WSRC-TR--95-0057-Vol. 5

Volume 5

Laboratory Test Results - Phase II
Volume 1 of 2

In-Tank Precipitation Facility (ITP) and H-Tank Farm (HTF) Geotechnical Report (U) WSRC-TR-95-0057, Rev. 0

LAW
ENGINEERING AND ENVIRONMENTAL SERVICES

February 21, 1994

Westinghouse Savannah River Company
P.O. Box 616
Aiken, South Carolina 29808

Attention: Sujit Samaddar
Subcontract No. AB08525N

Subject: **Final Report**
Geotechnical Testing Services
WSRC-ITP Project
Law Engineering Project No. 5810535301

Dear Mr. Samaddar:

Law Engineering has completed the assigned testing for Westinghouse Savannah River Company (WSRC) Subcontract No. AB08525N, ITP Geotechnical Services. In accordance with the Contract Engineering Document Requirements, we are transmitting ten bound copies of our final report included in two volumes.

Volume 1 contains laboratory test results of 70 undisturbed soil tubes collected by WSRC at the Savannah River Site (SRS) ITP site. These soil samples were tested for index (classification) properties, volumetrics, and static and dynamic properties. The results presented in Volume 1 were tested by LAW in our Atlanta, Georgia laboratory. These results are presented in boring and depth numerical order. Each undisturbed tube sample was logged by a soils technician on an Undisturbed Sample Log (blue copy). Following each sample log are the test results for samples removed from that tube in the following general order:

- Tube and/or Sample Densities
- Grain Size Analysis (includes hydrometer and Atterberg limits)
- Static Triaxial Tests (UU, CU, and CD)
- Dynamic Triaxial Tests (Resonant Column, RC, Strain Controlled Cyclic, SCC)
- Consolidation

In addition, a summary of the classification testing is presented. The summary includes specific gravity, Atterberg limits and a Unified Soil classification, when applicable.

Volume 2 contains laboratory test results of 14 undisturbed soil tubes (piston samples only). The results presented in Volume 2 were tested by LAW's subcontractor, Dr. Michael Riemer and the University of California, Berkeley. The index testing, however, was performed by LAW in Atlanta on split portions of each specimen following the completed physical testing in Berkeley.

LAW ENGINEERING, INC.
396 PLASTERS AVENUE, N.E. • ATLANTA, GA 30324
(404) 873-4761 • FAX (404) 881-0508

The testing under this WSRC subcontract was performed in accordance with applicable American Society for Testing and Materials (ASTM) test standards, SRS Specifications K-SPC-H-00003, K-SPC-G-00001, and K-SPC-G-00003, and Technical Procedures developed by LAW under the technical review and acceptance of WSRC. These Technical Procedures (TP) consist of TP-1, TP-2, TP-3, TP-4, TP-4A, TP-5 and TP-5A.

We appreciated the opportunity to provide our services to you on this very important geotechnical study. If you have any questions pertaining to this final report, please do not hesitate to call us.

Sincerely,

LAW ENGINEERING, INC.

Richard L. Boudreau, P.E.
Senior Engineer

Harry E. Johnson
Senior Laboratory Technician

cc: Bradley Diehm (without test results)

rlb\itp\finlrpt.ltr

SUMMARY OF CLASSIFICATION TEST RESULTS (Performed at LAW-Atlanta)
GEOTECHNICAL TESTS (Performed at LAW-Atlanta)

WSRC Subcontract No. AB08525N
LAW Project No. 5810535301
February 21, 1994

FINAL REPORT

Sample Location	Sample Type-No.	Main Test	Depth (ft.)	Specific Gravity	Atterberg Limits: Minus #200 Fraction LL	PL	PI	Minus #40 Fraction LL	PL	PI	USCS
H-Bor-2	ST-1	CD-18psi/Consol.	21	N.E.R.	Deleted						
H-Bor-2	ST-2	UU-33psi/Consol.	39	2.68				57	28	29	SC
H-Bor-2	ST-3	UU-40psi/Consol.	51	2.65				60	25	35	SC
H-Bor-2	"	SCC-40psi (del.)	51	2.63	109	29	80				N/A
H-Bor-2	"	RC-40psi (del.)	51	2.62				59	21	38	CH
H-Bor-2	ST-4	CD-60psi	110	2.66	196	55	141				N/A
H-Bor-2	"	CD-90psi	110	N.E.R.	Deleted						
H-Bor-2	"	CD-120psi	110	2.69				NL	NP	N/A	SM
H-Bor-2	ST-5	SCC-68psi	120	2.73				NL	NP	N/A	SP-SM
H-Bor-2	"	RC-68psi (del.)/Consol.	120	2.69	80	20	60				N/A
H-Bor-2	ST-6	Sample Dens.	136	2.61	149	30	119				N/A
H-Bor-2	PS-7	Tube Dens.	142	2.68				55	16	39	SC
H-Bor-2	PS-8	SCC-75psi/Consol.	145	2.71				139	26	113	CH
H-Bor-2	"	RC-75psi	145	2.67	231	52	179				N/A

N.E.R. = Not Enough Recovery, N.E.M. = Not Enough Material for specified test

SUMMARY OF CLASSIFICATION TEST RE. LTS (Performed at LAW-Atlanta)
GEOTECHNICAL TESTS (Performed at LAW-Atlanta)

WSRC Subcontract No. AB08525N
LAW Project No. 5810535301
February 21, 1994

FINAL REPORT

Sample Location	Sample Type-No.	Main Test	Depth (ft.)	Specific Gravity	Atterberg Limits: Minus #200 Fraction LL	PL	PI	Minus #40 Fraction LL	PL	PI	USCS
H-Bor-2	ST-9	Sample Dens.	162	2.64	148	27	121				N/A
H-Bor-2	ST-10	CD-40psi	167	2.64				NL	NP	N/A	SP-SM
H-Bor-2	"	CD-80psi	167	2.64	N.E.M. for PI Test						N/A
H-Bor-2	"	CD-120psi (del.)	167		Deleted						
H-Bor-2	PS-12	Tube Dens./Consol.	173	2.66				43	24	19	SC
H-Bor-2	ST-11	CD-90	183	2.69	169	35	134				N/A
H-Bor-2	"	CD-120	183	2.65				35	23	12	SC
H-Bor-2	ST-13	Sample Dens./Consol.	193	2.68				37	24	13	SC
H-Bor-2	ST-14	CD-50	200	2.67	127	26	101				N/A
H-Bor-2	"	CD-90	200	2.70				NL	NP	N/A	SP-SM
H-Bor-2	"	CD-120	200	2.70	171	31	140				N/A
H-Bor-2	ST-15	Sample Dens./Consol.(del.)	207	2.66	Deleted Consol			45	22	23	SC
H-Bor-2	ST-16	Sample Dens./Consol.(del.)	212	N.E.R.	Deleted Consol & Index						

N.E.R. = Not Enough Recovery, N.E.M. = Not Enough Material for specified test

SUMMARY OF CLASSIFICATION TEST RESULTS (Performed at LAW-Atlanta)
GEOTECHNICAL TESTS (Performed at LAW-Atlanta)

WSRC Subcontract No. AB08525N
LAW Project No. 5810535301
February 21, 1994

FINAL REPORT

Sample Location	Sample Type-No.	Main Test	Depth (ft.)	Specific Gravity	Atterberg Limits: Minus #200 Fraction LL	PL	PI	Minus #40 Fraction LL	PL	PI	USCS
H-Bor-12	ST-1	UU-7psi	8	2.66				98	42	56	SM
H-Bor-12	ST-2	CD-15psi/Consol.	13	2.67				86	32	54	SC
H-Bor-12	"	CD-28psi	13	2.66	144	43	101				N/A
H-Bor-12	"	CD-56psi	13	2.66				104	33	71	SC
H-Bor-12	ST-3	CU-15psi	18	2.67				100	39	61	SC
H-Bor-12	"	CU-24psi	18	2.71	152	54	98				N/A
H-Bor-12	"	CU-48psi	18	2.68				78	19	59	SC
H-Bor-12	PS-2	Tube Dens./UU-22psi/Consol.	27	2.70				91	30	61	SC
H-Bor-12	ST-5	CD-27psi/Consol.	44	2.66	70	39	31				N/A
H-Bor-12	ST-7	Sample Dens.	58	2.69				36	20	16	SP-SC
H-Bor-12	PS-3	Tube Dens./UU-30psi/Consol.	63	2.70				45	20	25	SC
H-Bor-12	"	UU-60psi	63	2.67				44	19	25	SC

N.E.R. = Not Enough Recovery, N.E.M. = Not Enough Material for specified test

SUMMARY OF CLASSIFICATION TEST RESULTS (Performed at LAW-Atlanta)
GEOTECHNICAL TESTS (Performed at LAW-Atlanta)

WSRC Subcontract No. AB08525N
LAW Project No. 5810535301
February 21, 1994

FINAL REPORT

Sample Location	Sample Type-No.	Main Test	Depth (ft.)	Specific Gravity	Atterberg Limits: Minus #200 Fraction LL	PL	PI	Minus #40 Fraction LL	PL	PI	USCS
H-Bor-12	PS-6	Tube Dens./CD-37psi	75	2.70				39	24	15	SC
H-Bor-12	"	CD-80psi	75	2.72	164	38	126				N/A
H-Bor-12	"	CD-120psi	75	2.70				47	19	28	SC
H-Bor-12	ST-8	SCC-45psi	80	2.70				34	23	11	SC
H-Bor-12	"	RC-45psi	80	2.67	167	45	122				N/A
H-Bor-12	ST-9	CD-48psi	85	2.69				42	22	20	SC
H-Bor-12	"	CD-85psi	85	2.70	173	53	120				N/A
H-Bor-12	"	CD-120psi	85	2.74				NL	NP	N/A	SM
H-Bor-12	ST-11	Jar Only	110	2.68	N.E.M.						
H-Bor-12	PS-9	Tube Density/CD-50psi	120	2.63				117	18	99	SC
H-Bor-12	"	CD-85psi	120	2.62	154	26	128				N/A
H-Bor-12	"	CD-120psi	120	2.63				130	22	108	SC
H-Bor-12	ST-13	Sample Dens. (no index tests)	125								
H-Bor-12	PS-10	Tube Dens./Consol.	129	2.71	TP-4A deleted			155	30	125	CH

N.E.R. = Not Enough Recovery, N.E.M. = Not Enough Material for specified test

SUMMARY OF CLASSIFICATION TEST RL .LTS (Performed at LAW-Atlanta)
GEOTECHNICAL TESTS (Performed at LAW-Atlanta)

WSRC Subcontract No. AB08525N
LAW Project No. 5810535301
February 21, 1994

FINAL REPORT

Sample Location	Sample Type-No.	Main Test	Depth (ft.)	Specific Gravity	Atterberg Limits: Minus #200 Fraction LL	PL	PI	Minus #40 Fraction LL	PL	PI	USCS
H-Bor-12	ST-15	SCC-70psi	143	2.66				87	15	72	SP-SC
H-Bor-12	"	RC-70psi	143	2.67	166	39	127				N/A
H-Bor-12	ST-16	Consol.	151	2.65				43	20	23	SC
H-Bor-12	ST-19	Sample Dens./Consol.	172	2.71				32	23	9	SC
H-Bor-12	ST-20	Sample Dens./Consol.	179	2.65				32	19	13	SC
H-Bor-12	ST-21	Sample Dens.	186	2.67	93	26	67				N/A
H-Bor-12	ST-22	Jar Only (index w/out PI)	193	2.72							N/A
H-Bor-12	ST-23	Jar Only (test PI -#40 only)	200					111	16	95	N/A

N.E.R. = Not Enough Recovery, N.E.M. = Not Enough Material for specified test

SUMMARY OF CLASSIFICATION TEST RE. .LTS (Performed at LAW-Atlanta)
GEOTECHNICAL TESTS (Performed at LAW-Atlanta)

WSRC Subcontract No. AB08525N
LAW Project No. 5810535301
February 21, 1994

FINAL REPORT

Sample Location	Sample Type-No.	Main Test	Depth (ft.)	Specific Gravity	Atterberg Limits: Minus #200 Fraction LL	PL	PI	Minus #40 Fraction LL	PL	PI	USCS
H-Bor-23	PS-1	Tube Dens./SCC-24psi	29	2.70				38	17	21	SC
H-Bor-23	"	RC-24psi	29	2.67				41	15	26	SC
H-Bor-23	ST-2	CU-27psi	43	2.66	168	43	125				N/A
H-Bor-23	"	CU-54psi (del.)	43	N.E.R.	Deleted						
H-Bor-23	"	CU-108psi	43	2.71				41	22	19	SC
H-Bor-23	ST-3	CD-30psi (failed before tested)	50	2.68				NL	NP	N/A	SM
H-Bor-23	"	CD-60psi	50	N.E.R.	Deleted						
H-Bor-23	"	CD-120psi	50	N.E.R.	Deleted						
H-Bor-23	ST-4	SCC-30psi	55	2.69				27	19	8	SP-SC
H-Bor-23	"	RC-30psi	55	2.68	127	41	86				N/A
H-Bor-23	ST-5	CD-30psi	60	2.67				49	19	30	SC
H-Bor-23	"	CD-60psi	60	2.67	178	40	138				N/A
H-Bor-23	ST-6	Sample Dens./Consol.	65	2.64				112	39	73	SP-SC
H-Bor-23	PS-5	Tube Dens./Consol.	96	2.68				66	16	50	SC
H-Bor-23	PB-4	Sample Dens./Consol.	119	2.65	110	25	85				N/A
H-Bor-23	PB-8	Sample Dens./Consol.(del.)	142	2.72	Consol. Deleted			29	16	13	GC
H-Bor-23	PB-9	Sample Dens./Consol. (del.)	148	2.68	N.E.M. for PI Test			Consol. Deleted			N/A
H-Bor-23	PB-11	Sample Dens./Consol.	158	2.56				NL	NP	N/A	SM

N.E.R. = Not Enough Recovery, N.E.M. = Not Enough Material for specified test

SUMMARY OF CLASSIFICATION TEST RESULTS (Performed at LAW-Atlanta)
GEOTECHNICAL TESTS (Performed at LAW-Atlanta)

WSRC Subcontract No. AB08525N
LAW Project No. 5810535301
February 21, 1994

FINAL REPORT

Sample Location	Sample Type-No.	Main Test	Depth (ft.)	Specific Gravity	Atterberg Limits: Minus #200 Fraction LL	PL	PI	Atterberg Limits: Minus #40 Fraction LL	PL	PI	USCS
H-Bor-23	PB-12	CD-35psi (dcl.)	163	N.E.R.	N.E.R.						
H-Bor-23	"	CD-70psi (60psi)	163	2.67	138	41	97				N/A
H-Bor-23	"	CD-120psi (dcl.)	163	N.E.R.	N.E.R.						
H-Bor-23	PB-14	Sample Dens./Consol.	175	2.65				47	24	23	CL

N.E.R. = Not Enough Recovery, N.E.M. = Not Enough Material for specified test

SUMMARY OF CLASSIFICATION TEST RI LTS (Performed at LAW-Atlanta)
GEOTECHNICAL TESTS (Performed at LAW-Atlanta)

WSRC Subcontract No. AB08525N
LAW Project No. 5810535301
February 21, 1994

FINAL REPORT

Sample Location	Sample Type-No.	Main Test	Depth (ft.)	Specific Gravity	Atterberg Limits: Minus #200 Fraction LL	PL	PI	Minus #40 Fraction LL	PL	PI	USCS
H-Bor-23.1	ST-3	CU-15psi	17	2.69				44	19	25	SC
H-Bor-23.1	"	CU-30psi (del.)	17	N.E.R.	Deleted						
H-Bor-23.1	"	CU-60psi	17	2.66	84	35	49				N/A
H-Bor-23.1	PS-2	Tube Dens./Consol.	95	2.71				80	18	62	SC

N.E.R. = Not Enough Recovery, N.E.M. = Not Enough Material for specified test

SUMMARY OF CLASSIFICATION TEST RESULTS (Performed at LAW-Atlanta)
GEOTECHNICAL TESTS (Performed at LAW-Atlanta)

WSRC Subcontract No. AB08525N
LAW Project No. 5810535301
February 21, 1994

FINAL REPORT

Sample Location	Sample Type-No.	Main Test	Depth (ft.)	Specific Gravity	Atterberg Limits: Minus #200 Fraction LL	PL	PI	Minus #40 Fraction LL	PL	PI	USCS
H-Bor-29	ST-1	UU-9psi	10	2.66				100	33	67	SC
H-Bor-29	ST-2	CU-14psi (del.)	15	N.E.R.	Deleted						
H-Bor-29	"	SCC-14psi (del.)	15	N.E.R.	Deleted						
H-Bor-29	"	RC-14psi	15	2.66				60	24	36	SC
H-Bor-29	ST-3	CU-14psi/Consol.	20	2.66				73	31	42	SC
H-Bor-29	"	CU-28psi	20	2.67	144	44	100				N/A
H-Bor-29	ST-4	SCC-22psi	25	2.66				55	23	32	SC
H-Bor-29	"	RC-22psi	25	2.66	110	45	65				N/A
H-Bor-29	ST-5	CD-15psi (del.)	30		Deleted						
H-Bor-29	"	CD-30psi	30	2.68	96	39	57				N/A
H-Bor-29	"	CD-60psi	30	2.72				55	26	29	SC
H-Bor-29	ST-6	CU-15psi/Consol.	35	2.66				57	20	37	SC
H-Bor-29	"	CU-30psi	35	2.65	110	36	74				N/A
H-Bor-29	"	CU-60psi	35	2.66				64	21	43	SC
H-Bor-29	ST-7	CU-30psi	40	2.67				45	16	29	SC
H-Bor-29	"	CU-60psi	40	2.70	89	22	67				N/A

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SUMMARY OF CLASSIFICATION TEST RESULTS (Performed at LAW-Atlanta)
GEOTECHNICAL TESTS (Performed at LAW-Atlanta)

WSRC Subcontract No. AB08525N
LAW Project No. 5810535301
February 21, 1994

FINAL REPORT

Sample Location	Sample Type-No.	Main Test	Depth (ft.)	Specific Gravity	Atterberg Limits: Minus #200 Fraction LL	PL	PI	Minus #40 Fraction LL	PL	PI	USCS
H-Bor-29	ST-8	CU-30psi (del.)	42		Tube badly out of round -						
H-Bor-29	"	CU-60psi (del.)	42		Cannot extrude - Deleted						
H-Bor-29	ST-9	CU-90psi	46	2.63				60	23	37	SC
H-Bor-29	ST-11	CU-22psi	58	2.62				97	26	71	SC
H-Bor-29	"	CU-44psi	58	2.64	169	42	127				N/A
H-Bor-29	"	CU-88psi (del.)	58		Deleted						
H-Bor-29	PS-4	Tube Dens./Consol.	64	2.67				92	34	58	CH
H-Bor-29	PS-5	Tube Dens./CD-30psi	67	2.68				104	25	79	SC
H-Bor-29	"	CD-60psi	67	2.67	150	39	111				N/A
H-Bor-29	"	CD-120psi	67	2.67				89	23	66	SC
H-Bor-29	PS-8	Tube Dens./CU-30psi	92	2.68				51	23	28	SC
H-Bor-29	"	CU-60psi	92	2.70	109	33	76				N/A
H-Bor-29	"	CU-90psi	92	2.68				46	15	31	SC
H-Bor-29	PS-9	Tube Dens./CD-30psi/Consol.	96	2.69				53	26	27	SC
H-Bor-29	"	CD-60psi	96	2.72	167	39	128				N/A
H-Bor-29	"	CD-120psi	96	2.74				46	21	25	SC
H-Bor-29	ST-18	CD-35psi	121		N.E.M.						
H-Bor-29	"	CD-35psi (100t50)	121	2.68	201	32	169				N/A
H-Bor-29	"	CD-35psi (50t50)	121	2.66				NL	NP	N/A	SP
H-Bor-29	PS-10	Tube Dens./Consol./RC-70psi	140	2.73				46	21	25	SC

N.E.R. = Not Enough Recovery, N.E.M. = Not Enough Material for specified test

SUMMARY OF CLASSIFICATION TEST RESULTS (Performed at LAW-Atlanta)
GEOTECHNICAL TESTS (Performed at LAW-Atlanta)

WSRC Subcontract No. AB08525N
LAW Project No. 5810535301
February 21, 1994

FINAL REPORT

Sample Location	Sample Type-No.	Main Test	Depth (ft.)	Specific Gravity	Atterberg Limits: Minus #200 Fraction LL	PL	PI	Minus #40 Fraction LL	PL	PI	USCS
H-Bor-29	PS-12	Tube Dens./SCC-90psi/Consol.	150	2.70				112	21	91	SC
H-Bor-29	"	RC-90psi	150	2.69	205	33	172				N/A
H-Bor-29	ST-20	CD-90psi (36hr shear)	153	2.71	190	58	132				N/A
H-Bor-29	ST-22	Sample Dens./Consol.	178	2.69				39	21	18	SC
H-Bor-29	ST-24	SCC-120psi/Consol.	197	2.69				NL	NP	N/A	SM
H-Bor-29	"	RC-120psi	197	2.72	89	25	64				N/A

USCS - Unified Soil Classification System

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N.E.R. = Not Enough Recovery, N.E.M. = Not Enough Material for specified test

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

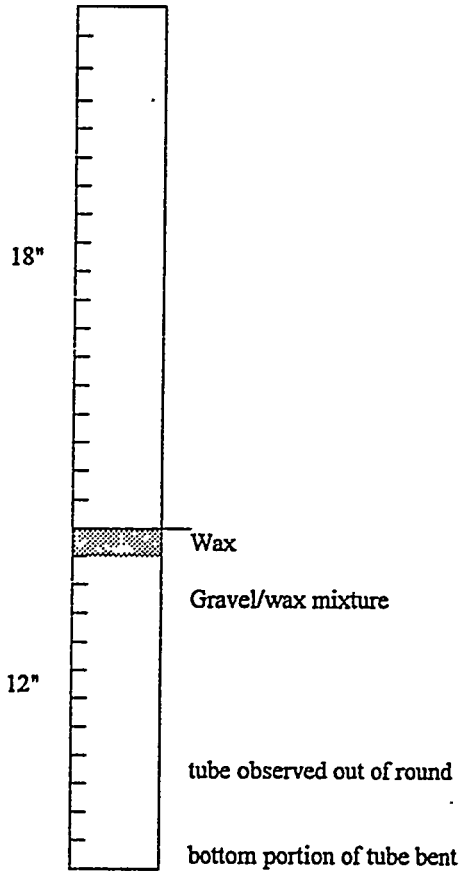
Project: SRS-ITP GEOTECHNICAL TESTING Date: 08-10-93

Boring No: H-Bor-2 Sample No: ST-1 Depth: 21 ft.

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION



Remarks:

1028mf srs-itp-xaif
7/22/93

rlb\itp\tubelog\b2-st1.wk3

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

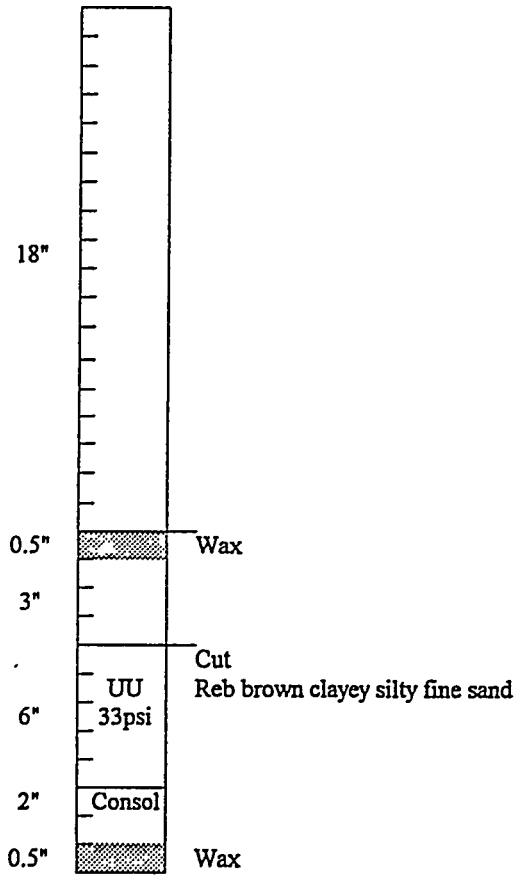
Project: SRS-ITP GEOTECHNICAL TESTING Date: 08-10-93

Boring No: H-Bor-2 Sample No: ST-2 Depth: 39' - 39'9"

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION

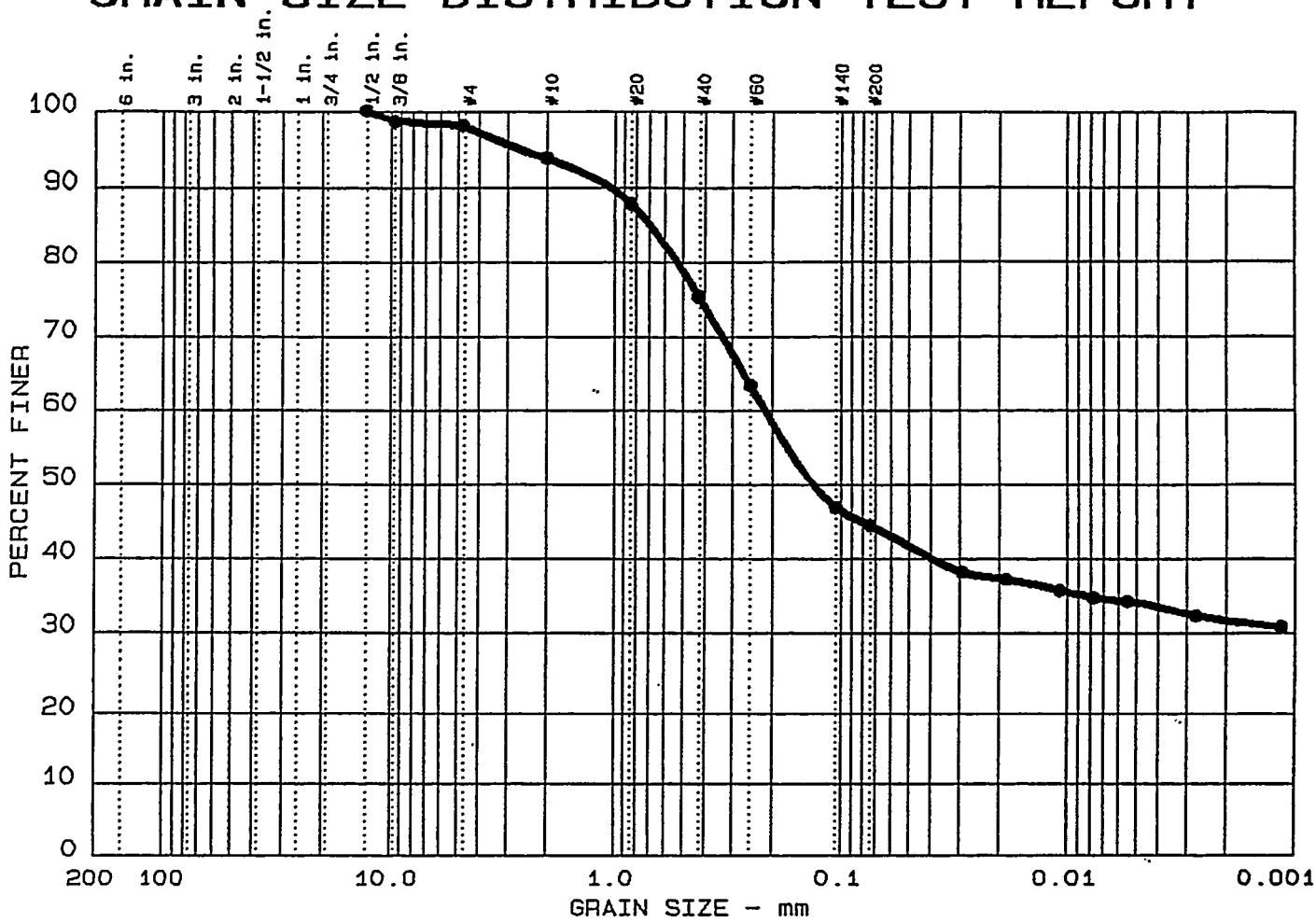


Remarks: _____

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b2-st2.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	18	0.0	1.9	53.7	10.4	34.0

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	57	29	0.68	0.22	0.13					

MATERIAL DESCRIPTION	USCS	AASHTO
● Red Brown Silty Clayey Medium to Fine Sand	SC	A-7-6 (8.1)

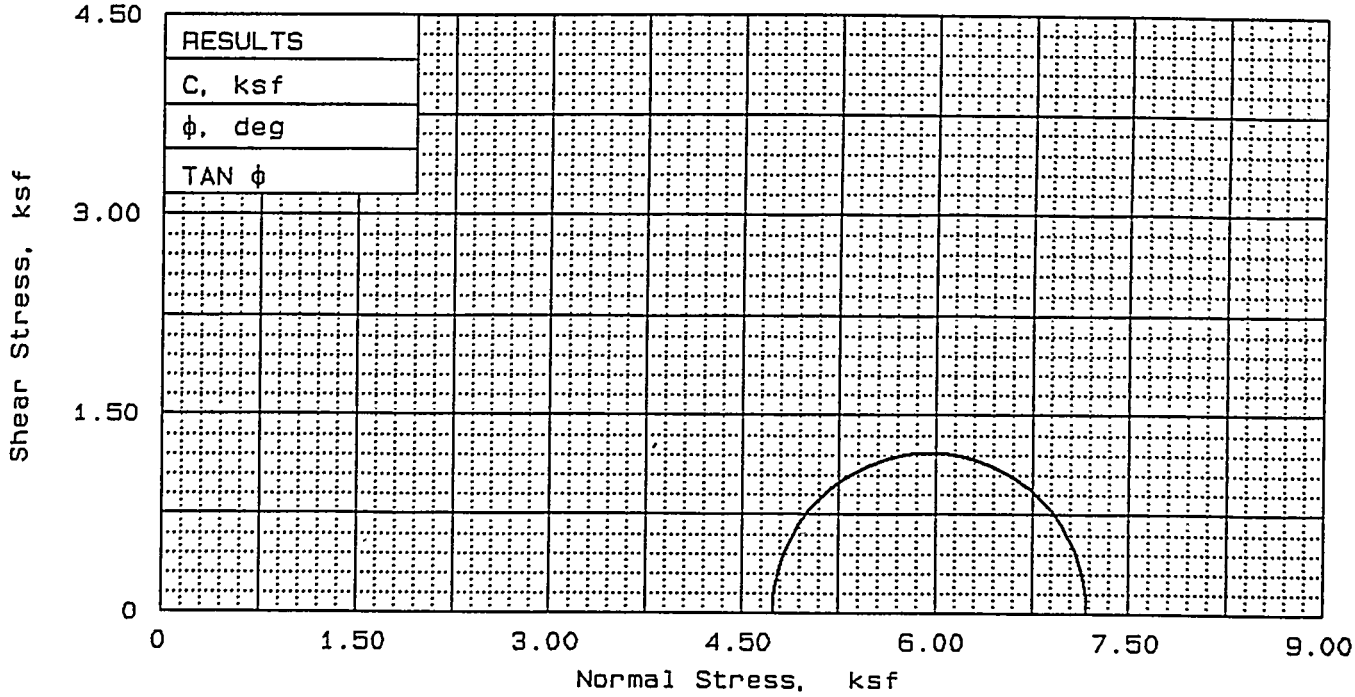
Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-2 ST-2 @ 39-39.75 Ft.

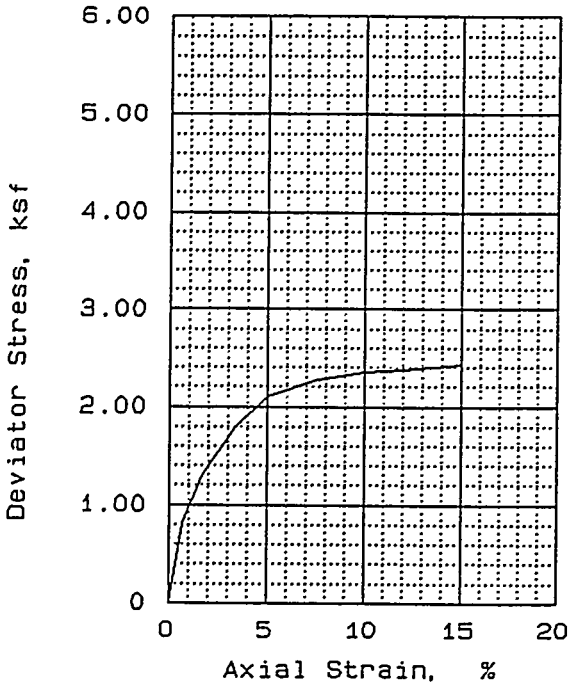
Date: September 23, 1993

Remarks:
Tested by: JRR
Reviewed by: RLK
UU @ 33 PSI

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.





SAMPLE NO.		1
INITIAL	WATER CONTENT, %	23.2
	DRY DENSITY, pcf	100.4
	SATURATION, %	93.3
	VOID RATIO	0.666
	DIAMETER, in	2.88
	HEIGHT, in	6.00
AT TEST	WATER CONTENT, %	23.2
	DRY DENSITY, pcf	100.4
	SATURATION, %	93.3
	VOID RATIO	0.666
	DIAMETER, in	2.88
	HEIGHT, in	6.00
BACK PRESSURE, ksf		0.00
CELL PRESSURE, ksf		4.75
FAILURE STRESS, ksf		2.43
PORE PRESSURE, ksf		
STRAIN RATE, %/min.		1.000
ULTIMATE STRESS, ksf		
PORE PRESSURE, ksf		
σ_1 FAILURE, ksf		7.18
σ_3 FAILURE, ksf		4.75

TYPE OF TEST:
Unconsolidated undrained
SAMPLE TYPE: Undisturbed
DESCRIPTION: See Grain Size

LL= PL= PI=
SPECIFIC GRAVITY= 2.68
REMARKS: Tested by: CLG

Reviewed by: R B

FIG. NO.

CLIENT: SRS

PROJECT: SRS-ITP

SAMPLE LOCATION: H-Bor-2 ST-2 @ 39-39'9"

PROJ. NO.: 5810535301 DATE: 10/8/93

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

TRIAXIAL COMPRESSION TEST
Unconsolidated undrained

2-24-1994
4:15 pm

Project Data

Project No.: 5810535301 Date: 10/8/93 Data file: SRS-ITP1
Client: SRS
Project: SRS-ITP
Sample location: H-Bor-2 ST-2 @ 39-39'9"
Sample description: See Grain Size
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.68 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.88	
Height change, in		0.00	
Height, in	6.00	6.00	
Weight, grams	1268.2		
Moisture, %	23.2	23.2	23.2
Dry density, pcf	100.4	100.4	
Saturation, %	93.3	93.3	
Void ratio	0.666	0.666	

Test Data

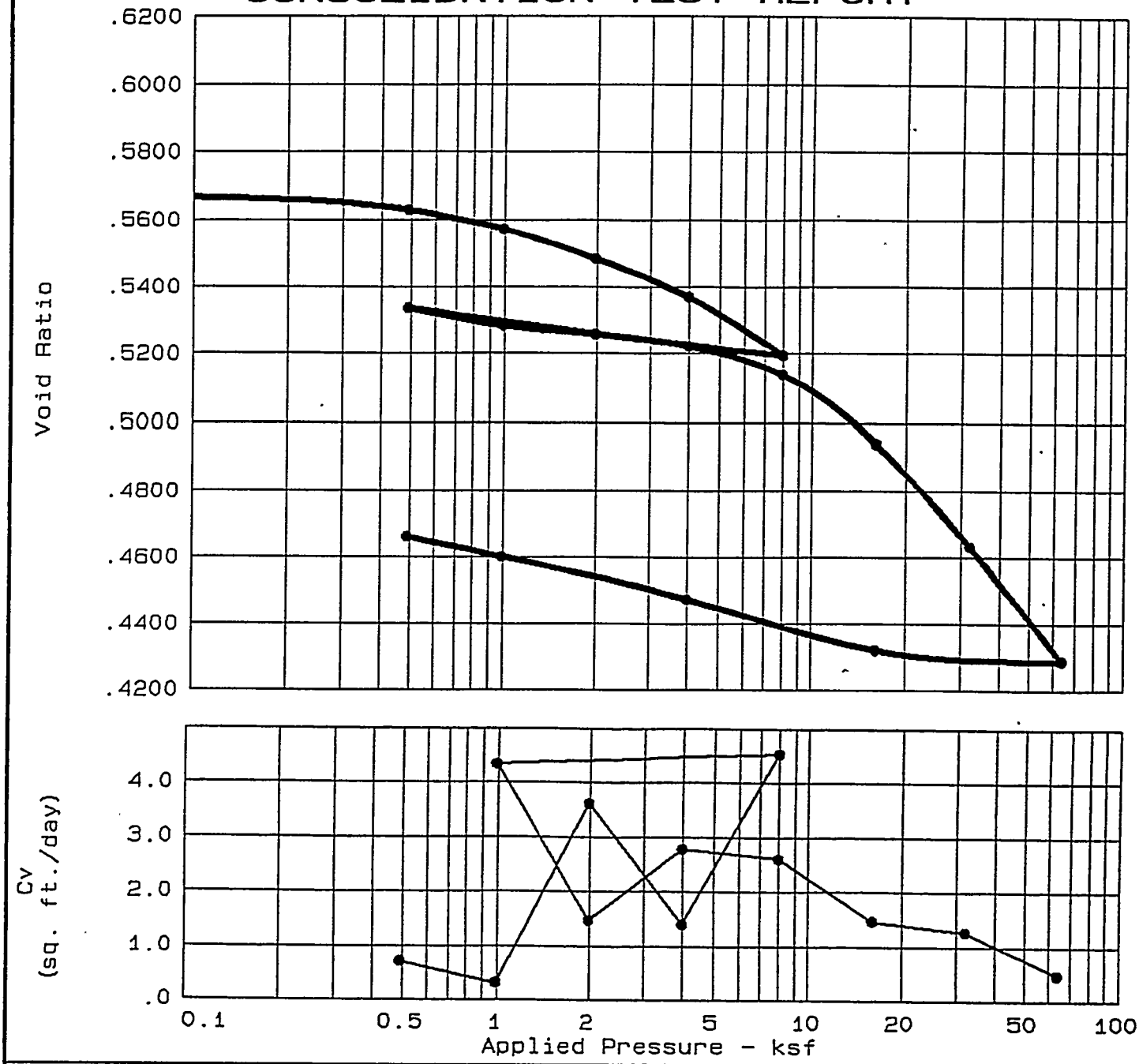
Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 1.000 % per minute
Cell pressure = 33 psi
Back pressure = 0 psi
Effective confining stress = 4.752 ksf
Peak deviator stress = 2.43 ksf at reading no. 9
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	4.75	4.75	1.00	4.75	0.00
1	0.0200	0.020	18.00	18.0	0.3	0.40	4.75	5.15	1.08	4.95	0.20
2	0.0400	0.040	37.00	37.0	0.7	0.81	4.75	5.56	1.17	5.16	0.41
3	0.1000	0.100	60.00	60.0	1.7	1.31	4.75	6.06	1.27	5.40	0.65
4	0.2000	0.200	83.50	83.5	3.3	1.79	4.75	6.54	1.38	5.64	0.89
5	[illegible] 3000	0.300	100.00	100.0	5.0	2.10	4.75	6.85	1.44	5.80	1.05
	[illegible]500	0.450	111.00	111.0	7.5	2.27	4.75	7.02	1.48	5.89	1.14

LAW ENGINEERING, INC.

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	0.6000	0.600	118.00	118.0	10.0	2.35	4.75	7.10	1.49	5.93	1.17
	0.7200	0.720	122.00	122.0	12.0	2.37	4.75	7.13	1.50	5.94	1.19
9	0.9000	0.900	129.00	129.0	15.0	2.43	4.75	7.18	1.51	5.96	1.21

CONSOLIDATION TEST REPORT



Natural Saturation	Natural Moisture	Dry Density	LL	PI	Sp.Gr.	Initial void ratio
90.4 %	19.1	106.8	57	29	2.680	0.5666

TEST RESULTS	MATERIAL DESCRIPTION
	Red Brown Silty Clayey Medium to Fine Sand Class: SC
Project No.: 5810535301 Project: SRS ITP Location: H-Bor-2 ST-2 39'-39'9.5" Date: 8/10/93	Remarks: Tested by: CLG Reviewed by: RLB
CONSOLIDATION TEST REPORT LAW ENGINEERING, INC.	Fig. No._____

17:16, 2-28-1994 CONSOLIDATION TEST PROJECT DATA Test No. 5

Project Number:	5810535301
Project:	SRS ITP
Date:	8/10/93
Location 1:	H-Bor-2 ST-2
2:	39'-39'9.5"
Remarks 1:	Tested by:
2:	Reviewed by:
3:	
4:	
5:	
Material 1:	Red Brown Silty Clayey
description 2:	Medium to Fine Sand
Classification:	SC
Liquid limit:	57
Plasticity index:	29
Figure Number:	

CONSOLIDATION TEST SPECIMEN DATA

TOTAL SAMPLE	BEFORE TEST	AFTER TEST
Wet w+t = 349.03 g.	Oedometer No. = 7	Wet w+t = 346.11 g.
Dry w+t = 328.18 g	Machine No. = 7	Dry w+t = 328.18 g.
Tare wt. = 219.04 g.	Spec. Gravity = 2.680	Tare wt. = 219.04 g.
Height = 0.8900 in.	Height = 0.8900 in.	
Diameter = 2.3600 in.	Diameter = 2.3590 in.	
Weight = 129.99 g.		
Moisture = 19.1 %	Ht. Solids = 0.5681 in.	Moisture = 16.4 %
Wet Den. = 127.2 pcf	Dry wt. = 109.05 g. *	Dry wt. = 109.14 g.
Dry Den. = 106.8 pcf	Void ratio = 0.5666	Void ratio = 0.4663
	Saturation = 90.4 %	Saturation = 94.4 %

* Initial dry weight used in calculations

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
Initial	0.02000			0.5666	
0.49	0.02340	0.0002	0.02320	0.5628*	0.2 Comprs.*
0.99	0.02690	0.0004	0.02650	0.5570*	0.6 Comprs.*
1.99	0.03220	0.0006	0.03160	0.5482*	1.2 Comprs.*
3.99	0.03930	0.0012	0.03810	0.5367*	1.9 Comprs.*
8.00	0.05180	0.0022	0.04960	0.5194*	3.0 Comprs.*
1.99	0.04660	0.0006	0.04600	0.5258	2.6 Comprs.
0.49	0.04180	0.0002	0.04160	0.5335	2.1 Comprs.
0.99	0.04240	0.0004	0.04200	0.5281*	2.5 Comprs.*
1.99	0.04450	0.0006	0.04390	0.5255*	2.6 Comprs.*
3.99	0.04700	0.0012	0.04580	0.5220*	2.8 Comprs.*
8.00	0.05300	0.0022	0.05080	0.5136*	3.4 Comprs.*
16.02	0.06640	0.0034	0.06300	0.4941*	4.6 Comprs.*
32.08	0.08710	0.0058	0.08130	0.4632*	6.6 Comprs.*

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
63.78	0.11250	0.0101	0.10240	0.4288*	8.8 Comprs.*
16.02	0.10400	0.0034	0.10060	0.4320	8.6 Comprs.
3.99	0.09300	0.0012	0.09180	0.4475	7.6 Comprs.
0.99	0.08500	0.0004	0.08460	0.4602	6.8 Comprs.
0.49	0.08130	0.0002	0.08110	0.4663	6.4 Comprs.

* CALCULATED USING D100 INSTEAD OF FINAL READING

CONSOLIDATION TEST RESULTS

Compression index = NOT SELECTED
Preconsolidation pressure = NOT SELECTED

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

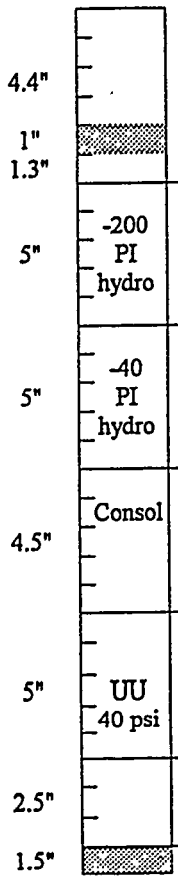
Project: SRS-ITP GEOTECHNICAL TESTING Date: 10-08-93

Boring No: H-Bor-2 Sample No: ST-3 Depth: 51'-53'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: CLG Checked By: RLB

VISUAL DESCRIPTION



Wax

Cut
Purple, red-brown and tan medium to fine sandy clay

Cut
Purple, red-brown and tan medium to fine sandy clay

Cut
Purple, red-brown and tan medium to fine sandy clay

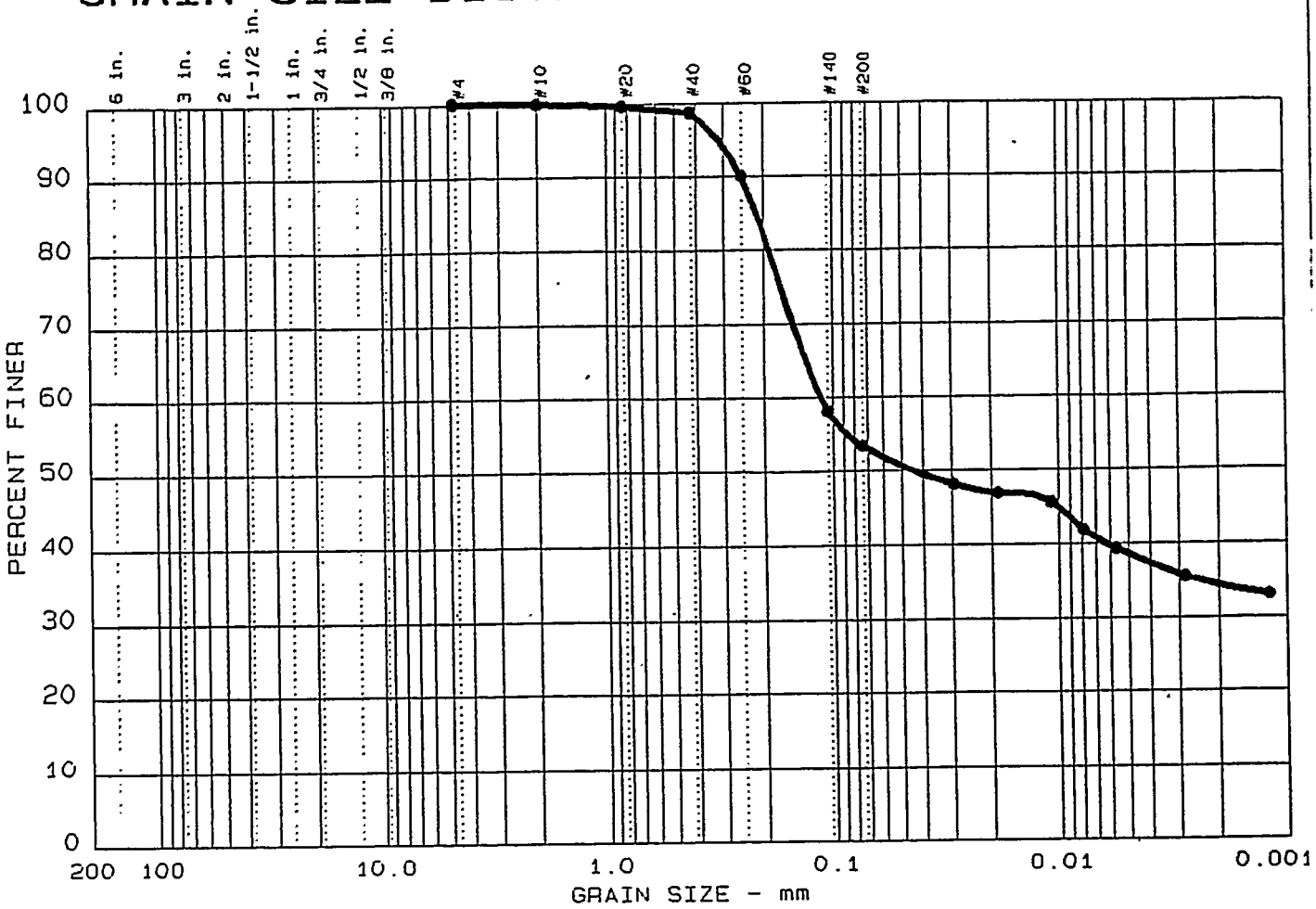
Cut
Purple, red-brown and tan medium to fine sandy clay

Cut
Purple clay and red-brown clayey medium to fine sand

Remarks:

WORKING COPY DATE _____

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	1	0.0	0.0	46.7	14.8	38.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.22	0.11	0.04					

MATERIAL DESCRIPTION	USCS	AASHTO
● Purple Red Brown & Tan Sandy Clay		

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-2 ST-3 @ 51 Ft. (bottom portion)

Date: January 5, 1994

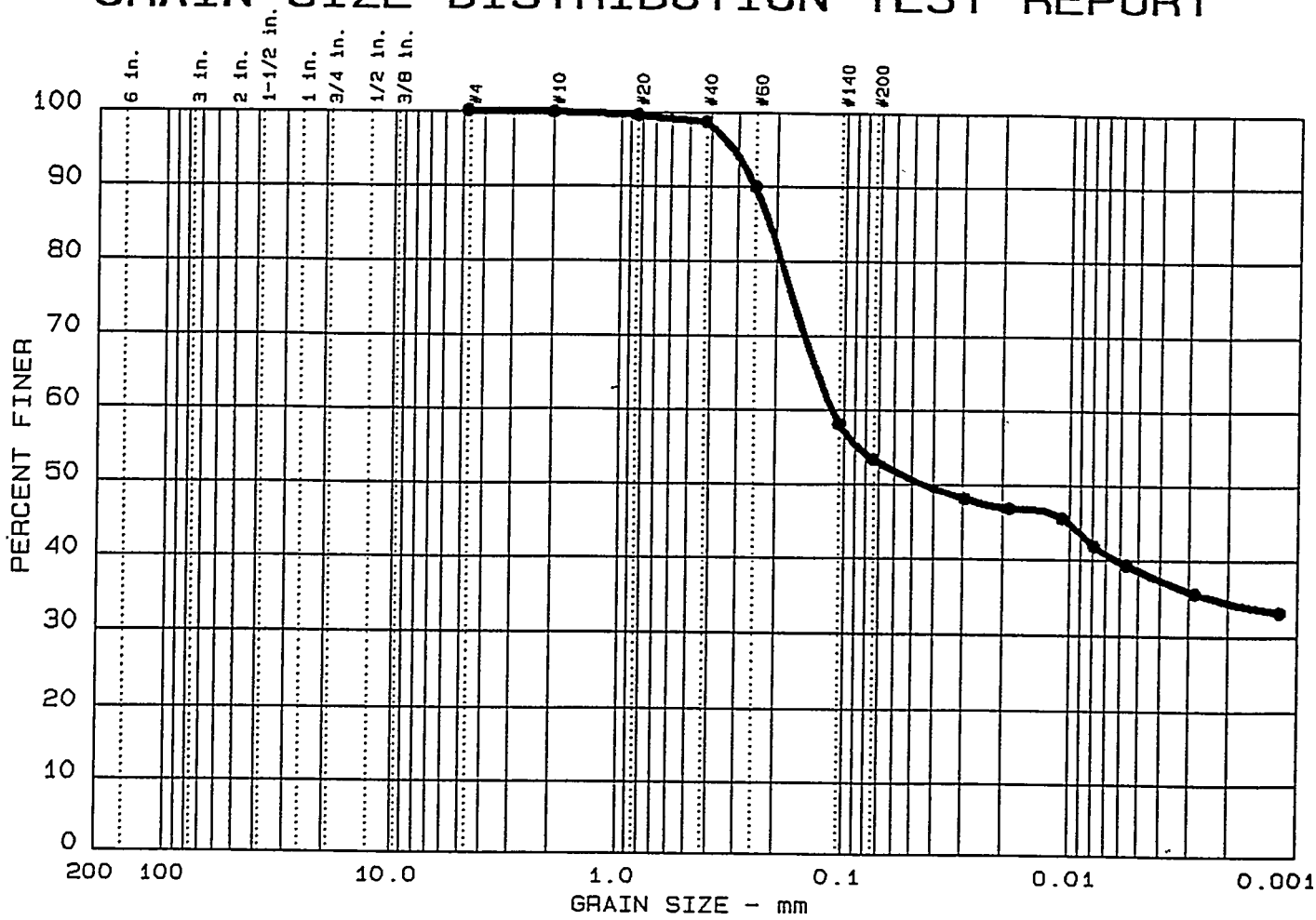
Remarks:
Tested by: ~~[illegible]~~ JTK
Reviewed by: RLB
Atterberg -200
LL=109 P=29 PI=80

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	4	0.0	0.0	46.7	14.8	38.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.22	0.11	0.04					

MATERIAL DESCRIPTION	USCS	AASHTO
● Purple Red Brown & Tan Sandy Clay		

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-2 ST-3 @ 51 Ft. (top portion)

Date: January 5, 1994

Remarks:

Tested by: JTK

Reviewed by: RLB

Atterberg Limits -200

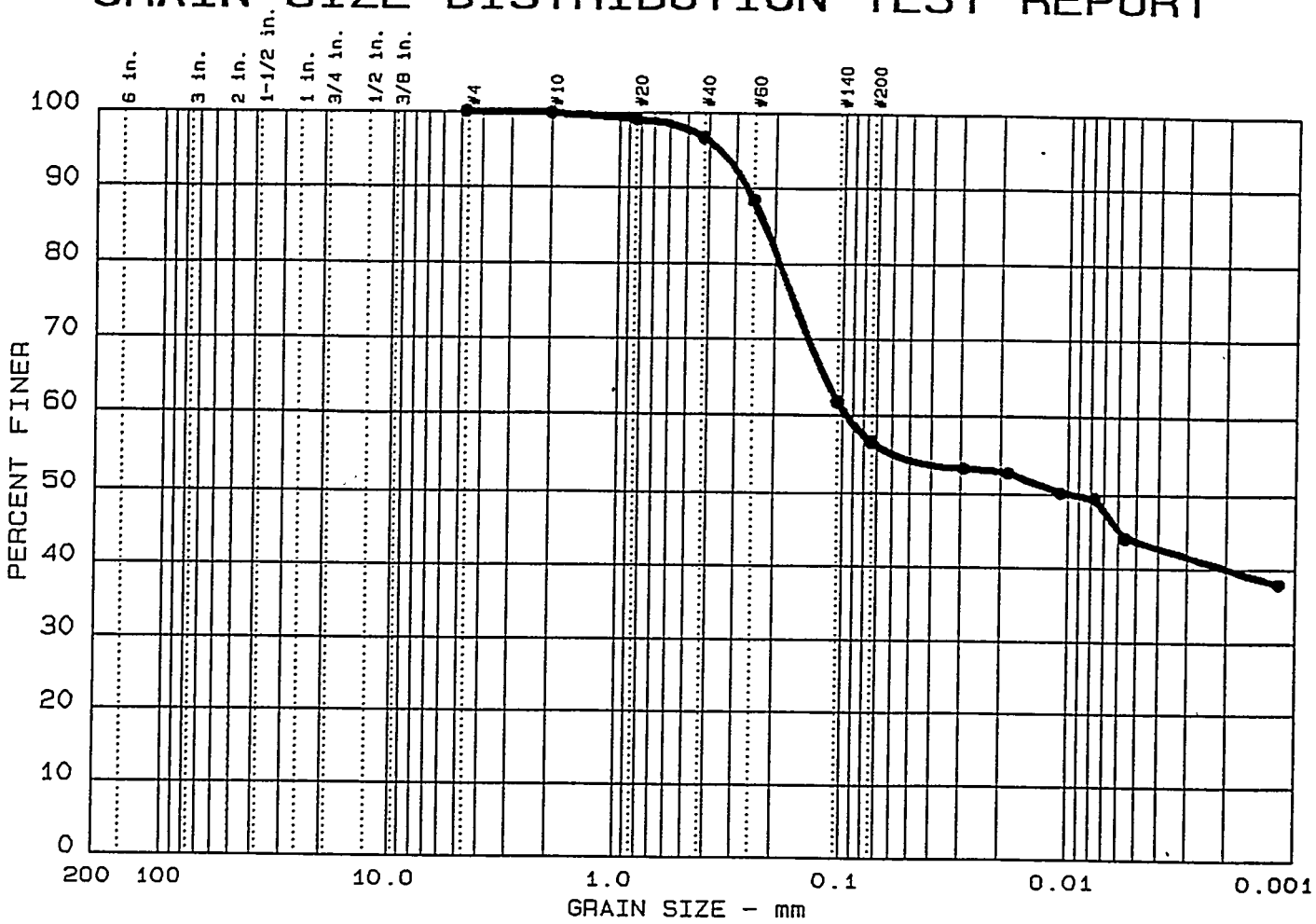
LL=109 PL=29 PI=80.

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	5	0.0	0.0	43.1	13.4	43.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	59	38	0.22	0.10	0.01					

MATERIAL DESCRIPTION	USCS	AASHTO
● Orange Brown Sandy Fat Clay	CH	A-7-6 (18.3)

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-2 ST-3 @ 51 Ft. (middle portion)

Date: January 3, 1993

Remarks:

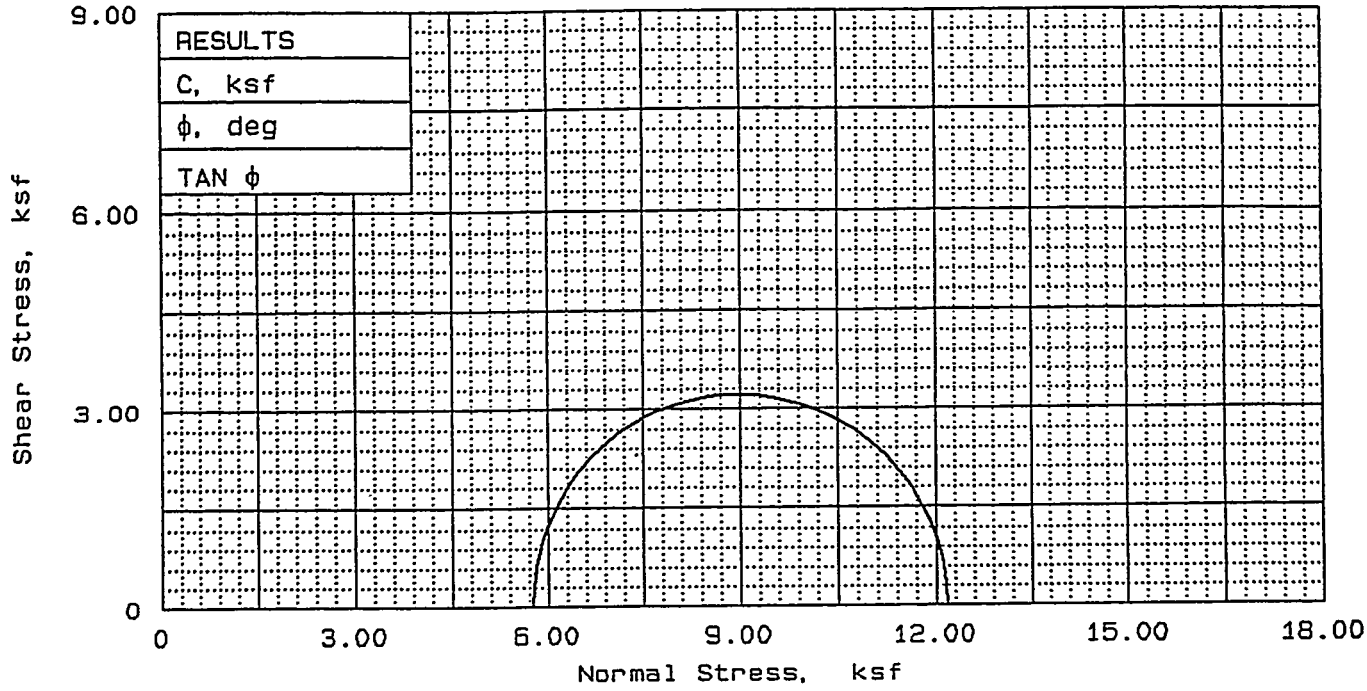
Tested by: JTK

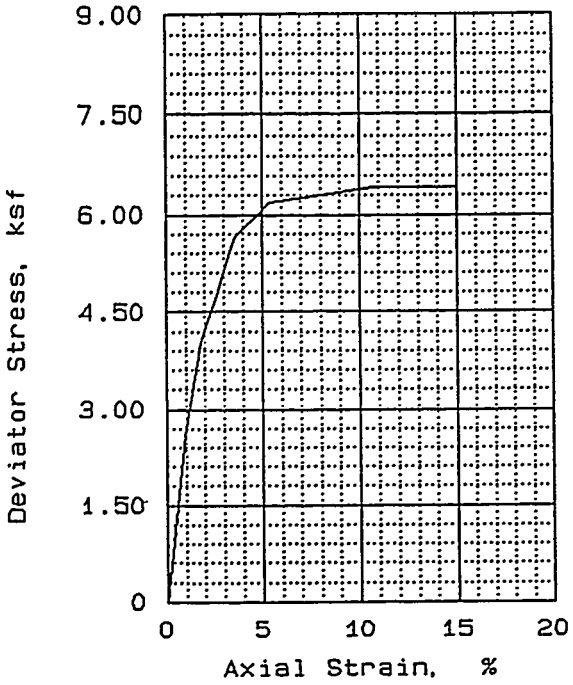
Reviewed by: RLB

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.





SAMPLE NO.		1
INITIAL	WATER CONTENT, %	24.3
	DRY DENSITY, pcf	96.7
	SATURATION, %	90.3
	VOID RATIO	0.712
	DIAMETER, in	2.83
	HEIGHT, in	5.60
AT TEST	WATER CONTENT, %	24.3
	DRY DENSITY, pcf	96.7
	SATURATION, %	90.3
	VOID RATIO	0.712
	DIAMETER, in	2.83
	HEIGHT, in	5.60
BACK PRESSURE, ksf		0.00
CELL PRESSURE, ksf		5.76
FAILURE STRESS, ksf		6.42
PORE PRESSURE, ksf		
STRAIN RATE, %/min.		1.000
ULTIMATE STRESS, ksf		
PORE PRESSURE, ksf		
σ_1 FAILURE, ksf		12.18
σ_3 FAILURE, ksf		5.76

TYPE OF TEST:
Unconsolidated undrained
SAMPLE TYPE: Undisturbed
DESCRIPTION: Red Brown Silty Clayey Fine Sand
LL= 60 PL= 25 PI= 35.0
SPECIFIC GRAVITY= 2.65
REMARKS: Tested by: CLG

Reviewed by: RLB

FIG. NO.

CLIENT: SRS

PROJECT: SRS-ITP

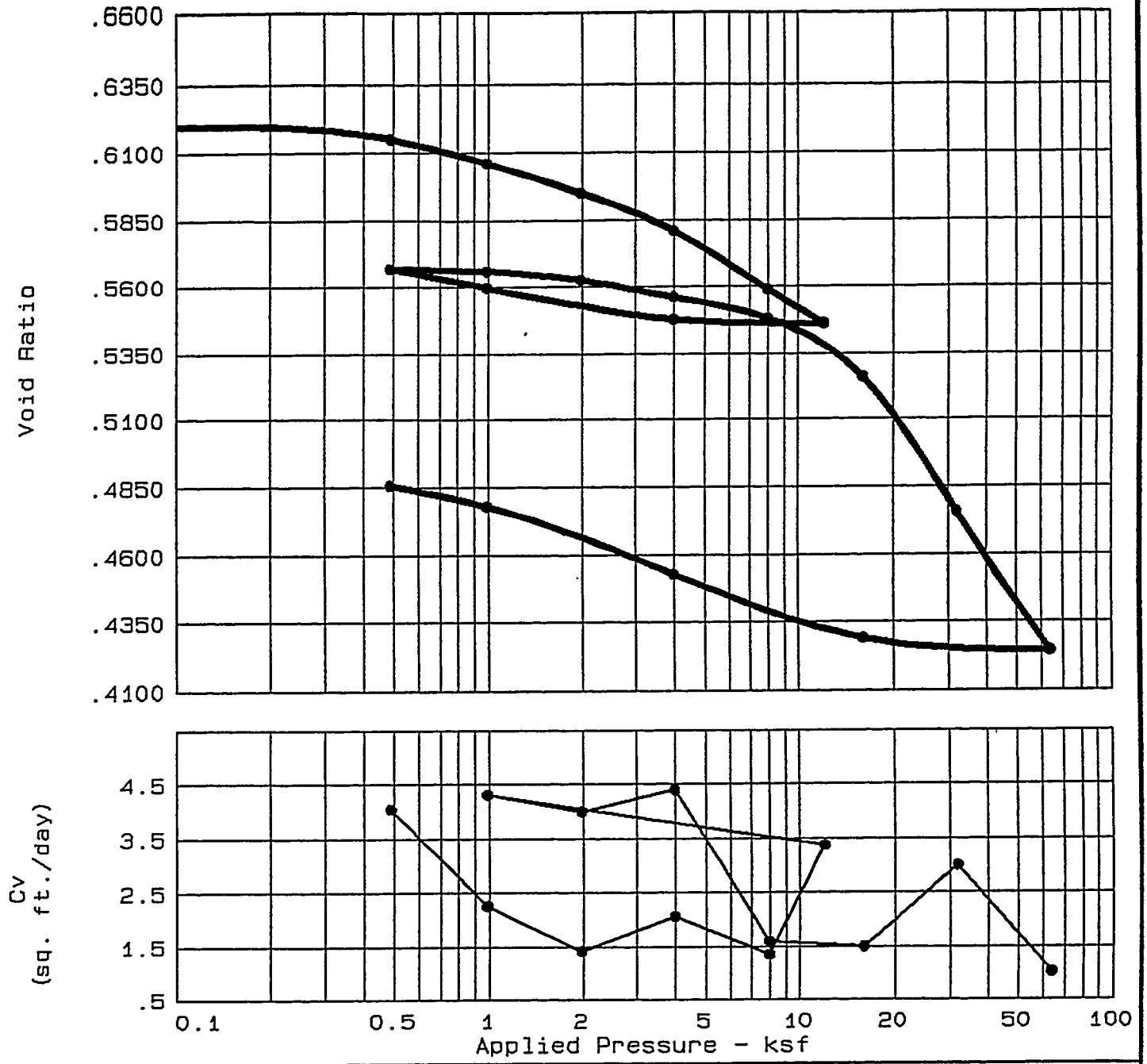
SAMPLE LOCATION: H-Bor-2 ST-3 @ 51-53

PROJ. NO.: 5810535301 DATE: 10/8/93

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

CONSOLIDATION TEST REPORT



Swell press.	Nat. Sat.	Nat. Moist.	Dry Density	LL	PI	Sp.Gr.	Initial void ratio
	86.6 %	20.2	102.1	60	35	2.65	0.6197

TEST RESULTS	MATERIAL DESCRIPTION
	Red Brown Silty Clayey Fine Sand Class: SC
Project No.: 5810535301 Project: SRS ITP Location: H-Bor-2 ST-3 51-53 Ft. Date: 9/2/93	Remarks: Tested by: CCG Reviewed by: RWB
CONSOLIDATION TEST REPORT **LAW ENGINEERING, INC.**	Fig. No._____

16:05, 10-13-1993 CONSOLIDATION TEST PROJECT DATA Test No. 15

Project Number:	5810565601
Project:	SRS ITP
Date:	9/2/93
Location 1:	H-Bor-2 ST-3
2:	51-53 Ft.
Remarks 1:	Tested by: CLB
2:	Reviewed by: RLB
3:	
4:	
5:	
Material 1:	Red Brown Silty Clayey
description 2:	Fine Sand
Classification:	SC
Liquid limit:	60
Plasticity index:	35
Figure Number:	

CONSOLIDATION TEST SPECIMEN DATA

TOTAL SAMPLE	BEFORE TEST	AFTER TEST
Wet w+t = 342.83 g.	Oedometer No. = 5	Wet w+t = 342.72 g.
Dry w+t = 321.62 g	Machine No. = 5	Dry w+t = 321.62 g.
Tare wt. = 216.86 g.	Spec. Gravity = 2.65	Tare wt. = 216.86 g.
Height = 0.89 in.	Height = 0.89 in.	
meter = 2.36 in.	Diameter = 2.36 in.	
Weight = 125.97 g.		
Moisture = 20.2 %	Ht. Solids = 0.55 in.	Moisture = 20.1 %
Wet Den. = 122.8 pcf	Dry wt. = 104.85 g. *	Dry wt. = 104.76 g.
Dry Den. = 102.1 pcf	Void ratio = 0.6197	Void ratio = 0.4856
	Saturation = 86.6 %	Saturation = 109. %

* Initial dry weight used in calculations

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
Initial	0.02000			0.6197	
0.49	0.02300	0.0003	0.02270	0.6148	0.3 Comprs.
0.99	0.02840	0.0007	0.02770	0.6058	0.9 Comprs.
1.99	0.03490	0.0012	0.03370	0.5949	1.5 Comprs.
3.99	0.04360	0.0021	0.04150	0.5807	2.4 Comprs.
8.00	0.05700	0.0032	0.05380	0.5585	3.8 Comprs.
12.01	0.06480	0.0040	0.06080	0.5458	4.6 Comprs.
3.99	0.06200	0.0021	0.05990	0.5474	4.5 Comprs.
0.99	0.05400	0.0007	0.05330	0.5594	3.7 Comprs.
0.49	0.04970	0.0003	0.04940	0.5664	3.3 Comprs.

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
0.99	0.05060	0.0007	0.04990	0.5655	3.3 Comprs.
1.99	0.05300	0.0012	0.05180	0.5621	3.6 Comprs.
3.99	0.05740	0.0021	0.05530	0.5557	3.9 Comprs.
8.00	0.06300	0.0032	0.05980	0.5476	4.5 Comprs.
16.00	0.07660	0.0048	0.07180	0.5259	5.8 Comprs.
32.04	0.10650	0.0071	0.09940	0.4758	8.9 Comprs.
63.74	0.13890	0.0109	0.12800	0.4240	12.1 Comprs.
16.00	0.13020	0.0048	0.12540	0.4287	11.8 Comprs.
3.99	0.11420	0.0021	0.11210	0.4528	10.3 Comprs.
0.99	0.09890	0.0007	0.09820	0.4780	8.7 Comprs.
0.49	0.09430	0.0003	0.09400	0.4856	8.3 Comprs.

CONSOLIDATION TEST RESULTS

Compression index = NOT SELECTED
Preconsolidation pressure = NOT SELECTED

Load 0.49 ksf — CONSOLIDATION TEST READINGS — Load No. 1

Machine Deflection 0.0003

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.02000	11	60.00	0.02300
2	0.10	0.02210			
3	0.25	0.02230			
4	0.50	0.02240			
5	1.00	0.02250			
6	2.00	0.02260			
7	4.00	0.02270			
8	8.00	0.02280			
9	15.00	0.02285			
10	30.00	0.02290			

Void Ratio: 0.6148 Compression: 0.3 %
D0 = 0.0215 D90 = 0.0221 D100 = 0.0221 T90 = 0.42 min.
Cv @ 0.4 min.= 4.04 sq. feet/day

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

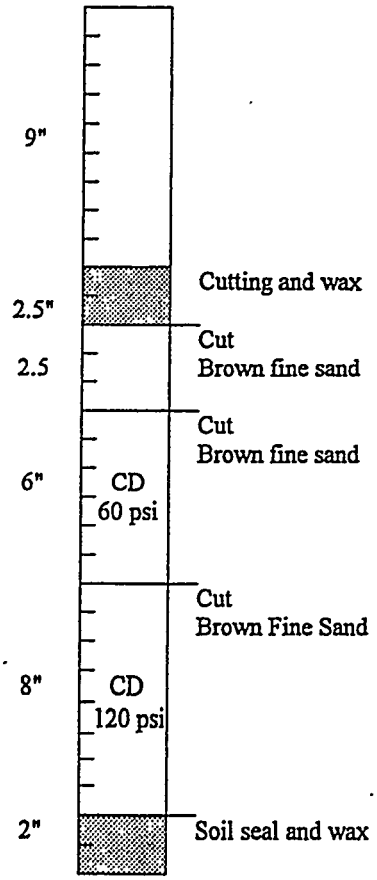
Project: SRS-ITP GEOTECHNICAL TESTING Date: 09-01-93

Boring No: H-Bor-2 Sample No: ST-4 Depth: 110'-111.8'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION

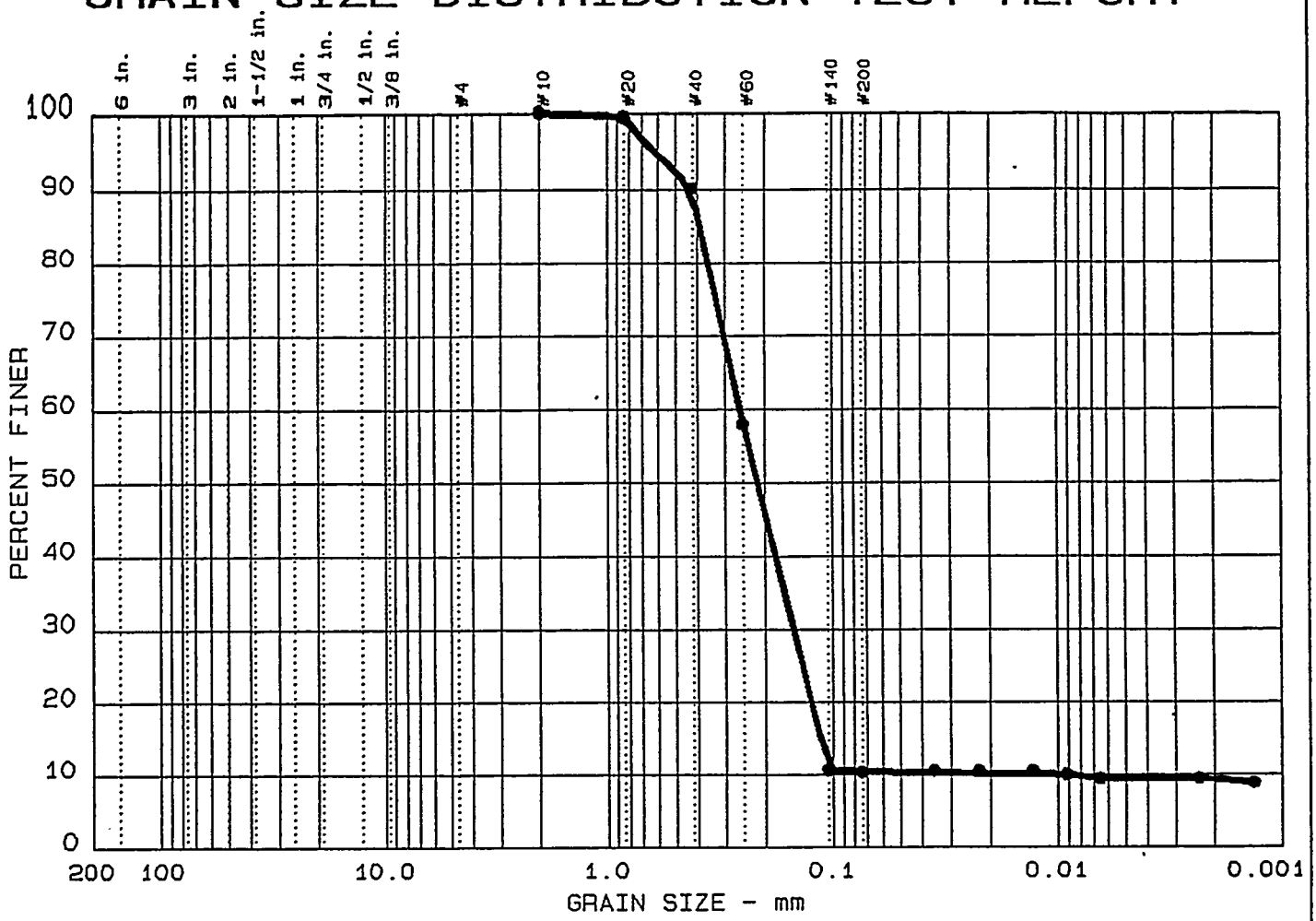


Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b2-st4.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	11	0.0	0.0	89.6	0.9	9.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.39	0.26	0.22	0.149	0.1136	0.0104	8.35	24.9

MATERIAL DESCRIPTION	USCS	AASHTO
● Orange Brown Clayey Medium to Fine Sand		

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-2 ST-4 @ 110 Ft.

Date: October 1, 1993

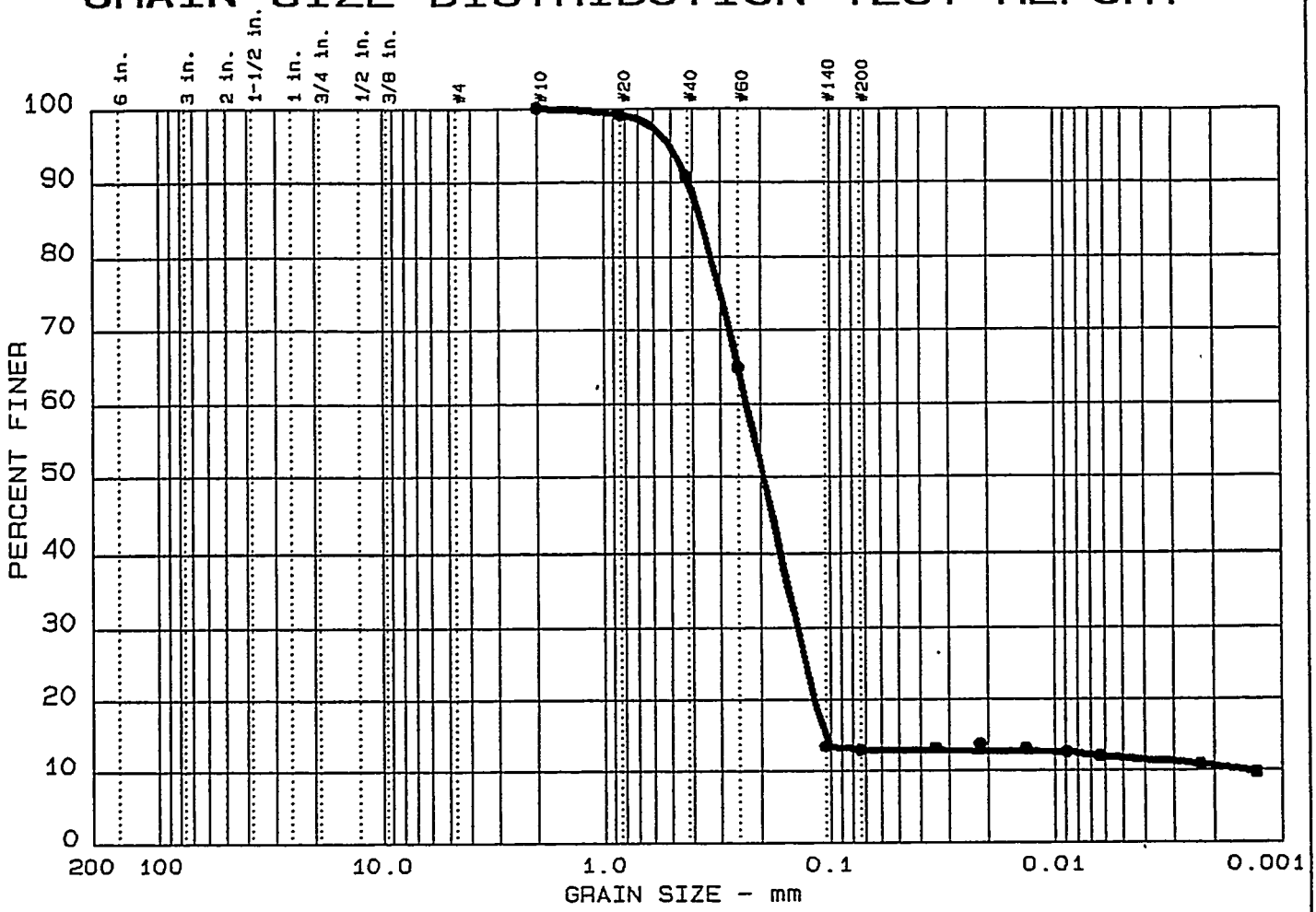
Remarks:
Tested by: JRR Ckd by: RLB
CD-60 psi
Atterberg Limits -200
LL=196 PL=55 PI=141

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	17	0.0	0.0	87.1	1.2	11.7

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	NL	NP	0.36	0.23	0.19	0.139	0.1076	0.0014	58.21	160.3

MATERIAL DESCRIPTION	USCS	AASHTO
● Orange Brown Clayey Medium to Fine Sand	SM	A-2-4 (0.2)

Project No.: 5810535301
Project: SRS ITP
◆ Location: H-BOr-2 ST-4 @ 110 Ft.

Date: September 20, 1993

Remarks:

Tested By: JRR

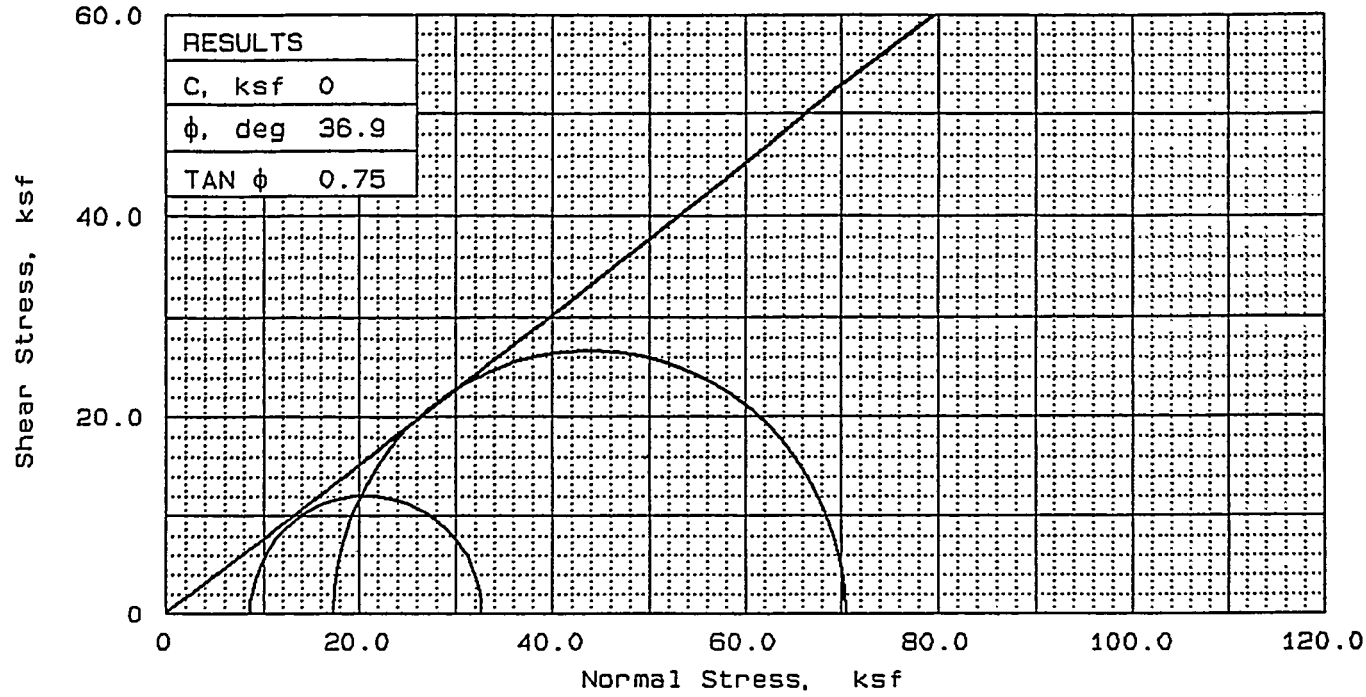
Reviewed By: RLB

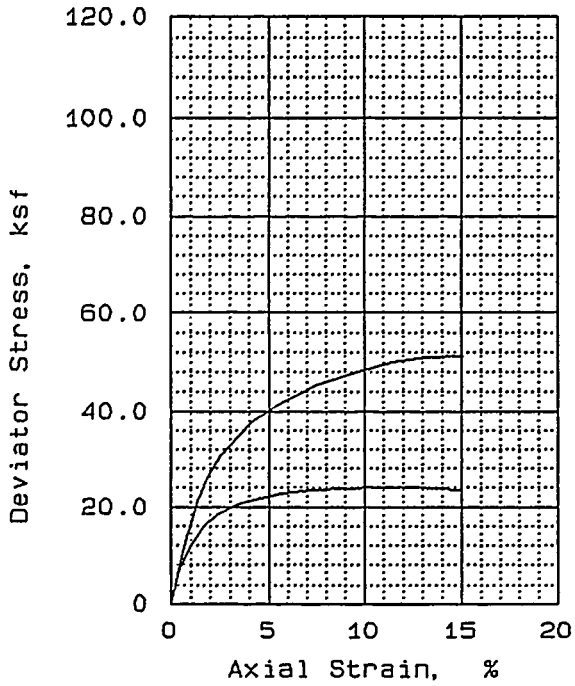
CD-120 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.





SAMPLE NO.		1	2
INITIAL	WATER CONTENT, %	26.6	28.1
	DRY DENSITY, pcf	90.5	94.5
	SATURATION, %	84.7	97.1
	VOID RATIO	0.835	0.778
	DIAMETER, in	2.88	2.87
	HEIGHT, in	6.00	5.99
AT TEST	WATER CONTENT, %	30.8	29.3
	DRY DENSITY, pcf	91.3	93.9
	SATURATION, %	100.0	100.0
	VOID RATIO	0.820	0.789
	DIAMETER, in	2.87	2.88
	HEIGHT, in	5.99	5.97
BACK PRESSURE, ksf		4.3	4.3
CELL PRESSURE, ksf		13.0	21.6
FAILURE STRESS, ksf		24.1	53.2
PORE PRESSURE, ksf			
STRAIN RATE, %/min.		0.100	0.100
ULTIMATE STRESS, ksf			
PORE PRESSURE, ksf			
σ_1 FAILURE, ksf		32.7	70.5
σ_3 FAILURE, ksf		8.6	17.3

TYPE OF TEST:
Consolidated drained

SAMPLE TYPE: Undisturbed

DESCRIPTION:

~~LL= PL= PI=~~

~~SPECIFIC GRAVITY= 2.69~~

REMARKS: Tested by: HEJ

Reviewed by: RLB

FIG. NO.

CLIENT: SRS

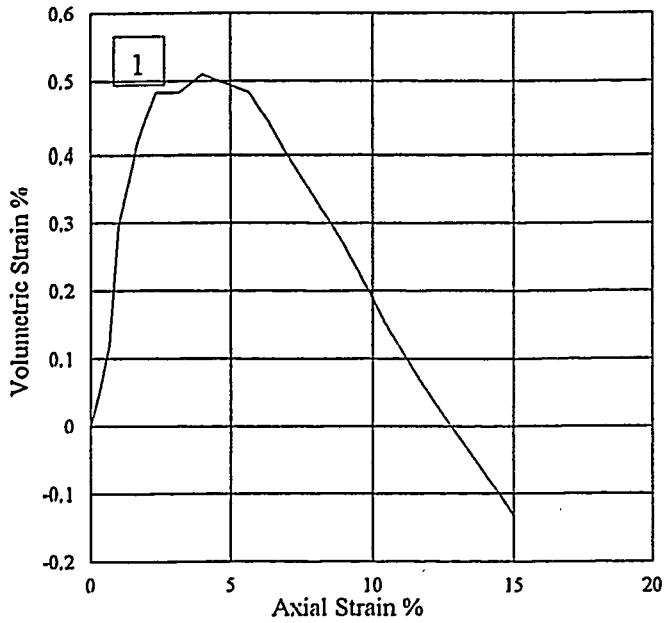
PROJECT: SRS-ITP

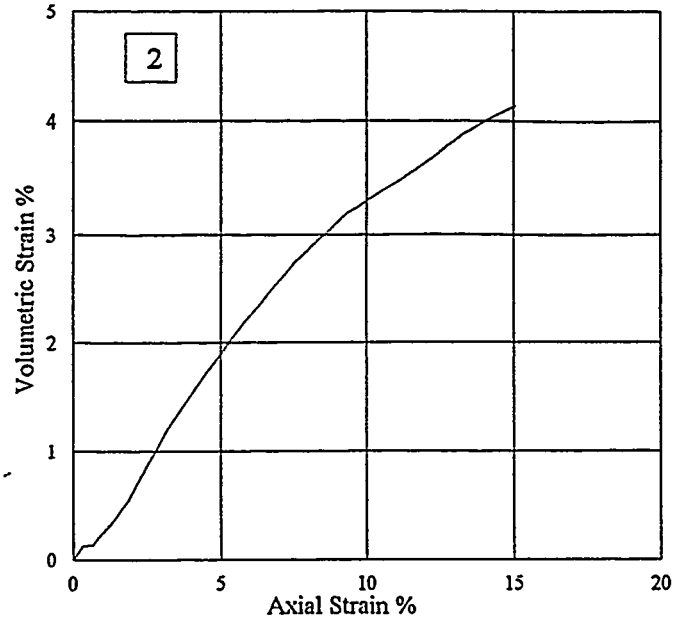
SAMPLE LOCATION: H Bor 2 ST-4 @ 110 Ft.

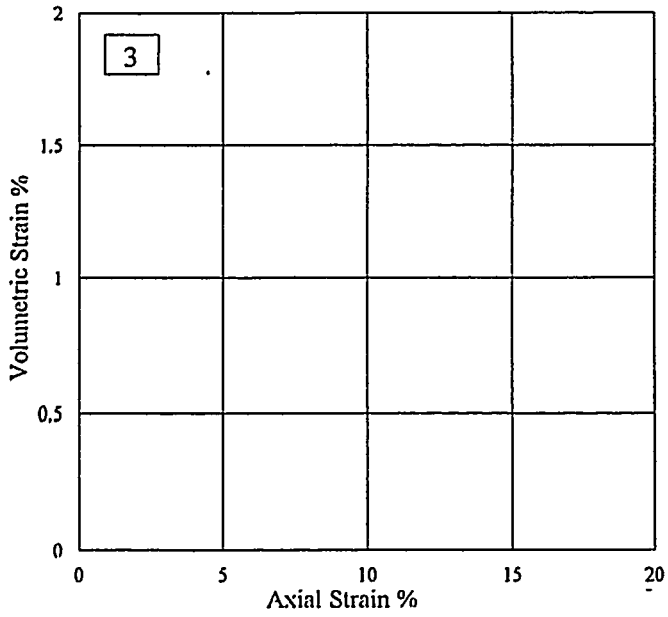
PROJ. NO.: 5810535301 DATE: Dec. 8, 1993

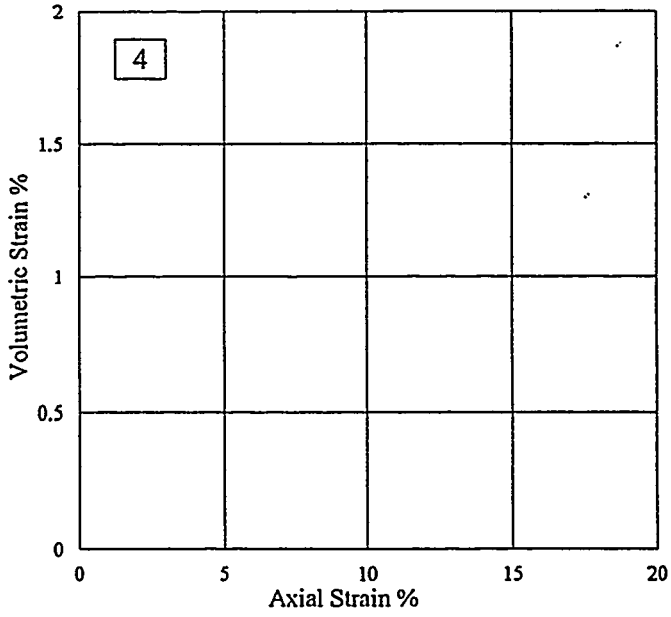
TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

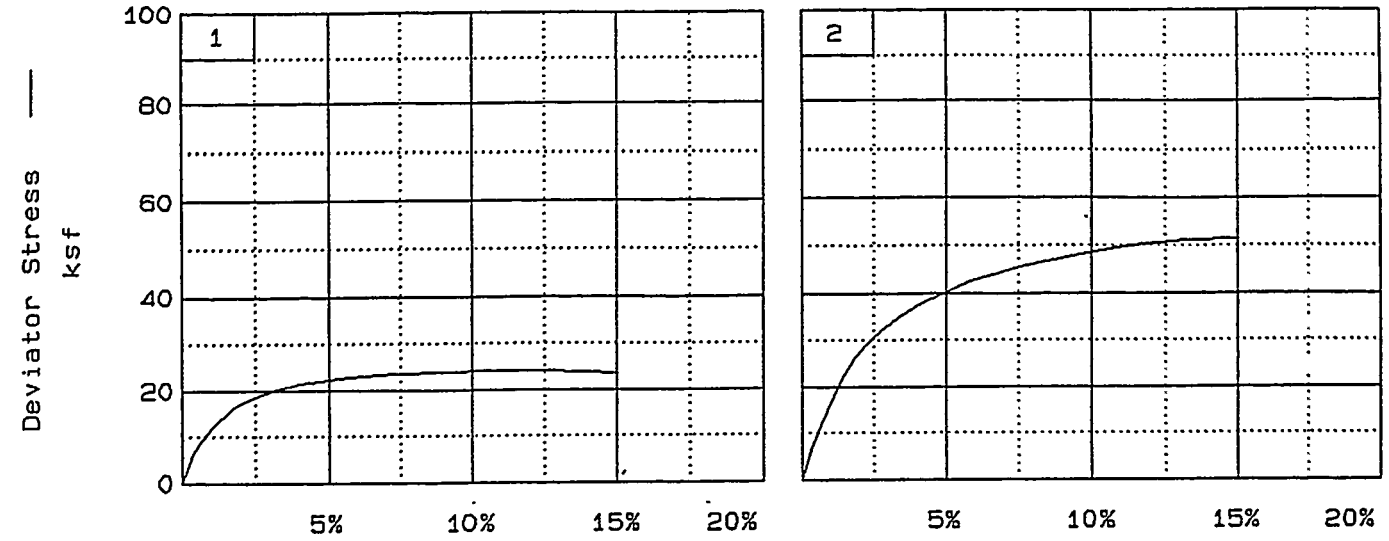


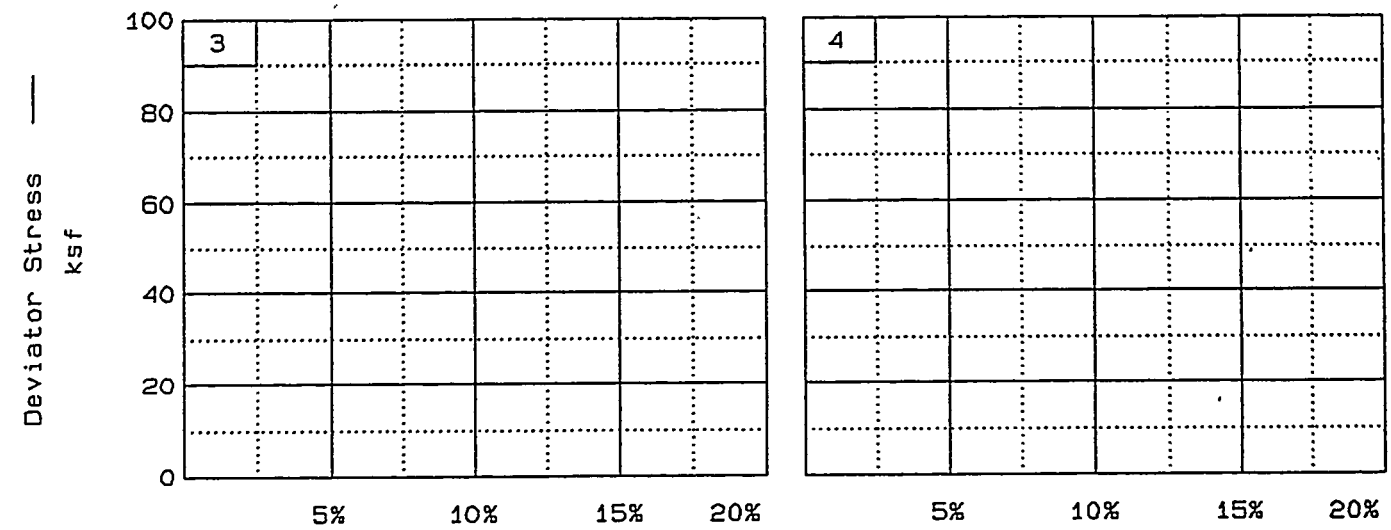


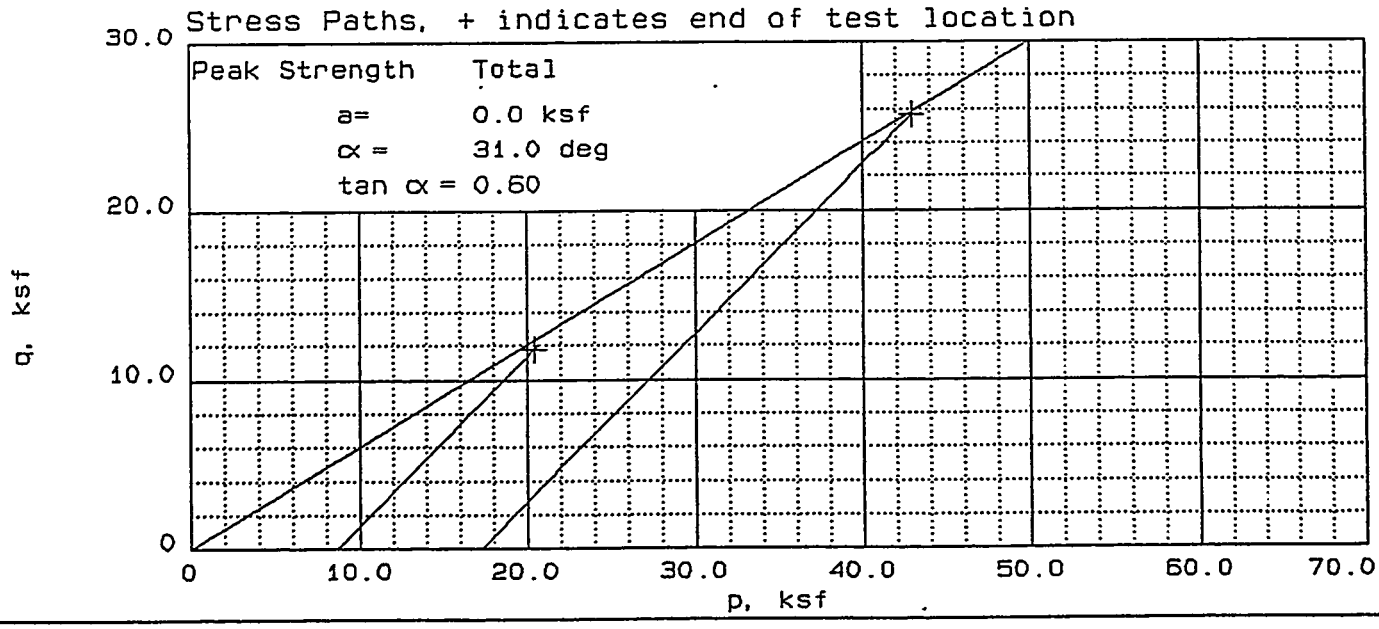




Client: SRS
Project: SRS-ITP
Location: H-Bor 2 ST-4 @ 110 Ft.
File: Project No.: 5810535301 Page 2 / 2 Fig. No. _____







Client: SRS

Project: SRS-ITP

Location: H Bor 2 ST-4 @ 110 Ft.

File: 535301C Project No.: 5810535301 Page 2/2 Fig. No. ____

TRIAXIAL COMPRESSION TEST
Consolidated drained

12-14-1993
1:30 pm

Project Data

Project No.: 5810535301 Date: Dec. 8,1993 Data file: 535301C
Client: SRS
Project: SRS-ITP
Sample location: H Bor 2 ST-4 @ 110 Ft.
Sample description:
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.66 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.87	
Height change, in		0.01	
Height, in	6.00	5.99	
Weight, grams	1177.6		
Water volume change, cc		-39.25	
Moisture, %	26.6	30.8	27.2
Dry density, pcf	90.5	91.3	
Saturation, %	84.7	100.0	
Void ratio	0.835	0.820	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 90 psi
Consolidation back pressure = 30 psi
Consolidation effective confining stress = 8.64 ksf
Peak deviator stress = 24.10 ksf at reading no. 12
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	8.64	8.64	1.00	8.64	0.00
1	0.0200	0.020	276.00	276.0	0.3	6.11	8.64	14.75	1.71	11.70	3.06
2	0.0400	0.040	420.00	420.0	0.7	9.27	8.64	17.91	2.07	13.27	4.63
3	0.0600	0.060	548.00	548.0	1.0	12.05	8.64	20.69	2.39	14.67	6.03
4	0.1000	0.100	730.00	730.0	1.7	15.94	8.64	24.58	2.85	16.61	7.97
	0.1400	0.140	842.00	842.0	2.3	18.27	8.64	26.91	3.11	17.77	9.13

LAW ENGINEERING, INC.

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	.1900	0.190	935.00	935.0	3.2	20.11	8.64	28.75	3.33	18.70	10.06
	0.2400	0.240	1000.00	1000.0	4.0	21.32	8.64	29.96	3.47	19.30	10.66
8	0.3400	0.340	1085.00	1085.0	5.7	22.73	8.64	31.37	3.63	20.01	11.37
9	0.4400	0.440	1145.00	1145.0	7.3	23.57	8.64	32.21	3.73	20.42	11.78
10	0.5400	0.540	1185.00	1185.0	9.0	23.95	8.64	32.59	3.77	20.61	11.97
11	0.6400	0.640	1212.00	1212.0	10.7	24.05	8.64	32.69	3.78	20.66	12.02
12	0.7500	0.750	1240.00	1240.0	12.5	24.10	8.64	32.74	3.79	20.69	12.05
13	0.9000	0.900	1250.00	1250.0	15.0	23.59	8.64	32.23	3.73	20.44	11.80

TRIAXIAL COMPRESSION TEST
Consolidated drained

12-14-1993
1:38 pm

Project Data

Project No.: 5810535301 Date: Dec. 8,1993 Data file: 535301C
Client: SRS
Project: SRS-ITP
Sample location: H Bor 2 ST-4 @ 110 Ft.
Sample description:
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 2 Data

Type of sample: Undisturbed
Specific Gravity= 2.69 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.87	2.88	
Height change, in		0.02	
Height, in	5.99	5.97	
Weight, grams	1232.2		
Water volume change, cc		-12.03	
Moisture, %	28.1	29.3	23.5
Dry density, pcf	94.5	93.9	
Saturation, %	97.1	100.0	
Void ratio	0.778	0.789	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 150 psi
Consolidation back pressure = 30 psi
Consolidation effective confining stress = 17.28 ksf
Peak deviator stress = 53.21 ksf at reading no. 14
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	17.28	17.28	1.00	17.28	0.00
1	0.0200	0.020	279.00	279.0	0.3	6.13	17.28	23.41	1.35	20.34	3.06
2	0.0400	0.040	540.00	540.0	0.7	11.82	17.28	29.10	1.68	23.19	5.91
3	0.0800	0.080	972.00	972.0	1.3	21.13	17.28	38.41	2.22	27.84	10.56
4	0.1100	0.110	1212.00	1212.0	1.8	26.21	17.28	43.49	2.52	30.38	13.10
	0.1500	0.150	1428.00	1428.0	2.5	30.67	17.28	47.95	2.77	32.61	15.33

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	.2000	0.200	1632.00	1632.0	3.3	34.75	17.28	52.03	3.01	34.65	17.37
	0.2500	0.250	1800.00	1800.0	4.2	37.99	17.28	55.27	3.20	36.28	19.00
	0.3500	0.350	2040.00	2040.0	5.9	42.31	17.28	59.59	3.45	38.43	21.15
9	0.4500	0.450	2235.00	2235.0	7.5	45.53	17.28	62.81	3.63	40.04	22.76
10	0.4500	0.450	2235.00	2235.0	7.5	45.53	17.28	62.81	3.63	40.04	22.76
11	0.5600	0.560	2400.00	2400.0	9.4	47.92	17.28	65.20	3.77	41.24	23.96
12	0.6800	0.680	2560.00	2560.0	11.4	49.98	17.28	67.26	3.89	42.27	24.99
13	0.7900	0.790	2670.00	2670.0	13.2	51.04	17.28	68.32	3.95	42.80	25.52
14	0.9000	0.900	2745.00	2745.0	15.1	51.36	17.28	68.64	3.97	42.96	25.68

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

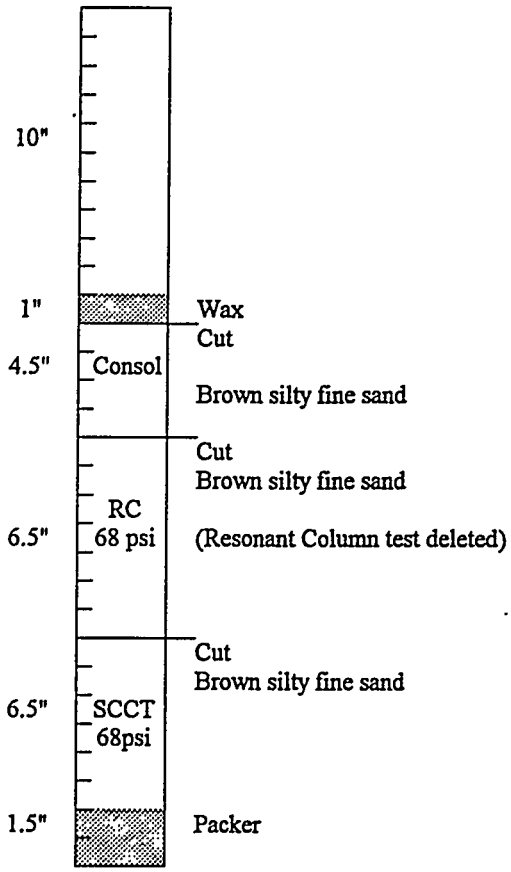
Project: SRS-ITP GEOTECHNICAL TESTING Date: 09-21-93

Boring No: H-Bor-2 Sample No: ST-5 Depth: 120'-122'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION

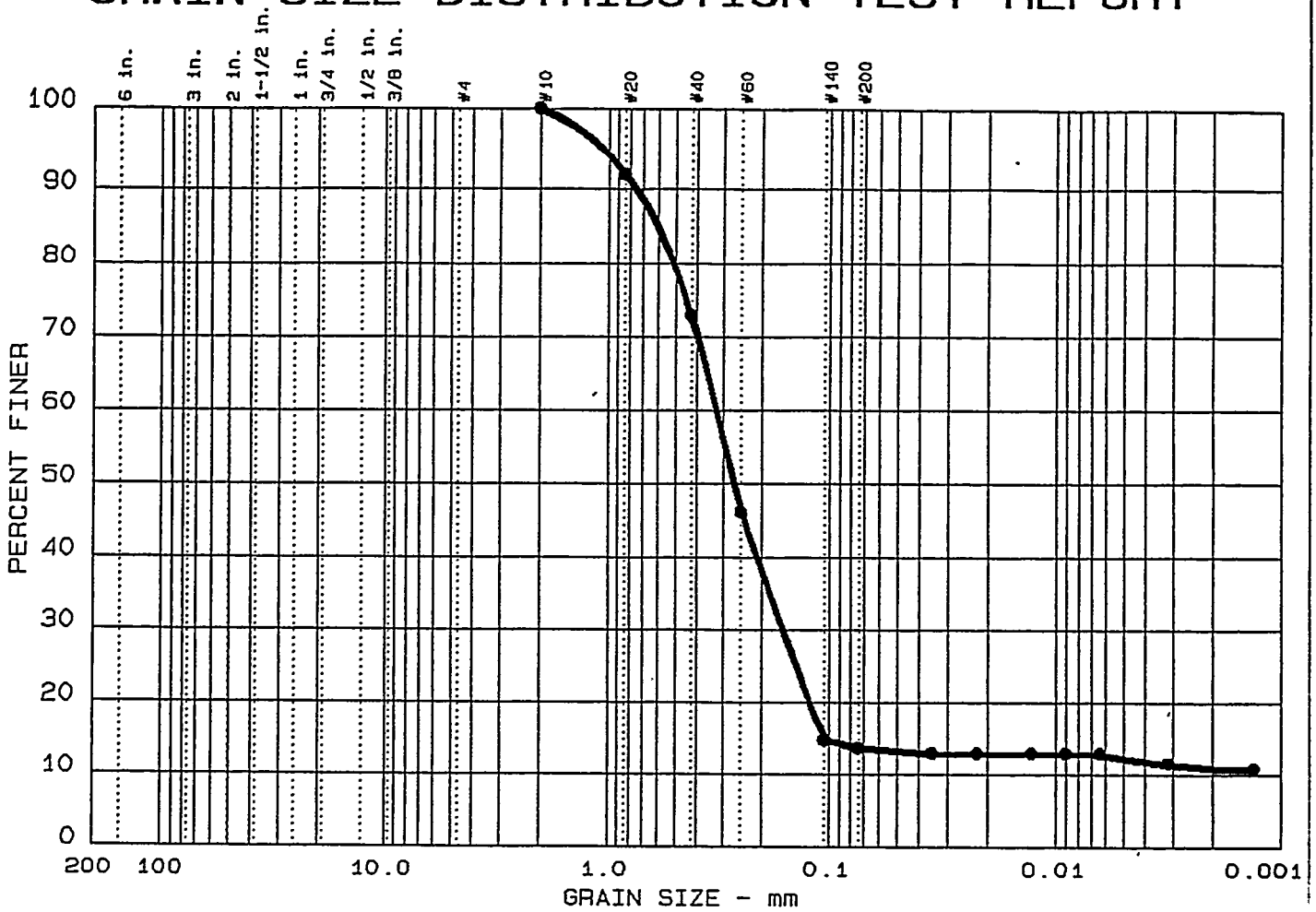


Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b2-st5.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	12	0.0	0.0	86.4	1.4	12.2

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.60	0.32	0.27	0.159	0.1053			

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Brown Clayey Medium to Fine Sand		

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-2 ST-5 @ 120-122 Ft.

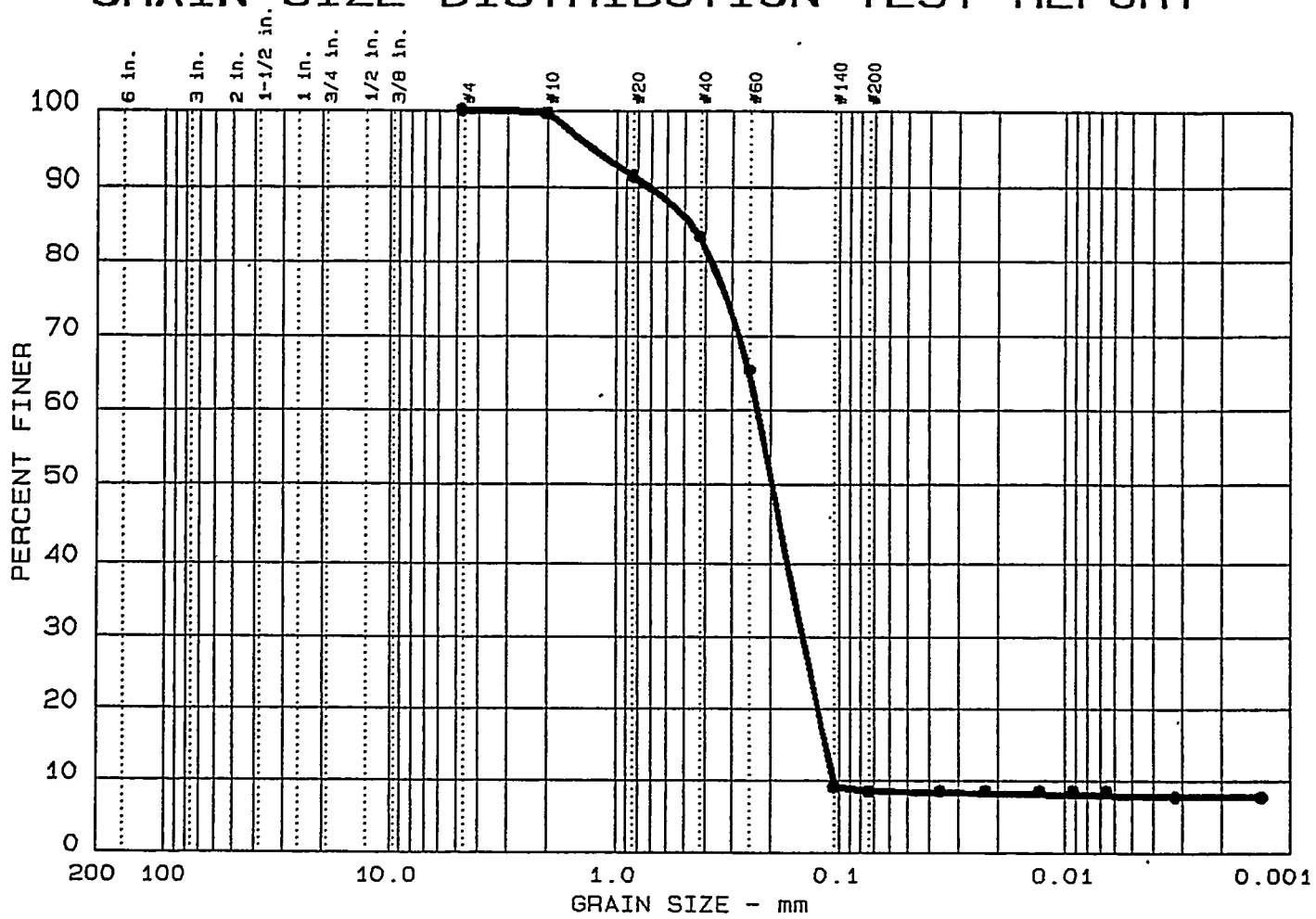
Date: October 1, 1993

Remarks:
Tested by: JLR Ckd by: RLB
RC-68 psi
Atterberg Limits -200
LL=80 PL=20 PI=60

GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	1	0.0	0.0	91.4	0.6	8.0

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	NL	NP	0.46	0.23	0.20	0.145	0.1148	0.1062	0.86	2.2

MATERIAL DESCRIPTION	USCS	AASHTO
● Brown Slightly Clayey Medium to Fine Sand	SP-SM	A-3

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-2 ST-5 @ 120-122 Ft.

