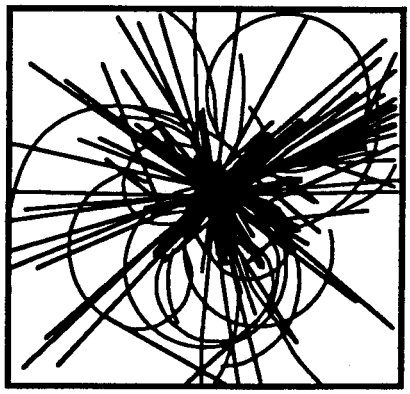
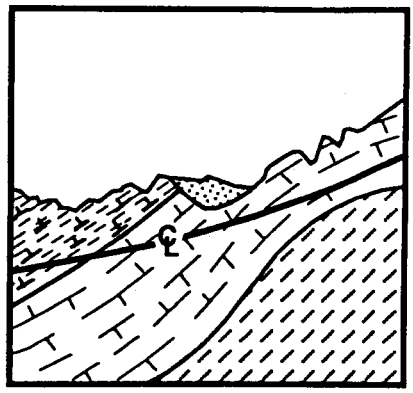
SSCL-SR-1102

SSCL-SR-1102
Project No. 87-888-0017
Report No. SSC-GR-43
June 1990
GR-43

Data Report for Corehole BF 7





Prepared by: The Earth Technology Corporation
Long Beach, California

Prepared for: RTK a joint venture
Oakland, California

FOREWORD

The goal of the geotechnical studies at the Texas Superconducting Super Collider (SSC) site is to allow the geologist and engineer to build their level of knowledge and confidence about the geologic structures and geotechnical properties of the site materials to the point at which there remains only a realistically small risk of encountering geotechnical conditions during construction that would significantly increase construction costs or delay construction schedules. To do this, a characterization program has been designed to meet the following objectives:

- To confirm the site's suitability and optimize the ring location (the "footprint") and hall positions on the ring
- To provide data for a preliminary structural design
- To provide a rational framework within which construction contracts and schedules can be formulated
- To maximize the use of the site-specific data already gathered by the proposer.

The geotechnical program to meet these objectives has been divided into the following three phases of study:

- Footprint location data
- Structure-specific data
- Global data.

This is one in a series of data reports prepared for the global data phase of geotechnical characterization at the SSC site. Data collection for this study phase focused on drillhole-based geological, geohydrological, geophysical, and geotechnical tests in the near vicinity of the E and F access shaft sites. The global data set has three key attributes: (1) uniform geographic distribution over the site footprint, (2) complete coverage of all of the strata through which the SSC tunnels and shafts will pass, and (3) consistency of the data from sampling site to sampling site throughout the SSC site. In combination with data from the other phases, these data will allow conceptual designs of construction methods. Each data report includes the results of both field and laboratory tests for specific drilling and sampling site(s).

DATA REPORT

Site Designator: BF 7

Objective: Drill a corehole at the proposed shaft location and determine geotechnical conditions through in-situ hydrological testing and laboratory geomechanical testing. The corehole was drilled to at least 35 feet below tunnel depth.

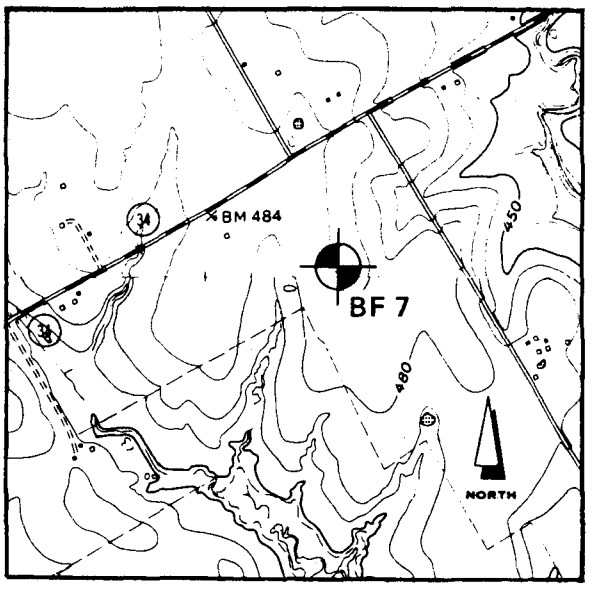
Location:

North 213,426 feet

East 2,241,756 feet

Surface Elevation 483.3 feet

BF 7 is located on the southern end of the ring, about 0.25 mile south of Highway 34.



SCALE 1:24,000

0 1000 2000 3000 4000 Feet

CONTOUR INTERVAL 10 FEET

Scope and Schedule:		
	Coring (full depth)	February 12 to 14, 1990
	Wire-line Logging	February 15, 1990
	Hydrologic Testing	February 16, 1990
	Laboratory Testing	February 19 to April 2, 1990
	Well Construction	February 16 to 27, 1990

Conditions Encountered: (see lithologic log, Appendix A)

Total Hole Depth:	343.5 feet
Soil:	0.0 to 6.3 feet
Weathered Taylor Marl:	6.3 to 50.3 feet
Fresh Taylor Marl:	50.3 to 300.2 feet
Austin Chalk:	300.2 to 343.5 (bottom of hole)
Static Water Level:	Water level in the well probably has not reached static condition. It was last measured at 292.3 feet above MSL (191.0 feet below ground surface) on April 5, 1990, 39 days after the well had been bailed to 166.3 feet above MSL.

Geophysical Logging: (see wire-line logs, Appendix B)

Spontaneous Potential (SP)
Normal Resistivity (short and long)
Guard Resistivity
Point Resistance
Natural Gamma
Short and Long Gamma
Compensated Density (caliper)
Sonic Velocity (full wave)

Hydrologic Test Results Summary: (see also Appendix C)

Vertical Depth (ft)	Packer Pressure (psi)	Gauge Pressure (psi)	Formation/ Lithology	Hydraulic Conductivity (cm/sec)
241.8-262.9	200	40	Taylor Marl	4.8×10^{-6}
296.3-317.4	225	25	Taylor Marl/ Austin Chalk	6.5×10^{-6}

Bulk and Clay Mineralogy Test Results:

Formation: Taylor Marl **Depth: 179.1 feet**

Whole Rock Composition:

Mineral	Percent
quartz	18
K feldspar	2
plagioclase	3
calcite	6
dolomite	2
siderite	12
pyrite	1
total clay	56
Total	100

Relative Clay Abundance:

Mineral	Percent
illite	18
kaolinite	5
Fe-chlorite	4
mixed layer (illite/smectite)	73
Total	100

Laboratory Geomechanical Test Results Summary: (see also Appendix D)

Vertical Depth (ft)	Formation/ Lithology	Moisture Content (%)	Dry Density (pcf)	*Compressive Strength (psi)	Tangent Young's Modulus E_{50} (psi x 10^5)	Brazil Tensile Strength (psi)
50-51	Taylor Marl	19	107-111	239	0.16	
81-82	Taylor Marl	15-16	116-123	536	0.44	
109-111	Taylor Marl	16-18	107-117	453-659 (100)	0.47-0.90 (300)	
166-168	Taylor Marl	15-16	116-119	622-747 (300)	0.94-1.55 (300)	
179-180	Taylor Marl	15-16	116-118			
210	Taylor Marl	15-16	118-119	746	0.97	
234-235	Taylor Marl	16	118	450	0.89	
293-295	Taylor Marl	16	108-116	257-586 (200)	0.34 (300)-1.05 (200)	
304-306	Austin Chalk	10	130-132	2760-3250 (200)	4.05 (300)-4.84 (200)	339
313-314	Austin Chalk	10-13	122-132	1338	1.85	
337-338	Austin Chalk	9-11	131-134	3254-3673 (300)	4.21 (200)-7.58 (300)	

*UU triaxial test indicated by confining pressure in parentheses.

Hole Status: A monitoring well was installed in the boring on February 27, 1990 (see Appendix E).

APPENDIX A

LITHOLOGIC LOG

LOG OF BORING

BORING NO: BF7 PG 1 OF 9

PROJECT: SSC - Texas Site

CLIENT: The Earth Technology Corporation

TASK NO.: 17

LOCATION: ~N 213,426 feet ~E 2,241, 756 feet

GROUND EL: ~483.3 feet

DATE: 2/12/90 TYPE: Nx Core CASED TO: 4.0' CONTRACTOR: MJA

DEPTH IN FEET	SYMBOL	SAMPLE TYPE & NUMBER	DEPTH RANGE TOP	DEPTH RANGE BOT.	PERCENT REC.	PERCENT RQD.	STANDARD PENETRATION TEST PER 6 INCHES		HAND PEN. TSF.	DESCRIPTION OF STRATUM
5										CLAY (Residual Soil), slightly silty, dark brownish-gray (CH) 6.3g
10										SHALE (Taylor Marl), highly to completely weathered, very soft to soft, very thinly bedded, very fine grained, tan,white and light gray, calcareous, with fractures/joints of various orientations w/iron-stained surfaces
15		C1	11.0	16.5	100	0				
20		C2	16.5	22.0	67	0				
25			22.0							
30										
35										
40				41.0						
		C3	41.0							

SAMPLE LEGEND

S= SPLIT SPOON
T= 2" THIN WALL TUBE
U= 3" THIN WALL TUBE
C= NX ROCK CORE

WATER INFORMATION

Approx. 15-20 gal/min temporary water loss from 0.0' to 4.0'
Water loss negligible below 4.0'
Wet rotary core hole, water level not determinable
Observation well installed for continued monitoring of water level

DRILLING GEOLOGIST Scott Lesikar ASSISTANT Mark G. Thomas CHECKED BY W.D. Flanigan

LOG OF BORING

PROJECT: SSC - Texas Site

CLIENT: The Earth Technology Corporation

TASK NO.: 17

BORING NO: BF 7 PG 2 OF 9

LOCATION: ~N 213,426 feet ~E 2,241,756 feet

GROUND EL: ~483.3 feet

DATE: 2/12/90 TYPE: Nx Core CASED TO: 4.0' CONTRACTOR: MJA

SAMPLE LEGEND: S= SPLIT SPOON; T= 2" THIN WALL TUBE; U= 3" THIN WALL TUBE; C= NX ROCK CORE

WATER INFORMATION: See p. 1 of 9

DEPTH IN FEET	SYMBOL	SAMPLE TYPE & NUMBER	DEPTH RANGE TOP	DEPTH RANGE BOT.	PERCENT REC.	PERCENT RQD.	STANDARD PENETRATION TEST PER 6 INCHES	HAND PEN. TSF.	DESCRIPTION OF STRATUM
				41.0					
45		C3	41.0	48.5	100	60			SHALE (Taylor Marl), highly to completely weathered, very soft to soft, very thinly bedded, very fine grained, tan, white and light gray, calcareous, weathered fractures/joints of various orientations, some w/iron-stained surfaces and some w/up to 1/2" gypsum filling 45.5g
50		C4	48.5	53.5	100	98			SHALE (Taylor Marl), slightly to moderately weathered, very soft to med.hard, very thinly bedded, very fine grained, tan and dark gray, calcareous, slightly fossiliferous, w/fractures/joints of various orientations, some w/iron-stained surfaces and some w/up to 1/2" gypsum filling 50.3s SHALE (Taylor Marl), fresh, soft to med.hard, very thinly bedded, very fine grained, dark gray, calcareous, slightly fossiliferous, very homogenous
55		C5	53.5	63.5	100	100			
60									
65		C6	63.5	73.5	100	100			
70									
75		C7	73.5		98	98			
80									

DRILLING GEOLOGIST Scott Lesikar ASSISTANT Mark G. Thomas CHECKED BY W.D. Flanigan

LOG OF BORING

PROJECT: SSC - Texas Site

CLIENT: The Earth Technology Corporation

TASK NO.: 17

BORING NO: BF 7 PG 3 OF 9

LOCATION: ~N 213,426 feet ~E 2,241,756 feet

GROUND EL: ~483.3 feet

DATE: 2/12/90 TYPE: Nx Core CASED TO: 4.0' CONTRACTOR: MJA

SAMPLE LEGEND: S= SPLIT SPOON; T= 2" THIN WALL TUBE; U= 3" THIN WALL TUBE; C= NX ROCK CORE

WATER INFORMATION: See p. 1 of 9

DEPTH IN FEET	SYMBOL	SAMPLE TYPE & NUMBER	DEPTH RANGE TOP	DEPTH RANGE BOT.	PERCENT REC.	PERCENT RQD.	STANDARD PENETRATION TEST PER 6 INCHES	HAND PEN. TSF.	DESCRIPTION OF STRATUM
		C7		83.5					SHALE (Taylor Marl), fresh, soft to med.hard very thinly bedded, very fine grained, dark gray, slightly fossiliferous, calcareous, very homogeneous
85		C8	83.5	93.5	95	95			
90									
95		C9	93.5	103.5	100	100			
100									
105		C10	103.5	113.5	99	99	Stopped Drilling 2/12/90		103.7 - 104.1 very thin (1/32" - 1/16") irregular pyrite laminations (5)
110									
115		C11	113.5		98	98	Started Drilling 2/13/90		116.95s-117.4s abundant, moderately hard, lt. gray limestone inclusions
120									

DRILLING GEOLOGIST Scott Lesikar ASSISTANT Mark G. Thomas CHECKED BY W.D. Flanigan

LOG OF BORING

PROJECT: SSC - Texas Site

CLIENT: The Earth Technology Corporation

TASK NO.: 17

BORING NO: BF 7 PG 4 OF 9

LOCATION: ~N 213,426 feet ~E 2,241,756 feet

GROUND EL: ~483.3 feet

DATE: 2/13/90 TYPE: Nx Core CASED TO: 4.0' CONTRACTOR: MJA

SAMPLE LEGEND

S= SPLIT SPOON
T= 2" THIN WALL TUBE
U= 3" THIN WALL TUBE
C= NX ROCK CORE

WATER INFORMATION

See p. 1 of 9

DEPTH IN FEET	SYMBOL	SAMPLE TYPE & NUMBER	DEPTH RANGE TOP	DEPTH RANGE BOT.	PERCENT REC.	PERCENT RQD.	STANDARD PENETRATION TEST PER 6 INCHES		HAND PEN. TSF.	DESCRIPTION OF STRATUM
		C11		123.5						SHALE (Taylor Marl), fresh, soft to med. hard very thinly bedded, very fine grained, dark gray, slightly fossiliferous, calcareous v.homogeneous
125		C12	123.5	133.5	90	90				
130										
135		C13	133.5	143.5	95	95				
140										
145		C14	143.5	153.5	100	100				
150										
155		C15	153.5		100	100				
160										

DRILLING GEOLOGIST Scott Lesikar ASSISTANT Mark G. Thomas CHECKED BY W.D. Flanigan

LOG OF BORING

BORING NO: BF7 PG 5 OF 9

PROJECT: SSC - Texas Site

CLIENT: The Earth Technology Corporation

TASK NO.: 17

LOCATION: ~N 213,426 feet ~E 2,241,756 feet

GROUND EL: ~483.3 feet

DATE: 2/13/90 TYPE: Nx Core CASED TO: 4.0' CONTRACTOR: MJA

SAMPLE LEGEND

S= SPLIT SPOON
T= 2" THIN WALL TUBE
U= 3" THIN WALL TUBE
C= NX ROCK CORE

WATER INFORMATION

See p. 1 of 9

DEPTH IN FEET	SYMBOL	SAMPLE TYPE & NUMBER	DEPTH RANGE TOP	DEPTH RANGE BOT.	PERCENT REC.	PERCENT RQD.	STANDARD PENETRATION TEST PER 6 INCHES		HAND PEN. TSF.	DESCRIPTION OF STRATUM
		C15		163.5						SHALE (Taylor Marl), fresh, soft to med. hard, very thinly bedded, very fine grained, dark gray, slightly fossiliferous, calcareous, very homogeneous
165		C16	163.5	173.5	98	98				
170										
175		C17	173.5	183.5	99	99				
180										
185		C18	183.5	193.5	100	100				
190										
195		C19	193.5		100	100				
200										

DRILLING GEOLOGIST Scott Lesikar ASSISTANT Mark G. Thomas CHECKED BY W.D. Flanigan

LOG OF BORING

BORING NO: BF 7 PG 6 OF 9

PROJECT: SSC - Texas Site

CLIENT: The Earth Technology Corporation

TASK NO.: 17

LOCATION: ~N 213,426 feet ~E 2,241,756 feet

GROUND EL: ~483.3 feet

DATE: 2/13/90 TYPE: Nx Core CASED TO: 4.0' CONTRACTOR: MJA

SAMPLE LEGEND

S= SPLIT SPOON
T= 2" THIN WALL TUBE
U= 3" THIN WALL TUBE
C= NX ROCK CORE

WATER INFORMATION

See p. 1 of 9

DEPTH IN FEET	SYMBOL	SAMPLE TYPE & NUMBER	DEPTH RANGE TOP	DEPTH RANGE BOT.	PERCENT REC.	PERCENT RQD.	STANDARD PENETRATION TEST PER 6 INCHES	HAND PEN. TSF.	DESCRIPTION OF STRATUM
		C19		203.5					SHALE (Taylor Marl), fresh, soft to med. hard, very thinly bedded, very fine grained, dark gray, slightly fossiliferous, calcareous, w/very thin (1/32"-1/16") $CaCO_3$ laminations, very homogeneous
205		C20	203.5	213.5	98	98			
210									
215		C21	213.5	223.5	99	99			
220									
225		C22	223.5	233.5	95	95	Stopped Drilling 2/13/90		
230									
235		C23	233.5		100	100	Started Drilling 2/14/90		
240									

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LOG OF BORING

PROJECT: SSC- Texas Site
CLIENT: The Earth Technology Corporation
TASK NO.: 17

BORING NO: BF 7 PG 7 OF 9
LOCATION: ~N 213,426 feet ~E2,241,756 feet
GROUND EL: ~483.3 feet

DATE: 2-14-90 TYPE: NX Core CASED TO: 4.0' CONTRACTOR: MJA

SAMPLE LEGEND
S= SPLIT SPOON
T= 2" THIN WALL TUBE
U= 3" THIN WALL TUBE
C= NX ROCK CORE

WATER INFORMATION
See p. 1 of 9

DEPTH IN FEET	SYMBOL	SAMPLE TYPE & NUMBER	DEPTH RANGE TOP	DEPTH RANGE BOT.	PERCENT REC.	PERCENT RQD.	STANDARD PENETRATION TEST PER 6 INCHES		HAND PEN. TSF.	DESCRIPTION OF STRATUM
		C23		243.5						SHALE(Taylor Marl), fresh,soft to med.hard,very thinly bedded,very fine grained,dark gray,slightly fossiliferous,calcareous,w/very thin(1/32"-1/16") $CaCO_3$ laminations increasing in frequency, very homogeneous
245		C24	243.5	253.5	100	100				
250										
255		C25	253.5	263.5	100	100				
260										
265		C26	263.5	273.5	100	100				
270										
275		C27	273.5		100	100				
280										

DRILLING GEOLOGIST Scott Lesikar ASSISTANT Mark G. Thomas CHECKED BY W.D. Flanigan

LOG OF BORING

PROJECT: SSC - Texas Site

CLIENT: The Earth Technology Corporation

TASK NO.: 17

BORING NO: BF 7 PG 8 OF 9

LOCATION: ~N 213,426 feet
~E2, 241,756 feet

GROUND EL: ~483.3 feet

DATE: 2-14-90 TYPE: NX Core CASED TO: 4.0' CONTRACTOR: MJA

DEPTH IN FEET	SYMBOL	SAMPLE TYPE & NUMBER	DEPTH RANGE TOP	DEPTH RANGE BOT.	PERCENT REC.	PERCENT RQD.	STANDARD PENETRATION TEST PER 6 INCHES	HAND PEN. TSF.	DESCRIPTION OF STRATUM
		C27		283.5					SHALE(Taylor Marl),fresh,soft to med. hard, very thinly bedded, very fine grained, dark gray, slightly fossiliferous, calcareous w/very thin (1/32"-1/16") $CaCO_3$ laminations, increasing in frequency, very homogeneous
285		C28	283.5	293.5	100	100			
290									
295		C29	293.5	303.5	99	99			299.9s-300.25s Thin,med. to mod.hard,dark gray bed w/ abundant fossil fragments 300.25s LIMESTONE(Austin Chalk),fresh,med.to mod.hard,light gray, slightly fossiliferous w/0.6 to 6.6ft. thick slightly to very argillaceous and shaly interbeds spaced 0.3 to 2.2 ft. apart
300									
305		C30	303.5	313.5	100	100			304.7g-305.3g Thin,sli.argill.,med.gray bed 305.9g-306.8g Thin,sli.argill.,med.gray bed 309.0g-310.8g Med.thick,mod.argill.,med.gray bed w/ numerous Inoceramus prisms 311.3g-311.9g Thin,sli.to mod.argill.,med.gray bed 311.9g-313.5g Med.thick,sli.argill.,med gray bed 313.8g-314.8g Med.thick,v.argill./shaly,soft,dk.to med. gray bed 314.8g-319.6g Thick,sli.argill.,med.gray bed
310									
315		C31	313.5		100	100			319.6g-320.4g Thin,mod. to v.argill.,med.gray bed
320									

SAMPLE LEGEND
S= SPLIT SPOON
T= 2" THIN WALL TUBE
U= 3" THIN WALL TUBE
C= NX ROCK CORE

WATER INFORMATION
See p. 1 of 9

DRILLING GEOLOGIST Scott Lesikar ASSISTANT Mark G. Thomas CHECKED BY W.D. Flanigan

LOG OF BORING

BORING NO: BF 7 PG 9 OF 9

PROJECT: SSC - Texas Site

CLIENT: The Earth Technology Corporation

TASK NO.: 17

LOCATION: ~N 213,426 feet
~E2,241,756 feet

GROUND EL: ~483.3 feet

DATE: 2-14-90 TYPE: NX Core CASED TO: 4.0' CONTRACTOR: MJA

DEPTH IN FEET	SYMBOL	SAMPLE TYPE & NUMBER	DEPTH RANGE TOP	DEPTH RANGE BOT.	PERCENT REC.	PERCENT RQD.	STANDARD PENETRATION TEST PER 6 INCHES	HAND PEN. TSF.	DESCRIPTION OF STRATUM
		C31		323.5					LIMESTONE (Austin Chalk) fresh, med. to mod. hard, slightly fossiliferous, light gray w/0.2 to 1.5 ft. thick slightly to moderately argillaceous interbeds spaced 0.9 to 7.3 ft. apart
-325		C32	323.5	333.5	100	97			324.0g-325.5g Med. thick, sli-mod. argill., med. gray bed 327.1g-328.4g Med. thick, sli. argill., med. gray bed 329.3g-330.4g Med. thick, sli. argill., med. gray bed 332.0g-333.1g Med. thick, sli. argill., med. gray bed 333.1 -333.4 70° fracture, slks., rough to v. rough, clean, closed, fresh surface
-330									
-335		C33	333.5	343.5	100	100			340.4g-340.6g Thin, sli. argill., med. gray bed
-340									
-345									Total Depth 343.5' 2-14-90 (1) Wash bored from 0.0-11.0' w/o sampling and, from 22.0'-41.0' due to caving (2) Wireline logged 2-15-90 (3) Hydrotested 2-16-90 (4) Borehole reamed to 7" down to 319.0' 2-16-90 to 2-20-90 (5) Well construction completed 2-27-90
-350									
-355									
-360									

SAMPLE LEGEND
S= SPLIT SPOON
T= 2" THIN WALL TUBE
U= 3" THIN WALL TUBE
C= NX ROCK CORE

WATER INFORMATION
See p. 1 of 9

DRILLING GEOLOGIST Scott Lesikar ASSISTANT Mark G. Thomas CHECKED BY W.D. Flanigan

APPENDIX B

WIRE-LINE LOGS

WIRE-LINE LOGGING PARAMETERS

Hole No. BF 7 **Log Measured From:** Ground Level

Drilling Parameters

Depth 343.5 feet

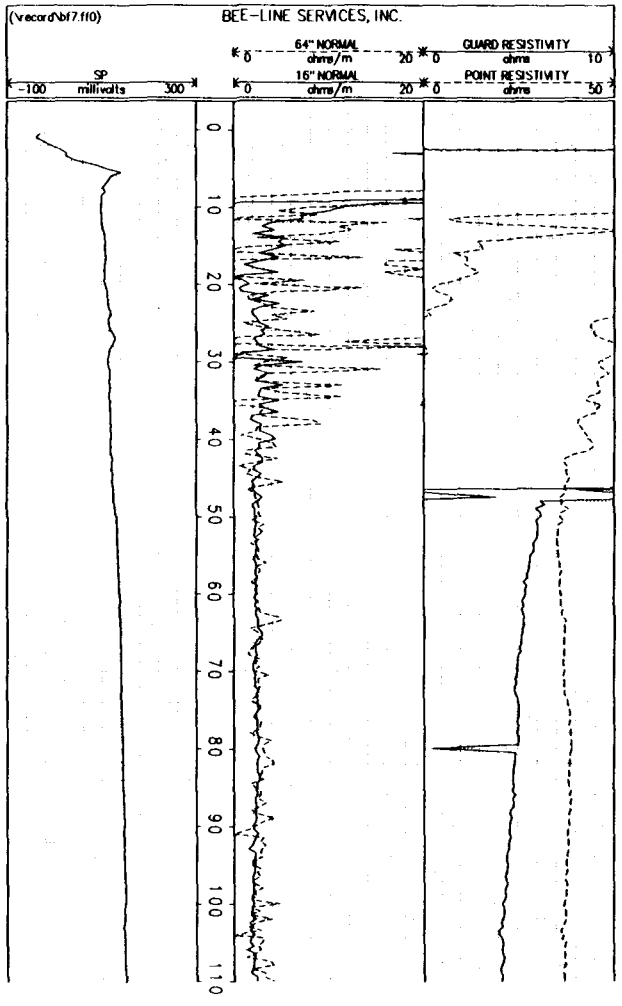
Bit Diameter 3.125 inches

Logging Parameters	Electrical Log	Gamma Log	Sonic Log
Date	February 15, 1990	February 15, 1990	February 15, 1990
Bottom Log Interval	331.0 feet	334.0 feet	330.8 feet
Top Log Interval	surface	surface	surface
Type of Fluid in Hole	drilling fluid	drilling fluid	drilling fluid
Time Since Circulation Stop	1.5 hours	1.5 hours	1.5 hours
Probe Type/S.N.	ALP-4979	XAP-4383	CLP-4877A
Module Type/S.N.	ALM-4979	XAM-4383	CLM-4877A
Logging Speed	40 feet/min.	20 feet/min.	20 feet/min.
Sample Interval	0.5 foot	0.5 foot	0.5 foot

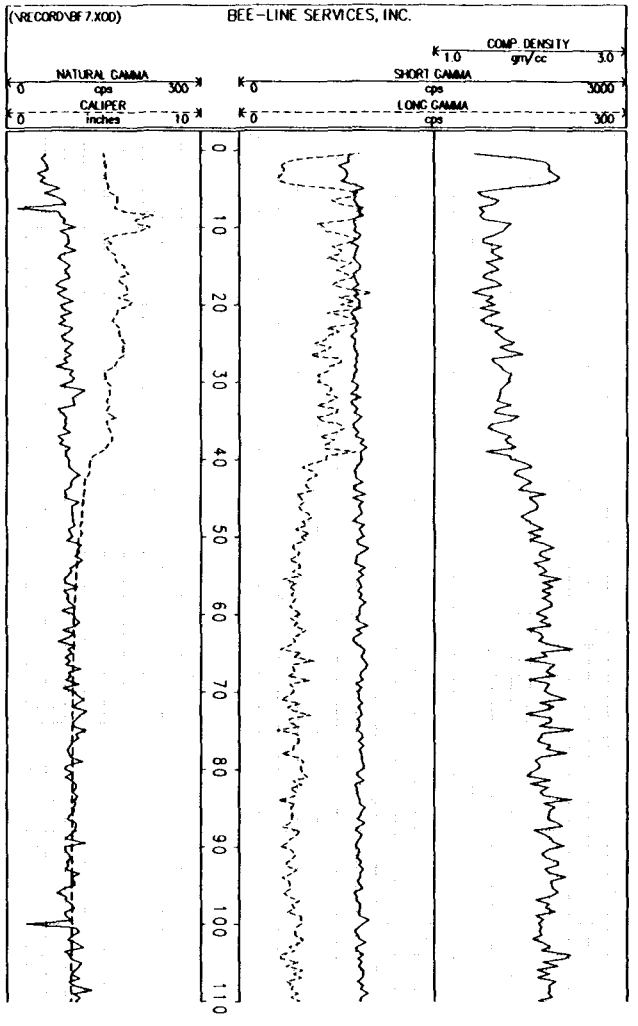
Logged by: BEE-LINE SERVICES, INC.
P. O. Box 2096
Corsicana, TX 75151

BF 7 Wire-line logs run February 15, 1990. Surface elevation 483.3 feet.

