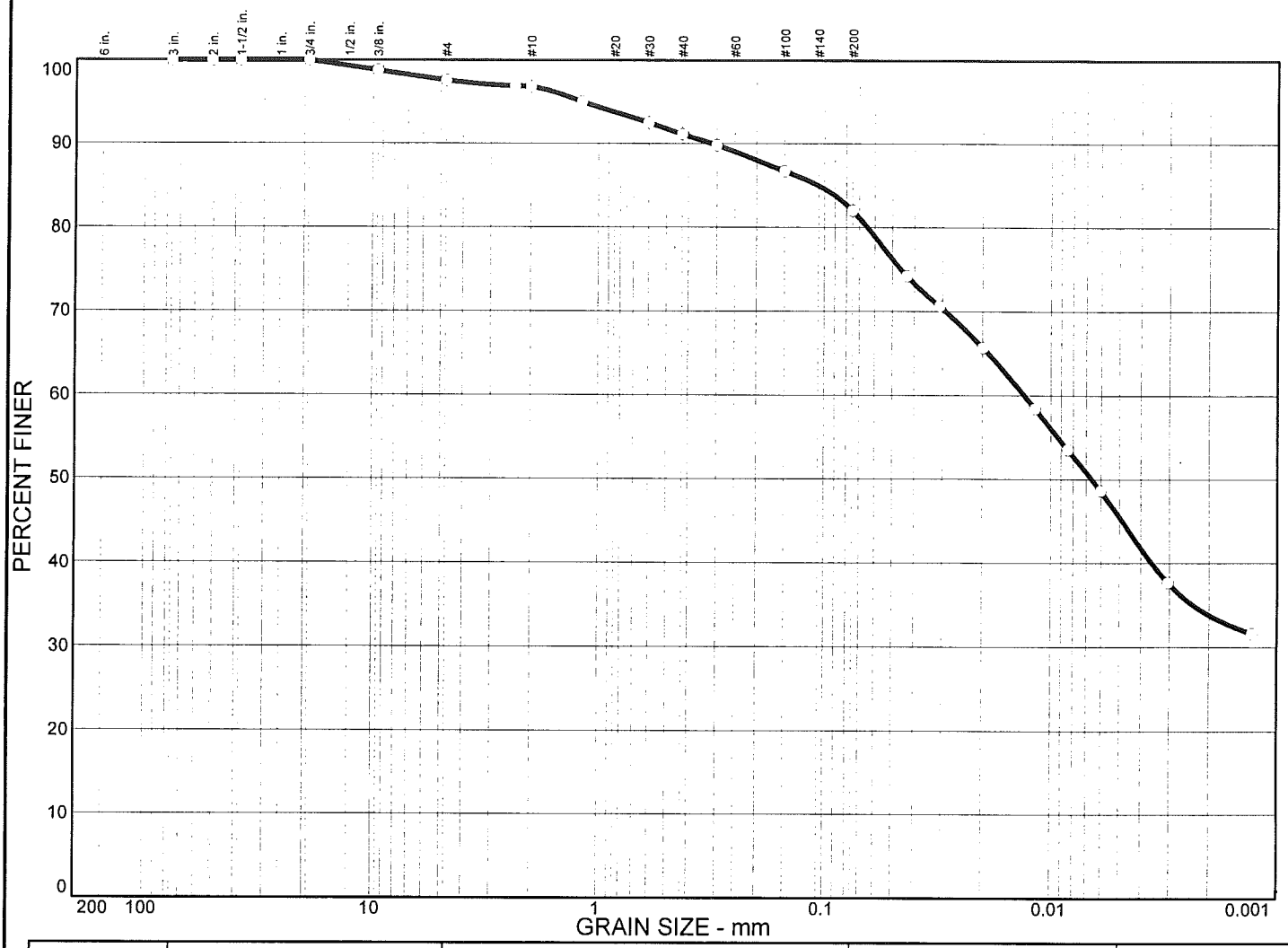
Specimen Parameter	Initial	Saturated	Consolidated	Final
Wt. moist soil and tare:	124.020			150.960
dry soil and tare:	105.250			119.060
Wt. of tare:	30.280			0.000
Weight, gms:	149.5			
Diameter, in:	1.400	1.400	1.389	
Area, in²:	1.539	1.538	1.516	
Height, in:	3.000	2.999	2.977	
Net decrease in height, in:		0.001	0.022	
Net decrease in water volume, cc:				
% Moisture:	25.0	25.8	24.4	26.8
Wet density, pcf:	123.3	124.2	125.6	
Dry density, pcf:	98.6	98.7	101.0	
Void ratio:	0.6897	0.6880	0.6511	
% Saturation:	96.9	100.0	100.0	

Test Readings Data for Specimen No. 3

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.3108 lbs per input unit
Secondary load ring constant= 0.77882 lbs per input unit
Crossover reading for secondary load ring= 474 input units
Consolidation cell pressure = 103.90 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 13.90 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 50.65 psi at reading no. 13
. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Major psi	1:3 Ratio	Pore Pres. psi	P psi	Q psi
0	0.0	0.000	78.0	0.0	0.0	0.00	13.90	13.90	1.00	90.00	13.90	0.00
1	5.0	0.005	110.0	9.9	0.2	6.55	11.40	17.95	1.57	92.50	14.68	3.28
2	10.0	0.010	127.0	15.2	0.3	10.01	9.20	19.21	2.09	94.70	14.21	5.01
3	20.0	0.020	146.0	21.1	0.7	13.85	7.60	21.45	2.82	96.30	14.52	6.92
4	50.0	0.050	180.0	31.7	1.7	20.56	7.30	27.86	3.82	96.60	17.58	10.28
5	80.0	0.080	208.0	40.4	2.7	25.94	8.10	34.04	4.20	95.80	21.07	12.97
6	110.0	0.110	234.0	48.5	3.7	30.80	9.80	40.60	4.14	94.10	25.20	15.40
7	150.0	0.150	265.0	58.1	5.0	36.41	11.80	48.21	4.09	92.10	30.01	18.21
8	200.0	0.200	296.0	67.8	6.7	41.70	14.80	56.50	3.82	89.10	35.65	20.85
9	250.0	0.250	316.0	74.0	8.4	44.70	17.30	62.00	3.58	86.60	39.65	22.35
10	300.0	0.300	333.0	79.3	10.1	47.02	18.80	65.82	3.50	85.10	42.31	23.51
11	350.0	0.350	347.0	83.6	11.8	48.67	20.20	68.87	3.41	83.70	44.54	24.34
12	400.0	0.400	359.0	87.3	13.4	49.88	21.50	71.38	3.32	82.40	46.44	24.94
13	450.0	0.450	369.0	90.4	15.1	50.65	22.70	73.35	3.23	81.20	48.02	25.32

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	2.4	15.6	36.5	45.5

LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
44	29	0.106	0.0131	0.0066					

MATERIAL DESCRIPTION	USCS	AASHTO
Light Brown Silt with sand	ML	A-7-6(14)

Project No. 2051 **Client:** Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Source: Ash Pond Dike **Sample No.:** 9 **Elev./Depth:** 21-23 feet

Remarks:

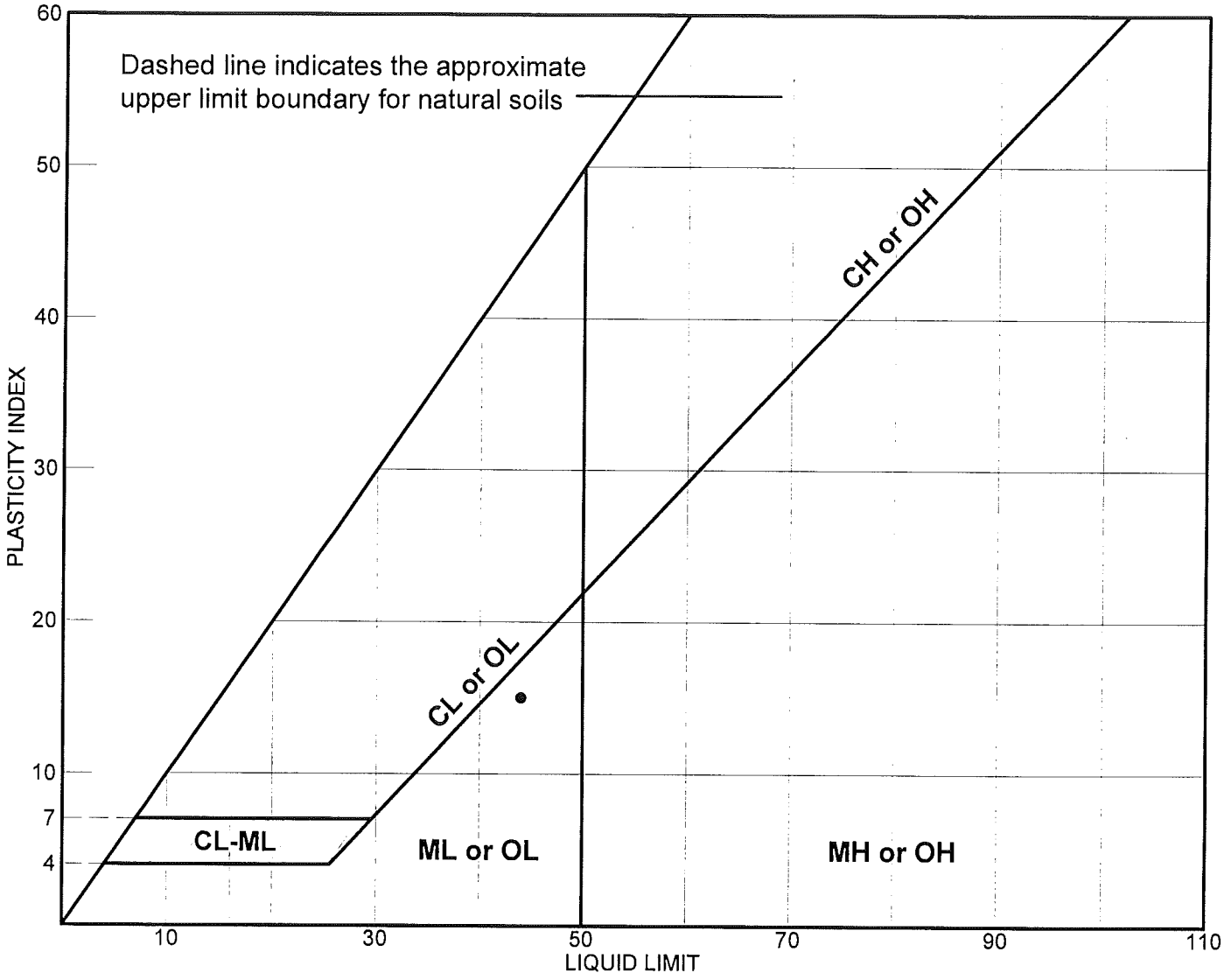
Boring No. 7

Particle Size Distribution Report

SOUTHERN COMPANY

Lab No. 9

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Ash Pond Dike	9	21-23 feet		29	44	15	ML

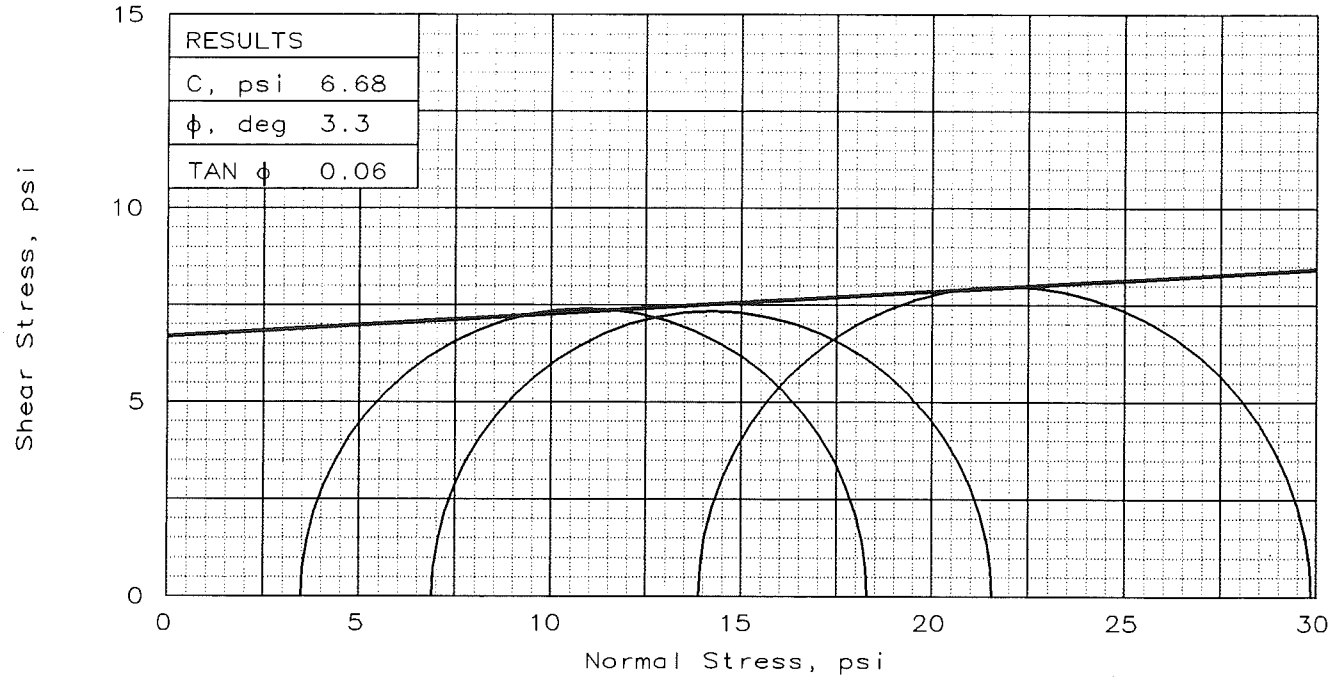
LIQUID AND PLASTIC LIMITS TEST REPORT

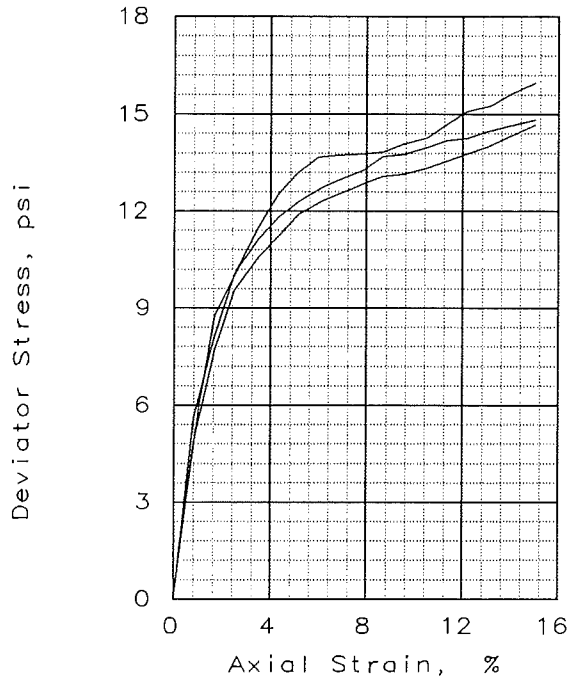
SOUTHERN COMPANY

Client: Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Project No.: 2051 **Lab No.** 9





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	40.2	38.3	38.3
	DRY DENSITY, pcf	76.9	78.2	80.0
	SATURATION, %	92.0	90.4	94.4
	VOID RATIO	1.168	1.131	1.083
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	3.00
AT TEST	WATER CONTENT, %	41.1	42.4	40.6
	DRY DENSITY, pcf	76.9	78.2	80.0
	SATURATION, %	94.0	100.0	100.0
	VOID RATIO	1.168	1.131	1.083
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	3.00
Strain rate, %/min		0.0010	0.0010	0.0010
BACK PRESSURE, psi		0.0	0.0	0.0
CELL PRESSURE, psi		3.5	6.9	13.9
FAIL. STRESS, psi		14.8	14.7	16.0
ULT. STRESS, psi				
σ_1 FAILURE, psi		18.3	21.6	29.9
σ_3 FAILURE, psi		3.5	6.9	13.9

TYPE OF TEST:
Unconsolidated Undrained
SAMPLE TYPE: UD
DESCRIPTION: Light brown silt with sand
LL= 44 PL= 29 PI= 15
SPECIFIC GRAVITY= 2.67
REMARKS:

Lob No: 9

CLIENT: Southern Company

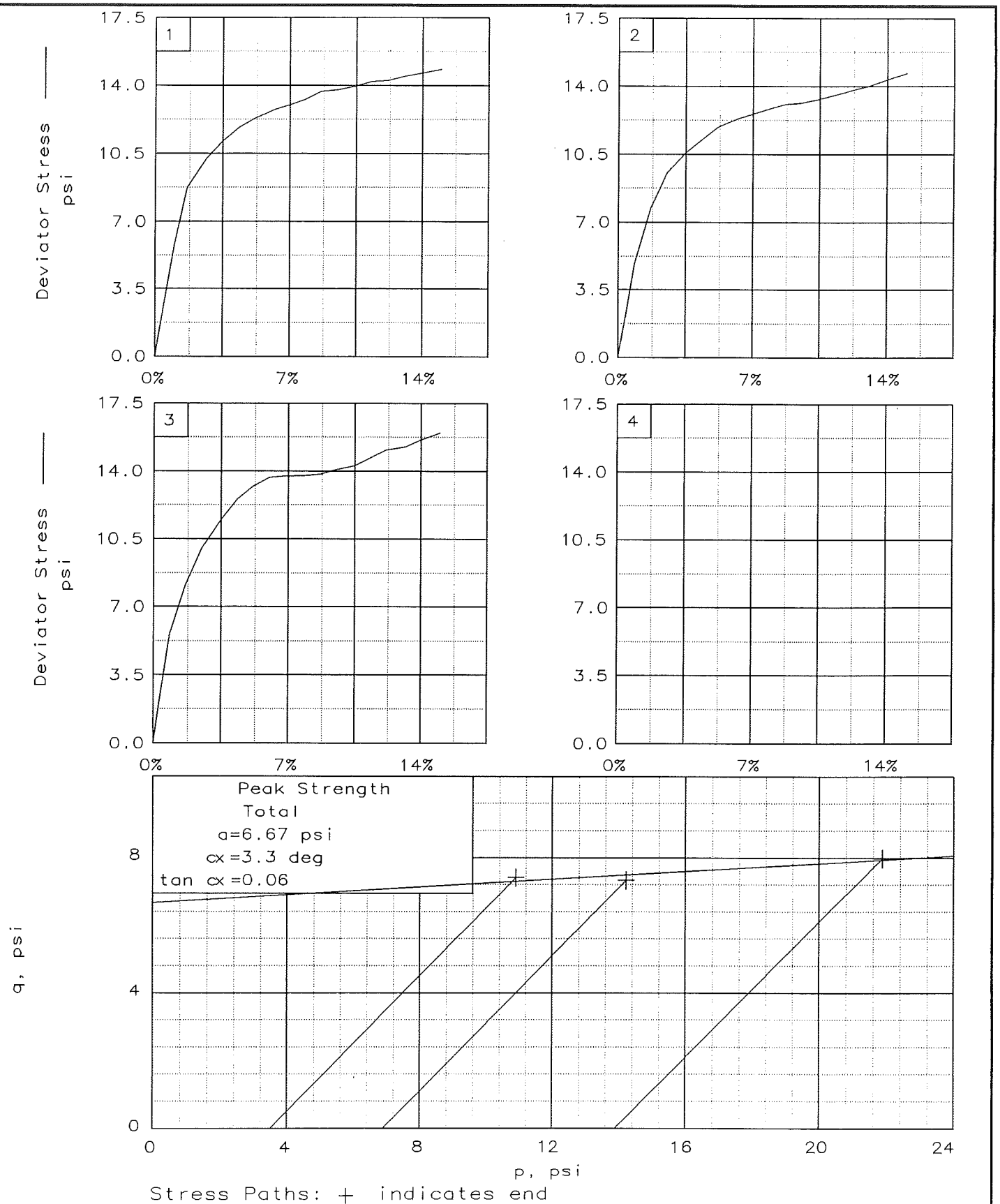
PROJECT: GPCo - Plant Bowen Ash Pond Dike

SAMPLE LOCATION: Boring #7
Depth: 21 - 23 feet

PROJ. NO.: 2051 DATE: 10/02/2002

TRIAXIAL SHEAR TEST REPORT

SOUTHERN COMPANY SERVICES



Client: Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Location: Boring #7 Depth: 21 - 23 feet

File: GPBAPD09 Project No.: 2051 Lab No: 9

Project and Sample Data

Date: 10/02/2002
Client: Southern Company
Project: GPCo - Plant Bowen Ash Pond Dike
Sample location: Boring #7 Depth: 21 - 23 feet
Sample description: Light brown silt with sand
Remarks:

Fig no.: 9 2nd page Fig no. (if applicable): 9
Type of sample: UD
Specific gravity= 2.67 LL= 44 PL= 29 PI= 15
Test method: ASTM - Method A

Specimen Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Final
Wt. moist soil and tare:	119.400		128.270
Wt. dry soil and tare:	93.850		90.900
Wt. of tare:	30.360		0.000
Weight, gms:	130.7		
Diameter, in:	1.400	1.400	
Area, in²:	1.539	1.539	
Height, in:	3.000	3.000	
Net decrease in height, in:		0.000	
% Moisture:	40.2	41.1	41.1
density, pcf:	107.8	108.5	
Dry density, pcf:	76.9	76.9	
Void ratio:	1.1681	1.1681	
% Saturation:	92.0	94.0	

Test Readings Data for Specimen No. 1

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.31199 lbs per input unit
Secondary load ring constant= 0.72824 lbs per input unit
Crossover reading for secondary load ring= 480 input units
Cell pressure = 3.50 psi
Back pressure = 0.00 psi
Effective confining stress = 3.50 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 14.82 psi at reading no. 17
ULT. STRESS = not selected

Test Readings Data for Specimen No. 1

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Principal Stresses Minor psi	Major psi	1:3 Ratio	P psi	Q psi
	0.0	0.000	66.0	0.0	0.0	0.00	3.50	3.50	1.00	3.50	0.00
1	30.0	0.030	95.0	9.0	1.0	5.82	3.50	9.32	2.66	6.41	2.91
2	50.0	0.050	110.0	13.7	1.7	8.77	3.50	12.27	3.51	7.88	4.38
3	80.0	0.080	118.0	16.2	2.7	10.26	3.50	13.76	3.93	8.63	5.13
4	105.0	0.105	123.0	17.8	3.5	11.15	3.50	14.65	4.19	9.07	5.57
5	130.0	0.130	127.0	19.0	4.3	11.83	3.50	15.33	4.38	9.41	5.91
6	155.0	0.155	130.0	20.0	5.2	12.30	3.50	15.80	4.51	9.65	6.15
7	185.0	0.185	133.0	20.9	6.2	12.74	3.50	16.24	4.64	9.87	6.37
8	210.0	0.210	135.0	21.5	7.0	13.01	3.50	16.51	4.72	10.00	6.50
9	235.0	0.235	137.0	22.2	7.8	13.26	3.50	16.76	4.79	10.13	6.63
10	260.0	0.260	140.0	23.1	8.7	13.70	3.50	17.20	4.91	10.35	6.85
11	285.0	0.285	141.0	23.4	9.5	13.76	3.50	17.26	4.93	10.38	6.88
12	315.0	0.315	143.0	24.0	10.5	13.97	3.50	17.47	4.99	10.48	6.98
13	340.0	0.340	145.0	24.6	11.3	14.20	3.50	17.70	5.06	10.60	7.10
14	365.0	0.365	146.0	25.0	12.2	14.24	3.50	17.74	5.07	10.62	7.12
15	390.0	0.390	148.0	25.6	13.0	14.46	3.50	17.96	5.13	10.73	7.23
16	420.0	0.420	150.0	26.2	14.0	14.64	3.50	18.14	5.18	10.82	7.32
17	450.0	0.450	152.0	26.8	15.0	14.82	3.50	18.32	5.23	10.91	7.41

Specimen Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Final
moist soil and tare:	122.510		131.960
dry soil and tare:	96.970		92.680
Wt. of tare:	30.300		0.000
Weight, gms:	131.1		
Diameter, in:	1.400	1.400	
Area, in²:	1.539	1.539	
Height, in:	3.000	3.000	
Net decrease in height, in:		0.000	
% Moisture:	38.3	42.4	42.4
Wet density, pcf:	108.2	111.4	
Dry density, pcf:	78.2	78.2	
Void ratio:	1.1314	1.1314	
% Saturation:	90.4	100.0	

Test Readings Data for Specimen No. 2

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.301799 lbs per input unit
Secondary load ring constant= 0.725864 lbs per input unit
Crossover reading for secondary load ring= 462 input units
Cell pressure = 6.90 psi
Back pressure = 0.00 psi
Effective confining stress = 6.90 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 14.66 psi at reading no. 17
ULT. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Principal Stresses Minor psi	Major psi	1:3 Ratio	P psi	Q psi
0	0.0	0.000	72.0	0.0	0.0	0.00	6.90	6.90	1.00	6.90	0.00
1	25.0	0.025	97.0	7.5	0.8	4.86	6.90	11.76	1.70	9.33	2.43
2	50.0	0.050	112.0	12.1	1.7	7.71	6.90	14.61	2.12	10.76	3.86
3	75.0	0.075	122.0	15.1	2.5	9.56	6.90	16.46	2.39	11.68	4.78
4	105.0	0.105	128.0	16.9	3.5	10.59	6.90	17.49	2.54	12.20	5.30
5	130.0	0.130	132.0	18.1	4.3	11.25	6.90	18.15	2.63	12.53	5.63
6	155.0	0.155	136.0	19.3	5.2	11.90	6.90	18.80	2.72	12.85	5.95
7	185.0	0.185	139.0	20.2	6.2	12.33	6.90	19.23	2.79	13.06	6.16
8	210.0	0.210	141.0	20.8	7.0	12.58	6.90	19.48	2.82	13.19	6.29
9	235.0	0.235	143.0	21.4	7.8	12.83	6.90	19.73	2.86	13.31	6.41
10	260.0	0.260	145.0	22.0	8.7	13.07	6.90	19.97	2.89	13.44	6.54
11	285.0	0.285	146.0	22.3	9.5	13.13	6.90	20.03	2.90	13.46	6.56
12	315.0	0.315	148.0	22.9	10.5	13.34	6.90	20.24	2.93	13.57	6.67
13	340.0	0.340	150.0	23.5	11.3	13.56	6.90	20.46	2.97	13.68	6.78
14	365.0	0.365	152.0	24.1	12.2	13.78	6.90	20.68	3.00	13.79	6.89
15	390.0	0.390	154.0	24.7	13.0	13.99	6.90	20.89	3.03	13.89	6.99
16	420.0	0.420	157.0	25.7	14.0	14.33	6.90	21.23	3.08	14.07	7.17
17	450.0	0.450	160.0	26.6	15.0	14.66	6.90	21.56	3.13	14.23	7.33

Specimen Parameters for Specimen No. 3

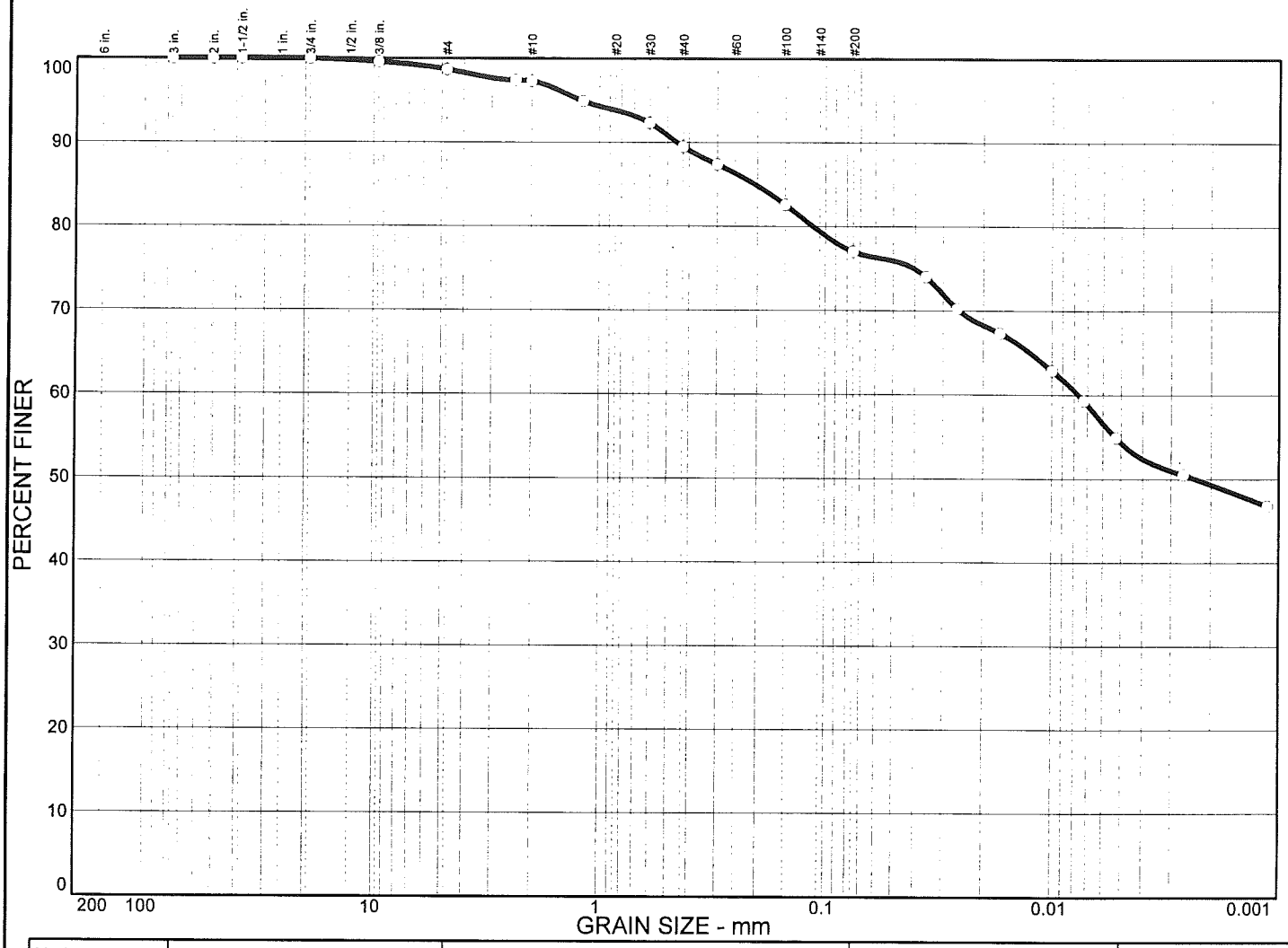
Specimen Parameter	Initial	Saturated	Final
W moist soil and tare:	123.060		135.090
dry soil and tare:	97.410		96.100
Wt. of tare:	30.410		0.000
Weight, gms:	134.1		
Diameter, in:	1.400	1.400	
Area, in²:	1.539	1.539	
Height, in:	3.000	3.000	
Net decrease in height, in:		0.000	
% Moisture:	38.3	40.6	40.6
Wet density, pcf:	110.7	112.5	
Dry density, pcf:	80.0	80.0	
Void ratio:	1.0830	1.0830	
% Saturation:	94.4	100.0	

Test Readings Data for Specimen No. 3

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.3108 lbs per input unit
Secondary load ring constant= 0.77882 lbs per input unit
Crossover reading for secondary load ring= 474 input units
Cell pressure = 13.90 psi
Back pressure = 0.00 psi
Effective confining stress = 13.90 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 15.96 psi at reading no. 17
ULT. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Principal Stresses Minor psi	Major psi	1:3 Ratio	P psi	Q psi
0	0.0	0.000	75.0	0.0	0.0	0.00	13.90	13.90	1.00	13.90	0.00
1	25.0	0.025	103.0	8.7	0.8	5.61	13.90	19.51	1.40	16.70	2.80
2	50.0	0.050	116.0	12.7	1.7	8.14	13.90	22.04	1.59	17.97	4.07
3	75.0	0.075	126.0	15.9	2.5	10.04	13.90	23.94	1.72	18.92	5.02
4	105.0	0.105	134.0	18.3	3.5	11.50	13.90	25.40	1.83	19.65	5.75
5	130.0	0.130	140.0	20.2	4.3	12.55	13.90	26.45	1.90	20.18	6.28
6	155.0	0.155	144.0	21.4	5.2	13.21	13.90	27.11	1.95	20.51	6.61
7	180.0	0.180	147.0	22.4	6.0	13.66	13.90	27.56	1.98	20.73	6.83
8	205.0	0.205	148.0	22.7	6.8	13.73	13.90	27.63	1.99	20.77	6.87
9	235.0	0.235	149.0	23.0	7.8	13.77	13.90	27.67	1.99	20.79	6.89
10	260.0	0.260	150.0	23.3	8.7	13.83	13.90	27.73	1.99	20.82	6.92
11	285.0	0.285	152.0	23.9	9.5	14.07	13.90	27.97	2.01	20.93	7.03
12	315.0	0.315	154.0	24.6	10.5	14.28	13.90	28.18	2.03	21.04	7.14
13	340.0	0.340	157.0	25.5	11.3	14.68	13.90	28.58	2.06	21.24	7.34
14	365.0	0.365	160.0	26.4	12.2	15.07	13.90	28.97	2.08	21.44	7.54
15	395.0	0.395	162.0	27.0	13.2	15.25	13.90	29.15	2.10	21.53	7.63
16	420.0	0.420	165.0	28.0	14.0	15.63	13.90	29.53	2.12	21.71	7.81
17	450.0	0.450	168.0	28.9	15.0	15.96	13.90	29.86	2.15	21.88	7.98

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	1.3	21.7	22.7	54.3

LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
56	23	0.204	0.0077	0.0023					

MATERIAL DESCRIPTION	USCS	AASHTO
Tan Fat clay with sand	CH	A-7-6(26)

Project No. 2051 **Client:** Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Source: Ash Pond Dike **Sample No.:** 10 **Elev./Depth:** 28.5-30 feet

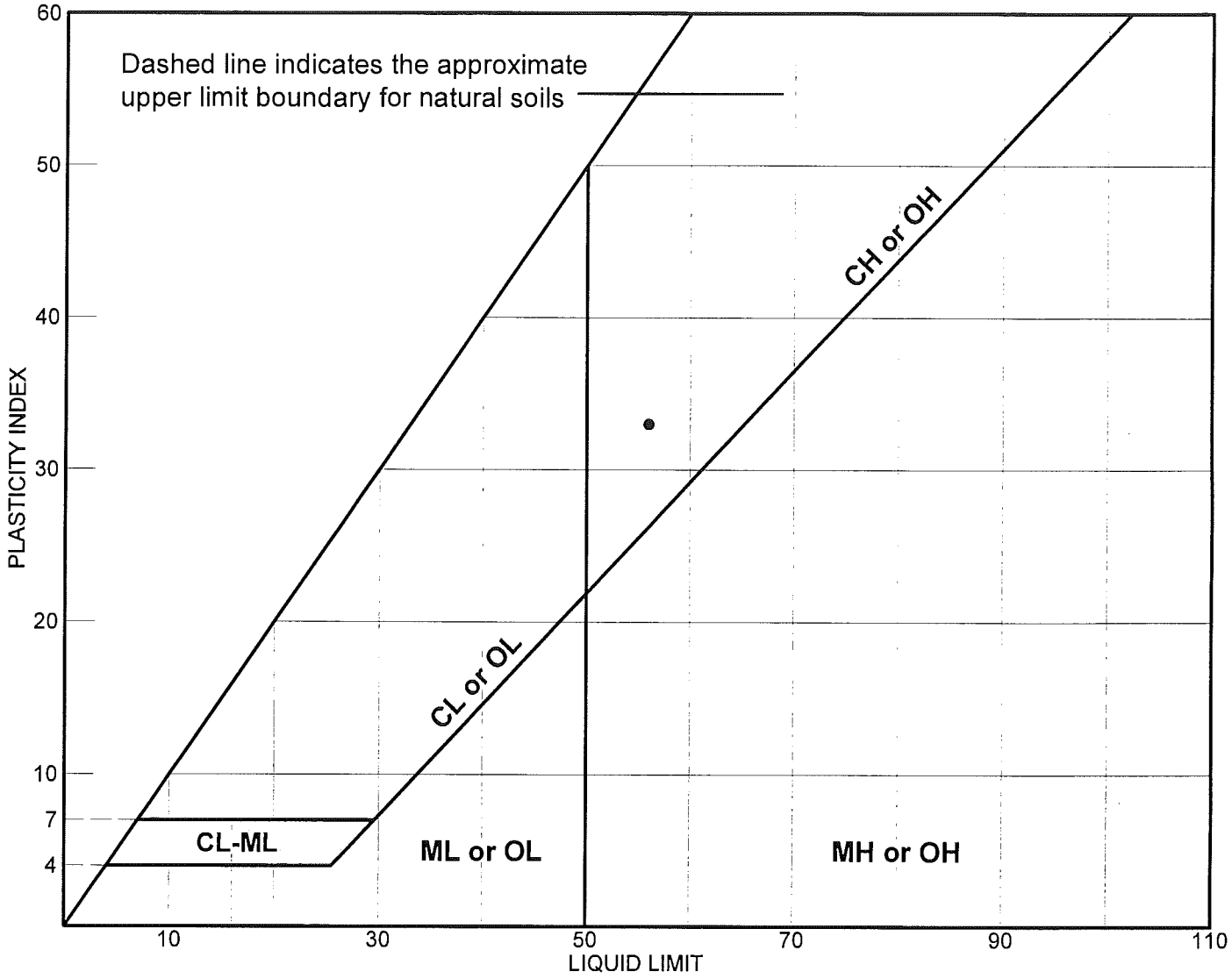
Remarks:
Boring No. 6

Particle Size Distribution Report

SOUTHERN COMPANY

Lab No. 10

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Ash Pond Dike	10	28.5-30 feet		23	56	33	CH

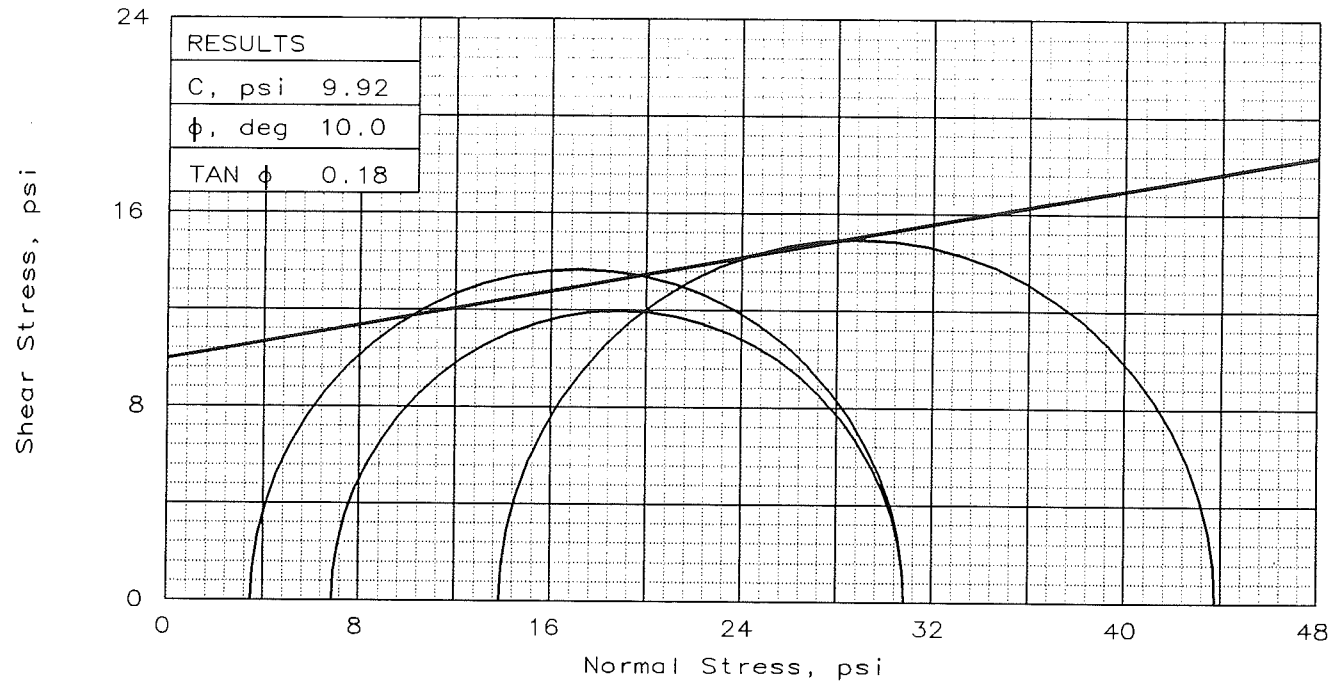
LIQUID AND PLASTIC LIMITS TEST REPORT

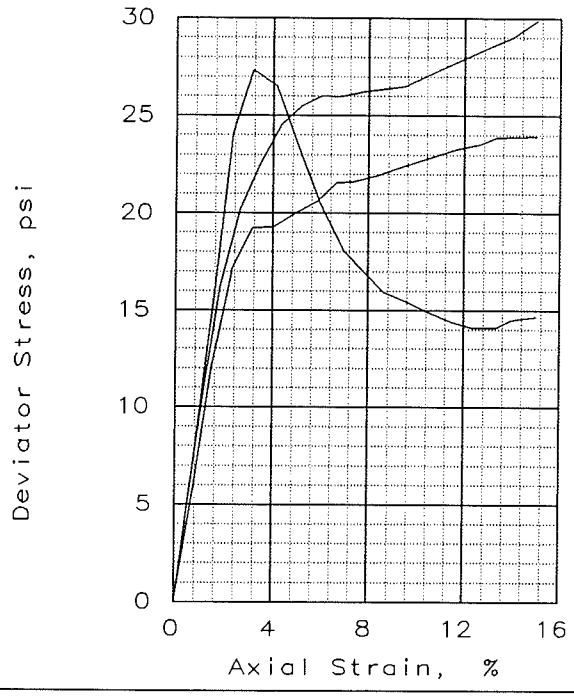
SOUTHERN COMPANY

Client: Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Project No.: 2051 **Lab No.** 10





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	23.6	22.2	19.6
	DRY DENSITY, pcf	100.3	102.7	105.8
	SATURATION, %	94.2	94.1	90.1
	VOID RATIO	0.674	0.636	0.587
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	3.00
AT TEST	WATER CONTENT, %	25.1	23.6	21.2
	DRY DENSITY, pcf	100.3	102.7	105.8
	SATURATION, %	100.0	100.0	97.1
	VOID RATIO	0.674	0.636	0.587
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	3.00
Strain rate, %/min		0.0010	0.0010	0.0010
BACK PRESSURE, psi		0.0	0.0	0.0
CELL PRESSURE, psi		3.5	6.9	13.9
FAIL. STRESS, psi		27.3	23.9	29.9
ULT. STRESS, psi				
σ_1 FAILURE, psi		30.8	30.8	43.8
σ_3 FAILURE, psi		3.5	6.9	13.9

TYPE OF TEST:
Unconsolidated Undrained
SAMPLE TYPE: UD
DESCRIPTION: Tan fat clay with sand
LL= 56 PL= 23 PI= 33
SPECIFIC GRAVITY= 2.69
REMARKS:

Lab No: 10

CLIENT: Southern Company

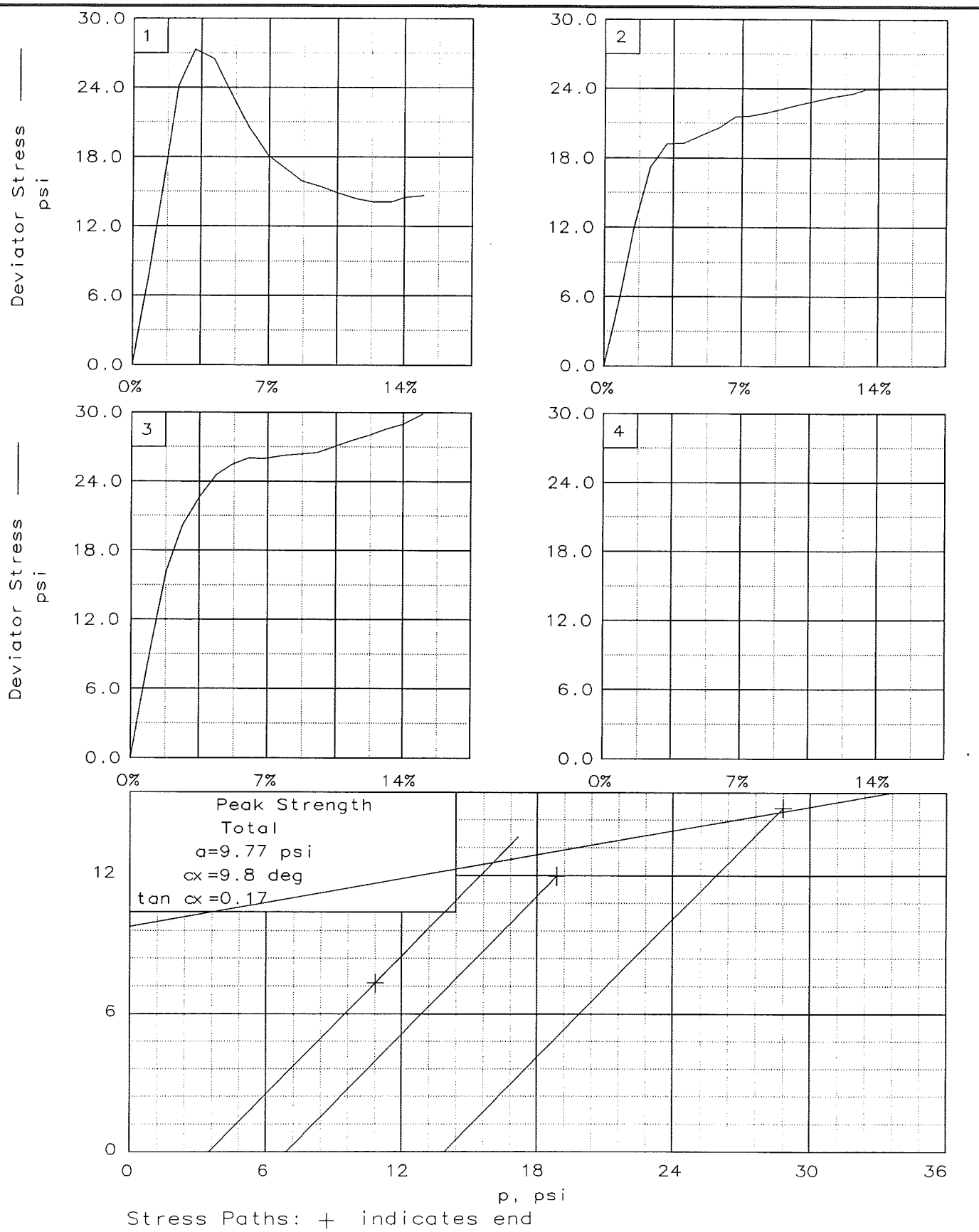
PROJECT: GPCo - Plant Bowen Ash Pond Dike

SAMPLE LOCATION: Boring #6
Depth: 28.5 - 30.0 feet

PROJ. NO.: 2051 DATE: 10/02/2002

TRIAXIAL SHEAR TEST REPORT

SOUTHERN COMPANY SERVICES



Client: Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Location: Boring #6 Depth: 28.5 - 30.0 feet

File: GPBAPD10 Project No.: 2051 Lab No: 10

Project and Sample Data

Date: 10/02/2002
Client: Southern Company
Project: GPCo - Plant Bowen Ash Pond Dike
Sample location: Boring #6 Depth: 28.5 - 30.0 feet
Sample description: Tan fat clay with sand
Remarks:

Fig no.: 10 2nd page Fig no. (if applicable): 10
Type of sample: UD
Specific gravity= 2.69 LL= 56 PL= 23 PI= 33
Test method: ASTM - Method A

Specimen Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Final
Wt. moist soil and tare:	121.750		154.550
Wt. dry soil and tare:	104.280		123.570
Wt. of tare:	30.340		0.000
Weight, gms:	150.3		
Diameter, in:	1.400	1.400	
Area, in²:	1.539	1.539	
Height, in:	3.000	3.000	
Net decrease in height, in:		0.000	
% Moisture:	23.6	25.1	25.1
Wet density, pcf:	124.0	125.4	
Dry density, pcf:	100.3	100.3	
Void ratio:	0.6744	0.6744	
% Saturation:	94.2	100.0	

Test Readings Data for Specimen No. 1

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.30179 lbs per input unit
Secondary load ring constant= 0.78528 lbs per input unit
Crossover reading for secondary load ring= 462 input units
Cell pressure = 3.50 psi
Back pressure = 0.00 psi
Effective confining stress = 3.50 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 27.34 psi at reading no. 4
ULT. STRESS = not selected

Test Readings Data for Specimen No. 1

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Principal Stresses Minor psi	Major psi	1:3 Ratio	P psi	Q psi
	0.0	0.000	70.0	0.0	0.0	0.00	3.50	3.50	1.00	3.50	0.00
1	25.0	0.025	110.0	12.1	0.8	7.78	3.50	11.28	3.22	7.39	3.89
2	50.0	0.050	156.0	26.0	1.7	16.58	3.50	20.08	5.74	11.79	8.29
3	70.0	0.070	196.0	38.0	2.3	24.13	3.50	27.63	7.89	15.56	12.06
4	95.0	0.095	214.0	43.5	3.2	27.34	3.50	30.84	8.81	17.17	13.67
5	125.0	0.125	211.0	42.6	4.2	26.49	3.50	29.99	8.57	16.75	13.25
6	150.0	0.150	197.0	38.3	5.0	23.65	3.50	27.15	7.76	15.33	11.83
7	180.0	0.180	181.0	33.5	6.0	20.46	3.50	23.96	6.84	13.73	10.23
8	210.0	0.210	169.0	29.9	7.0	18.05	3.50	21.55	6.16	12.53	9.03
9	235.0	0.235	164.0	28.4	7.8	16.98	3.50	20.48	5.85	11.99	8.49
10	260.0	0.260	159.0	26.9	8.7	15.94	3.50	19.44	5.55	11.47	7.97
11	290.0	0.290	157.0	26.3	9.7	15.41	3.50	18.91	5.40	11.20	7.70
12	315.0	0.315	155.0	25.7	10.5	14.91	3.50	18.41	5.26	10.96	7.46
13	345.0	0.345	153.0	25.0	11.5	14.40	3.50	17.90	5.11	10.70	7.20
14	370.0	0.370	152.0	24.7	12.3	14.09	3.50	17.59	5.03	10.55	7.05
15	400.0	0.400	153.0	25.0	13.3	14.10	3.50	17.60	5.03	10.55	7.05
16	420.0	0.420	156.0	26.0	14.0	14.50	3.50	18.00	5.14	10.75	7.25
17	450.0	0.450	158.0	26.6	15.0	14.66	3.50	18.16	5.19	10.83	7.33

Specimen Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Final
moist soil and tare:	149.730		154.970
dry soil and tare:	128.000		125.350
Wt. of tare:	30.300		0.000
Weight, gms:	152.2		
Diameter, in:	1.400	1.400	
Area, in²:	1.539	1.539	
Height, in:	3.000	3.000	
Net decrease in height, in:		0.000	
% Moisture:	22.2	23.6	23.6
Wet density, pcf:	125.5	126.9	
Dry density, pcf:	102.7	102.7	
Void ratio:	0.6356	0.6356	
% Saturation:	94.1	100.0	

Test Readings Data for Specimen No. 2

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.31199 lbs per input unit
Secondary load ring constant= 0.72824 lbs per input unit
Crossover reading for secondary load ring= 480 input units
Cell pressure = 6.90 psi
Back pressure = 0.00 psi
Effective confining stress = 6.90 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 23.95 psi at reading no. 17
U.T. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Principal Stresses Minor psi	Major psi	1:3 Ratio	P psi	Q psi
0	0.0	0.000	73.0	0.0	0.0	0.00	6.90	6.90	1.00	6.90	0.00
1	25.0	0.025	104.0	9.7	0.8	6.23	6.90	13.13	1.90	10.02	3.12
2	45.0	0.045	133.0	18.7	1.5	11.98	6.90	18.88	2.74	12.89	5.99
3	70.0	0.070	160.0	27.1	2.3	17.22	6.90	24.12	3.50	15.51	8.61
4	95.0	0.095	171.0	30.6	3.2	19.23	6.90	26.13	3.79	16.52	9.62
5	120.0	0.120	172.0	30.9	4.0	19.26	6.90	26.16	3.79	16.53	9.63
6	150.0	0.150	177.0	32.4	5.0	20.02	6.90	26.92	3.90	16.91	10.01
7	175.0	0.175	181.0	33.7	5.8	20.61	6.90	27.51	3.99	17.21	10.31
8	200.0	0.200	187.0	35.6	6.7	21.56	6.90	28.46	4.13	17.68	10.78
9	220.0	0.220	188.0	35.9	7.3	21.60	6.90	28.50	4.13	17.70	10.80
10	250.0	0.250	191.0	36.8	8.3	21.92	6.90	28.82	4.18	17.86	10.96
11	275.0	0.275	194.0	37.8	9.2	22.28	6.90	29.18	4.23	18.04	11.14
12	300.0	0.300	197.0	38.7	10.0	22.62	6.90	29.52	4.28	18.21	11.31
13	325.0	0.325	200.0	39.6	10.8	22.95	6.90	29.85	4.33	18.38	11.48
14	350.0	0.350	203.0	40.6	11.7	23.27	6.90	30.17	4.37	18.54	11.64
15	380.0	0.380	206.0	41.5	12.7	23.54	6.90	30.44	4.41	18.67	11.77
16	400.0	0.400	209.0	42.4	13.3	23.89	6.90	30.79	4.46	18.84	11.94
17	450.0	0.450	212.0	43.4	15.0	23.95	6.90	30.85	4.47	18.87	11.97