Date: October 25, 1993

Remarks:

Tested By: JRR

Reviewed By: RLB

SCC-68 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-2
Test Date:	9/21/93-10/12/93	Sample No.:	ST-5
Reviewed By:	JW/RLB RLB	Depth:	120 - 122 ft
Review Date:	12/30/93	Sample Description:	See classification data

SPECIMEN DATA

Initial Conditions of Specimen

Diameters, in.		Area , sq. in.	6.46
Top	2.894	Volume, cubic in.	38.16
Middle	2.892	Mass of Specimen, grams	1158.90
Bottom	2.890		
Average	2.892	Moisture Content	
Membrane Thickness, in.	0.012	Pan No.	K-9
Net Diameter, in.	2.868	Wet Mass + Pan, grams	1210.95
		Dry Mass + Pan, grams	1007.16
Length, in.		Container Mass, grams	52.05
Location 1	8.555	Moisture Content, %	21.3
Location 2	8.560		
Location 3	8.558	Density, pcf	115.4
Average	8.558	Dry Density, pcf	95.1
Length of Top Platen	1.395	Specific Gravity	2.73
Length of Bottom Platen	1.255	Degree of Saturation, %	73.7
Length of Specimen, in	5.908	Void Ratio	0.791

Conditions of Specimen After Saturation and Consolidation

After Saturation		After Consolidation	
Change in Length, in.	0.000	Change in Length, in.	0.036
Length, in.	5.908	Length, in.	5.872
Area, sq. in.	6.46	Change in Volume, cc	9.45
Volume, cubic in.	38.16	Volume, cubic in.	37.59
Back Pressure, psi	50.0	Area, sq. in.	6.40
B Value	0.28	Effe. Consoli.. Stress, psi	68.0
		Moisture Content, %	28.0
		Dry Density, pcf	96.6
		Void Ratio	0.764
		Degree of Saturation, %	100.0

WORKING COPY DATE _____

CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

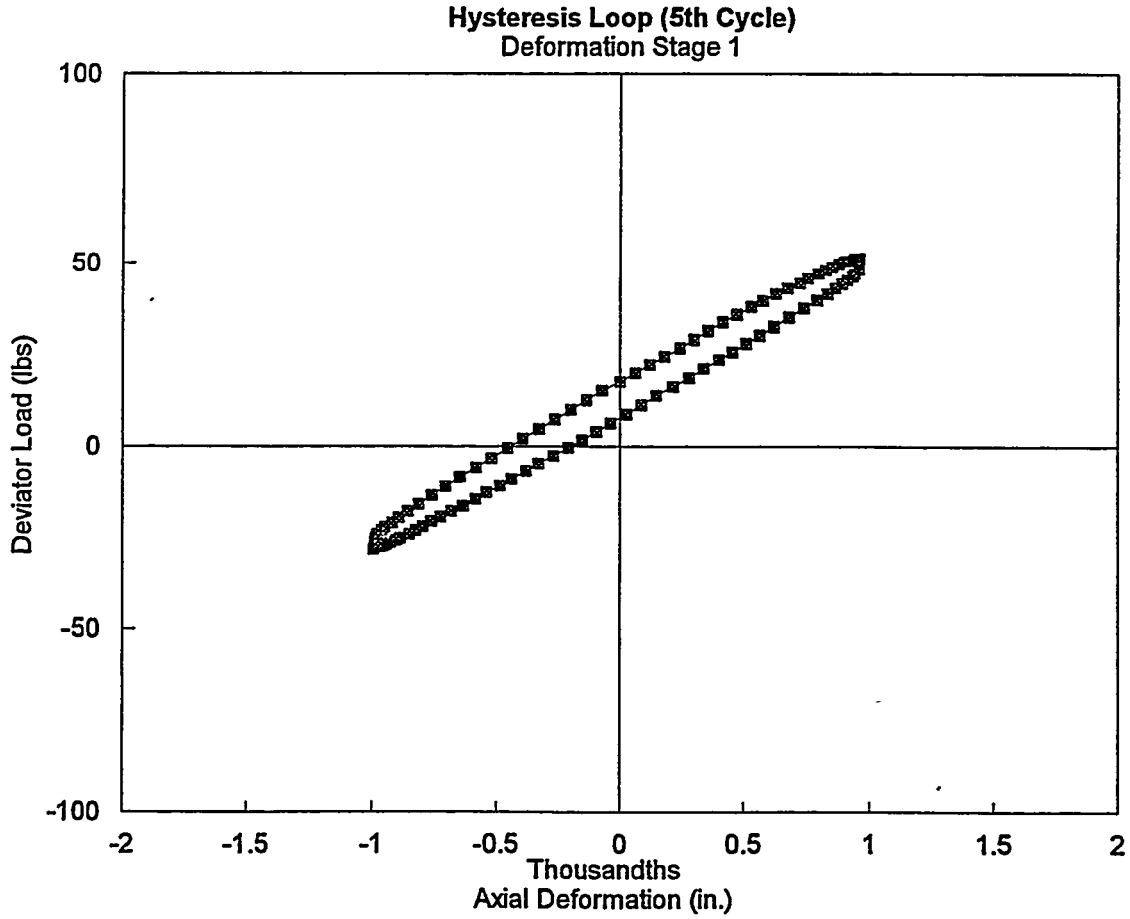
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-2
Test Date:	9/21/93-10/12/93	Sample No.:	ST-5
Reviewed By:	JW/RLB RLB	Depth:	120 - 122 ft
Review Date:	12/30/93	Sample Description:	See classification data

Area, A_c, in²	6.40		Effective Consolidation Stress, psi	68.0
Length, H_c, in.	5.87		Cyclic Load, P_c, lbs	39.81
			Cyclic Deviator Stress, psi	6.2

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
79.6	0.0020	37388	0.017

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
0.016	0.019	6.6



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

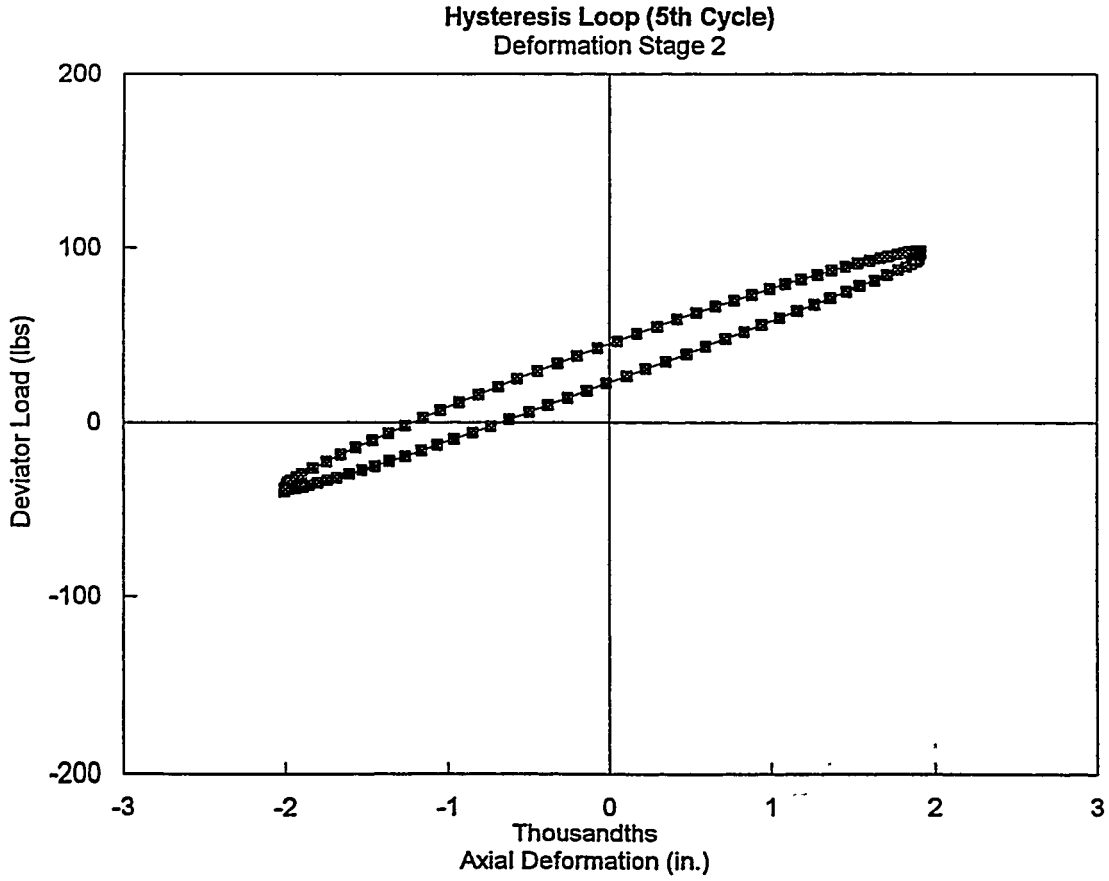
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-2
Test Date:	9/21/93-10/12/93	Sample No.:	ST-5
Reviewed By:	JW/RLB RLB	Depth:	120 - 122 ft
Review Date:	12/30/93	Sample Description:	See classification data

Area, A_c, in²	6.40		Effective Consolidation Stress, psi	68.0
Length, H_c, in.	5.87		Cyclic Load, P_c, lbs	69.01
			Cyclic Deviator Stress, psi	10.8

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
138.0	0.0039	32253	0.033

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
0.071	0.068	8.4



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

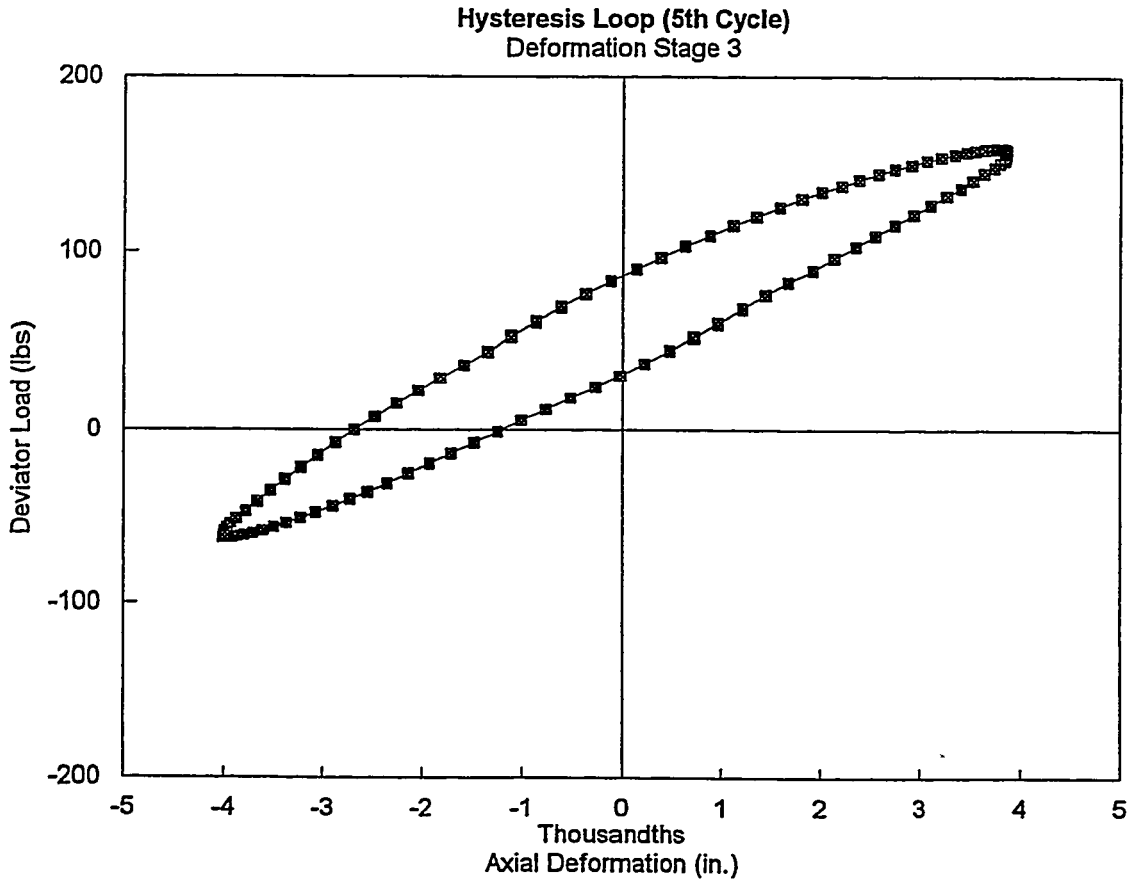
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-2
Test Date:	9/21/93-10/12/93	Sample No.:	ST-5
Reviewed By:	JW/RLB RLB	Depth:	120 - 122 ft
Review Date:	12/30/93	Sample Description:	See classification data

Area, A_c, in²	6.40		Effective Consolidation Stress, psi	68.0
Length, H_c, in.	5.87		Cyclic Load, P_c, lbs	110.49
			Cyclic Deviator Stress, psi	17.3

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
221.0	0.0079	25742	0.067

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
0.319	0.217	11.7



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

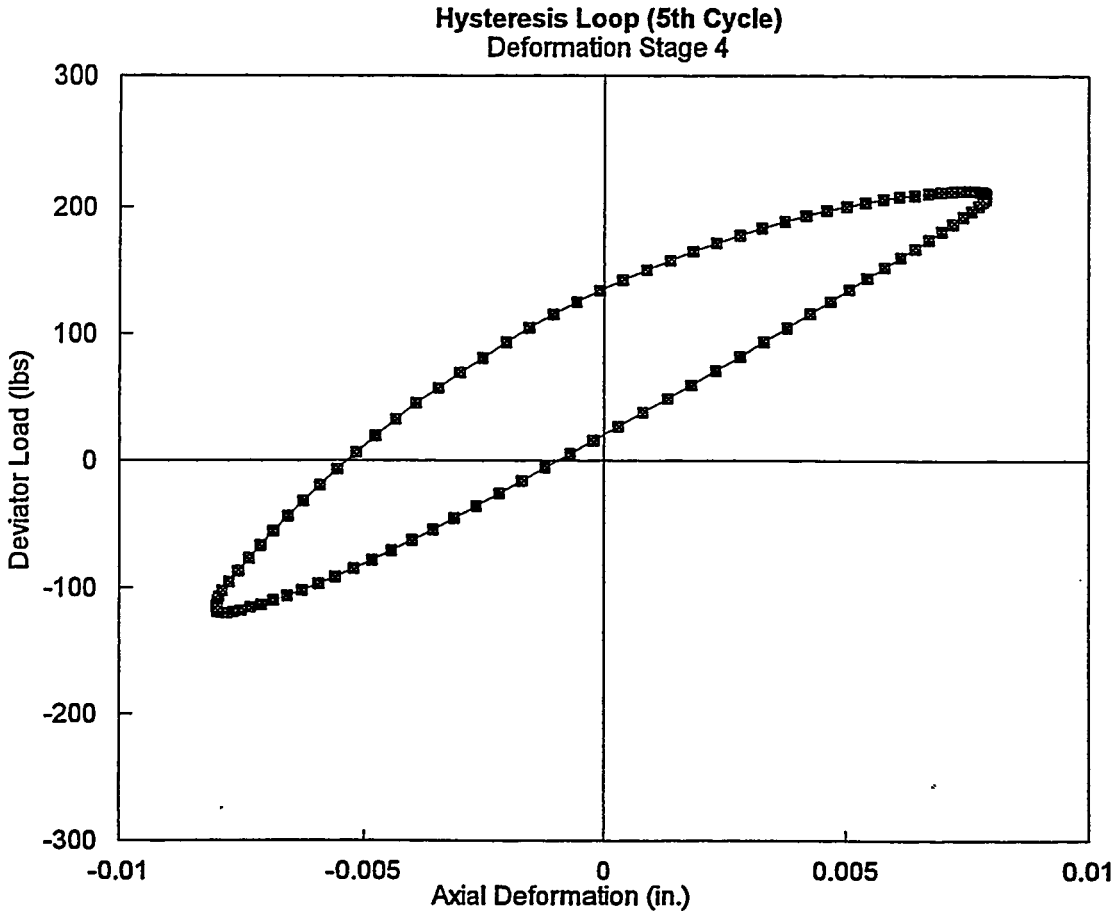
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-2
Test Date:	9/21/93-10/12/93	Sample No.:	ST-5
Reviewed By:	JW/RLB RLB	Depth:	120 - 122 ft
Review Date:	12/30/93	Sample Description:	See classification data

Area, A_c, in²	6.40		Effective Consolidation Stress, psi	68.0
Length, H_c, in.	5.87		Cyclic Load, P_c, lbs	166.52
			Cyclic Deviator Stress, psi	26.0

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
333.0	0.0159	19196	0.136

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
1.295	0.662	15.6



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

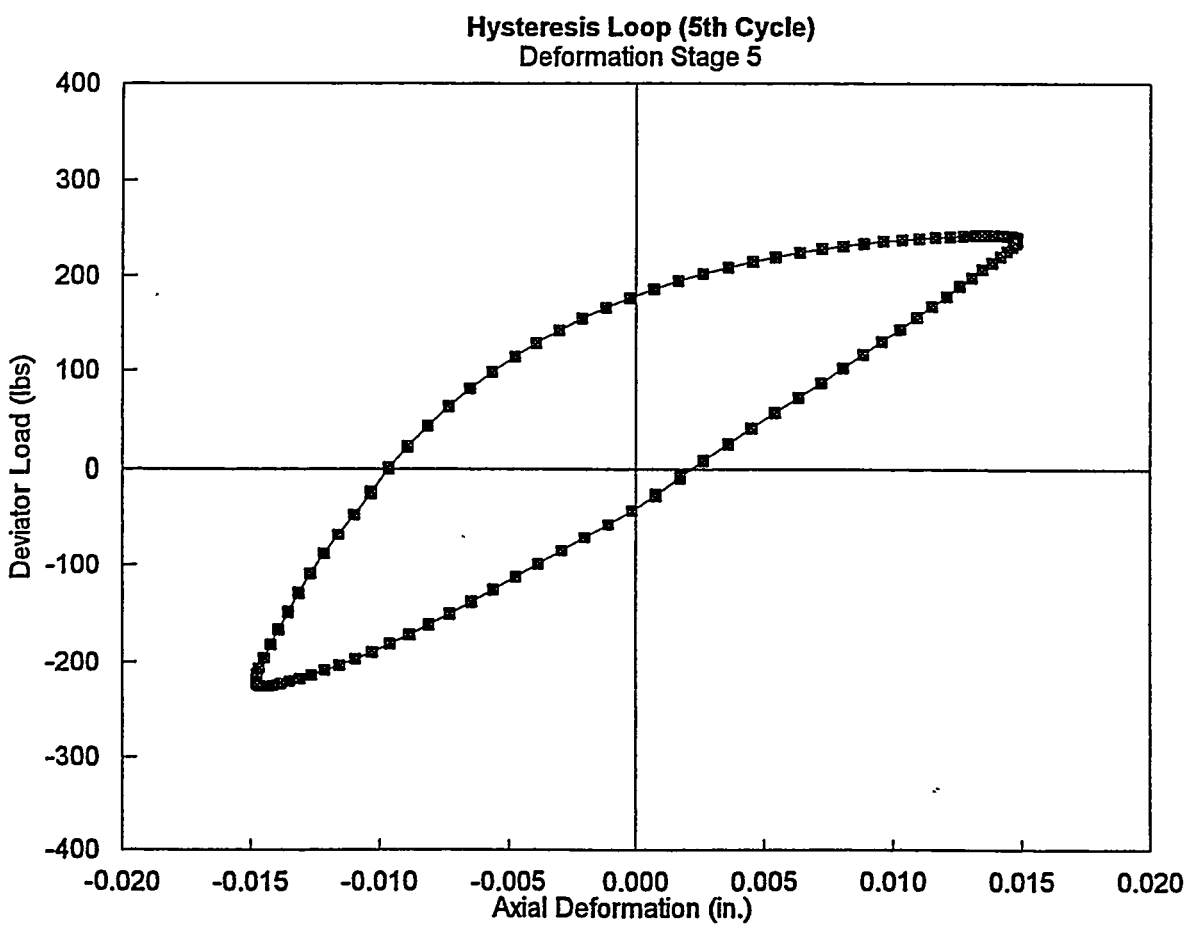
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-2
Test Date:	9/21/93-10/12/93	Sample No.:	ST-5
Reviewed By:	JW/RLB RLB	Depth:	120 - 122 ft
Review Date:	12/30/93	Sample Description:	See classification data

Area, A_c, in²	6.40		Effective Consolidation Stress, psi	68.0
Length, H_c, in.	5.87		Cyclic Load, P_c, lbs	233.99
			Cyclic Deviator Stress, psi	36.6

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
468.0	0.0296	14490	0.252

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
4.564	1.733	21.0



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

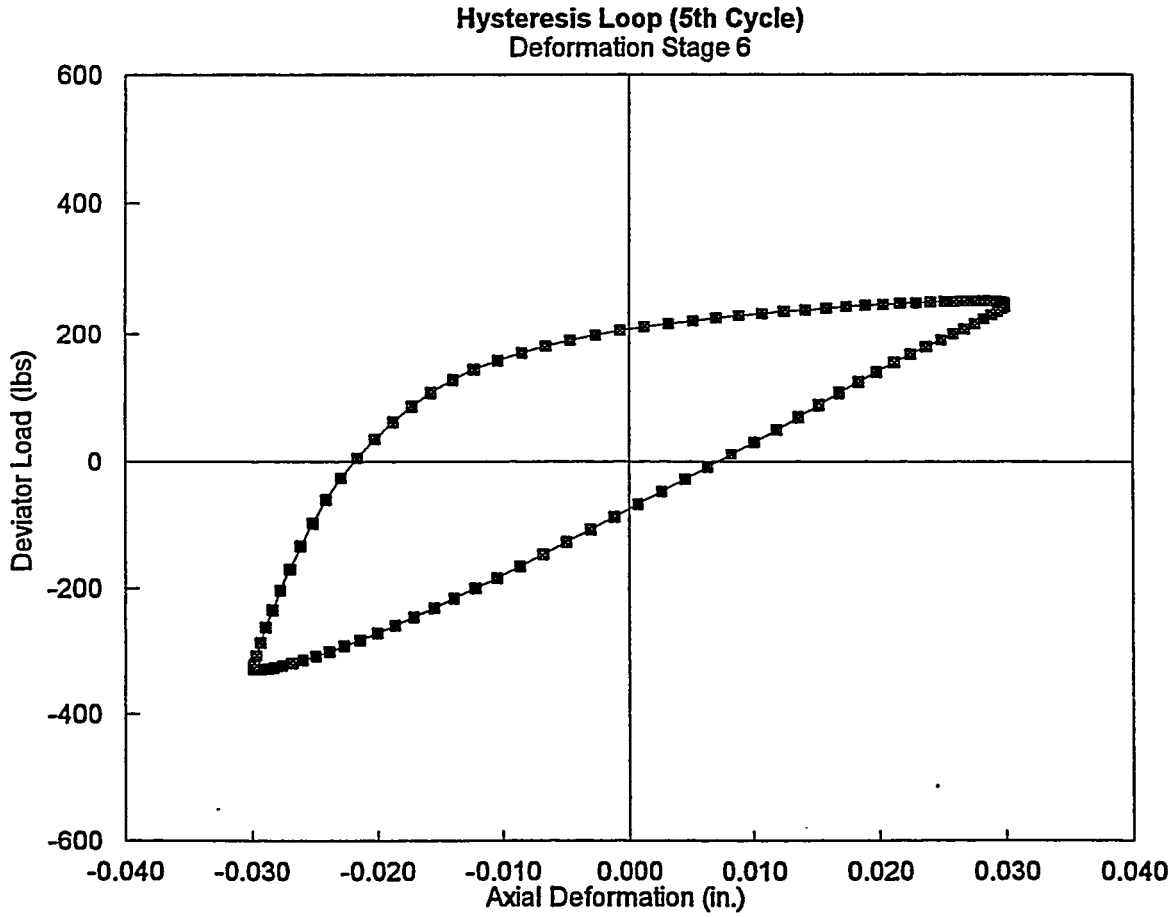
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-2
Test Date:	9/21/93-10/12/93	Sample No.:	ST-5
Reviewed By:	JW/RLB RLB	Depth:	120 - 122 ft
Review Date:	12/30/93	Sample Description:	See classification data

Area, A_c, in²	6.40		Effective Consolidation Stress, psi	68.0
Length, H_c, in.	5.87		Cyclic Load, P_c, lbs	291.87
			Cyclic Deviator Stress, psi	45.6

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
583.7	0.0598	8954	0.509

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
13.273	4.363	24.2



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

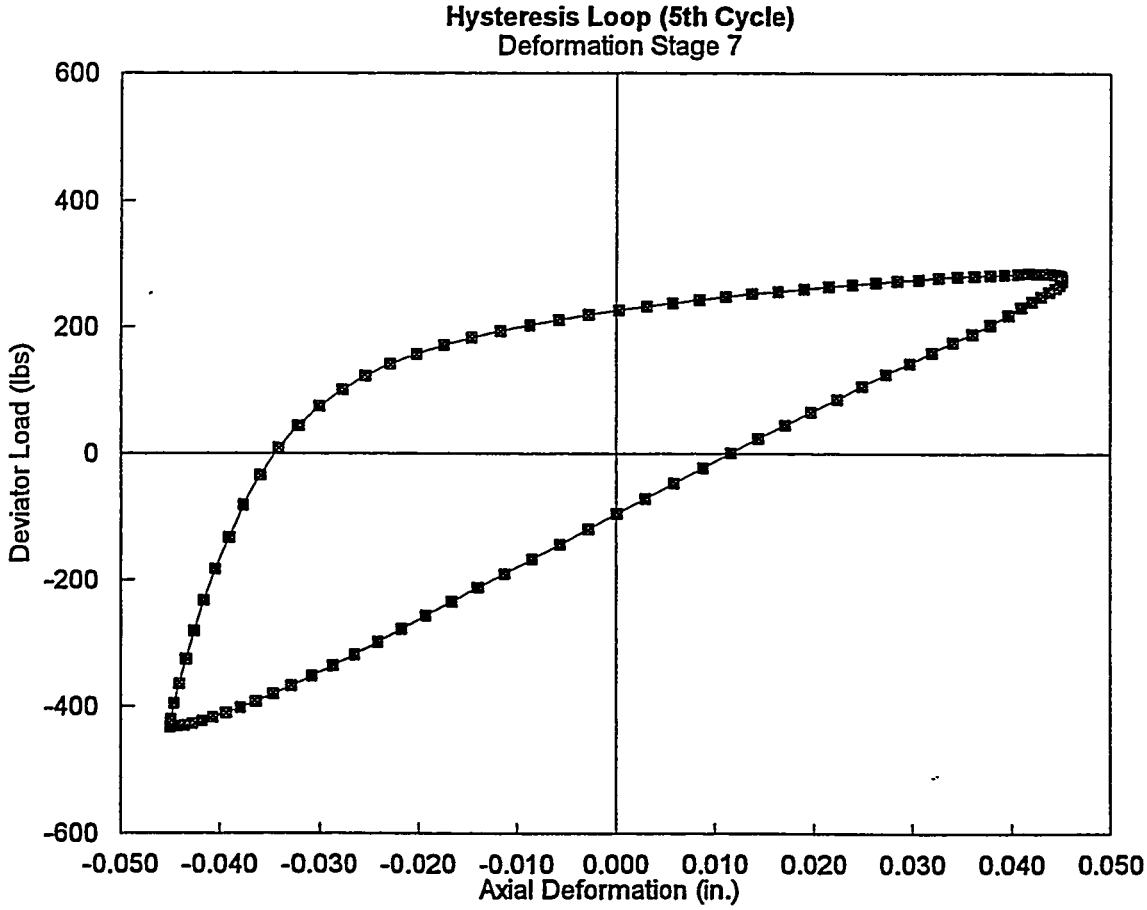
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-2
Test Date:	9/21/93-10/12/93	Sample No.:	ST-5
Reviewed By:	JW/RLB RLB	Depth:	120 - 122 ft
Review Date:	12/30/93	Sample Description:	See classification data

Area, A_c, in²	6.40		Effective Consolidation Stress, psi	68.0
Length, Hc, in.	5.87		Cyclic Load, P_c, lbs	358.95
			Cyclic Deviator Stress, psi	56.1

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
717.9	0.0901	7311	0.767

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
24.530	8.083	24.2



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

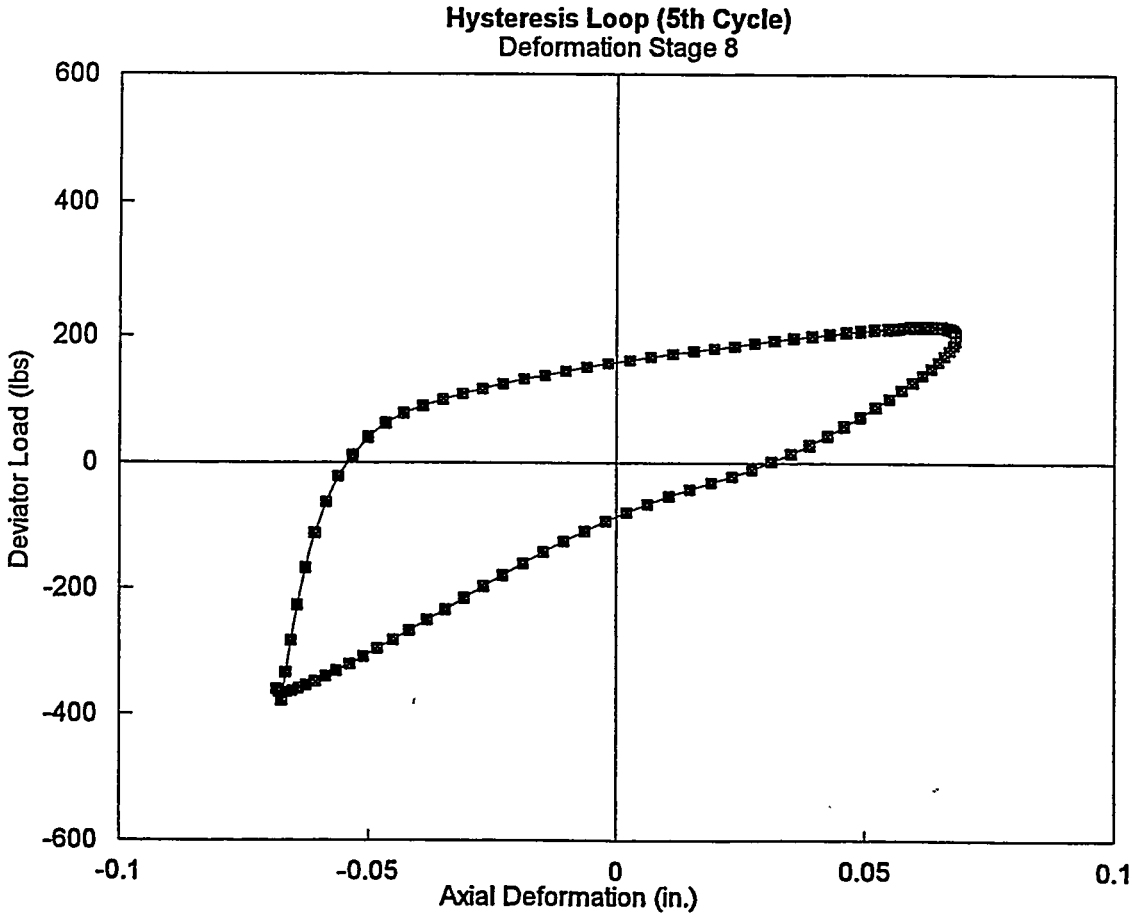
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-2
Test Date:	9/21/93-10/12/93	Sample No.:	ST-5
Reviewed By:	JW/RLB RLB	Depth:	120 - 122 ft
Review Date:	12/30/93	Sample Description:	See classification data

Area, A_c, in^2	6.40		Effective Consolidation Stress, psi	68.0
Length, H_c, in.	5.87		Cyclic Load, P_c, lbs	333.71
			Cyclic Deviator Stress, psi	52.1

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
667.4	0.1365	4484	1.163

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
37.013	11.390	25.9



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

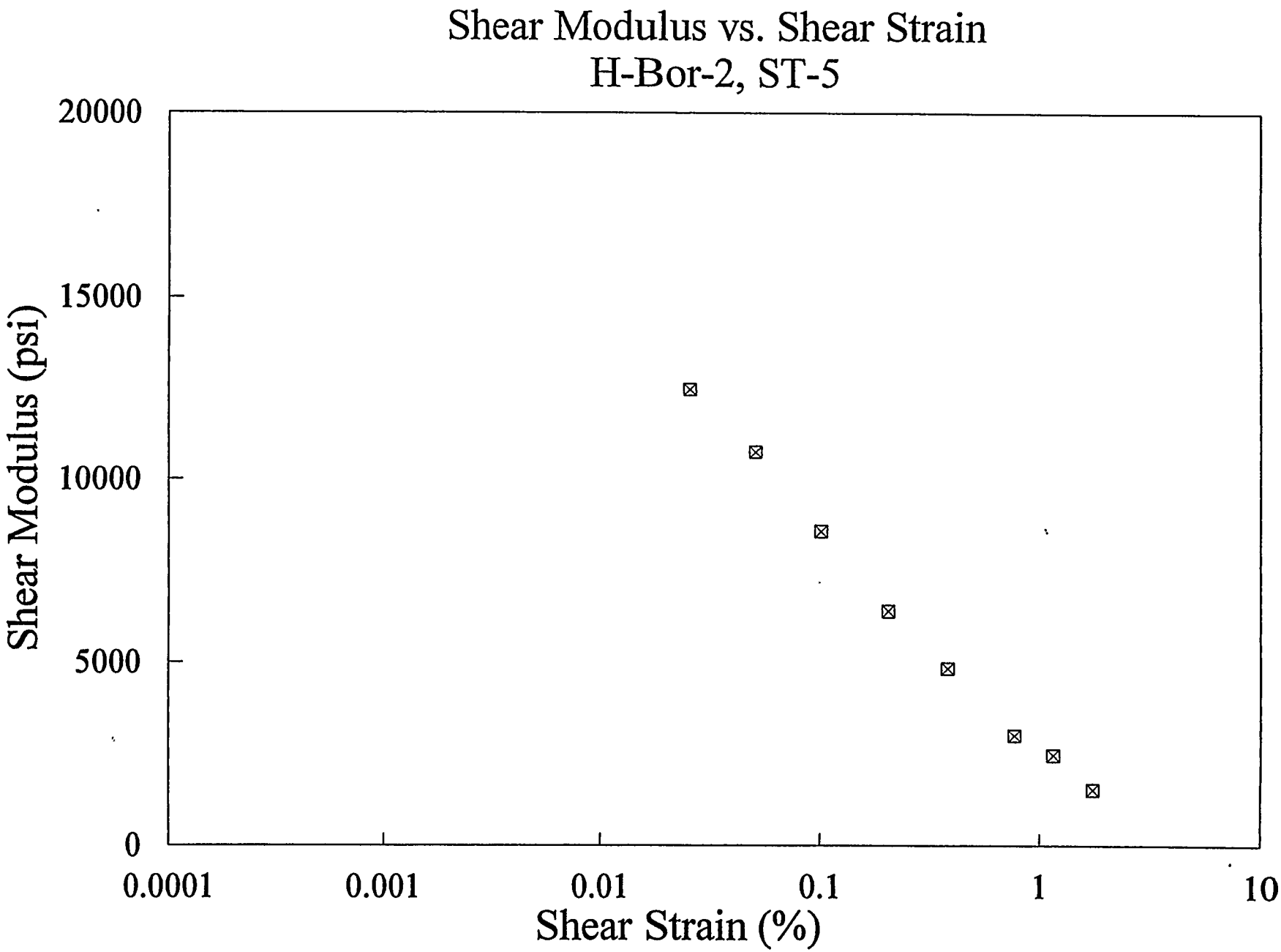
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-2
Test Date:	9/21/93-10/12/93	Sample No.:	ST-5
Reviewed By:	JW/RLB RLB	Depth:	120 - 122 ft
Review Date:	12/30/93	Sample Description:	See classification data

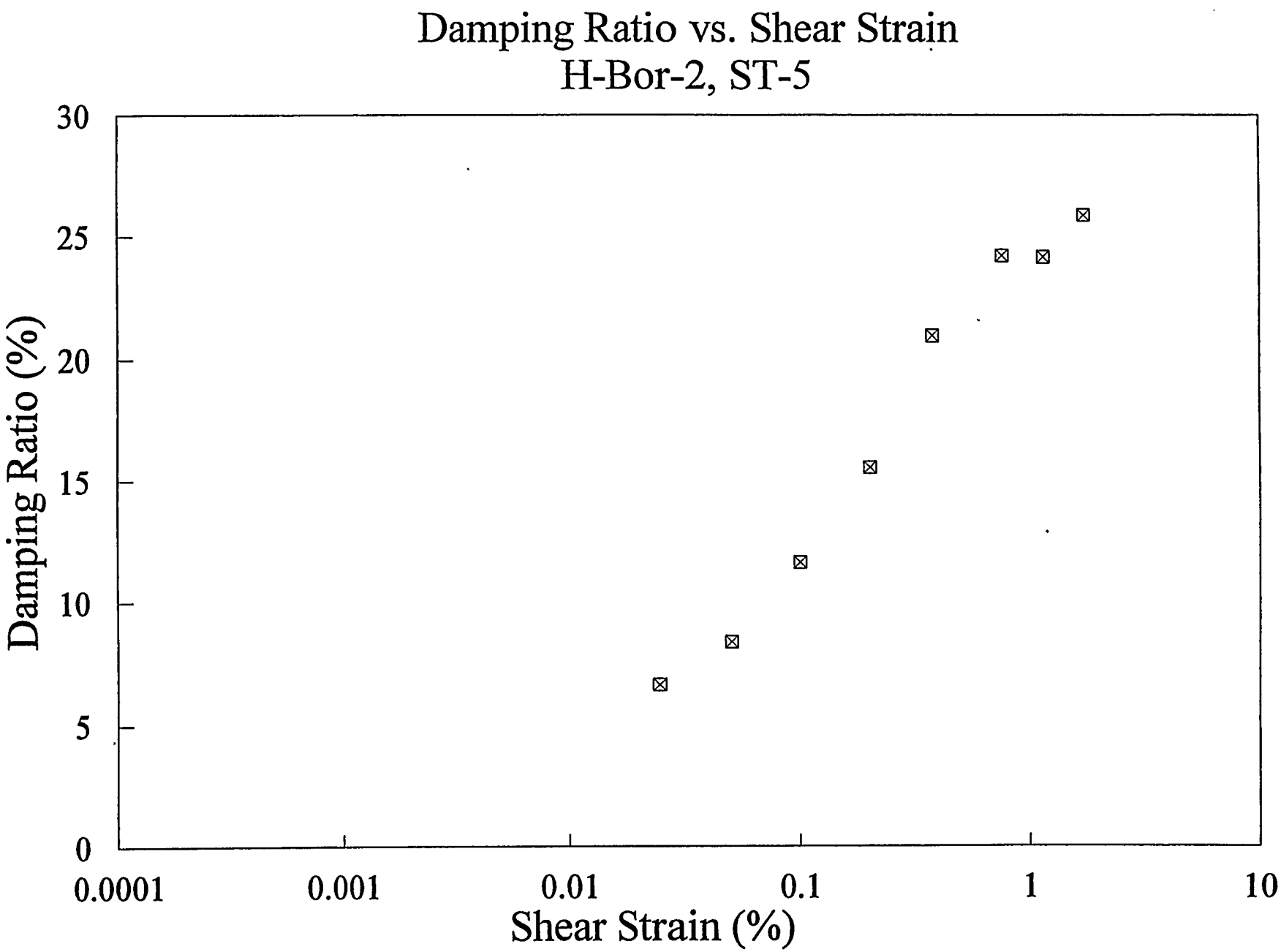
Effective Consolidation Stress 68 psi

Deformation Stage No.	Cyclic Stress (psi)	Axial Strain ε (%)	Young's Modulus E, (psi)	Damping Ratio D, (%)	Shear* Modulus G, (psi)	Shear* Strain γ (%)
1	6.2	0.017	37388	6.64	12463	0.025
2	10.8	0.033	32253	8.38	10751	0.050
3	17.3	0.067	25742	11.66	8581	0.101
4	26.0	0.136	19196	15.56	6399	0.203
5	36.6	0.252	14490	20.96	4830	0.378
6	45.6	0.509	8954	24.21	2985	0.764
7	56.1	0.767	7311	24.15	2437	1.150
8	52.1	1.163	4484	25.86	1495	1.744

* Calculated based on assumed Poisson's Ratio value, 0.5.
All calculations are based on 5th cycle.

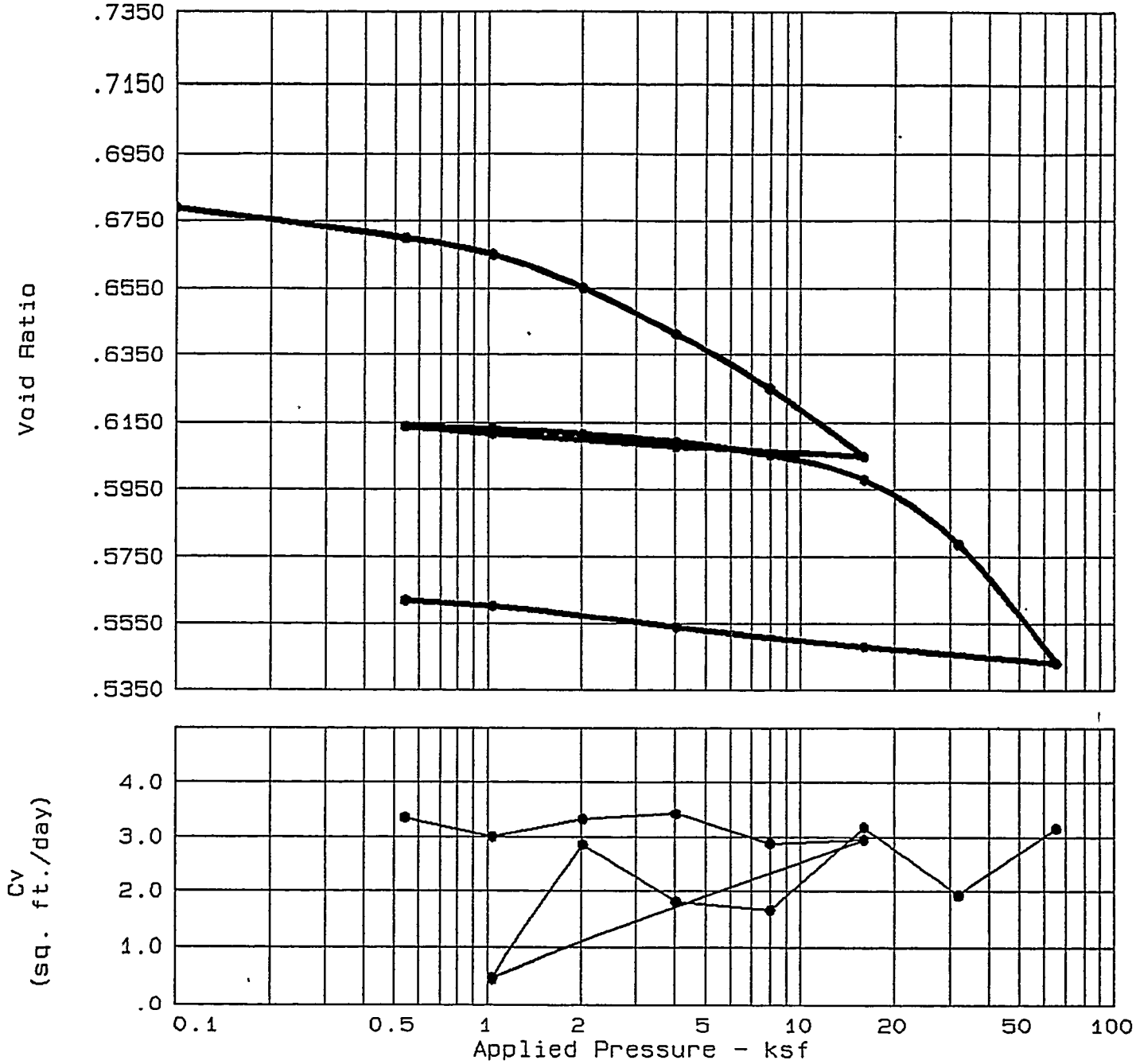


Law Engineering Project No.: 5810535301
SRS-ITP: Strain Controlled Cyclic Triaxial



Law Engineering Project No: 5810535301
SRS-ITP: Strain Controlled Cyclic Triaxial

CONSOLIDATION TEST REPORT



Swell press.	Nat. Sat.	Nat. Moist.	Dry Density	LL	PI	Sp.Gr.	Initial void ratio
	95.4 %	24.1	100.0	NL	NP	2.69	0.6798

TEST RESULTS	MATERIAL DESCRIPTION
	Brown Slightly Clayey Medium to Fine Sand Class: SP-SM
Project No.: 581.535301 Project: SRS-ITP Location: H-Bor-2 ST-5 @ 120'-122' Date: Oct 22, 1993	Remarks: Tested By: CLG Reviewed By: RLB
CONSOLIDATION TEST REPORT LAW ENGINEERING, INC.	Fig. No._____

17:07, 10-22-1993 CONSOLIDATION TEST PROJECT DATA Test No. 26

roject Number:	581.535301
.roject:	SRS-ITP
Date:	Oct 22,1993
Location 1:	H-Bor-2 ST-5 @ 120'-122'
2:	
Remarks 1:	Tested By:
2:	Reviewed By:
3:	
4:	
5:	
Material 1:	
description 2:	
Classification:	
Liquid limit:	
Plasticity index:	
Figure Number:	

CONSOLIDATION TEST SPECIMEN DATA

TOTAL SAMPLE	BEFORE TEST	AFTER TEST
Wet w+t = 344.44 g.	Oedometer No. = 14	Wet w+t = 342.50 g.
Dry w+t = 321.08 g	Machine No. = 14	Dry w+t = 321.08 g.
Tare wt. = 224.21 g.	Spec. Gravity = 2.69	Tare wt. = 224.21 g.
"-ight = 0.75 in.	Height = 0.75 in.	
.meter = 2.50 in.	Diameter = 2.50 in.	
Weight = 120.23 g.		
Moisture = 24.1 %	Ht. Solids = 0.45 in.	Moisture = 22.1 %
Wet Den. = 124.1 pcf	Dry wt. = 96.79 g. *	Dry wt. = 96.87 g.
Dry Den. = 100.0 pcf	Void ratio = 0.6798	Void ratio = 0.5621
	Saturation = 95.4 %	Saturation = 105. %

* Initial dry weight used in calculations

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
Initial	0.02000			0.6798	
0.10	0.02050	0.0000	0.02050	0.6787	0.1 Comprs.
0.54	0.02450	0.0000	0.02450	0.6697	0.6 Comprs.
1.04	0.02725	0.0006	0.02665	0.6649	0.9 Comprs.
2.04	0.03250	0.0014	0.03110	0.6550	1.5 Comprs.
4.04	0.03990	0.0026	0.03730	0.6411	2.3 Comprs.
8.04	0.04840	0.0038	0.04460	0.6248	3.3 Comprs.
16.03	0.05830	0.0047	0.05360	0.6047	4.5 Comprs.
4.04	0.05480	0.0026	0.05220	0.6079	4.3 Comprs.
1.04	0.05120	0.0006	0.05060	0.6114	4.1 Comprs.

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
0.54	0.04960	0.0000	0.04960	0.6137	3.9 Comprs.
1.04	0.05050	0.0006	0.04990	0.6130	4.0 Comprs.
2.04	0.05200	0.0014	0.05060	0.6114	4.1 Comprs.
4.04	0.05420	0.0026	0.05160	0.6092	4.2 Comprs.
8.04	0.05715	0.0038	0.05335	0.6053	4.4 Comprs.
16.03	0.06140	0.0047	0.05670	0.5978	4.9 Comprs.
32.03	0.07105	0.0058	0.06525	0.5787	6.0 Comprs.
65.59	0.08930	0.0081	0.08120	0.5431	8.1 Comprs.
16.03	0.08370	0.0047	0.07900	0.5480	7.8 Comprs.
4.04	0.07900	0.0026	0.07640	0.5538	7.5 Comprs.
1.04	0.07410	0.0006	0.07350	0.5603	7.1 Comprs.
0.54	0.07270	0.0000	0.07270	0.5621	7.0 Comprs.

CONSOLIDATION TEST RESULTS

Compression index = NOT SELECTED
Preconsolidation pressure = NOT SELECTED

Load 0.54 ksf — CONSOLIDATION TEST READINGS — Load No. 2

Machine Deflection 0.0000

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.02050	11	60.00	0.02445
2	0.10	0.02370	12	120.00	0.02450
3	0.25	0.02390			
4	0.50	0.02395			
5	1.00	0.02400			
6	2.00	0.02410			
7	4.00	0.02410			
8	8.00	0.02420			
9	15.00	0.02430			
10	30.00	0.02435			

Void Ratio: 0.6697 Compression: 0.6 %
D0 = 0.0234 D90 = 0.0239 D100 = 0.0240 T90 = 0.36 min.
Cv @ 0.4 min.= 3.34 sq. feet/day

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

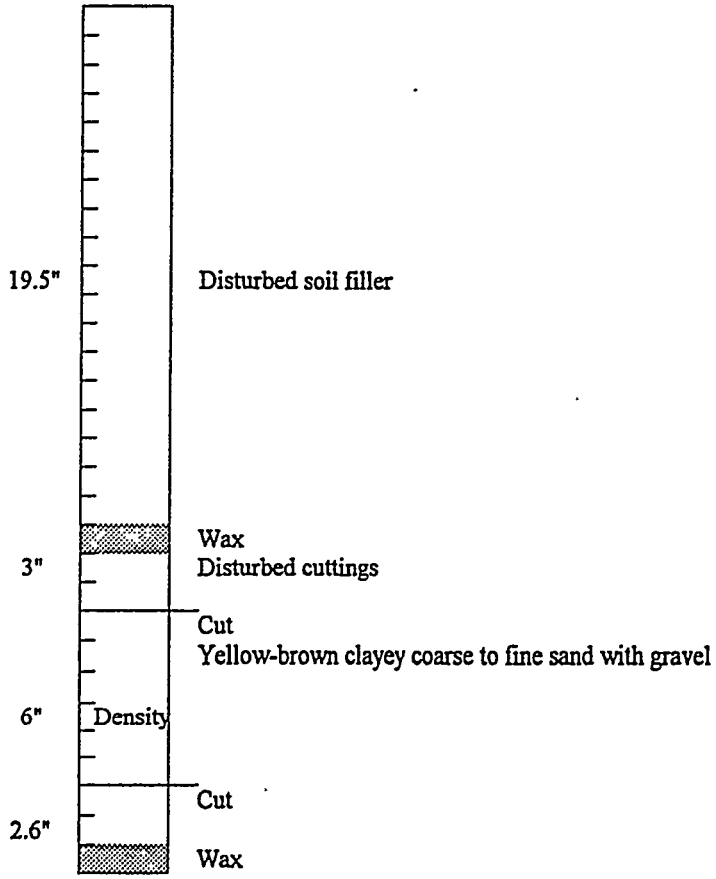
Project: SRS-ITP GEOTECHNICAL TESTING Date: 11-30-93

Boring No: H-Bor-2 Sample No: ST-6 Depth: 136'-136'10"

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: CLG Checked By: RLB

VISUAL DESCRIPTION



Remarks:

1028mf srs-itp-saif
7/22/93

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ATTACHMENT 3

Tested by:	JTK	Reviewed by:	RLB	Law Job No.	5810535301
Date:	11/30/93	Date:	12/13/93	Job Name	SRS - ITP

TP-4A: UNIT WEIGHT OF SAMPLE
"TYPICAL"

Sample: Boring No.: H-Bor-2
Depth: 136' - 136'16"
Sample ID: ST-6

MEASUREMENTS (Nominal 6-inch cut sample height):

TOTAL SAMPLE HEIGHT (inches)		INSIDE DIAMETER OF CUT TUBE (inches)	
1	6.097		
2	6.068	top	2.771
3	6.133	bottom	2.854
Avg.	6.099 (H)	Avg.	2.813 (D)

MOISTURE CONTENT DETERMINATION

MOISTURE CONTENT	
Tare No.	R-15
Tare Weight	15.70 gm
Wet Wt. + Tare	129.10 gm
Dry Wt. + Tare	102.22 gm
Wt. of Water	26.88 gm
Dry Weight	86.52 gm
Moisture Content, w	31.1 %

TOTAL WEIGHT OF SOIL + TUBE SECTION	W_{s+t} =	1743.89 gm
WEIGHT OF CLEAN, DRY TUBE SECTION	W_t =	425.91 gm
WET WEIGHT OF SOIL, [(W_{s+t} - W_t)/454]	W_s =	2.903 lbs
VOLUME OF SAMPLE, [(pi*D²/4)*H/1728]	V =	0.022 ft³
WET DENSITY, [W_s/V]	**D_w=**	**132.4 pcf**
DRY DENSITY, [D_w/(1+w/100)]	**D_D=**	**101.0 pcf**

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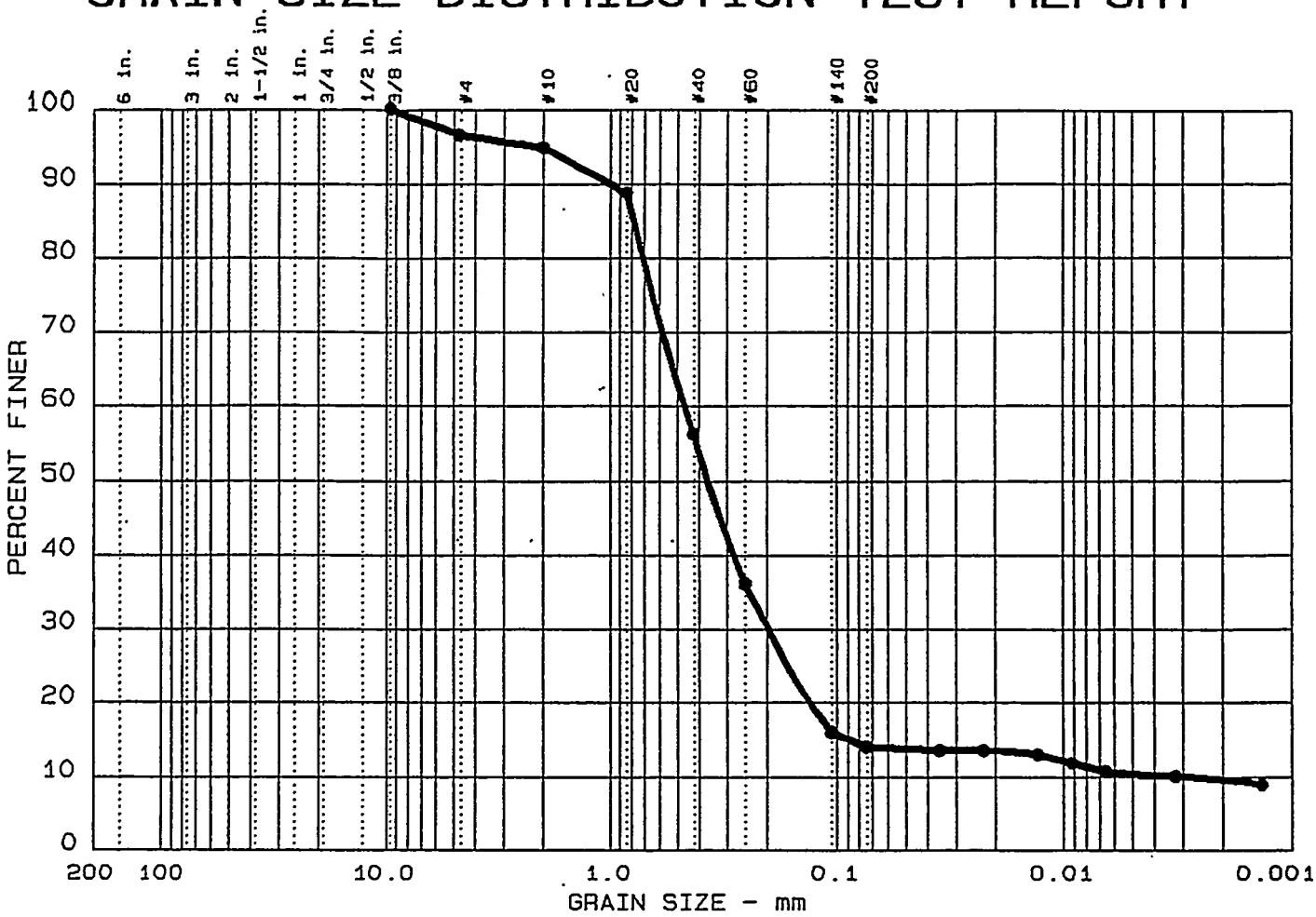
GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	7	0.0	3.5	82.4	3.8	10.3

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.78	0.46	0.37	0.198	0.0866	0.0025	33.73	182.8

MATERIAL DESCRIPTION	USCS	AASHTO
● Yellow Brown Clayey Sand		

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-2 ST-6 @ 136'-136'10"

Date: January 3, 1994

Remarks:

Tested by JTK Reviewed by: RLB

Sample Density

Atterberg Limits-#200

LL=149 PL=30 PI=119

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

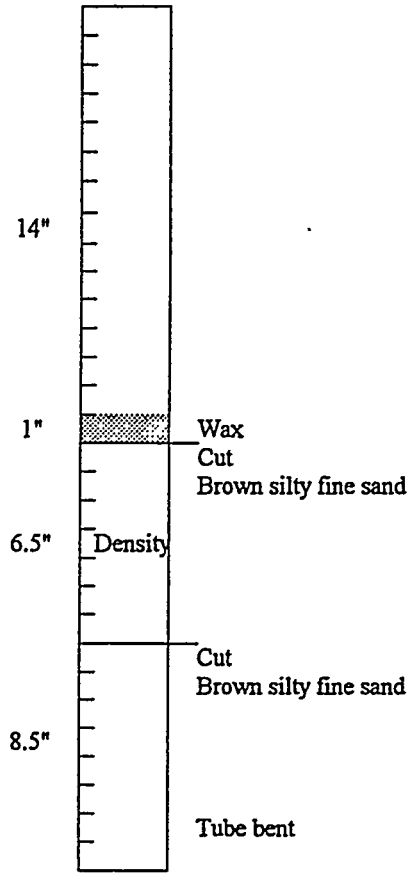
Project: SRS-ITP GEOTECHNICAL TESTING Date: 01-21-94

Boring No: H-Bor-2 Sample No: PS-7 Depth: 142'-143'6"

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION



Remarks:

1028mf srs-itp-saif
7/22/93

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ATTACHMENT 3

Tested by:	HEJ	Reviewed by:	RLB	Law Job No.	5810535301
Date:	01/21/94	Date:	01/24/94	Job Name	SRS - ITP

WORKING COPY DATE _____

TP-4A: UNIT WEIGHT OF SAMPLE
"TYPICAL"

Sample: Boring No.: H-Bor-2
Depth: 142' - 143'
Sample ID: PS-7

MEASUREMENTS (Nominal 6-inch cut sample height):

TOTAL SAMPLE HEIGHT (inches)		INSIDE DIAMETER OF CUT TUBE (inches)	
1	6.460		
2	6.460	top	2.880
3	6.460	bottom	2.890
Avg.	6.460 (H)	Avg.	2.885 (D)

MOISTURE CONTENT DETERMINATION

MOISTURE CONTENT	
Tare No.	AB-2
Tare Weight	85.25 gm
Wet Wt. + Tare	484.30 gm
Dry Wt. + Tare	419.24 gm
Wt. of Water	65.06 gm
Dry Weight	333.99 gm
Moisture Content, *w*	19.5 %

TOTAL WEIGHT OF SOIL + TUBE SECTION	W_{s+t} =	1834.1 gm
WEIGHT OF CLEAN, DRY TUBE SECTION	W_t =	439.6 gm
WET WEIGHT OF SOIL, $[(W_{s+t} - W_t)/454]$	W_s =	3.072 lbs
VOLUME OF SAMPLE, $[(pi*D^2/4)*H/1728]$	V =	0.024 ft^3
WET DENSITY, $[W_s/V]$	**D_w=**	**125.7 pcf**
DRY DENSITY, $[D_w/(1+w/100)]$	**D_D=**	**105.2 pcf**

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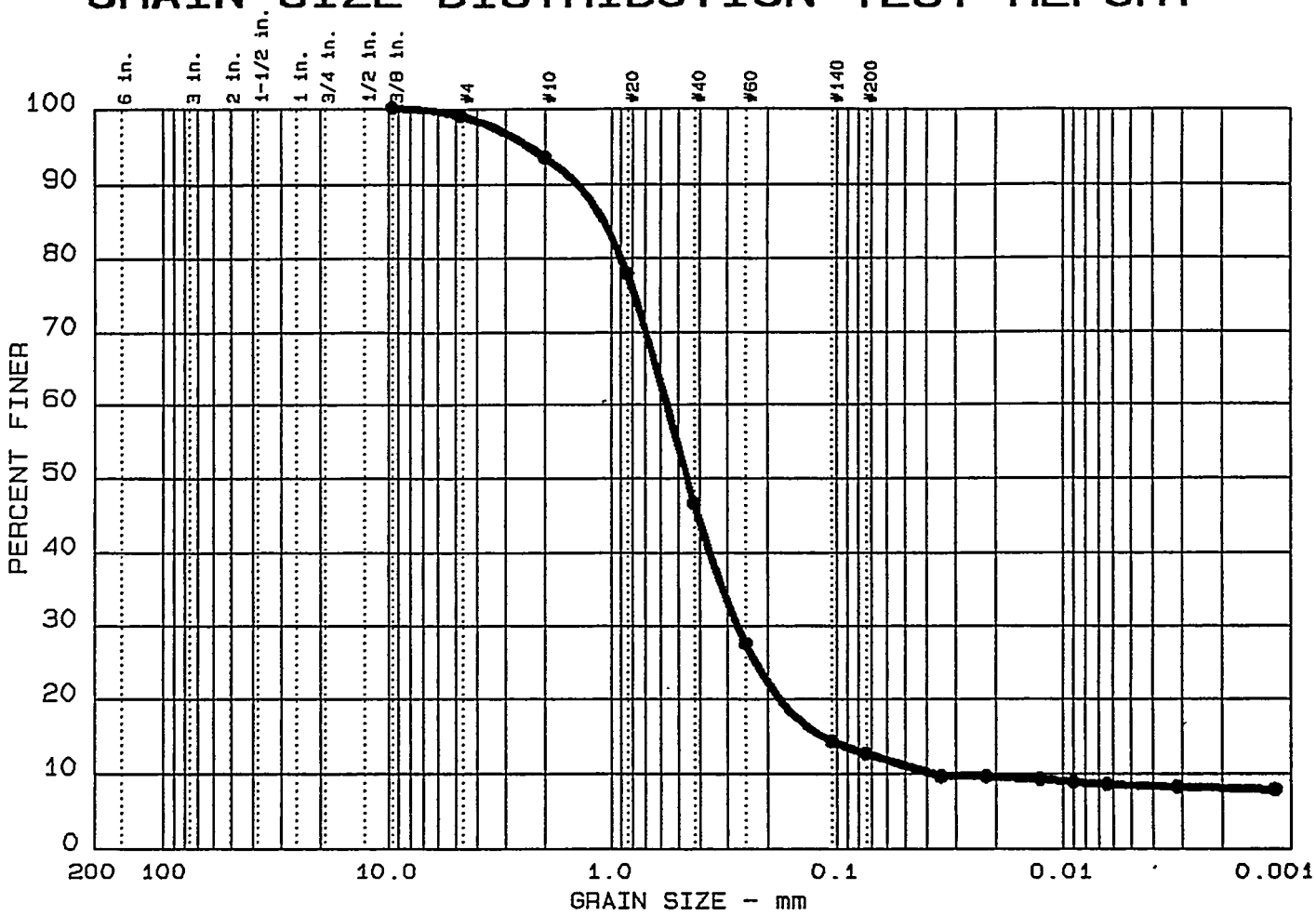
GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	15	0.0	1.0	86.4	4.1	8.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	55	39	1.07	0.56	0.45	0.272	0.1160	0.0367	3.63	15.2

MATERIAL DESCRIPTION	USCS	AASHTO
● Brown Clayey Sand	SC	A-2-7 (0.0)

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-2 PS-7 @ 142 Ft.

Date: January 19, 1994

Remarks:

Tested by: CLG

Reviewed by: RLB

Tube Density

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

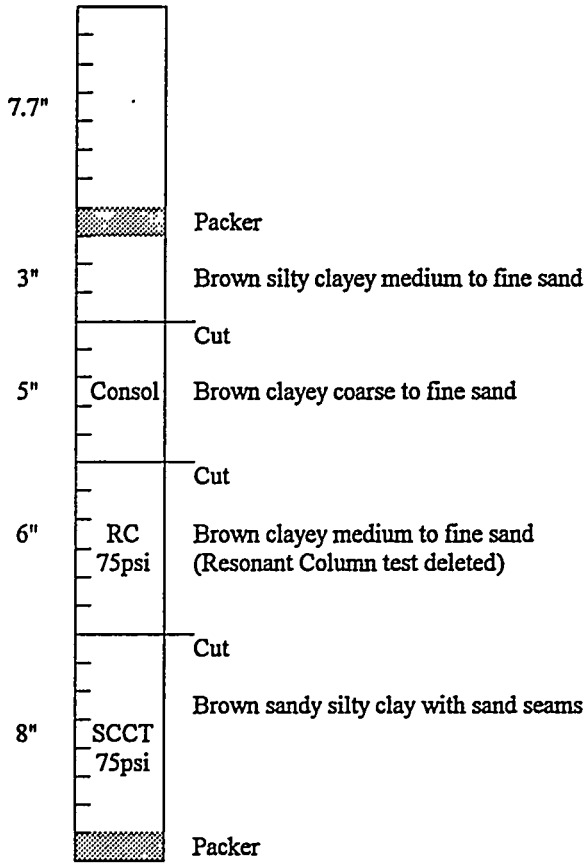
Project: SRS-ITP GEOTECHNICAL TESTING Date: 10-19-93

Boring No: H-Bor-2 Sample No: PS-8 Depth: 144'10" - 146'10"

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION



Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b2-ps8.wk3

ATTACHMENT 2

Tested by:	JRR	Reviewed by:	RLB	Law Job No.:	5810535301
Date:	09/14/93	Date:	09/14/93	Job Name:	SRS - ITP

TP-4A: UNIT WEIGHT OF THIN WALL TUBE SAMPLES.

"TYPICAL"

Sample: Boring No.: H-Bor-2
Depth: 144' 11"
Sample ID: PS-8

MEASUREMENTS (Entire Tube):

	FROM TOP OF TUBE PACKER (inches)	FROM TOP OF TUBE SOIL (inches)	FROM BOTTOM OF TUBE PACKER (inches)	FROM BOTTOM OF TUBE SOIL (inches)	TOTAL TUBE LENGTH (inches)	INSIDE DIAMETER OF TUBE (inches)
1.	7.30	7.64	0.80	1.28		
2.	7.32	7.65	0.70	1.41		
3.	7.42	7.73	0.78	1.29		
Avg.:	7.35 L_1 =	7.67	0.76 L_2 =	1.33	L_3 = 29.875 *	D_i = 2.888 *

TOTAL WEIGHT OF TUBE + PACKERS + SOIL	M_1 =	6,535.9	gm
WEIGHT OF PACKERS	M_2 =	153.3 *	gm
TOTAL WEIGHT OF TUBE	M_3 =	2,043.4 *	gm
WET WEIGHT OF SOIL COLUMN, [M_1 -M_2 -M_3]	M_4 =	4,339.2	gm

* *Denotes information supplied by WSRC/TO*

MOISTURE CONTENTS (From assigned tests of same tube):

MOISTURE CONTENT		
Specimen 1:	41.5	% moisture
Specimen 2:	20.6	% moisture
Specimen 3:	N/A	% moisture
Average, (w):	31.1	% moisture

Notations:

Specimen 1 moisture content obtained from Strain-Control Cyclic Triaxial test
Specimen 2 moisture content obtained from Resonant Column test
Specimen 3 moisture content obtained from N/A test

CALCULATIONS:

CROSS-SECTIONAL AREA OF TUBE, [pi*(D_i^2)/4]	A_o=	6.55	in.²
LENGTH OF SOIL COLUMN, [L_3 - L_2 - L_1]	L_s =	20.88	in.
VOLUME OF SOIL COLUMN, [L_s*A_o]	V_s =	136.74	in.³
WET DENSITY, [(M_4 /V_s)*3.810]	**D_w=**	**120.9**	**pcf**
DRY DENSITY, [D_w/(1+w/100)]	**D_D=**	**92.3**	**pcf**

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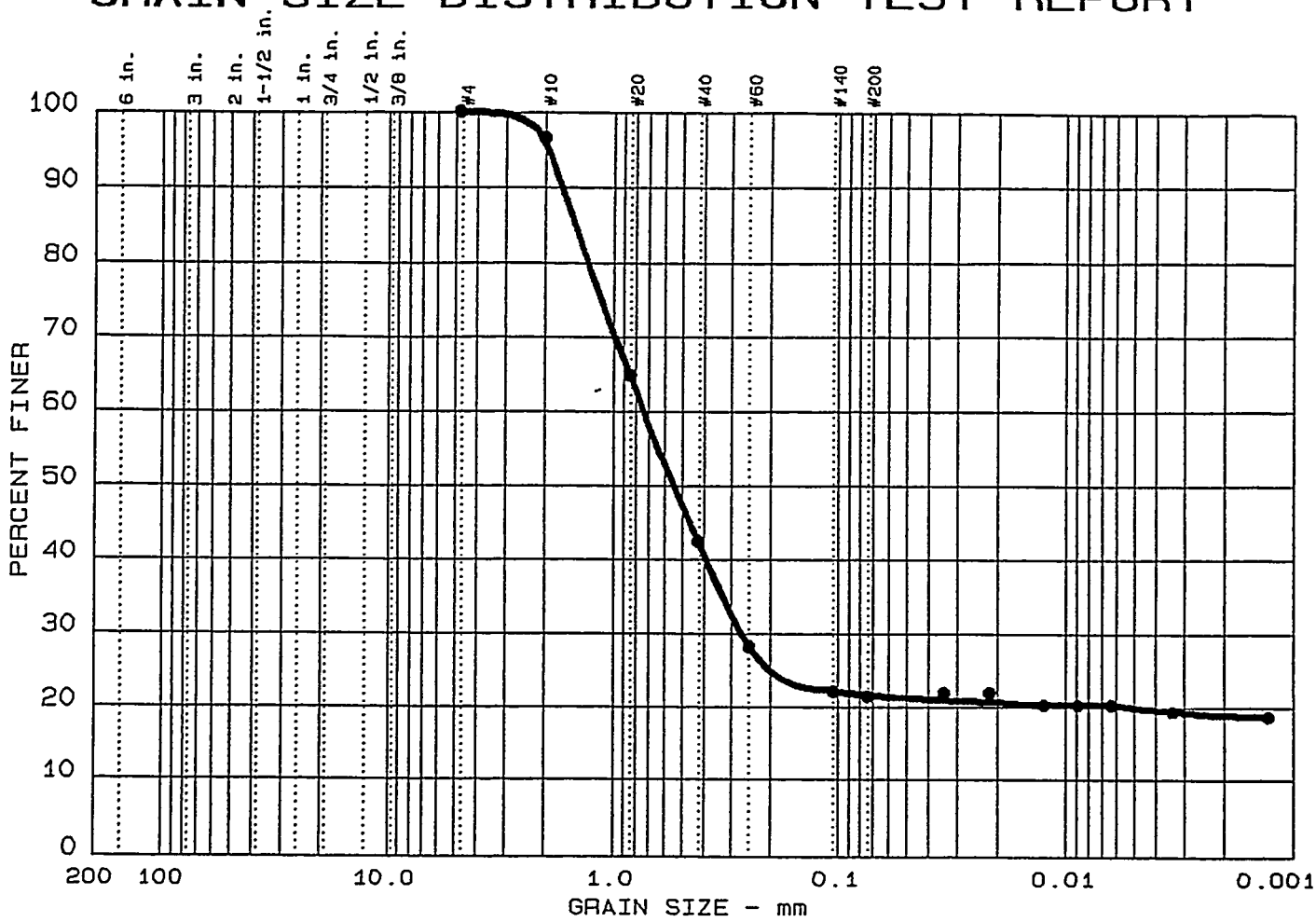
GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	2	0.0	0.0	78.5	1.6	19.9

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			1.47	0.74	0.54	0.270				

MATERIAL DESCRIPTION	USCS	AASHTO
● Green Brown Clayey Medium to Fine Sand		

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-2 PS-8 @ 144'11"-145'10"

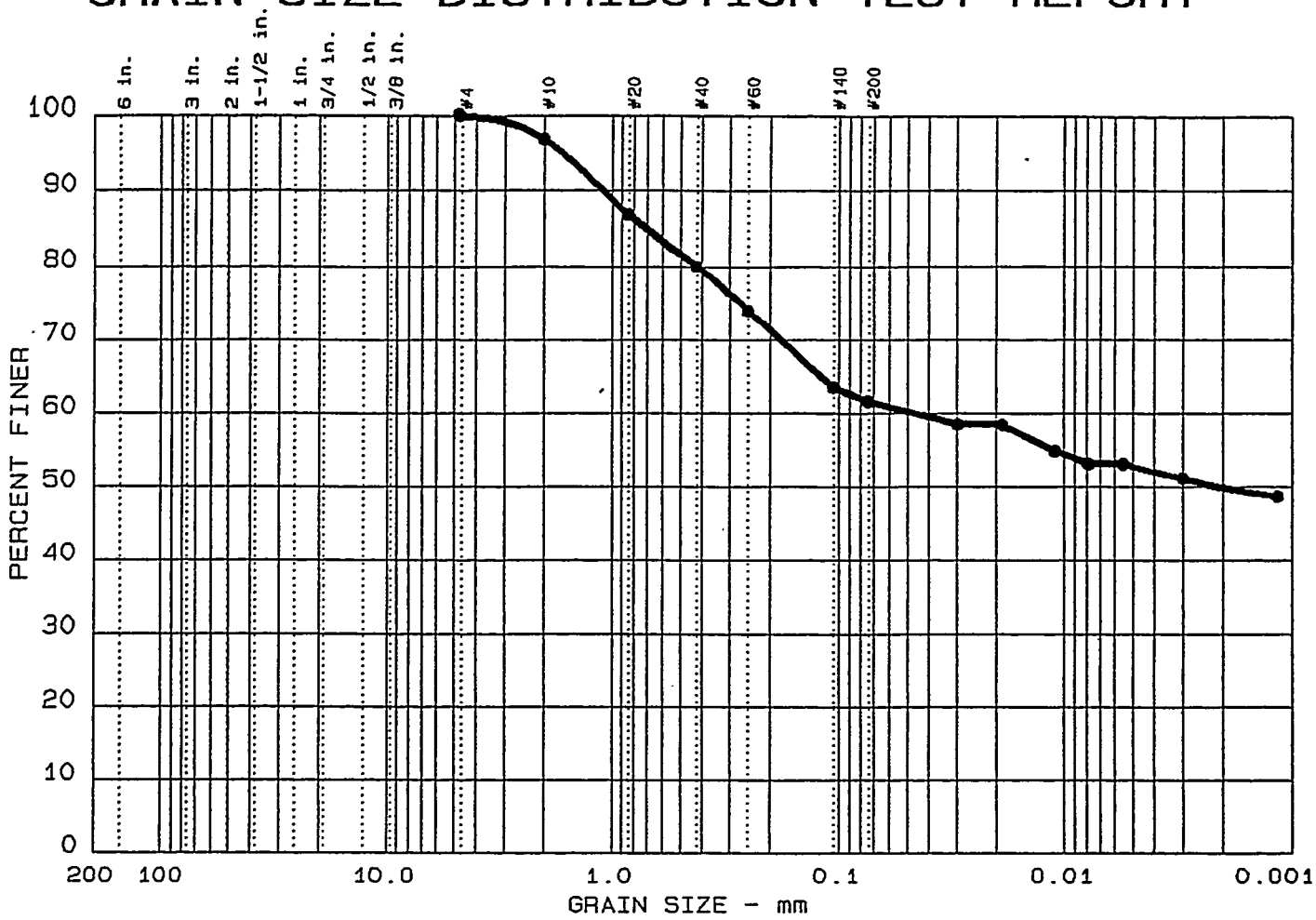
Date: November 15, 1993

Remarks:
Tested by: BNS Ckd by: RLB
RC 75 psi
Atterberg Limits -200
LL=231 PL=52 PI=179

GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	1	0.0	0.0	38.5	8.8	52.7

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	139	113	0.71		0.00					

MATERIAL DESCRIPTION	USCS	AASHTO
● Yellow Brown Silty Sandy Clay	CH	A-7-6 (67.2)

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-2 PS-8 @ 144'11"-145'10"

Date: November 15, 1993

Remarks:
Tested by: BNS
Reviewed by: RLB
SCC 75 psi (Consol.)

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-2
Test Date:	10/19/93-10/29/93	Sample No.:	PS-8
Reviewed By:	JW/RLB RLB	Depth:	144'11" - 145'10"
Review Date:	11/8/93	Sample Description:	See classification data

SPECIMEN DATA

Initial Conditions of Specimen

Diameters, in.		Area , sq. in.	6.48
Top	2.893	Volume, cubic in.	38.12
Middle	2.901	Mass of Specimen, grams	1109.00
Bottom	2.892		
Average	2.895	Moisture Content	
Membrane Thickness, in.	0.012	Pan No.	AB-6
Net Diameter, in.	2.871	Wet Mass + Pan, grams	1195.60
		Dry Mass + Pan, grams	870.48
Length, in.		Container Mass, grams	86.60
Location 1	8.533	Moisture Content, %	41.5
Location 2	8.551		
Location 3	8.556	Density, pcf	110.6
Average	8.547	Dry Density, pcf	78.2
Length of Top Platen	1.150	Specific Gravity	2.71
Length of Bottom Platen	1.510	Degree of Saturation, %	96.6
Length of Specimen, in	5.887	Void Ratio	1.163

Conditions of Specimen After Saturation and Consolidation

After Saturation		After Consolidation	
Change in Length, in.	0.000	Change in Length, in.	0.026
Length, in.	5.887	Length, in.	5.861
Area, sq. in.	6.48	Change in Volume, cc	8.26
Volume, cubic in.	38.12	Volume, cubic in.	37.61
Back Pressure, psi	65.0	Area, sq. in.	6.42
B Value	0.52	Effe. Consoli.. Stress, psi	75.0
		Moisture Content, %	41.9
		Dry Density, pcf	79.2
		Void Ratio	1.134
		Degree of Saturation, %	100.0

CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

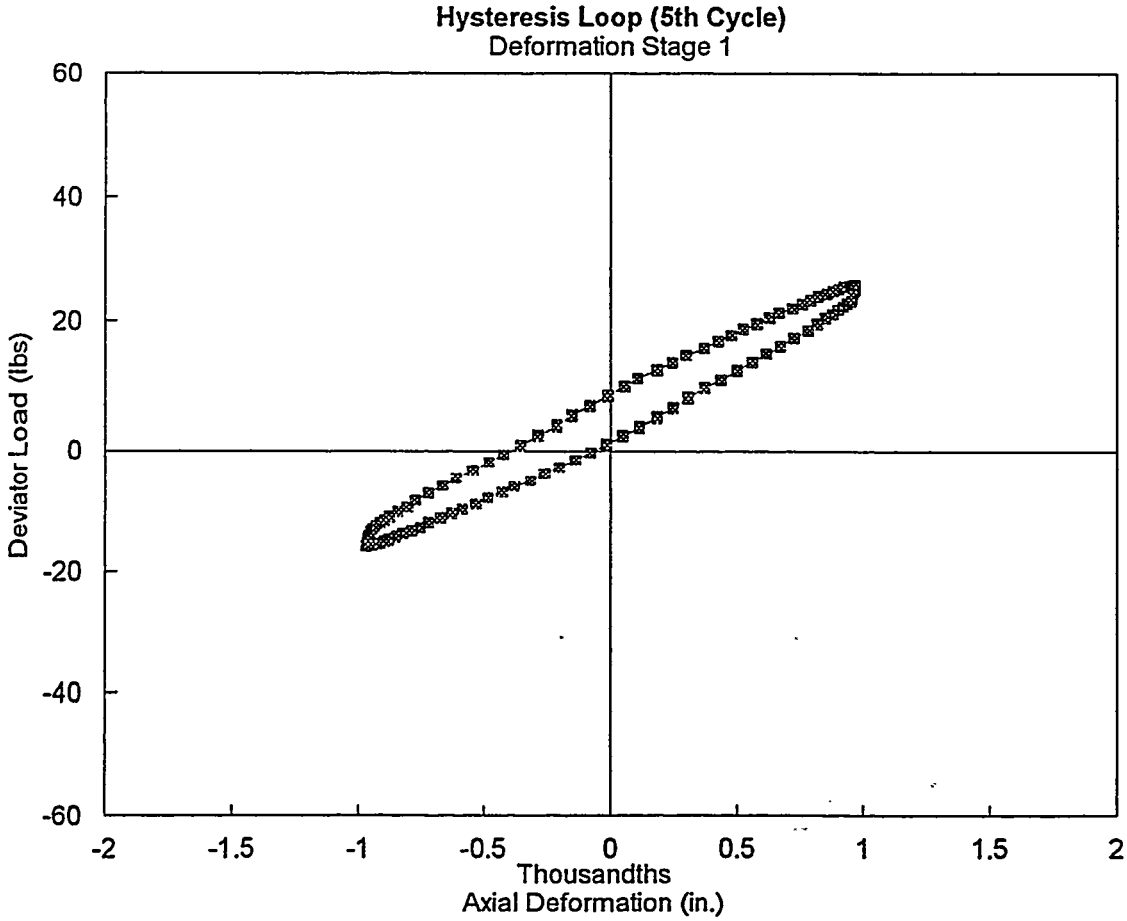
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-2
Test Date:	10/19/93-10/29/93	Sample No.:	PS-8
Reviewed By:	JW/RLB RLB	Depth:	144'11" - 145'10"
Review Date:	11/8/93	Sample Description:	See classification data

Area, A_c, in ^{2}	6.42		Effective Consolidation Stress, psi	75.0
Length, H_c, in.	5.86		Cyclic Load, P_c, lbs	20.96
			Cyclic Deviator Stress, psi	3.3

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
41.9	0.0019	19733	0.017

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
0.012	0.010	9.1



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

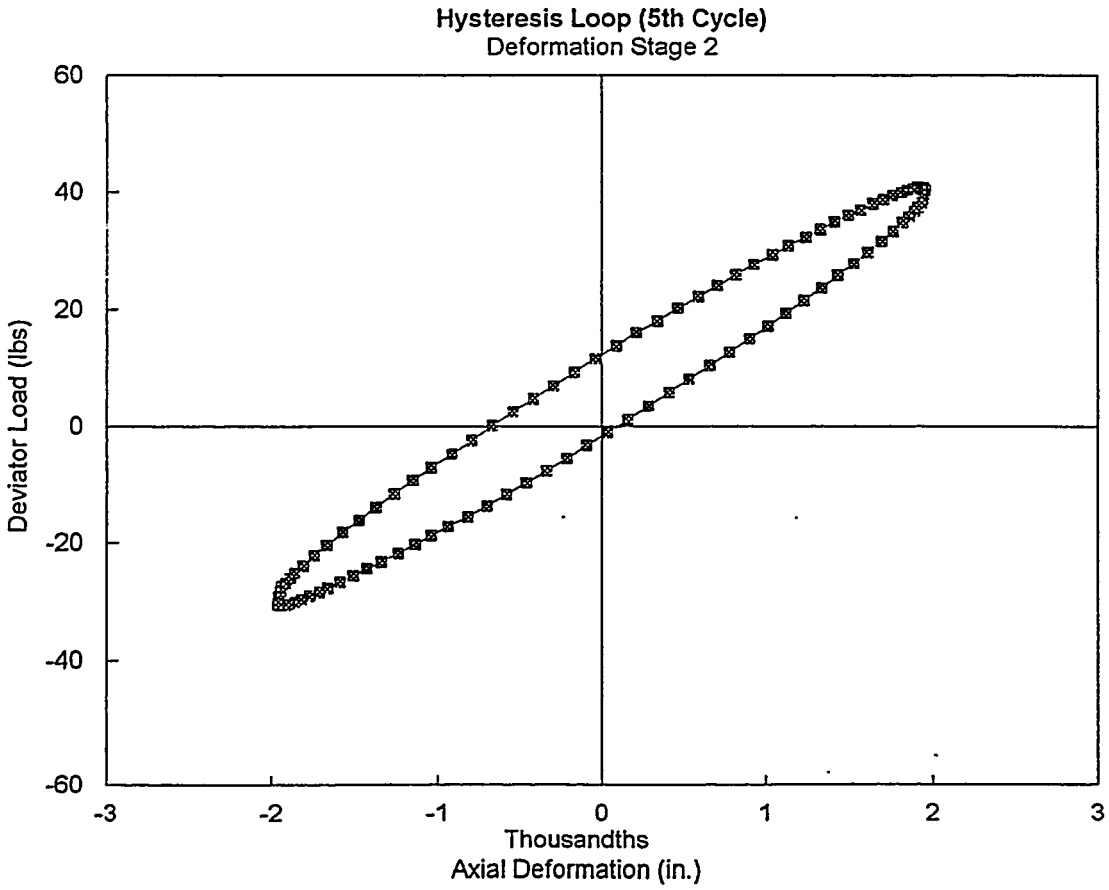
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-2
Test Date:	10/19/93-10/29/93	Sample No.:	PS-8
Reviewed By:	JW/RLB RLB	Depth:	144'11" - 145'10"
Review Date:	11/8/93	Sample Description:	See classification data

Area, A_c, in²	6.42		Effective Consolidation Stress, psi	75.0
Length, H_c, in.	5.86		Cyclic Load, P_c, lbs	35.78
			Cyclic Deviator Stress, psi	5.6

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
71.6	0.0039	16678	0.033

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
0.043	0.035	9.7



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

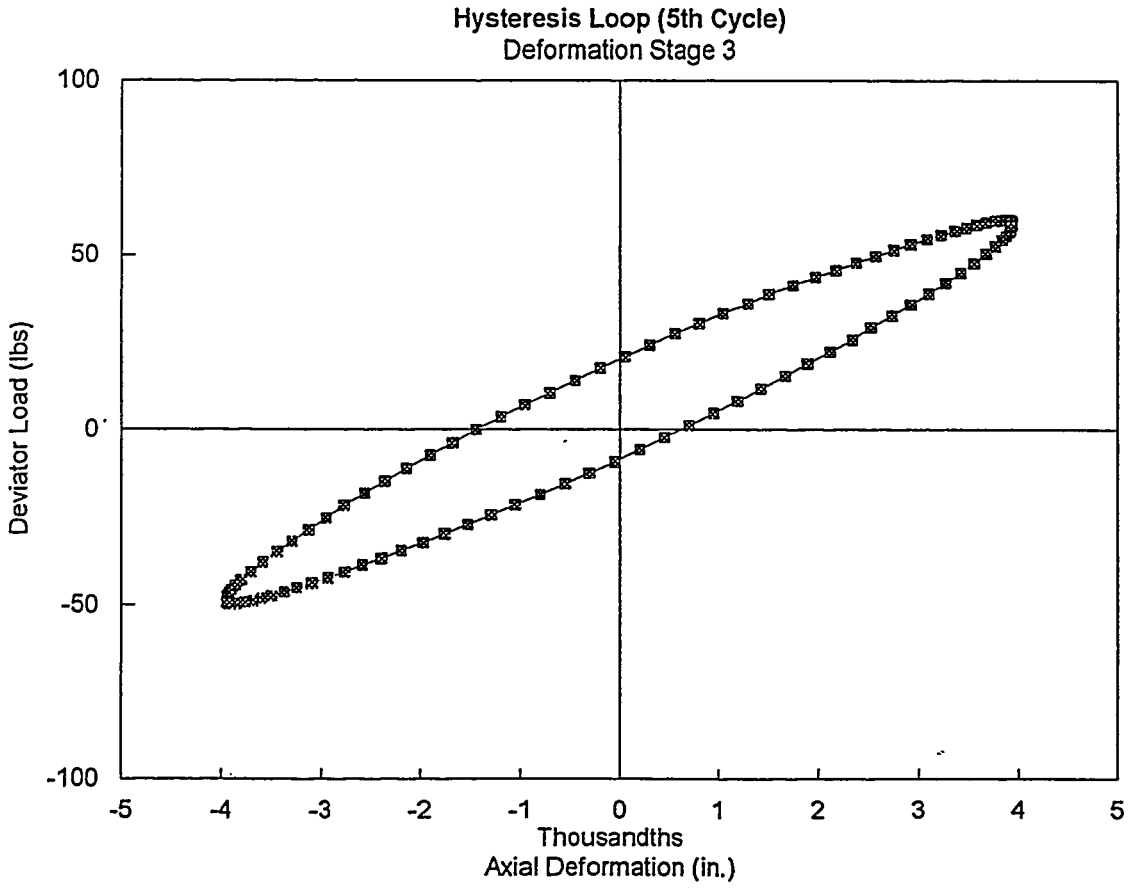
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-2
Test Date:	10/19/93-10/29/93	Sample No.:	PS-8
Reviewed By:	JW/RLB RLB	Depth:	144'11" - 145'10"
Review Date:	11/8/93	Sample Description:	See classification data

Area, A_c, in ^{2}	6.42		Effective Consolidation Stress, psi	75.0
Length, H_c, in.	5.86		Cyclic Load, P_c, lbs	54.99
			Cyclic Deviator Stress, psi	8.6

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
110.0	0.0079	12747	0.067

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
0.169	0.108	12.4



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

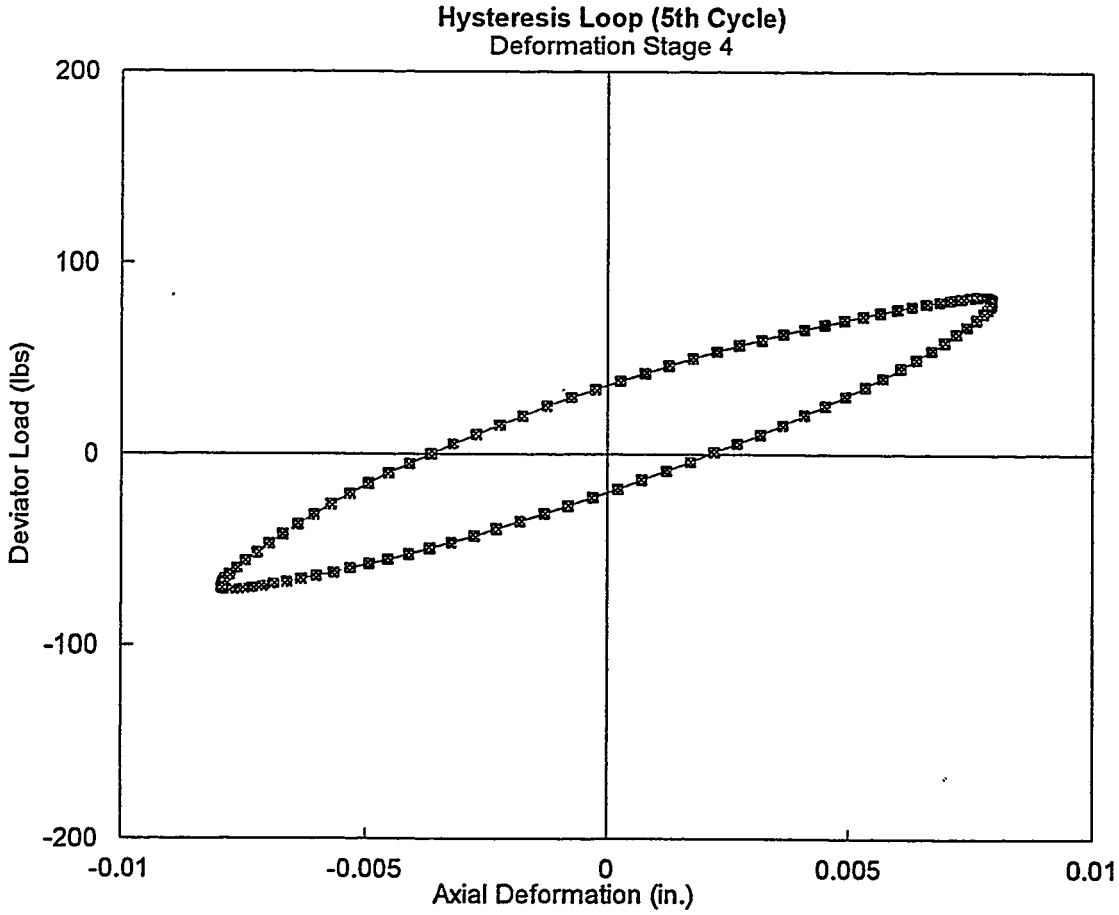
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-2
Test Date:	10/19/93-10/29/93	Sample No.:	PS-8
Reviewed By:	JW/RLB RLB	Depth:	144'11" - 145'10"
Review Date:	11/8/93	Sample Description:	See classification data

Area, A_c, in^2	6.42		Effective Consolidation Stress, psi	75.0
Length, H_c, in.	5.86		Cyclic Load, P_c, lbs	76.72
			Cyclic Deviator Stress, psi	12.0

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
153.4	0.0159	8823	0.135

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
0.657	0.305	17.2



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

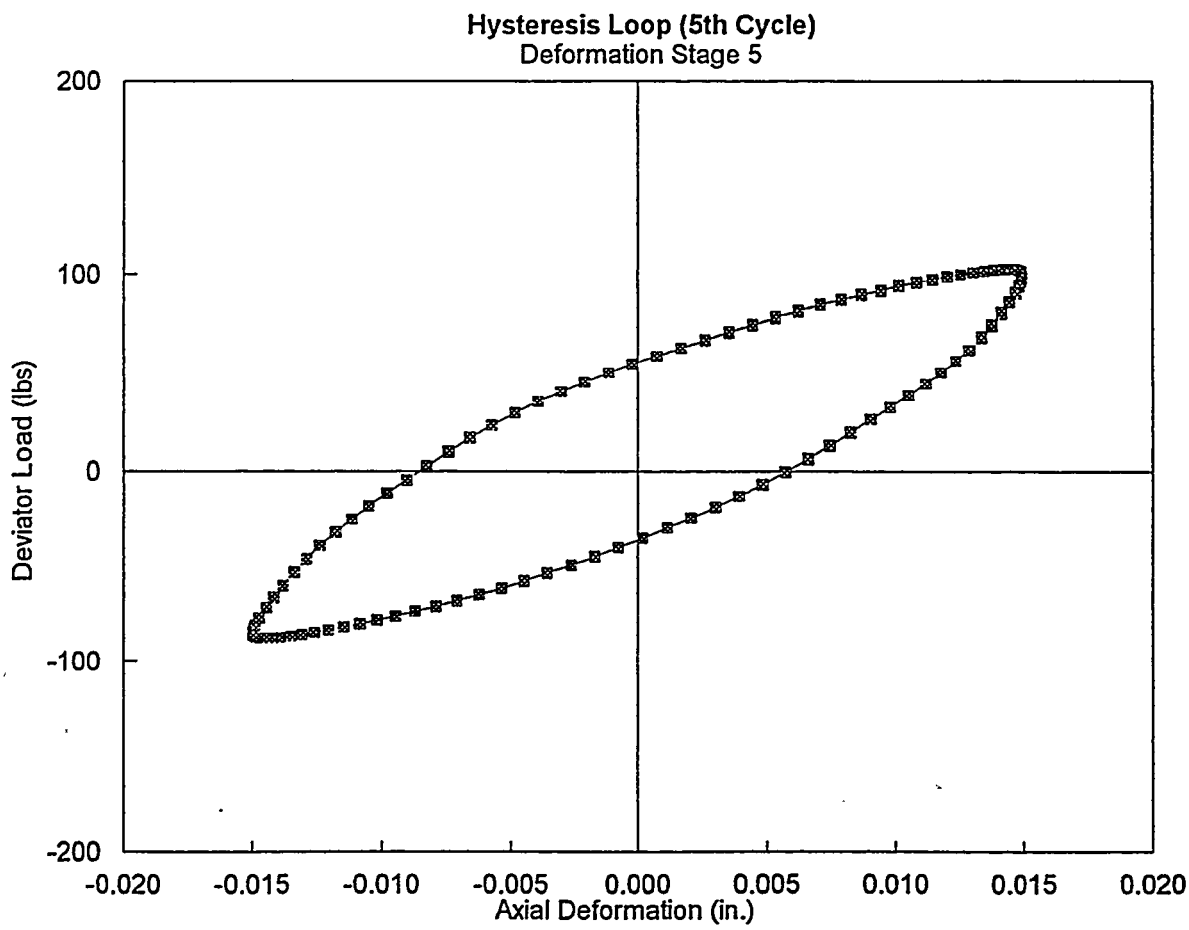
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-2
Test Date:	10/19/93-10/29/93	Sample No.:	PS-8
Reviewed By:	JW/RLB RLB	Depth:	144'11" - 145'10"
Review Date:	11/8/93	Sample Description:	See classification data

Area, A_c, in ^{2}	6.42		Effective Consolidation Stress, psi	75.0
Length, H_c, in.	5.86		Cyclic Load, P_c, lbs	95.06
			Cyclic Deviator Stress, psi	14.8

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
190.1	0.0299	5804	0.255

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
2.038	0.711	22.8



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

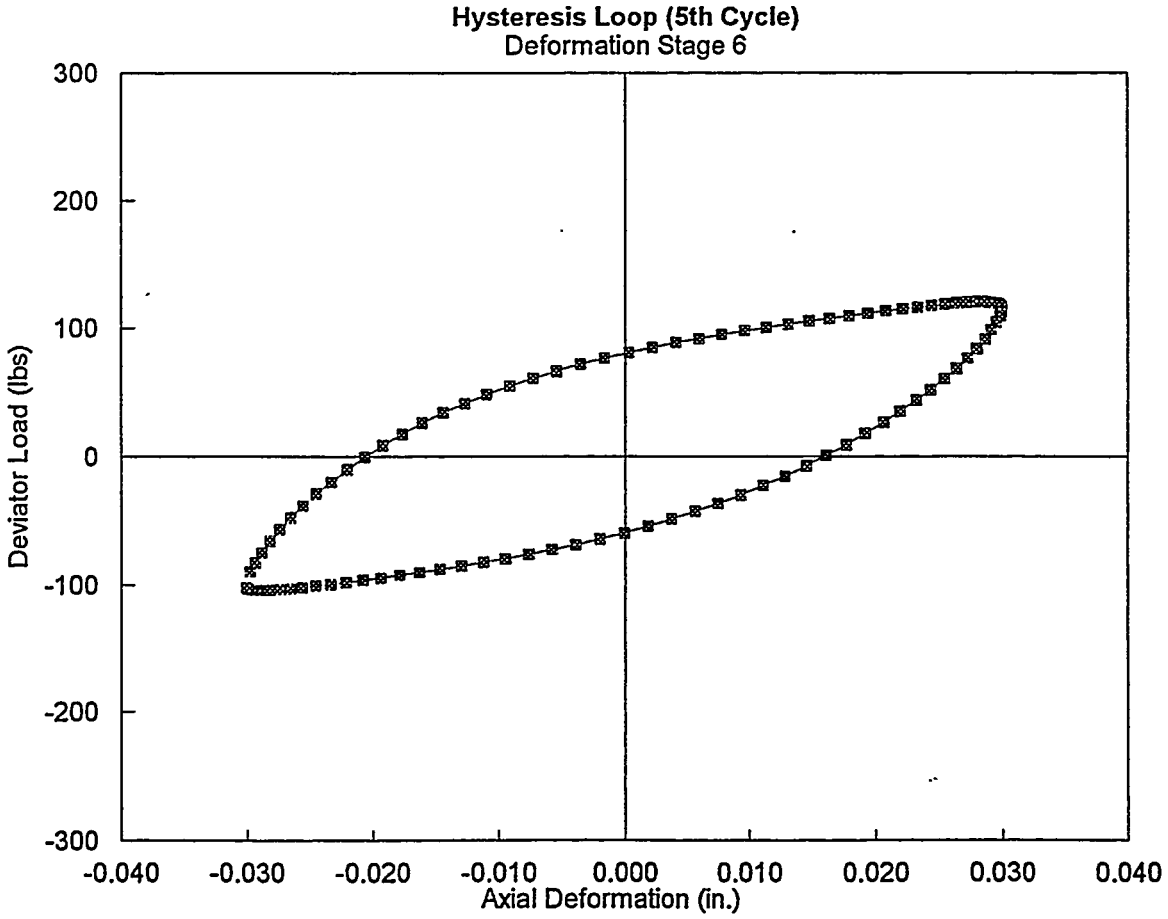
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-2
Test Date:	10/19/93-10/29/93	Sample No.:	PS-8
Reviewed By:	JW/RLB RLB	Depth:	144'11" - 145'10"
Review Date:	11/8/93	Sample Description:	See classification data

Area, A_c, in²	6.42		Effective Consolidation Stress, psi	75.0
Length, H_c, in.	5.86		Cyclic Load, P_c, lbs	112.54
			Cyclic Deviator Stress, psi	17.5

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
225.1	0.0602	3416	0.513

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
6.169	1.693	29.0



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

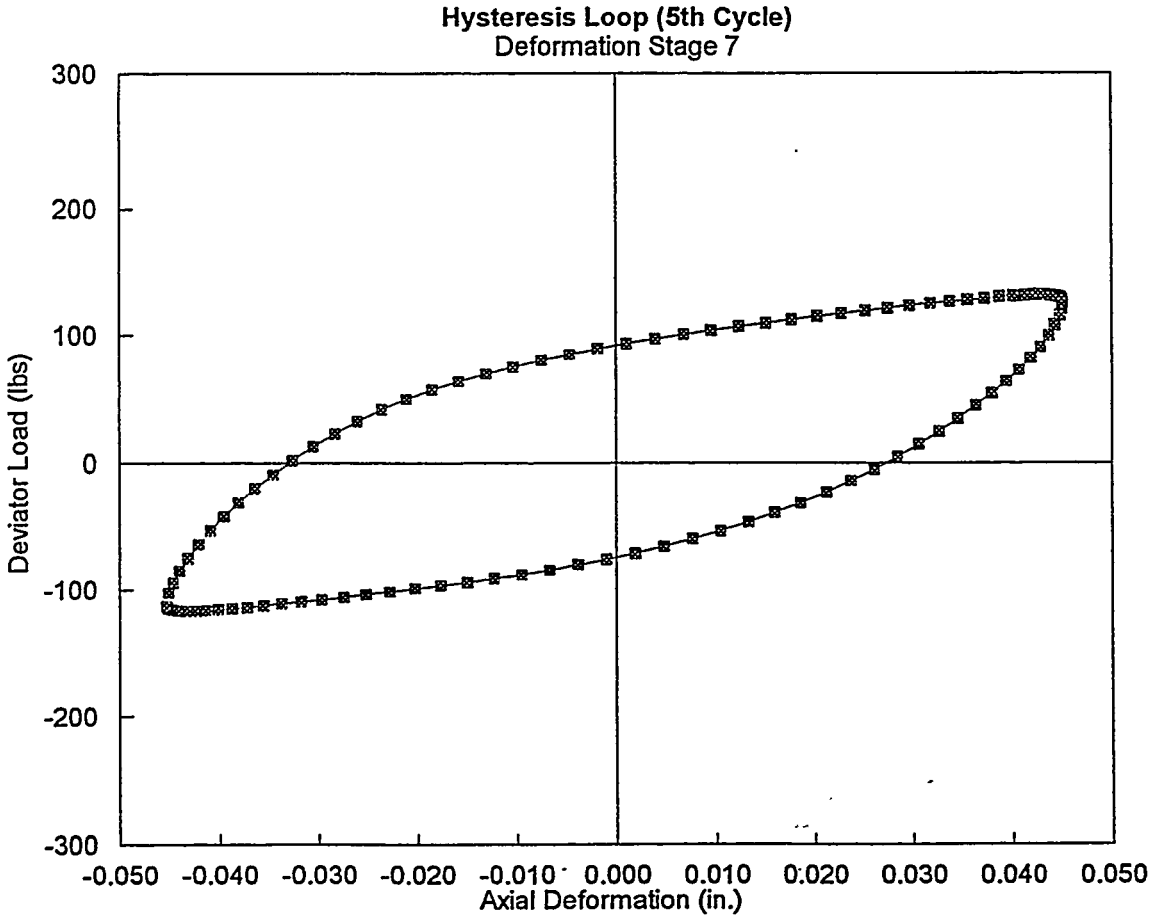
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-2
Test Date:	10/19/93-10/29/93	Sample No.:	PS-8
Reviewed By:	JW/RLB RLB	Depth:	144'11" - 145'10"
Review Date:	11/8/93	Sample Description:	See classification data

Area, A_c, in ^{2}	6.42		Effective Consolidation Stress, psi	75.0
Length, H_c, in.	5.86		Cyclic Load, P_c, lbs	123.75
			Cyclic Deviator Stress, psi	19.3

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
247.5	0.0905	2497	0.772

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
11.296	2.801	32.1



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

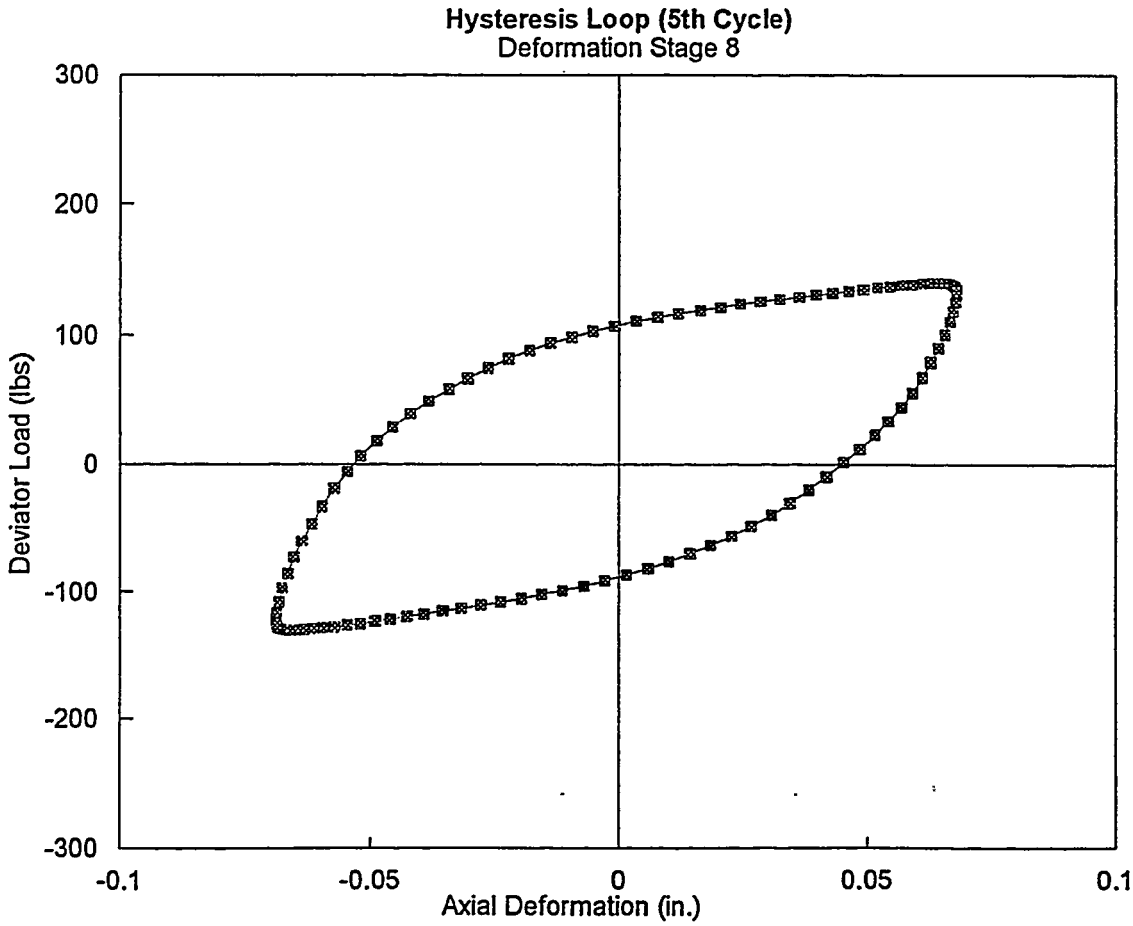
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-2
Test Date:	10/19/93-10/29/93	Sample No.:	PS-8
Reviewed By:	JW/RLB RLB	Depth:	144'11" - 145'10"
Review Date:	11/8/93	Sample Description:	See classification data

Area, A_c, in ^{2}	6.42		Effective Consolidation Stress, psi	75.0
Length, H_c, in.	5.86		Cyclic Load, P_c, lbs	136.71
			Cyclic Deviator Stress, psi	21.3

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
273.4	0.1369	1824	1.168

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
20.494	4.680	34.9



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

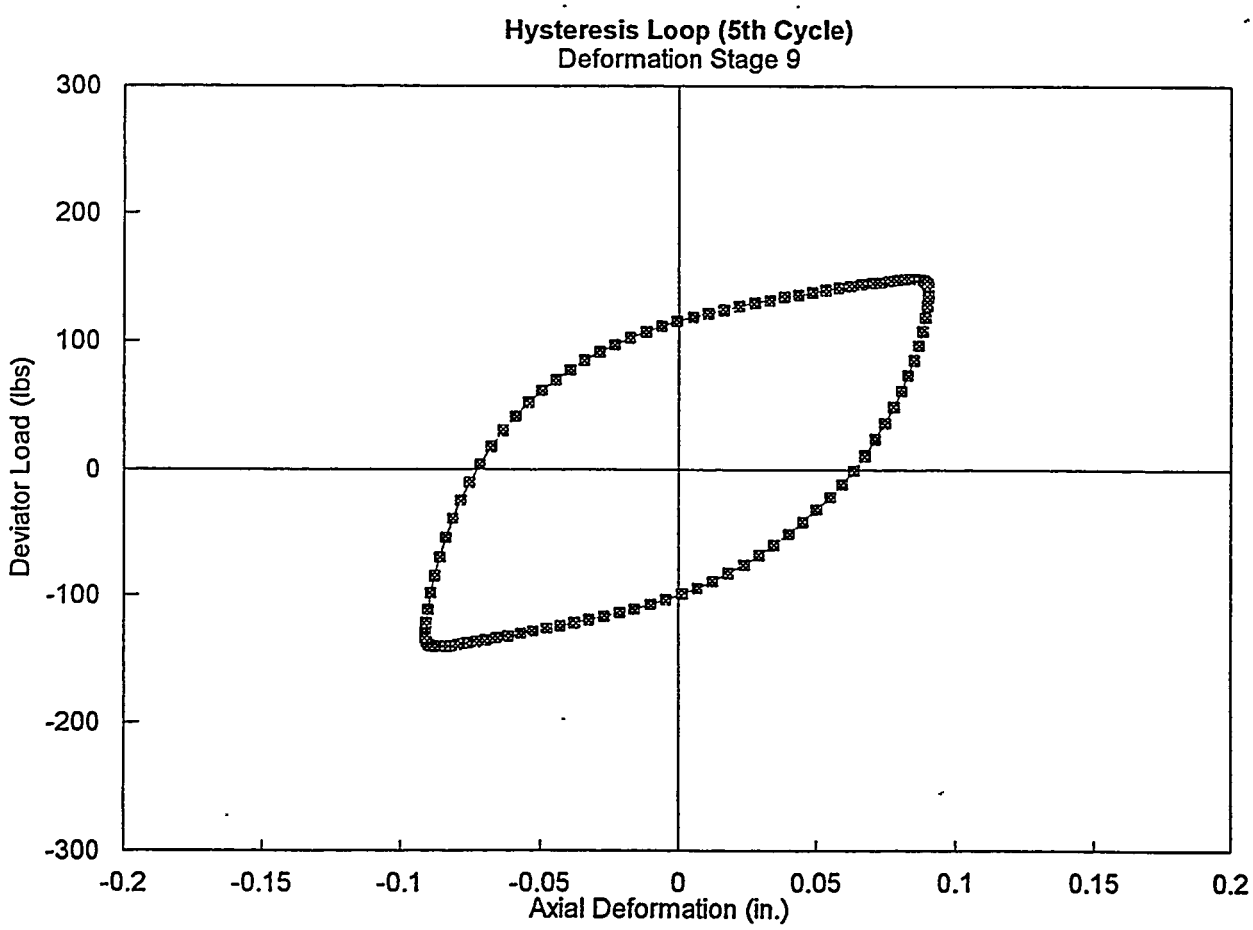
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-2
Test Date:	10/19/93-10/29/93	Sample No.:	PS-8
Reviewed By:	JW/RLB RLB	Depth:	144'11" - 145'10"
Review Date:	11/8/93	Sample Description:	See classification data

Area, A_c, in²	6.42		Effective Consolidation Stress, psi	75.0
Length, H_c, in.	5.86		Cyclic Load, P_c, lbs	144.97
			Cyclic Deviator Stress, psi	22.6

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
289.9	0.1813	1460	1.547

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
30.162	6.571	36.5



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

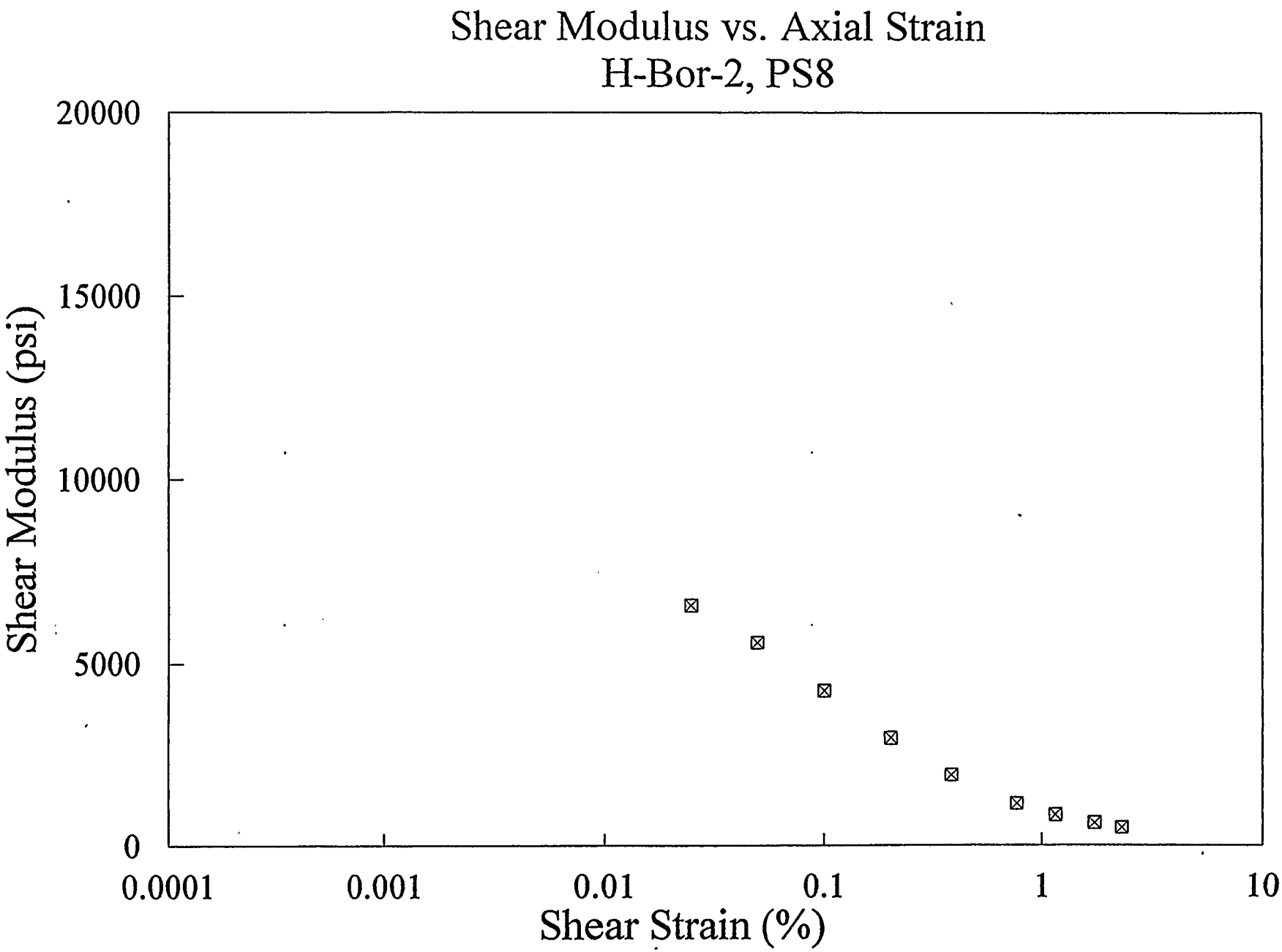
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-2
Test Date:	10/19/93-10/29/93	Sample No.:	PS-8
Reviewed By:	JW/RLB RLB	Depth:	144'11" - 145'10"
Review Date:	11/8/93	Sample Description:	See classification data

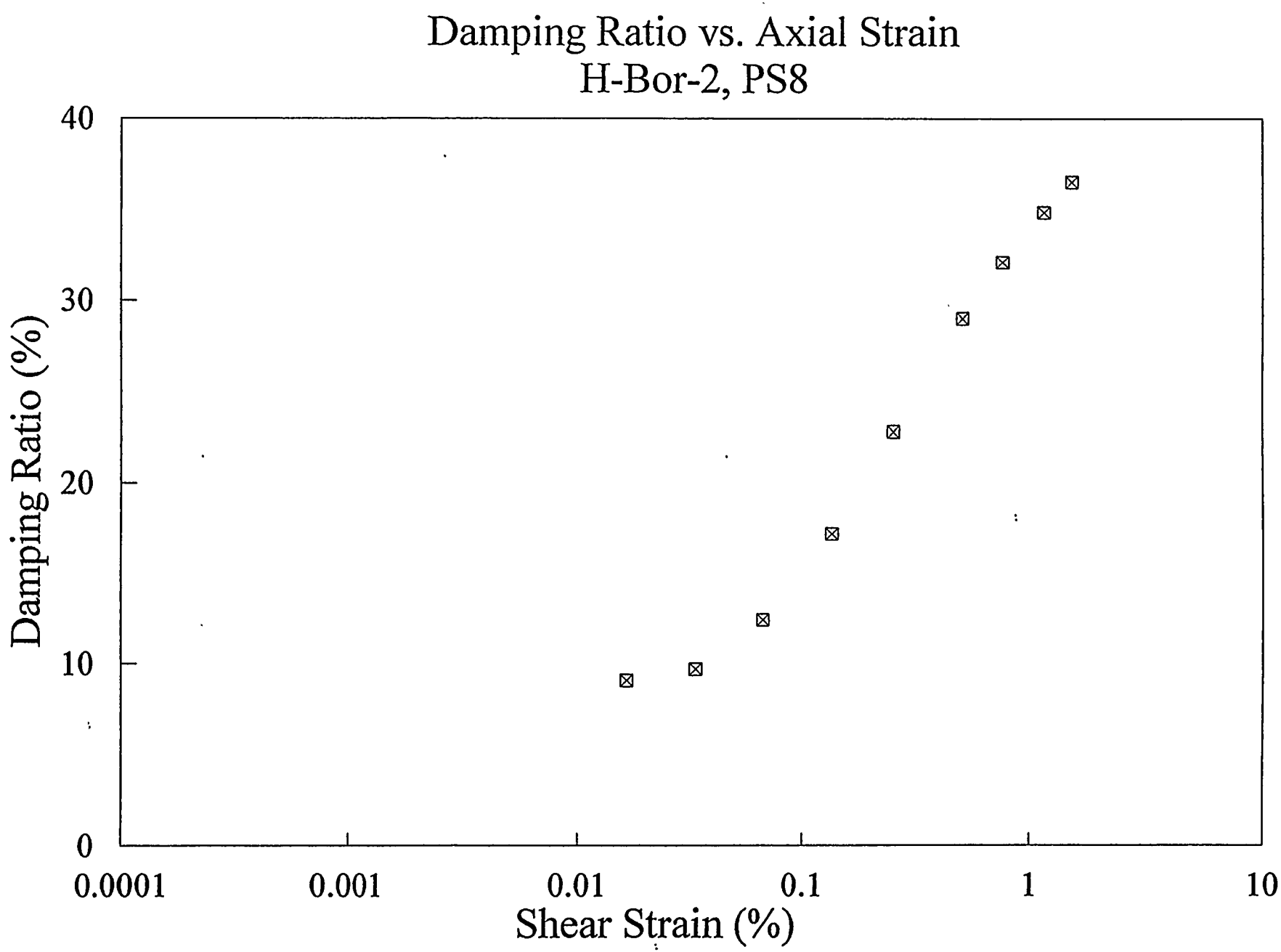
Effective Consolidation Stress 75 psi

Deformation Stage No.	Cyclic Stress (psi)	Axial Strain ε (%)	Young's Modulus E, (psi)	Damping Ratio D, (%)	Shear* Modulus G, (psi)	Shear* Strain γ (%)
1	3.3	0.017	19733	9.06	6578	0.025
2	5.6	0.033	16678	9.68	5559	0.050
3	8.6	0.067	12747	12.38	4249	0.101
4	12.0	0.135	8823	17.15	2941	0.203
5	14.8	0.255	5804	22.81	1935	0.383
6	17.5	0.513	3416	29.00	1139	0.770
7	19.3	0.772	2497	32.10	832	1.158
8	21.3	1.168	1824	34.85	608	1.752
9	22.6	1.547	1460	36.53	487	2.320

* Calculated based on assumed Poisson's Ratio value, 0.5.
All calculations are based on 5th cycle.

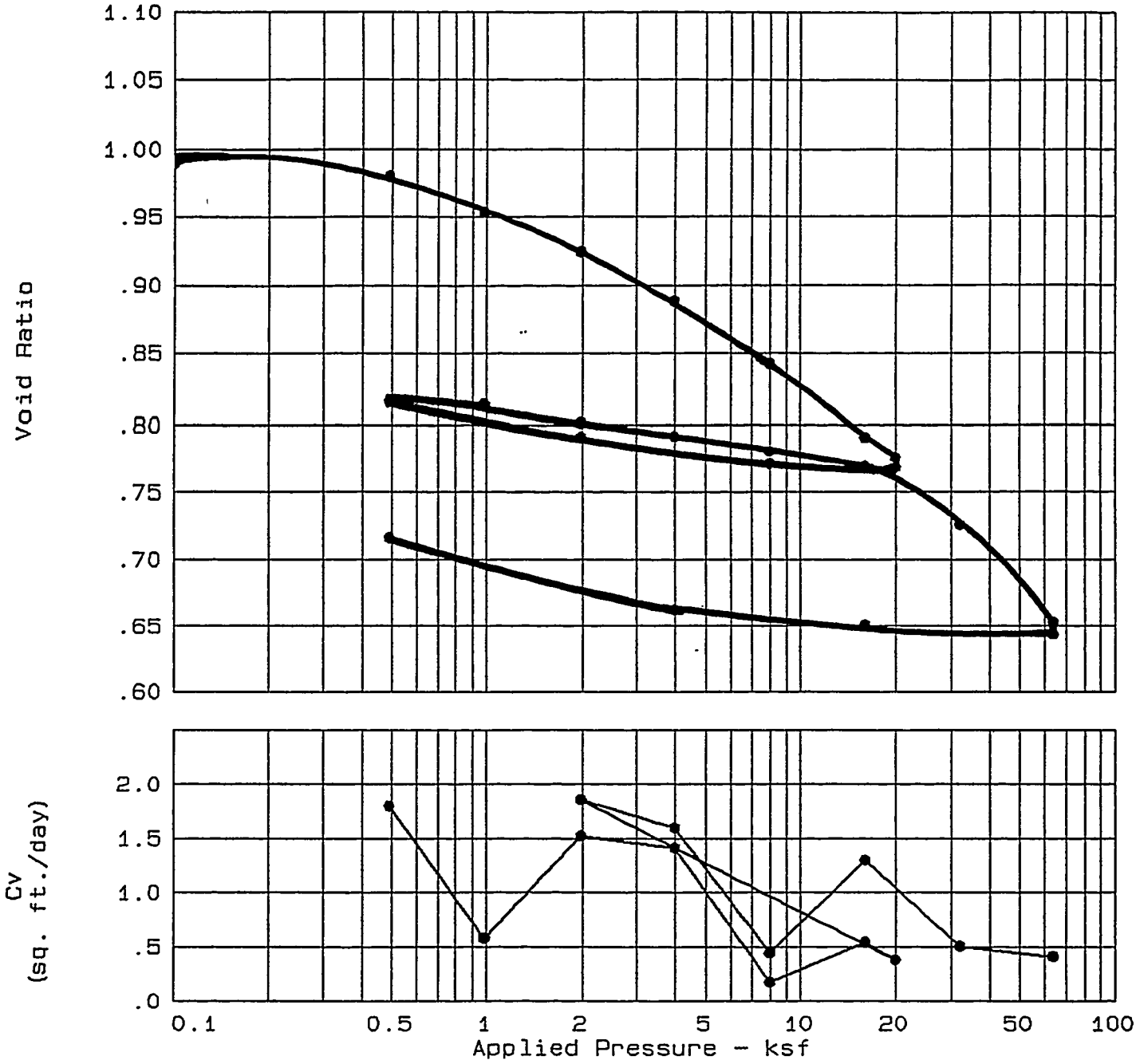


Law Engineering Project No.: 5810535301
SRS-ITP: Strain Controlled Cyclic Triaxial



Law Engineering Project No: 5810535301
SRS-ITP: Strain Controlled Cyclic Triaxial

CONSOLIDATION TEST REPORT



Clpse. %	Nat. Sat.	Nat. Moist.	Dry Density	LL	PI	Sp.Gr.	Initial void ratio
0.5	63.0 %	23.1	84.9	169	113	2.710	0.9935

TEST RESULTS	MATERIAL DESCRIPTION
	Yellow Brown Silty sandy Clay Class: CH
Project No.: 5810535301 Project: SRS-ITP Location: H-Bor-2 PS-8 @144'11"-145'10" Date: Oct.22, 1993	Remarks: Tested By: CLG Reviewed By: RB
CONSOLIDATION TEST REPORT LAW ENGINEERING, INC.	Fig. No._____

16:42, 2-01-1994 CONSOLIDATION TEST PROJECT DATA Test No. 25

Project Number:	5810535301
Project:	SRS-ITP
Date:	Oct.22,1993
Location 1:	H-Bor-2 PS-8 @144'11"-145'10"
2:	
Remarks 1:	Tested By:
2:	Reviewed By:
3:	
4:	
5:	
Material 1:	Yellow Brown Silty
description 2:	sandy Clay
Classification:	CH
Liquid limit:	169
Plasticity index:	113
Figure Number:	

CONSOLIDATION TEST SPECIMEN DATA

TOTAL SAMPLE	BEFORE TEST	AFTER TEST
Wet w+t = 339.95 g.	Oedometer No. = 9	Wet w+t = 337.11 g.
Dry w+t = 317.31 g	Machine No. = 9	Dry w+t = 317.31 g.
Tare wt. = 219.33 g.	Spec. Gravity = 2.710	Tare wt. = 219.33 g.
Height = 0.8960 in.	Height = 0.8960 in.	
Diameter = 2.5000 in.	Diameter = 2.3630 in.	
Weight = 120.62 g.		
Moisture = 23.1 %	Ht. Solids = 0.4495 in.	Moisture = 20.2 %
Wet Den. = 104.5 pcf	Dry wt. = 87.54 g. *	Dry wt. = 97.98 g.
Dry Den. = 84.9 pcf	Void ratio = 0.9935	Void ratio = 0.7162
	Saturation = 63.0 %	Saturation = 76.5 %

* Initial dry weight used in calculations

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
Initial	0.02000			0.9935	
0.10	0.02180	0.0000	0.02180	0.9895	0.2 Comprs.
0.49	0.02820	0.0003	0.02790	0.9795*	0.7 Comprs.*
0.99	0.04100	0.0007	0.04030	0.9530*	2.0 Comprs.*
1.99	0.05470	0.0014	0.05330	0.9240*	3.5 Comprs.*
3.99	0.07205	0.0023	0.06975	0.8877*	5.3 Comprs.*
8.00	0.09390	0.0038	0.09010	0.8419*	7.6 Comprs.*
16.01	0.11850	0.0054	0.11310	0.7912*	10.1 Comprs.*
20.00	0.12735	0.0059	0.12145	0.7754*	10.9 Comprs.*
20.00	0.13080	0.0059	0.12490	0.7678	11.3 Comprs.
8.00	0.12730	0.0038	0.12350	0.7709	11.2 Comprs.
1.99	0.11570	0.0014	0.11430	0.7914	10.1 Comprs.
0.49	0.10360	0.0003	0.10330	0.8158	8.9 Comprs.
0.99	0.10510	0.0007	0.10440	0.8134	9.0 Comprs.