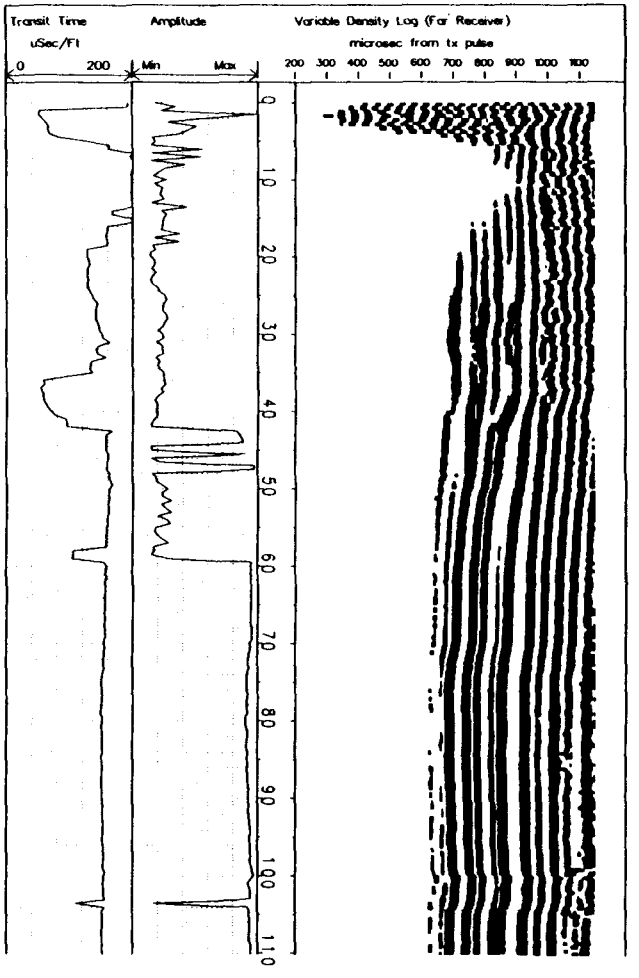
ELECTRICAL LOG



GAMMA LOG

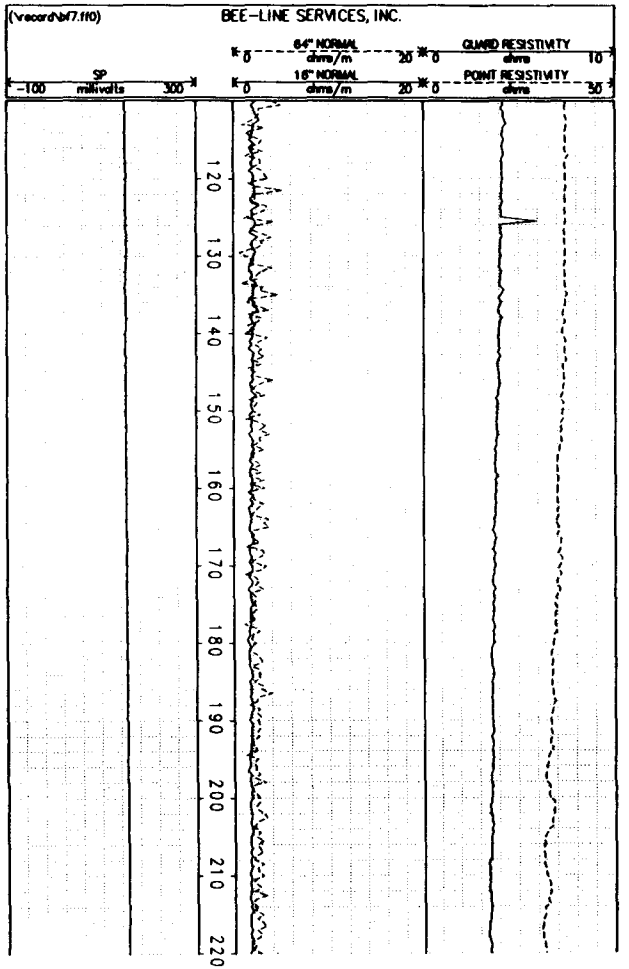


SONIC LOG

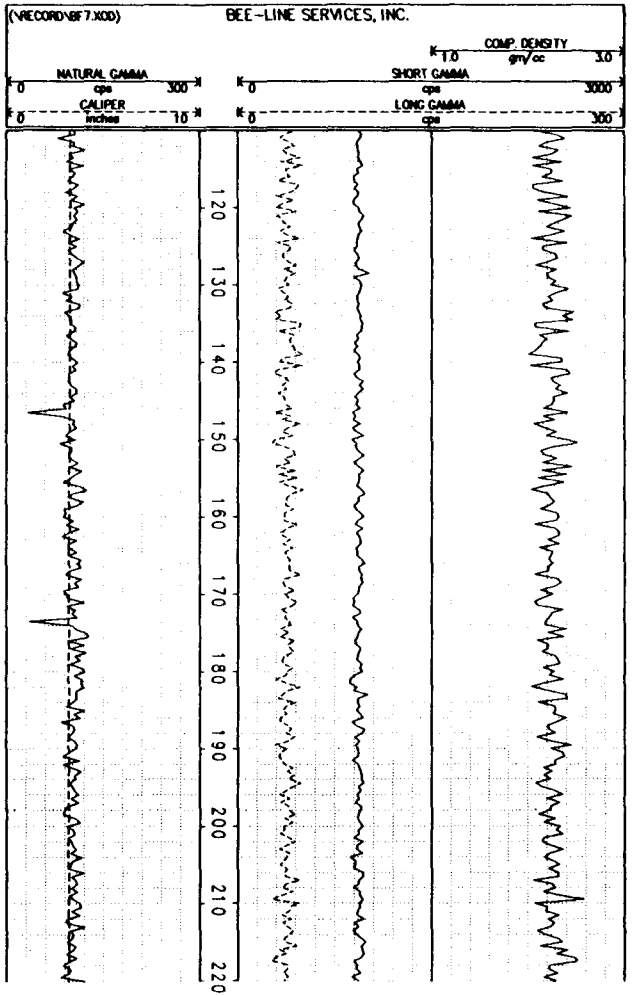


BF 7 Wire-line logs run February 15, 1990 (Continued). Surface elevation 483.3 feet.

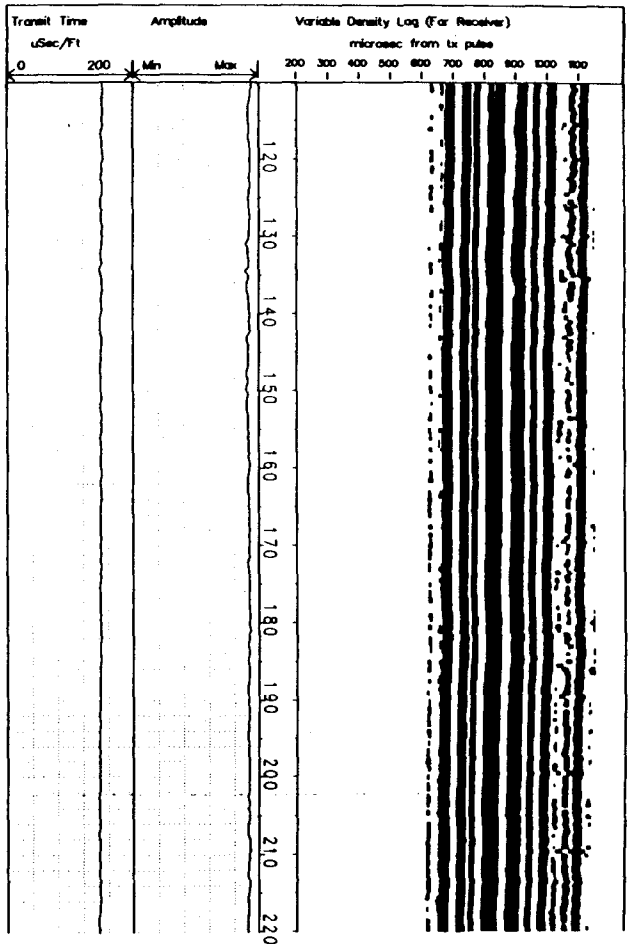
ELECTRICAL LOG CONTINUED



GAMMA LOG CONTINUED

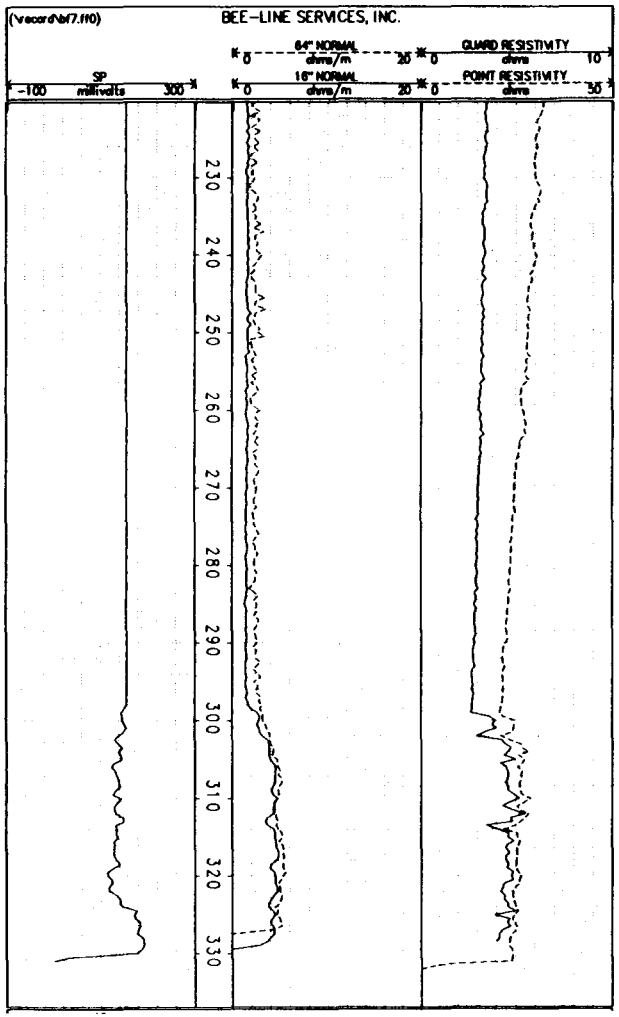


SONIC LOG CONTINUED

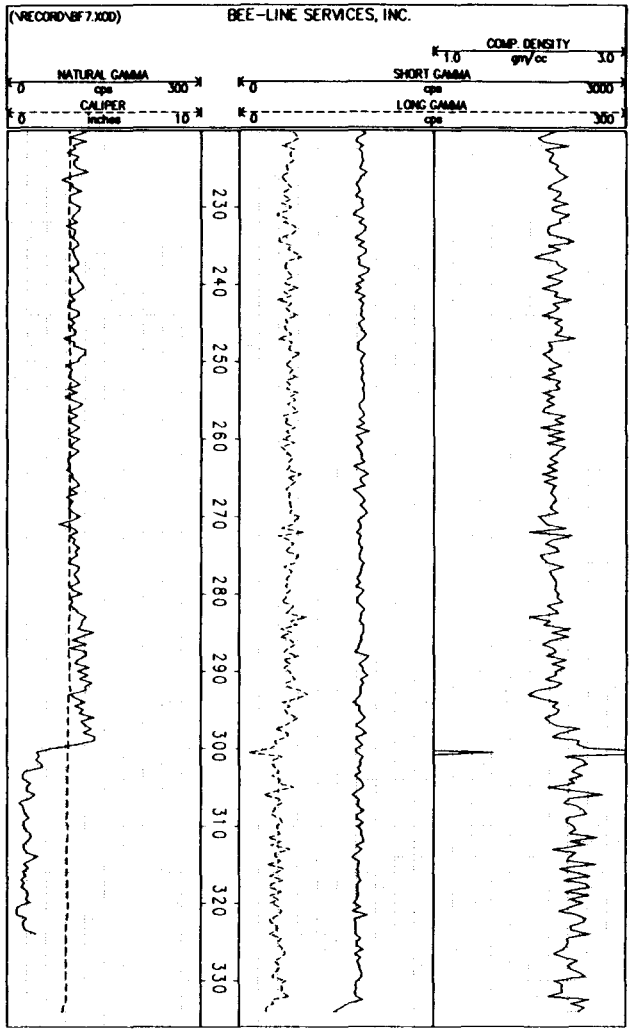


BF 7 Wire-line logs run February 15, 1990 (Continued). Surface elevation 483.3 feet.

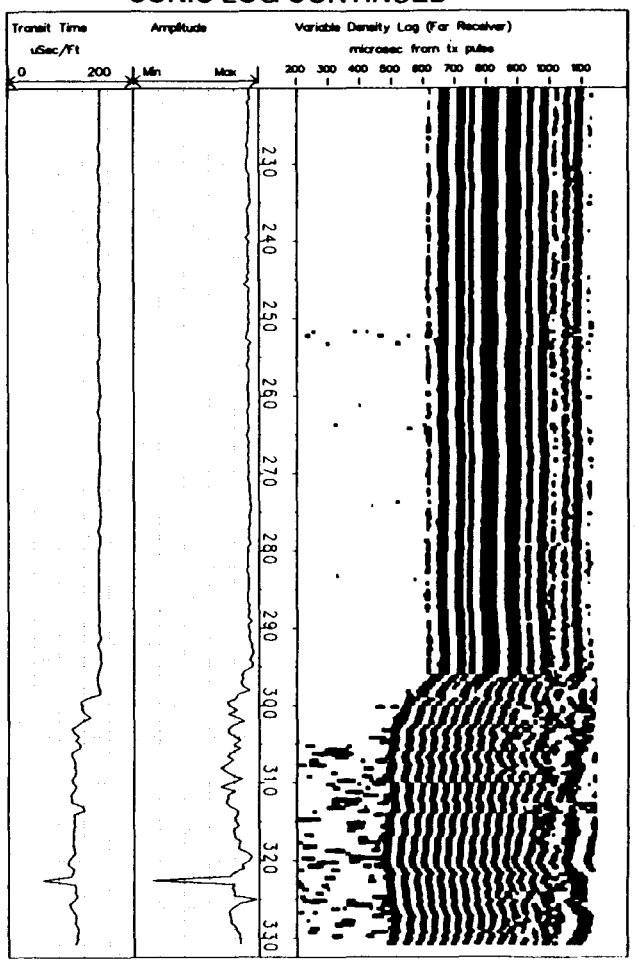
ELECTRICAL LOG CONTINUED



GAMMA LOG CONTINUED



SONIC LOG CONTINUED



APPENDIX C

HYDROLOGIC TEST RESULTS

APPENDIX C

The objectives of the hydrologic (packer) tests were to provide estimates of the hydraulic conductivity within the Taylor Marl, Austin Chalk, and Eagle Ford Shale formations in unfractured zones, fractured or other suspected water-bearing zones, at the formation contacts, and at the tunnel elevation. Intervals within boreholes were selected for packer testing based on visual inspections of rock cores and the results of borehole geophysical testing. Sections of a borehole that exhibited increased frequency of fractures or bedding plane parting were commonly packer tested.

Standard procedures used to conduct these tests included lowering a pair of pneumatically operated rubber packers (in straddle-packer configuration) separated by a known length of perforated pipe into the drill hole to a predetermined depth. The packer interval was approximately 20 feet. The packers were then inflated to a precalculated pressure to seal against the rock side walls and water was pumped into the test interval at a selected pressure while the flow rate was measured with a cumulative flow meter. To improve the accuracy of measurements at low flow rates, water was pumped from a large container (e.g., a drum or section of casing) and the volume removed was recorded. In addition to monitoring the water pressure and flow rate at appropriate intervals, the height of the water pressure gauge above ground surface, as well as the diameter and length of water pipe used, were recorded. The tests were continued until five consecutive readings indicated a stabilization of the flow rate but for a minimum of at least 10 minutes. Standard forms were used for data records and the hydraulic conductivity was calculated using standard Bureau of Reclamation procedures.

STRADDLE PACKER TEST RESULTS

Test Depth (feet)	Packer Pressure (psi)	Gauge Pressure (psi)	Formation/ Lithology	Hydraulic Conductivity (cm/sec)	Estimated Depth to Static Water Level* (feet)
241.8-262.9	200	40	Taylor Marl	4.8×10^{-6}	5.3
296.3-317.4	225	25	Taylor Marl/ Austin Chalk	6.5×10^{-6}	5.3

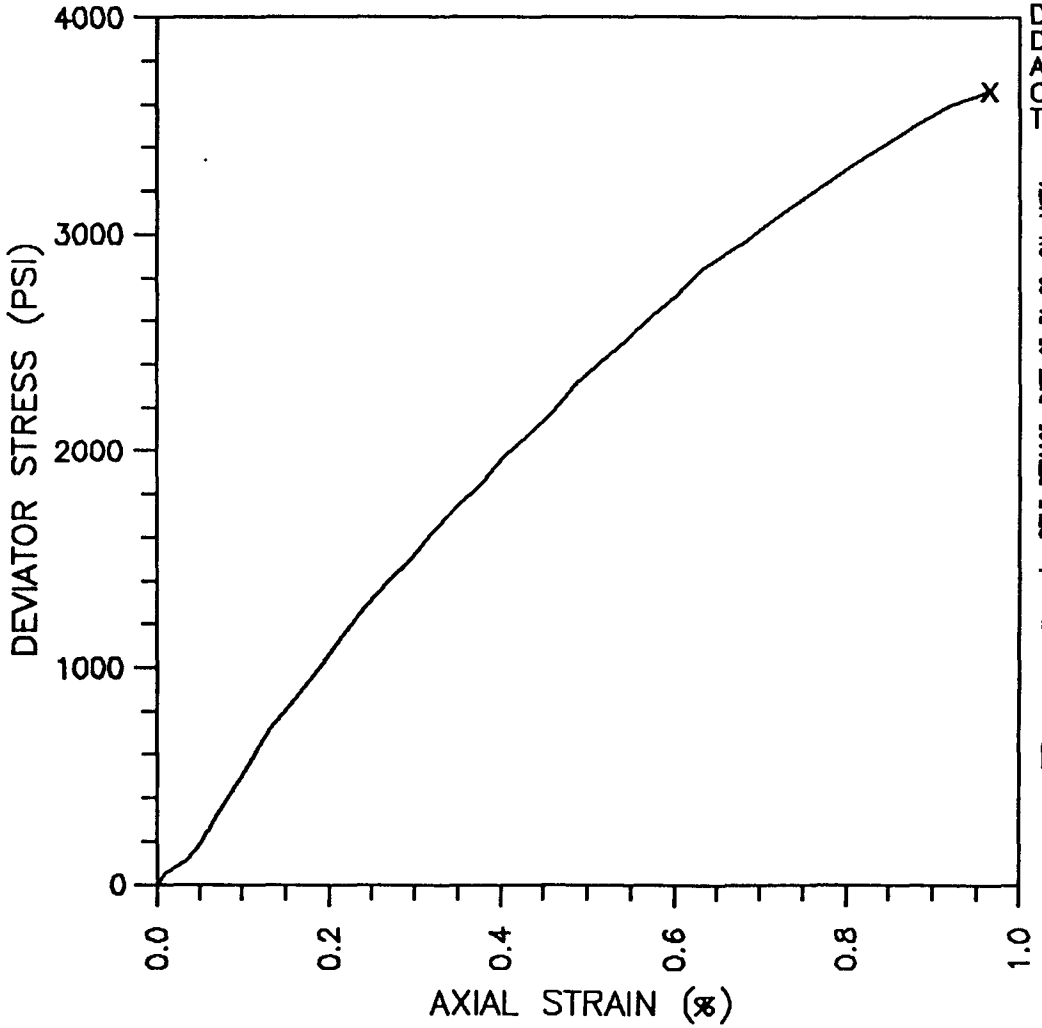
At boring BF 7 two test intervals were selected based on a review of the lithologic and wire-line logs. The upper test interval was selected to provide hydrologic data for unfractured Taylor Marl, above the base of the unit. The lower test interval straddled the Taylor Marl/Austin Chalk contact. Hydrologic (packer) testing followed the general procedures outlined above. Packer and gauge pressures used during the testing along with the calculated hydraulic conductivities are listed in the table above. Flow volumes were measured using a flow meter; no calibrated container was used for the tests.

*The hydraulic conductivity values presented are based on an estimated static water level 5.3 feet below the ground surface. When last measured, the water level was 191.0 feet below ground surface. Hydraulic conductivity values calculated from the test data would be lower for a static water level below the estimated value.

APPENDIX D

LABORATORY RESULTS

BORING NO.: BF7
DEPTH (FT): 337.2
AUSTIN CHALK LIMESTONE



INCLINATION (DEG): VERTICAL
MOISTURE CONTENT (%): 9.3
DRY UNIT WEIGHT (PCF): 134.3
DEG. OF SATURATION (%): 98.0
ASSUMED SPECIFIC GRAVITY: 2.7
CONFINING PRESSURE (PSI): 200
TEST TYPE: TRIAXIAL COMPRESSION
(ASTM D 2664)