Specimen Parameters for Specimen No. 3

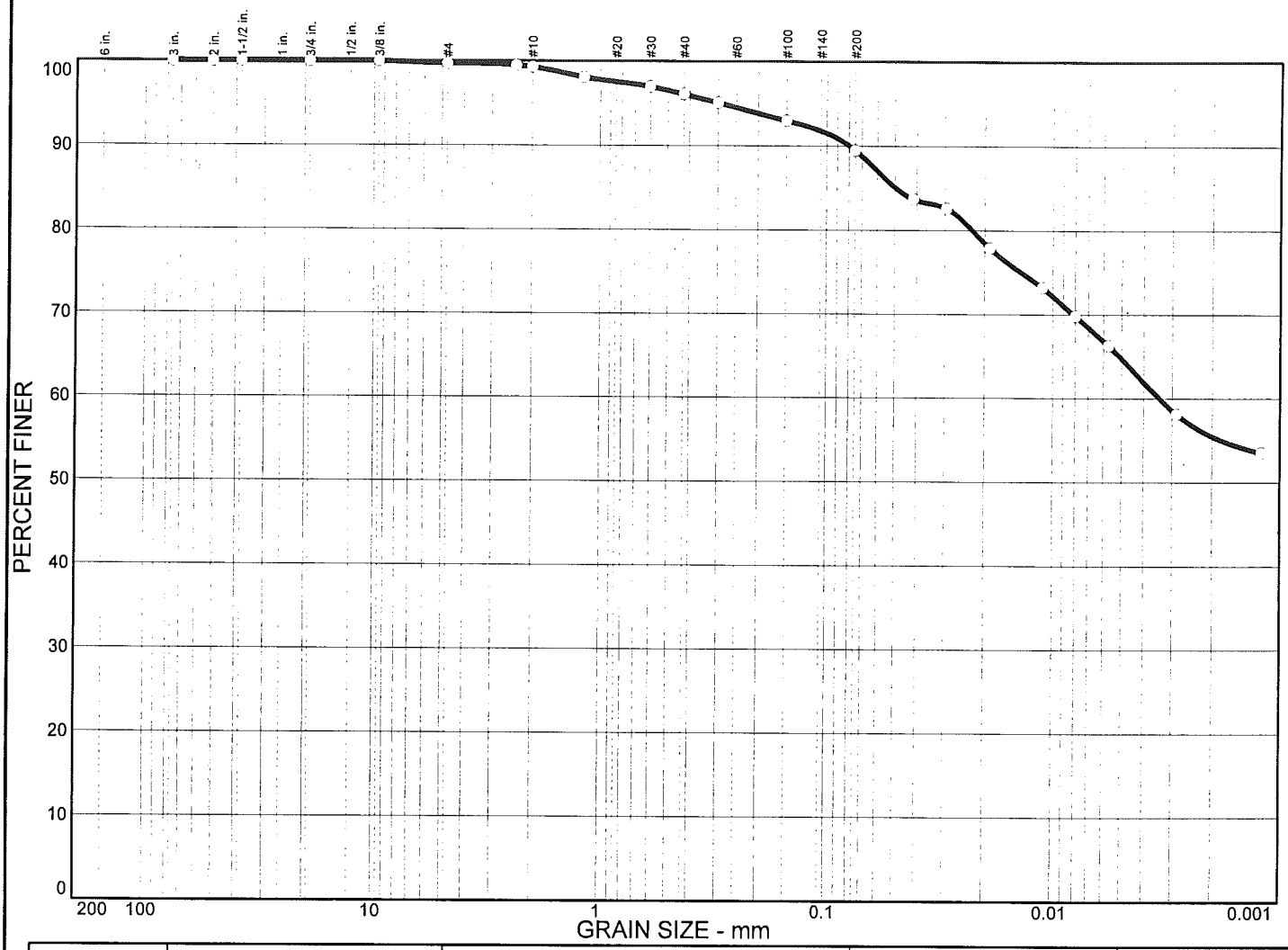
Specimen Parameter	Initial	Saturated	Final
W' moist soil and tare:	138.740		155.300
dry soil and tare:	120.940		128.150
Wt. of tare:	30.350		0.000
Weight, gms:	153.5		
Diameter, in:	1.400	1.400	
Area, in²:	1.539	1.539	
Height, in:	3.000	3.000	
Net decrease in height, in:		0.000	
% Moisture:	19.6	21.2	21.2
Wet density, pcf:	126.6	128.3	
Dry density, pcf:	105.8	105.8	
Void ratio:	0.5867	0.5867	
% Saturation:	90.1	97.1	

Test Readings Data for Specimen No. 3

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.3108 lbs per input unit
Secondary load ring constant= 0.77882 lbs per input unit
Crossover reading for secondary load ring= 474 input units
Cell pressure = 13.90 psi
Back pressure = 0.00 psi
Effective confining stress = 13.90 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 29.86 psi at reading no. 17
ULT. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Principal Stresses Minor psi	Major psi	1:3 Ratio	P psi	Q psi
0	0.0	0.000	78.0	0.0	0.0	0.00	13.90	13.90	1.00	13.90	0.00
1	30.0	0.030	125.0	14.6	1.0	9.39	13.90	23.29	1.68	18.60	4.70
2	55.0	0.055	160.0	25.5	1.8	16.25	13.90	30.15	2.17	22.03	8.13
3	80.0	0.080	181.0	32.0	2.7	20.24	13.90	34.14	2.46	24.02	10.12
4	105.0	0.105	194.0	36.1	3.5	22.60	13.90	36.50	2.63	25.20	11.30
5	130.0	0.130	205.0	39.5	4.3	24.53	13.90	38.43	2.76	26.17	12.27
6	155.0	0.155	211.0	41.3	5.2	25.47	13.90	39.37	2.83	26.63	12.73
7	180.0	0.180	215.0	42.6	6.0	26.00	13.90	39.90	2.87	26.90	13.00
8	205.0	0.205	216.0	42.9	6.8	25.96	13.90	39.86	2.87	26.88	12.98
9	235.0	0.235	219.0	43.8	7.8	26.24	13.90	40.14	2.89	27.02	13.12
10	260.0	0.260	221.0	44.4	8.7	26.37	13.90	40.27	2.90	27.08	13.18
11	285.0	0.285	223.0	45.1	9.5	26.49	13.90	40.39	2.91	27.15	13.25
12	315.0	0.315	228.0	46.6	10.5	27.11	13.90	41.01	2.95	27.45	13.55
13	340.0	0.340	232.0	47.9	11.3	27.57	13.90	41.47	2.98	27.68	13.78
14	365.0	0.365	236.0	49.1	12.2	28.02	13.90	41.92	3.02	27.91	14.01
15	395.0	0.395	241.0	50.7	13.2	28.58	13.90	42.48	3.06	28.19	14.29
16	420.0	0.420	245.0	51.9	14.0	29.00	13.90	42.90	3.09	28.40	14.50
17	450.0	0.450	252.0	54.1	15.0	29.86	13.90	43.76	3.15	28.83	14.93

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.3	10.2	24.8	64.7

LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
70	33	0.0494	0.0034						

MATERIAL DESCRIPTION	USCS	AASHTO
Light Reddish Brown Fat clay	CH	A-7-5(40)

Project No. 2051 **Client:** Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Source: Ash Pond Dike **Sample No.:** 11 **Elev./Depth:** 23.5-25 feet

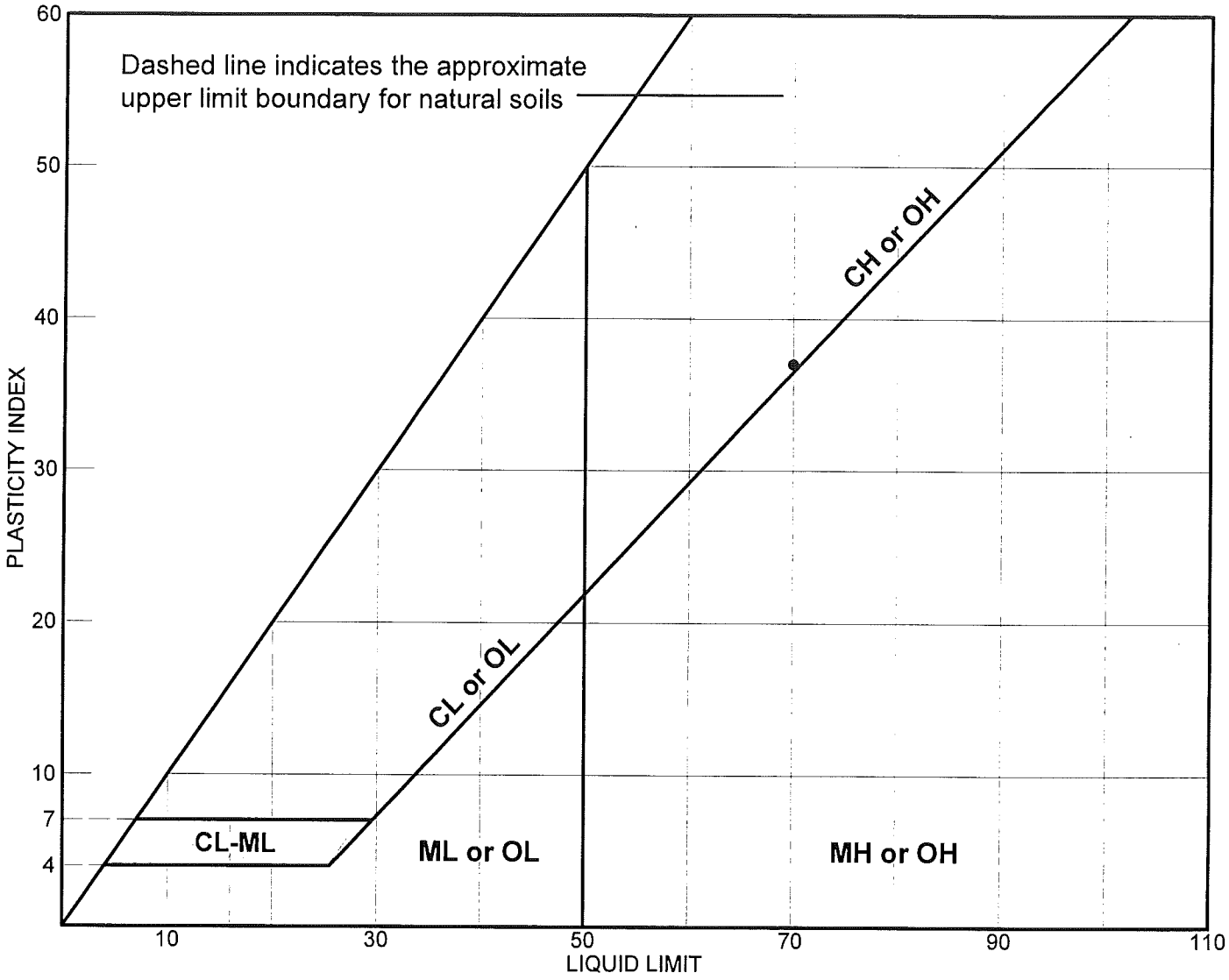
Remarks:
Boring No. 6
Sample No. 5
Jar Sample

Particle Size Distribution Report

SOUTHERN COMPANY

Lab No. 11

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Ash Pond Dike	11	23.5-25 feet		33	70	37	CH

LIQUID AND PLASTIC LIMITS TEST REPORT

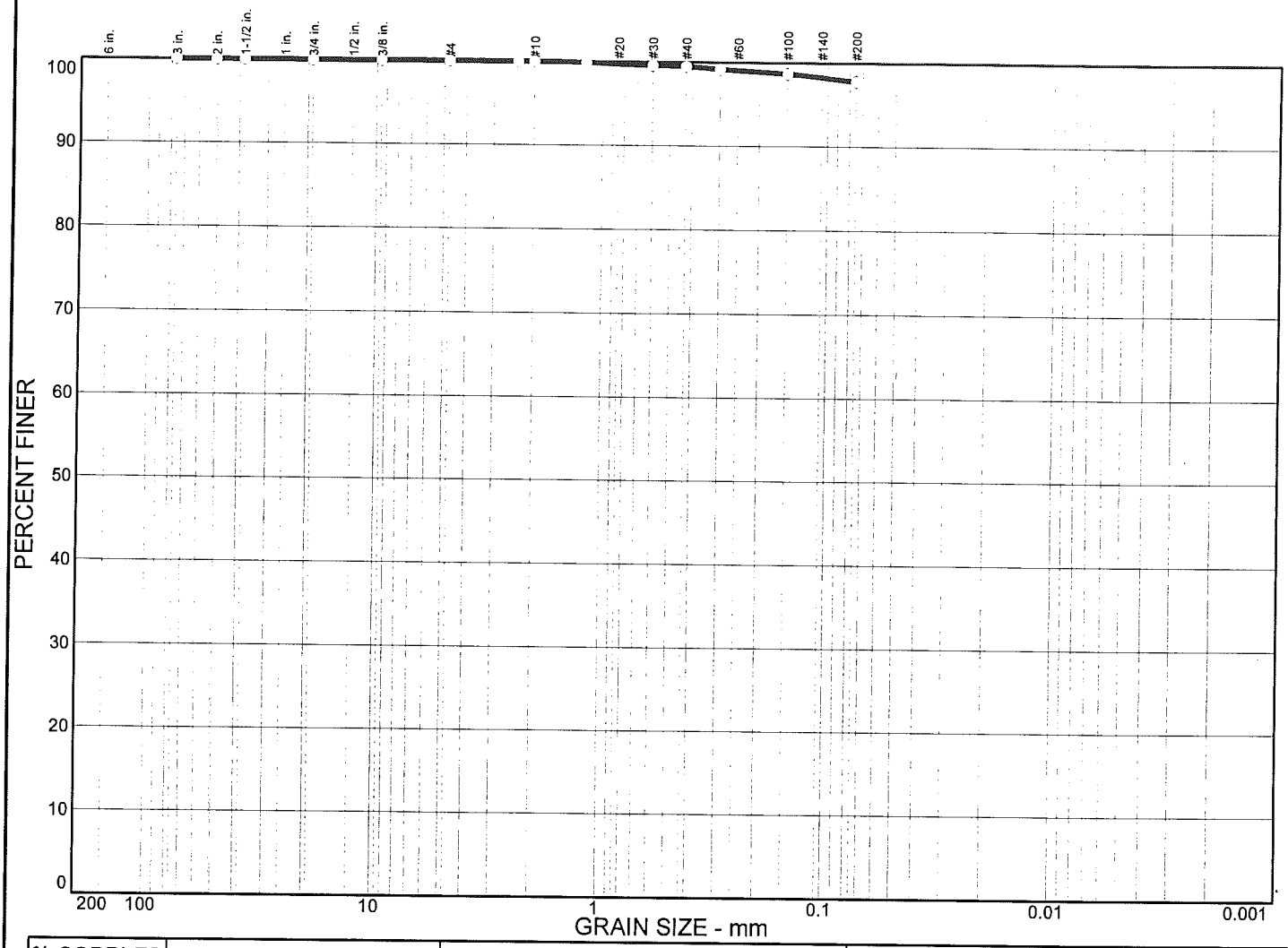
SOUTHERN COMPANY

Client: Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Project No.: 2051 **Lab No.** 11

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	2.2	97.8	

LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
81	37								

MATERIAL DESCRIPTION	USCS	AASHTO
Light Brown Elastic silt	MH	A-7-5(54)

Project No. 2051 **Client:** Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Source: Ash Pond Dike **Sample No.:** 12 **Elev./Depth:** 48.5-50 feet

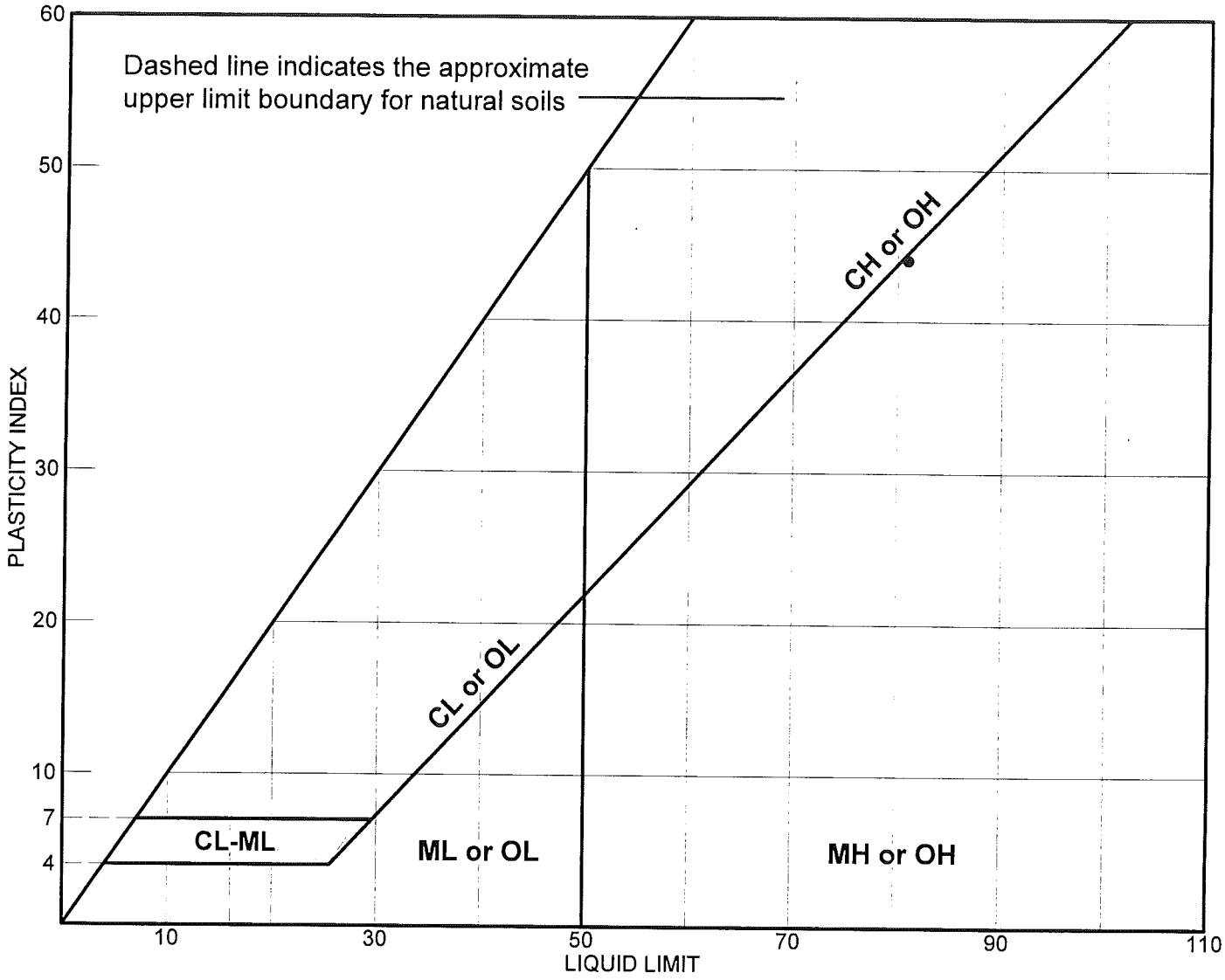
Remarks:
Boring No. 6
Sample No. 10
Jar Sample

Particle Size Distribution Report

SOUTHERN COMPANY

Lab No. 12

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Ash Pond Dike	12	48.5-50 feet		37	81	44	MH

LIQUID AND PLASTIC LIMITS TEST REPORT

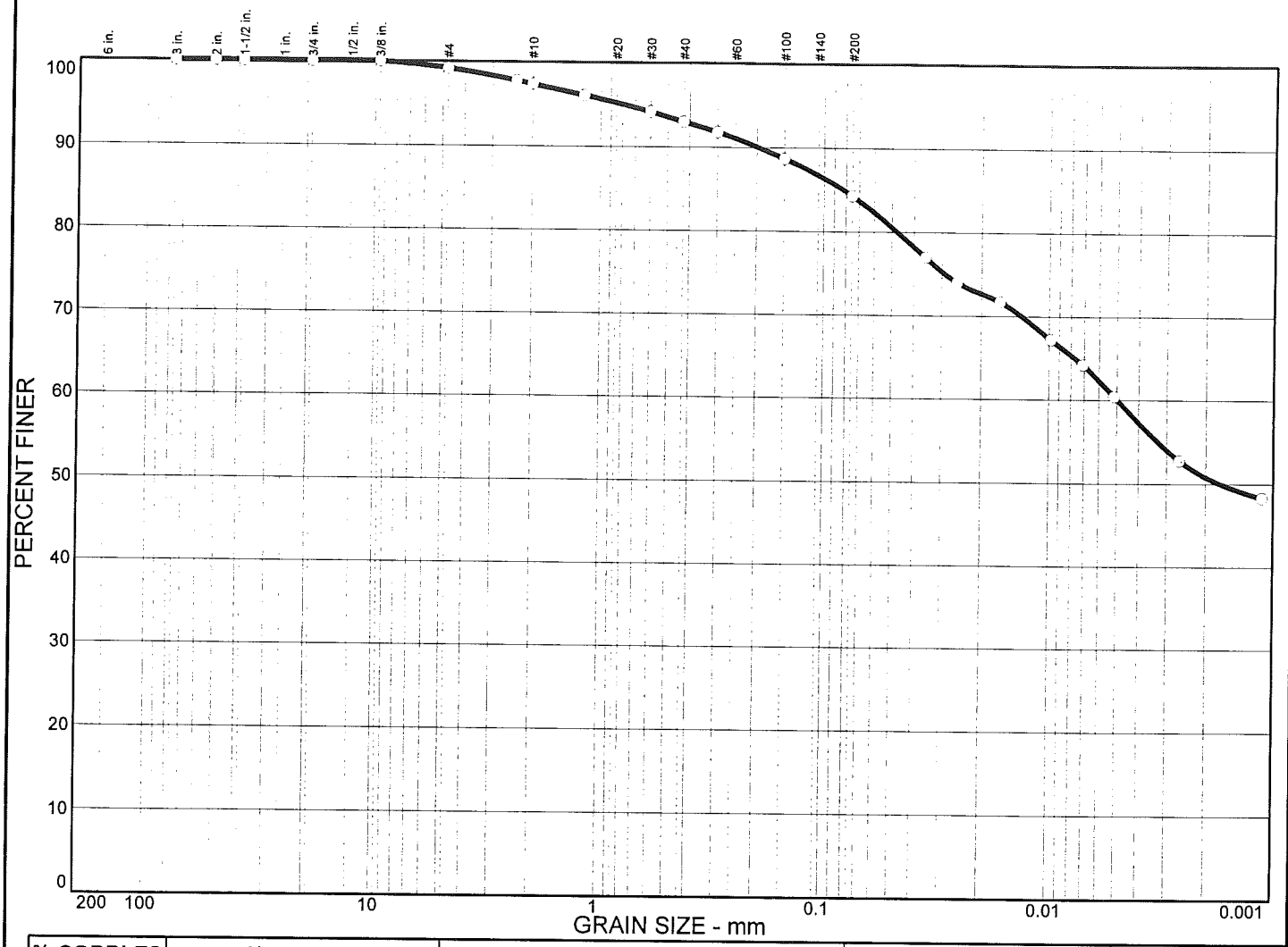
SOUTHERN COMPANY

Client: Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Project No.: 2051 **Lab No.** 12

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.8	14.9	24.2	60.1

LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
50	24	0.0820	0.0050	0.0017					

MATERIAL DESCRIPTION	USCS	AASHTO
Light Brown Fat clay with sand	CH	A-7-6(23)

Project No. 2051 **Client:** Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Source: Ash Pond Dike **Sample No.:** 17 **Elev./Depth:** 9-11 feet

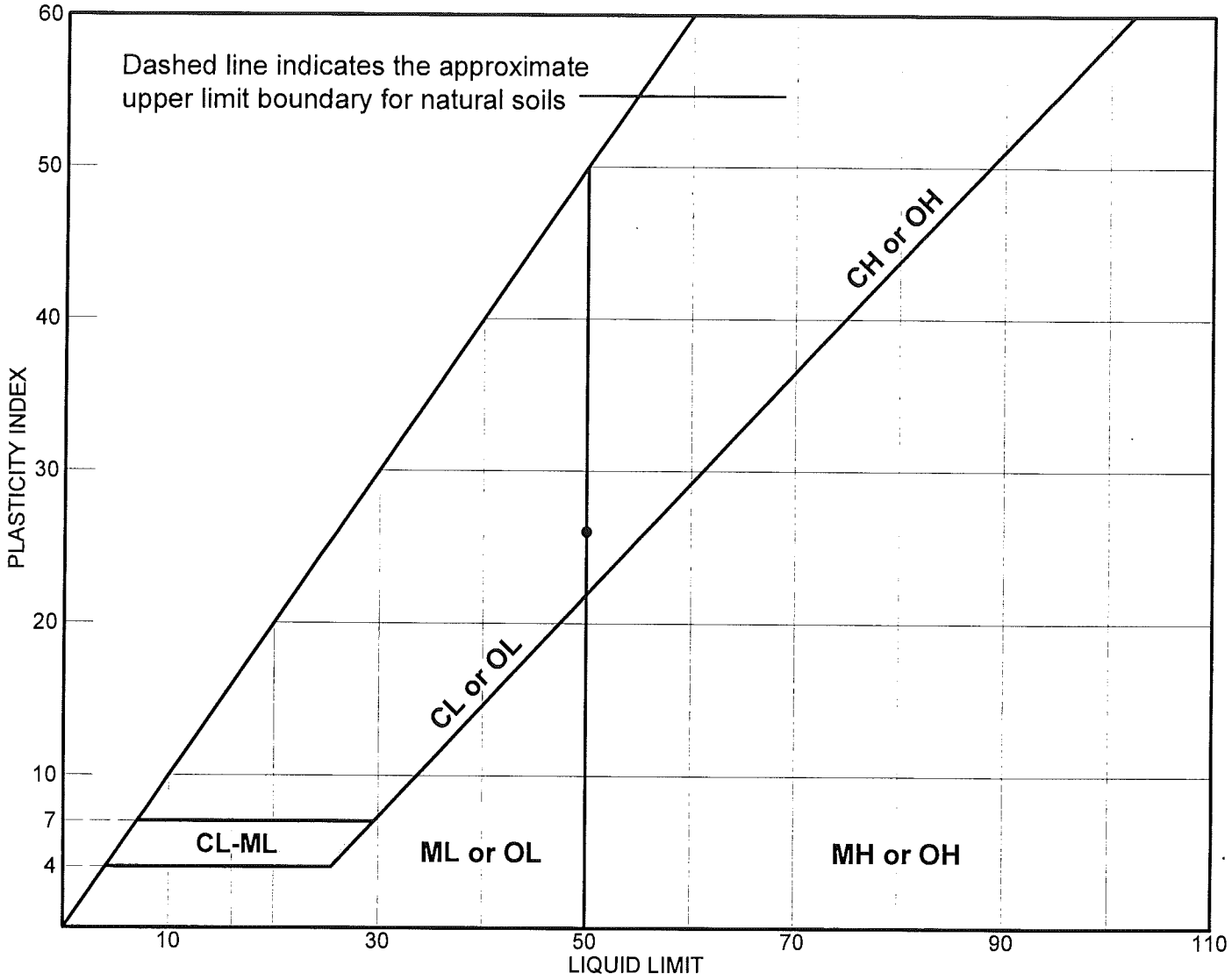
Remarks:
Boring No. 7

Particle Size Distribution Report

SOUTHERN COMPANY

Lab No. 17

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Ash Pond Dike	17	9-11 feet		24	50	26	CH

LIQUID AND PLASTIC LIMITS TEST REPORT

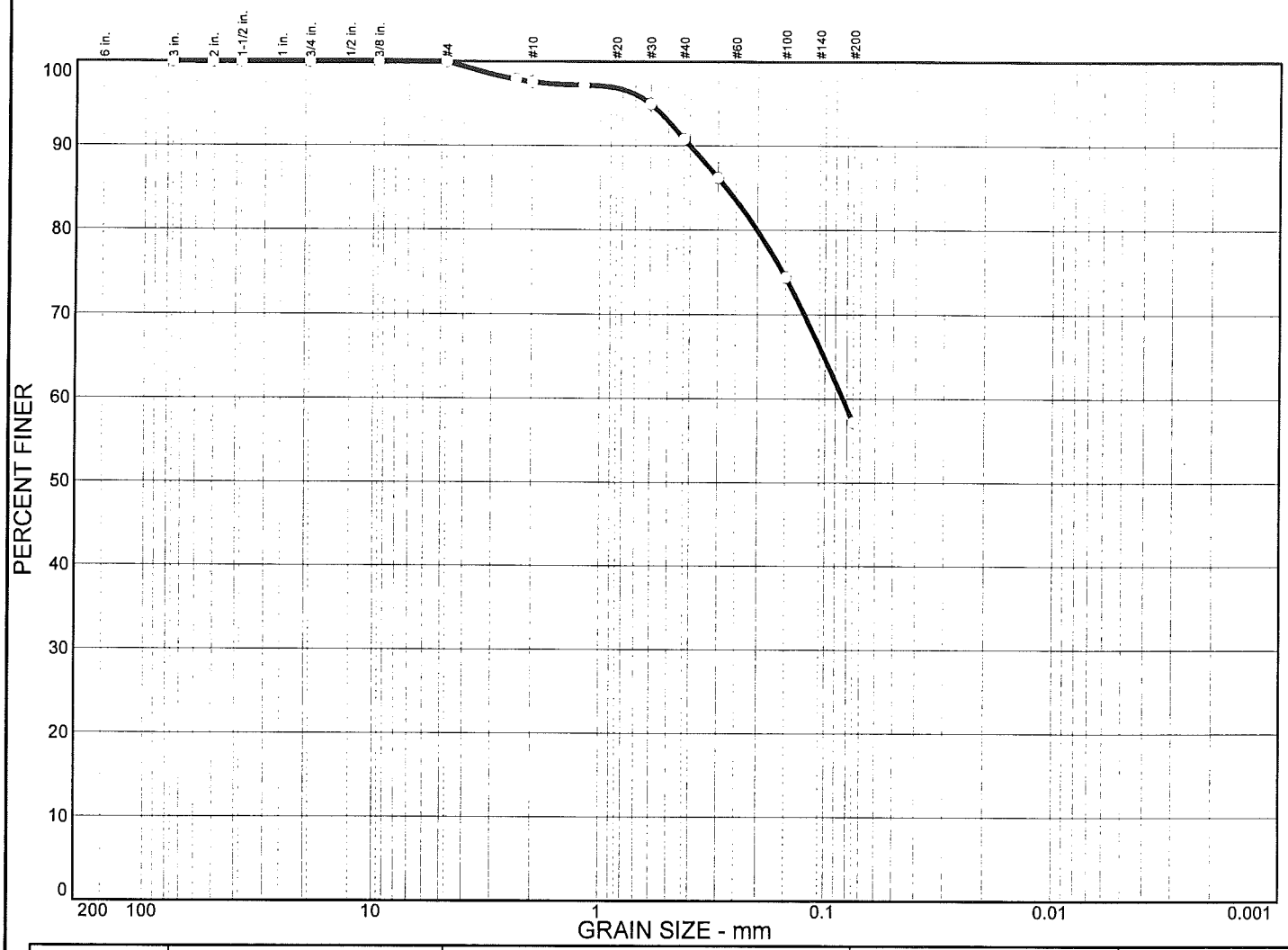
SOUTHERN COMPANY

Client: Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Project No.: 2051 **Lab No.** 17

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	42.8	57.2	

LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
26	13	0.275	0.0833						

MATERIAL DESCRIPTION	USCS	AASHTO
Brown Sandy lean clay	CL	A-6(4)

Project No. 2051 **Client:** Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Source: Ash Pond Dike **Sample No.:** 20 **Elev./Depth:** 18.5-20 feet

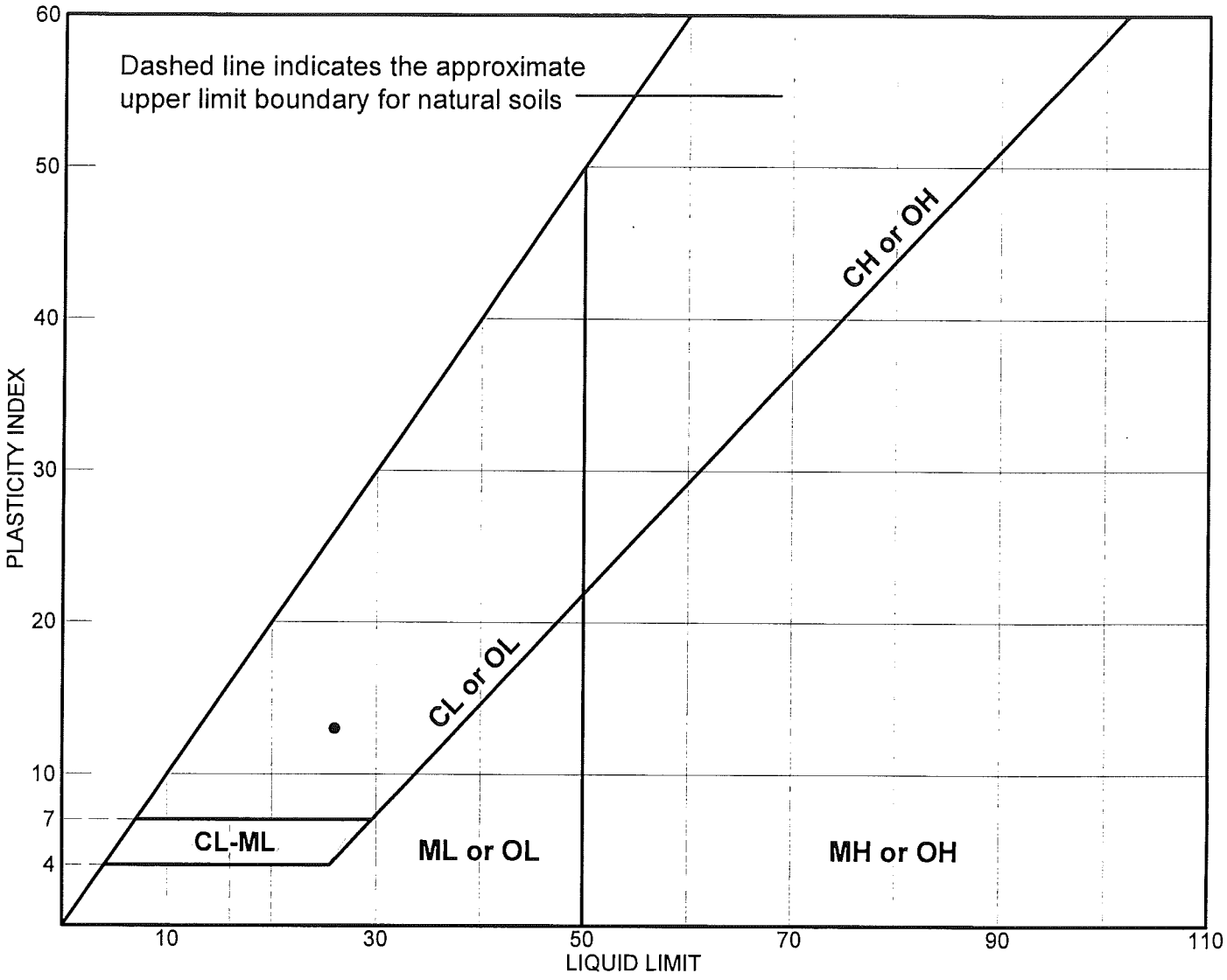
Remarks:
Boring No. 8
Sample No. 4
Jar Sample

Particle Size Distribution Report

SOUTHERN COMPANY

Lab No. 20

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Ash Pond Dike	20	18.5-20 feet		13	26	13	CL

LIQUID AND PLASTIC LIMITS TEST REPORT

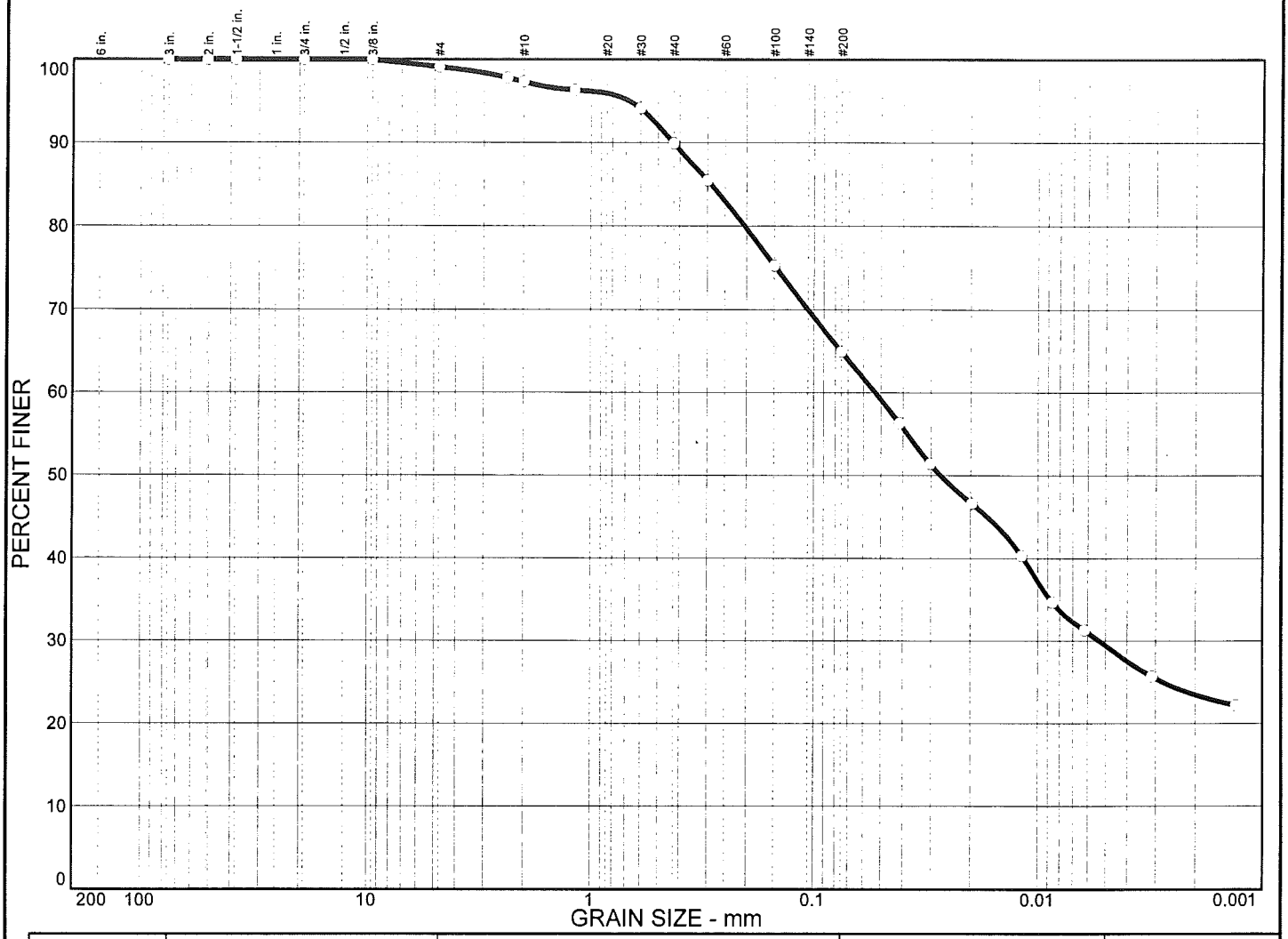
SOUTHERN COMPANY

Client: Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Project No.: 2051 **Lab No.** 20

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.9	34.2	35.4	29.5

LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
25	14	0.289	0.0531	0.0272	0.0053				

MATERIAL DESCRIPTION	USCS	AASHTO
Brown Sandy lean clay	CL	A-6(4)

Project No. 2051 **Client:** Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Source: Ash Pond Dike **Sample No.:** 23 **Elev./Depth:** 4.5-6 feet

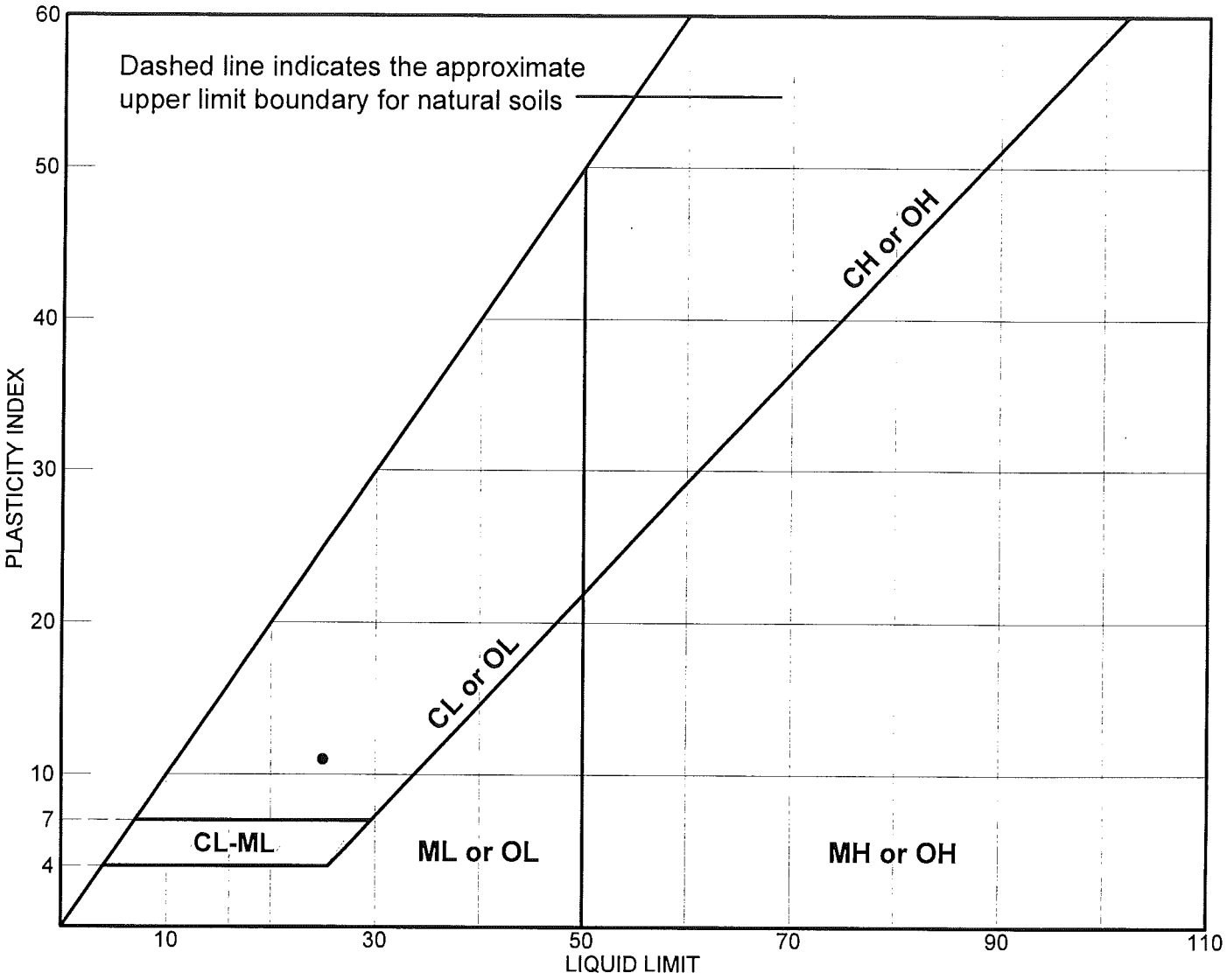
Remarks:
Boring No. 9
Sample No. 1
Bag Sample

Particle Size Distribution Report

SOUTHERN COMPANY

Lab No. 23

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Ash Pond Dike	23	4.5-6 feet		14	25	11	CL

LIQUID AND PLASTIC LIMITS TEST REPORT

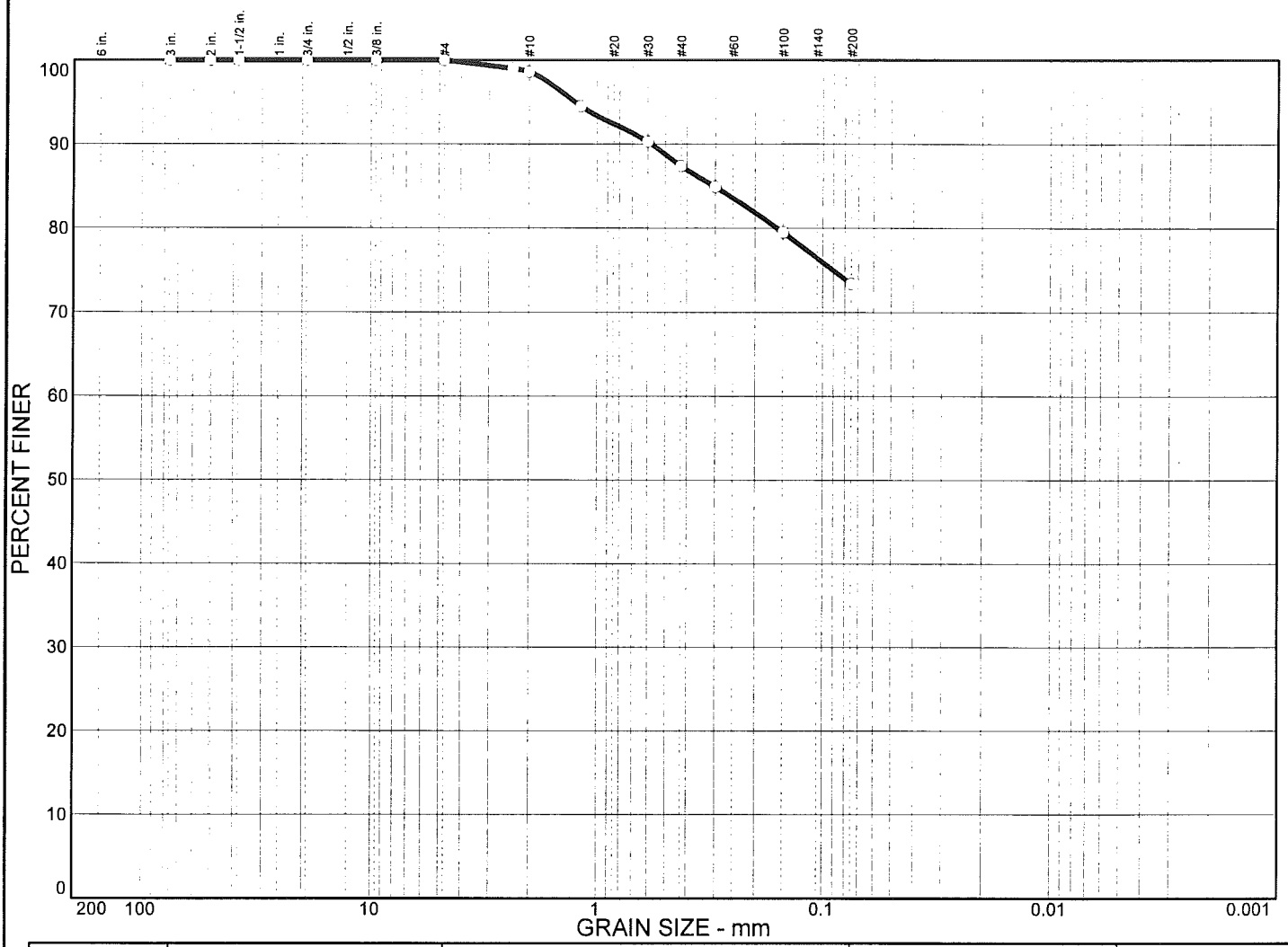
SOUTHERN COMPANY

Client: Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Project No.: 2051 **Lab No.** 23

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	26.6	73.4	

LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
69	36	0.304							

MATERIAL DESCRIPTION	USCS	AASHTO
Light Brown Elastic silt with sand	MH	A-7-5(26)

Project No. 2051 **Client:** Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Source: Ash Pond Dike **Sample No.:** 29 **Elev./Depth:** 36-37.5 feet

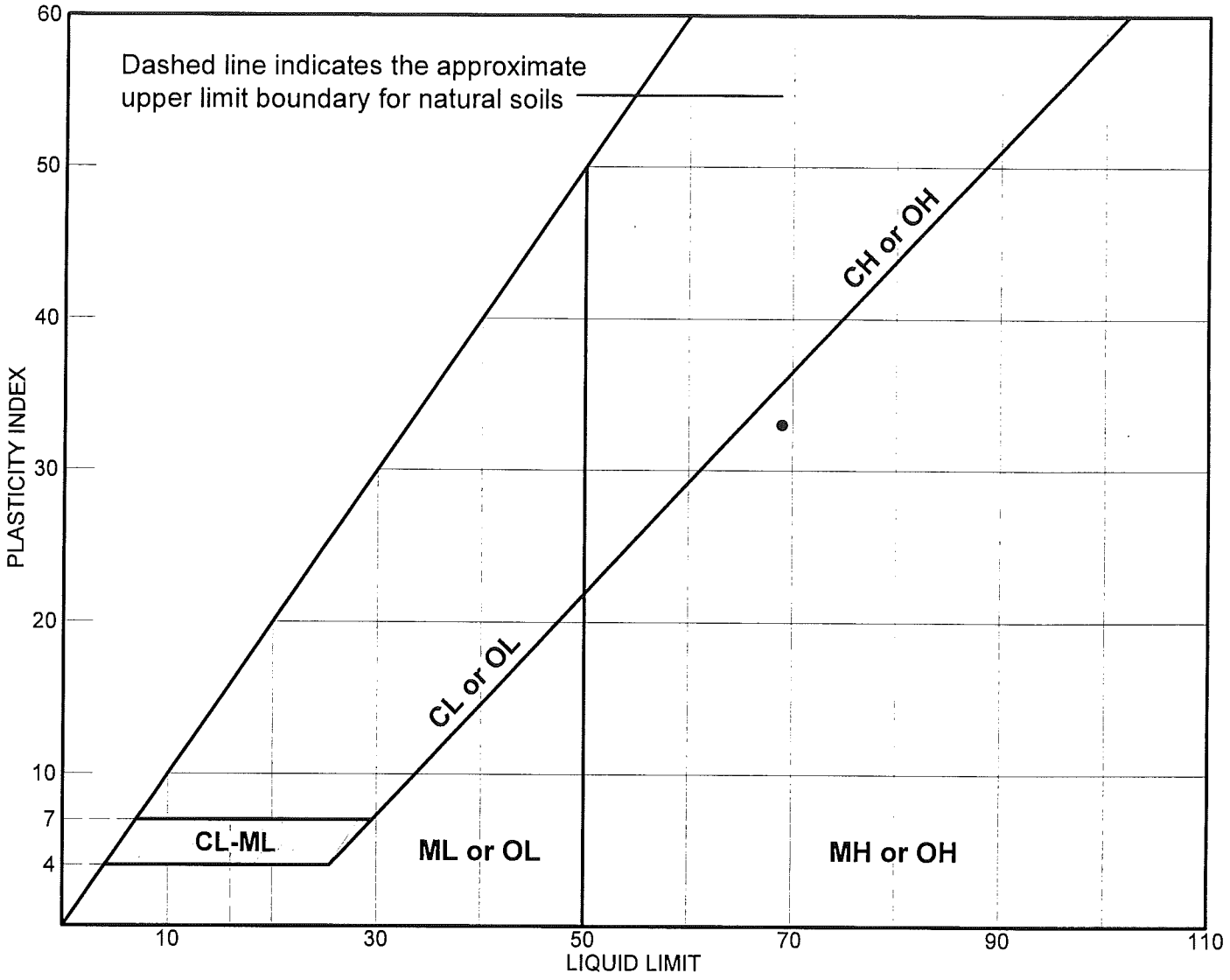
Remarks:
Boring No. 10
Sample No. 9
Jar Sample

Particle Size Distribution Report

SOUTHERN COMPANY

Lab No. 29

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Ash Pond Dike	29	36-37.5 feet		36	69	33	MH

LIQUID AND PLASTIC LIMITS TEST REPORT

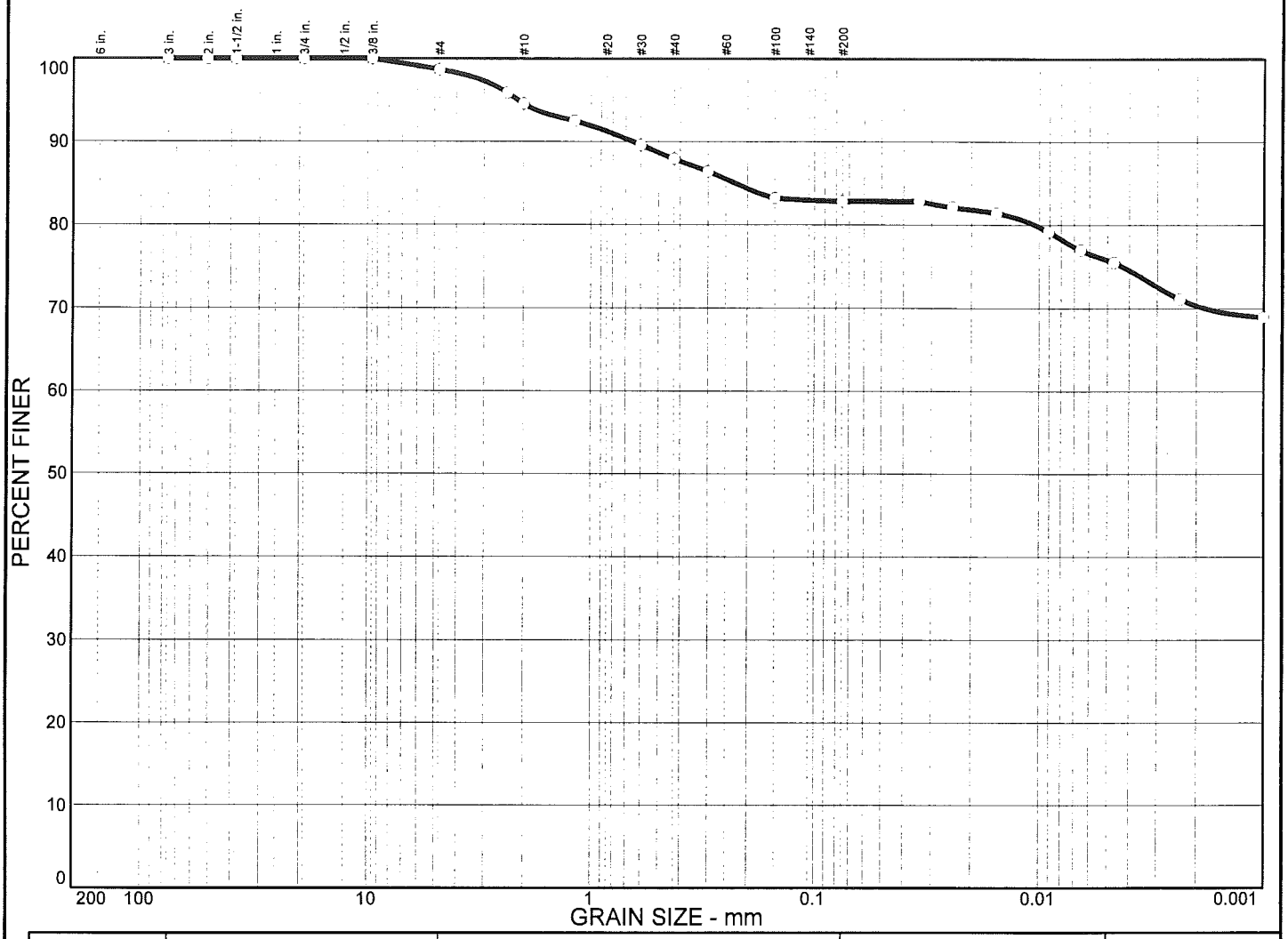
SOUTHERN COMPANY

Client: Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Project No.: 2051 **Lab No.** 29