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
1.99	0.10890	0.0014	0.10750	0.8015*	9.6 Comprs.*
3.99	0.11410	0.0023	0.11180	0.7921*	10.1 Comprs.*
8.00	0.12035	0.0038	0.11655	0.7804*	10.7 Comprs.*
16.01	0.12740	0.0054	0.12200	0.7690*	11.3 Comprs.*
32.09	0.15125	0.0074	0.14385	0.7260*	13.4 Comprs.*
63.79	0.18940	0.0121	0.17730	0.6528*	17.1 Comprs.*
63.79	0.19360	0.0121	0.18150	0.6434	17.6 Comprs.
16.01	0.18370	0.0054	0.17830	0.6505	17.2 Comprs.
3.99	0.17540	0.0023	0.17310	0.6621	16.6 Comprs.
0.49	0.14880	0.0000	0.14880	0.7162	13.9 Comprs.

* CALCULATED USING D100 INSTEAD OF FINAL READING

CONSOLIDATION TEST RESULTS

Compression index = NOT SELECTED
Preconsolidation pressure = NOT SELECTED

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

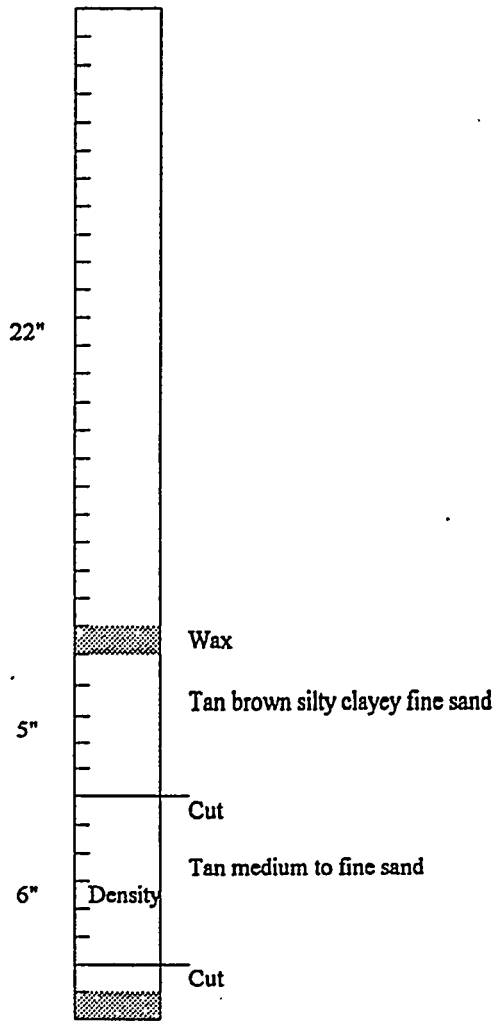
Project: SRS-ITP GEOTECHNICAL TESTING Date: 11-30-93

Boring No: H-Bor-2 Sample No: ST-9 Depth: 162' - 163'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L: 36.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION



Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b2-st9.wk3

ATTACHMENT 3

Tested by:	JTK	Reviewed by:	RLB	Law Job No.	5810535301
Date:	11/30/93	Date:	12/13/93	Job Name	SRS - ITP

TP-4A: UNIT WEIGHT OF SAMPLE
"TYPICAL"

Sample: Boring No.: H-Bor-2
Depth: 162' - 163'
Sample ID: ST-9

MEASUREMENTS (Nominal 6-inch cut sample height):

TOTAL SAMPLE HEIGHT (inches)		INSIDE DIAMETER OF CUT TUBE (inches)	
1	6.129		
2	6.120	top	2.870
3	6.111	bottom	2.845
Avg.	6.120 (H)	Avg.	2.858 (D)

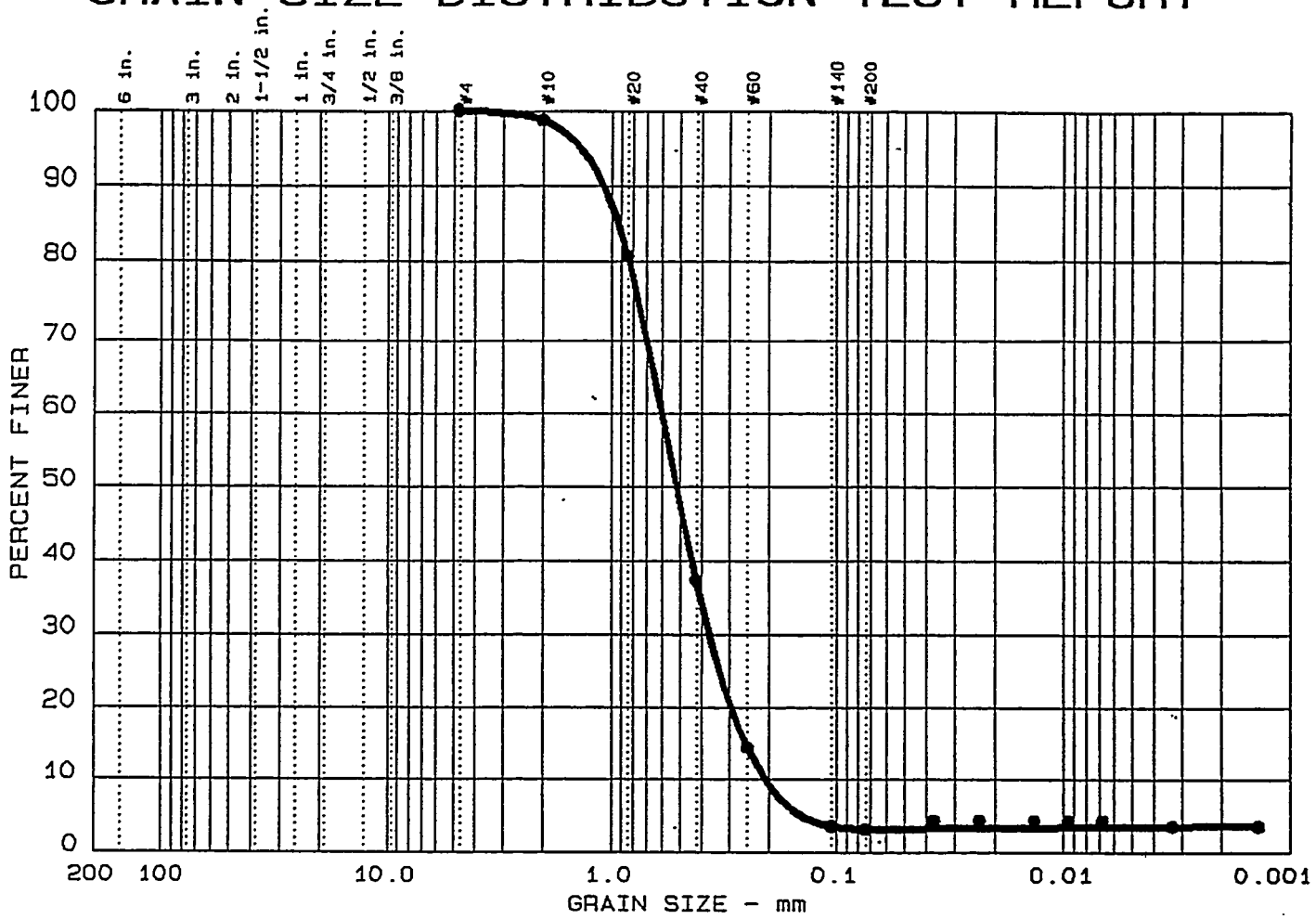
MOISTURE CONTENT DETERMINATION

MOISTURE CONTENT	
Tare No.	V-25
Tare Weight	14.54 gm
Wet Wt. + Tare	102.07 gm
Dry Wt. + Tare	89.54 gm
Wt. of Water	12.53 gm
Dry Weight	75.00 gm
Moisture Content, w	16.7 %

TOTAL WEIGHT OF SOIL + TUBE SECTION	W_{s+t} =	1705.36 gm
WEIGHT OF CLEAN, DRY TUBE SECTION	W_t =	430.5 gm
WET WEIGHT OF SOIL, $[(W_{s+t} - W_t)/454]$	W_s =	2.808 lbs
VOLUME OF SAMPLE, $[(pi*D^2/4)*H/1728]$	V =	0.023 ft^3
WET DENSITY, $[W_s/V]$	D_w=	**123.6 pcf**
DRY DENSITY, $[D_w/(1+w/100)]$	D_D=	**105.9 pcf**

h:\users\lab\rlb\itp\sampdens\h2-st9.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	1	0.0	0.0	96.9	3.1	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.92	0.59	0.51	0.368	0.2544	0.2087	1.09	2.9

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Poorly Graded Sand		

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-2 ST-9 @ 162-163 Ft.

Date: January 3, 1994

Remarks:
Tested by: JTK Reviewed by: RLB
Sample Density
Atterberg Limits-#200
LL=148 PL=27 PI=121

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

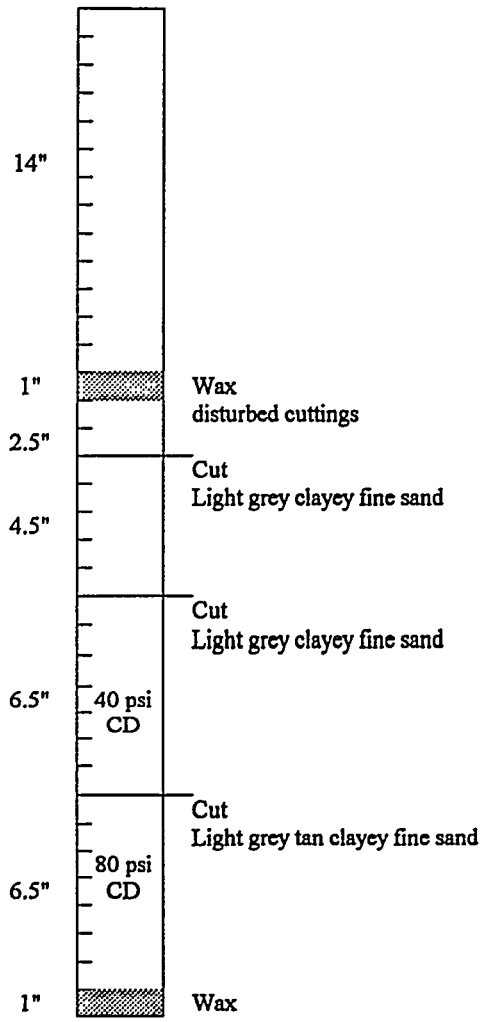
Project: SRS-ITP GEOTECHNICAL TESTING Date: 01-04-94

Boring No: H-Bor-2 Sample No: ST-10 Depth: 167'-169'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

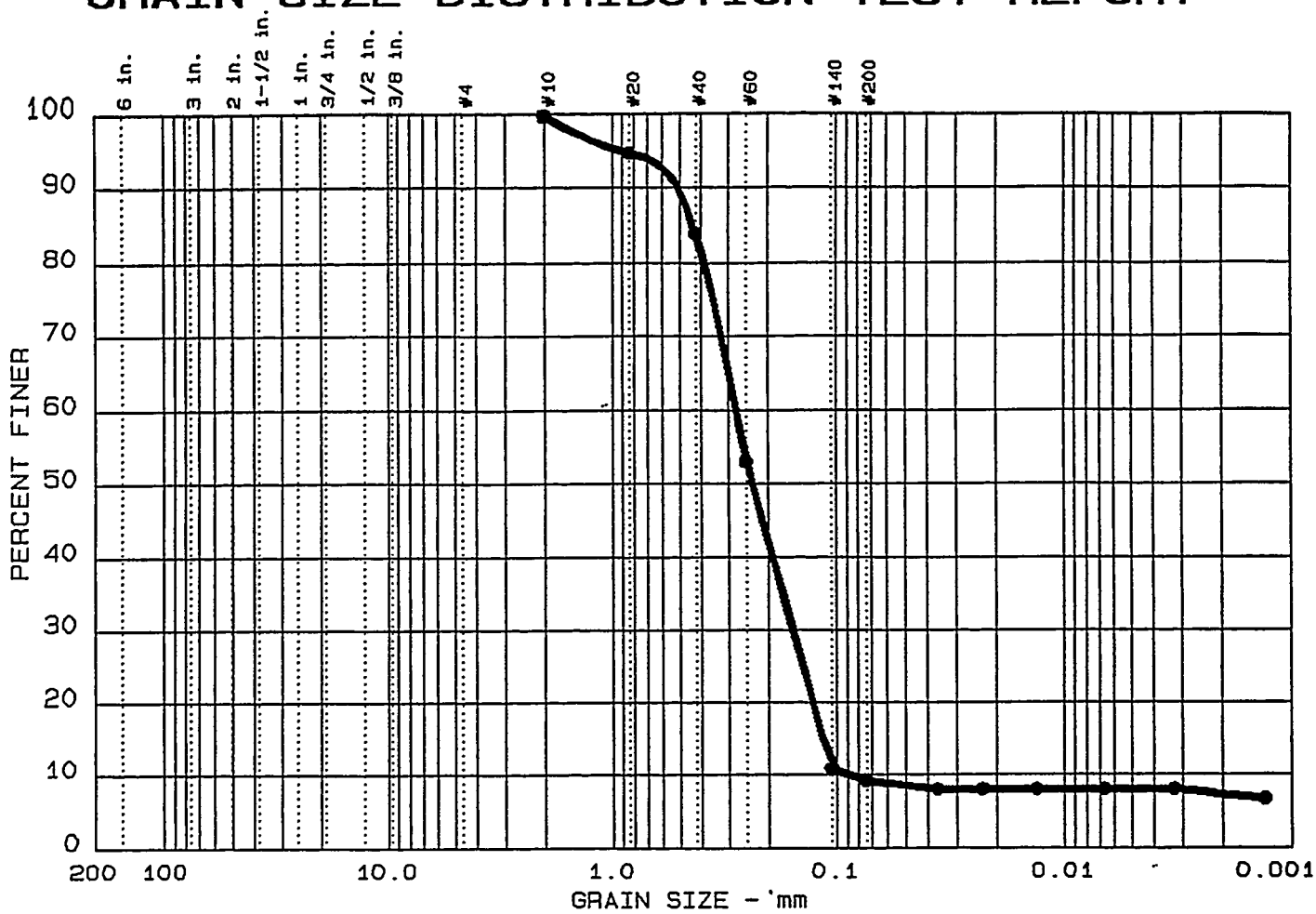
Total Length of Tube (inches), L : 36.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION



Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	12	0.0	0.0	90.8	1.2	8.0

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	NL	NP	0.43	0.28	0.24	0.155	0.1144	0.0878	0.99	3.2

MATERIAL DESCRIPTION	USCS	AASHTO
● Yellow -Tan Poorly Graded Sand with Silt	SP-SM	A-3

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-2 ST-10 @ 167 FT.

Date: January 19, 1994

Remarks:

Tested by: CLG

Reviewed by: RLB

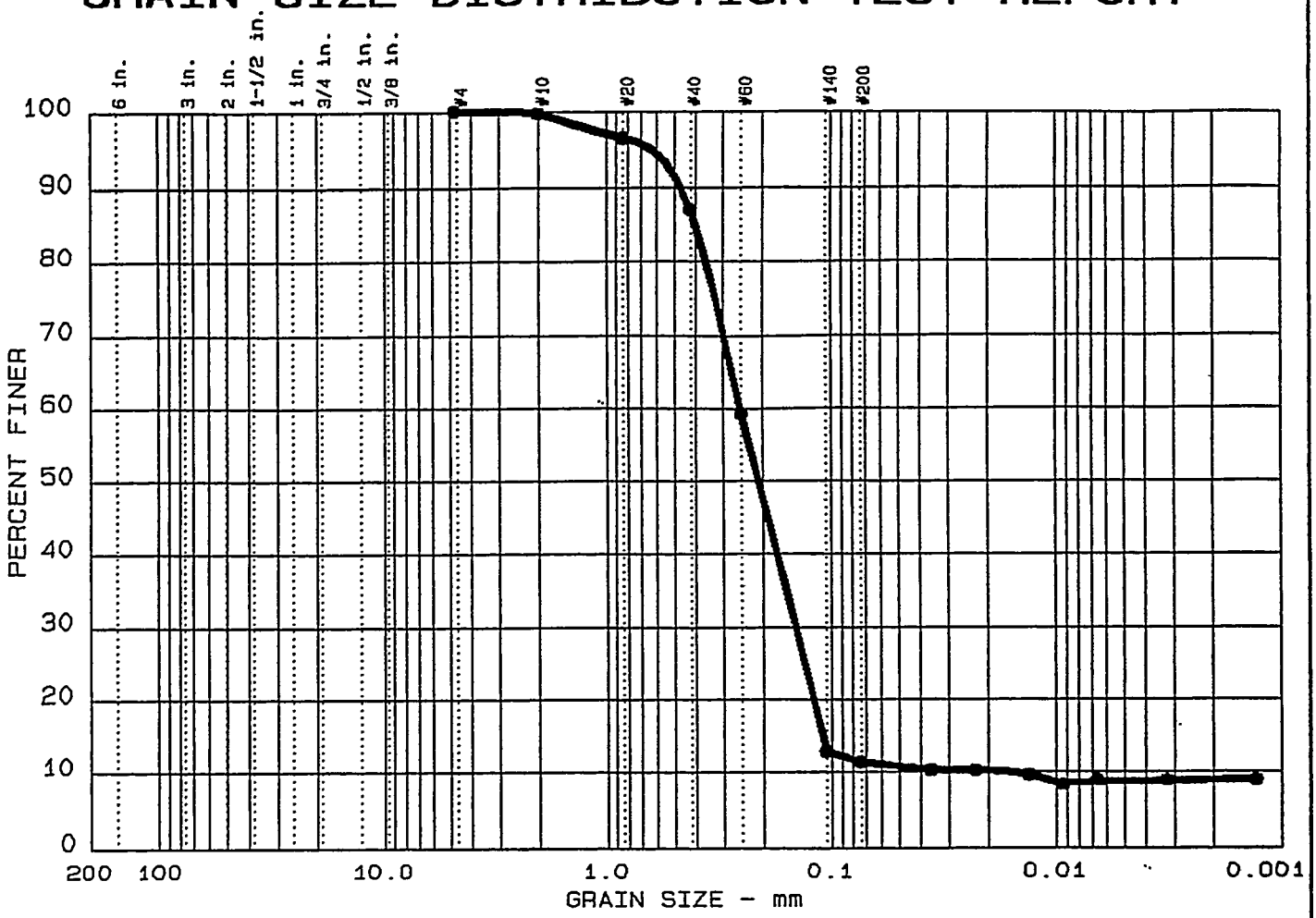
CD-40 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	13	0.0	0.0	88.7	11.3	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.40	0.25	0.21	0.145	0.1093	0.0160	5.19	15.8

MATERIAL DESCRIPTION	USCS	AASHTO
● Yellow -Tan Poorly Graded Sand with Silt		

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-2 ST-10 @ 167 Ft.

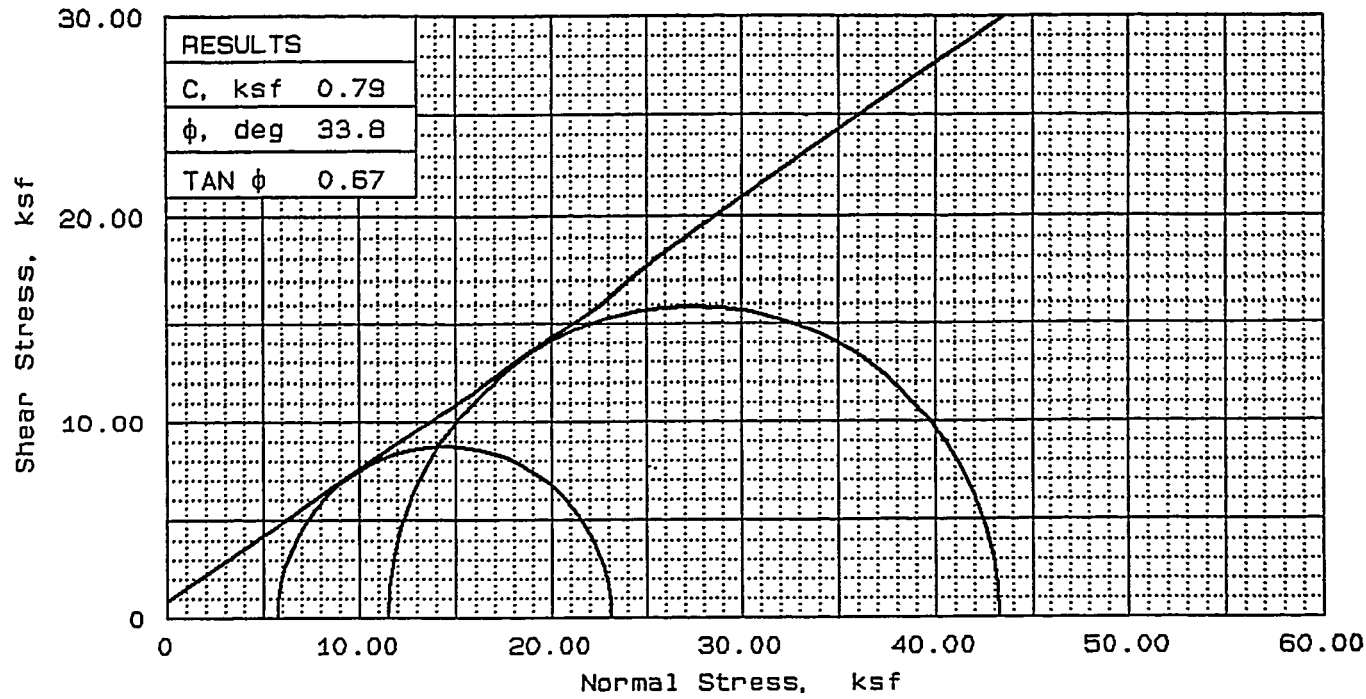
Date: January 19, 1994

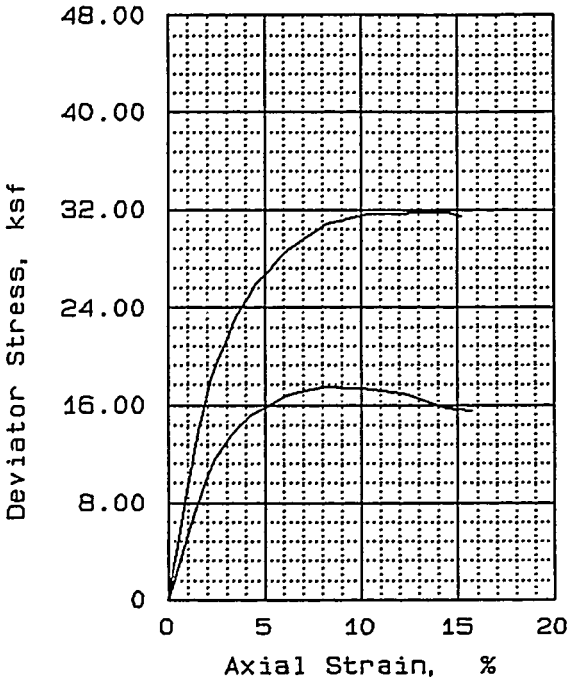
Remarks:
Tested by: CLG Chkd by: RLB
CD-80 psi
Atterberg Limits -200
Not enough material

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.





SAMPLE NO.		1	2
INITIAL	WATER CONTENT, %	24.6	25.1
	DRY DENSITY, pcf	95.6	94.0
	SATURATION, %	89.8	87.8
	VOID RATIO	0.724	0.753
	DIAMETER, in	2.88	2.88
	HEIGHT, in	6.00	6.00
AT TEST	WATER CONTENT, %	27.0	27.6
	DRY DENSITY, pcf	96.2	95.3
	SATURATION, %	100.0	100.0
	VOID RATIO	0.713	0.729
	DIAMETER, in	2.88	2.86
	HEIGHT, in	5.99	5.98
BACK PRESSURE, ksf		6.48	6.48
CELL PRESSURE, ksf		12.24	18.00
FAILURE STRESS, ksf		17.38	31.79
PORE PRESSURE, ksf			
STRAIN RATE, %/min.		0.100	0.100
ULTIMATE STRESS, ksf			
PORE PRESSURE, ksf			
σ_1 FAILURE, ksf		23.14	43.31
σ_3 FAILURE, ksf		5.76	11.52

TYPE OF TEST:
Consolidated drained
SAMPLE TYPE: Undisturbed
DESCRIPTION: See Grain Size

REMARKS: Tested by: HEJ

Reviewed by: RLB

FIG. NO.

CLIENT: SRS

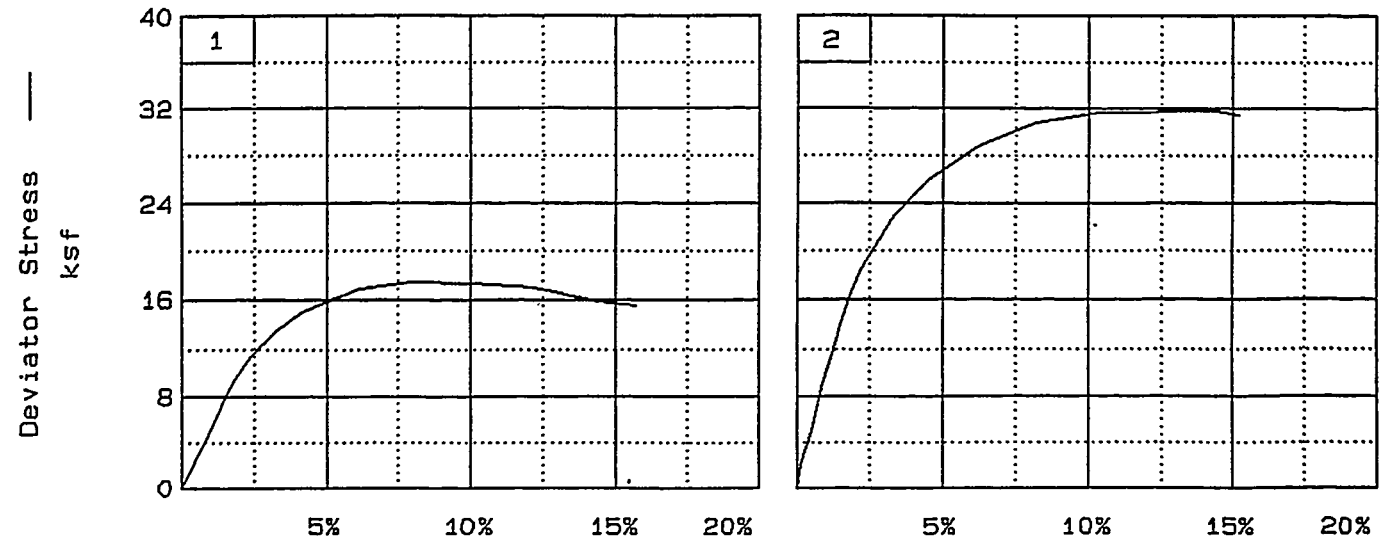
PROJECT: SRS-ITP

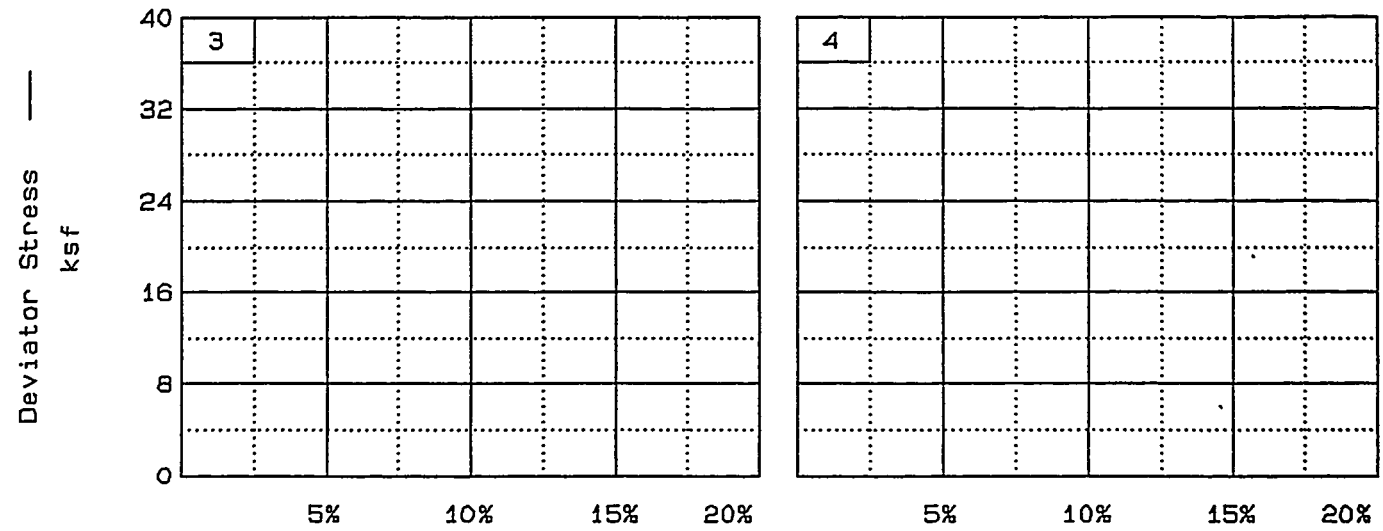
SAMPLE LOCATION: H Bor-2 ST-10 @ 157 FT.

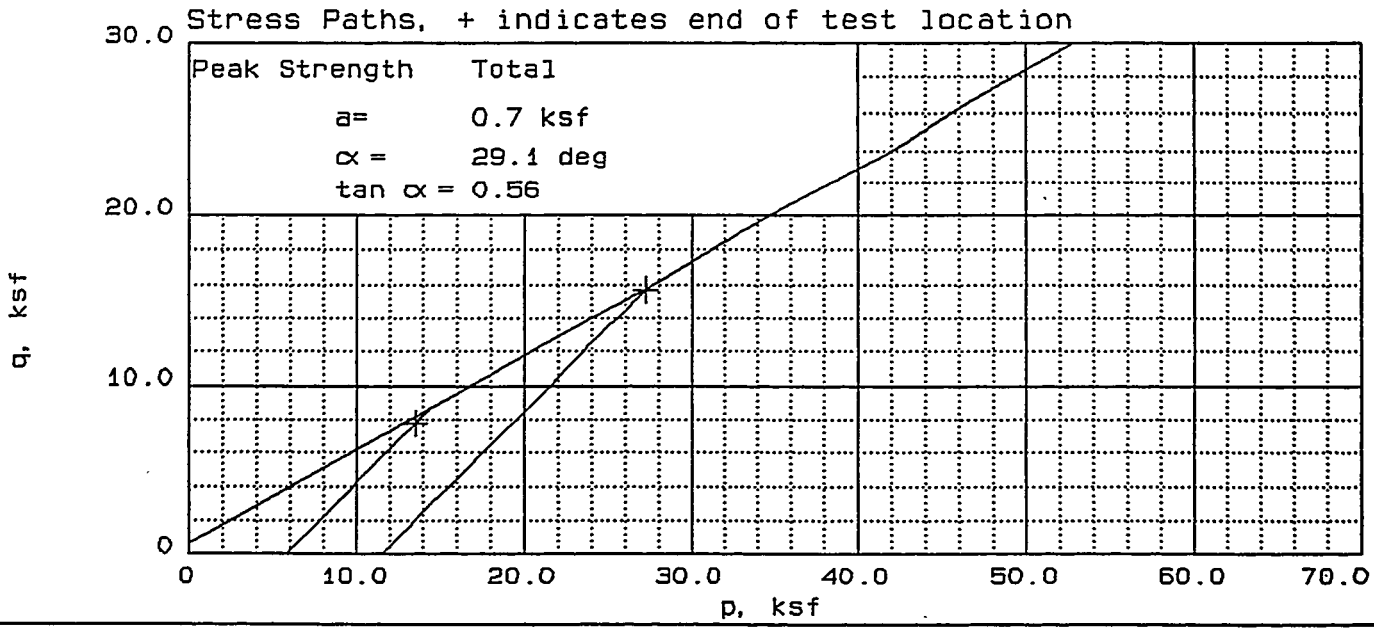
PROJ. NO.: 5810535301 DATE: 01/27/94

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.





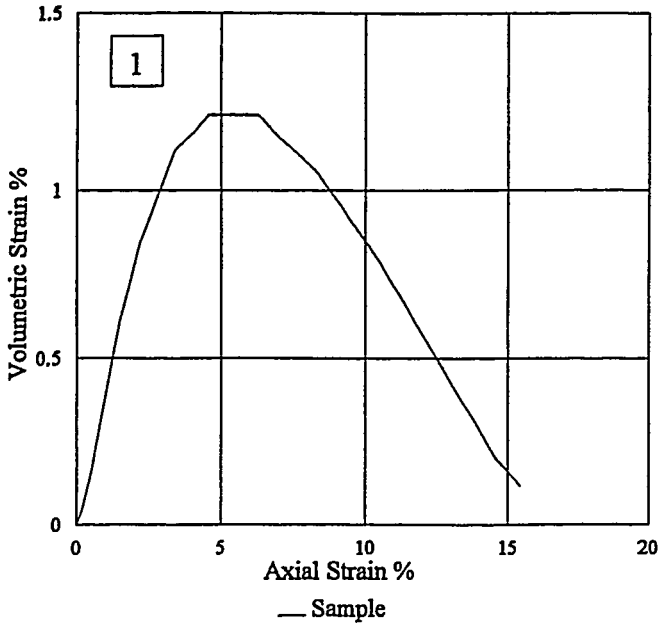


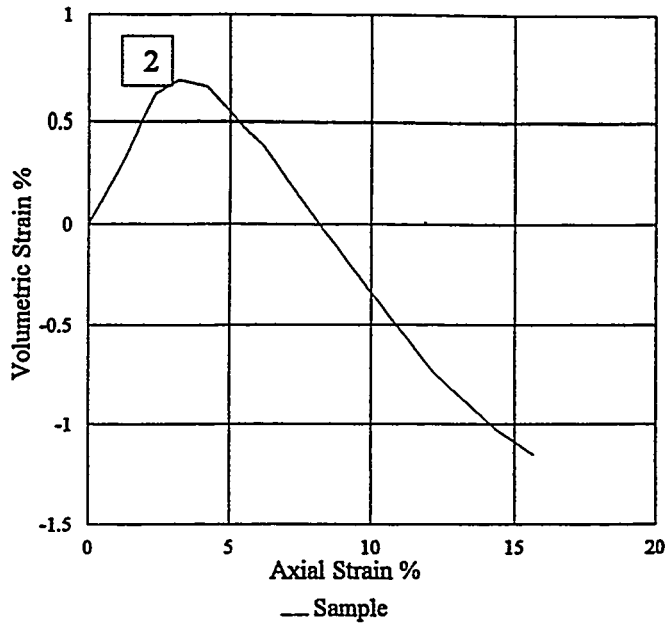
Client: SRS

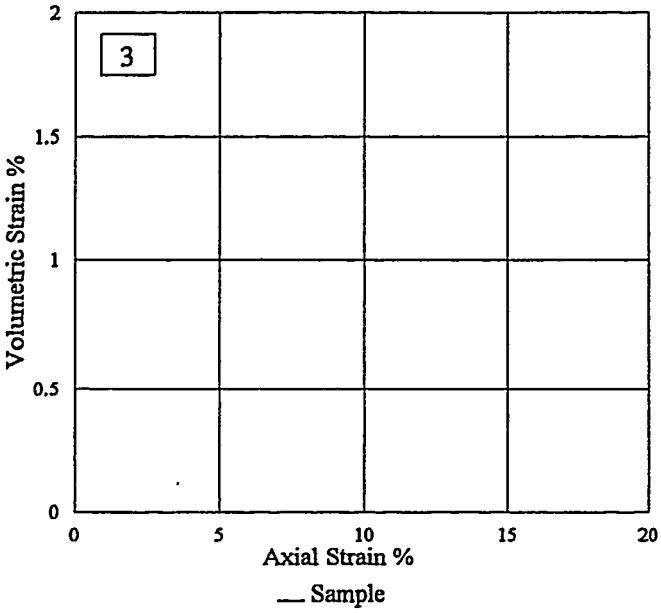
Project: SRS-ITP

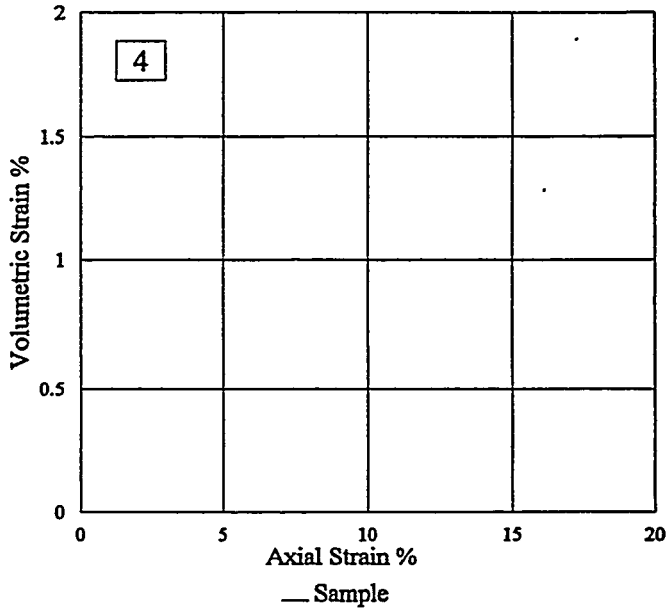
Location: H Bor-2 ST-10 @ 167 FT.

File: 535301Q Project No.: 5810535301 Page 2/2 Fig. No. ____









Client: Westinghouse Savannah River Co.
Project: ITP Geotechnical Testing
Location: H-Bor-2, ST-10 @ 167 ft.
File: Project No.: 5810535301 Page 2 / 2 Fig. No. _____

TRIAXIAL COMPRESSION TEST 2-01-1994
Consolidated drained 11:34 am

Project Data

Project No.: 5810535301 Date: 01/27/94 Data file: 535301Q
Client: SRS
Project: SRS-ITP
Sample location: H Bor-2 ST-10 @ 167 FT.
Sample description: See Grain Size
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.64 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.88	
Height change, in		0.01	
Height, in	6.00	5.99	
Weight, grams	1224.3		
Water volume change, cc		-23.35	
Moisture, %	24.6	27.0	26.1
Dry density, pcf	95.6	96.2	
Saturation, %	89.8	100.0	
Void ratio	0.724	0.713	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 85 psi
Consolidation back pressure = 45 psi
Consolidation effective confining stress = 5.76 ksf
Peak deviator stress = 17.38 ksf at reading no. 7
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	5.76	5.76	1.00	5.76	0.00
1	0.0800	0.080	324.00	324.0	1.3	7.09	5.76	12.85	2.23	9.30	3.54
2	0.1100	0.110	441.00	441.0	1.8	9.60	5.76	15.36	2.67	10.56	4.80
3	0.1400	0.140	528.00	528.0	2.3	11.44	5.76	17.20	2.99	11.48	5.72
[illegible]	0.1900	0.190	630.00	630.0	3.2	13.53	5.76	19.29	3.35	12.52	6.76
	0.2500	0.250	711.00	711.0	4.2	15.11	5.76	20.87	3.62	13.31	7.55

LAW ENGINEERING, INC.

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	0.3700	0.370	810.00	810.0	6.2	16.85	5.76	22.61	3.93	14.19	8.43
7	0.4800	0.480	852.00	852.0	8.0	17.38	5.76	23.14	4.02	14.45	8.69
8	0.6000	0.600	868.00	868.0	10.0	17.32	5.76	23.08	4.01	14.42	8.66
9	0.7300	0.730	870.00	870.0	12.2	16.94	5.76	22.70	3.94	14.23	8.47
10	0.8600	0.860	832.00	832.0	14.4	15.80	5.76	21.56	3.74	13.66	7.90
11	0.9400	0.940	832.00	832.0	15.7	15.56	5.76	21.32	3.70	13.54	7.78

TRIAXIAL COMPRESSION TEST 2-01-1994
Consolidated drained 11:34 am

Project Data

Project No.: 5810535301 Date: 01/27/94 Data file: 535301Q
Client: SRS
Project: SRS-ITP
Sample location: H Bor-2 ST-10 @ 167 FT.
Sample description: See Grain Size
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 2 Data

Type of sample: Undisturbed
Specific Gravity= 2.64 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.86	
Height change, in		0.02	
Height, in	6.00	5.98	
Weight, grams	1204.4		
Water volume change, cc		-24.73	
Moisture, %	25.1	27.6	25.9
Dry density, pcf	94.0	95.3	
Saturation, %	87.8	100.0	
Void ratio	0.753	0.729	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 125 psi
Consolidation back pressure = 45 psi
Consolidation effective confining stress = 11.52 ksf
Peak deviator stress = 31.79 ksf at reading no. 11
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	11.52	11.52	1.00	11.52	0.00
1	0.0100	0.010	97.00	97.0	0.2	2.17	11.52	13.69	1.19	12.60	1.08
2	0.0300	0.030	225.00	225.0	0.5	5.01	11.52	16.53	1.43	14.02	2.50
3	0.0500	0.050	375.00	375.0	0.8	8.32	11.52	19.84	1.72	15.68	4.16
	0.0900	0.090	633.00	633.0	1.5	13.95	11.52	25.47	2.21	18.49	6.97
	0.1300	0.130	831.00	831.0	2.2	18.18	11.52	29.70	2.58	20.61	9.09

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	0.2000	0.200	1065.00	1065.0	3.3	23.03	11.52	34.55	3.00	23.03	11.51
7	0.2700	0.270	1215.00	1215.0	4.5	25.95	11.52	37.47	3.25	24.50	12.98
8	0.3700	0.370	1370.00	1370.0	6.2	28.75	11.52	40.27	3.50	25.89	14.37
9	0.4900	0.490	1500.00	1500.0	8.2	30.80	11.52	42.32	3.67	26.92	15.40
10	0.6200	0.620	1580.00	1580.0	10.4	31.68	11.52	43.20	3.75	27.36	15.84
11	0.8600	0.860	1660.00	1660.0	14.4	31.79	11.52	43.31	3.76	27.42	15.90
12	0.9100	0.910	1660.00	1660.0	15.2	31.48	11.52	43.00	3.73	27.26	15.74

Client Westinghouse Savannah River Co.
Project: ITP Geotechnical Testing
Location: H-Bor-2, ST-10 @ 167 ft.
File: Project No.: 5810535301

No. of Circles
2

Circle No.1					
Consolidation Pressure, ksf	After Consolidation			Burette Cal. Factor	No. of Points
	Diameter, in.	Height, in.	Volume, cc		
5.76	2.88	5.88	626.83	1	13

		Sample		Cell	
LVDT Reading (in)	Axial Strain (in/in)	Burette Reading (div.)	Volumetric Strain (cc/cc)	Burette Reading (div.)	Volumetric Strain (cc/cc)
0.00	0.00	19.0	0.00	3.0	0.00
0.01	0.17	18.7	0.05	3.2	0.04
0.03	0.51	18.0	0.16	3.8	0.14
0.05	0.85	17.0	0.32	4.8	0.31
0.09	1.53	15.1	0.62	6.6	0.62
0.13	2.21	13.7	0.85	7.9	0.85
0.20	3.40	12.0	1.12	9.4	1.12
0.27	4.59	11.4	1.21	9.8	1.22
0.37	6.29	11.4	1.21	9.5	1.23
0.49	8.33	12.4	1.05	8.2	1.08
0.62	10.54	14.1	0.78	6.1	0.81
0.86	14.63	17.8	0.19	1.7	0.23
0.91	15.48	18.3	0.11	1.1	0.16

Client Westinghouse Savannah River Co.
Project: ITP Geotechnical Testing
Location: H-Bor-2, ST-10 @ 167 ft.
File: Project No.: 5810535301

Circle No.2					
Consolidation	After Consolidation			Burette Cal.	No. of
Pressure, ksf	Diameter, in	Height, in.	Volume, cc	Factor	Points
5.76	2.88	5.99	640.33	1	12

		Sample		Cell	
LVDT Reading (in)	Axial Strain (in/in)	Burette Reading (div.)	Volumetric Strain (cc/cc)	Burette Reading (div.)	Volumetric Strain (cc/cc)
0.00	0.00	19.0	0.00	23.0	0.00
0.08	1.34	16.8	0.34	24.8	0.32
0.11	1.84	15.8	0.50	25.7	0.48
0.14	2.34	15.1	0.61	26.2	0.57
0.19	3.17	14.7	0.67	26.3	0.61
0.25	4.17	14.9	0.64	26.0	0.59
0.37	6.18	16.5	0.39	23.8	0.31
0.48	8.01	18.8	0.03	21.2	-0.04
0.60	10.02	21.2	-0.34	18.4	-0.42
0.73	12.19	23.7	-0.73	15.2	-0.85
0.86	14.36	25.6	-1.03	13.2	-1.10
0.94	15.69	26.4	-1.16	11.7	-1.29

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

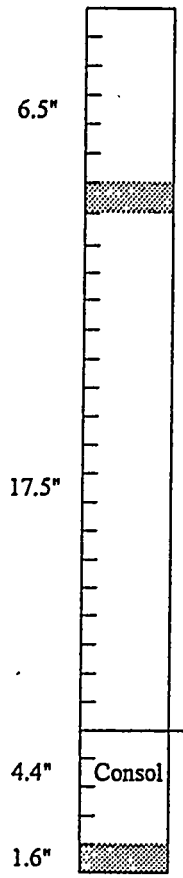
Project: SRS-ITP GEOTECHNICAL TESTING Date: 09-02-93

Boring No: H-Bor-2 Sample No: PS-12 Depth: 173' - 175'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: CLG Checked By: RLB

VISUAL DESCRIPTION



Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b2-ps12.wk3

ATTACHMENT 2

Tested by:	CLG	Reviewed by:	RLB	Law Job No.:	5810535301
Date:	09/02/93	Date:	09/14/93	Job Name:	SRS - ITP

TP-4A: UNIT WEIGHT OF THIN WALL TUBE SAMPLES

"TYPICAL"

Sample: Boring No.: H-Bor-2
Depth: 173' - 175'
Sample ID: PS-12

MEASUREMENTS (Entire Tube):

	FROM TOP OF TUBE PACKER (inches)		FROM TOP OF TUBE SOIL (inches)		FROM BOTTOM OF TUBE PACKER (inches)		FROM BOTTOM OF TUBE SOIL (inches)		TOTAL TUBE LENGTH (inches)		INSIDE DIAMETER OF TUBE (inches)
1.	6.13		6.41		0.85		1.65				
2.	6.11		6.77		0.94		1.56				
3.	6.18		6.48		0.83		1.57				
Avg.:	6.14	L_1 =	6.55		0.87	L_2 =	1.59	L_3 =	29.906 *	D_i =	2.889 *

TOTAL WEIGHT OF TUBE + PACKERS + SOIL	M_1 =	6,517.7	gm
WEIGHT OF PACKERS	M_2 =	152.7 *	gm
TOTAL WEIGHT OF TUBE	M_3 =	1,995.8 *	gm
WET WEIGHT OF SOIL COLUMN, [M_1-M_2-M_3]	M_4 =	4,369.2	gm

* *Denotes information supplied by WSRC/TO*

MOISTURE CONTENTS (From assigned tests of same tube):

MOISTURE CONTENT		
Specimen 1:	29.3	% moisture
Specimen 2:	N/A	% moisture
Specimen 3:	N/A	% moisture
Average, (w):	29.3	% moisture

Notations:

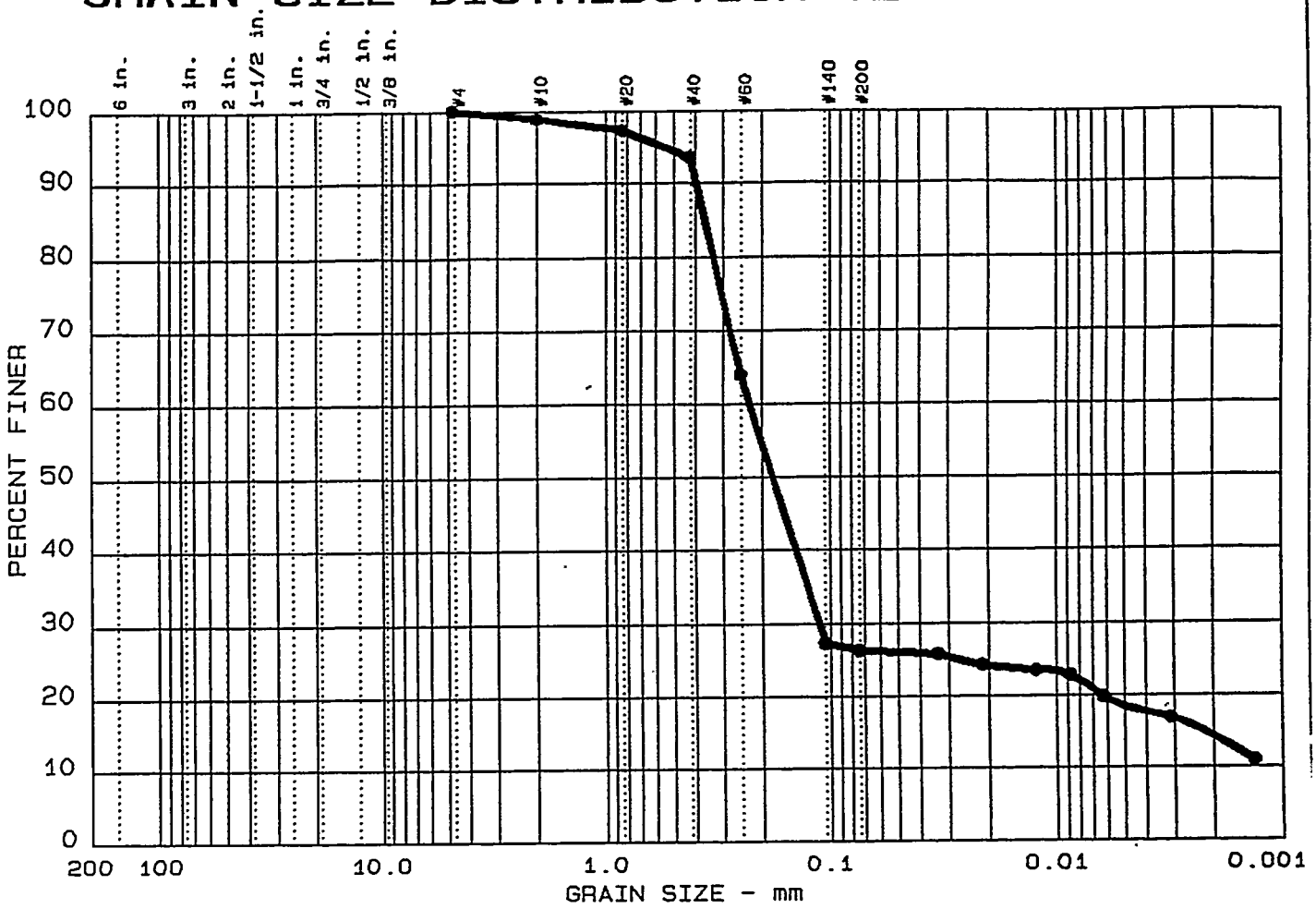
Specimen 1 moisture content obtained from Consolidation test
Specimen 2 moisture content obtained from N/A test
Specimen 3 moisture content obtained from N/A test

CALCULATIONS:

CROSS-SECTIONAL AREA OF TUBE, [pi*(D_i^2)/4]	A_0=	6.56	in.^{2}
LENGTH OF SOIL COLUMN, [L_3 - L_2 - L_1]	L_s =	21.76	in.
VOLUME OF SOIL COLUMN, [L_s*A_0]	V_s =	142.64	in.^{3}
WET DENSITY, [(M_4/V_s)*3.810]	**D_w=**	**116.7**	**pcf**
DRY DENSITY, [D_w/(1+w/100)]	**D_D=**	**90.3**	**pcf**

h:\users\lab\rlb\itp\b2-ps12.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	12	0.0	0.0	73.7	7.8	18.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	43	19	0.36	0.23	0.18	0.112	0.0022			

MATERIAL DESCRIPTION	USCS	AASHTO
● Light Tan Silty Clayey Medium to Fine Sand	SC	A-2-7 (1.0)

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-2 PS-12 @ 173-175 Ft.

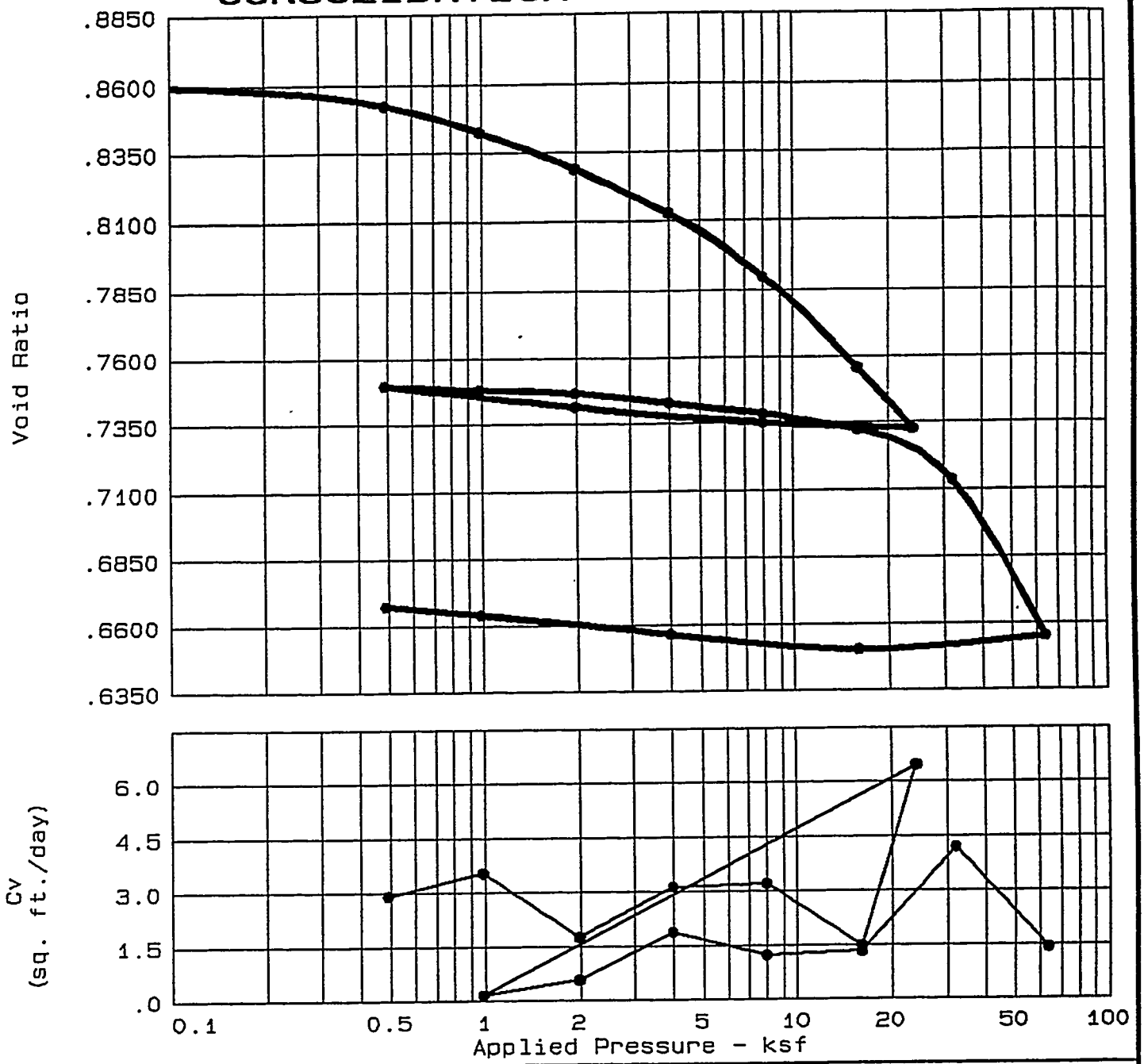
Date: September 23, 1993

Remarks:
Tested by: JRR
Reviewed by: RLB
Consol

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

CONSOLIDATION TEST REPORT



Swell press.	Nat. Sat.	Nat. Moist.	Dry Density	LL	PI	Sp.Gr.	Initial void ratio
	90.5 %	29.3	89.6	43	19	2.66	0.8595

TEST RESULTS

MATERIAL DESCRIPTION

Light Tan Silty Clayey Medium to Fine Sand

Class: SC

Project No.: 5810535301
Project: SRS ITP
Location: H-Bor-2 PS-12
173-175 Ft.
Date: 9/2/93

Remarks:

Tested by: CLG
Reviewed by: RLB

CONSOLIDATION TEST REPORT

LAW ENGINEERING, INC.

Fig. No._____

14:40, 10-13-1993 CONSOLIDATION TEST PROJECT DATA Test No. 14

Project Number:	5810535301
Project:	SRS ITP
Date:	9/2/93
Location 1:	H-Bor-2 PS-12
2:	173-175 Ft.
Remarks 1:	Tested by: CCG
2:	Reviewed by: RLB
3:	
4:	
5:	
Material 1:	Light Tan Silty Clayey
description 2:	Medium to Fine Sand
Classification:	SC
Liquid limit:	43
Plasticity index:	19
Figure Number:	

CONSOLIDATION TEST SPECIMEN DATA

TOTAL SAMPLE	BEFORE TEST	AFTER TEST
Wet w+t = 336.21 g.	Oedometer No. = 9	Wet w+t = 334.73 g.
Dry w+t = 309.26 g	Machine No. = 9	Dry w+t = 309.26 g.
Tare wt. = 217.15 g.	Spec. Gravity = 2.66	Tare wt. = 217.15 g.
Height = 0.90 in.	Height = 0.90 in.	
Diameter = 2.36 in.	Diameter = 2.36 in.	
Weight = 119.06 g.		
Moisture = 29.3 %	Ht. Solids = 0.48 in.	Moisture = 27.7 %
Wet Den. = 115.8 pcf	Dry wt. = 92.42 g.	Dry wt. = 92.11 g. *
Dry Den. = 89.6 pcf	Void ratio = 0.8595	Void ratio = 0.6674
	Saturation = 90.5 %	Saturation = 110. %

* Final dry weight used in calculations

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
Initial	0.02000			0.8595	
0.49	0.02385	0.0003	0.02355	0.8522	0.4 Comprs.
0.99	0.02890	0.0007	0.02820	0.8425	0.9 Comprs.
1.99	0.03630	0.0014	0.03490	0.8286	1.7 Comprs.
3.99	0.04500	0.0023	0.04270	0.8124	2.5 Comprs.
8.00	0.05730	0.0038	0.05350	0.7900	3.7 Comprs.
16.01	0.07560	0.0054	0.07020	0.7553	5.6 Comprs.
24.01	0.08760	0.0064	0.08120	0.7325	6.8 Comprs.
8.00	0.08380	0.0038	0.08000	0.7350	6.7 Comprs.
1.99	0.07840	0.0014	0.07700	0.7412	6.4 Comprs.

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
0.49	0.07330	0.0003	0.07300	0.7495	5.9 Comprs.
0.99	0.07450	0.0007	0.07380	0.7479	6.0 Comprs.
1.99	0.07590	0.0014	0.07450	0.7464	6.1 Comprs.
3.99	0.07870	0.0023	0.07640	0.7425	6.3 Comprs.
8.00	0.08230	0.0038	0.07850	0.7381	6.5 Comprs.
16.01	0.08670	0.0054	0.08130	0.7323	6.8 Comprs.
32.09	0.09780	0.0074	0.09040	0.7134	7.9 Comprs.
63.79	0.13060	0.0121	0.11850	0.6551	11.0 Comprs.
16.01	0.12630	0.0054	0.12090	0.6501	11.3 Comprs.
3.99	0.12020	0.0023	0.11790	0.6563	10.9 Comprs.
0.99	0.11490	0.0007	0.11420	0.6640	10.5 Comprs.
0.49	0.11285	0.0003	0.11255	0.6674	10.3 Comprs.

CONSOLIDATION TEST RESULTS

Compression index = NOT SELECTED
Preconsolidation pressure = NOT SELECTED

Load 0.49 ksf CONSOLIDATION TEST READINGS Load No. 1

Machine Deflection 0.0003

No.	Elapsed Time	Dial Reading
1	0.00	0.02000
2	0.10	0.02300
3	0.29	0.02320
4	0.50	0.02330
5	1.00	0.02340
6	2.00	0.02350
7	4.00	0.02360
8	8.00	0.02370
9	15.00	0.02380
10	30.00	0.02385

Void Ratio: 0.8522 Compression: 0.4 %
D0 = 0.0224 D90 = 0.0230 D100 = 0.0231 T90 = 0.58 min.
Cv @ 0.6 min.= 2.90 sq. feet/day

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

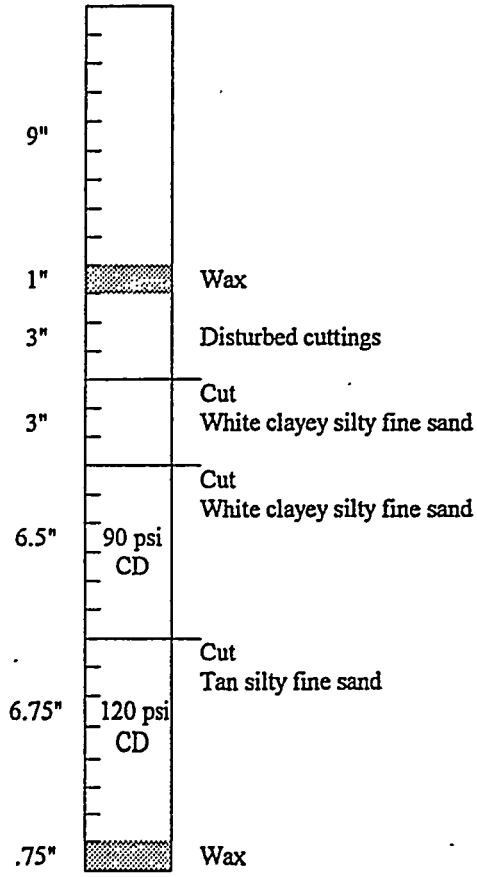
Project: SRS-ITP GEOTECHNICAL TESTING Date: 12-03-93

Boring No: H-Bor-2 Sample No: ST-11 Depth: 183'6"-185'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION

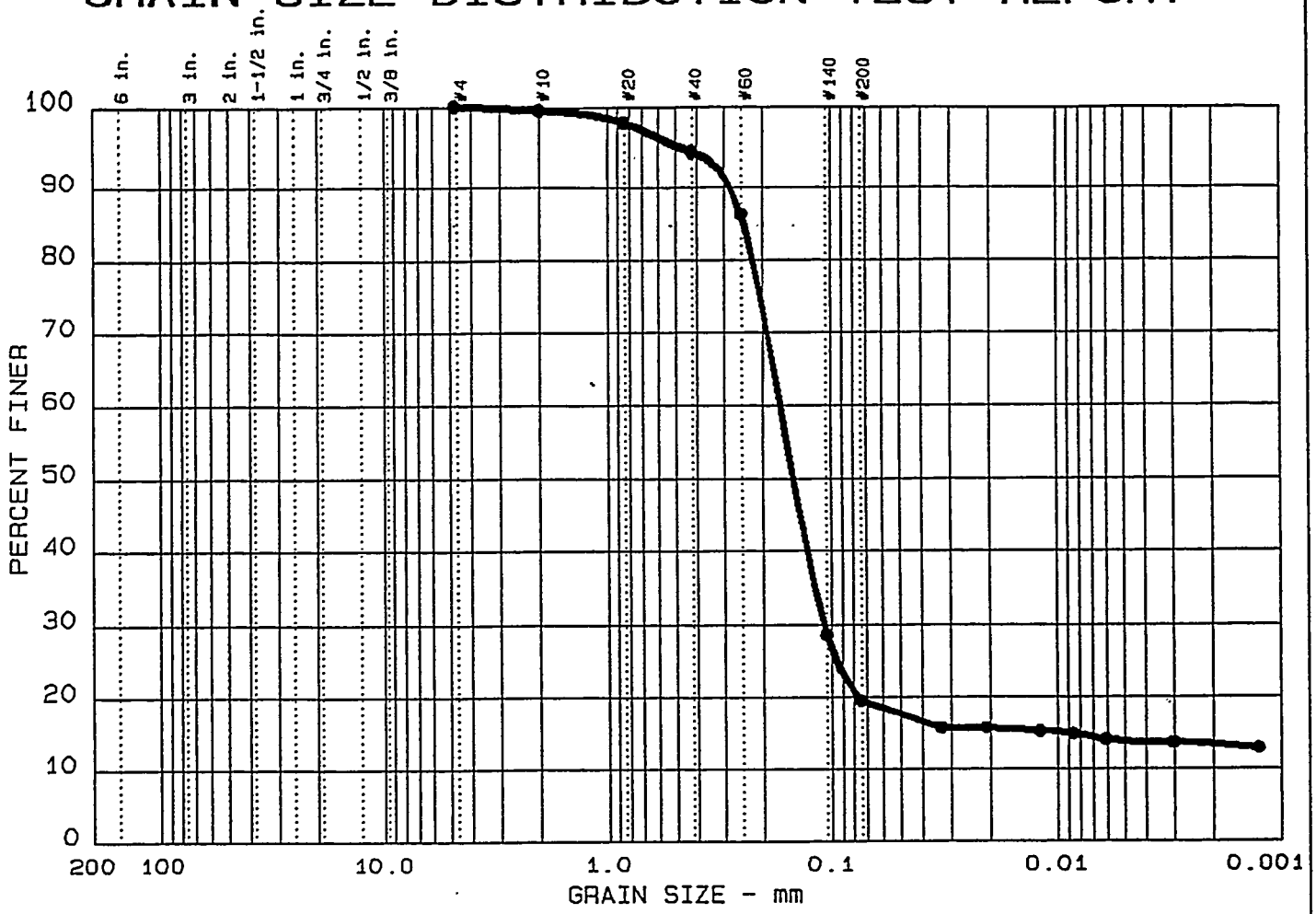


Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b2-st11.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	2	0.0	0.0	80.5	5.7	13.8

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.24	0.17	0.15	0.108	0.0092			

MATERIAL DESCRIPTION	USCS	AASHTO
● White Clayey Sand		

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-2 ST-11 @ 183.5-185 Ft.

Date: January 3, 1994

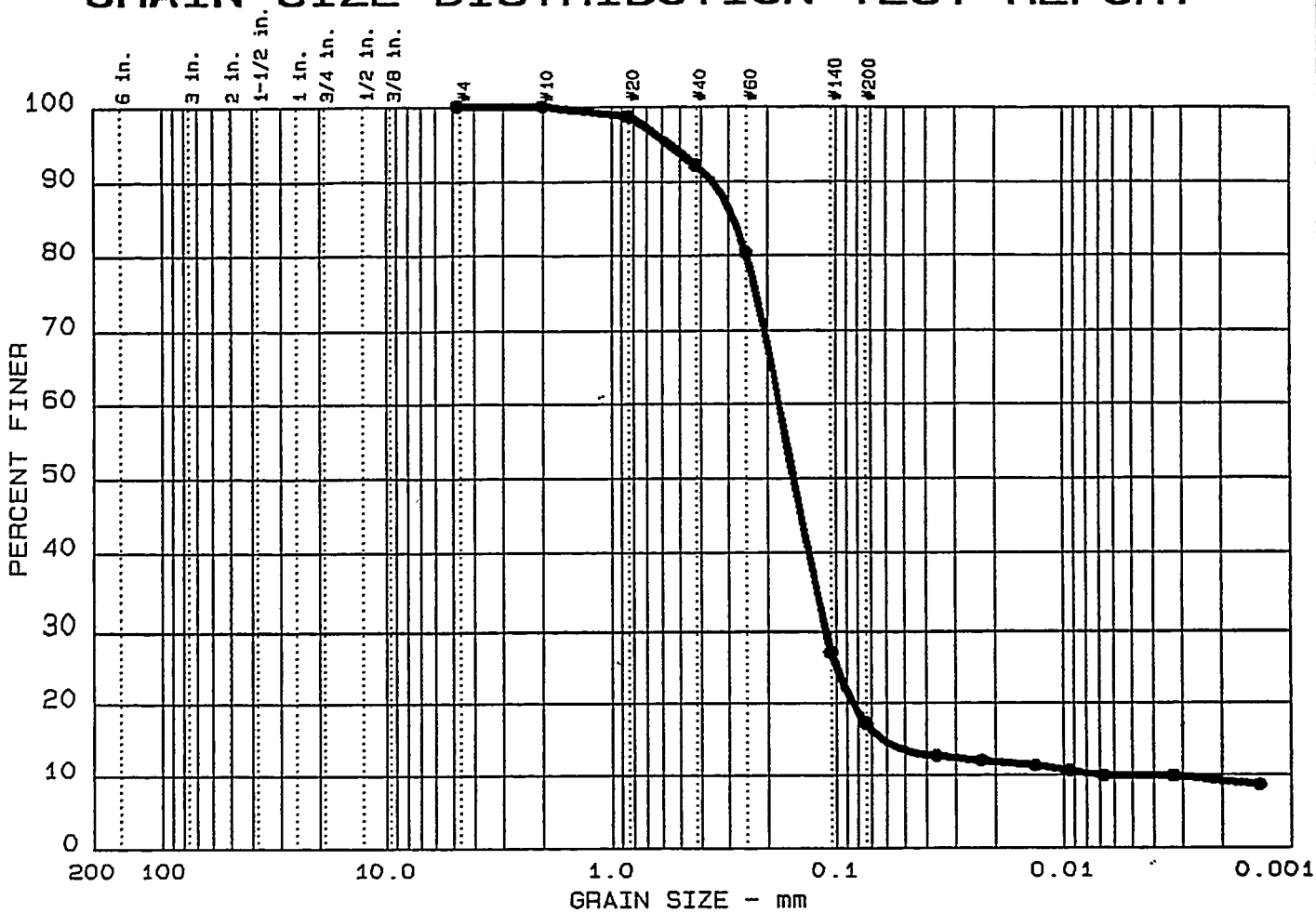
Remarks:
Tested by: JTK Reviewed by: RLS
CD-90 psi
Atterberg Limits-#200
LL=169 PL=35 PI=134

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	8	0.0	0.0	82.7	7.5	9.8

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	35	12	0.28	0.18	0.15	0.111	0.0617	0.0070	9.94	25.3

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Clayey Sand	SC	A-2-6 (0.0)

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-2 ST-11 @ 183.5-185 Ft.

Date: January 19, 1994

Remarks:

Tested by: CLG

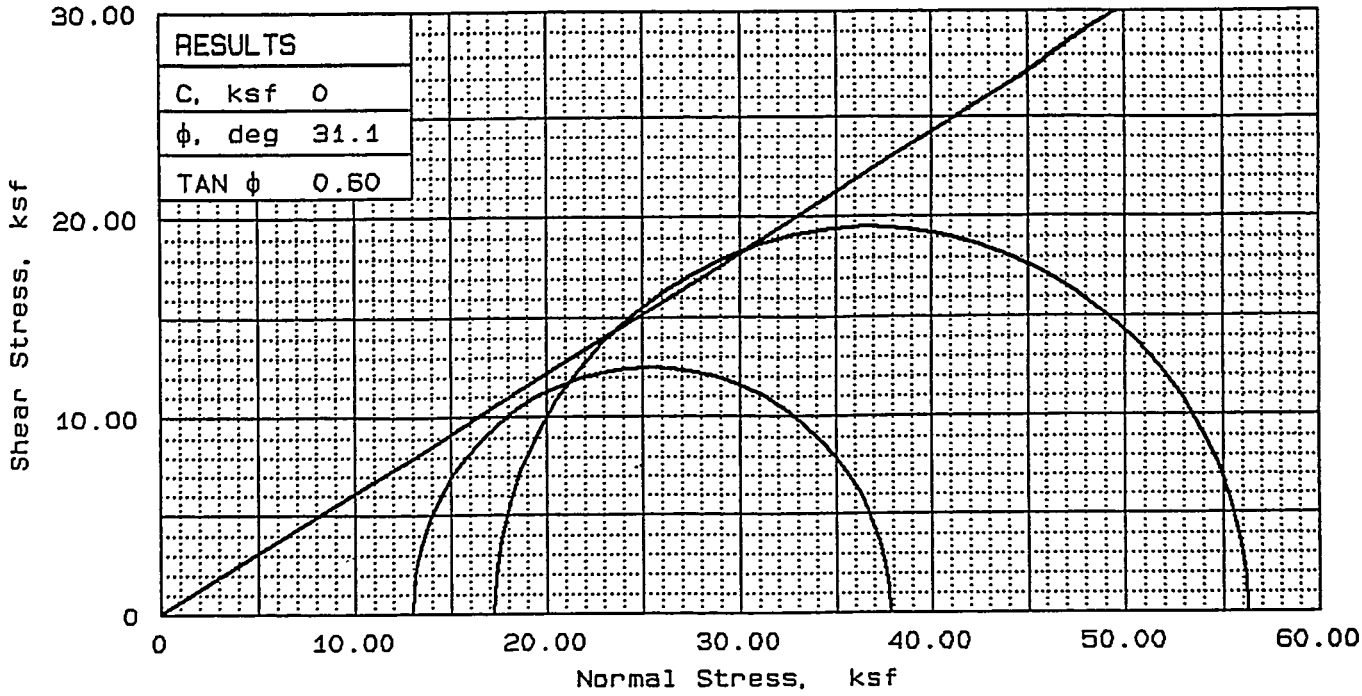
Reviewed by: RLB

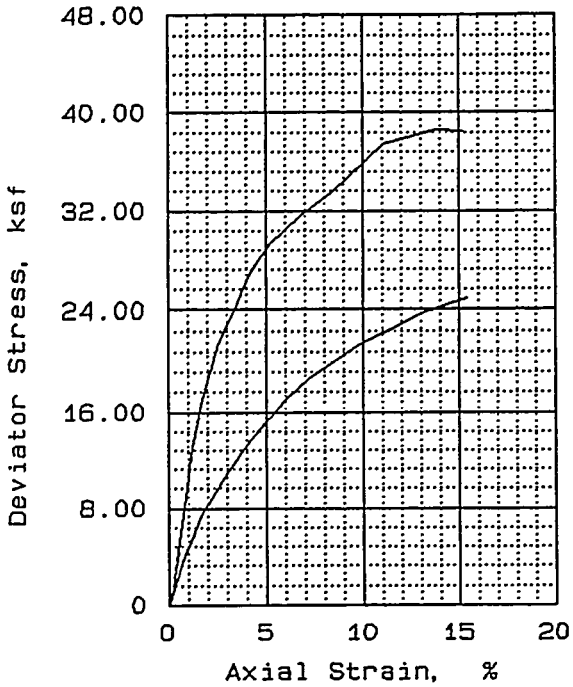
CD-120 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.





	SAMPLE NO.	1	2
INITIAL	WATER CONTENT, %	36.9	30.5
	DRY DENSITY, pcf	82.8	91.9
	SATURATION, %	96.6	101.1
	VOID RATIO	1.029	0.801
	DIAMETER, in	2.88	2.87
	HEIGHT, in	6.00	6.00
AT TEST	WATER CONTENT, %	35.1	28.9
	DRY DENSITY, pcf	86.3	93.7
	SATURATION, %	100.0	100.0
	VOID RATIO	0.945	0.765
	DIAMETER, in	2.82	2.85
	HEIGHT, in	5.98	5.99
BACK PRESSURE, ksf		5.04	5.04
CELL PRESSURE, ksf		18.00	22.32
FAILURE STRESS, ksf		24.90	38.96
PORE PRESSURE, ksf			
STRAIN RATE, %/min.		0.100	
ULTIMATE STRESS, ksf			
PORE PRESSURE, ksf			
σ_1 FAILURE, ksf		37.86	56.24
σ_3 FAILURE, ksf		12.96	17.28

TYPE OF TEST:
Consolidated drained
SAMPLE TYPE: Undisturbed
DESCRIPTION: See Grain Size

REMARKS: Tested by: HEJ

Reviewed by: RLG

FIG. NO.

CLIENT: SRS

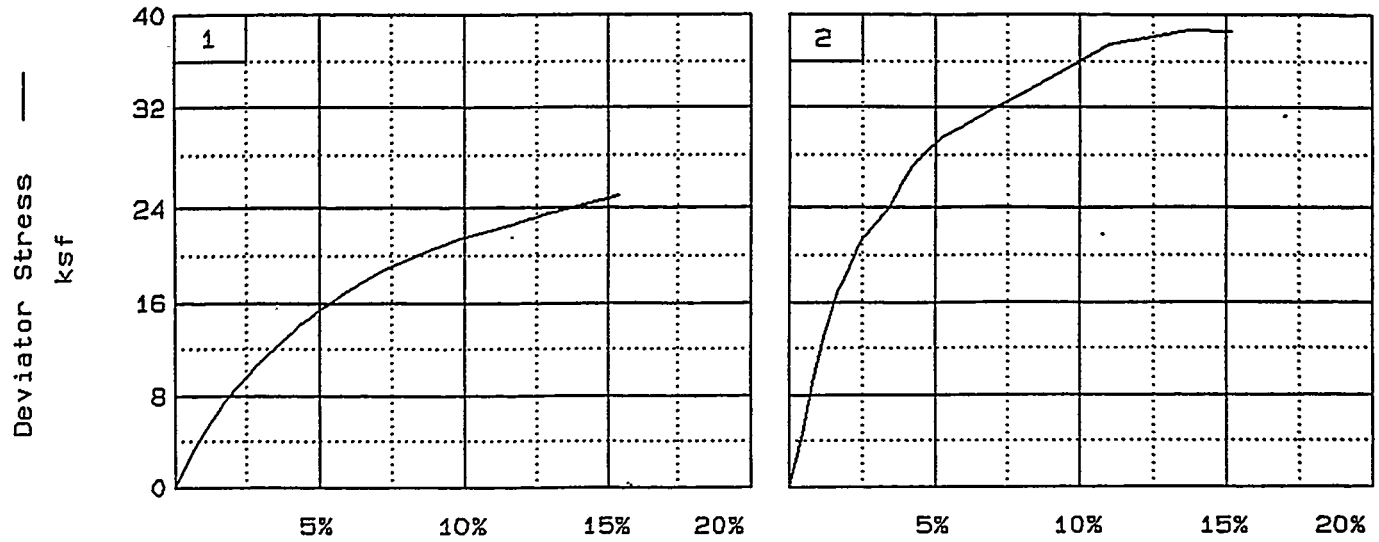
PROJECT: SRS-ITP

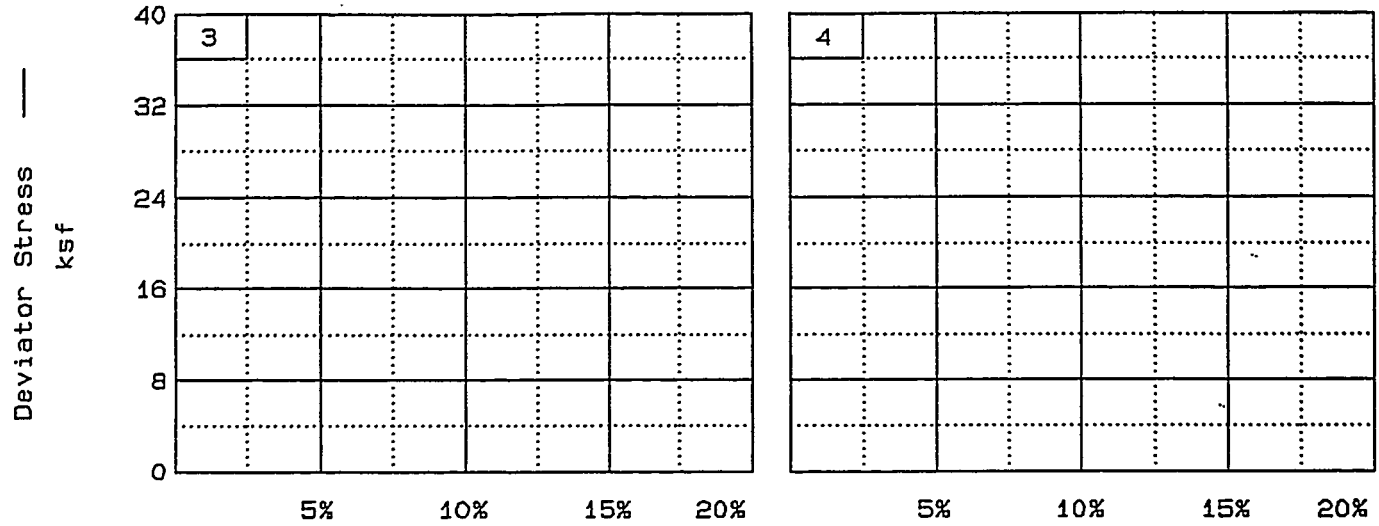
SAMPLE LOCATION: H Bor 2 ST-11 @ 183.5-185 Ft

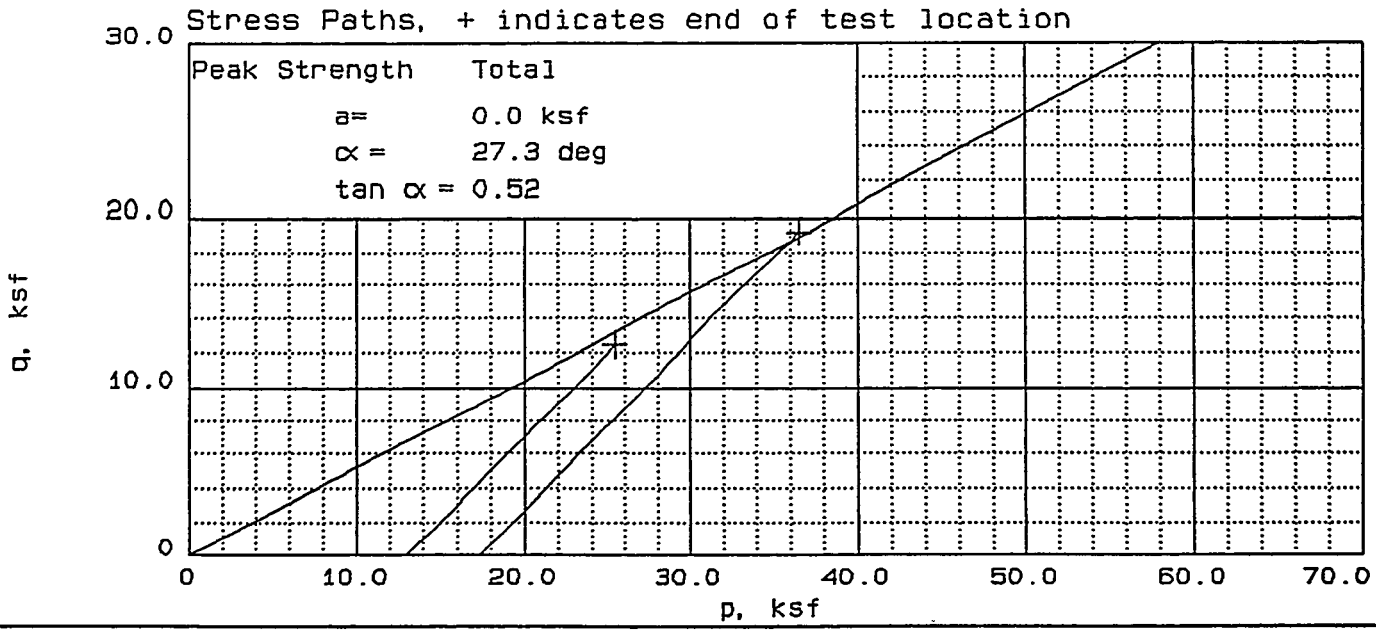
PROJ. NO.: 5810535301 DATE: 01/03/94

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.





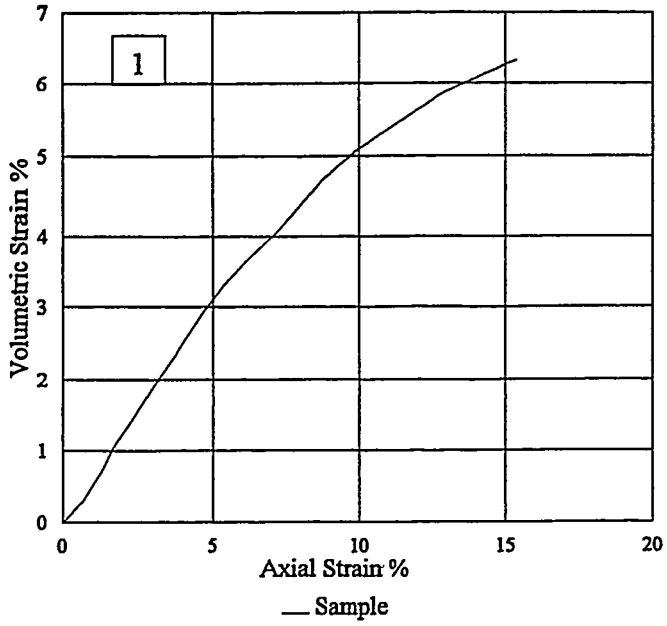


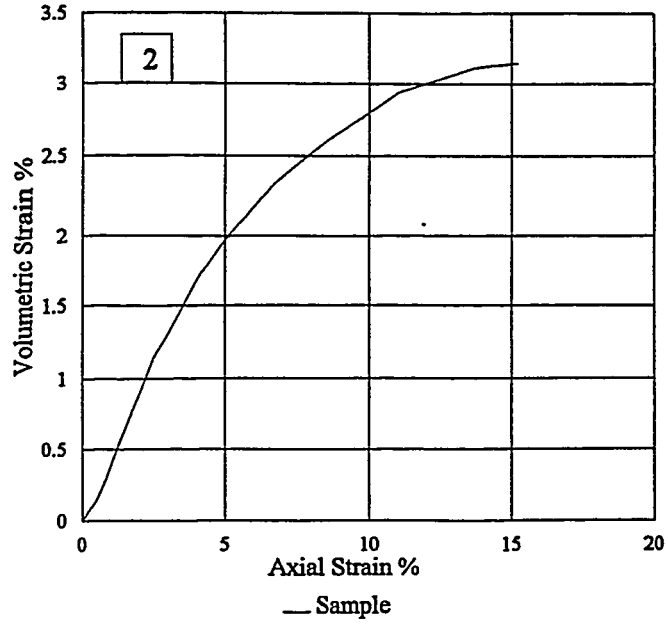
Client: SRS

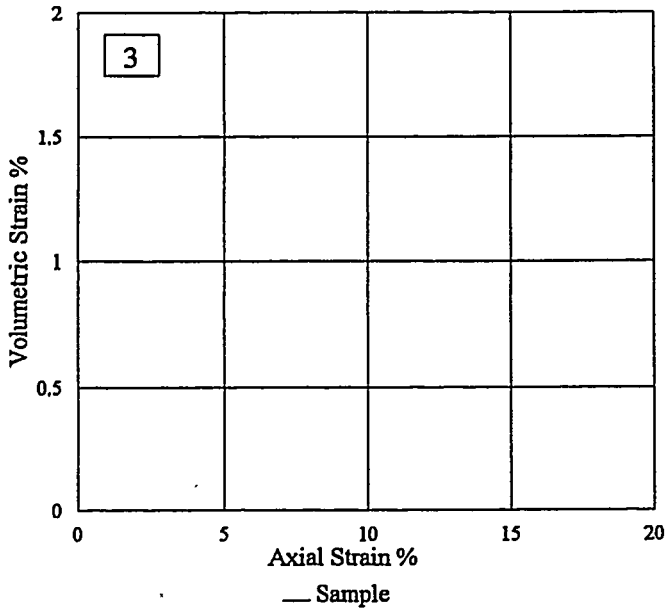
Project: SRS-ITP

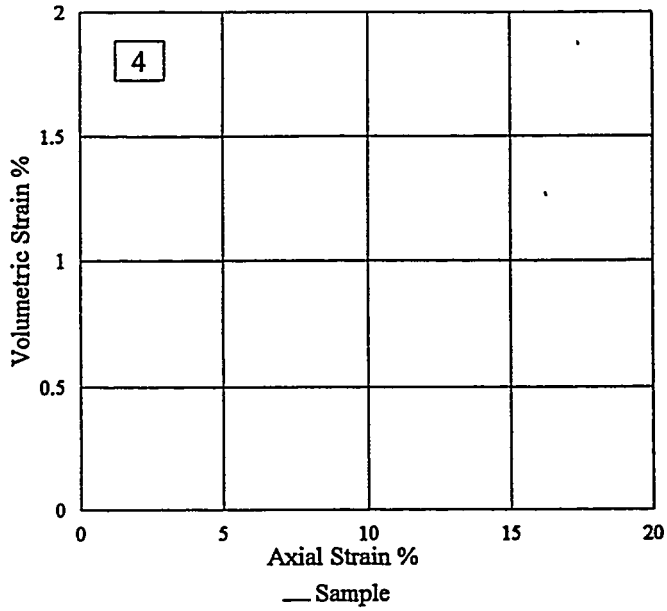
Location: H Bor 2 ST-11 @ 183.5- 185 Ft

File: 535301J Project No.: 5810535301 Page 2/2 Fig. No. ____









Client: Westinghouse Savannah River Co.
Project: ITP Geotechnical Testing
Location: H-Bor-2, ST-11 @ 183.5 - 185 ft.
File: Project No.: 5810535301 Page 2 / 2 Fig. No. _____

TRIAXIAL COMPRESSION TEST
Consolidated drained

2-25-1994
8:11 am

Project Data

Project No.: 5810535301 Date: 01/03/94 Data file: 535301J
Client: SRS
Project: SRS-ITP
Sample location: H Bor 2 ST-11 @ 183.5- 185 Ft
Sample description: See Grain Size
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.69 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.82	
Height change, in		0.02	
Height, in	6.00	5.98	
Weight, grams	1160.5		
Water volume change, cc		15.35	
Moisture, %	36.9	35.1	28.1
Dry density, pcf	82.8	86.3	
Saturation, %	96.6	100.0	
Void ratio	1.029	0.945	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 125 psi
Consolidation back pressure = 35 psi
Consolidation effective confining stress = 12.96 ksf
Peak deviator stress = 24.90 ksf at reading no. 14
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	12.96	12.96	1.00	12.96	0.00
1	0.0400	0.040	150.00	150.0	0.7	3.43	12.96	16.39	1.26	14.68	1.72
2	0.0750	0.075	252.00	252.0	1.3	5.73	12.96	18.69	1.44	15.83	2.87
3	0.1000	0.100	328.00	328.0	1.7	7.43	12.96	20.39	1.57	16.67	3.71
	1800	0.180	492.00	492.0	3.0	10.99	12.96	23.95	1.85	18.45	5.49
	2200	0.220	570.00	570.0	3.7	12.64	12.96	25.60	1.98	19.28	6.32

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	0.2600	0.260	640.00	640.0	4.3	14.10	12.96	27.06	2.09	20.01	7.05
7	0.3000	0.300	702.00	702.0	5.0	15.36	12.96	28.32	2.18	20.64	7.68
8	0.3600	0.360	789.00	789.0	6.0	17.08	12.96	30.04	2.32	21.50	8.54
9	0.4300	0.430	876.00	876.0	7.2	18.72	12.96	31.68	2.44	22.32	9.36
10	0.5200	0.520	966.00	966.0	8.7	20.31	12.96	33.27	2.57	23.12	10.16
11	0.5900	0.590	1032.00	1032.0	9.9	21.42	12.96	34.38	2.65	23.67	10.71
12	0.6800	0.680	1104.00	1104.0	11.4	22.53	12.96	35.49	2.74	24.23	11.27
13	0.7700	0.770	1176.00	1176.0	12.9	23.60	12.96	36.56	2.82	24.76	11.80
14	0.9200	0.920	1278.00	1278.0	15.4	24.90	12.96	37.86	2.92	25.41	12.45

TRIAXIAL COMPRESSION TEST
Consolidated drained

2-01-1994
1:50 pm

Project Data

Project No.: 5810535301 Date: 01/03/94 Data file: 535301J
Client: SRS
Project: SRS-ITP
Sample location: H Bor 2 ST-11 @ 183.5- 185 Ft
Sample description: See Grain Size
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 2 Data

Type of sample: Undisturbed
Specific Gravity= 2.65 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.87	2.85	
Height change, in		0.02	
Height, in	6.00	5.99	
Weight, grams	1224.5		
Water volume change, cc		15.69	
Moisture, %	30.5	28.9	24.9
Dry density, pcf	91.9	93.7	
Saturation, %	101.1	100.0	
Void ratio	0.801	0.765	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units

Consolidation cell pressure = 155 psi
Consolidation back pressure = 35 psi
Consolidation effective confining stress = 17.28 ksf
Peak deviator stress = 38.96 ksf at reading no. 13
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	17.28	17.28	1.00	17.28	0.00
1	0.0100	0.010	60.00	60.0	0.2	1.35	17.28	18.63	1.08	17.96	0.68
2	0.0300	0.030	232.50	232.5	0.5	5.23	17.28	22.51	1.30	19.89	2.61
3	0.0500	0.050	399.00	399.0	0.8	8.94	17.28	26.22	1.52	21.75	4.47
	0.0700	0.070	584.00	584.0	1.2	13.05	17.28	30.33	1.76	23.80	6.52
	0.1000	0.100	753.00	753.0	1.7	16.74	17.28	34.02	1.97	25.65	8.37

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	0.1500	0.150	975.00	975.0	2.5	21.49	17.28	38.77	2.24	28.02	10.74
	0.2000	0.200	1092.00	1092.0	3.3	23.86	17.28	41.14	2.38	29.21	11.93
8	0.2500	0.250	1248.00	1248.0	4.2	27.03	17.28	44.31	2.56	30.80	13.52
9	0.3100	0.310	1368.00	1368.0	5.2	29.32	17.28	46.60	2.70	31.94	14.66
10	0.4000	0.400	1494.00	1494.0	6.7	31.52	17.28	48.80	2.82	33.04	15.76
11	0.5000	0.500	1620.00	1620.0	8.4	33.56	17.28	50.84	2.94	34.06	16.78
12	0.6600	0.660	1860.00	1860.0	11.0	37.41	17.28	54.69	3.16	35.99	18.71
13	0.8200	0.820	1980.00	1980.0	13.7	38.63	17.28	55.91	3.24	36.59	19.31
14	0.9100	0.910	2010.00	2010.0	15.2	38.53	17.28	55.81	3.23	36.54	19.26

Client Westinghouse Savannah River Co.
Project: ITP Geotechnical Testing
Location: H-Bor-2, ST-11 @ 183.5 - 185 ft.
File: Project No.: 5810535301

No. of Circles
2

Circle No.1					
Consolidation Pressure, ksf	After Consolidation			Burette Cal. Factor	No. of Points
	Diameter, in.	Height, in.	Volume, cc		
12.96	2.88	5.98	637.05	0.34	15

		Sample		Cell	
LVDT Reading (in)	Axial Strain (in/in)	Burette Reading (div.)	Volumetric Strain (cc/cc)	Burette Reading (div.)	Volumetric Strain (cc/cc)
0.00	0.00	5.0	0.00	not measured	
0.04	0.67	10.5	0.29		
0.08	1.25	17.6	0.67		
0.10	1.67	24.0	1.01		
0.18	3.01	40.5	1.89		
0.22	3.68	48.2	2.31		
0.26	4.35	56.3	2.74		
0.30	5.02	63.1	3.10		
0.36	6.02	72.3	3.59		
0.43	7.19	81.3	4.07		
0.52	8.70	92.6	4.68		
0.59	9.87	100.0	5.07		
0.68	11.37	107.5	5.47		
0.77	12.88	114.8	5.86		
0.92	15.38	123.5	6.32		

Client Westinghouse Savannah River Co.
Project: ITP Geotechnical Testing
Location: H-Bor-2, ST-11 @ 183.5 - 185 ft.
File: Project No.: 5810535301

Circle No.2					
Consolidation Pressure, ksf	After Consolidation			Burette Cal. Factor	No. of Points
	Diameter, in	Height, in.	Volume, cc		
17.28	2.87	5.99	635.81	1	15

		Sample		Cell	
LVDT Reading (in)	Axial Strain (in/in)	Burette Reading (div.)	Volumetric Strain (cc/cc)	Burette Reading (div.)	Volumetric Strain (cc/cc)
0.00	0.00	24.0	0.00	13.5	0.00
0.01	0.17	23.7	0.05	13.6	0.02
0.03	0.50	23.1	0.14	14.0	0.09
0.05	0.84	22.1	0.30	15.1	0.28
0.07	1.17	21.0	0.47	15.6	0.37
0.10	1.67	19.4	0.72	17.4	0.66
0.15	2.51	16.7	1.15	20.3	1.15
0.20	3.34	14.9	1.43	21.5	1.36
0.25	4.18	13.0	1.73	23.8	1.75
0.31	5.18	11.2	2.01	23.6	1.75
0.40	6.68	9.3	2.31	23.8	1.82
0.50	8.35	7.6	2.58	24.6	2.00
0.66	11.03	5.3	2.94	25.8	2.27
0.82	13.70	4.2	3.11	26.3	2.43
0.91	15.20	4.0	3.15	25.8	2.39

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

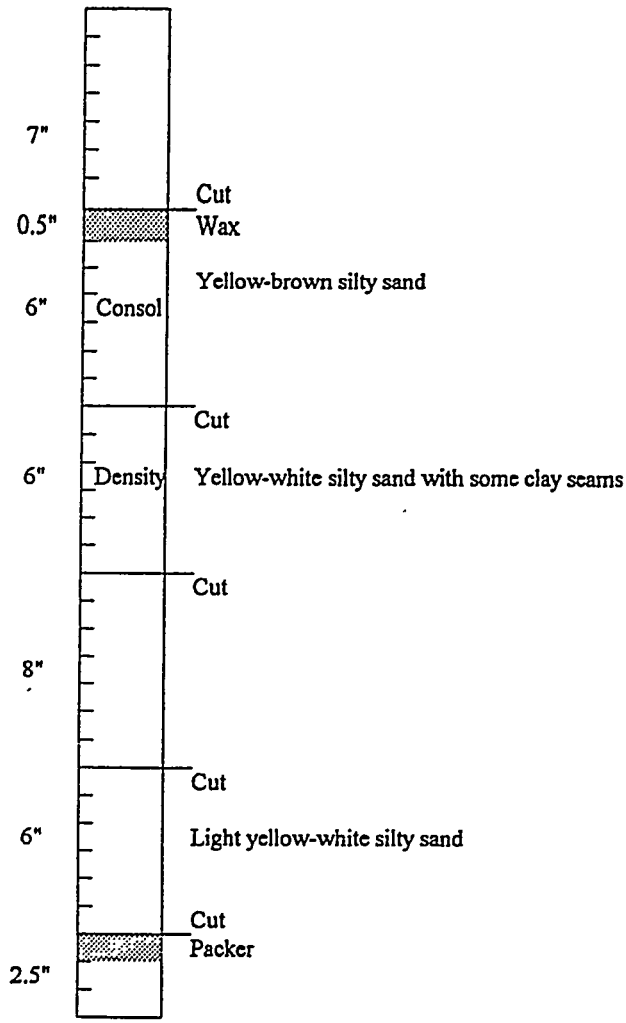
Project: SRS-ITP GEOTECHNICAL TESTING Date: 08-10-93

Boring No: H-Bor-2 Sample No: ST-13 Depth: 193'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 36.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION



Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b2-st13.wk3

ATTACHMENT 3

Tested by:	JTK	Reviewed by:	RLB	Law Job No.	5810535301
Date:	12/02/93	Date:	12/13/93	Job Name	SRS - ITP

TP-4A: UNIT WEIGHT OF SAMPLE
"TYPICAL"

Sample: Boring No.: H-Bor-2
Depth: 193' - 195.5'
Sample ID: ST-13

MEASUREMENTS (Nominal 6-inch cut sample height):

TOTAL SAMPLE HEIGHT (inches)		INSIDE DIAMETER OF CUT TUBE (inches)	
1	6.052		
2	6.062	top	2.867
3	6.057	bottom	2.862
Avg.	6.057 (H)	Avg.	2.865 (D)

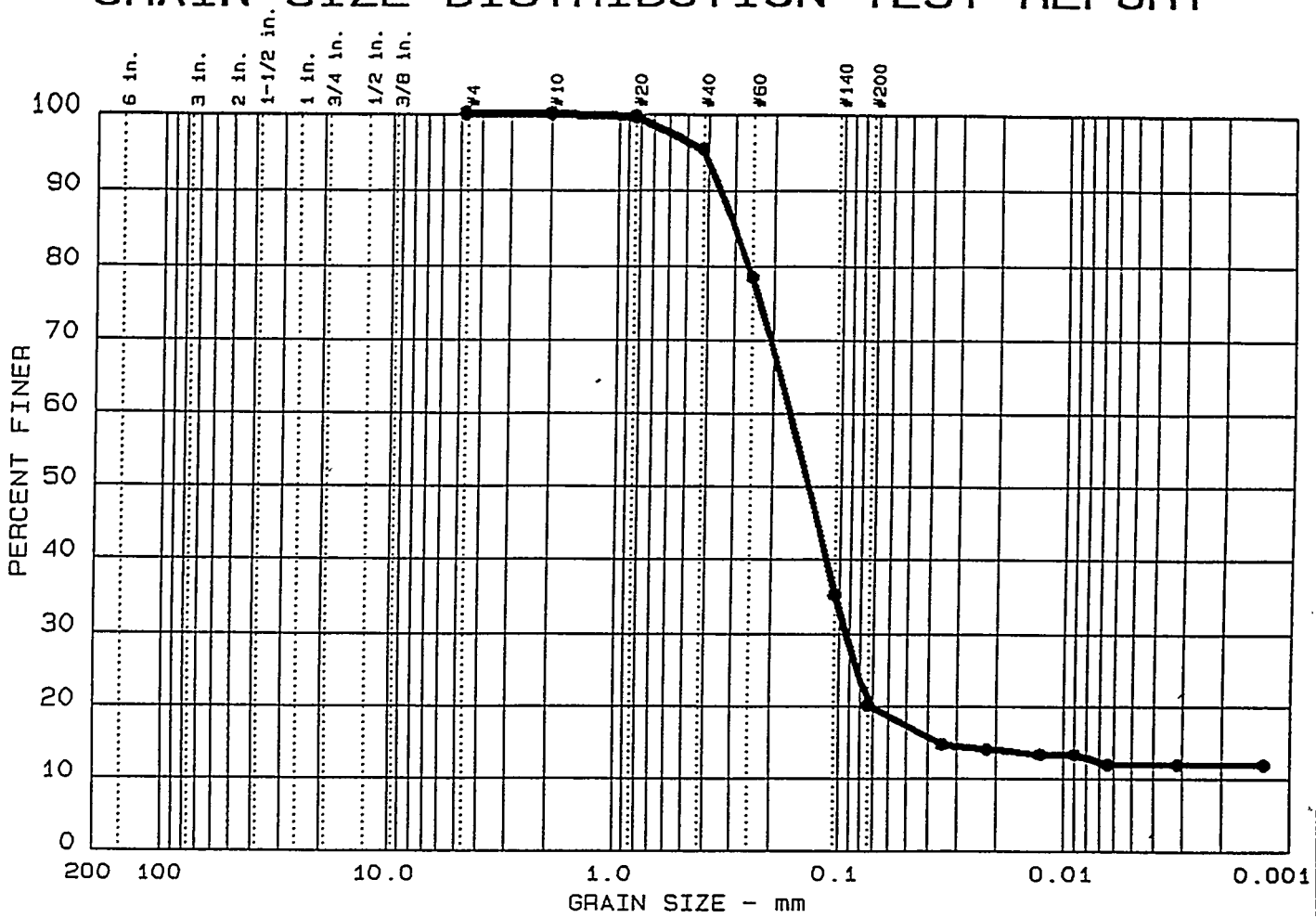
MOISTURE CONTENT DETERMINATION

MOISTURE CONTENT	
Tare No.	R-21
Tare Weight	16.68 gm
Wet Wt. + Tare	105.46 gm
Dry Wt. + Tare	87.04 gm
Wt. of Water	18.42 gm
Dry Weight	70.36 gm
Moisture Content, w	26.2 %

TOTAL WEIGHT OF SOIL + TUBE SECTION	W_{s+t} =	1638.8 gm
WEIGHT OF CLEAN, DRY TUBE SECTION	W_t =	415.77 gm
WET WEIGHT OF SOIL, $[(W_{s+t} - W_t)/454]$	W_s =	2.694 lbs
VOLUME OF SAMPLE, $[(pi*D^2/4)*H/1728]$	V =	0.023 ft^3
WET DENSITY, $[W_s/V]$	D_w=	119.3 pcf
DRY DENSITY, $[D_w/(1+w/100)]$	D_D=	94.5 pcf

h:\users\lab\rlb\itp\sampdens\h2-st13.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	5	0.0	0.0	79.8	8.2	12.0

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	37	13	0.30	0.17	0.14	0.093	0.0354			

MATERIAL DESCRIPTION	USCS	AASHTO
● Yellow-Tan Silty Clayey Medium to Fine Sand	SC	A-2-6 (0.2)

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-2 ST-13 @ 193-195.6 FT.

Date: September 23, 1993

Remarks:

Tested by: JRR

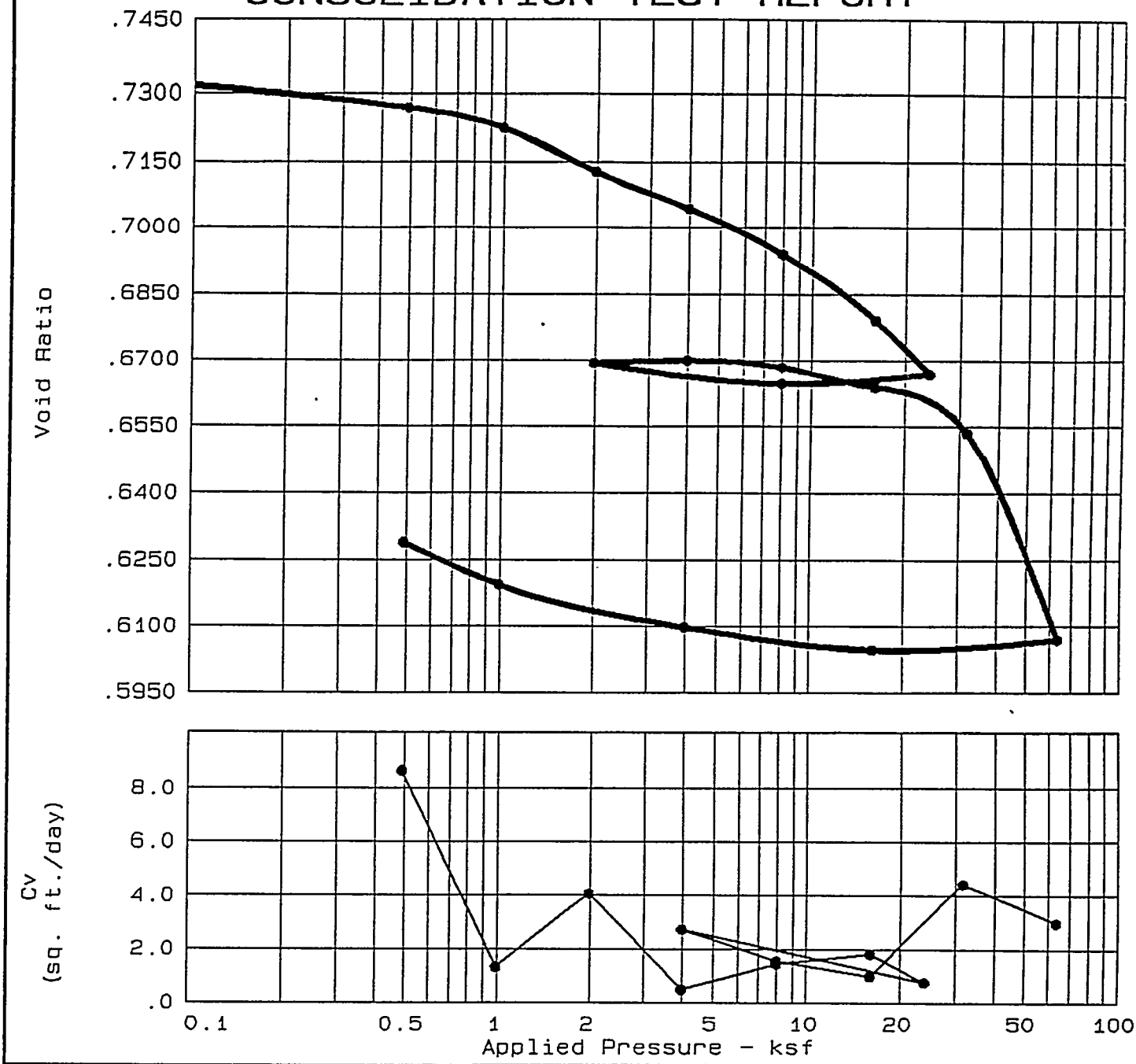
Reviewed by: RLB

Consol

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

CONSOLIDATION TEST REPORT



Swell press.	Nat. Sat.	Nat. Moist.	Dry Density	LL	PI	Sp.Gr.	Initial void ratio
	96.0 %	26.2	96.6	37	13	2.68	0.7315

TEST RESULTS	MATERIAL DESCRIPTION
	Yellow Tan silty Clayey Medium to Fine Sand Class: SC
Project No.: 5810535301 Project: SRS ITP Location: H-Bor-2 ST-13 193-195.5 Ft. Date: 8/17/93	Remarks: Tested by: CCF Reviewed by: RLB
CONSOLIDATION TEST REPORT LAW ENGINEERING, INC.	Fig. No._____

15:56, 10-13-1993 CONSOLIDATION TEST PROJECT DATA Test No. 6

roject Number:	5810535301
.roject:	SRS ITP
Date:	8/17/93
Location 1:	H Bor -2
2:	ST-13 193-195.5 Ft.
Remarks 1:	Tested by: CLG
2:	Reviewed by: RLJ
3:	
4:	
5:	
Material 1:	Yellow Tan silty Clayey
description 2:	Medium to Fine Sand
Classification:	SC
Liquid limit:	37
Plasticity index:	13
Figure Number:	

CONSOLIDATION TEST SPECIMEN DATA

TOTAL SAMPLE	BEFORE TEST	AFTER TEST
Wet w+t = 344.45 g.	Oedometer No. = 8	Wet w+t = 342.78 g.
Dry w+t = 318.50 g	Machine No. = 8	Dry w+t = 318.50 g.
Tare wt. = 219.42 g.	Spec. Gravity = 2.68	Tare wt. = 219.42 g.
Height = 0.89 in.	Height = 0.89 in.	
. eter = 2.36 in.	Diameter = 2.36 in.	
Weight = 125.03 g.		
Moisture = 26.2 %	Ht. Solids = 0.52 in.	Moisture = 24.5 %
Wet Den. = 121.9 pcf	Dry wt. = 99.08 g.	Dry wt. = 99.08 g. *
Dry Den. = 96.6 pcf	Void ratio = 0.7315	Void ratio = 0.6289
	Saturation = 96.0 %	Saturation = 104. %

* Final dry weight used in calculations

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
Initial	0.02000			0.7315	
0.49	0.02275	0.0003	0.02245	0.7267	0.3 Comprs.
0.99	0.02550	0.0007	0.02480	0.7222	0.5 Comprs.
1.99	0.03110	0.0014	0.02970	0.7127	1.1 Comprs.
3.98	0.03680	0.0027	0.03410	0.7041	1.6 Comprs.
7.99	0.04400	0.0046	0.03940	0.6939	2.2 Comprs.
15.99	0.05420	0.0071	0.04710	0.6789	3.0 Comprs.
24.00	0.06210	0.0087	0.05340	0.6667	3.7 Comprs.
7.99	0.05910	0.0046	0.05450	0.6646	3.9 Comprs.
1.99	0.05350	0.0014	0.05210	0.6692	3.6 Comprs.

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
3.98	0.05450	0.0027	0.05180	0.6698	3.6 Comprs.
7.99	0.05720	0.0046	0.05260	0.6683	3.7 Comprs.
15.99	0.06200	0.0071	0.05490	0.6638	3.9 Comprs.
31.78	0.07050	0.0103	0.06020	0.6535	4.5 Comprs.
63.45	0.09740	0.0131	0.08430	0.6068	7.2 Comprs.
15.99	0.09260	0.0071	0.08550	0.6045	7.3 Comprs.
3.98	0.08550	0.0027	0.08280	0.6097	7.0 Comprs.
0.99	0.07845	0.0007	0.07775	0.6195	6.5 Comprs.
0.49	0.07320	0.0003	0.07290	0.6289	5.9 Comprs.

CONSOLIDATION TEST RESULTS

Compression index = NOT SELECTED
Preconsolidation pressure = NOT SELECTED

Load 0.49 ksf CONSOLIDATION TEST READINGS Load No. 1

Machine Deflection 0.0003

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.02000	11	60.00	0.02210
2	0.10	0.02120	12	190.00	0.02235
3	0.25	0.02135	13	1476.00	0.02275
4	0.50	0.02145			
5	1.00	0.02150			
6	2.00	0.02160			
7	4.00	0.02170			
8	8.00	0.02180			
9	15.00	0.02190			
10	30.00	0.02200			

Void Ratio: 0.7267 Compression: 0.3 %
D0 = 0.0206 D90 = 0.0210 D100 = 0.0211 T90 = 0.20 min.
Cv @ 0.2 min.= 8.63 sq. feet/day

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

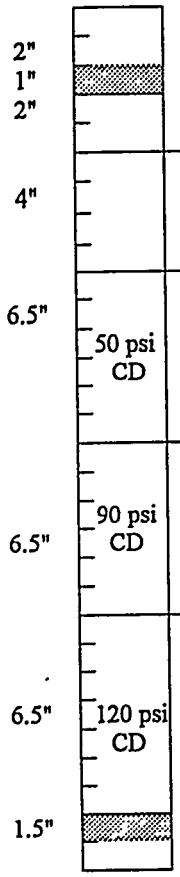
Project: SRS-ITP GEOTECHNICAL TESTING Date: 01-04-94

Boring No: H-Bor-2 Sample No: ST-14 Depth: 200'-202'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION



Disturbed cuttings

Cut
Light brown/tan clayey fine sand

Cut
Light brown/tan clayey fine sand

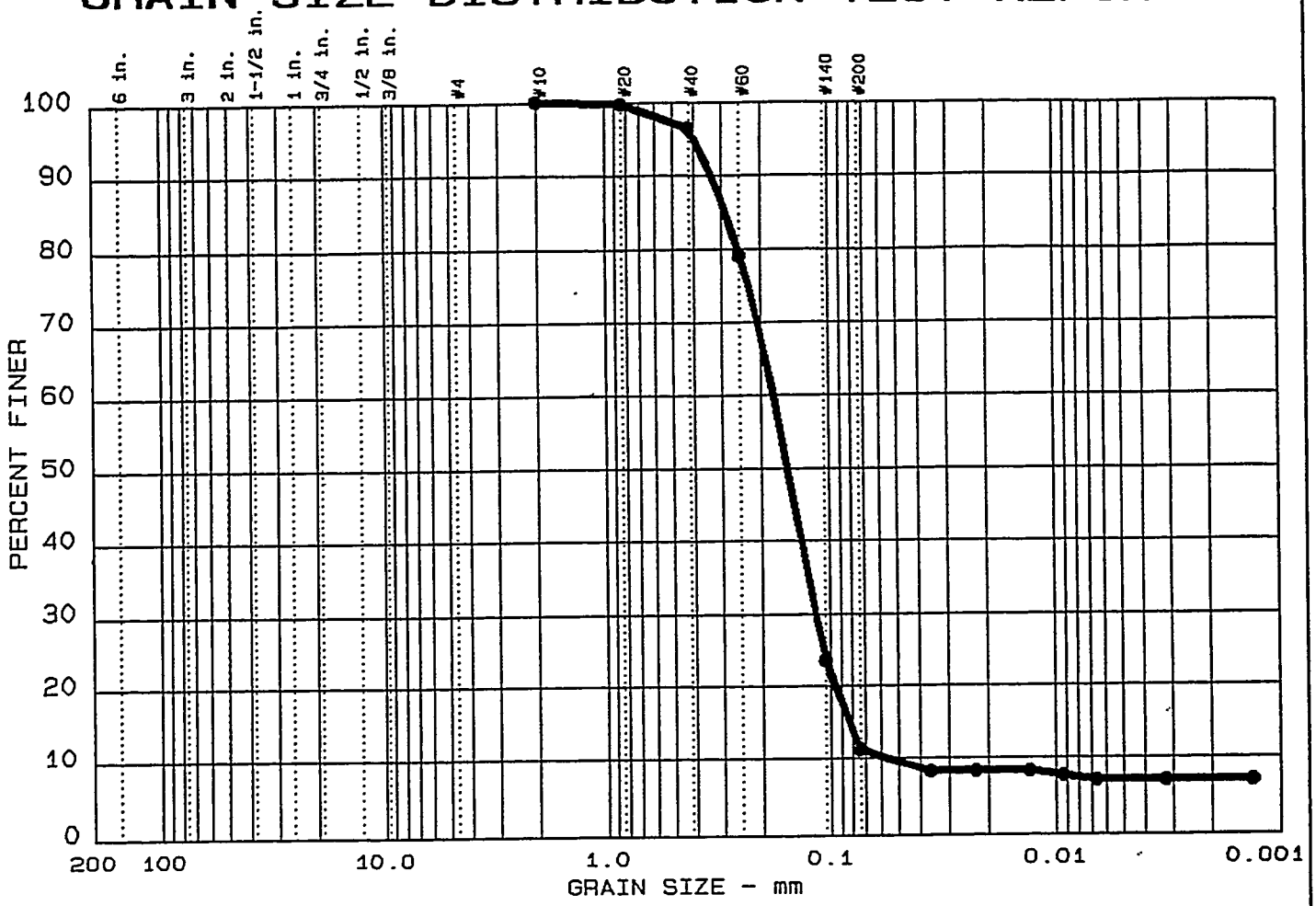
Cut
Light brown/tan clayey fine sand

Cut
Light tan clayey fine sand

Packer

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	6	0.0	0.0	88.9	4.3	6.8

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.29	0.18	0.15	0.116	0.0826	0.0558	1.36	3.2

MATERIAL DESCRIPTION	USCS	AASHTO
● Yellow Brown Poorly Graded Sand with Clay		

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-2 ST-14 @ 200-202 Ft.