BFILE: BF71106 DATE: 06-31-90 CAL: MCT4

TANGENT MODULUS AT 50%
MAXIMUM STRESS:
4.211 x10E5 PSI

FAILURE MODE:
LOADED TO 3657 PSI
W/O FAILURE

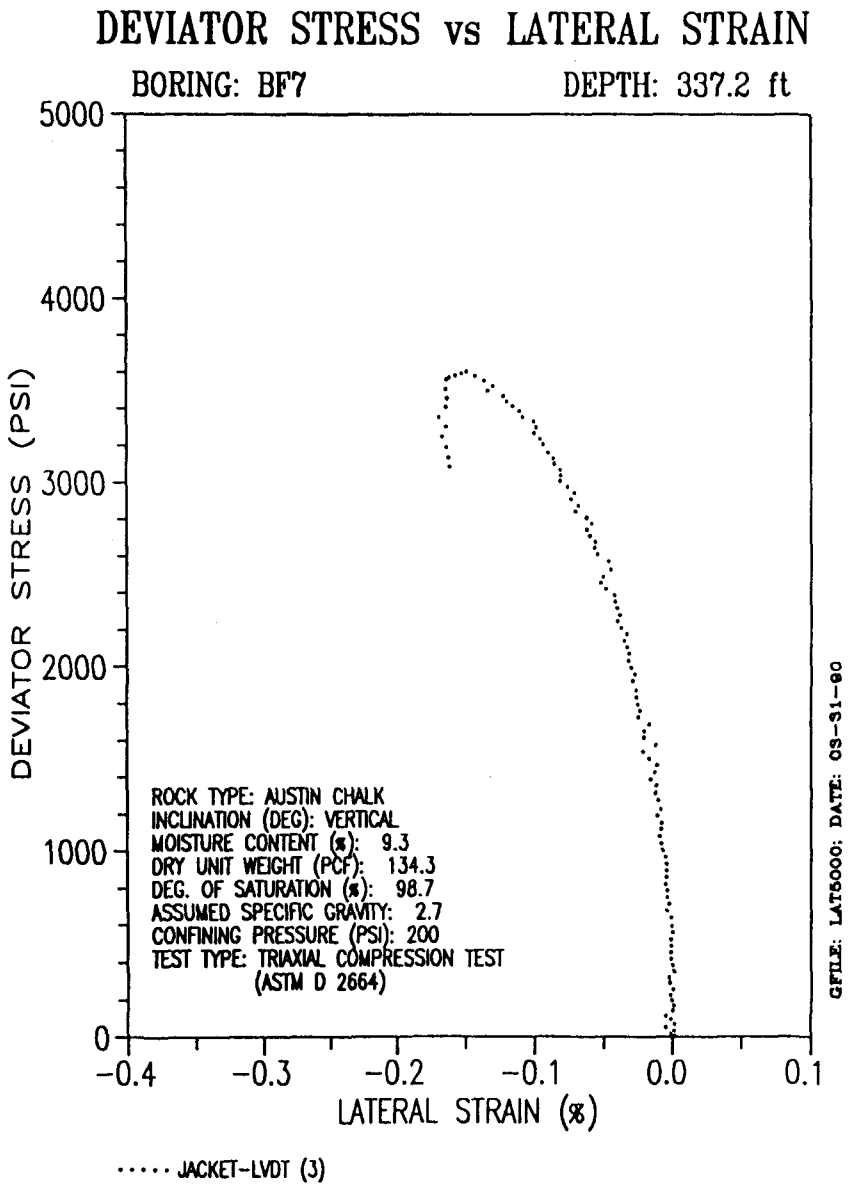
TEXAS SSC SITE

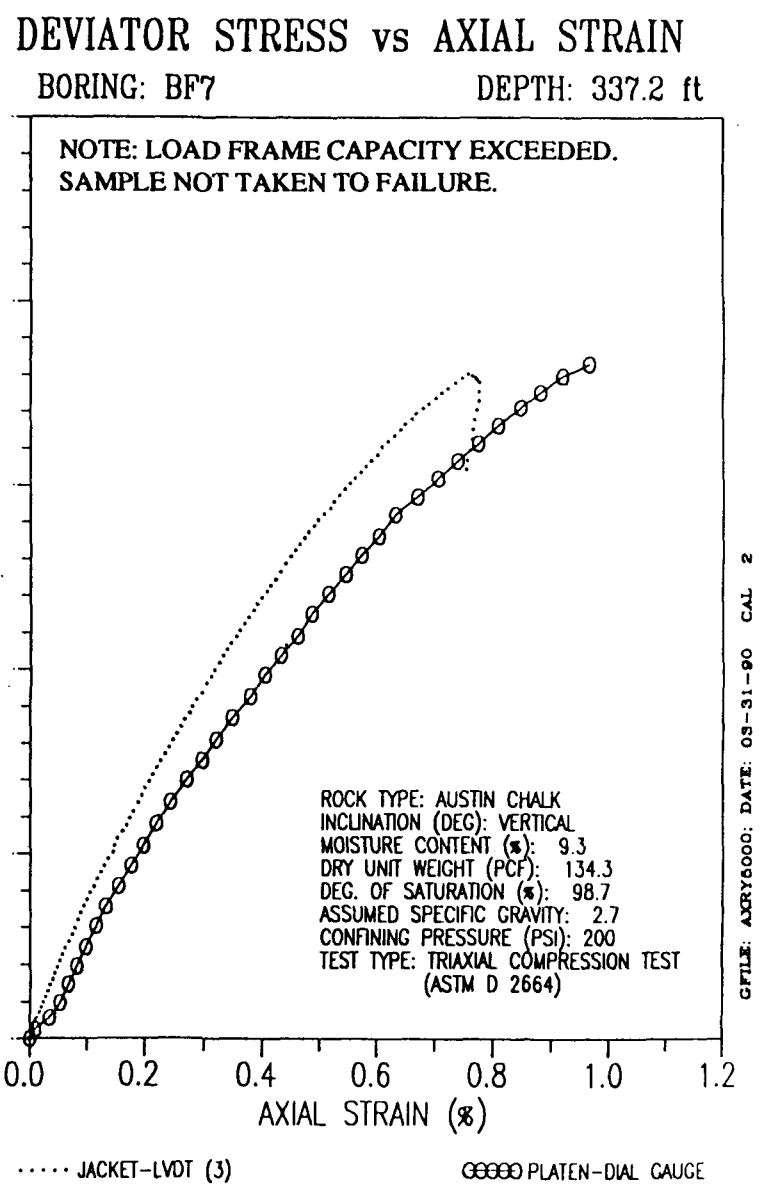
STRESS-STRAIN PLOT

MASON-JOHNSTON & ASSOCIATES, INC.
GEOLOGISTS-ENGINEERS

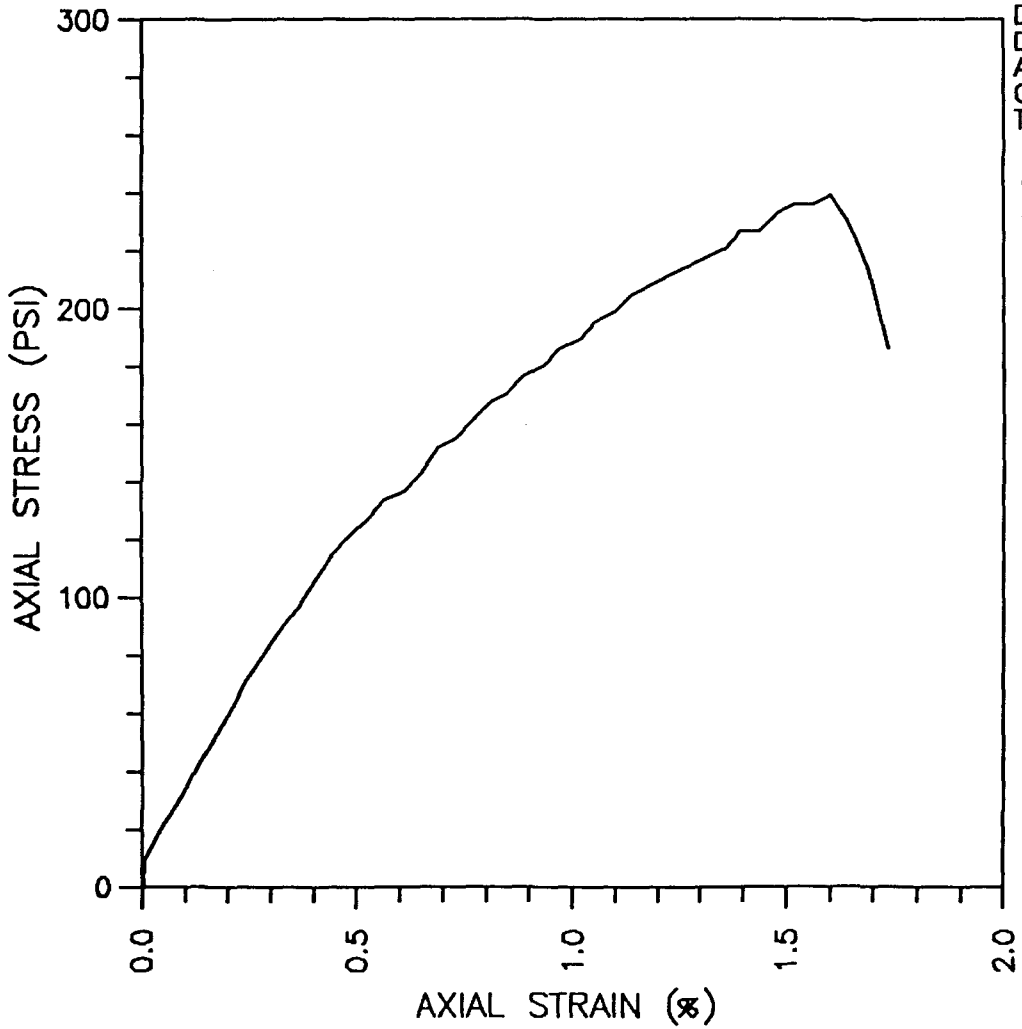
JOB NO.: 5530.17

FIGURE


DEVIATOR STRESS vs LATERAL STRAIN
BORING: BF7
DEPTH: 337.2 ft
DEVIATOR STRESS (PSI)
5000
4000
3000
2000
1000
0
-0.4
-0.3
-0.2
-0.1
0.0
0.1
LATERAL STRAIN (%)
ROCK TYPE: AUSTIN CHALK
INCLINATION (DEG): VERTICAL
MOISTURE CONTENT (%): 9.3
DRY UNIT WEIGHT (PCF): 134.3
DEG. OF SATURATION (%): 98.7
ASSUMED SPECIFIC GRAVITY: 2.7
CONFINING PRESSURE (PSI): 200
TEST TYPE: TRIAXIAL COMPRESSION TEST
(ASTM D 2664)
GFILE: LAT5000; DATE: 03-31-90
····· JACKET-LVDT (3)


DEVIATOR STRESS vs AXIAL STRAIN
BORING: BF7
DEPTH: 337.2 ft
NOTE: LOAD FRAME CAPACITY EXCEEDED.
SAMPLE NOT TAKEN TO FAILURE.
0.0
0.2
0.4
0.6
0.8
1.0
1.2
AXIAL STRAIN (%)
ROCK TYPE: AUSTIN CHALK
INCLINATION (DEG): VERTICAL
MOISTURE CONTENT (%): 9.3
DRY UNIT WEIGHT (PCF): 134.3
DEG. OF SATURATION (%): 98.7
ASSUMED SPECIFIC GRAVITY: 2.7
CONFINING PRESSURE (PSI): 200
TEST TYPE: TRIAXIAL COMPRESSION TEST
(ASTM D 2664)
GFILE: AXRY6000; DATE: 03-31-90 CAL 2
····· JACKET-LVDT (3)
ooooo PLATEN-DIAL GAUGE

BORING NO.: BF7
DEPTH (FT): 50.9
TAYLOR MARL



INCLINATION (DEG): VERTICAL
MOISTURE CONTENT (%): 18.9
DRY UNIT WEIGHT (PCF): 111.4
DEG. OF SATURATION (%): 99.5
ASSUMED SPECIFIC GRAVITY: 2.7
CONFINING PRESSURE (PSI): 0
TEST TYPE: UNCONFINED COMPRESSION
(ASTM D 2938)

BFILE: BF70500 DATE: 05-31-00 CAL: MCL3

TANGENT MODULUS AT 50%
ULTIMATE STRESS:
0.161 x10E5 PSI

FAILURE MODE:
AXIAL SPLITTING

TEXAS SSC SITE

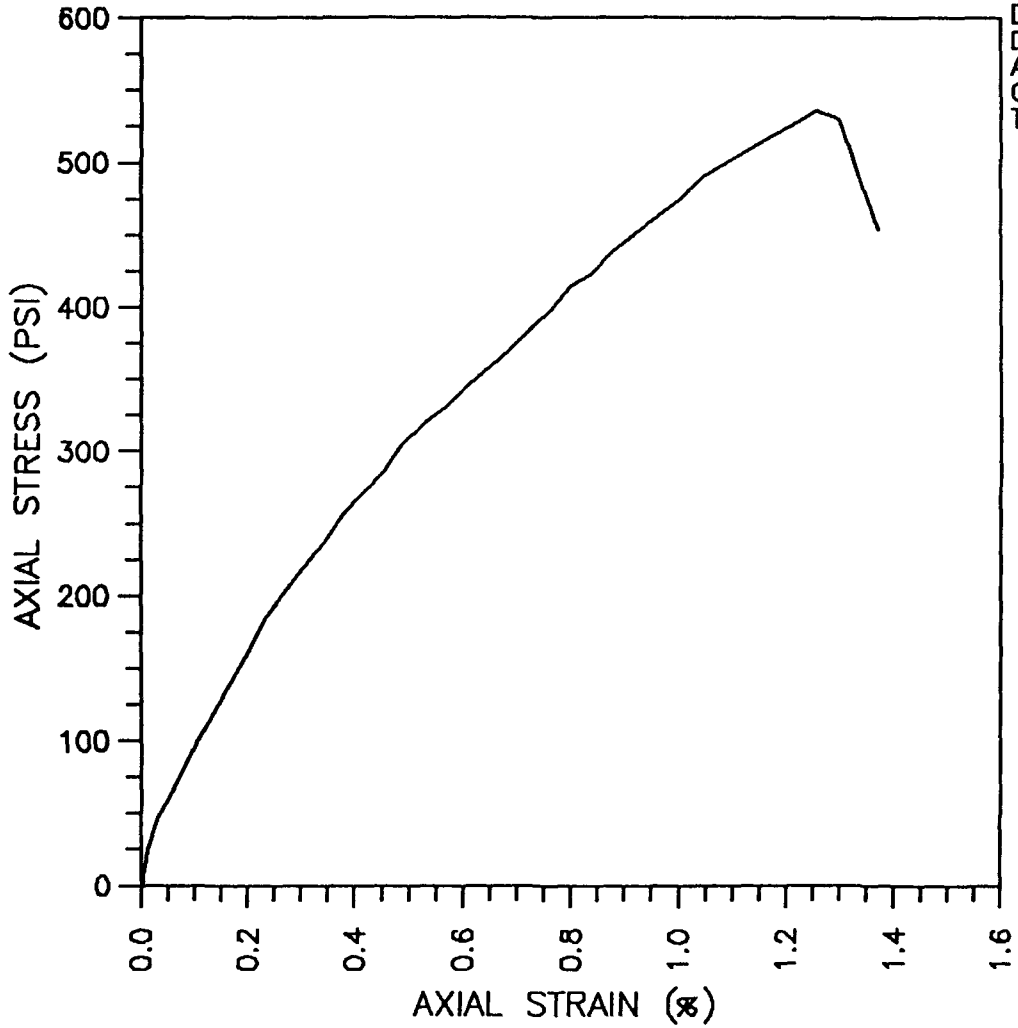
STRESS-STRAIN PLOT

MASON-JOHNSTON & ASSOCIATES, INC.
GEOLOGISTS-ENGINEERS

JOB NO.: 5530.17

FIGURE

BORING NO.: BF7
DEPTH (FT): 81.1
TAYLOR MARL



INCLINATION (DEG): VERTICAL
MOISTURE CONTENT (%): 15.6
DRY UNIT WEIGHT (PCF): 116.7
DEG. OF SATURATION (%): 94.7
ASSUMED SPECIFIC GRAVITY: 2.7
CONFINING PRESSURE (PSI): 0
TEST TYPE: UNCONFINED COMPRESSION
(ASTM D 2938)

BFILE: BF70811 DATE: 05-31-90 CAL: MCU3

TANGENT MODULUS AT 50%
ULTIMATE STRESS:
0.439 x10E5 PSI

FAILURE MODE:
AXIAL SPLITTING

TEXAS SSC SITE

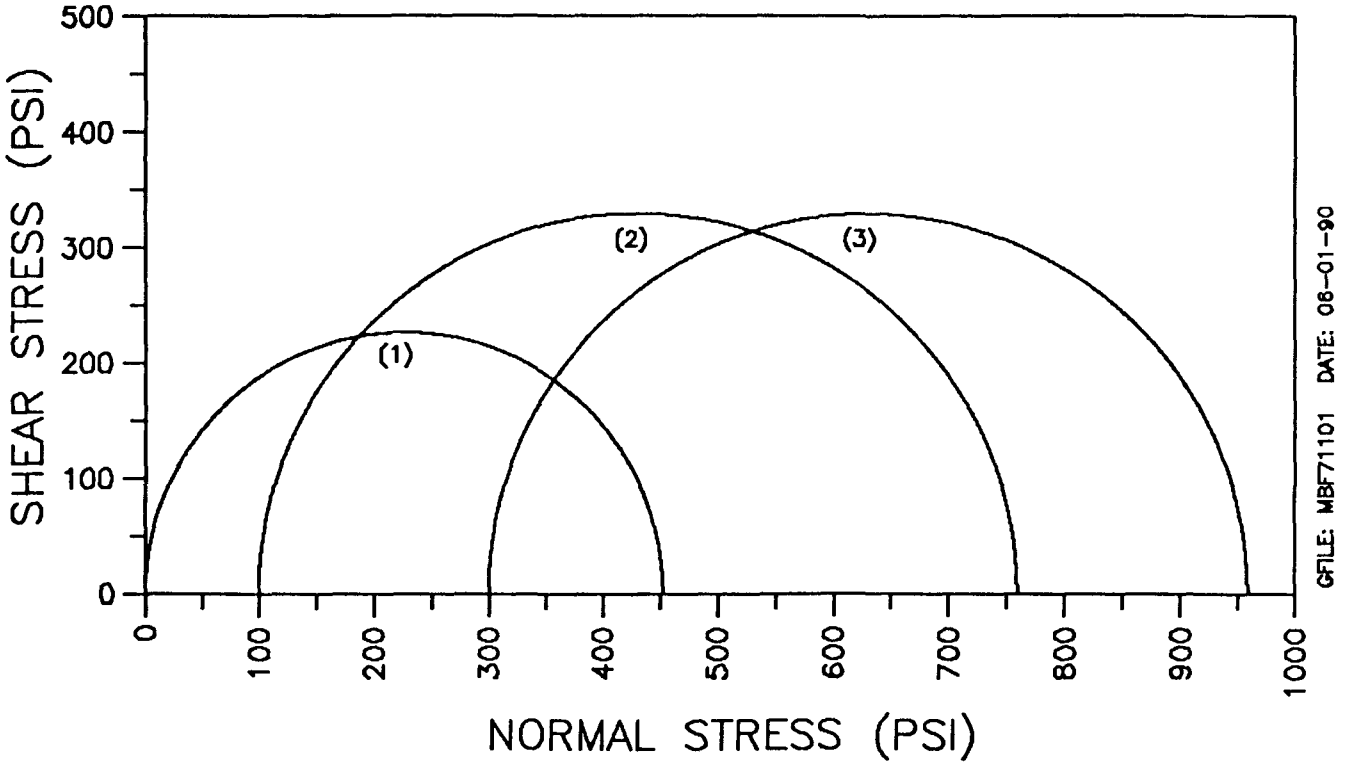
STRESS-STRAIN PLOT

MASON-JOHNSTON & ASSOCIATES, INC.
GEOLOGISTS-ENGINEERS

JOB NO.: 5530.17

FIGURE

BORING NO.: BF7
DEPTH RANGE (FT): 110.1–111.3
TAYLOR MARL



GFILE: MBF71101 DATE: 08-01-90

SEE STRESS–STRAIN PLOTS
FOR INDIVIDUAL SAMPLE DATA

(1) DEPTH (FT): 110.1
(2) DEPTH (FT): 110.5
(3) DEPTH (FT): 110.9

INCLINATION (DEG): VERTICAL
TEST TYPE: UNCONFINED COMPRESSION (ASTM D2938)
TRIAXIAL COMPRESSION (ASTM D2664)

TEXAS SSC SITE

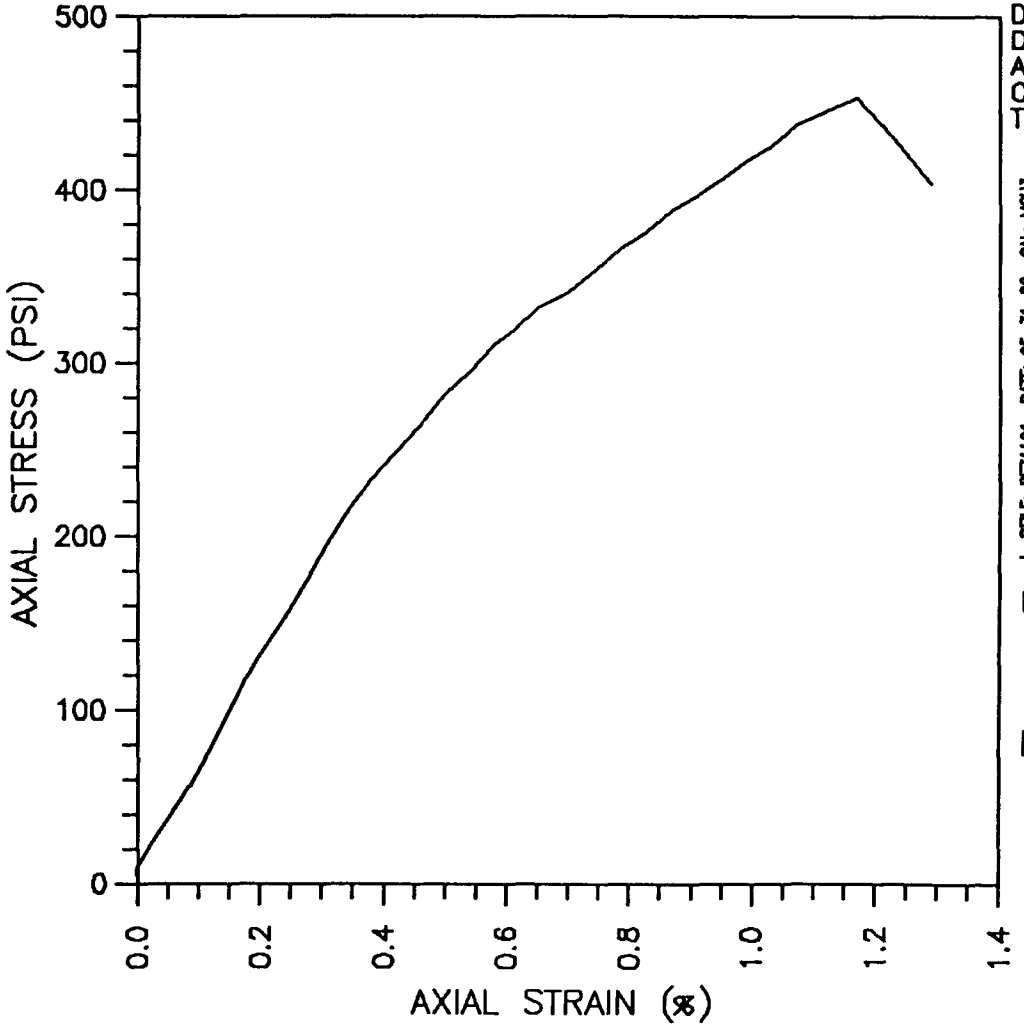
MOHR CIRCLE PLOT

MASON–JOHNSTON & ASSOCIATES, INC.
GEOLOGISTS–ENGINEERS

JOB NO.: 5530.17

FIGURE

BORING NO.: BF7
DEPTH (FT): 110.1
TAYLOR MARL



INCLINATION (DEG): VERTICAL
MOISTURE CONTENT (%): 16.4
DRY UNIT WEIGHT (PCF): 114.1
DEG. OF SATURATION (%): 92.8
ASSUMED SPECIFIC GRAVITY: 2.7
CONFINING PRESSURE (PSI): 0
TEST TYPE: UNCONFINED COMPRESSION
(ASTM D 2938)

BFILE: BF71101 DATE: 05-31-90 CAL: MCU3

TANGENT MODULUS AT 50%
ULTIMATE STRESS:
0.471 x10E5 PSI

FAILURE MODE:
AXIAL SPLITTING

TEXAS SSC SITE

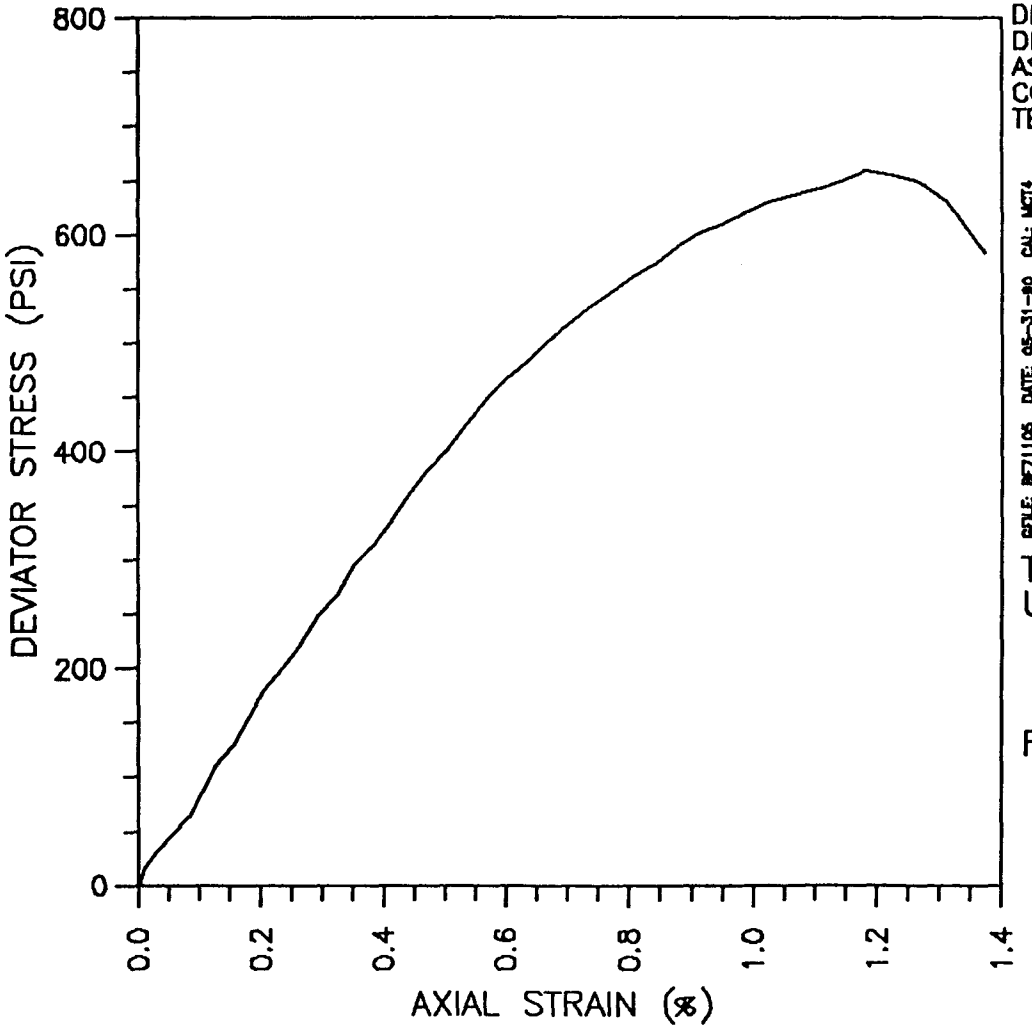
STRESS-STRAIN PLOT

MASON-JOHNSTON & ASSOCIATES,INC.
GEOLOGISTS-ENGINEERS

JOB NO.: 5530.17

FIGURE

BORING NO.: BF7
DEPTH (FT): 110.5
TAYLOR MARL



INCLINATION (DEG): VERTICAL
MOISTURE CONTENT (%): 16.3
DRY UNIT WEIGHT (PCF): 117.5
DEG. OF SATURATION (%): 101.3
ASSUMED SPECIFIC GRAVITY: 2.7
CONFINING PRESSURE (PSI): 100
TEST TYPE: TRIAXIAL COMPRESSION
(ASTM D 2664)

FILE: BF7110S DATE: 05-31-90 CAL: MCT4

TANGENT MODULUS AT 50%
ULTIMATE STRESS:
0.789 x10E5 PSI

FAILURE MODE:
AXIAL SPLITTING

TEXAS SSC SITE

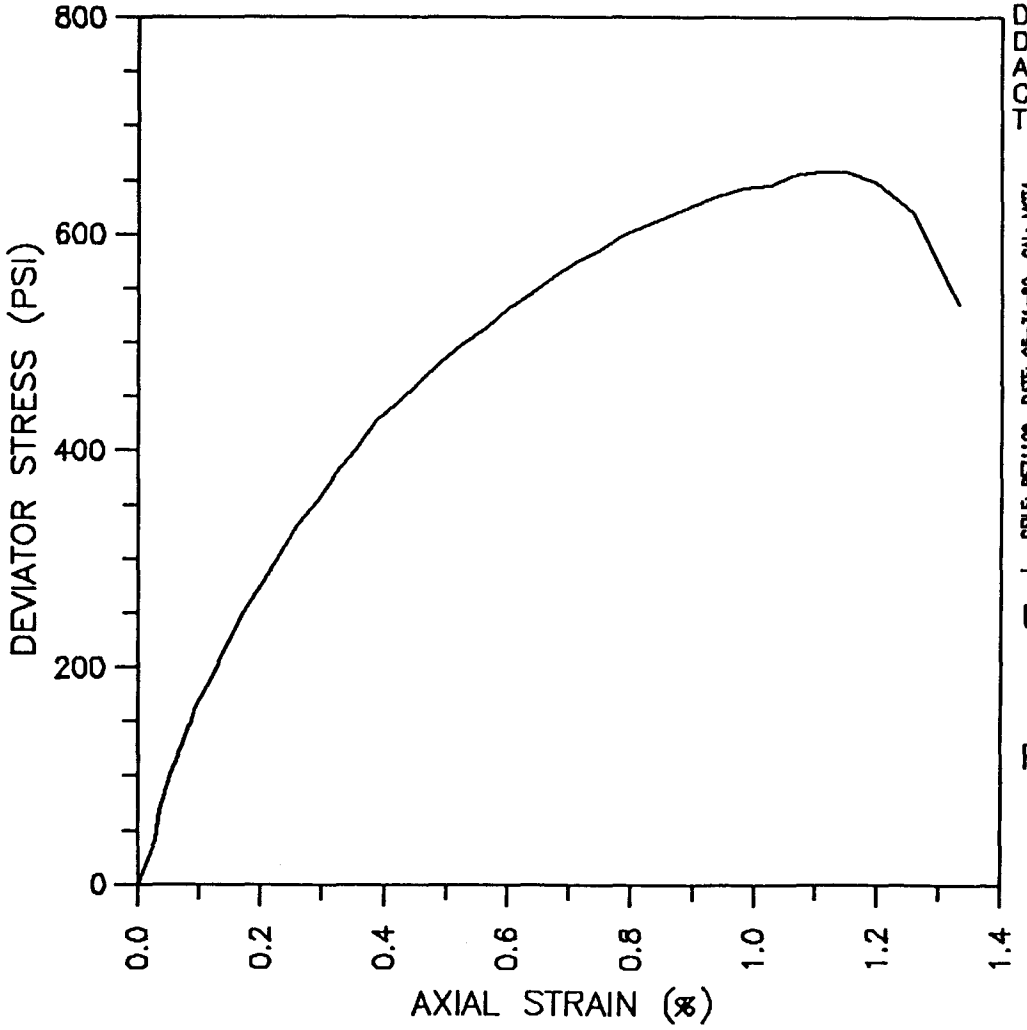
STRESS-STRAIN PLOT

MASON-JOHNSTON & ASSOCIATES, INC.
GEOLOGISTS-ENGINEERS

JOB NO.: 5530.17

FIGURE

BORING NO.: BF7
DEPTH (FT): 110.9
TAYLOR MARL



INCLINATION (DEG): VERTICAL
MOISTURE CONTENT (%): 16.2
DRY UNIT WEIGHT (PCF): 116.5
DEG. OF SATURATION (%): 98.1
ASSUMED SPECIFIC GRAVITY: 2.7
CONFINING PRESSURE (PSI): 300
TEST TYPE: TRIAXIAL COMPRESSION
(ASTM D 2664)

BFILE: BF71109 DATE: 05-31-90 CAL: MGT4

TANGENT MODULUS AT 50%
ULTIMATE STRESS:
0.896 x10E5 PSI

FAILURE MODE:
SHEAR PLANES AT
15 AND 30 DEG.