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	1.3	15.9	7.0	75.8

LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
83	38	0.227							

MATERIAL DESCRIPTION	USCS	AASHTO
Light Reddish Brown Elastic silt with sand	MH	A-7-5(44)

Project No. 2051 **Client:** Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Source: Ash Pond Dike **Sample No.:** 30 **Elev./Depth:** 36-38 feet

Remarks:

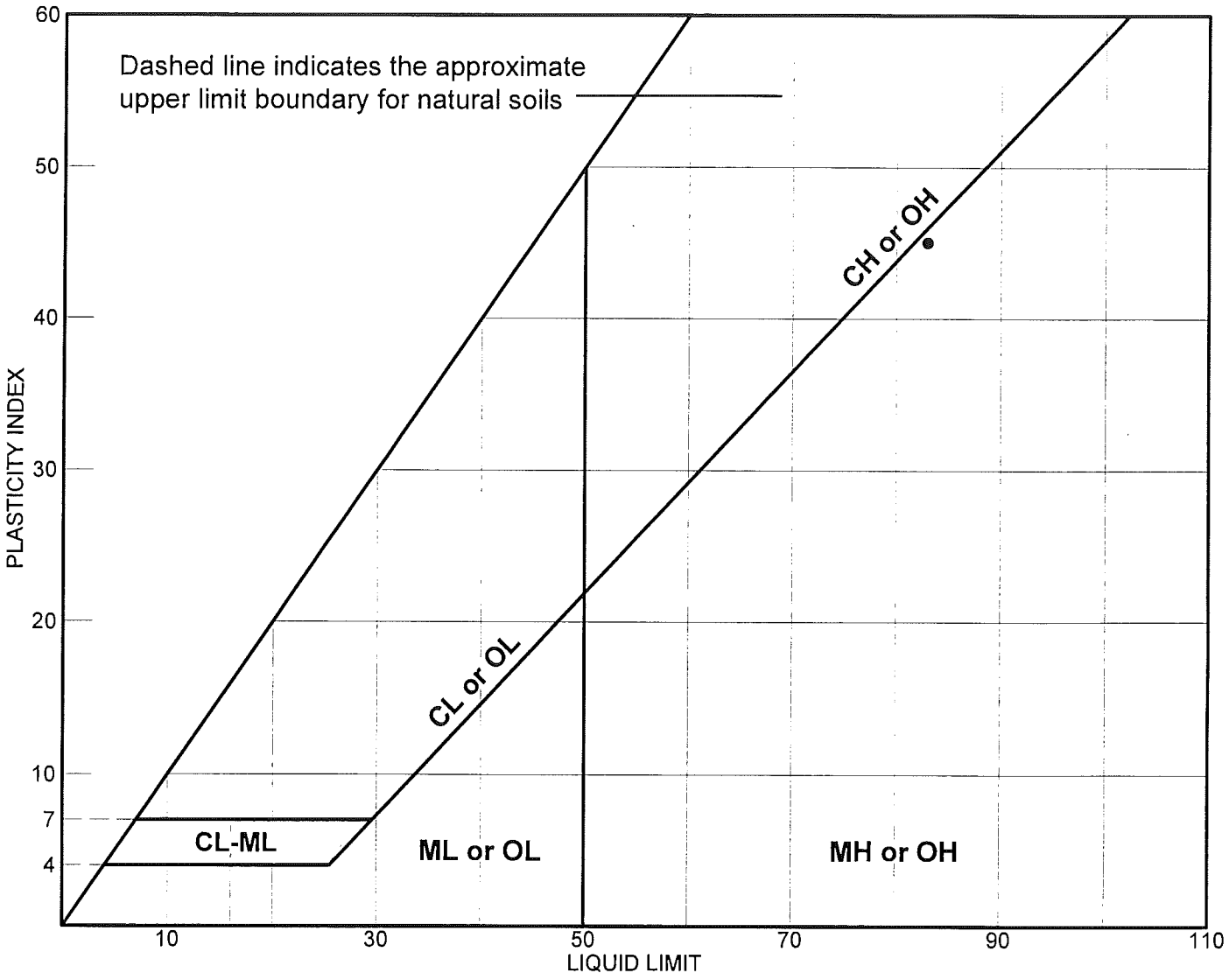
Boring No. 10

Particle Size Distribution Report

SOUTHERN COMPANY

Lab No. 30

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Ash Pond Dike	30	36-38 feet		38	83	45	MH

LIQUID AND PLASTIC LIMITS TEST REPORT

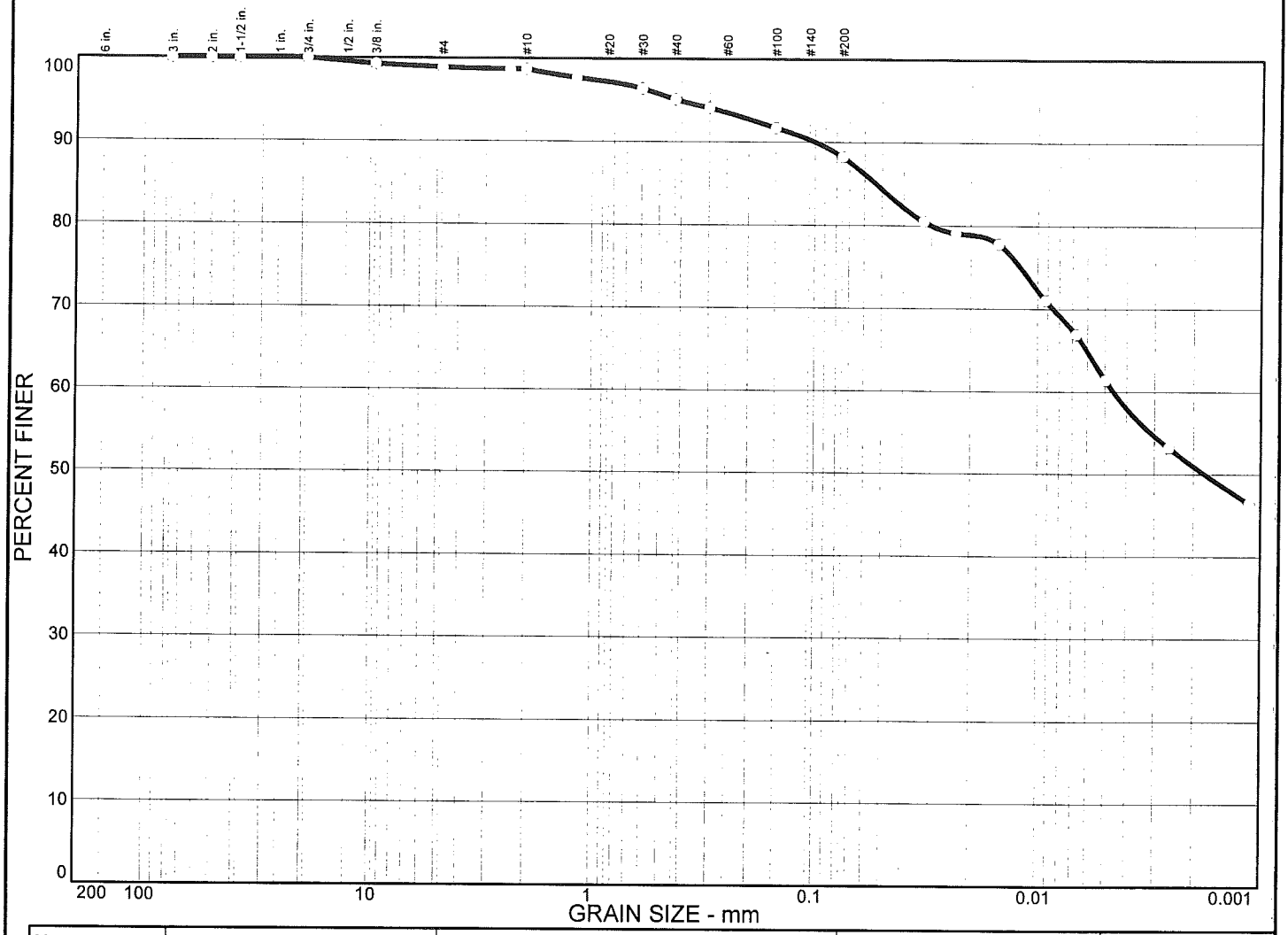
SOUTHERN COMPANY

Client: Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Project No.: 2051 **Lab No.** 30

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	1.1	10.7	26.7	61.5

LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
58	26	0.0532	0.0046	0.0018					

MATERIAL DESCRIPTION	USCS	AASHTO
Light Brown Fat clay	CH	A-7-6(31)

Project No. 2051 **Client:** Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Source: Ash Pond Dike **Sample No.:** 33 **Elev./Depth:** 14-16 feet

Remarks:

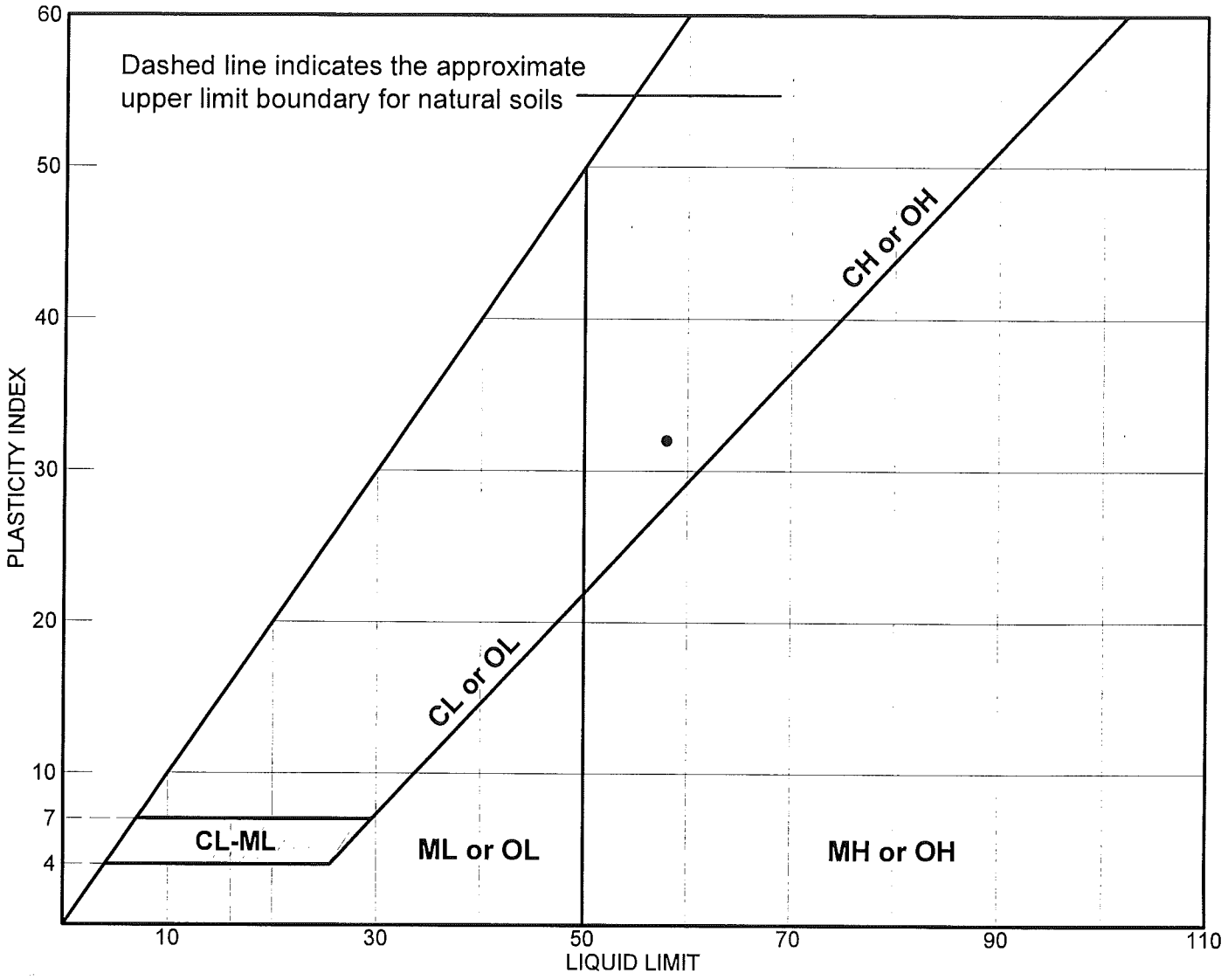
Boring No. 2

Particle Size Distribution Report

SOUTHERN COMPANY

Lab No. 33

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Ash Pond Dike	33	14-16 feet		26	58	32	CH

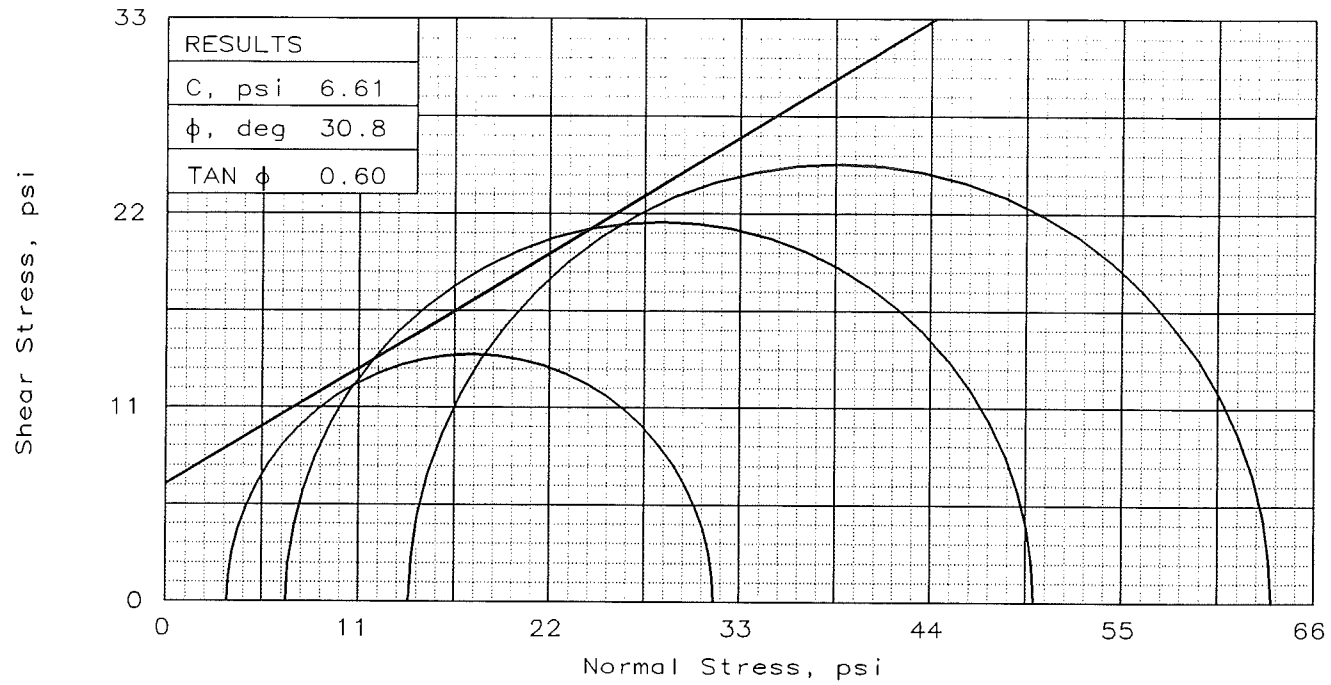
LIQUID AND PLASTIC LIMITS TEST REPORT

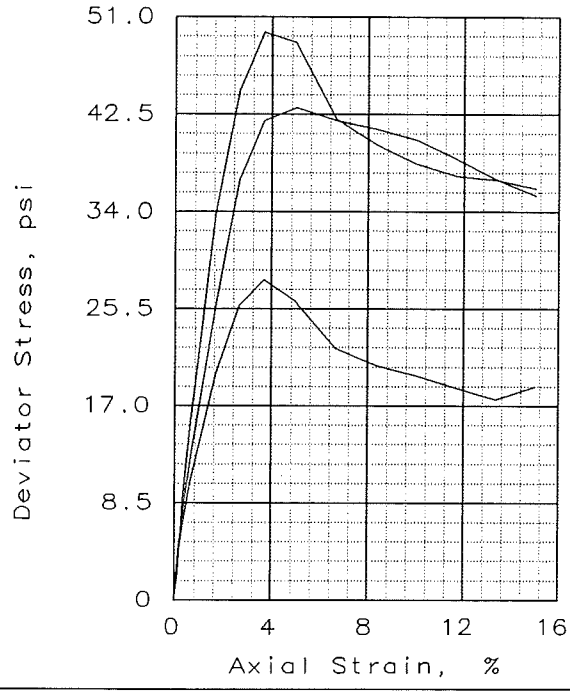
SOUTHERN COMPANY

Client: Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Project No.: 2051 **Lab No.** 33





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	26.5	24.5	23.9
	DRY DENSITY, pcf	96.9	100.1	101.0
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.701	0.646	0.632
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	3.00
AT TEST	WATER CONTENT, %	26.3	24.1	23.4
	DRY DENSITY, pcf	97.3	100.6	101.8
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.694	0.637	0.619
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	2.99
Strain rate, %/min		0.0010	0.0010	0.0010
BACK PRESSURE, psi		0.0	0.0	0.0
CELL PRESSURE, psi		3.5	6.9	13.9
FAIL. STRESS, psi		28.0	43.1	49.7
ULT. STRESS, psi				
σ_1 FAILURE, psi		31.5	50.0	63.6
σ_3 FAILURE, psi		3.5	6.9	13.9

TYPE OF TEST:
Consolidated Drained
SAMPLE TYPE: UD
DESCRIPTION: Light brown fat clay
LL= 58 PL= 26 PI= 32
SPECIFIC GRAVITY= 2.64
REMARKS:

Lab No: 33

CLIENT: Southern Company

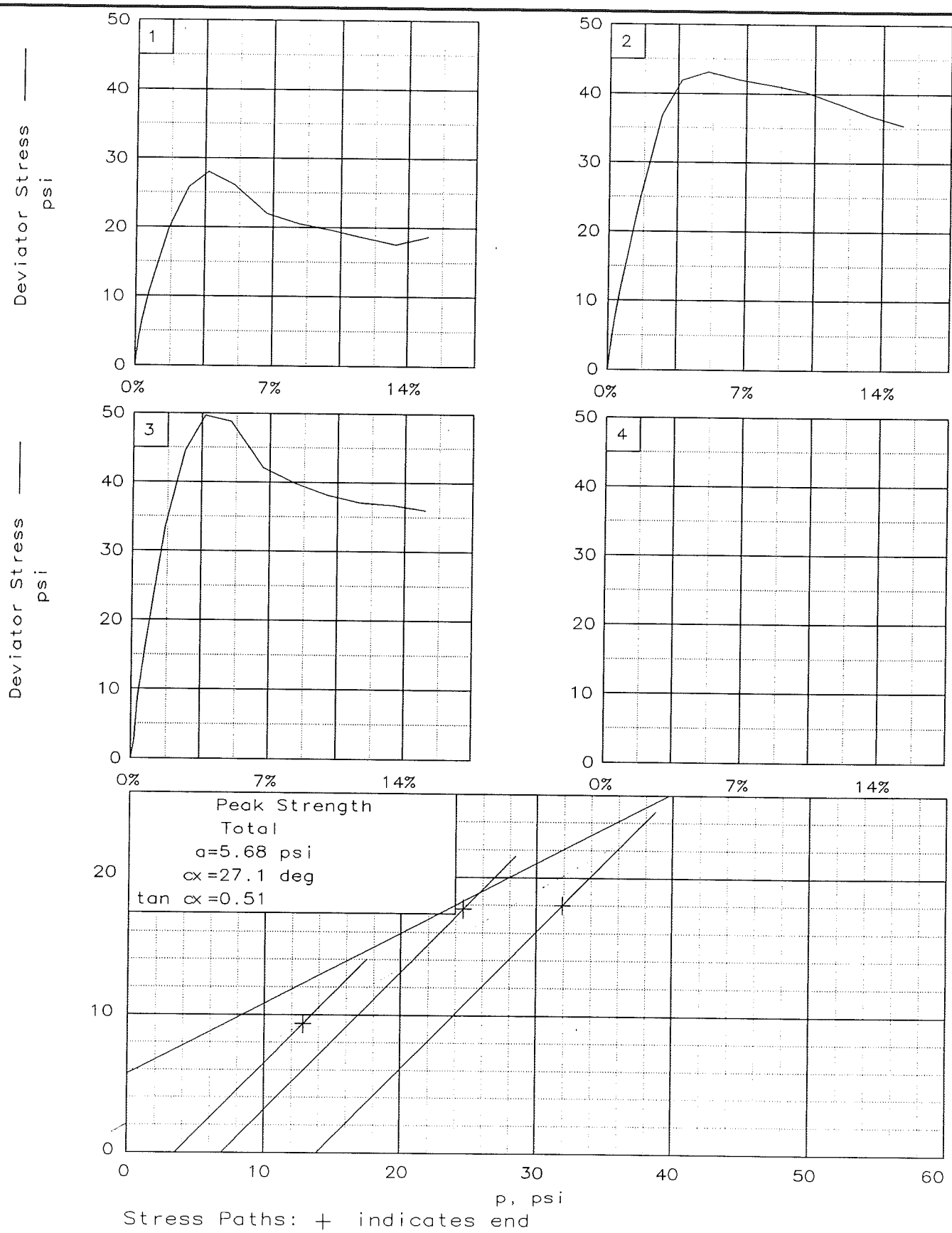
PROJECT: GPCo - Plant Bowen Ash Pond Dike

SAMPLE LOCATION: Boring #2

PROJ. NO.: 2051 DATE: 10/10/2002

TRIAXIAL SHEAR TEST REPORT

SOUTHERN COMPANY SERVICES



Client: Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Location: Boring #2

File: GPBAPD33 Project No.: 2051 Lab No: 33

Project and Sample Data

Date: 10/10/2002
Client: Southern Company
Project: GPCo - Plant Bowen Ash Pond Dike
Sample location: Boring #2
Sample description: Light brown fat clay
Remarks:

Fig no.: 33 2nd page Fig no. (if applicable): 33
Type of sample: UD
Specific gravity= 2.64 LL= 58 PL= 26 PI= 32
Test method: Corps of Eng. - uniform strain

Specimen Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Wt. moist soil and tare:	116.970			116.970
Wt. dry soil and tare:	98.780			98.780
Wt. of tare:	30.260			30.260
Weight, gms:	148.6			
Diameter, in:	1.400	1.400	1.398	
Area, in²:	1.539	1.539	1.535	
Height, in:	3.000	3.000	2.996	
Net decrease in height, in:		0.000	0.004	
Net decrease in water volume, cc:				
Moisture:	26.5	26.6	26.3	26.5
Wet density, pcf:	122.6	122.6	122.9	
Dry density, pcf:	96.9	96.9	97.3	
Void ratio:	0.7011	0.7011	0.6943	
% Saturation:	100.0	100.0	100.0	

Test Readings Data for Specimen No. 1

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.30179 lbs per input unit
Secondary load ring constant= 0.72586 lbs per input unit
Crossover reading for secondary load ring= 462 input units
Consolidation cell pressure = 3.50 psi
Consolidation back pressure = 0.00 psi
Consolidation effective confining stress = 3.50 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 28.02 psi at reading no. 6
ULT. STRESS = not selected

Test Readings Data for Specimen No. 1

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Principal Stresses Minor psi	Principal Stresses Major psi	1:3 Ratio	P psi	Q psi
	0.0	0.000	6.0	0.0	0.0	0.00	3.50	3.50	1.00	3.50	0.00
1	5.0	0.005	26.0	6.0	0.2	3.92	3.50	7.42	2.12	5.46	1.96
2	10.0	0.010	39.0	10.0	0.3	6.47	3.50	9.97	2.85	6.73	3.23
3	20.0	0.020	60.0	16.3	0.7	10.54	3.50	14.04	4.01	8.77	5.27
4	50.0	0.050	108.0	30.8	1.7	19.72	3.50	23.22	6.63	13.36	9.86
5	80.0	0.080	141.0	40.7	2.7	25.83	3.50	29.33	8.38	16.41	12.91
6	110.0	0.110	154.0	44.7	3.7	28.02	3.50	31.52	9.01	17.51	14.01
7	150.0	0.150	146.0	42.3	5.0	26.14	3.50	29.64	8.47	16.57	13.07
8	200.0	0.200	126.0	36.2	6.7	22.01	3.50	25.51	7.29	14.51	11.01
9	250.0	0.250	120.0	34.4	8.3	20.54	3.50	24.04	6.87	13.77	10.27
10	300.0	0.300	117.0	33.5	10.0	19.63	3.50	23.13	6.61	13.32	9.82
11	350.0	0.350	113.0	32.3	11.7	18.58	3.50	22.08	6.31	12.79	9.29
12	400.0	0.400	109.0	31.1	13.4	17.54	3.50	21.04	6.01	12.27	8.77
13	450.0	0.450	118.0	33.8	15.0	18.71	3.50	22.21	6.35	12.85	9.35

Specimen Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Consolidated	Final
moist soil and tare:	121.060			121.060
dry soil and tare:	103.220			103.220
Wt. of tare:	30.300			30.300
Weight, gms:	151.1			
Diameter, in:	1.400	1.400	1.398	
Area, in²:	1.539	1.539	1.534	
Height, in:	3.000	3.000	2.995	
Net decrease in height, in:		0.000	0.005	
Net decrease in water volume, cc:				
% Moisture:	24.5	24.5	24.1	24.5
Wet density, pcf:	124.6	124.6	125.0	
Dry density, pcf:	100.1	100.1	100.6	
Void ratio:	0.6457	0.6457	0.6375	
% Saturation:	100.0	100.0	100.0	

Test Readings Data for Specimen No. 2

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.31199 lbs per input unit
Secondary load ring constant= 0.72824 lbs per input unit
Crossover reading for secondary load ring= 480 input units
Consolidation cell pressure = 6.90 psi
Consolidation back pressure = 0.00 psi
Consolidation effective confining stress = 6.90 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 43.08 psi at reading no. 7
U . STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Principal Stresses Minor psi	Principal Stresses Major psi	1:3 Ratio	P psi	Q psi
0	0.0	0.000	8.0	0.0	0.0	0.00	6.90	6.90	1.00	6.90	0.00
1	5.0	0.005	29.0	6.6	0.2	4.26	6.90	11.16	1.62	9.03	2.13
2	10.0	0.010	45.0	11.5	0.3	7.50	6.90	14.40	2.09	10.65	3.75
3	20.0	0.020	70.0	19.3	0.7	12.52	6.90	19.42	2.82	13.16	6.26
4	50.0	0.050	136.0	39.9	1.7	25.59	6.90	32.49	4.71	19.70	12.80
5	80.0	0.080	194.0	58.0	2.7	36.81	6.90	43.71	6.34	25.31	18.41
6	110.0	0.110	222.0	66.8	3.7	41.92	6.90	48.82	7.08	27.86	20.96
7	150.0	0.150	231.0	69.6	5.0	43.08	6.90	49.98	7.24	28.44	21.54
8	200.0	0.200	229.0	68.9	6.7	41.94	6.90	48.84	7.08	27.87	20.97
9	250.0	0.250	229.0	68.9	8.3	41.19	6.90	48.09	6.97	27.49	20.59
10	300.0	0.300	228.0	68.6	10.0	40.26	6.90	47.16	6.83	27.03	20.13
11	350.0	0.350	223.0	67.1	11.7	38.61	6.90	45.51	6.60	26.21	19.31
12	400.0	0.400	217.0	65.2	13.4	36.82	6.90	43.72	6.34	25.31	18.41
13	450.0	0.450	213.0	64.0	15.0	35.42	6.90	42.32	6.13	24.61	17.71

Specimen Parameters for Specimen No. 3

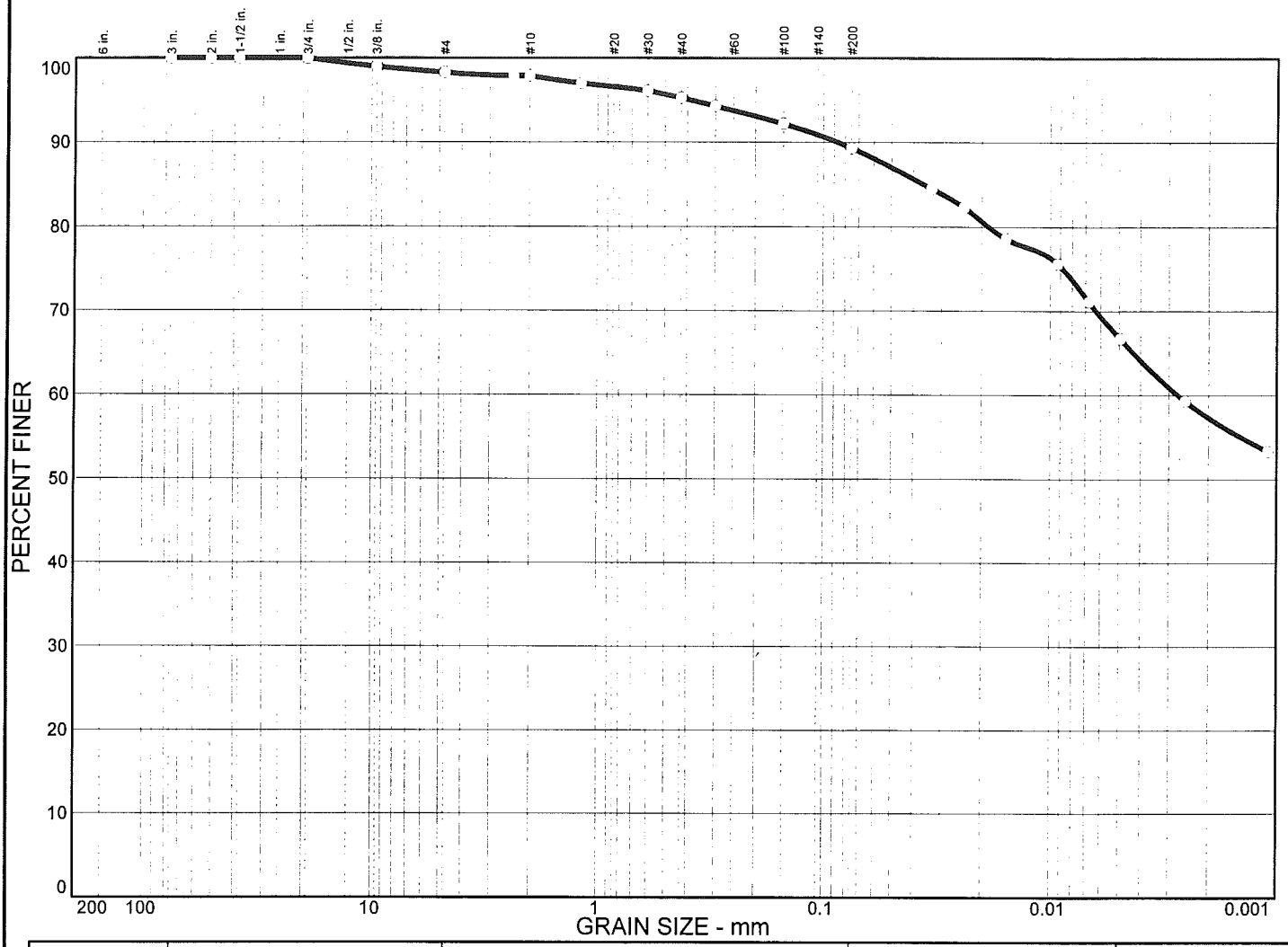
Specimen Parameter	Initial	Saturated	Consolidated	Final
moist soil and tare:	119.440			119.440
dry soil and tare:	102.220			102.220
Wt. of tare:	30.280			30.280
Weight, gms:	151.7			
Diameter, in:	1.400	1.400	1.396	
Area, in²:	1.539	1.539	1.531	
Height, in:	3.000	3.000	2.992	
Net decrease in height, in:		0.000	0.008	
Net decrease in water volume, cc:				
% Moisture:	23.9	23.9	23.4	23.9
Wet density, pcf:	125.2	125.2	125.7	
Dry density, pcf:	101.0	101.0	101.8	
Void ratio:	0.6320	0.6320	0.6190	
% Saturation:	100.0	100.0	100.0	

Test Readings Data for Specimen No. 3

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.3108 lbs per input unit
Secondary load ring constant= 0.77882 lbs per input unit
Crossover reading for secondary load ring= 474 input units
Consolidation cell pressure = 13.90 psi
Consolidation back pressure = 0.00 psi
Consolidation effective confining stress = 13.90 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 49.66 psi at reading no. 6
U STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Principal Stresses Minor psi	Major psi	1:3 Ratio	P psi	Q psi
0	0.0	0.000	14.0	0.0	0.0	0.00	13.90	13.90	1.00	13.90	0.00
1	5.0	0.005	26.0	3.7	0.2	2.43	13.90	16.33	1.17	15.12	1.22
2	10.0	0.010	57.0	13.4	0.3	8.70	13.90	22.60	1.63	18.25	4.35
3	20.0	0.020	92.0	24.2	0.7	15.73	13.90	29.63	2.13	21.76	7.86
4	50.0	0.050	183.0	52.5	1.7	33.73	13.90	47.63	3.43	30.77	16.87
5	80.0	0.080	240.0	70.2	2.7	44.65	13.90	58.55	4.21	36.22	22.32
6	110.0	0.110	268.0	78.9	3.7	49.66	13.90	63.56	4.57	38.73	24.83
7	150.0	0.150	267.0	78.6	5.0	48.78	13.90	62.68	4.51	38.29	24.39
8	200.0	0.200	236.0	69.0	6.7	42.05	13.90	55.95	4.03	34.92	21.02
9	250.0	0.250	228.0	66.5	8.4	39.81	13.90	53.71	3.86	33.80	19.90
10	300.0	0.300	223.0	65.0	10.0	38.17	13.90	52.07	3.75	32.98	19.08
11	350.0	0.350	221.0	64.3	11.7	37.10	13.90	51.00	3.67	32.45	18.55
12	400.0	0.400	223.0	65.0	13.4	36.75	13.90	50.65	3.64	32.28	18.38
13	450.0	0.450	223.0	65.0	15.0	36.04	13.90	49.94	3.59	31.92	18.02

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	1.7	9.0	22.4	66.9

LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
66	27	0.0360	0.0027						

MATERIAL DESCRIPTION	USCS	AASHTO
Light Brown Fat clay	CH	A-7-6(39)

Project No. 2051 **Client:** Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Source: Ash Pond Dike **Sample No.:** 34 **Elev./Depth:** 19-21 feet

Remarks:

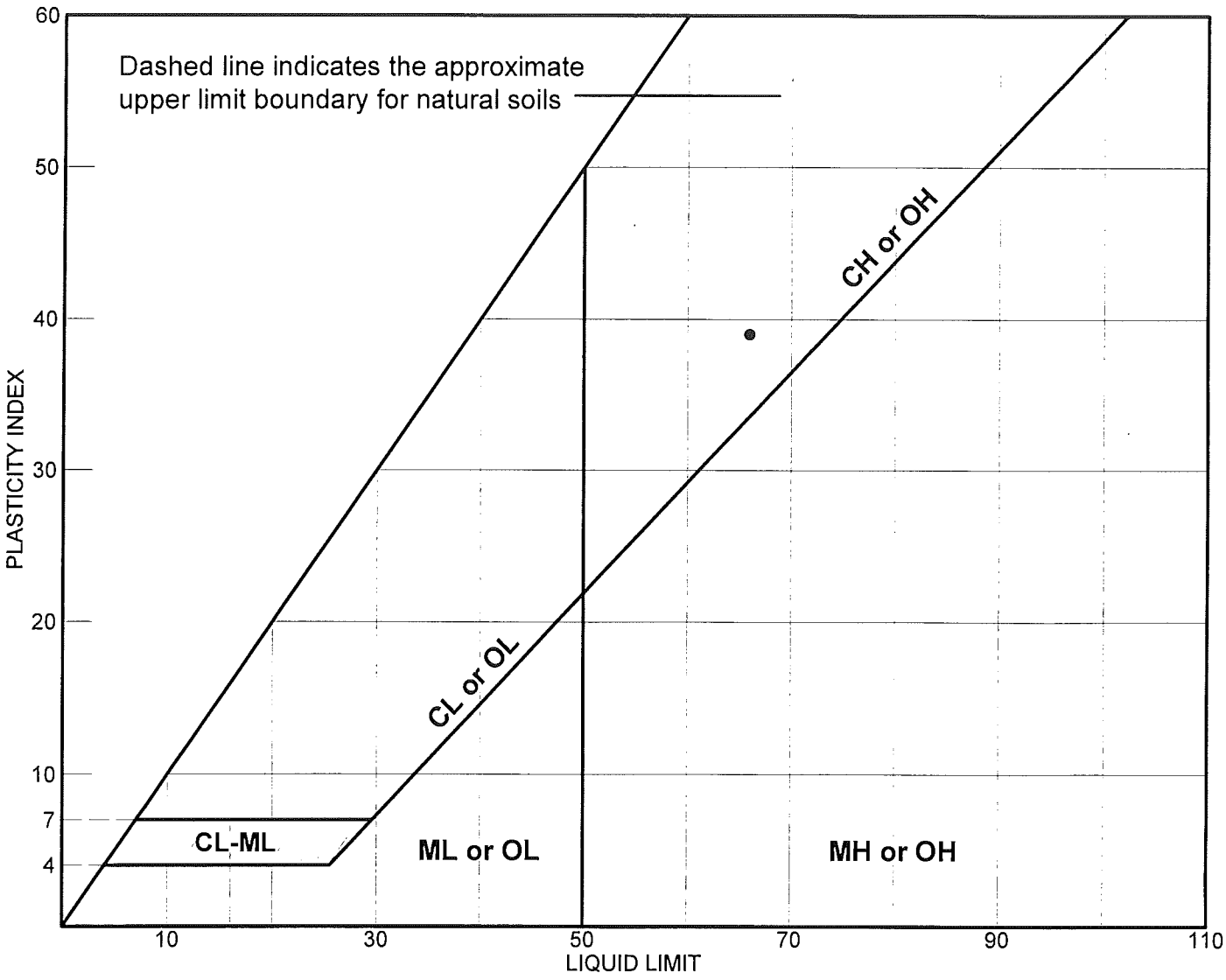
Boring No: 4

Particle Size Distribution Report

SOUTHERN COMPANY

Lab No. 34

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Ash Pond Dike	34	19-21 feet		27	66	39	CH

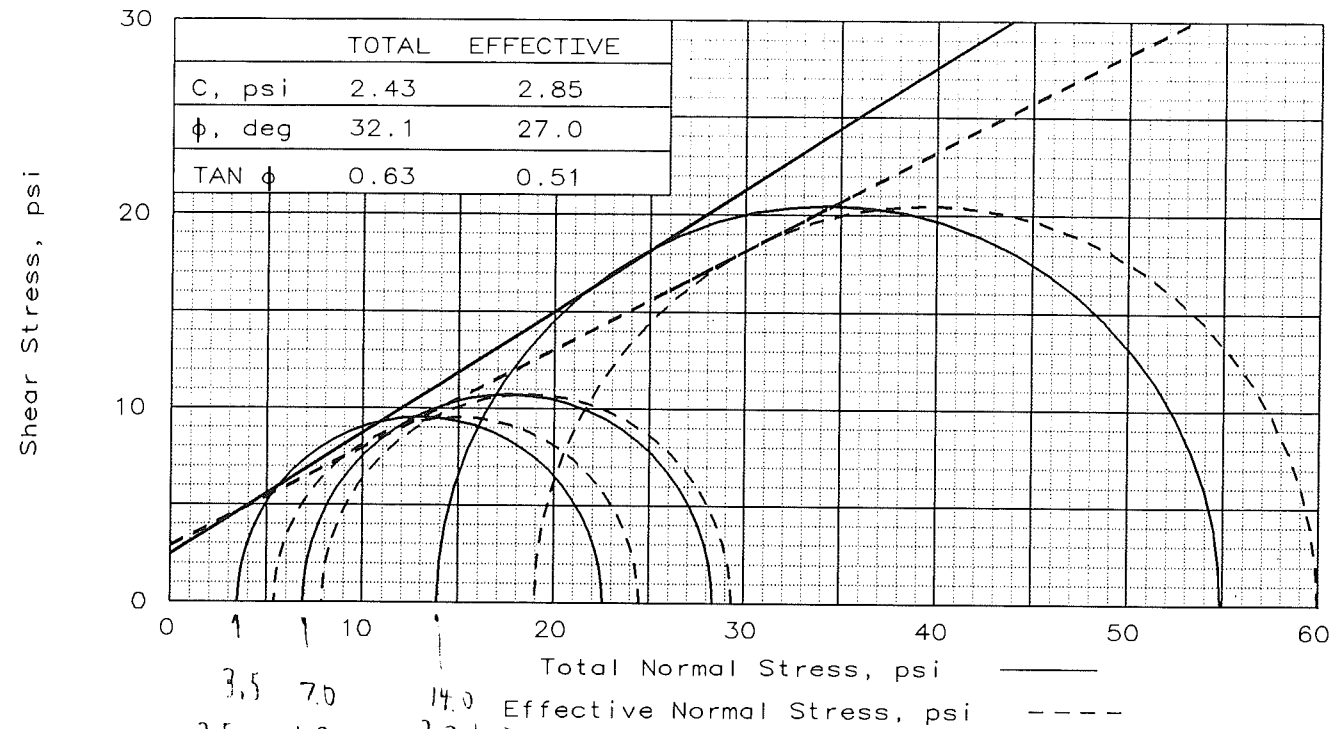
LIQUID AND PLASTIC LIMITS TEST REPORT

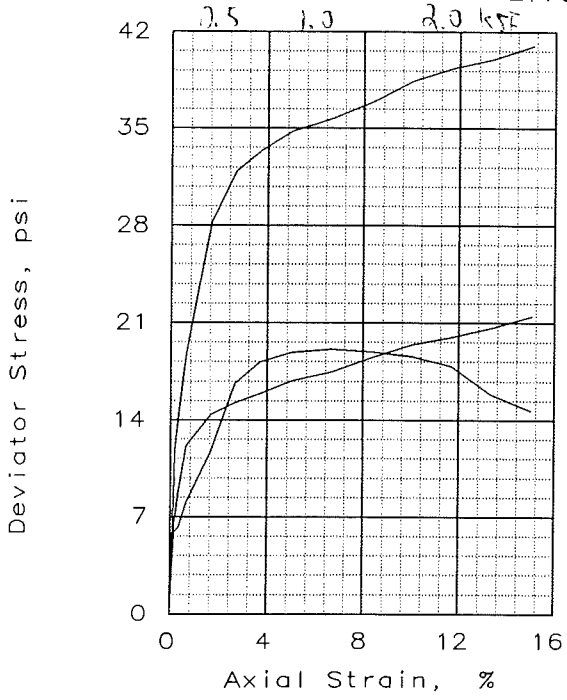
SOUTHERN COMPANY

Client: Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Project No.: 2051 **Lab No.** 34





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	27.3	26.8	27.4
	DRY DENSITY, pcf	91.5	93.0	94.4
	SATURATION, %	88.9	90.2	95.7
	VOID RATIO	0.821	0.792	0.765
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	3.00
AT TEST	WATER CONTENT, %	30.5	29.2	27.9
	DRY DENSITY, pcf	91.9	93.7	95.6
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.814	0.780	0.744
	DIAMETER, in	1.40	1.40	1.39
	HEIGHT, in	3.00	2.99	2.99
Strain rate, %/min		0.0010	0.0010	0.0010
BACK PRESSURE, psi		90.0	90.0	90.0
CELL PRESSURE, psi		93.5	96.9	103.9
FAIL. STRESS, psi		19.1	21.5	41.0
TOTAL PORE PR., psi		88.1	89.0	84.9
ULT. STRESS, psi				
TOTAL PORE PR., psi				
$\bar{\sigma}_1$ FAILURE, psi		24.5	29.4	60.0
$\bar{\sigma}_3$ FAILURE, psi		5.4	7.9	19.0

TYPE OF TEST:
CU with Pore Pressures
SAMPLE TYPE: UD
DESCRIPTION: Light brown fat clay
LL= 66 PL= 27 PI= 39
SPECIFIC GRAVITY= 2.67
REMARKS:

Lab No: 34

CLIENT: Southern Company

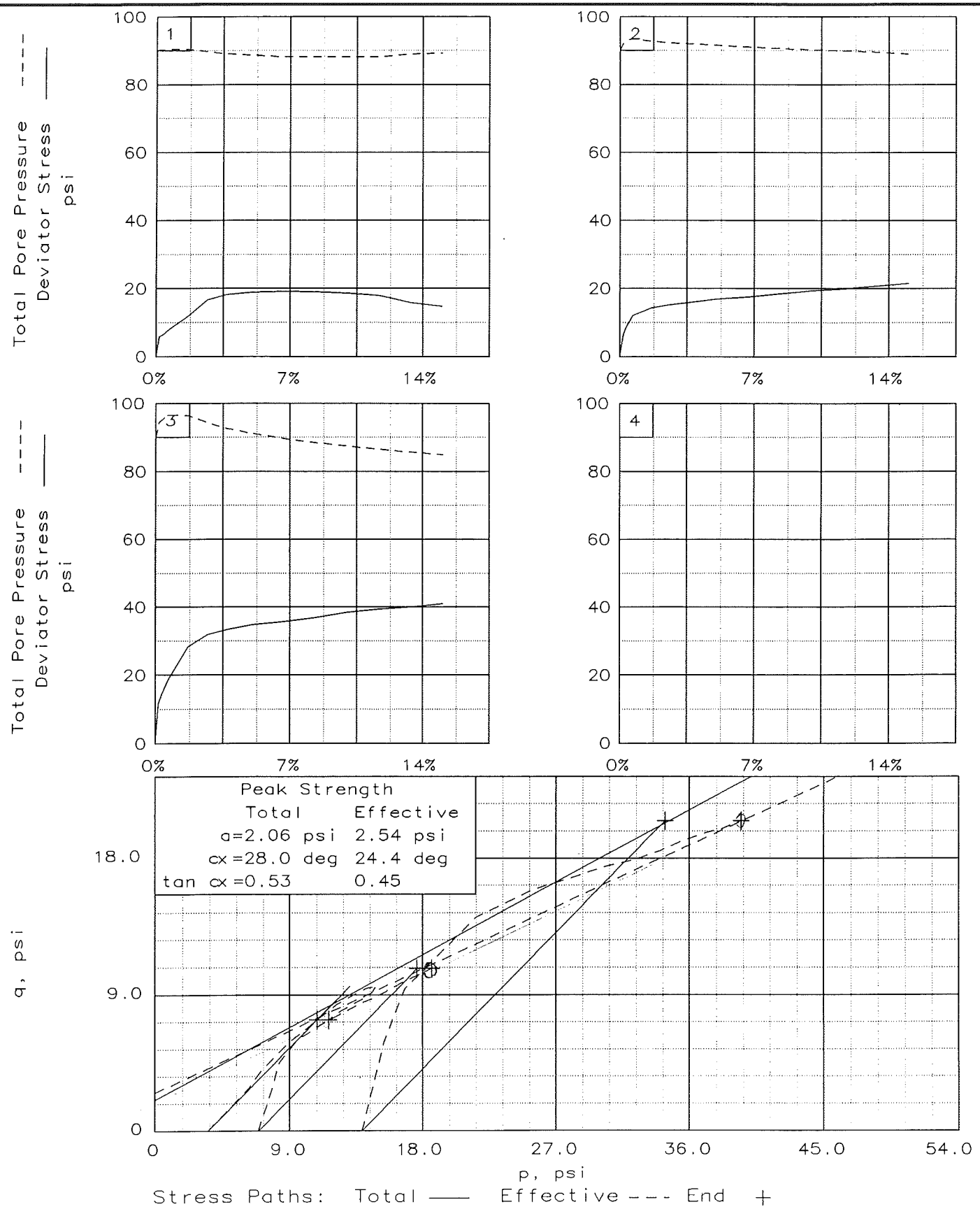
PROJECT: GPCo - Plant Bowen Ash Pond Dike

SAMPLE LOCATION: Boring #4

PROJ. NO.: 2051 DATE: 10/10/2002

TRIAXIAL SHEAR TEST REPORT

SOUTHERN COMPANY SERVICES



Client: Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Location: Boring #4

File: GPBAPD34 Project No.: 2051 Lab No: 34

Project and Sample Data

Date: 10/10/2002
Client: Southern Company
Project: GPCo - Plant Bowen Ash Pond Dike
Sample location: Boring #4
Sample description: Light brown fat clay
Remarks:

Fig no.: 34 2nd page Fig no. (if applicable): 34
Type of sample: UD
Specific gravity= 2.67 LL= 66 PL= 27 PI= 39
Test method: Corps of Eng. - uniform strain

Specimen Parameters for Specimen No. 1

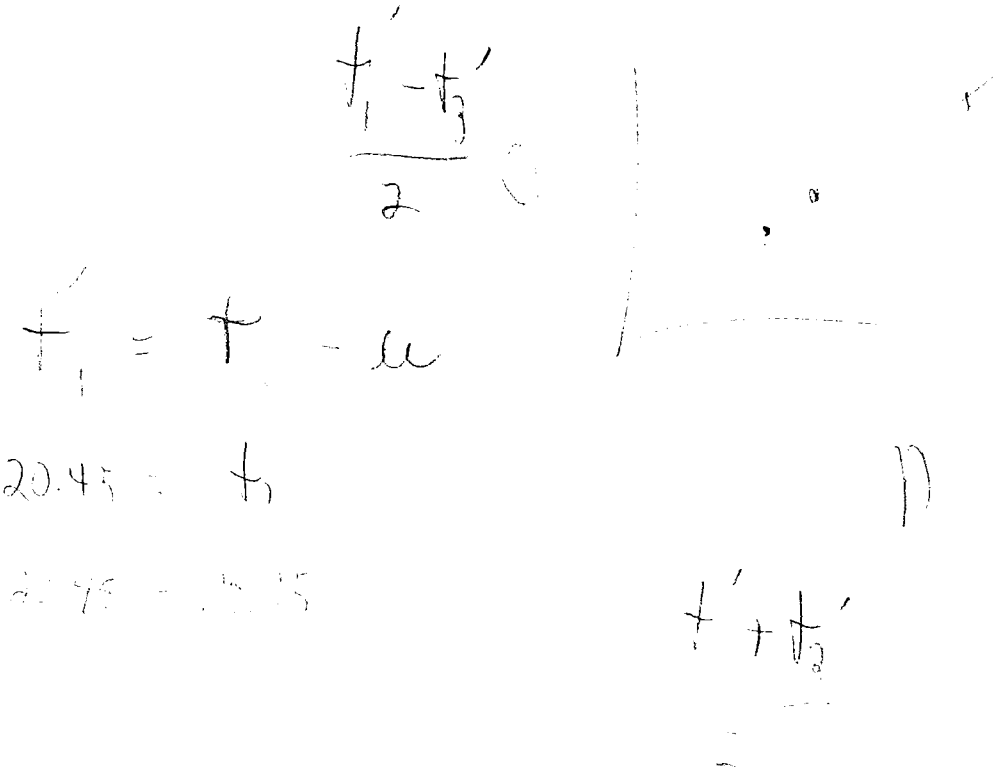
Specimen Parameter	Initial	Saturated	Consolidated	Final
Wt. moist soil and tare:	132.710			143.190
Wt. dry soil and tare:	110.740			105.440
Wt. of tare:	30.390			0.000
Weight, gms:	141.3			
Diameter, in:	1.400	1.400	1.398	
Area, in²:	1.539	1.538	1.535	
Height, in:	3.000	2.999	2.996	
Net decrease in height, in:		0.001	0.003	
Net decrease in water volume, cc:				
Moisture:	27.3	30.7	30.5	35.8
Wet density, pcf:	116.5	119.7	119.9	
Dry density, pcf:	91.5	91.6	91.9	
Void ratio:	0.8213	0.8194	0.8140	
% Saturation:	88.9	100.0	100.0	

Test Readings Data for Specimen No. 1

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.30179 lbs per input unit
Secondary load ring constant= 0.72586 lbs per input unit
Crossover reading for secondary load ring= 462 input units
Consolidation cell pressure = 93.50 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 3.50 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 19.08 psi at reading no. 8
ULT. STRESS = not selected

Test Readings Data for Specimen No. 1

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Effective Stresses Major psi	Effective Stresses 1:3 Ratio	Pore Pres. psi	P psi	Q psi
	0.0	0.000	70.0	0.0	0.0	0.00	3.50	3.50	1.00	90.00	3.50	0.00
1	5.0	0.005	100.0	9.1	0.2	5.89	3.40	9.29	2.73	90.10	6.34	2.94
2	10.0	0.010	102.0	9.7	0.3	6.27	3.30	9.57	2.90	90.20	6.43	3.13
3	20.0	0.020	111.0	12.4	0.7	8.01	3.10	11.11	3.58	90.40	7.10	4.00
4	50.0	0.050	131.0	18.4	1.7	11.79	3.10	14.89	4.80	90.40	9.00	5.90
5	80.0	0.080	157.0	26.3	2.7	16.65	3.80	20.45	5.38	89.70	12.12	8.32
6	110.0	0.110	166.0	29.0	3.7	18.18	4.40	22.58	5.13	89.10	13.49	9.09
7	150.0	0.150	171.0	30.5	5.0	18.86	4.80	23.66	4.93	88.70	14.23	9.43
8	200.0	0.200	174.0	31.4	6.7	19.08	5.40	24.48	4.53	88.10	14.94	9.54
9	250.0	0.250	175.0	31.7	8.3	18.92	5.30	24.22	4.57	88.20	14.76	9.46
10	300.0	0.300	175.0	31.7	10.0	18.57	5.40	23.97	4.44	88.10	14.69	9.29
11	350.0	0.350	173.0	31.1	11.7	17.88	5.40	23.28	4.31	88.10	14.34	8.94
12	400.0	0.400	163.0	28.1	13.4	15.84	4.50	20.34	4.52	89.00	12.42	7.92
13	450.0	0.450	158.0	26.6	15.0	14.70	4.30	19.00	4.42	89.20	11.65	7.35



Specimen Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Consolidated	Final
W moist soil and tare:	120.500			147.930
dry soil and tare:	101.460			113.990
Wt. of tare:	30.310			0.000
Weight, gms:	142.9			
Diameter, in:	1.400	1.400	1.397	
Area, in²:	1.539	1.538	1.532	
Height, in:	3.000	2.999	2.993	
Net decrease in height, in:		0.001	0.006	
Net decrease in water volume, cc:				
% Moisture:	26.8	29.6	29.2	29.8
Wet density, pcf:	117.9	120.7	121.0	
Dry density, pcf:	93.0	93.1	93.7	
Void ratio:	0.7924	0.7906	0.7799	
% Saturation:	90.2	100.0	100.0	