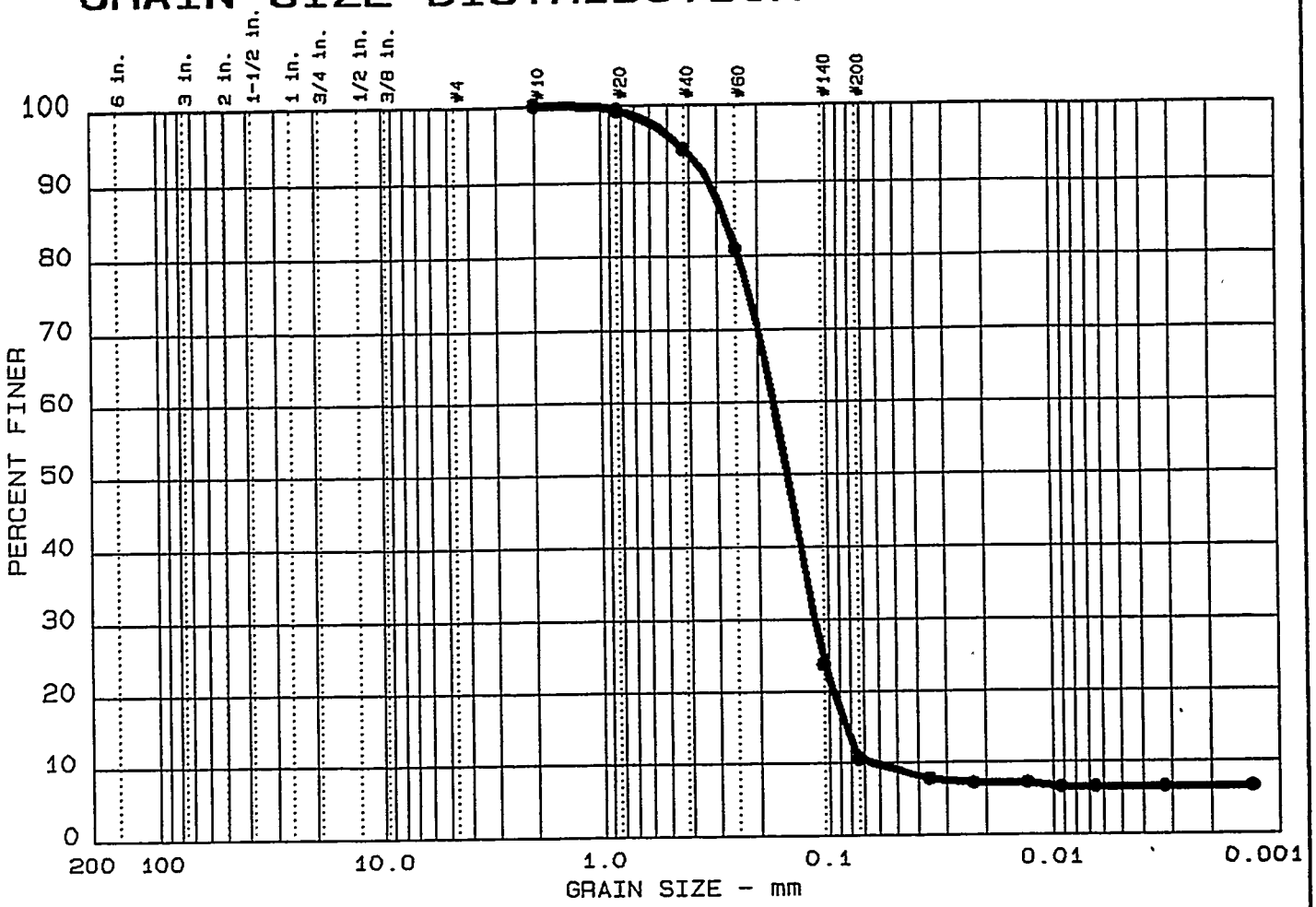
Date: January 19, 1994

Remarks:
Tested by: CLG Chkd by: RLB
CD-50 psi
Atterberg Limits -200
LL=127 PL=26 PI=101

GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	11	0.0	0.0	89.5	4.0	6.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	NL	NP	0.27	0.17	0.15	0.115	0.0831	0.0652	1.18	2.6

MATERIAL DESCRIPTION	USCS	AASHTO
● Yellow Brown Poorly Graded Sand with Silt	SP-SM	A-3

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-2 ST-14 @ 200-202 Ft.

Date: January 19, 1994

Remarks:

Tested by: CLG

Reviewed by: RLB

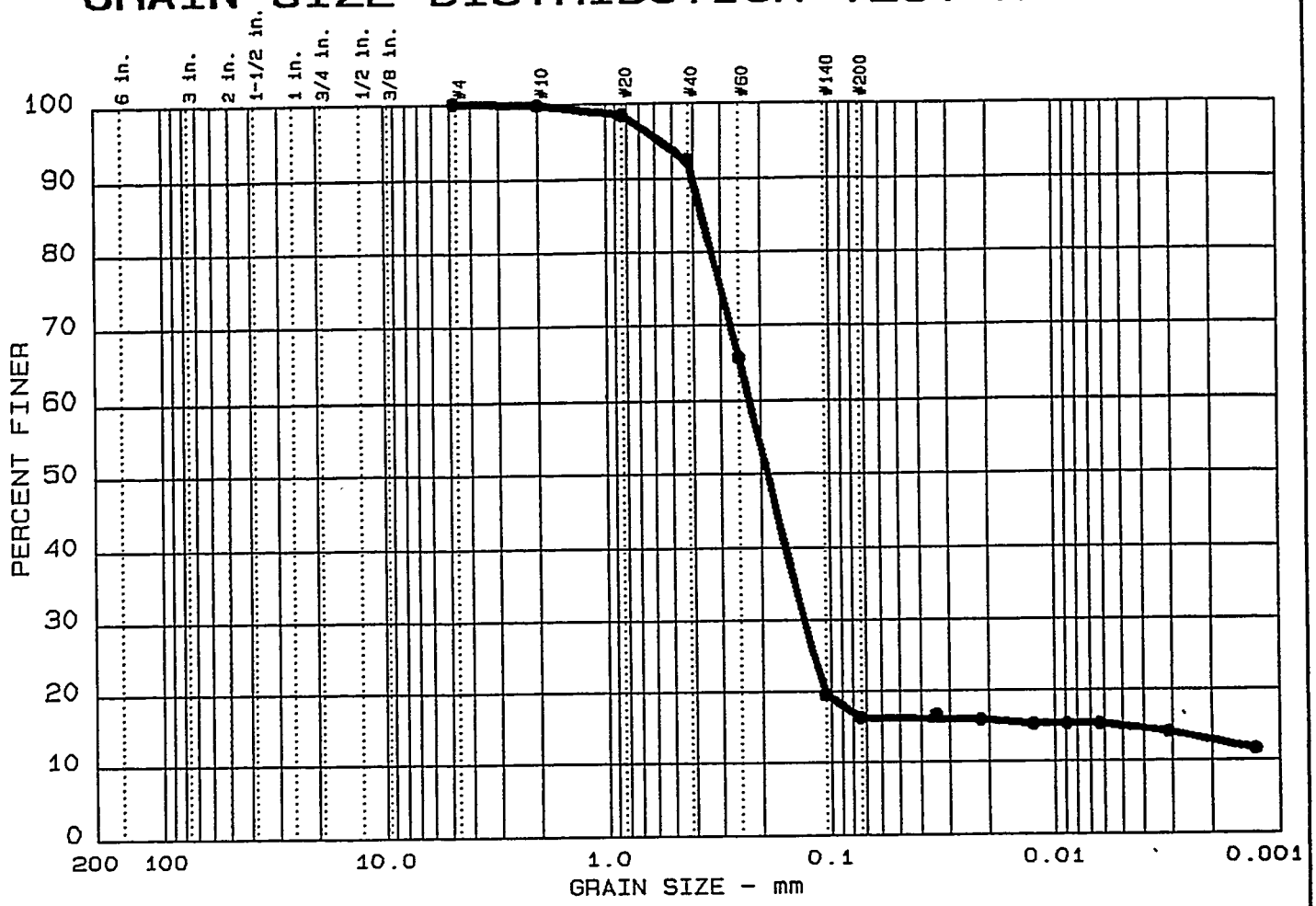
CD-90 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	3	0.0	0.0	83.6	1.3	15.1

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.36	0.22	0.19	0.131	0.0044			

MATERIAL DESCRIPTION	USCS	AASHTO
● Yellow Brown Clayey Sand		

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-2 ST-14 @ 200-202 Ft.

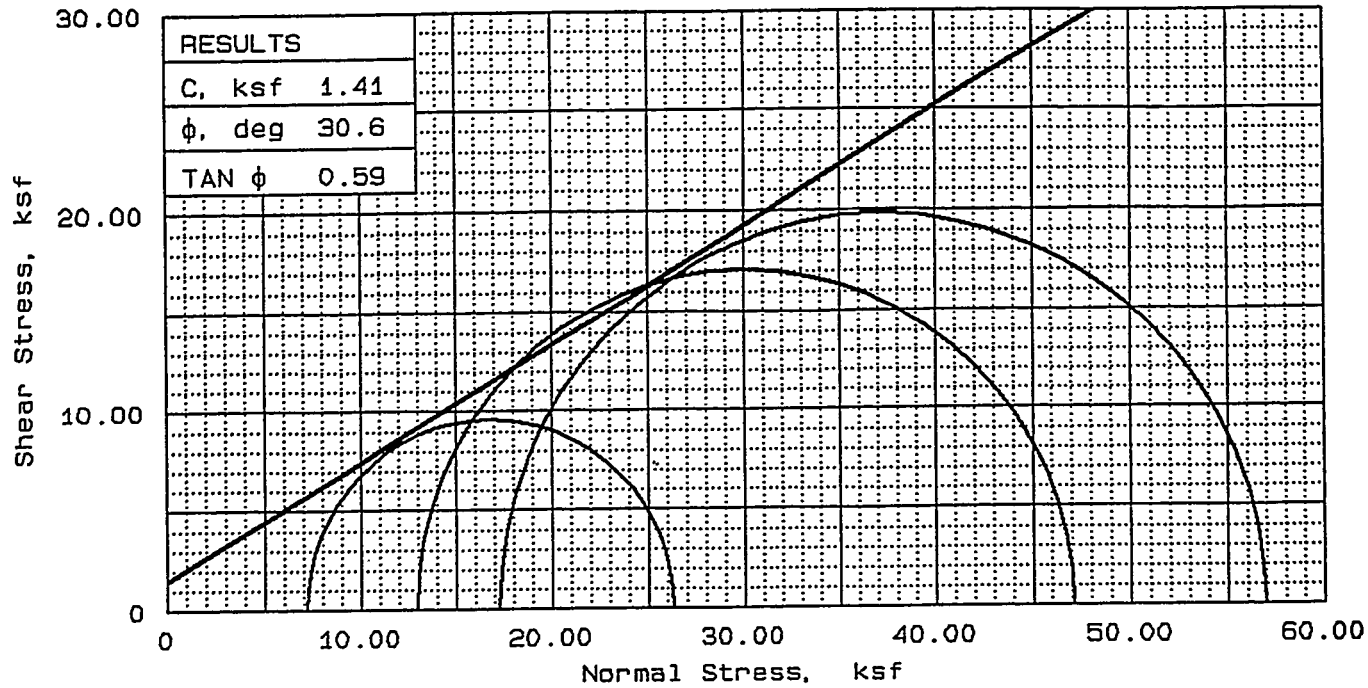
Date: January 3, 1994

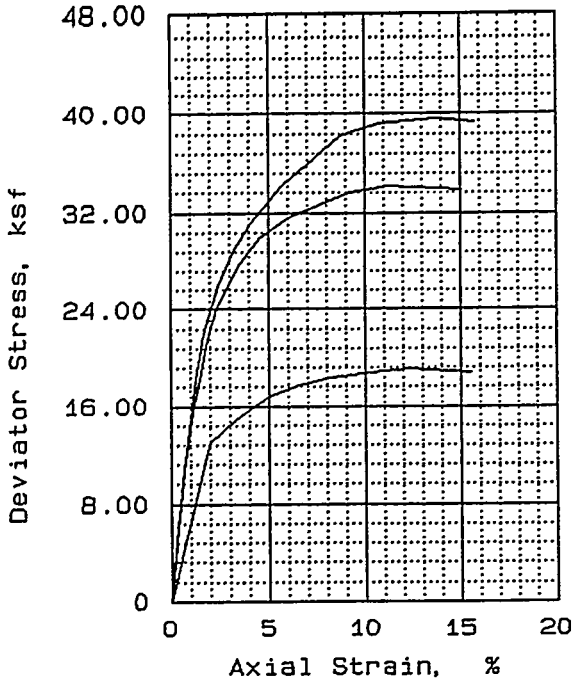
Remarks:
Tested by: CLA Chkd by: RLB
CD-120 psi
Atterberg Limits -200
LL=171 PL=31 PI=140

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.





SAMPLE NO.		1	2	3
INITIAL	WATER CONTENT, %	29.5	28.5	28.7
	DRY DENSITY, pcf	92.9	92.9	92.3
	SATURATION, %	99.3	94.6	93.8
	VOID RATIO	0.794	0.813	0.826
	DIAMETER, in	2.85	2.88	2.88
	HEIGHT, in	6.00	6.00	6.00
AT TEST	WATER CONTENT, %	29.0	27.7	27.9
	DRY DENSITY, pcf	93.9	96.5	96.1
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.775	0.747	0.753
	DIAMETER, in	2.84	2.83	2.83
	HEIGHT, in	5.99	5.98	5.97
BACK PRESSURE, ksf		4.32	5.76	6.48
CELL PRESSURE, ksf		11.52	18.72	23.76
FAILURE STRESS, ksf		19.14	34.16	39.66
PORE PRESSURE, ksf				
STRAIN RATE, %/min.		0.100	0.100	0.100
ULTIMATE STRESS, ksf				
PORE PRESSURE, ksf				
σ_1 FAILURE, ksf		26.34	47.12	56.94
σ_3 FAILURE, ksf		7.2	12.96	17.28

TYPE OF TEST:
Consolidated drained
SAMPLE TYPE: Undisturbed
DESCRIPTION: See Grain Size

REMARKS: Tested by: HEJ

Reviewed by: RLB

FIG. NO.

CLIENT: SRS

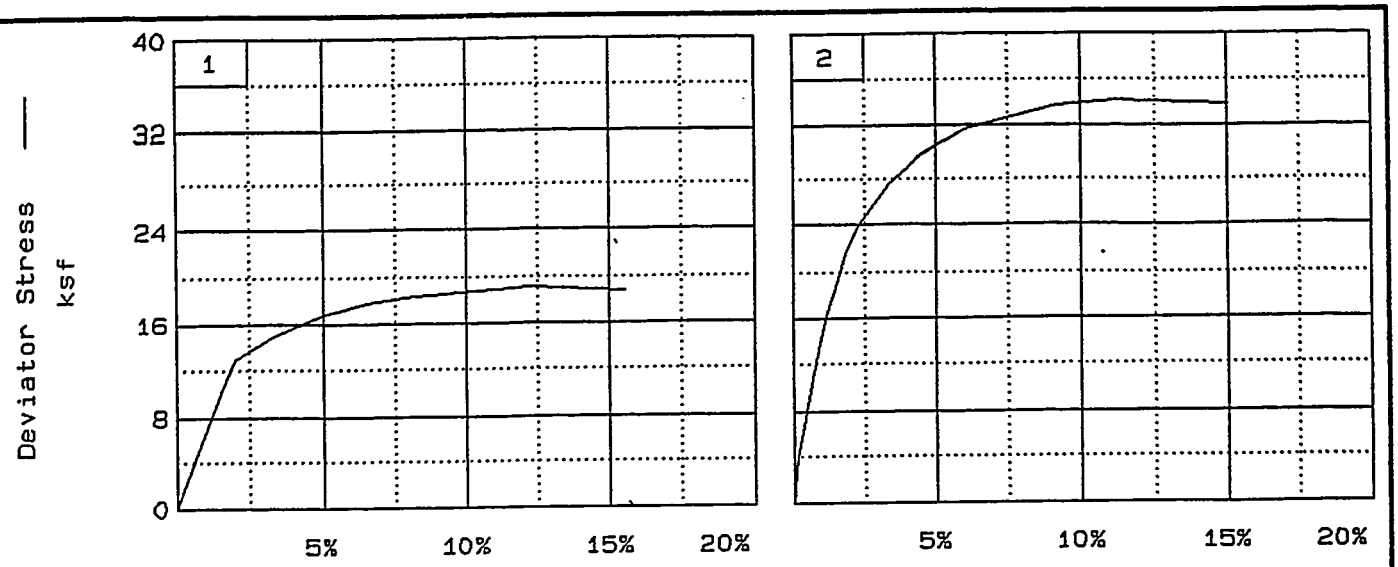
PROJECT: SRS-ITP

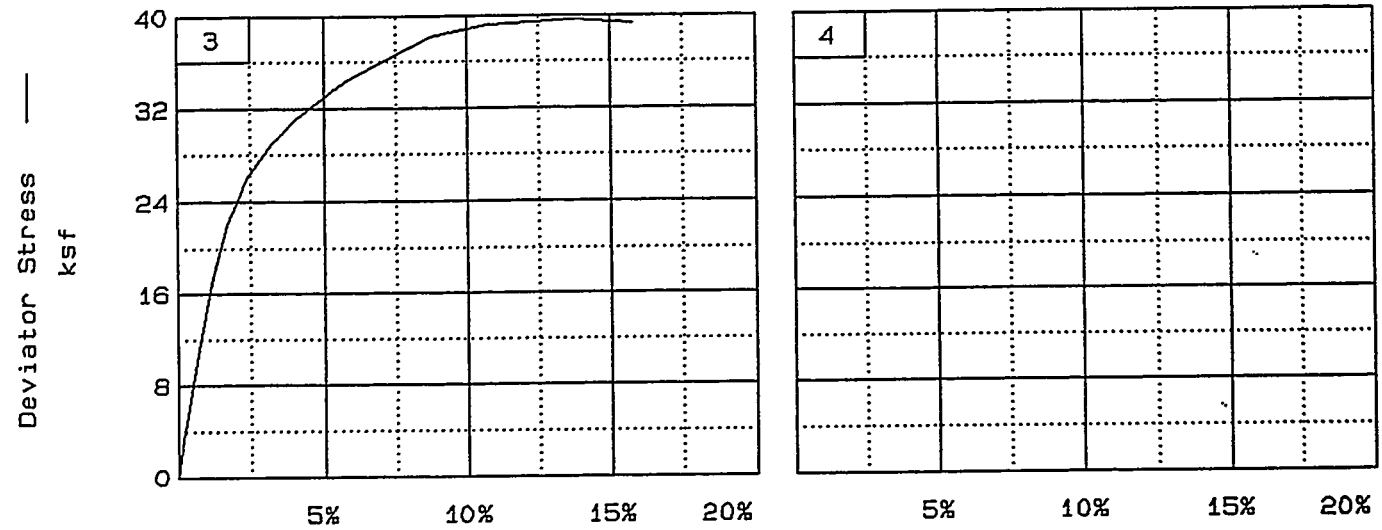
SAMPLE LOCATION: H Bor 2 ST-14 @ 200-202 Ft.

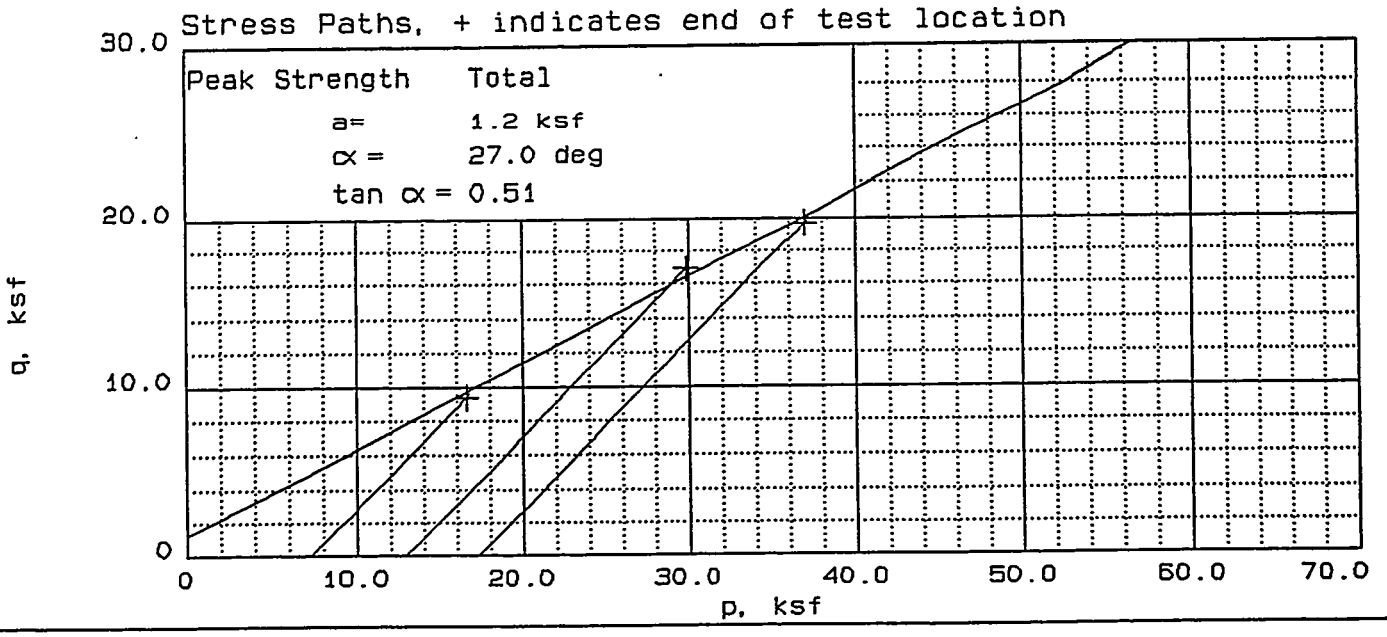
PROJ. NO.: 5810535301 DATE: 01/27/94

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.





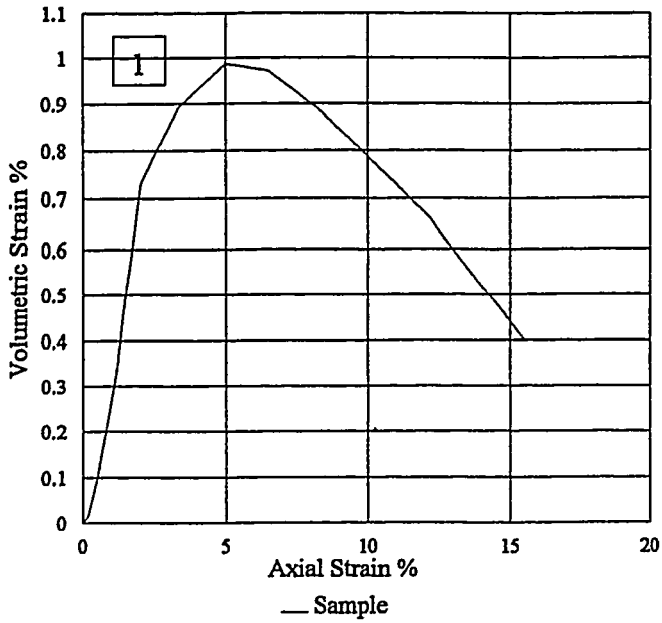


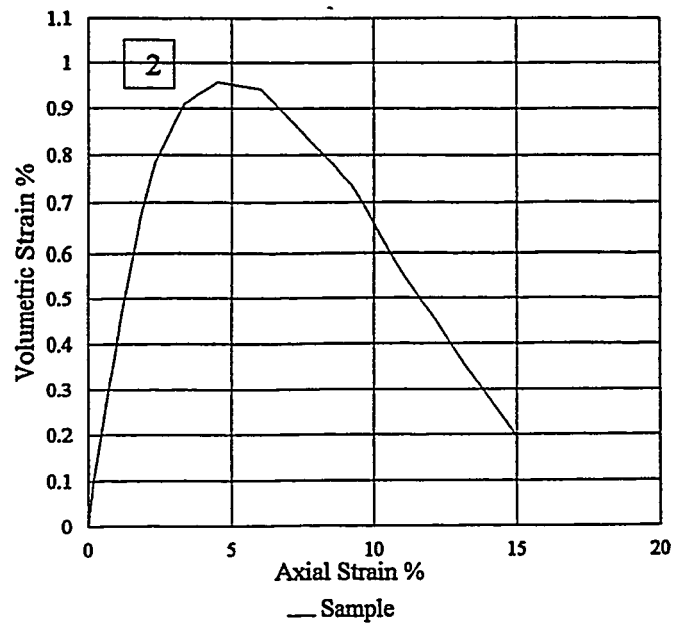
Client: SAS

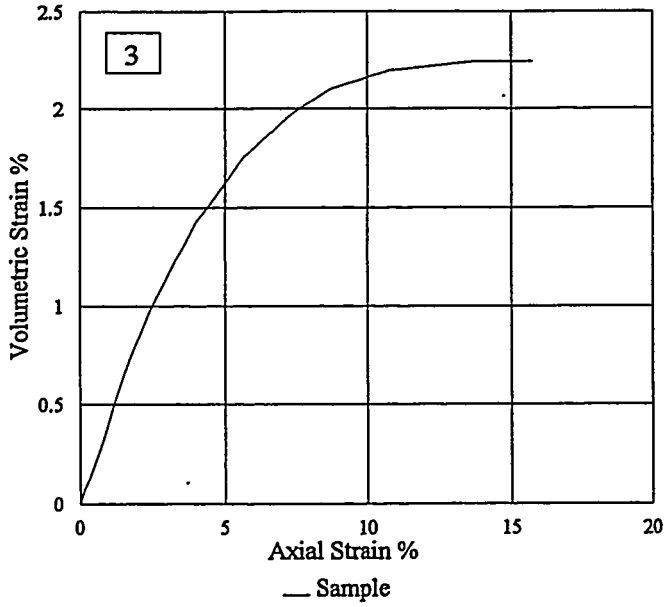
Project: SAS-ITP

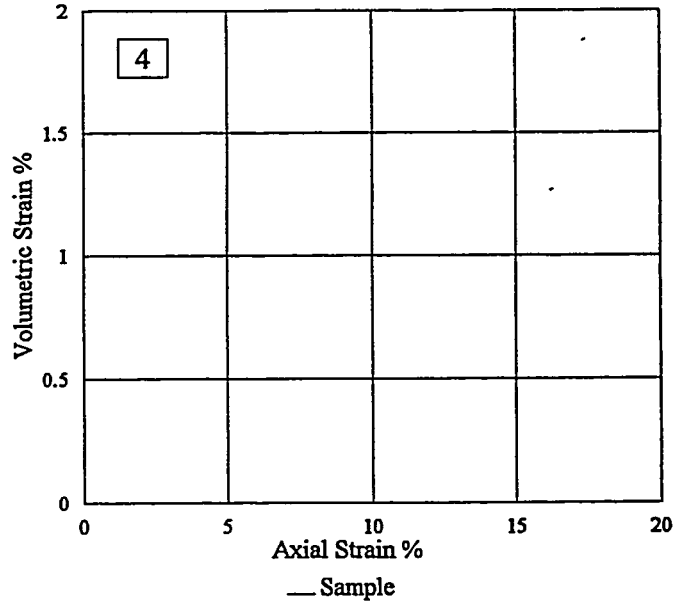
Location: H Bor 2 ST-14 @ 200-202 Ft.

File: 535301P Project No.: 5810535301 Page 2/2 Fig. No. ____









Client: Westinghouse Savannah River Co.
Project: ITP Geotechnical Testing
Location: H-Bor-2, ST-14 @ 200-202 ft.
File: Project No.: 5810535301 Page 2 / 2 Fig. No. _____

TRIAXIAL COMPRESSION TEST
Consolidated drained

2-24-1994
4:23 pm

Project Data

Project No.: 5810535301 Date: 01/27/94 Data file: 535301P
Client: SRS
Project: SRS-ITP
Sample location: H Bor 2 ST-14 @ 200-202 Ft.
Sample description: See Grain Size
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.67 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.85	2.84	
Height change, in		0.01	
Height, in	6.00	5.99	
Weight, grams	1211.7		
Water volume change, cc		4.76	
Moisture, %	29.5	29.0	26.2
Dry density, pcf	92.9	93.9	
Saturation, %	99.3	100.0	
Void ratio	0.794	0.775	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 80 psi
Consolidation back pressure = 30 psi
Consolidation effective confining stress = 7.2 ksf
Peak deviator stress = 19.14 ksf at reading no. 11
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	7.20	7.20	1.00	7.20	0.00
1	0.0100	0.010	57.00	57.0	0.2	1.29	7.20	8.49	1.18	7.85	0.65
2	0.0300	0.030	156.00	156.0	0.5	3.53	7.20	10.73	1.49	8.96	1.76
3	0.0700	0.070	351.00	351.0	1.2	7.88	7.20	15.08	2.10	11.14	3.94
4	0.0900	0.090	450.00	450.0	1.5	10.07	7.20	17.27	2.40	12.24	5.04
	1200	0.120	582.00	582.0	2.0	12.96	7.20	20.16	2.80	13.68	6.48

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	0.2000	0.200	680.00	680.0	3.3	14.94	7.20	22.14	3.07	14.67	7.47
7	0.3000	0.300	777.00	777.0	5.0	16.78	7.20	23.98	3.33	15.59	8.39
8	0.3900	0.390	834.00	834.0	6.5	17.72	7.20	24.92	3.46	16.06	8.86
9	0.4900	0.490	879.00	879.0	8.2	18.34	7.20	25.54	3.55	16.37	9.17
10	0.6200	0.620	922.00	922.0	10.4	18.79	7.20	25.99	3.61	16.59	9.39
11	0.7350	0.735	960.00	960.0	12.3	19.14	7.20	26.34	3.66	16.77	9.57
12	0.9300	0.930	978.00	978.0	15.5	18.78	7.20	25.98	3.61	16.59	9.39

TRIAXIAL COMPRESSION TEST 2-01-1994
Consolidated drained 11:37 am

Project Data

Project No.: 5810535301 Date: 01/27/94 Data file: 535301P
Client: SRS
Project: SRS-ITP
Sample location: H Bor 2 ST-14 @ 200-202 Ft.
Sample description: See Grain Size
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.70 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.85	2.84	
Height change, in		0.01	
Height, in	6.00	5.99	
Weight, grams	1211.7		
Water volume change, cc		4.76	
Moisture, %	29.5	29.0	26.2
Dry density, pcf	92.9	93.9	
Saturation, %	99.3	100.0	
Void ratio	0.794	0.775	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 80 psi
Consolidation back pressure = 30 psi
Consolidation effective confining stress = 7.2 ksf
Peak deviator stress = 19.14 ksf at reading no. 11
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	7.20	7.20	1.00	7.20	0.00
1	0.0100	0.010	57.00	57.0	0.2	1.29	7.20	8.49	1.18	7.85	0.65
2	0.0300	0.030	156.00	156.0	0.5	3.53	7.20	10.73	1.49	8.96	1.76
3	0.0700	0.070	351.00	351.0	1.2	7.88	7.20	15.08	2.10	11.14	3.94
4	0.0900	0.090	450.00	450.0	1.5	10.07	7.20	17.27	2.40	12.24	5.04
	0.1200	0.120	582.00	582.0	2.0	12.96	7.20	20.16	2.80	13.68	6.48

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No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	1.2000	0.200	680.00	680.0	3.3	14.94	7.20	22.14	3.07	14.67	7.47
	0.3000	0.300	777.00	777.0	5.0	16.78	7.20	23.98	3.33	15.59	8.39
8	0.3900	0.390	834.00	834.0	6.5	17.72	7.20	24.92	3.46	16.06	8.86
9	0.4900	0.490	879.00	879.0	8.2	18.34	7.20	25.54	3.55	16.37	9.17
10	0.6200	0.620	922.00	922.0	10.4	18.79	7.20	25.99	3.61	16.59	9.39
11	0.7350	0.735	960.00	960.0	12.3	19.14	7.20	26.34	3.66	16.77	9.57
12	0.9300	0.930	978.00	978.0	15.5	18.78	7.20	25.98	3.61	16.59	9.39

TRIAXIAL COMPRESSION TEST
Consolidated drained

2-01-1994
11:38 am

Project Data

Project No.: 5810535301 Date: 01/27/94 Data file: 535301P
Client: SRS
Project: SRS-ITP
Sample location: H Bor 2 ST-14 @ 200-202 Ft.
Sample description: See Grain Size
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 2 Data

Type of sample: Undisturbed
Specific Gravity= 2.70 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.83	
Height change, in		0.02	
Height, in	6.00	5.98	
Weight, grams	1223.7		
Water volume change, cc		7.82	
Moisture, %	28.5	27.7	26.2
Dry density, pcf	92.9	96.5	
Saturation, %	94.6	100.0	
Void ratio	0.813	0.747	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 130 psi
Consolidation back pressure = 40 psi
Consolidation effective confining stress = 12.96 ksf
Peak deviator stress = 34.16 ksf at reading no. 10
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	12.96	12.96	1.00	12.96	0.00
1	0.0100	0.010	174.00	174.0	0.2	3.98	12.96	16.94	1.31	14.95	1.99
2	0.0400	0.040	474.00	474.0	0.7	10.78	12.96	23.74	1.83	18.35	5.39
3	0.0700	0.070	714.00	714.0	1.2	16.16	12.96	29.12	2.25	21.04	8.08
4	0.1100	0.110	958.00	958.0	1.8	21.53	12.96	34.49	2.66	23.73	10.77
	0.1400	0.140	1074.00	1074.0	2.3	24.02	12.96	36.98	2.85	24.97	12.01

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	0.2000	0.200	1242.00	1242.0	3.3	27.49	12.96	40.45	3.12	26.70	13.74
7	0.2700	0.270	1368.00	1368.0	4.5	29.91	12.96	42.87	3.31	27.91	14.95
8	0.3600	0.360	1470.00	1470.0	6.0	31.63	12.96	44.59	3.44	28.78	15.82
9	0.5500	0.550	1620.00	1620.0	9.2	33.68	12.96	46.64	3.60	29.80	16.84
10	0.6700	0.670	1680.00	1680.0	11.2	34.16	12.96	47.12	3.64	30.04	17.08
11	0.9000	0.900	1740.00	1740.0	15.1	33.84	12.96	46.80	3.61	29.88	16.92

TRIAXIAL COMPRESSION TEST 2-01-1994
Consolidated drained 11:38 am

Project Data

Project No.: 5810535301 Date: 01/27/94 Data file: 535301P
Client: SRS
Project: SRS-ITP
Sample location: H Bor 2 ST-14 @ 200-202 Ft.
Sample description: See Grain Size
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 3 Data

Type of sample: Undisturbed
Specific Gravity= 2.70 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.83	
Height change, in		0.03	
Height, in	6.00	5.97	
Weight, grams	1220.7		
Water volume change, cc		7.63	
Moisture, %	28.7	27.9	25.3
Dry density, pcf	92.3	96.1	
Saturation, %	93.8	100.0	
Void ratio	0.826	0.753	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 165 psi
Consolidation back pressure = 45 psi
Consolidation effective confining stress = 17.28 ksf
Peak deviator stress = 39.66 ksf at reading no. 13
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	17.28	17.28	1.00	17.28	0.00
1	0.0100	0.010	144.00	144.0	0.2	3.29	17.28	20.57	1.19	18.92	1.64
2	0.0200	0.020	270.00	270.0	0.3	6.16	17.28	23.44	1.36	20.36	3.08
3	0.0400	0.040	468.00	468.0	0.7	10.63	17.28	27.91	1.62	22.60	5.32
4	0.0700	0.070	774.00	774.0	1.2	17.50	17.28	34.78	2.01	26.03	8.75
	0.1000	0.100	978.00	978.0	1.7	22.00	17.28	39.28	2.27	28.28	11.00

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	0.1400	0.140	1164.00	1164.0	2.3	26.00	17.28	43.28	2.50	30.28	13.00
	0.1900	0.190	1306.00	1306.0	3.2	28.92	17.28	46.20	2.67	31.74	14.46
8	0.2400	0.240	1416.00	1416.0	4.0	31.09	17.28	48.37	2.80	32.82	15.54
9	0.3400	0.340	1590.00	1590.0	5.7	34.30	17.28	51.58	2.98	34.43	17.15
10	0.4400	0.440	1722.00	1722.0	7.4	36.49	17.28	53.77	3.11	35.52	18.24
11	0.5200	0.520	1830.00	1830.0	8.7	38.21	17.28	55.49	3.21	36.39	19.11
12	0.6400	0.640	1920.00	1920.0	10.7	39.21	17.28	56.49	3.27	36.89	19.61
13	0.8200	0.820	2010.00	2010.0	13.7	39.66	17.28	56.94	3.30	37.11	19.83
14	0.9400	0.940	2040.00	2040.0	15.7	39.32	17.28	56.60	3.28	36.94	19.66

Client Westinghouse Savannah River Co.
Project: ITP Geotechnical Testing
Location: H-Bor-2, ST-14 @ 200-202 ft.
File: Project No.: 5810535301

No. of Circles
3

Circle No.1					
Consolidation Pressure, ksf	After Consolidation			Burette Cal. Factor	No. of Points
	Diameter, in.	Height, in.	Volume, cc		
7.20	2.85	5.99	627.51	1	13

		Sample		Cell	
LVDT Reading (in)	Axial Strain (in/in)	Burette Reading (div.)	Volumetric Strain (cc/cc)	Burette Reading (div.)	Volumetric Strain (cc/cc)
0.00	0.00	20.0	0.00	5.7	0.00
0.01	0.17	19.9	0.02	5.8	0.02
0.03	0.50	19.4	0.10	6.2	0.10
0.07	1.17	17.9	0.33	7.6	0.34
0.09	1.50	16.8	0.51	8.5	0.49
0.12	2.00	15.4	0.73	9.8	0.71
0.20	3.34	14.4	0.89	10.5	0.87
0.30	5.01	13.8	0.99	10.7	0.95
0.39	6.51	13.9	0.97	10.4	0.95
0.49	8.18	14.4	0.89	9.4	0.84
0.62	10.35	15.2	0.76	8.2	0.72
0.74	12.27	15.9	0.65	7.0	0.58
0.93	15.53	17.5	0.40	4.7	0.32

Client Westinghouse Savannah River Co.
Project: ITP Geotechnical Testing
Location: H-Bor-2, ST-14 @ 200-202 ft.
File: Project No.: 5810535301

Circle No.2					
Consolidation	After Consolidation			Burette Cal.	No. of
Pressure, ksf	Diameter, in	Height, in.	Volume, cc	Factor	Points
12.96	2.88	5.98	637.49	1	12

		Sample		Cell	
LVDT Reading (in)	Axial Strain (in/in)	Burette Reading (div.)	Volumetric Strain (cc/cc)	Burette Reading (div.)	Volumetric Strain (cc/cc)
0.00	0.00	20.0	0.00	3.0	0.00
0.01	0.17	19.4	0.09	3.3	0.05
0.04	0.67	18.2	0.28	4.5	0.26
0.07	1.17	17.0	0.47	5.6	0.44
0.11	1.84	15.7	0.67	6.9	0.67
0.14	2.34	15.0	0.78	7.5	0.78
0.20	3.34	14.2	0.91	8.1	0.90
0.27	4.52	13.9	0.96	8.2	0.95
0.36	6.02	14.0	0.94	7.9	0.95
0.55	9.20	15.3	0.74	6.0	0.75
0.67	11.20	16.6	0.53	4.5	0.57
0.90	15.05	18.8	0.19	1.5	0.22

Client Westinghouse Savannah River Co.
Project: ITP Geotechnical Testing
Location: H-Bor-2, ST-14 @ 200-202 ft.
File: Project No.: 5810535301

Circle No.3					
Consolidation Pressure, ksf	After Consolidation			Burette Cal. Factor	No. of Points
	Diameter, in	Height, in.	Volume, cc		
17.28	2.88	5.97	638.19	1	15

		Sample		Cell	
LVDT Reading (in)	Axial Strain (in/in)	Burette Reading (div.)	Volumetric Strain (cc/cc)	Burette Reading (div.)	Volumetric Strain (cc/cc)
0.00	0.00	20.0	0.00	1.5	0.00
0.01	0.17	19.5	0.08	1.8	0.05
0.02	0.34	19.2	0.13	2.3	0.14
0.04	0.67	18.3	0.27	3.2	0.29
0.07	1.17	16.8	0.50	4.8	0.55
0.10	1.68	15.4	0.72	6.1	0.77
0.14	2.35	13.9	0.96	7.5	1.01
0.19	3.18	12.3	1.21	9.1	1.29
0.24	4.02	10.9	1.43	10.3	1.50
0.34	5.70	8.8	1.75	12.2	1.85
0.44	7.37	7.4	1.97	13.4	2.09
0.52	8.71	6.6	2.10	14.0	2.22
0.64	10.72	6.0	2.19	14.3	2.33
0.82	13.74	5.7	2.24	14.0	2.37
0.94	15.75	5.7	2.24	13.8	2.40

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

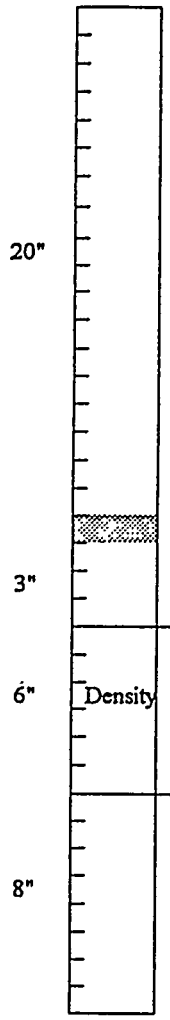
Project: SRS-ITP GEOTECHNICAL TESTING Date: 08-10-93

Boring No: H-Bor-2 Sample No: ST-15 Depth: 207' - 208'2"

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 36.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION



Thin wax layer
Reddish brown disturbed cuttings

Cut

Yellow-brown medium to fine sand

Cut

Tube severely damaged bottom 3"

Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b2-st15.wk3

ATTACHMENT 3

Tested by:	JTK	Reviewed by:	RLB	Law Job No.	5810535301
Date:	12-21-93	Date:	01-14-93	Job Name	SRS - ITP

TP-4A: UNIT WEIGHT OF SAMPLE
"TYPICAL"

Sample: Boring No.: H-Bor-2
Depth: 207'-208'2"
Sample ID: ST-15

MEASUREMENTS (Nominal 6-inch cut sample height):

TOTAL SAMPLE HEIGHT (inches)		INSIDE DIAMETER OF CUT TUBE (inches)	
1	6.633		
2	6.228	top	2.860
3	6.140	bottom	2.850
Avg.	6.334 (H)	Avg.	2.855 (D)

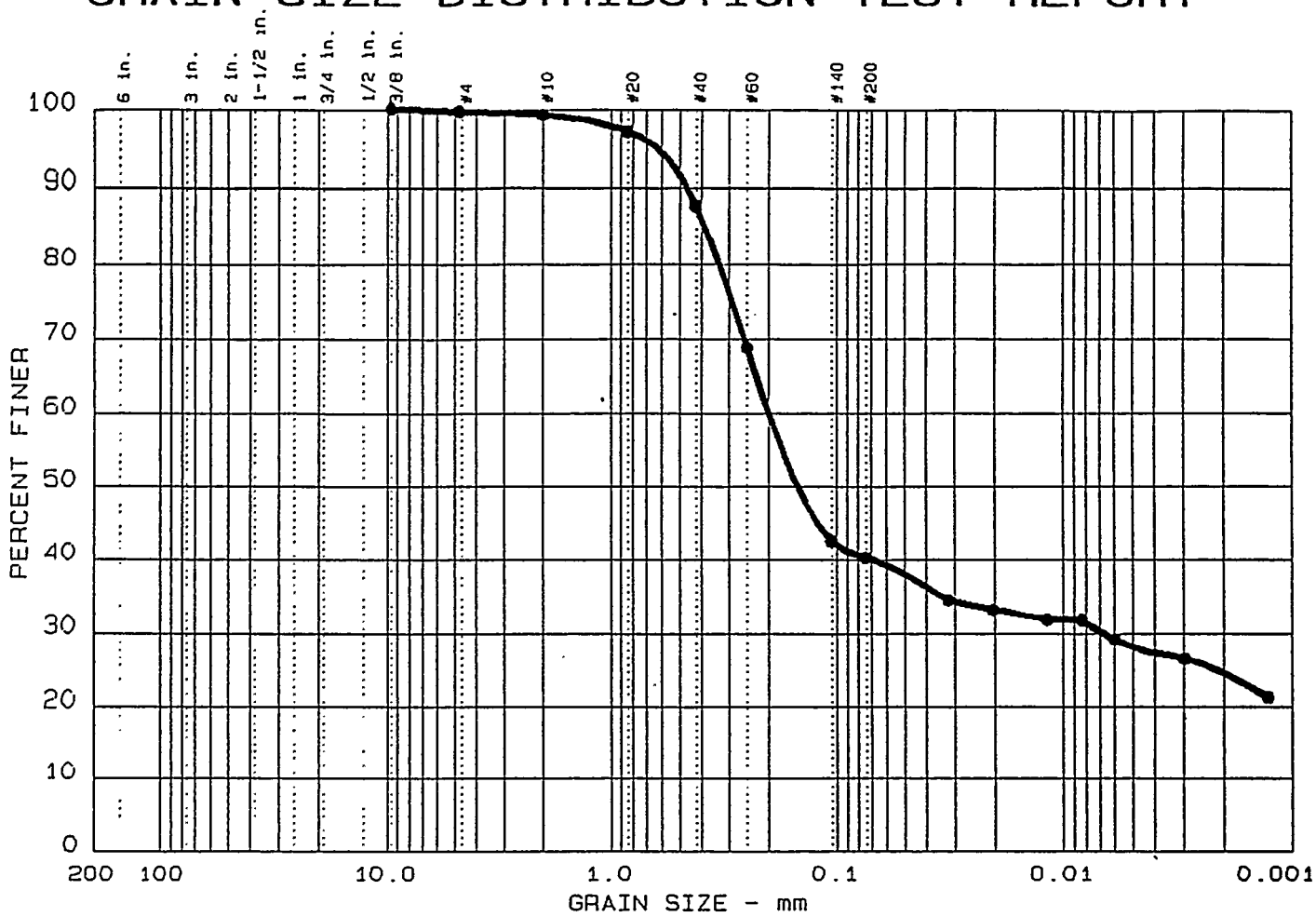
MOISTURE CONTENT DETERMINATION

MOISTURE CONTENT	
Tare No.	V-82
Tare Weight	16.61 gm
Wet Wt. + Tare	110.33 gm
Dry Wt. + Tare	92.76 gm
Wt. of Water	17.57 gm
Dry Weight	76.15 gm
Moisture Content, *w*	23.1 %

TOTAL WEIGHT OF SOIL + TUBE SECTION	W_{s+t} =	1804.89 gm
WEIGHT OF CLEAN, DRY TUBE SECTION	W_t =	479.09 gm
WET WEIGHT OF SOIL, [(W_{s+t} - W_t)/454]	W_s =	2.920 lbs
VOLUME OF SAMPLE, [(pi*D²/4)*H/1728]	V =	0.023 ft³
WET DENSITY, [W_s/V]	**D_w=**	**124.5 pcf**
DRY DENSITY, [D_w/(1+w/100)]	**D_D=**	**101.1 pcf**

h:\users\lab\rlb\itp\h2-st15.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	2	0.0	0.3	59.5	12.1	28.1

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	45	23	0.38	0.20	0.15	0.007				

MATERIAL DESCRIPTION	USCS	AASHTO
● Yellow Brown Clayey Sand	SC	A-7-6 (4.4)

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-2 ST-15 @ 207'-208'2"

Date: January 5, 1994

Remarks:

Tested by: JTK

Reviewed by: RLB

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

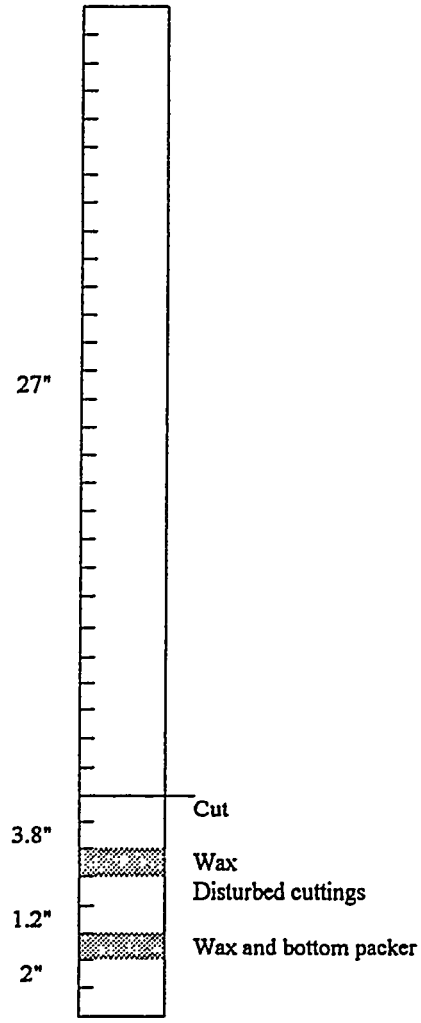
Project: SRS-ITP GEOTECHNICAL TESTING Date: 12-16-93

Boring No: H-Bor-2 Sample No: ST-16 Depth: 212'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 36 By: CLG Checked By: RLB

VISUAL DESCRIPTION



Remarks: No testable recovery

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b2-st16.wk3

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

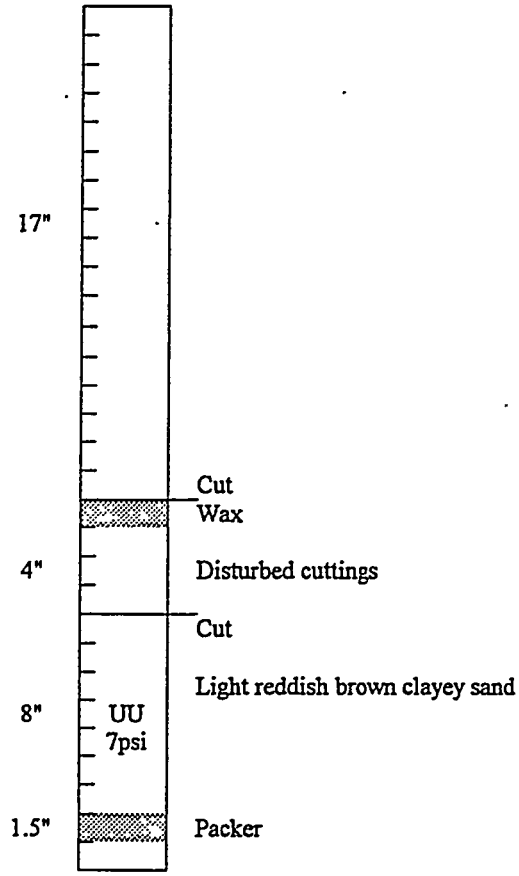
Project: SRS-ITP GEOTECHNICAL TESTING Date: 08-24-93

Boring No: H-Bor-12 Sample No: ST-1 Depth: 8' - 9'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION

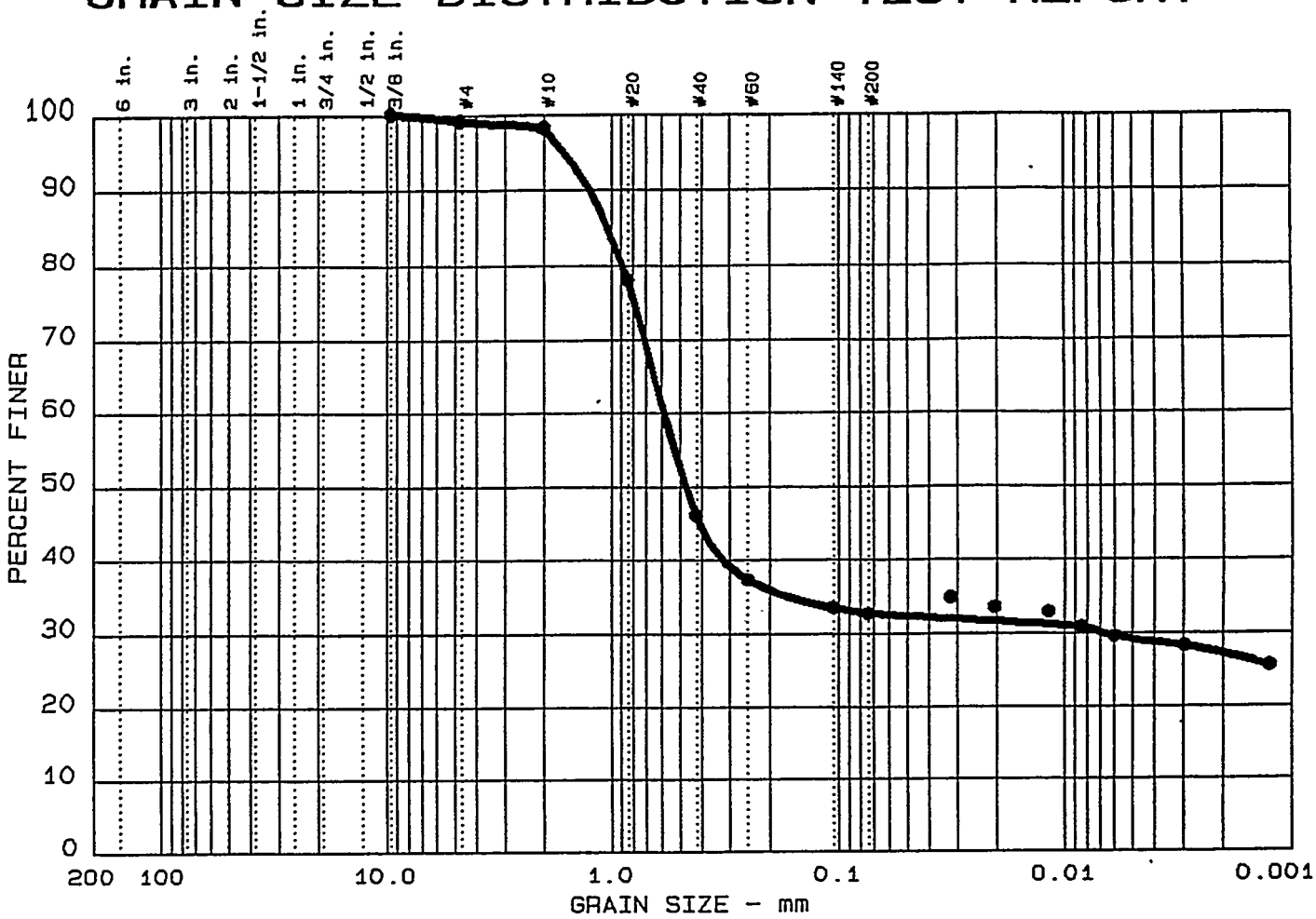


Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b12-st1.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	6	0.0	0.8	66.6	3.6	29.0

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	98	56	1.02	0.58	0.47	0.007				

MATERIAL DESCRIPTION	USCS	AASHTO
● Orange-Brown Clayey Medium to Fine Sand	SM	A-2-7 (8.3)

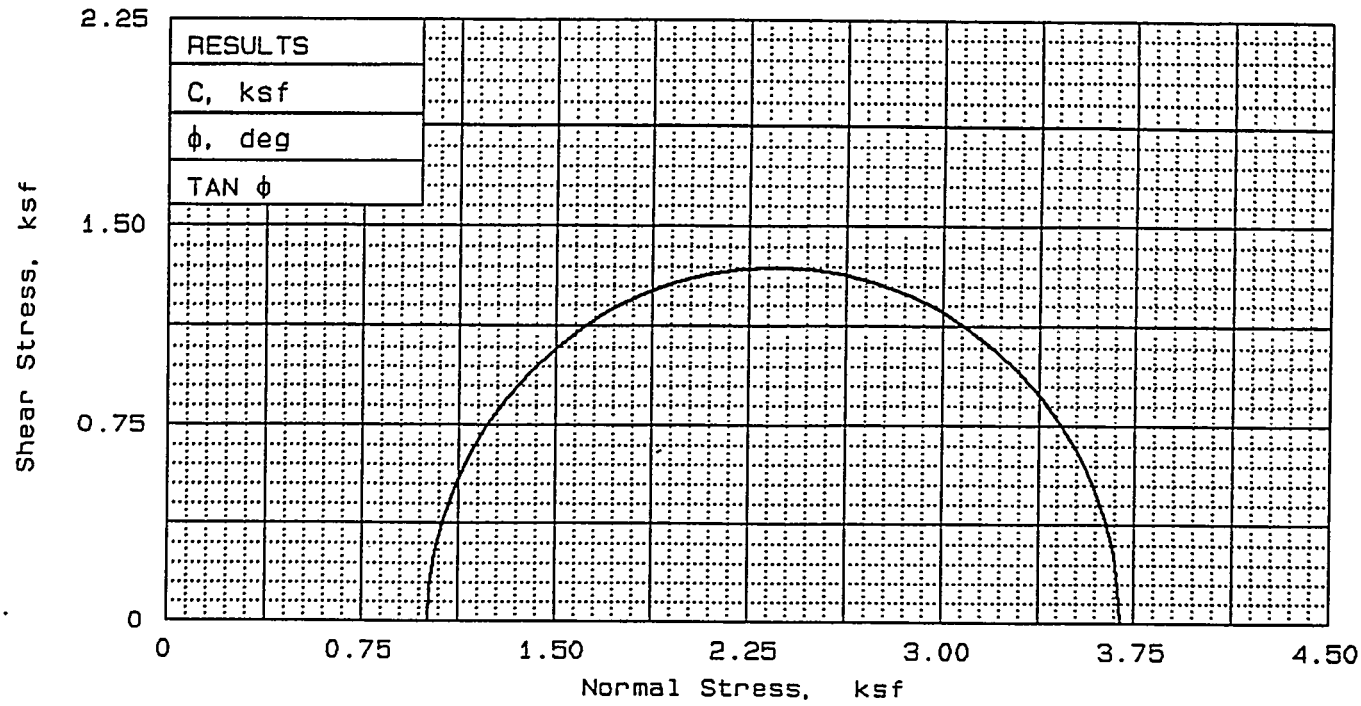
Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-12 ST-1 @ 8-9 Ft.

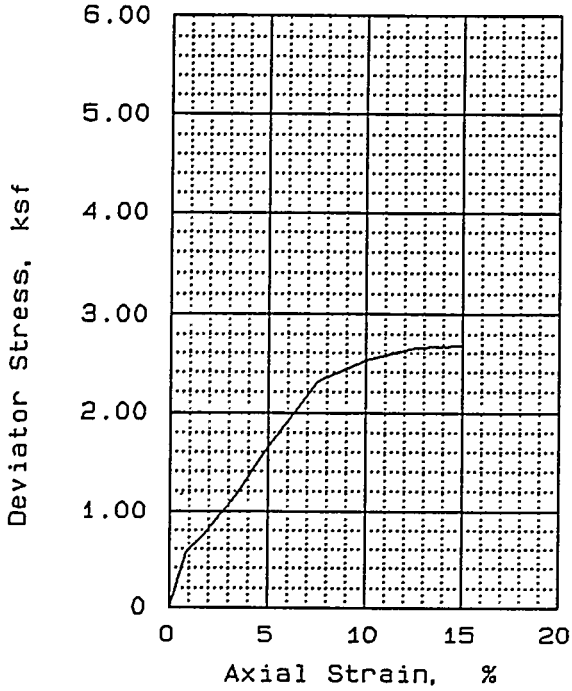
Date: September 23, 1993

Remarks:
Tested by: JRR
Reviewed by: RLB
UU @ 7 PSI

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.





SAMPLE NO.		1
INITIAL	WATER CONTENT, %	23.1
	DRY DENSITY, pcf	98.9
	SATURATION, %	90.5
	VOID RATIO	0.679
	DIAMETER, in	2.88
	HEIGHT, in	5.99
AT TEST	WATER CONTENT, %	23.1
	DRY DENSITY, pcf	98.9
	SATURATION, %	90.5
	VOID RATIO	0.679
	DIAMETER, in	2.88
	HEIGHT, in	5.99
BACK PRESSURE, ksf		0.00
CELL PRESSURE, ksf		1.01
FAILURE STRESS, ksf		2.69
PORE PRESSURE, ksf		
STRAIN RATE, %/min.		1.000
ULTIMATE STRESS, ksf		
PORE PRESSURE, ksf		
σ_1 FAILURE, ksf		3.69
σ_3 FAILURE, ksf		1.01

TYPE OF TEST:
Unconsolidated undrained
SAMPLE TYPE: Undisturbed
DESCRIPTION: Orange Brown
Clayey Medium to Fine Sand
LL= 98 PL= 42 PI= 56.0
SPECIFIC GRAVITY= 2.66
REMARKS: Tested by: CLG

Reviewed by: RLB

FIG. NO.

CLIENT: SRS

PROJECT: SRS-ITP

SAMPLE LOCATION: H-Bor-12 ST-1 @ 8-9 Ft.

PROJ. NO.: 5810535301 DATE: 10/8/93

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

TRIAXIAL COMPRESSION TEST
Unconsolidated undrained

2-24-1994
4:33 pm

Project Data

Project No.: 5810535301 Date: 10/8/93 Data file: SRS-ITP3
Client: SRS
Project: SRS-ITP
Sample location: H-Bor-12 ST-1 @ 8-9 Ft.
Sample description: Orange Brown Clayey Medium to Fine Sand
Remarks: Tested by:
Reviewed by; Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.66 LL= 98 PL= 42 PI= 56

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.88	
Height change, in		0.00	
Height, in	5.99	5.99	
Weight, grams	1247.2		
Moisture, %	23.1	23.1	23.1
Dry density, pcf	98.9	98.9	
Saturation, %	90.5	90.5	
Void ratio	0.679	0.679	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 1.000 % per minute
Cell pressure = 7 psi
Back pressure = 0 psi
Effective confining stress = 1.008 ksf
Peak deviator stress = 2.69 ksf at reading no. 8
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	1.01	1.01	1.00	1.01	0.00
1	0.0500	0.050	26.00	26.0	0.8	0.57	1.01	1.58	1.57	1.29	0.28
2	0.1000	0.100	34.00	34.0	1.7	0.74	1.01	1.75	1.73	1.38	0.37
3	0.2000	0.200	54.00	54.0	3.3	1.15	1.01	2.16	2.14	1.58	0.58
4	0.3000	0.300	79.00	79.0	5.0	1.66	1.01	2.67	2.65	1.84	0.83
5	0.4500	0.450	113.00	113.0	7.5	2.31	1.01	3.32	3.29	2.16	1.16
	6000	0.600	127.00	127.0	10.0	2.53	1.01	3.53	3.51	2.27	1.26

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	0.7500	0.750	137.00	137.0	12.5	2.65	1.01	3.66	3.63	2.33	1.32
	0.9000	0.900	143.00	143.0	15.0	2.69	1.01	3.69	3.66	2.35	1.34

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

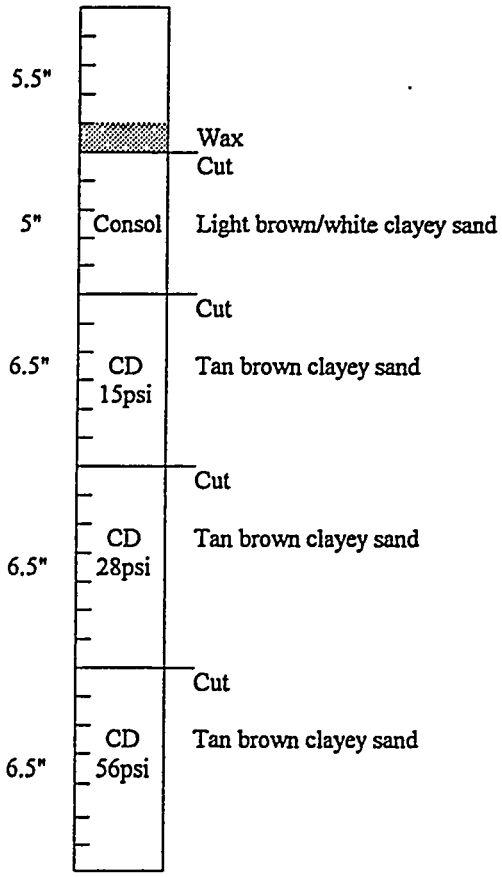
Project: SRS-ITP GEOTECHNICAL TESTING Date: 10-22-93

Boring No: H-Bor-12 Sample No: ST-2 Depth: 13'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

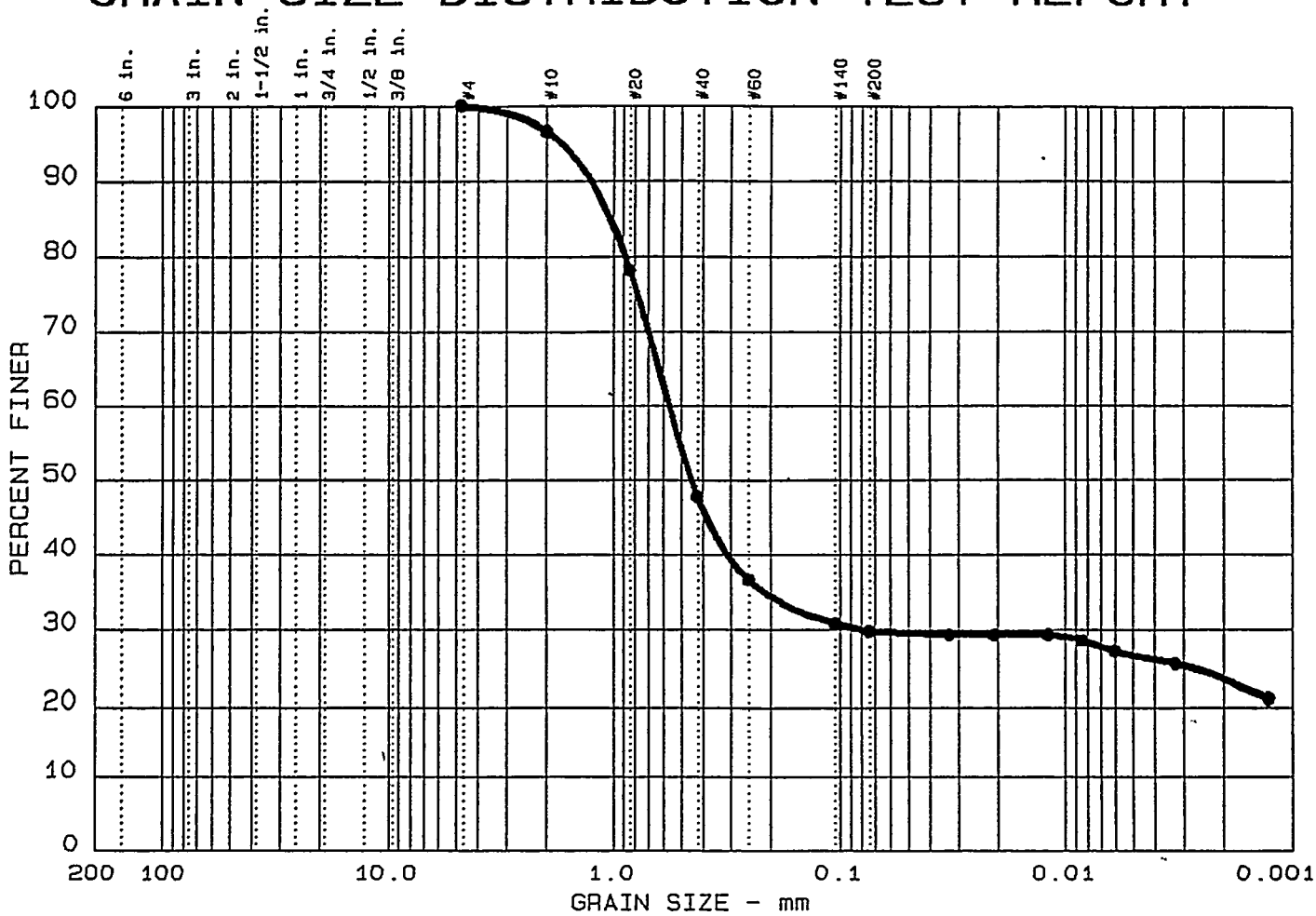
Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION



Remarks: _____

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	3	0.0	0.0	70.3	3.3	26.4

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	86	54	1.02	0.56	0.45	0.082				

MATERIAL DESCRIPTION	USCS	AASHTO
● Light Brown Red Clayey Medium to Fine Sand	SC	A-2-7 (6.6)

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-12 ST-2 @ 13 Ft

Date: November 15, 1993

Remarks:

Tested by: BNS

Reviewed by: RLB

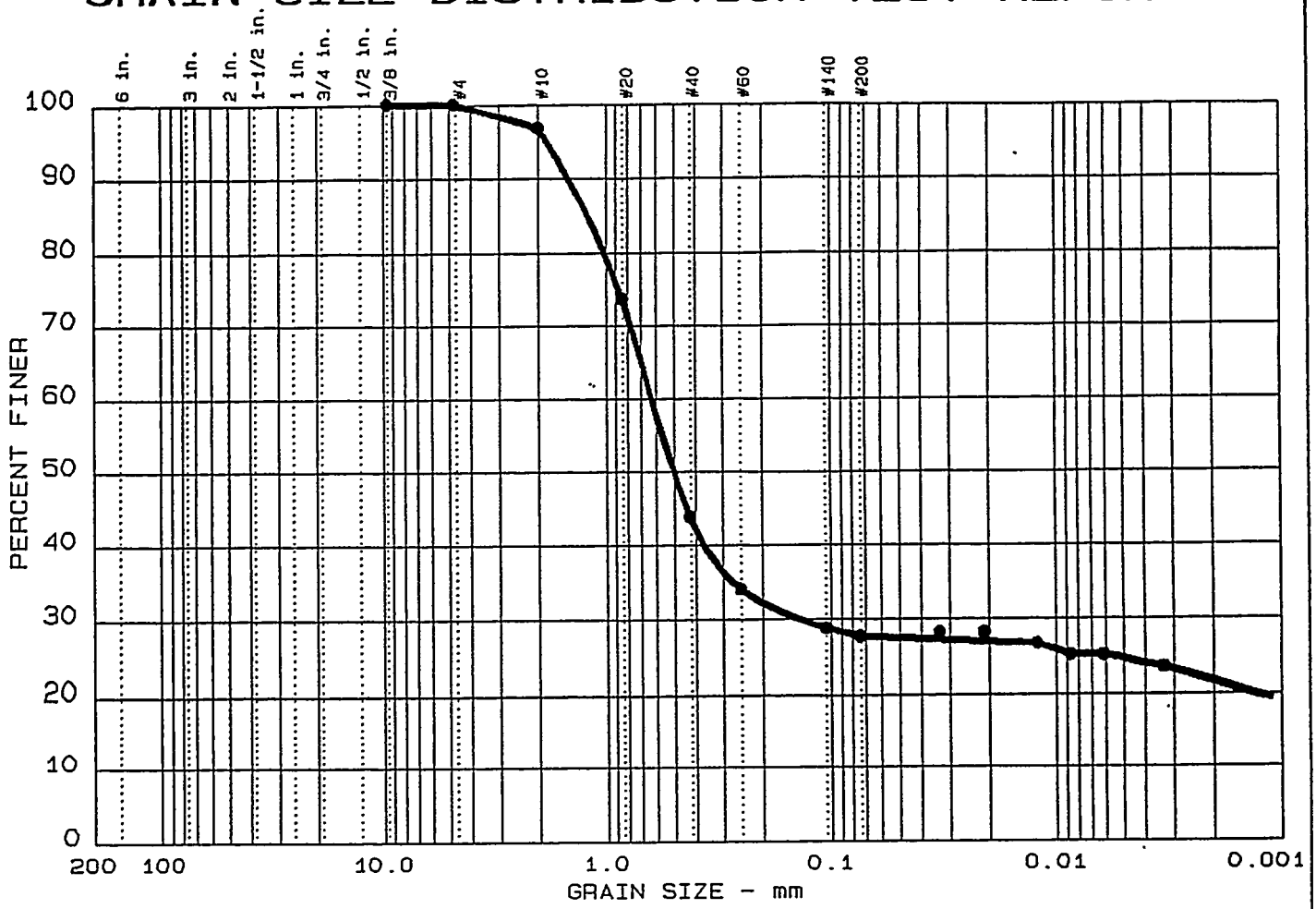
CD 14.7 psi (Consol.)

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	12	0.0	0.0	72.4	3.1	24.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			1.20	0.62	0.50	0.140				

MATERIAL DESCRIPTION	USCS	AASHTO
● Red Clayey Medium to Fine Sand		

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-12 ST-2 @ 13 Ft

Date: November 15, 1993

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Remarks:

Tested by: BNS Ckd by: RLB

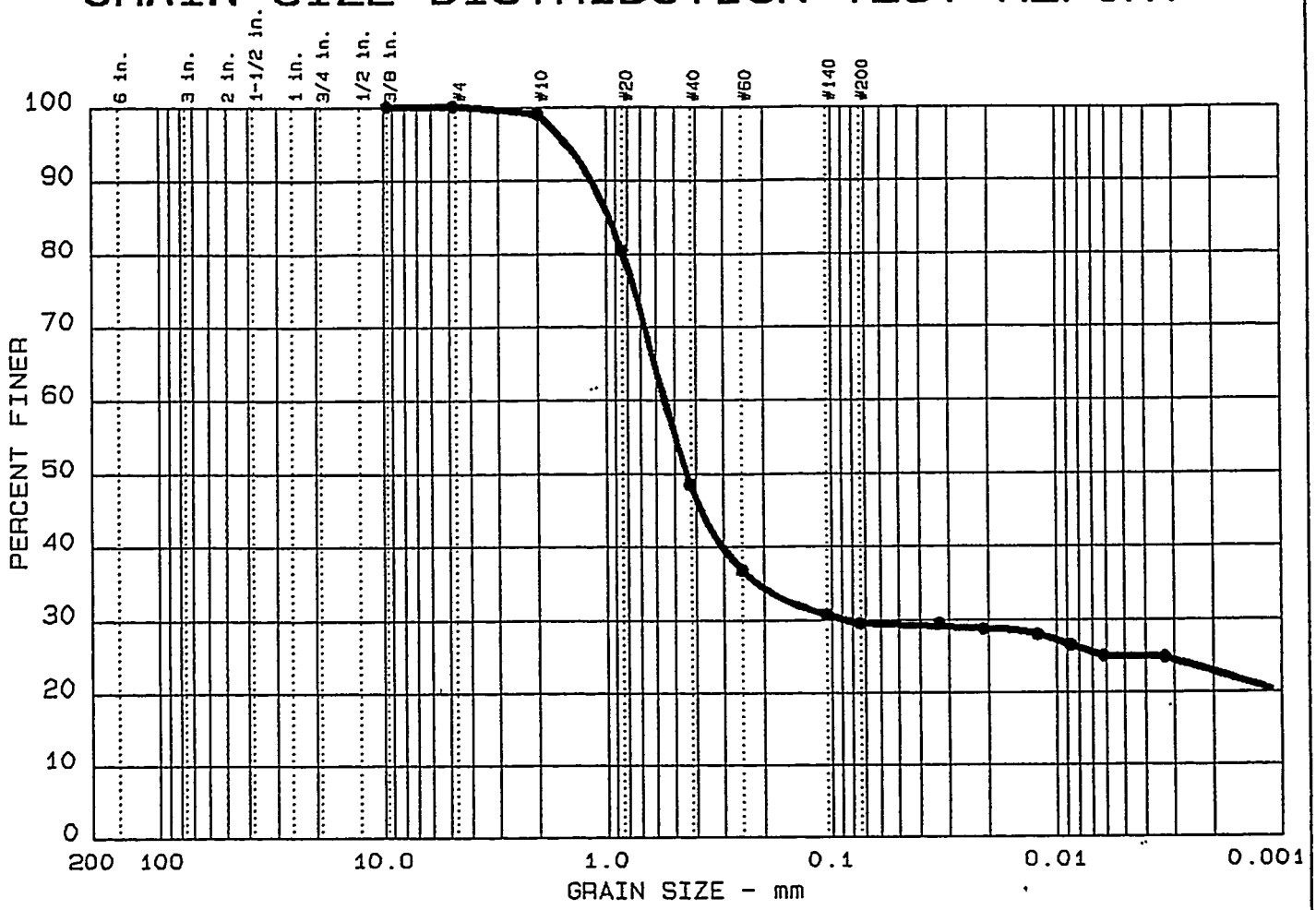
CD 28psi

Atterberg Limits -200

LL=144 PL=43 PI=101

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	3	0.0	0.0	70.6	4.6	24.8

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	104	71	0.95	0.55	0.44	0.083				

MATERIAL DESCRIPTION	USCS	AASHTO
● Red Tan Clayey Medium to Fine Sand	SC	A-2-7 (8.5)

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-12 ST-2 @ 13 Ft

Date: November 15, 1993

Remarks:

Tested by: BNS

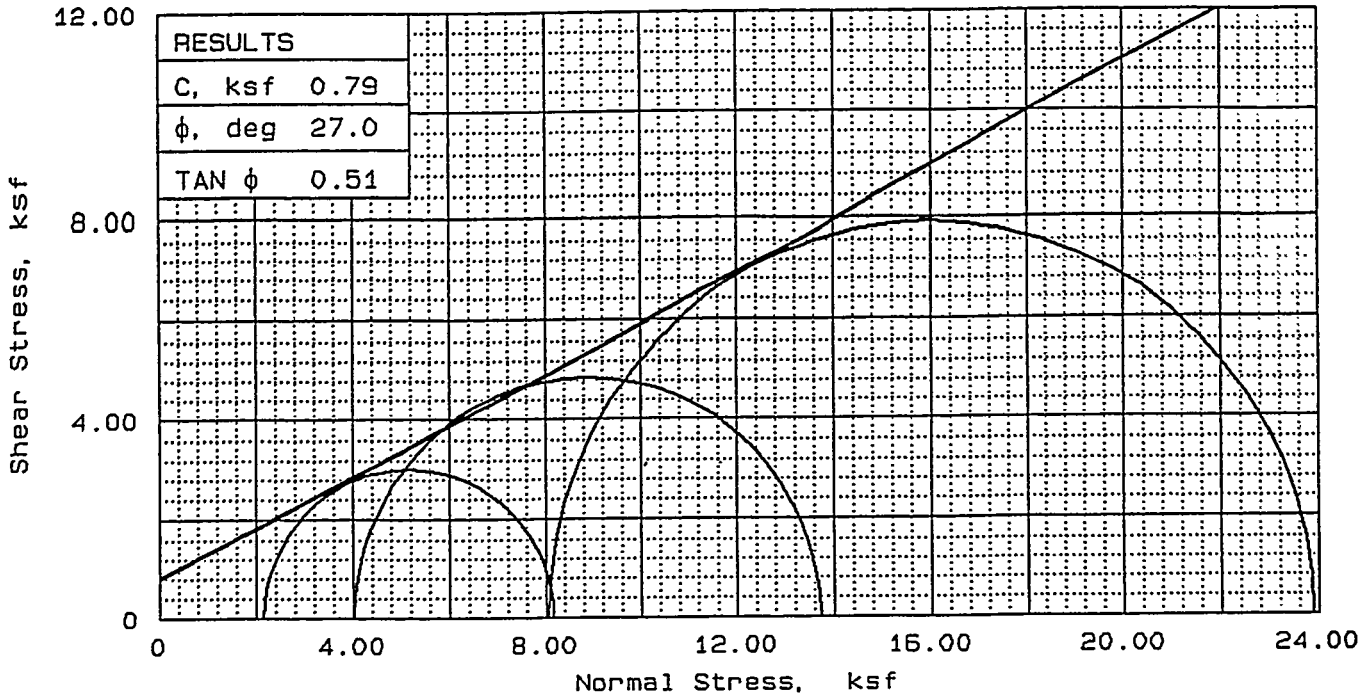
Reviewed by: RLB

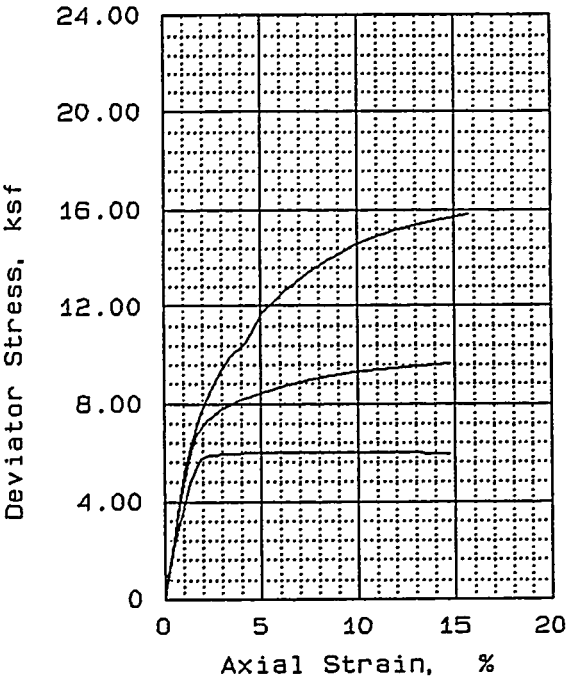
CD 56psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.





	SAMPLE NO.	1	2	3
INITIAL	WATER CONTENT, %	21.4	20.9	23.6
	DRY DENSITY, pcf	97.3	97.4	95.3
	SATURATION, %	80.1	78.9	84.6
	VOID RATIO	0.713	0.705	0.742
	DIAMETER, in	2.88	2.87	2.88
	HEIGHT, in	6.00	6.00	6.00
AT TEST	WATER CONTENT, %	24.0	24.5	26.6
	DRY DENSITY, pcf	101.5	100.5	97.3
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.642	0.652	0.706
	DIAMETER, in	2.82	2.83	2.85
	HEIGHT, in	6.00	5.98	5.98
BACK PRESSURE, ksf		7.92	7.92	7.92
CELL PRESSURE, ksf		10.08	11.95	15.98
FAILURE STRESS, ksf		6.01	9.71	15.84
PORE PRESSURE, ksf				
STRAIN RATE, %/min.		0.100	0.100	56.000
ULTIMATE STRESS, ksf				
PORE PRESSURE, ksf				
σ_1 FAILURE, ksf		8.17	13.74	23.90
σ_3 FAILURE, ksf		2.16	4.03	8.06

TYPE OF TEST:
Consolidated drained

SAMPLE TYPE: Undisturbed

DESCRIPTION:

~~LL- PL- PI-~~

~~SPECIFIC GRAVITY- 2.66~~

REMARKS: Tested by: HEJ

Reviewed by: RLB

FIG. NO. 1

CLIENT: SRS

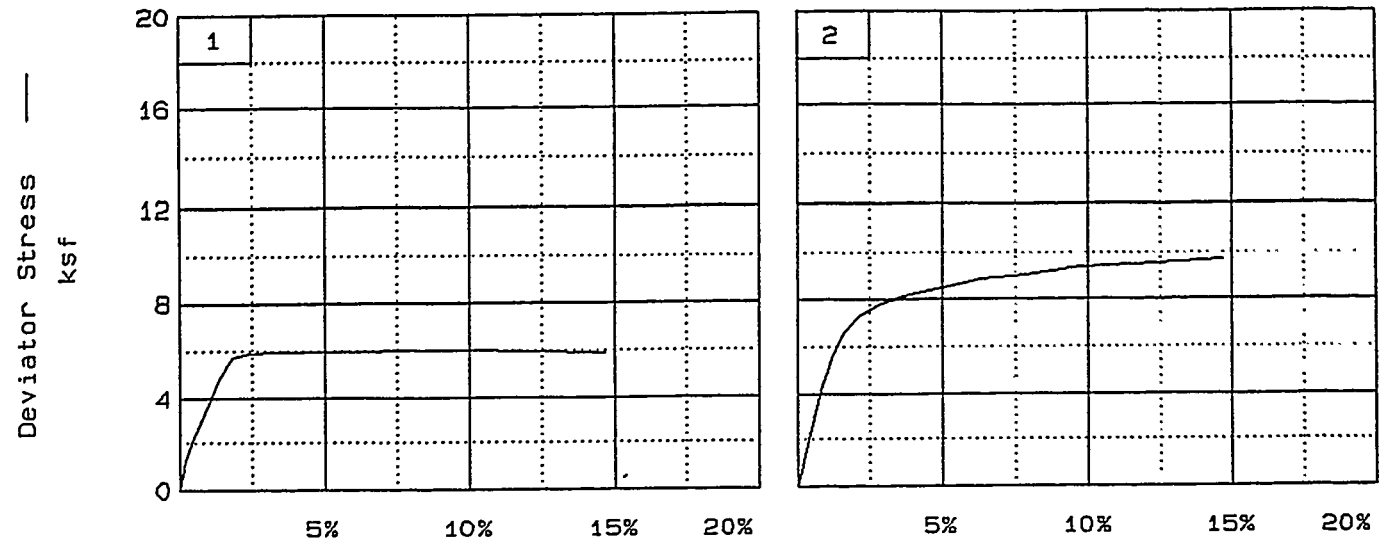
PROJECT: SRS-ITP

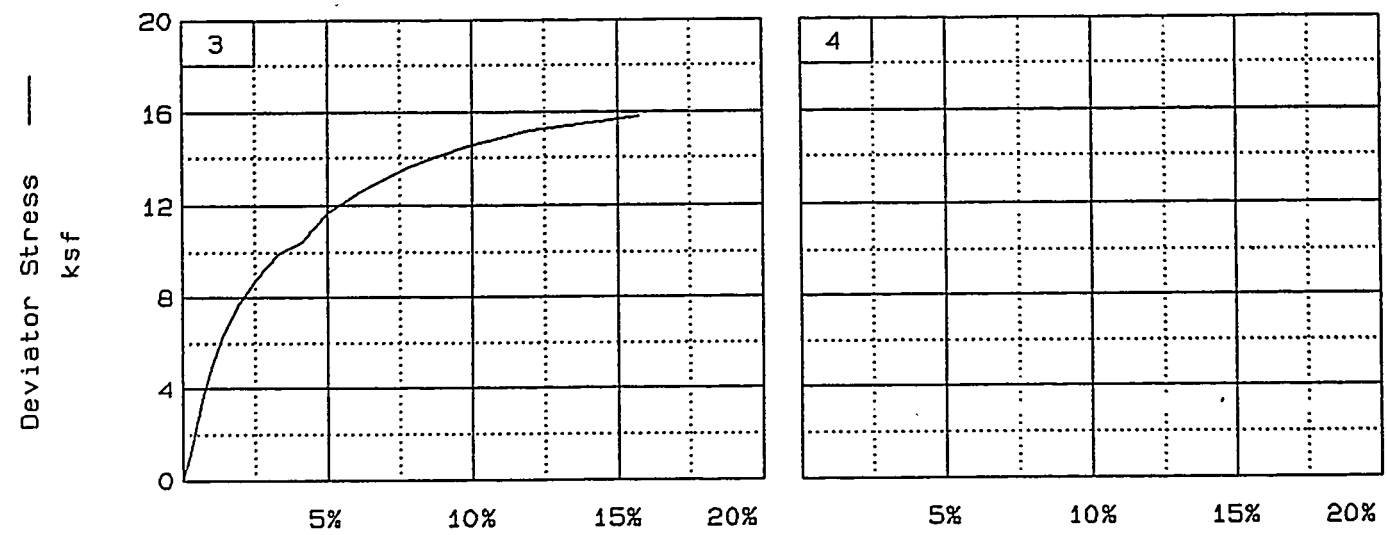
SAMPLE LOCATION: H Bor 12 St-2 @ 13 Ft.

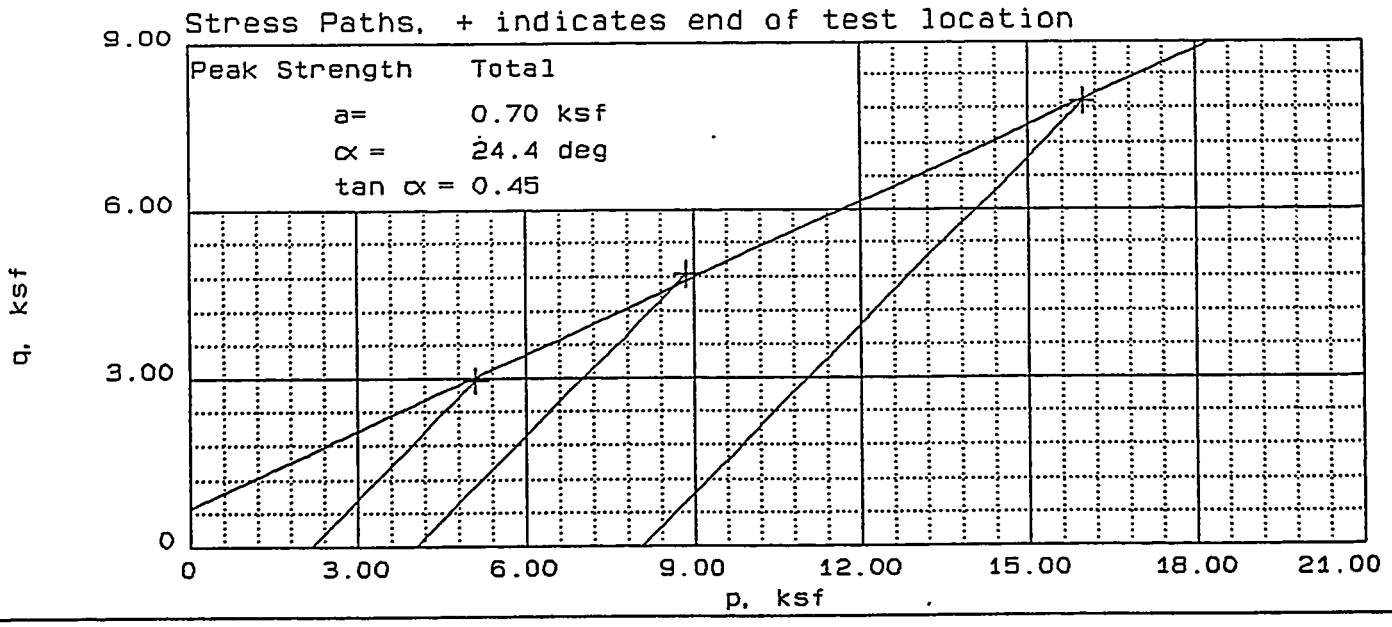
PROJ. NO.: 2-67535301 DATE: Dec.3, 1993

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.





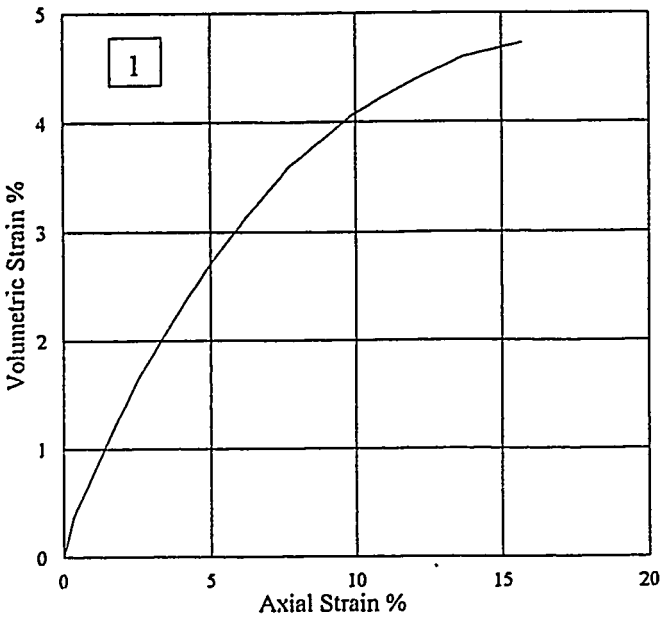


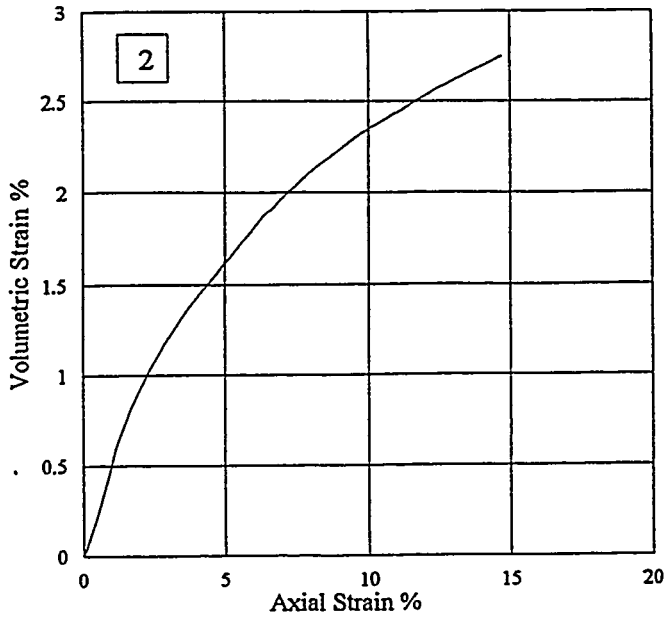
Client: SRS

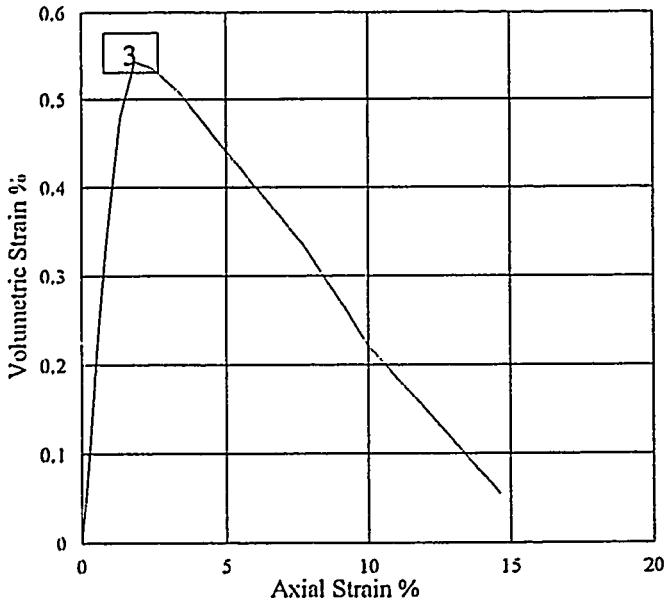
Project: SRS-ITP

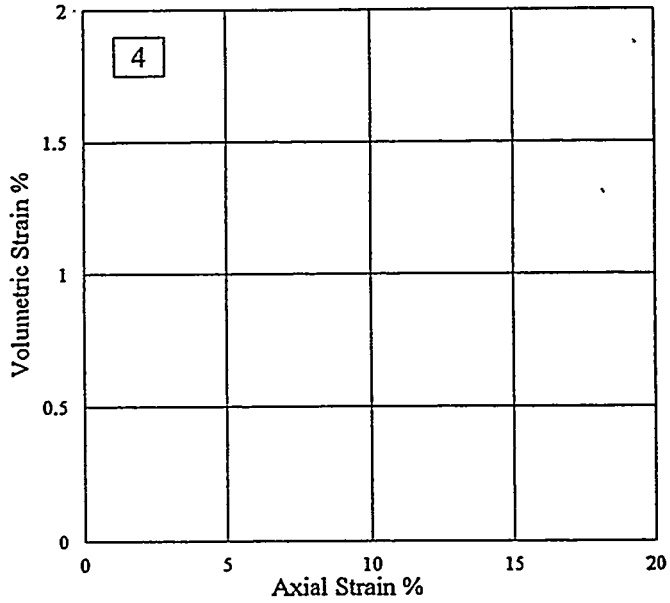
Location: H Bor 12 St-2 @ 13 Ft.

File: 535301 Project No.: 2.67535301 Page 2/2 Fig. No. 1









Client: SRS
Project: SRS-ITP
Location: H Bor 12 ST-2 @ 13 Ft.
File: Project No.: 5810535301 Page 2 / 2 Fig. No. _____

TRIAXIAL COMPRESSION TEST
Consolidated drained

12-14-1993
1:23 pm

Project Data

Project No.: 2.67535301 Date: Dec.3,1993 Data file: 535301
Client: SRS
Project: SRS-ITP
Sample location: H Bor 12 St-2 @ 13 Ft.
Sample description:
Remarks: Tested by:
Reviewed by: Fig No. 1

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.67 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.82	
Height change, in		0.00	
Height, in	6.00	6.00	
Weight, grams	1212.1		
Water volume change, cc		-26.39	
Moisture, %	21.4	24.0	24.0
Dry density, pcf	97.3	101.5	
Saturation, %	80.1	100.0	
Void ratio	0.713	0.642	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 70 psi
Consolidation back pressure = 55 psi
Consolidation effective confining stress = 2.16 ksf
Peak deviator stress = 6.01 ksf at reading no. 10
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	2.16	2.16	1.00	2.16	0.00
1	0.0100	0.010	54.00	54.0	0.2	1.24	2.16	3.40	1.58	2.78	0.62
2	0.0300	0.030	98.00	98.0	0.5	2.25	2.16	4.41	2.04	3.28	1.12
3	0.0500	0.050	144.00	144.0	0.8	3.29	2.16	5.45	2.52	3.81	1.65
4	0.0800	0.080	210.00	210.0	1.3	4.78	2.16	6.94	3.21	4.55	2.39
	0.1100	0.110	252.00	252.0	1.8	5.71	2.16	7.87	3.64	5.01	2.85

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	.1400	0.140	261.00	261.0	2.3	5.88	2.16	8.04	3.72	5.10	2.94
	0.2000	0.200	266.00	266.0	3.3	5.93	2.16	8.09	3.75	5.13	2.97
8	0.2900	0.290	272.00	272.0	4.8	5.97	2.16	8.13	3.76	5.15	2.99
9	0.3800	0.380	277.00	277.0	6.3	5.98	2.16	8.14	3.77	5.15	2.99
10	0.4600	0.460	282.00	282.0	7.7	6.01	2.16	8.17	3.78	5.16	3.00
11	0.6000	0.600	289.00	289.0	10.0	6.00	2.16	8.16	3.78	5.16	3.00
12	0.7200	0.720	294.00	294.0	12.0	5.97	2.16	8.13	3.76	5.14	2.98
13	0.8800	0.880	300.00	300.0	14.7	5.90	2.16	8.06	3.73	5.11	2.95

TRIAXIAL COMPRESSION TEST
Consolidated drained

12-14-1993
1:23 pm

Project Data

Project No.: 2.67535301 Date: Dec.3,1993 Data file: 535301
Client: SRS
Project: SRS-ITP
Sample location: H Bor 12 St-2 @ 13 Ft.
Sample description:
Remarks: Tested by:
Reviewed by: Fig No. 1

Sample No. 2 Data

Type of sample: Undisturbed
Specific Gravity= 2.66 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.87	2.83	
Height change, in		0.02	
Height, in	6.00	5.98	
Weight, grams	1200.2		
Water volume change, cc		-35.59	
Moisture, %	20.9	24.5	22.5
Dry density, pcf	97.4	100.5	
Saturation, %	78.9	100.0	
Void ratio	0.705	0.652	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 83 psi
Consolidation back pressure = 55 psi
Consolidation effective confining stress = 4.032 ksf
Peak deviator stress = 9.71 ksf at reading no. 13
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	4.03	4.03	1.00	4.03	0.00
1	0.0300	0.030	106.00	106.0	0.5	2.41	4.03	6.45	1.60	5.24	1.21
2	0.0500	0.050	184.00	184.0	0.8	4.18	4.03	8.21	2.04	6.12	2.09
3	0.0700	0.070	240.00	240.0	1.2	5.43	4.03	9.46	2.35	6.75	2.72
4	0.1000	0.100	298.00	298.0	1.7	6.71	4.03	10.74	2.66	7.39	3.35
	0.1300	0.130	326.00	326.0	2.2	7.30	4.03	11.33	2.81	7.68	3.65

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	).1700	0.170	348.00	348.0	2.8	7.74	4.03	11.77	2.92	7.90	3.87
	0.2200	0.220	366.00	366.0	3.7	8.07	4.03	12.10	3.00	8.07	4.04
8	0.3000	0.300	388.00	388.0	5.0	8.44	4.03	12.47	3.09	8.25	4.22
9	0.3800	0.380	410.00	410.0	6.4	8.79	4.03	12.82	3.18	8.43	4.40
10	0.4700	0.470	427.00	427.0	7.9	9.01	4.03	13.04	3.23	8.54	4.50
11	0.5800	0.580	450.00	450.0	9.7	9.30	4.03	13.34	3.31	8.68	4.65
12	0.7400	0.740	473.00	473.0	12.4	9.49	4.03	13.52	3.35	8.78	4.74
13	0.8800	0.880	496.00	496.0	14.7	9.69	4.03	13.72	3.40	8.87	4.84

TRIAXIAL COMPRESSION TEST
Consolidated drained

12-14-1993
1:24 pm

Project Data

Project No.: 2.67535301 Date: Dec.3,1993 Data file: 535301
Client: SRS
Project: SRS-ITP
Sample location: H Bor 12 St-2 @ 13 Ft.
Sample description:
Remarks: Tested by:
Reviewed by: Fig No. 1

Sample No. 3 Data

Type of sample: Undisturbed
Specific Gravity= 2.66 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.85	
Height change, in		0.02	
Height, in	6.00	5.98	
Weight, grams	1206.3		
Water volume change, cc		-29.03	
Moisture, %	23.6	26.6	21.7
Dry density, pcf	95.3	97.3	
Saturation, %	84.6	100.0	
Void ratio	0.742	0.706	

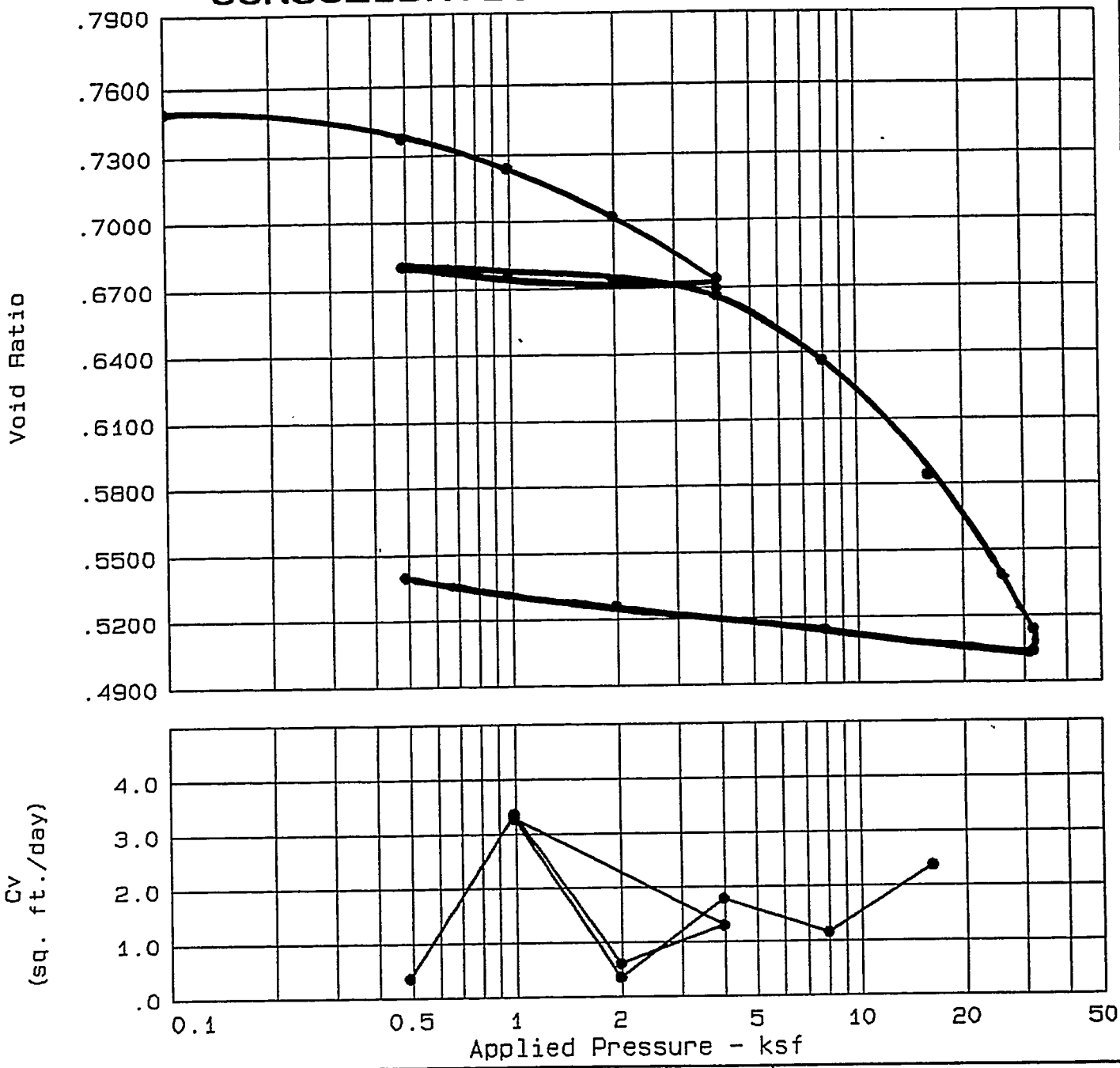
Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= % 56 % per minute
Consolidation cell pressure = 111 psi
Consolidation back pressure = 55 psi
Consolidation effective confining stress = 8.064 ksf
Peak deviator stress = 15.84 ksf at reading no. 15
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	8.06	8.06	1.00	8.06	0.00
1	0.0200	0.020	72.00	72.0	0.3	1.62	8.06	9.68	1.20	8.87	0.81
2	0.0400	0.040	156.00	156.0	0.7	3.49	8.06	11.56	1.43	9.81	1.75
3	0.0600	0.060	228.00	228.0	1.0	5.09	8.06	13.15	1.63	10.61	2.54
	0.0800	0.080	276.00	276.0	1.3	6.14	8.06	14.20	1.76	11.13	3.07
	1100	0.110	342.00	342.0	1.8	7.57	8.06	15.63	1.94	11.85	3.78

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	.1500	0.150	400.00	400.0	2.5	8.79	8.06	16.85	2.09	12.46	4.39
	0.2000	0.200	456.00	456.0	3.3	9.93	8.06	18.00	2.23	13.03	4.97
8	0.2500	0.250	486.00	486.0	4.2	10.49	8.06	18.56	2.30	13.31	5.25
9	0.3000	0.300	546.00	546.0	5.0	11.69	8.06	19.75	2.45	13.91	5.84
10	0.3700	0.370	596.00	596.0	6.2	12.60	8.06	20.66	2.56	14.36	6.30
11	0.4600	0.460	652.00	652.0	7.7	13.56	8.06	21.63	2.68	14.85	6.78
12	0.5900	0.590	717.00	717.0	9.9	14.56	8.06	22.63	2.81	15.35	7.28
13	0.7200	0.720	767.00	767.0	12.0	15.20	8.06	23.27	2.89	15.67	7.60
14	0.8200	0.820	798.00	798.0	13.7	15.52	8.06	23.58	2.92	15.82	7.76
15	0.9400	0.940	832.00	832.0	15.7	15.80	8.06	23.87	2.96	15.97	7.90

CONSOLIDATION TEST REPORT



Clpse. %	Nat. Sat.	Nat. Moist.	Dry Density	LL	PI	Sp.Gr.	Initial void ratio
0.5	72.0 %	20.2	95.3	86	54	2.670	0.7490

TEST RESULTS

MATERIAL DESCRIPTION

Light Red Brown Clayey Medium to Fine Sand

Class: SC

Project No.: 5810535301
Project: SRS-ITP
Location: H-Bor-12 ST-2 @ 13'

Date: OCT 25, 1993

Remarks:

Tested by: CLG
Checked By: RLB

CONSOLIDATION TEST REPORT

LAW ENGINEERING, INC.

Fig. No._____

16:45, 2-01-1994 CONSOLIDATION TEST PROJECT DATA Test No. 28

Project Number:	5810535301
Project:	SRS-ITP
Date:	OCT 25,1993
Location 1:	H-Bor-12 ST-2 @ 13'
2:	
Remarks 1:	Tested by:
2:	Checked By:
3:	
4:	
5:	
Material 1:	Light Red Brown Clayey
description 2:	Medium to Fine Sand
Classification:	SC
Liquid limit:	86
Plasticity index:	54
Figure Number:	

CONSOLIDATION TEST SPECIMEN DATA

TOTAL SAMPLE	BEFORE TEST	AFTER TEST
Wet w+t = 336.59 g.	Oedometer No. = 5	Wet w+t = 338.27 g.
Dry w+t = 316.84 g	Machine No. = 5	Dry w+t = 316.84 g.
Tare wt. = 219.01 g.	Spec. Gravity = 2.670	Tare wt. = 219.01 g.
Height = 0.8940 in.	Height = 0.8940 in.	
Diameter = 2.3600 in.	Diameter = 2.3600 in.	
Weight = 117.58 g.		
Moisture = 20.2 %	Ht. Solids = 0.5111 in.	Moisture = 21.9 %
Wet Den. = 114.5 pcf	Dry wt. = 97.83 g. *	Dry wt. = 97.83 g.
Dry Den. = 95.3 pcf	Void ratio = 0.7490	Void ratio = 0.5400
	Saturation = 72.0 %	Saturation = 108.3 %

* Initial dry weight used in calculations

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
Initial	0.02000			0.7490	
0.10	0.02000	0.0000	0.02000	0.7490	0.0
0.49	0.02710	0.0003	0.02680	0.7373*	0.7 Comprs.*
0.99	0.03480	0.0007	0.03410	0.7236*	1.5 Comprs.*
1.99	0.04760	0.0012	0.04640	0.7018*	2.7 Comprs.*
3.99	0.06230	0.0021	0.06020	0.6736*	4.3 Comprs.*
3.99	0.06450	0.0021	0.06240	0.6693	4.6 Comprs.
1.99	0.06160	0.0012	0.06040	0.6732	4.3 Comprs.
0.49	0.05715	0.0003	0.05685	0.6802	3.9 Comprs.
0.99	0.05850	0.0007	0.05780	0.6754*	4.2 Comprs.*
1.99	0.06105	0.0012	0.05985	0.6717*	4.4 Comprs.*
3.99	0.06548	0.0021	0.06338	0.6662*	4.7 Comprs.*
8.00	0.08345	0.0032	0.08025	0.6361*	6.5 Comprs.*
16.00	0.11210	0.0048	0.10730	0.5841*	9.4 Comprs.*

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
32.04	0.15040	0.0071	0.14330	0.5137*	13.5 Comprs.*
32.04	0.15340	0.0071	0.14630	0.5079	13.8 Comprs.
8.00	0.14620	0.0032	0.14300	0.5143	13.4 Comprs.
1.99	0.13810	0.0012	0.13690	0.5263	12.7 Comprs.
0.49	0.13020	0.0003	0.12990	0.5400	12.0 Comprs.

* CALCULATED USING D100 INSTEAD OF FINAL READING

CONSOLIDATION TEST RESULTS

Compression index = NOT SELECTED
Preconsolidation pressure = NOT SELECTED

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

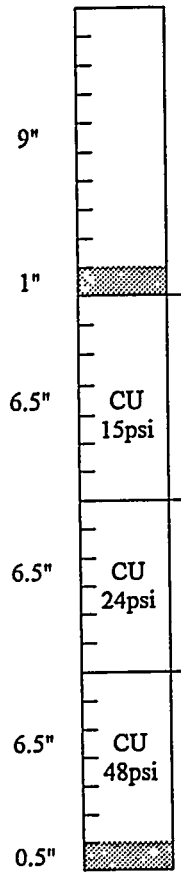
Project: SRS-ITP GEOTECHNICAL TESTING Date: 09-01-93

Boring No: H-Bor-12 Sample No: ST-3 Depth: 18'-19'10"

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION



Wax
Cut
Reddish brown clayey silty fine sand

Cut
Reddish brown clayey silty fine sand

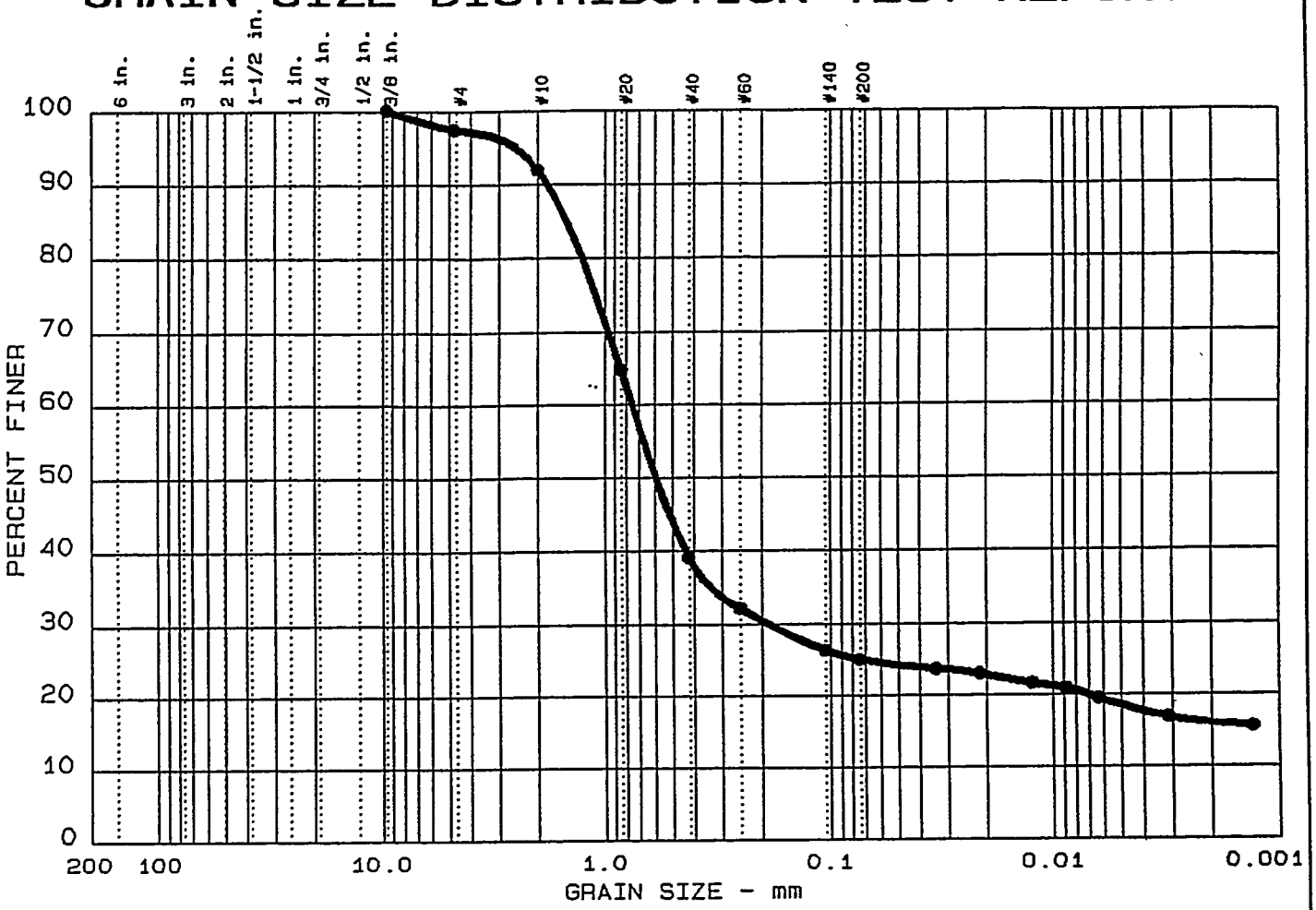
Cut
Brown clayey silty fine sand

Remarks:

1028mf srs-itp-aaif
7/22/93

rlb\itp\tubelog\b12-st3.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	3	0.0	2.6	72.5	6.4	18.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	100	61	1.48	0.75	0.59	0.188				

MATERIAL DESCRIPTION	USCS	AASHTO
● Orange Brown Silty Clayey Medium to Fine Sand	SC	A-2-7 (5.1)

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-12 ST-3 @ 18-19'10'

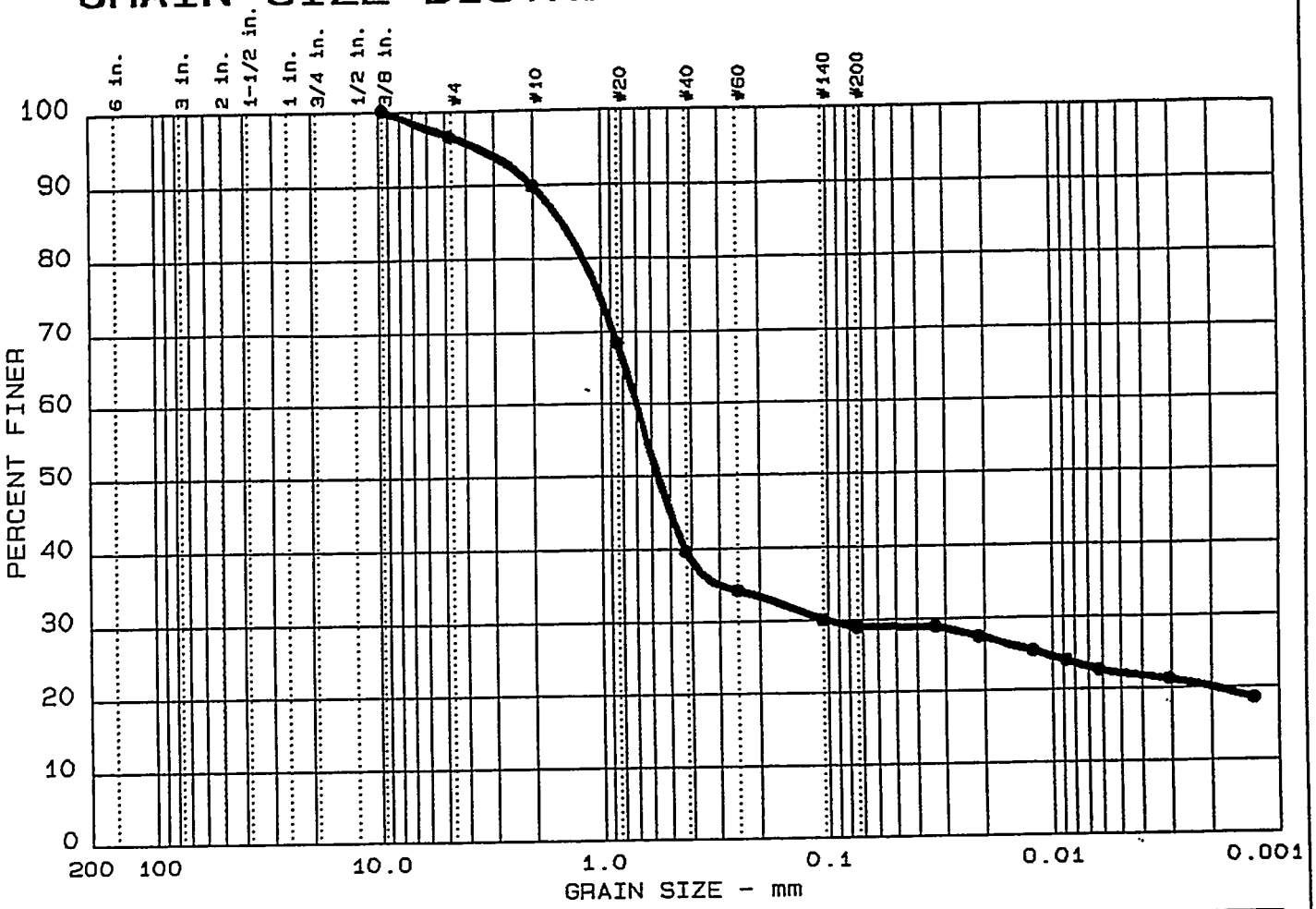
Date: September 23, 1993

Remarks:
Tested by: JRR
Reviewed by: RLB
CU @ 14.7 PSI

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	14	0.0	3.4	67.6	6.8	22.2

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			1.46	0.70	0.56	0.105				

MATERIAL DESCRIPTION	USCS	AASHTO
● Orange-Brown Silty Clayey Medium to Fine Sand		

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-12 ST-3 @ 18-19.83 Ft.