TEXAS SSC SITE

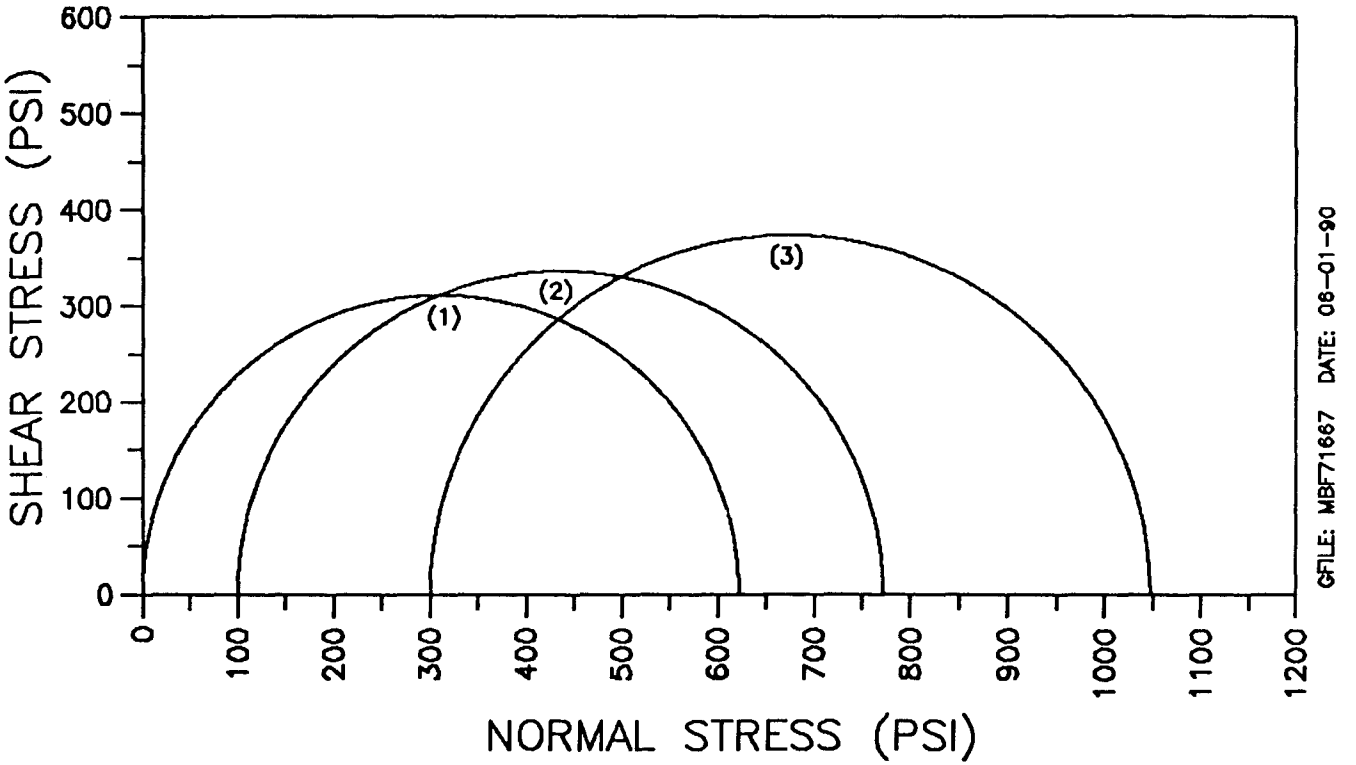
STRESS-STRAIN PLOT

MASON-JOHNSTON & ASSOCIATES, INC.
GEOLOGISTS-ENGINEERS

JOB NO.: 5530.17

FIGURE

BORING NO.: BF7
DEPTH RANGE (FT): 166.7–168.2
TAYLOR MARL



GFILE: MBF71667 DATE: 08-01-90

SEE STRESS-STRAIN PLOTS
FOR INDIVIDUAL SAMPLE DATA

(1) DEPTH (FT): 166.7
(2) DEPTH (FT): 167.1
(3) DEPTH (FT): 167.8

INCLINATION (DEG): VERTICAL
TEST TYPE: UNCONFINED COMPRESSION (ASTM D2938)
TRIAXIAL COMPRESSION (ASTM D2664)

TEXAS SSC SITE

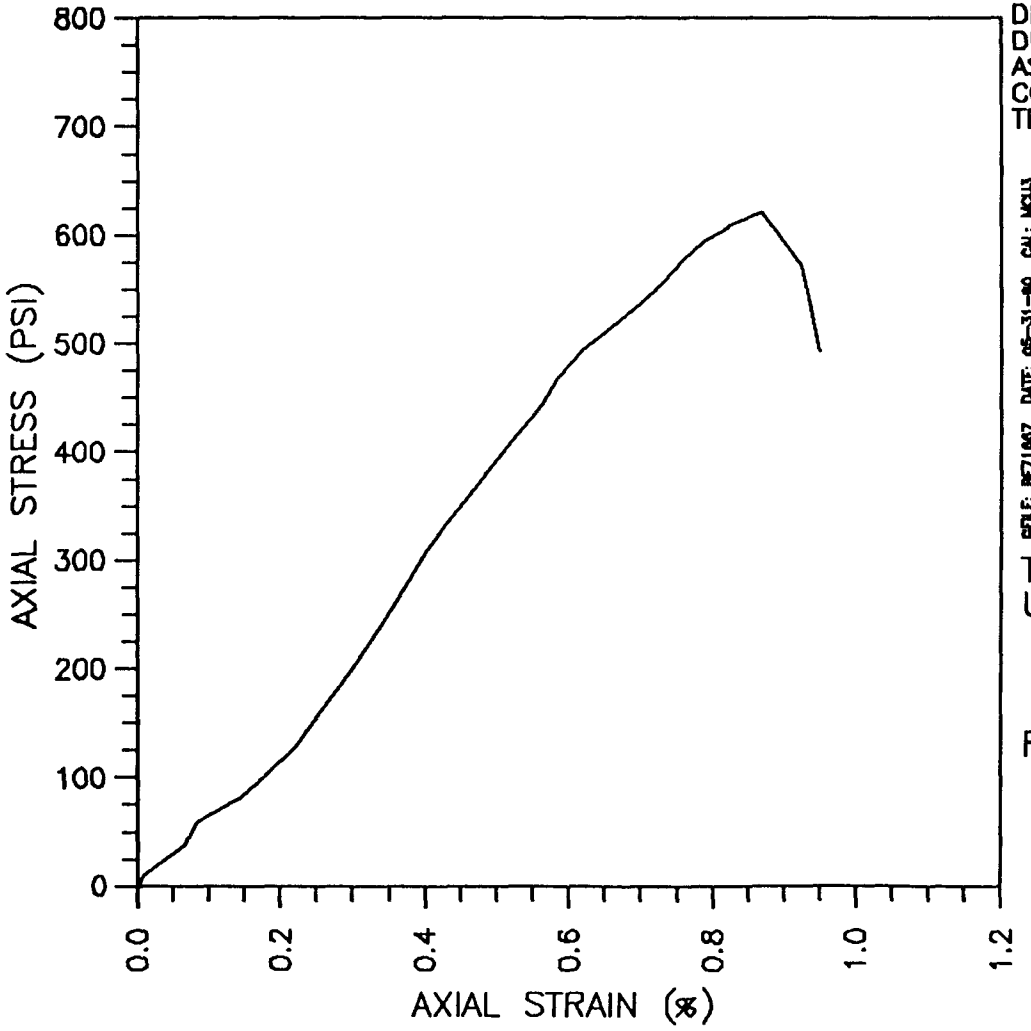
MOHR CIRCLE PLOT

MASON-JOHNSTON & ASSOCIATES,INC.
GEOLOGISTS-ENGINEERS

JOB NO.: 5530.17

FIGURE

BORING NO.: BF7
DEPTH (FT): 166.7
TAYLOR MARL



INCLINATION (DEG): VERTICAL
MOISTURE CONTENT (%): 15.5
DRY UNIT WEIGHT (PCF): 118.6
DEG. OF SATURATION (%): 99.2
ASSUMED SPECIFIC GRAVITY: 2.7
CONFINING PRESSURE (PSI): 0
TEST TYPE: UNCONFINED COMPRESSION
(ASTM D 2938)

BFILE: BF71007 DATE: 05-31-90 CAL: MCL3

TANGENT MODULUS AT 50%
ULTIMATE STRESS:
0.940 x10E5 PSI

FAILURE MODE:
AXIAL SPLITTING

TEXAS SSC SITE

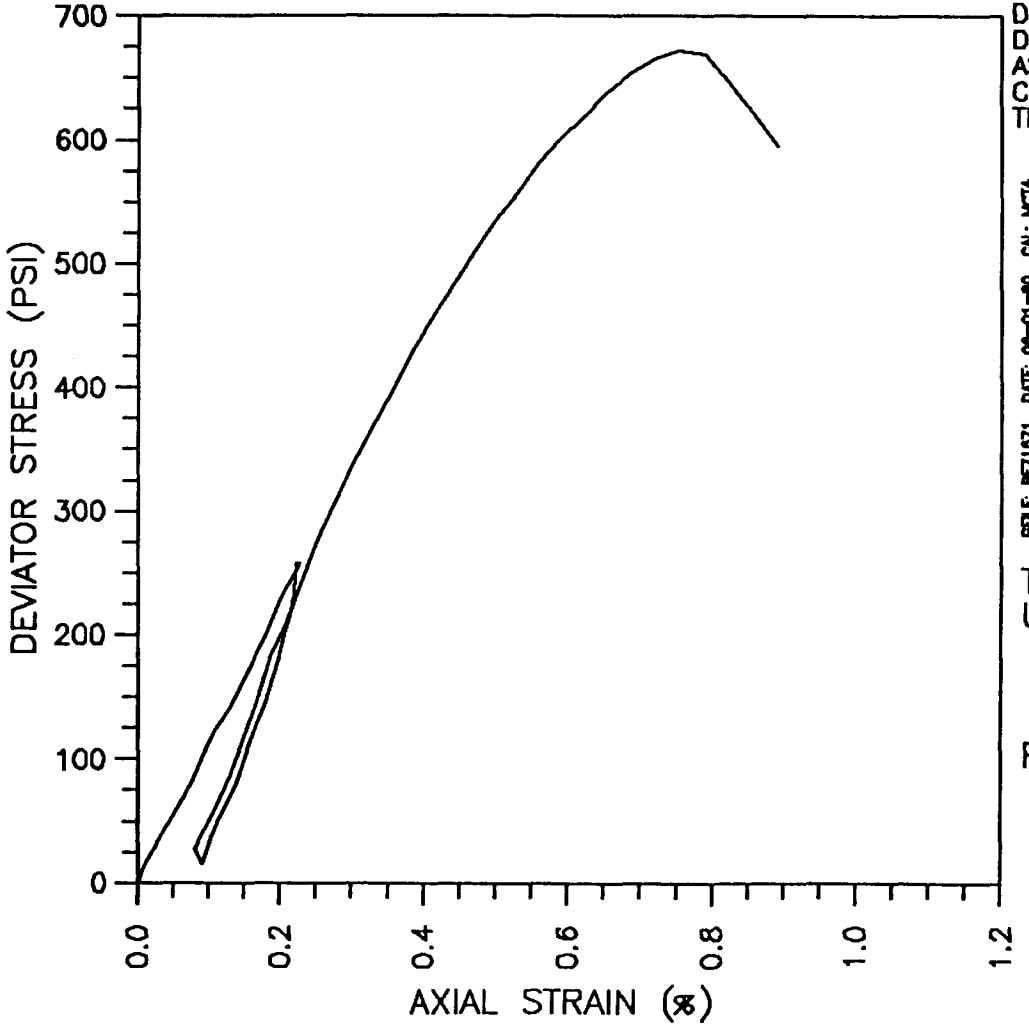
STRESS-STRAIN PLOT

MASON-JOHNSTON & ASSOCIATES, INC.
GEOLOGISTS-ENGINEERS

JOB NO.: 5530.17

FIGURE

BORING NO.: BF7
DEPTH (FT): 167.1
TAYLOR MARL



INCLINATION (DEG): VERTICAL
MOISTURE CONTENT (%): 15.8
DRY UNIT WEIGHT (PCF): 117.1
DEG. OF SATURATION (%): 97.3
ASSUMED SPECIFIC GRAVITY: 2.7
CONFINING PRESSURE (PSI): 100
TEST TYPE: TRIAXIAL COMPRESSION
(ASTM D 2664)

BFTLE: BF71671 DATE: 06-01-90 CAL: MCT4

TANGENT MODULUS AT 50%
ULTIMATE STRESS:
1.200 x10E5 PSI

FAILURE MODE:
SHEAR PLANE
AT 35 DEG.

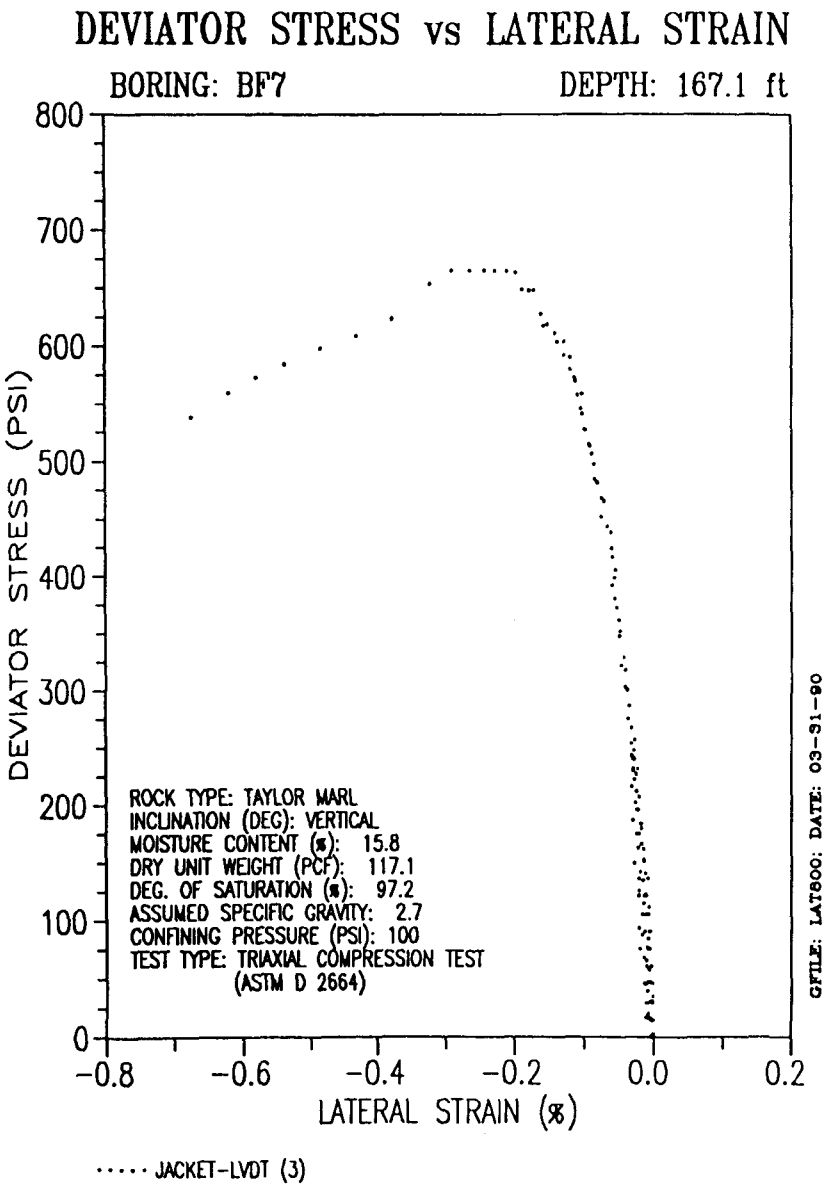
TEXAS SSC SITE

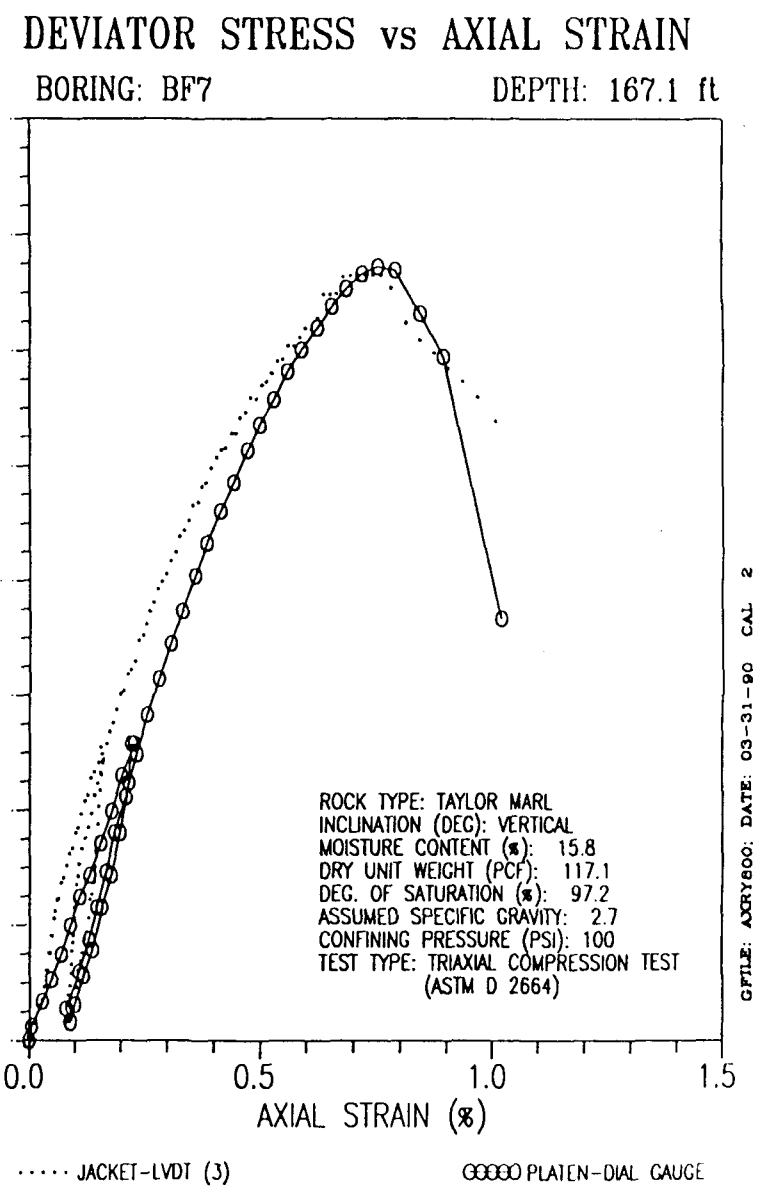
STRESS-STRAIN PLOT

MASON-JOHNSTON & ASSOCIATES, INC.
GEOLOGISTS-ENGINEERS

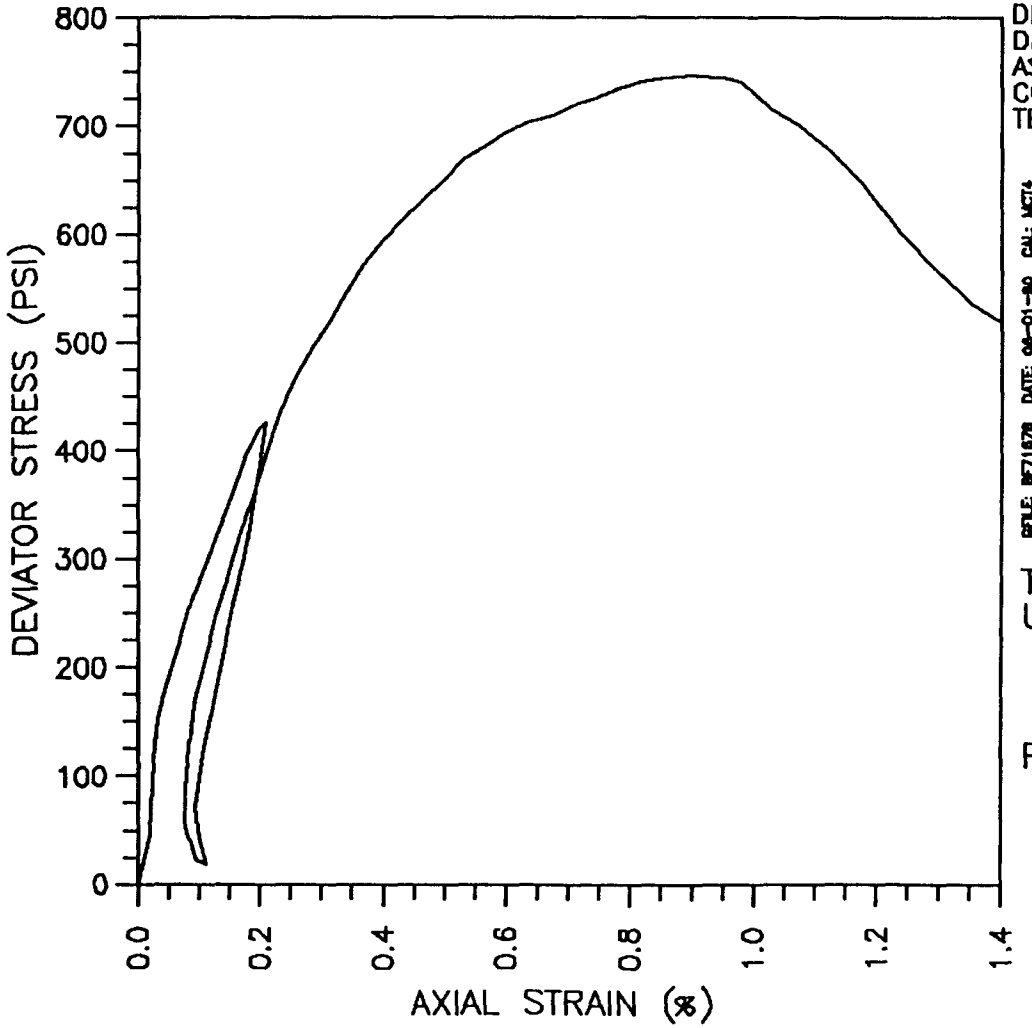
JOB NO.: 5530.17

FIGURE


DEVIATOR STRESS vs LATERAL STRAIN
BORING: BF7
DEPTH: 167.1 ft
DEVIATOR STRESS (PSI)
LATERAL STRAIN (%)
ROCK TYPE: TAYLOR MARL
INCLINATION (DEG): VERTICAL
MOISTURE CONTENT (%): 15.8
DRY UNIT WEIGHT (PCF): 117.1
DEG. OF SATURATION (%): 97.2
ASSUMED SPECIFIC GRAVITY: 2.7
CONFINING PRESSURE (PSI): 100
TEST TYPE: TRIAXIAL COMPRESSION TEST
(ASTM D 2664)
GFILE: LAT800; DATE: 03-31-90
····· JACKET-LVDT (3)


DEVIATOR STRESS vs AXIAL STRAIN
BORING: BF7
DEPTH: 167.1 ft
AXIAL STRAIN (%)
ROCK TYPE: TAYLOR MARL
INCLINATION (DEG): VERTICAL
MOISTURE CONTENT (%): 15.8
DRY UNIT WEIGHT (PCF): 117.1
DEG. OF SATURATION (%): 97.2
ASSUMED SPECIFIC GRAVITY: 2.7
CONFINING PRESSURE (PSI): 100
TEST TYPE: TRIAXIAL COMPRESSION TEST
(ASTM D 2664)
GFILE: AXRY800; DATE: 03-31-90 CAL 2
····· JACKET-LVDT (3)
OOOOO PLATEN-DIAL GAUGE

BORING NO.: BF7
DEPTH (FT): 167.8
TAYLOR MARL



INCLINATION (DEG): VERTICAL
MOISTURE CONTENT (%): 15.8
DRY UNIT WEIGHT (PCF): 118.3
DEG. OF SATURATION (%): 100.5
ASSUMED SPECIFIC GRAVITY: 2.7
CONFINING PRESSURE (PSI): 300
TEST TYPE: TRIAXIAL COMPRESSION
(ASTM D 2664)

BFILE: BF71678 DATE: 06-01-90 CAL: MCT4

TANGENT MODULUS AT 50%
ULTIMATE STRESS:
1.548 x10E5 PSI

FAILURE MODE:
SHEAR PLANE
AT 30 DEG.