Test Readings Data for Specimen No. 2

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.31199 lbs per input unit
Secondary load ring constant= 0.72824 lbs per input unit
Crossover reading for secondary load ring= 480 input units
Consolidation cell pressure = 96.90 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 6.90 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 21.45 psi at reading no. 13
U . STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Effective Stresses Major psi	1:3 Ratio	Pore Pres. psi	P psi	Q psi
0	0.0	0.000	68.0	0.0	0.0	0.00	6.90	6.90	1.00	90.00	6.90	0.00
1	5.0	0.005	100.0	10.0	0.2	6.51	4.70	11.21	2.38	92.20	7.95	3.25
2	10.0	0.010	112.0	13.7	0.3	8.93	3.80	12.73	3.35	93.10	8.26	4.46
3	20.0	0.020	128.0	18.7	0.7	12.14	3.50	15.64	4.47	93.40	9.57	6.07
4	50.0	0.050	140.0	22.5	1.7	14.42	4.20	18.62	4.43	92.70	11.41	7.21
5	80.0	0.080	145.0	24.0	2.7	15.26	4.60	19.86	4.32	92.30	12.23	7.63
6	110.0	0.110	149.0	25.3	3.7	15.89	4.90	20.79	4.24	92.00	12.84	7.94
7	150.0	0.150	155.0	27.1	5.0	16.83	5.30	22.13	4.17	91.60	13.71	8.41
8	200.0	0.200	160.0	28.7	6.7	17.48	5.90	23.38	3.96	91.00	14.64	8.74
9	250.0	0.250	167.0	30.9	8.4	18.47	6.30	24.77	3.93	90.60	15.54	9.24
10	300.0	0.300	174.0	33.1	10.0	19.42	6.70	26.12	3.90	90.20	16.41	9.71
11	350.0	0.350	179.0	34.6	11.7	19.96	7.00	26.96	3.85	89.90	16.98	9.98
12	400.0	0.400	185.0	36.5	13.4	20.64	7.40	28.04	3.79	89.50	17.72	10.32
13	450.0	0.450	192.0	38.7	15.0	21.45	7.90	29.35	3.72	89.00	18.63	10.73

Specimen Parameters for Specimen No. 3

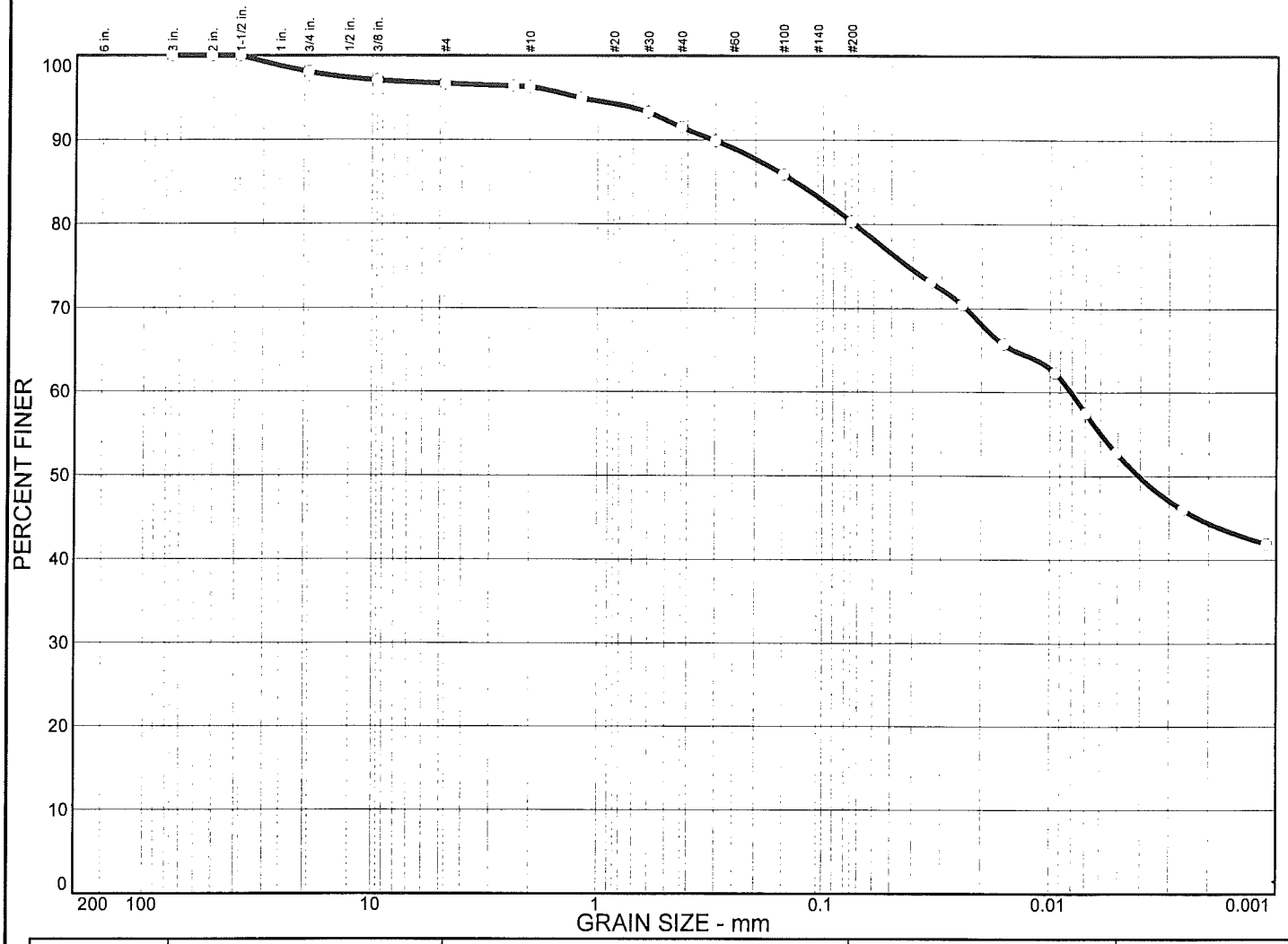
Specimen Parameter	Initial	Saturated	Consolidated	Final
moist soil and tare:	131.460			148.130
dry soil and tare:	109.630			114.120
Wt. of tare:	30.070			0.000
Weight, gms:	145.9			
Diameter, in:	1.400	1.400	1.394	
Area, in^2:	1.539	1.538	1.527	
Height, in:	3.000	2.999	2.988	
Net decrease in height, in:		0.001	0.011	
Net decrease in water volume, cc:				
% Moisture:	27.4	28.6	27.9	29.8
Wet density, pcf:	120.3	121.5	122.2	
Dry density, pcf:	94.4	94.5	95.6	
Void ratio:	0.7654	0.7636	0.7443	
% Saturation:	95.7	100.0	100.0	

Test Readings Data for Specimen No. 3

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.3108 lbs per input unit
Secondary load ring constant= 0.77882 lbs per input unit
Crossover reading for secondary load ring= 474 input units
Consolidation cell pressure = 103.90 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 13.90 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 40.97 psi at reading no. 13
[illegible]. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Major psi	1:3 Ratio	Pore Pres. psi	P psi	Q psi
0	0.0	0.000	80.0	0.0	0.0	0.00	13.90	13.90	1.00	90.00	13.90	0.00
1	5.0	0.005	138.0	18.0	0.2	11.78	9.50	21.28	2.24	94.40	15.39	5.89
2	10.0	0.010	151.0	22.1	0.3	14.40	8.70	23.10	2.66	95.20	15.90	7.20
3	20.0	0.020	173.0	28.9	0.7	18.80	7.40	26.20	3.54	96.50	16.80	9.40
4	50.0	0.050	221.0	43.8	1.7	28.22	7.50	35.72	4.76	96.40	21.61	14.11
5	80.0	0.080	241.0	50.0	2.7	31.89	9.60	41.49	4.32	94.30	25.55	15.95
6	110.0	0.110	250.0	52.8	3.7	33.33	11.30	44.63	3.95	92.60	27.96	16.66
7	150.0	0.150	260.0	55.9	5.0	34.80	12.80	47.60	3.72	91.10	30.20	17.40
8	200.0	0.200	268.0	58.4	6.7	35.70	14.30	50.00	3.50	89.60	32.15	17.85
9	250.0	0.250	278.0	61.5	8.4	36.93	15.50	52.43	3.38	88.40	33.96	18.46
10	300.0	0.300	290.0	65.3	10.0	38.45	16.50	54.95	3.33	87.40	35.72	19.22
11	350.0	0.350	299.0	68.1	11.7	39.35	17.40	56.75	3.26	86.50	37.08	19.68
12	400.0	0.400	307.0	70.6	13.4	40.02	18.30	58.32	3.19	85.60	38.31	20.01
13	450.0	0.450	317.0	73.7	15.1	40.97	19.00	59.97	3.16	84.90	39.49	20.49

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	3.3	16.4	27.7	52.6

LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
50	22	0.132	0.0081	0.0041					

MATERIAL DESCRIPTION	USCS	AASHTO
Light Brown Fat clay with sand	CH	A-7-6(23)

Project No. 2051 **Client:** Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Source: Ash Pond Dike **Sample No.:** 35 **Elev./Depth:** 10-12 feet

Remarks:

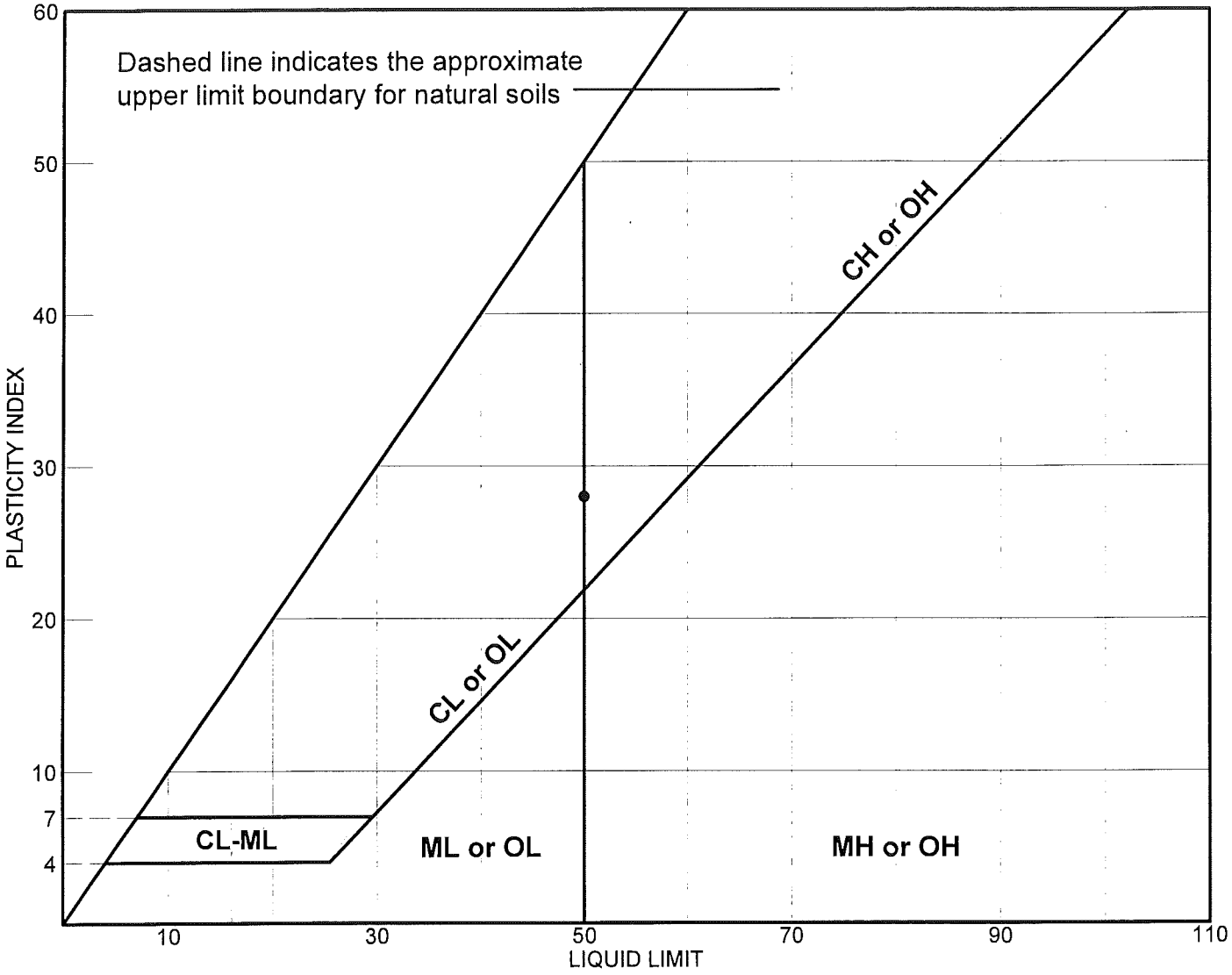
Boring No. 6

Particle Size Distribution Report

SOUTHERN COMPANY

Lab No. 35

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Ash Pond Dike	35	10-12 feet		22	50	28	CH

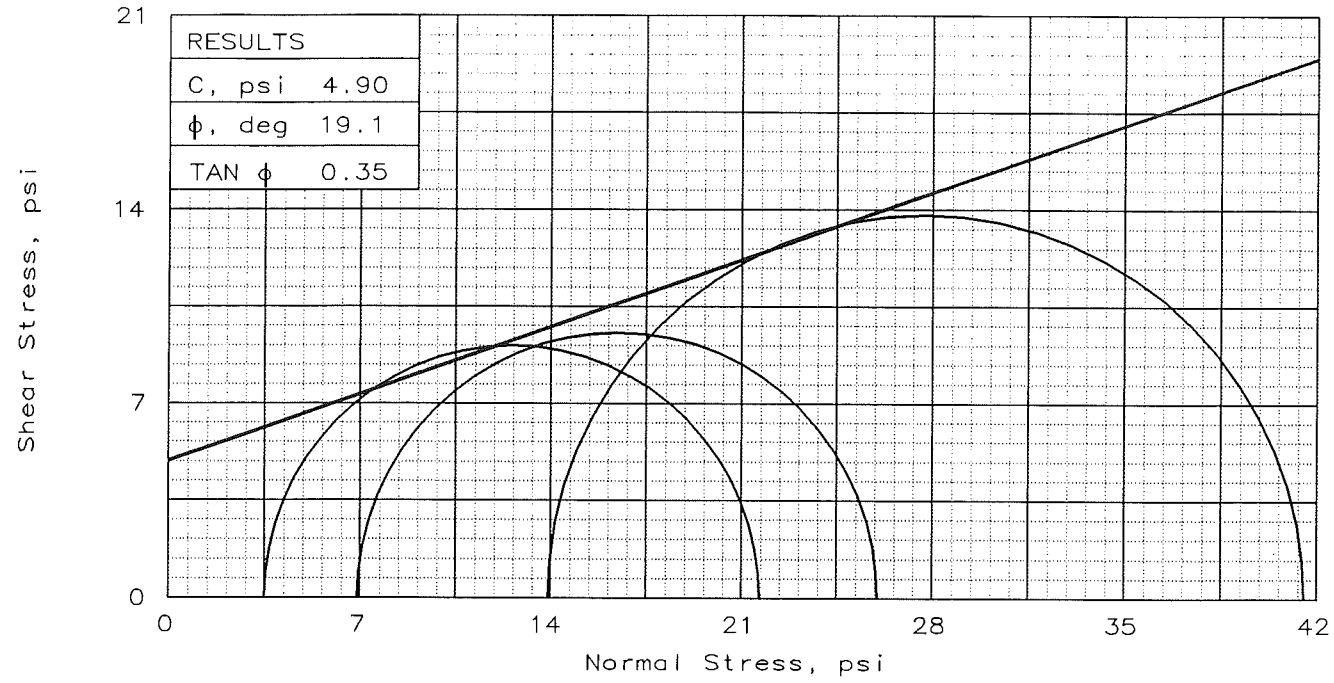
LIQUID AND PLASTIC LIMITS TEST REPORT

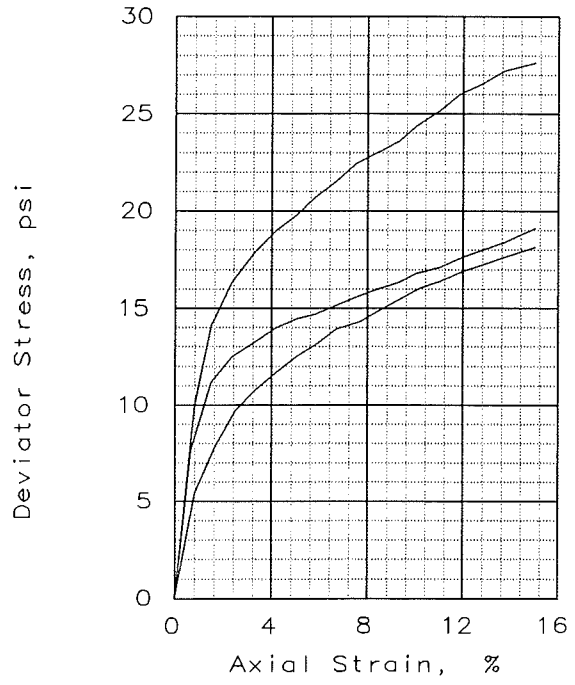
SOUTHERN COMPANY

Client: Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Project No.: 2051 **Lab No.** 35





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	36.3	32.4	28.2
	DRY DENSITY, pcf	84.2	86.9	93.9
	SATURATION, %	95.8	91.1	93.1
	VOID RATIO	1.046	0.982	0.835
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	3.00
AT TEST	WATER CONTENT, %	37.9	35.6	30.2
	DRY DENSITY, pcf	84.2	86.9	93.9
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	1.046	0.982	0.835
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	3.00
Strain rate, %/min		0.0010	0.0010	0.0010
BACK PRESSURE, psi		0.0	0.0	0.0
CELL PRESSURE, psi		3.5	6.9	13.9
FAIL. STRESS, psi		18.2	19.1	27.6
ULT. STRESS, psi				
σ_1 FAILURE, psi		21.7	26.0	41.5
σ_3 FAILURE, psi		3.5	6.9	13.9

TYPE OF TEST:
Unconsolidoted Undrained
SAMPLE TYPE: UD
DESCRIPTION: Light brown fat clay with sand
LL= 50 PL= 22 PI= 28
SPECIFIC GRAVITY= 2.76
REMARKS:

Lab No: 35

CLIENT: Southern Company

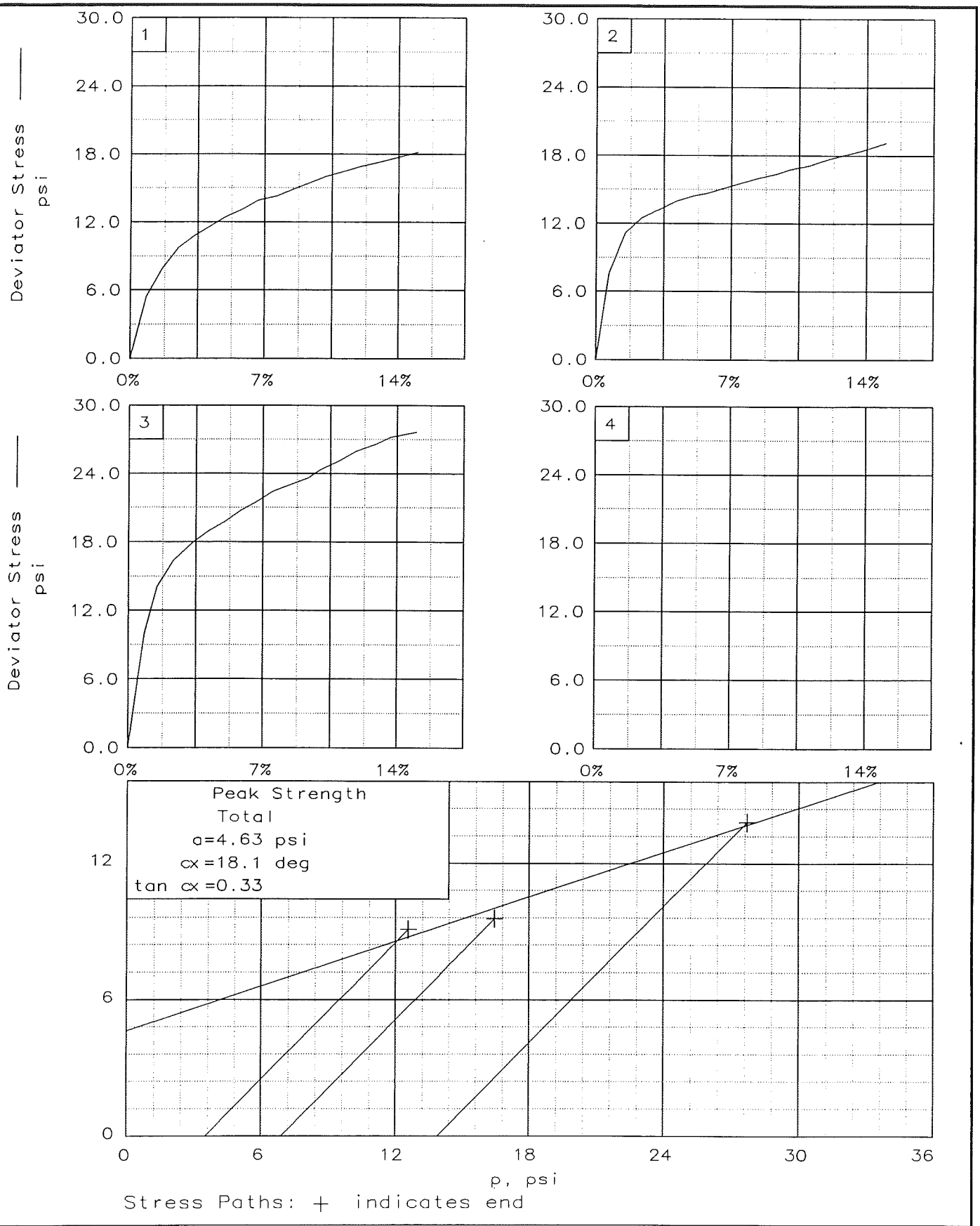
PROJECT: GPCo - Plant Bowen Ash Pond Dike

SAMPLE LOCATION: Boring #6

PROJ. NO.: 2051 DATE: 10/10/2002

TRIAXIAL SHEAR TEST REPORT

SOUTHERN COMPANY SERVICES



Client: Southern Company

Project: GPCo - Plant Bowen Ash Pond Dike

Locotion: Boring #6

File: GPBAPF35 Project No.: 2051 Lab No: 35

Project and Sample Data

Date: 10/10/2002
Client: Southern Company
Project: GPCo - Plant Bowen Ash Pond Dike
Sample location: Boring #6
Sample description: Light brown fat clay with sand
Remarks:

Fig no.: 35 2nd page Fig no. (if applicable): 35
Type of sample: UD
Specific gravity= 2.76 LL= 50 PL= 22 PI= 28
Test method: Corps of Eng. - uniform strain

Specimen Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Final
Wt. moist soil and tare:	126.650		142.550
Wt. dry soil and tare:	101.000		100.470
Wt. of tare:	30.370		0.000
Weight, gms:	139.2		
Diameter, in:	1.400	1.400	
Area, in²:	1.539	1.539	
Height, in:	3.000	3.000	
Net decrease in height, in:		0.000	
% Moisture:	36.3	37.9	41.9
density, pcf:	114.8	116.1	
Dry density, pcf:	84.2	84.2	
Void ratio:	1.0459	1.0459	
% Saturation:	95.8	100.0	

Test Readings Data for Specimen No. 1

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.30179 lbs per input unit
Secondary load ring constant= 0.72586 lbs per input unit
Crossover reading for secondary load ring= 462 input units
Cell pressure = 3.50 psi
Back pressure = 0.00 psi
Effective confining stress = 3.50 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 18.16 psi at reading no. 17
ULT. STRESS = not selected

Test Readings Data for Specimen No. 1

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Principal Stresses Minor psi	Major psi	1:3 Ratio	P psi	Q psi
	0.0	0.000	68.0	0.0	0.0	0.00	3.50	3.50	1.00	3.50	0.00
1	25.0	0.025	96.0	8.5	0.8	5.44	3.50	8.94	2.56	6.22	2.72
2	50.0	0.050	109.0	12.4	1.7	7.90	3.50	11.40	3.26	7.45	3.95
3	75.0	0.075	119.0	15.4	2.5	9.75	3.50	13.25	3.79	8.37	4.87
4	100.0	0.100	125.0	17.2	3.3	10.80	3.50	14.30	4.09	8.90	5.40
5	125.0	0.125	130.0	18.7	4.2	11.65	3.50	15.15	4.33	9.32	5.82
6	150.0	0.150	135.0	20.2	5.0	12.48	3.50	15.98	4.57	9.74	6.24
7	175.0	0.175	139.0	21.4	5.8	13.11	3.50	16.61	4.74	10.05	6.55
8	200.0	0.200	144.0	22.9	6.7	13.91	3.50	17.41	4.97	10.45	6.95
9	230.0	0.230	147.0	23.8	7.7	14.30	3.50	17.80	5.09	10.65	7.15
10	255.0	0.255	151.0	25.0	8.5	14.89	3.50	18.39	5.25	10.94	7.44
11	280.0	0.280	155.0	26.3	9.3	15.46	3.50	18.96	5.42	11.23	7.73
12	305.0	0.305	159.0	27.5	10.2	16.03	3.50	19.53	5.58	11.51	8.01
13	330.0	0.330	162.0	28.4	11.0	16.40	3.50	19.90	5.69	11.70	8.20
14	360.0	0.360	166.0	29.6	12.0	16.91	3.50	20.41	5.83	11.95	8.45
15	385.0	0.385	169.0	30.5	12.8	17.26	3.50	20.76	5.93	12.13	8.63
16	410.0	0.410	172.0	31.4	13.7	17.60	3.50	21.10	6.03	12.30	8.80
17	450.0	0.450	177.0	32.9	15.0	18.16	3.50	21.66	6.19	12.58	9.08

Specimen Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Final
W moist soil and tare:	111.000		140.140
dry soil and tare:	91.250		103.670
Wt. of tare:	30.310		0.000
Weight, gms:	139.6		
Diameter, in:	1.400	1.400	
Area, in²:	1.539	1.539	
Height, in:	3.000	3.000	
Net decrease in height, in:		0.000	
% Moisture:	32.4	35.6	35.2
Wet density, pcf:	115.1	117.9	
Dry density, pcf:	86.9	86.9	
Void ratio:	0.9817	0.9817	
% Saturation:	91.1	100.0	

Test Readings Data for Specimen No. 2

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.31199 lbs per input unit
Secondary load ring constant= 0.72824 lbs per input unit
Crossover reading for secondary load ring= 480 input units
Cell pressure = 6.90 psi
Back pressure = 0.00 psi
Effective confining stress = 6.90 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 19.12 psi at reading no. 17
ULT. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Principal Stresses Minor psi	Major psi	1:3 Ratio	P psi	Q psi
0	0.0	0.000	64.0	0.0	0.0	0.00	6.90	6.90	1.00	6.90	0.00
1	20.0	0.020	102.0	11.9	0.7	7.65	6.90	14.55	2.11	10.73	3.83
2	45.0	0.045	120.0	17.5	1.5	11.18	6.90	18.08	2.62	12.49	5.59
3	70.0	0.070	127.0	19.7	2.3	12.47	6.90	19.37	2.81	13.14	6.24
4	95.0	0.095	131.0	20.9	3.2	13.15	6.90	20.05	2.91	13.47	6.57
5	125.0	0.125	136.0	22.5	4.2	13.98	6.90	20.88	3.03	13.89	6.99
6	150.0	0.150	139.0	23.4	5.0	14.44	6.90	21.34	3.09	14.12	7.22
7	175.0	0.175	141.0	24.0	5.8	14.70	6.90	21.60	3.13	14.25	7.35
8	200.0	0.200	144.0	25.0	6.7	15.13	6.90	22.03	3.19	14.47	7.57
9	225.0	0.225	147.0	25.9	7.5	15.56	6.90	22.46	3.26	14.68	7.78
10	250.0	0.250	150.0	26.8	8.3	15.98	6.90	22.88	3.32	14.89	7.99
11	280.0	0.280	153.0	27.8	9.3	16.35	6.90	23.25	3.37	15.08	8.18
12	300.0	0.300	156.0	28.7	10.0	16.78	6.90	23.68	3.43	15.29	8.39
13	330.0	0.330	159.0	29.6	11.0	17.14	6.90	24.04	3.48	15.47	8.57
14	360.0	0.360	163.0	30.9	12.0	17.66	6.90	24.56	3.56	15.73	8.83
15	385.0	0.385	166.0	31.8	12.8	18.02	6.90	24.92	3.61	15.91	9.01
16	410.0	0.410	169.0	32.8	13.7	18.37	6.90	25.27	3.66	16.09	9.19
17	450.0	0.450	175.0	34.6	15.0	19.12	6.90	26.02	3.77	16.46	9.56

Specimen Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Final
moist soil and tare:	107.330		146.230
dry soil and tare:	90.370		112.730
Wt. of tare:	30.160		0.000
Weight, gms:	145.9		
Diameter, in:	1.400	1.400	
Area, in²:	1.539	1.539	
Height, in:	3.000	3.000	
Net decrease in height, in:		0.000	
% Moisture:	28.2	30.2	29.7
Wet density, pcf:	120.4	122.3	
Dry density, pcf:	93.9	93.9	
Void ratio:	0.8349	0.8349	
% Saturation:	93.1	100.0	

Test Readings Data for Specimen No. 3

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.3108 lbs per input unit
Secondary load ring constant= 0.77882 lbs per input unit
Crossover reading for secondary load ring= 474 input units
Cell pressure = 13.90 psi
Back pressure = 0.00 psi
Effective confining stress = 13.90 psi
Strain rate, %/min = 0.00
FAIL. STRESS = 27.63 psi at reading no. 17
ULT. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Principal Stresses Minor psi	Major psi	1:3 Ratio	P psi	Q psi
0	0.0	0.000	75.0	0.0	0.0	0.00	13.90	13.90	1.00	13.90	0.00
1	25.0	0.025	125.0	15.5	0.8	10.01	13.90	23.91	1.72	18.91	5.01
2	45.0	0.045	146.0	22.1	1.5	14.12	13.90	28.02	2.02	20.96	7.06
3	70.0	0.070	158.0	25.8	2.3	16.37	13.90	30.27	2.18	22.08	8.18
4	100.0	0.100	167.0	28.6	3.3	17.96	13.90	31.86	2.29	22.88	8.98
5	125.0	0.125	173.0	30.5	4.2	18.96	13.90	32.86	2.36	23.38	9.48
6	150.0	0.150	178.0	32.0	5.0	19.76	13.90	33.66	2.42	23.78	9.88
7	175.0	0.175	184.0	33.9	5.8	20.72	13.90	34.62	2.49	24.26	10.36
8	200.0	0.200	189.0	35.4	6.7	21.48	13.90	35.38	2.55	24.64	10.74
9	225.0	0.225	195.0	37.3	7.5	22.41	13.90	36.31	2.61	25.11	11.21
10	250.0	0.250	199.0	38.5	8.3	22.95	13.90	36.85	2.65	25.37	11.47
11	280.0	0.280	204.0	40.1	9.3	23.61	13.90	37.51	2.70	25.71	11.81
12	300.0	0.300	209.0	41.6	10.0	24.35	13.90	38.25	2.75	26.07	12.17
13	330.0	0.330	215.0	43.5	11.0	25.16	13.90	39.06	2.81	26.48	12.58
14	355.0	0.355	221.0	45.4	11.8	25.99	13.90	39.89	2.87	26.89	12.99
15	385.0	0.385	226.0	46.9	12.8	26.57	13.90	40.47	2.91	27.19	13.29
16	410.0	0.410	231.0	48.5	13.7	27.19	13.90	41.09	2.96	27.50	13.60
17	450.0	0.450	236.0	50.0	15.0	27.63	13.90	41.53	2.99	27.72	13.82

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,outhern Company Services
Georgia Power Company – Plant Bowen Ash Pond Stability
Soil Testing Report

Mr. Richard M. Franke

February 18, 2003

Mr. Ray Halbert
Southern Company

Enclosed are the test results for the soil samples delivered to the Southern Company, Central Laboratory on November 19, 2002. Performed test included Atterberg Limits (ASTM D-4318), Specific Gravity (ASTM D854), Natural Moisture Content (ASTM D-2216), Consolidated-Undrained (R) Triaxial Test and Torvane Shear Testing.

Laboratory sample #1, represents a UD soil sample material from the GPCo-Plant Bowen Ash Pond Stability Project, Location: DCP-7, Boring AH-1, Sample No. UD-1, from a depth of 11.0-13.0 feet. Liquid Limit was 65 with a Plasticity Limit was 32 with a Plasticity Index of 33. Specific Gravity was 3.18. Note: Sample appears to contain iron oxide. Natural Moisture content was 36.9%. For Consolidated-Undrained (R) Triaxial Test, see attached report. For Torvane Shear Test and Moisture Content, see attached report.

Laboratory sample #2, represents a UD soil sample material from the GPCo-Plant Bowen Ash Pond Stability Project, Location: DCP-7, Boring AH-1, Sample No. UD-2, from a depth of 13.0-15.0 feet. Liquid Limit was 43 with a Plasticity Limit was 23 with a Plasticity Index of 20. Specific Gravity was2.89. Natural Moisture content was 41.2%. For Consolidated-Undrained (R) Triaxial Test, see attached report. For Torvane Shear Test and Moisture Content, see attached report.

Laboratory sample #3, represents a UD soil sample material from the GPCo-Plant Bowen Ash Pond Stability Project, Location: DCP-14, Boring AH-2, Sample No. UD-5, from a depth of 12.0-14.0 feet. Liquid Limit was 58 with a Plasticity Limit was 23 with a Plasticity Index of 35. Specific Gravity was 2.72. Natural Moisture content was 24.5%. For Consolidated-Undrained (R) Triaxial Test, see attached report. For Torvane Shear Test and Moisture Content, see attached report.

Laboratory sample #4, represents a UD soil sample material from the GPCo-Plant Bowen Ash Pond Stability Project, Location: DCP-14, Boring AH-2, Sample No. UD-4, from a depth of 10.0-12.0 feet. Liquid Limit was 65 with a Plasticity Limit was 24 with a Plasticity Index of 41. Specific Gravity was 2.67. Natural Moisture content was 29.9%.

Laboratory sample #5, represents a UD soil sample material from the GPCo-Plant Bowen Ash Pond Stability Project, Location: DCP-14, Sample No. UD-4, from a depth of 10.0-12.0 feet. Liquid Limit was 52 with a Plasticity Limit 22 was with a Plasticity Index of 30. Specific Gravity was 2.75. Natural Moisture content was 24.2%. For Consolidated-Undrained (R) Triaxial Test, see attached report. For Torvane Shear Test and Moisture Content, see attached report.

Laboratory sample #6, represents a UD soil sample material from the GPCo-Plant Bowen Ash Pond Stability Project, Location: DCP-14, Sample No. UD-5, from a depth of 12.0-14.00 feet. Liquid Limit was 81 with a Plasticity Limit 39 was with a Plasticity Index of 42. Specific Gravity was 2.74. Natural Moisture content was 45.6%. For Consolidated-Undrained (R) Triaxial Test, see attached report. For Torvane Shear Test and Moisture Content, see attached report.

Laboratory sample #7, represents a UD soil sample material from the GPCo-Plant Bowen Ash Pond Stability Project, Location: DCP-11, Sample No. UD-6, from a depth of 18.0-20.0 feet. Liquid Limit was 86 with a Plasticity Limit 49 was with a Plasticity Index of 37. Specific Gravity was 2.75. Natural Moisture content was 35.8%. For Consolidated-Undrained (R) Triaxial Test, see attached report. For Torvane Shear Test and Moisture Content, see attached report.

Laboratory sample #8, represents a UD soil sample material from the GPCo-Plant Bowen Ash Pond Stability Project, Location: DCP-11, Sample No. UD-7, from a depth of 23.0-25.0feet. Liquid Limit was 34 with a Plasticity Limit 19 was with a Plasticity Index of 15. Specific Gravity was 2.69. Natural Moisture content was 24.1%. Note: No Consolidated-Undrained (R) Triaxial Test performed due to sandy material. For Torvane Shear Test and Moisture Content, see attached report.

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Laboratory sample #9, represents a UD soil sample material from the GPCo-Plant Bowen Ash Pond Stability Project, Location: DCP-12S, Sample No. UD-8, from a depth of 19.0-21.0 feet. Liquid Limit was 62 with a Plasticity Limit was 24 with a Plasticity Index of 38. Specific Gravity was 2.69. Natural Moisture content was 40.1%. For Consolidated-Undrained (R) Triaxial Test, see attached report. For Torvane Shear Test and Moisture Content, see attached report.

Laboratory sample #10, represents a UD soil sample material from the GPCo-Plant Bowen Ash Pond Stability Project, Location: DCP-38, Sample No. UD-11, from a depth of 3.0-5.0 feet. Liquid Limit was 54 with a Plasticity Limit was 28 with a Plasticity Index of 26. Specific Gravity was2.70. Natural Moisture content was 21.6%. For Consolidated-Undrained (R) Triaxial Test, see attached report. For Torvane Shear Test and Moisture Content, see attached report.

Laboratory sample #11, represents a UD soil sample material from the GPCo-Plant Bowen Ash Pond Stability Project, Location: DCP-38, Sample No. UD-12, from a depth of 5.0-7.0 feet. Liquid Limit was 45 with a Plasticity Limit was 27 with a Plasticity Index of 18. Specific Gravity was 2.66. Natural Moisture content was 32.4%. For Consolidated-Undrained (R) Triaxial Test, see attached report. For Torvane Shear Test and Moisture Content, see attached report.

Laboratory sample #12, represents a UD soil sample material from the GPCo-Plant Bowen Ash Pond Stability Project, Location: DCP-38, Sample No. UD-13, from a depth of 7.0-9.0 feet. Liquid Limit was 54 with a Plasticity Limit was 22 with a Plasticity Index of 32. Specific Gravity was 2.69. Natural Moisture content was 26.8%. For Consolidated-Undrained (R) Triaxial Test, see attached report. For Torvane Shear Test and Moisture Content, see attached report.

We appreciate the opportunity to assist you on this project. If there are any questions or if we can be of any further assistance, please call at extension (205/664-6266) or 8-255-6266.

Sincerely,

Ray Halbert, PE, CM
Southern Company

ALABAMA LICENSED No. 24060 PROFESSIONAL ENGINEER RAY E. HALBERT

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GPCo – Plant Bowen Ash Stability
Vane Shear Test Results

Lab No.	Location:	Sample No.	Boring No.	Depth: (ft.)	Sample Location: (ft.)	% Moisture	Shear Strength (tsf.)
1	DCP-7	UD-1	AH-1	11-13	12' 8"	37.5	.80
					12' 4"	30.8	.95
					12' 4"	31.8	.95
					12' 0"	39.5	.85
					12' 0"	41.7	.90
					11' 8"	39.9	.75
2	DCP-7	UD-2	AH-1	13-15	14' 8"	36.5	.55
					14' 4"	44.8	.35
					14' 4"	42.2	.35
					14' 0"	44.1	.15
					14' 0"	37.4	.175
					13' 8"	42.2	.40
3	DCP-14	UD-5	AH-2	12-14	13' 8"	25.6	>1.0
					13' 4"	22.0	>1.0
					13' 4"	22.7	>1.0
					13' 0"	25.4	>1.0
					13' 0"	25.2	>1.0
					12' 8"	26.0	>1.0
4	DCP-14	UD-4	AH-2	10-12	11' 8"	29.9	.45
5	DCP-14	UD-4		10-12	11' 8"	21.6	>1.0
					11' 4"	23.3	>1.0
					11' 4"	23.6	>1.0
					11' 0"	25.5	>1.0
					11' 0"	25.8	>1.0
					10' 8"	24.0	>1.0
6	DCP-14	UD-5		12-14	13' 8"	44.7	.35
					13' 4"	42.1	.40
					13' 4"	42.1	.45
					13' 0"	36.2	>1.0
					13' 0"	34.3	>1.0
					12' 8"	35.8	>1.0
7	DCP-11	UD-6		18-20	19' 8"	34.7	>1.0
					19' 4"	33.7	.70
					19' 4"	27.3	>1.0
					19' 0"	31.6	>1.0
					19' 0"	33.8	>1.0
					18' 8"	27.9	>1.0
8	DCP-11	UD-7		23-25	24' 8"	20.5	.45
					24' 4"	14.1	NA *
					24' 4"	12.7	.35 *
					24' 0"	15.8	.40 *
					24' 0"	14.7	.40 *
					23' 8"	27.9	.85

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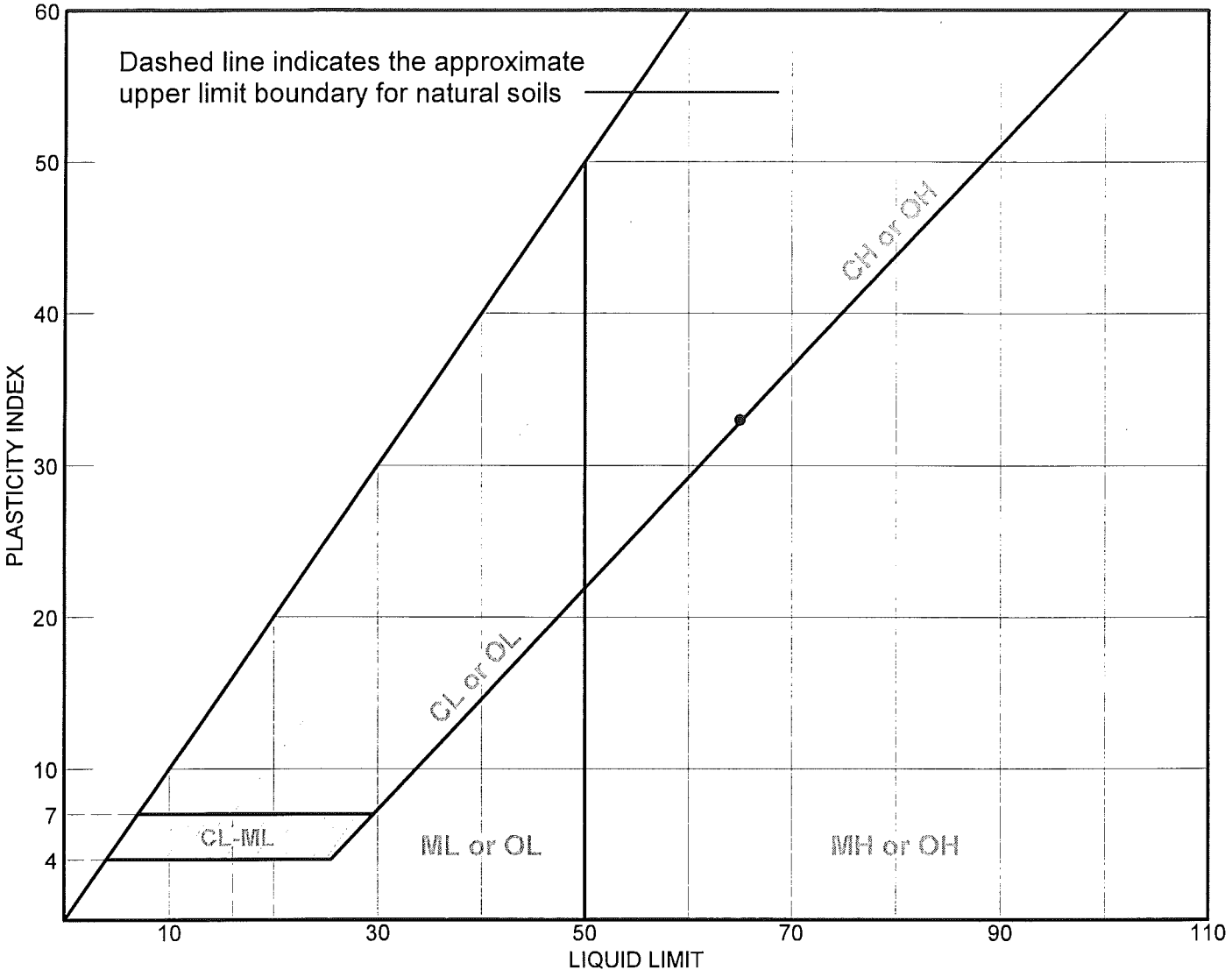
Lab No.	Location:	Sample No.	Boring No.	Depth: (ft.)	Sample Location: (ft.)	% Moisture	Shear Strength (tsf.)
9	DCP-125	UD-8		19-21	20' 8"	38.6	.30
					20' 4"	34.5	.60
					20' 4"	35.5	.47
					19' 0"	34.9	.52
					19' 0"	35.3	.49
					18' 8"	37.9	.41
10	DCP-38	UD-11		3-5	4' 8"	21.2	>1.0
					4' 4"	19.7	>1.0
					4' 4"	21.7	>1.0
					4' 0"	19.6	.90
					4' 0"	20.6	>1.0
					3' 8"	21.7	.85
11	DCP-38	UD-12		5-7	6' 8"	26.2	.30
					6' 4"	22.6	.75
					6' 4"	21.8	.75
					6' 0"	26.3	.65
					6' 0"	26.7	NA
					5' 8"	28.8	.60
12	DCP-38	UD-13		7-9	8' 8"	27.4	.50
					8' 4"	18.1	>1.0
					8' 4"	16.6	>1.0
					8' 0"	19.0	>1.0
					8' 0"	18.7	.85
					7' 8"	28.9	NA **

Note: 1.) * indicates sample was sandy.
2.) ** indicates sample was rocky.

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Plant Bowen	1	11-13		32	65	33	

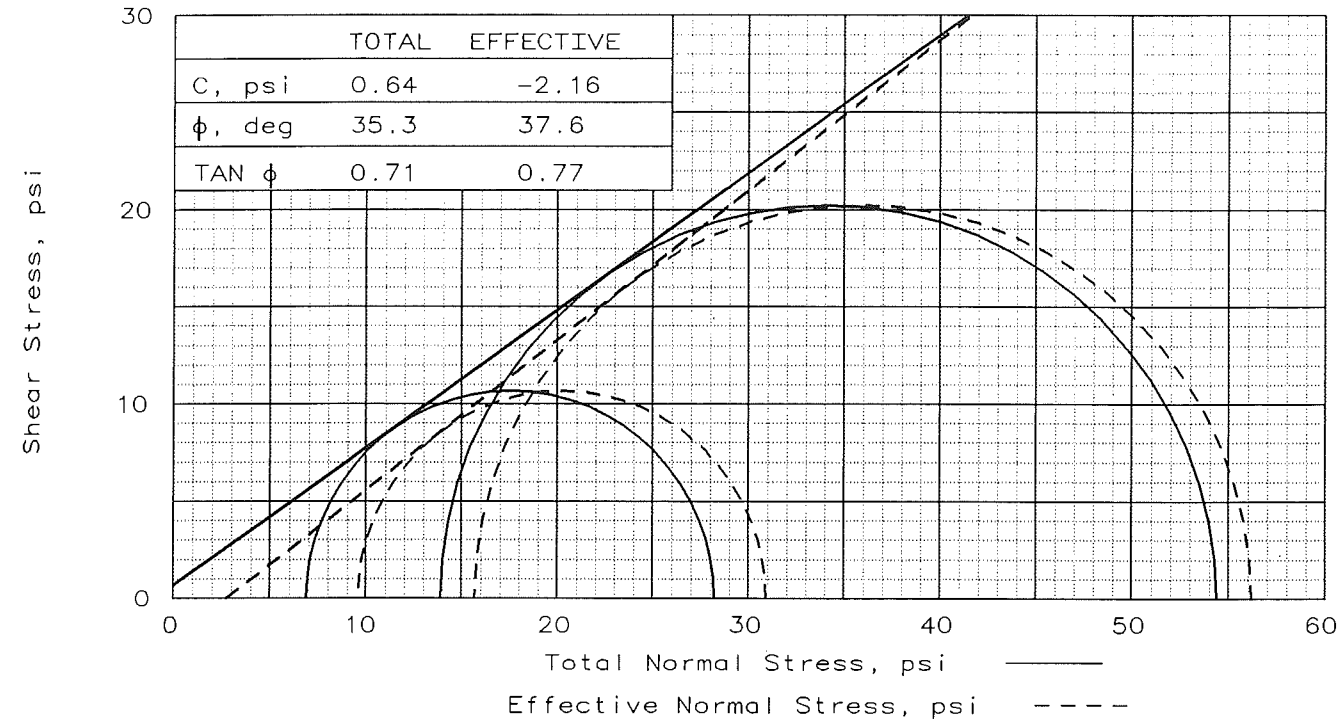
LIQUID AND PLASTIC LIMITS TEST REPORT

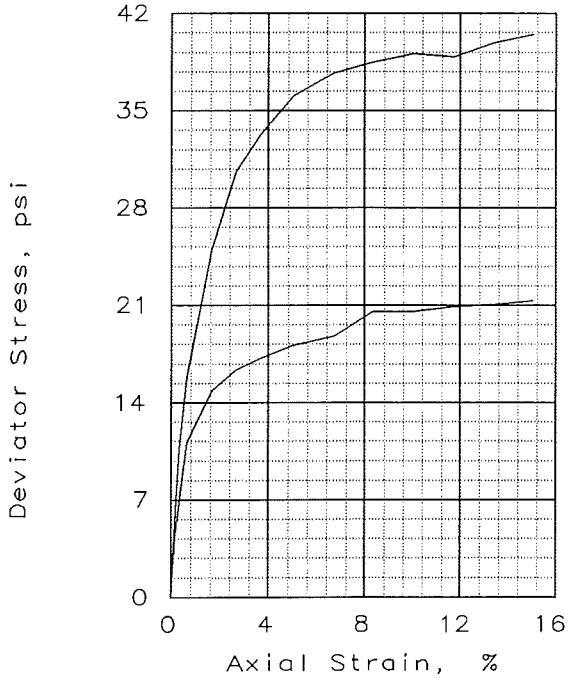
SOUTHERN COMPANY

Client: Southern Company

Project: GPCo - Plant Bowen Stability

Project No.: 2051 **Lab No.** 1





SAMPLE NO.:		1	2
INITIAL	WATER CONTENT, %	38.2	33.9
	DRY DENSITY, pcf	87.7	95.6
	SATURATION, %	96.1	100.0
	VOID RATIO	1.265	1.077
	DIAMETER, in	1.40	1.40
	HEIGHT, in	3.00	3.00
AT TEST	WATER CONTENT, %	37.9	33.5
	DRY DENSITY, pcf	90.0	96.1
	SATURATION, %	100.0	100.0
	VOID RATIO	1.207	1.067
	DIAMETER, in	1.38	1.40
	HEIGHT, in	2.99	2.99
Strain rate, %/min		0.0080	0.0080
BACK PRESSURE, psi		90.0	90.0
CELL PRESSURE, psi		96.9	103.9
FAIL. STRESS, psi		21.3	40.5
TOTAL PORE PR., psi		87.3	88.2
ULT. STRESS, psi			
TOTAL PORE PR., psi			
$\bar{\sigma}_1$ FAILURE, psi		30.9	56.2
$\bar{\sigma}_3$ FAILURE, psi		9.6	15.7

TYPE OF TEST:
CU with Pore Pressures
SAMPLE TYPE: UD
DESCRIPTION:

LL= 65 PL= 32 PI= 33
SPECIFIC GRAVITY= 3.18
REMARKS: BORING NO: AH-1
SAMPLE NO: UD-1
DEPTH: 11.0-13.0 FEET

Lab No: 1

CLIENT: SOUTHERN COMPANY

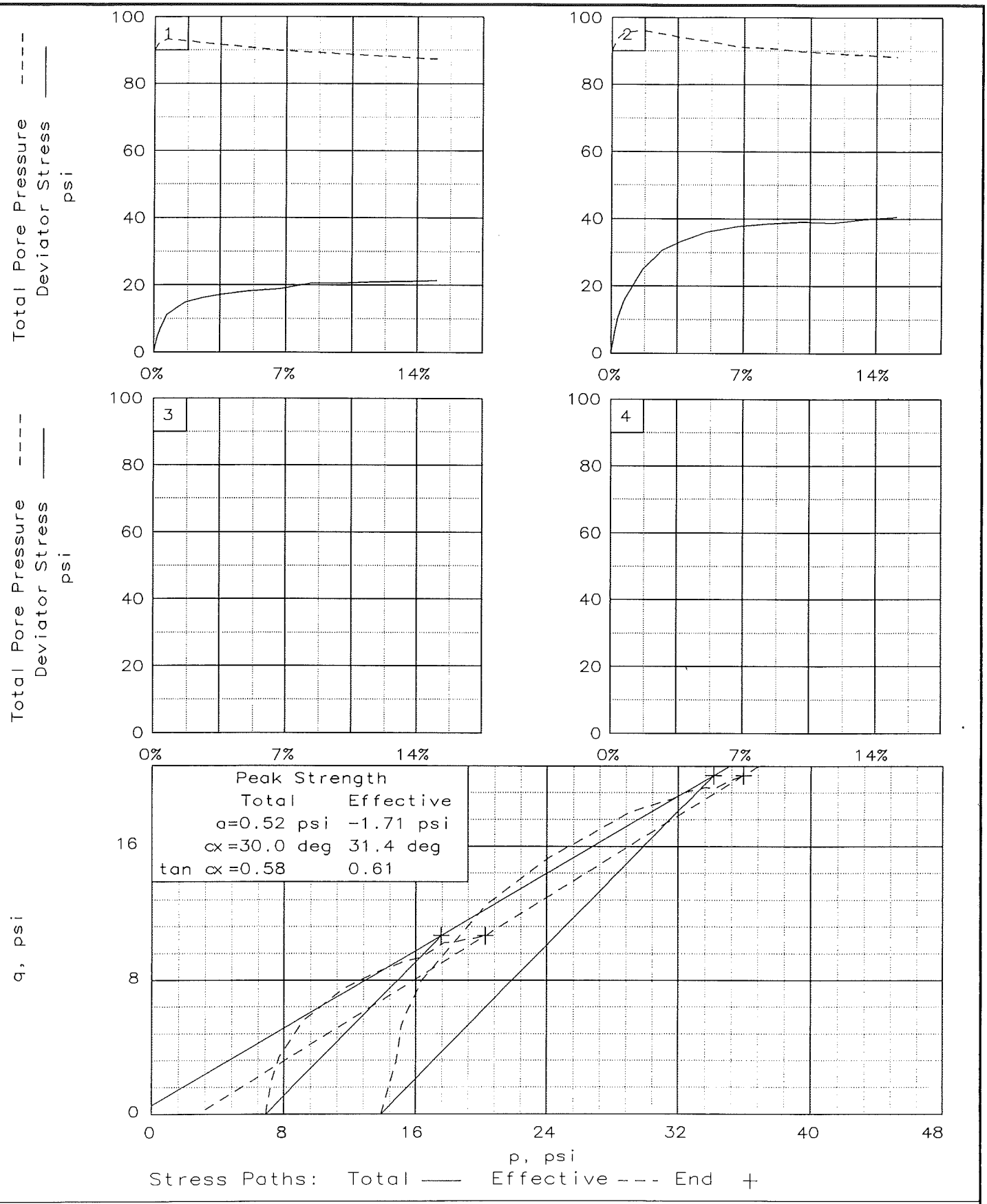
PROJECT: PLANT BOWEN STABILITY

SAMPLE LOCATION: PLANT BOWEN
DCP-7

PROJ. NO.: 2051 DATE: 02/12/2003

TRIAXIAL SHEAR TEST REPORT

SOUTHERN COMPANY SERVICES



Client: SOUTHERN COMPANY

Project: PLANT BOWEN STABILITY

Location: PLANT BOWEN DCP-7

File: GPBOW1 Project No.: 2051 Lab No: 1

Project and Sample Data

Date: 02/12/2003
Client: SOUTHERN COMPANY
Project: PLANT BOWEN STABILITY
Sample location: PLANT BOWEN DCP-7
Sample description:
Remarks: BORING NO: AH-1 SAMPLE NO: UD-1
DEPTH: 11.0-13.0 FEET
Fig no.: 1 2nd page Fig no. (if applicable): 1
Type of sample: UD
Specific gravity= 3.18 LL= 65 PL= 32 PI= 33
Test method: Corps of Eng. - saturation assumed