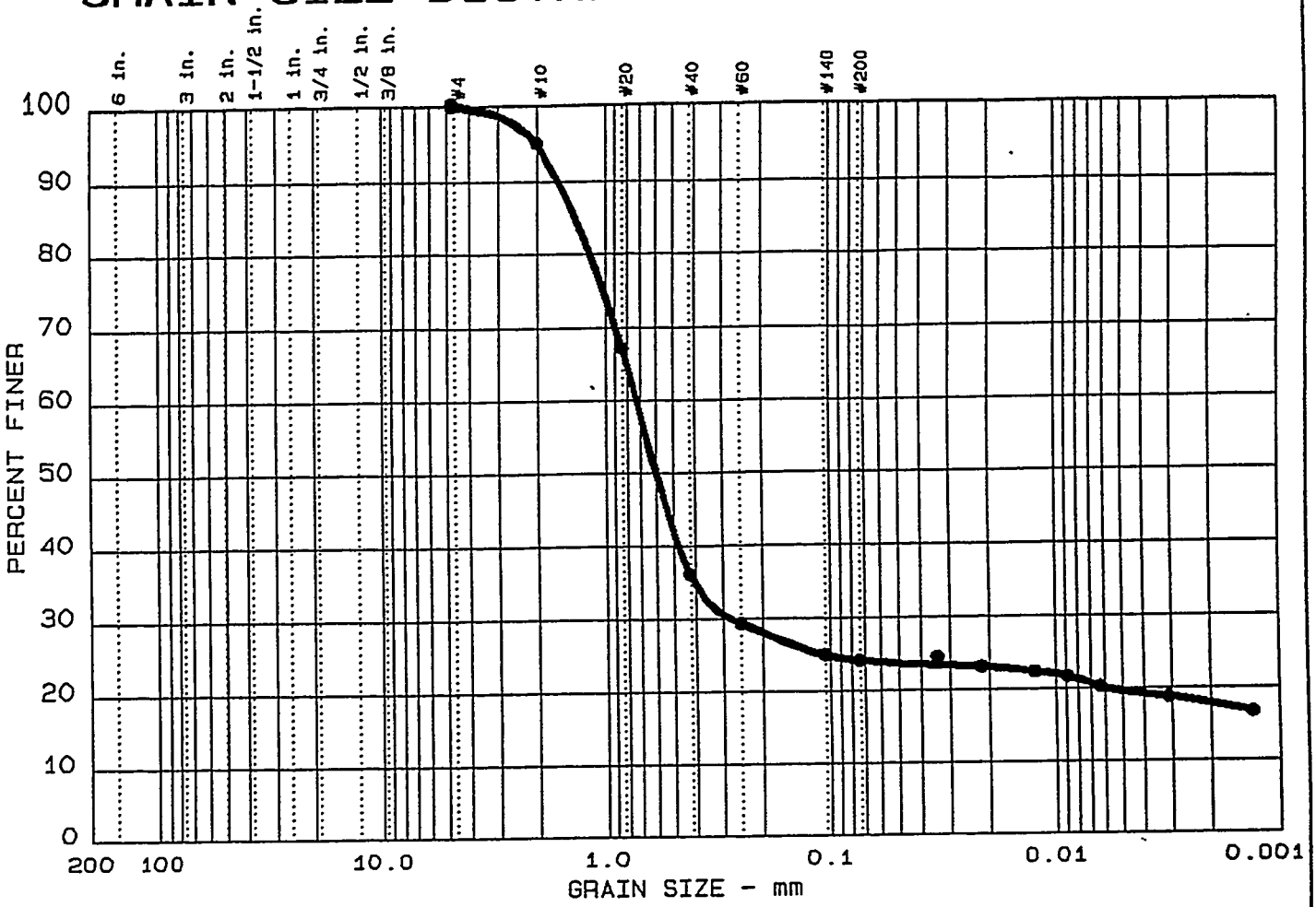
Date: September 23, 1993

Remarks:
Tested by: JRR
Chkd by RLB CU @ 24 PSI
Atterberg Limits -200
LL=152 PL=54 PI=98

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	1	0.0	0.0	75.9	4.5	19.6

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	78	59	1.35	0.72	0.59	0.285				

MATERIAL DESCRIPTION	USCS	AASHTO
● Orange-Brown Clayey Medium to Fine Sand	SC	A-2-7 (4.4)

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-12 ST-3 @ 18-19'10"

Date: September 23, 1993

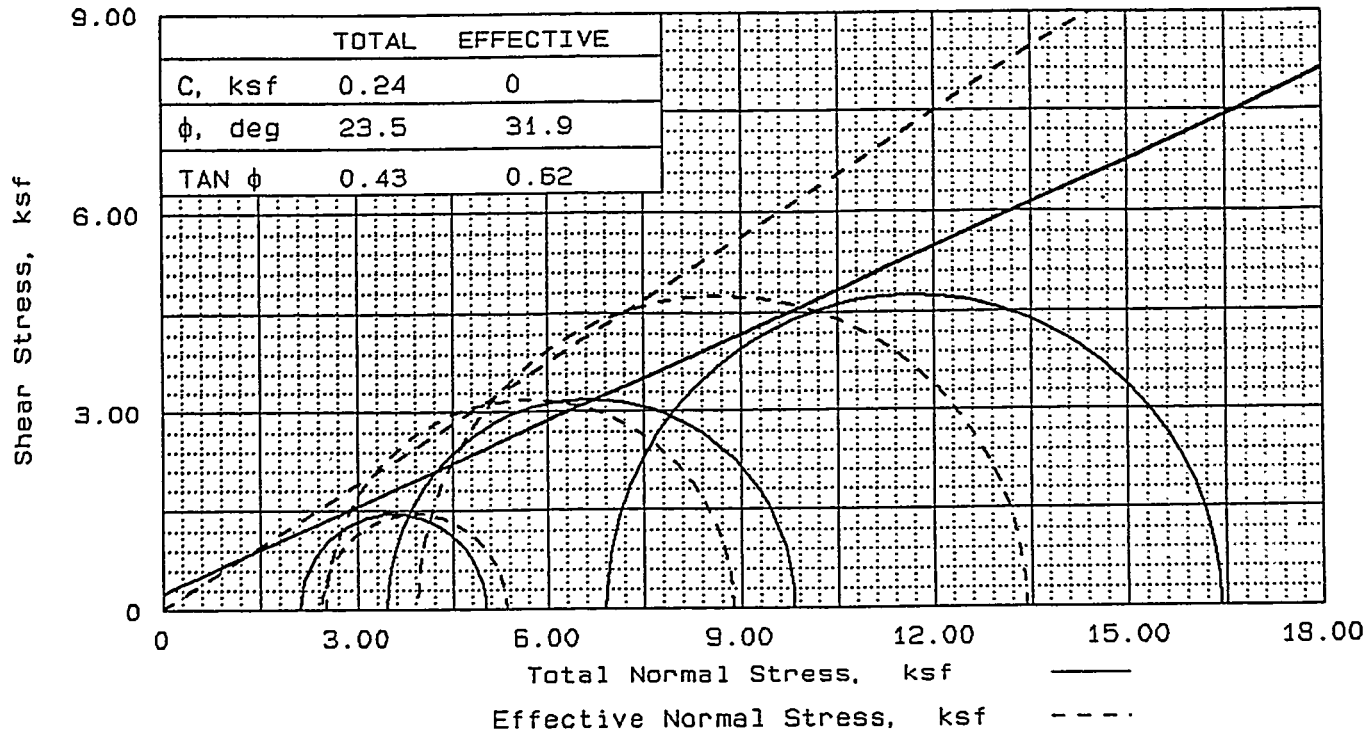
Remarks:

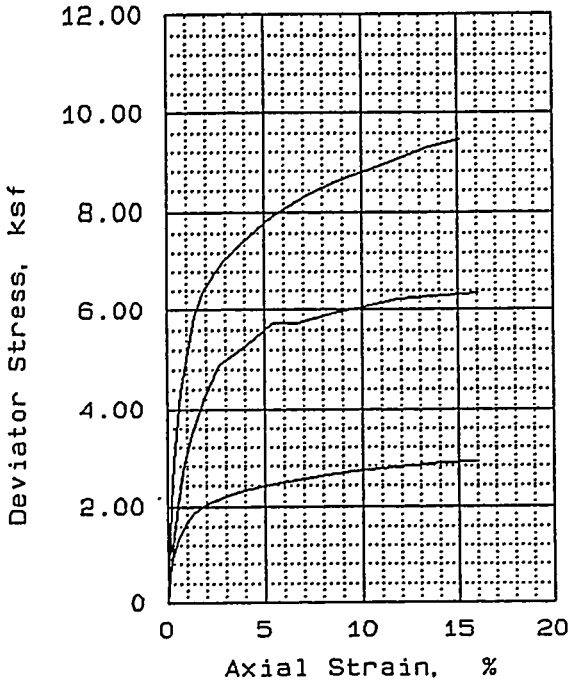
Tested by: JRR
Reviewed by: RLB

CU @ 48 PSI

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.





SAMPLE NO.		1	2	3
INITIAL	WATER CONTENT, %	25.5	22.2	19.3
	DRY DENSITY, pcf	94.5	97.6	99.7
	SATURATION, %	89.3	81.9	76.5
	VOID RATIO	0.763	0.734	0.677
	DIAMETER, in	2.87	2.88	2.87
	HEIGHT, in	6.00	6.00	6.00
AT TEST	WATER CONTENT, %	28.6	26.0	24.0
	DRY DENSITY, pcf	94.5	99.2	101.9
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.763	0.706	0.642
	DIAMETER, in	2.87	2.86	2.85
	HEIGHT, in	6.00	5.98	5.95
BACK PRESSURE, ksf		3.00	3.66	3.64
CELL PRESSURE, ksf		5.11	7.11	10.56
FAILURE STRESS, ksf		2.90	6.37	9.50
PORE PRESSURE, ksf		2.66	4.61	6.62
STRAIN RATE, %/min.		0.100	0.100	0.100
ULTIMATE STRESS, ksf				
PORE PRESSURE, ksf				
$\bar{\sigma}_1$ FAILURE, ksf		5.35	8.88	13.43
$\bar{\sigma}_3$ FAILURE, ksf		2.45	2.51	3.93

TYPE OF TEST:
CU with pore pressures
SAMPLE TYPE: Undisturbed
DESCRIPTION:

LL= 100 PL= 39 PI= 61.0
SPECIFIC GRAVITY= 2.67
REMARKS: Tested by: HES

Reviewed by: RLB

FIG. NO. 5

CLIENT: SRS

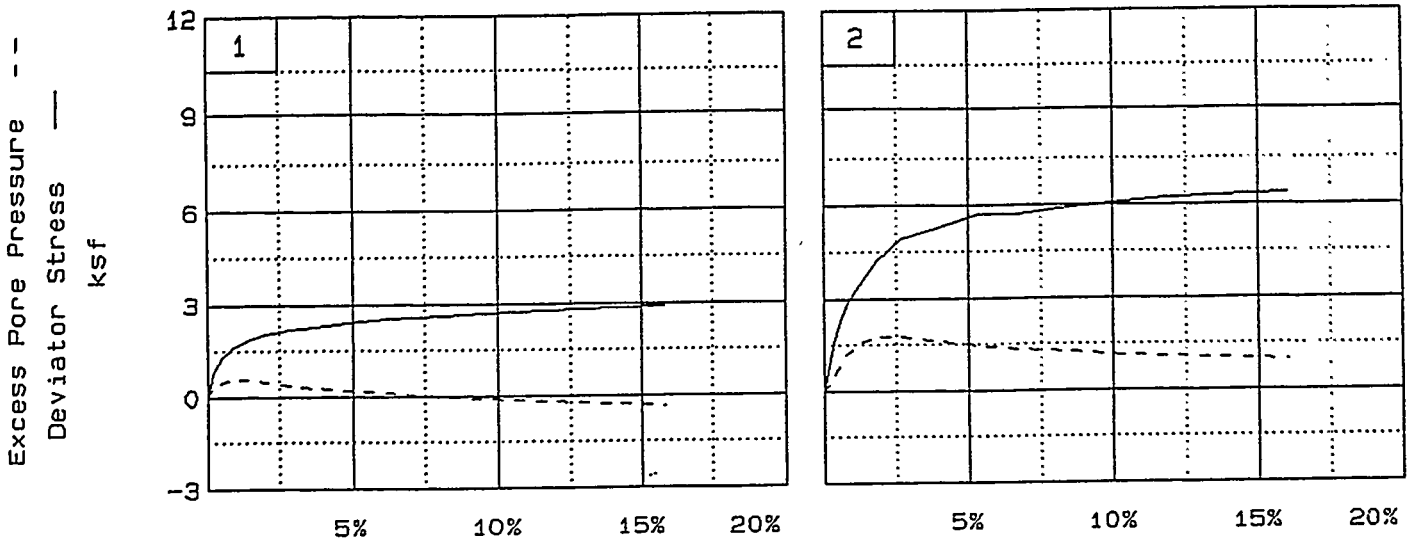
PROJECT: SRS-ITP

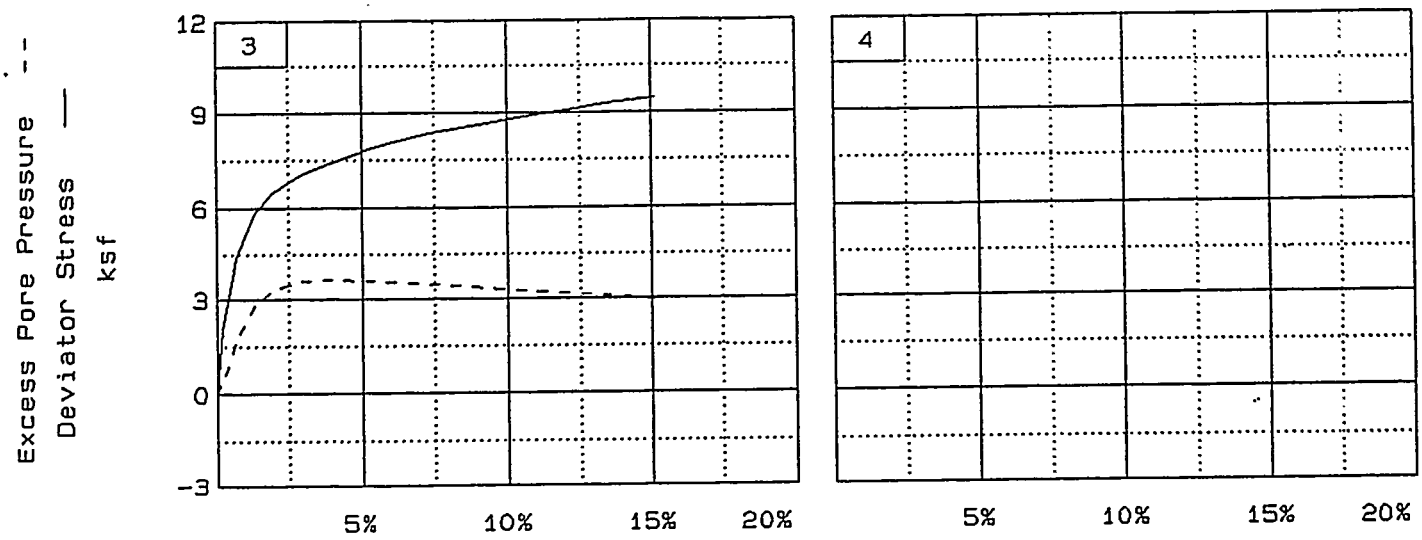
SAMPLE LOCATION: H-Bor-12 ST-3 @ 18-19'10"

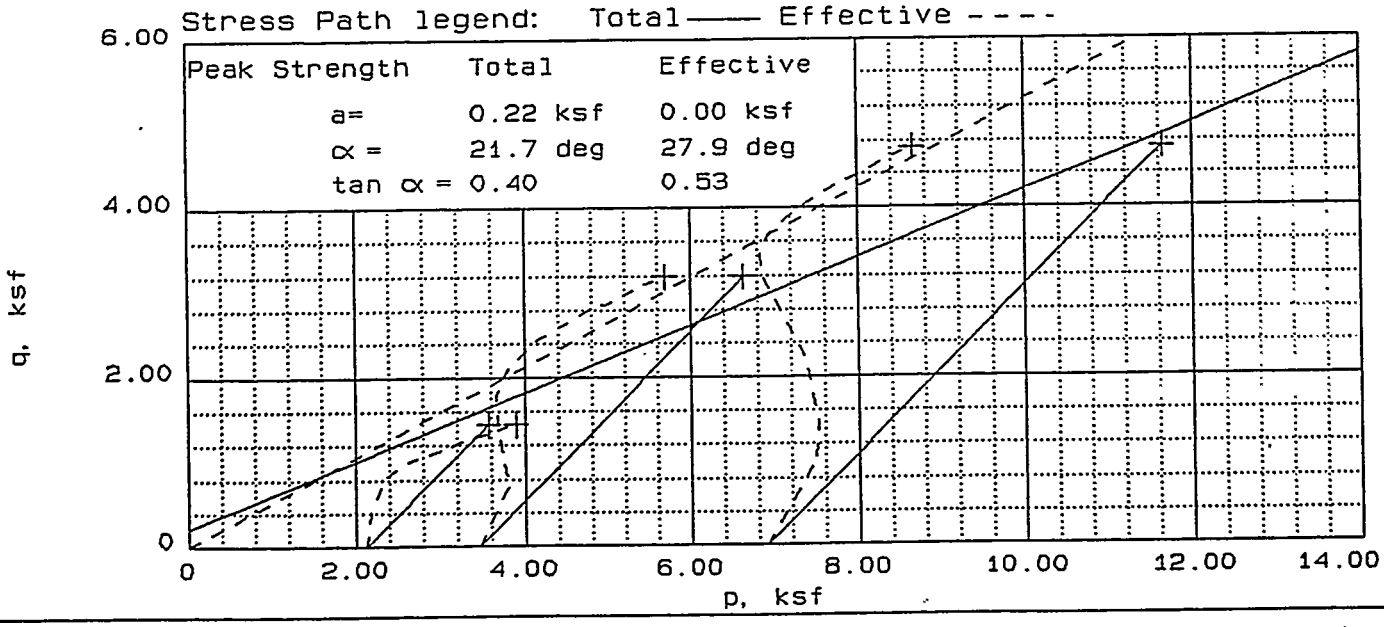
PROJ. NO.: 5810535301 DATE: 10/8/93

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.







Client: SRS

Project: SRS-ITP

Location: H-Bor-12 ST-3 @ 18-19'10"

File: SRS-ITP4 Project No.: 5810535301 Page 2/2 Fig. No. 5

TRIAXIAL COMPRESSION TEST
CU with pore pressures

12-07-1993
9:13 am

Project Data

Project No.: 5810535301 Date: 10/8/93 Data file: SRS-ITP4
Client: SRS
Project: SRS-ITP
Sample location: H-Bor-12 ST-3 @ 18-19'10"
Sample description:
Remarks: Tested by: HEJ
Reviewed by: RLB Fig No. 5

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.67 LL= 100 PL= 39 PI= 61

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.87	2.87	
Height change, in		0.00	
Height, in	6.00	6.00	
Weight, grams	1211.6		
Water volume change, cc		-29.27	
Moisture, %	25.5	28.6	23.7
Dry density, pcf	94.5	94.5	
Saturation, %	89.3	100.0	
Void ratio	0.763	0.763	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 35.5 psi
Consolidation back pressure = 20.8 psi
Consolidation effective confining stress = 2.1168 ksf
Peak deviator stress = 2.90 ksf at reading no. 14
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	2.12	2.12	1.00	20.8	2.12	0.00
1	0.0100	0.010	36.00	36.0	0.2	0.80	1.77	2.57	1.45	23.2	2.17	0.40
2	0.0300	0.030	59.00	59.0	0.5	1.30	1.63	2.93	1.80	24.2	2.28	0.65
3	0.0500	0.050	73.00	73.0	0.8	1.61	1.54	3.15	2.04	24.8	2.34	0.80
4	0.0800	0.080	85.00	85.0	1.3	1.86	1.56	3.42	2.20	24.7	2.49	0.93
	.1200	0.120	94.00	94.0	2.0	2.05	1.63	3.67	2.26	24.2	2.65	1.02

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Effective Stresses Major ksf	Effective Stresses 1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
	0.1700	0.170	101.00	101.0	2.8	2.18	1.73	3.91	2.26	23.5	2.82	1.09
	0.2200	0.220	106.00	106.0	3.7	2.27	1.83	4.10	2.24	22.8	2.96	1.13
8	0.2900	0.290	113.00	113.0	4.8	2.39	1.93	4.32	2.24	22.1	3.12	1.19
9	0.3700	0.370	120.00	120.0	6.2	2.50	2.02	4.52	2.24	21.5	3.27	1.25
10	0.4900	0.490	128.00	128.0	8.2	2.61	2.15	4.76	2.22	20.6	3.45	1.31
11	0.5700	0.570	134.00	134.0	9.5	2.69	2.22	4.91	2.21	20.1	3.56	1.35
12	0.7000	0.700	142.00	142.0	11.7	2.79	2.30	5.09	2.21	19.5	3.70	1.39
13	0.8500	0.850	150.00	150.0	14.2	2.86	2.39	5.25	2.20	18.9	3.82	1.43
14	0.9500	0.950	155.00	155.0	15.8	2.90	2.45	5.35	2.18	18.5	3.90	1.45

TRIAXIAL COMPRESSION TEST 2-24-1994
CU with pore pressures 4:36 pm

Project Data

Project No.: 5810535301 Date: 10/8/93 Data file: SRS-ITP4
Client: SRS
Project: SRS-ITP
Sample location: H-Bor-12 ST-3 @ 18-19'10"
Sample description:
Remarks: Tested by:
Reviewed by: Fig No. 5

Sample No. 2 Data

Type of sample: Undisturbed
Specific Gravity= 2.71 LL= 100 PL= 39 PI= 61

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.86	
Height change, in		0.02	
Height, in	6.00	5.98	
Weight, grams	1223.1		
Water volume change, cc		-38.82	
Moisture, %	22.2	26.0	22.9
Dry density, pcf	97.6	99.2	
Saturation, %	81.9	100.0	
Void ratio	0.734	0.706	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 49.4 psi
Consolidation back pressure = 25.4 psi
Consolidation effective confining stress = 3.456 ksf
Peak deviator stress = 6.37 ksf at reading no. 14
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	3.46	3.46	1.00	25.4	3.46	0.00
1	0.0200	0.020	64.00	64.0	0.3	1.43	3.08	4.51	1.46	28.0	3.80	0.71
2	0.0300	0.030	90.00	90.0	0.5	2.01	2.75	4.76	1.73	30.3	3.75	1.00
3	0.0500	0.050	129.00	129.0	0.8	2.86	2.25	5.11	2.28	33.8	3.68	1.43
4	0.0800	0.080	162.00	162.0	1.3	3.58	1.87	5.45	2.91	36.4	3.66	1.79
	1100	0.110	191.00	191.0	1.8	4.20	1.70	5.90	3.47	37.6	3.80	2.10

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Effective Stresses Major ksf	Effective Stresses 1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
	0.1600	0.160	225.00	225.0	2.7	4.90	1.70	6.60	3.89	37.6	4.15	2.45
7	0.2400	0.240	246.00	246.0	4.0	5.29	1.87	7.16	3.82	36.4	4.52	2.64
8	0.3200	0.320	270.00	270.0	5.4	5.72	2.00	7.72	3.86	35.5	4.86	2.86
9	0.4000	0.400	274.00	274.0	6.7	5.73	2.10	7.83	3.72	34.8	4.96	2.86
10	0.5100	0.510	290.00	290.0	8.5	5.94	2.22	8.16	3.68	34.0	5.19	2.97
11	0.6200	0.620	304.00	304.0	10.4	6.10	2.30	8.41	3.65	33.4	5.35	3.05
12	0.7100	0.710	315.00	315.0	11.9	6.22	2.36	8.58	3.63	33.0	5.47	3.11
13	0.8100	0.810	324.00	324.0	13.5	6.27	2.42	8.69	3.59	32.6	5.56	3.14
14	0.9600	0.960	339.00	339.0	16.1	6.37	2.51	8.88	3.54	32.0	5.69	3.19

TRIAXIAL COMPRESSION TEST 2-24-1994
CU with pore pressures 4:38 pm

Project Data

Project No.: 5810535301 Date: 10/8/93 Data file: SRS-ITP4
Client: SRS
Project: SRS-ITP
Sample location: H-Bor-12 ST-3 @ 18-19'10"
Sample description:
Remarks: Tested by:
Reviewed by: Fig No. 5

Sample No. 3 Data

Type of sample: Undisturbed
Specific Gravity= 2.68 LL= 100 PL= 39 PI= 61

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.87	2.85	
Height change, in		0.05	
Height, in	6.00	5.95	
Weight, grams	1214.5		
Water volume change, cc		-46.94	
Moisture, %	19.3	24.0	21.1
Dry density, pcf	99.7	101.9	
Saturation, %	76.5	100.0	
Void ratio	0.677	0.642	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 73.3 psi
Consolidation back pressure = 25.3 psi
Consolidation effective confining stress = 6.912 ksf
Peak deviator stress = 9.50 ksf at reading no. 13
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	6.91	6.91	1.00	25.3	6.91	0.00
1	0.0100	0.010	90.00	90.0	0.2	2.02	6.48	8.50	1.31	28.3	7.49	1.01
2	0.0200	0.020	129.00	129.0	0.3	2.90	6.08	8.97	1.48	31.1	7.52	1.45
3	0.0400	0.040	195.00	195.0	0.7	4.36	5.21	9.57	1.84	37.1	7.39	2.18
4	.0800	0.080	264.00	264.0	1.3	5.87	4.08	9.94	2.44	45.0	7.01	2.93
	.100	0.110	290.00	290.0	1.8	6.41	3.64	10.05	2.76	48.0	6.85	3.20

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
	.1700	0.170	321.00	321.0	2.9	7.02	3.33	10.35	3.11	50.2	6.84	3.51
	0.2300	0.230	342.00	342.0	3.9	7.40	3.25	10.66	3.27	50.7	6.96	3.70
8	0.3200	0.320	371.00	371.0	5.4	7.91	3.30	11.20	3.40	50.4	7.25	3.95
9	0.4400	0.440	401.00	401.0	7.4	8.36	3.43	11.79	3.44	49.5	7.61	4.18
10	0.5200	0.520	418.00	418.0	8.7	8.59	3.53	12.12	3.43	48.8	7.82	4.30
11	0.6500	0.650	444.00	444.0	10.9	8.91	3.67	12.58	3.43	47.8	8.13	4.45
12	0.8000	0.800	477.00	477.0	13.4	9.30	3.83	13.13	3.43	46.7	8.48	4.65
13	0.9000	0.900	495.00	495.0	15.1	9.46	3.93	13.39	3.41	46.0	8.66	4.73

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

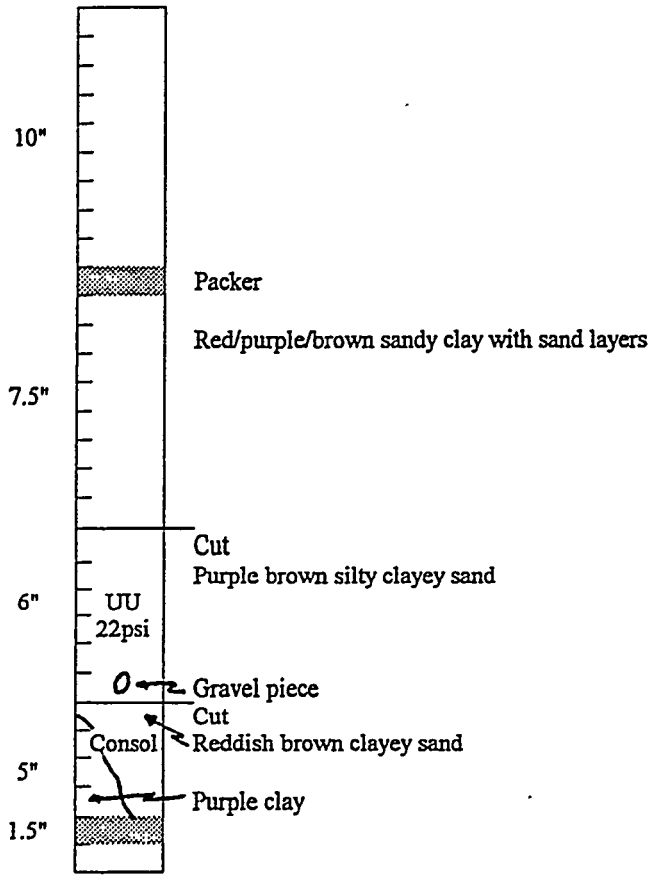
Project: SRS-ITP GEOTECHNICAL TESTING Date: 09-21-93

Boring No: H-Bor-12 Sample No: PS-2 Depth: 27'4" - 29'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION



Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b12-ps2.wk3

ATTACHMENT 2

Tested by:	CLG	Reviewed by:	RLB	Law Job No.:	5810535301
Date:	09/21/93	Date:	09/21/93	Job Name:	SRS - ITP

TP-4A: UNIT WEIGHT OF THIN WALL TUBE SAMPLES

"TYPICAL"

Sample: Boring No.: H-Bor-12
Depth: 27' 4" - 29'
Sample ID: PS-2

MEASUREMENTS (Entire Tube):

	FROM TOP OF TUBE PACKER (inches)		FROM TOP OF TUBE SOIL (inches)		FROM BOTTOM OF TUBE PACKER (inches)		FROM BOTTOM OF TUBE SOIL (inches)		TOTAL TUBE LENGTH (inches)		INSIDE DIAMETER OF TUBE (inches)
1.	9.89		10.18		0.78		1.40				
2.	9.89		10.17		0.77		1.38				
3.	9.89		10.18		0.70		1.37				
Avg.:	9.89	L_1 =	10.18		0.75	L_2 =	1.38	L_3 =	30.000 *	D_i =	2.868 *

TOTAL WEIGHT OF TUBE + PACKERS + SOIL	M_1 =	6,412.1	gm
WEIGHT OF PACKERS	M_2 =	147.3 *	gm
TOTAL WEIGHT OF TUBE	M_3 =	2,453.1 *	gm
WET WEIGHT OF SOIL COLUMN, [M_1-M_2-M_3]	M_4 =	3,811.7	gm

* *Denotes information supplied by WSRC/TO*

MOISTURE CONTENTS (From assigned tests of same tube):

MOISTURE CONTENT		
Specimen 1:	25.8	% moisture
Specimen 2:	26.6	% moisture
Specimen 3:	N/A	% moisture
Average, (w):	26.2	% moisture

Notations:

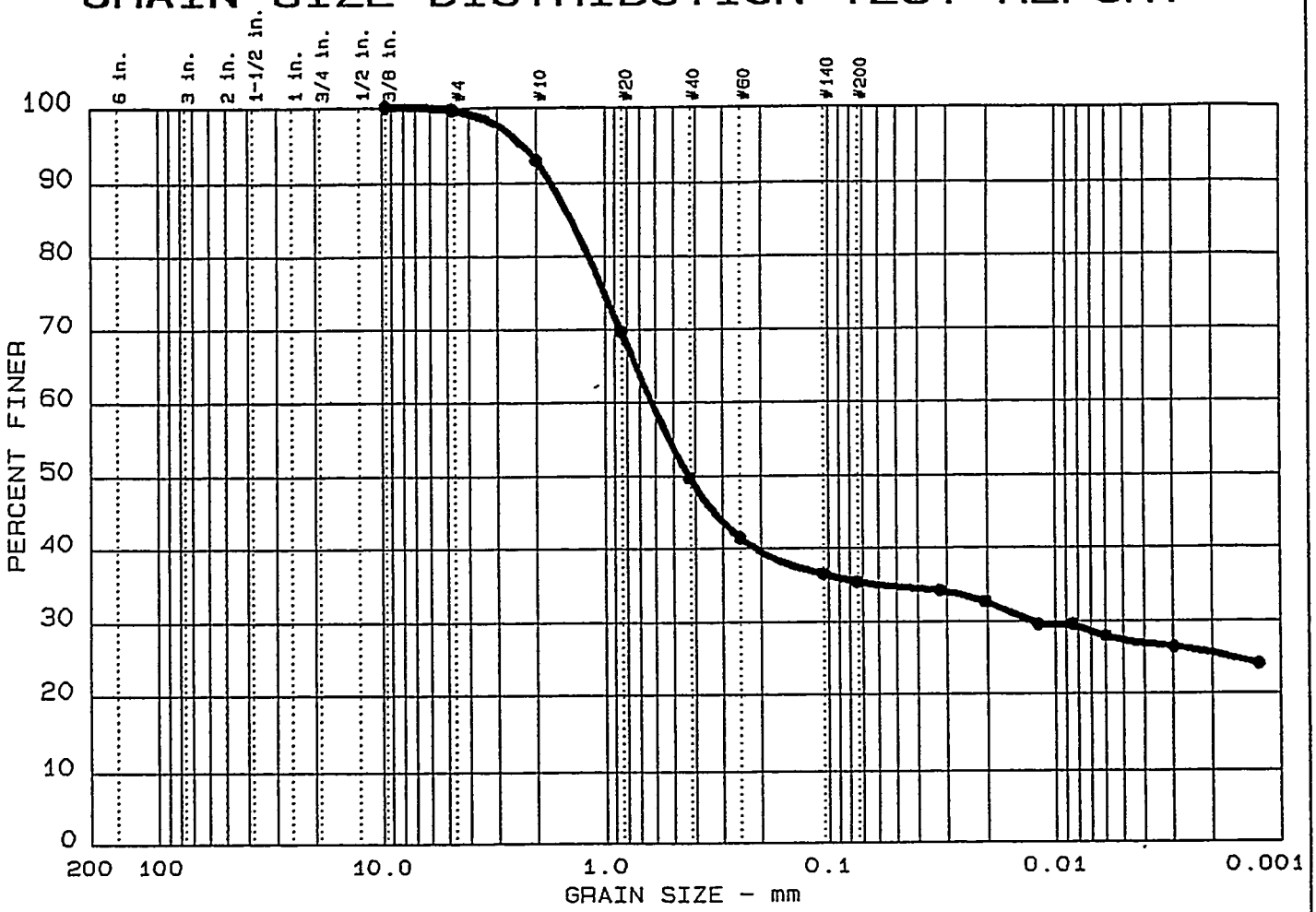
Specimen 1 moisture content obtained from UU - 22psi test
Specimen 2 moisture content obtained from Consolidation test
Specimen 3 moisture content obtained from N/A test

CALCULATIONS:

CROSS-SECTIONAL AREA OF TUBE, [pi*(D_i^2)/4]	A_o=	6.46	in.^{2}
LENGTH OF SOIL COLUMN, [L_3 - L_2 - L_1]	L_s =	18.44	in.
VOLUME OF SOIL COLUMN, [L_s*A_o]	V_s =	119.13	in.^{3}
WET DENSITY, [(M_4/V_s)*3.810]	**D_w=**	**121.9**	**pcf**
DRY DENSITY, [D_w/(1+w/100)]	**D_D=**	**96.6**	**pcf**

h:\users\lab\rlb\itp\b12-ps2.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	4	0.0	0.4	64.3	8.0	27.3

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	91	61	1.40	0.62	0.43	0.013				

MATERIAL DESCRIPTION	USCS	AASHTO
● Brown Purple Silty Clayey Coarse to Fine Sand	SC	A-2-7 (10.2)

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-12 PS-2 @ 27'4"-29'

Date: October 25, 1993

Remarks:

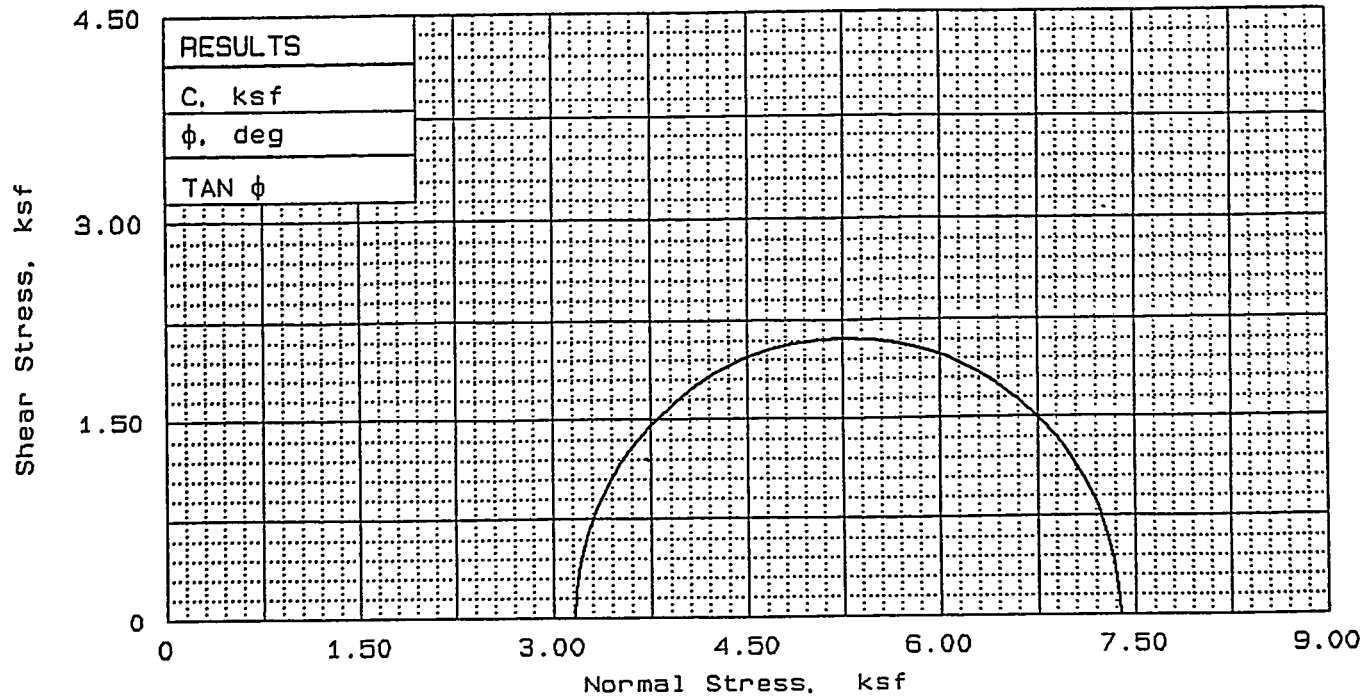
Tested by: JRR
Reviewed by: RLR

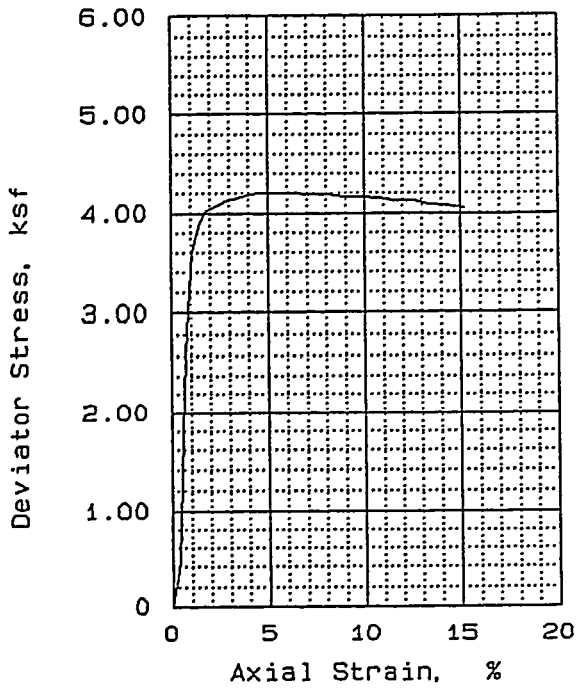
UU 22 psi (Consol.)

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.





SAMPLE NO.		1
INITIAL	WATER CONTENT, %	25.8
	DRY DENSITY, pcf	93.2
	SATURATION, %	86.1
	VOID RATIO	0.808
	DIAMETER, in	2.89
	HEIGHT, in	5.60
AT TEST	WATER CONTENT, %	25.8
	DRY DENSITY, pcf	93.2
	SATURATION, %	86.1
	VOID RATIO	0.808
	DIAMETER, in	2.89
	HEIGHT, in	5.60
BACK PRESSURE, ksf		0.00
CELL PRESSURE, ksf		3.17
FAILURE STRESS, ksf		4.21
PORE PRESSURE, ksf		
STRAIN RATE, %/min.		1.000
ULTIMATE STRESS, ksf		
PORE PRESSURE, ksf		
σ_1 FAILURE, ksf		7.38
σ_3 FAILURE, ksf		3.17

TYPE OF TEST:
Unconsolidated undrained
SAMPLE TYPE: Undisturbed
DESCRIPTION: Brown & Purple
Silty Clayey M-F Sand
LL= 91 PL= 61 PI= 30.0
SPECIFIC GRAVITY= 2.70
REMARKS: Tested by: CLG
Reviewed by: RLB

CLIENT: SRS

PROJECT: SRS-ITP

SAMPLE LOCATION: H-Bor-12 PS-2 @ 27'4"-29'

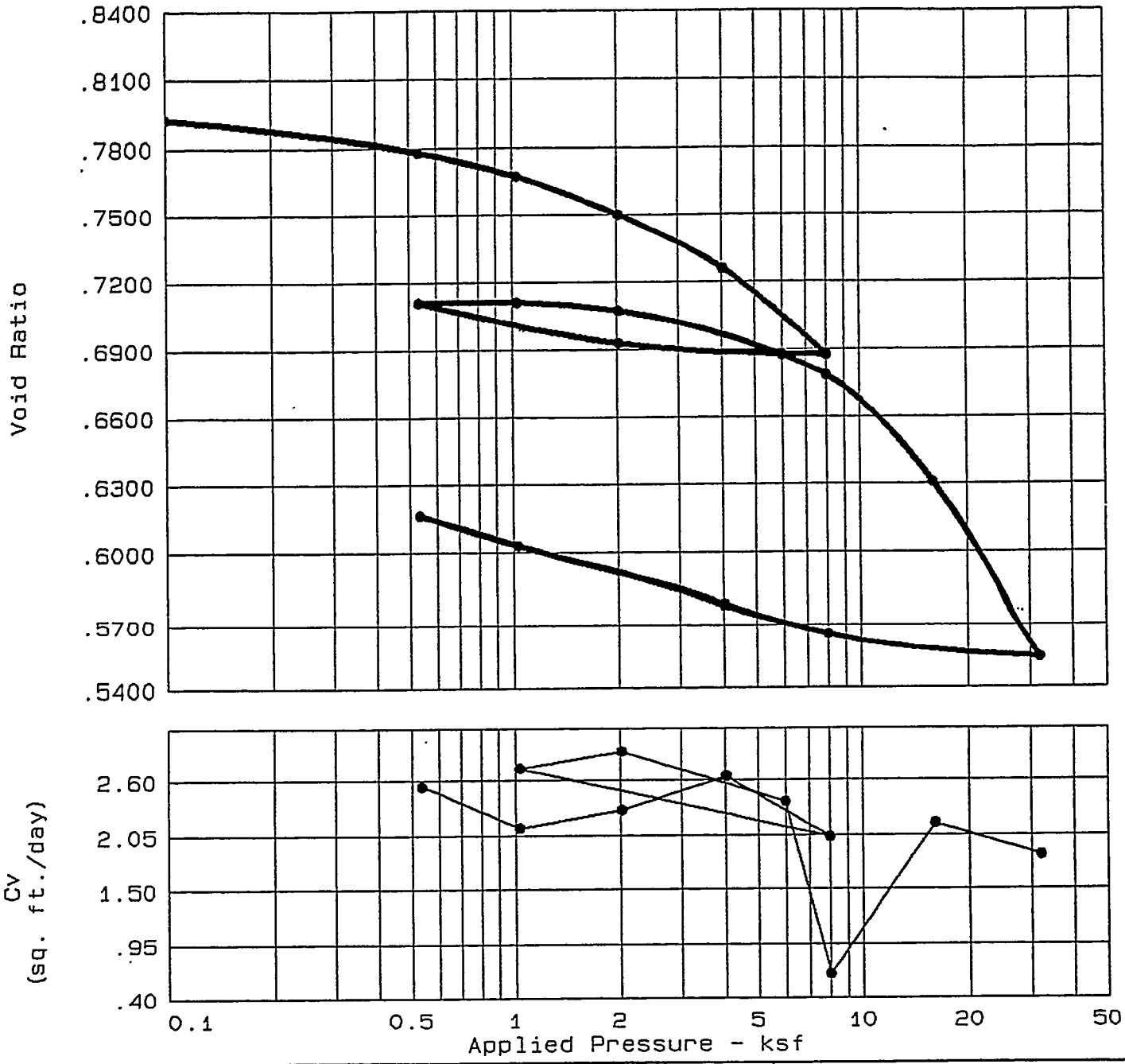
PROJ. NO.: 5810535301 DATE: Oct. 20, 1993

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

FIG. NO.

CONSOLIDATION TEST REPORT



Swell press.	Nat. Sat.	Nat. Moist.	Dry Density	LL	PI	Sp.Gr.	Initial void ratio
	90.7 %	26.6	94.1	91	61	2.70	0.7910

TEST RESULTS

MATERIAL DESCRIPTION

Brown @ Purple Silty Clayey M-F Sand

Class: SC

Project No.: 5810535301
Project: SRS-ITP
Location: H-Bor-12 PS-2 @ 27'4"-29'

Date: Oct 22, 1993

Remarks:

Tested By: CLG
Reviewed By: RLB

CONSOLIDATION TEST REPORT

LAW ENGINEERING, INC.

Fig. No._____

15:43, 10-27-1993 CONSOLIDATION TEST PROJECT DATA Test No. 27

Project Number:	5810535301
Project:	SRS-ITP
Date:	Oct 22,1993
Location 1:	H-Bor-12 PS-2 @ 27'4"-29'
2:	
Remarks 1:	Tested By:
2:	Reviewed By:
3:	
4:	
5:	
Material 1:	Brown @ Purple Silty
description 2:	Clayey M-F Sand
Classification:	SC
Liquid limit:	91
Plasticity index:	61
Figure Number:	

CONSOLIDATION TEST SPECIMEN DATA

TOTAL SAMPLE	BEFORE TEST	AFTER TEST
Wet w+t = 338.80 g.	Oedometer No. = 13	Wet w+t = 337.42 g.
Dry w+t = 314.61 g	Machine No. = 13	Dry w+t = 314.61 g.
Tare wt. = 223.54 g.	Spec. Gravity = 2.70	Tare wt. = 223.54 g.
ight = 0.75 in.	Height = 0.75 in.	
meter = 2.50 in.	Diameter = 2.50 in.	
Weight = 115.26 g.		
Moisture = 26.6 %	Ht. Solids = 0.42 in.	Moisture = 25.0 %
Wet Den. = 119.1 pcf	Dry wt. = 91.07 g. *	Dry wt. = 91.07 g.
Dry Den. = 94.1 pcf	Void ratio = 0.7910	Void ratio = 0.6164
	Saturation = 90.7 %	Saturation = 109. %

* Initial dry weight used in calculations

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
Initial	0.02000			0.7910	
0.10	0.01950	0.0000	0.01950	0.7922	0.1 Swell
0.54	0.02560	0.0000	0.02560	0.7777	0.7 Comprs.
1.03	0.03070	0.0006	0.03010	0.7669	1.3 Comprs.
2.03	0.03920	0.0019	0.03730	0.7498	2.3 Comprs.
4.05	0.05070	0.0032	0.04750	0.7254	3.7 Comprs.
8.05	0.06750	0.0040	0.06350	0.6873	5.8 Comprs.
2.03	0.06130	0.0000	0.06130	0.6925	5.5 Comprs.
0.54	0.05360	0.0000	0.05360	0.7109	4.5 Comprs.
1.03	0.05420	0.0006	0.05360	0.7109	4.5 Comprs.

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
2.03	0.05715	0.0019	0.05525	0.7070	4.7 Comprs.
6.00	0.06600	0.0025	0.06350	0.6873	5.8 Comprs.
8.05	0.07140	0.0040	0.06740	0.6780	6.3 Comprs.
16.04	0.09200	0.0048	0.08720	0.6308	8.9 Comprs.
32.04	0.12530	0.0058	0.11950	0.5537	13.2 Comprs.
8.05	0.11860	0.0040	0.11460	0.5654	12.6 Comprs.
4.05	0.11210	0.0032	0.10890	0.5790	11.8 Comprs.
1.03	0.09950	0.0006	0.09890	0.6029	10.5 Comprs.
0.54	0.09320	0.0000	0.09320	0.6164	9.7 Comprs.

CONSOLIDATION TEST RESULTS

Compression index = NOT SELECTED
Preconsolidation pressure = NOT SELECTED

Load 0.54 ksf — CONSOLIDATION TEST READINGS — Load No. 2

Machine Deflection 0.0000

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.02000	11	60.00	0.02550
2	0.10	0.02380	12	70.00	0.02560
3	0.25	0.02430			
4	0.50	0.02460			
5	1.00	0.02470			
6	2.00	0.02480			
7	4.00	0.02490			
8	8.00	0.02520			
9	15.00	0.02530			
10	30.00	0.02540			

Void Ratio: 0.7777 Compression: 0.7 %
D0 = 0.0229 D90 = 0.0246 D100 = 0.0247 T90 = 0.47 min.
Cv @ 0.5 min.= 2.54 sq. feet/day

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

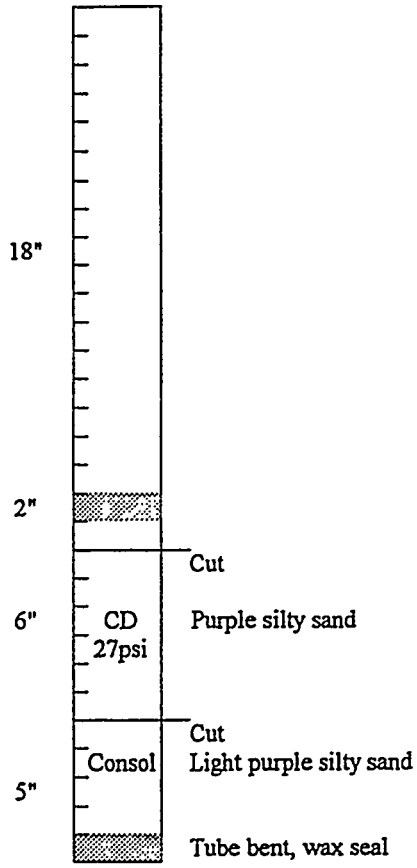
Project: SRS-ITP GEOTECHNICAL TESTING Date: 10-25-93

Boring No: H-Bor-12 Sample No: ST-5 Depth: 44' - 45'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION

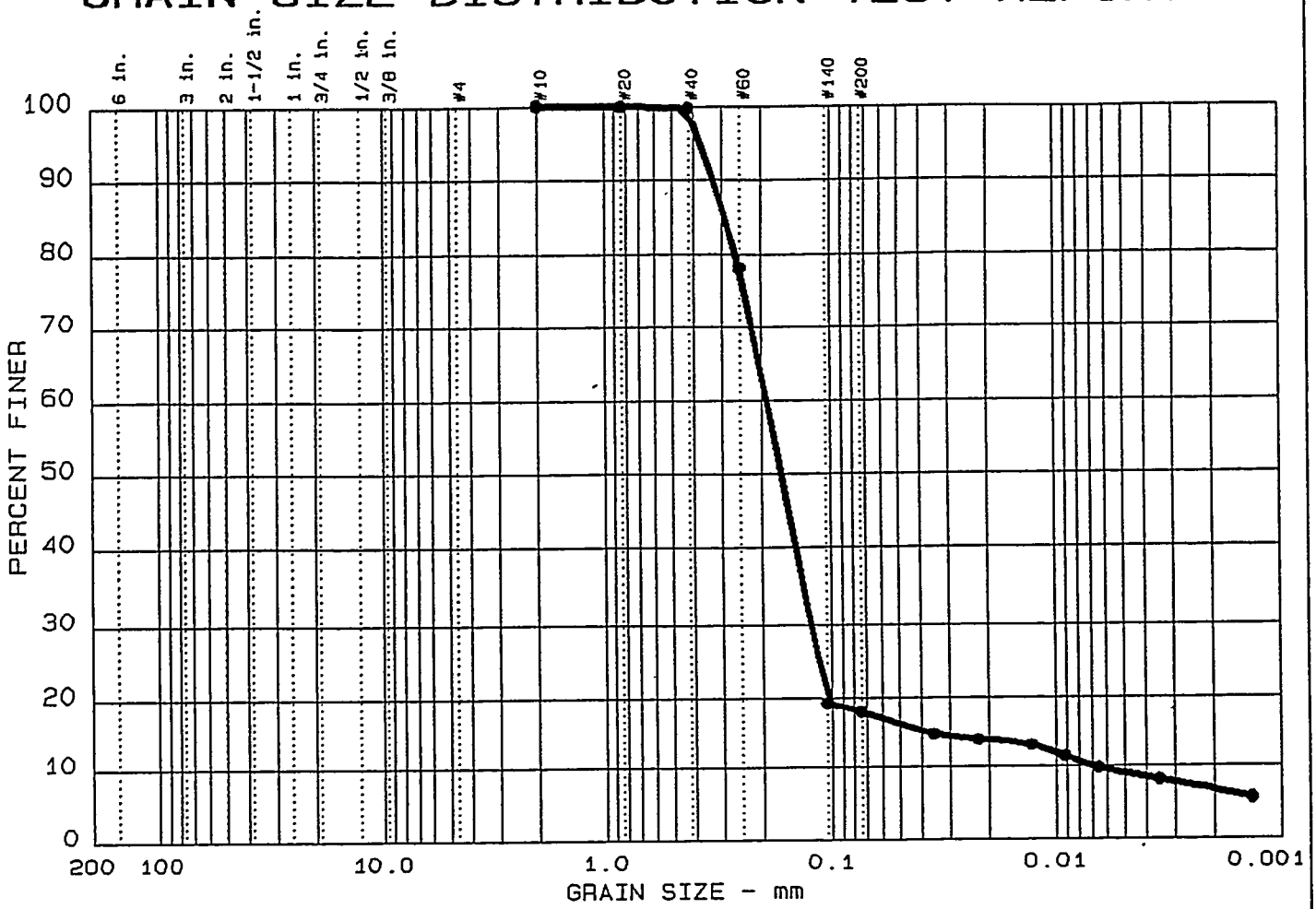


Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b12-st5.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	7	0.0	0.0	81.9	9.2	8.9

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.29	0.19	0.17	0.123	0.0367	0.0068	11.56	28.0

MATERIAL DESCRIPTION	USCS	AASHTO
● Purple Clayey Silty Fine Sand		

Project No.: 581535301
Project: SRS ITP
● Location: H-Bor-12 ST-5 @ 44-45 Ft.

Date: November 19, 1993

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Remarks:

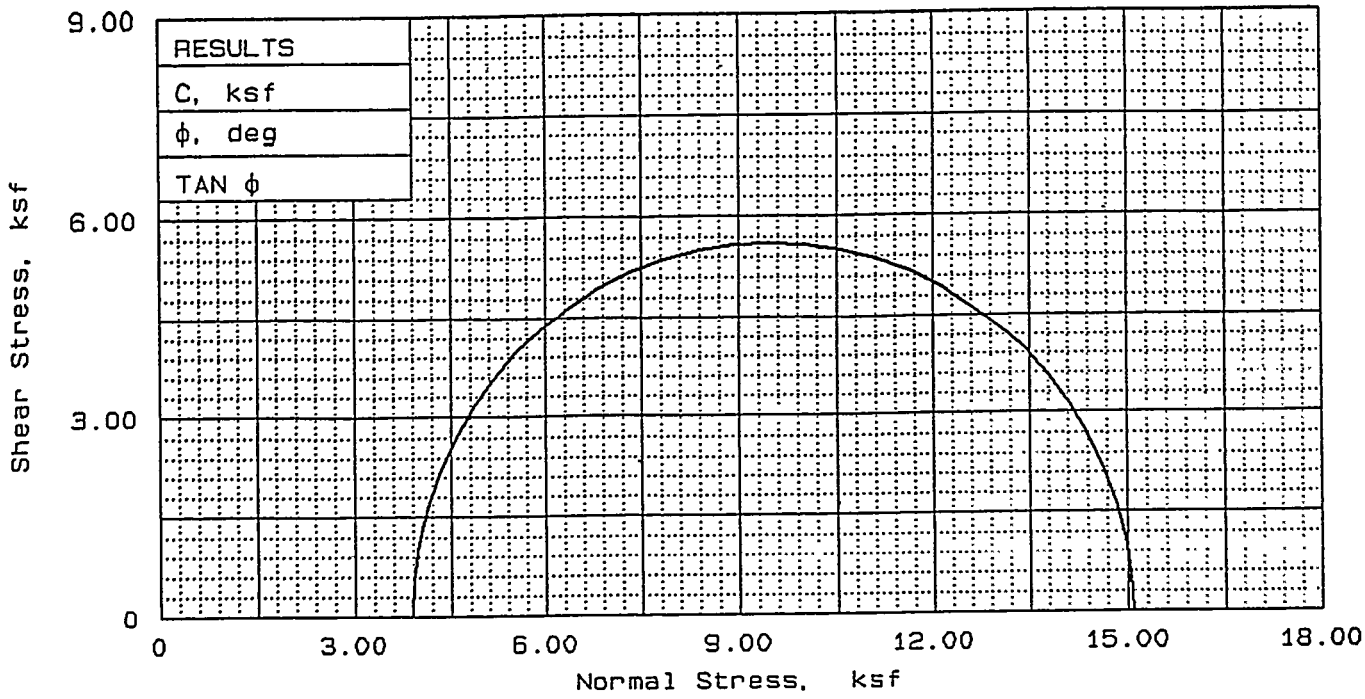
Tested by: BNS Ckd by: RLB

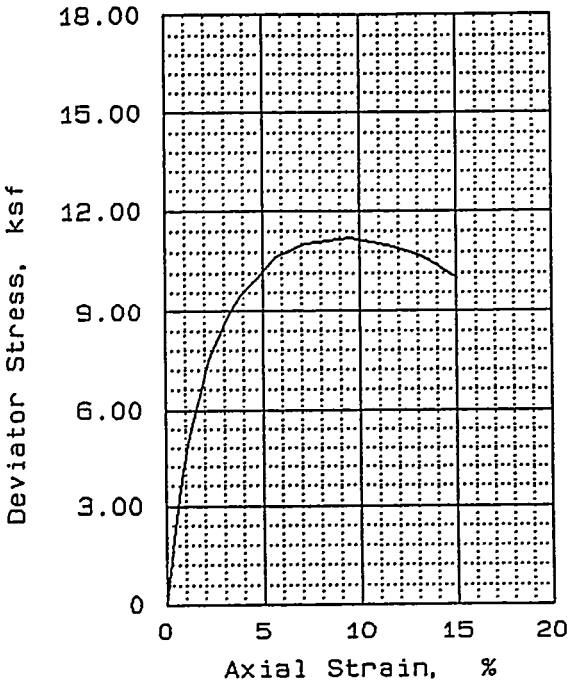
CD 27 psi

Atterberg Limits -200

LL=70 PL=39 PI=31

Figure No.





SAMPLE NO.		1
INITIAL	WATER CONTENT, %	26.7
	DRY DENSITY, pcf	97.1
	SATURATION, %	100.0
	VOID RATIO	0.710
	DIAMETER, in	2.89
	HEIGHT, in	6.00
AT TEST	WATER CONTENT, %	26.4
	DRY DENSITY, pcf	97.5
	SATURATION, %	100.0
	VOID RATIO	0.703
	DIAMETER, in	2.88
	HEIGHT, in	5.98
BACK PRESSURE, ksf		7.20
CELL PRESSURE, ksf		11.09
FAILURE STRESS, ksf		11.19
PORE PRESSURE, ksf		
STRAIN RATE, %/min.		0.100
ULTIMATE STRESS, ksf		
PORE PRESSURE, ksf		
σ_1 FAILURE, ksf		15.08
σ_3 FAILURE, ksf		3.89

TYPE OF TEST:
Consolidated drained
SAMPLE TYPE: Undisturbed
DESCRIPTION:

~~LL= PL= PI=~~
~~SPECIFIC GRAVITY= 2.66~~
REMARKS: Tested by: HEJ

Reviewed by: RLB

FIG. NO.

CLIENT: SRS

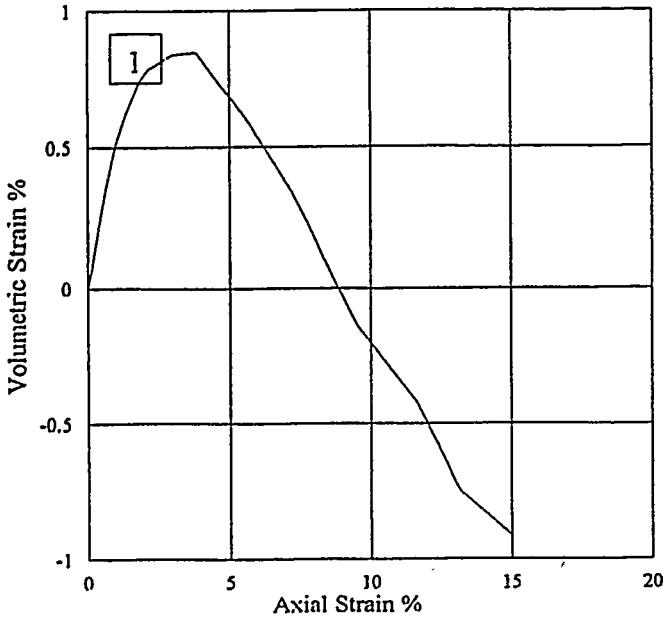
PROJECT: SRS-ITP

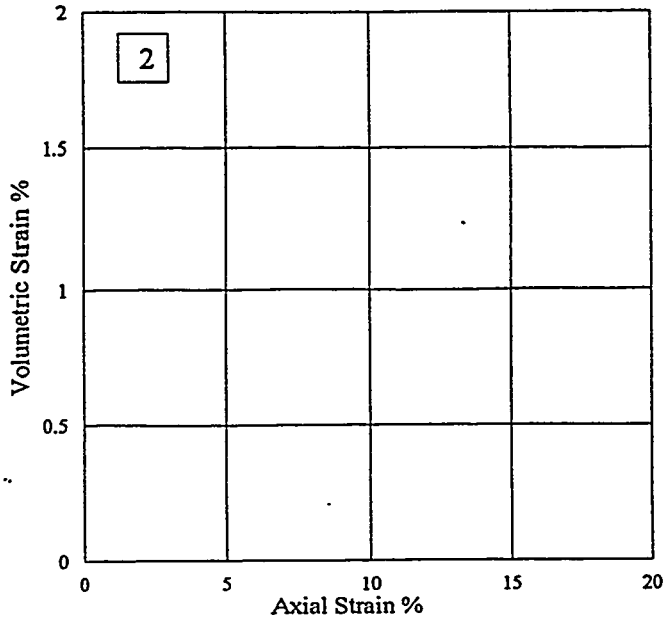
SAMPLE LOCATION: H Bor 12 ST-5 @ 44-45 Ft.

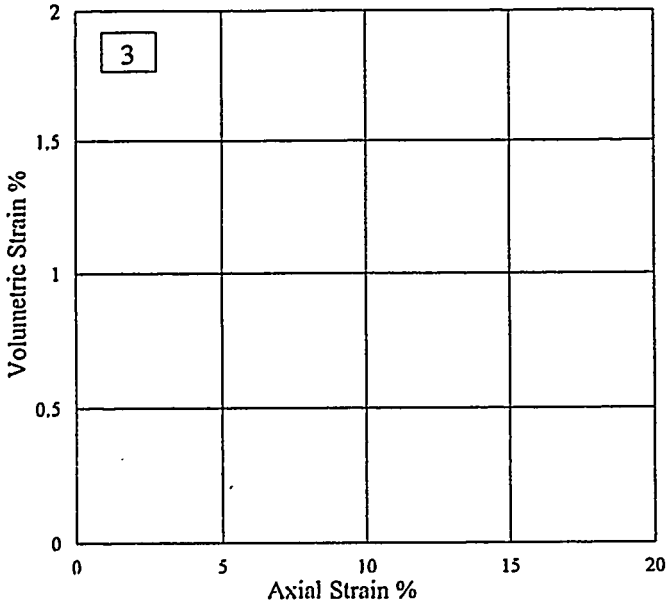
PROJ. NO.: 5810535301 DATE: Dec. 8, 1993

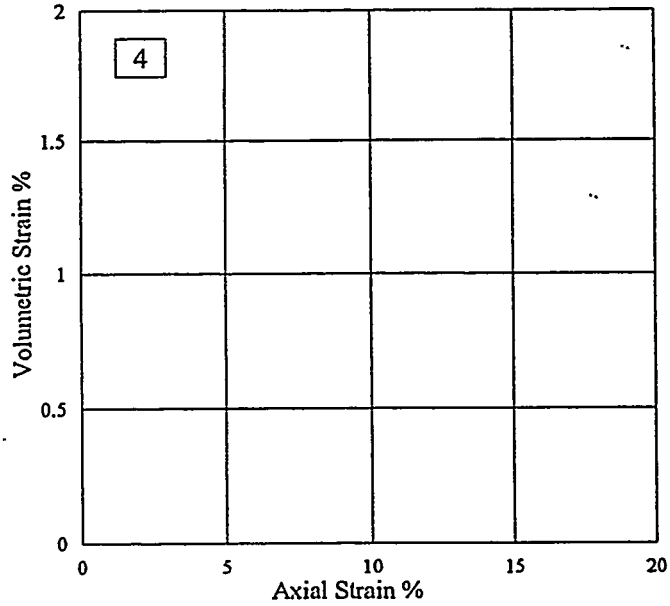
TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.









Client: SRS
Project: SRS-ITP
Location: H Bor 12 ST-5 @ 44-45 Ft.
File: Project No.: 5810535301 Page 2 / 2 Fig. No. _____

TRIAXIAL COMPRESSION TEST
Consolidated drained

12-14-1993
1:05 pm

Project Data

Project No.: 5810535301 Date: Dec. 8,1993 Data file: 535301F
Client: SRS
Project: SRS-ITP
Sample location: H Bor 12 ST-5 @ 44-45 Ft.
Sample description:
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.66 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.89	2.88	
Height change, in		0.02	
Height, in	6.00	5.98	
Weight, grams	1266.7		
Water volume change, cc		2.62	
Moisture, %	26.7	26.4	25.2
Dry density, pcf	97.1	97.5	
Saturation, %	100.0	100.0	
Void ratio	0.710	0.703	

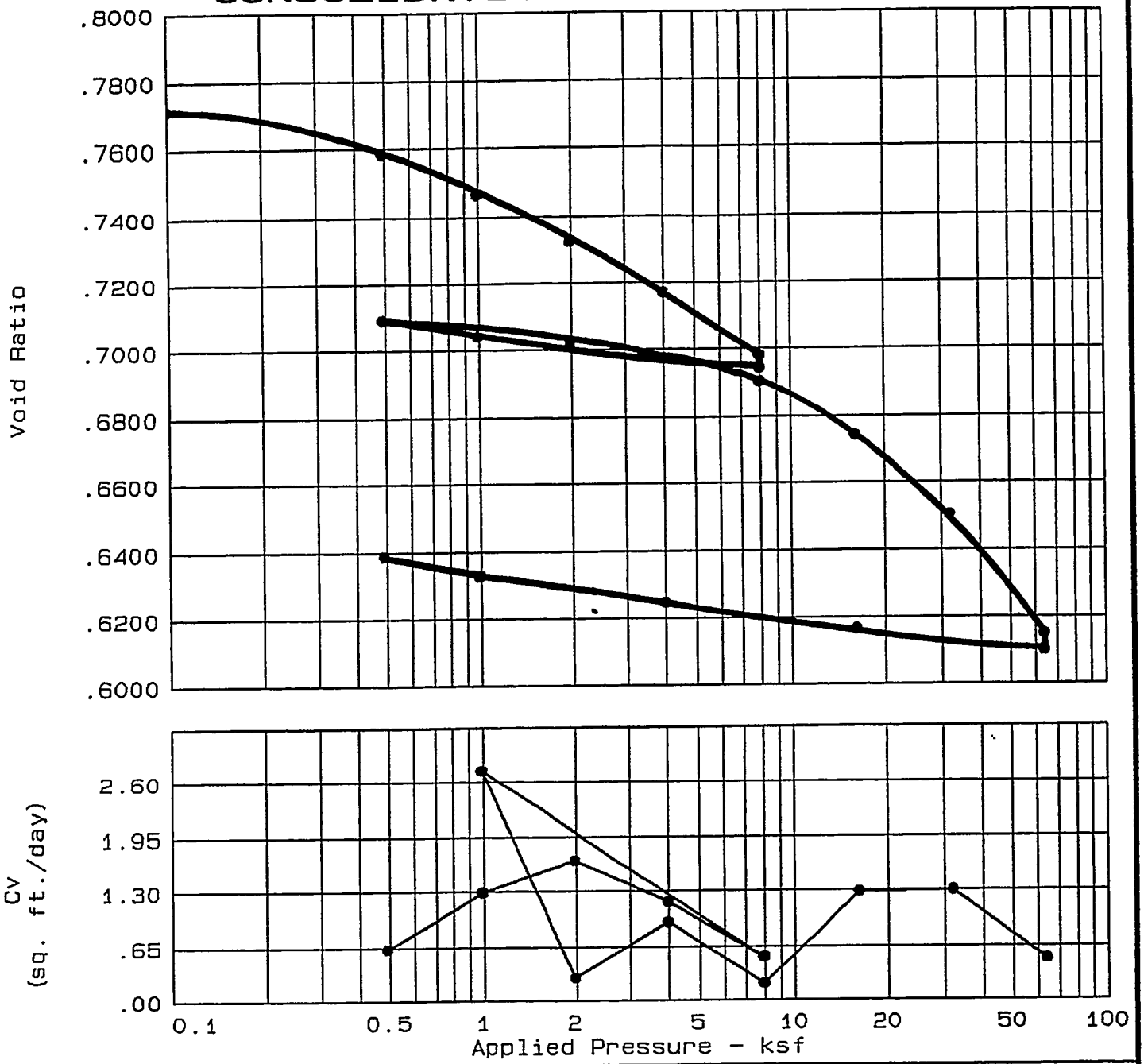
Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 77 psi
Consolidation back pressure = 50 psi
Consolidation effective confining stress = 3.888 ksf
Peak deviator stress = 11.19 ksf at reading no. 11
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	3.89	3.89	1.00	3.89	0.00
1	0.0200	0.020	75.00	75.0	0.3	1.65	3.89	5.54	1.42	4.71	0.82
2	0.0400	0.040	147.00	147.0	0.7	3.22	3.89	7.11	1.83	5.50	1.61
3	0.0600	0.060	207.00	207.0	1.0	4.52	3.89	8.41	2.16	6.15	2.26
4	0.0800	0.080	255.00	255.0	1.3	5.55	3.89	9.43	2.43	6.66	2.77
	0.1100	0.110	312.00	312.0	1.8	6.75	3.89	10.64	2.74	7.26	3.38

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	.1300	0.130	345.00	345.0	2.2	7.44	3.89	11.33	2.91	7.61	3.72
	0.1800	0.180	408.00	408.0	3.0	8.72	3.89	12.61	3.24	8.25	4.36
8	0.2300	0.230	450.00	450.0	3.8	9.54	3.89	13.43	3.45	8.66	4.77
9	0.3400	0.340	513.00	513.0	5.7	10.67	3.89	14.56	3.74	9.22	5.33
10	0.4300	0.430	540.00	540.0	7.2	11.05	3.89	14.94	3.84	9.41	5.52
11	0.5700	0.570	561.00	561.0	9.5	11.19	3.89	15.08	3.88	9.48	5.59
12	0.7000	0.700	562.00	562.0	11.7	10.94	3.89	14.83	3.81	9.36	5.47
13	0.7900	0.790	558.00	558.0	13.2	10.68	3.89	14.57	3.75	9.23	5.34
14	0.9000	0.900	537.00	537.0	15.1	10.06	3.89	13.95	3.59	8.92	5.03

CONSOLIDATION TEST REPORT



Clpse. %	Nat. Sat.	Nat. Moist.	Dry Density	LL	PI	Sp.Gr.	Initial void ratio
0.3	97.2 %	28.2	93.8			2.660	0.7710

TEST RESULTS	MATERIAL DESCRIPTION
	Purple Clayey Silty Fine Sand

Project No.: 5810535301
Project: SRS-ITP
Location: H-Bor-12 ST-5 @44'-45'1"

Date: OCT 29, 1993

Remarks:

Tested By: CLG
Checked By: RLB

CONSOLIDATION TEST REPORT

LAW ENGINEERING, INC.

Fig. No._____

17:05, 2-01-1994 CONSOLIDATION TEST PROJECT DATA Test No. 29

'roject Number: 5810535301
Project: SRS-ITP
Date: OCT 29,1993
Location 1: H-Bor-12 ST-5 @44'-45'1"
2:
Remarks 1: Tested By:
2: Checked By:
3:
4:
5:
Material 1: Purple Clayey Silty
description 2: Fine Sand
Classification:
Liquid limit:
Plasticity index:
Figure Number:

CONSOLIDATION TEST SPECIMEN DATA

TOTAL SAMPLE	BEFORE TEST	AFTER TEST
Wet w+t = 341.85 g.	Oedometer No. = 7	Wet w+t = 338.62 g.
Dry w+t = 314.87 g	Machine No. = 7	Dry w+t = 314.87 g.
Tare wt. = 219.13 g.	Spec. Gravity = 2.660	Tare wt. = 219.13 g.
ight = 0.8900 in.	Height = 0.8900 in.	
ameter = 2.3590 in.	Diameter = 2.3590 in.	
Weight = 122.72 g.		
Moisture = 28.2 %	Ht. Solids = 0.5025 in.	Moisture = 24.8 %
Wet Den. = 120.2 pcf	Dry wt. = 95.74 g. *	Dry wt. = 95.74 g.
Dry Den. = 93.8 pcf	Void ratio = 0.7710	Void ratio = 0.6388
	Saturation = 97.2 %	Saturation = 103.3 %

* Initial dry weight used in calculations

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
Initial	0.02000			0.7710	
0.10	0.01995	0.0000	0.01995	0.7711	0.0 Swell
0.49	0.02800	0.0002	0.02780	0.7584*	0.7 Comprs.*
0.99	0.03365	0.0004	0.03325	0.7466*	1.4 Comprs.*
1.99	0.04095	0.0006	0.04035	0.7323*	2.2 Comprs.*
3.99	0.04970	0.0012	0.04850	0.7168*	3.1 Comprs.*
8.00	0.06075	0.0022	0.05855	0.6980*	4.1 Comprs.*
8.00	0.06260	0.0022	0.06040	0.6943	4.3 Comprs.
1.99	0.05680	0.0006	0.05620	0.7027	3.9 Comprs.
0.49	0.05310	0.0002	0.05290	0.7092	3.5 Comprs.
0.99	0.05400	0.0004	0.05360	0.7043*	3.8 Comprs.*
1.99	0.05610	0.0006	0.05550	0.7016*	3.9 Comprs.*
3.99	0.05860	0.0012	0.05740	0.6974*	4.2 Comprs.*
8.00	0.06405	0.0022	0.06185	0.6903*	4.6 Comprs.*

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
16.02	0.07340	0.0034	0.07000	0.6742*	5.5 Comprs.*
32.08	0.08840	0.0058	0.08260	0.6502*	6.8 Comprs.*
63.78	0.11100	0.0101	0.10090	0.6148*	8.8 Comprs.*
63.78	0.11340	0.0101	0.10330	0.6100	9.1 Comprs.
16.02	0.10345	0.0034	0.10005	0.6164	8.7 Comprs.
3.99	0.09710	0.0012	0.09590	0.6247	8.3 Comprs.
0.99	0.09225	0.0004	0.09185	0.6328	7.8 Comprs.
0.49	0.08900	0.0002	0.08880	0.6388	7.5 Comprs.

* CALCULATED USING D100 INSTEAD OF FINAL READING

CONSOLIDATION TEST RESULTS

Compression index = NOT SELECTED
Preconsolidation pressure = NOT SELECTED

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

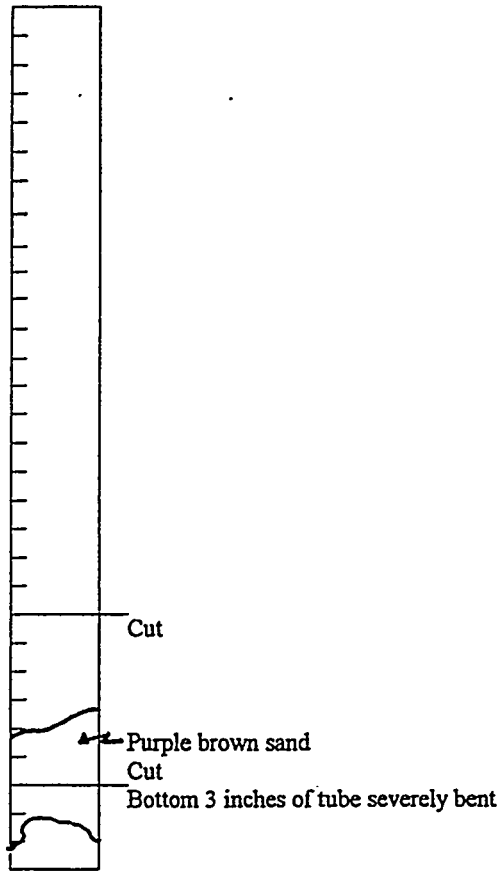
Project: SRS-ITP GEOTECHNICAL TESTING Date: 01-05-94

Boring No: H-Bor-12 Sample No: ST-7 Depth: 58'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: CLG Checked By: RLB

VISUAL DESCRIPTION

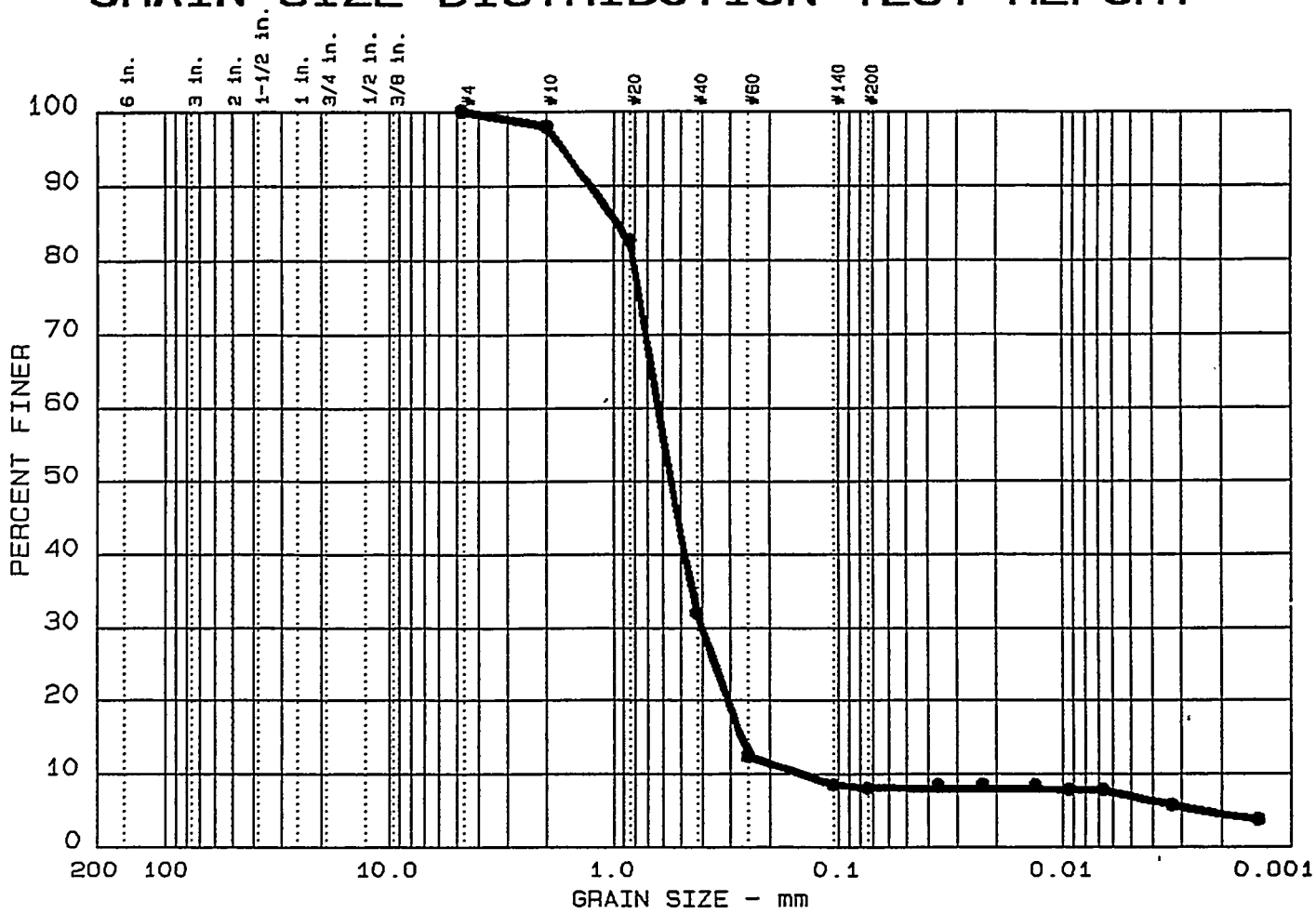


Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b12-st7.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	1	0.0	0.0	92.0	1.1	6.9

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	36	16	0.94	0.62	0.55	0.399	0.2679	0.1455	1.75	4.3

MATERIAL DESCRIPTION	USCS	AASHTO
● Purple Brown Poorly Graded Sand with Clay	SP-SC	A-2-6 (0.0)

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-12 ST-7 @ 58'-58'6"

Date: December 11, 1993

Remarks:

Tested by: CLG

Reviewed by: RLB

Tube Density

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

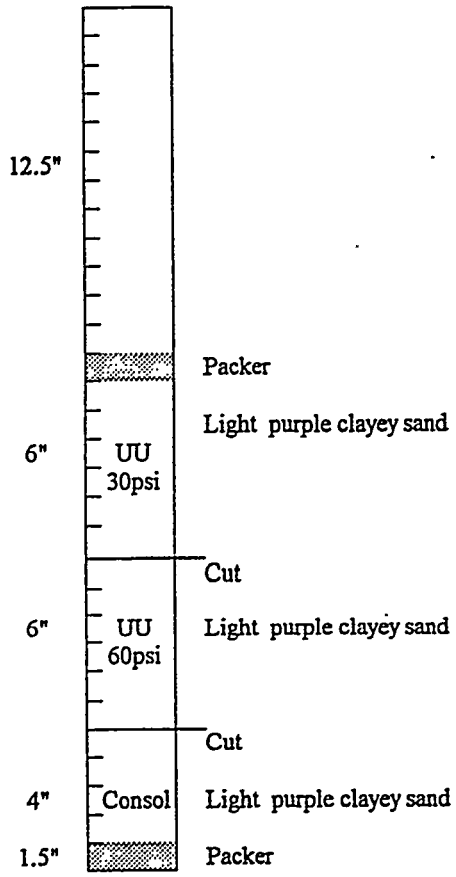
Project: SRS-ITP GEOTECHNICAL TESTING Date: 09-27-93

Boring No: H-Bor-12 Sample No: PS-3 Depth: 62'9" - 64'3"

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION



Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b12-ps3.wk3

ATTACHMENT 2

Tested by:	CLG	Reviewed by:	RLB	Law Job No.:	5810535301
Date:	09/21/93	Date:	09/21/93	Job Name:	SRS - ITP

TP-4A: UNIT WEIGHT OF THIN WALL TUBE SAMPLES

"TYPICAL"

Sample: Boring No.: H-Bor-12
Depth: 62' 9"
Sample ID: PS-3

MEASUREMENTS (Entire Tube):

	FROM TOP OF TUBE			FROM BOTTOM OF TUBE			TOTAL TUBE		INSIDE DIAMETER
	PACKER (inches)		SOIL (inches)	PACKER (inches)		SOIL (inches)	LENGTH (inches)		OF TUBE (inches)
1.	12.30		12.64	0.89		1.42			
2.	12.25		12.60	0.75		1.48			
3.	12.20		12.58	0.90		1.50			
Avg.:	12.25	L_1 =	12.61	0.85	L_2 =	1.47	L_3 =	29.969 *	D_i = 2.869 *

only 2 markings on tube for bottom measurement reference

TOTAL WEIGHT OF TUBE + PACKERS + SOIL	M_1 =	6,141.3	gm
WEIGHT OF PACKERS	M_2 =	153.2 *	gm
TOTAL WEIGHT OF TUBE	M_3 =	2,452.5 *	gm
WET WEIGHT OF SOIL COLUMN, [M_1-M_2-M_3]	M_4 =	3,535.6	gm

* *Denotes information supplied by WSRC/TO*

MOISTURE CONTENTS (From assigned tests of same tube):

MOISTURE CONTENT		
Specimen 1:	19.7	% moisture
Specimen 2:	18.4	% moisture
Specimen 3:	18.4	% moisture
Average, (w):	18.8	% moisture

Notations:

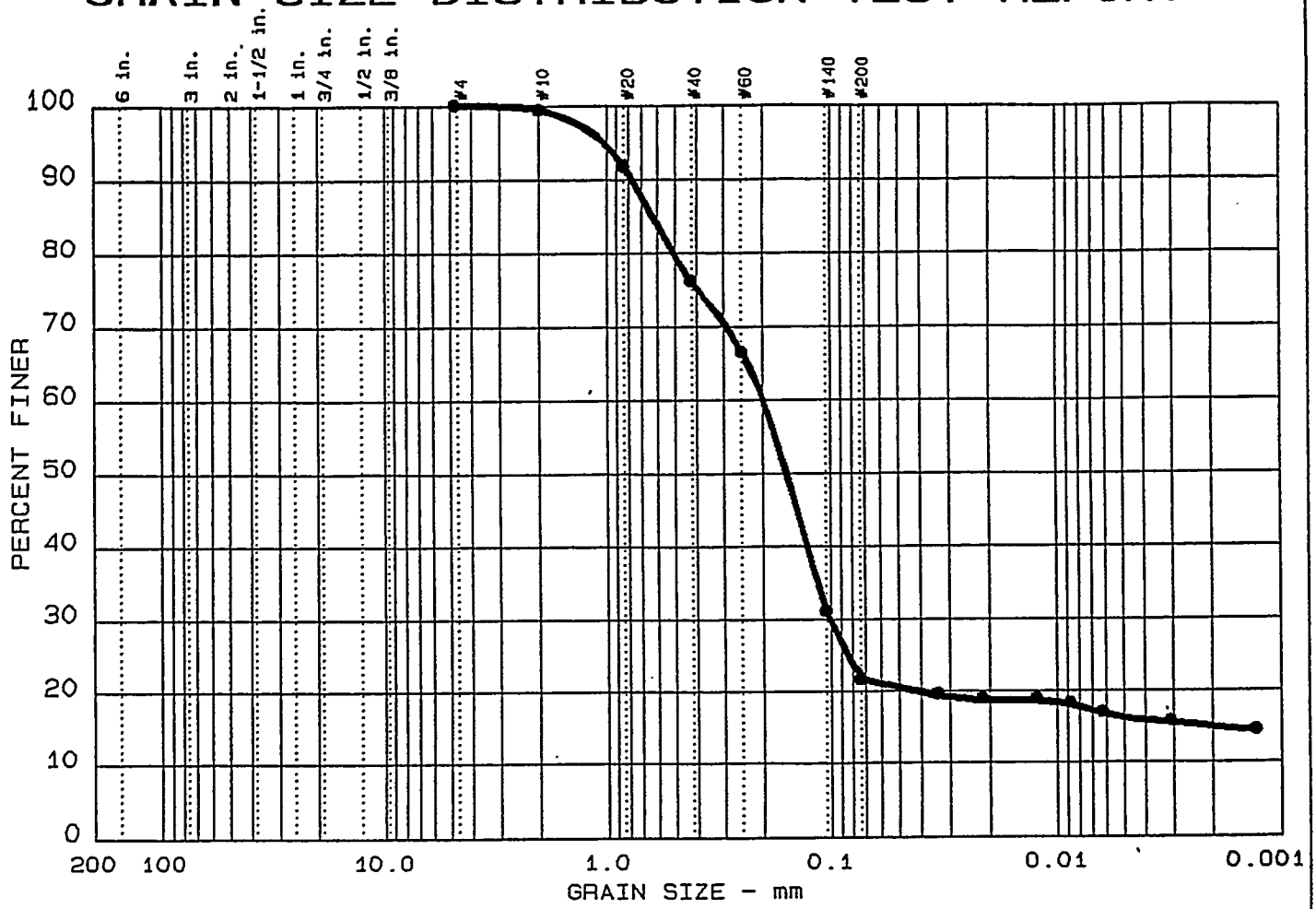
Specimen 1 moisture content obtained from Consolidation test
Specimen 2 moisture content obtained from UU - 30psi test
Specimen 3 moisture content obtained from UU - 60psi test

CALCULATIONS:

CROSS-SECTIONAL AREA OF TUBE, [pi*(D_i^2)/4]	A_o=	6.46	in.²
LENGTH OF SOIL COLUMN, [L_3 - L_2 - L_1]	L_s =	15.90	in.
VOLUME OF SOIL COLUMN, [L_s*A_o]	V_s =	102.76	in.³
WET DENSITY, [(M_4/V_s)*3.810]	**D_w=**	**131.1**	**pcf**
DRY DENSITY, [D_w/(1+w/100)]	**D_D=**	**110.3**	**pcf**

h:\users\lab\rlb\itp\b12-pa3.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	14	0.0	0.0	78.3	5.5	16.2

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	45	25	0.62	0.20	0.16	0.100	0.0019			

MATERIAL DESCRIPTION	USCS	AASHTO
● Purple Silty Clayey Medium to Fine Sand	SC	A-2-7 (1.1)

Project No.: 5810535301
Project: SRS ITP
◆ Location: H-Bor-12 PS-3 @ 63 Ft.

Date: September 30, 1993

Remarks:

Tested By: JRR

Reviewed By: RLB

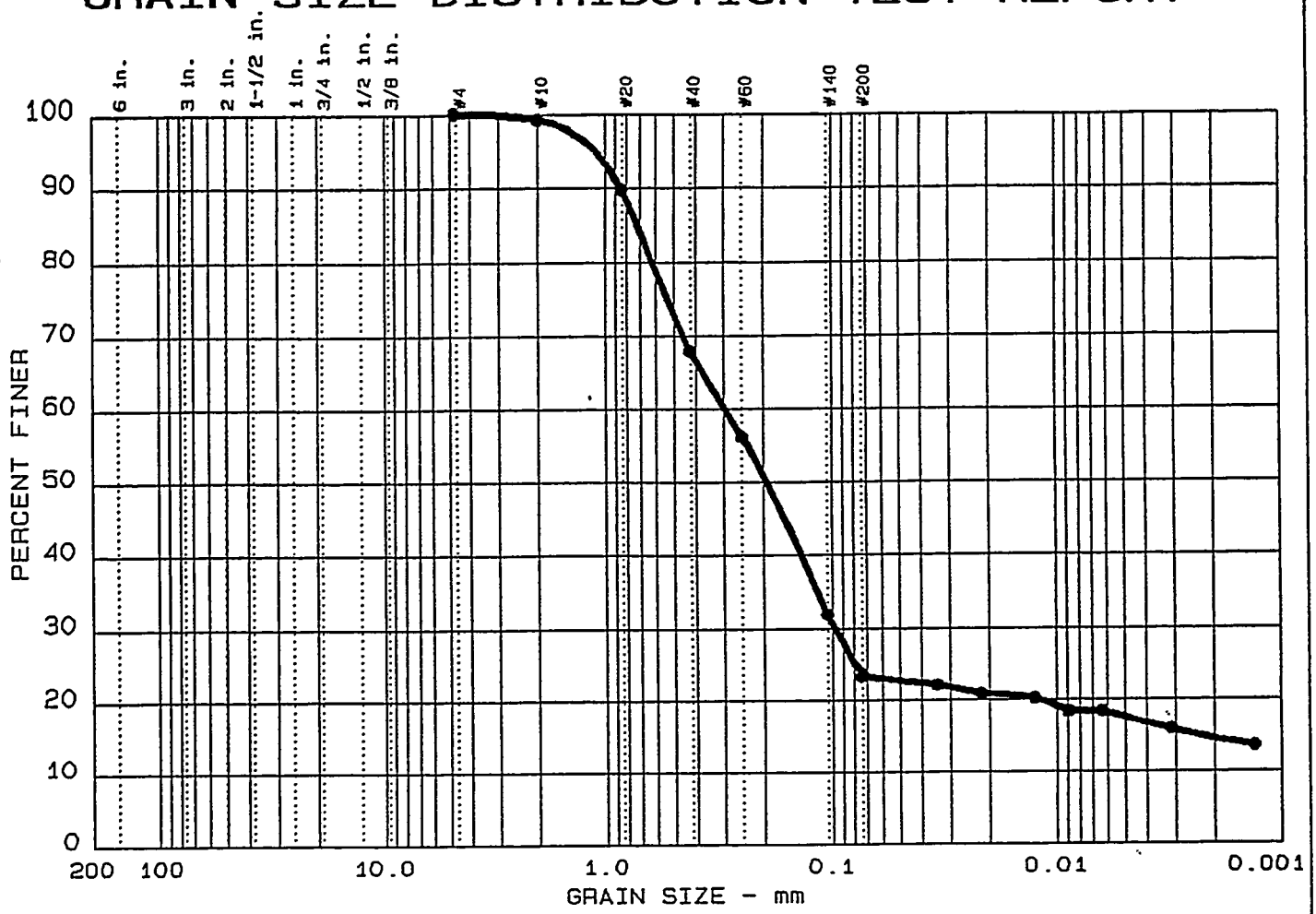
UU-30 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	16	0.0	0.0	76.7	5.8	17.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	44	25	0.71	0.30	0.19	0.097	0.0022			

MATERIAL DESCRIPTION	USCS	AASHTO
● Purple Silty Clayey Medium to Fine Sand	SC	A-2-7 (1.2)

Project No.: 5810535301
Project: SRS ITP
◆ Location: H-Bor-12 PS-3 @ 62'9"-64'3"

Date: October 1, 1993

Remarks:

Tested By: JRR

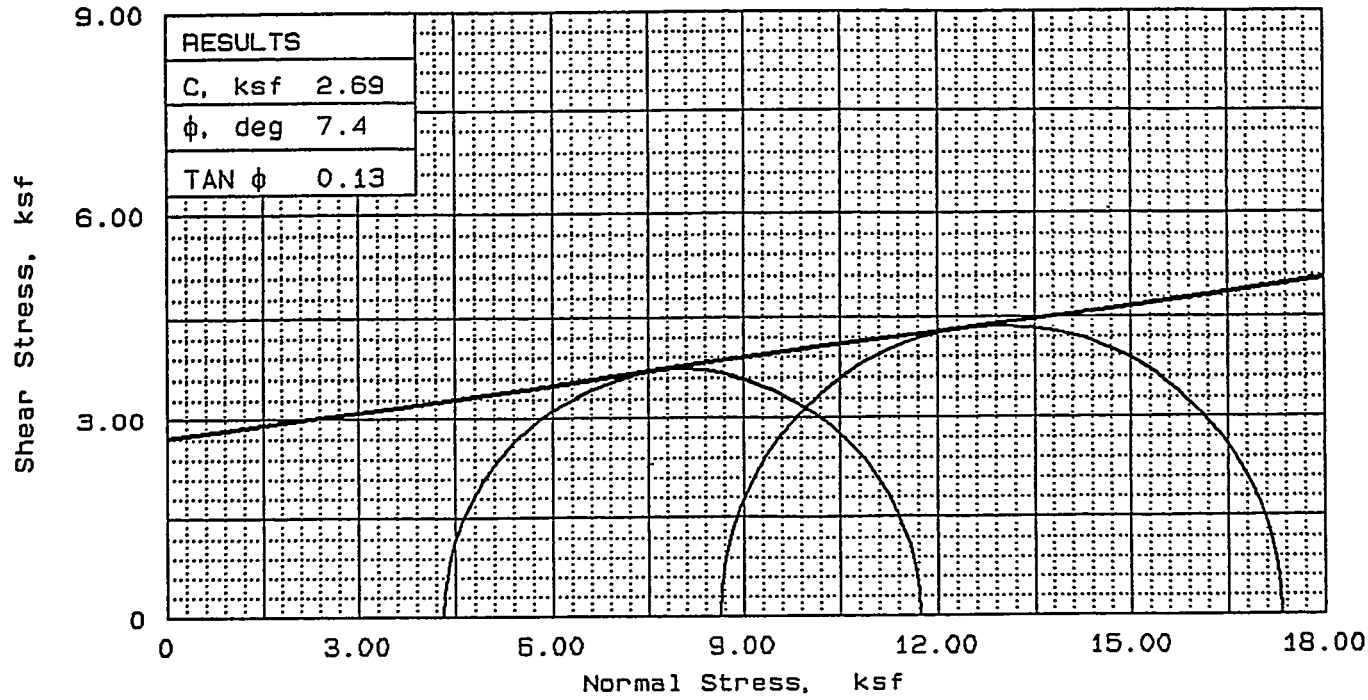
Reviewed By: RLB

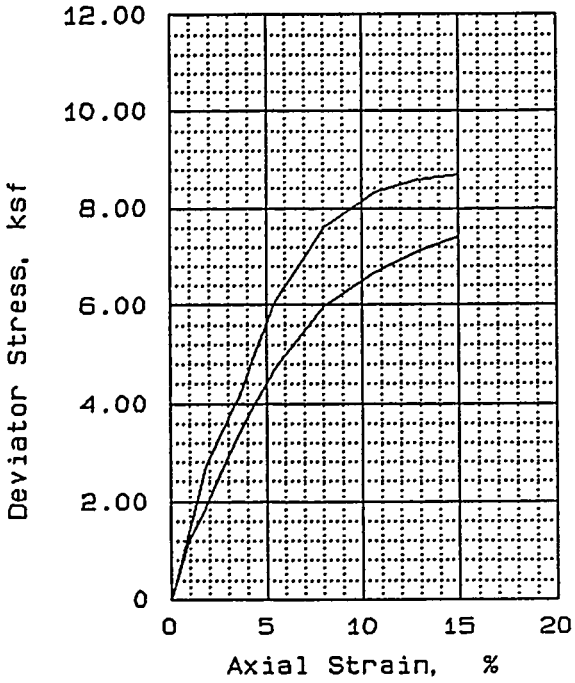
UU-60 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.





SAMPLE NO.		1	2
INITIAL	WATER CONTENT, %	18.4	18.4
	DRY DENSITY, pcf	108.4	110.1
	SATURATION, %	94.1	97.6
	VOID RATIO	0.514	0.497
	DIAMETER, in	2.87	2.87
	HEIGHT, in	5.60	5.60
AT TEST	WATER CONTENT, %	18.4	18.4
	DRY DENSITY, pcf	108.4	110.1
	SATURATION, %	94.1	97.6
	VOID RATIO	0.514	0.497
	DIAMETER, in	2.87	2.87
	HEIGHT, in	5.60	5.60
BACK PRESSURE, ksf		0.00	0.00
CELL PRESSURE, ksf		4.32	8.64
FAILURE STRESS, ksf		7.42	8.70
PORE PRESSURE, ksf			
STRAIN RATE, %/min.		1.000	1.000
ULTIMATE STRESS, ksf			
PORE PRESSURE, ksf			
σ_1 FAILURE, ksf		11.74	17.34
σ_3 FAILURE, ksf		4.32	8.64

TYPE OF TEST:
Unconsolidated undrained

SAMPLE TYPE: Undisturbed

DESCRIPTION: Purple Silty Clayey Medium to Fine Sand

REMARKS: Tested by: CLG

Reviewed by: RLB

FIG. NO.

CLIENT: SRS

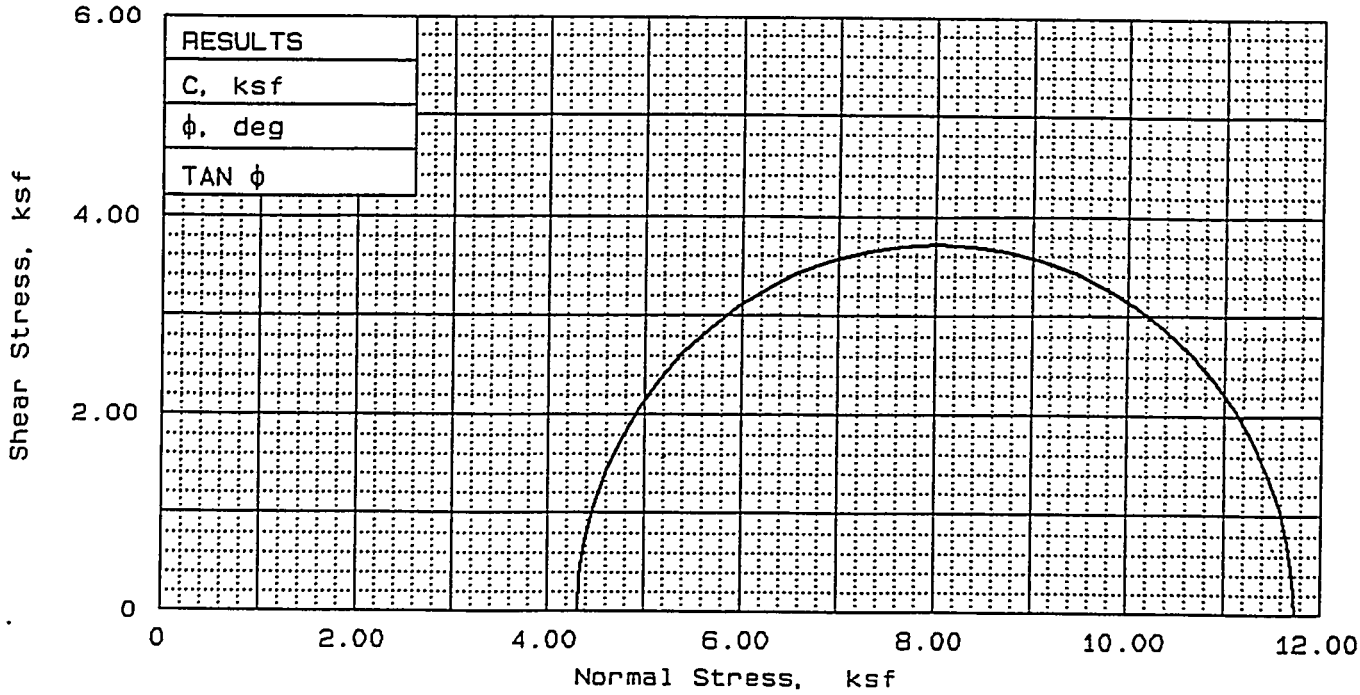
PROJECT: SRS-ITP

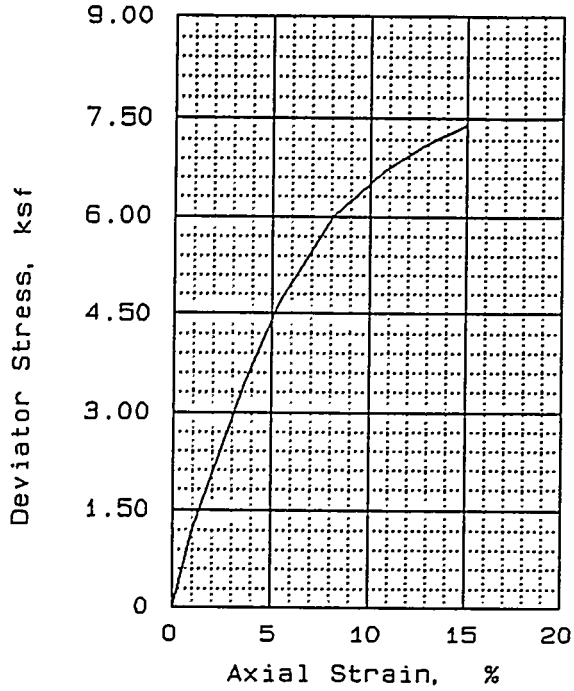
SAMPLE LOCATION: H-Bor-12 PS-3 @ 62.9-64.3 Ft.

PROJ. NO.: 5810535301 DATE: 10/8/93

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.





SAMPLE NO.		1
INITIAL	WATER CONTENT, %	18.4
	DRY DENSITY, pcf	108.4
	SATURATION, %	89.6
	VOID RATIO	0.555
	DIAMETER, in	2.87
	HEIGHT, in	5.60
AT TEST	WATER CONTENT, %	18.4
	DRY DENSITY, pcf	108.4
	SATURATION, %	89.6
	VOID RATIO	0.555
	DIAMETER, in	2.87
	HEIGHT, in	5.60
BACK PRESSURE, ksf		0.00
CELL PRESSURE, ksf		4.32
FAILURE STRESS, ksf		7.42
PORE PRESSURE, ksf		
STRAIN RATE, %/min.		1.000
ULTIMATE STRESS, ksf		
PORE PRESSURE, ksf		
σ_1 FAILURE, ksf		11.74
σ_3 FAILURE, ksf		4.32

TYPE OF TEST:
Unconsolidated undrained
SAMPLE TYPE: Undisturbed
DESCRIPTION: Purple Silty Clayey Medium to Fine Sand
LL= 45 PL= 20 PI= 25.0
SPECIFIC GRAVITY= 2.70
REMARKS: Tested by: CLG
Reviewed by: KLB

CLIENT: SRS

PROJECT: SRS-ITP

SAMPLE LOCATION: H-Bor-12 PS-3 @ 62'9"-64'3"

PROJ. NO.: 5810535301 DATE: Sept. 27, 1993

FIG. NO.

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

TRIAXIAL COMPRESSION TEST
Unconsolidated undrained

2-24-1994
4:54 pm

Project Data

Project No.: 5810535301 Date: Sept. 27,1993 Data file: ITP
Client: SRS
Project: SRS-ITP
Sample location: H-Bor-12 PS-3 @ 62'9"-64'3"
Sample description: Purple Silty Clayey Medium to Fine Sand
Remarks: Tested by: Reviewed by:
Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.70 LL= 45 PL= 20 PI= 25

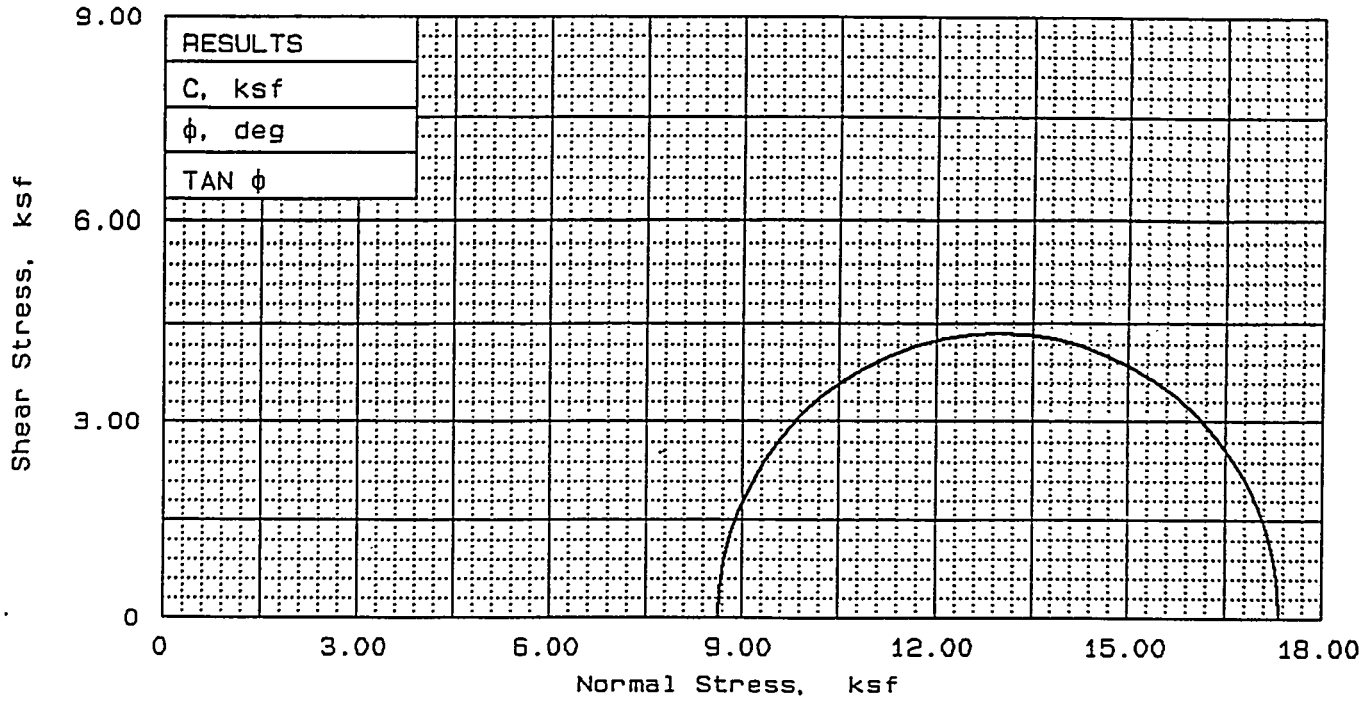
Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.87	2.87	
Height change, in		0.00	
Height, in	5.60	5.60	
Weight, grams	1220.7		
Moisture, %	18.4	18.4	18.4
Dry density, pcf	108.4	108.4	
Saturation, %	89.6	89.6	
Void ratio	0.555	0.555	

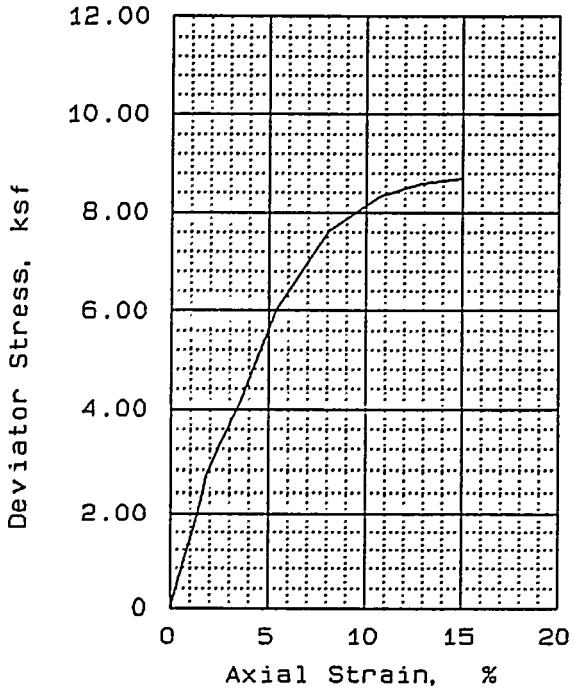
Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 1.000 % per minute
Cell pressure = 30 psi
Back pressure = 0 psi
Effective confining stress = 4.32 ksf
Peak deviator stress = 7.42 ksf at reading no. 8
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	4.32	4.32	1.00	4.32	0.00
1	0.0500	0.050	53.00	53.0	0.9	1.17	4.32	5.49	1.27	4.90	0.58
2	0.1000	0.100	86.00	86.0	1.8	1.88	4.32	6.20	1.44	5.26	0.94
3	0.2000	0.200	160.00	160.0	3.6	3.43	4.32	7.75	1.79	6.04	1.72
4	0.3000	0.300	223.00	223.0	5.4	4.70	4.32	9.02	2.09	6.67	2.35
5	0.4500	0.450	293.00	293.0	8.0	6.00	4.32	10.32	2.39	7.32	3.00
	000	0.600	337.00	337.0	10.7	6.70	4.32	11.02	2.55	7.67	3.35

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	0.7200	0.720	367.00	367.0	12.9	7.12	4.32	11.44	2.65	7.88	3.56
	0.8400	0.840	392.00	392.0	15.0	7.42	4.32	11.74	2.72	8.03	3.71





SAMPLE NO.		1
INITIAL	WATER CONTENT, %	18.4
	DRY DENSITY, pcf	110.1
	SATURATION, %	95.5
	VOID RATIO	0.514
	DIAMETER, in	2.87
	HEIGHT, in	5.60
AT TEST	WATER CONTENT, %	18.4
	DRY DENSITY, pcf	110.1
	SATURATION, %	95.5
	VOID RATIO	0.514
	DIAMETER, in	2.87
	HEIGHT, in	5.60
BACK PRESSURE, ksf		0.00
CELL PRESSURE, ksf		8.64
FAILURE STRESS, ksf		8.70
PORE PRESSURE, ksf		
STRAIN RATE, %/min.		1.000
ULTIMATE STRESS, ksf		
PORE PRESSURE, ksf		
σ_1 FAILURE, ksf		17.34
σ_3 FAILURE, ksf		8.64

TYPE OF TEST:
Unconsolidated undrained
SAMPLE TYPE: Undisturbed
DESCRIPTION: Purple Silty
Clayey Medium to Fine Sand
LL= 44 PL= 19 PI= 25.0
SPECIFIC GRAVITY= 2.67
REMARKS: Tested by: CLG
Reviewed by: RLB

CLIENT: SRS

PROJECT: SRS ITP

SAMPLE LOCATION: H-Bor-12 PS-3 @
62'9"-64'3"

PROJ. NO.: 5810535301 DATE: Sept. 27, 1993

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

FIG. NO.

TRIAXIAL COMPRESSION TEST
Unconsolidated undrained

2-24-1994
4:59 pm

Project Data

Project No.: 5810535301 Date: Sept. 27,1993 Data file: ITP1
Client: SRS
Project: SRS ITP
Sample location: H-Bor-12 PS-3 @ 62'9"-64'3"
Sample description: Purple Silty Clayey Medium to Fine Sand
Remarks: Tested by: Reviewed by:
Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.67 LL= 44 PL= 19 PI= 25

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.87	2.87	
Height change, in		0.00	
Height, in	5.60	5.60	
Weight, grams	1239.2		
Moisture, %	18.4	18.4	18.4
Dry density, pcf	110.1	110.1	
Saturation, %	95.5	95.5	
Void ratio	0.514	0.514	

Test Data

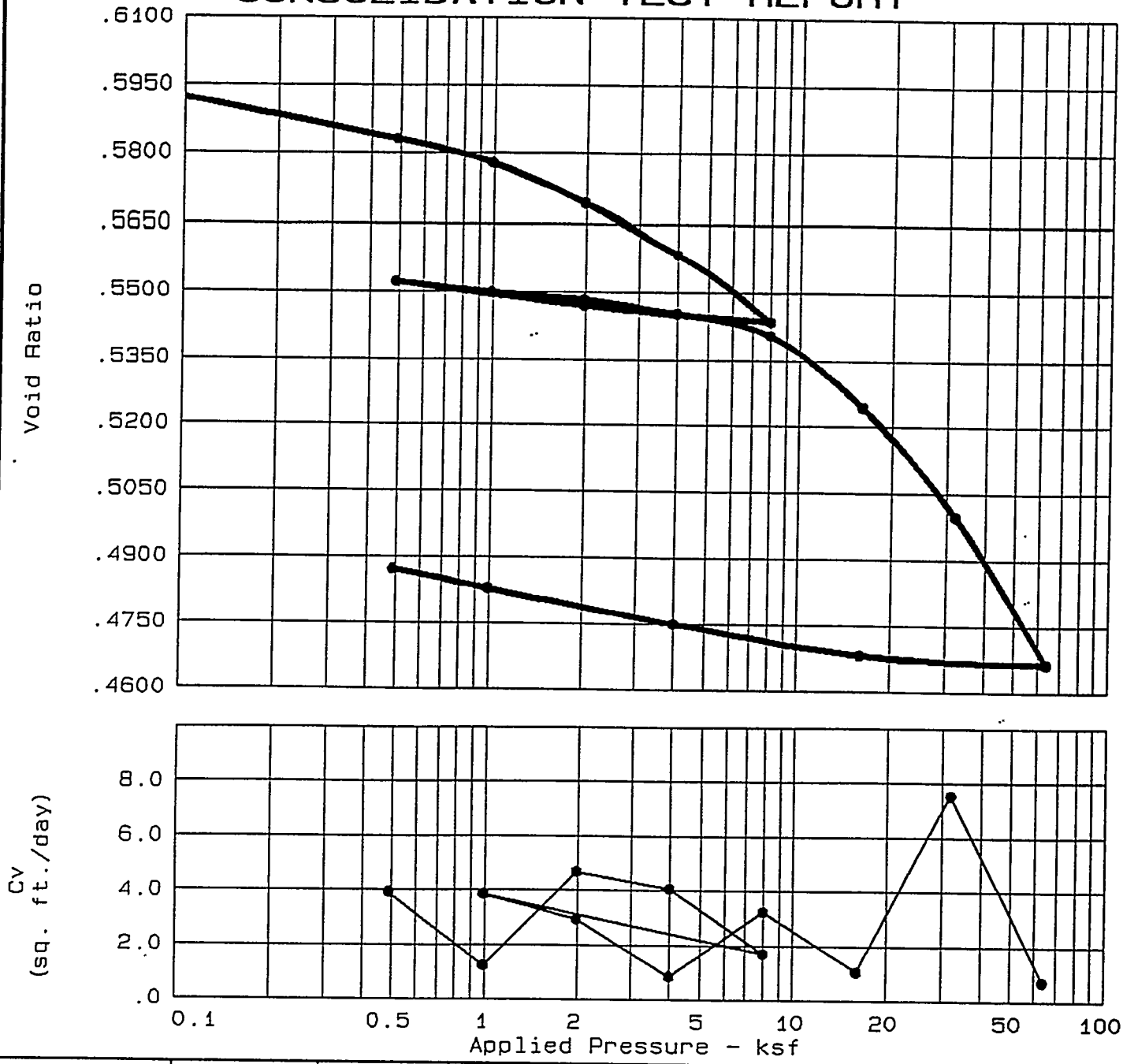
Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 1.000 % per minute
Cell pressure = 60 psi
Back pressure = 0 psi
Effective confining stress = 8.64 ksf
Peak deviator stress = 8.70 ksf at reading no. 8
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	8.64	8.64	1.00	8.64	0.00
1	0.0500	0.050	62.00	62.0	0.9	1.37	8.64	10.01	1.16	9.32	0.68
2	0.1000	0.100	124.00	124.0	1.8	2.71	8.64	11.35	1.31	10.00	1.36
3	0.2000	0.200	196.00	196.0	3.6	4.21	8.64	12.85	1.49	10.74	2.10
4	0.3000	0.300	287.00	287.0	5.4	6.05	8.64	14.69	1.70	11.66	3.02
[illegible]	4500	0.450	372.00	372.0	8.0	7.62	8.64	16.26	1.88	12.45	3.81
[illegible]	[illegible]000	0.600	419.00	419.0	10.7	8.33	8.64	16.97	1.96	12.80	4.16

LAW ENGINEERING, INC.