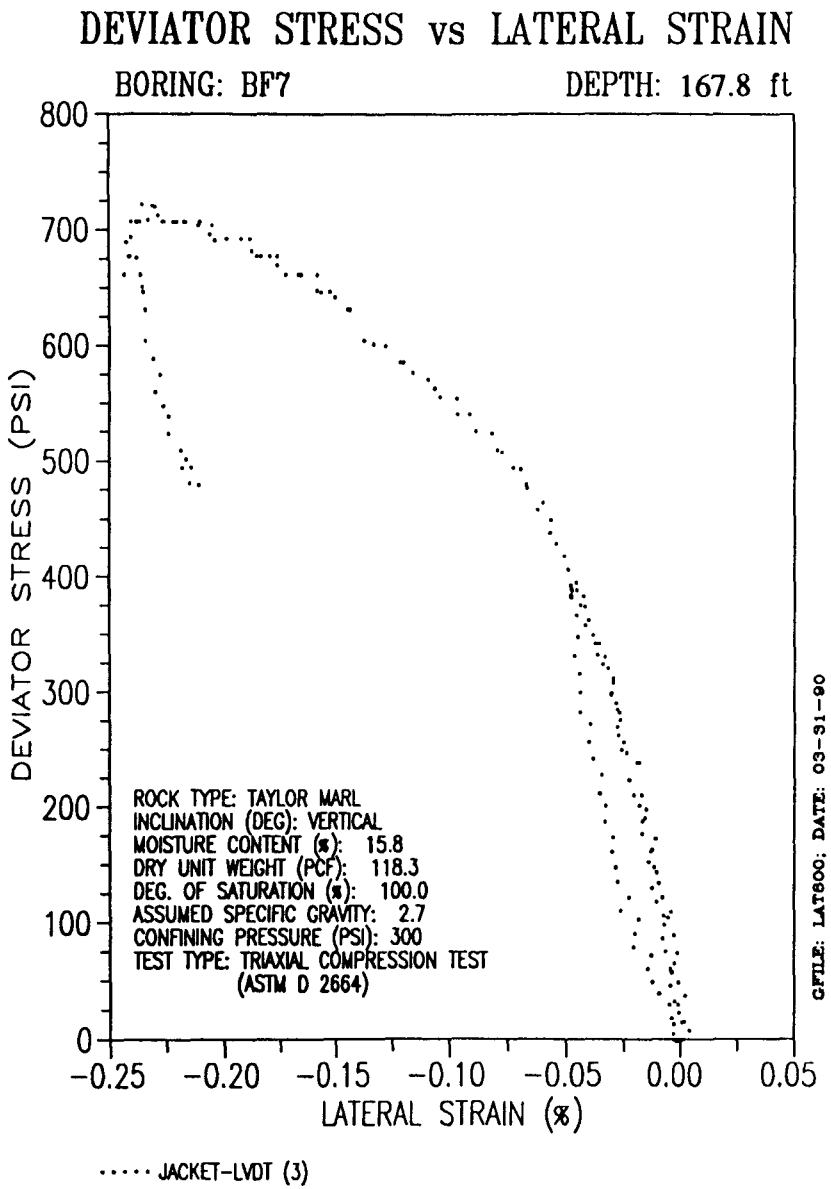
TEXAS SSC SITE

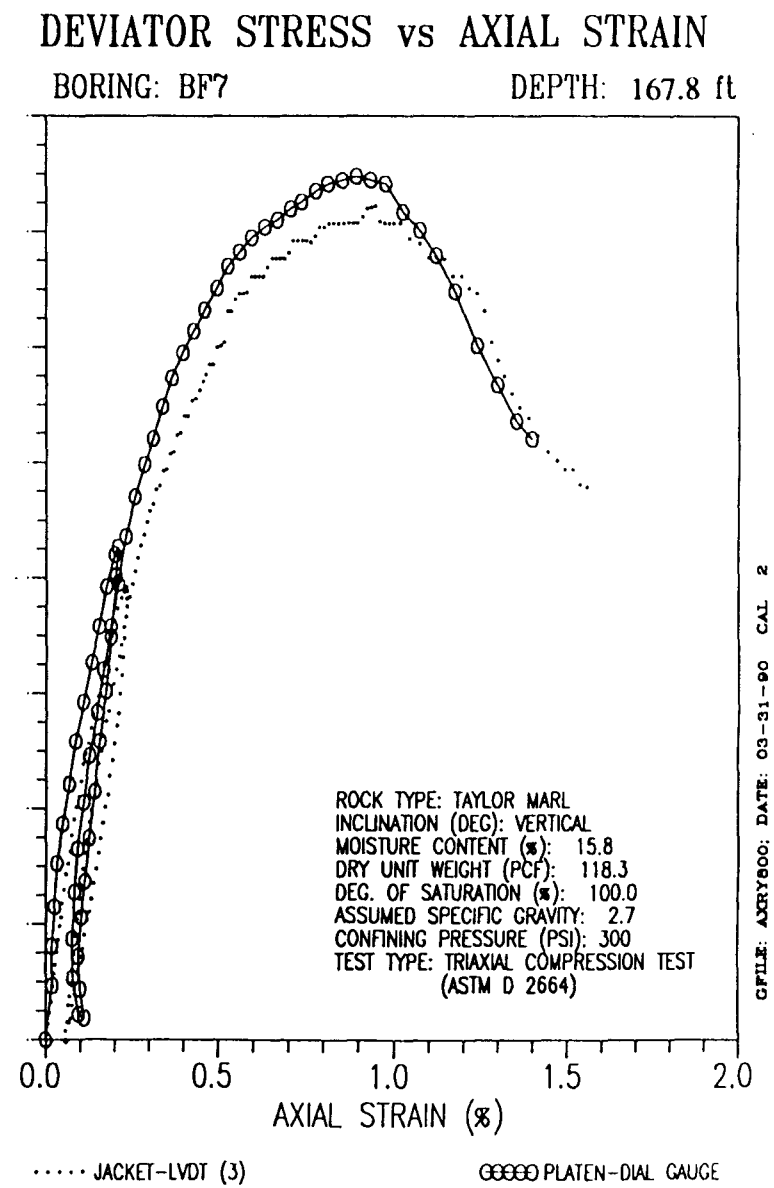
STRESS-STRAIN PLOT

MASON-JOHNSTON & ASSOCIATES, INC.
GEOLOGISTS-ENGINEERS

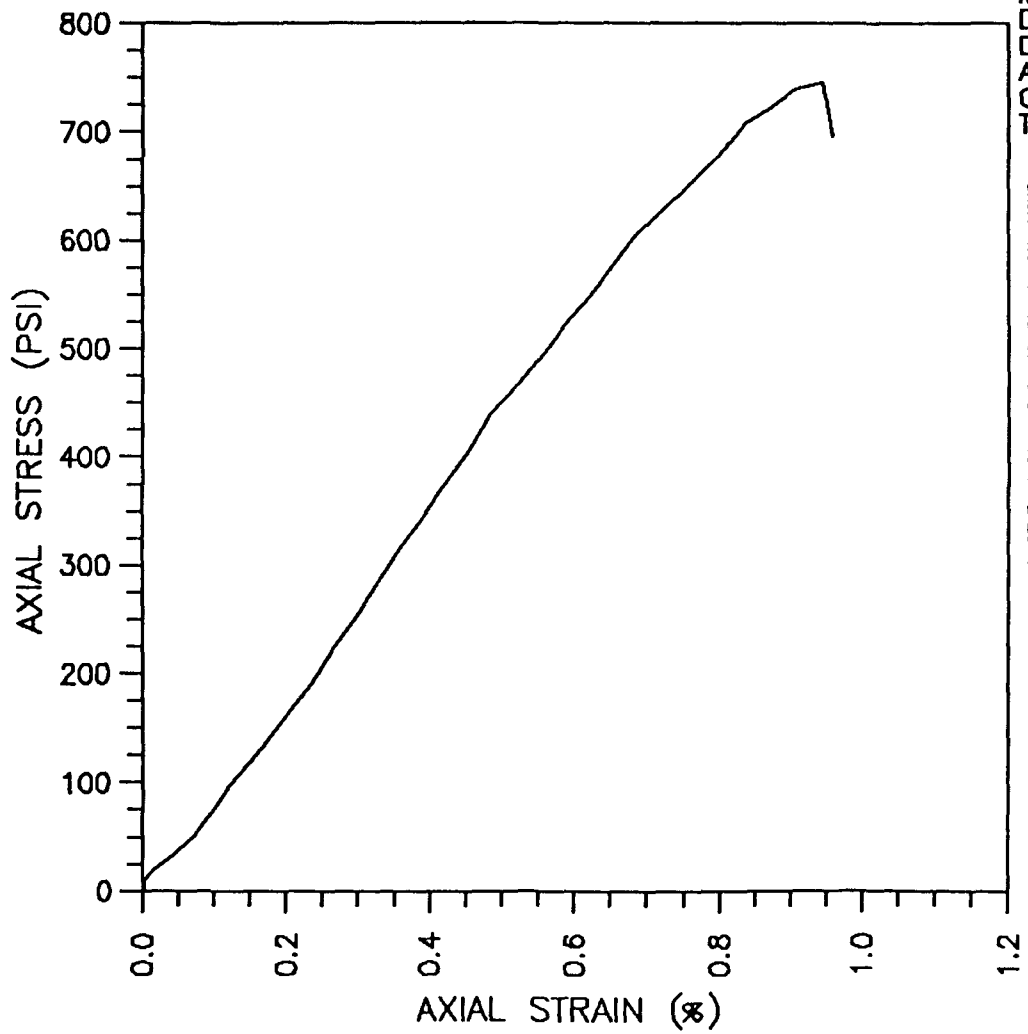
JOB NO.: 5530.17

FIGURE


DEVIATOR STRESS vs LATERAL STRAIN
BORING: BF7
DEPTH: 167.8 ft
DEVIATOR STRESS (PSI)
LATERAL STRAIN (%)
ROCK TYPE: TAYLOR MARL
INCLINATION (DEG): VERTICAL
MOISTURE CONTENT (%): 15.8
DRY UNIT WEIGHT (PCF): 118.3
DEG. OF SATURATION (%): 100.0
ASSUMED SPECIFIC GRAVITY: 2.7
CONFINING PRESSURE (PSI): 300
TEST TYPE: TRIAXIAL COMPRESSION TEST
(ASTM D 2664)
GFILE: LAT800; DATE: 03-31-90
JACKET-LVDT (3)


DEVIATOR STRESS vs AXIAL STRAIN
BORING: BF7
DEPTH: 167.8 ft
AXIAL STRAIN (%)
ROCK TYPE: TAYLOR MARL
INCLINATION (DEG): VERTICAL
MOISTURE CONTENT (%): 15.8
DRY UNIT WEIGHT (PCF): 118.3
DEG. OF SATURATION (%): 100.0
ASSUMED SPECIFIC GRAVITY: 2.7
CONFINING PRESSURE (PSI): 300
TEST TYPE: TRIAXIAL COMPRESSION TEST
(ASTM D 2664)
GFILE: AXRY800; DATE: 03-31-90 CAL 2
JACKET-LVDT (3)
PLATEN-DIAL GAUGE

BORING NO.: BF7
DEPTH (FT): 209.8
TAYLOR MARL



INCLINATION (DEG): VERTICAL
MOISTURE CONTENT (%): 15.5
DRY UNIT WEIGHT (PCF): 118.1
DEG. OF SATURATION (%): 98.2
ASSUMED SPECIFIC GRAVITY: 2.7
CONFINING PRESSURE (PSI): 0
TEST TYPE: UNCONFINED COMPRESSION
(ASTM D 2938)

FILE: BF72089 DATE: 05-31-90 CAL: MCL3

TANGENT MODULUS AT 50%
ULTIMATE STRESS:
0.970 x10E5 PSI

FAILURE MODE:
AXIAL SPLITTING

TEXAS SSC SITE

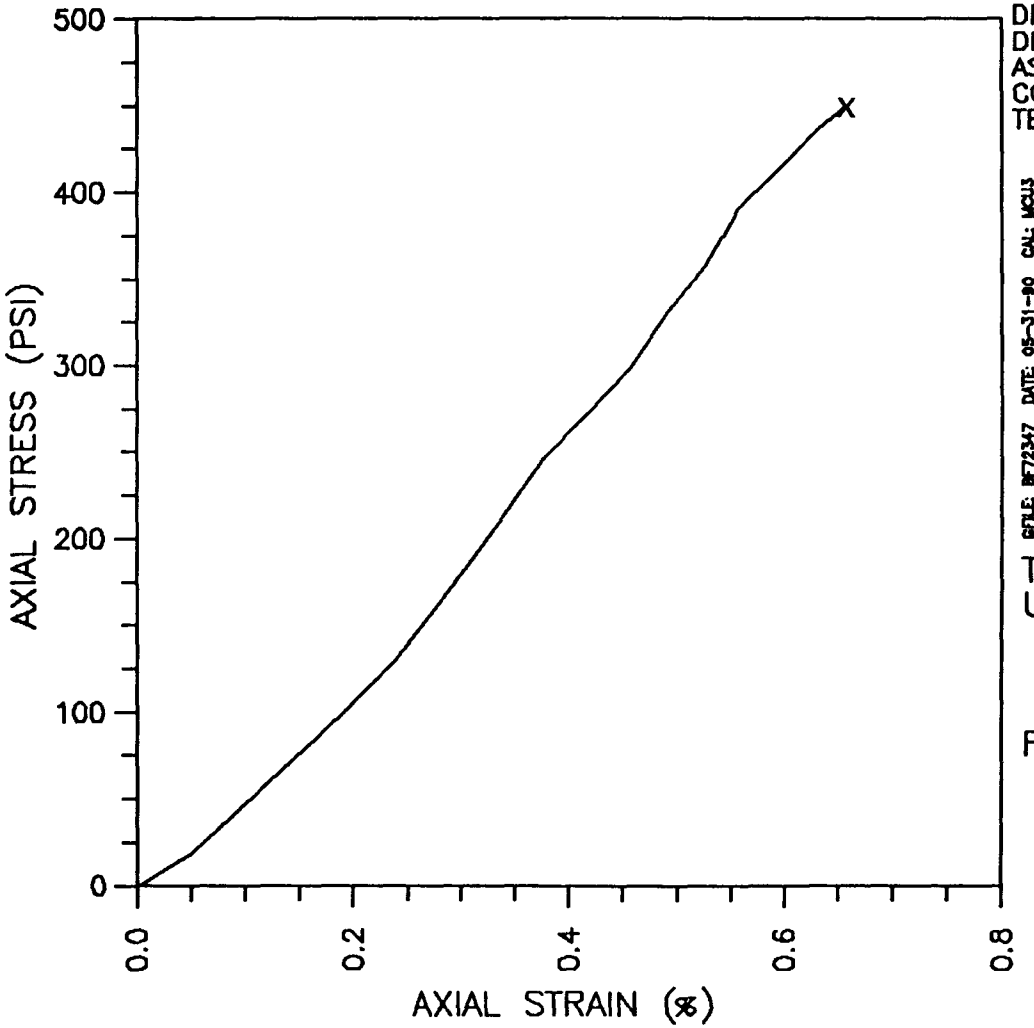
STRESS-STRAIN PLOT

MASON-JOHNSTON & ASSOCIATES, INC.
GEOLOGISTS-ENGINEERS

JOB NO.: 5530.17

FIGURE

BORING NO.: BF7
DEPTH (FT): 234.7
TAYLOR MARL



INCLINATION (DEG): VERTICAL
MOISTURE CONTENT (%): 15.8
DRY UNIT WEIGHT (PCF): 117.9
DEG. OF SATURATION (%): 99.3
ASSUMED SPECIFIC GRAVITY: 2.7
CONFINING PRESSURE (PSI): 0
TEST TYPE: UNCONFINED COMPRESSION
(ASTM D 2938)

GFILE: BF72347 DATE: 05-31-90 CAL: MCU3

TANGENT MODULUS AT 50%
ULTIMATE STRESS:
0.889 x10E5 PSI

FAILURE MODE:
AXIAL SPLITTING

TEXAS SSC SITE

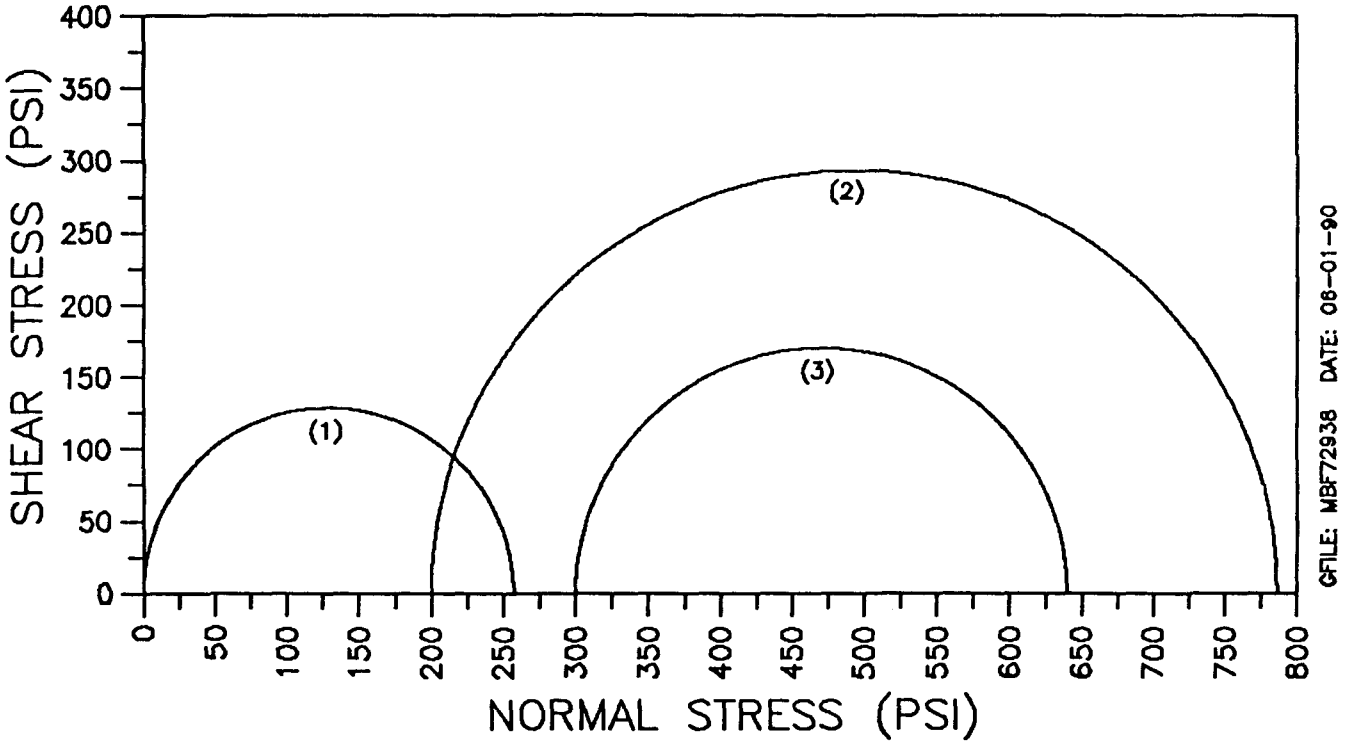
STRESS-STRAIN PLOT

MASON-JOHNSTON & ASSOCIATES,INC.
GEOLOGISTS-ENGINEERS

JOB NO.: 5530.17

FIGURE

BORING NO.: BF7
DEPTH RANGE (FT): 293.8–295.2
TAYLOR MARL



SEE STRESS–STRAIN PLOTS
FOR INDIVIDUAL SAMPLE DATA

(1) DEPTH (FT): 293.8
(2) DEPTH (FT): 294.2
(3) DEPTH (FT): 294.8

INCLINATION (DEG): VERTICAL
TEST TYPE: UNCONFINED COMPRESSION (ASTM D2938)
TRIAXIAL COMPRESSION (ASTM D2664)

TEXAS SSC SITE

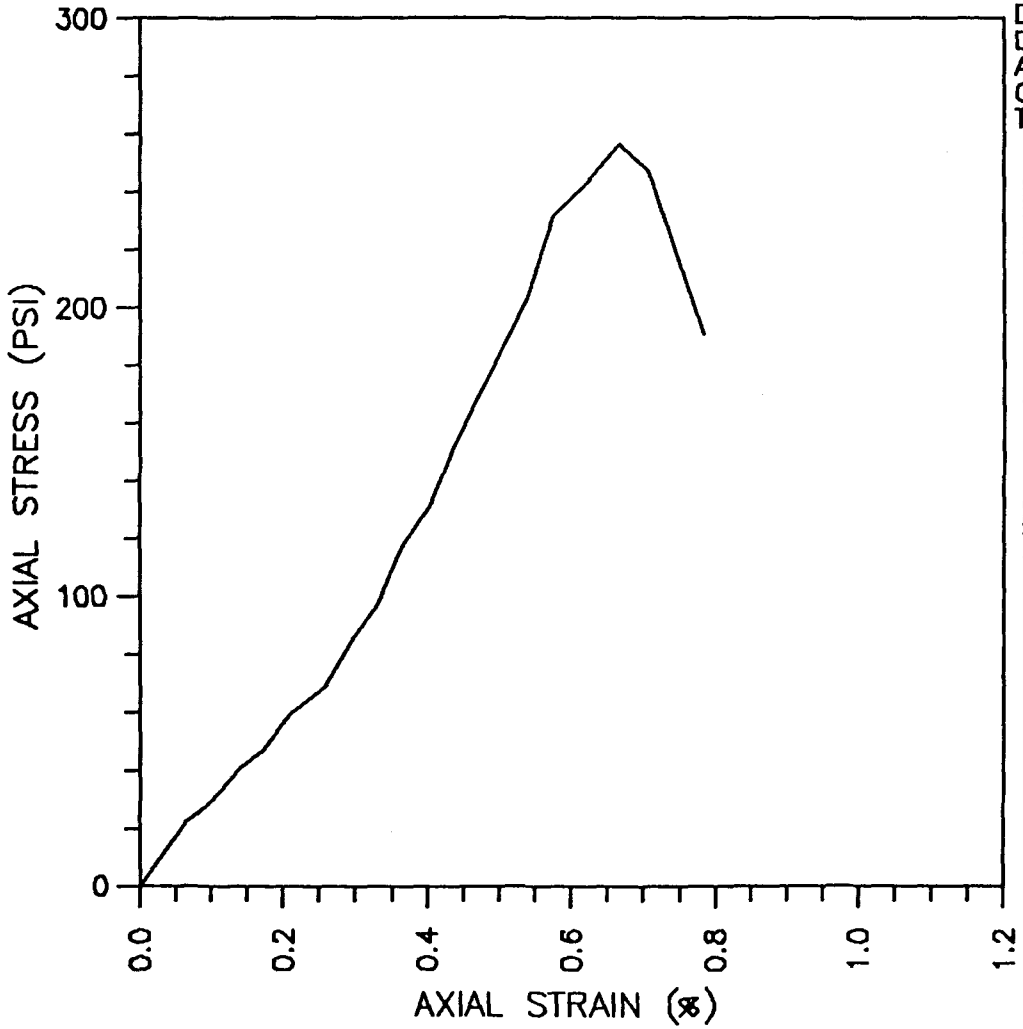
MOHR CIRCLE PLOT

MASON–JOHNSTON & ASSOCIATES, INC.
GEOLOGISTS–ENGINEERS

JOB NO.: 5530.17

FIGURE

BORING NO.: BF7
DEPTH (FT): 293.8
TAYLOR MARL



INCLINATION (DEG): VERTICAL
MOISTURE CONTENT (%): 15.8
DRY UNIT WEIGHT (PCF): 115.6
DEG. OF SATURATION (%): 93.3
ASSUMED SPECIFIC GRAVITY: 2.7
CONFINING PRESSURE (PSI): 0
TEST TYPE: UNCONFINED COMPRESSION
(ASTM D 2938)

FILE: BF72938 DATE: 08-14-90 CAL: MCU3

TANGENT MODULUS AT 50%
ULTIMATE STRESS:
0.513 x10E5 PSI

FAILURE MODE:
AXIAL SPLITTING

TEXAS SSC SITE

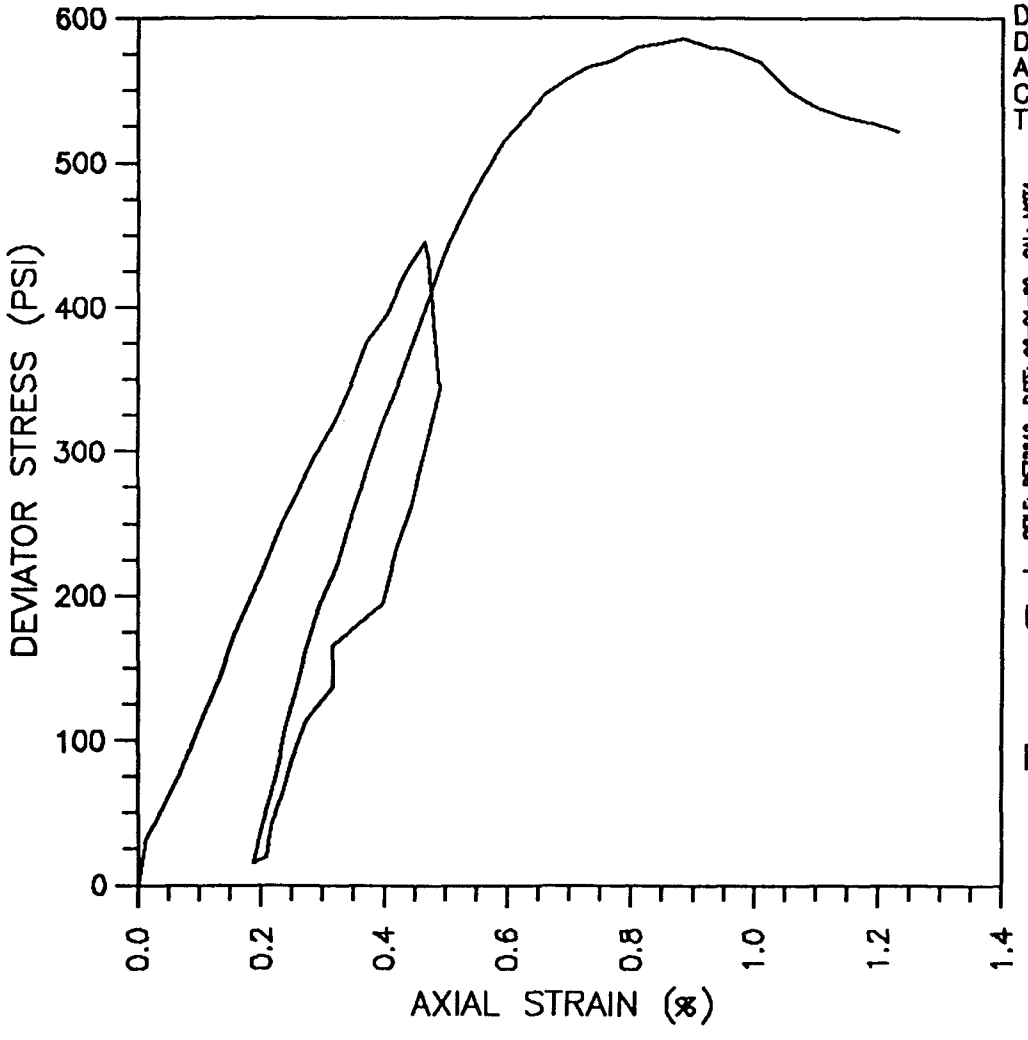
STRESS-STRAIN PLOT

MASON-JOHNSTON & ASSOCIATES, INC.
GEOLOGISTS-ENGINEERS

JOB NO.: 5530.17

FIGURE

BORING NO.: BF7
DEPTH (FT): 294.2
TAYLOR MARL



INCLINATION (DEG): VERTICAL
MOISTURE CONTENT (%): 15.8
DRY UNIT WEIGHT (PCF): 107.7
DEG. OF SATURATION (%): 75.4
ASSUMED SPECIFIC GRAVITY: 2.7
CONFINING PRESSURE (PSI): 200
TEST TYPE: TRIAXIAL COMPRESSION
(ASTM D 2664)

FILE: BF72942 DATE: 06-01-90 CAL: MCT4

TANGENT MODULUS AT 50%
ULTIMATE STRESS:
0.889 x10E5 PSI

FAILURE MODE:
SHEAR PLANE
AT 35 DEG.