Specimen Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Wt. moist soil and tare:	111.580			150.970
Wt. dry soil and tare:	89.120			106.370
Wt. of tare:	30.370			30.370
Weight, gms:	146.9			
Diameter, in:	1.400	1.385	1.383	
Area, in²:	1.539	1.507	1.503	
Height, in:	3.000	2.999	2.994	
Net decrease in height, in:		0.001	0.005	
Net decrease in water volume, cc:		0.000	0.300	
Moisture:	38.2	38.2	37.9	58.7
Wet density, pcf:	121.2	123.9	124.1	
Dry density, pcf:	87.7	89.6	90.0	
Void ratio:	1.2647	1.2157	1.2067	
% Saturation:	96.1	100.0	100.0	

Test Readings Data for Specimen No. 1

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.31199 lbs per input unit
Secondary load ring constant= 0.72824 lbs per input unit
Crossover reading for secondary load ring= 480 input units
Consolidation cell pressure = 96.90 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 6.90 psi
Strain rate, %/min = 0.01
FAIL. STRESS = 21.34 psi at reading no. 13
ULT. STRESS = not selected

Test Readings Data for Specimen No. 1

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Effective Stresses Major psi	Effective Stresses 1:3 Ratio	Pore Pres. psi	P psi	Q psi
	0.0	0.000	79.0	0.0	0.0	0.00	6.90	6.90	1.00	90.00	6.90	0.00
1	5.0	0.005	99.0	6.2	0.2	4.14	5.20	9.34	1.80	91.70	7.27	2.07
2	10.0	0.010	112.0	10.3	0.3	6.83	4.30	11.13	2.59	92.60	7.71	3.41
3	20.0	0.020	133.0	16.8	0.7	11.13	3.60	14.73	4.09	93.30	9.17	5.57
4	50.0	0.050	152.0	22.8	1.7	14.90	4.10	19.00	4.63	92.80	11.55	7.45
5	80.0	0.080	160.0	25.3	2.7	16.36	4.80	21.16	4.41	92.10	12.98	8.18
6	110.0	0.110	165.0	26.8	3.7	17.20	5.30	22.50	4.24	91.60	13.90	8.60
7	150.0	0.150	171.0	28.7	5.0	18.14	6.10	24.24	3.97	90.80	15.17	9.07
8	200.0	0.200	176.0	30.3	6.7	18.79	7.00	25.79	3.68	89.90	16.40	9.40
9	250.0	0.250	187.0	33.7	8.4	20.55	7.50	28.05	3.74	89.40	17.77	10.27
10	300.0	0.300	189.0	34.3	10.0	20.55	8.10	28.65	3.54	88.80	18.37	10.27
11	350.0	0.350	193.0	35.6	11.7	20.90	8.60	29.50	3.43	88.30	19.05	10.45
12	400.0	0.400	196.0	36.5	13.4	21.04	9.10	30.14	3.31	87.80	19.62	10.52
13	450.0	0.450	200.0	37.8	15.0	21.34	9.60	30.94	3.22	87.30	20.27	10.67

Specimen Parameters for Specimen No. 2

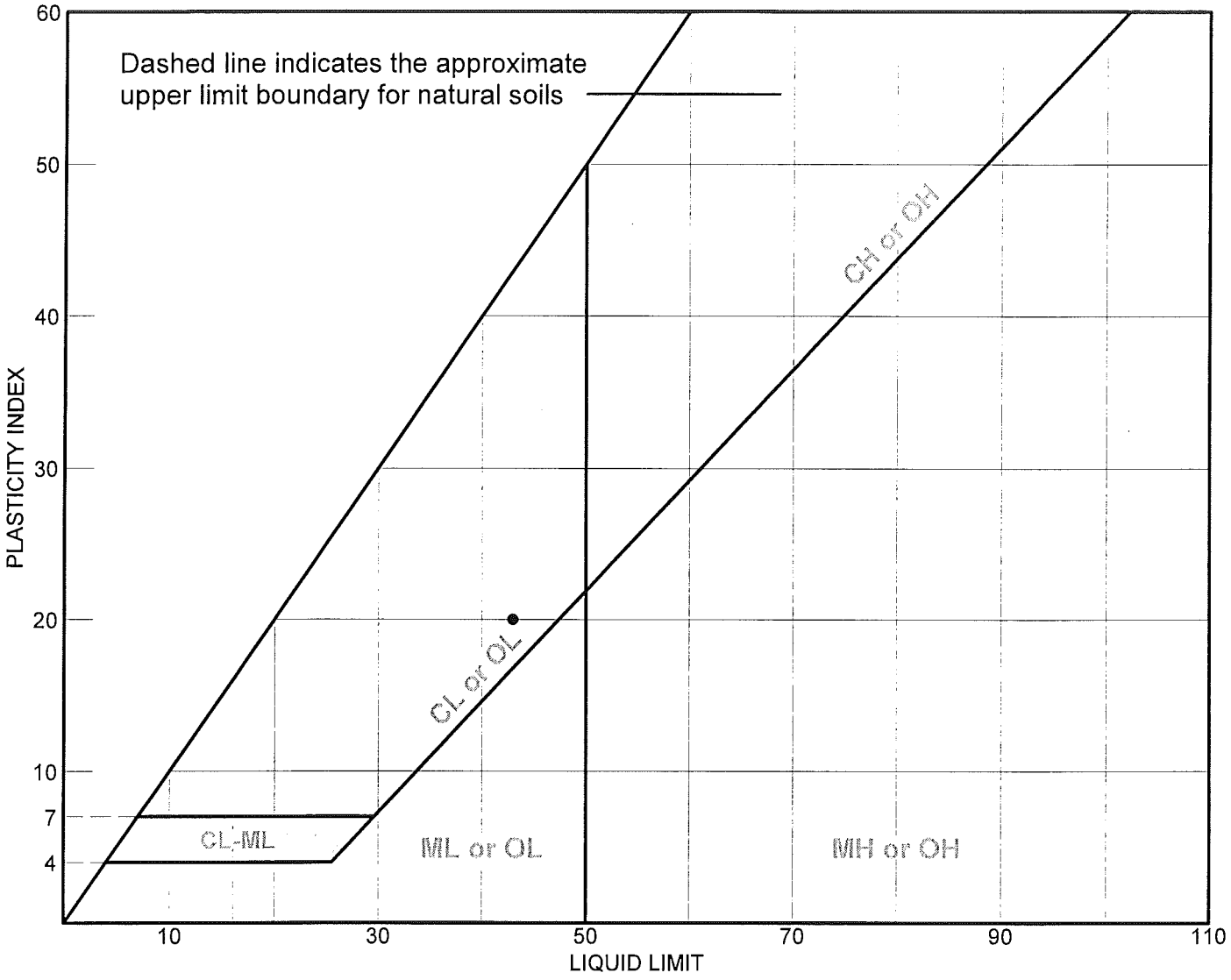
Specimen Parameter	Initial	Saturated	Consolidated	Final
Wt. moist soil and tare:	98.810			157.750
dry soil and tare:	81.460			113.430
Wt. of tare:	30.260			30.260
Weight, gms:	155.1			
Diameter, in:	1.400	1.400	1.400	
Area, in^2:	1.539	1.540	1.539	
Height, in:	3.000	2.999	2.986	
Net decrease in height, in:		0.001	0.013	
Net decrease in water volume, cc:		0.000	0.400	
% Moisture:	33.9	33.9	33.5	53.3
Wet density, pcf:	127.9	127.9	128.3	
Dry density, pcf:	95.6	95.6	96.1	
Void ratio:	1.0774	1.0776	1.0666	
% Saturation:	100.0	100.0	100.0	

Test Readings Data for Specimen No. 2

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.3108 lbs per input unit
Secondary load ring constant= 0.77882 lbs per input unit
Crossover reading for secondary load ring= 474 input units
Consolidation cell pressure = 103.90 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 13.90 psi
Strain rate, %/min = 0.01
FAIL. STRESS = 40.49 psi at reading no. 13
U STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Effective Stresses Major psi	Effective Stresses 1:3 Ratio	Pore Pres. psi	P psi	Q psi
0	0.0	0.000	76.0	0.0	0.0	0.00	13.90	13.90	1.00	90.00	13.90	0.00
1	5.0	0.005	107.0	9.6	0.2	6.25	11.70	17.95	1.53	92.20	14.83	3.13
2	10.0	0.010	129.0	16.5	0.3	10.67	9.80	20.47	2.09	94.10	15.14	5.34
3	20.0	0.020	155.0	24.6	0.7	15.85	8.40	24.25	2.89	95.50	16.33	7.93
4	50.0	0.050	202.0	39.2	1.7	25.03	7.80	32.83	4.21	96.10	20.31	12.51
5	80.0	0.080	232.0	48.5	2.7	30.67	8.80	39.47	4.49	95.10	24.13	15.33
6	110.0	0.110	247.0	53.1	3.7	33.27	9.90	43.17	4.36	94.00	26.54	16.64
7	150.0	0.150	264.0	58.4	5.0	36.07	11.00	47.07	4.28	92.90	29.03	18.03
8	200.0	0.200	276.0	62.2	6.7	37.70	12.80	50.50	3.94	91.10	31.65	18.85
9	250.0	0.250	284.0	64.6	8.4	38.50	13.20	51.70	3.92	90.70	32.45	19.25
10	300.0	0.300	291.0	66.8	10.0	39.07	14.10	53.17	3.77	89.80	33.63	19.53
11	350.0	0.350	294.0	67.8	11.7	38.88	14.70	53.58	3.64	89.20	34.14	19.44
12	400.0	0.400	304.0	70.9	13.4	39.89	15.20	55.09	3.62	88.70	35.14	19.94
13	450.0	0.450	312.0	73.3	15.1	40.49	15.70	56.19	3.58	88.20	35.94	20.24

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Plant Bowen	2	13-15		23	43	20	

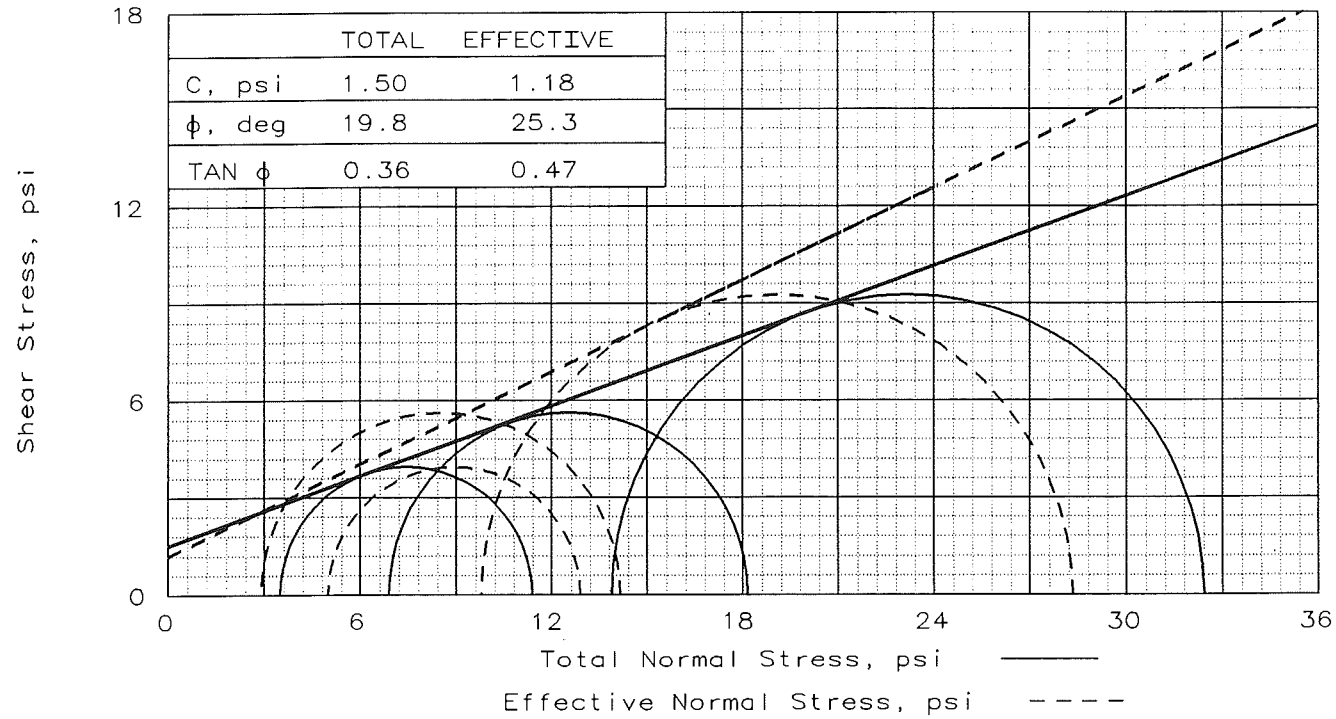
LIQUID AND PLASTIC LIMITS TEST REPORT

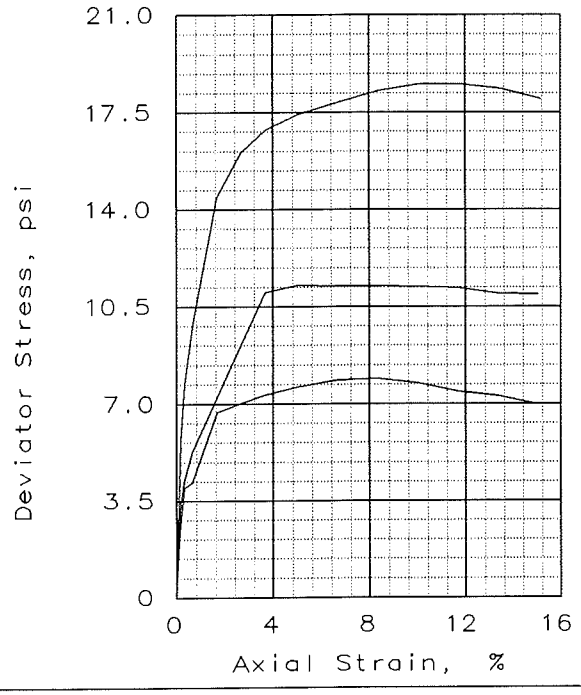
SOUTHERN COMPANY

Client: Southern Company

Project: GPCo - Plant Bowen Stability

Project No.: 2051 **Lab No.** 2





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	49.2	47.7	35.4
	DRY DENSITY, pcf	73.4	75.9	89.2
	SATURATION, %	97.6	100.0	100.0
	VOID RATIO	1.458	1.377	1.022
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	3.00
AT TEST	WATER CONTENT, %	48.6	46.7	33.9
	DRY DENSITY, pcf	75.1	76.8	91.1
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	1.404	1.349	0.980
	DIAMETER, in	1.39	1.39	1.39
	HEIGHT, in	3.00	2.99	2.97
Strain rate, %/min		0.0090	0.0090	0.0090
BACK PRESSURE, psi		90.0	90.0	90.0
CELL PRESSURE, psi		93.5	96.9	103.9
FAIL. STRESS, psi		7.9	11.3	18.5
TOTAL PORE PR., psi		88.5	94.0	94.1
ULT. STRESS, psi				
TOTAL PORE PR., psi				
$\bar{\sigma}_1$ FAILURE, psi		12.9	14.2	28.3
$\bar{\sigma}_3$ FAILURE, psi		5.0	2.9	9.8

TYPE OF TEST:
CU with Pore Pressures
SAMPLE TYPE: UD
DESCRIPTION:

LL= 43 PL= 23 PI= 20
SPECIFIC GRAVITY= 2.89
REMARKS: BORING NO: AH-1
SAMPLE NO: UD-2
DEPTH: 13.0-15.0 FEET

Lab No: 2

CLIENT: SOUTHERN COMPANY

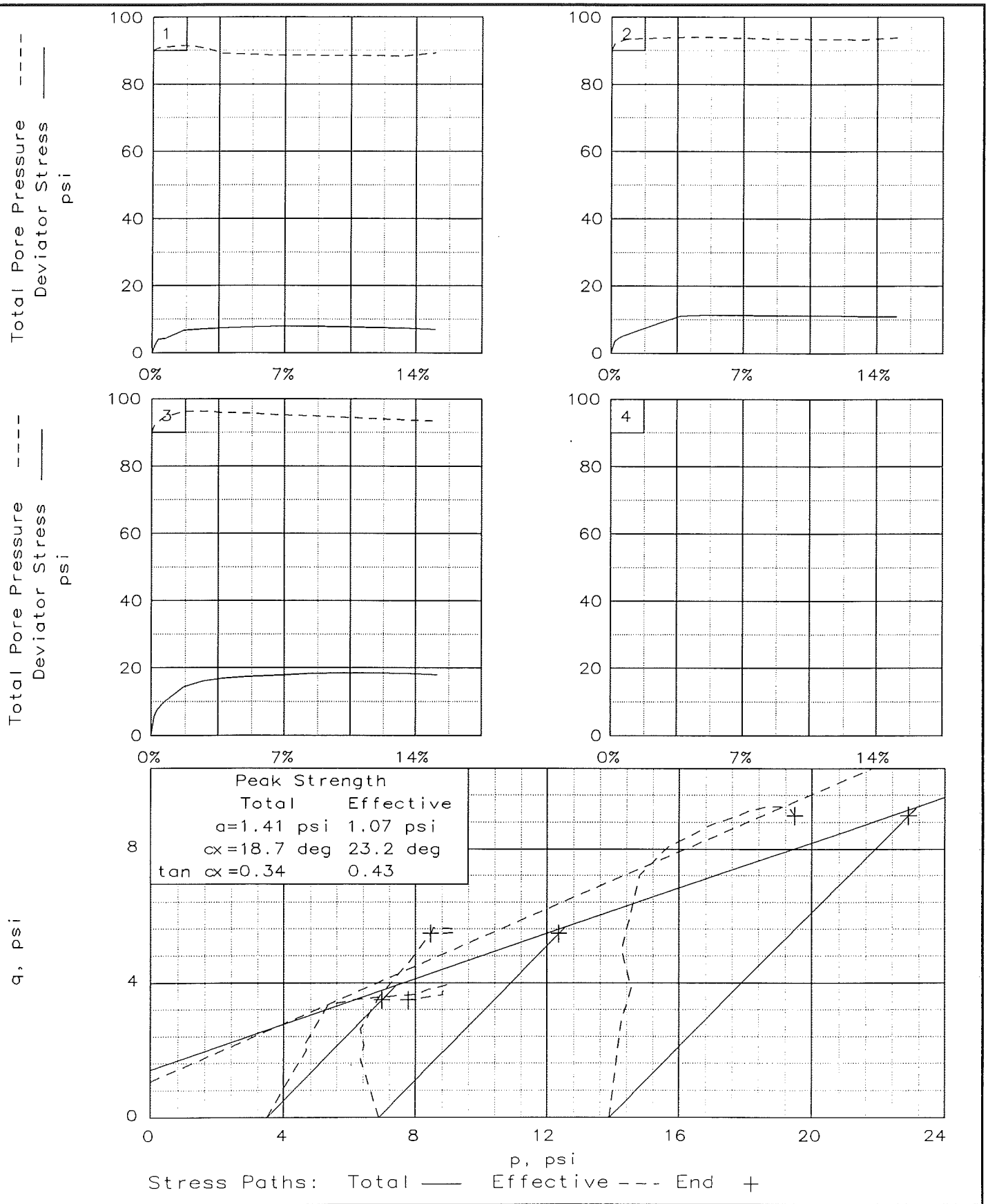
PROJECT: PLANT BOWEN STABILITY

SAMPLE LOCATION: PLANT BOWEN
DCP-2

PROJ. NO.: 2051 DATE: 02/12/2003

TRIAXIAL SHEAR TEST REPORT

SOUTHERN COMPANY SERVICES



Client: SOUTHERN COMPANY

Project: PLANT BOWEN STABILITY

Location: PLANT BOWEN DCP-2

File: GPBOW2 Project No.: 2051 Lab No: 2

Project and Sample Data

Date: 02/12/2003
Client: SOUTHERN COMPANY
Project: PLANT BOWEN STABILITY
Sample location: PLANT BOWEN DCP-2
Sample description:
Remarks: BORING NO: AH-1 SAMPLE NO: UD-2
DEPTH: 13.0-15.0 FEET
Fig no.: 2 2nd page Fig no. (if applicable): 2
Type of sample: UD
Specific gravity= 2.89 LL= 43 PL= 23 PI= 20
Test method: Corps of Eng. - saturation assumed

Specimen Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Wt. moist soil and tare:	105.080			133.030
Wt. dry soil and tare:	80.450			84.670
Wt. of tare:	30.430			30.430
Weight, gms:	132.8			
Diameter, in:	1.400	1.390	1.385	
Area, in²:	1.539	1.518	1.507	
Height, in:	3.000	2.999	2.996	
Net decrease in height, in:		0.001	0.003	
Net decrease in water volume, cc:		0.000	0.600	
Moisture:	49.2	49.2	48.6	89.2
Wet density, pcf:	109.5	111.1	111.5	
Dry density, pcf:	73.4	74.5	75.1	
Void ratio:	1.4584	1.4230	1.4036	
% Saturation:	97.6	100.0	100.0	

Test Readings Data for Specimen No. 1

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.30179 lbs per input unit
Secondary load ring constant= 0.72586 lbs per input unit
Crossover reading for secondary load ring= 462 input units
Consolidation cell pressure = 93.50 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 3.50 psi
Strain rate, %/min = 0.01
FAIL. STRESS = 7.89 psi at reading no. 9
ULT. STRESS = not selected

Test Readings Data for Specimen No. 1

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Effective Stresses Major psi	Effective Stresses 1:3 Ratio	Pore Pres. psi	P psi	Q psi
	0.0	0.000	69.0	0.0	0.0	0.00	3.50	3.50	1.00	90.00	3.50	0.00
1	5.0	0.005	81.0	3.6	0.2	2.40	3.00	5.40	1.80	90.50	4.20	1.20
2	10.0	0.010	89.0	6.0	0.3	3.99	2.70	6.69	2.48	90.80	4.70	2.00
3	20.0	0.020	90.0	6.3	0.7	4.18	2.50	6.68	2.67	91.00	4.59	2.09
4	50.0	0.050	103.0	10.3	1.7	6.69	2.00	8.69	4.35	91.50	5.35	3.35
5	80.0	0.080	105.0	10.9	2.7	7.02	2.70	9.72	3.60	90.80	6.21	3.51
6	110.0	0.110	107.0	11.5	3.7	7.33	4.40	11.73	2.67	89.10	8.07	3.67
7	150.0	0.150	109.0	12.1	5.0	7.61	4.60	12.21	2.65	88.90	8.40	3.80
8	200.0	0.200	111.0	12.7	6.7	7.85	5.00	12.85	2.57	88.50	8.92	3.92
9	250.0	0.250	112.0	13.0	8.3	7.89	5.00	12.89	2.58	88.50	8.95	3.95
10	300.0	0.300	112.0	13.0	10.0	7.75	5.10	12.85	2.52	88.40	8.97	3.87
11	350.0	0.350	111.0	12.7	11.7	7.43	5.10	12.53	2.46	88.40	8.81	3.71
12	400.0	0.400	111.0	12.7	13.4	7.29	5.20	12.49	2.40	88.30	8.84	3.64
13	450.0	0.450	110.0	12.4	15.0	6.98	4.30	11.28	2.62	89.20	7.79	3.49

Specimen Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Consolidated	Final
Wt. moist soil and tare:	110.190			136.120
dry soil and tare:	84.400			87.600
Wt. of tare:	30.300			30.300
Weight, gms:	135.9			
Diameter, in:	1.400	1.400	1.394	
Area, in²:	1.539	1.540	1.527	
Height, in:	3.000	2.999	2.989	
Net decrease in height, in:		0.001	0.010	
Net decrease in water volume, cc:		0.000	0.900	
% Moisture:	47.7	47.7	46.7	84.7
Wet density, pcf:	112.1	112.1	112.6	
Dry density, pcf:	75.9	75.9	76.8	
Void ratio:	1.3772	1.3777	1.3494	
% Saturation:	100.0	100.0	100.0	

Test Readings Data for Specimen No. 2

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.31199 lbs per input unit
Secondary load ring constant= 0.72824 lbs per input unit
Crossover reading for secondary load ring= 480 input units
Consolidation cell pressure = 96.90 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 6.90 psi
Strain rate, %/min = 0.01
FAIL. STRESS = 11.26 psi at reading no. 7
. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Effective Stresses Major psi	Effective Stresses 1:3 Ratio	Pore Pres. psi	P psi	Q psi
0	0.0	0.000	68.0	0.0	0.0	0.00	6.90	6.90	1.00	90.00	6.90	0.00
1	5.0	0.005	85.0	5.3	0.2	3.47	4.60	8.07	1.75	92.30	6.33	1.73
2	10.0	0.010	89.0	6.6	0.3	4.28	4.30	8.58	1.99	92.60	6.44	2.14
3	20.0	0.020	94.0	8.1	0.7	5.28	3.70	8.98	2.43	93.20	6.34	2.64
4	50.0	0.050	104.0	11.2	1.7	7.23	3.30	10.53	3.19	93.60	6.92	3.62
5	80.0	0.080	114.0	14.4	2.7	9.15	3.20	12.35	3.86	93.70	7.77	4.57
6	110.0	0.110	124.0	17.5	3.7	11.02	3.00	14.02	4.67	93.90	8.51	5.51
7	150.0	0.150	126.0	18.1	5.0	11.26	2.90	14.16	4.88	94.00	8.53	5.63
8	200.0	0.200	127.0	18.4	6.7	11.25	3.20	14.45	4.52	93.70	8.82	5.62
9	250.0	0.250	128.0	18.7	8.4	11.23	3.40	14.63	4.30	93.50	9.02	5.62
10	300.0	0.300	129.0	19.0	10.0	11.21	3.50	14.71	4.20	93.40	9.11	5.61
11	350.0	0.350	130.0	19.3	11.7	11.18	3.60	14.78	4.11	93.30	9.19	5.59
12	400.0	0.400	130.0	19.3	13.4	10.97	3.70	14.67	3.97	93.20	9.19	5.49
13	450.0	0.450	131.0	19.7	15.1	10.93	3.00	13.93	4.64	93.90	8.47	5.47

Specimen Parameters for Specimen No. 3

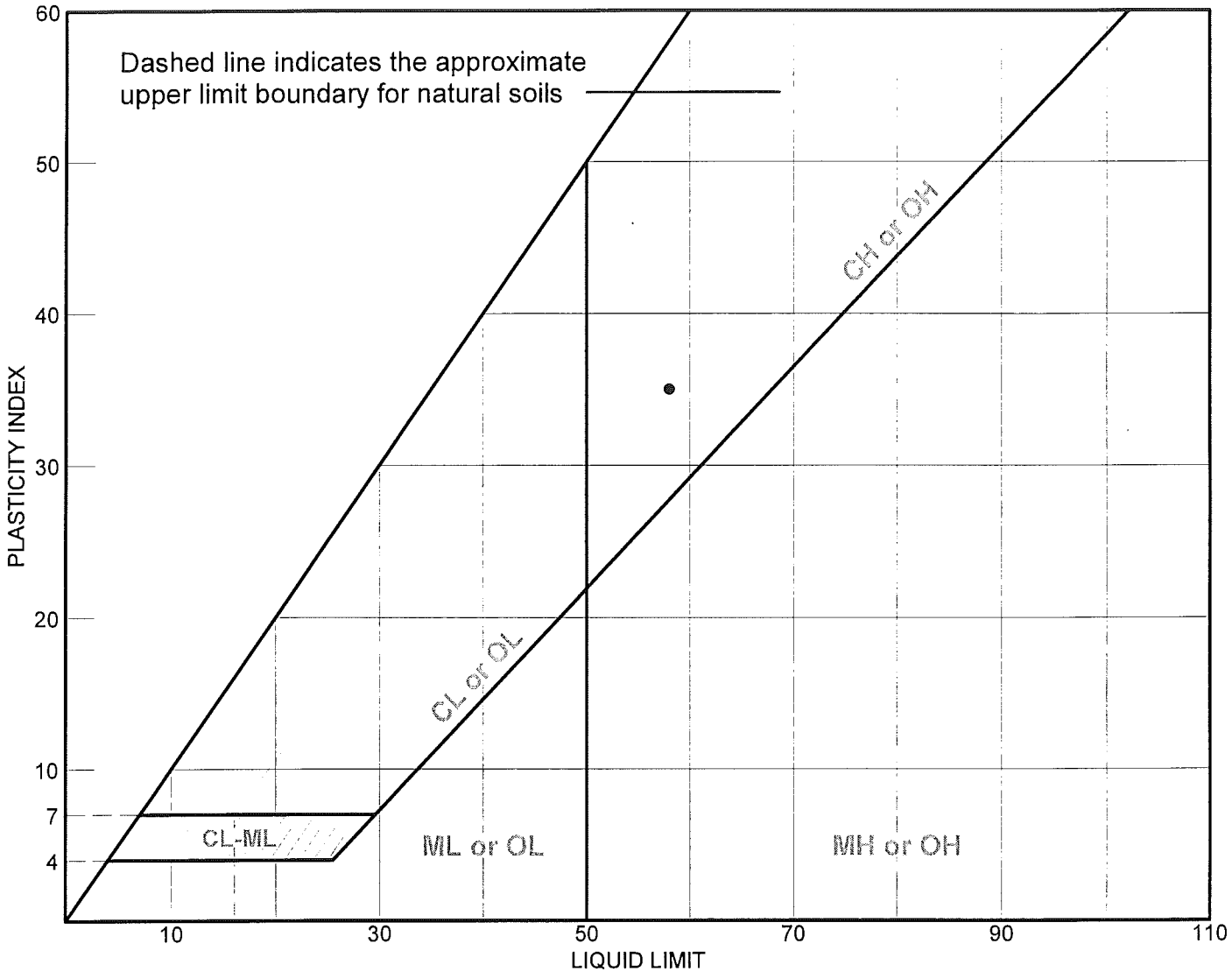
Specimen Parameter	Initial	Saturated	Consolidated	Final
moist soil and tare:	105.500			147.850
dry soil and tare:	85.850			105.860
Wt. of tare:	30.300			30.300
Weight, gms:	146.4			
Diameter, in:	1.400	1.400	1.393	
Area, in²:	1.539	1.540	1.524	
Height, in:	3.000	2.999	2.967	
Net decrease in height, in:		0.001	0.032	
Net decrease in water volume, cc:		0.000	1.600	
% Moisture:	35.4	35.4	33.9	55.6
Wet density, pcf:	120.8	120.8	122.0	
Dry density, pcf:	89.2	89.2	91.1	
Void ratio:	1.0218	1.0223	0.9795	
% Saturation:	100.0	100.0	100.0	

Test Readings Data for Specimen No. 3

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.3108 lbs per input unit
Secondary load ring constant= 0.77882 lbs per input unit
Crossover reading for secondary load ring= 474 input units
Consolidation cell pressure = 103.90 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 13.90 psi
Strain rate, %/min = 0.01
FAIL. STRESS = 18.53 psi at reading no. 11
. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Effective Stresses Major psi	Effective Stresses 1:3 Ratio	Pore Pres. psi	P psi	Q psi
0	0.0	0.000	77.0	0.0	0.0	0.00	13.90	13.90	1.00	90.00	13.90	0.00
1	5.0	0.005	105.0	8.7	0.2	5.70	11.40	17.10	1.50	92.50	14.25	2.85
2	10.0	0.010	115.0	11.8	0.3	7.72	10.70	18.42	1.72	93.20	14.56	3.86
3	20.0	0.020	126.0	15.2	0.7	9.93	9.30	19.23	2.07	94.60	14.26	4.96
4	50.0	0.050	149.0	22.4	1.7	14.44	7.60	22.04	2.90	96.30	14.82	7.22
5	80.0	0.080	158.0	25.2	2.7	16.07	7.60	23.67	3.11	96.30	15.64	8.04
6	110.0	0.110	163.0	26.7	3.7	16.89	8.00	24.89	3.11	95.90	16.44	8.44
7	150.0	0.150	167.0	28.0	5.1	17.43	8.20	25.63	3.13	95.70	16.91	8.71
8	200.0	0.200	171.0	29.2	6.7	17.88	8.70	26.58	3.05	95.20	17.64	8.94
9	250.0	0.250	175.0	30.5	8.4	18.30	9.00	27.30	3.03	94.90	18.15	9.15
10	300.0	0.300	178.0	31.4	10.1	18.52	9.40	27.92	2.97	94.50	18.66	9.26
11	350.0	0.350	180.0	32.0	11.8	18.53	9.80	28.33	2.89	94.10	19.06	9.26
12	400.0	0.400	181.0	32.3	13.5	18.35	10.20	28.55	2.80	93.70	19.38	9.18
13	450.0	0.450	181.0	32.3	15.2	17.99	10.50	28.49	2.71	93.40	19.50	9.00

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Plant Bowen	3	12-14		23	58	35	

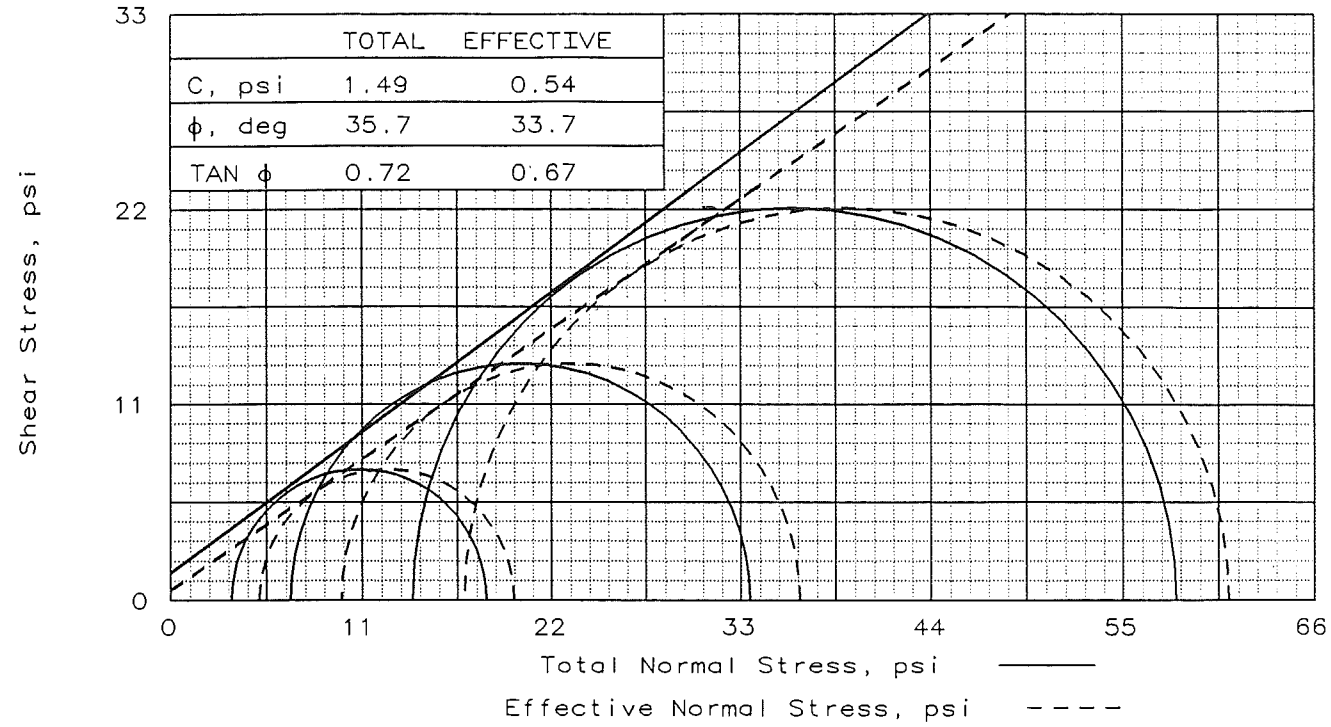
LIQUID AND PLASTIC LIMITS TEST REPORT

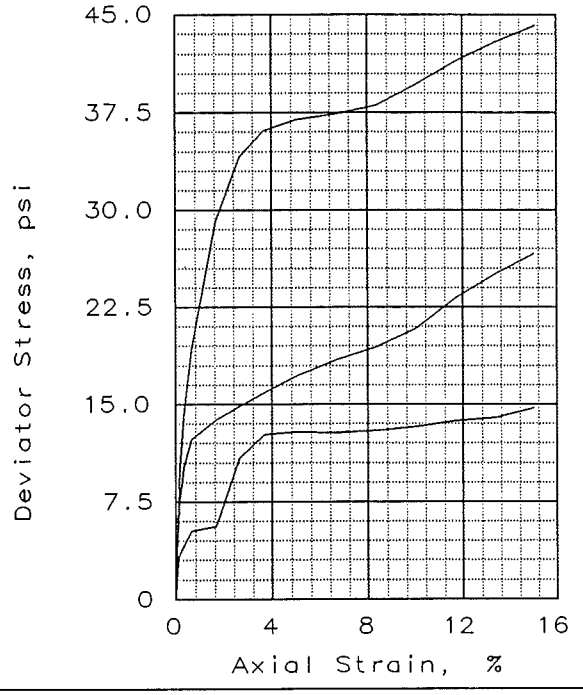
SOUTHERN COMPANY

Client: Southern Company

Project: GPCo - Plant Bowen Stability

Project No.: 2051 **Lab No.** 3





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	23.8	23.6	23.3
	DRY DENSITY, pcf	103.0	103.5	103.9
	SATURATION, %	99.8	100.0	100.0
	VOID RATIO	0.648	0.641	0.635
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	3.00
AT TEST	WATER CONTENT, %	23.7	23.3	23.1
	DRY DENSITY, pcf	103.3	104.0	104.3
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.645	0.633	0.628
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	2.98
Strain rate, %/min		0.0090	0.0090	0.0090
BACK PRESSURE, psi		90.0	90.0	90.0
CELL PRESSURE, psi		93.5	96.9	103.9
FAIL. STRESS, psi		14.7	26.6	44.2
TOTAL PORE PR., psi		88.4	87.1	87.0
ULT. STRESS, psi				
TOTAL PORE PR., psi				
$\bar{\sigma}_1$ FAILURE, psi		19.8	36.4	61.1
$\bar{\sigma}_3$ FAILURE, psi		5.1	9.8	16.9

TYPE OF TEST:
CU with Pore Pressures
SAMPLE TYPE: UD
DESCRIPTION:

LL= 58 PL= 23 PI= 35
SPECIFIC GRAVITY= 2.72
REMARKS: BORING NO: AH-2
SAMPLE NO: UD-5
DEPTH: 12.0-14.0 FEET

Lab No: 3

CLIENT: SOUTHERN COMPANY

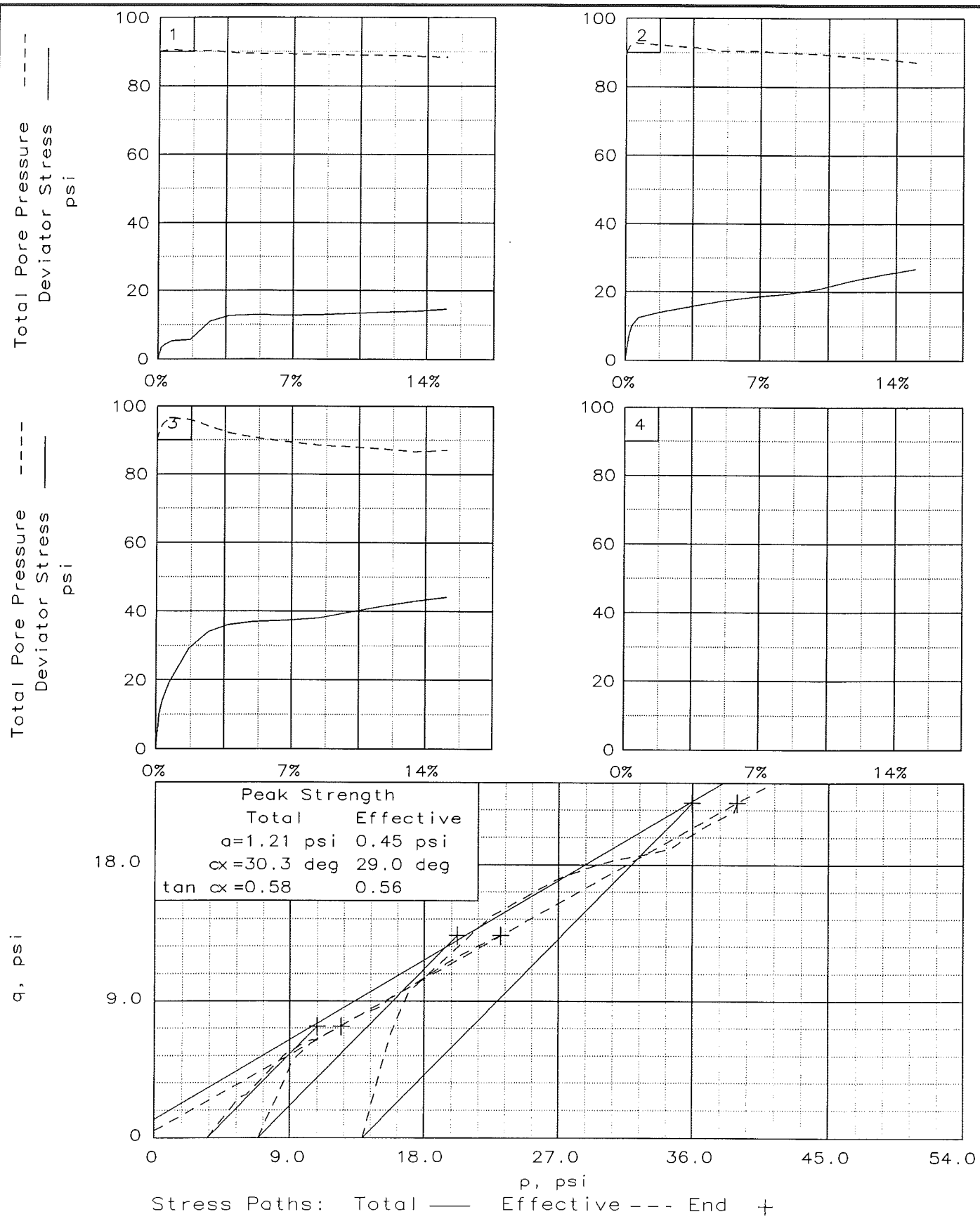
PROJECT: PLANT BOWEN STABILITY

SAMPLE LOCATION: PLANT BOWEN
DCP-14

PROJ. NO.: 2051 DATE: 02/12/2003

TRIAXIAL SHEAR TEST REPORT

SOUTHERN COMPANY SERVICES



Client: SOUTHERN COMPANY

Project: PLANT BOWEN STABILITY

Location: PLANT BOWEN DCP-14

File: GPBOW3 Project No.: 2051 Lab No: 3

Project and Sample Data

Date: 02/12/2003
Client: SOUTHERN COMPANY
Project: PLANT BOWEN STABILITY
Sample location: PLANT BOWEN DCP-14
Sample description:
Remarks: BORING NO: AH-2 SAMPLE NO: UD-5
DEPTH: 12.0-14.0 FEET
Fig no.: 3 2nd page Fig no. (if applicable): 3
Type of sample: UD
Specific gravity= 2.72 LL= 58 PL= 23 PI= 35
Test method: Corps of Eng. - saturation assumed

Specimen Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Wt. moist soil and tare:	107.470			152.760
Wt. dry soil and tare:	92.660			119.230
Wt. of tare:	30.370			30.370
Weight, gms:	154.6			
Diameter, in:	1.400	1.400	1.399	
Area, in²:	1.539	1.539	1.538	
Height, in:	3.000	2.999	2.997	
Net decrease in height, in:		0.001	0.002	
Net decrease in water volume, cc:		0.000	0.100	
Moisture:	23.8	23.8	23.7	37.7
Wet density, pcf:	127.5	127.6	127.7	
Dry density, pcf:	103.0	103.1	103.3	
Void ratio:	0.6481	0.6467	0.6445	
% Saturation:	99.8	100.0	100.0	

Test Readings Data for Specimen No. 1

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.30179 lbs per input unit
Secondary load ring constant= 0.72586 lbs per input unit
Crossover reading for secondary load ring= 462 input units
Consolidation cell pressure = 93.50 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 3.50 psi
Strain rate, %/min = 0.01
FAIL. STRESS = 14.68 psi at reading no. 13
ULT. STRESS = not selected

Test Readings Data for Specimen No. 1

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Effective Stresses Major psi	Effective Stresses 1:3 Ratio	Pore Pres. psi	P psi	Q psi
	0.0	0.000	69.0	0.0	0.0	0.00	3.50	3.50	1.00	90.00	3.50	0.00
1	5.0	0.005	86.0	5.1	0.2	3.33	3.20	6.53	2.04	90.30	4.87	1.67
2	10.0	0.010	90.0	6.3	0.3	4.11	3.10	7.21	2.33	90.40	5.15	2.05
3	20.0	0.020	96.0	8.1	0.7	5.26	3.00	8.26	2.75	90.50	5.63	2.63
4	50.0	0.050	98.0	8.8	1.7	5.60	3.30	8.90	2.70	90.20	6.10	2.80
5	80.0	0.080	126.0	17.2	2.7	10.89	3.20	14.09	4.40	90.30	8.64	5.44
6	110.0	0.110	136.0	20.2	3.7	12.67	3.80	16.47	4.33	89.70	10.13	6.33
7	150.0	0.150	138.0	20.8	5.0	12.87	4.10	16.97	4.14	89.40	10.53	6.43
8	200.0	0.200	139.0	21.1	6.7	12.82	4.20	17.02	4.05	89.30	10.61	6.41
9	250.0	0.250	141.0	21.7	8.3	12.95	4.30	17.25	4.01	89.20	10.78	6.48
10	300.0	0.300	144.0	22.6	10.0	13.25	4.50	17.75	3.94	89.00	11.12	6.62
11	350.0	0.350	148.0	23.8	11.7	13.70	4.60	18.30	3.98	88.90	11.45	6.85
12	400.0	0.400	151.0	24.7	13.3	13.95	4.80	18.75	3.91	88.70	11.77	6.97
13	450.0	0.450	157.0	26.6	15.0	14.68	5.10	19.78	3.88	88.40	12.44	7.34

Specimen Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Consolidated	Final
Wt. moist soil and tare:	124.110			156.100
dry soil and tare:	106.210			122.200
Wt. of tare:	30.300			30.300
Weight, gms:	155.0			
Diameter, in:	1.400	1.400	1.397	
Area, in²:	1.539	1.540	1.533	
Height, in:	3.000	2.999	2.997	
Net decrease in height, in:		0.001	0.002	
Net decrease in water volume, cc:		0.000	0.400	
% Moisture:	23.6	23.6	23.3	36.9
Wet density, pcf:	127.9	127.8	128.2	
Dry density, pcf:	103.5	103.5	104.0	
Void ratio:	0.6411	0.6414	0.6327	
% Saturation:	100.0	100.0	100.0	

Test Readings Data for Specimen No. 2

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.31199 lbs per input unit
Secondary load ring constant= 0.72824 lbs per input unit
Crossover reading for secondary load ring= 480 input units
Consolidation cell pressure = 96.90 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 6.90 psi
Strain rate, %/min = 0.01
FAIL. STRESS = 26.63 psi at reading no. 13
[illegible]. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Effective Stresses Major psi	Effective Stresses 1:3 Ratio	Pore Pres. psi	P psi	Q psi
0	0.0	0.000	68.0	0.0	0.0	0.00	6.90	6.90	1.00	90.00	6.90	0.00
1	5.0	0.005	103.0	10.9	0.2	7.11	5.00	12.11	2.42	91.90	8.56	3.56
2	10.0	0.010	118.0	15.6	0.3	10.14	4.10	14.24	3.47	92.80	9.17	5.07
3	20.0	0.020	129.0	19.0	0.7	12.33	4.20	16.53	3.94	92.70	10.37	6.17
4	50.0	0.050	137.0	21.5	1.7	13.81	4.70	18.51	3.94	92.20	11.60	6.90
5	80.0	0.080	143.0	23.4	2.7	14.86	5.10	19.96	3.91	91.80	12.53	7.43
6	110.0	0.110	149.0	25.3	3.7	15.88	5.50	21.38	3.89	91.40	13.44	7.94
7	150.0	0.150	157.0	27.8	5.0	17.21	6.50	23.71	3.65	90.40	15.10	8.60
8	200.0	0.200	165.0	30.3	6.7	18.42	6.50	24.92	3.83	90.40	15.71	9.21
9	250.0	0.250	172.0	32.4	8.3	19.40	7.00	26.40	3.77	89.90	16.70	9.70
10	300.0	0.300	182.0	35.6	10.0	20.88	7.40	28.28	3.82	89.50	17.84	10.44
11	350.0	0.350	197.0	40.2	11.7	23.19	8.10	31.29	3.86	88.80	19.69	11.59
12	400.0	0.400	210.0	44.3	13.3	25.04	8.90	33.94	3.81	88.00	21.42	12.52
13	450.0	0.450	222.0	48.0	15.0	26.63	9.80	36.43	3.72	87.10	23.12	13.32

Specimen Parameters for Specimen No. 3

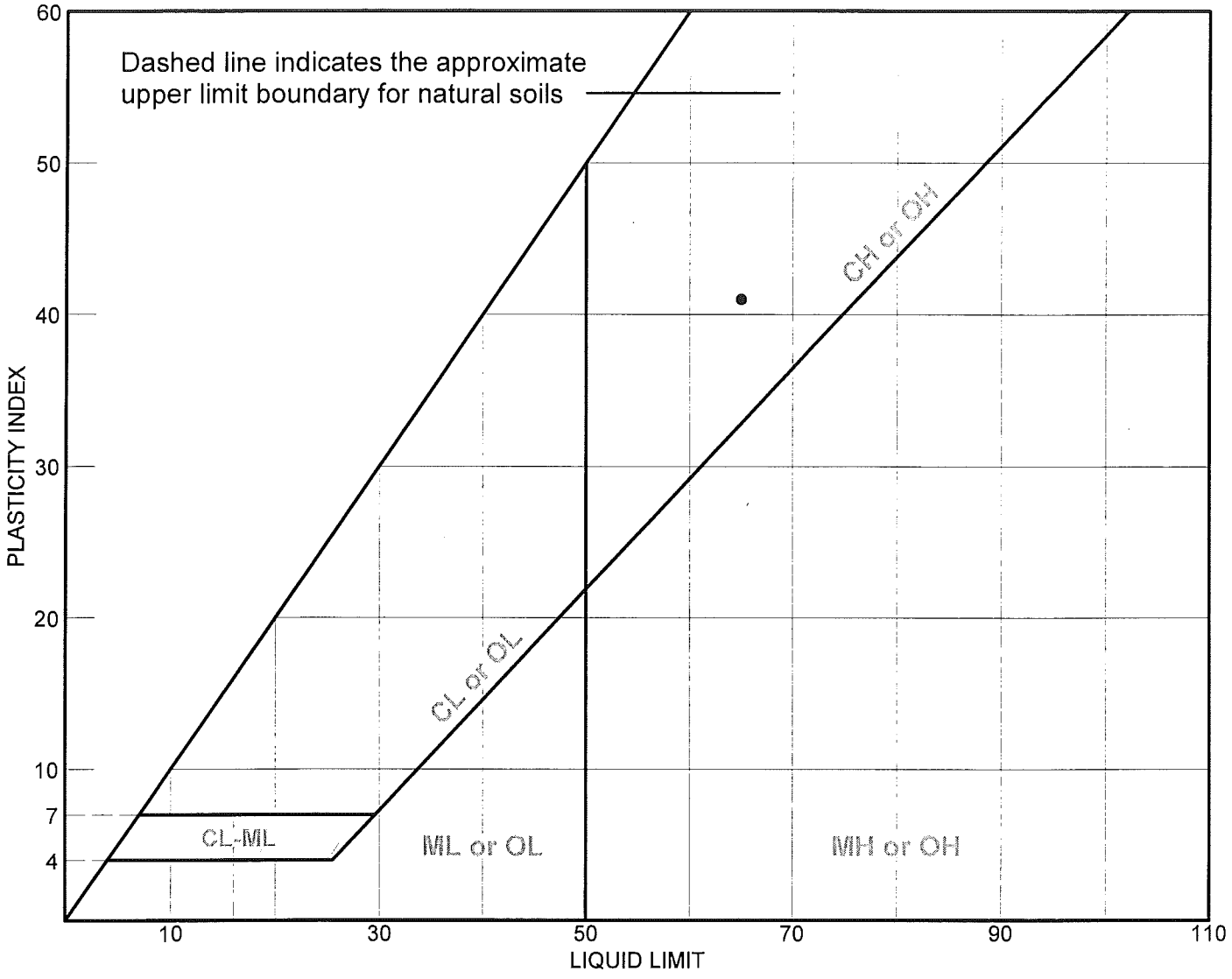
Specimen Parameter	Initial	Saturated	Consolidated	Final
Wt. moist soil and tare:	107.580			158.640
dry soil and tare:	92.960			123.780
Wt. of tare:	30.310			30.100
Weight, gms:	155.3			
Diameter, in:	1.400	1.400	1.401	
Area, in²:	1.539	1.540	1.542	
Height, in:	3.000	2.999	2.984	
Net decrease in height, in:		0.001	0.015	
Net decrease in water volume, cc:		0.000	0.300	
% Moisture:	23.3	23.3	23.1	37.2
Wet density, pcf:	128.1	128.1	128.4	
Dry density, pcf:	103.9	103.9	104.3	
Void ratio:	0.6346	0.6347	0.6283	
% Saturation:	100.0	100.0	100.0	