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	0.7200	0.720	443.00	443.0	12.9	8.59	8.64	17.23	1.99	12.94	4.30
	0.8400	0.840	460.00	460.0	15.0	8.70	8.64	17.34	2.01	12.99	4.35

CONSOLIDATION TEST REPORT



Natural Saturation	Natural Moisture	Dry Density	LL	PI	Sp.Gr.	Initial void ratio
90.0 %	19.7	105.9	45	25	2.700	0.5921

TEST RESULTS

MATERIAL DESCRIPTION

Purple Clayey Medium to Fine Sand

Class: SC

Project No.: 5810535301
Project: SRS ITP
Location: H-Bor-12 PS-3
62'9"-64'3"
Date: Sept. 27, 1993

Remarks:

Tested by: CLG
Reviewed by: RLB

CONSOLIDATION TEST REPORT

LAW ENGINEERING, INC.

Fig. No._____

17:14, 2-28-1994 CONSOLIDATION TEST PROJECT DATA Test No. 24

roject Number:	5810535301
Project:	SRS ITP
Date:	Sept. 27,1993
Location 1:	H-Bor-12 PS-3
2:	62'9"-64'3"
Remarks 1:	Tested by:
2:	Reviewed by:
3:	
4:	
5:	
Material 1:	Purple Clayey Medium to
description 2:	Fine Sand
Classification:	SC
Liquid limit:	45
Plasticity index:	25
Figure Number:	

CONSOLIDATION TEST SPECIMEN DATA

TOTAL SAMPLE	BEFORE TEST	AFTER TEST
Wet w+t = 349.09 g.	Oedometer No. = 5	Wet w+t = 347.53 g.
Dry w+t = 327.65 g	Machine No. = 5	Dry w+t = 327.65 g.
Tare wt. = 219.06 g.	Spec. Gravity = 2.700	Tare wt. = 219.06 g.
' ht = 0.8940 in.	Height = 0.8940 in.	
L meter = 2.3590 in.	Diameter = 2.3600 in.	
Weight = 130.03 g.		
Moisture = 19.7 %	Ht. Solids = 0.5615 in.	Moisture = 18.3 %
Wet Den. = 126.8 pcf	Dry wt. = 108.68 g. *	Dry wt. = 108.59 g.
Dry Den. = 105.9 pcf	Void ratio = 0.5921	Void ratio = 0.4871
	Saturation = 90.0 %	Saturation = 101.5 %

* Initial dry weight used in calculations

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
Initial	0.02000			0.5921	
0.49	0.02620	0.0003	0.02590	0.5830*	0.6 Comprs.*
0.99	0.02940	0.0007	0.02870	0.5777*	0.9 Comprs.*
1.99	0.03520	0.0012	0.03400	0.5690*	1.4 Comprs.*
3.99	0.04230	0.0021	0.04020	0.5586*	2.1 Comprs.*
8.00	0.05150	0.0032	0.04830	0.5436*	3.0 Comprs.*
1.99	0.04760	0.0012	0.04640	0.5470	2.8 Comprs.
0.49	0.04380	0.0003	0.04350	0.5521	2.5 Comprs.
0.99	0.04460	0.0007	0.04390	0.5498*	2.7 Comprs.*
1.99	0.04610	0.0012	0.04490	0.5482*	2.8 Comprs.*
3.99	0.04860	0.0021	0.04650	0.5453*	2.9 Comprs.*
8.00	0.05300	0.0032	0.04980	0.5404*	3.2 Comprs.*
16.00	0.06510	0.0048	0.06030	0.5242*	4.3 Comprs.*
32.04	0.08080	0.0071	0.07370	0.4997*	5.8 Comprs.*

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
63.74	0.10410	0.0109	0.09320	0.4664*	7.9 Comprs.*
16.00	0.09700	0.0048	0.09220	0.4682	7.8 Comprs.
3.99	0.09050	0.0021	0.08840	0.4749	7.4 Comprs.
0.99	0.08470	0.0007	0.08400	0.4828	6.9 Comprs.
0.49	0.08185	0.0003	0.08155	0.4871	6.6 Comprs.

* CALCULATED USING D100 INSTEAD OF FINAL READING

CONSOLIDATION TEST RESULTS

Compression index = NOT SELECTED
Preconsolidation pressure = NOT SELECTED

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

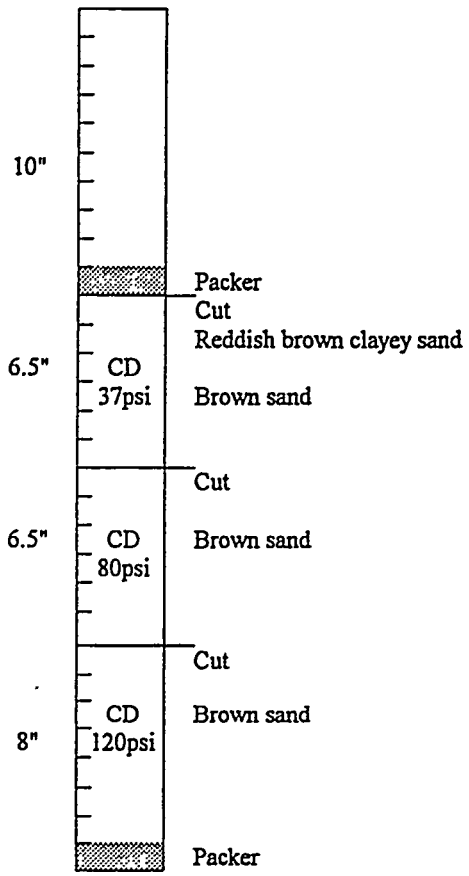
Project: SRS-ITP GEOTECHNICAL TESTING Date: 09-21-93

Boring No: H-Bor-12 Sample No: PS-6 Depth: 75' - 76'9"

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION



Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b12-ps6.wk3

ATTACHMENT 2

Tested by:	CLG	Reviewed by:	RLB	Law Job No.:	5810535301
Date:	09/21/93	Date:	09/21/93	Job Name:	SRS - ITP

TP-4A: UNIT WEIGHT OF THIN WALL TUBE SAMPLES

"TYPICAL"

Sample: Boring No.: H-Bor-12
Depth: 75' 1"
Sample ID: PS-6

MEASUREMENTS (Entire Tube):

	FROM TOP OF TUBE		FROM BOTTOM OF TUBE		TOTAL TUBE LENGTH	INSIDE DIAMETER OF TUBE
	PACKER (inches)	SOIL (inches)	PACKER (inches)	SOIL (inches)	(inches)	(inches)
1.	9.56	9.88	0.94	1.63		
2.	9.52	9.89	0.96	1.52		
3.	9.55	9.97	0.98	1.54		
Avg.:	9.54	L_1 = 9.91	0.96	L_2 = 1.56	L_3 = 30.000 *	D_i = 2.871 *

TOTAL WEIGHT OF TUBE + PACKERS + SOIL	M_1 =	6,655.5	gm
WEIGHT OF PACKERS	M_2 =	153.0 *	gm
TOTAL WEIGHT OF TUBE	M_3 =	2,447.9 *	gm
WET WEIGHT OF SOIL COLUMN, [M_1-M_2-M_3]	M_4 =	4,054.6	gm

* *Denotes information supplied by WSRC/TO*

MOISTURE CONTENTS (From assigned tests of same tube):

MOISTURE CONTENT		
Specimen 1:	21.1	% moisture
Specimen 2:	20.6	% moisture
Specimen 3:	20.1	% moisture
Average, (w):	20.6	% moisture

Notations:

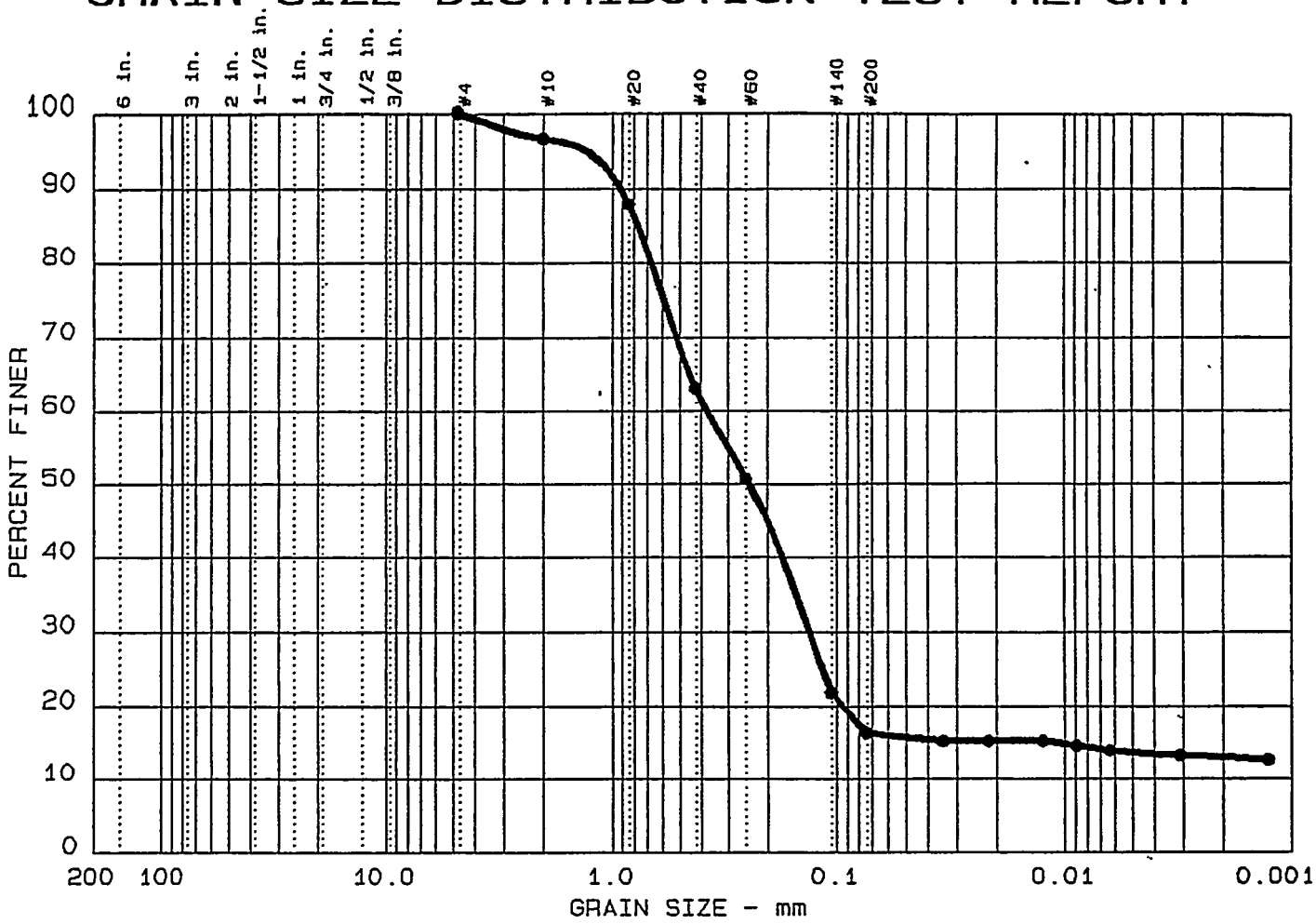
Specimen 1 moisture content obtained from CD - 37psi test
Specimen 2 moisture content obtained from CD - 80psi test
Specimen 3 moisture content obtained from CD - 120psi test

CALCULATIONS:

CROSS-SECTIONAL AREA OF TUBE, [pi*(D_i^2)/4]	A_o=	6.47	in.^{2}
LENGTH OF SOIL COLUMN, [L_3 - L_2 - L_1]	L_s =	18.52	in.
VOLUME OF SOIL COLUMN, [L_s*A_o]	V_s =	119.92	in.^{3}
WET DENSITY, [(M_4/V_s)*3.810]	**D_w=**	**128.8**	**pcf**
DRY DENSITY, [D_w/(1+w/100)]	**D_D=**	**106.8**	**pcf**

h:\users\lab\rlb\itp\b12-ps6.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	15	0.0	0.0	83.6	2.7	13.7

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	39	15	0.76	0.37	0.24	0.132	0.0098			

MATERIAL DESCRIPTION	USCS	AASHTO
● Red-White	SC	A-2-6 (0.1)

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-12 PS-6 @ 75 Ft.

Date: November 24, 1993

Remarks:

Tested by: BNS

Reviewed by: RLB

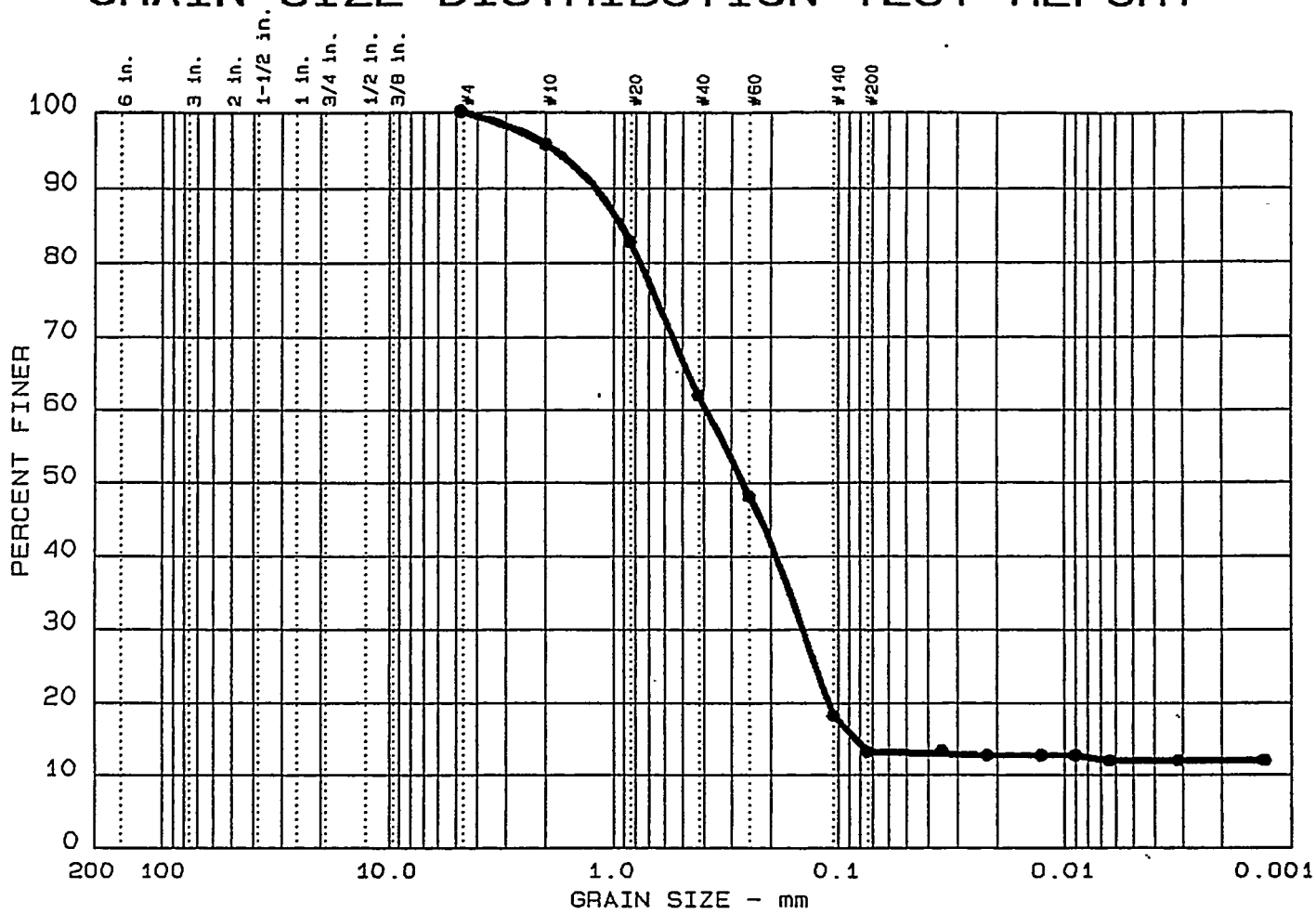
CD 37 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	14	0.0	0.0	86.7	1.2	12.1

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.91	0.39	0.27	0.145	0.0826			

MATERIAL DESCRIPTION	USCS	AASHTO
● Red Clayey Medium to Fine Sand		

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-12 PS-6 @ 75 Ft

Date: October 25, 1993

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Remarks:

Tested by: JRR Ckd by: RLB

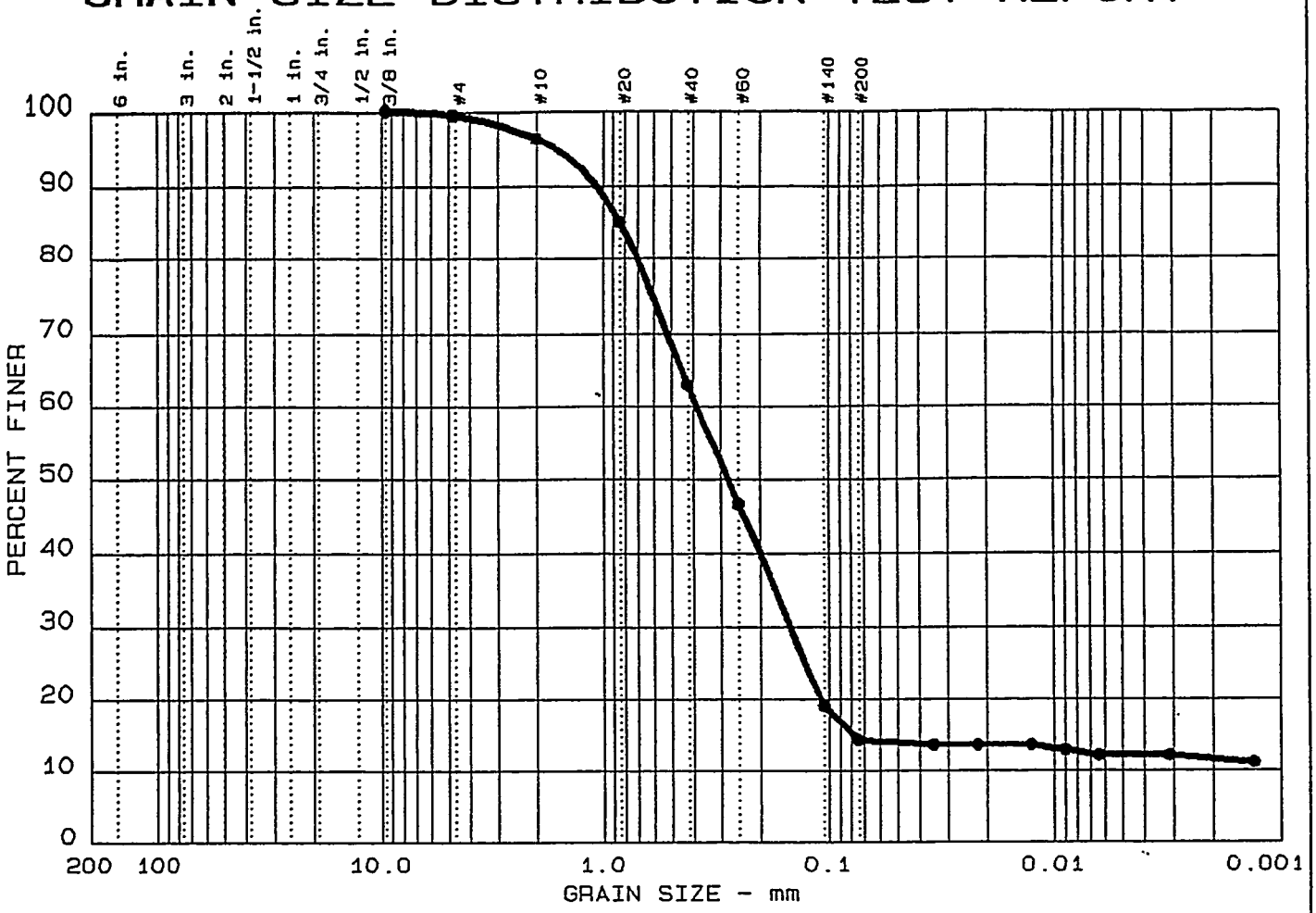
CD 80 psi

Atterberg Limits -200

LL=164 PL=38 PI=126

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	11	0.0	0.6	85.2	2.1	12.1

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	47	28	0.83	0.38	0.28	0.148	0.0779			

MATERIAL DESCRIPTION	USCS	AASHTO
● Red Brown Clayey Medium to Fine Sand	SC	A-2-7 (0.0)

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-12 PS-6 @ 75 Ft.

Date: October 25, 1993

Remarks:

Tested by: BNS

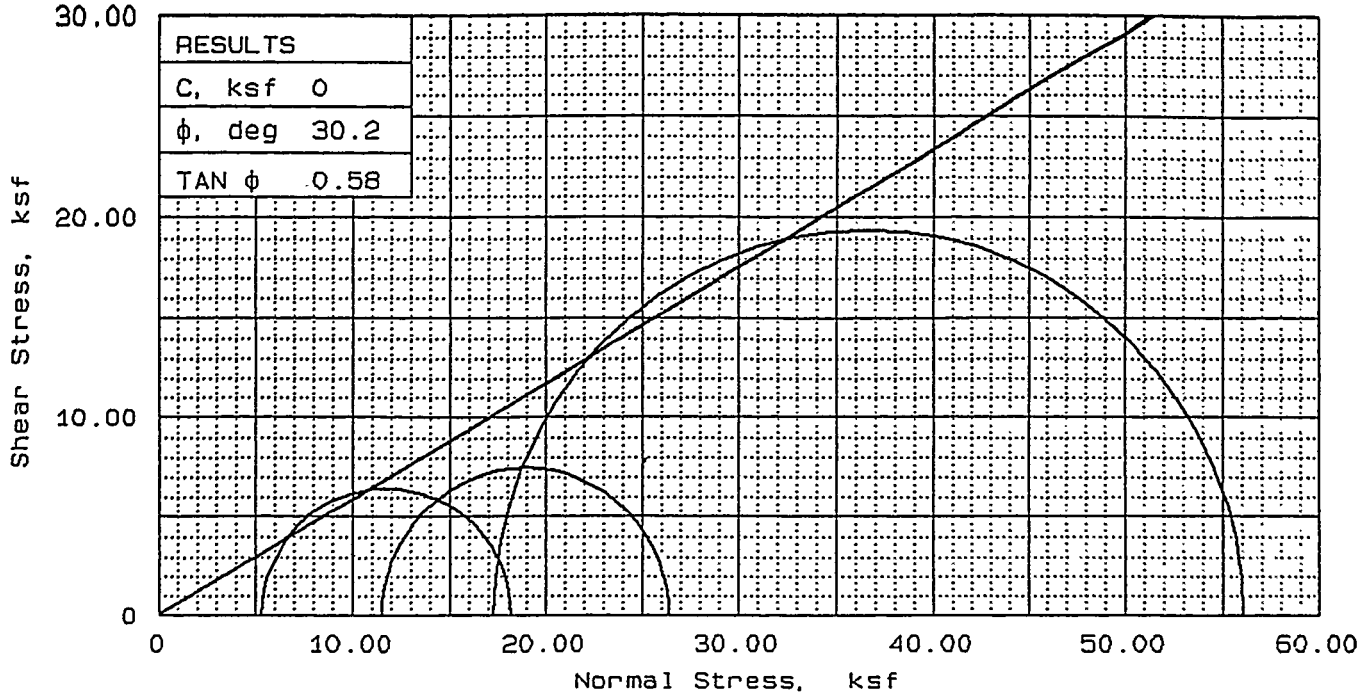
Reviewed by: RLB

CD-120psi

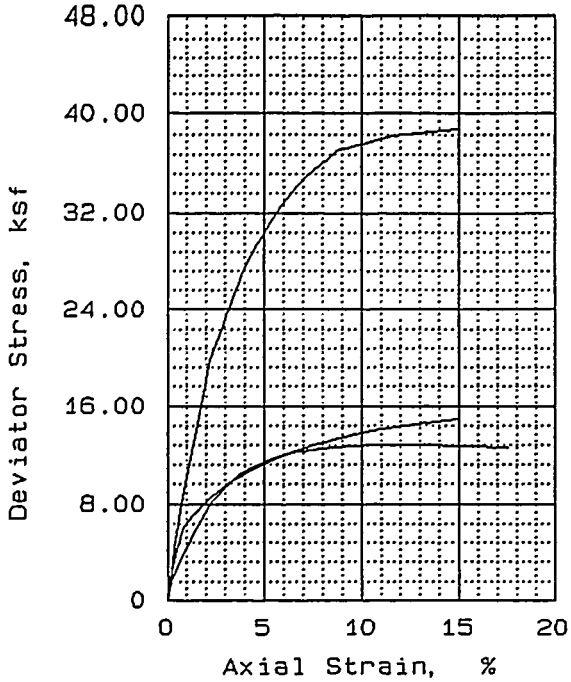
GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.



*H/D ratio = 1.81 (sample #1)



	SAMPLE NO.	1*	2	3
INITIAL	WATER CONTENT, %	21.1	20.6	20.1
	DRY DENSITY, pcf	104.5	105.9	106.9
	SATURATION, %	92.9	92.7	93.9
	VOID RATIO	0.613	0.603	0.577
	DIAMETER, in	2.88	2.88	2.88
	HEIGHT, in	5.21	6.00	6.00
AT TEST	WATER CONTENT, %	22.5	21.2	20.1
	DRY DENSITY, pcf	104.9	107.6	109.3
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.606	0.578	0.543
	DIAMETER, in	2.87	2.86	2.85
	HEIGHT, in	5.20	5.99	5.98
	BACK PRESSURE, ksf	7.92	6.48	7.20
	CELL PRESSURE, ksf	13.25	18.00	24.48
	FAILURE STRESS, ksf	12.86	14.90	38.78
	PORE PRESSURE, ksf			
	STRAIN RATE, %/min.	0.100	0.100	0.100
	ULTIMATE STRESS, ksf			
	PORE PRESSURE, ksf			
	σ_1 FAILURE, ksf	18.19	26.42	56.06
	σ_3 FAILURE, ksf	5.33	11.52	17.28

TYPE OF TEST:
Consolidated drained
SAMPLE TYPE: Undisturbed
DESCRIPTION:

~~LL= 39 PL= 24 PI= 15.0~~
~~SPECIFIC GRAVITY= 2.72~~
REMARKS: Tested by: HEJ

Reviewed by: RLB

FIG. NO.

CLIENT: SRS

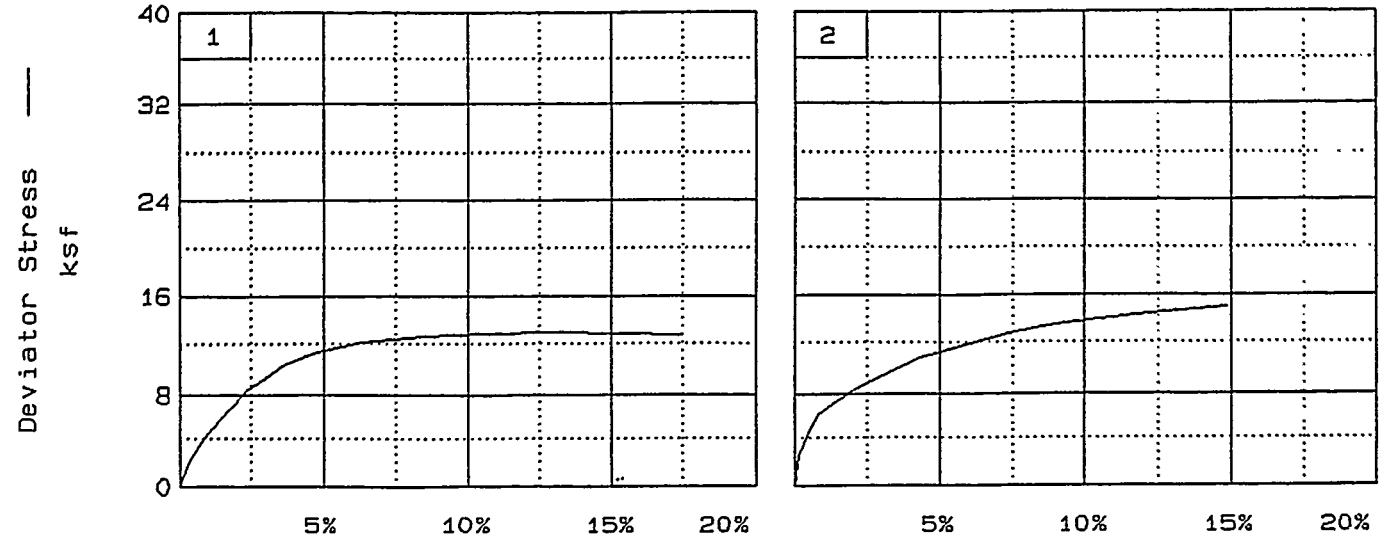
PROJECT: SRS-ITP

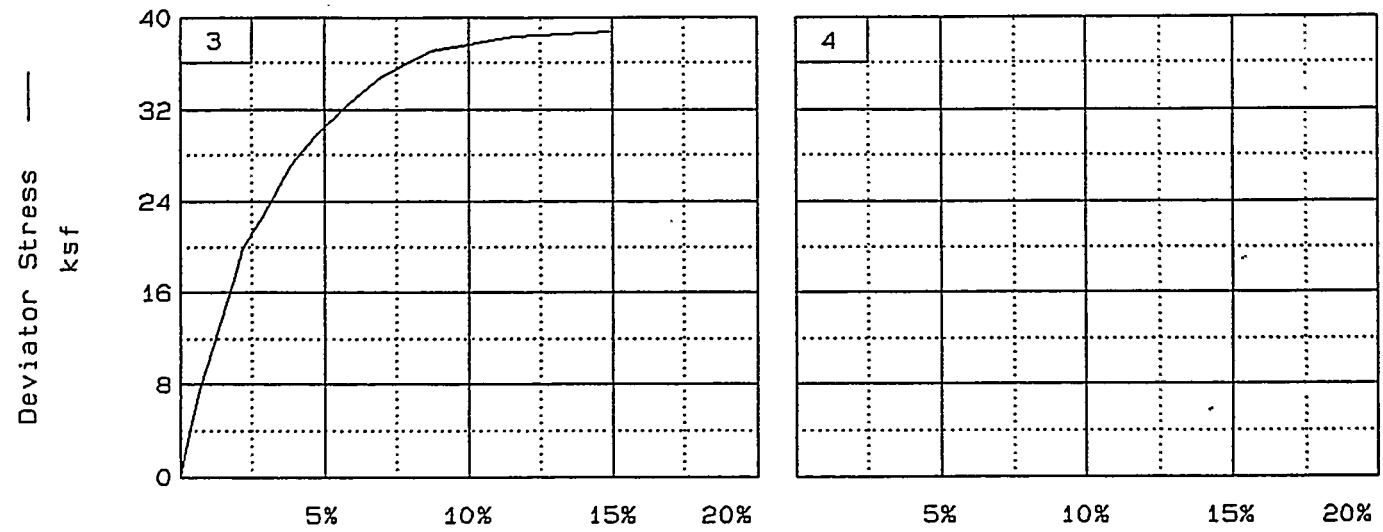
SAMPLE LOCATION: H Bor 12 PS-6 @ 75 Ft.

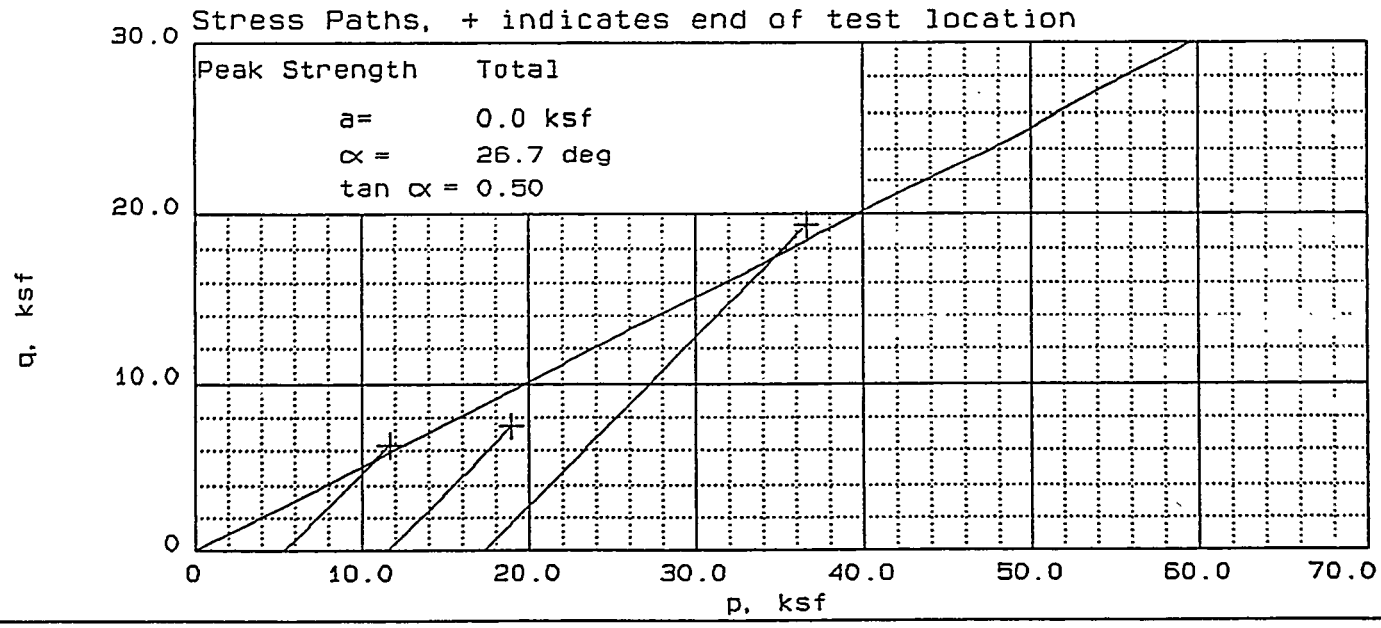
PROJ. NO.: 5810535301 DATE: Dec. 13, 1993

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.





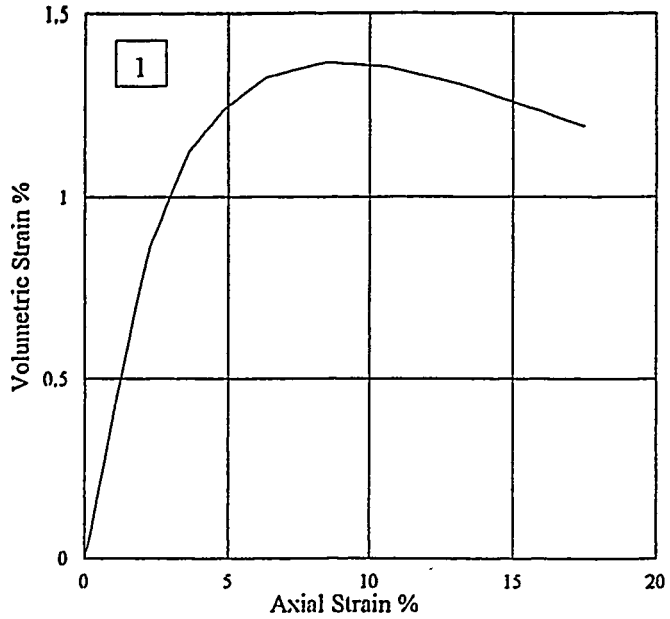


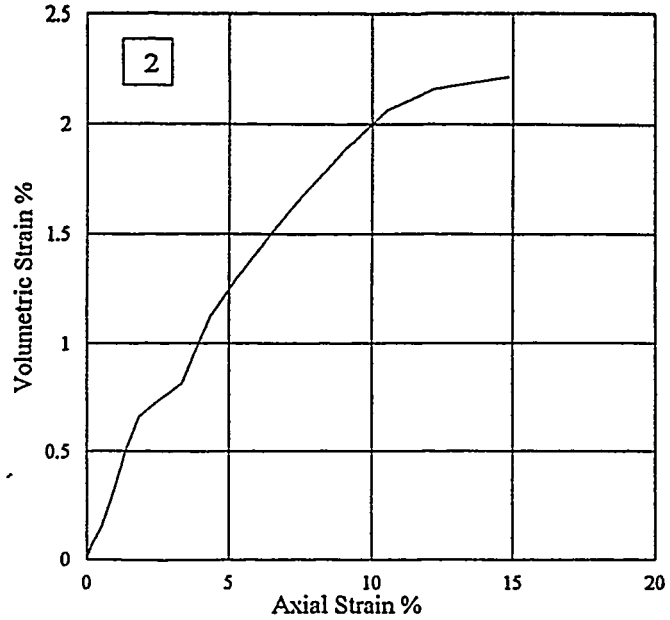
Client: SRS

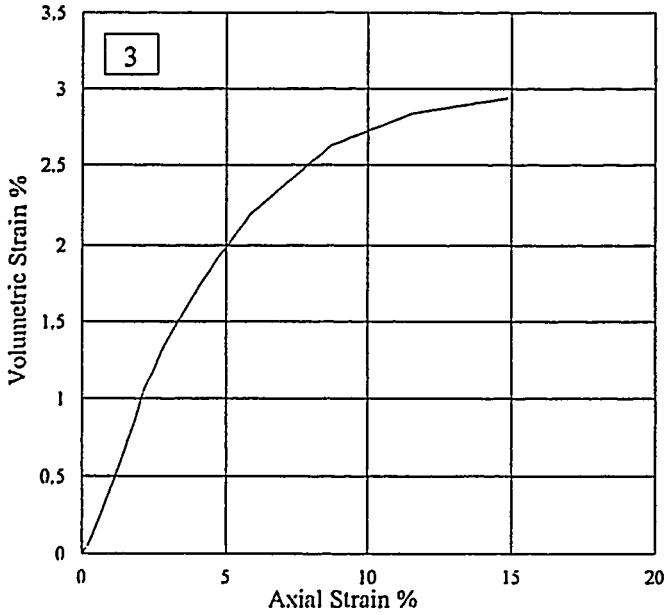
Project: SRS-ITP

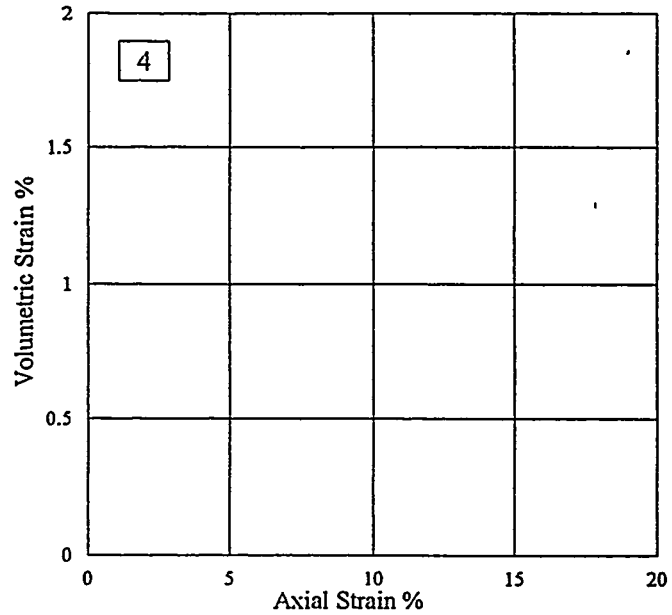
Location: H Bor 12 PS-6 @ 75 Ft.

File: 535301G Project No.: 5810535301 Page 2/2 Fig. No. ____









Client: SRS
Project: SRS-ITP
Location: H Bor 12 PS-6 @ 75 Ft.
File: Project No.: 5810535301 Page 2 / 2 Fig. No. _____

TRIAXIAL COMPRESSION TEST
Consolidated drained

12-13-1993
10:41 am

Project Data

Project No.: 5810535301 Date: Dec. 13,1993 Data file: 535301G
Client: SRS
Project: SRS-ITP
Sample location: H Bor 12 PS-6 @ 75 Ft.
Sample description:
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.70 LL= 39 PL= 24 PI= 15

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.87	
Height change, in		0.01	
Height, in	5.21 *	5.20	
Weight, grams	1124.1		
Water volume change, cc		-12.56	
Moisture, %	21.1	22.5	21.1
Dry density, pcf	104.5	104.9	
Saturation, %	92.9	100.0	
Void ratio	0.613	0.606	

* H/D = 1.81 < 2 (ok by Strassburger)

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 92 psi
Consolidation back pressure = 55 psi
Consolidation effective confining stress = 5.328 ksf
Peak deviator stress = 12.86 ksf at reading no. 12
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	5.33	5.33	1.00	5.33	0.00
1	0.0100	0.010	72.00	72.0	0.2	1.60	5.33	6.92	1.30	6.13	0.80
2	0.0200	0.020	108.00	108.0	0.4	2.39	5.33	7.72	1.45	6.52	1.20
3	0.0400	0.040	168.00	168.0	0.8	3.70	5.33	9.03	1.70	7.18	1.85
4	0.0600	0.060	228.00	228.0	1.2	5.01	5.33	10.34	1.94	7.83	2.50
	0.0900	0.090	309.00	309.0	1.7	6.75	5.33	12.08	2.27	8.70	3.37

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	.1200	0.120	381.00	381.0	2.3	8.27	5.33	13.60	2.55	9.46	4.14
	0.1900	0.190	484.00	484.0	3.7	10.36	5.33	15.69	2.94	10.51	5.18
8	0.2500	0.250	538.00	538.0	4.8	11.38	5.33	16.71	3.14	11.02	5.69
9	0.3300	0.330	584.00	584.0	6.3	12.15	5.33	17.48	3.28	11.40	6.08
10	0.4400	0.440	620.00	620.0	8.5	12.61	5.33	17.94	3.37	11.63	6.31
11	0.5500	0.550	647.00	647.0	10.6	12.86	5.33	18.18	3.41	11.76	6.43
12	0.6800	0.680	666.00	666.0	13.1	12.86	5.33	18.19	3.41	11.76	6.43
13	0.9100	0.910	690.00	690.0	17.5	12.65	5.33	17.98	3.37	11.65	6.32

TRIAXIAL COMPRESSION TEST
Consolidated drained

12-13-1993
11:04 am

Project Data

Project No.: 5810535301 Date: Dec. 13,1993 Data file: 535301G
Client: SRS
Project: SRS-ITP
Sample location: H Bor 12 PS-6 @ 75 Ft.
Sample description:
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 2 Data

Type of sample: Undisturbed
Specific Gravity= 2.72 ~~LL= 39 PL= 24 PI= 15~~

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.86	
Height change, in		0.02	
Height, in	6.00	5.99	
Weight, grams	1308.3		
Water volume change, cc		-7.53	
Moisture, %	20.6	21.2	20.6 19.6
Dry density, pcf	105.9	107.6	
Saturation, %	92.7	100.0	
Void ratio	0.603	0.578	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 125 psi
Consolidation back pressure = 45 psi
Consolidation effective confining stress = 11.52 ksf
Peak deviator stress = 14.90 ksf at reading no. 14
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	11.52	11.52	1.00	11.52	0.00
1	0.0100	0.010	108.00	108.0	0.2	2.42	11.52	13.94	1.21	12.73	1.21
2	0.0300	0.030	200.00	200.0	0.5	4.46	11.52	15.98	1.39	13.75	2.23
3	0.0500	0.050	276.00	276.0	0.8	6.14	11.52	17.66	1.53	14.59	3.07
4	0.0800	0.080	324.00	324.0	1.3	7.17	11.52	18.69	1.62	15.11	3.59
	.1100	0.110	360.00	360.0	1.8	7.93	11.52	19.45	1.69	15.48	3.96

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	.1400	0.140	396.00	396.0	2.3	8.68	11.52	20.20	1.75	15.86	4.34
	0.2000	0.200	453.00	453.0	3.3	9.82	11.52	21.34	1.85	16.43	4.91
8	0.2600	0.260	504.00	504.0	4.3	10.81	11.52	22.33	1.94	16.93	5.41
9	0.3600	0.360	567.00	567.0	6.0	11.95	11.52	23.47	2.04	17.50	5.98
10	0.4400	0.440	612.00	612.0	7.4	12.72	11.52	24.24	2.10	17.88	6.36
11	0.5400	0.540	660.00	660.0	9.0	13.47	11.52	24.99	2.17	18.25	6.73
12	0.6300	0.630	696.00	696.0	10.5	13.97	11.52	25.49	2.21	18.50	6.98
13	0.7300	0.730	732.00	732.0	12.2	14.42	11.52	25.94	2.25	18.73	7.21
14	0.8900	0.890	780.00	780.0	14.9	14.90	11.52	26.42	2.29	18.97	7.45

TRIAXIAL COMPRESSION TEST
Consolidated drained

12-13-1993
10:45 am

Project Data

Project No.: 5810535301 Date: Dec. 13,1993 Data file: 535301G
Client: SRS
Project: SRS-ITP
Sample location: H Bor 12 PS-6 @ 75 Ft.
Sample description:
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 3 Data

Type of sample: Undisturbed
Specific Gravity= 2.70 ~~LL= 39~~ ~~PL= 24~~ ~~PI= 15~~

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.85	
Height change, in		0.02	
Height, in	6.00	5.98	
Weight, grams	1314.7		
Water volume change, cc		-0.26	
Moisture, %	20.1	20.1	20.1 /17.3
Dry density, pcf	106.9	109.3	
Saturation, %	93.9	100.0	
Void ratio	0.577	0.543	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 170 psi
Consolidation back pressure = 50 psi
Consolidation effective confining stress = 17.28 ksf
Peak deviator stress = 38.78 ksf at reading no. 13
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	17.28	17.28	1.00	17.28	0.00
1	0.0100	0.010	105.00	105.0	0.2	2.36	17.28	19.64	1.14	18.46	1.18
2	0.0200	0.020	189.00	189.0	0.3	4.25	17.28	21.53	1.25	19.40	2.12
3	0.0400	0.040	336.00	336.0	0.7	7.53	17.28	24.81	1.44	21.04	3.76
4	0.1100	0.110	775.00	775.0	1.8	17.16	17.28	34.44	1.99	25.86	8.58
	0.1300	0.130	900.00	900.0	2.2	19.86	17.28	37.14	2.15	27.21	9.93

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LAW ENGINEERING, INC.

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	).1700	0.170	1030.00	1030.0	2.8	22.57	17.28	39.85	2.31	28.57	11.29
,	0.2300	0.230	1250.00	1250.0	3.8	27.11	17.28	44.39	2.57	30.84	13.56
8	0.2800	0.280	1380.00	1380.0	4.7	29.67	17.28	46.95	2.72	32.12	14.84
9	0.3500	0.350	1536.00	1536.0	5.9	32.62	17.28	49.90	2.89	33.59	16.31
10	0.4200	0.420	1666.00	1666.0	7.0	34.94	17.28	52.22	3.02	34.75	17.47
11	0.5200	0.520	1800.00	1800.0	8.7	37.07	17.28	54.35	3.15	35.82	18.54
12	0.6900	0.690	1920.00	1920.0	11.5	38.31	17.28	55.59	3.22	36.44	19.16
13	0.8900	0.890	2020.00	2020.0	14.9	38.78	17.28	56.06	3.24	36.67	19.39

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

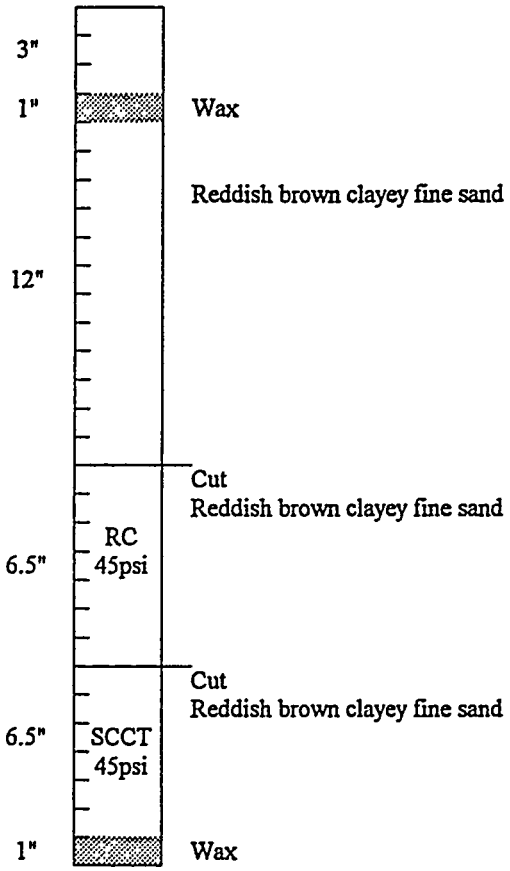
Project: SRS-ITP GEOTECHNICAL TESTING Date: 11-02-93

Boring No: H-Bor-12 Sample No: ST-8 Depth: 80'-82'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION

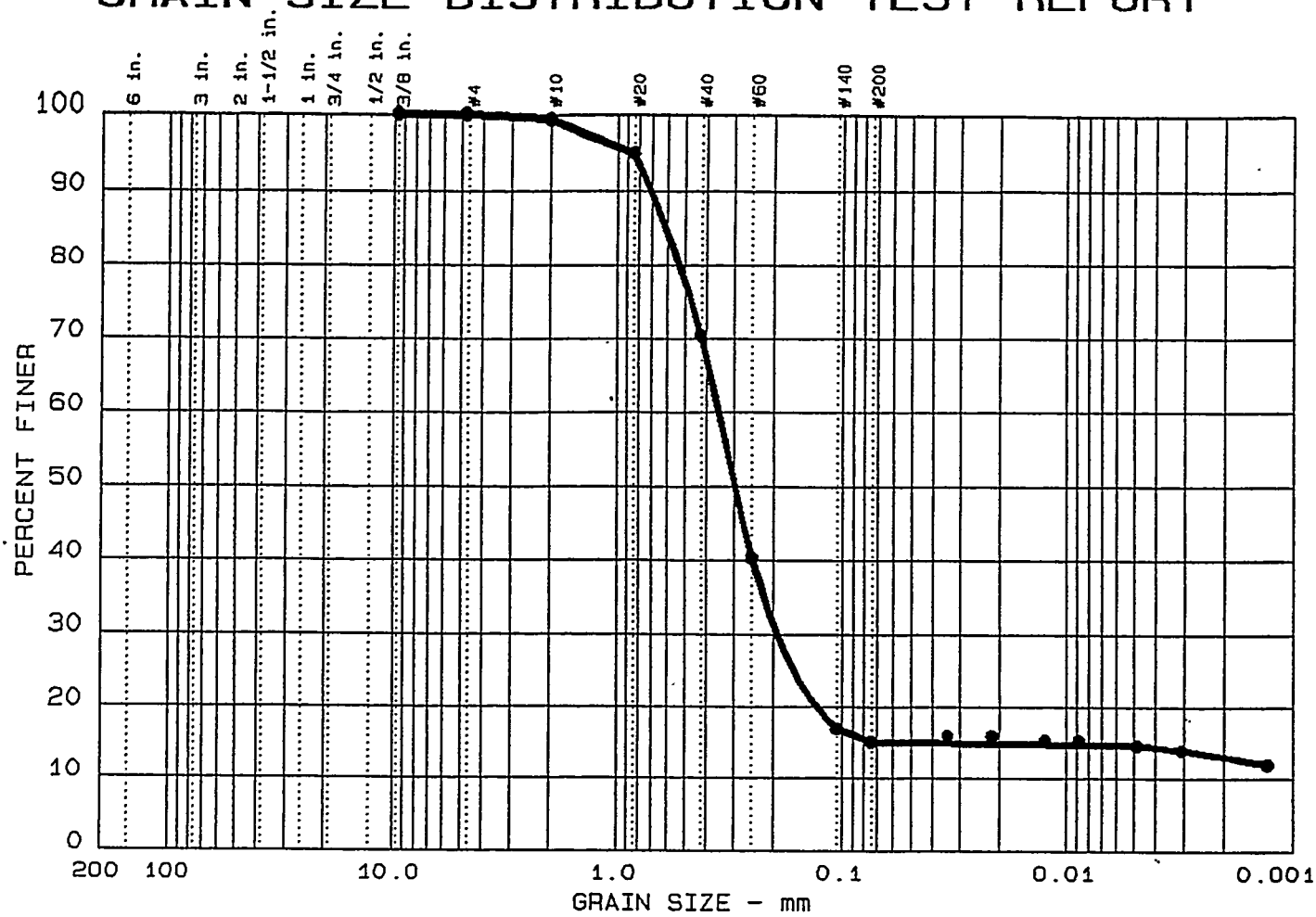


Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b12-st8.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	19	0.0	0.0	85.0	0.4	14.6

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.60	0.35	0.30	0.193	0.0583			

MATERIAL DESCRIPTION	USCS	AASHTO
● Red-Brown Clayey Medium to Fine Sand		

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-12 ST-8 @ 80-82 Ft

Date: November 19, 1993

Remarks:
Tested by: BNS Ckd by: RLB
RC 45psi
Atterberg Limits -200
LL=167 PL=45 PI=122

GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Figure No.

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-12
Test Date:	11/4/93-11/5/93	Sample No.:	ST-8
Reviewed By:	JW/RLB RLB	Depth:	80.0 - 82.0'
Reviewed Date:	11/8/93	Sample Description:	See classification data

Initial Specimen Data

Labels	Values	Units	Description
Masses			
M_{scb}	1285.82	g	*Mass of soil and container before*
M_{sca}	0.00	g	*Mass of soil and container after*
M_s	1285.82	g	*M_{scb} - M_{sca} = mass of soil*
Diameters			
D_t	73.74	mm	*Diameter near top of specimen*
D_m	73.71	mm	*Diameter near middle of specimen*
D_b	73.76	mm	*Diameter near bottom of specimen*
T_{mem}	0.30	mm	*Single thickness of membrane*
D_{net}	73.13	mm	*$(D_t + D_m + D_b)/3 - 2*T_{mem}$*
Lengths			
L_{cbp}	199.52	mm	*Length between chamber bottom & top of top platen*
L_{tp}	23.95	mm	*Length of top platen*
L_{bp}	24.00	mm	*Length of bottom platen*
L_{net}	151.57	mm	*Length of Specimen = L_{cbp} - L_{tp} - L_{bp}*
Volume			
V	636589	mm³	*$D^2_{net}*Pi*L_{net}/4$*

Labels	Values	Units	Description
Mass Density and Unit Weight			
Rho	2019.9	kg/m³	*Mass density of specimen = $M_s/V*10^6$*
U_{wt}	19.81	kN/m³	*Unit weight of specimen = Rho*9.806/1000*
Moisture Content, mc			
No.	T-15		*Container number*
M_{wscb}	1337.88	g	*Mass of wet soil + container*
M_{wsca}	1106.85	g	*Mass of dry soil + container*
M_{wat}	231.03	g	*Mass of water = M_{wscb} - M_{wsca}*
M_{cont}	52.06	g	*Mass of container.*
mc	21.9	%	*$M_{wat}/(M_{wsca} - M_{cont})*100\%$*
Rho_d	1656.9	kg/m³	*Dry mass density = Rho/(1+mc)*
G_s	2.67		*Specific gravity*
e	0.611		*Void Ratio, $[1000*G_s)]/Rho_d-1$*
S_r	95.6	%	*Degree of Saturation = $mc*G_s/e$*
J	0.000860	kg-m²	*Polar mass moment of inertia = $(M_s/1000)*(D_{net}/1000)^2/8$*

Conditions After Saturation				Conditions After Consolidation			
CL_s	0.08	mm	*Change in length*	CL_c	0.35	mm	*Change in length*
L_s	151.5	mm	*Length after saturation, L - CL_s*	L_c	151.1	mm	*Length after consolidation, L_s - CL_c*
A_s	4200.0	mm²	*Area of specimen*	CV_c	4046	mm³	*Change in volume*
V_s	636264	mm³	*Volume after saturation, A_s * L_s*	V_c	632218	mm³	*Volume, V_s - CV_c*
B	0.96		*B Value*	S_r	100.0	%	*Degree of Saturation = $mc*G_s/e$*
				e	0.600		*Void Ratio, $[1000*G_s]/Rho_d-1$*
				mc	22.5	%	*Moisture Content*
				Rho_d	1668	kg/m³	*Dry mass density, Rho_d*V/V_c*

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

INPUT DATA

Project No.: 5810535301
Tested By: HEJ/JW
Test Date: 11/4/93-11/5/93
Reviewed By: JW/RLB RLB
Reviewed Date: 11/8/93

Project Name: SRS-ITP
Boring No: H-Bor-12
Sample No.: ST-8
Depth: 80.0 - 82.0'
Sample Description: See classification data

Line No.	Elapsed Time [min]	Cell Pressure [unit]	Pore Pressure [unit]	Axial Load [unit]	Burette Reading [unit]	Length Reading [unit]	Longitudinal or Torsional	Force or Torque Reading [V_{rms}]	Transducer Reading [V_{rms}]	Resonant Period [msec]
1	0.7	80.0	36.4	0	12.0	-2.2050	T	0.011	0.017	6.613
2	1.0	80.0	36.5	0	12.0	-2.2050	T	0.022	0.030	6.614
3	1.3	80.0	36.5	0	12.0	-2.2060	T	0.041	0.051	6.615
4	2.0	80.0	36.5	0	12.0	-2.2060	T	0.091	0.104	6.643
5	2.7	80.0	36.6	0	12.0	-2.2060	T	0.188	0.198	6.690
6	3.2	80.0	36.6	0	12.0	-2.2060	T	0.426	0.406	6.772
7	4.0	80.0	36.7	0	12.0	-2.2060	T	0.959	0.864	7.049
8	4.7	80.0	37.5	0	12.0	-2.2060	T	1.991	1.598	7.436
9	5.6	80.0	40.6	0	12.0	-2.2180	T	3.630	2.404	7.952
10	7.3	80.0	40.9	0	12.0	-2.2180	T	0.028	0.035	6.999

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

INTERMEDIATE DATA

Project No.: 5810535301
Tested By: HEJ/JW
Test Date: 11/4/93-11/5/93
Reviewed By: JW/RLB RLB
Reviewed Date: 11/8/93

Project Name: SRS-ITP
Boring No: H-Bor-12
Sample No.: ST-8
Depth: 80.0 - 82.0'
Sample Description: See classification data

Specimen Volume [mm³]	Specimen Length [mm]	Specimen Diameter [mm]	Specimen Mass [grams]	Mass Density [kg/m³]	Polar Inertia J [kg-m²]	Inertia Stiffness Ratio T	Apparatus Damping Factor ADF	Dimensionless Frequency F	Damping Factor A
632218	151.14	72.98	1292.28	2044.0	0.000860	3.7544	0.00446	0.495	8.21
632218	151.14	72.98	1292.28	2044.0	0.000860	3.7544	0.00446	0.495	8.21
632218	151.14	72.98	1292.28	2044.0	0.000860	3.7544	0.00446	0.495	8.21
632218	151.14	72.98	1292.28	2044.0	0.000860	3.7544	0.00448	0.495	8.21
632218	151.14	72.98	1292.28	2044.0	0.000860	3.7544	0.00451	0.495	8.21
632218	151.14	72.98	1292.28	2044.0	0.000860	3.7544	0.00457	0.495	8.21
632218	151.14	72.98	1292.28	2044.0	0.000860	3.7544	0.00475	0.495	8.21
632218	151.14	72.98	1292.28	2044.0	0.000860	3.7544	0.00501	0.495	8.21
632218	151.13	72.98	1292.28	2044.0	0.000860	3.7542	0.00536	0.495	8.21
632218	151.13	72.98	1292.28	2044.0	0.000860	3.7542	0.00472	0.495	8.21

Resonant Column Test (ASTM D4015-87)

TEST RESULTS SUMMARY

LAW ENGINEERING

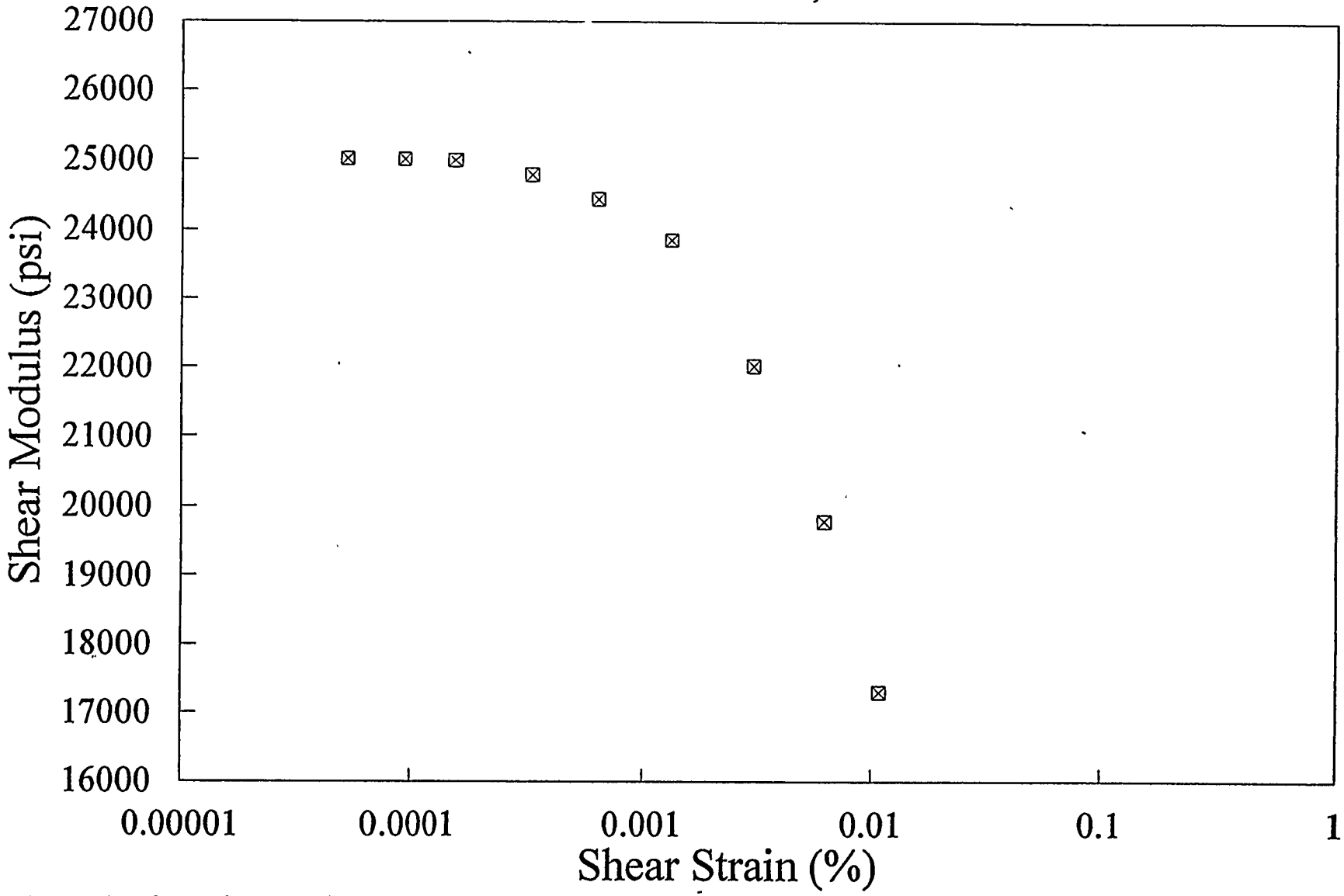
Project No.: 5810535301
Tested By: HEJ/JW
Test Date: 11/4/93-11/5/93
Reviewed By: JW/RLB RLB
Reviewed Date: 11/8/93

Project Name: SRS-ITP
Boring No: H-Bor-12
Sample No.: ST-8
Depth: 80.0 - 82.0'
Sample Description: See classification data

Line No.	Effective Confining Stress [kPa]	Principal Stress Ratio	Void Ratio e	Longitudinal or Torsional	No. of Vibration Cycles	Shear Modulus G [Mpa]	Shear Strain Amplititude [%]	Damping Ratio [%]	Shear Modulus G [psi]
1	300.13	1.00	0.600	T	6079	172.33	0.00005	3.04	25011
2	299.58	1.00	0.600	T	3266	172.28	0.00009	3.45	25004
3	299.58	1.00	0.600	T	2630	172.22	0.00016	3.79	24996
4	299.44	1.00	0.600	T	6232	170.77	0.00033	4.12	24786
5	299.30	1.00	0.600	T	6278	168.38	0.00063	4.48	24439
6	299.16	1.00	0.600	T	4519	164.33	0.00132	4.96	23850
7	298.34	1.00	0.600	T	6299	151.67	0.00305	5.24	22013
8	292.96	1.00	0.600	T	5568	136.29	0.00629	5.89	19781
9	271.19	1.00	0.600	T	6866	119.16	0.01082	7.15	17295
10	269.40	1.00	0.600	T	15259	153.82	0.00012	3.76	22325

Shear Modulus vs. Shear Strain

H-BOR-12, ST-8

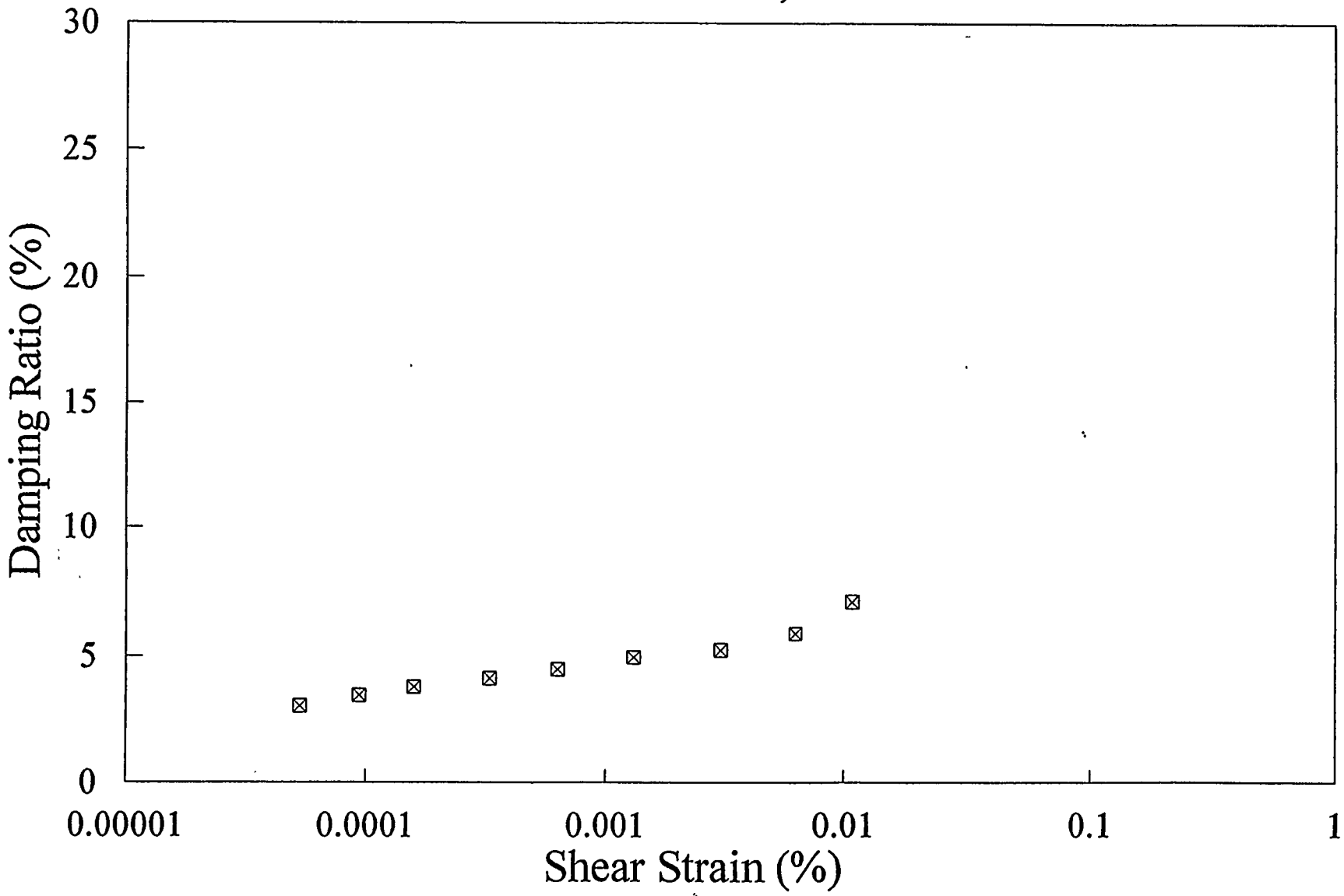


Law Engineering Project No.: 5810535301

SRS-ITP: Resonant Column

Damping Ratio vs. Shear Strain

H-BOR-12, ST-8



Law Engineering Project No.: 5810535301

SRS-ITP: Resonant Column

CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-12
Test Date:	11/4/93-11/5/93	Sample No.:	ST-8
Reviewed By:	JW/RLB	Depth:	80.0 - 82.0 ft.
Review Date:	11/8/93	Sample Description:	See classification data

SPECIMEN DATA

Initial Conditions of Specimen

Diameters, in.		Area , sq. in.	6.50
Top	2.901	Volume, cubic in.	38.04
Middle	2.900	Mass of Specimen, grams	1280.82
Bottom	2.902		
Average	2.901	Moisture Content	
Membrane Thickness, in.	0.012	Pan No.	L-31
Net Diameter, in.	2.877	Wet Mass + Pan, grams	1369.66
		Dry Mass + Pan, grams	1138.89
Length, in.		Container Mass, grams	88.84
Location 1	8.520	Moisture Content, %	22.0
Location 2	8.510		
Location 3	8.505	Density, pcf	128.0
Average	8.512	Dry Density, pcf	104.9
Length of Top Platen	1.150	Specific Gravity	2.70
Length of Bottom Platen	1.510	Degree of Saturation, %	98.0
Length of Specimen, in	5.852	Void Ratio	0.606

Conditions of Specimen After Saturation and Consolidation

After Saturation		After Consolidation	
Change in Length, in.	0.000	Change in Length, in.	0.019
Length, in.	5.852	Length, in.	5.833
Area, sq. in.	6.50	Change in Volume, cc	5.81
Volume, cubic in.	38.04	Volume, cubic in.	37.69
Back Pressure, psi	45.0	Area, sq. in.	6.46
B Value	0.96	Effe. Consoli.. Stress, psi	45.0
		Moisture Content, %	21.9
		Dry Density, pcf	105.9
		Void Ratio	0.591
		Degree of Saturation, %	100.0

CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

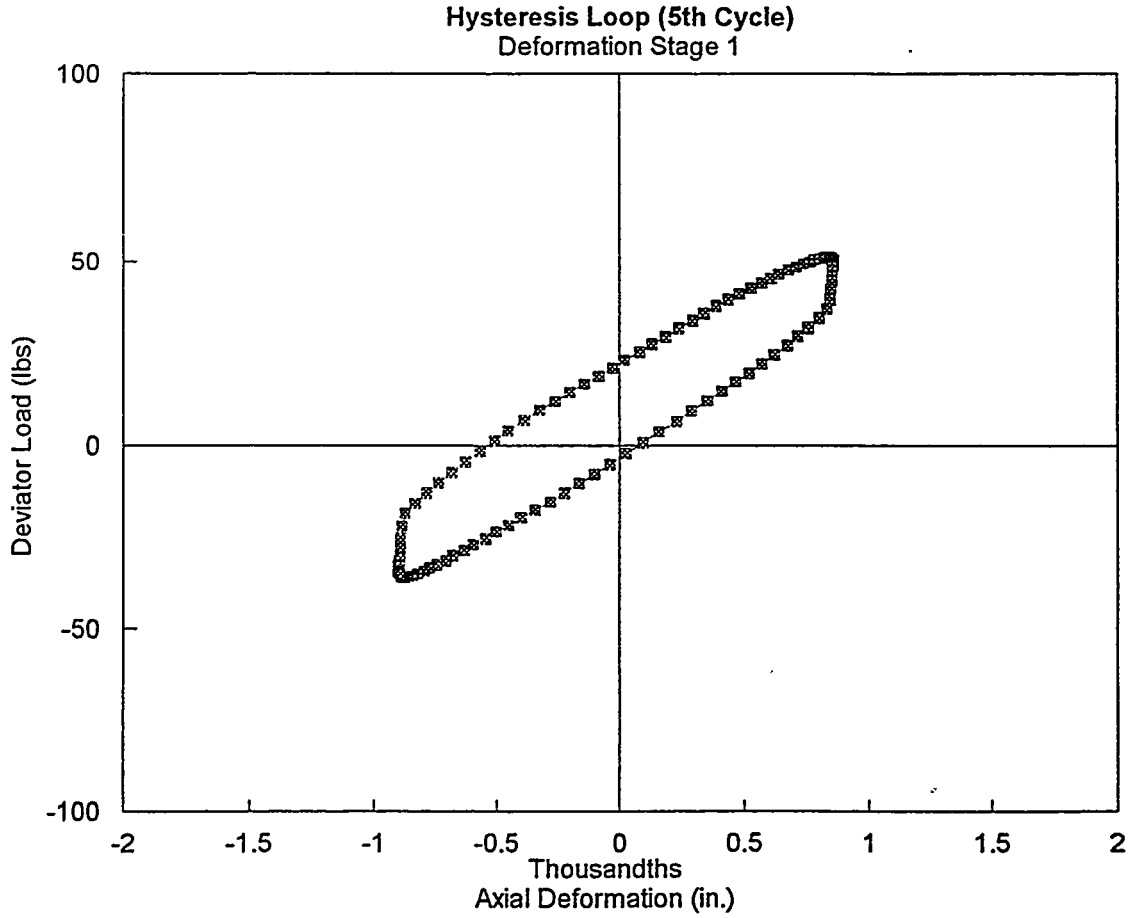
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-12
Test Date:	11/4/93-11/5/93	Sample No.:	ST-8
Reviewed By:	JW /RLB	Depth:	80.0 - 82.0 ft.
Review Date:	11/8/93	Sample Description:	See classification data

Area, A_c, in ^{2}	6.46		Effective Consolidation Stress, psi	45.0
Length, H_c, in.	5.83		Cyclic Load, P_c, lbs	43.66
			Cyclic Deviator Stress, psi	6.8

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
87.3	0.0018	44771	0.015

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
0.041	0.019	16.9



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

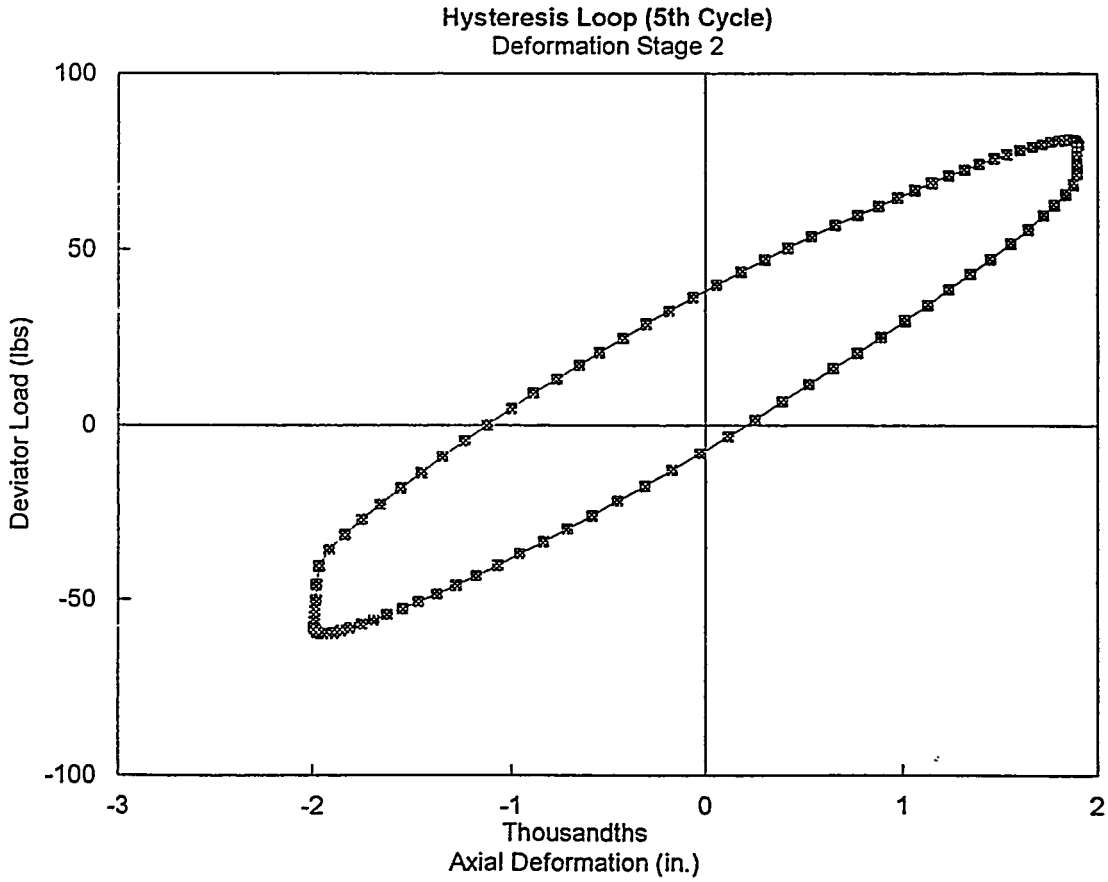
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-12
Test Date:	11/4/93-11/5/93	Sample No.:	ST-8
Reviewed By:	JW/RLB	Depth:	80.0 - 82.0 ft.
Review Date:	11/8/93	Sample Description:	See classification data

Area, A_c, in^2	6.46		Effective Consolidation Stress, psi	45.0
Length, H_c, in.	5.83		Cyclic Load, P_c, lbs	70.58
			Cyclic Deviator Stress, psi	10.9

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
141.2	0.0039	32702	0.033

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
0.144	0.069	16.6



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

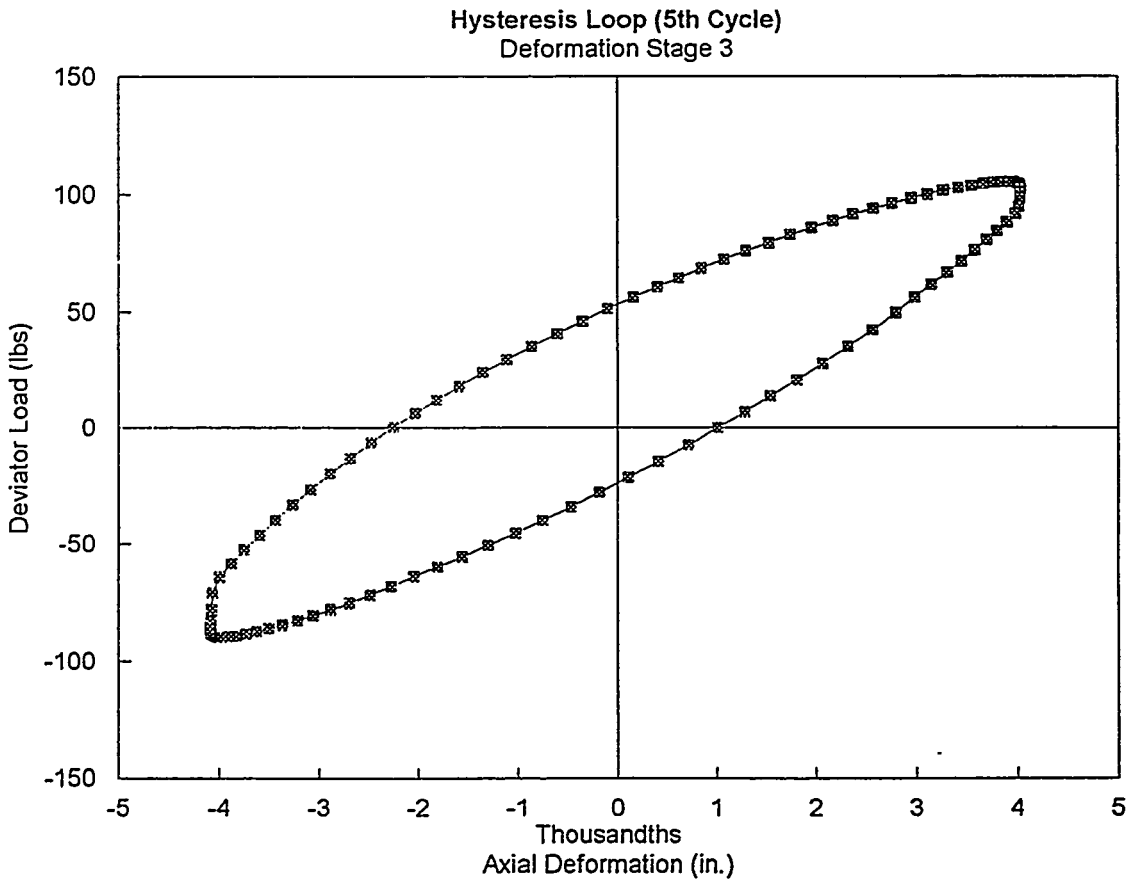
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-12
Test Date:	11/4/93-11/5/93	Sample No.:	ST-8
Reviewed By:	JW / RLB	Depth:	80.0 - 82.0 ft.
Review Date:	11/8/93	Sample Description:	See classification data

Area, A_c, in^2	6.46		Effective Consolidation Stress, psi	45.0
Length, H_c, in.	5.83		Cyclic Load, P_c, lbs	97.59
			Cyclic Deviator Stress, psi	15.1

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
195.2	0.0081	21680	0.070

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
0.480	0.198	19.3



WORKING COPY DATE

CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

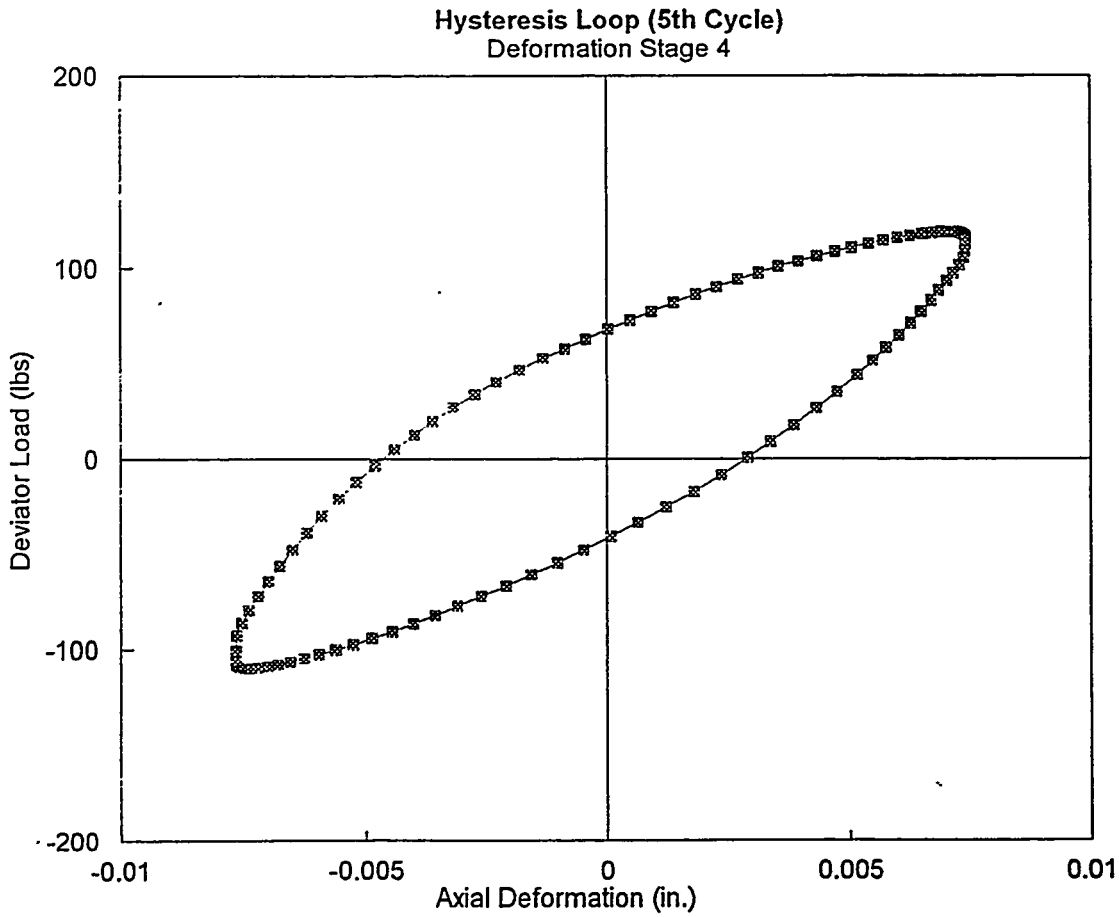
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-12
Test Date:	11/4/93-11/5/93	Sample No.:	ST-8
Reviewed By:	JW / RLB	Depth:	80.0 - 82.0 ft.
Review Date:	11/8/93	Sample Description:	See classification data

Area, A_c, in^2	6.46		Effective Consolidation Stress, psi	45.0
Length, H_c, in.	5.83		Cyclic Load, P_c, lbs	114.45
			Cyclic Deviator Stress, psi	17.7

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
228.9	0.0151	13712	0.129

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
1.287	0.431	23.8



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

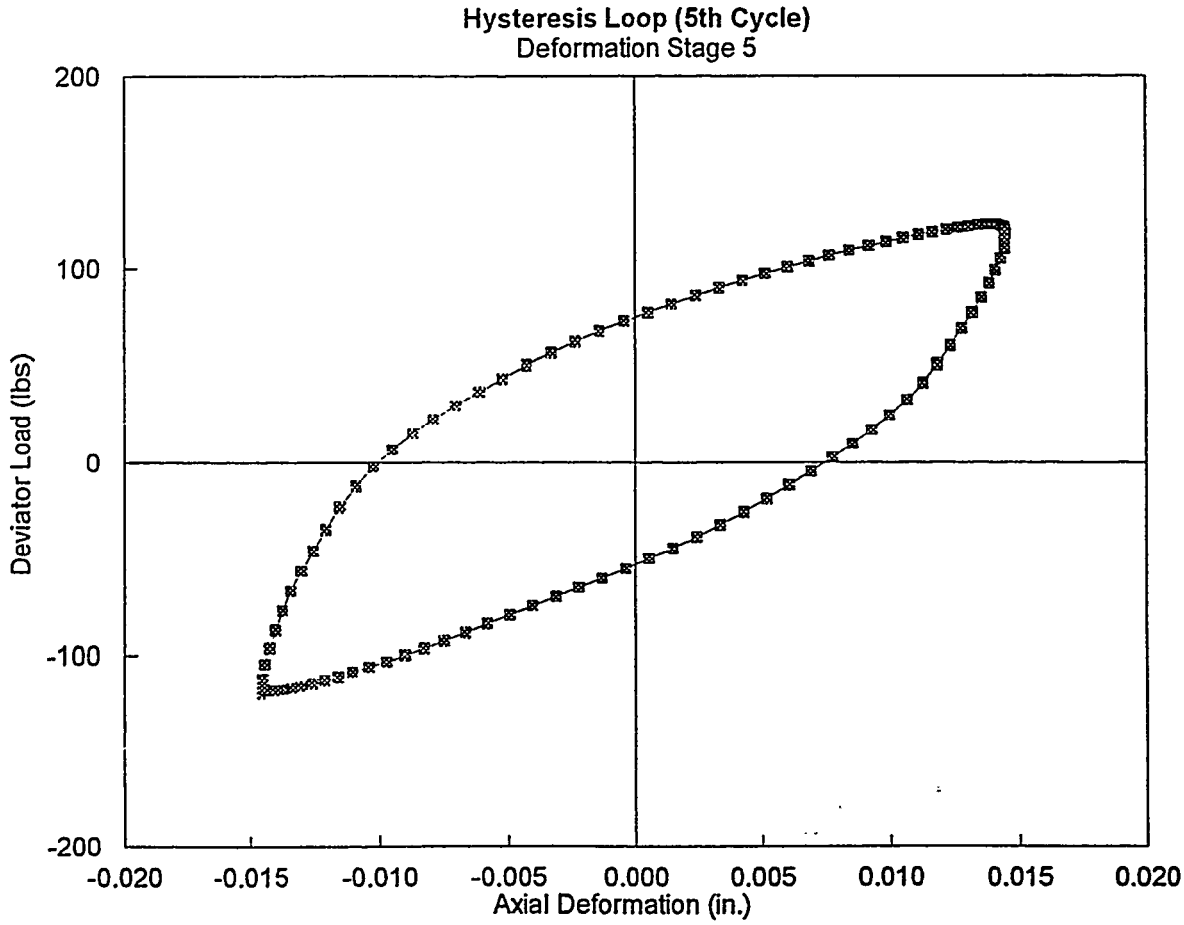
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-12
Test Date:	11/4/93-11/5/93	Sample No.:	ST-8
Reviewed By:	JW / RLB	Depth:	80.0 - 82.0 ft.
Review Date:	11/8/93	Sample Description:	See classification data

Area, A_c, in^2	6.46		Effective Consolidation Stress, psi	45.0
Length, H_c, in.	5.83		Cyclic Load, P_c, lbs	121.79
			Cyclic Deviator Stress, psi	18.8

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
243.6	0.0290	7588	0.248

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
3.056	0.882	27.6



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

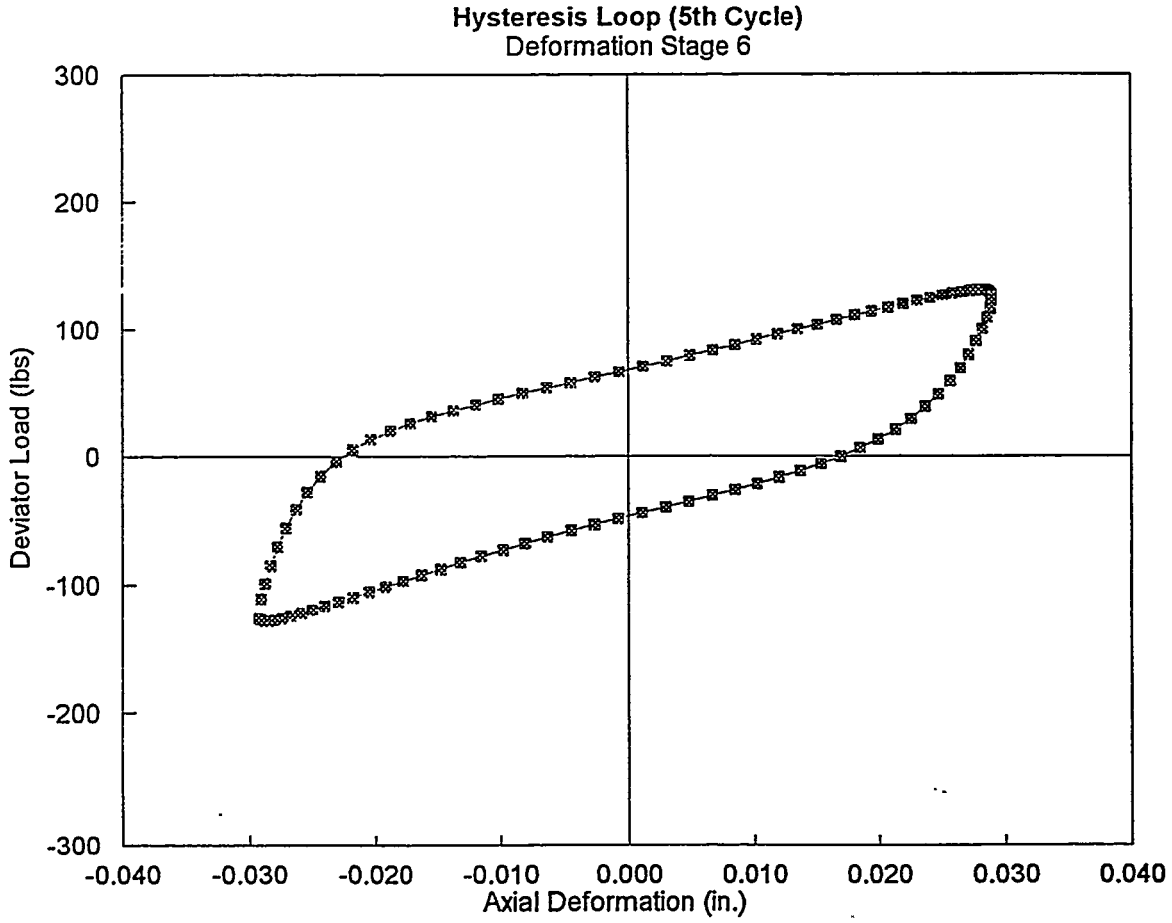
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP.
Tested By:	HEJ/JW	Boring No.:	H-Bor-12
Test Date:	11/4/93-11/5/93	Sample No.:	ST-8
Reviewed By:	JW / RLB	Depth:	80.0 - 82.0 ft.
Review Date:	11/8/93	Sample Description:	See classification data

Area, A_c, in ^{2}	6.46		Effective Consolidation Stress, psi	45.0
Length, H_c, in.	5.83		Cyclic Load, P_c, lbs	131.35
			Cyclic Deviator Stress, psi	20.3

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
262.7	0.0583	4070	0.499

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
6.279	1.913	26.1



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

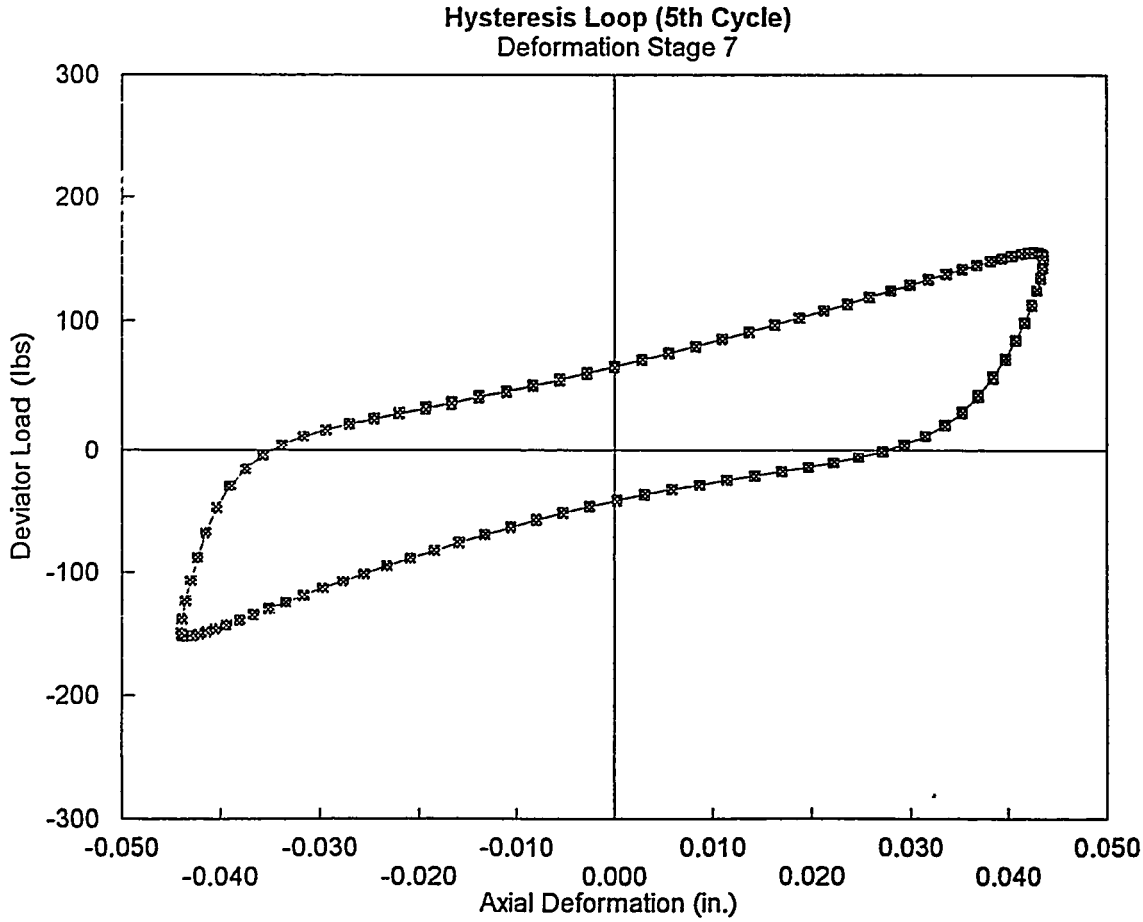
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-12
Test Date:	11/4/93-11/5/93	Sample No.:	ST-8
Reviewed By:	JW / RLB	Depth:	80.0 - 82.0 ft.
Review Date:	11/8/93	Sample Description:	See classification data

Area, A_c, in ^{2}	6.46		Effective Consolidation Stress, psi	45.0
Length, H_c, in.	5.83		Cyclic Load, P_c, lbs	156.26
			Cyclic Deviator Stress, psi	24.2

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
312.5	0.0876	3221	0.751

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
10.002	3.422	23.3



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

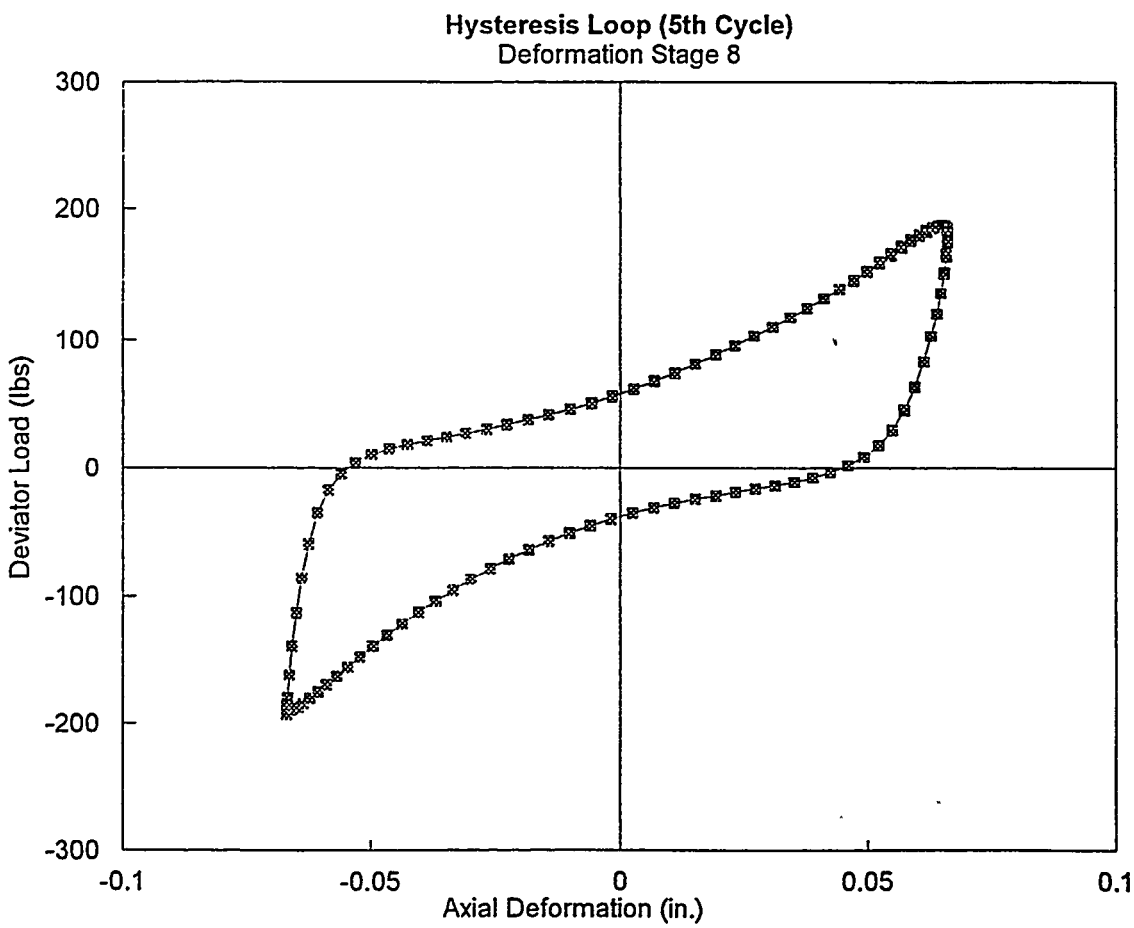
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-12
Test Date:	11/4/93-11/5/93	Sample No.:	ST-8
Reviewed By:	JW /RLB	Depth:	80.0 - 82.0 ft.
Review Date:	11/8/93	Sample Description:	See classification data

Area, A_c, in ^{2}	6.46		Effective Consolidation Stress, psi	45.0
Length, H_c, in.	5.83		Cyclic Load, P_c, lbs	190.15
			Cyclic Deviator Stress, psi	29.4

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
380.3	0.1328	2586	1.138

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
16.164	6.312	20.4



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

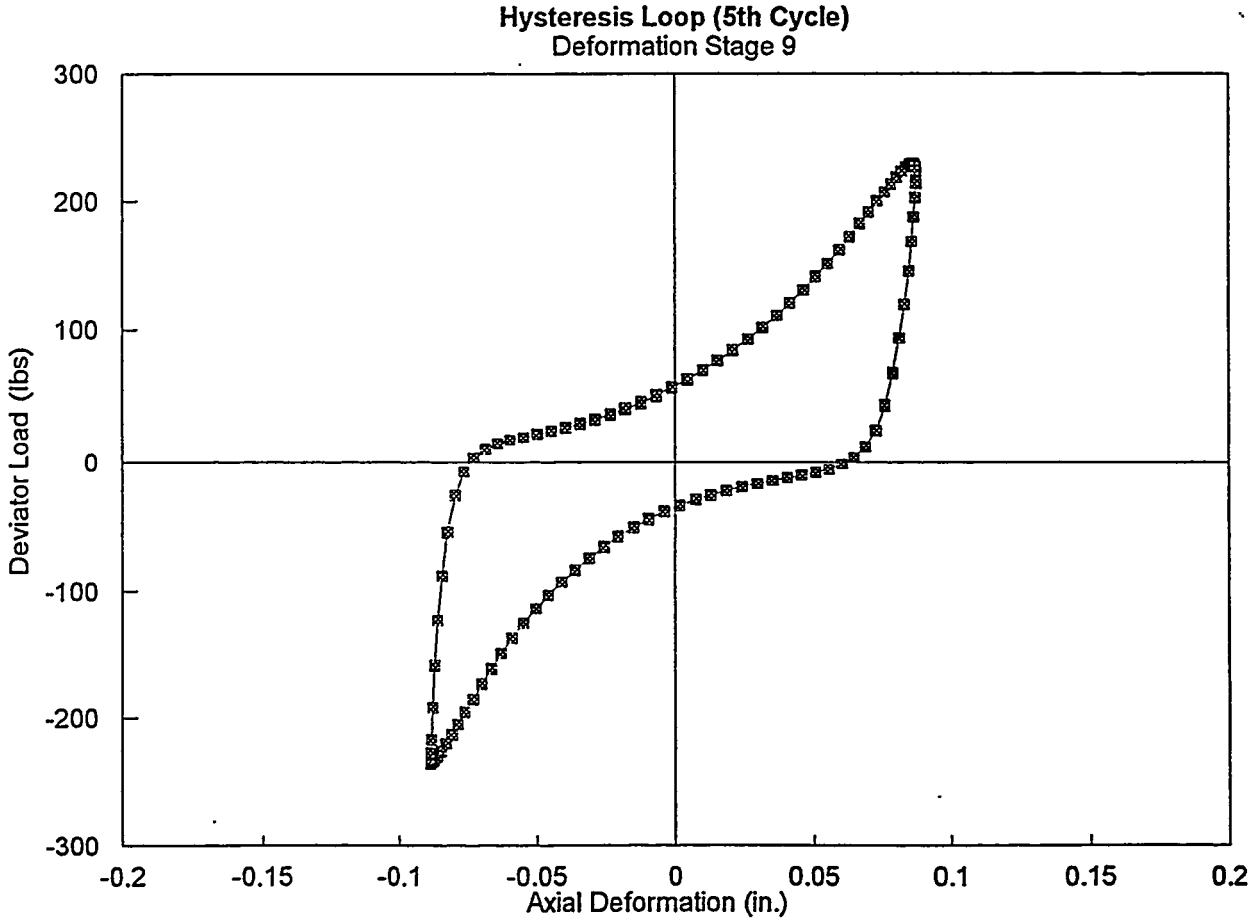
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-12
Test Date:	11/4/93-11/5/93	Sample No.:	ST-8
Reviewed By:	JW / RLB	Depth:	80.0 - 82.0 ft.
Review Date:	11/8/93	Sample Description:	See classification data

Area, A_c, in^2	6.46		Effective Consolidation Stress, psi	45.0
Length, H_c, in.	5.83		Cyclic Load, P_c, lbs	232.34
			Cyclic Deviator Stress, psi	36.0

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
464.7	0.1759	2385	1.508

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
23.435	10.218	18.3



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

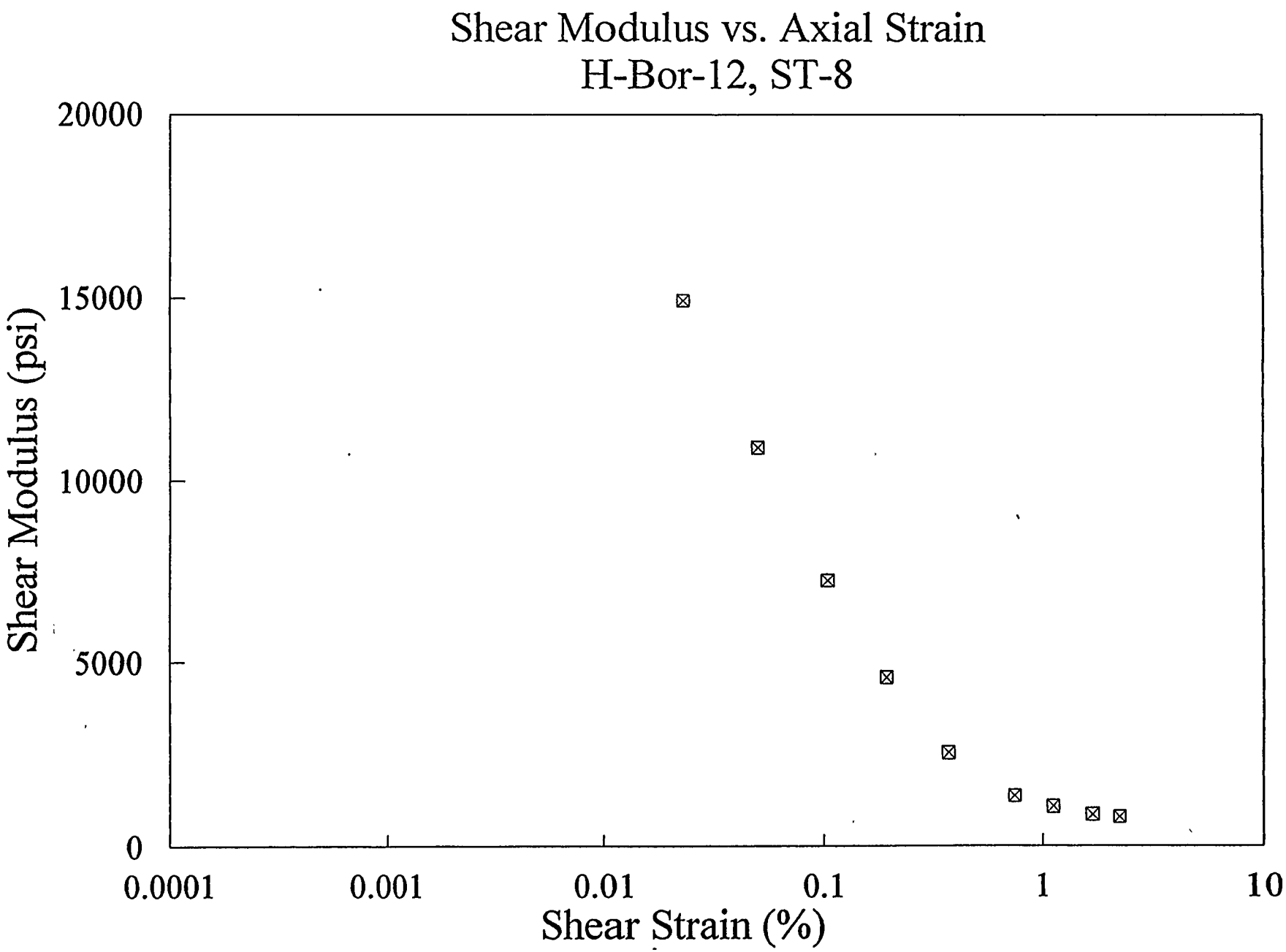
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-12
Test Date:	11/4/93-11/5/93	Sample No.:	ST-8
Reviewed By:	JW/RLB	Depth:	80.0 - 82.0 ft.
Review Date:	11/8/93	Sample Description:	See classification data

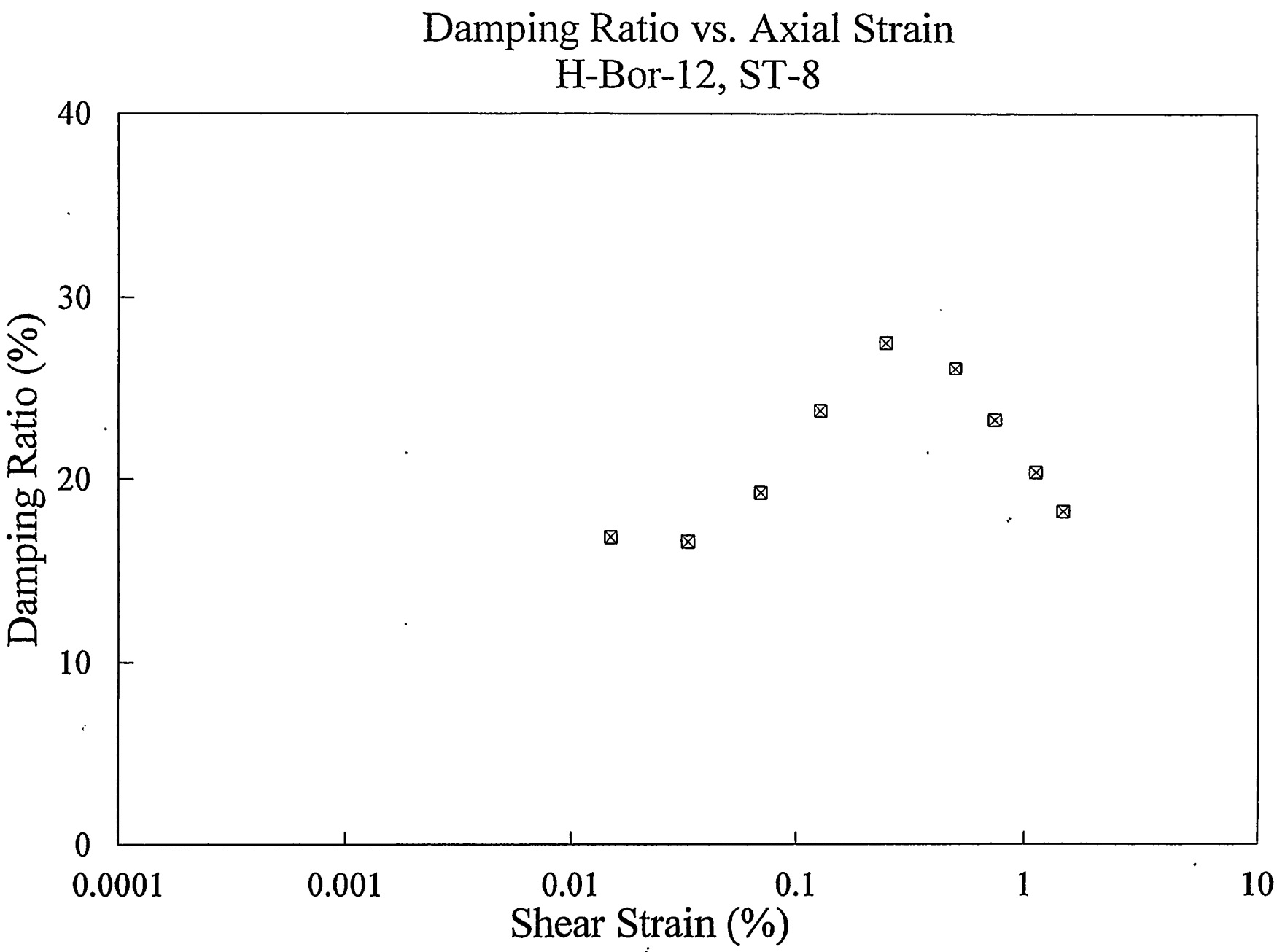
Effective Consolidation Stress 45 psi

Deformation Stage No.	Cyclic Stress (psi)	Axial Strain ε (%)	Young's Modulus E, (psi)	Damping Ratio D, (%)	Shear* Modulus G, (psi)	Shear* Strain γ (%)
1	6.8	0.015	44771	16.85	14924	0.023
2	10.9	0.033	32702	16.62	10901	0.050
3	15.1	0.070	21680	19.27	7227	0.105
4	17.7	0.129	13712	23.76	4571	0.194
5	18.8	0.248	7588	27.56	2529	0.373
6	20.3	0.499	4070	26.12	1357	0.749
7	24.2	0.751	3221	23.26	1074	1.126
8	29.4	1.138	2586	20.38	862	1.707
9	36.0	1.508	2385	18.25	795	2.262

* Calculated based on assumed Poisson's Ratio value, 0.5.
All calculations are based on 5th cycle.



Law Engineering Project No.: 5810535301
SRS-ITP: Strain Controlled Cyclic Triaxial



Law Engineering Project No: 5810535301
SRS-ITP: Strain Controlled Cyclic Triaxial

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

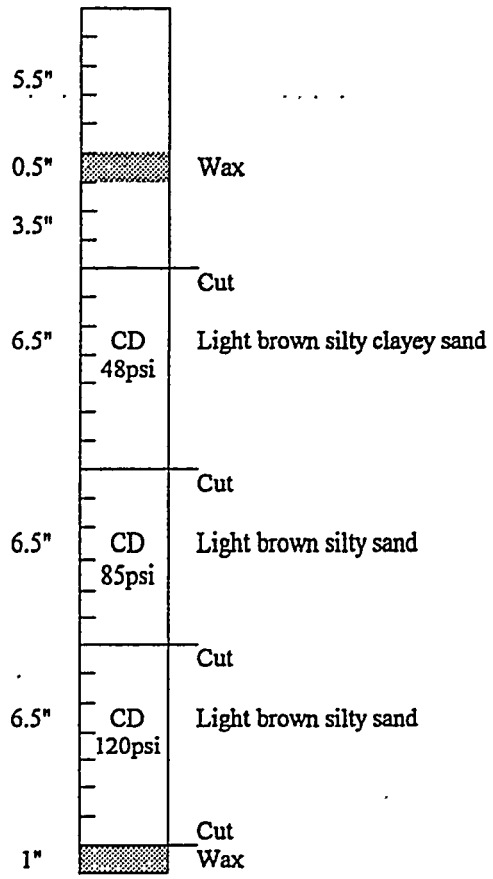
Project: SRS-ITP GEOTECHNICAL TESTING Date: 11-01-93

Boring No: H-Bor-12 Sample No: ST-9 Depth: 85' - 87'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION

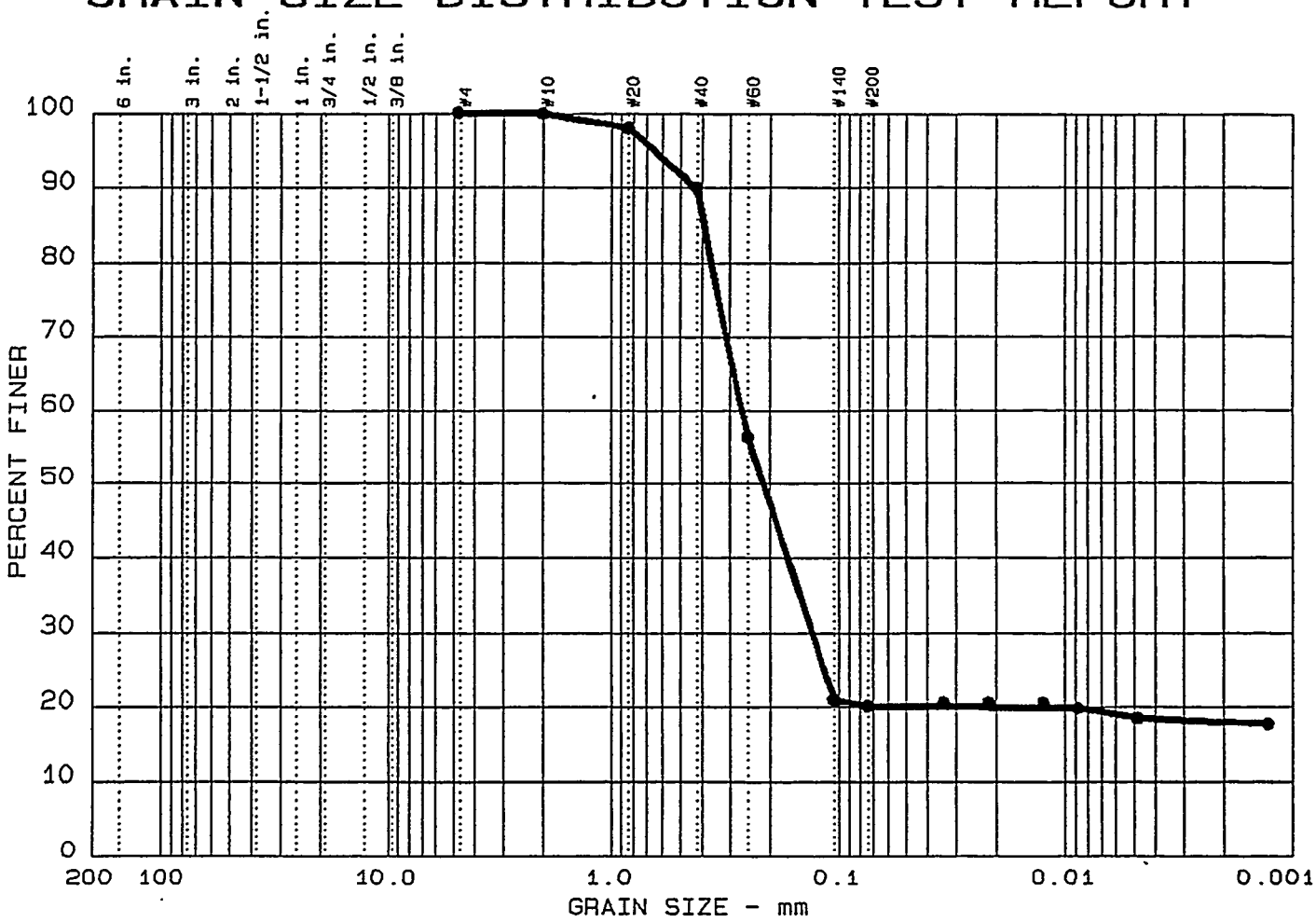


Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b12-st9.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	6	0.0	0.0	79.8	1.6	18.6

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	42	20	0.39	0.27	0.21	0.131				

MATERIAL DESCRIPTION	USCS	AASHTO
● Light Brown Clayey Medium to Fine Sand	SC	A-2-7 (0.5)

Project No.: 581535301
Project: SRS ITP
● Location: H-Bor-12 ST-9 @ 85-87 FT.