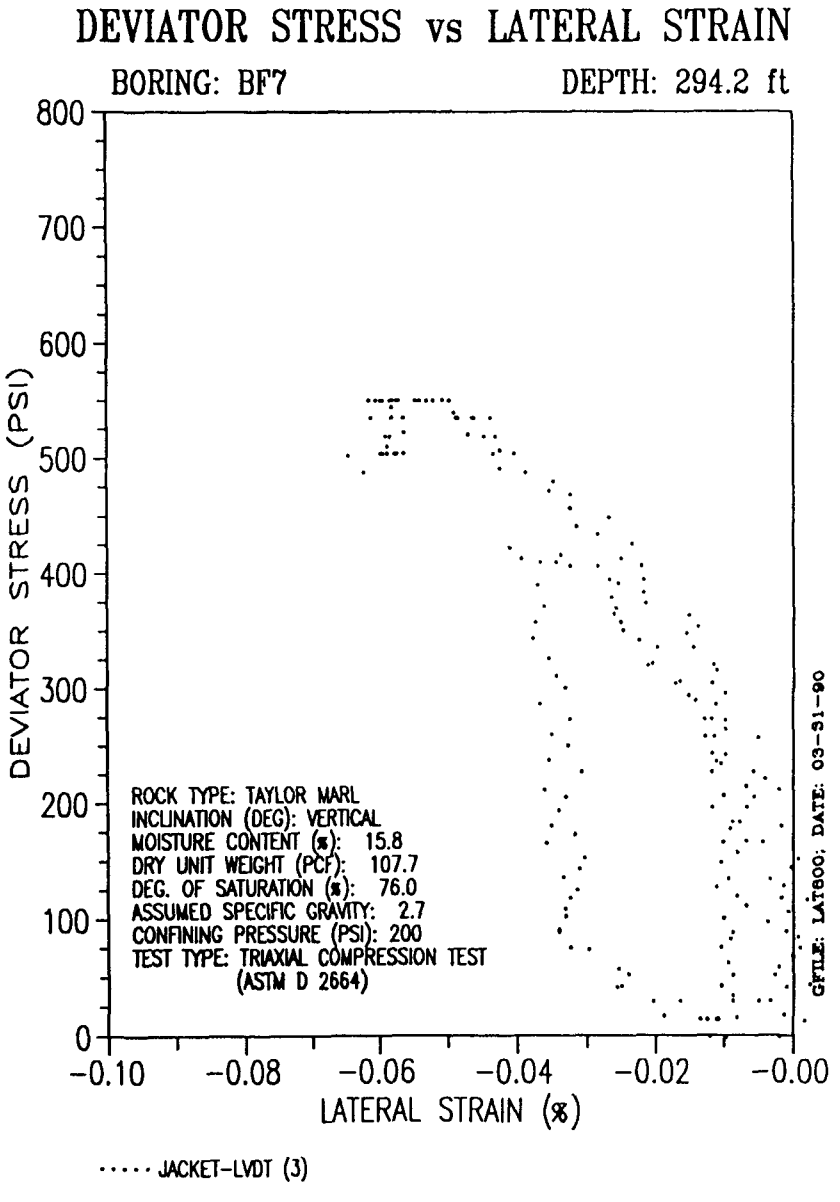
TEXAS SSC SITE

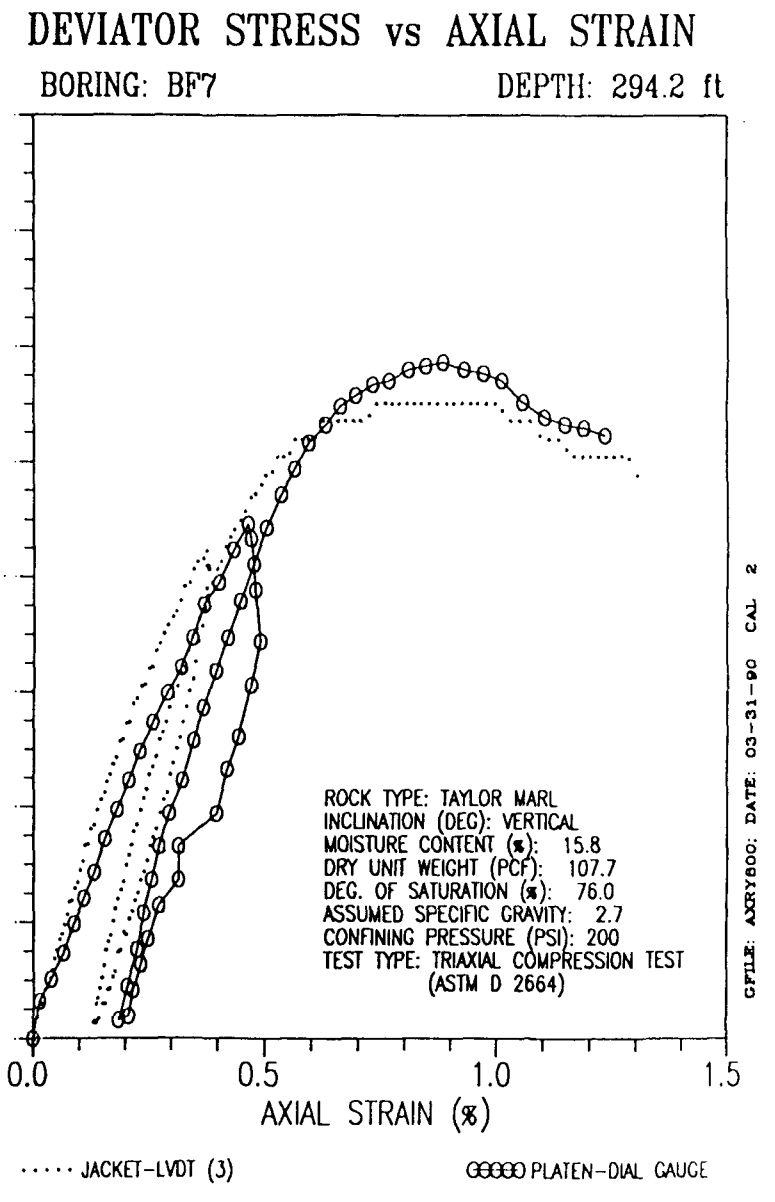
STRESS-STRAIN PLOT

MASON-JOHNSTON & ASSOCIATES, INC.
GEOLOGISTS-ENGINEERS

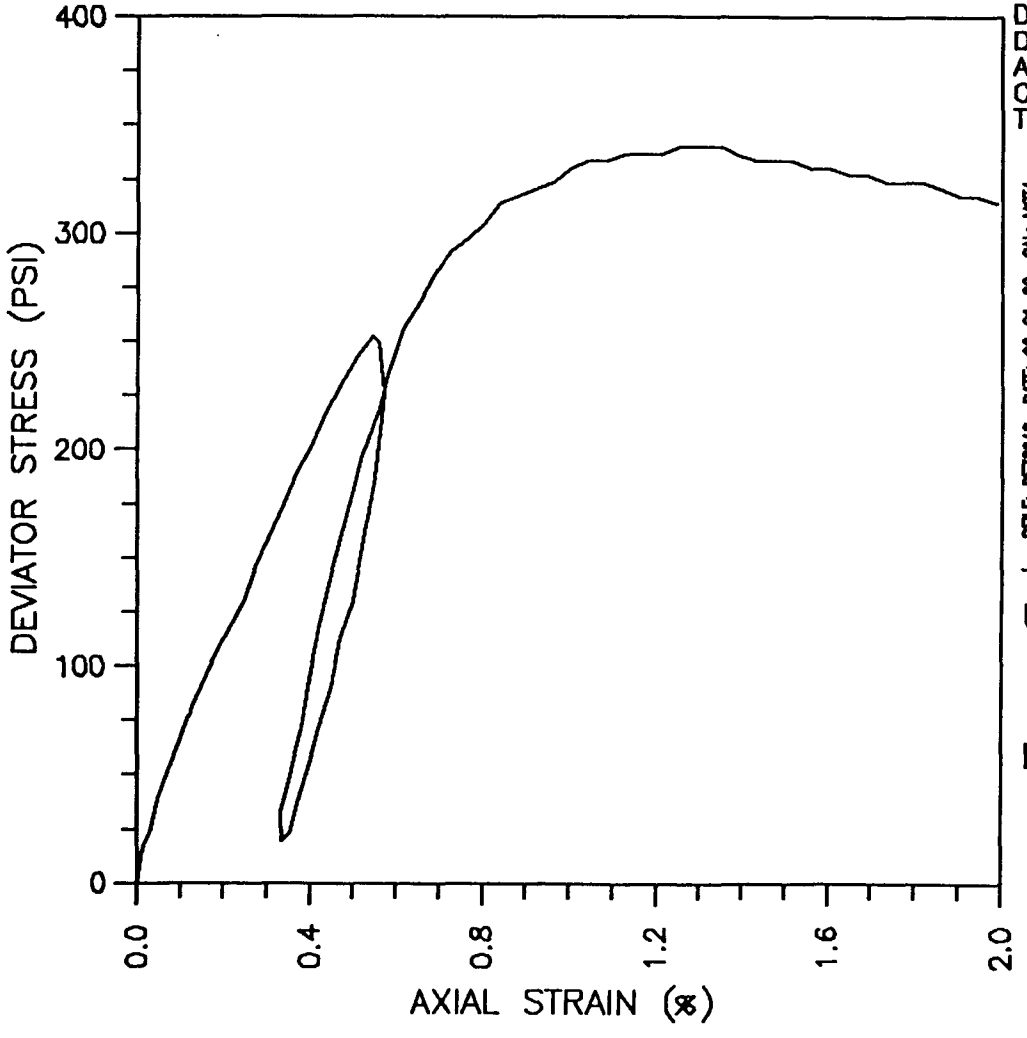
JOB NO.: 5530.17

FIGURE


DEVIATOR STRESS vs LATERAL STRAIN
BORING: BF7
DEPTH: 294.2 ft
DEVIATOR STRESS (PSI)
LATERAL STRAIN (%)
ROCK TYPE: TAYLOR MARL
INCLINATION (DEG): VERTICAL
MOISTURE CONTENT (%): 15.8
DRY UNIT WEIGHT (PCF): 107.7
DEG. OF SATURATION (%): 76.0
ASSUMED SPECIFIC GRAVITY: 2.7
CONFINING PRESSURE (PSI): 200
TEST TYPE: TRIAXIAL COMPRESSION TEST
(ASTM D 2664)
GFILE: LATBOO; DATE: 03-31-90
JACKET-LVDT (3)


DEVIATOR STRESS vs AXIAL STRAIN
BORING: BF7
DEPTH: 294.2 ft
AXIAL STRAIN (%)
ROCK TYPE: TAYLOR MARL
INCLINATION (DEG): VERTICAL
MOISTURE CONTENT (%): 15.8
DRY UNIT WEIGHT (PCF): 107.7
DEG. OF SATURATION (%): 76.0
ASSUMED SPECIFIC GRAVITY: 2.7
CONFINING PRESSURE (PSI): 200
TEST TYPE: TRIAXIAL COMPRESSION TEST
(ASTM D 2664)
GFILE: AXRYBOO; DATE: 03-31-90 CAL 2
JACKET-LVDT (3)
PLATEN-DIAL GAUGE

BORING NO.: BF7
DEPTH (FT): 294.8
TAYLOR MARL



INCLINATION (DEG): VERTICAL
MOISTURE CONTENT (%): 16.3
DRY UNIT WEIGHT (PCF): 115.6
DEG. OF SATURATION (%): 98.0
ASSUMED SPECIFIC GRAVITY: 2.7
CONFINING PRESSURE (PSI): 300
TEST TYPE: TRIAXIAL COMPRESSION
(ASTM D 2664)

FILE: BF7294B DATE: 08-01-90 CAL: MCT4

TANGENT MODULUS AT 50%
ULTIMATE STRESS:
0.455 x10E5 PSI

FAILURE MODE:
SHEAR PLANE
AT 50 DEG.

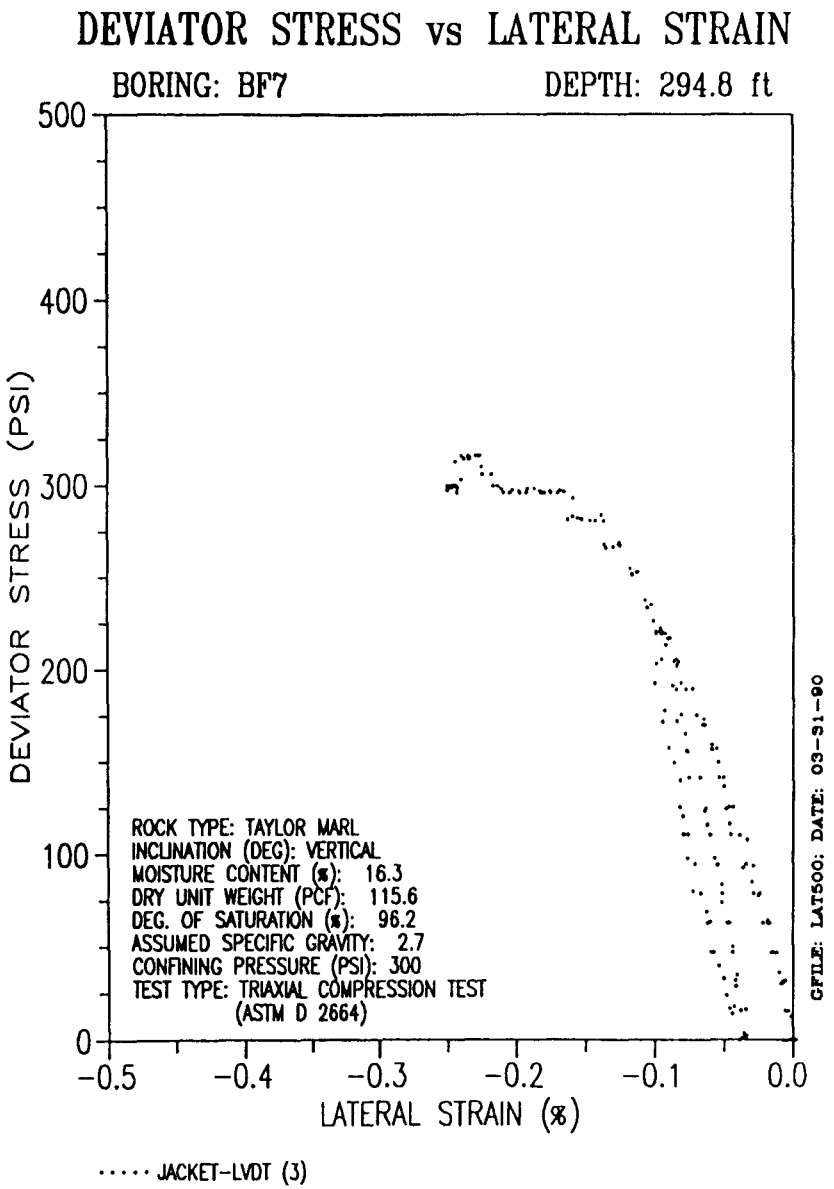
TEXAS SSC SITE

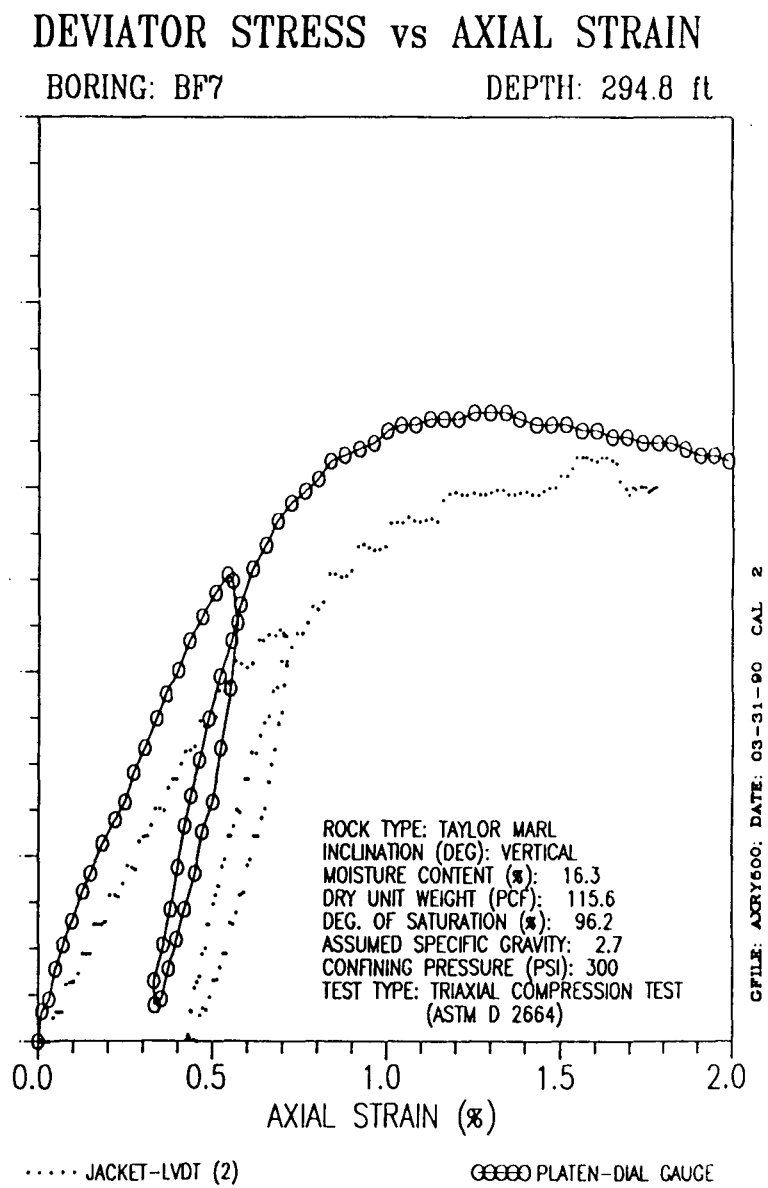
STRESS-STRAIN PLOT

MASON-JOHNSTON & ASSOCIATES,INC.
GEOLOGISTS-ENGINEERS

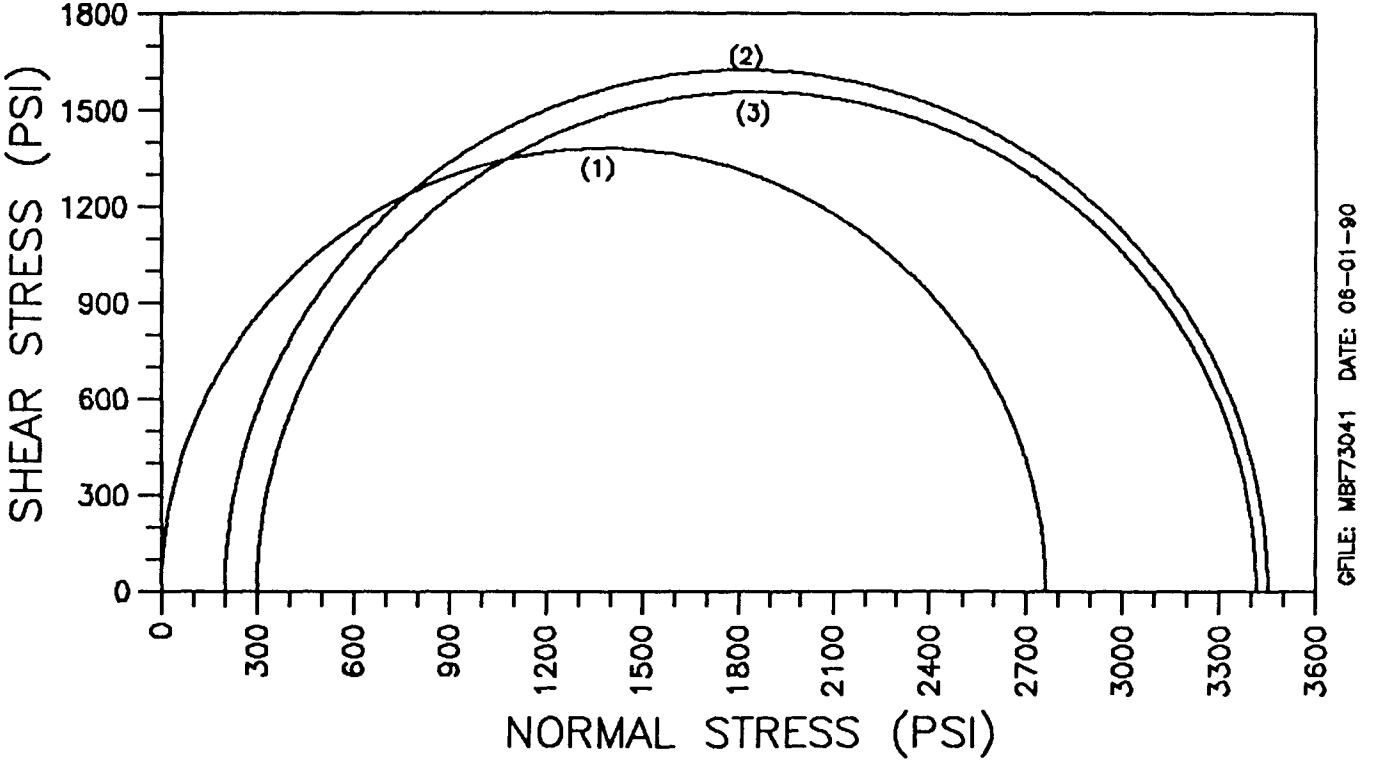
JOB NO.: 5530.17

FIGURE


DEVIATOR STRESS vs LATERAL STRAIN
BORING: BF7
DEPTH: 294.8 ft
DEVIATOR STRESS (PSI)
500
400
300
200
100
0
-0.5
-0.4
-0.3
-0.2
-0.1
0.0
LATERAL STRAIN (%)
ROCK TYPE: TAYLOR MARL
INCLINATION (DEG): VERTICAL
MOISTURE CONTENT (%): 16.3
DRY UNIT WEIGHT (PCF): 115.6
DEG. OF SATURATION (%): 96.2
ASSUMED SPECIFIC GRAVITY: 2.7
CONFINING PRESSURE (PSI): 300
TEST TYPE: TRIAXIAL COMPRESSION TEST
(ASTM D 2664)
GFILE: LAT500; DATE: 03-31-90
····· JACKET-LVDT (3)


DEVIATOR STRESS vs AXIAL STRAIN
BORING: BF7
DEPTH: 294.8 ft
0.0
0.5
1.0
1.5
2.0
AXIAL STRAIN (%)
ROCK TYPE: TAYLOR MARL
INCLINATION (DEG): VERTICAL
MOISTURE CONTENT (%): 16.3
DRY UNIT WEIGHT (PCF): 115.6
DEG. OF SATURATION (%): 96.2
ASSUMED SPECIFIC GRAVITY: 2.7
CONFINING PRESSURE (PSI): 300
TEST TYPE: TRIAXIAL COMPRESSION TEST
(ASTM D 2664)
GFILE: AXRY600; DATE: 03-31-90 CAL 2
····· JACKET-LVDT (2)
OOOOO PLATEN-DIAL GAUGE

BORING NO.: BF7
DEPTH RANGE (FT): 304.1–306.0
AUSTIN CHALK LIMESTONE



GFILE: MBF73041 DATE: 08-01-90

SEE STRESS–STRAIN PLOTS
FOR INDIVIDUAL SAMPLE DATA

(1) DEPTH (FT): 304.1
(2) DEPTH (FT): 305.2
(3) DEPTH (FT): 305.6

INCLINATION (DEG): VERTICAL
TEST TYPE: UNCONFINED COMPRESSION (ASTM D2938)
TRIAXIAL COMPRESSION (ASTM D2664)

TEXAS SSC SITE

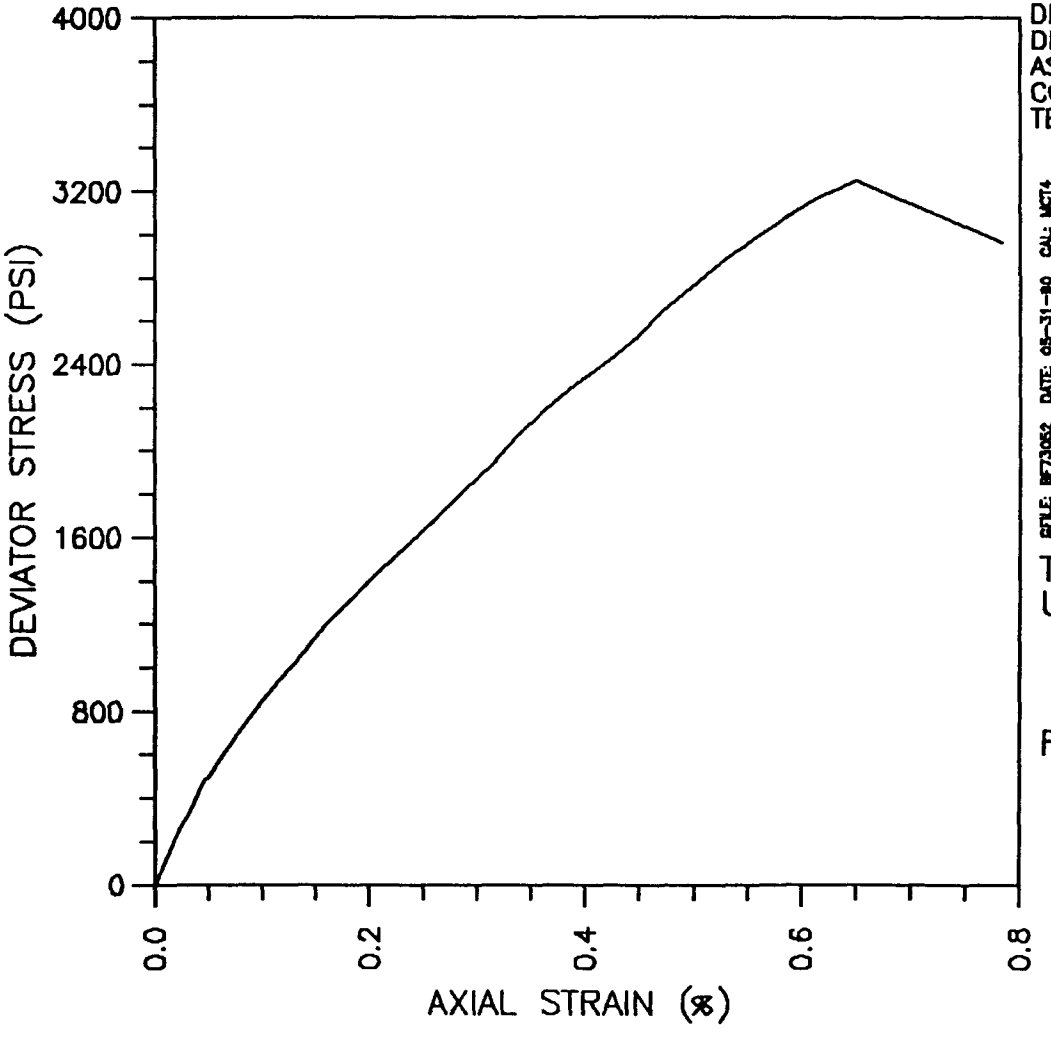
MOHR CIRCLE PLOT

MASON–JOHNSTON & ASSOCIATES, INC.
GEOLOGISTS–ENGINEERS

JOB NO.: 5530.17

FIGURE

BORING NO.: BF7
DEPTH (FT): 305.2
AUSTIN CHALK LIMESTONE



INCLINATION (DEG): VERTICAL
MOISTURE CONTENT (%): 9.6
DRY UNIT WEIGHT (PCF): 131.6
DEG. OF SATURATION (%): 92.8
ASSUMED SPECIFIC GRAVITY: 2.7
CONFINING PRESSURE (PSI): 200
TEST TYPE: TRIAXIAL COMPRESSION
(ASTM D 2664)