Test Readings Data for Specimen No. 3

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.3108 lbs per input unit
Secondary load ring constant= 0.77882 lbs per input unit
Crossover reading for secondary load ring= 474 input units
Consolidation cell pressure = 103.90 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 13.90 psi
Strain rate, %/min = 0.01
FAIL. STRESS = 44.17 psi at reading no. 13
[illegible]. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Effective Stresses Major psi	1:3 Ratio	Pore Pres. psi	P psi	Q psi
0	0.0	0.000	77.0	0.0	0.0	0.00	13.90	13.90	1.00	90.00	13.90	0.00
1	5.0	0.005	127.0	15.5	0.2	10.06	10.20	20.26	1.99	93.70	15.23	5.03
2	10.0	0.010	147.0	21.8	0.3	14.06	8.80	22.86	2.60	95.10	15.83	7.03
3	20.0	0.020	173.0	29.8	0.7	19.22	7.40	26.62	3.60	96.50	17.01	9.61
4	50.0	0.050	224.0	45.7	1.7	29.14	7.90	37.04	4.69	96.00	22.47	14.57
5	80.0	0.080	251.0	54.1	2.7	34.14	9.90	44.04	4.45	94.00	26.97	17.07
6	110.0	0.110	263.0	57.8	3.7	36.12	11.70	47.82	4.09	92.20	29.76	18.06
7	150.0	0.150	270.0	60.0	5.0	36.95	13.20	50.15	3.80	90.70	31.68	18.48
8	200.0	0.200	276.0	61.8	6.7	37.43	14.40	51.83	3.60	89.50	33.11	18.71
9	250.0	0.250	283.0	64.0	8.4	38.05	15.40	53.45	3.47	88.50	34.43	19.03
10	300.0	0.300	296.0	68.1	10.1	39.71	15.90	55.61	3.50	88.00	35.76	19.86
11	350.0	0.350	310.0	72.4	11.7	41.46	16.50	57.96	3.51	87.40	37.23	20.73
12	400.0	0.400	323.0	76.5	13.4	42.95	17.30	60.25	3.48	86.60	38.77	21.47
13	450.0	0.450	335.0	80.2	15.1	44.17	16.90	61.07	3.61	87.00	38.98	22.08

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Plant Bowen	4	10-12		24	65	41	

LIQUID AND PLASTIC LIMITS TEST REPORT

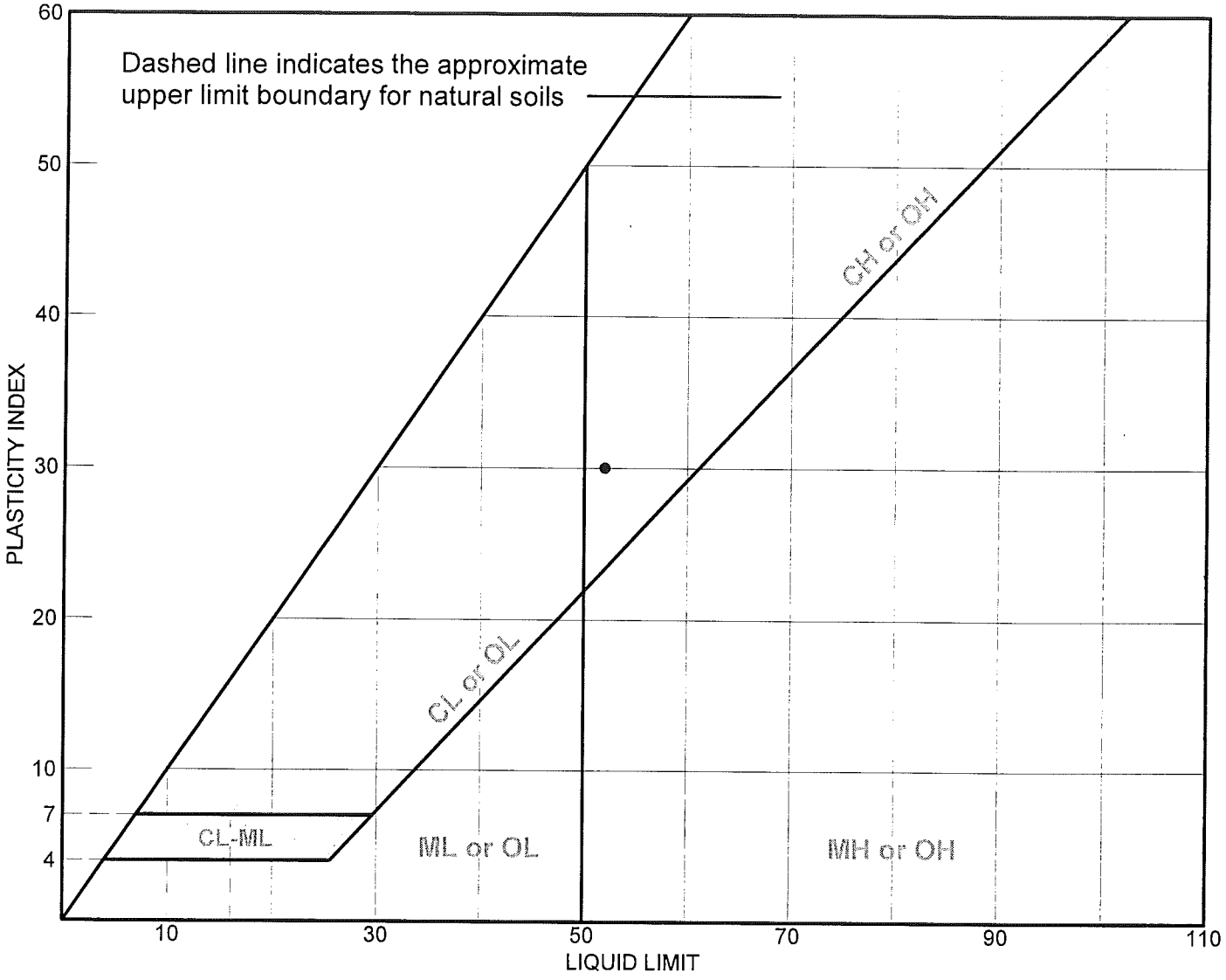
SOUTHERN COMPANY

Client: Southern Company

Project: GPCo - Plant Bowen Stability

Project No.: 2051 **Lab No.** 4

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Plant Bowen	5	10-12		22	52	30	

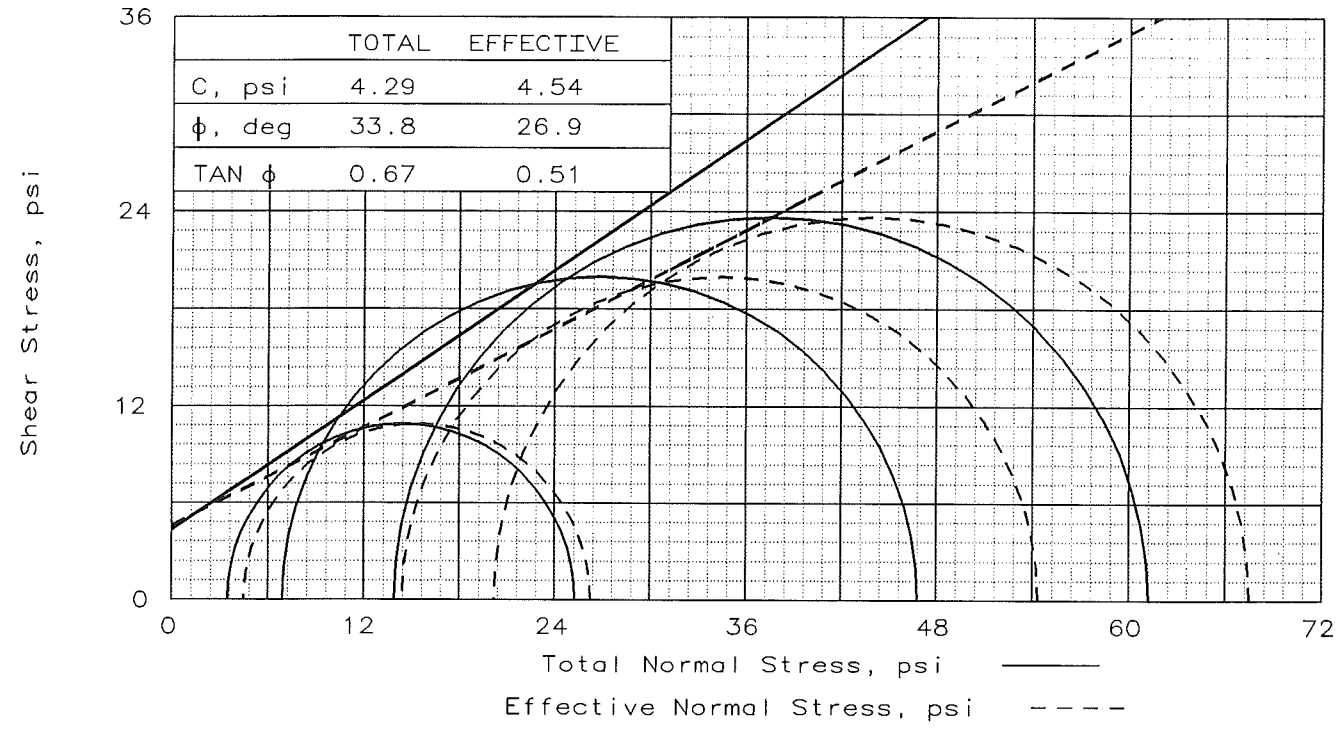
LIQUID AND PLASTIC LIMITS TEST REPORT

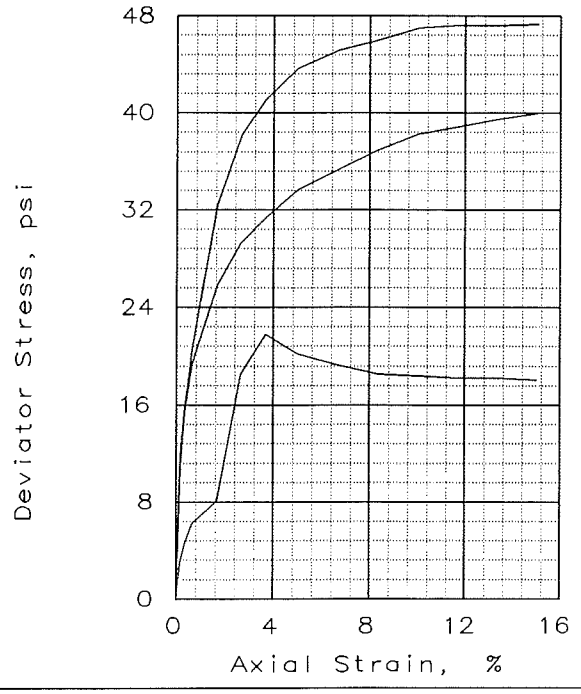
SOUTHERN COMPANY

Client: Southern Company

Project: GPCo - Plant Bowen Stability

Project No.: 2051 **Lab No.** 5





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	25.8	25.6	22.6
	DRY DENSITY, pcf	100.4	100.8	105.1
	SATURATION, %	100.0	100.0	98.2
	VOID RATIO	0.709	0.703	0.633
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	3.00
AT TEST	WATER CONTENT, %	25.5	25.2	22.4
	DRY DENSITY, pcf	100.8	101.4	106.3
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.703	0.694	0.615
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	2.99
Strain rate, %/min		0.0080	0.0080	0.0080
BACK PRESSURE, psi		90.0	90.0	90.0
CELL PRESSURE, psi		93.5	96.9	103.9
FAIL. STRESS, psi		21.8	39.9	47.3
TOTAL PORE PR., psi		89.0	82.5	83.7
ULT. STRESS, psi				
TOTAL PORE PR., psi				
$\bar{\sigma}_1$ FAILURE, psi		26.3	54.3	67.5
$\bar{\sigma}_3$ FAILURE, psi		4.5	14.4	20.2

TYPE OF TEST:
CU with Pore Pressures
SAMPLE TYPE: UD
DESCRIPTION:

LL= 52 PL= 22 PI= 30
SPECIFIC GRAVITY= 2.75
REMARKS: SAMPLE NO: UD-4
DEPTH: 10.0-12.0 FEET

Lab No: 5

CLIENT: SOUTHERN COMPANY

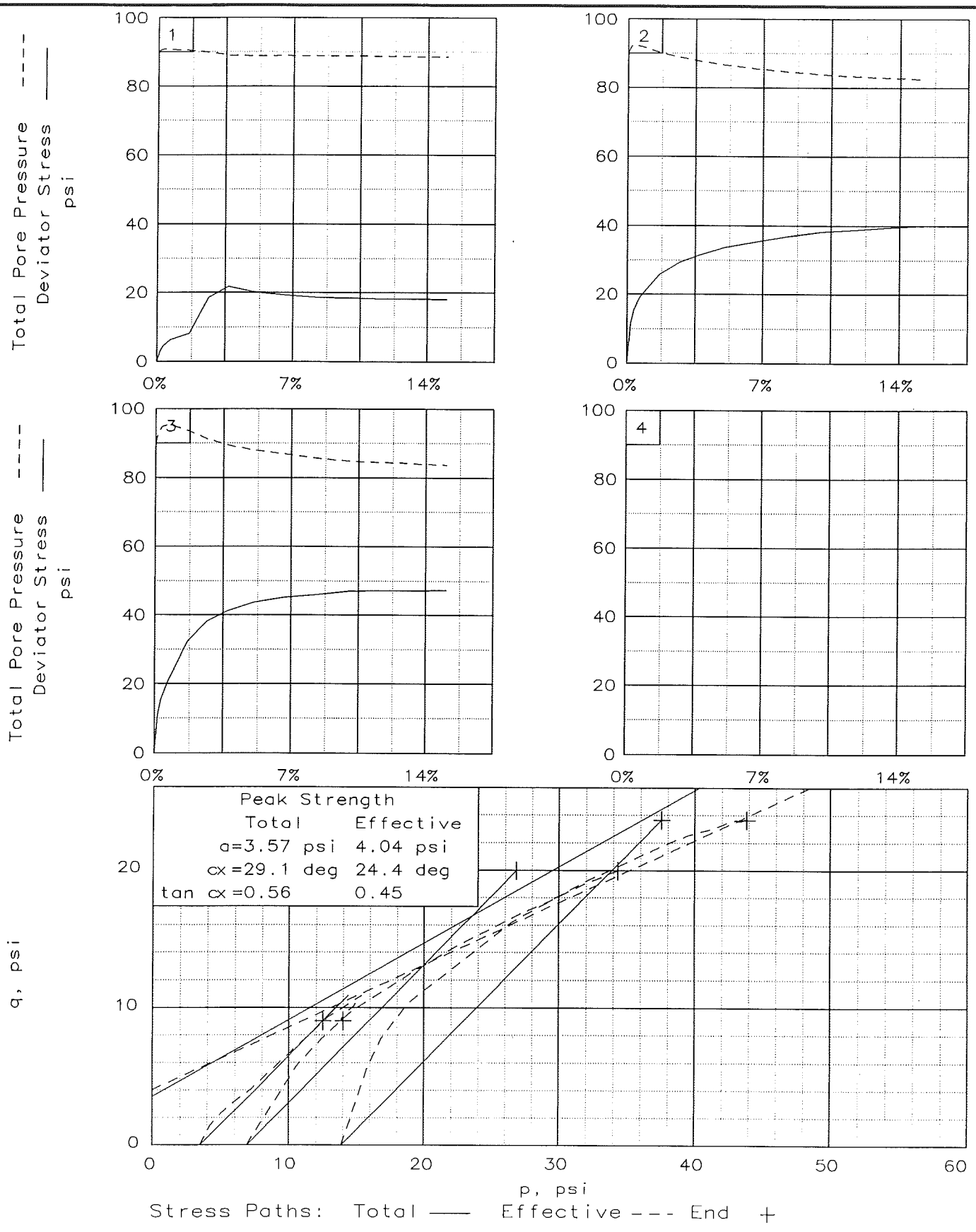
PROJECT: GPCo - PLANT BOWEN STABILITY

SAMPLE LOCATION: PLANT BOWEN
DCP-14

PROJ. NO.: 2051 DATE: 02/19/2003

TRIAXIAL SHEAR TEST REPORT

SOUTHERN COMPANY SERVICES



Client: SOUTHERN COMPANY

Project: GPCo - PLANT BOWEN STABILITY

Location: PLANT BOWEN DCP-14

File: GPBOW5 Project No.: 2051 Lab No: 5

Project and Sample Data

Date: 02/19/2003
Client: SOUTHERN COMPANY
Project: GPCo - PLANT BOWEN STABILITY
Sample location: PLANT BOWEN DCP-14
Sample description:
Remarks: SAMPLE NO: UD-4 DEPTH: 10.0-12.0 FEET

Fig no.: 5 2nd page Fig no. (if applicable): 5
Type of sample: UD
Specific gravity= 2.75 LL= 52 PL= 22 PI= 30
Test method: Corps of Eng. - saturation assumed

Specimen Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Wt. moist soil and tare:	116.420			155.570
Wt. dry soil and tare:	98.760			120.570
Wt. of tare:	30.300			30.300
Weight, gms:	153.2			
Diameter, in:	1.400	1.400	1.398	
Area, in²:	1.539	1.540	1.535	
Height, in:	3.000	2.999	2.997	
Net decrease in height, in:		0.001	0.002	
Net decrease in water volume, cc:		0.000	0.300	
% Moisture:	25.8	25.8	25.5	38.8
Wet density, pcf:	126.4	126.3	126.6	
Dry density, pcf:	100.4	100.4	100.8	
Void ratio:	0.7092	0.7094	0.7026	
% Saturation:	100.0	100.0	100.0	

Test Readings Data for Specimen No. 1

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.30179 lbs per input unit
Secondary load ring constant= 0.72586 lbs per input unit
Crossover reading for secondary load ring= 462 input units
Consolidation cell pressure = 93.50 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 3.50 psi
Strain rate, %/min = 0.01
FAIL. STRESS = 21.78 psi at reading no. 6
ULT. STRESS = not selected

Test Readings Data for Specimen No. 1

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Effective Stresses Major psi	Effective Stresses 1:3 Ratio	Pore Pres. psi	P psi	Q psi
	0.0	0.000	69.0	0.0	0.0	0.00	3.50	3.50	1.00	90.00	3.50	0.00
1	5.0	0.005	84.0	4.5	0.2	2.94	2.80	5.74	2.05	90.70	4.27	1.47
2	10.0	0.010	92.0	6.9	0.3	4.51	2.70	7.21	2.67	90.80	4.95	2.25
3	20.0	0.020	101.0	9.7	0.7	6.25	2.80	9.05	3.23	90.70	5.92	3.12
4	50.0	0.050	111.0	12.7	1.7	8.12	3.10	11.22	3.62	90.40	7.16	4.06
5	80.0	0.080	166.0	29.3	2.7	18.56	3.60	22.16	6.16	89.90	12.88	9.28
6	110.0	0.110	184.0	34.7	3.7	21.78	4.50	26.28	5.84	89.00	15.39	10.89
7	150.0	0.150	177.0	32.6	5.0	20.17	4.70	24.87	5.29	88.80	14.79	10.09
8	200.0	0.200	174.0	31.7	6.7	19.27	4.60	23.87	5.19	88.90	14.23	9.63
9	250.0	0.250	172.0	31.1	8.3	18.56	4.70	23.26	4.95	88.80	13.98	9.28
10	300.0	0.300	173.0	31.4	10.0	18.40	4.70	23.10	4.92	88.80	13.90	9.20
11	350.0	0.350	174.0	31.7	11.7	18.23	4.80	23.03	4.80	88.70	13.92	9.12
12	400.0	0.400	176.0	32.3	13.3	18.23	4.90	23.13	4.72	88.60	14.01	9.11
13	450.0	0.450	177.0	32.6	15.0	18.05	5.00	23.05	4.61	88.50	14.02	9.02

Specimen Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Consolidated	Final
moist soil and tare:	108.080			155.910
dry soil and tare:	92.250			122.780
Wt. of tare:	30.310			30.310
Weight, gms:	153.4			
Diameter, in:	1.400	1.400	1.397	
Area, in²:	1.539	1.540	1.533	
Height, in:	3.000	2.999	2.996	
Net decrease in height, in:		0.001	0.003	
Net decrease in water volume, cc:		0.000	0.400	
% Moisture:	25.6	25.6	25.2	35.8
Wet density, pcf:	126.6	126.6	126.9	
Dry density, pcf:	100.8	100.8	101.4	
Void ratio:	0.7031	0.7028	0.6938	
% Saturation:	100.0	100.0	100.0	

Test Readings Data for Specimen No. 2

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.31199 lbs per input unit
Secondary load ring constant= 0.72824 lbs per input unit
Crossover reading for secondary load ring= 480 input units
Consolidation cell pressure = 96.90 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 6.90 psi
Strain rate, %/min = 0.01
FAIL. STRESS = 39.95 psi at reading no. 13
. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Effective Stresses Major psi	1:3 Ratio	Pore Pres. psi	P psi	Q psi
0	0.0	0.000	68.0	0.0	0.0	0.00	6.90	6.90	1.00	90.00	6.90	0.00
1	5.0	0.005	125.0	17.8	0.2	11.58	4.80	16.38	3.41	92.10	10.59	5.79
2	10.0	0.010	144.0	23.7	0.3	15.42	4.70	20.12	4.28	92.20	12.41	7.71
3	20.0	0.020	164.0	30.0	0.7	19.41	4.90	24.31	4.96	92.00	14.60	9.70
4	50.0	0.050	197.0	40.2	1.7	25.81	6.80	32.61	4.80	90.10	19.71	12.91
5	80.0	0.080	216.0	46.2	2.7	29.31	8.10	37.41	4.62	88.80	22.76	14.66
6	110.0	0.110	228.0	49.9	3.7	31.37	9.20	40.57	4.41	87.70	24.88	15.68
7	150.0	0.150	242.0	54.3	5.0	33.64	10.30	43.94	4.27	86.60	27.12	16.82
8	200.0	0.200	254.0	58.0	6.7	35.33	11.50	46.83	4.07	85.40	29.16	17.66
9	250.0	0.250	266.0	61.8	8.3	36.93	12.30	49.23	4.00	84.60	30.77	18.47
10	300.0	0.300	277.0	65.2	10.0	38.27	13.10	51.37	3.92	83.80	32.24	19.14
11	350.0	0.350	284.0	67.4	11.7	38.82	13.60	52.42	3.85	83.30	33.01	19.41
12	400.0	0.400	292.0	69.9	13.4	39.50	14.00	53.50	3.82	82.90	33.75	19.75
13	450.0	0.450	299.0	72.1	15.0	39.95	14.40	54.35	3.77	82.50	34.37	19.97

Specimen Parameters for Specimen No. 3

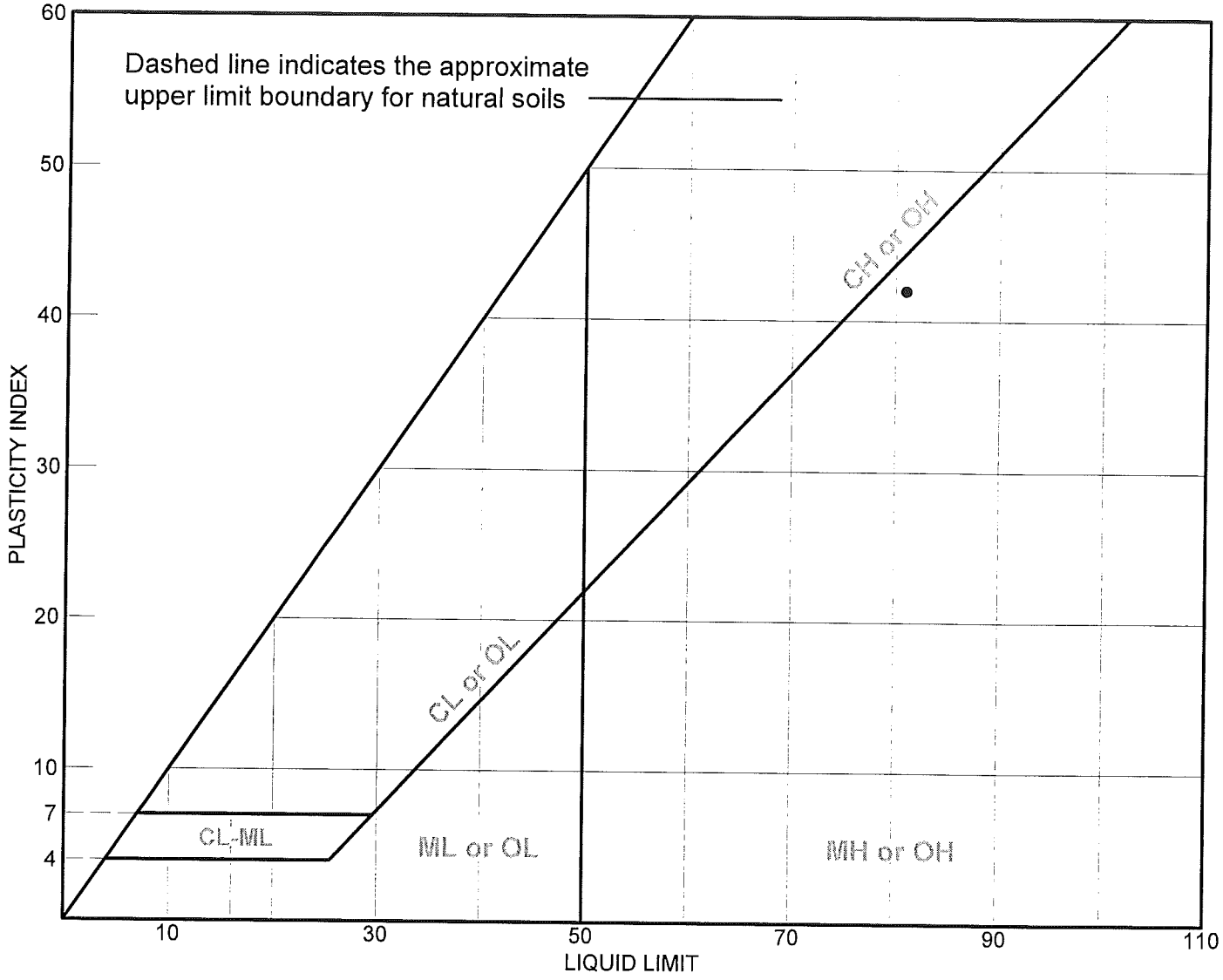
Specimen Parameter	Initial	Saturated	Consolidated	Final
moist soil and tare:	118.220			157.390
dry soil and tare:	102.020			124.850
Wt. of tare:	30.350			30.350
Weight, gms:	156.3			
Diameter, in:	1.400	1.395	1.395	
Area, in²:	1.539	1.529	1.529	
Height, in:	3.000	2.999	2.988	
Net decrease in height, in:		0.001	0.011	
Net decrease in water volume, cc:		0.000	0.300	
% Moisture:	22.6	22.6	22.4	34.4
Wet density, pcf:	128.9	129.8	130.1	
Dry density, pcf:	105.1	105.9	106.3	
Void ratio:	0.6329	0.6216	0.6151	
% Saturation:	98.2	100.0	100.0	

Test Readings Data for Specimen No. 3

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.3108 lbs per input unit
Secondary load ring constant= 0.77882 lbs per input unit
Crossover reading for secondary load ring= 474 input units
Consolidation cell pressure = 103.90 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 13.90 psi
Strain rate, %/min = 0.01
FAIL. STRESS = 47.32 psi at reading no. 13
MAX. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Effective Stresses Major psi	Effective Stresses 1:3 Ratio	Pore Pres. psi	P psi	Q psi
0	0.0	0.000	78.0	0.0	0.0	0.00	13.90	13.90	1.00	90.00	13.90	0.00
1	5.0	0.005	132.0	16.8	0.2	10.96	10.30	21.26	2.06	93.60	15.78	5.48
2	10.0	0.010	154.0	23.6	0.3	15.40	9.10	24.50	2.69	94.80	16.80	7.70
3	20.0	0.020	180.0	31.7	0.7	20.60	8.50	29.10	3.42	95.40	18.80	10.30
4	50.0	0.050	240.0	50.3	1.7	32.38	10.30	42.68	4.14	93.60	26.49	16.19
5	80.0	0.080	271.0	60.0	2.7	38.19	12.70	50.89	4.01	91.20	31.79	19.09
6	110.0	0.110	288.0	65.3	3.7	41.12	14.40	55.52	3.86	89.50	34.96	20.56
7	150.0	0.150	304.0	70.2	5.0	43.64	15.90	59.54	3.74	88.00	37.72	21.82
8	200.0	0.200	316.0	74.0	6.7	45.15	17.00	62.15	3.66	86.90	39.57	22.57
9	250.0	0.250	325.0	76.8	8.4	46.01	18.30	64.31	3.51	85.60	41.31	23.01
10	300.0	0.300	335.0	79.9	10.0	47.00	19.10	66.10	3.46	84.80	42.60	23.50
11	350.0	0.350	341.0	81.7	11.7	47.21	19.40	66.61	3.43	84.50	43.00	23.60
12	400.0	0.400	346.0	83.3	13.4	47.19	19.80	66.99	3.38	84.10	43.40	23.60
13	450.0	0.450	352.0	85.2	15.1	47.32	20.20	67.52	3.34	83.70	43.86	23.66

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Plant Bowen	6	12-14		39	81	42	

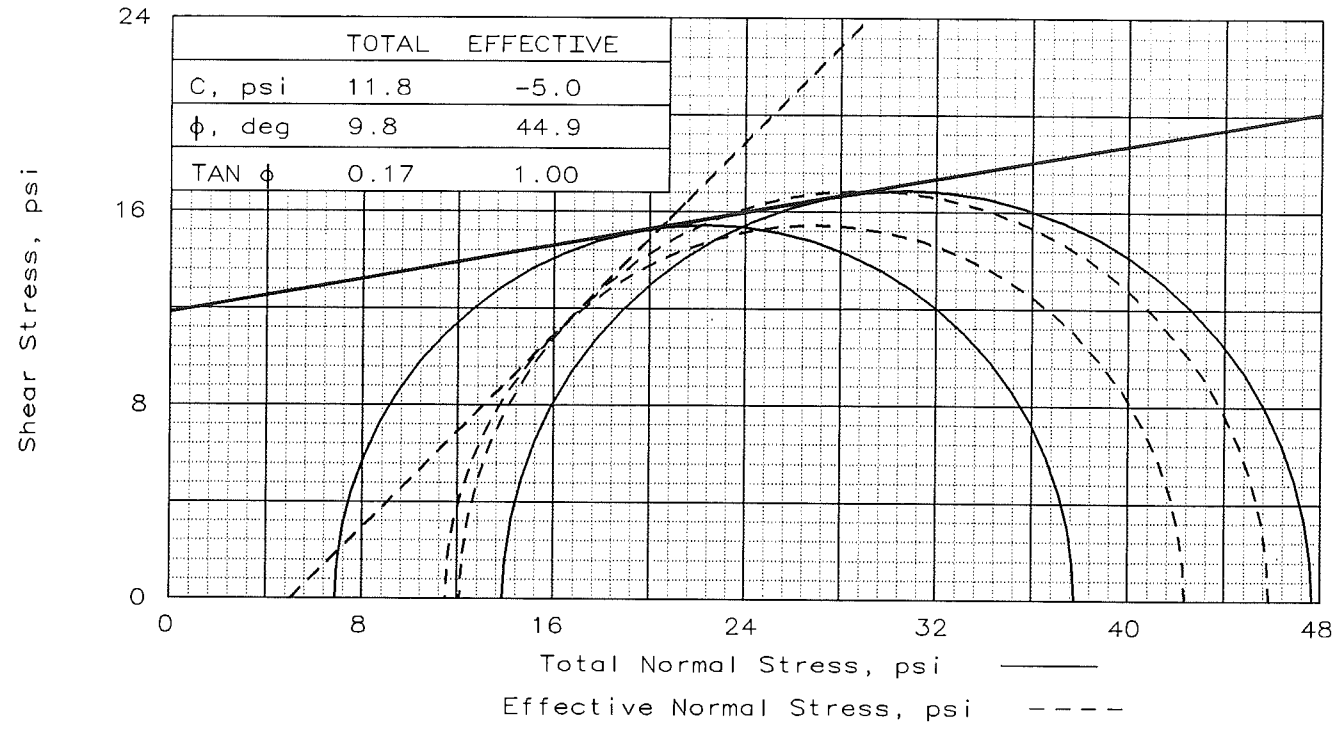
LIQUID AND PLASTIC LIMITS TEST REPORT

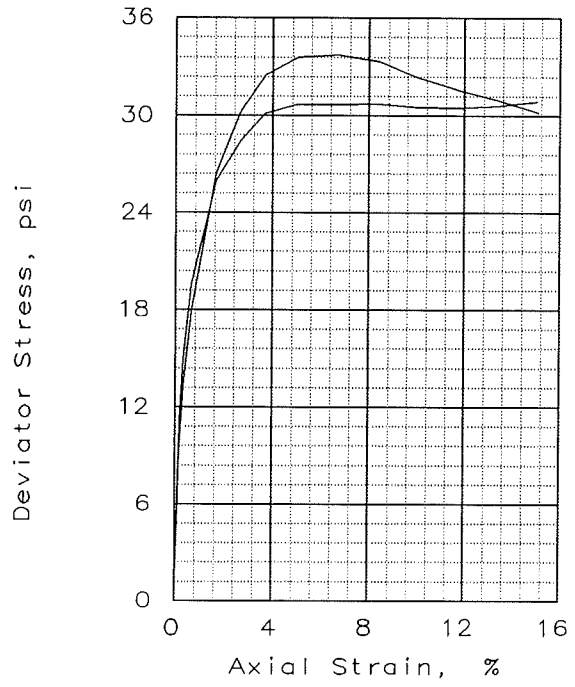
SOUTHERN COMPANY

Client: Southern Company

Project: GPCo - Plant Bowen Stability

Project No.: 2051 **Lab No.** 6





SAMPLE NO.:		1	2
INITIAL	WATER CONTENT, %	38.1	37.2
	DRY DENSITY, pcf	83.7	84.7
	SATURATION, %	100.0	100.0
	VOID RATIO	1.044	1.020
	DIAMETER, in	1.40	1.40
	HEIGHT, in	3.00	3.00
AT TEST	WATER CONTENT, %	37.7	36.7
	DRY DENSITY, pcf	84.1	85.3
	SATURATION, %	100.0	100.0
	VOID RATIO	1.034	1.006
	DIAMETER, in	1.40	1.40
	HEIGHT, in	2.99	2.98
Strain rate, %/min		0.0080	0.0080
BACK PRESSURE, psi		90.0	90.0
CELL PRESSURE, psi		96.9	103.9
FAIL. STRESS, psi		30.9	33.8
TOTAL PORE PR., psi		85.4	91.8
ULT. STRESS, psi			
TOTAL PORE PR., psi			
$\bar{\sigma}_1$ FAILURE, psi		42.4	45.9
$\bar{\sigma}_3$ FAILURE, psi		11.5	12.1

TYPE OF TEST:
CU with Pore Pressures
SAMPLE TYPE: UD
DESCRIPTION:

LL= 81 PL= 39 PI= 42
SPECIFIC GRAVITY= 2.74
REMARKS: SAMPLE NO: UD-5
DEPTH: 12.0-14.0

Lab No: 6

CLIENT: SOUTHERN COMPANY

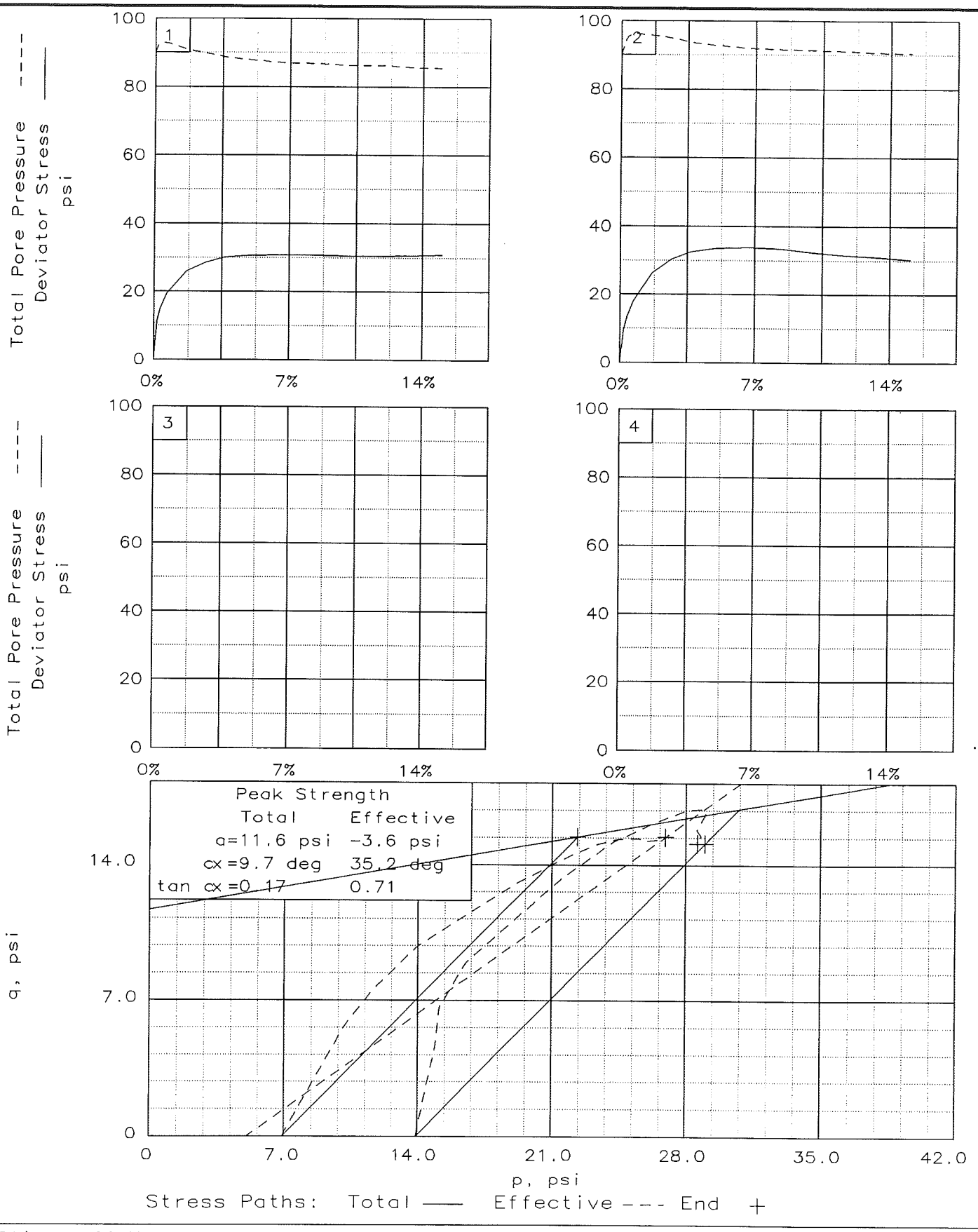
PROJECT: PLANT BOWEN STABILITY

SAMPLE LOCATION: PLANT BOWEN
DCP-14

PROJ. NO.: 2051 DATE: 02/19/2003

TRIAXIAL SHEAR TEST REPORT

SOUTHERN COMPANY SERVICES



Client: SOUTHERN COMPANY

Project: PLANT BOWEN STABILITY

Location: PLANT BOWEN DCP-14

File: GPBOW6 Project No.: 2051 Lab No: 6

Project and Sample Data

Date: 02/19/2003
Client: SOUTHERN COMPANY
Project: PLANT BOWEN STABILITY
Sample location: PLANT BOWEN DCP-14
Sample description:
Remarks: SAMPLE NO: UD-5 DEPTH: 12.0-14.0

Fig no.: 6 2nd page Fig no. (if applicable): 6
Type of sample: UD
Specific gravity= 2.74 LL= 81 PL= 39 PI= 42
Test method: Corps of Eng. - saturation assumed

Specimen Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Wt. moist soil and tare:	124.710			143.280
Wt. dry soil and tare:	98.650			100.550
Wt. of tare:	30.280			30.280
Weight, gms:	140.1			
Diameter, in:	1.400	1.400	1.398	
Area, in²:	1.539	1.540	1.536	
Height, in:	3.000	2.999	2.991	
Net decrease in height, in:		0.001	0.008	
Net decrease in water volume, cc:		0.000	0.400	
Moisture:	38.1	38.1	37.7	60.8
Wet density, pcf:	115.6	115.6	115.8	
Dry density, pcf:	83.7	83.7	84.1	
Void ratio:	1.0442	1.0444	1.0336	
% Saturation:	100.0	100.0	100.0	

Test Readings Data for Specimen No. 1

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.3119 lbs per input unit
Secondary load ring constant= 0.72824 lbs per input unit
Crossover reading for secondary load ring= 480 input units
Consolidation cell pressure = 96.90 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 6.90 psi
Strain rate, %/min = 0.01
FAIL. STRESS = 30.88 psi at reading no. 13
ULT. STRESS = not selected

Test Readings Data for Specimen No. 1

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Effective Stresses Major psi	Effective Stresses 1:3 Ratio	Pore Pres. psi	P psi	Q psi
	0.0	0.000	66.0	0.0	0.0	0.00	6.90	6.90	1.00	90.00	6.90	0.00
1	5.0	0.005	121.0	17.2	0.2	11.15	4.50	15.65	3.48	92.40	10.07	5.57
2	10.0	0.010	140.0	23.1	0.3	14.98	4.10	19.08	4.65	92.80	11.59	7.49
3	20.0	0.020	163.0	30.3	0.7	19.57	4.20	23.77	5.66	92.70	13.98	9.78
4	50.0	0.050	196.0	40.5	1.7	25.96	6.10	32.06	5.26	90.80	19.08	12.98
5	80.0	0.080	210.0	44.9	2.7	28.46	7.20	35.66	4.95	89.70	21.43	14.23
6	110.0	0.110	220.0	48.0	3.7	30.12	8.30	38.42	4.63	88.60	23.36	15.06
7	150.0	0.150	225.0	49.6	5.0	30.67	9.20	39.87	4.33	87.70	24.53	15.33
8	200.0	0.200	228.0	50.5	6.7	30.70	10.00	40.70	4.07	86.90	25.35	15.35
9	250.0	0.250	231.0	51.5	8.4	30.70	10.20	40.90	4.01	86.70	25.55	15.35
10	300.0	0.300	233.0	52.1	10.0	30.51	10.70	41.21	3.85	86.20	25.96	15.26
11	350.0	0.350	236.0	53.0	11.7	30.48	10.70	41.18	3.85	86.20	25.94	15.24
12	400.0	0.400	240.0	54.3	13.4	30.61	11.30	41.91	3.71	85.60	26.60	15.30
13	450.0	0.450	245.0	55.8	15.0	30.88	11.50	42.38	3.69	85.40	26.94	15.44

Specimen Parameters for Specimen No. 2

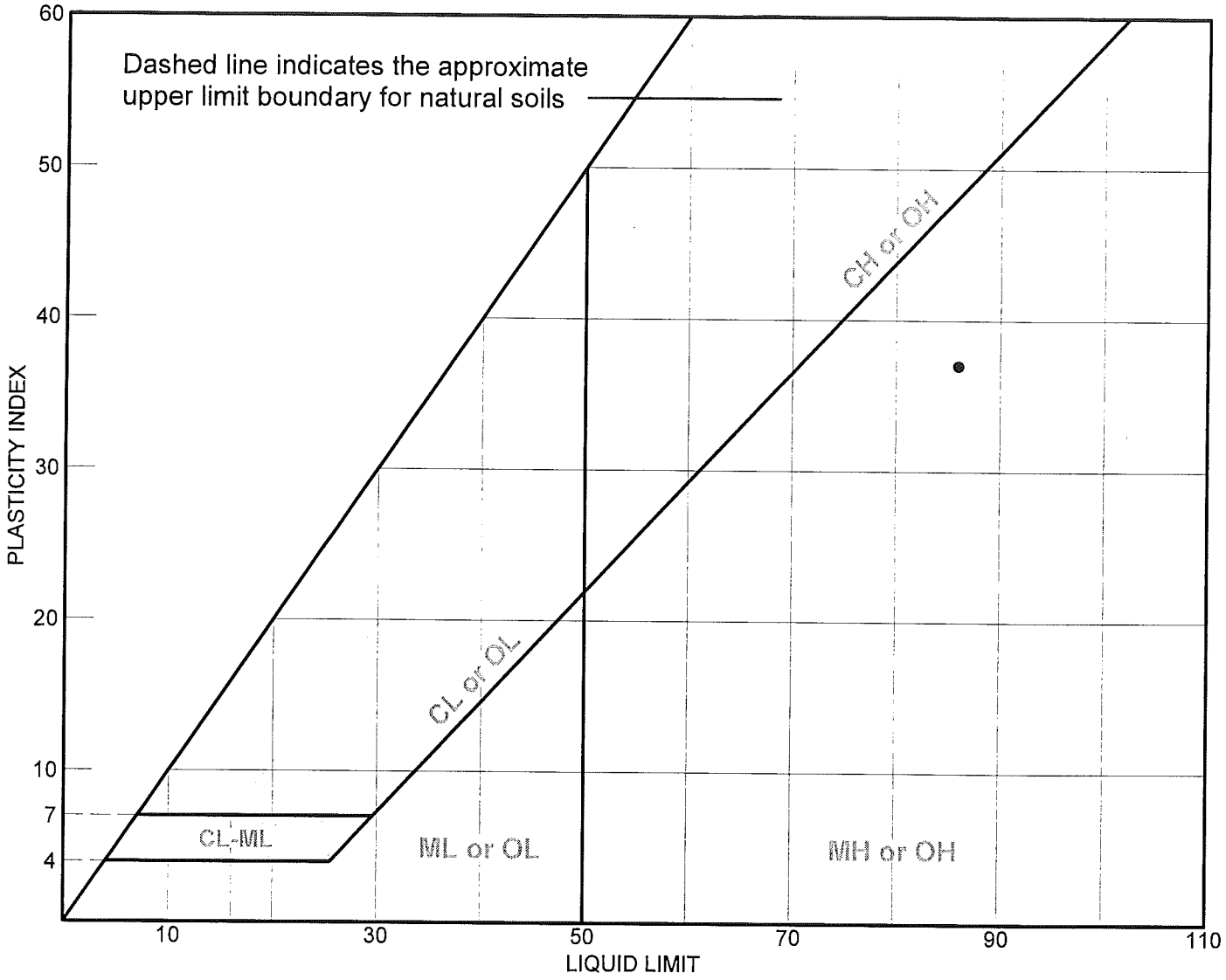
Specimen Parameter	Initial	Saturated	Consolidated	Final
Wt. moist soil and tare:	123.930			141.400
dry soil and tare:	98.540			99.140
Wt. of tare:	30.300			30.300
Weight, gms:	140.9			
Diameter, in:	1.400	1.400	1.399	
Area, in²:	1.539	1.540	1.538	
Height, in:	3.000	2.999	2.983	
Net decrease in height, in:		0.001	0.016	
Net decrease in water volume, cc:		0.000	0.500	
% Moisture:	37.2	37.2	36.7	61.4
Wet density, pcf:	116.2	116.2	116.6	
Dry density, pcf:	84.7	84.7	85.3	
Void ratio:	1.0198	1.0195	1.0061	
% Saturation:	100.0	100.0	100.0	

Test Readings Data for Specimen No. 2

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.3108 lbs per input unit
Secondary load ring constant= 0.77882 lbs per input unit
Crossover reading for secondary load ring= 474 input units
Consolidation cell pressure = 103.90 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 13.90 psi
Strain rate, %/min = 0.01
FAIL. STRESS = 33.75 psi at reading no. 8
U STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Major psi	1:3 Ratio	Pore Pres. psi	P psi	Q psi
0	0.0	0.000	78.0	0.0	0.0	0.00	13.90	13.90	1.00	90.00	13.90	0.00
1	5.0	0.005	125.0	14.6	0.2	9.48	10.20	19.68	1.93	93.70	14.94	4.74
2	10.0	0.010	144.0	20.5	0.3	13.30	8.50	21.80	2.56	95.40	15.15	6.65
3	20.0	0.020	167.0	27.7	0.7	17.87	7.60	25.47	3.35	96.30	16.53	8.93
4	50.0	0.050	211.0	41.3	1.7	26.43	8.20	34.63	4.22	95.70	21.42	13.22
5	80.0	0.080	232.0	47.9	2.7	30.29	9.00	39.29	4.37	94.90	24.15	15.15
6	110.0	0.110	245.0	51.9	3.7	32.51	10.30	42.81	4.16	93.60	26.55	16.25
7	150.0	0.150	253.0	54.4	5.0	33.59	11.20	44.79	4.00	92.70	28.00	16.80
8	200.0	0.200	257.0	55.6	6.7	33.75	12.10	45.85	3.79	91.80	28.98	16.88
9	250.0	0.250	258.0	55.9	8.4	33.33	12.40	45.73	3.69	91.50	29.07	16.67
10	300.0	0.300	256.0	55.3	10.1	32.36	12.60	44.96	3.57	91.30	28.78	16.18
11	350.0	0.350	255.0	55.0	11.7	31.58	12.80	44.38	3.47	91.10	28.59	15.79
12	400.0	0.400	255.0	55.0	13.4	30.98	13.30	44.28	3.33	90.60	28.79	15.49
13	450.0	0.450	254.0	54.7	15.1	30.21	13.50	43.71	3.24	90.40	28.60	15.10

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Plant Bowen	7	18-20		49	86	37	

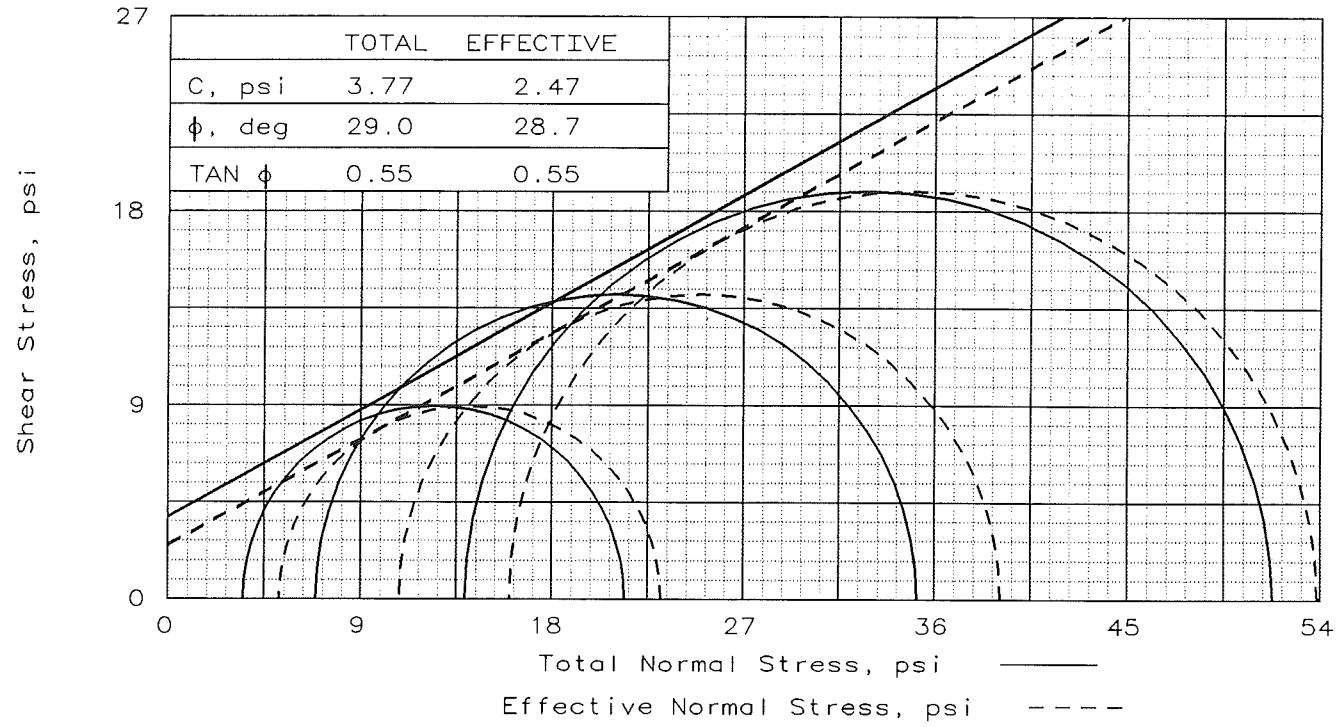
LIQUID AND PLASTIC LIMITS TEST REPORT

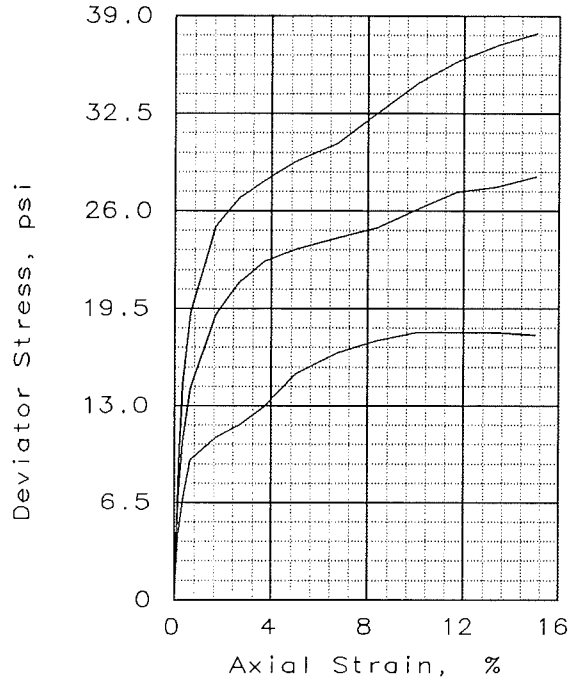
SOUTHERN COMPANY

Client: Southern Company

Project: GPCo - Plant Bowen Stability

Project No.: 2051 **Lab No.** 7





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	34.9	29.8	25.0
	DRY DENSITY, pcf	87.3	93.7	101.7
	SATURATION, %	99.3	98.2	100.0
	VOID RATIO	0.967	0.833	0.689
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	3.00
AT TEST	WATER CONTENT, %	34.7	29.6	24.9
	DRY DENSITY, pcf	87.8	94.7	101.9
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.955	0.813	0.684
	DIAMETER, in	1.40	1.39	1.40
	HEIGHT, in	3.00	2.99	2.99
Strain rate, %/min		0.0080	0.0080	0.0080
BACK PRESSURE, psi		90.0	90.0	90.0
CELL PRESSURE, psi		93.5	96.9	103.9
FAIL. STRESS, psi		17.9	28.3	37.9
TOTAL PORE PR., psi		88.3	86.1	87.9
ULT. STRESS, psi				
TOTAL PORE PR., psi				
$\bar{\sigma}_1$ FAILURE, psi		23.1	39.1	53.9
$\bar{\sigma}_3$ FAILURE, psi		5.2	10.8	16.0

TYPE OF TEST:
CU with Pore Pressures
SAMPLE TYPE: UD
DESCRIPTION:

LL= 86 PL= 49 PI= 37
SPECIFIC GRAVITY= 2.75
REMARKS: SAMPLE NO: UD-6
DEPTH: 18.0-20.0 FEET

Lab No: 7

CLIENT: SOUTHERN COMPANY

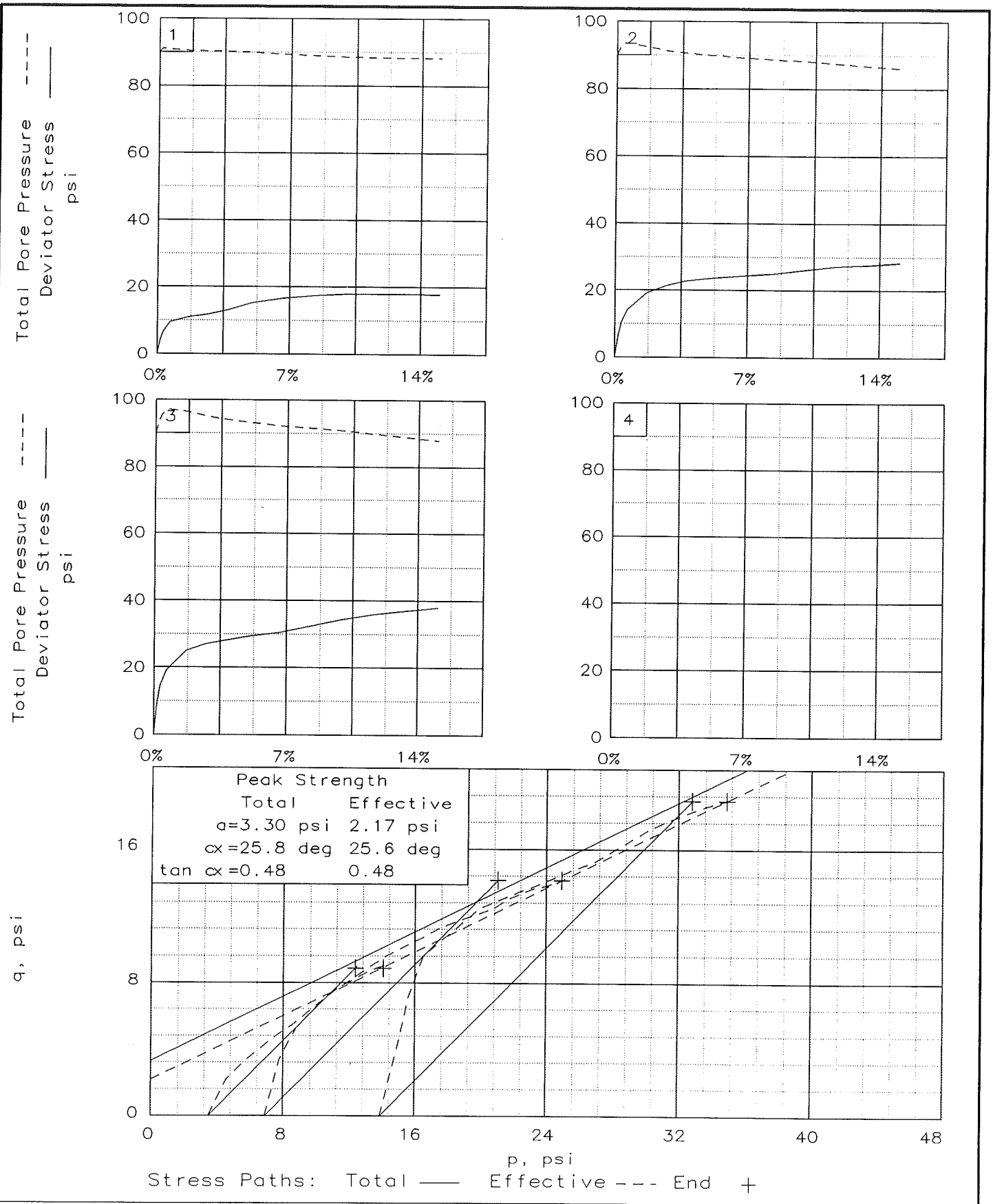
PROJECT: PLANT BOWEN STABILITY

SAMPLE LOCATION: PLANT BOWEN
DCP-11

PROJ. NO.: 2051 DATE: 02/18/2003

TRIAXIAL SHEAR TEST REPORT

SOUTHERN COMPANY SERVICES



Client: SOUTHERN COMPANY

Project: PLANT BOWEN STABILITY

Location: PLANT BOWEN DCP-11

File: GPBOW7 Project No.: 2051 Lab No: 7

Project and Sample Data

Date: 02/18/2003
Client: SOUTHERN COMPANY
Project: PLANT BOWEN STABILITY
Sample location: PLANT BOWEN DCP-11
Sample description:
Remarks: SAMPLE NO: UD-6 DEPTH: 18.0-20.0 FEET

Fig no.: 7 2nd page Fig no. (if applicable): 7
Type of sample: UD
Specific gravity= 2.75 LL= 86 PL= 49 PI= 37
Test method: Corps of Eng. - saturation assumed

Specimen Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Wt. moist soil and tare:	117.740			146.400
Wt. dry soil and tare:	95.110			105.980
Wt. of tare:	30.310			30.310
Weight, gms:	142.7			
Diameter, in:	1.400	1.398	1.397	
Area, in²:	1.539	1.535	1.532	
Height, in:	3.000	2.999	2.996	
Net decrease in height, in:		0.001	0.003	
Net decrease in water volume, cc:		0.000	0.200	
Moisture:	34.9	34.9	34.7	53.4
Wet density, pcf:	117.7	118.2	118.3	
Dry density, pcf:	87.3	87.6	87.8	
Void ratio:	0.9672	0.9604	0.9552	
% Saturation:	99.3	100.0	100.0	

Test Readings Data for Specimen No. 1

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.30179 lbs per input unit
Secondary load ring constant= 0.72586 lbs per input unit
Crossover reading for secondary load ring= 462 input units
Consolidation cell pressure = 93.50 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 3.50 psi
Strain rate, %/min = 0.01
FAIL. STRESS = 17.92 psi at reading no. 12
ULT. STRESS = not selected

Test Readings Data for Specimen No. 1

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Effective Stresses Major psi	Effective Stresses 1:3 Ratio	Pore Pres. psi	P psi	Q psi
	0.0	0.000	67.0	0.0	0.0	0.00	3.50	3.50	1.00	90.00	3.50	0.00
1	5.0	0.005	89.0	6.6	0.2	4.33	2.40	6.73	2.80	91.10	4.56	2.16
2	10.0	0.010	101.0	10.3	0.3	6.68	2.40	9.08	3.78	91.10	5.74	3.34
3	20.0	0.020	115.0	14.5	0.7	9.39	2.70	12.09	4.48	90.80	7.40	4.70
4	50.0	0.050	123.0	16.9	1.7	10.85	3.10	13.95	4.50	90.40	8.52	5.42
5	80.0	0.080	128.0	18.4	2.7	11.70	3.20	14.90	4.65	90.30	9.05	5.85
6	110.0	0.110	135.0	20.5	3.7	12.90	3.30	16.20	4.91	90.20	9.75	6.45
7	150.0	0.150	148.0	24.4	5.0	15.16	3.60	18.76	5.21	89.90	11.18	7.58
8	200.0	0.200	157.0	27.2	6.7	16.55	4.10	20.65	5.04	89.40	12.37	8.27
9	250.0	0.250	163.0	29.0	8.3	17.33	4.50	21.83	4.85	89.00	13.17	8.67
10	300.0	0.300	168.0	30.5	10.0	17.90	4.90	22.80	4.65	88.60	13.85	8.95
11	350.0	0.350	170.0	31.1	11.7	17.92	5.10	23.02	4.51	88.40	14.06	8.96
12	400.0	0.400	172.0	31.7	13.4	17.92	5.20	23.12	4.45	88.30	14.16	8.96
13	450.0	0.450	173.0	32.0	15.0	17.74	5.20	22.94	4.41	88.30	14.07	8.87

Specimen Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Consolidated	Final
Wt. moist soil and tare:	128.170			149.950
dry soil and tare:	105.740			112.910
Wt. of tare:	30.350			30.350
Weight, gms:	147.3			
Diameter, in:	1.400	1.395	1.394	
Area, in²:	1.539	1.527	1.527	
Height, in:	3.000	2.999	2.992	
Net decrease in height, in:		0.001	0.007	
Net decrease in water volume, cc:		0.000	0.200	
% Moisture:	29.8	29.8	29.6	44.9
Wet density, pcf:	121.5	122.5	122.7	
Dry density, pcf:	93.7	94.4	94.7	
Void ratio:	0.8330	0.8182	0.8133	
% Saturation:	98.2	100.0	100.0	

Test Readings Data for Specimen No. 2

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.31199 lbs per input unit
Secondary load ring constant= 0.72824 lbs per input unit
Crossover reading for secondary load ring= 480 input units
Consolidation cell pressure = 96.90 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 6.90 psi
Strain rate, %/min = 0.01
FAIL. STRESS = 28.30 psi at reading no. 13
[illegible]. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Effective Stresses Major psi	Effective Stresses 1:3 Ratio	Pore Pres. psi	P psi	Q psi
0	0.0	0.000	66.0	0.0	0.0	0.00	6.90	6.90	1.00	90.00	6.90	0.00
1	5.0	0.005	99.0	10.3	0.2	6.73	4.40	11.13	2.53	92.50	7.77	3.37
2	10.0	0.010	118.0	16.2	0.3	10.59	3.50	14.09	4.03	93.40	8.79	5.29
3	20.0	0.020	136.0	21.8	0.7	14.21	3.40	17.61	5.18	93.50	10.50	7.10
4	50.0	0.050	161.0	29.6	1.7	19.09	4.60	23.69	5.15	92.30	14.14	9.54
5	80.0	0.080	173.0	33.4	2.7	21.28	5.70	26.98	4.73	91.20	16.34	10.64
6	110.0	0.110	181.0	35.9	3.7	22.63	6.30	28.93	4.59	90.60	17.62	11.32
7	150.0	0.150	187.0	37.8	5.0	23.48	7.00	30.48	4.35	89.90	18.74	11.74
8	200.0	0.200	193.0	39.6	6.7	24.21	7.70	31.91	4.14	89.20	19.81	12.11
9	250.0	0.250	199.0	41.5	8.4	24.90	8.30	33.20	4.00	88.60	20.75	12.45
10	300.0	0.300	208.0	44.3	10.0	26.10	8.70	34.80	4.00	88.20	21.75	13.05
11	350.0	0.350	217.0	47.1	11.7	27.24	9.50	36.74	3.87	87.40	23.12	13.62
12	400.0	0.400	222.0	48.7	13.4	27.61	10.20	37.81	3.71	86.70	24.01	13.81
13	450.0	0.450	229.0	50.9	15.0	28.30	10.80	39.10	3.62	86.10	24.95	14.15

Specimen Parameters for Specimen No. 3

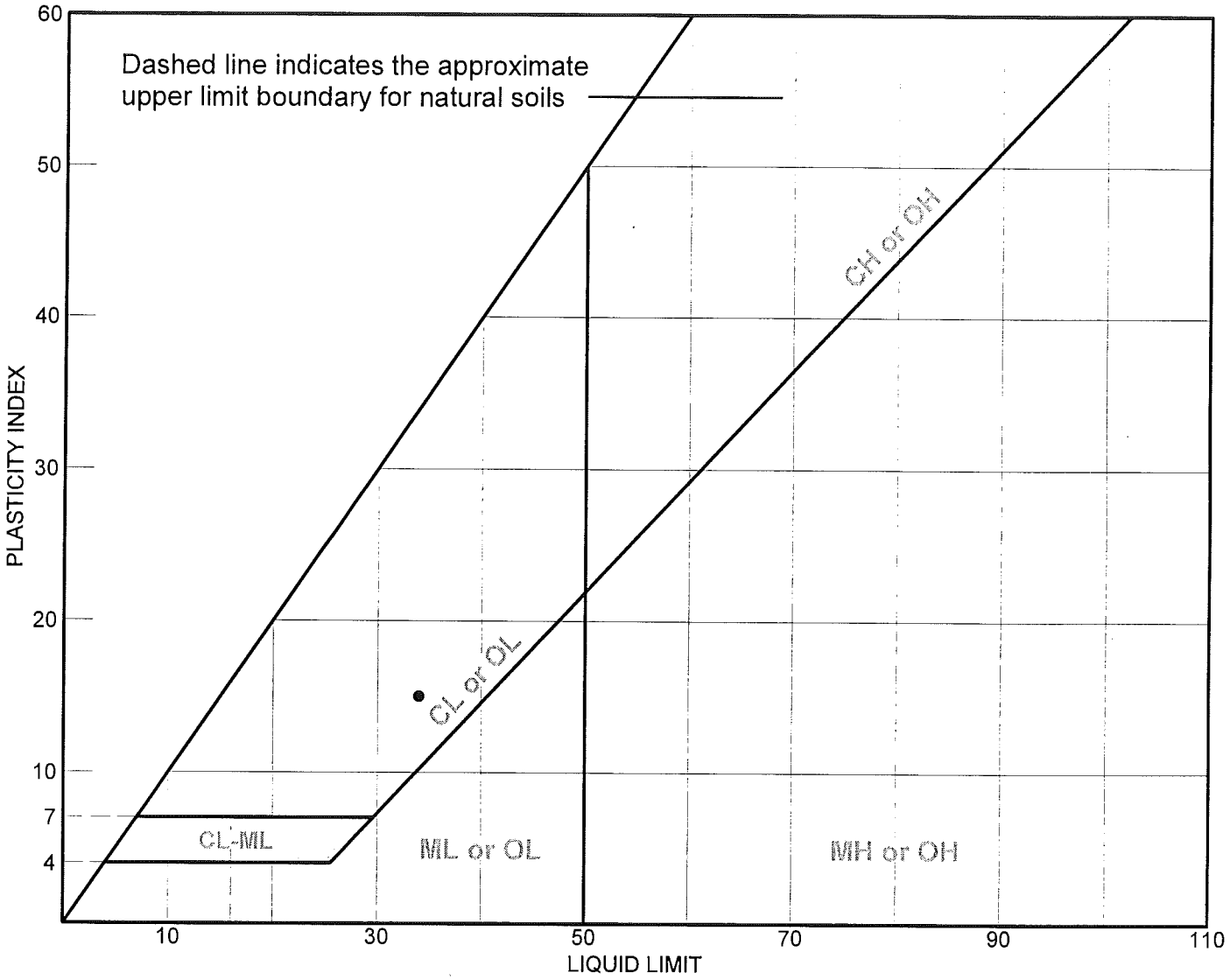
Specimen Parameter	Initial	Saturated	Consolidated	Final
moist soil and tare:	126.710			155.320
dry soil and tare:	107.400			122.740
Wt. of tare:	30.300			30.300
Weight, gms:	154.1			
Diameter, in:	1.400	1.400	1.401	
Area, in²:	1.539	1.540	1.541	
Height, in:	3.000	2.999	2.989	
Net decrease in height, in:		0.001	0.010	
Net decrease in water volume, cc:		0.000	0.200	
% Moisture:	25.0	25.0	24.9	35.2
Wet density, pcf:	127.1	127.1	127.3	
Dry density, pcf:	101.7	101.7	101.9	
Void ratio:	0.6885	0.6887	0.6843	
% Saturation:	100.0	100.0	100.0	

Test Readings Data for Specimen No. 3

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.3108 lbs per input unit
Secondary load ring constant= 0.77882 lbs per input unit
Crossover reading for secondary load ring= 474 input units
Consolidation cell pressure = 103.90 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 13.90 psi
Strain rate, %/min = 0.01
FAIL. STRESS = 37.86 psi at reading no. 13
. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Major psi	1:3 Ratio	Pore Pres. psi	P psi	Q psi
0	0.0	0.000	78.0	0.0	0.0	0.00	13.90	13.90	1.00	90.00	13.90	0.00
1	5.0	0.005	123.0	14.0	0.2	9.06	10.50	19.56	1.86	93.40	15.03	4.53
2	10.0	0.010	150.0	22.4	0.3	14.47	8.40	22.87	2.72	95.50	15.64	7.24
3	20.0	0.020	174.0	29.8	0.7	19.23	6.90	26.13	3.79	97.00	16.52	9.62
4	50.0	0.050	204.0	39.2	1.7	24.98	7.50	32.48	4.33	96.40	19.99	12.49
5	80.0	0.080	215.0	42.6	2.7	26.89	8.90	35.79	4.02	95.00	22.34	13.44
6	110.0	0.110	222.0	44.8	3.7	27.97	9.80	37.77	3.85	94.10	23.79	13.99
7	150.0	0.150	231.0	47.6	5.0	29.31	10.70	40.01	3.74	93.20	25.35	14.65
8	200.0	0.200	240.0	50.3	6.7	30.48	11.70	42.18	3.61	92.20	26.94	15.24
9	250.0	0.250	254.0	54.7	8.4	32.52	12.40	44.92	3.62	91.50	28.66	16.26
10	300.0	0.300	268.0	59.1	10.0	34.47	13.10	47.57	3.63	90.80	30.34	17.24
11	350.0	0.350	280.0	62.8	11.7	35.97	14.10	50.07	3.55	89.80	32.08	17.98
12	400.0	0.400	290.0	65.9	13.4	37.03	15.00	52.03	3.47	88.90	33.52	18.52
13	450.0	0.450	299.0	68.7	15.1	37.86	16.00	53.86	3.37	87.90	34.93	18.93

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Plant Bowen	8	23-25		19	34	15	

LIQUID AND PLASTIC LIMITS TEST REPORT

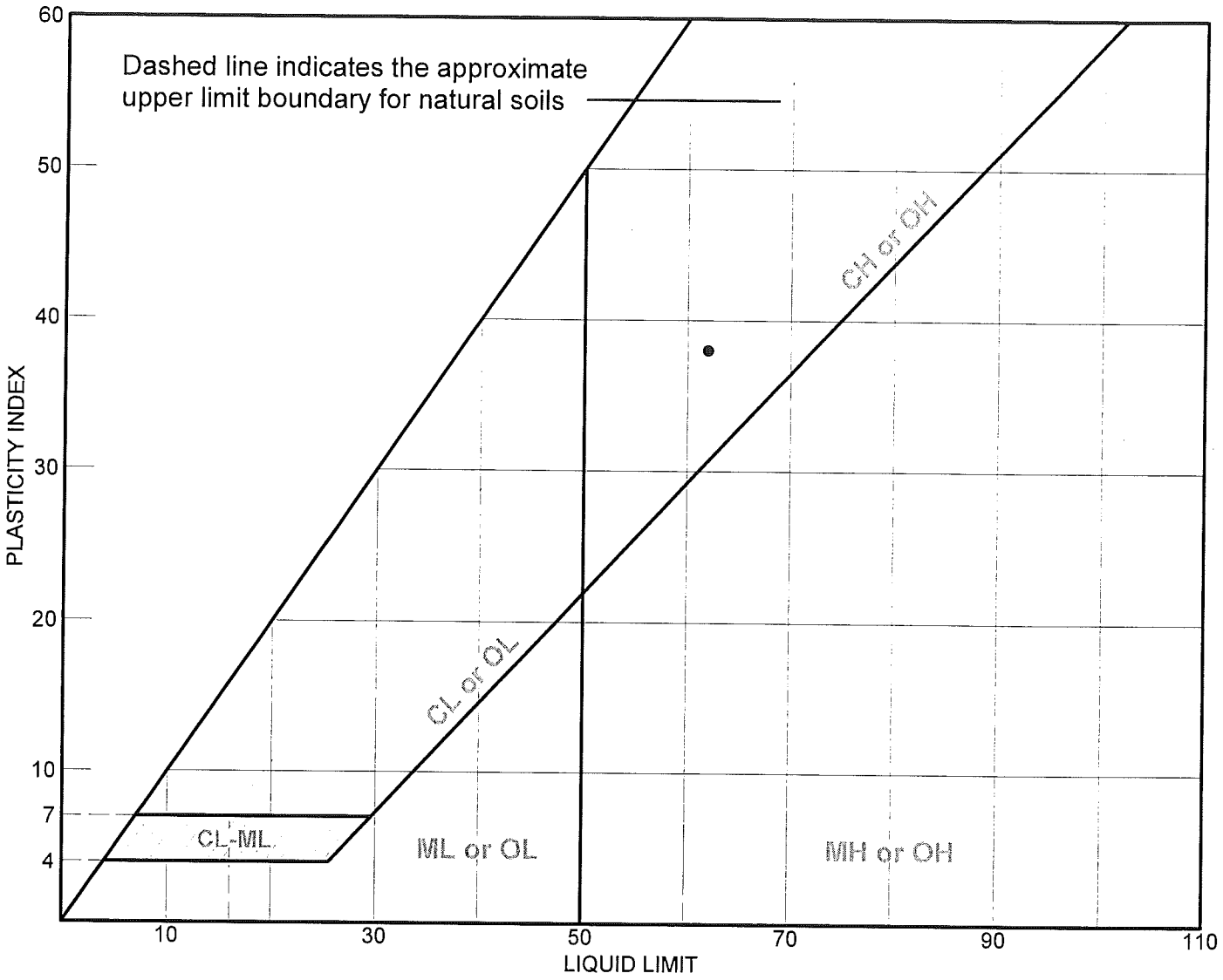
SOUTHERN COMPANY

Client: Southern Company

Project: GPCo - Plant Bowen Stability

Project No.: 2051 **Lab No.** 8

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Plant Bowen	9	19-21		24	62	38	

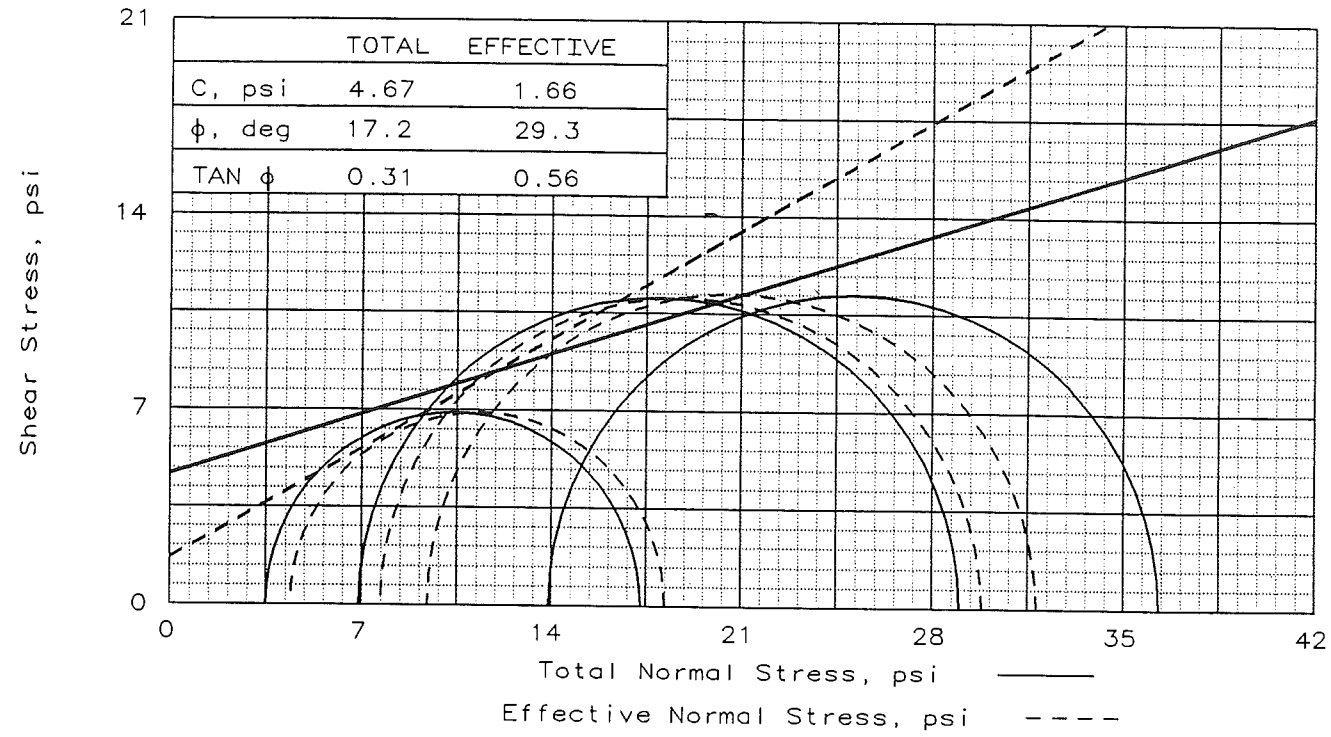
LIQUID AND PLASTIC LIMITS TEST REPORT

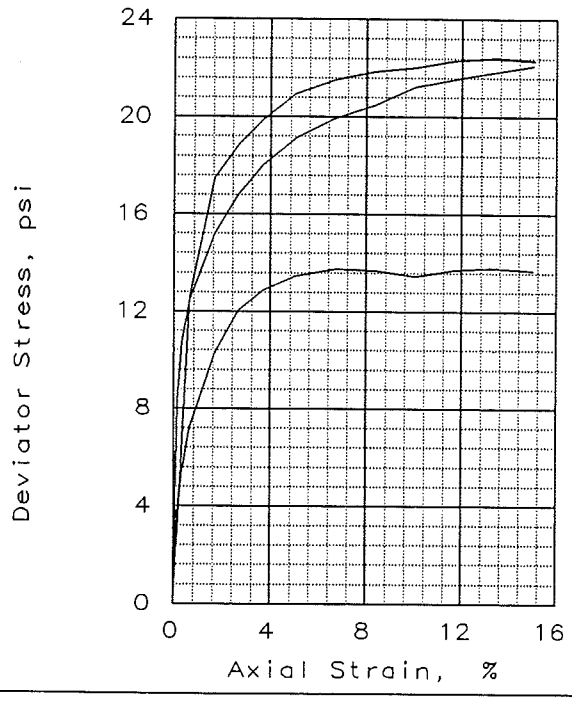
SOUTHERN COMPANY

Client: Southern Company

Project: GPCo - Plant Bowen Stability

Project No.: 2051 **Lab No.** 9





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	35.0	32.8	33.4
	DRY DENSITY, pcf	86.5	89.2	88.5
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.941	0.883	0.897
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	3.00
AT TEST	WATER CONTENT, %	34.7	32.6	33.0
	DRY DENSITY, pcf	86.9	89.5	89.0
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.933	0.876	0.887
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	2.99
Strain rate, %/min		0.01	0.01	0.01
BACK PRESSURE, psi		90.0	90.0	90.0
CELL PRESSURE, psi		93.5	96.9	103.9
FAIL. STRESS, psi		13.8	22.1	22.4
TOTAL PORE PR., psi		89.1	89.2	94.5
ULT. STRESS, psi				
TOTAL PORE PR., psi				
$\bar{\sigma}_1$ FAILURE, psi		18.2	29.8	31.8
$\bar{\sigma}_3$ FAILURE, psi		4.4	7.7	9.4

TYPE OF TEST:
CU with Pore Pressures
SAMPLE TYPE: UD
DESCRIPTION:

LL= 62 PL= 24 PI= 38
SPECIFIC GRAVITY= 2.69
REMARKS: SAMPLE NO: UD-8
DEPTH: 19.0-21.0 FEET

Lab No: 9

CLIENT: SOUTHERN COMPANY

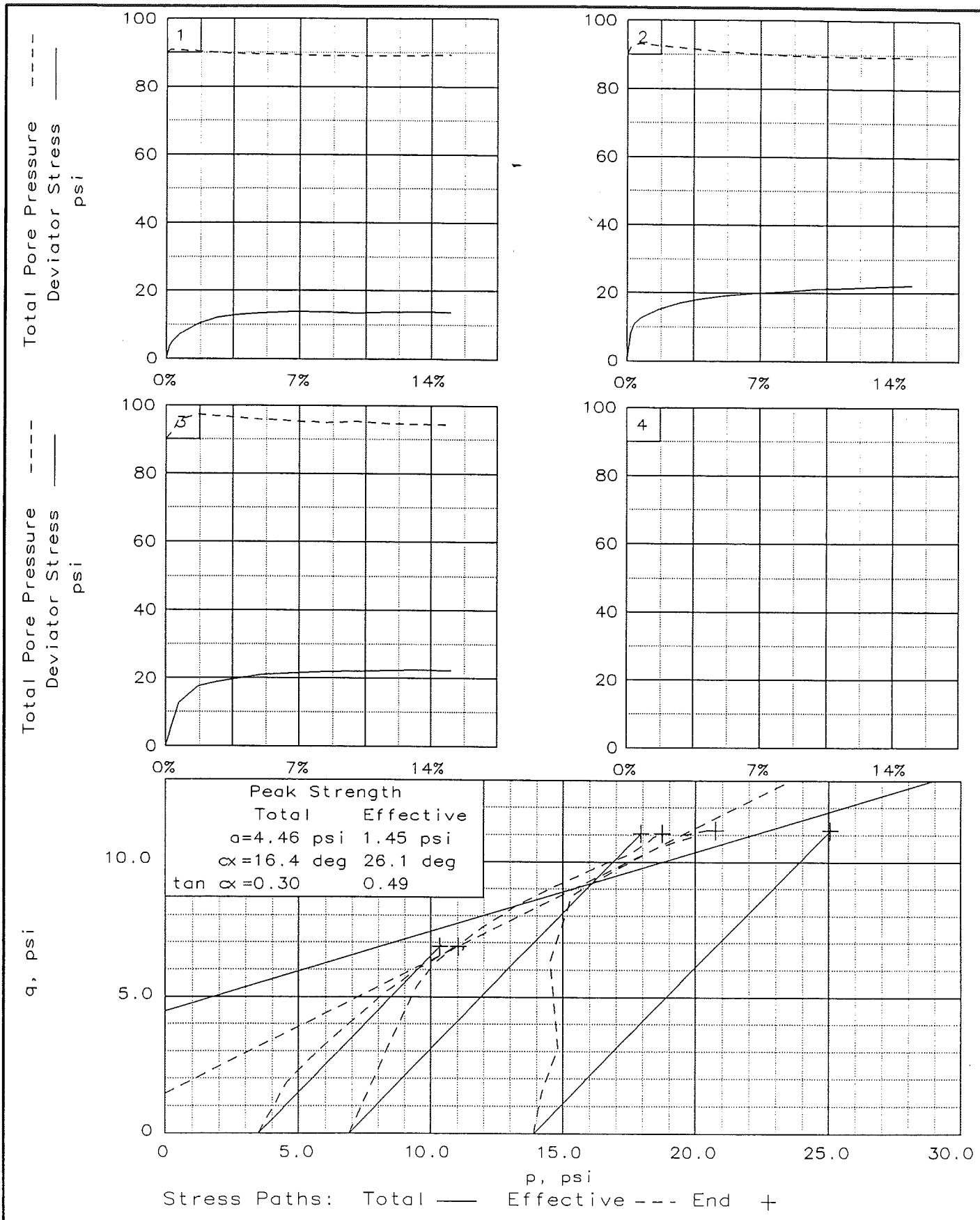
PROJECT: GPCo - PLANT BOWEN STABILITY

SAMPLE LOCATION: PLANT BOWEN
DCP-12S

PROJ. NO.: 2051 DATE: 02/11/2003

TRIAXIAL SHEAR TEST REPORT

SOUTHERN COMPANY SERVICES



Client: SOUTHERN COMPANY

Project: GPCo - PLANT BOWEN STABILITY

Location: PLANT BOWEN DCP-12S

File: GPBOW9 Project No.: 2051 Lab No: 9

Project and Sample Data

Date: 02/11/2003
Client: SOUTHERN COMPANY
Project: GPCo - PLANT BOWEN STABILITY
Sample location: PLANT BOWEN DCP-12S
Sample description:
Remarks: SAMPLE NO: UD-8 DEPTH: 19.0-21.0 FEET

Fig no.: 9 2nd page Fig no. (if applicable): 9
Type of sample: UD
Specific gravity= 2.69 LL= 62 PL= 24 PI= 38
Test method: Corps of Eng. - saturation assumed

Specimen Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Wt. moist soil and tare:	92.150			143.980
Wt. dry soil and tare:	76.130			103.170
Wt. of tare:	30.300			30.300
Weight, gms:	141.6			
Diameter, in:	1.400	1.400	1.398	
Area, in²:	1.539	1.540	1.535	
Height, in:	3.000	2.999	2.996	
Net decrease in height, in:		0.001	0.003	
Net decrease in water volume, cc:		0.000	0.300	
% Moisture:	35.0	35.0	34.7	56.0
Wet density, pcf:	116.8	116.8	117.0	
Dry density, pcf:	86.5	86.5	86.9	
Void ratio:	0.9408	0.9403	0.9326	
% Saturation:	100.0	100.0	100.0	

Test Readings Data for Specimen No. 1

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.30179 lbs per input unit
Secondary load ring constant= 0.72586 lbs per input unit
Crossover reading for secondary load ring= 462 input units
Consolidation cell pressure = 93.50 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 3.50 psi
Strain rate, %/min = 0.01
FAIL. STRESS = 13.80 psi at reading no. 12
ULT. STRESS = not selected

Test Readings Data for Specimen No. 1

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Effective Stresses Major psi	Effective Stresses 1:3 Ratio	Pore Pres. psi	P psi	Q psi
	0.0	0.000	70.0	0.0	0.0	0.00	3.50	3.50	1.00	90.00	3.50	0.00
1	5.0	0.005	89.0	5.7	0.2	3.73	2.70	6.43	2.38	90.80	4.56	1.86
2	10.0	0.010	97.0	8.1	0.3	5.29	2.70	7.99	2.96	90.80	5.35	2.65
3	20.0	0.020	107.0	11.2	0.7	7.23	2.80	10.03	3.58	90.70	6.41	3.61
4	50.0	0.050	123.0	16.0	1.7	10.25	3.10	13.35	4.31	90.40	8.22	5.12
5	80.0	0.080	133.0	19.0	2.7	12.06	3.50	15.56	4.44	90.00	9.53	6.03
6	110.0	0.110	138.0	20.5	3.7	12.88	3.80	16.68	4.39	89.70	10.24	6.44
7	150.0	0.150	142.0	21.7	5.0	13.45	4.00	17.45	4.36	89.50	10.72	6.72
8	200.0	0.200	145.0	22.6	6.7	13.76	4.10	17.86	4.36	89.40	10.98	6.88
9	250.0	0.250	146.0	22.9	8.3	13.70	4.40	18.10	4.11	89.10	11.25	6.85
10	300.0	0.300	146.0	22.9	10.0	13.45	4.50	17.95	3.99	89.00	11.22	6.72
11	350.0	0.350	149.0	23.8	11.7	13.72	4.40	18.12	4.12	89.10	11.26	6.86
12	400.0	0.400	151.0	24.4	13.4	13.80	4.40	18.20	4.14	89.10	11.30	6.90
13	450.0	0.450	152.0	24.7	15.0	13.70	4.20	17.90	4.26	89.30	11.05	6.85

Specimen Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Consolidated	Final
Wt. moist soil and tare:	110.870			144.920
dry soil and tare:	90.960			105.780
Wt. of tare:	30.350			30.350
Weight, gms:	143.6			
Diameter, in:	1.400	1.400	1.398	
Area, in²:	1.539	1.540	1.535	
Height, in:	3.000	2.999	2.997	
Net decrease in height, in:		0.001	0.002	
Net decrease in water volume, cc:		0.000	0.300	
% Moisture:	32.8	32.8	32.6	51.9
Wet density, pcf:	118.5	118.4	118.7	
Dry density, pcf:	89.2	89.2	89.5	
Void ratio:	0.8833	0.8836	0.8762	
% Saturation:	100.0	100.0	100.0	

Test Readings Data for Specimen No. 2

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.31199 lbs per input unit
Secondary load ring constant= 0.72824 lbs per input unit
Crossover reading for secondary load ring= 480 input units
Consolidation cell pressure = 96.90 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 6.90 psi
Strain rate, %/min = 0.01
FAIL. STRESS = 22.11 psi at reading no. 13
[illegible]. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Major psi	1:3 Ratio	Pore Pres. psi	P psi	Q psi
0	0.0	0.000	67.0	0.0	0.0	0.00	6.90	6.90	1.00	90.00	6.90	0.00
1	5.0	0.005	108.0	12.8	0.2	8.32	4.70	13.02	2.77	92.20	8.86	4.16
2	10.0	0.010	120.0	16.5	0.3	10.74	4.10	14.84	3.62	92.80	9.47	5.37
3	20.0	0.020	129.0	19.3	0.7	12.52	3.90	16.42	4.21	93.00	10.16	6.26
4	50.0	0.050	143.0	23.7	1.7	15.19	4.40	19.59	4.45	92.50	11.99	7.59
5	80.0	0.080	152.0	26.5	2.7	16.81	4.90	21.71	4.43	92.00	13.31	8.41
6	110.0	0.110	159.0	28.7	3.7	18.01	5.50	23.51	4.27	91.40	14.51	9.01
7	150.0	0.150	166.0	30.9	5.0	19.11	6.20	25.31	4.08	90.70	15.76	9.56
8	200.0	0.200	172.0	32.8	6.7	19.92	6.70	26.62	3.97	90.20	16.66	9.96
9	250.0	0.250	177.0	34.3	8.3	20.49	7.20	27.69	3.85	89.70	17.45	10.25
10	300.0	0.300	183.0	36.2	10.0	21.22	7.40	28.62	3.87	89.50	18.01	10.61
11	350.0	0.350	187.0	37.4	11.7	21.54	7.50	29.04	3.87	89.40	18.27	10.77
12	400.0	0.400	191.0	38.7	13.3	21.84	7.50	29.34	3.91	89.40	18.42	10.92
13	450.0	0.450	195.0	39.9	15.0	22.11	7.70	29.81	3.87	89.20	18.75	11.05

Specimen Parameters for Specimen No. 3

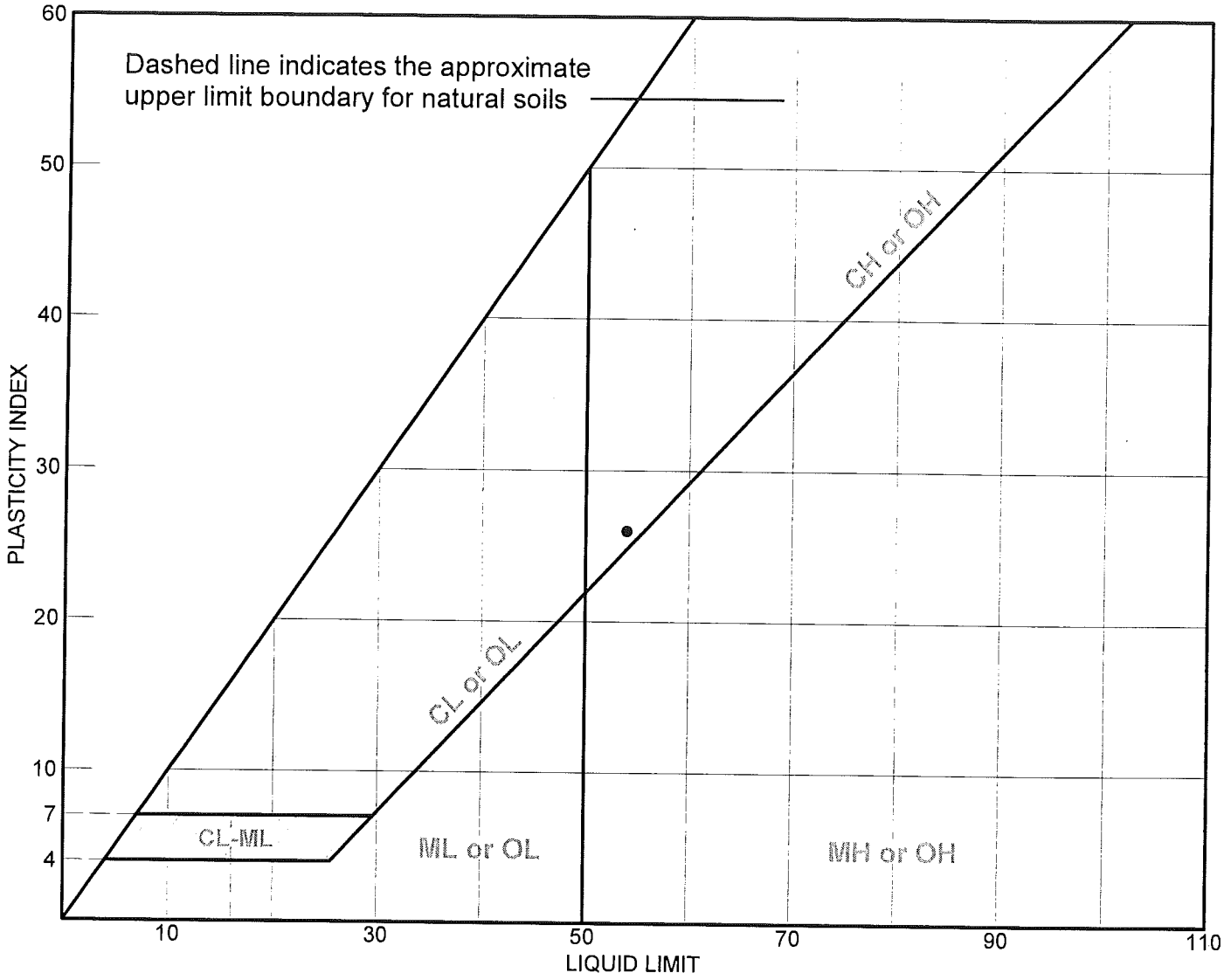
Specimen Parameter	Initial	Saturated	Consolidated	Final
Wt. moist soil and tare:	102.110			145.210
dry soil and tare:	84.150			104.950
Wt. of tare:	30.310			30.310
Weight, gms:	143.1			
Diameter, in:	1.400	1.400	1.399	
Area, in²:	1.539	1.540	1.537	
Height, in:	3.000	2.999	2.988	
Net decrease in height, in:		0.001	0.011	
Net decrease in water volume, cc:		0.000	0.400	
% Moisture:	33.4	33.4	33.0	53.9
Wet density, pcf:	118.0	118.0	118.3	
Dry density, pcf:	88.5	88.5	89.0	
Void ratio:	0.8973	0.8973	0.8873	
% Saturation:	100.0	100.0	100.0	

Test Readings Data for Specimen No. 3

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.3108 lbs per input unit
Secondary load ring constant= 0.77882 lbs per input unit
Crossover reading for secondary load ring= 474 input units
Consolidation cell pressure = 103.90 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 13.90 psi
Strain rate, %/min = 0.01
FAIL. STRESS = 22.41 psi at reading no. 12
[illegible]. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Effective Stresses Major psi	Effective Stresses 1:3 Ratio	Pore Pres. psi	P psi	Q psi
0	0.0	0.000	75.0	0.0	0.0	0.00	13.90	13.90	1.00	90.00	13.90	0.00
1	5.0	0.005	90.0	4.7	0.2	3.03	12.70	15.73	1.24	91.20	14.21	1.51
2	10.0	0.010	106.0	9.6	0.3	6.25	11.70	17.95	1.53	92.20	14.82	3.12
3	20.0	0.020	138.0	19.6	0.7	12.65	8.20	20.85	2.54	95.70	14.53	6.33
4	50.0	0.050	163.0	27.4	1.7	17.49	6.60	24.09	3.65	97.30	15.35	8.75
5	80.0	0.080	171.0	29.8	2.7	18.89	7.10	25.99	3.66	96.80	16.54	9.44
6	110.0	0.110	177.0	31.7	3.7	19.86	7.50	27.36	3.65	96.40	17.43	9.93
7	150.0	0.150	184.0	33.9	5.0	20.93	8.00	28.93	3.62	95.90	18.46	10.46
8	200.0	0.200	189.0	35.4	6.7	21.50	8.50	30.00	3.53	95.40	19.25	10.75
9	250.0	0.250	193.0	36.7	8.4	21.86	9.00	30.86	3.43	94.90	19.93	10.93
10	300.0	0.300	196.0	37.6	10.0	22.00	8.60	30.60	3.56	95.30	19.60	11.00
11	350.0	0.350	200.0	38.9	11.7	22.31	9.20	31.51	3.42	94.70	20.35	11.15
12	400.0	0.400	203.0	39.8	13.4	22.41	9.40	31.81	3.38	94.50	20.61	11.21
13	450.0	0.450	205.0	40.4	15.1	22.32	9.60	31.92	3.33	94.30	20.76	11.16

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Plant Bowen	10	3-5		28	54	26	

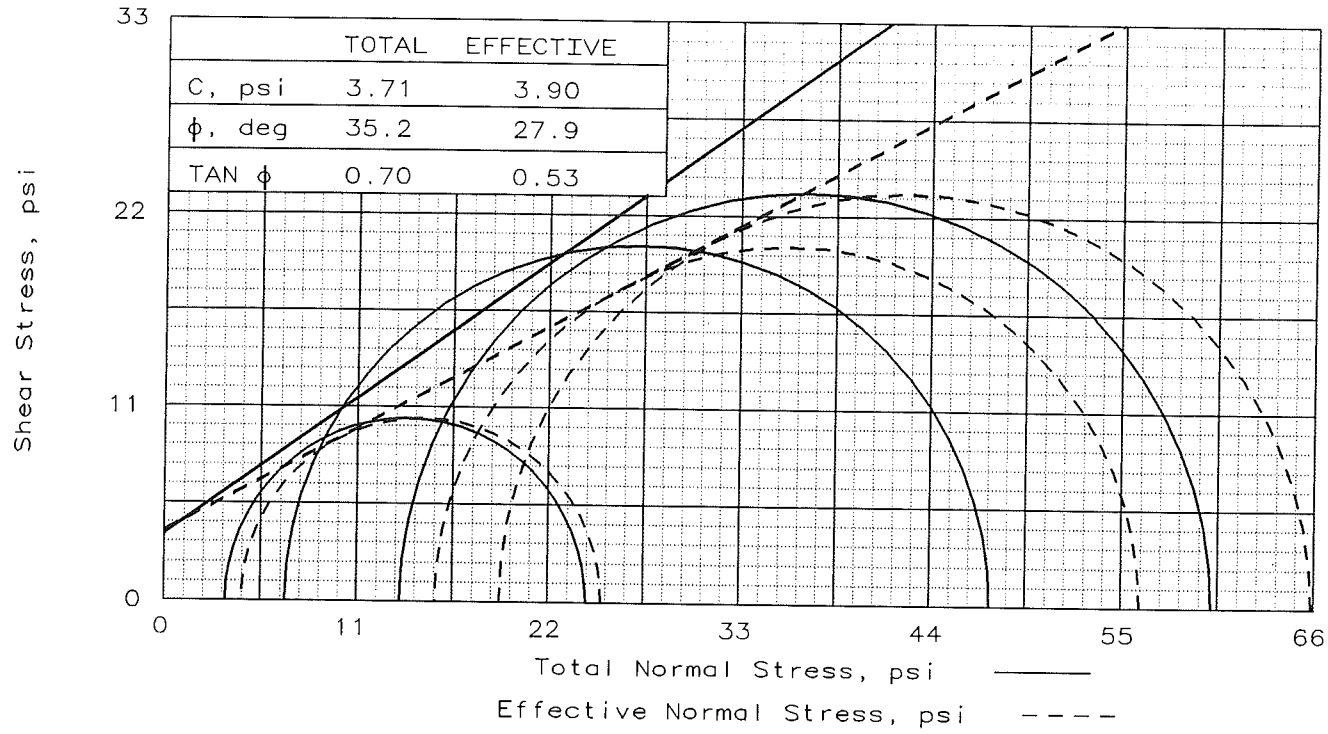
LIQUID AND PLASTIC LIMITS TEST REPORT

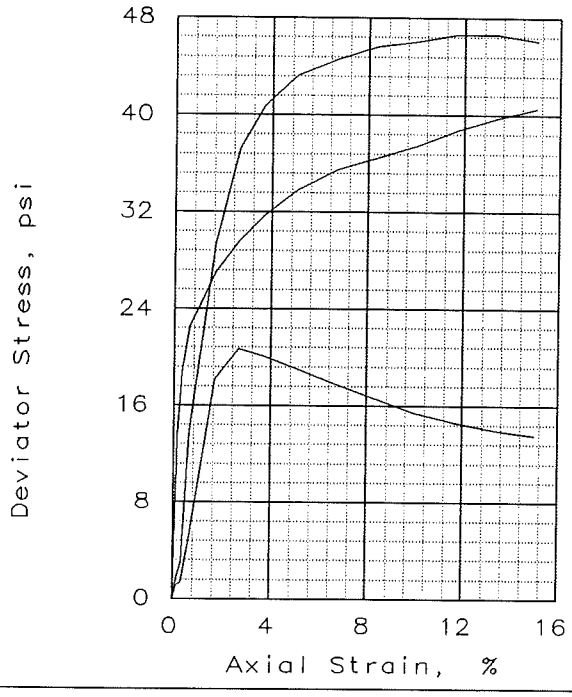
SOUTHERN COMPANY

Client: Southern Company

Project: GPCo - Plant Bowen Stability

Project No.: 2051 **Lab No.** 10





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	21.0	19.9	19.8
	DRY DENSITY, pcf	107.5	109.6	109.9
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.568	0.539	0.533
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	3.00
AT TEST	WATER CONTENT, %	20.8	19.8	19.5
	DRY DENSITY, pcf	107.9	109.9	110.4
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.561	0.534	0.527
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	3.00
Strain rate, %/min		0.0080	0.0078	0.0078
BACK PRESSURE, psi		90.0	90.0	90.0
CELL PRESSURE, psi		93.5	96.9	103.5
FAIL. STRESS, psi		20.7	40.5	46.6
TOTAL PORE PR., psi		89.1	81.4	84.3
ULT. STRESS, psi				
TOTAL PORE PR., psi				
$\bar{\sigma}_1$ FAILURE, psi		25.1	56.0	65.8
$\bar{\sigma}_3$ FAILURE, psi		4.4	15.5	19.2

TYPE OF TEST:
CU with Pore Pressures
SAMPLE TYPE: UD
DESCRIPTION:

LL= 54 PL= 28 PI= 26
SPECIFIC GRAVITY= 2.7
REMARKS: SAMPLE NO: UD-11
DEPTH: 3.0-5.0 FEET

Lab No: 10

CLIENT: SOUTHERN COMPANY

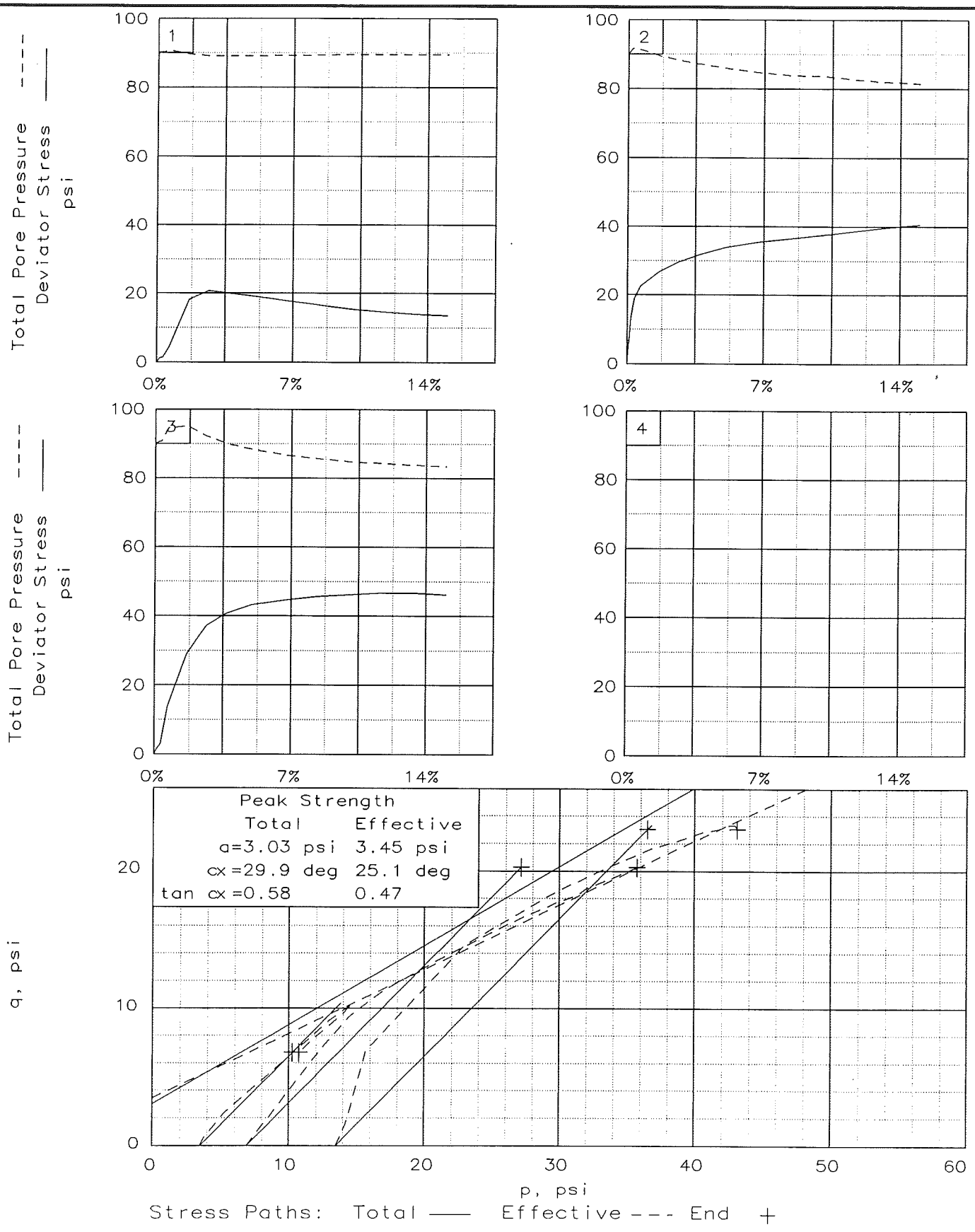
PROJECT: PLANT BOWEN STABILITY

SAMPLE LOCATION: PLANT BOWEN
DCP-38

PROJ. NO.: 2051 DATE: 02/12/2003

TRIAXIAL SHEAR TEST REPORT

SOUTHERN COMPANY SERVICES



Client: SOUTHERN COMPANY

Project: PLANT BOWEN STABILITY

Location: PLANT BOWEN DCP-38

File: GPBOW10 Project No.: 2051 Lab No: 10

Project and Sample Data

Date: 02/12/2003
Client: SOUTHERN COMPANY
Project: PLANT BOWEN STABILITY
Sample location: PLANT BOWEN DCP-38
Sample description:
Remarks: SAMPLE NO: UD-11 DEPTH: 3.0-5.0 FEET

Fig no.: 10 2nd page Fig no. (if applicable): 10
Type of sample: UD
Specific gravity= 2.70 LL= 54 PL= 28 PI= 26
Test method: Corps of Eng. - saturation assumed