Date: November 19, 1993

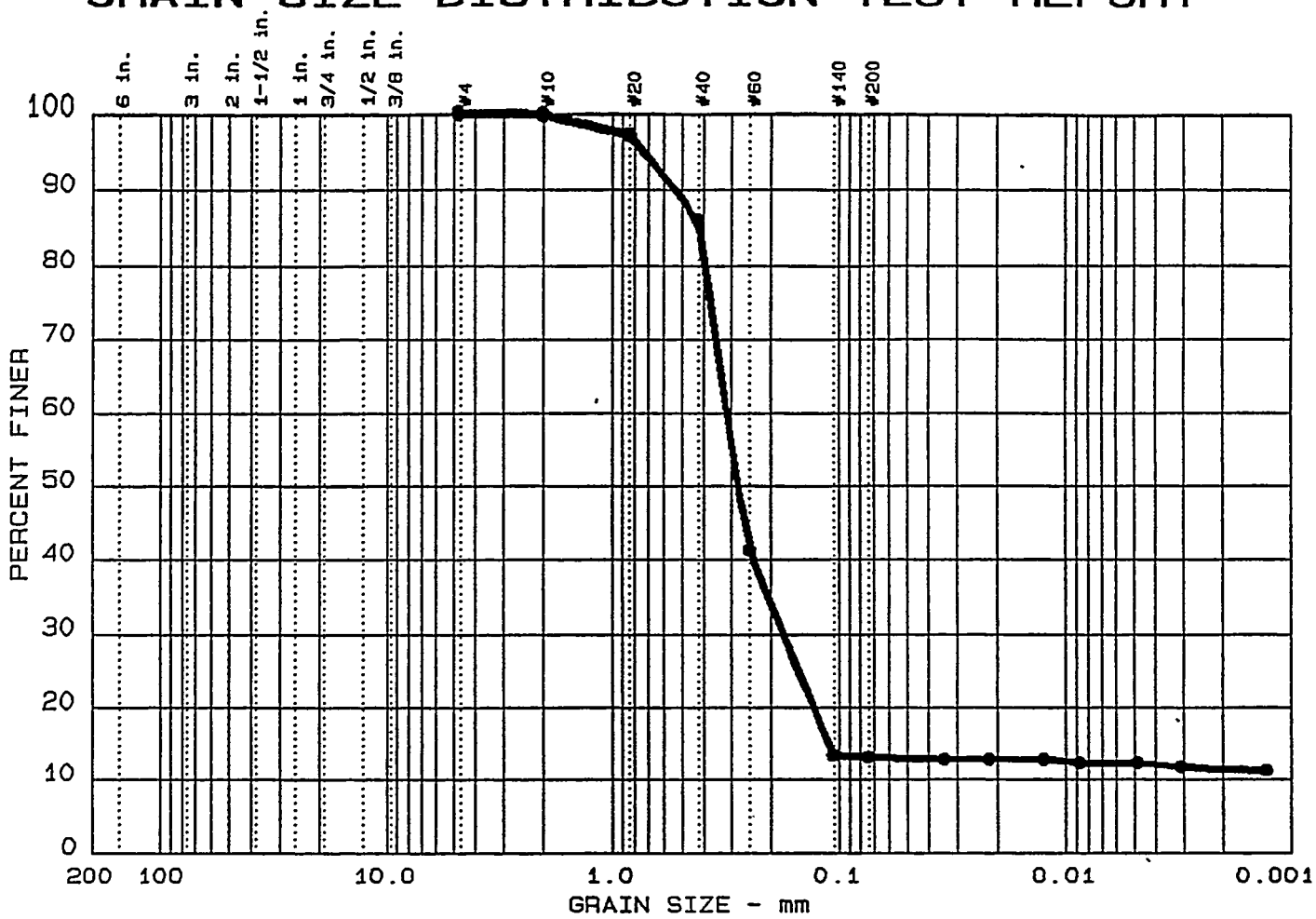
Remarks:
Tested by: BNS
Reviewed by: RLB
CO 48psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	5	0.0	0.0	87.0	0.8	12.2

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.41	0.31	0.28	0.176	0.1099			

MATERIAL DESCRIPTION	USCS	AASHTO
● Light Brown Clayey Medium to Fine Sand		

Project No.: 581535301
Project: SRS ITP
● Location: H-Bor-12 ST-9 @ 85-87 Ft.

Date: November 19, 1993

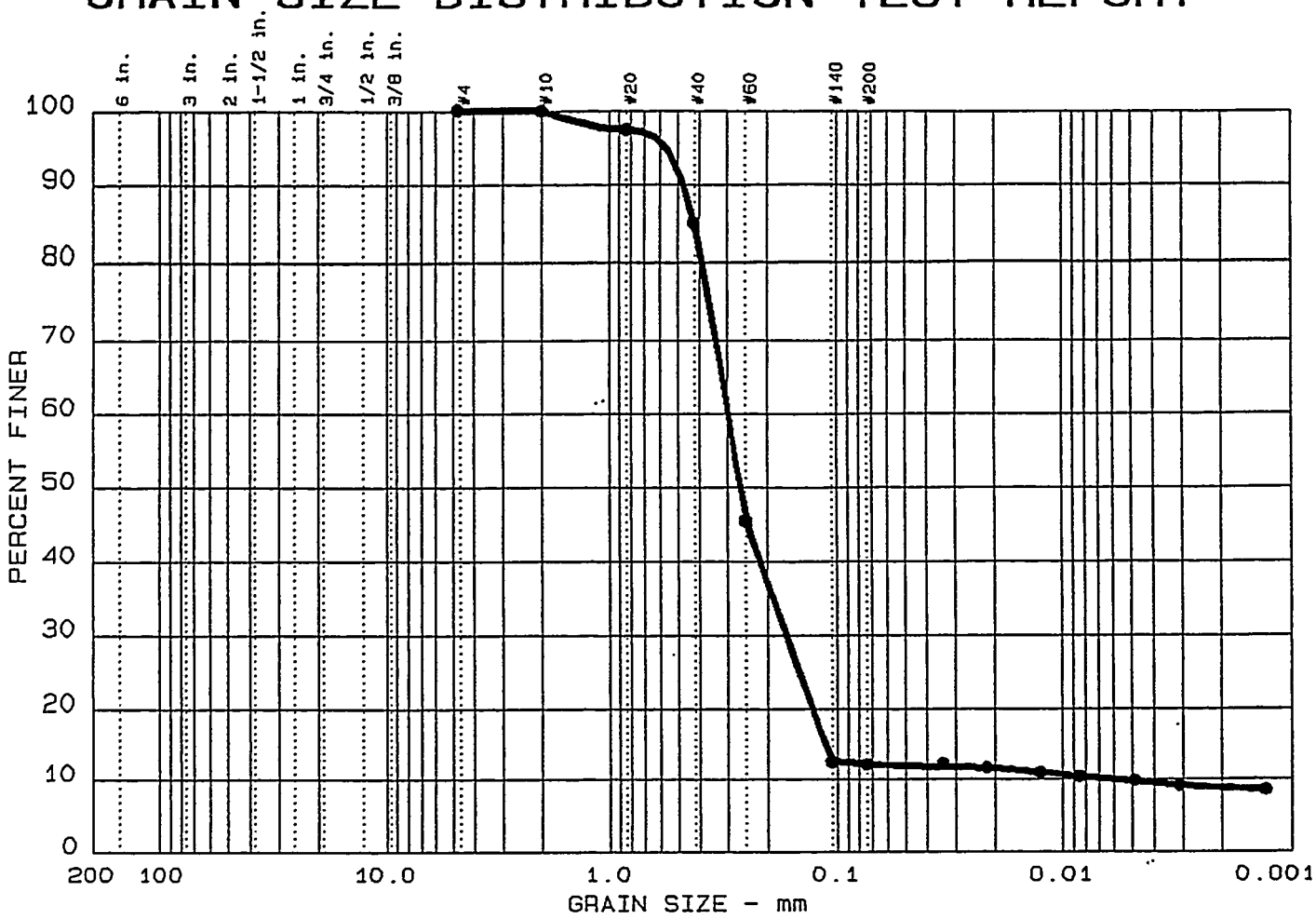
Remarks:
Tested by: BNS Ckd by: RLB
CD 85 psi
Atterberg Limits -200
LL=173 PL=53 PI=120

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	4	0.0	0.0	87.9	2.3	9.8

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	NL	NP	0.42	0.30	0.26	0.167	0.1122	0.0060	15.70	49.8

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Clayey Medium to Fine Sand	SM	A-2-4 (0.3)

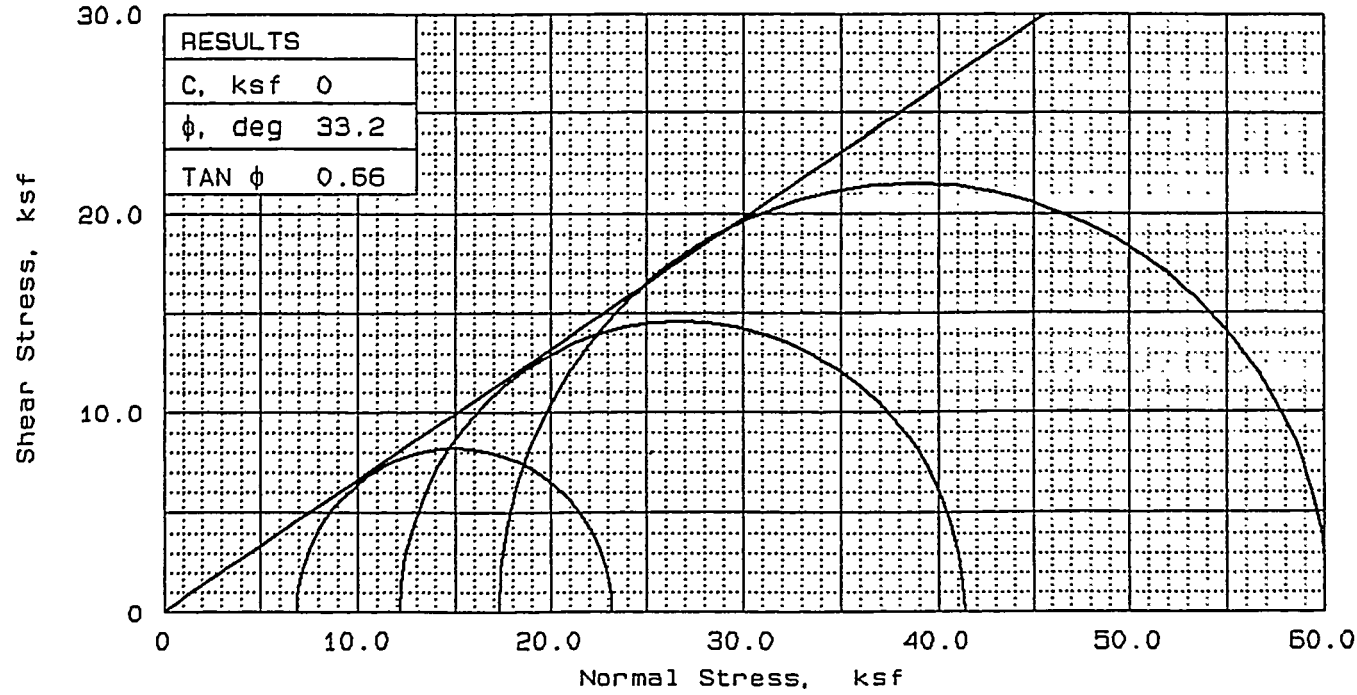
Project No.: 581535301
Project: SRS ITP
● Location: H-Bor-12 ST-9 @ 85-87 FT.

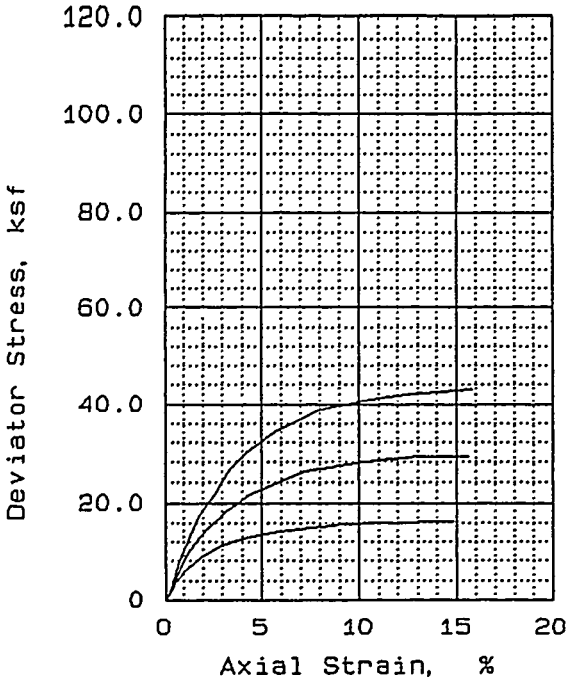
Date: November 19, 1993

Remarks:
Tested by: BNS
Reviewed by: RLB
CD 120 psi

GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Figure No.





SAMPLE NO.		1	2	3
INITIAL	WATER CONTENT, %	26.3	25.1	26.0
	DRY DENSITY, pcf	91.9	97.2	97.5
	SATURATION, %	85.7	92.6	94.5
	VOID RATIO	0.827	0.733	0.755
	DIAMETER, in	2.87	2.88	2.88
	HEIGHT, in	6.00	6.00	6.00
AT TEST	WATER CONTENT, %	29.0	26.3	26.4
	DRY DENSITY, pcf	94.3	98.6	99.2
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.781	0.710	0.724
	DIAMETER, in	2.84	2.86	2.86
	HEIGHT, in	5.98	5.97	5.95
BACK PRESSURE, ksf		7.2	7.2	5.0
CELL PRESSURE, ksf		14.1	19.4	22.3
FAILURE STRESS, ksf		16.3	29.2	43.0
PORE PRESSURE, ksf				
STRAIN RATE, %/min.		0.100	0.100	0.100
ULTIMATE STRESS, ksf				
PORE PRESSURE, ksf				
σ_1 FAILURE, ksf		23.2	41.4	60.2
σ_3 FAILURE, ksf		6.9	12.2	17.3

TYPE OF TEST:
Consolidated drained
SAMPLE TYPE: Undisturbed
DESCRIPTION:

~~LL= PL= PI=~~
~~SPECIFIC GRAVITY= 2.74~~
REMARKS: Tested by: HEJ

Reviewed by: RLB

FIG. NO.

CLIENT: SRS

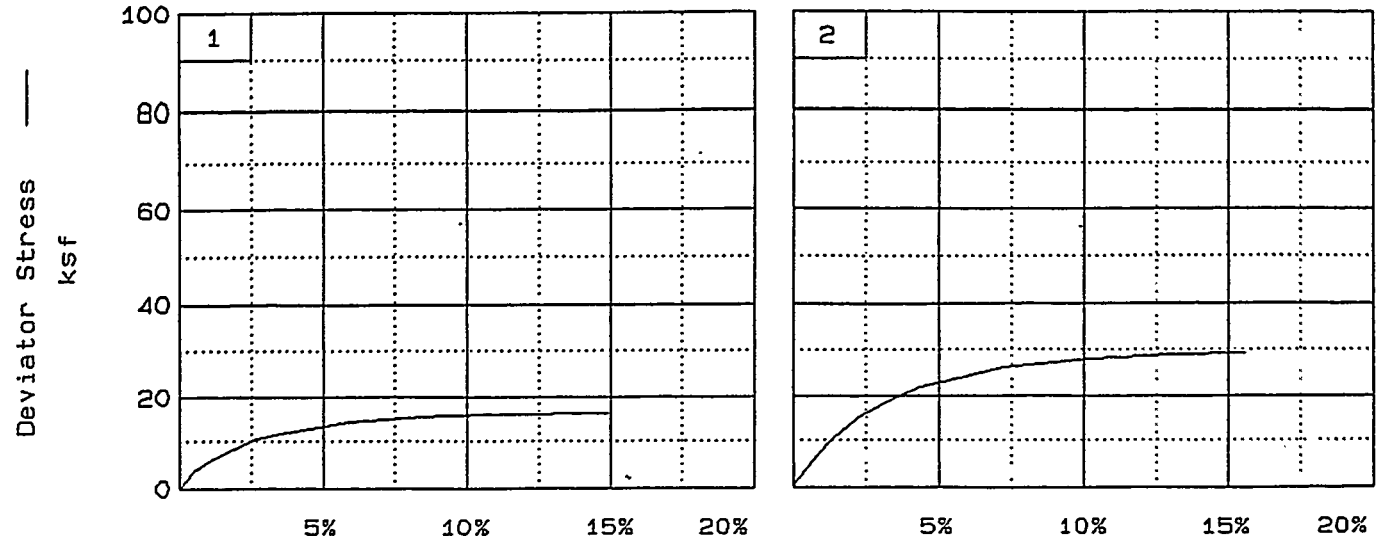
PROJECT: SRS-ITP

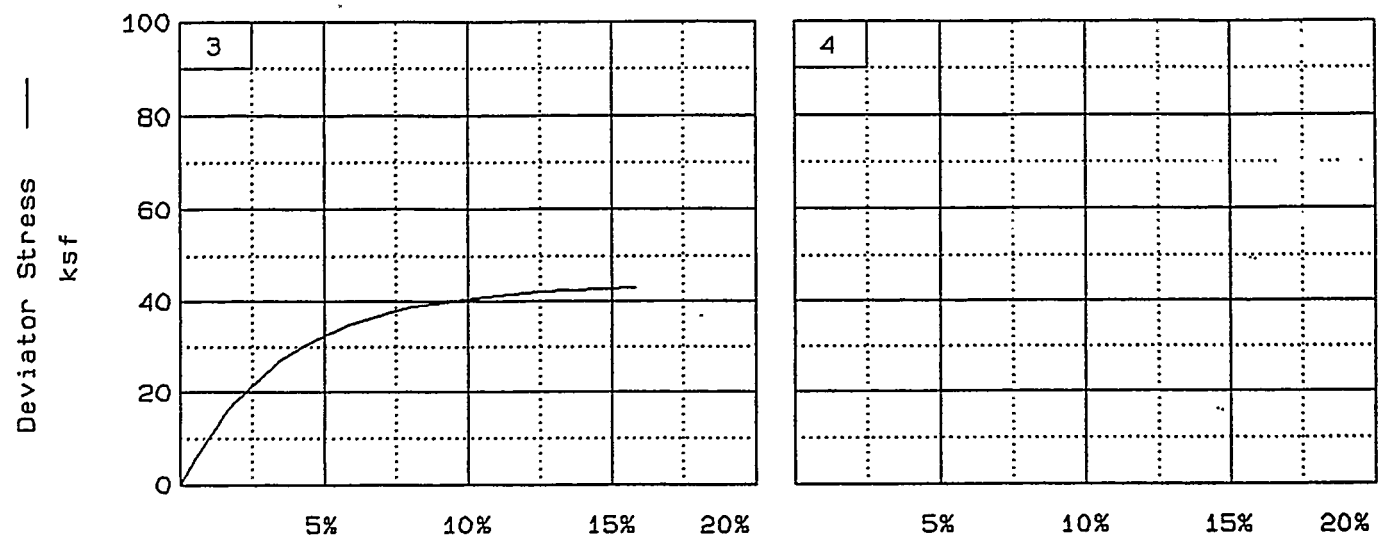
SAMPLE LOCATION: H Bor 12 ST-9 @ 85-87 Ft.

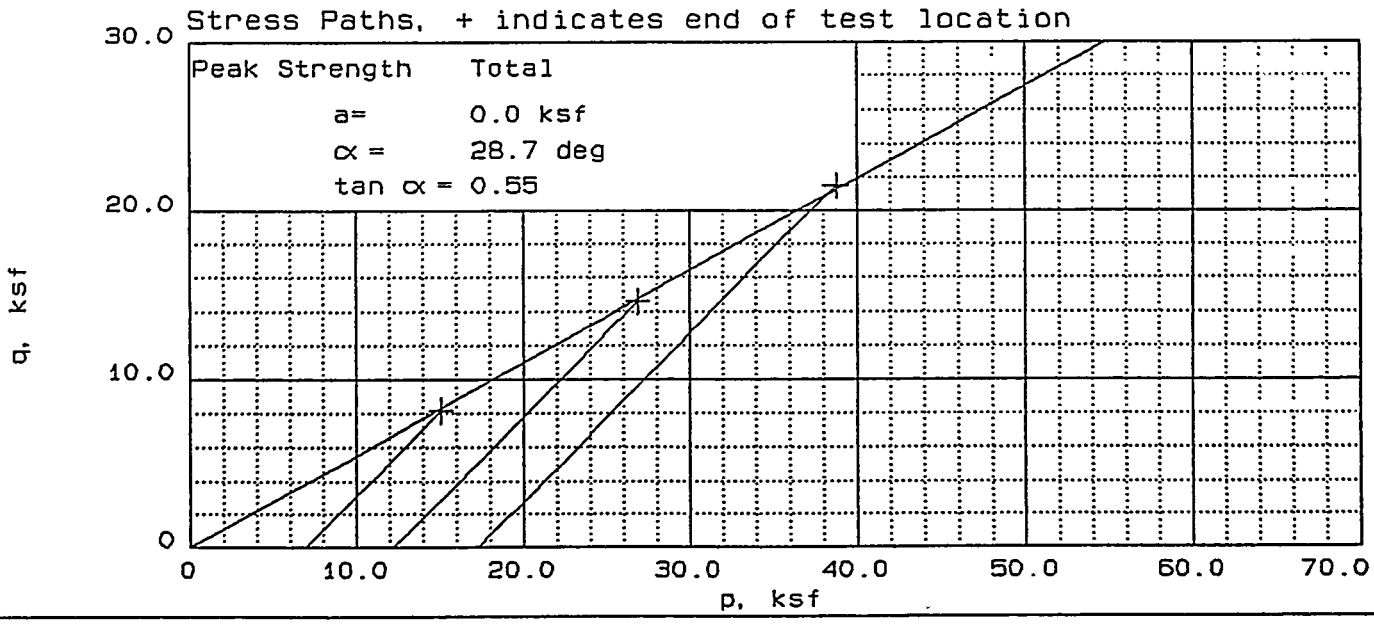
PROJ. NO.: 5810535301 DATE: Dec. 8, 1993

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.





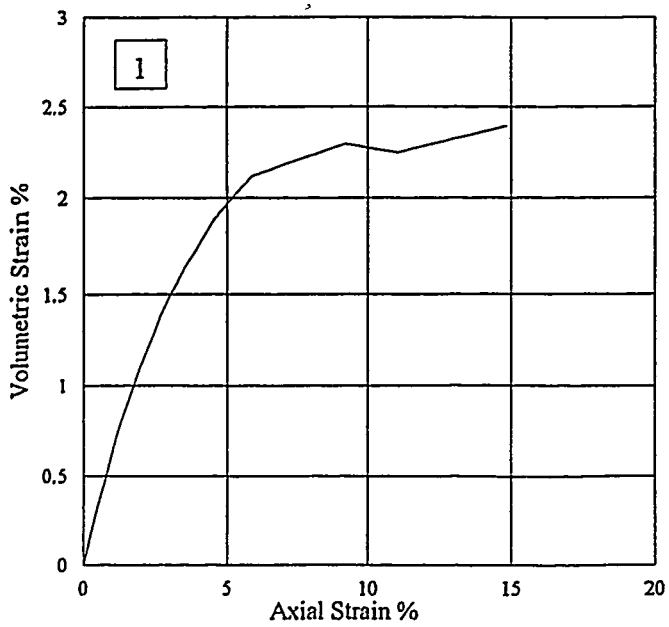


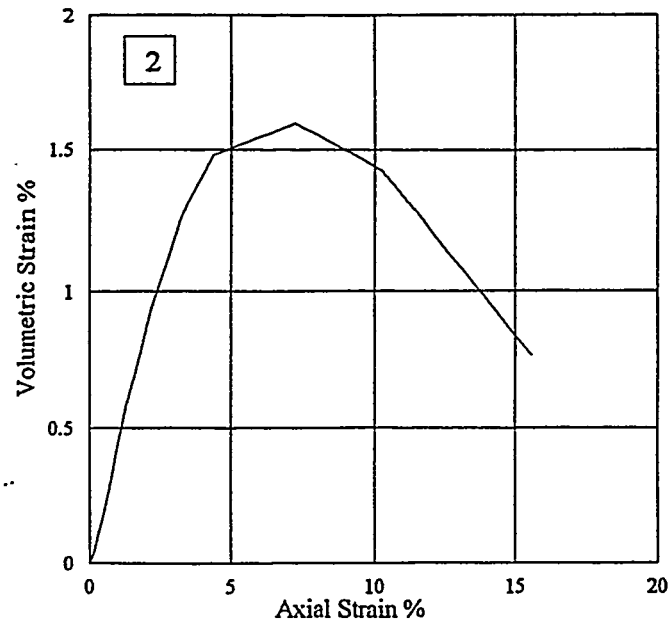
Client: SRS

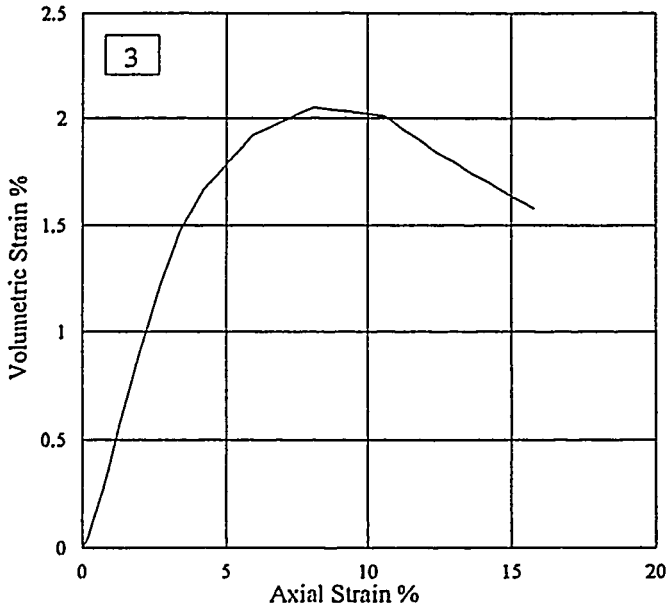
Project: SRS-ITP

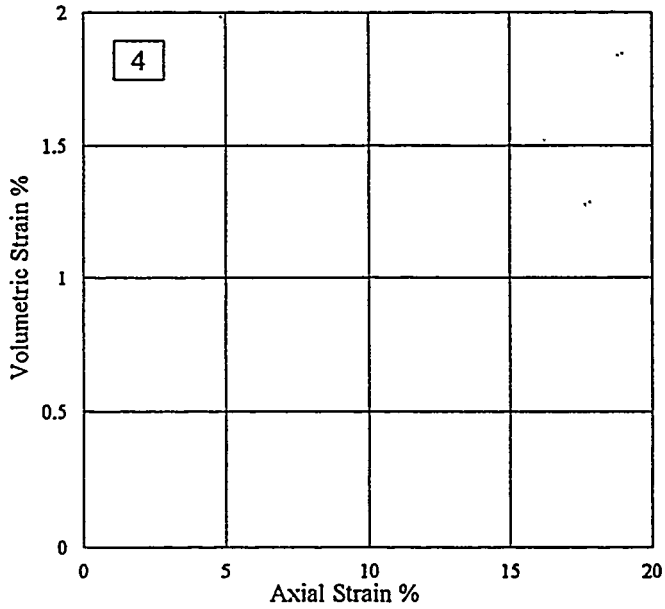
Location: H Bor 12 ST-9 @ 85-87 Ft.

File: 535301B Project No.: 5810535301 Page 2/2 Fig. No. ____









Client: SRS
Project: SRS-ITP
Location: H Bor 12 ST-9 @ 85-87 Ft.
File: Project No.: 5810535301 Page 2 / 2 Fig. No. _____

TRIAXIAL COMPRESSION TEST
Consolidated drained

12-14-1993
1:00 pm

Project Data

Project No.: 5810535301 Date: Dec. 8,1993 Data file: 535301B
Client: SRS
Project: SRS-ITP
Sample location: H Bor 12 ST-9 @ 85-87 Ft.
Sample description:
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.69 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.87	2.84	
Height change, in		0.02	
Height, in	6.00	5.98	
Weight, grams	1185.7		
Water volume change, cc		-25.41	
Moisture, %	26.3	29.0	27.2
Dry density, pcf	91.9	94.3	
Saturation, %	85.7	100.0	
Void ratio	0.827	0.781	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 98 psi
Consolidation back pressure = 50 psi
Consolidation effective confining stress = 6.912 ksf
Peak deviator stress = 16.33 ksf at reading no. 10
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	6.91	6.91	1.00	6.91	0.00
1	0.0300	0.030	164.00	164.0	0.5	3.71	6.91	10.62	1.54	8.76	1.85
2	0.0700	0.070	288.00	288.0	1.2	6.46	6.91	13.38	1.94	10.14	3.23
3	0.1100	0.110	384.00	384.0	1.8	8.56	6.91	15.47	2.24	11.19	4.28
	0.1600	0.160	481.00	481.0	2.7	10.63	6.91	17.54	2.54	12.23	5.32
	.2100	0.210	544.00	544.0	3.5	11.92	6.91	18.83	2.72	12.87	5.96

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	.2700	0.270	600.00	600.0	4.5	13.01	6.91	19.92	2.88	13.42	6.50
	0.3500	0.350	665.00	665.0	5.9	14.22	6.91	21.13	3.06	14.02	7.11
8	0.5500	0.550	760.00	760.0	9.2	15.67	6.91	22.58	3.27	14.75	7.84
9	0.6600	0.660	795.00	795.0	11.0	16.06	6.91	22.97	3.32	14.94	8.03
10	0.8900	0.890	845.00	845.0	14.9	16.33	6.91	23.24	3.36	15.08	8.17

TRIAXIAL COMPRESSION TEST
Consolidated drained

12-14-1993
1:01 pm

Project Data

Project No.: 5810535301 Date: Dec. 8,1993 Data file: 535301B
Client: SRS
Project: SRS-ITP
Sample location: H Bor 12 ST-9 @ 85-87 Ft.
Sample description:
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 2 Data

Type of sample: Undisturbed
Specific Gravity= 2.70 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.86	
Height change, in		0.03	
Height, in	6.00	5.97	
Weight, grams	1246.0		
Water volume change, cc		-11.51	
Moisture, %	25.1	26.3	24.3
Dry density, pcf	97.2	98.6	
Saturation, %	92.6	100.0	
Void ratio	0.733	0.710	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 135 psi
Consolidation back pressure = 50 psi
Consolidation effective confining stress = 12.24 ksf
Peak deviator stress = 29.19 ksf at reading no. 11
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	12.24	12.24	1.00	12.24	0.00
1	0.0100	0.010	72.00	72.0	0.2	1.61	12.24	13.85	1.13	13.04	0.80
2	0.0300	0.030	186.00	186.0	0.5	4.13	12.24	16.37	1.34	14.31	2.07
3	0.0500	0.050	312.00	312.0	0.8	6.91	12.24	19.15	1.56	15.70	3.46
'	0.0800	0.080	468.00	468.0	1.3	10.31	12.24	22.55	1.84	17.40	5.16
	).1300	0.130	675.00	675.0	2.2	14.75	12.24	26.99	2.21	19.62	7.38

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	.1900	0.190	852.00	852.0	3.2	18.43	12.24	30.67	2.51	21.45	9.21
	0.2600	0.260	1020.00	1020.0	4.4	21.79	12.24	34.03	2.78	23.14	10.90
8	0.4300	0.430	1266.00	1266.0	7.2	26.24	12.24	38.48	3.14	25.36	13.12
9	0.6100	0.610	1395.00	1395.0	10.2	27.98	12.24	40.22	3.29	26.23	13.99
10	0.7800	0.780	1494.00	1494.0	13.1	29.01	12.24	41.25	3.37	26.75	14.51
11	0.9300	0.930	1548.00	1548.0	15.6	29.19	12.24	41.43	3.39	26.84	14.60

TRIAXIAL COMPRESSION TEST
Consolidated drained

12-14-1993
1:02 pm

Project Data

Project No.: 5810535301 Date: Dec. 8,1993 Data file: 535301B
Client: SRS
Project: SRS-ITP
Sample location: H Bor 12 ST-9 @ 85-87 Ft.
Sample description:
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 3 Data

Type of sample: Undisturbed
Specific Gravity= 2.74 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.86	
Height change, in		0.05	
Height, in	6.00	5.95	
Weight, grams	1257.0		
Water volume change, cc		-3.77	
Moisture, %	26.0	26.4	23.6
Dry density, pcf	97.5	99.2	
Saturation, %	94.5	100.0	
Void ratio	0.755	0.724	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 155 psi
Consolidation back pressure = 35 psi
Consolidation effective confining stress = 17.28 ksf
Peak deviator stress = 42.96 ksf at reading no. 14
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	17.28	17.28	1.00	17.28	0.00
1	0.0100	0.010	81.00	81.0	0.2	1.81	17.28	19.09	1.10	18.18	0.90
2	0.0300	0.030	258.00	258.0	0.5	5.74	17.28	23.02	1.33	20.15	2.87
3	0.0500	0.050	405.00	405.0	0.8	8.99	17.28	26.27	1.52	21.77	4.49
4	0.0700	0.070	546.00	546.0	1.2	12.07	17.28	29.35	1.70	23.32	6.04
	.0900	0.090	684.00	684.0	1.5	15.07	17.28	32.35	1.87	24.82	7.54

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	.1100	0.110	810.00	810.0	1.8	17.79	17.28	35.07	2.03	26.17	8.89
	0.1600	0.160	1040.00	1040.0	2.7	22.65	17.28	39.93	2.31	28.60	11.32
8	0.2000	0.200	1236.00	1236.0	3.4	26.73	17.28	44.01	2.55	30.64	13.36
9	0.2500	0.250	1396.00	1396.0	4.2	29.93	17.28	47.21	2.73	32.24	14.96
10	0.3500	0.350	1650.00	1650.0	5.9	34.75	17.28	52.03	3.01	34.65	17.37
11	0.4800	0.480	1890.00	1890.0	8.1	38.88	17.28	56.16	3.25	36.72	19.44
12	0.6300	0.630	2050.00	2050.0	10.6	41.02	17.28	58.30	3.37	37.79	20.51
13	0.7400	0.740	2150.00	2150.0	12.4	42.13	17.28	59.41	3.44	38.34	21.06
14	0.9400	0.940	2280.00	2280.0	15.8	42.96	17.28	60.24	3.49	38.76	21.48

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

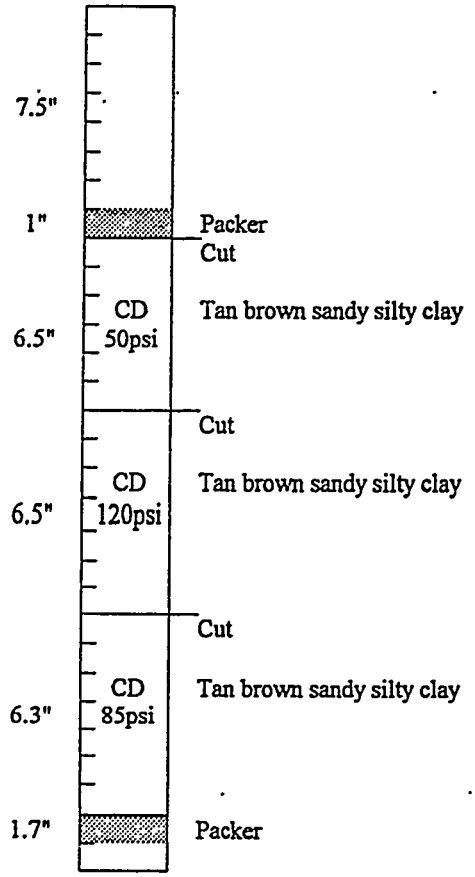
Project: SRS-ITP GEOTECHNICAL TESTING Date: 11-16-93

Boring No: H-Bor-12 Sample No: PS-9 Depth: 119' - 121'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION



Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b12-ps9.wk3

ATTACHMENT 2

Tested by:	CLG	Reviewed by:	RLB	Law Job No.:	5810535301
Date:	09/21/93	Date:	09/21/93	Job Name:	SRS - ITP

TP-4A: UNIT WEIGHT OF THIN WALL TUBE SAMPLES

"TYPICAL"

Sample: Boring No.: H-Bor-12
Depth: 119' 8"
Sample ID: PS-9

MEASUREMENTS (Entire Tube):

	FROM TOP OF TUBE PACKER (inches)	FROM TOP OF TUBE SOIL (inches)	FROM BOTTOM OF TUBE PACKER (inches)	FROM BOTTOM OF TUBE SOIL (inches)	TOTAL TUBE LENGTH (inches)	INSIDE DIAMETER OF TUBE (inches)
1.	7.05	7.36	1.08	1.72		
2.	7.08	7.38	0.99	1.58		
3.	7.05	7.35	1.06	1.58		
Avg.:	7.06 L_1 =	7.36	1.04 L_2 =	1.63	L_3 = 29.844 *	D_i = 2.901 *

TOTAL WEIGHT OF TUBE + PACKERS + SOIL	M_1 =	6,307.0	gm
WEIGHT OF PACKERS	M_2 =	152.9 *	gm
TOTAL WEIGHT OF TUBE	M_3 =	1,976.8 *	gm
WET WEIGHT OF SOIL COLUMN, [M_1 - M_2 - M_3]	M_4 =	4,177.3	gm

* *Denotes information supplied by WSRC/TO*

MOISTURE CONTENTS (From assigned tests of same tube):

MOISTURE CONTENT		
Specimen 1:	32.9	% moisture
Specimen 2:	39.9	% moisture
Specimen 3:	37.8	% moisture
Average, (w):	36.9	% moisture

Notations:

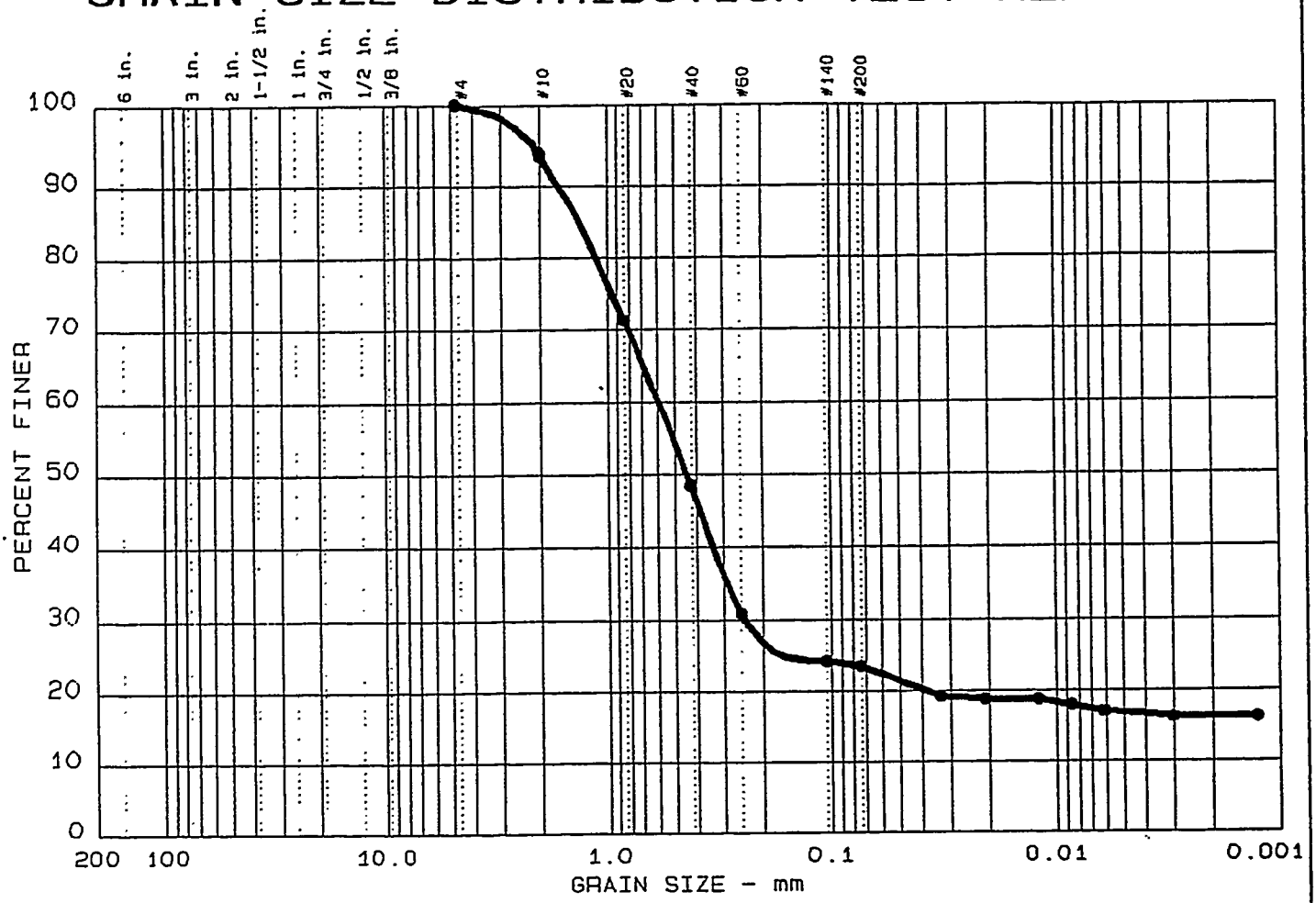
Specimen 1 moisture content obtained from CD - 50psi test
Specimen 2 moisture content obtained from CD - 85psi test
Specimen 3 moisture content obtained from CD - 120psi test

CALCULATIONS:

CROSS-SECTIONAL AREA OF TUBE, [pi*(D_i^2)/4]	A_0 =	6.61	in.^{2}
LENGTH OF SOIL COLUMN, [L_3 - L_2 - L_1]	L_s =	20.85	in.
VOLUME OF SOIL COLUMN, [L_s*A_0]	V_s =	137.84	in.^{3}
WET DENSITY, [(M_4/V_s)*3.810]	**D_w=**	**115.5**	**pcf**
DRY DENSITY, [D_w/(1+w/100)]	**D_D=**	**84.4**	**pcf**

h:\users\lab\rlb\itp\b12-ps9.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	14	0.0	0.0	76.6	6.5	16.9

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	117	99	1.33	0.59	0.44	0.241				

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Brown Clayey Sand	SC	A-2-7(7.1)

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-12 PS-9 @ 120 Ft.

Date: December 30, 1993

Remarks:

Tested by: JTK

Reviewed by: RLB

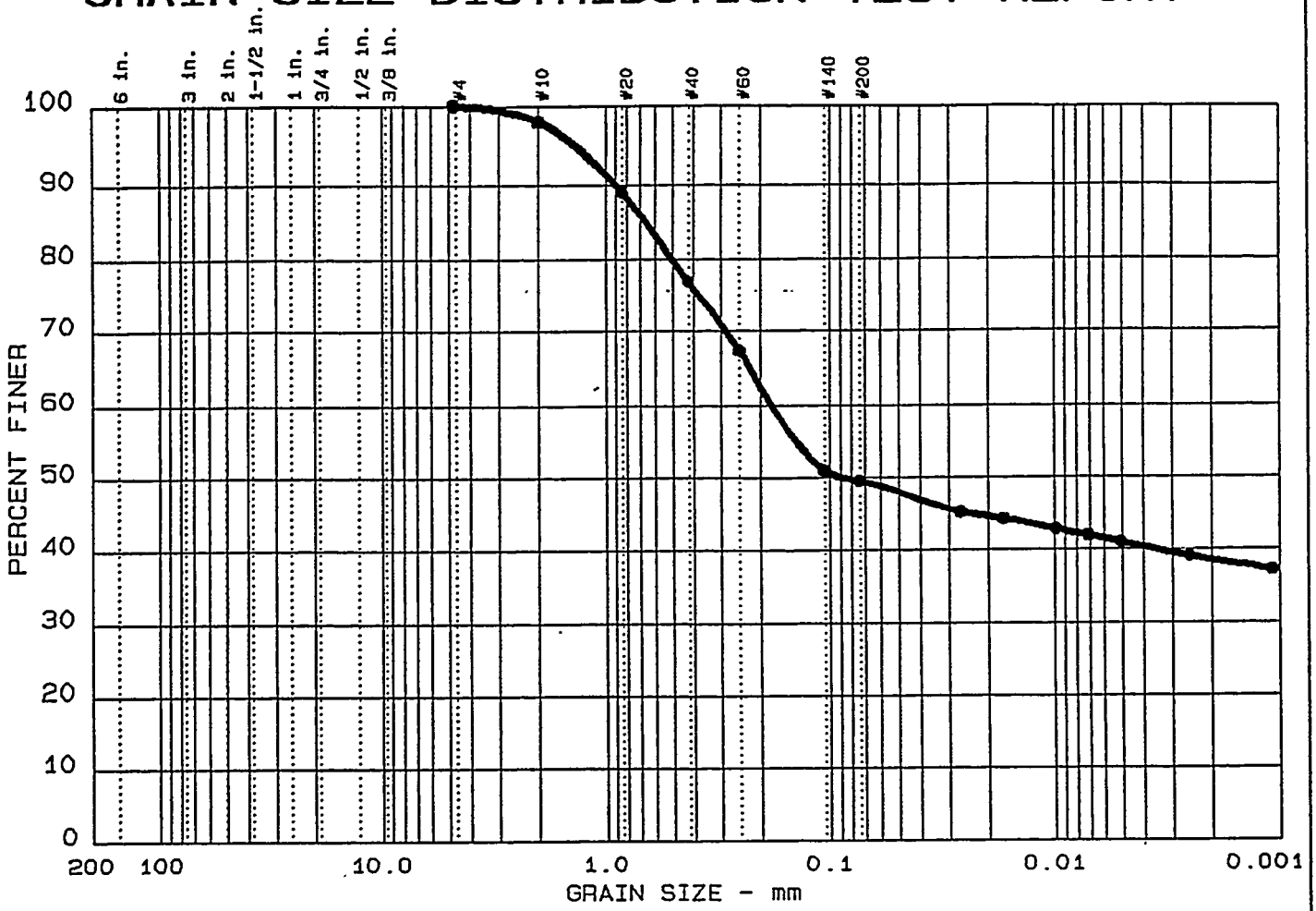
CD- 50 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	3	0.0	0.0	50.6	8.6	40.8

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.66	0.18	0.09					

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Brown Clayey Sand		

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-12 PS-9 @ 120 Ft.

Date: January 3, 1994

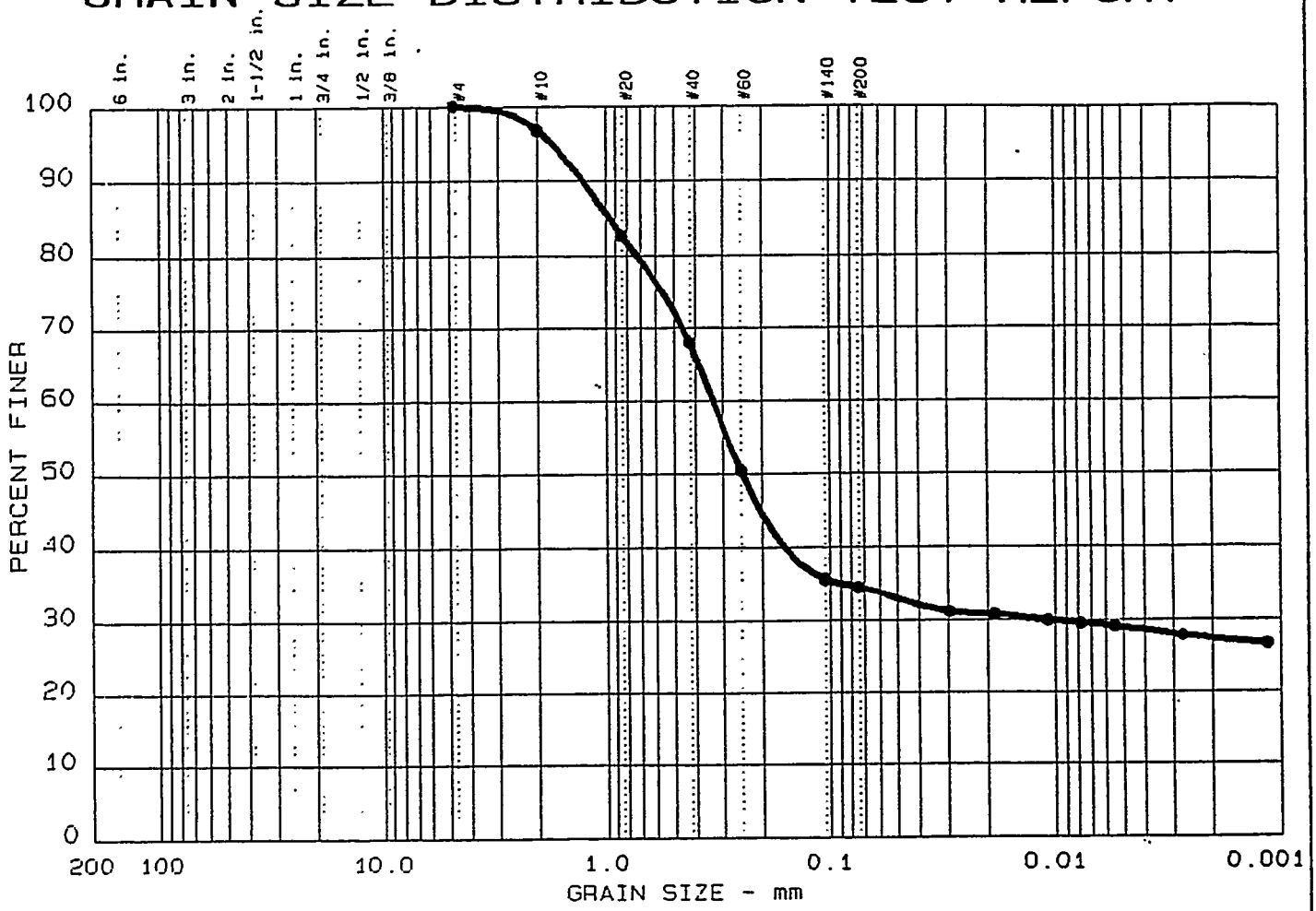
Remarks:
Tested by: JTK Reviewed by: RLB
CD-85psi
Atterberg Limits-#200
LL=154 PL=26 PI=128

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	14	0.0	0.0	65.7	5.5	28.8

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	130	108	0.94	0.33	0.25	0.012				

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Brown Clayey Sand	SC	A-2-7 (18.6)

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-12 PS-9 @ 120 Ft.

Date: December 30, 1993

Remarks:

Tested by: JTK

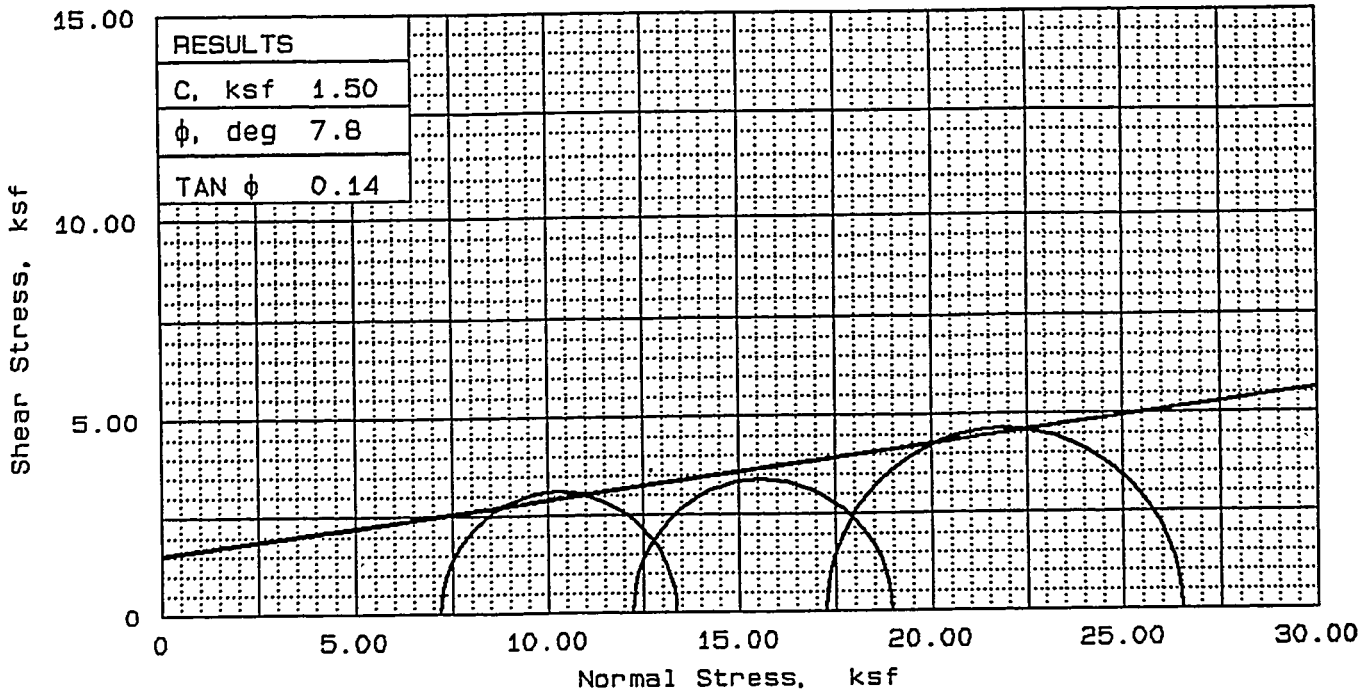
Reviewed by: RLB

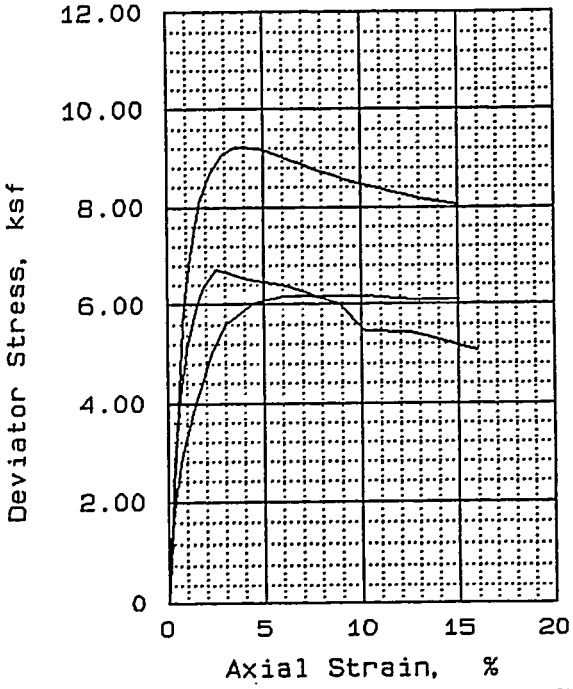
CD - 120 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.





	SAMPLE NO.	1	2	3
INITIAL	WATER CONTENT, %	32.9	39.9	37.8
	DRY DENSITY, pcf	88.7	79.7	83.3
	SATURATION, %	101.5	99.4	102.2
	VOID RATIO	0.852	1.051	0.972
	DIAMETER, in	2.89	2.88	2.89
	HEIGHT, in	6.00	6.00	6.00
AT TEST	WATER CONTENT, %	34.9	41.2	37.9
	DRY DENSITY, pcf	85.6	78.7	82.2
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.918	1.079	0.998
	DIAMETER, in	2.95	2.91	2.91
	HEIGHT, in	5.98	5.98	5.97
BACK PRESSURE, ksf		7.92	5.04	7.20
CELL PRESSURE, ksf		15.12	17.28	24.48
FAILURE STRESS, ksf		6.18	6.72	9.23
PORE PRESSURE, ksf				
STRAIN RATE, %/min.		0.027	0.027	0.027
ULTIMATE STRESS, ksf				
PORE PRESSURE, ksf				
σ_1 FAILURE, ksf		13.38	18.96	26.51
σ_3 FAILURE, ksf		7.2	12.24	17.28

TYPE OF TEST:
Consolidated drained
SAMPLE TYPE: Undisturbed
DESCRIPTION: See Grain Size

REMARKS: Tested by: HEJ

Reviewed by: RLB

FIG. NO.

CLIENT: SRS

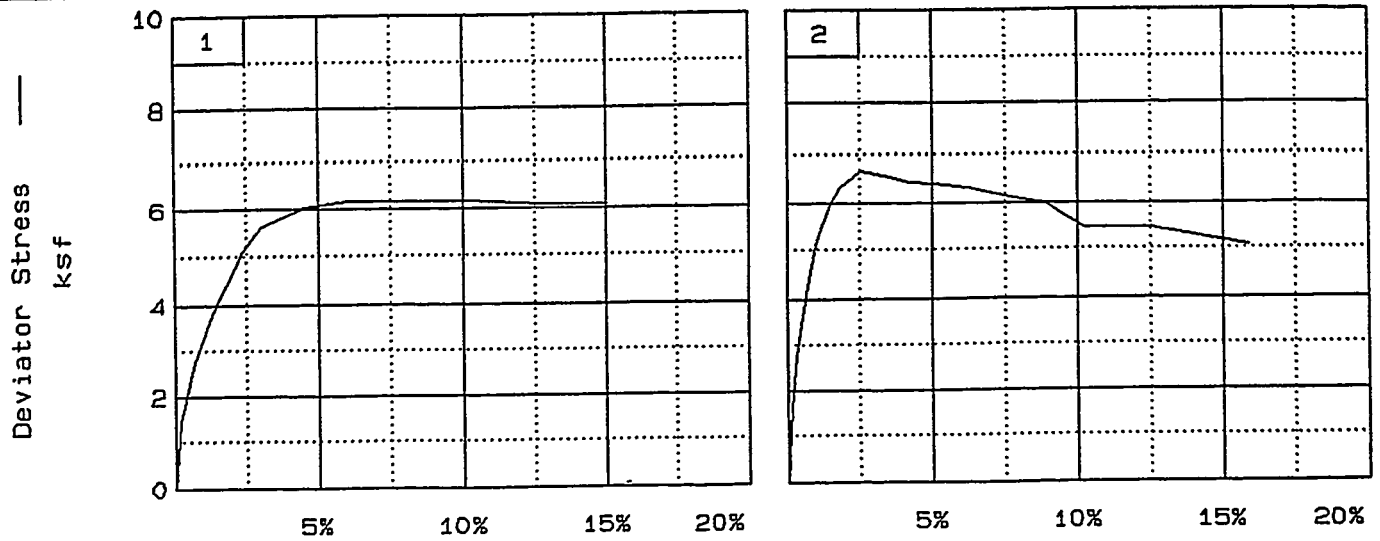
PROJECT: SRS-ITP

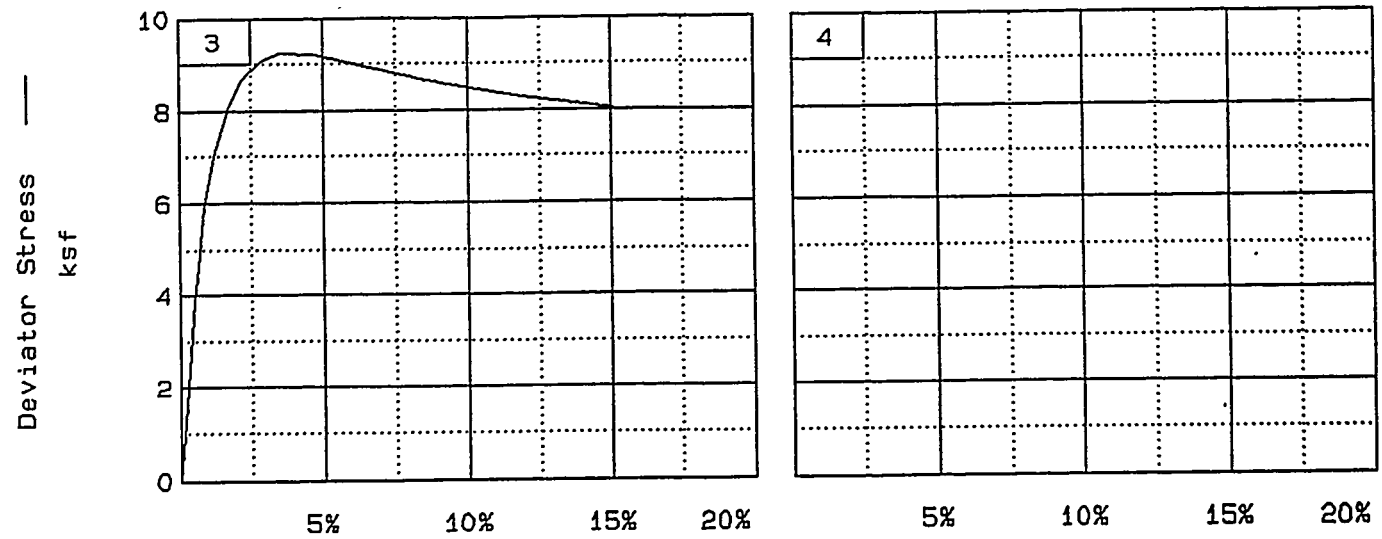
SAMPLE LOCATION: H-Bor-12 PS-9 @ 120 Ft.

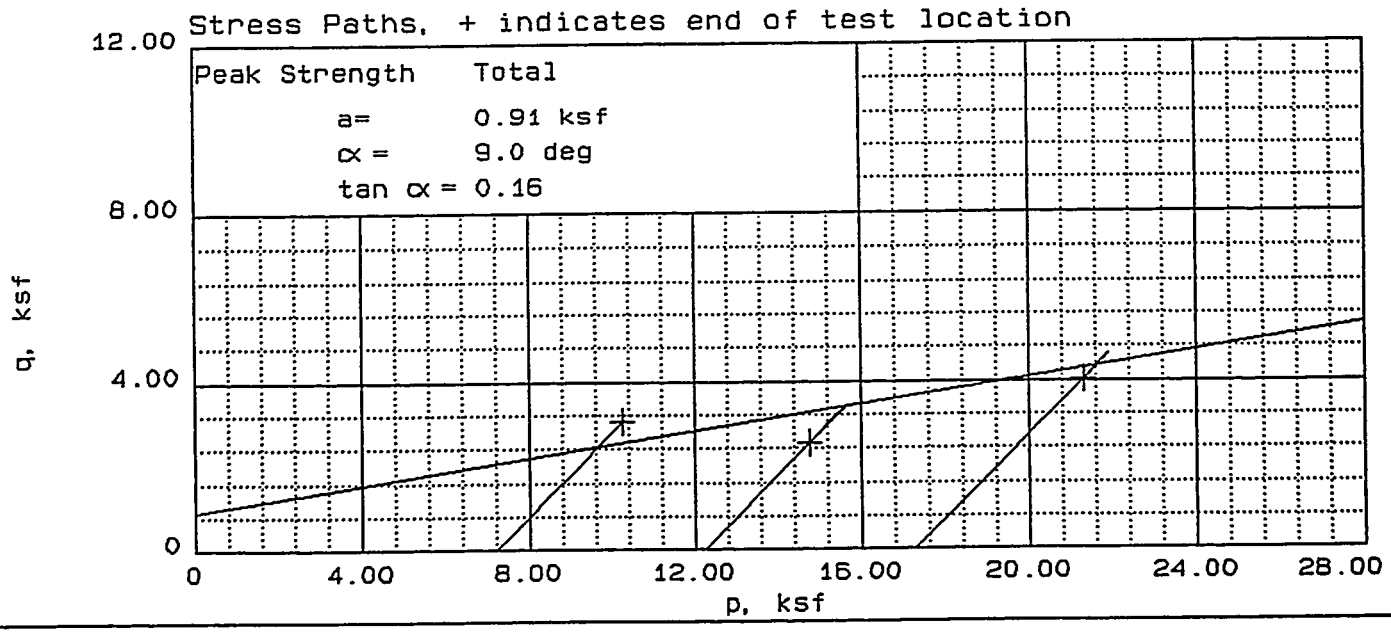
PROJ. NO.: 5810535301 DATE: 11/19/93

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.





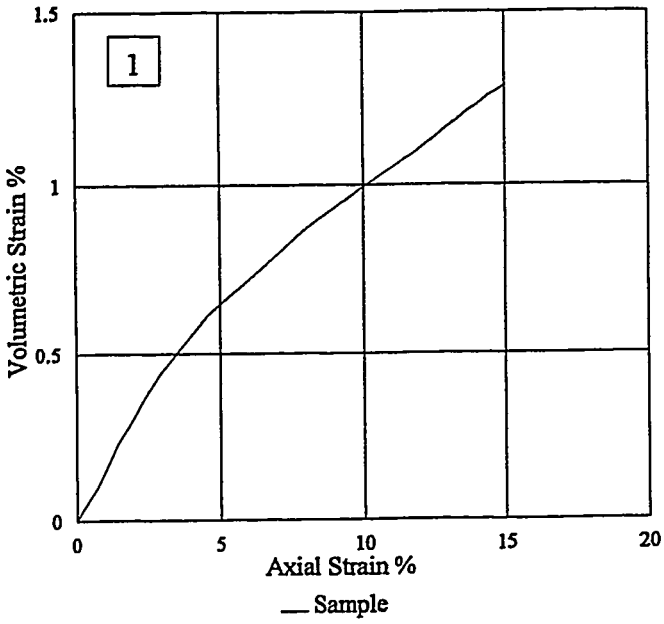


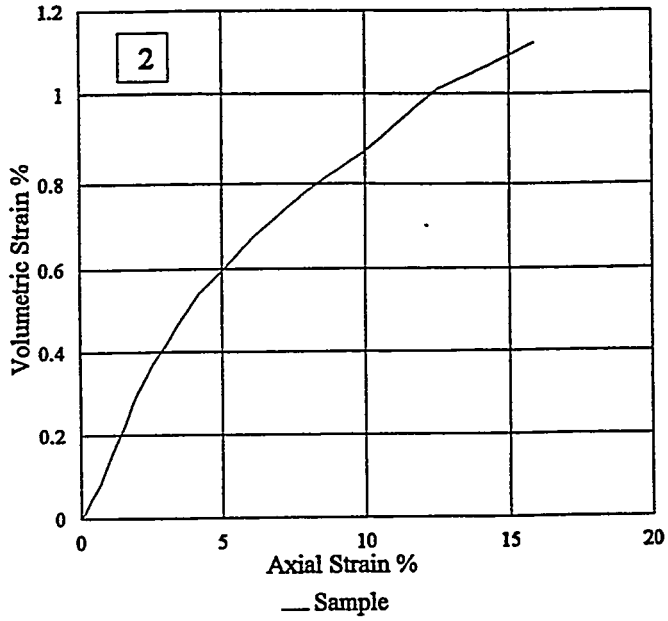
Client: SRS

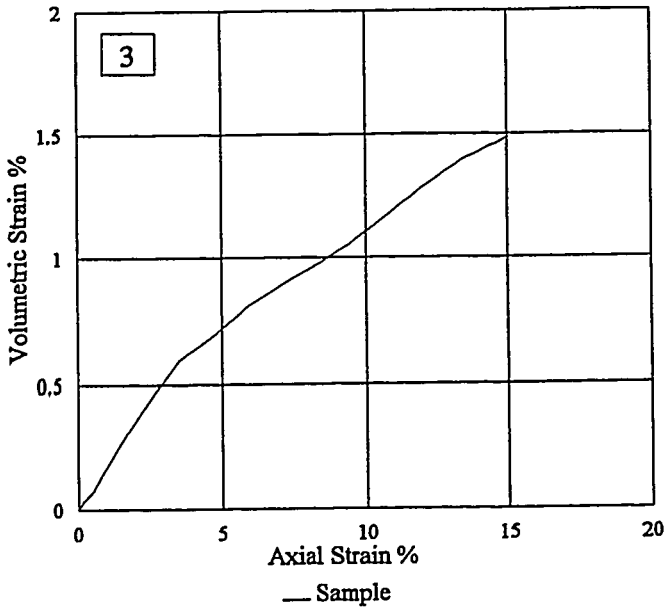
Project: SRS-ITP

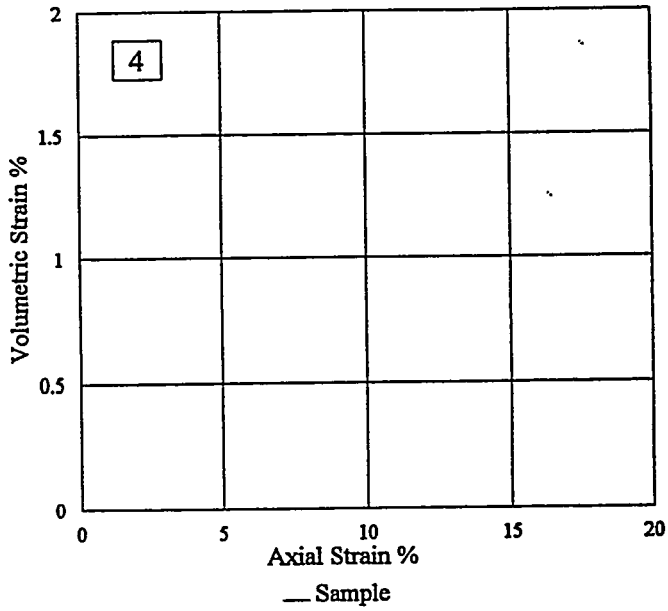
Location: H-Bor-12 PS-9 @ 120 Ft.

File: HBOR12 Project No.: 5810535301 Page 2/2 Fig. No. ____









Client: Westinghouse Savannah River Co.
Project: ITP Geotechnical Testing
Location: H-Bor-12, PS-9 @ 120 ft.
File: Project No.: 5810535301 Page 2 / 2 Fig. No. _____

TRIAXIAL COMPRESSION TEST
Consolidated drained

2-01-1994
1:57 pm

Project Data

Project No.: 5810535301 Date: 11/19/93 Data file: HBOR12
Client: SRS
Project: SRS-ITP
Sample location: H-Bor-12 PS-9 @ 120 Ft.
Sample description: See Grain Size
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.63 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.89	2.95	
Height change, in		0.02	
Height, in	6.00	5.98	
Weight, grams	1217.3		
Water volume change, cc		-18.48	
Moisture, %	32.9	34.9	31.3
Dry density, pcf	88.7	85.6	
Saturation, %	101.5	100.0	
Void ratio	0.852	0.918	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 0.027 % per minute
Consolidation cell pressure = 105 psi
Consolidation back pressure = 55 psi
Consolidation effective confining stress = 7.2 ksf
Peak deviator stress = 6.18 ksf at reading no. 10
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	7.20	7.20	1.00	7.20	0.00
1	0.0100	0.010	68.00	68.0	0.2	1.43	7.20	8.63	1.20	7.92	0.72
2	0.0400	0.040	131.00	131.0	0.7	2.75	7.20	9.95	1.38	8.57	1.37
3	0.0700	0.070	173.00	173.0	1.2	3.61	7.20	10.81	1.50	9.01	1.81
•	0.0900	0.090	197.00	197.0	1.5	4.10	7.20	11.30	1.57	9.25	2.05
	0.1400	0.140	246.00	246.0	2.3	5.08	7.20	12.28	1.70	9.74	2.54

LAW ENGINEERING, INC.

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	0.1800	0.180	274.00	274.0	3.0	5.61	7.20	12.81	1.78	10.01	2.81
	0.2700	0.270	300.00	300.0	4.5	6.05	7.20	13.25	1.84	10.23	3.03
8	0.3600	0.360	311.00	311.0	6.0	6.17	7.20	13.37	1.86	10.29	3.09
9	0.4800	0.480	318.00	318.0	8.0	6.18	7.20	13.38	1.86	10.29	3.09
10	0.6100	0.610	326.00	326.0	10.2	6.18	7.20	13.38	1.86	10.29	3.09
11	0.7600	0.760	331.00	331.0	12.7	6.10	7.20	13.30	1.85	10.25	3.05
12	0.9000	0.900	340.00	340.0	15.1	6.10	7.20	13.30	1.85	10.25	3.05

TRIAXIAL COMPRESSION TEST
Consolidated drained

2-24-1994
5:27 pm

Project Data

Project No.: 5810535301 Date: 11/19/93 Data file: HBOR12
Client: SRS
Project: SRS-ITP
Sample location: H-Bor-12 PS-9 @ 120 Ft.
Sample description: See Grain Size
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 2 Data

Type of sample: Undisturbed
Specific Gravity= 2.62 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.91	
Height change, in		0.03	
Height, in	6.00	5.98	
Weight, grams	1145.9		
Water volume change, cc		-10.77	
Moisture, %	39.9	41.2	36.5
Dry density, pcf	79.7	78.7	
Saturation, %	99.4	100.0	
Void ratio	1.051	1.079	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 0.027 % per minute
Consolidation cell pressure = 120 psi
Consolidation back pressure = 35 psi
Consolidation effective confining stress = 12.24 ksf
Peak deviator stress = 6.72 ksf at reading no. 7
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	12.24	12.24	1.00	12.24	0.00
1	0.0100	0.010	74.00	74.0	0.2	1.60	12.24	13.84	1.13	13.04	0.80
2	0.0200	0.020	128.00	128.0	0.3	2.77	12.24	15.01	1.23	13.62	1.38
3	0.0400	0.040	192.00	192.0	0.7	4.14	12.24	16.38	1.34	14.31	2.07
[illegible]	0600	0.060	237.00	237.0	1.0	5.09	12.24	17.33	1.42	14.78	2.54
	900	0.090	280.00	280:0	1.5	5.98	12.24	18.22	1.49	15.23	2.99

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	0.1100	0.110	299.00	299.0	1.8	6.37	12.24	18.61	1.52	15.42	3.18
7	0.1500	0.150	318.00	318.0	2.5	6.72	12.24	18.96	1.55	15.60	3.36
8	0.2000	0.200	316.00	316.0	3.3	6.62	12.24	18.86	1.54	15.55	3.31
9	0.2500	0.250	313.00	313.0	4.2	6.50	12.24	18.74	1.53	15.49	3.25
10	0.3000	0.300	314.00	314.0	5.0	6.47	12.24	18.71	1.53	15.47	3.23
11	0.3700	0.370	314.00	314.0	6.2	6.39	12.24	18.63	1.52	15.43	3.19
12	0.4700	0.470	307.00	307.0	7.9	6.13	12.24	18.37	1.50	15.31	3.07
13	0.5300	0.530	304.00	304.0	8.9	6.01	12.24	18.25	1.49	15.24	3.00
14	0.6100	0.610	280.00	280.0	10.2	5.45	12.24	17.69	1.45	14.97	2.73
15	0.7500	0.750	287.00	287.0	12.6	5.44	12.24	17.68	1.44	14.96	2.72
16	0.8500	0.850	282.00	282.0	14.2	5.25	12.24	17.49	1.43	14.86	2.62
17	0.9500	0.950	278.00	278.0	15.9	5.07	12.24	17.31	1.41	14.78	2.54

TRIAXIAL COMPRESSION TEST
Consolidated drained

2-01-1994
1:57 pm

Project Data

Project No.: 5810535301 Date: 11/19/93 Data file: HBOR12
Client: SRS
Project: SRS-ITP
Sample location: H-Bor-12 PS-9 @ 120 Ft.
Sample description: See Grain Size
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 3 Data

Type of sample: Undisturbed
Specific Gravity= 2.63 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.89	2.91	
Height change, in		0.03	
Height, in	6.00	5.97	
Weight, grams	1182.8		
Water volume change, cc		-1.47	
Moisture, %	37.8	37.9	34.0
Dry density, pcf	83.3	82.2	
Saturation, %	102.2	100.0	
Void ratio	0.972	0.998	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 0.027 % per minute
Consolidation cell pressure = 170 psi
Consolidation back pressure = 50 psi
Consolidation effective confining stress = 17.28 ksf
Peak deviator stress = 9.23 ksf at reading no. 8
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	17.28	17.28	1.00	17.28	0.00
1	0.0100	0.010	58.00	58.0	0.2	1.25	17.28	18.53	1.07	17.91	0.63
2	0.0300	0.030	180.00	180.0	0.5	3.87	17.28	21.15	1.22	19.21	1.93
3	0.0500	0.050	277.00	277.0	0.8	5.93	17.28	23.21	1.34	20.25	2.97
4	0.0700	0.070	329.00	329.0	1.2	7.02	17.28	24.30	1.41	20.79	3.51
	0.1000	0.100	381.00	381.0	1.7	8.09	17.28	25.37	1.47	21.33	4.05

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No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	0.1300	0.130	411.00	411.0	2.2	8.68	17.28	25.96	1.50	21.62	4.34
	0.1700	0.170	432.00	432.0	2.8	9.07	17.28	26.35	1.52	21.81	4.53
8	0.2100	0.210	443.00	443.0	3.5	9.23	17.28	26.51	1.53	21.90	4.62
9	0.2800	0.280	447.00	447.0	4.7	9.20	17.28	26.48	1.53	21.88	4.60
10	0.3500	0.350	444.00	444.0	5.9	9.03	17.28	26.31	1.52	21.79	4.51
11	0.4400	0.440	440.00	440.0	7.4	8.80	17.28	26.08	1.51	21.68	4.40
12	0.5000	0.500	438.00	438.0	8.4	8.67	17.28	25.95	1.50	21.61	4.33
13	0.5700	0.570	436.00	436.0	9.5	8.52	17.28	25.80	1.49	21.54	4.26
14	0.7100	0.710	435.00	435.0	11.9	8.28	17.28	25.56	1.48	21.42	4.14
15	0.8000	0.800	436.00	436.0	13.4	8.16	17.28	25.44	1.47	21.36	4.08
16	0.9000	0.900	438.00	438.0	15.1	8.03	17.28	25.31	1.46	21.30	4.02

Client Westinghouse Savannah River Co.
Project: ITP Geotechnical Testing
Location: H-Bor-12, PS-9 @ 120 ft.
File: Project No.: 5810535301

No. of Circles
3

Circle No.1					
Consolidation Pressure, ksf	After Consolidation			Burette Cal. Factor	No. of Points
	Diameter, in.	Height, in.	Volume, cc		
7.20	2.89	5.98	642.82	0.34	13

		Sample		Cell	
LVDT Reading (in)	Axial Strain (in/in)	Burette Reading (div.)	Volumetric Strain (cc/cc)	Burette Reading (div.)	Volumetric Strain (cc/cc)
0.00	0.00	5.0	0.00	not measured	
0.01	0.17	5.5	0.03		
0.04	0.67	6.8	0.10		
0.07	1.17	8.4	0.18		
0.09	1.51	9.5	0.24		
0.14	2.34	11.8	0.36		
0.18	3.01	13.5	0.45		
0.27	4.52	16.5	0.61		
0.36	6.02	18.7	0.72		
0.48	8.03	21.6	0.88		
0.61	10.20	24.0	1.00		
0.76	12.71	26.8	1.15		
0.90	15.05	29.2	1.28		

Client Westinghouse Savannah River Co.
Project: ITP Geotechnical Testing
Location: H-Bor-12, PS-9 @ 120 ft.
File: Project No.: 5810535301

Circle No.2					
Consolidation Pressure, ksf	After Consolidation			Burette Cal. Factor	No. of Points
	Diameter, in	Height, in.	Volume, cc		
12.24	2.88	5.98	639.26	0.34	18

		Sample		Cell	
LVDT Reading (in)	Axial Strain (in/in)	Burette Reading (div.)	Volumetric Strain (cc/cc)	Burette Reading (div.)	Volumetric Strain (cc/cc)
0.00	0.00	5.0	0.00	not measured	
0.01	0.17	5.3	0.02		
0.02	0.33	5.8	0.04		
0.04	0.67	6.5	0.08		
0.06	1.00	7.6	0.14		
0.09	1.51	9.1	0.22		
0.11	1.84	10.2	0.28		
0.15	2.51	11.9	0.37		
0.20	3.34	13.5	0.45		
0.25	4.18	15.1	0.54		
0.30	5.02	16.2	0.60		
0.37	6.19	17.8	0.68		
0.47	7.86	19.6	0.78		
0.53	8.86	20.5	0.82		
0.61	10.20	21.7	0.89		
0.75	12.54	24.0	1.01		
0.85	14.21	25.0	1.06		
0.95	15.89	26.1	1.12		

Client Westinghouse Savannah River Co.
Project: ITP Geotechnical Testing
Location: H-Bor-12, PS-9 @ 120 ft.
File: Project No.: 5810535301

Circle No.3					
Consolidation Pressure, ksf	After Consolidation			Burette Cal. Factor	No. of Points
	Diameter, in	Height, in.	Volume, cc		
17.28	2.89	5.97	640.41	0.34	17

		Sample		Cell	
LVDT Reading (in)	Axial Strain (in/in)	Burette Reading (div.)	Volumetric Strain (cc/cc)	Burette Reading (div.)	Volumetric Strain (cc/cc)
0.00	0.00	5.0	0.00	not measured	
0.01	0.17	5.6	0.03		
0.03	0.50	6.3	0.07		
0.05	0.84	7.7	0.14		
0.07	1.17	8.9	0.21		
0.10	1.68	11.0	0.32		
0.13	2.18	12.5	0.40		
0.17	2.85	14.3	0.49		
0.21	3.52	16.1	0.59		
0.28	4.69	17.9	0.68		
0.35	5.86	20.1	0.80		
0.44	7.37	22.2	0.91		
0.50	8.38	23.4	0.98		
0.57	9.55	25.1	1.07		
0.71	11.89	29.0	1.27		
0.80	13.40	31.2	1.39		
0.90	15.08	33.0	1.49		

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

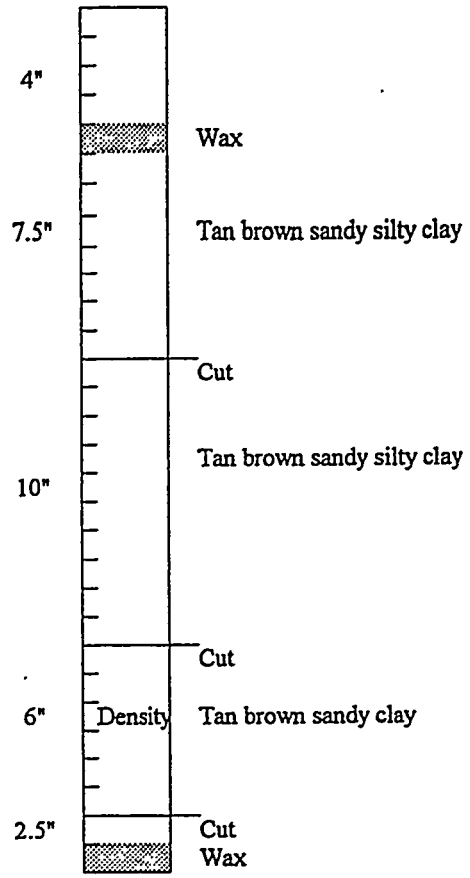
Project: SRS-ITP GEOTECHNICAL TESTING Date: 12-22-93

Boring No: H-Bor-12 Sample No: ST-13 Depth: 125' - 127'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION



Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b12-st13.wk3

ATTACHMENT 3

Tested by:	JTK	Reviewed by:	RLB	Law Job No.	5810535301
Date:	12-22-93	Date:	01-14-93	Job Name	SRS - ITP

TP-4A: UNIT WEIGHT OF SAMPLE
"TYPICAL"

Sample: Boring No.: H-Bor-12
Depth: 125'-127'
Sample ID: ST-13

MEASUREMENTS (Nominal 6-inch cut sample height):

TOTAL SAMPLE HEIGHT (inches)		INSIDE DIAMETER OF CUT TUBE (inches)	
1	6.175		
2	6.184	top	2.850
3	6.170	bottom	2.854
Avg.	6.176 (H)	Avg.	2.852 (D)

MOISTURE CONTENT DETERMINATION

MOISTURE CONTENT	
Tare No.	R-33
Tare Weight	16.57 gm
Wet Wt. + Tare	156.11 gm
Dry Wt. + Tare	107.42 gm
Wt. of Water	48.69 gm
Dry Weight	90.85 gm
Moisture Content, *w*	53.6 %

TOTAL WEIGHT OF SOIL + TUBE SECTION	W_{s+t} =	1560.12 gm
WEIGHT OF CLEAN, DRY TUBE SECTION	W_t =	437.3 gm
WET WEIGHT OF SOIL, $[(W_{s+t} - W_t)/454]$	W_s =	2.473 lbs
VOLUME OF SAMPLE, $[(pi*D^2/4)*H/1728]$	V =	0.023 ft^3
WET DENSITY, $[W_s/V]$	**D_w=**	**108.3 pcf**
DRY DENSITY, $[D_w/(1+w/100)]$	**D_D=**	**70.5 pcf**

h:\users\lab\rlb\itp\h12-st13.wk3

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

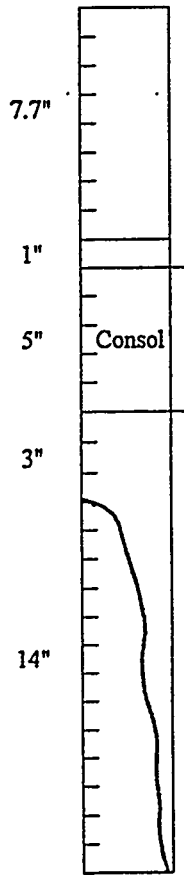
Project: SRS-ITP GEOTECHNICAL TESTING Date: 09-03-93

Boring No: H-Bor-12 Sample No: PS-10 Depth: 129'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: CLG Checked By: RLB

VISUAL DESCRIPTION



Top of soil column without moisture seal/wax

Cut

Tan clay with vertical fissures

Cut

Bottom 14 inches of tube crushed - no soil recovery

Remarks: Tube density was not completed due to damage of tube

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7/22/93

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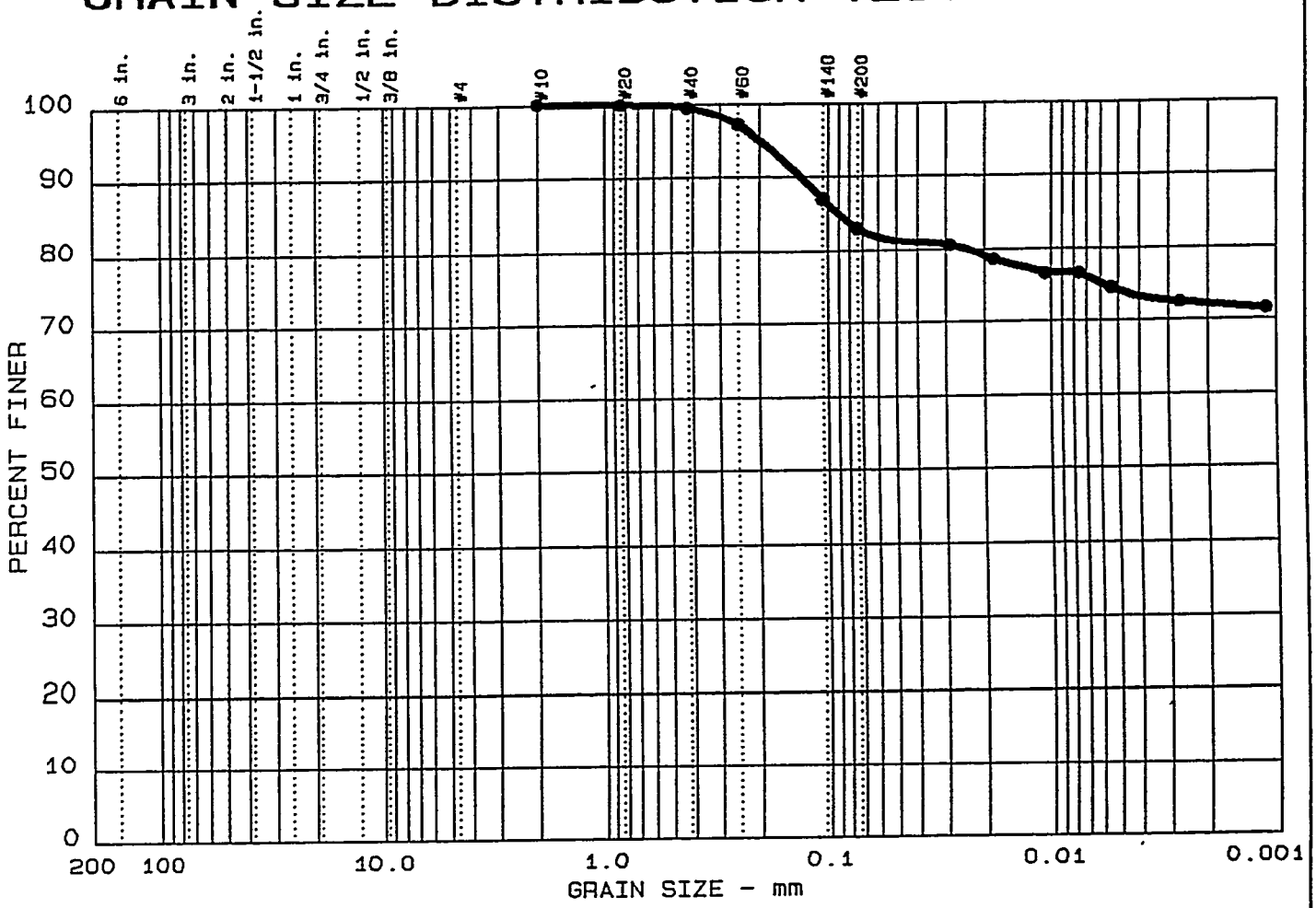
WORKING COPY DATE

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	9	0.0	0.0	16.9	8.9	74.2

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	155	125	0.09							

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Fine Sandy Silty Clay	CH	A-7-5 (115.4

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-12 PS-10 @ 129 Ft.

Date: September 23, 1993

Remarks:
Tested by: JRR
Reviewed by: RLB
Consol

GRAIN SIZE DISTRIBUTION TEST REPORT

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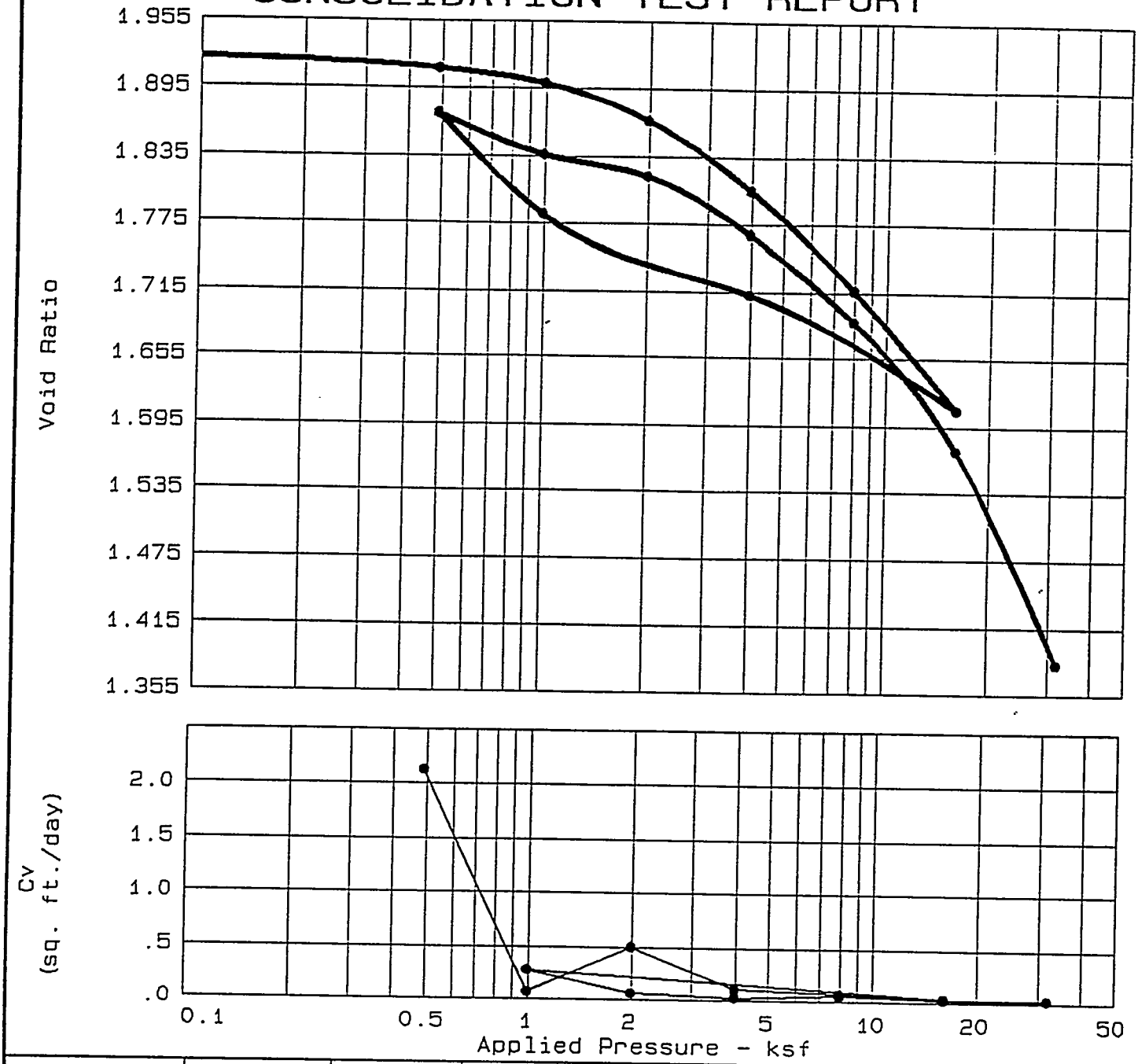
CONSOLIDATION TEST REPORT



Natural Saturation	Natural Moisture	Dry Density	LL	PI	Sp.Gr.	Initial void ratio
93.2 %	66.1	57.9	155	125	2.710	1.9209

TEST RESULTS	MATERIAL DESCRIPTION
	Tan fine Sandy Silty Clay Class: CH
Project No.: 5810535301 Project: SRS ITP Location: H-Bor-12 PS-10 @ 129 Ft. Date: 9/3/93	Remarks: Tested by: CLG Reviewed by: RLB Sample collapsed under 64KSF, test stopped Fig. No. _____
CONSOLIDATION TEST REPORT LAW ENGINEERING, INC.	

11:16, 3-01-1994 CONSOLIDATION TEST PROJECT DATA Test No. 13

›ject Number:	5810535301
Project:	SRS ITP
Date:	9/3/93
Location 1:	H-Bor-12
2:	PS-10 @ 129 Ft.
Remarks 1:	
2:	Tested by:
3:	Reviewed by:
4:	Sample collapsed under
5:	64KSF,test stopped
Material 1:	Tan fine Sandy Silty
description 2:	Clay
Classification:	CH
Liquid limit:	155
Plasticity index:	125
Figure Number:	

CONSOLIDATION TEST SPECIMEN DATA

TOTAL SAMPLE	BEFORE TEST	AFTER TEST
Wet w+t = 315.92 g.	Oedometer No. = 8	Wet w+t = 305.17 g.
Dry w+t = 276.67 g	Machine No. = 8	Dry w+t = 276.67 g.
Tare wt. = 217.28 g.	Spec. Gravity = 2.710	Tare wt. = 217.28 g.
H t = 0.8930 in.	Height = 0.8930 in.	
Di. .eter = 2.3600 in.	Diameter = 2.3600 in.	
Weight = 98.64 g.		
Moisture = 66.1 %	Ht. Solids = 0.3057 in.	Moisture = 48.0 %
Wet Den. = 96.2 pcf	Dry wt. = 59.39 g. *	Dry wt. = 59.39 g.
Dry Den. = 57.9 pcf	Void ratio = 1.9209	Void ratio = 1.3831
	Saturation = 93.2 %	Saturation = 94.0 %

* Initial dry weight used in calculations

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
Initial	0.02000			1.9209	
0.49	0.02390	0.0003	0.02360	1.9121*	0.3 Comprs.*
0.99	0.02920	0.0003	0.02890	1.8992*	0.7 Comprs.*
1.99	0.04240	0.0009	0.04150	1.8665*	1.9 Comprs.*
3.98	0.06090	0.0016	0.05930	1.8050*	4.0 Comprs.*
7.99	0.09160	0.0028	0.08880	1.7161*	7.0 Comprs.*
15.99	0.12960	0.0042	0.12540	1.6088*	10.7 Comprs.*
3.98	0.09550	0.0016	0.09390	1.7119	7.2 Comprs.
0.99	0.07250	0.0003	0.07220	1.7829	4.7 Comprs.
0.49	0.04510	0.0003	0.04480	1.8725	1.7 Comprs.
0.99	0.04780	0.0003	0.04750	1.8361*	2.9 Comprs.*
.99	0.05490	0.0009	0.05400	1.8171*	3.6 Comprs.*
3.98	0.07270	0.0016	0.07110	1.7657*	5.3 Comprs.*
7.99	0.10200	0.0028	0.09920	1.6880*	8.0 Comprs.*

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
15.99	0.13610	0.0042	0.13190	1.5723*	11.9 Comprs.*
31.78	0.20410	0.0061	0.19800	1.3831*	18.4 Comprs.*

* CALCULATED USING D100 INSTEAD OF FINAL READING

CONSOLIDATION TEST RESULTS

Compression index = NOT SELECTED
Preconsolidation pressure = NOT SELECTED

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

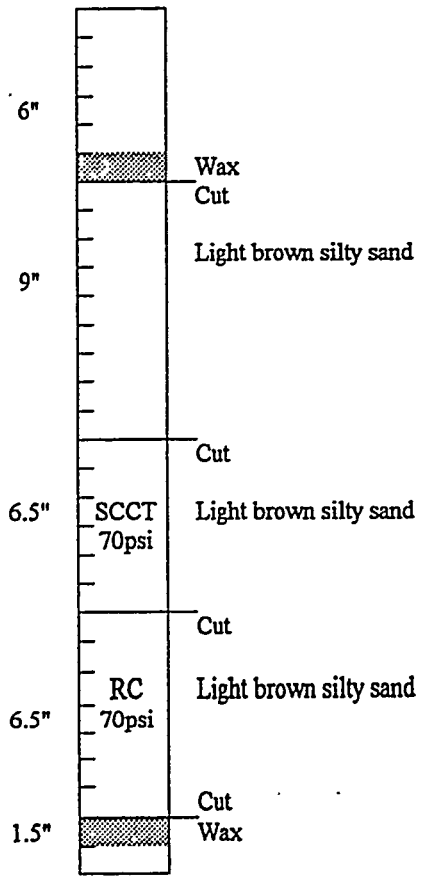
Project: SRS-ITP GEOTECHNICAL TESTING Date: 11-30-93

Boring No: H-Bor-12 Sample No: ST-15 Depth: 143' - 144.9'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION

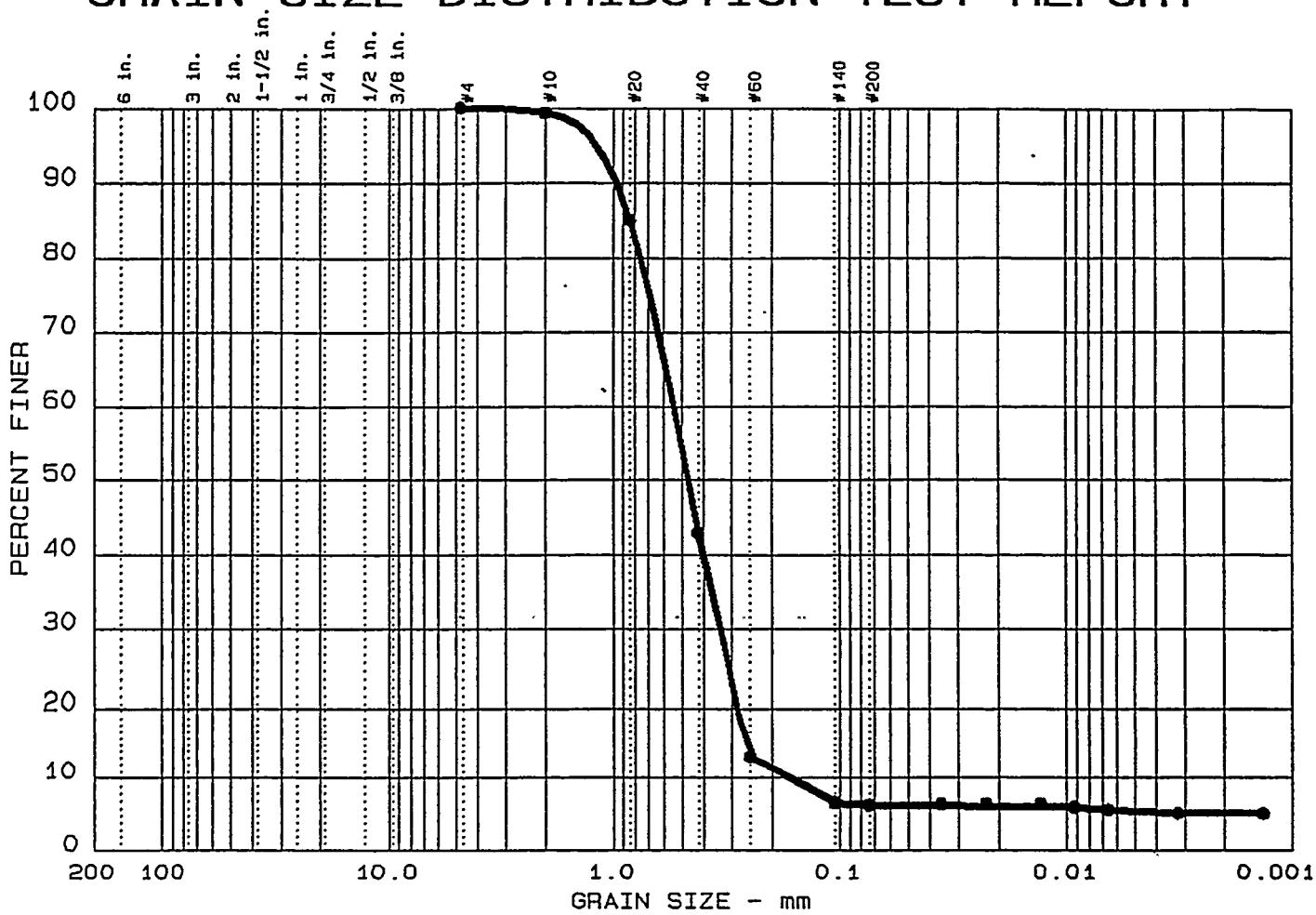


Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b12-st15.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	15	0.0	0.0	93.7	0.8	5.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	87	72	0.84	0.54	0.47	0.336	0.2588	0.1652	1.27	3.3

MATERIAL DESCRIPTION	USCS	AASHTO
● Light Brown Poorly Graded Sand with Clay	SP-SC	A-2-7 (0.0)

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-12 ST-15 @ 143-144.9

Date: January 3, 1994

Remarks:

Tested by: JTK

Reviewed by: RLB

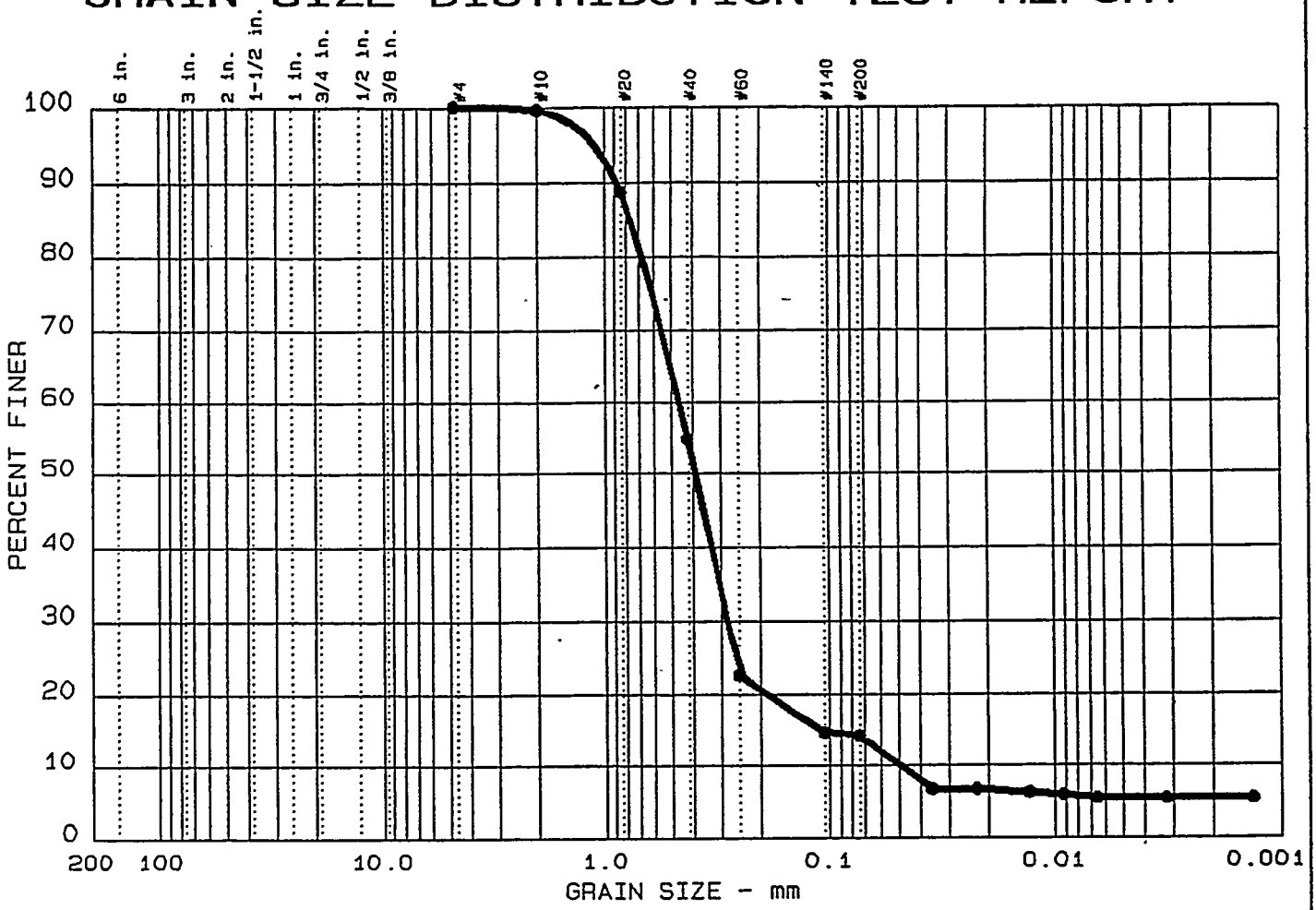
SCC-70psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	4	0.0	0.0	85.8	8.7	5.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.76	0.46	0.39	0.281	0.1094	0.0489	3.54	9.4

MATERIAL DESCRIPTION	USCS	AASHTO
● Light Brown Silty Sand		

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-12 ST-15 @ 143-144.9 Ft.