FILE: BF73052 DATE: 05-31-90 CAL: MCT4

TANGENT MODULUS AT 50%
ULTIMATE STRESS:
4.839 x10E5 PSI

FAILURE MODE:
AXIAL SPLITTING

TEXAS SSC SITE

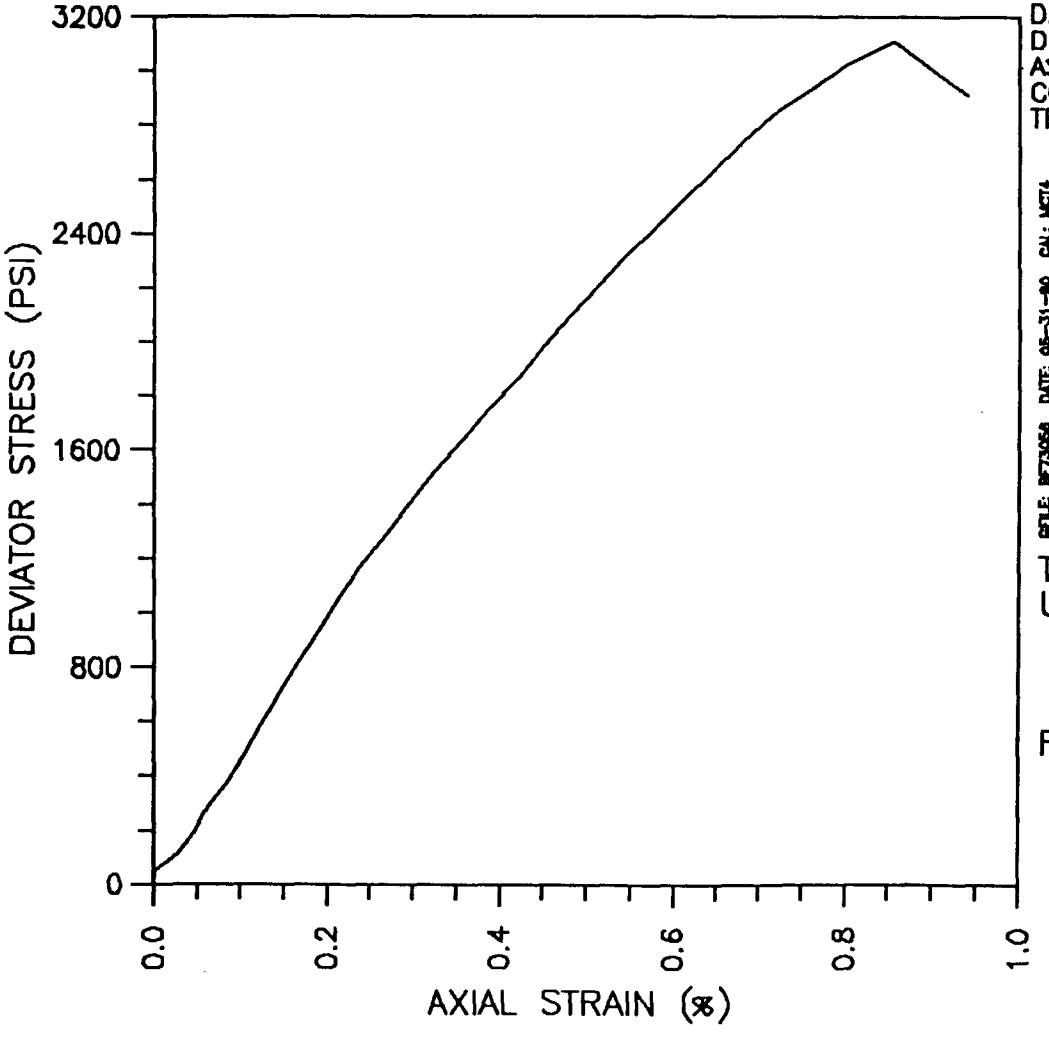
STRESS-STRAIN PLOT

MASON-JOHNSTON & ASSOCIATES, INC.
GEOLOGISTS-ENGINEERS

JOB NO.: 5530.17

FIGURE

BORING NO.: BF7
DEPTH (FT): 305.6
AUSTIN CHALK LIMESTONE



INCLINATION (DEG): VERTICAL
MOISTURE CONTENT (%): 9.7
DRY UNIT WEIGHT (PCF): 131.0
DEG. OF SATURATION (%): 91.2
ASSUMED SPECIFIC GRAVITY: 2.7
CONFINING PRESSURE (PSI): 300
TEST TYPE: TRIAXIAL COMPRESSION
(ASTM D 2664)

FILE: BF73058 DATE: 05-31-90 CAL: MST14

TANGENT MODULUS AT 50%
ULTIMATE STRESS:
4.054 x10E5 PSI

FAILURE MODE:
AXIAL SPLITTING

TEXAS SSC SITE

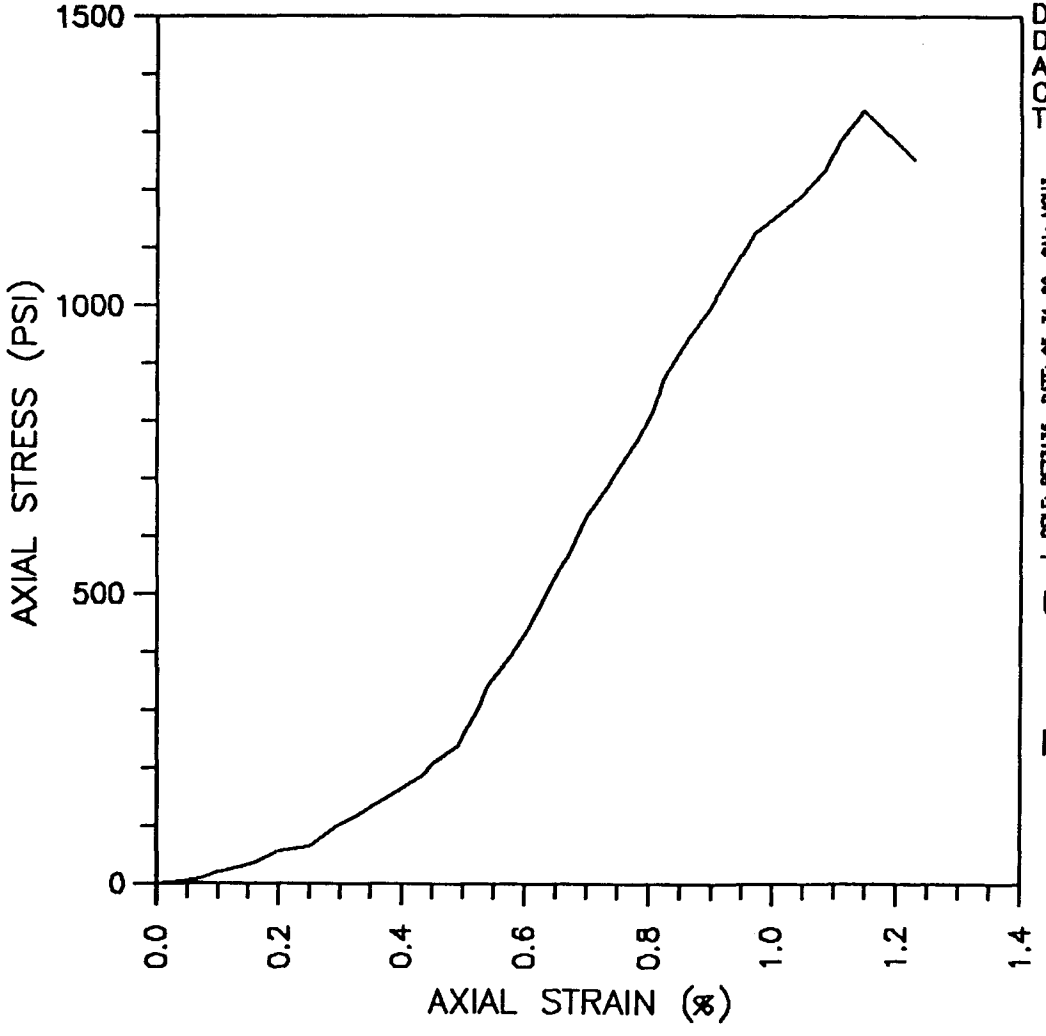
STRESS-STRAIN PLOT

MASON-JOHNSTON & ASSOCIATES, INC.
GEOLOGISTS-ENGINEERS

JOB NO.: 5530.17

FIGURE

BORING NO.: BF7
DEPTH (FT): 313.5
AUSTIN CHALK LIMESTONE



INCLINATION (DEG): VERTICAL
MOISTURE CONTENT (%): 9.8
DRY UNIT WEIGHT (PCF): 132.1
DEG. OF SATURATION (%): 95.9
ASSUMED SPECIFIC GRAVITY: 2.7
CONFINING PRESSURE (PSI): 0
TEST TYPE: UNCONFINED COMPRESSION
(ASTM D 2938)

BFILE: BF73136 DATE: 05-31-90 CAL: MCU3

TANGENT MODULUS AT 50%
ULTIMATE STRESS:
1.852 x10E5 PSI

FAILURE MODE:
AXIAL SPLITTING

TEXAS SSC SITE

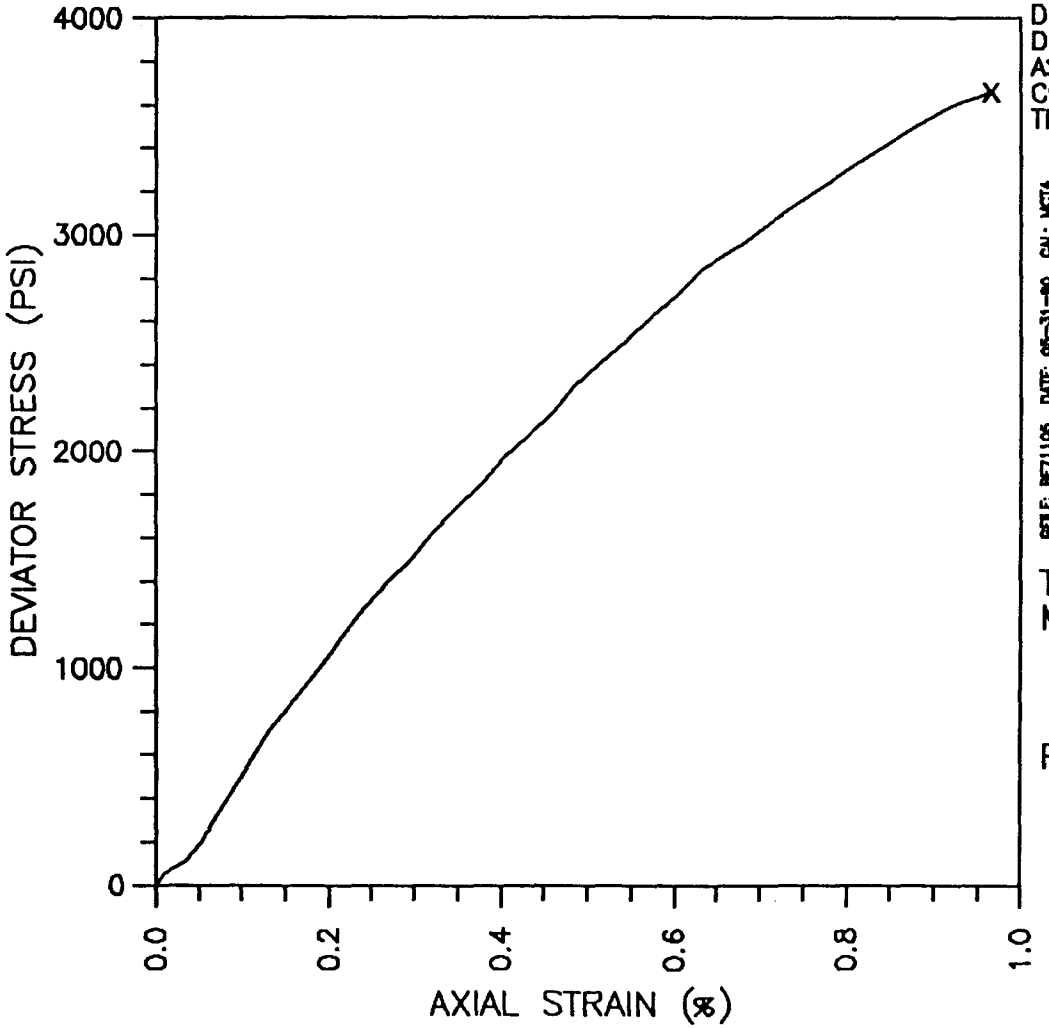
STRESS-STRAIN PLOT

MASON-JOHNSTON & ASSOCIATES,INC.
GEOLOGISTS-ENGINEERS

JOB NO.: 5530.17

FIGURE

BORING NO.: BF7
DEPTH (FT): 337.2
AUSTIN CHALK LIMESTONE



INCLINATION (DEG): VERTICAL
MOISTURE CONTENT (%): 9.3
DRY UNIT WEIGHT (PCF): 134.3
DEG. OF SATURATION (%): 98.0
ASSUMED SPECIFIC GRAVITY: 2.7
CONFINING PRESSURE (PSI): 200
TEST TYPE: TRIAXIAL COMPRESSION
(ASTM D 2664)

FILE: BF71105 DATE: 05-31-90 CAL: MCT4

TANGENT MODULUS AT 50%
MAXIMUM STRESS:
4.211 x10E5 PSI

FAILURE MODE:
LOADED TO 3657 PSI
W/O FAILURE

TEXAS SSC SITE

STRESS-STRAIN PLOT

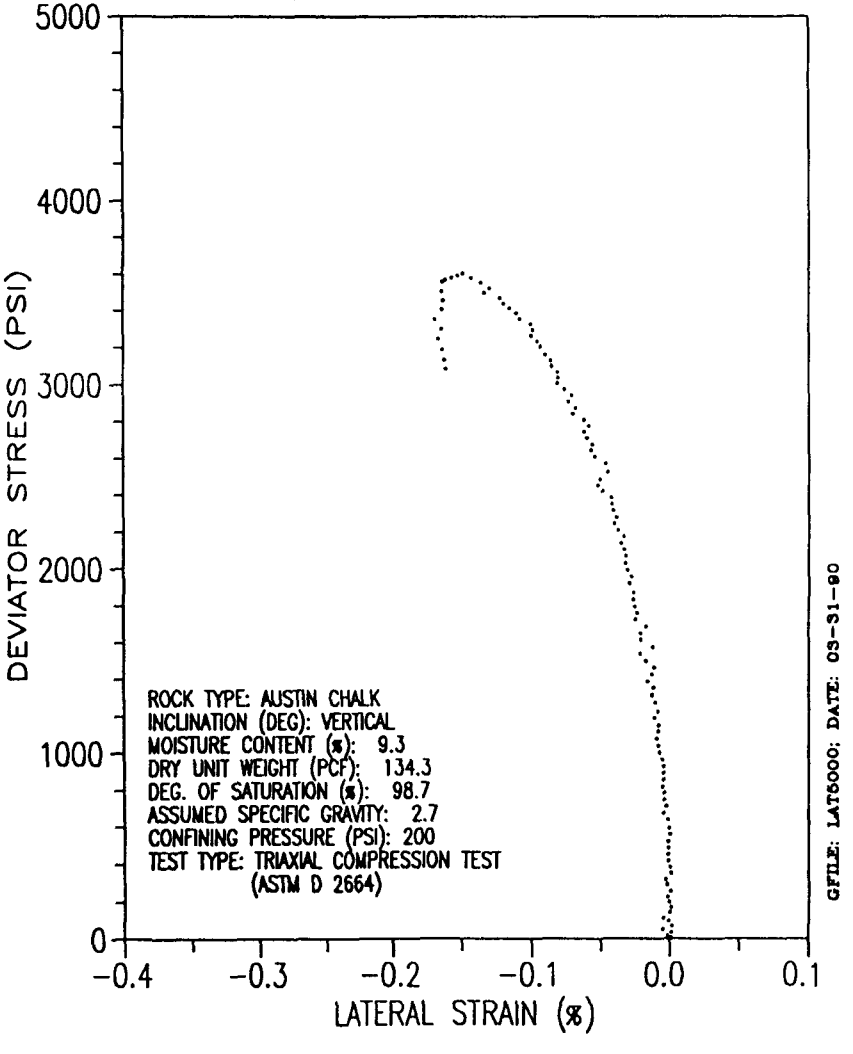
MASON-JOHNSTON & ASSOCIATES, INC.
GEOLOGISTS-ENGINEERS

JOB NO.: 5530.17

FIGURE

DEVIATOR STRESS vs LATERAL STRAIN

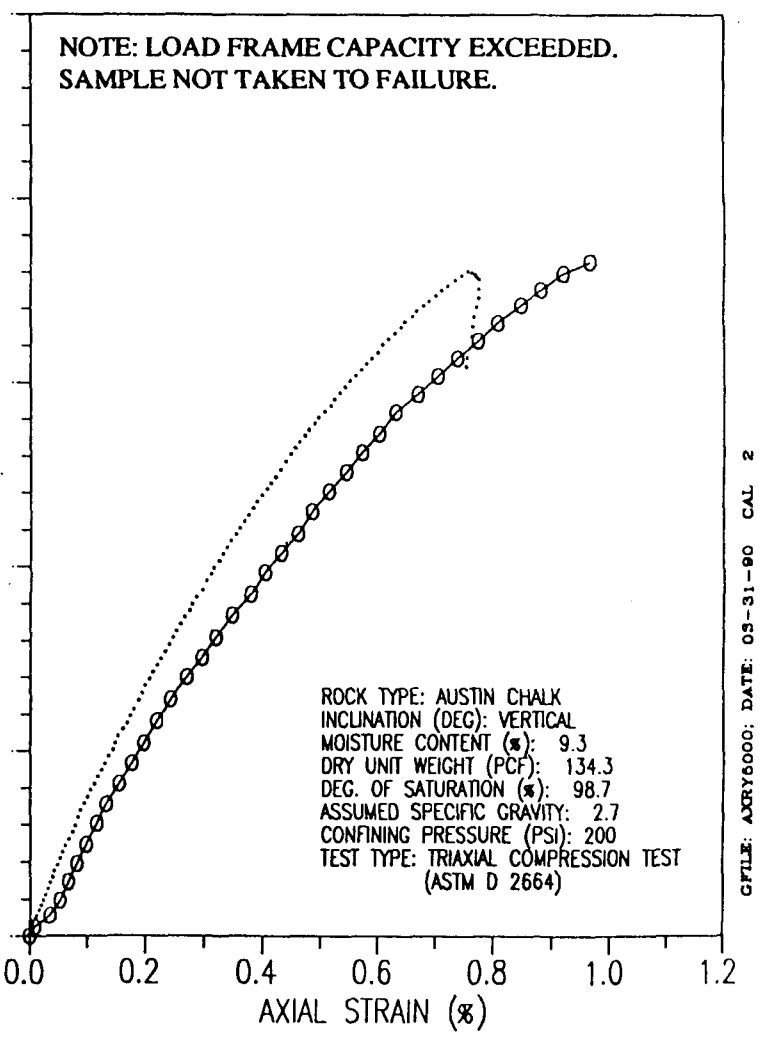
BORING: BF7 DEPTH: 337.2 ft



····· JACKET-LVDT (3)

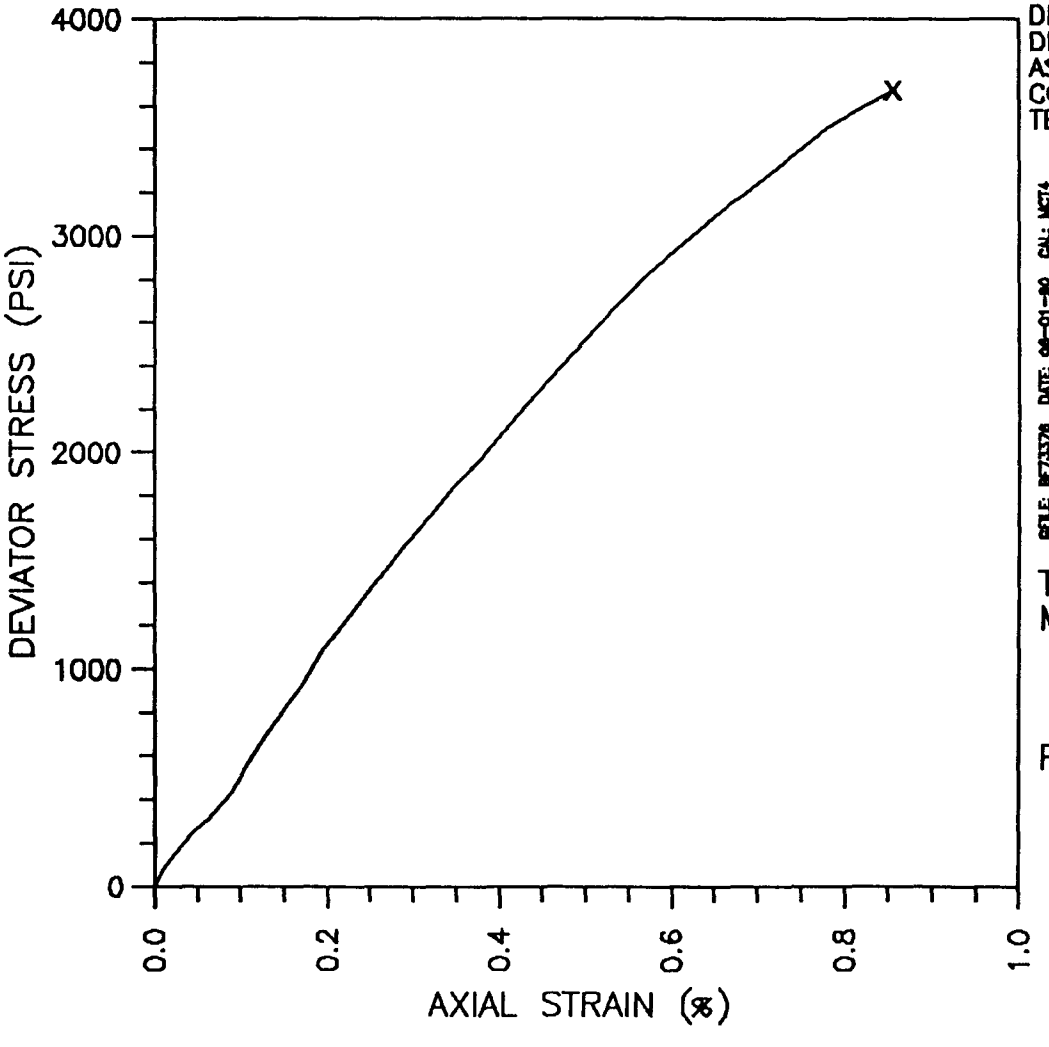
DEVIATOR STRESS vs AXIAL STRAIN

BORING: BF7 DEPTH: 337.2 ft



····· JACKET-LVDT (3) ⊖⊖⊖⊖ PLATEN-DIAL GAUGE

BORING NO.: BF7
DEPTH (FT): 337.6
AUSTIN CHALK LIMESTONE



INCLINATION (DEG): VERTICAL
MOISTURE CONTENT (%): 10.0
DRY UNIT WEIGHT (PCF): 131.4
DEG. OF SATURATION (%): 95.8
ASSUMED SPECIFIC GRAVITY: 2.7
CONFINING PRESSURE (PSI): 300
TEST TYPE: TRIAXIAL COMPRESSION
(ASTM D 2664)