Specimen Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Wt. moist soil and tare:	132.420			161.610
Wt. dry soil and tare:	114.680			129.220
Wt. of tare:	30.310			30.310
Weight, gms:	157.7			
Diameter, in:	1.400	1.400	1.398	
Area, in²:	1.539	1.540	1.534	
Height, in:	3.000	2.999	2.998	
Net decrease in height, in:		0.001	0.001	
Net decrease in water volume, cc:		0.000	0.300	
[illegible]oisture:	21.0	21.0	20.8	32.7
[illegible] density, pcf:	130.1	130.1	130.4	
Dry density, pcf:	107.5	107.5	107.9	
Void ratio:	0.5677	0.5677	0.5615	
% Saturation:	100.0	100.0	100.0	

Test Readings Data for Specimen No. 1

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.30179 lbs per input unit
Secondary load ring constant= 0.72586 lbs per input unit
Crossover reading for secondary load ring= 462 input units
Consolidation cell pressure = 93.50 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 3.50 psi
Strain rate, %/min = 0.01
FAIL. STRESS = 20.68 psi at reading no. 5
ULT. STRESS = not selected

Test Readings Data for Specimen No. 1

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Major psi	1:3 Ratio	Pore Pres. psi	P psi	Q psi
	0.0	0.000	68.0	0.0	0.0	0.00	3.50	3.50	1.00	90.00	3.50	0.00
1	5.0	0.005	74.0	1.8	0.2	1.18	3.20	4.38	1.37	90.30	3.79	0.59
2	10.0	0.010	75.0	2.1	0.3	1.37	3.20	4.57	1.43	90.30	3.89	0.69
3	20.0	0.020	93.0	7.5	0.7	4.88	2.90	7.78	2.68	90.60	5.34	2.44
4	50.0	0.050	162.0	28.4	1.7	18.18	3.90	22.08	5.66	89.60	12.99	9.09
5	80.0	0.080	176.0	32.6	2.7	20.68	4.40	25.08	5.70	89.10	14.74	10.34
6	110.0	0.110	174.0	32.0	3.7	20.08	4.40	24.48	5.56	89.10	14.44	10.04
7	150.0	0.150	170.0	30.8	5.0	19.06	4.40	23.46	5.33	89.10	13.93	9.53
8	200.0	0.200	165.0	29.3	6.7	17.81	4.30	22.11	5.14	89.20	13.20	8.90
9	250.0	0.250	160.0	27.8	8.3	16.59	4.20	20.79	4.95	89.30	12.49	8.29
10	300.0	0.300	155.0	26.3	10.0	15.40	4.00	19.40	4.85	89.50	11.70	7.70
11	350.0	0.350	152.0	25.4	11.7	14.59	4.00	18.59	4.65	89.50	11.30	7.30
12	400.0	0.400	150.0	24.7	13.3	13.98	4.00	17.98	4.49	89.50	10.99	6.99
13	450.0	0.450	149.0	24.4	15.0	13.54	4.00	17.54	4.39	89.50	10.77	6.77

Specimen Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Consolidated	Final
moist soil and tare:	115.030			160.970
dry soil and tare:	100.950			131.140
Wt. of tare:	30.350			30.350
Weight, gms:	159.3			
Diameter, in:	1.400	1.400	1.399	
Area, in^2:	1.539	1.540	1.537	
Height, in:	3.000	2.999	2.997	
Net decrease in height, in:		0.001	0.002	
Net decrease in water volume, cc:		0.000	0.200	
% Moisture:	19.9	19.9	19.8	29.6
Wet density, pcf:	131.4	131.4	131.6	
Dry density, pcf:	109.6	109.6	109.9	
Void ratio:	0.5386	0.5385	0.5344	
% Saturation:	100.0	100.0	100.0	

Test Readings Data for Specimen No. 2

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.31199 lbs per input unit
Secondary load ring constant= 0.72824 lbs per input unit
Crossover reading for secondary load ring= 480 input units
Consolidation cell pressure = 96.90 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 6.90 psi
Strain rate, %/min = 0.01
FAIL. STRESS = 40.55 psi at reading no. 13
. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Major psi	1:3 Ratio	Pore Pres. psi	P psi	Q psi
0	0.0	0.000	66.0	0.0	0.0	0.00	6.90	6.90	1.00	90.00	6.90	0.00
1	5.0	0.005	133.0	20.9	0.2	13.58	5.40	18.98	3.51	91.50	12.19	6.79
2	10.0	0.010	159.0	29.0	0.3	18.82	5.10	23.92	4.69	91.80	14.51	9.41
3	20.0	0.020	178.0	34.9	0.7	22.59	5.70	28.29	4.96	91.20	16.99	11.29
4	50.0	0.050	201.0	42.1	1.7	26.95	7.50	34.45	4.59	89.40	20.98	13.48
5	80.0	0.080	216.0	46.8	2.7	29.64	8.80	38.44	4.37	88.10	23.62	14.82
6	110.0	0.110	228.0	50.5	3.7	31.68	9.80	41.48	4.23	87.10	25.64	15.84
7	150.0	0.150	241.0	54.6	5.0	33.75	11.00	44.75	4.07	85.90	27.88	16.88
8	200.0	0.200	253.0	58.3	6.7	35.43	12.20	47.63	3.90	84.70	29.92	17.72
9	250.0	0.250	262.0	61.2	8.3	36.47	13.10	49.57	3.78	83.80	31.34	18.24
10	300.0	0.300	271.0	64.0	10.0	37.45	13.30	50.75	3.82	83.60	32.03	18.73
11	350.0	0.350	282.0	67.4	11.7	38.73	14.30	53.03	3.71	82.60	33.67	19.37
12	400.0	0.400	292.0	70.5	13.3	39.76	15.00	54.76	3.65	81.90	34.88	19.88
13	450.0	0.450	301.0	73.3	15.0	40.55	15.50	56.05	3.62	81.40	35.77	20.27

Specimen Parameters for Specimen No. 3

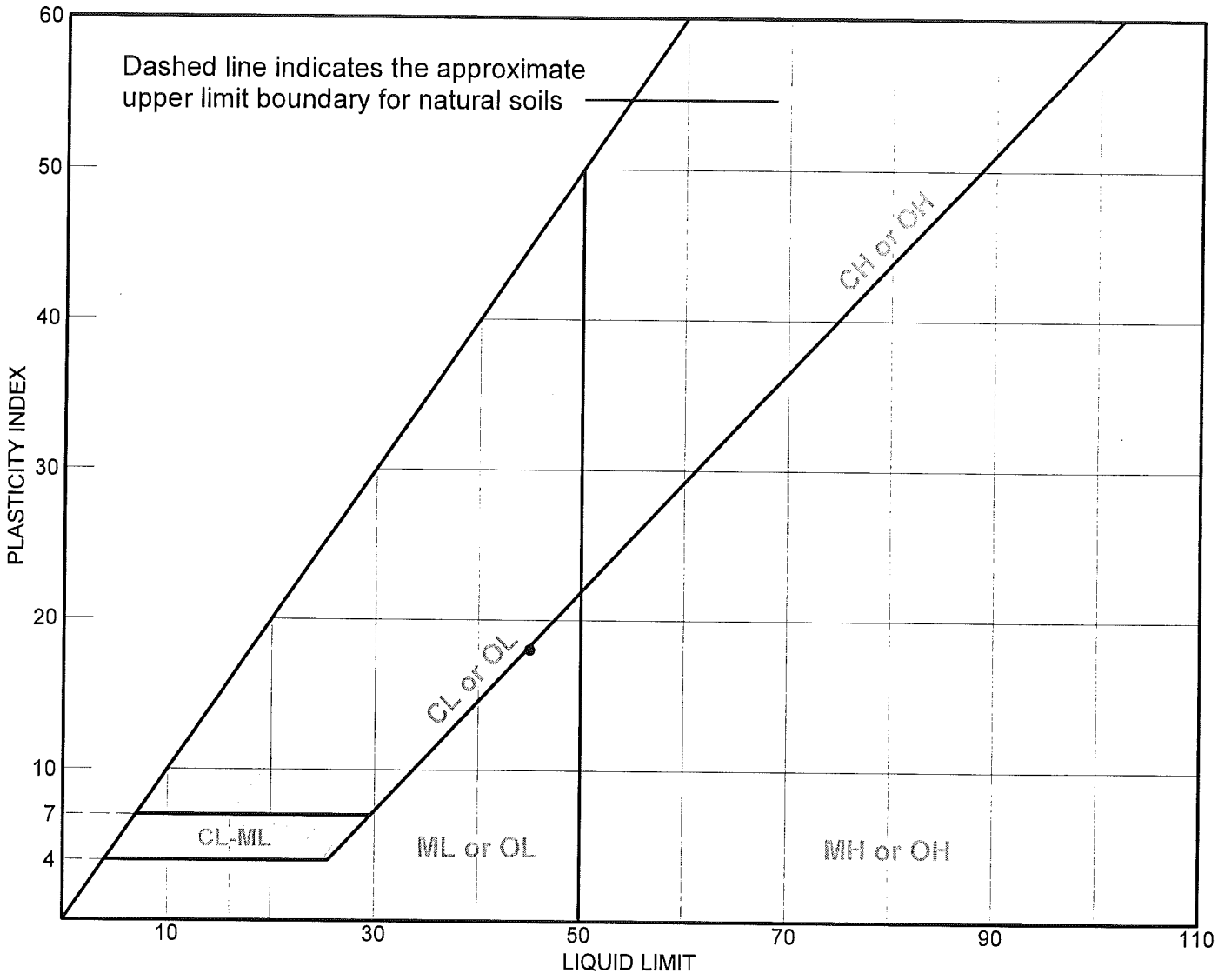
Specimen Parameter	Initial	Saturated	Consolidated	Final
moist soil and tare:	119.040			160.950
dry soil and tare:	104.400			131.170
Wt. of tare:	30.300			30.300
Weight, gms:	159.6			
Diameter, in:	1.400	1.400	1.398	
Area, in²:	1.539	1.540	1.536	
Height, in:	3.000	2.999	2.995	
Net decrease in height, in:		0.001	0.004	
Net decrease in water volume, cc:		0.000	0.300	
% Moisture:	19.8	19.8	19.5	29.5
Wet density, pcf:	131.6	131.6	131.9	
Dry density, pcf:	109.9	109.9	110.4	
Void ratio:	0.5333	0.5334	0.5274	
% Saturation:	100.0	100.0	100.0	

Test Readings Data for Specimen No. 3

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.3108 lbs per input unit
Secondary load ring constant= 0.77882 lbs per input unit
Crossover reading for secondary load ring= 474 input units
Consolidation cell pressure = 103.50 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 13.50 psi
Strain rate, %/min = 0.01
FAIL. STRESS = 46.64 psi at reading no. 11
. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Effective Stresses Major psi	Effective Stresses 1:3 Ratio	Pore Pres. psi	P psi	Q psi
0	0.0	0.000	77.0	0.0	0.0	0.00	13.50	13.50	1.00	90.00	13.50	0.00
1	5.0	0.005	86.0	2.8	0.2	1.82	13.00	14.82	1.14	90.50	13.91	0.91
2	10.0	0.010	92.0	4.7	0.3	3.03	12.70	15.73	1.24	90.80	14.21	1.51
3	20.0	0.020	146.0	21.4	0.7	13.87	8.80	22.67	2.58	94.70	15.73	6.93
4	50.0	0.050	224.0	45.7	1.7	29.25	8.40	37.65	4.48	95.10	23.02	14.62
5	80.0	0.080	266.0	58.7	2.7	37.22	11.40	48.62	4.27	92.10	30.01	18.61
6	110.0	0.110	286.0	65.0	3.7	40.74	13.50	54.24	4.02	90.00	33.87	20.37
7	150.0	0.150	302.0	69.9	5.0	43.25	15.20	58.45	3.85	88.30	36.82	21.62
8	200.0	0.200	313.0	73.3	6.7	44.57	16.80	61.37	3.65	86.70	39.08	22.28
9	250.0	0.250	323.0	76.5	8.3	45.62	17.80	63.42	3.56	85.70	40.61	22.81
10	300.0	0.300	330.0	78.6	10.0	46.07	18.70	64.77	3.46	84.80	41.73	23.03
11	350.0	0.350	338.0	81.1	11.7	46.64	19.20	65.84	3.43	84.30	42.52	23.32
12	400.0	0.400	343.0	82.7	13.4	46.64	19.70	66.34	3.37	83.80	43.02	23.32
13	450.0	0.450	345.0	83.3	15.0	46.08	20.10	66.18	3.29	83.40	43.14	23.04

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Plant Bowen	11	5-7		27	45	18	

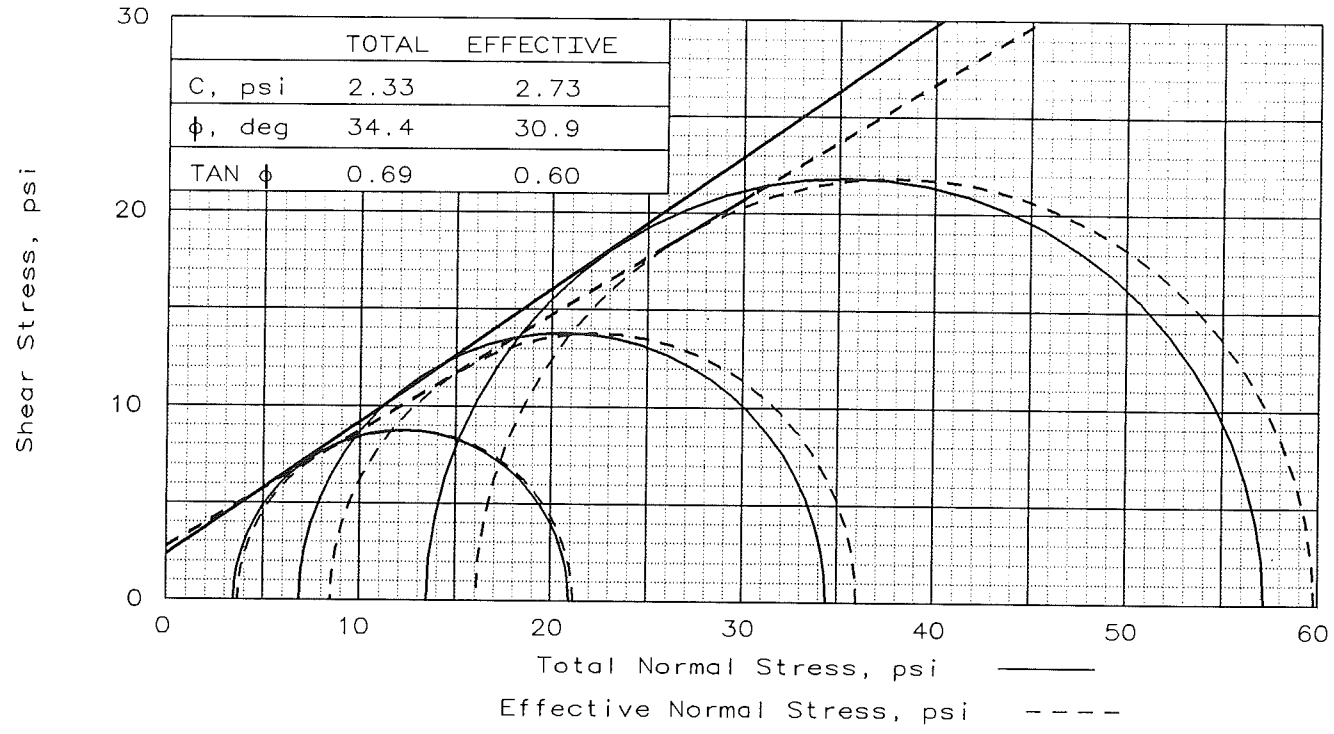
LIQUID AND PLASTIC LIMITS TEST REPORT

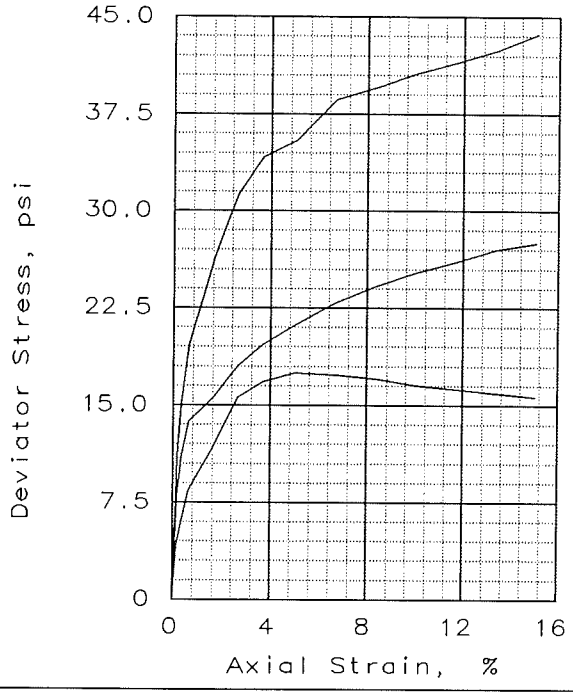
SOUTHERN COMPANY

Client: Southern Company

Project: GPCo - Plant Bowen Stability

Project No.: 2051 **Lab No.** 11





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	25.2	20.2	19.7
	DRY DENSITY, pcf	98.8	106.3	109.0
	SATURATION, %	98.5	95.5	100.0
	VOID RATIO	0.681	0.562	0.524
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	3.00
AT TEST	WATER CONTENT, %	24.9	19.9	19.5
	DRY DENSITY, pcf	99.9	108.7	109.4
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.662	0.528	0.518
	DIAMETER, in	1.39	1.39	1.40
	HEIGHT, in	2.99	2.99	2.99
Strain rate, %/min		0.0080	0.0080	0.0080
BACK PRESSURE, psi		90.0	90.0	90.0
CELL PRESSURE, psi		93.5	96.9	103.5
FAIL. STRESS, psi		17.5	27.5	43.7
TOTAL PORE PR., psi		89.8	88.4	87.4
ULT. STRESS, psi				
TOTAL PORE PR., psi				
$\bar{\sigma}_1$ FAILURE, psi		21.2	36.0	59.8
$\bar{\sigma}_3$ FAILURE, psi		3.7	8.5	16.1

TYPE OF TEST:
CU with Pore Pressures
SAMPLE TYPE: UD
DESCRIPTION:

LL= 45 PL= 27 PI= 18
SPECIFIC GRAVITY= 2.66
REMARKS: SAMPLE NO: UD-12
DEPTH: 5.0-7.0 FEET

Lab No: 11

CLIENT: SOUTHERN COMPANY

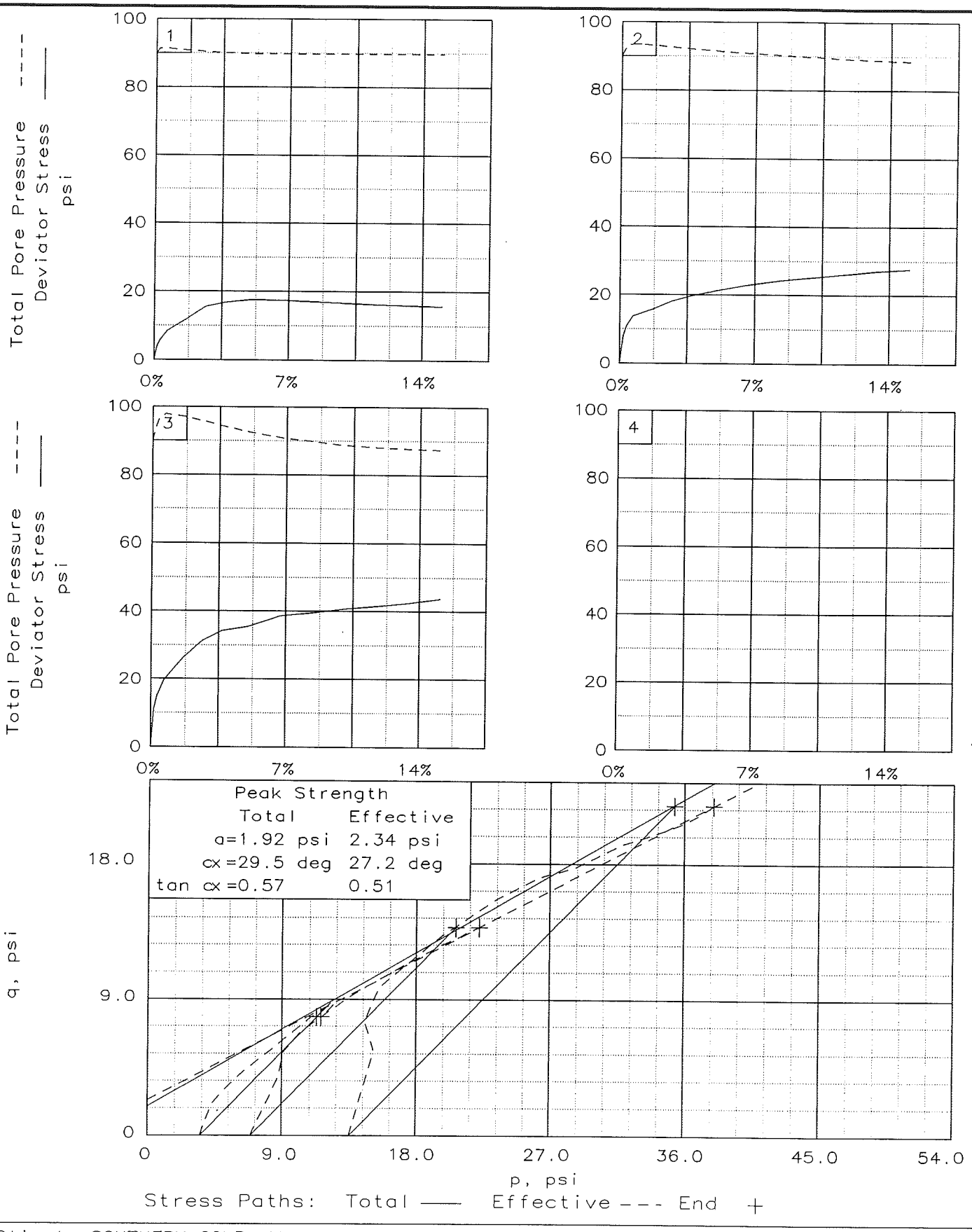
PROJECT: PLANT BOWEN STABILITY

SAMPLE LOCATION: PLANT BOWEN
DCP-38

PROJ. NO.: 2051 DATE: 02/17/2003

TRIAXIAL SHEAR TEST REPORT

SOUTHERN COMPANY SERVICES



Client: SOUTHERN COMPANY

Project: PLANT BOWEN STABILITY

Location: PLANT BOWEN DCP-38

File: GPBOW11 Project No.: 2051 Lab No: 11

Project and Sample Data

Date: 02/17/2003
Client: SOUTHERN COMPANY
Project: PLANT BOWEN STABILITY
Sample location: PLANT BOWEN DCP-38
Sample description:
Remarks: SAMPLE NO: UD-12 DEPTH: 5.0-7.0 FEET

Fig no.: 11 2nd page Fig no. (if applicable): 11
Type of sample: UD
Specific gravity= 2.66 LL= 45 PL= 27 PI= 18
Test method: Corps of Eng. - saturation assumed

Specimen Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Wt. moist soil and tare:	115.650			153.910
Wt. dry soil and tare:	98.470			118.890
Wt. of tare:	30.350			30.350
Weight, gms:	150.0			
Diameter, in:	1.400	1.396	1.394	
Area, in²:	1.539	1.531	1.525	
Height, in:	3.000	2.999	2.994	
Net decrease in height, in:		0.001	0.005	
Net decrease in water volume, cc:		0.000	0.400	
Moisture:	25.2	25.2	24.9	39.6
Wet density, pcf:	123.7	124.5	124.8	
Dry density, pcf:	98.8	99.4	99.9	
Void ratio:	0.6808	0.6709	0.6620	
% Saturation:	98.5	100.0	100.0	

Test Readings Data for Specimen No. 1

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.30179 lbs per input unit
Secondary load ring constant= 0.72586 lbs per input unit
Crossover reading for secondary load ring= 462 input units
Consolidation cell pressure = 93.50 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 3.50 psi
Strain rate, %/min = 0.01
FAIL. STRESS = 17.48 psi at reading no. 7
ULT. STRESS = not selected

Test Readings Data for Specimen No. 1

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Effective Stresses Major psi	Effective Stresses 1:3 Ratio	Pore Pres. psi	P psi	Q psi
	0.0	0.000	69.0	0.0	0.0	0.00	3.50	3.50	1.00	90.00	3.50	0.00
1	5.0	0.005	90.0	6.3	0.2	4.15	2.20	6.35	2.89	91.30	4.27	2.07
2	10.0	0.010	99.0	9.1	0.3	5.92	2.10	8.02	3.82	91.40	5.06	2.96
3	20.0	0.020	112.0	13.0	0.7	8.45	2.20	10.65	4.84	91.30	6.43	4.23
4	50.0	0.050	130.0	18.4	1.7	11.87	2.70	14.57	5.40	90.80	8.63	5.93
5	80.0	0.080	150.0	24.4	2.7	15.60	3.10	18.70	6.03	90.40	10.90	7.80
6	110.0	0.110	157.0	26.6	3.7	16.77	3.50	20.27	5.79	90.00	11.89	8.39
7	150.0	0.150	162.0	28.1	5.0	17.48	3.70	21.18	5.72	89.80	12.44	8.74
8	200.0	0.200	163.0	28.4	6.7	17.36	3.80	21.16	5.57	89.70	12.48	8.68
9	250.0	0.250	163.0	28.4	8.4	17.05	3.80	20.85	5.49	89.70	12.32	8.52
10	300.0	0.300	162.0	28.1	10.0	16.56	3.80	20.36	5.36	89.70	12.08	8.28
11	350.0	0.350	162.0	28.1	11.7	16.25	3.80	20.05	5.28	89.70	11.93	8.13
12	400.0	0.400	162.0	28.1	13.4	15.94	3.80	19.74	5.20	89.70	11.77	7.97
13	450.0	0.450	162.0	28.1	15.0	15.64	3.80	19.44	5.11	89.70	11.62	7.82

Specimen Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Consolidated	Final
moist soil and tare:	144.090			158.670
dry soil and tare:	124.990			127.660
Wt. of tare:	30.310			30.310
Weight, gms:	154.9			
Diameter, in:	1.400	1.389	1.387	
Area, in²:	1.539	1.515	1.512	
Height, in:	3.000	2.999	2.990	
Net decrease in height, in:		0.001	0.009	
Net decrease in water volume, cc:		0.000	0.400	
% Moisture:	20.2	20.2	19.9	31.9
Wet density, pcf:	127.8	129.9	130.2	
Dry density, pcf:	106.3	108.1	108.7	
Void ratio:	0.5617	0.5366	0.5284	
% Saturation:	95.5	100.0	100.0	

Test Readings Data for Specimen No. 2

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.31199 lbs per input unit
Secondary load ring constant= 0.72824 lbs per input unit
Crossover reading for secondary load ring= 480 input units
Consolidation cell pressure = 96.90 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 6.90 psi
Strain rate, %/min = 0.01
FAIL. STRESS = 27.53 psi at reading no. 13
. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Major psi	1:3 Ratio	Pore Pres. psi	P psi	Q psi
0	0.0	0.000	66.0	0.0	0.0	0.00	6.90	6.90	1.00	90.00	6.90	0.00
1	5.0	0.005	105.0	12.2	0.2	8.04	4.80	12.84	2.67	92.10	8.82	4.02
2	10.0	0.010	119.0	16.5	0.3	10.90	3.60	14.50	4.03	93.30	9.05	5.45
3	20.0	0.020	133.0	20.9	0.7	13.74	3.40	17.14	5.04	93.50	10.27	6.87
4	50.0	0.050	143.0	24.0	1.7	15.63	3.80	19.43	5.11	93.10	11.61	7.81
5	80.0	0.080	156.0	28.1	2.7	18.08	4.30	22.38	5.20	92.60	13.34	9.04
6	110.0	0.110	165.0	30.9	3.7	19.68	4.80	24.48	5.10	92.10	14.64	9.84
7	150.0	0.150	174.0	33.7	5.0	21.17	5.40	26.57	4.92	91.50	15.99	10.59
8	200.0	0.200	185.0	37.1	6.7	22.92	6.10	29.02	4.76	90.80	17.56	11.46
9	250.0	0.250	194.0	39.9	8.4	24.21	6.70	30.91	4.61	90.20	18.81	12.11
10	300.0	0.300	202.0	42.4	10.0	25.26	7.20	32.46	4.51	89.70	19.83	12.63
11	350.0	0.350	209.0	44.6	11.7	26.06	7.70	33.76	4.38	89.20	20.73	13.03
12	400.0	0.400	217.0	47.1	13.4	27.00	8.10	35.10	4.33	88.80	21.60	13.50
13	450.0	0.450	223.0	49.0	15.1	27.53	8.50	36.03	4.24	88.40	22.26	13.76

Specimen Parameters for Specimen No. 3

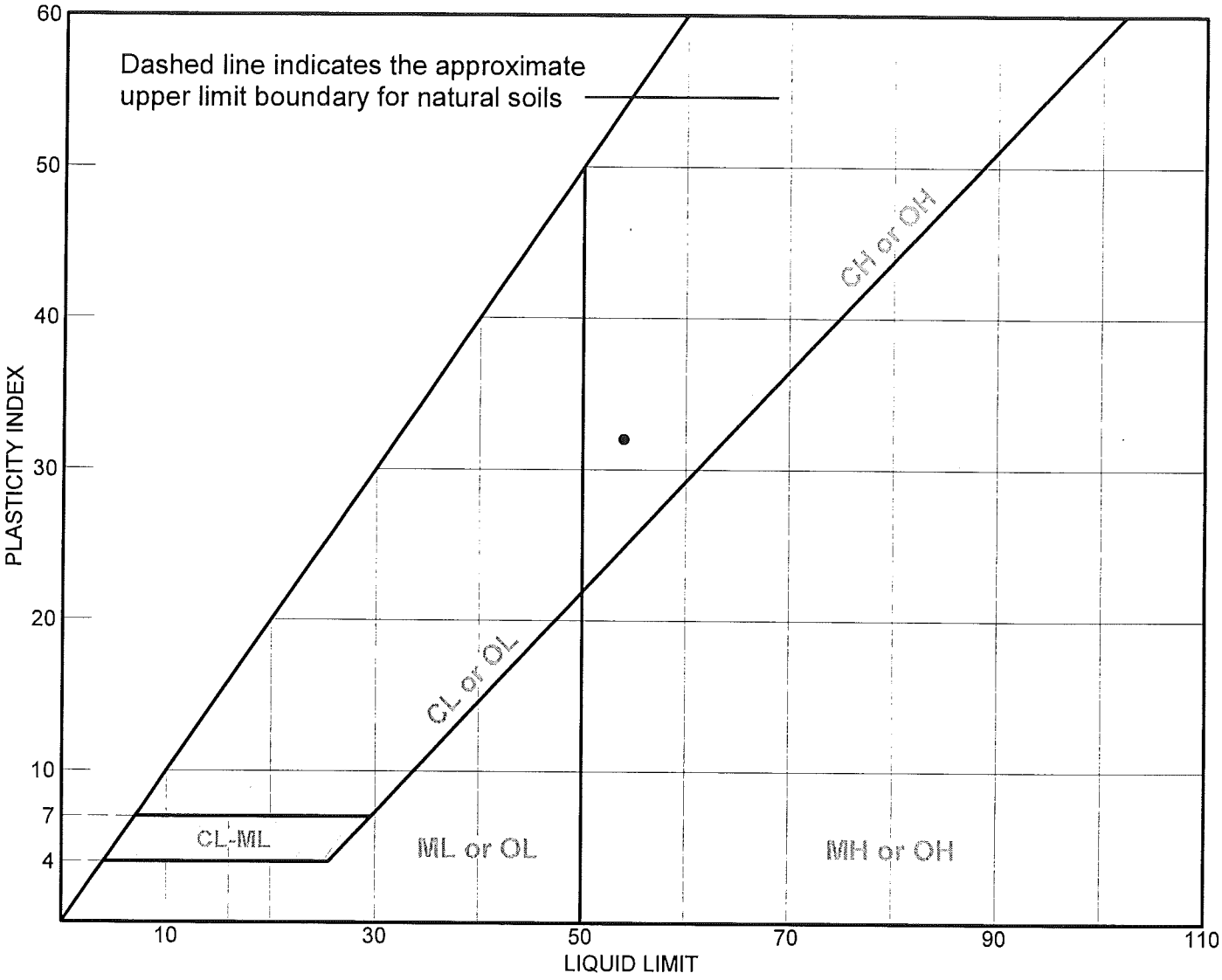
Specimen Parameter	Initial	Saturated	Consolidated	Final
Wt. moist soil and tare:	112.070			160.880
dry soil and tare:	98.620			131.980
Wt. of tare:	30.300			30.300
Weight, gms:	158.1			
Diameter, in:	1.400	1.400	1.401	
Area, in²:	1.539	1.540	1.541	
Height, in:	3.000	2.999	2.985	
Net decrease in height, in:		0.001	0.014	
Net decrease in water volume, cc:		0.000	0.300	
% Moisture:	19.7	19.7	19.5	28.4
Wet density, pcf:	130.4	130.4	130.7	
Dry density, pcf:	109.0	109.0	109.4	
Void ratio:	0.5238	0.5237	0.5176	
% Saturation:	100.0	100.0	100.0	

Test Readings Data for Specimen No. 3

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.3108 lbs per input unit
Secondary load ring constant= 0.77882 lbs per input unit
Crossover reading for secondary load ring= 474 input units
Consolidation cell pressure = 103.50 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 13.50 psi
Strain rate, %/min = 0.01
FAIL. STRESS = 43.68 psi at reading no. 13
. STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Effective Stresses Major psi	Effective Stresses 1:3 Ratio	Pore Pres. psi	P psi	Q psi
0	0.0	0.000	77.0	0.0	0.0	0.00	13.50	13.50	1.00	90.00	13.50	0.00
1	5.0	0.005	132.0	17.1	0.2	11.08	9.60	20.68	2.15	93.90	15.14	5.54
2	10.0	0.010	152.0	23.3	0.3	15.08	7.00	22.08	3.15	96.50	14.54	7.54
3	20.0	0.020	175.0	30.5	0.7	19.64	5.70	25.34	4.44	97.80	15.52	9.82
4	50.0	0.050	210.0	41.3	1.7	26.38	6.50	32.88	5.06	97.00	19.69	13.19
5	80.0	0.080	237.0	49.7	2.7	31.41	7.80	39.21	5.03	95.70	23.50	15.70
6	110.0	0.110	253.0	54.7	3.7	34.19	9.20	43.39	4.72	94.30	26.30	17.10
7	150.0	0.150	262.0	57.5	5.0	35.44	10.90	46.34	4.25	92.60	28.62	17.72
8	200.0	0.200	282.0	63.7	6.7	38.58	12.60	51.18	4.06	90.90	31.89	19.29
9	250.0	0.250	291.0	66.5	8.4	39.55	13.70	53.25	3.89	89.80	33.48	19.78
10	300.0	0.300	301.0	69.6	10.1	40.64	14.80	55.44	3.75	88.70	35.12	20.32
11	350.0	0.350	310.0	72.4	11.7	41.49	15.40	56.89	3.69	88.10	36.14	20.74
12	400.0	0.400	320.0	75.5	13.4	42.45	15.80	58.25	3.69	87.70	37.02	21.22
13	450.0	0.450	332.0	79.3	15.1	43.68	16.10	59.78	3.71	87.40	37.94	21.84

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Plant Bowen	12	7-9		22	54	32	

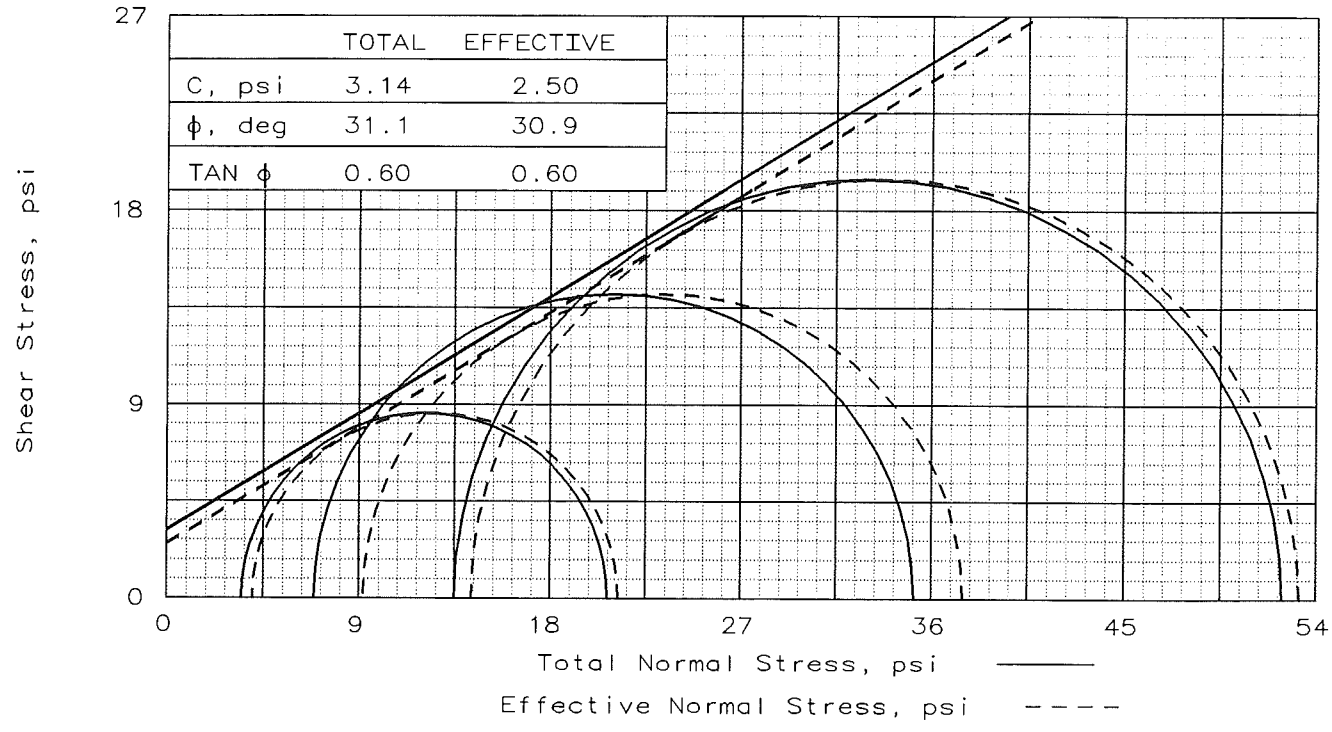
LIQUID AND PLASTIC LIMITS TEST REPORT

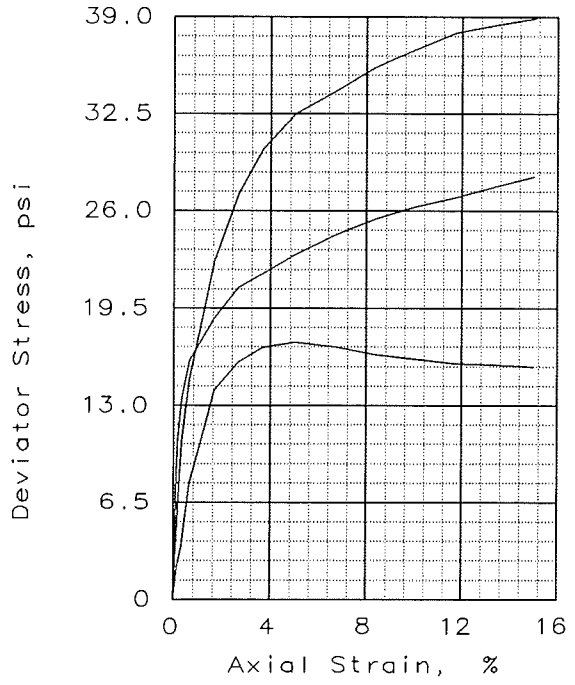
SOUTHERN COMPANY

Client: Southern Company

Project: GPCo - Plant Bowen Stability

Project No.: 2051 **Lab No.** 12





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	19.9	19.7	19.0
	DRY DENSITY, pcf	108.6	109.8	111.1
	SATURATION, %	98.1	100.0	100.0
	VOID RATIO	0.546	0.529	0.511
	DIAMETER, in	1.40	1.40	1.40
	HEIGHT, in	3.00	3.00	3.00
AT TEST	WATER CONTENT, %	18.8	19.2	18.2
	DRY DENSITY, pcf	111.6	110.7	112.8
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.505	0.517	0.489
	DIAMETER, in	1.38	1.40	1.39
	HEIGHT, in	3.00	3.00	2.98
Strain rate, %/min		0.01	0.01	0.01
BACK PRESSURE, psi		90.0	90.0	90.0
CELL PRESSURE, psi		93.5	96.9	103.5
FAIL. STRESS, psi		17.2	28.3	38.9
TOTAL PORE PR., psi		89.5	87.7	89.2
ULT. STRESS, psi				
TOTAL PORE PR., psi				
$\bar{\sigma}_1$ FAILURE, psi		21.2	37.5	53.2
$\bar{\sigma}_3$ FAILURE, psi		4.0	9.2	14.3

TYPE OF TEST:
CU with Pore Pressures
SAMPLE TYPE: UD
DESCRIPTION:

LL= 54 PL= 22 PI= 32
SPECIFIC GRAVITY= 2.69
REMARKS: SAMPLE NO: DCP-38
DEPTH 7.0-9.0 FEET

Lob No: 12

CLIENT: SOUTHERN COMPANY

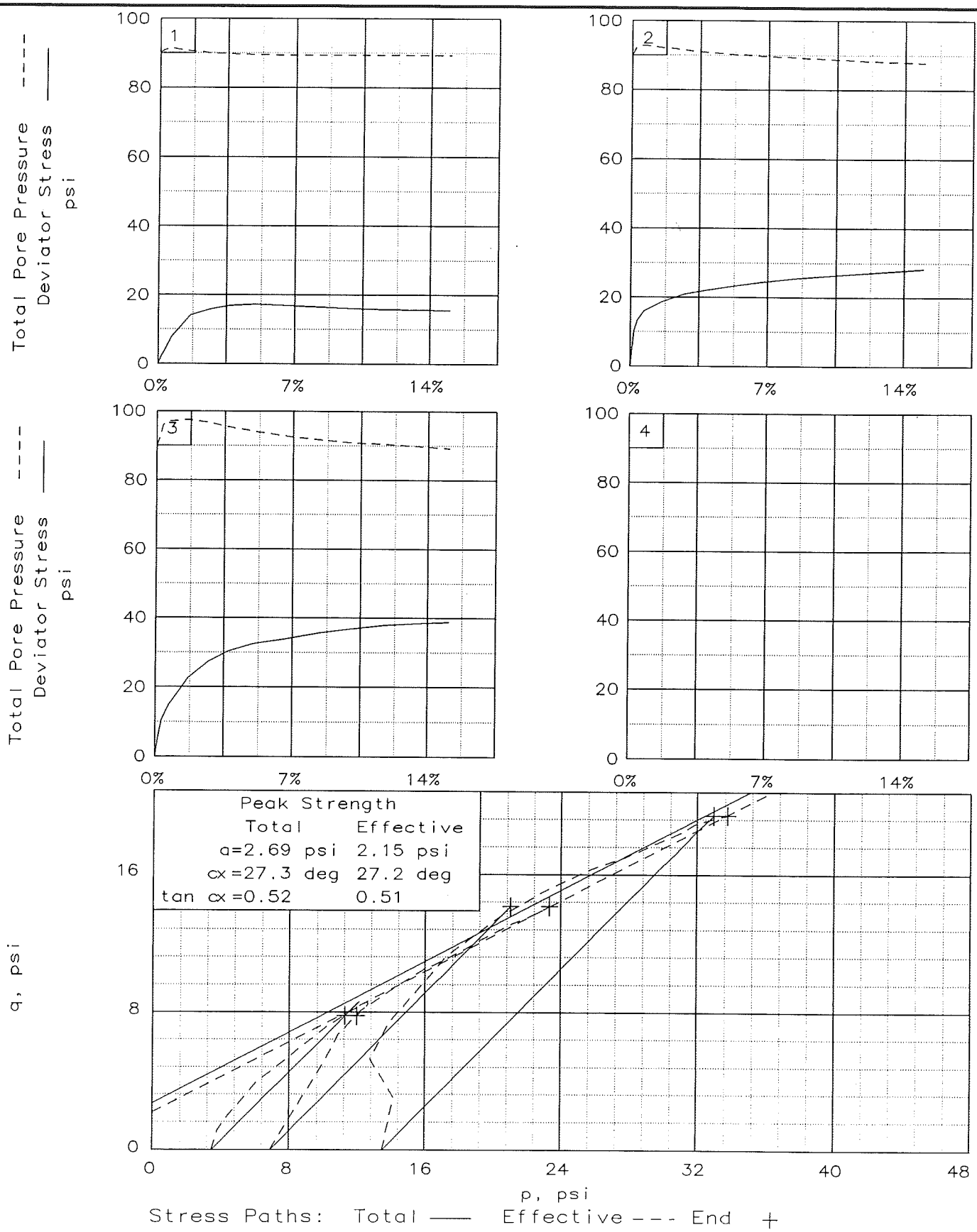
PROJECT: GPCo - PLANT BOWEN STABILITY

SAMPLE LOCATION: PLANT BOWEN

PROJ. NO.: 2051 DATE: 02/11/2003

TRIAXIAL SHEAR TEST REPORT

SOUTHERN COMPANY SERVICES



Client: SOUTHERN COMPANY

Project: GPCo - PLANT BOWEN STABILITY

Location: PLANT BOWEN

File: GPBOW12 Project No.: 2051 Lab No: 12

Project and Sample Data

Date: 02/11/2003
Client: SOUTHERN COMPANY
Project: GPCo - PLANT BOWEN STABILITY
Sample location: PLANT BOWEN
Sample description:
Remarks: SAMPLE NO: DCP-38 DEPTH 7.0-9.0 FEET

Fig no.: 12 2nd page Fig no. (if applicable): 12
Type of sample: UD
Specific gravity= 2.69 LL= 54 PL= 22 PI= 32
Test method: Corps of Eng. - saturation assumed

Specimen Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Wt. moist soil and tare:	105.260			160.930
Wt. dry soil and tare:	92.820			131.570
Wt. of tare:	30.300			30.300
Weight, gms:	157.9			
Diameter, in:	1.400	1.395	1.382	
Area, in²:	1.539	1.529	1.500	
Height, in:	3.000	2.999	2.997	
Net decrease in height, in:		0.001	0.002	
Net decrease in water volume, cc:		0.000	1.500	
% Moisture:	19.9	19.9	18.8	29.0
Wet density, pcf:	130.2	131.1	132.5	
Dry density, pcf:	108.6	109.4	111.6	
Void ratio:	0.5459	0.5352	0.5046	
% Saturation:	98.1	100.0	100.0	

Test Readings Data for Specimen No. 1

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.30179 lbs per input unit
Secondary load ring constant= 0.72586 lbs per input unit
Crossover reading for secondary load ring= 462 input units
Consolidation cell pressure = 93.50 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 3.50 psi
Strain rate, %/min = 0.01
FAIL. STRESS = 17.20 psi at reading no. 7
ULT. STRESS = not selected

Test Readings Data for Specimen No. 1

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Effective Stresses Major psi	Effective Stresses 1:3 Ratio	Pore Pres. psi	P psi	Q psi
	0.0	0.000	70.0	0.0	0.0	0.00	3.50	3.50	1.00	90.00	3.50	0.00
1	5.0	0.005	81.0	3.3	0.2	2.21	2.70	4.91	1.82	90.80	3.80	1.10
2	10.0	0.010	88.0	5.4	0.3	3.61	2.50	6.11	2.44	91.00	4.30	1.80
3	20.0	0.020	109.0	11.8	0.7	7.80	2.20	10.00	4.54	91.30	6.10	3.90
4	50.0	0.050	141.0	21.4	1.7	14.05	3.00	17.05	5.68	90.50	10.02	7.02
5	80.0	0.080	151.0	24.4	2.7	15.86	3.50	19.36	5.53	90.00	11.43	7.93
6	110.0	0.110	157.0	26.3	3.7	16.86	3.80	20.66	5.44	89.70	12.23	8.43
7	150.0	0.150	160.0	27.2	5.0	17.20	4.00	21.20	5.30	89.50	12.60	8.60
8	200.0	0.200	160.0	27.2	6.7	16.90	4.20	21.10	5.02	89.30	12.65	8.45
9	250.0	0.250	159.0	26.9	8.3	16.42	4.20	20.62	4.91	89.30	12.41	8.21
10	300.0	0.300	159.0	26.9	10.0	16.12	4.20	20.32	4.84	89.30	12.26	8.06
11	350.0	0.350	159.0	26.9	11.7	15.82	4.20	20.02	4.77	89.30	12.11	7.91
12	400.0	0.400	160.0	27.2	13.3	15.69	4.20	19.89	4.74	89.30	12.05	7.85
13	450.0	0.450	161.0	27.5	15.0	15.56	4.20	19.76	4.71	89.30	11.98	7.78

Specimen Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Consolidated	Final
Wt. moist soil and tare:	121.010			161.300
dry soil and tare:	106.100			129.810
Wt. of tare:	30.310			30.310
Weight, gms:	159.3			
Diameter, in:	1.400	1.400	1.395	
Area, in²:	1.539	1.540	1.529	
Height, in:	3.000	2.999	2.997	
Net decrease in height, in:		0.001	0.002	
Net decrease in water volume, cc:		0.000	0.600	
% Moisture:	19.7	19.7	19.2	31.6
Wet density, pcf:	131.4	131.4	132.0	
Dry density, pcf:	109.8	109.8	110.7	
Void ratio:	0.5293	0.5292	0.5171	
% Saturation:	100.0	100.0	100.0	

Test Readings Data for Specimen No. 2

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.31199 lbs per input unit
Secondary load ring constant= 0.72824 lbs per input unit
Crossover reading for secondary load ring= 480 input units
Consolidation cell pressure = 96.90 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 6.90 psi
Strain rate, %/min = 0.01
FAIL. STRESS = 28.27 psi at reading no. 13
U STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Effective Stresses Major psi	Effective Stresses 1:3 Ratio	Pore Pres. psi	P psi	Q psi
0	0.0	0.000	66.0	0.0	0.0	0.00	6.90	6.90	1.00	90.00	6.90	0.00
1	5.0	0.005	117.0	15.9	0.2	10.39	4.90	15.29	3.12	92.00	10.10	5.20
2	10.0	0.010	132.0	20.6	0.3	13.43	4.20	17.63	4.20	92.70	10.91	6.71
3	20.0	0.020	145.0	24.6	0.7	16.02	4.10	20.12	4.91	92.80	12.11	8.01
4	50.0	0.050	160.0	29.3	1.7	18.87	4.80	23.67	4.93	92.10	14.23	9.43
5	80.0	0.080	171.0	32.8	2.7	20.86	5.40	26.26	4.86	91.50	15.83	10.43
6	110.0	0.110	177.0	34.6	3.7	21.82	6.00	27.82	4.64	90.90	16.91	10.91
7	150.0	0.150	185.0	37.1	5.0	23.07	6.60	29.67	4.50	90.30	18.14	11.54
8	200.0	0.200	194.0	39.9	6.7	24.38	7.10	31.48	4.43	89.80	19.29	12.19
9	250.0	0.250	202.0	42.4	8.3	25.44	7.60	33.04	4.35	89.30	20.32	12.72
10	300.0	0.300	209.0	44.6	10.0	26.27	8.00	34.27	4.28	88.90	21.13	13.13
11	350.0	0.350	215.0	46.5	11.7	26.86	8.50	35.36	4.16	88.40	21.93	13.43
12	400.0	0.400	222.0	48.7	13.3	27.59	8.90	36.49	4.10	88.00	22.70	13.80
13	450.0	0.450	229.0	50.9	15.0	28.27	9.20	37.47	4.07	87.70	23.34	14.14

Specimen Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Consolidated	Final
moist soil and tare:	106.300			162.110
dry soil and tare:	94.170			132.830
Wt. of tare:	30.350			30.350
Weight, gms:	160.3			
Diameter, in:	1.400	1.400	1.394	
Area, in²:	1.539	1.540	1.526	
Height, in:	3.000	2.999	2.982	
Net decrease in height, in:		0.001	0.017	
Net decrease in water volume, cc:		0.000	1.100	
% Moisture:	19.0	19.0	18.2	28.6
Wet density, pcf:	132.3	132.2	133.3	
Dry density, pcf:	111.1	111.1	112.8	
Void ratio:	0.5111	0.5113	0.4893	
% Saturation:	100.0	100.0	100.0	

Test Readings Data for Specimen No. 3

Deformation dial constant= 0.001 in per input unit
Primary load ring constant= 0.3108 lbs per input unit
Secondary load ring constant= 0.77882 lbs per input unit
Crossover reading for secondary load ring= 474 input units
Consolidation cell pressure = 103.50 psi
Consolidation back pressure = 90.00 psi
Consolidation effective confining stress = 13.50 psi
Strain rate, %/min = 0.01
FAIL. STRESS = 38.90 psi at reading no. 13
STRESS = not selected

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs	Strain %	Deviator Stress psi	Effective Stresses Minor psi	Major psi	1:3 Ratio	Pore Pres. psi	P psi	Q psi
0	0.0	0.000	77.0	0.0	0.0	0.00	13.50	13.50	1.00	90.00	13.50	0.00
1	5.0	0.005	107.0	9.3	0.2	6.10	11.10	17.20	1.55	92.40	14.15	3.05
2	10.0	0.010	129.0	16.2	0.3	10.55	7.50	18.05	2.41	96.00	12.78	5.28
3	20.0	0.020	150.0	22.7	0.7	14.77	6.50	21.27	3.27	97.00	13.88	7.38
4	50.0	0.050	190.0	35.1	1.7	22.62	6.00	28.62	4.77	97.50	17.31	11.31
5	80.0	0.080	214.0	42.6	2.7	27.15	6.90	34.05	4.93	96.60	20.47	13.57
6	110.0	0.110	231.0	47.9	3.7	30.20	8.10	38.30	4.73	95.40	23.20	15.10
7	150.0	0.150	245.0	52.2	5.0	32.49	9.40	41.89	4.46	94.10	25.64	16.24
8	200.0	0.200	256.0	55.6	6.7	34.01	10.80	44.81	4.15	92.70	27.80	17.00
9	250.0	0.250	268.0	59.4	8.4	35.63	11.80	47.43	4.02	91.70	29.62	17.82
10	300.0	0.300	278.0	62.5	10.1	36.81	12.60	49.41	3.92	90.90	31.01	18.41
11	350.0	0.350	288.0	65.6	11.7	37.92	13.00	50.92	3.92	90.50	31.96	18.96
12	400.0	0.400	295.0	67.8	13.4	38.44	13.60	52.04	3.83	89.90	32.82	19.22
13	450.0	0.450	302.0	69.9	15.1	38.90	14.30	53.20	3.72	89.20	33.75	19.45