BFILE: BF73376 DATE: 08-01-90 CAL: MCT4

TANGENT MODULUS AT 50%
MAXIMUM STRESS:
4.746 x10E5 PSI

FAILURE MODE:
LOADED TO 3673 PSI
W/O FAILURE

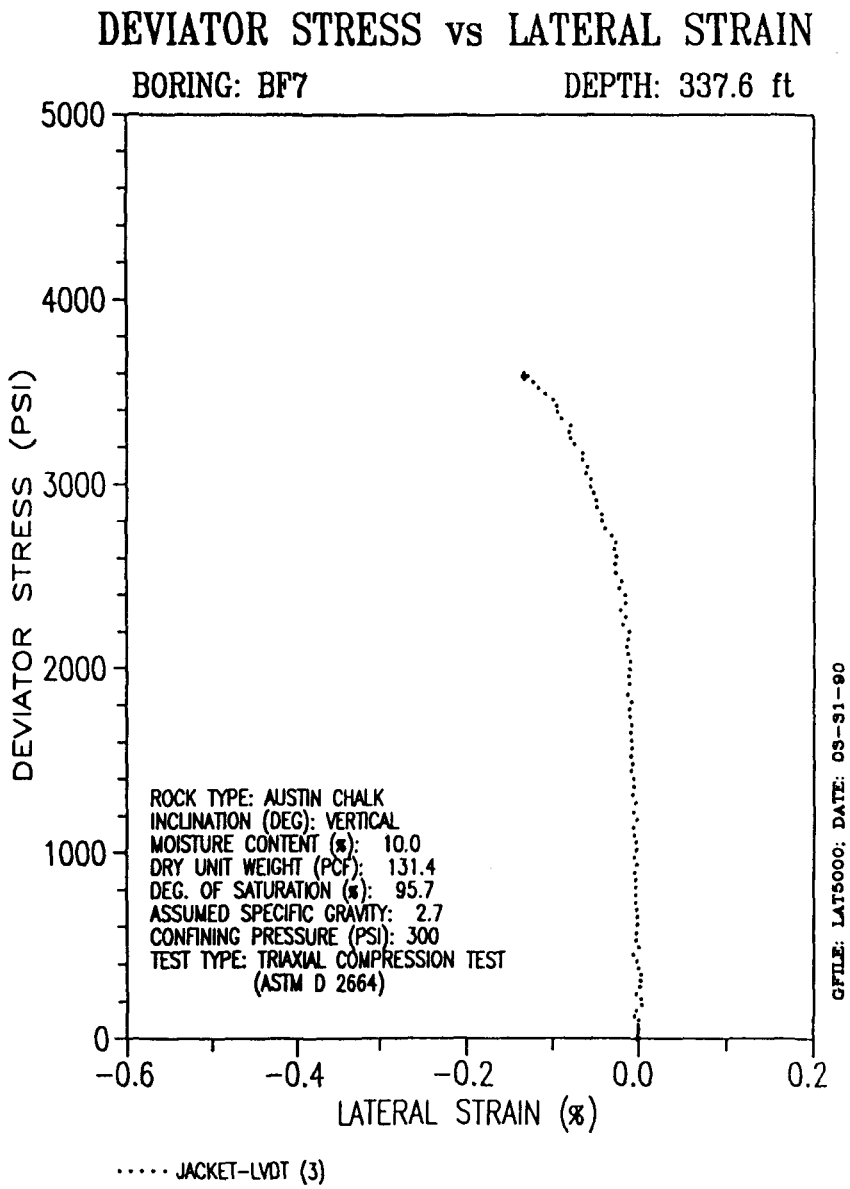
TEXAS SSC SITE

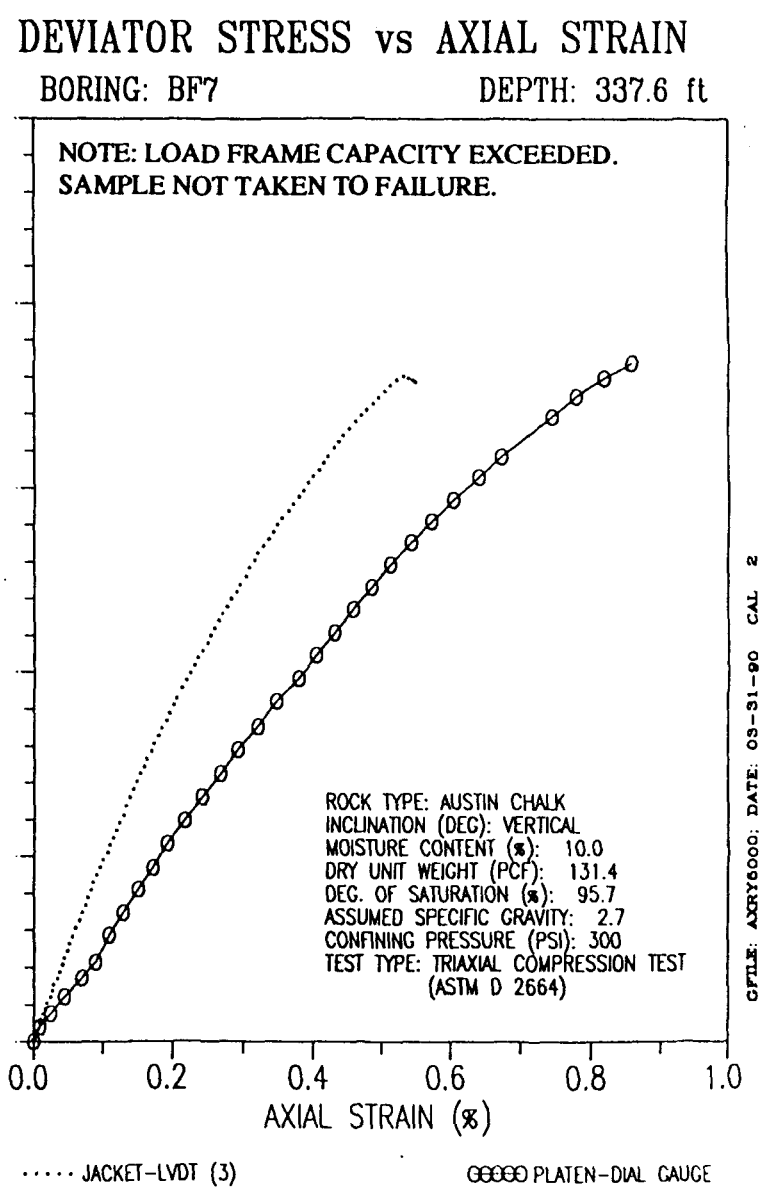
STRESS-STRAIN PLOT

MASON-JOHNSTON & ASSOCIATES,INC.
GEOLOGISTS-ENGINEERS

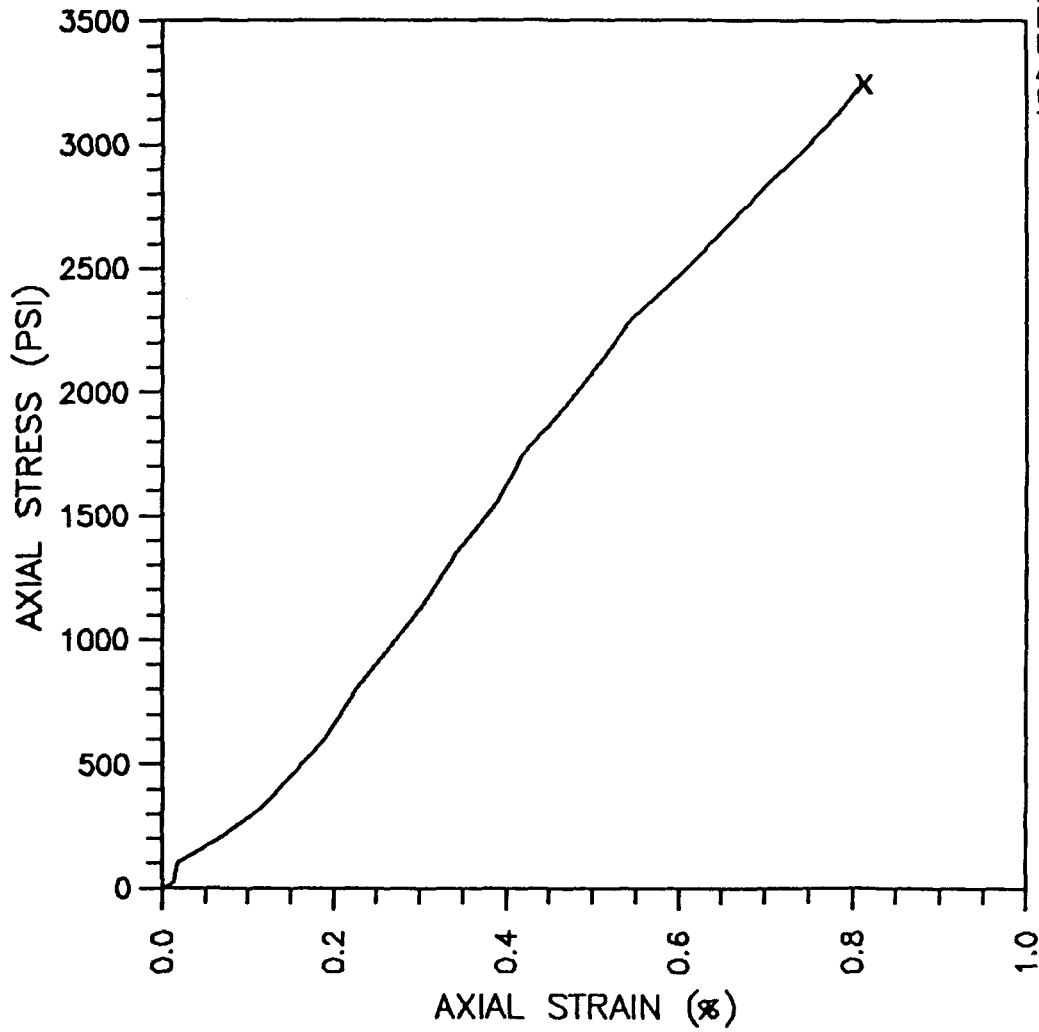
JOB NO.: 5530.17

FIGURE


DEVIATOR STRESS vs LATERAL STRAIN
BORING: BF7
DEPTH: 337.6 ft
DEVIATOR STRESS (PSI)
5000
4000
3000
2000
1000
0
-0.6
-0.4
-0.2
0.0
0.2
LATERAL STRAIN (%)
ROCK TYPE: AUSTIN CHALK
INCLINATION (DEG): VERTICAL
MOISTURE CONTENT (%): 10.0
DRY UNIT WEIGHT (PCF): 131.4
DEG. OF SATURATION (%): 95.7
ASSUMED SPECIFIC GRAVITY: 2.7
CONFINING PRESSURE (PSI): 300
TEST TYPE: TRIAXIAL COMPRESSION TEST
(ASTM D 2664)
GFILE: LAT5000; DATE: 03-31-90
····· JACKET-LVDT (3)


DEVIATOR STRESS vs AXIAL STRAIN
BORING: BF7
DEPTH: 337.6 ft
NOTE: LOAD FRAME CAPACITY EXCEEDED.
SAMPLE NOT TAKEN TO FAILURE.
0.0
0.2
0.4
0.6
0.8
1.0
AXIAL STRAIN (%)
ROCK TYPE: AUSTIN CHALK
INCLINATION (DEG): VERTICAL
MOISTURE CONTENT (%): 10.0
DRY UNIT WEIGHT (PCF): 131.4
DEG. OF SATURATION (%): 95.7
ASSUMED SPECIFIC GRAVITY: 2.7
CONFINING PRESSURE (PSI): 300
TEST TYPE: TRIAXIAL COMPRESSION TEST
(ASTM D 2664)
GFILE: AXRY6000; DATE: 03-31-90 CAL 2
····· JACKET-LVDT (3)
OOOOO PLATEN-DIAL GAUGE

BORING NO.: BF7
DEPTH (FT): 338.0
AUSTIN CHALK LIMESTONE



INCLINATION (DEG): VERTICAL
MOISTURE CONTENT (%): 9.7
DRY UNIT WEIGHT (PCF): 133.0
DEG. OF SATURATION (%): 97.6
ASSUMED SPECIFIC GRAVITY: 2.7
CONFINING PRESSURE (PSI): 0
TEST TYPE: UNCONFINED COMPRESSION
(ASTM D 2938)

STYLE: BF71108 DATE: 05-31-90 CAL: MCU3

TANGENT MODULUS AT 50%
ULTIMATE STRESS:
4.762 x10E5 PSI

FAILURE MODE:
CONICAL FAILURE

TEXAS SSC SITE

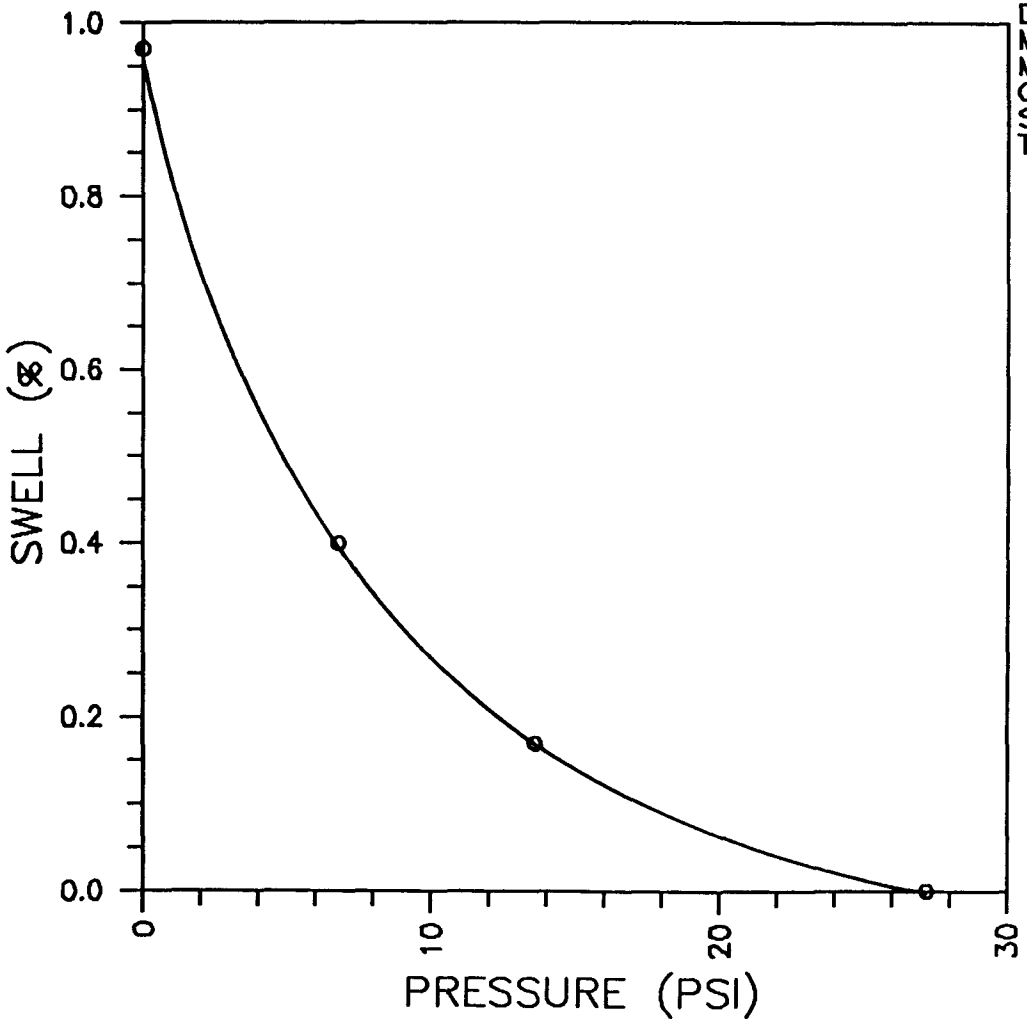
STRESS-STRAIN PLOT

MASON-JOHNSTON & ASSOCIATES, INC.
GEOLOGISTS-ENGINEERS

JOB NO.: 5530.17

FIGURE

BORING NO.: BF7
DEPTH (FT): 81.7
TAYLOR MARL



INCLINATION (DEG): VERTICAL
DRY UNIT WEIGHT (PCF): 123.0
M.C. BEFORE TEST (%): 15.2
M.C.AFTER TEST (%): 17.9
GAIN IN MOISTURE (%): 2.6
SWELLING PRESSURE INDEX (PSI): 27
TEST TYPE: SWELLING PRESSURE INDEX (ISRM)

TEXAS SSC SITE

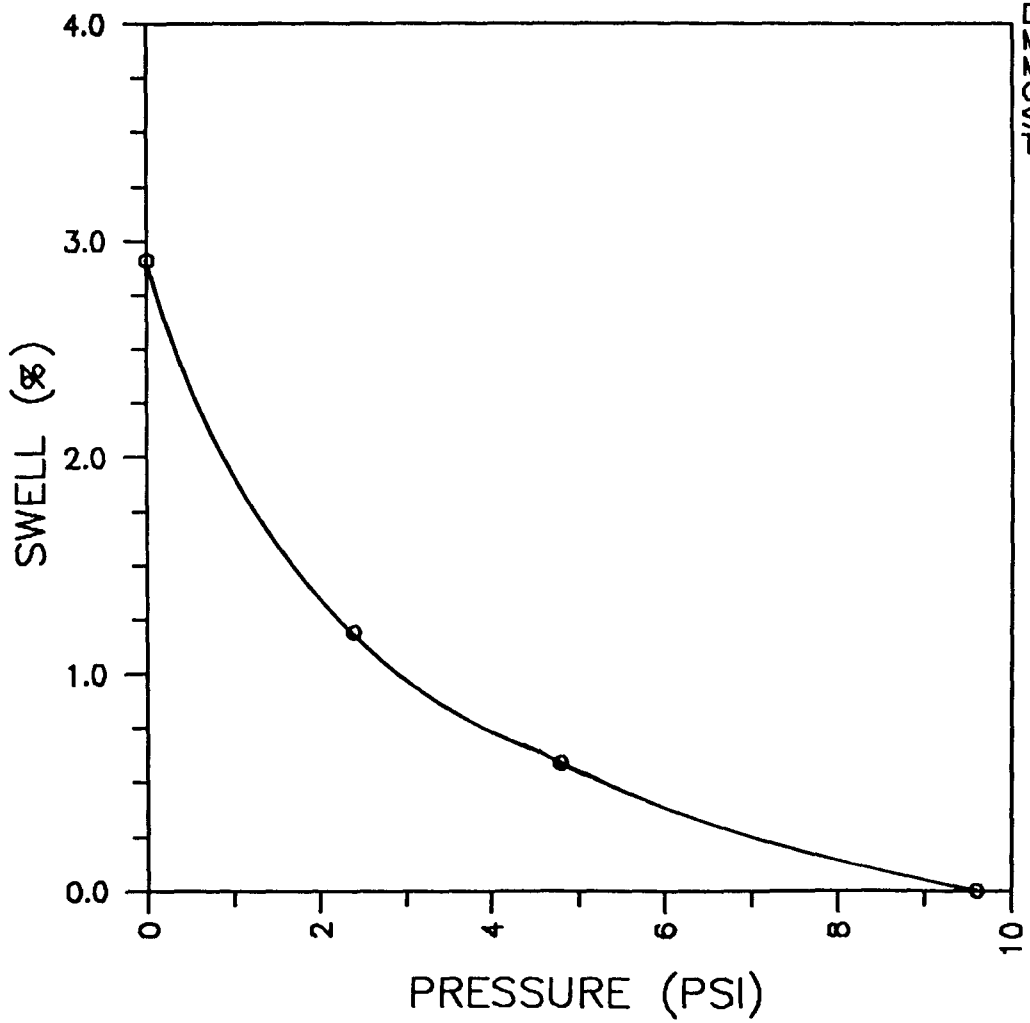
SWELLING PRESSURE INDEX

MASON–JOHNSTON & ASSOCIATES, INC.
GEOLOGISTS–ENGINEERS

JOB NO.: 5530.17

FIGURE

BORING NO.: BF7
DEPTH (FT): 109.5
TAYLOR MARL



INCLINATION (DEG): VERTICAL
DRY UNIT WEIGHT (PCF): 110.4
M.C. BEFORE TEST (%): 17.3
M.C.AFTER TEST (%): 24.7
GAIN IN MOISTURE (%): 7.4
SWELLING PRESSURE INDEX (PSI): 10
TEST TYPE: SWELLING PRESSURE INDEX (ISRM)

TEXAS SSC SITE

SWELLING PRESSURE INDEX

MASON–JOHNSTON & ASSOCIATES, INC.
GEOLOGISTS–ENGINEERS

JOB NO.: 5530.17

FIGURE

APPENDIX E

WELL AS-BUILT DIAGRAM

GEOMECHANICAL TEST RESULTS - BORING BF 7

GENERAL LITHOLOGY	BORING DEPTH feet	MOISTURE CONTENT percent	DRY DENSITY pcf	SPECIFIC GRAVITY	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	FRACTION FINER THAN # 200 SIEVE percent	CARBONATE CONTENT percent	SAMPLE DIMENSION RATIO L/D	SAMPLE FAILURE MODE/ DEGREES *	UNCONFINED COMPRESSIVE STRENGTH psi	TRIAXIAL COMPRESSION CONFINING PRESSURE σ_3 psi	TRIAXIAL COMPRESSION DEVIATOR STRESS $\sigma_1-\sigma_3$ psi	FAILURE STRAIN percent	TANGENT YOUNG'S MODULUS E50 (psi)x10E5	TANGENT YOUNG'S MODULUS UNLOAD/ RELOAD (psi)x10E5	TANGENT YOUNG'S MODULUS σ_3 psi	POISSON'S RATIO	BRAZIL TENSILE STRENGTH psi	2ND CYCLE SLAKE DURABILITY INDEX percent	MODIFIED TABER ABRASION INDEX	SWELL PRESSURE INDEX psi	COMMENTS
TAYLOR MARL	50.5	19.3	107.0		54	27	98.7	23.4															
TAYLOR MARL	50.9	18.9	111.4						2.3	D	239			1.60	0.16		0						NOTE 1
TAYLOR MARL	80.9	16.2	115.9	2.71	55	28	97.6	25.6															
TAYLOR MARL	81.1	15.6	116.7						2.3	D	536			1.26	0.44		0						
TAYLOR MARL	81.5	16.0	116.9		58	34	99.4															19.0	
TAYLOR MARL	81.7	15.2	123.0																			27.2	
TAYLOR MARL	109.5	17.3	110.4		66	44	98.4															9.6	
TAYLOR MARL	109.8	17.6	107.5																			8.5	
TAYLOR MARL	110.0	17.2	113.5																				
TAYLOR MARL	110.1	16.4	114.1		65	35	98.4	18.8	2.2	D	453			1.17	0.47		0						
TAYLOR MARL	110.5	16.3	117.5						2.4	D		100	659	1.19	0.79		100						
TAYLOR MARL	110.9	16.2	116.5						2.4	B-1/15&30		300	658	1.10	0.90		300						
TAYLOR MARL	166.5	16.3	116.1																				
TAYLOR MARL	166.7	15.5	118.6		74	43	98.4	22.5	2.3	D	622			0.87	0.94		0						
TAYLOR MARL	167.1	15.8	117.1	2.69	85	58	98.1	20.2	2.4	B-1/35		100	672	0.75	1.20	1.74	100						NOTE 2
TAYLOR MARL	167.1														1.24	3.20		0.23					NOTE 3
TAYLOR MARL	167.8	15.8	118.3		72	46	98.5	23.7	2.4	B-1/30		300	747	0.90	1.55	3.72	300						NOTE 2
TAYLOR MARL	167.8														1.28	2.10		0.21					NOTE 3
TAYLOR MARL	178.8	15.5	118.0					21.7															
TAYLOR MARL	179.4	16.3			102	65	99.6																
TAYLOR MARL	179.6	15.8	117.7																			25.3	
TAYLOR MARL	179.7	15.3			100	65	99.7													38.8			
TAYLOR MARL	179.9	15.8	116.2																			28.9	
TAYLOR MARL	209.8	15.5	118.1		84	52	98.7	19.7	2.4	D	746			0.94	0.97		0						
TAYLOR MARL	210.2	15.6	118.8																				
TAYLOR MARL	234.3	16.1	117.8	2.71	83	58	98.2	21.0															
TAYLOR MARL	234.7	15.8	117.9						2.4	D	450			0.66	0.89		0						
TAYLOR MARL	293.5	16.3	113.3	2.72	79	52	98.4	16.6															
TAYLOR MARL	293.8	15.8	115.6						2.3	D	257			0.67	0.51		0						
TAYLOR MARL	294.2	15.8	107.7		76	50	98.0	18.8	2.5	B-1/35		200	586	0.88	0.89	1.60	200						NOTE 2
TAYLOR MARL	294.2														1.05	1.75		0.10					NOTE 3
TAYLOR MARL	294.8	16.3	115.6		77	50	97.9	16.2	2.4	B-1/50		300	340	1.25	0.46	1.13	300						NOTE 2
TAYLOR MARL	294.8														0.34	0.88		0.15					NOTE 3
AUSTIN CHALK	304.1	10.1	130.4						2.4	D	2760			0.53									
AUSTIN CHALK	304.5	9.6	132.4																				
AUSTIN CHALK	305.1								0.6										339				
AUSTIN CHALK	305.2	9.6	131.6						2.1	D		200	3250	0.65	4.84		200						
AUSTIN CHALK	305.6	9.7	131.0						2.1	D		300	3114	0.86	4.05		300						
AUSTIN CHALK	313.5	9.8	132.1						2.4	D	1338			1.15	1.85		0						
AUSTIN CHALK	313.9	12.6	122.5																				
AUSTIN CHALK	337.2	9.3	134.3	2.67					2.4	A		200	3657	0.96	4.21		200						NOTE 4
AUSTIN CHALK	337.2														5.36			0.16					NOTES 3 and 4
AUSTIN CHALK	337.6	10.0	131.4						2.3	A		300	3673	0.86	4.75		300						NOTE 4
AUSTIN CHALK	337.6														7.58			0.08					NOTES 3 and 4
AUSTIN CHALK	338.0	9.7	133.0						2.2	E	3254			0.81	4.76		0						
AUSTIN CHALK	338.5	10.8	130.8																				
PROCEDURE		ASTM-D2216		ASTM-D854	ASTM-D4318		ASTM-D1140				ASTM-D2938	ASTM-D2664			ASTM-D3148			ASTM-D3148	ASTM-D3967	ISRM	ISRM	ISRM	

BF7PRT21.WK1
REVISION: 2.1
DATE: 06/14/90

* EXPLANATION OF SAMPLE FAILURE MODE AS FOLLOWS.

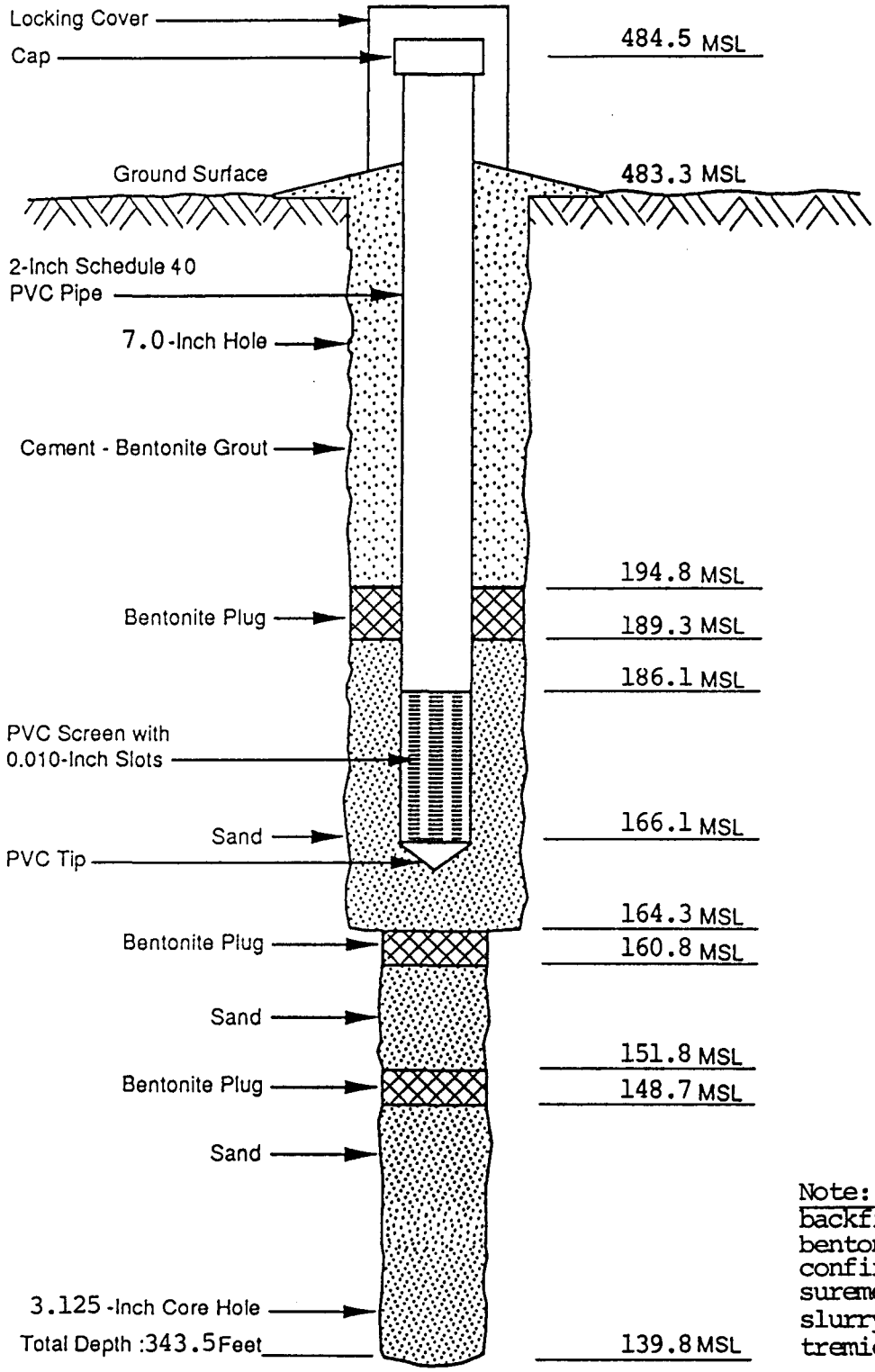
Symbol	Failure Type
A	No discernible failure plane
(B)	Well defined shear plane @ "X" angle (deg) to vertical or to long axis of core
B-1	Shear plane
B-2	Bedding plane shear
B-3	Shear plane along pre-existing fracture, shear zone, etc.
B-4	Combination
C	Barreling/Bulging
D	Longitudinal (axial) splitting
E	Conical
F	No information

NOTES :
1) All moduli calculated from axial strains using a dial micrometer except where noted. Axial gage length is the sample length.

2) Triaxial compression test is cyclic with one unload/reload cycle.

3) Modulus and Poisson's ratio calculated from axial and lateral strains measured using LVDTs. Axial gage length is 2.8 inches.

4) Load frame capacity exceeded. Sample not taken to failure. Modulus taken at 50 % of maximum stress.



Note: Placement depths of backfill materials (sand & bentonite pellets) were confirmed by manual measurement. Cement/bentonite slurry was placed by tremie.

NOT TO SCALE

Boring: BF 7
Location: N 213,426
E 2,241,756
Date(s) Installed: 2/16/90-2/27/90
Well Construction
Supervising Geologist: Scott Lesikar
Approved By: W.D. Flanigan Date: 5/15/90

Observation Well
No. BF 7

5/90 Figure