Date: January 3, 1994

Remarks:
Tested by: JTK Reviewed by: RLB
RC-70psi
Atterberg Limits-#200
LL=166 PL=39 PI=127

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ	Boring No.:	H-Bor-12
Test Date:	11/29/93-12/06/93	Sample No.:	ST-15
Reviewed By:	JW / RLB	Depth:	143.0' - 144.9'
Reviewed Date:	12/14/93	Sample Description:	See classification data

Initial Specimen Data

Labels	Values	Units	Description
Masses			
M_{scb}	1164.60	g	*Mass of soil and container before*
M_{sca}	0.00	g	*Mass of soil and container after*
M_s	1164.60	g	*M_{scb} - M_{sca} = mass of soil*
Diameters			
D_t	73.28	mm	*Diameter near top of specimen*
D_m	73.40	mm	*Diameter near middle of specimen*
D_b	73.46	mm	*Diameter near bottom of specimen*
T_{mem}	0.30	mm	*Single thickness of membrane*
D_{net}	72.77	mm	*$(D_t + D_m + D_b)/3 - 2*T_{mem}$*
Lengths			
L_{cbp}	198.65	mm	*Length between chamber bottom & top of top platen*
L_{tp}	23.95	mm	*Length of top platen*
L_{bp}	24.00	mm	*Length of bottom platen*
L_{net}	150.70	mm	*Length of Specimen = L_{cbp} - L_{tp} - L_{bp}*
Volume			
V	626776	mm^3	*$D^2_{net}*Pi*L_{net}/4$*

Labels	Values	Units	Description
Mass Density and Unit Weight			
Rho	1858.1	kg/m^3	*Mass density of specimen = $M_s/V*10^6$*
U_{wt}	18.22	kN/m^3	*Unit weight of specimen = Rho*9.806/1000*
Moisture Content, mc			
No.	AB-8		*Container number*
M_{wscb}	1251.27	g	*Mass of wet soil + container*
M_{wsca}	1049.11	g	*Mass of dry soil + container*
M_{wat}	202.16	g	*Mass of water = M_{wscb} - M_{wsca}*
M_{cont}	86.67	g	*Mass of container.*
mc	21.0	%	*$M_{wat}/(M_{wsca} - M_{cont})*100\%$*
Rho_d	1535.5	kg/m^3	*Dry mass density = Rho/(1+mc)*
G_s	2.67		*Specific gravity*
e	0.739		*Void Ratio, $[1000*G_s)]/Rho_d-1$*
S_r	75.9	%	*Degree of Saturation = $mc*G_s/e$*
J	0.000771	$kg\text{-}m^2$	*Polar mass moment of inertia = $(M_s/1000)*(D_{net}/1000)^2/8$*

Conditions After Saturation			
CL_s	0.00	mm	*Change in length*
L_s	150.7	mm	*Length after saturation, L - CL_s*
A_s	4159.1	mm^2	*Area of specimen*
V_s	626766	mm^3	*Volume after saturation, A_s * L_s*
B	0.72		*B Value*

Conditions After Consolidation			
CL_c	0.01	mm	*Change in length*
L_c	150.7	mm	*Length after consolidation, L_s - CL_c*
CV_c	4420	mm^3	*Change in volume*
V_c	622346	mm^3	*Volume, V_s - CV_c*
S_r	100.0	%	*Degree of Saturation = $mc*G_s/e$*
e	0.727		*Void Ratio, $[1000*G_s]/Rho_d-1$*
mc	27.2	%	*Moisture Content*
Rho_d	1546	kg/m^3	*Dry mass density. Rho_d*V/V_c*

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

INPUT DATA

Project No.: 5810535301
Tested By: HEJ
Test Date: 11/29/93-12/06/93
Reviewed By: JW/RLB
Reviewed Date: 12/14/93

Project Name: SRS-ITP
Boring No: H-Bor-12
Sample No.: ST-15
Depth: 143.0' - 144.9'
Sample Description: See classification data

Line No.	Elapsed Time [min]	Cell Pressure [unit]	Pore Pressure [unit]	Axial Load [unit]	Burette Reading [unit]	Length Reading [unit]	Longitudinal or Torsional	Force or Torque Reading [V_{rms}]	Transducer Reading [V_{rms}]	Resonant Period [msec]
1	0.5	120.0	51.3	0	13.0	-7.2360	T	0.008	0.024	6.333
2	1.0	120.0	51.3	0	13.0	-7.2360	T	0.019	0.051	6.339
3	2.0	120.0	51.4	0	13.0	-7.2370	T	0.044	0.109	6.365
4	2.5	120.0	51.4	0	13.0	-7.2370	T	0.091	0.217	6.407
5	3.0	120.0	51.4	0	13.0	-7.2370	T	0.188	0.450	6.445
6	3.5	120.0	51.4	0	13.0	-7.2370	T	0.366	0.837	6.518
7	4.0	120.0	51.4	0	13.0	-7.2370	T	0.697	1.476	6.624
8	4.9	120.0	51.8	0	13.0	-7.2450	T	1.306	2.440	6.826
9	5.5	120.0	55.6	0	13.0	-7.2900	T	2.610	3.960	7.236
10	6.0	120.0	60.1	0	13.0	-7.3310	T	3.540	4.830	7.625
11	6.8	120.0	59.9	0	13.0	-7.3310	T	0.008	0.021	6.941

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

INTERMEDIATE DATA

Project No.: 5810535301
Tested By: HEJ
Test Date: 11/29/93-12/06/93
Reviewed By: JW/RLB
Reviewed Date: 12/14/93

Project Name: SRS-ITP
Boring No: H-Bor-12
Sample No.: ST-15
Depth: 143.0' - 144.9'
Sample Description: See classification data

Specimen Volume [mm³]	Specimen Length [mm]	Specimen Diameter [mm]	Specimen Mass [grams]	Mass Density [kg/m³]	Polar Inertia J [kg-m²]	Inertia Stiffness Ratio T	Apparatus Damping Factor ADF	Dimensionles Frequency F	Damping Factor A
622346	150.69	72.52	1224.33	1967.3	0.000805	4.0136	0.00457	0.480	8.73
622346	150.69	72.52	1224.33	1967.3	0.000805	4.0136	0.00457	0.480	8.73
622346	150.69	72.52	1224.33	1967.3	0.000805	4.0135	0.00459	0.480	8.73
622346	150.69	72.52	1224.33	1967.3	0.000805	4.0135	0.00462	0.480	8.73
622346	150.69	72.52	1224.33	1967.3	0.000805	4.0135	0.00465	0.480	8.73
622346	150.69	72.52	1224.33	1967.3	0.000805	4.0135	0.00470	0.480	8.73
622346	150.69	72.52	1224.33	1967.3	0.000805	4.0135	0.00477	0.480	8.73
622346	150.68	72.52	1224.33	1967.3	0.000805	4.0134	0.00492	0.480	8.73
622346	150.65	72.52	1224.33	1967.3	0.000805	4.0127	0.00521	0.480	8.73
622346	150.63	72.53	1224.33	1967.3	0.000805	4.0120	0.00549	0.480	8.72
622346	150.63	72.53	1224.33	1967.3	0.000805	4.0120	0.00500	0.480	8.72

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

TEST RESULTS SUMMARY

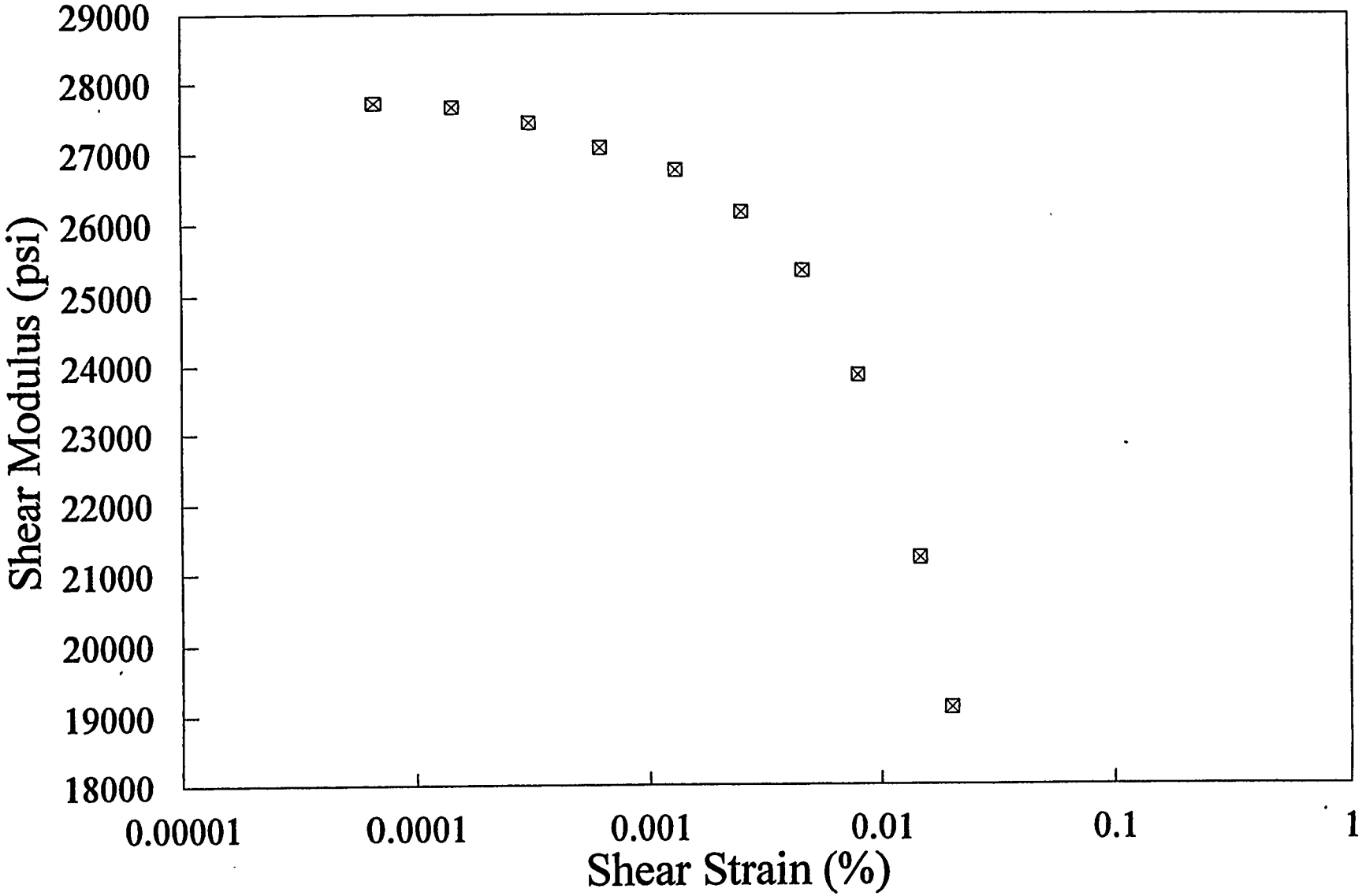
Project No.: 5810535301
Tested By: HEJ
Test Date: 11/29/93-12/06/93
Reviewed By: JW/RLB
Reviewed Date: 12/14/93

Project Name: SRS-ITP
Boring No: H-Bor-12
Sample No.: ST-15
Depth: 143.0' - 144.9'
Sample Description: See classification data

Line No.	Effective Confining Stress [kPa]	Principal Stress Ratio	Void Ratio e	Longitudina or Torsional	No. of Vibration Cycles	Shear Modulus G [Mpa]	Shear Strain Amplitude [%]	Damping Ratio [%]	Shear Modulus G [psi]
1	473.07	1.00	0.727	T	4737	191.03	0.00007	1.55	27726
2	473.07	1.00	0.727	T	4733	190.67	0.00015	1.74	27673
3	472.93	1.00	0.727	T	9427	189.11	0.00031	1.89	27447
4	472.93	1.00	0.727	T	4682	186.64	0.00063	1.96	27089
5	472.93	1.00	0.727	T	4655	184.45	0.00133	1.95	26770
6	472.79	1.00	0.727	T	4603	180.34	0.00252	2.05	26174
7	472.52	1.00	0.727	T	4529	174.61	0.00459	2.21	25343
8	470.04	1.00	0.727	T	7911	164.41	0.00806	2.51	23863
9	443.72	1.00	0.727	T	4975	146.23	0.01471	3.11	21224
10	412.85	1.00	0.727	T	3934	131.62	0.01992	3.46	19104
11	414.23	1.00	0.727	T	6915	158.84	0.00007	1.77	23054

Shear Modulus vs. Shear Strain

H-BOR-12, ST- 15

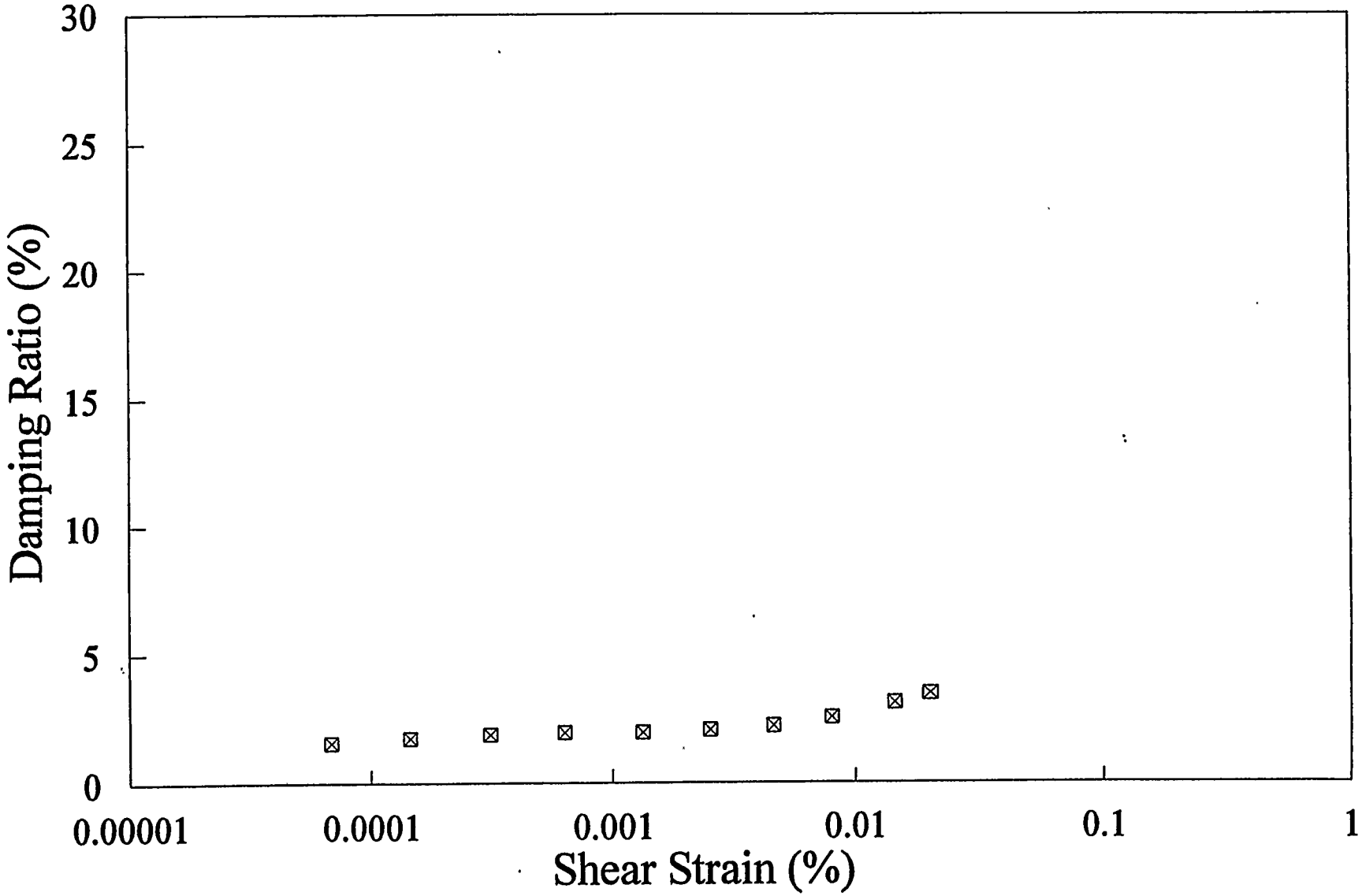


Law Engineering Project No.: 5810535301

SRS-ITP: Resonant Column

Damping Ratio vs. Shear Strain

H-BOR-12, ST-15



Law Engineering Project No.: 5810535301

SRS-ITP: Resonant Column

CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-12
Test Date:	11/29/93-12/02/93	Sample No.:	ST-15
Reviewed By:	JW/RLB RLC	Depth:	143.0' - 144.9'
Review Date:	12/14/93	Sample Description:	See classification data

SPECIMEN DATA

Initial Conditions of Specimen

Diameters, in.		Area , sq. in.	6.50
Top	2.900	Volume, cubic in.	38.30
Middle	2.905	Mass of Specimen, grams	1138.70
Bottom	2.897		
Average	2.901	Moisture Content	
Membrane Thickness, in.	0.012	Pan No.	X-25
Net Diameter, in.	2.877	Wet Mass + Pan, grams	1186.85
		Dry Mass + Pan, grams	1001.21
Length, in.		Container Mass, grams	48.15
Location 1	8.532	Moisture Content, %	19.5
Location 2	8.547		
Location 3	8.533	Density, pcf	113.0
Average	8.537	Dry Density, pcf	94.6
Length of Top Platen	1.140	Specific Gravity	2.66
Length of Bottom Platen	1.505	Degree of Saturation, %	68.7
Length of Specimen, in	5.892	Void Ratio	0.754

Conditions of Specimen After Saturation and Consolidation

After Saturation		After Consolidation	
Change in Length, in.	0.001	Change in Length, in.	0.017
Length, in.	5.891	Length, in.	5.874
Area, sq. in.	6.50	Change in Volume, cc	5.78
Volume, cubic in.	38.29	Volume, cubic in.	37.94
Back Pressure, psi	60.0	Area, sq. in.	6.46
B Value	0.83	Effe. Consoli.. Stress, psi	70.0
		Moisture Content, %	27.8
		Dry Density, pcf	95.5
		Void Ratio	0.738
		Degree of Saturation, %	100.0

CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

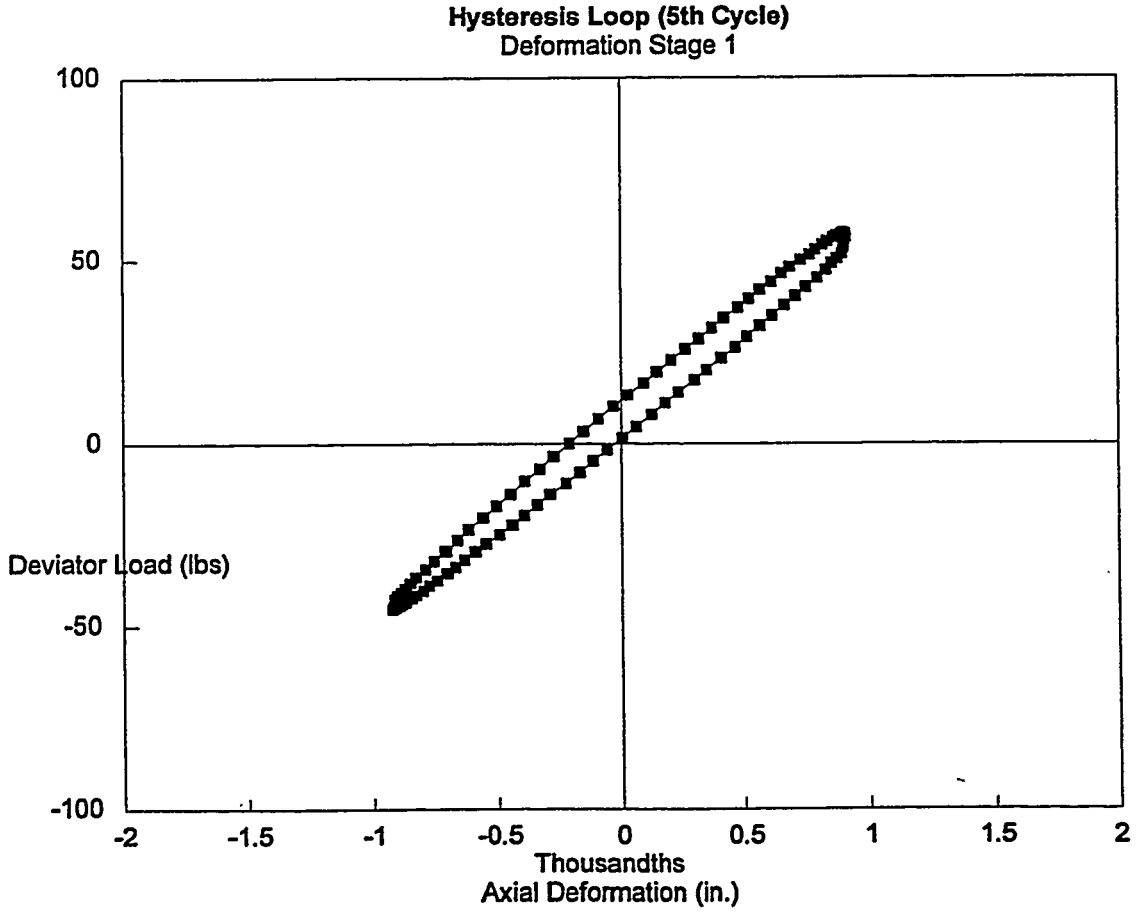
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-12
Test Date:	11/29/93-12/02/93	Sample No.:	ST-15
Reviewed By:	JW/RLB RLB	Depth:	143.0' - 144.9'
Review Date:	12/14/93	Sample Description:	See classification data

Area, A_c, in ^{2}	6.46		Effective Consolidation Stress, psi	70.0
Length, H_c, in.	5.87		Cyclic Load, P_c, lbs	51.35
			Cyclic Deviator Stress, psi	8.0

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
102.7	0.0018	50905	0.016

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
0.017	0.024	5.6



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

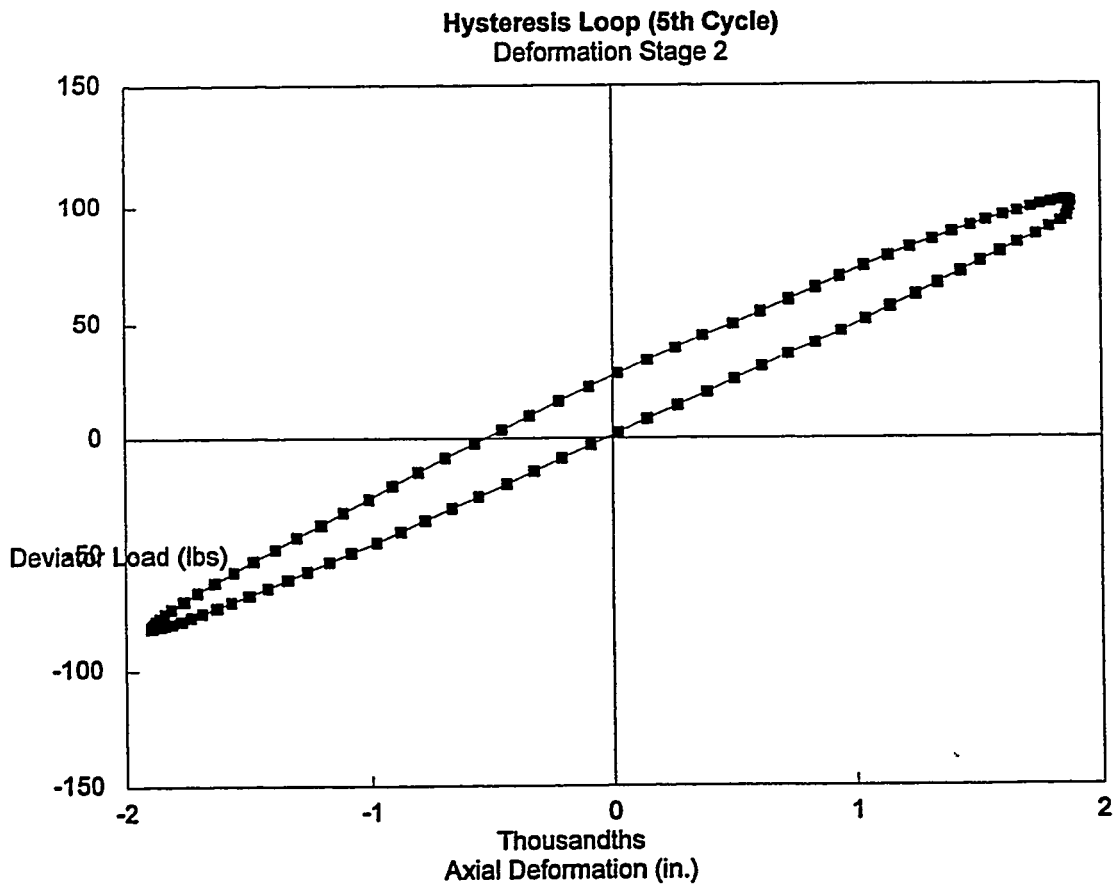
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-12
Test Date:	11/29/93-12/02/93	Sample No.:	ST-15
Reviewed By:	JW/RLB RLB	Depth:	143.0' - 144.9'
Review Date:	12/14/93	Sample Description:	See classification data

Area, A_c, in²	6.46		Effective Consolidation Stress, psi	70.0
Length, H_c, in.	5.87		Cyclic Load, P_c, lbs	92.27
			Cyclic Deviator Stress, psi	14.3

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
184.5	0.0038	44495	0.032

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
0.079	0.087	7.2



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

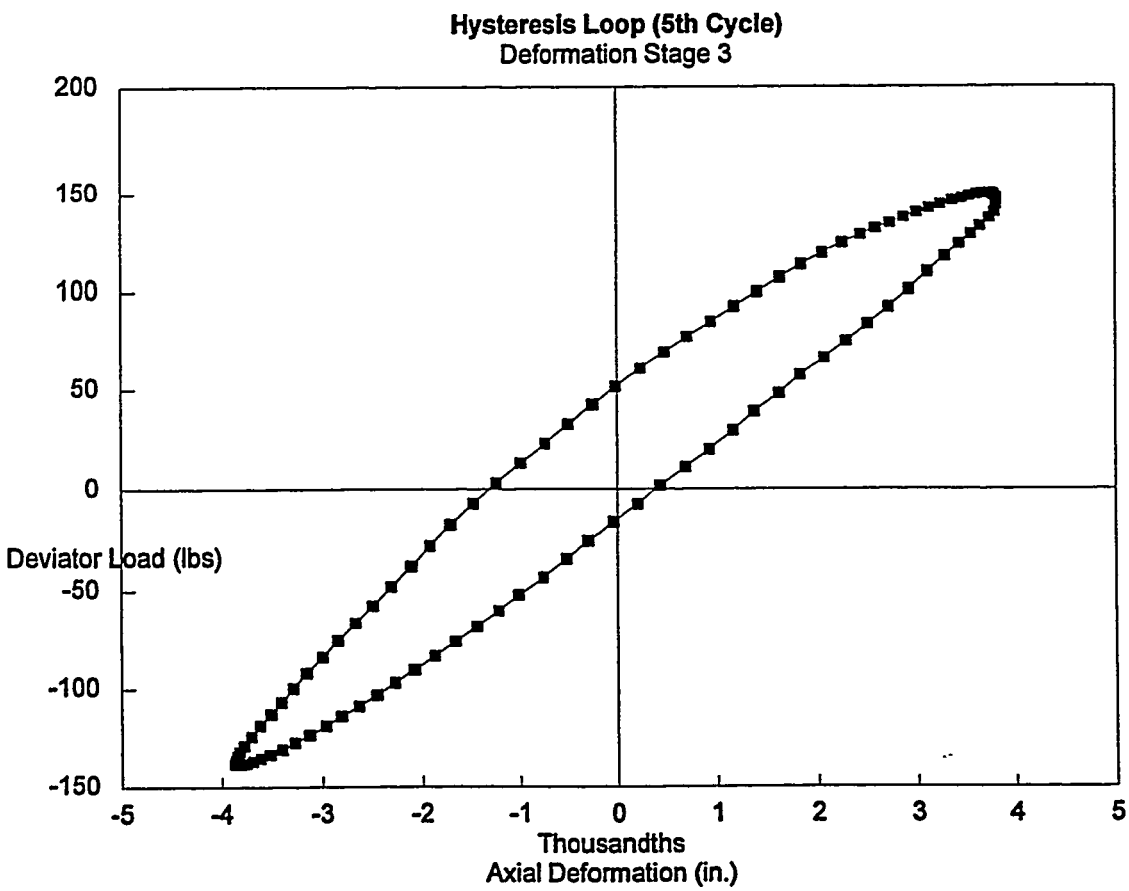
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-12
Test Date:	11/29/93-12/02/93	Sample No.:	ST-15
Reviewed By:	JW/RLB RLB	Depth:	143.0' - 144.9'
Review Date:	12/14/93	Sample Description:	See classification data

Area, A_c, in²	6.46		Effective Consolidation Stress, psi	70.0
Length, H_c, in.	5.87		Cyclic Load, P_c, lbs	144.09
			Cyclic Deviator Stress, psi	22.3

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
288.2	0.0077	34159	0.065

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
0.388	0.276	11.2



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

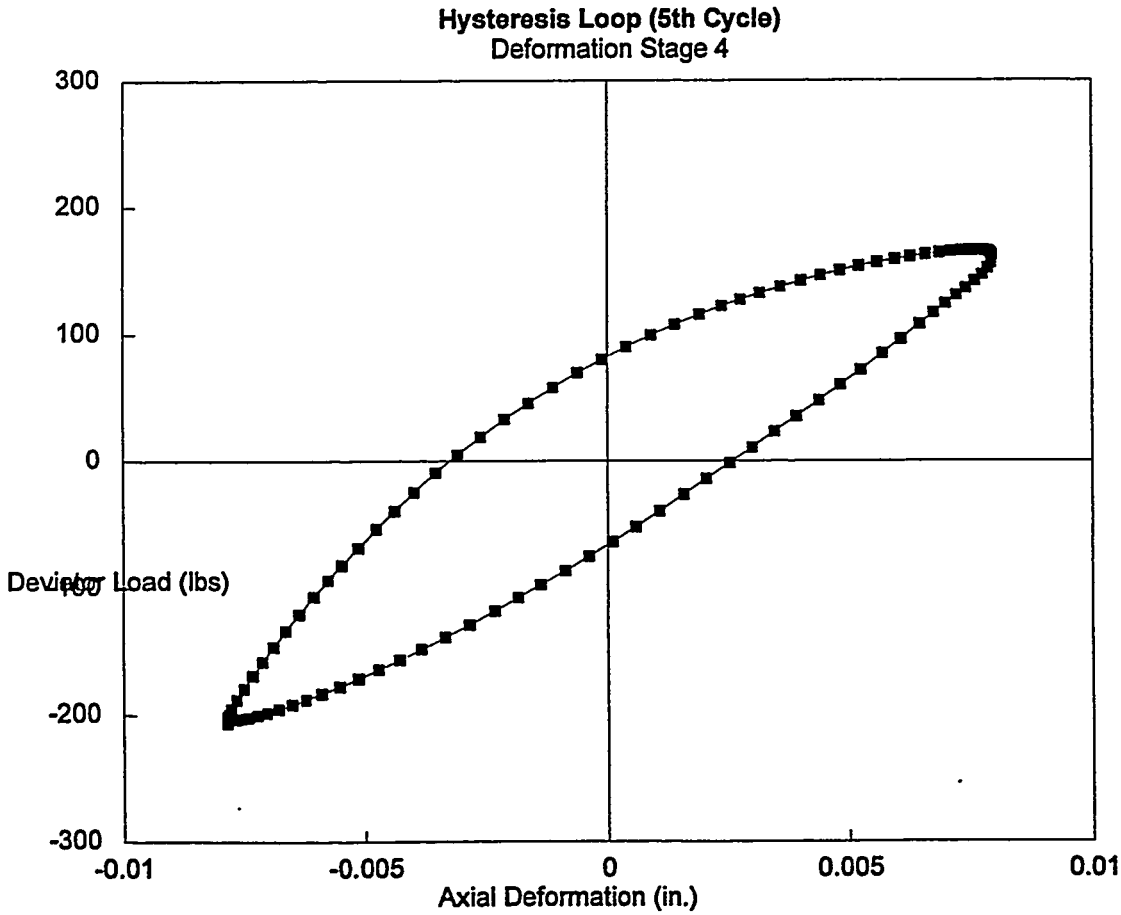
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-12
Test Date:	11/29/93-12/02/93	Sample No.:	ST-15
Reviewed By:	JW/RLB RLB	Depth:	143.0' - 144.9'
Review Date:	12/14/93	Sample Description:	See classification data

Area, A_c, in²	6.46		Effective Consolidation Stress, psi	70.0
Length, H_c, in.	5.87		Cyclic Load, P_c, lbs	186.67
			Cyclic Deviator Stress, psi	28.9

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
373.3	0.0158	21488	0.135

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
1.730	0.737	18.7



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

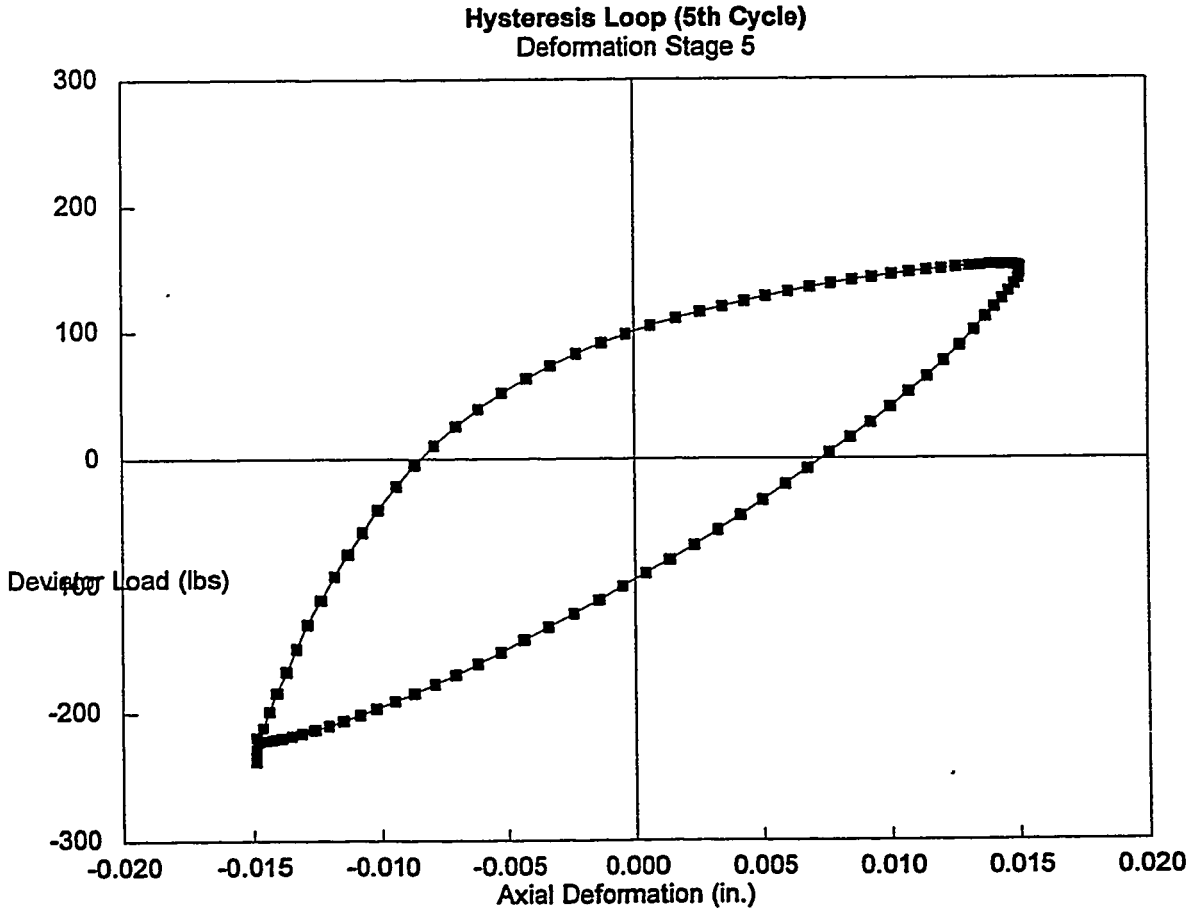
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-12
Test Date:	11/29/93-12/02/93	Sample No.:	ST-15
Reviewed By:	JW/RLB RLB	Depth:	143.0' - 144.9'
Review Date:	12/14/93	Sample Description:	See classification data

Area, A_c, in ^{2}	6.46		Effective Consolidation Stress, psi	70.0
Length, H_c, in.	5.87		Cyclic Load, P_c, lbs	195.54
			Cyclic Deviator Stress, psi	30.3

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
391.1	0.0300	11867	0.255

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
4.766	1.465	25.9



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

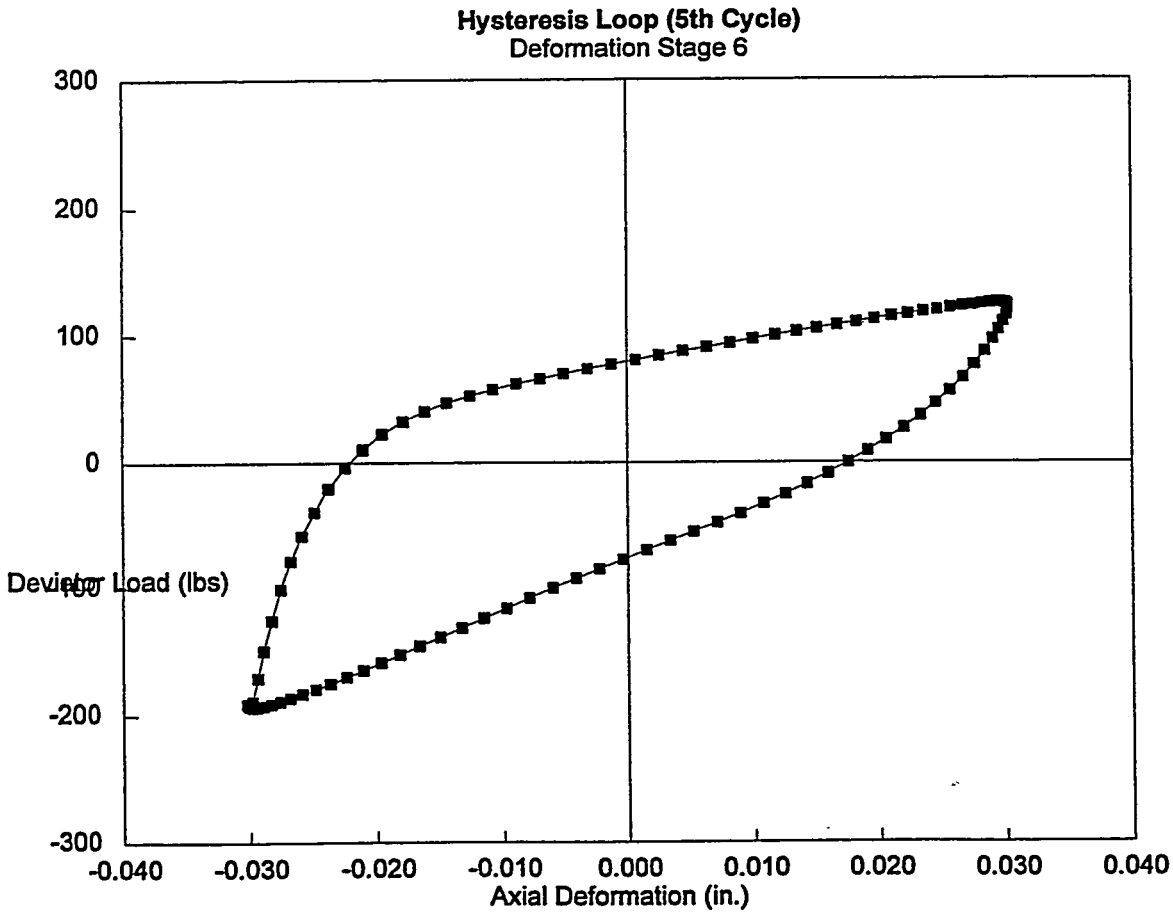
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-12
Test Date:	11/29/93-12/02/93	Sample No.:	ST-15
Reviewed By:	JW/RLB RLB	Depth:	143.0' - 144.9'
Review Date:	12/14/93	Sample Description:	See classification data

Area, A_c, in²	6.46		Effective Consolidation Stress, psi	70.0
Length, H_c, in.	5.87		Cyclic Load, P_c, lbs	172.29
			Cyclic Deviator Stress, psi	26.7

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
344.6	0.0604	5188	0.514

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
9.281	2.602	28.4



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

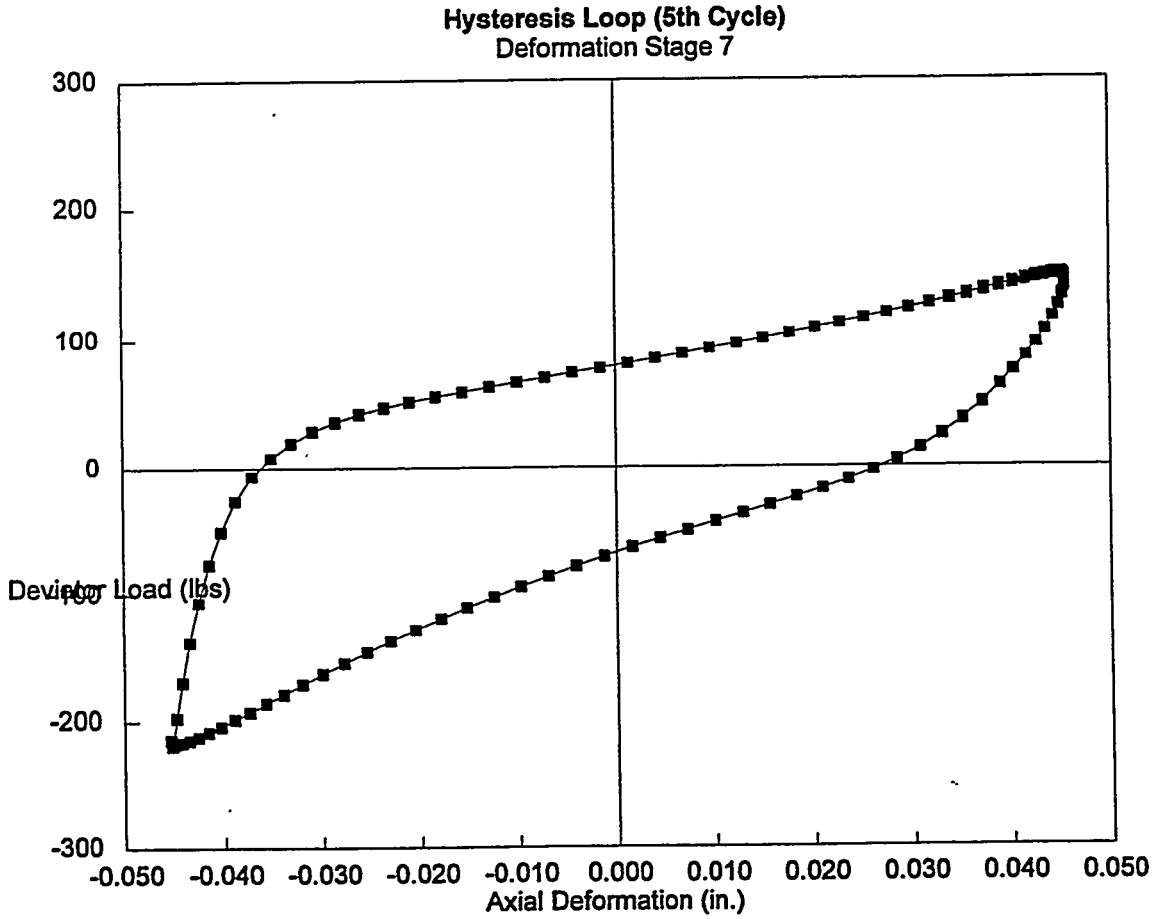
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-12
Test Date:	11/29/93-12/02/93	Sample No.:	ST-15
Reviewed By:	JW/RLB RLB	Depth:	143.0' - 144.9'
Review Date:	12/14/93	Sample Description:	See classification data

Area, A_c, in ^{2}	6.46		Effective Consolidation Stress, psi	70.0
Length, H_c, in.	5.87		Cyclic Load, P_c, lbs	197.15
			Cyclic Deviator Stress, psi	30.5

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
394.3	0.0909	3945	0.774

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
14.154	4.480	25.1



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

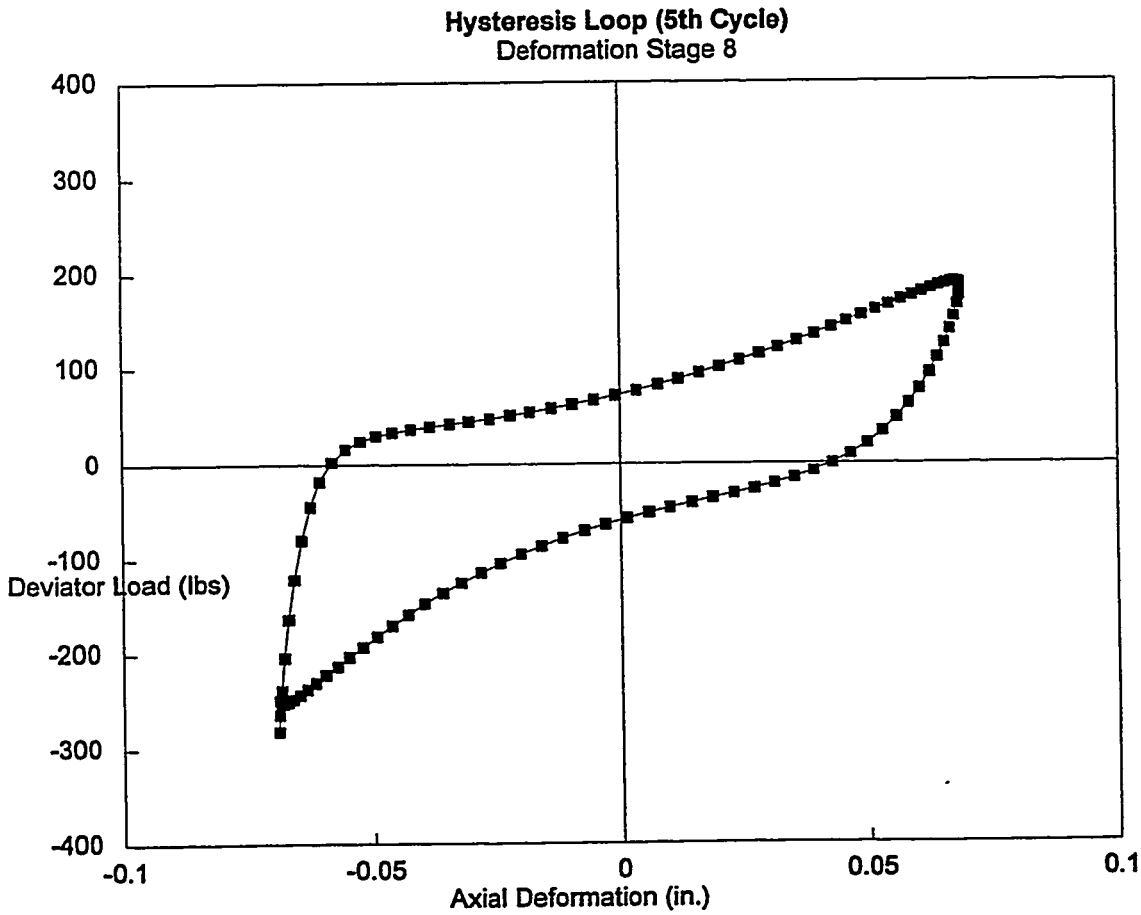
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-12
Test Date:	11/29/93-12/02/93	Sample No.:	ST-15
Reviewed By:	JW/RLB RLB	Depth:	143.0' - 144.9'
Review Date:	12/14/93	Sample Description:	See classification data

Area, A_c, in²	6.46		Effective Consolidation Stress, psi	70.0
Length, H_c, in.	5.87		Cyclic Load, P_c, lbs	235.67
			Cyclic Deviator Stress, psi	36.5

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
471.3	0.1376	3116	1.171

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
22.913	8.104	22.5



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

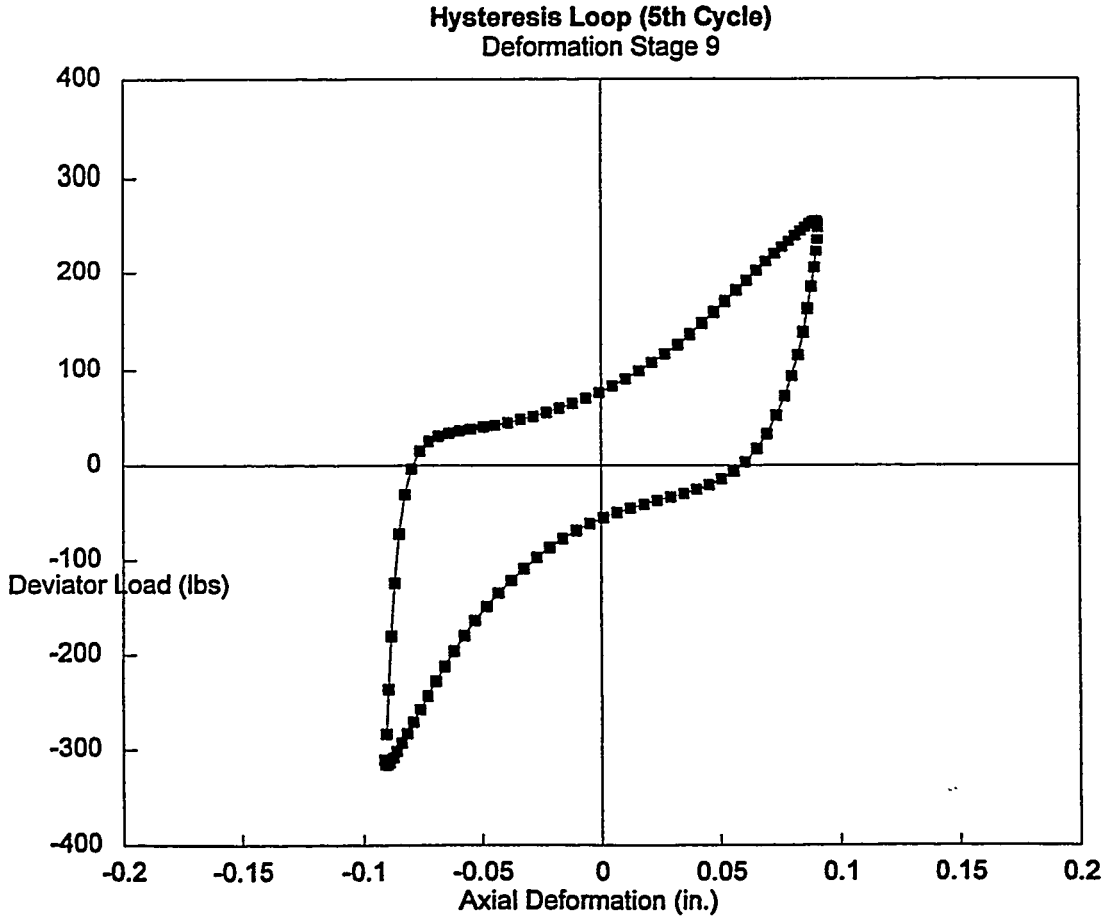
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-12
Test Date:	11/29/93-12/02/93	Sample No.:	ST-15
Reviewed By:	JW/RLB RLB	Depth:	143.0' - 144.9'
Review Date:	12/14/93	Sample Description:	See classification data

Area, A_c, in ^{2}	6.46		Effective Consolidation Stress, psi	70.0
Length, H_c, in.	5.87		Cyclic Load, P_c, lbs	302.20
			Cyclic Deviator Stress, psi	46.8

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
604.4	0.1820	3020	1.549

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
34.162	13.751	19.8



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

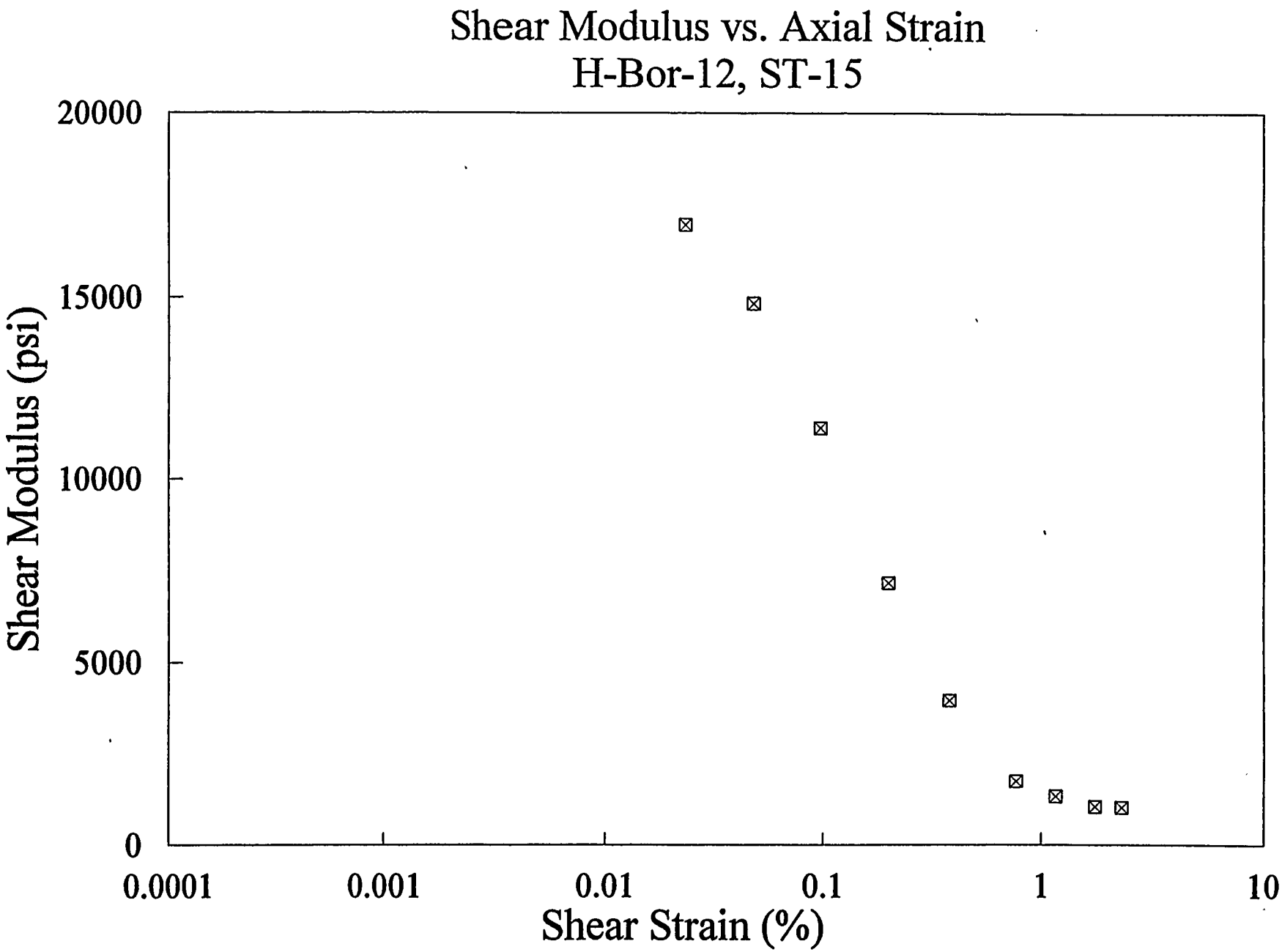
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-12
Test Date:	11/29/93-12/02/93	Sample No.:	ST-15
Reviewed By:	JW/RLB RLB	Depth:	143.0' - 144.9'
Review Date:	12/14/93	Sample Description:	See classification data

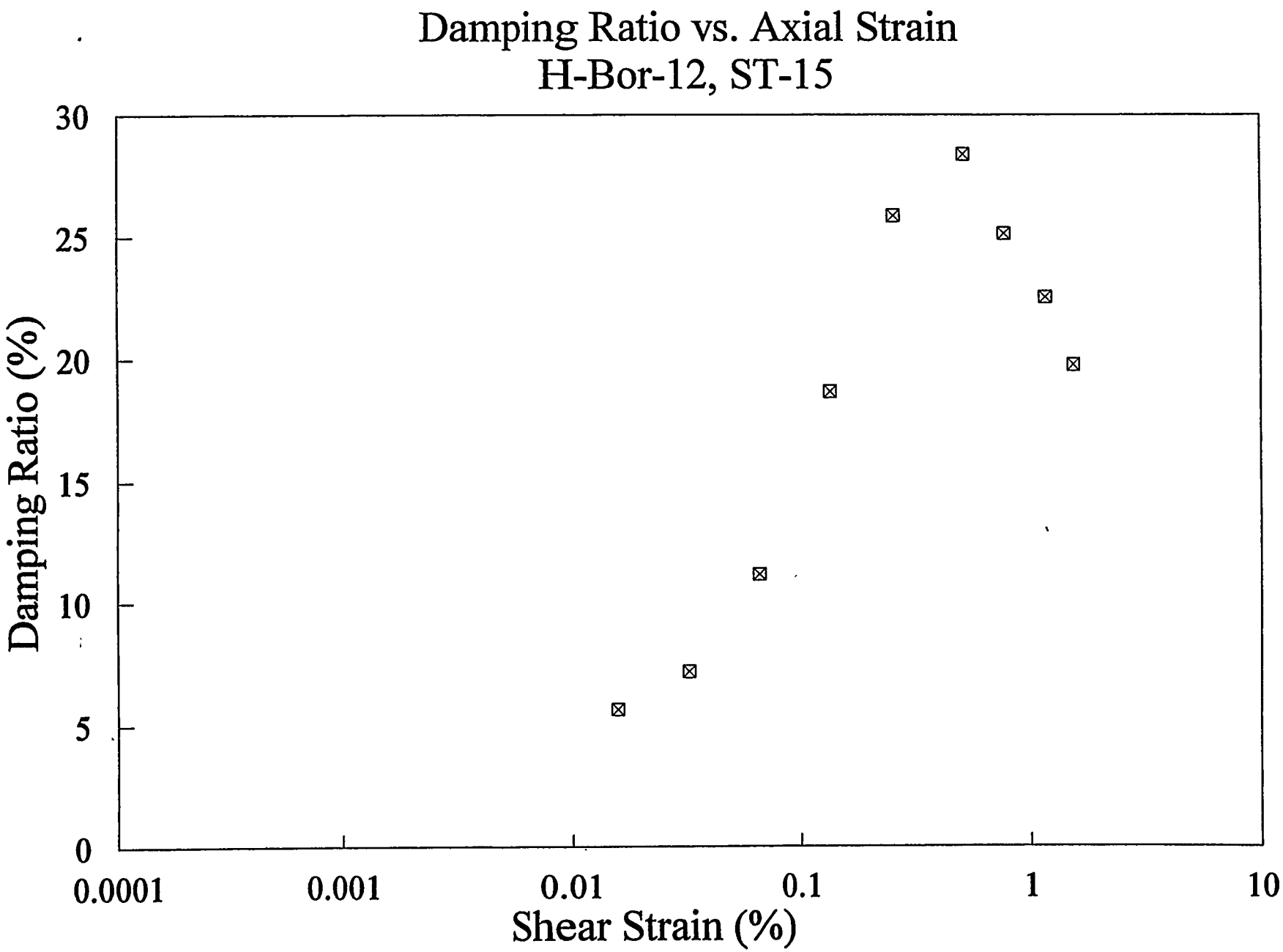
Effective Consolidation Stress 70 psi

Deformation Stage No.	Cyclic Stress (psi)	Axial Strain ε (%)	Young's Modulus E, (psi)	Damping Ratio D, (%)	Shear* Modulus G, (psi)	Shear* Strain γ (%)
1	8.0	0.016	50905	5.64	16968	0.023
2	14.3	0.032	44495	7.19	14832	0.048
3	22.3	0.065	34159	11.17	11386	0.098
4	28.9	0.135	21488	18.67	7163	0.202
5	30.3	0.255	11867	25.89	3956	0.383
6	26.7	0.514	5188	28.39	1729	0.771
7	30.5	0.774	3945	25.14	1315	1.161
8	36.5	1.171	3116	22.50	1039	1.756
9	46.8	1.549	3020	19.77	1007	2.324

* Calculated based on assumed Poisson's Ratio value, 0.5.
All calculations are based on 5th cycle.



Law Engineering Project No.: 5810535301
SRS-ITP: Strain Controlled Cyclic Triaxial



Law Engineering Project No: 5810535301
SRS-ITP: Strain Controlled Cyclic Triaxial

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

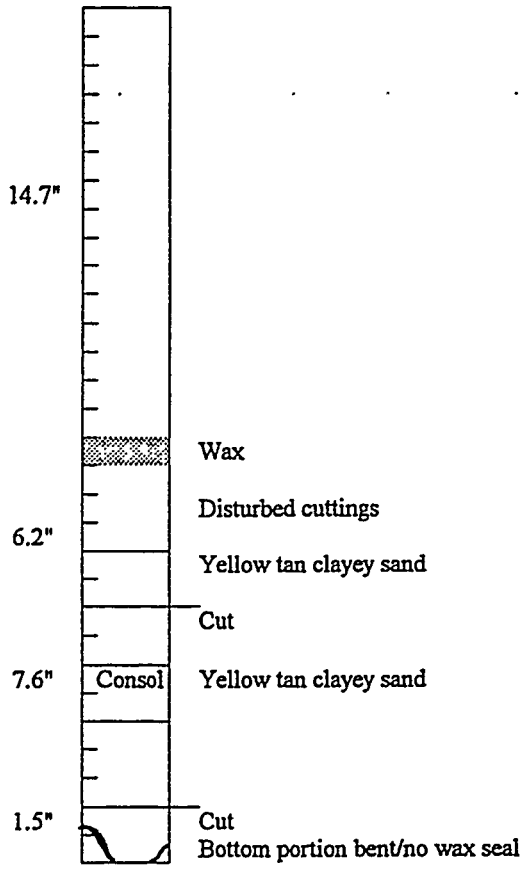
Project: SRS-ITP GEOTECHNICAL TESTING Date: 09-02-93

Boring No: H-Bor-12 Sample No: ST-16 Depth: 151' - 152'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: CLG Checked By: RLB

VISUAL DESCRIPTION

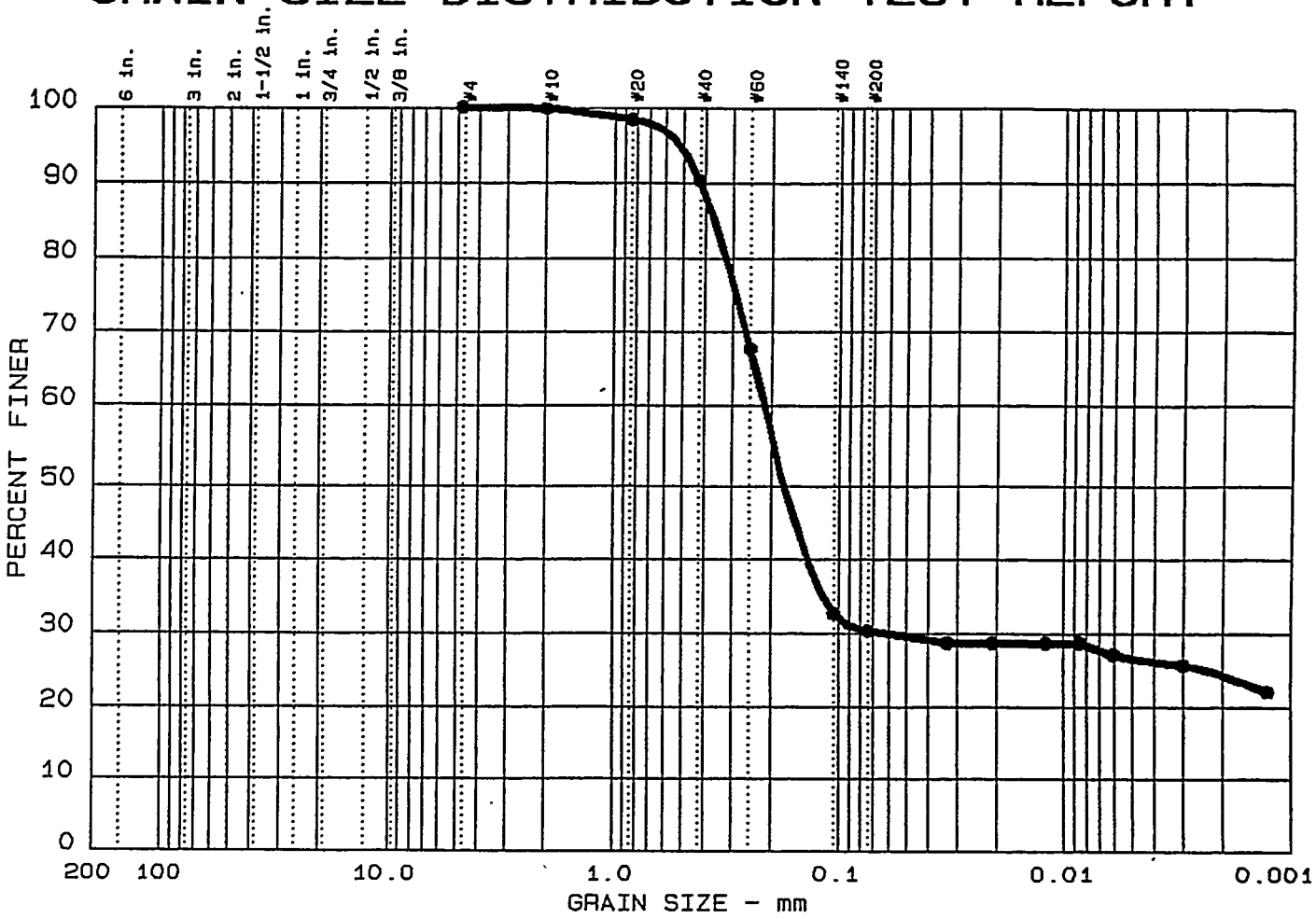


Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b12-st16.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	4	0.0	0.0	69.8	3.6	26.6

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	43	23	0.36	0.22	0.18	0.065				

MATERIAL DESCRIPTION	USCS	AASHTO
● Yellow-Tan Clayey Medium to Fine Sand	SC	A-2-7 (2.0)

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-12 ST-16 @ 151-152 FT.

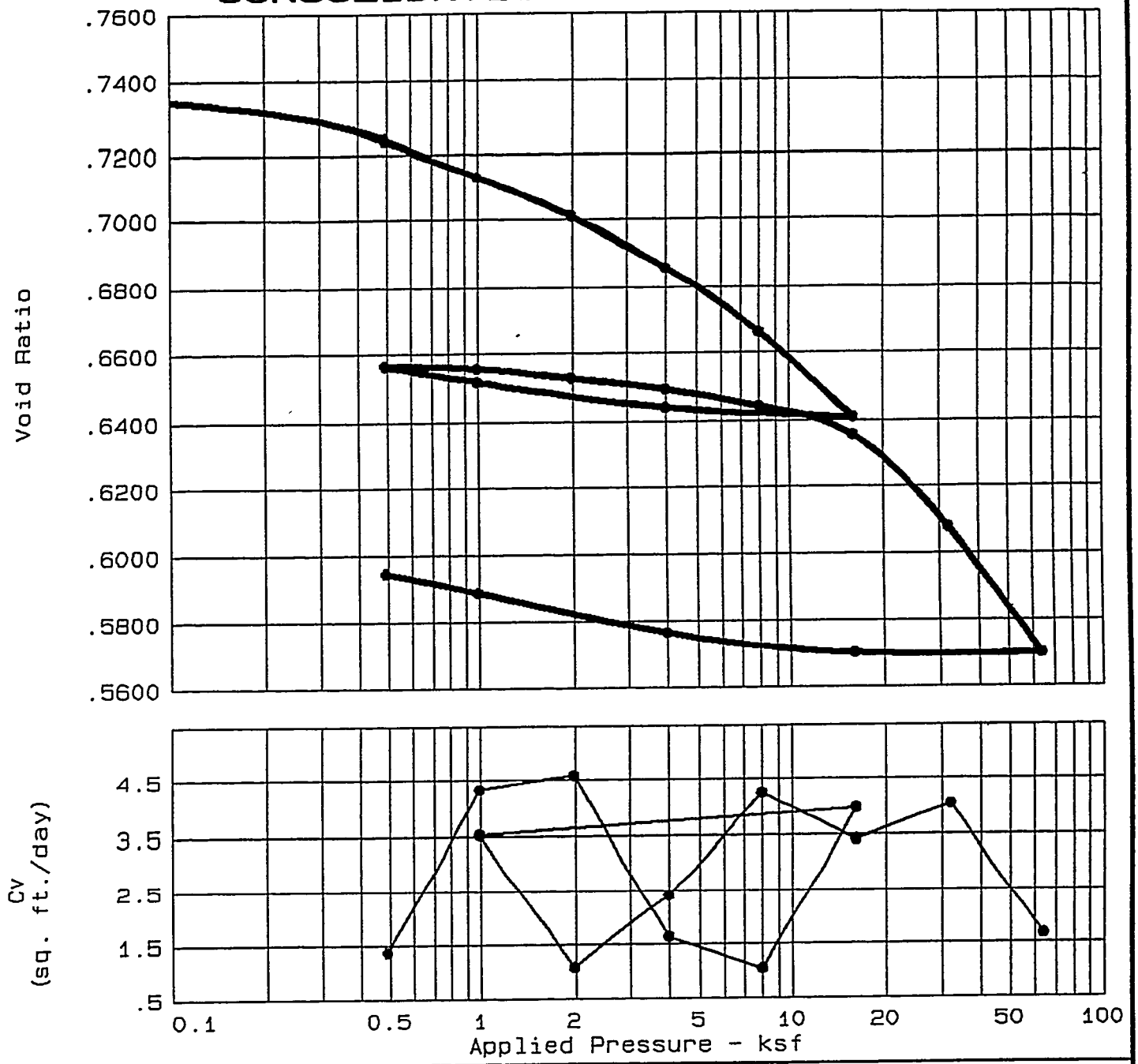
Date: September 23, 1993

Remarks:
Tested by: JRR
Reviewed by: RLB
Consol

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

CONSOLIDATION TEST REPORT



Swell press.	Nat. Sat.	Nat. Moist.	Dry Density	LL	PI	Sp.Gr.	Initial void ratio
	96.3 %	26.7	95.4	43	23	2.65	0.7339

TEST RESULTS	MATERIAL DESCRIPTION
	Yellow-Tan Clayey Medium to Fine Sand Class: SC
Project No.: 5810535301 Project: SRS ITP Location: H-Bor-12 ST-16 151-153 Ft. Date: 9/2/93	Remarks: Tested by: CLG Reviewed by: RLB
CONSOLIDATION TEST REPORT **LAW ENGINEERING, INC.**	Fig. No._____

18:49, 10-14-1993 CONSOLIDATION TEST PROJECT DATA Test No. 12

Project Number:	5810535301
Project:	SRS ITP
Date:	9/2/93
Location 1:	H-Bor-12 ST-16
2:	151-153 Ft.
Remarks 1:	
2:	Tested by: CCG
3:	Reviewed by: RLB
4:	
5:	
Material 1:	Yellow-Tan Clayey
description 2:	Medium to Fine Sand
Classification:	SC
Liquid limit:	43
Plasticity index:	23
Figure Number:	

CONSOLIDATION TEST SPECIMEN DATA

TOTAL SAMPLE	BEFORE TEST	AFTER TEST
Wet w+t = 340.39 g.	Oedometer No. = 7	Wet w+t = 338.46 g.
Dry w+t = 314.40 g	Machine No. = 7	Dry w+t = 314.40 g.
Tare wt. = 216.98 g.	Spec. Gravity = 2.65	Tare wt. = 216.98 g.
Height = 0.89 in.	Height = 0.89 in.	
Diameter = 2.36 in.	Diameter = 2.36 in.	
Weight = 123.41 g.		
Moisture = 26.7 %	Ht. Solids = 0.51 in.	Moisture = 24.7 %
Wet Den. = 120.9 pcf	Dry wt. = 97.42 g. *	Dry wt. = 97.42 g.
Dry Den. = 95.4 pcf	Void ratio = 0.7339	Void ratio = 0.5946
	Saturation = 96.3 %	Saturation = 110. %

* Initial dry weight used in calculations

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
Initial	0.02000			0.7339	
0.49	0.02560	0.0002	0.02540	0.7234	0.6 Comprs.
0.99	0.03120	0.0004	0.03080	0.7129	1.2 Comprs.
1.99	0.03760	0.0006	0.03700	0.7008	1.9 Comprs.
3.99	0.04590	0.0012	0.04470	0.6858	2.8 Comprs.
8.00	0.05700	0.0022	0.05480	0.6661	3.9 Comprs.
16.02	0.07125	0.0034	0.06785	0.6407	5.4 Comprs.
3.99	0.06740	0.0012	0.06620	0.6439	5.2 Comprs.
0.99	0.06260	0.0004	0.06220	0.6517	4.7 Comprs.
0.49	0.06000	0.0002	0.05980	0.6564	4.5 Comprs.

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
0.99	0.06060	0.0004	0.06020	0.6556	4.5 Comprs.
1.99	0.06230	0.0006	0.06170	0.6527	4.7 Comprs.
3.99	0.06460	0.0012	0.06340	0.6494	4.9 Comprs.
8.00	0.06830	0.0022	0.06610	0.6441	5.2 Comprs.
16.02	0.07400	0.0034	0.07060	0.6354	5.7 Comprs.
32.08	0.09060	0.0058	0.08480	0.6077	7.3 Comprs.
63.78	0.11430	0.0101	0.10420	0.5699	9.5 Comprs.
16.02	0.10750	0.0034	0.10410	0.5701	9.4 Comprs.
3.99	0.10210	0.0012	0.10090	0.5763	9.1 Comprs.
0.99	0.09490	0.0004	0.09450	0.5888	8.4 Comprs.
0.49	0.09170	0.0002	0.09150	0.5946	8.0 Comprs.

CONSOLIDATION TEST RESULTS

Compression index = NOT SELECTED
Preconsolidation pressure = NOT SELECTED

Load 0.49 ksf — CONSOLIDATION TEST READINGS — Load No. 1

Machine Deflection 0.0002

No.	Elapsed Time	Dial Reading
1	0.00	0.02000
2	0.10	0.02460
3	0.25	0.02470
4	0.50	0.02480
5	1.00	0.02490
6	2.00	0.02500
7	8.00	0.02520
8	15.00	0.02525
9	30.00	0.02540
10	60.00	0.02560

Void Ratio: 0.7234 Compression: 0.6 %
D0 = 0.0242 D90 = 0.0248 D100 = 0.0248 T90 = 1.23 min.
Cv @ 1.2 min.= 1.36 sq. feet/day

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

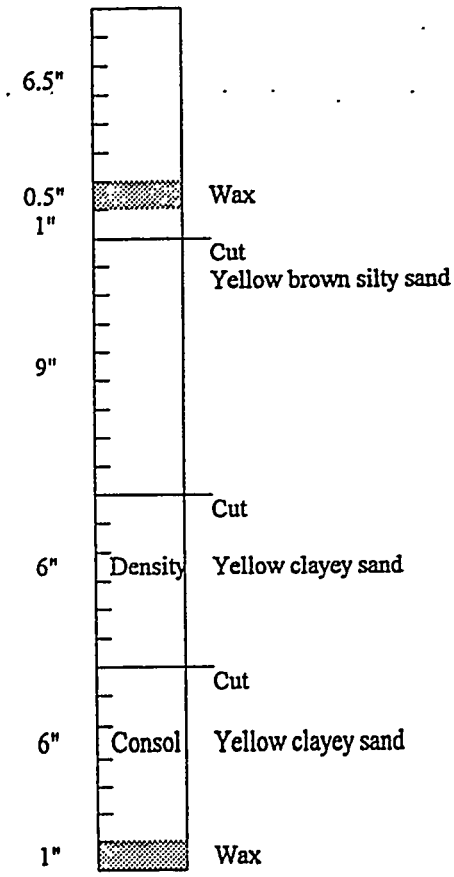
Project: SRS-ITP GEOTECHNICAL TESTING Date: 10-14-93

Boring No: H-Bor-12 Sample No: ST-19 Depth: 172' - 174'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: CLG Checked By: RLB

VISUAL DESCRIPTION



Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b12-st19.wk3

ATTACHMENT 3

Tested by:	JRR	Reviewed by:	RLB	Law Job No.	5810535301
Date:	10/14/93	Date:	10/15/93	Job Name	SRS - ITP

TP-4A: UNIT WEIGHT OF SAMPLE
"TYPICAL"

Sample: Boring No.: H-Bor-12
Depth: 172' - 174'
Sample ID: ST-19

MEASUREMENTS (Nominal 6-inch cut sample height):

TOTAL SAMPLE HEIGHT (inches)		INSIDE DIAMETER OF CUT TUBE (inches)	
1	6.231		
2	6.217	top	2.875
3	6.231	bottom	2.877
Avg.	6.226 (H)	Avg.	2.876 (D)

MOISTURE CONTENT DETERMINATION

MOISTURE CONTENT	
Tare No.	C-31
Tare Weight	16.30 gm
Wet Wt. + Tare	195.23 gm
Dry Wt. + Tare	157.07 gm
Wt. of Water	38.16 gm
Dry Weight	140.77 gm
Moisture Content, w	27.1 %

TOTAL WEIGHT OF SOIL + TUBE SECTION	W_{s+t} =	1731.94 gm
WEIGHT OF CLEAN, DRY TUBE SECTION	W_t =	438.41 gm
WET WEIGHT OF SOIL, $[(W_{s+t} - W_t)/454]$	W_s =	2.849 lbs
VOLUME OF SAMPLE, $[(pi*D^2/4)*H/1728]$	V =	0.023 ft^3
WET DENSITY, $[W_s/V]$	**D_w=**	**121.7 pcf**
DRY DENSITY, $[D_w/(1+w/100)]$	**D_D=**	**95.8 pcf**

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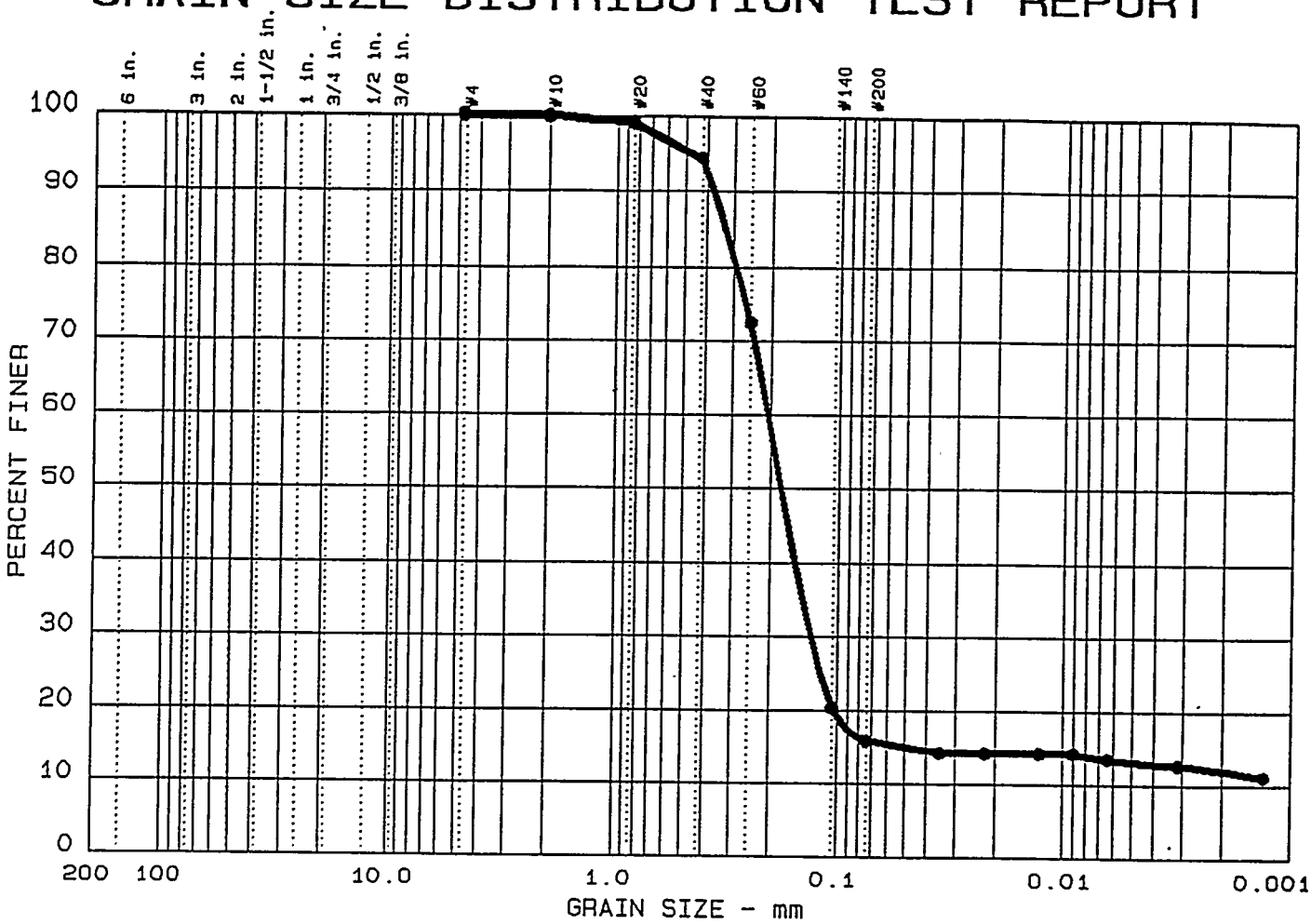
GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	3	0.0	0.0	84.3	2.8	12.9

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	32	9	0.33	0.21	0.18	0.131	0.0522			

MATERIAL DESCRIPTION	USCS	AASHTO
● Yellow Clayey Medium to Fine Sand	SC	A-2-4 (0.0)

Project No.: 5810535301
Project: SRS-ITP
◆ Location: H-Bor-12 ST-19 @ 172 Ft.

Date: October 25, 1993

Remarks:

Tested by: JRR

Reviewed by: RLB

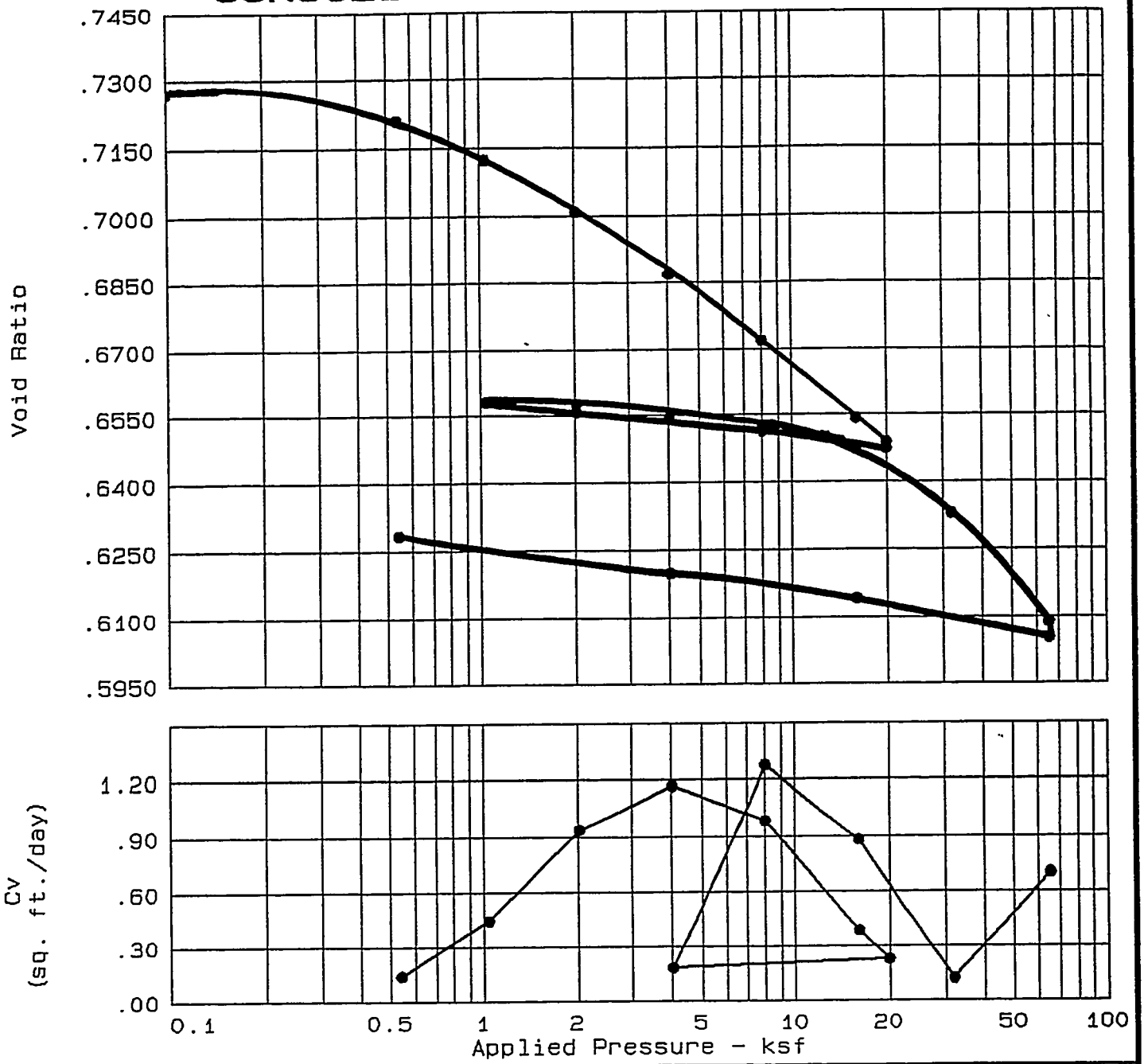
Consol.

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

CONSOLIDATION TEST REPORT



Clpse. %	Nat. Sat.	Nat. Moist.	Dry Density	LL	PI	Sp.Gr.	Initial void ratio
0.2	96.5 %	25.9	97.9	32	9	2.710	0.7271

TEST RESULTS	MATERIAL DESCRIPTION
	Yellow Clayey Medium to Fine Sand Class: SC
Project No.: 5810535301 Project: SRS-ITP Location: H-Bor-12 ST-19 @ 172'-174' Date: Oct. 19, 1993	Remarks: Tested by: CLG Reviewed by: RLB
CONSOLIDATION TEST REPORT LAW ENGINEERING, INC.	Fig. No._____

16:55, 2-01-1994 CONSOLIDATION TEST PROJECT DATA Test No. 22

roject Number: 5810535301
Project: SRS-ITP
Date: Oct. 19,1993
Location 1: H-Bor-12 ST-19 @ 172'-174'
2:
Remarks 1: Tested by:
2: Reviewed by:
3:
4:
5:
Material 1: Yellow Clayey Medium
description 2: to Fine Sand
Classification: SC
Liquid limit: 32
Plasticity index: 9
Figure Number:

CONSOLIDATION TEST SPECIMEN DATA

TOTAL SAMPLE	BEFORE TEST	AFTER TEST
Wet w+t = 343.50 g.	Oedometer No. = 14	Wet w+t = 342.07 g.
Dry w+t = 318.94 g	Machine No. = 14	Dry w+t = 318.94 g.
Tare wt. = 224.10 g.	Spec. Gravity = 2.710	Tare wt. = 224.10 g.
ght = 0.7520 in.	Height = 0.7520 in.	
meter = 2.5000 in.	Diameter = 2.4990 in.	
Weight = 119.40 g.		
Moisture = 25.9 %	Ht. Solids = 0.4354 in.	Moisture = 24.4 %
Wet Den. = 123.2 pcf	Dry wt. = 94.76 g.	Dry wt. = 94.84 g. *
Dry Den. = 97.9 pcf	Void ratio = 0.7271	Void ratio = 0.6283
	Saturation = 96.5 %	Saturation = 105.2 %

* Final dry weight used in calculations

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
Initial	0.02000			0.7271	
0.10	0.02010	0.0000	0.02010	0.7269	0.0 Comprs.
0.54	0.02350	0.0000	0.02350	0.7208*	0.4 Comprs.*
1.04	0.02790	0.0006	0.02730	0.7122*	0.9 Comprs.*
2.04	0.03380	0.0014	0.03240	0.7007*	1.5 Comprs.*
4.04	0.04100	0.0026	0.03840	0.6866*	2.3 Comprs.*
8.04	0.04890	0.0038	0.04510	0.6718*	3.2 Comprs.*
16.03	0.05755	0.0047	0.05285	0.6542*	4.2 Comprs.*
20.00	0.05970	0.0050	0.05470	0.6488*	4.5 Comprs.*
20.00	0.06030	0.0050	0.05530	0.6475	4.6 Comprs.
8.04	0.05740	0.0038	0.05360	0.6514	4.4 Comprs.
2.04	0.05310	0.0014	0.05170	0.6557	4.1 Comprs.
1.04	0.05130	0.0006	0.05070	0.6580	4.0 Comprs.
2.04	0.05230	0.0014	0.05090	0.6576	4.0 Comprs.

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
4.04	0.05435	0.0026	0.05175	0.6546*	4.2 Comprs.*
8.04	0.05650	0.0038	0.05270	0.6526*	4.3 Comprs.*
16.03	0.06000	0.0047	0.05530	0.6473*	4.6 Comprs.*
32.03	0.06820	0.0058	0.06240	0.6329*	5.5 Comprs.*
65.59	0.08120	0.0081	0.07310	0.6088*	6.9 Comprs.*
65.59	0.08280	0.0081	0.07470	0.6051	7.1 Comprs.
16.03	0.07550	0.0047	0.07080	0.6141	6.5 Comprs.
4.04	0.07090	0.0026	0.06830	0.6198	6.2 Comprs.
0.54	0.06460	0.0000	0.06460	0.6283	5.7 Comprs.

* CALCULATED USING D100 INSTEAD OF FINAL READING

CONSOLIDATION TEST RESULTS

Compression index = NOT SELECTED
Preconsolidation pressure = NOT SELECTED

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

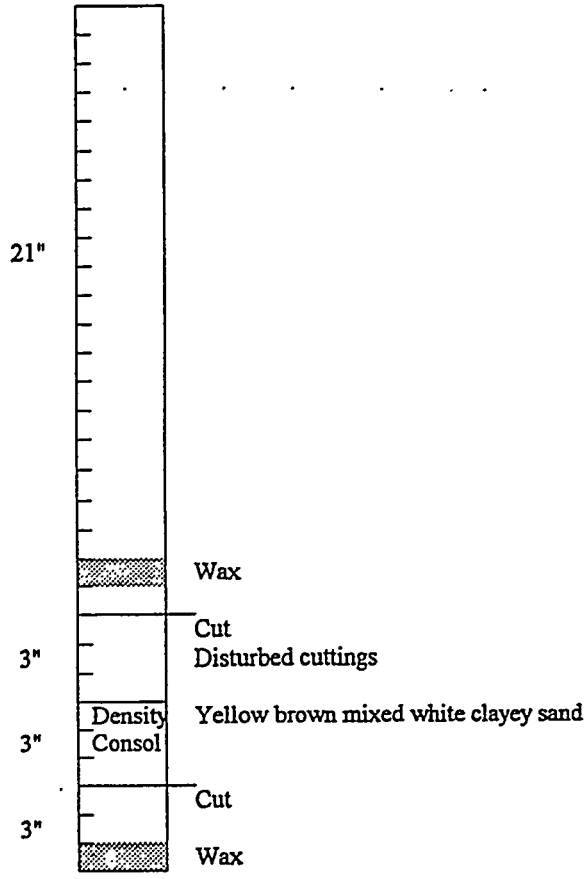
Project: SRS-ITP GEOTECHNICAL TESTING Date: 01-06-93

Boring No: H-Bor-12 Sample No: ST-20 Depth: 179' - 179'10"

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: CLG Checked By: RLB

VISUAL DESCRIPTION



Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b12-st20.wk3

ATTACHMENT 3

Tested by:	CLG	Reviewed by:	RLB	Law Job No.	5810535301
Date:	01-12-94	Date:	01-14-93	Job Name	SRS - ITP

TP-4A: UNIT WEIGHT OF SAMPLE
"TYPICAL"

Sample: Boring No.: H-Bor-12
Depth: 179'
Sample ID: ST-20

MEASUREMENTS (Nominal 6-inch cut sample height):

TOTAL SAMPLE HEIGHT (inches)		INSIDE DIAMETER OF CUT TUBE (inches)	
1	2.855		
2	2.857	top	2.873
3	2.852	bottom	2.876
Avg.	2.855 (H)	Avg.	2.875 (D)

MOISTURE CONTENT DETERMINATION

MOISTURE CONTENT	
Tare No.	V-76
Tare Weight	16.88 gm
Wet Wt. + Tare	110.52 gm
Dry Wt. + Tare	88.78 gm
Wt. of Water	21.74 gm
Dry Weight	71.90 gm
Moisture Content, *w*	30.2 %

TOTAL WEIGHT OF SOIL + TUBE SECTION	W_{s+t} =	528.72 gm
WEIGHT OF CLEAN, DRY TUBE SECTION	W_t =	0 gm
WET WEIGHT OF SOIL, [(W_{s+t} - W_t)/454]	W_s =	1.165 lbs
VOLUME OF SAMPLE, [(pi*D²/4)*H/1728]	V =	0.011 ft³
WET DENSITY, [W_s/V]	**D_w=**	**108.6 pcf**
DRY DENSITY, [D_w/(1+w/100)]	**D_D=**	**83.4 pcf**

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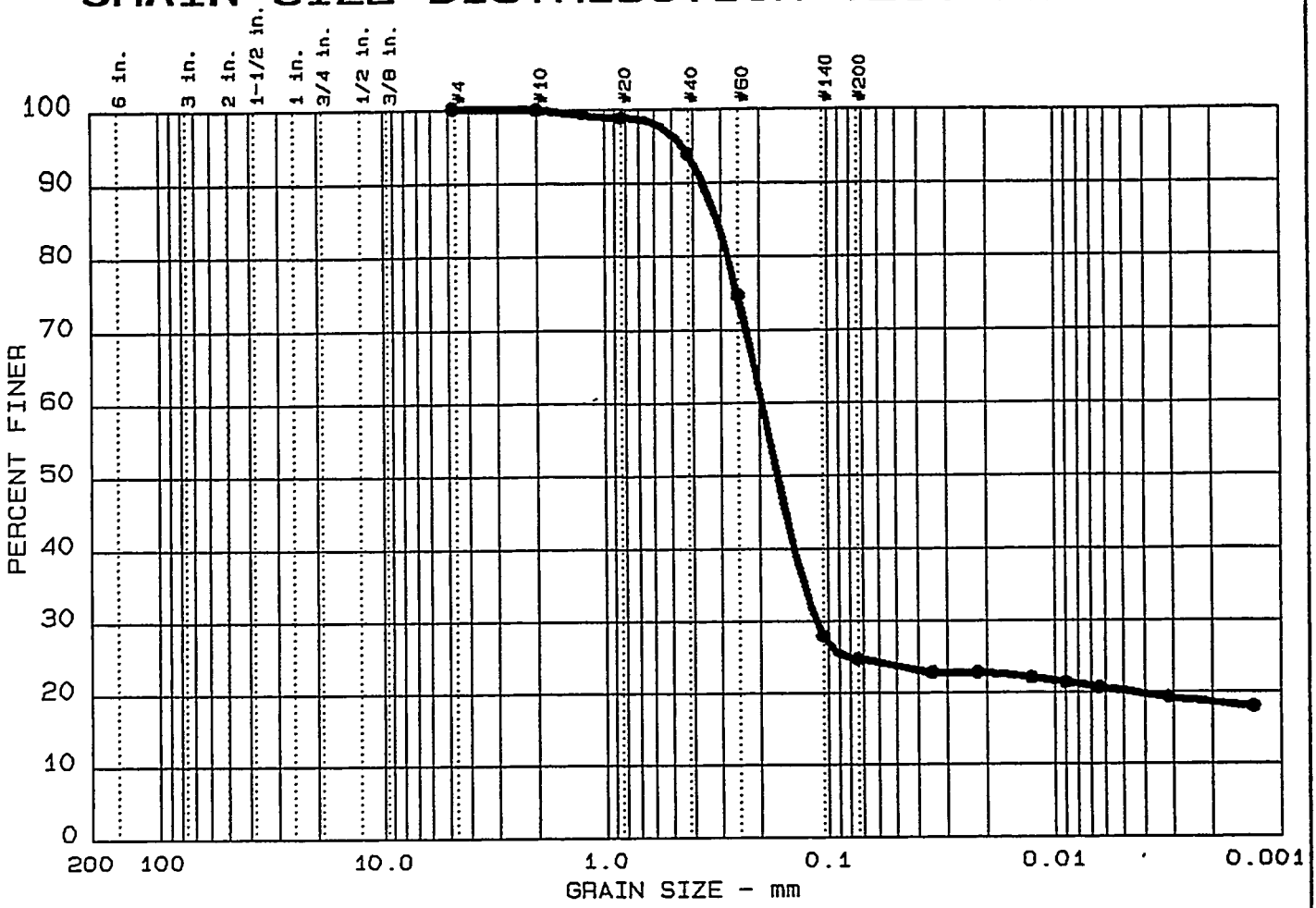
GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	14	0.0	0.0	75.4	4.5	20.1

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	32	13	0.31	0.20	0.17	0.113				

MATERIAL DESCRIPTION	USCS	AASHTO
● Yellow Brown Clayey Sand	SC	A-2-6 (0.3)

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-12 ST-20 @ 179-179'9"

Date: January 19, 1994

Remarks:

Tested by: CLG

Reviewed by: RLB

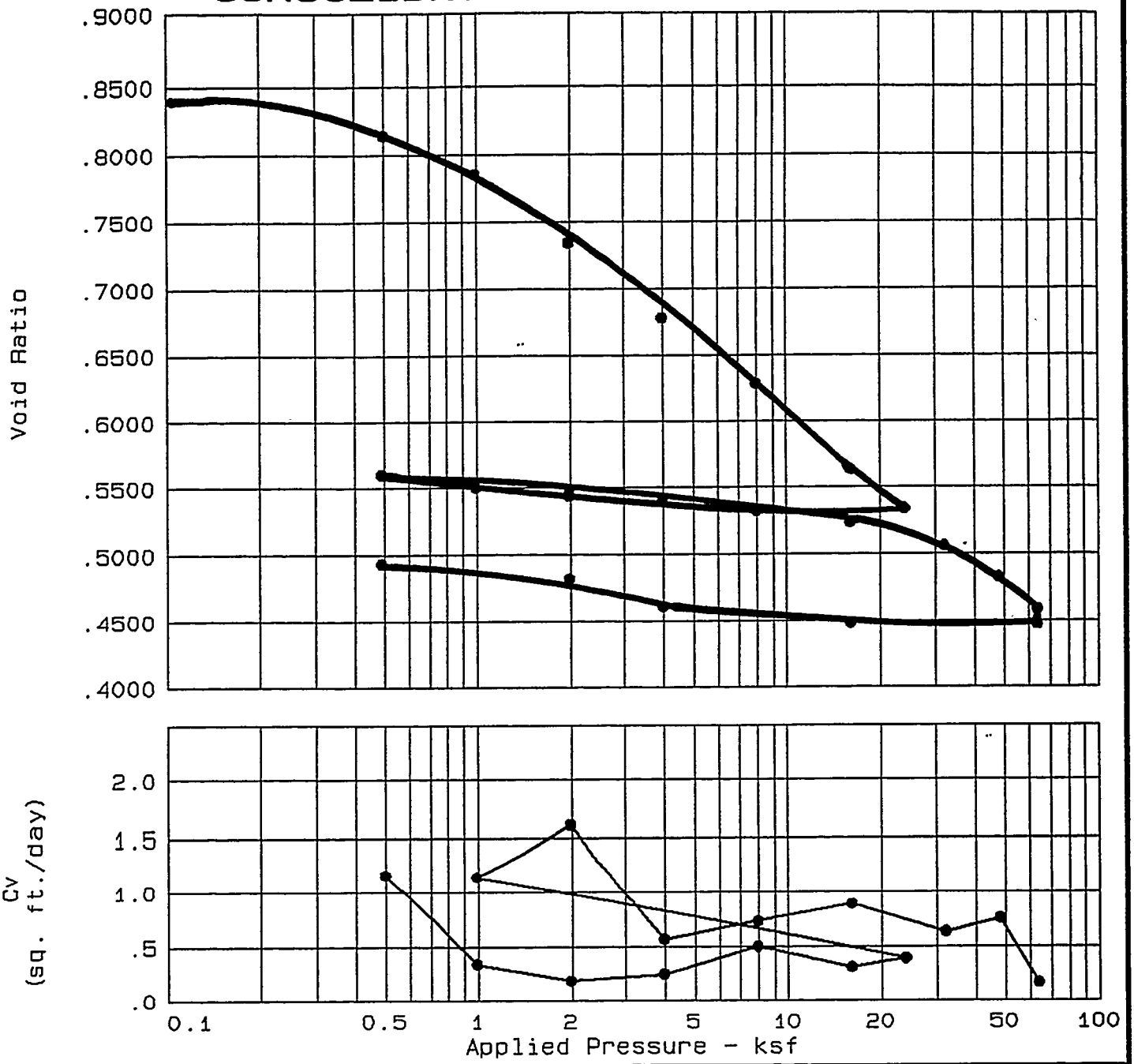
Sample Dens. (Consol)

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

CONSOLIDATION TEST REPORT



Clpse. %	Nat. Sat.	Nat. Moist.	Dry Density	LL	PI	Sp.Gr.	Initial void ratio
0.6	100.1 %	31.2	90.6	32	13	2.650	0.8270

TEST RESULTS	MATERIAL DESCRIPTION
	Yellow Brown Clayey Sand
Project No.: 5810535301 Project: SRS-ITP Location: H-Bor-12 ST-20 179'-179'10" Date: January 6, 1994	Class: SC Remarks: Tested by: CLG Reviewed by: RLB
CONSOLIDATION TEST REPORT LAW ENGINEERING, INC.	Fig. No._____

21:07, 2-01-1994 CONSOLIDATION TEST PROJECT DATA Test No. 42

roject Number:	5810535301
roject:	SRS-ITP
Date:	January 6,1994
Location 1:	H-Bor-12 ST-20 179'-179'10"
2:	
Remarks 1:	Tested by:
2:	Reviewed by:
3:	
4:	
5:	
Material 1:	Yellow Brown Clayey
description 2:	Sand
Classification:	SC
Liquid limit:	32
Plasticity index:	13
Figure Number:	

CONSOLIDATION TEST SPECIMEN DATA

TOTAL SAMPLE	BEFORE TEST	AFTER TEST
Wet w+t = 339.18 g.	Oedometer No. = 7	Wet w+t = 330.26 g.
Dry w+t = 310.52 g	Machine No. = 7	Dry w+t = 310.52 g.
Tare wt. = 218.79 g.	Spec. Gravity = 2.650	Tare wt. = 218.79 g.
ght = 0.8900 in.	Height = 0.8900 in.	
meter = 2.3600 in.	Diameter = 2.3590 in.	
Weight = 121.45 g.		
Moisture = 31.2 %	Ht. Solids = 0.4871 in.	Moisture = 21.5 %
Wet Den. = 118.8 pcf	Dry wt. = 92.46 g. *	Dry wt. = 91.73 g.
Dry Den. = 90.6 pcf	Void ratio = 0.8270	Void ratio = 0.4893
	Saturation = 100.1 %	Saturation = 116.5 %

* Initial dry weight used in calculations

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
Initial	0.02000			0.8270	
0.50	0.03040	0.0000	0.03040	0.8141*	0.7 Comprs.*
0.99	0.04620	0.0004	0.04580	0.7844*	2.3 Comprs.*
1.99	0.07150	0.0006	0.07090	0.7341*	5.1 Comprs.*
3.98	0.09910	0.0000	0.09910	0.6775*	8.2 Comprs.*
8.00	0.12880	0.0022	0.12660	0.6282*	10.9 Comprs.*
16.02	0.15560	0.0034	0.15220	0.5636*	14.4 Comprs.*
24.00	0.17220	0.0046	0.16760	0.5336*	16.1 Comprs.*
24.00	0.17230	0.0046	0.16770	0.5334	16.1 Comprs.
8.00	0.17010	0.0022	0.16790	0.5330	16.1 Comprs.
1.99	0.16340	0.0006	0.16280	0.5434	15.5 Comprs.
0.49	0.15490	0.0002	0.15470	0.5601	14.6 Comprs.
0.99	0.15590	0.0004	0.15550	0.5499*	15.2 Comprs.*
1.99	0.15850	0.0006	0.15790	0.5460*	15.4 Comprs.*

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
3.99	0.16230	0.0012	0.16110	0.5398*	15.7 Comprs.*
8.00	0.16680	0.0022	0.16460	0.5318*	16.2 Comprs.*
16.02	0.17200	0.0034	0.16860	0.5236*	16.6 Comprs.*
32.08	0.18510	0.0058	0.17930	0.5058*	17.6 Comprs.*
48.00	0.20060	0.0080	0.19260	0.4827*	18.8 Comprs.*
63.78	0.21050	0.0101	0.20040	0.4585*	20.2 Comprs.*
63.78	0.21600	0.0101	0.20590	0.4472	20.8 Comprs.
16.02	0.20910	0.0034	0.20570	0.4476	20.8 Comprs.
3.99	0.20050	0.0012	0.19930	0.4608	20.0 Comprs.
1.99	0.18870	0.0006	0.18810	0.4838	18.8 Comprs.
0.49	0.18560	0.0002	0.18540	0.4893	18.5 Comprs.

* CALCULATED USING D100 INSTEAD OF FINAL READING

CONSOLIDATION TEST RESULTS

Compression index = NOT SELECTED
Preconsolidation pressure = NOT SELECTED

Load 0.50 ksf — CONSOLIDATION TEST READINGS — Load No. 1

Machine Deflection 0.0000

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.02000	11	60.00	0.03010
2	0.10	0.02390	12	120.00	0.03040
3	0.25	0.02440			
4	0.50	0.02500			
5	1.00	0.02560			
6	2.00	0.02630			
7	4.00	0.02700			
8	8.00	0.02780			
9	15.00	0.02850			
10	30.00	0.02960			

Void Ratio: 0.8141 Compression: 0.7 % >>> CALCULATED USING D100
D0 = 0.0230 D90 = 0.0259 D100 = 0.0263 T90 = 1.43 min.
Cv @ 1.4 min.= 1.17 sq. feet/day

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

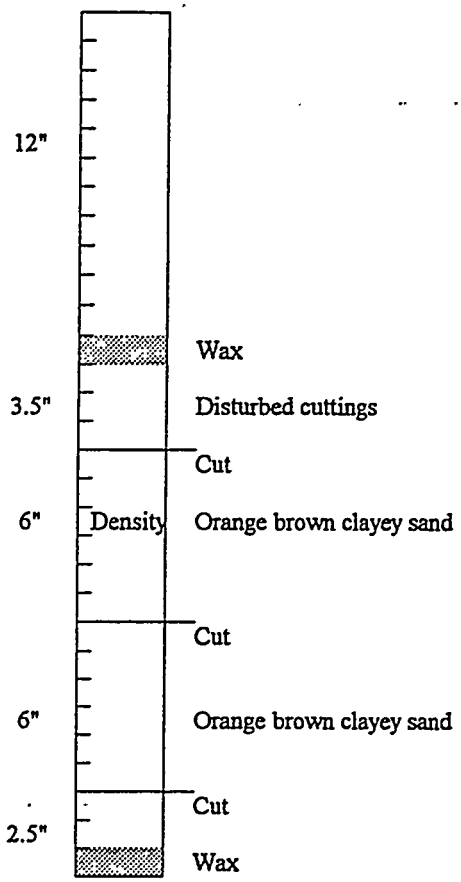
Project: SRS-ITP GEOTECHNICAL TESTING Date: 11-30-93

Boring No: H-Bor-12 Sample No: ST-21 Depth: 186' - 187'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: CLG Checked By: RLB

VISUAL DESCRIPTION



Remarks:

1028mf srs-itp-saif
7/22/93

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ATTACHMENT 3

Tested by:	JTK	Reviewed by:	RLB	Law Job No.	5810535301
Date:	11/30/93	Date:	12/13/93	Job Name	SRS - ITP

TP-4A: UNIT WEIGHT OF SAMPLE

"TYPICAL"

Sample: Boring No.: H-Bor-12
Depth: 186' - 187'
Sample ID: ST-21

MEASUREMENTS (Nominal 6-inch cut sample height):

TOTAL SAMPLE HEIGHT (inches)		INSIDE DIAMETER OF CUT TUBE (inches)	
1	6.141		
2	6.155	top	2.857
3	6.132	bottom	2.864
Avg.	6.143 (H)	Avg.	2.861 (D)

MOISTURE CONTENT DETERMINATION

MOISTURE CONTENT	
Tare No.	V-52
Tare Weight	16.98 gm
Wet Wt. + Tare	104.29 gm
Dry Wt. + Tare	87.00 gm
Wt. of Water	17.29 gm
Dry Weight	70.02 gm
Moisture Content, w	24.7 %

TOTAL WEIGHT OF SOIL + TUBE SECTION	W_{s+t} =	1701.85 gm
WEIGHT OF CLEAN, DRY TUBE SECTION	W_t =	431.76 gm
WET WEIGHT OF SOIL, $[(W_{s+t} - W_t)/454]$	W_s =	2.798 lbs
VOLUME OF SAMPLE, $[(pi*D^2/4)*H/1728]$	V =	0.023 ft^3
WET DENSITY, $[W_s/V]$	D_w=	122.5 pcf
DRY DENSITY, $[D_w/(1+w/100)]$	D_D=	98.2 pcf

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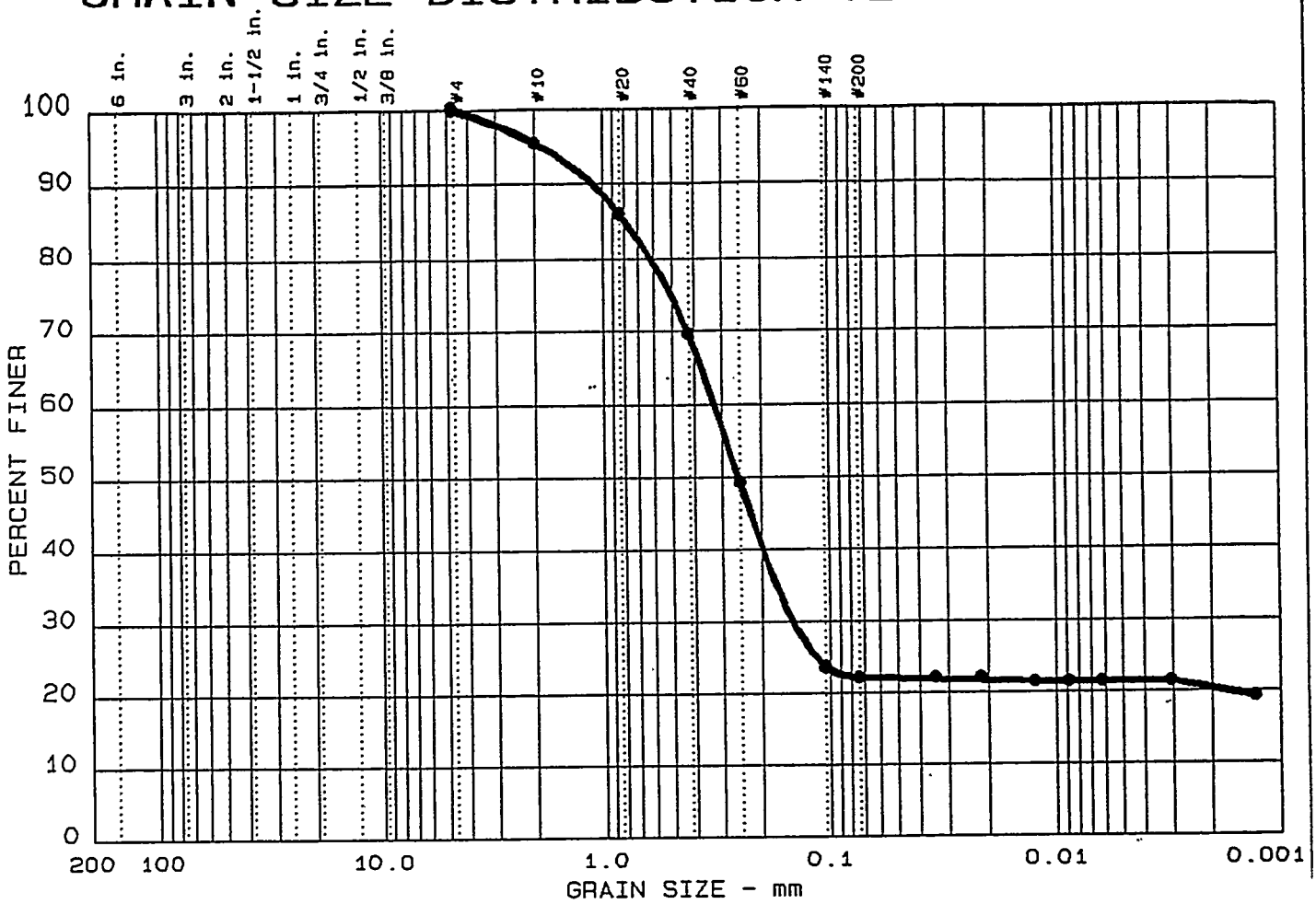
GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	5	0.0	0.0	77.9	0.7	21.4

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.79	0.32	0.25	0.145				

MATERIAL DESCRIPTION	USCS	AASHTO
● Orange Brown Clayey Sand		

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-12 ST-21 @186-187 Ft.

Date: January 3, 1994

Remarks:
Tested by: JTK Reviewed by: RLK
Sample Density
Atterberg Limits-#200
LL=93 PL=26 PI=67

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

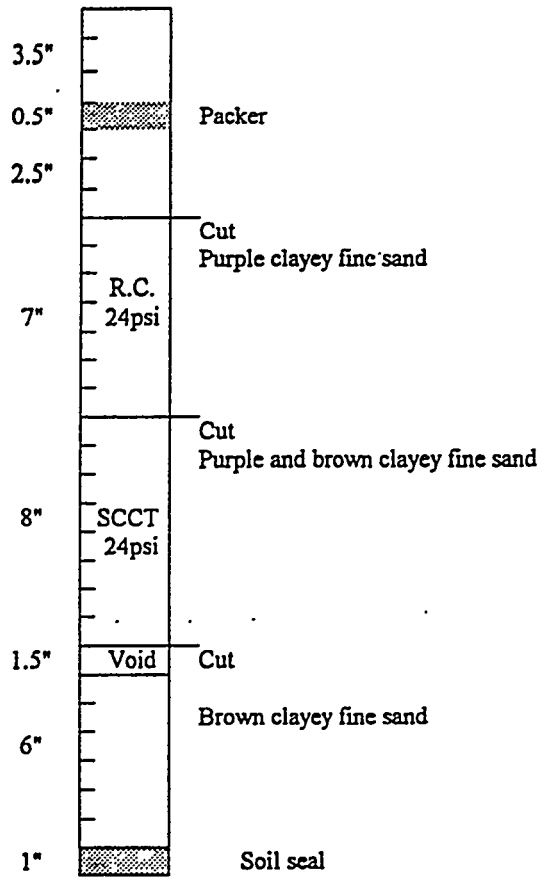
Project: SRS-ITP GEOTECHNICAL TESTING Date: 12-09-93

Boring No: H-Bor-23 Sample No: PS-1 Depth: 28' 8" - 30' 6"

Method of Sample Extrusion: Horizontal cut / Verticle extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION



Remarks:

1028mf srs-itp-ssif
7/22/93

rlb\itp\tubelog\b23-ps1.wk3

ATTACHMENT 2

Tested by:	HEJ	**Reviewed by:**	RLB	**Law Job No.:**	5810535301
Date:	12/09/93	**Date:**	12/13/93	**Job Name:**	SRS - ITP

TP-4A: UNIT WEIGHT OF THIN WALL TUBE SAMPLES

"TYPICAL"

Sample: Boring No.: H-Bor-23
Depth: 28'8" - 30'6"
Sample ID: PS-1

MEASUREMENTS (Entire Tube):

	FROM TOP OF TUBE			FROM BOTTOM OF TUBE			TOTAL TUBE LENGTH		INSIDE DIAMETER OF TUBE
	PACKER (inches)		SOIL (inches)	PACKER (inches)		SOIL (inches)	(inches)		(inches)
1.	3.36		3.58	0.80		1.60			
2.	3.38		3.78	1.01		1.65			
3.	3.38		3.76	0.90		1.85			
Avg.:	3.37	L_1 =	3.71	0.90	L_2 =	1.70	L_3 =	29.906 *	D_i = 2.887 *

TOTAL WEIGHT OF TUBE + PACKERS + SOIL	M_1 =	6,479.7	gm
WEIGHT OF PACKERS	M_2 =	146.4 *	gm
TOTAL WEIGHT OF TUBE	M_3 =	2,070.7 *	gm
WET WEIGHT OF SOIL COLUMN, [M_1-M_2-M_3]	M_4 =	4,262.6	gm

Denotes information supplied by WSRC/TO

MOISTURE CONTENTS (From assigned tests of same tube):

MOISTURE CONTENT		
Specimen 1:	21.3	% moisture
Specimen 2:	20.3	% moisture
Specimen 3:	N/A	% moisture
Average, (w):	20.8	% moisture

Notations:

Specimen 1 moisture content obtained from Strain-Control Cyclic Triaxial test
Specimen 2 moisture content obtained from Resonant Column test
Specimen 3 moisture content obtained from N/A test

CALCULATIONS:

CROSS-SECTIONAL AREA OF TUBE, [pi*(D_i^2)/4]	A_D=	6.55	in.^{2}
LENGTH OF SOIL COLUMN, [L_3 - L_2 - L_1]	L_s =	24.50	in.
VOLUME OF SOIL COLUMN, [L_s*A_D]	V_s =	160.38	in.^{3}
WET DENSITY, [(M_4/V_s)*3.810]	**D_w=**	**101.3**	**pcf**
DRY DENSITY, [D_w/(1+w/100)]	**D_D=**	**83.8**	**pcf**

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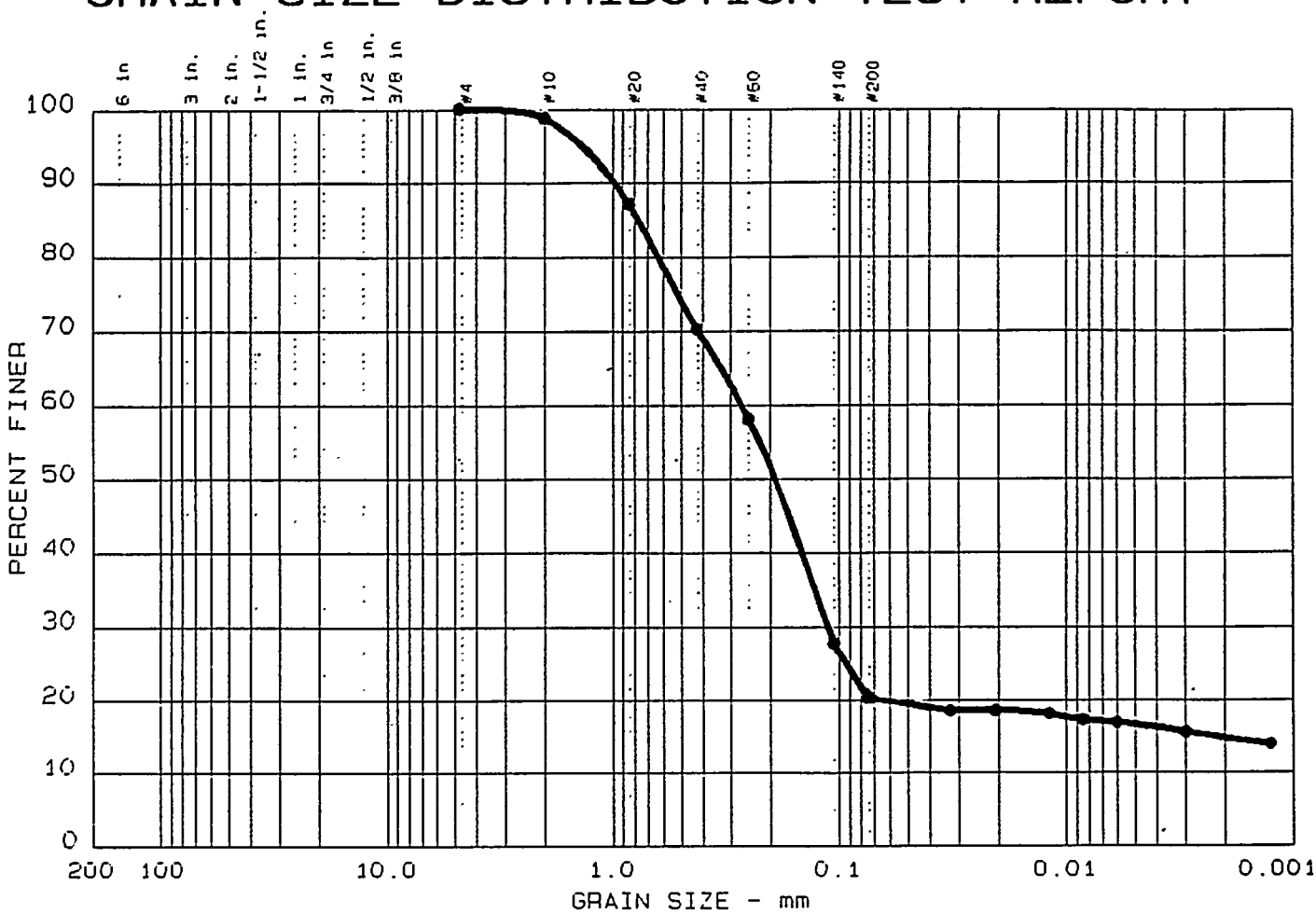
GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	4	0.0	0.0	79.7	3.7	16.6

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	38	21	0.76	0.27	0.19	0.112	0.0021			

MATERIAL DESCRIPTION	USCS	AASHTO
● Purple and Brown Clayey Sand	SC	A-2-6 (0.6)

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-23 PS-1 28'8"-30'6"

Date: January 5, 1994

Remarks:

Tested by: JTK

Reviewed by: RLB

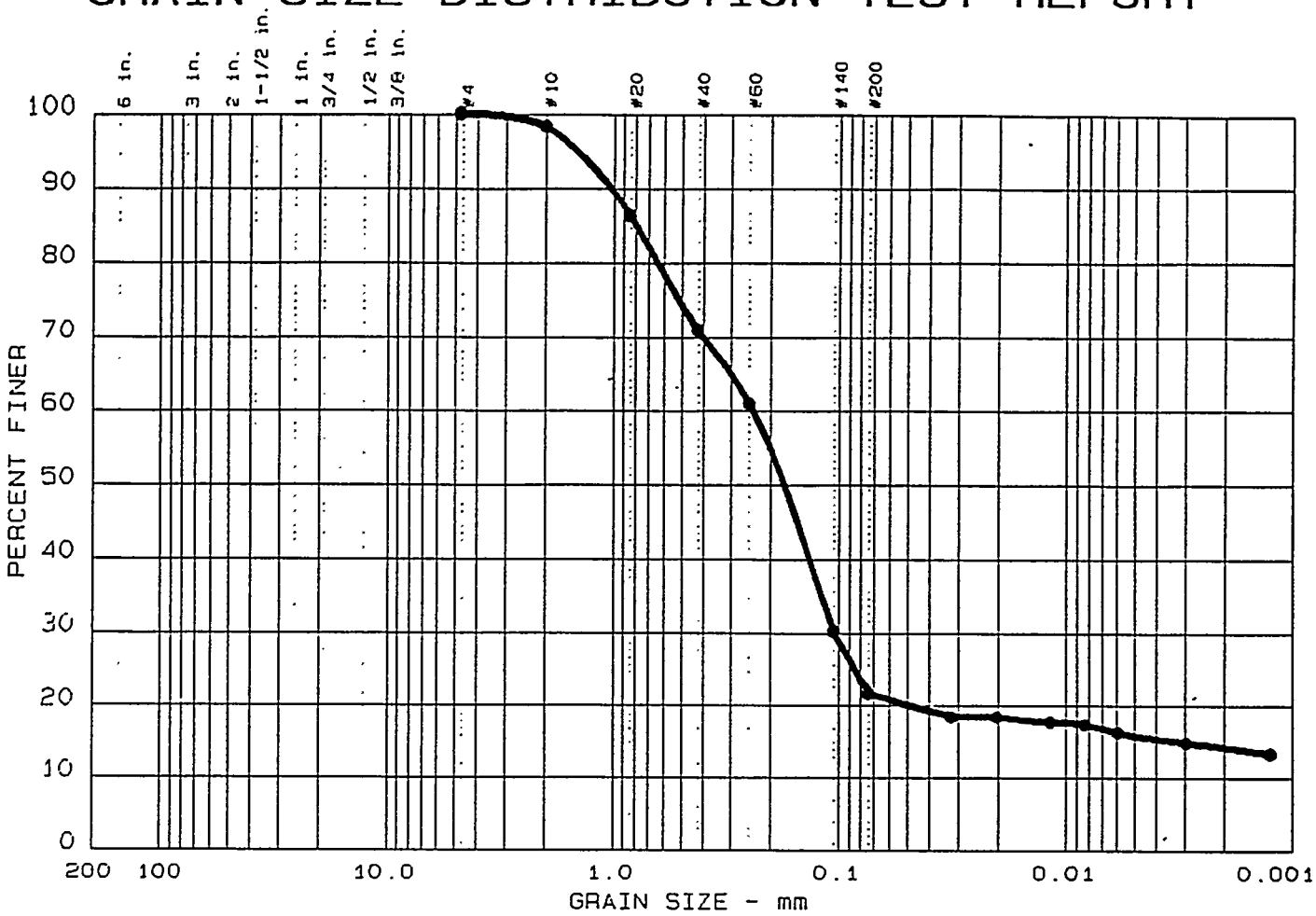
SCC-24 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	3	0.0	0.0	78.3	6.0	15.7

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	41	26	0.78	0.24	0.17	0.104	0.0033			

MATERIAL DESCRIPTION	USCS	AASHTO
● Purple and Brown Clayey Sand	SC	A-2-7 (1.1)

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-23 PS-1 28'8"-30'6"

Date: January 5, 1994

Remarks:

Tested by: JTK

Reviewed by: RLB

RC-24 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-23
Test Date:	12/09/93-12/15/93	Sample No.:	PS-1
Reviewed By:	JW/RLB RLB	Depth:	28'8" - 30'6"
Reviewed Date:	12/27/93	Sample Description:	See classification data

Initial Specimen Data

Labels	Values	Units	Description	Labels	Values	Units	Description
Masses				Mass Density and Unit Weight			
M_{scb}	1285.42	g	*Mass of soil and container before*	Rho	2064.8	kg/m³	*Mass density of specimen* $= M_s/V*10^6$
M_{sca}	0.00	g	*Mass of soil and container after*				
M_s	1285.42	g	$M_{scb} - M_{sca}$ = *mass of soil*	U_{wt}	20.25	kN/m³	*Unit weight of specimen* $= Rho*9.806/1000$
Diameters				Moisture Content, mc			
D_t	73.33	mm	*Diameter near top of specimen*	No.	T-15		*Container number*
D_m	73.15	mm	*Diameter near middle of specimen*	M_{wscb}	1337.92	g	*Mass of wet soil + container*
D_b	73.23	mm	*Diameter near bottom of specimen*	M_{wsca}	1120.90	g	*Mass of dry soil + container*
T_{mem}	0.30	mm	*Single thickness of membrane*	M_{wat}	217.02	g	*Mass of water* $= M_{wscb} - M_{wsca}$
D_{nat}	72.63	mm	$(D_t + D_m + D_b)/3 - 2*T_{mem}$	M_{cont}	52.50	g	*Mass of container.*
Lengths				mc	20.3	%	$M_{wat}/(M_{wsca} - M_{cont})*100\%$
L_{cbp}	198.22	mm	*Length between chamber bottom & top of top platen*				
L_{tp}	23.95	mm	*Length of top platen*	Rho_d	1716.2	kg/m³	*Dry mass density* $= Rho/(1+mc)$
L_{bp}	24.00	mm	*Length of bottom platen*	G_s	2.67		*Specific gravity*
L_{nat}	150.27	mm	*Length of Specimen* $= L_{cbp} - L_{tp} - L_{bp}$	e	0.556		*Void Ratio,* $[1000*G_s)]/Rho_d-1$
				S_r	97.6	%	*Degree of Saturation* $= mc*G_s/e$
Volume				J	0.000848	kg-m²	*Polar mass moment of inertia* $= (M_s/1000)*(D_{nat}/1000)^2/8$
V	622528	mm³	$D^2_{nat}*Pi*L_{nat}/4$				

Conditions After Saturation				Conditions After Consolidation			
CL_s	0.35	mm	*Change in length*	CL_c	0.13	mm	*Change in length*
L_s	149.9	mm	*Length after saturation,* $L - CL_s$	L_c	149.8	mm	*Length after consolidation,* $L_s - CL_c$
A_s	4142.7	mm²	*Area of specimen*	CV_c	2480	mm³	*Change in volume*
V_s	621078	mm³	*Volume after saturation,* $A_s * L_s$	V_c	618598	mm³	*Volume,* $V_s - CV_c$
B	0.97		*B Value*	S_r	100.0	%	*Degree of Saturation* $= mc*G_s/e$
				e	0.546		*Void Ratio,* $[1000*G_s]/Rho_d-1$
				mc	20.6	%	*Moisture Content*
				Rho_d	1727	kg/m³	*Dry mass density,* Rho_d*V/V_c

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

INPUT DATA

Project No.: 5810535301
Tested By: HEJ/JW
Test Date: 12/09/93-12/15/93
Reviewed By: JW/RLB RLB
Reviewed Date: 12/27/93

Project Name: SRS-ITP
Boring No: H-Bor-23
Sample No.: PS-1
Depth: 28'8" - 30'6"
Sample Description: See classification data

Line No.	Elapsed Time [min]	Cell Pressure [unit]	Pore Pressure [unit]	Axial Load [unit]	Burette Reading [unit]	Length Reading [unit]	Longitudinal or Torsional	Force or Torque Reading [V_{rms}]	Transducer Reading [V_{rms}]	Resonant Period [msec]
1	0.4	74.0	51.5	0	7.5	-2.6230	T	0.008	0.012	8.109
2	0.7	74.0	51.5	0	7.5	-2.6230	T	0.015	0.022	8.124
3	1.2	74.0	51.5	0	7.5	-2.6230	T	0.029	0.052	8.156
4	1.7	74.0	51.5	0	7.5	-2.6240	T	0.083	0.141	8.217
5	2.2	74.0	51.5	0	7.5	-2.6240	T	0.152	0.241	8.329
6	2.6	74.0	51.6	0	7.5	-2.6250	T	0.348	0.454	8.581
7	3.2	74.0	51.8	0	7.5	-2.6250	T	0.827	0.779	9.041
8	3.7	74.0	52.8	0	7.5	-2.6250	T	1.453	1.144	9.626
9	4.4	74.0	55.9	0	7.5	-2.6170	T	3.220	1.770	10.899
10	4.8	74.0	57.2	0	7.5	-2.6140	T	3.650	1.830	11.524

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

INTERMEDIATE DATA

Project No.: 5810535301
Tested By: HEJ/JW
Test Date: 12/09/93-12/15/93
Reviewed By: JW/RLB RLB
Reviewed Date: 12/27/93

Project Name: SRS-ITP
Boring No: H-Bor-23
Sample No.: PS-1
Depth: 28'8" - 30'6"
Sample Description: See classification data

Specimen Volume [mm³]	Specimen Length [mm]	Specimen Diameter [mm]	Specimen Mass [grams]	Mass Density [kg/m³]	Polar Inertia J [kg-m²]	Inertia Stiffness Ratio T	Apparatus Damping Factor ADF	Dimensionless Frequency F	Damping Factor A
618598	149.79	72.51	1288.30	2082.6	0.000847	3.8146	0.00556	0.491	8.33
618598	149.79	72.51	1288.30	2082.6	0.000847	3.8146	0.00557	0.491	8.33
618598	149.79	72.51	1288.30	2082.6	0.000847	3.8146	0.00559	0.491	8.33
618598	149.79	72.51	1288.30	2082.6	0.000847	3.8146	0.00563	0.491	8.33
618598	149.79	72.51	1288.30	2082.6	0.000847	3.8146	0.00571	0.491	8.33
618598	149.79	72.51	1288.30	2082.6	0.000847	3.8145	0.00588	0.491	8.33
618598	149.79	72.51	1288.30	2082.6	0.000847	3.8145	0.00619	0.491	8.33
618598	149.79	72.51	1288.30	2082.6	0.000847	3.8145	0.00659	0.491	8.33
618598	149.80	72.51	1288.30	2082.6	0.000847	3.8147	0.00747	0.491	8.33
618598	149.80	72.51	1288.30	2082.6	0.000847	3.8147	0.00790	0.491	8.33

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

TEST RESULTS SUMMARY

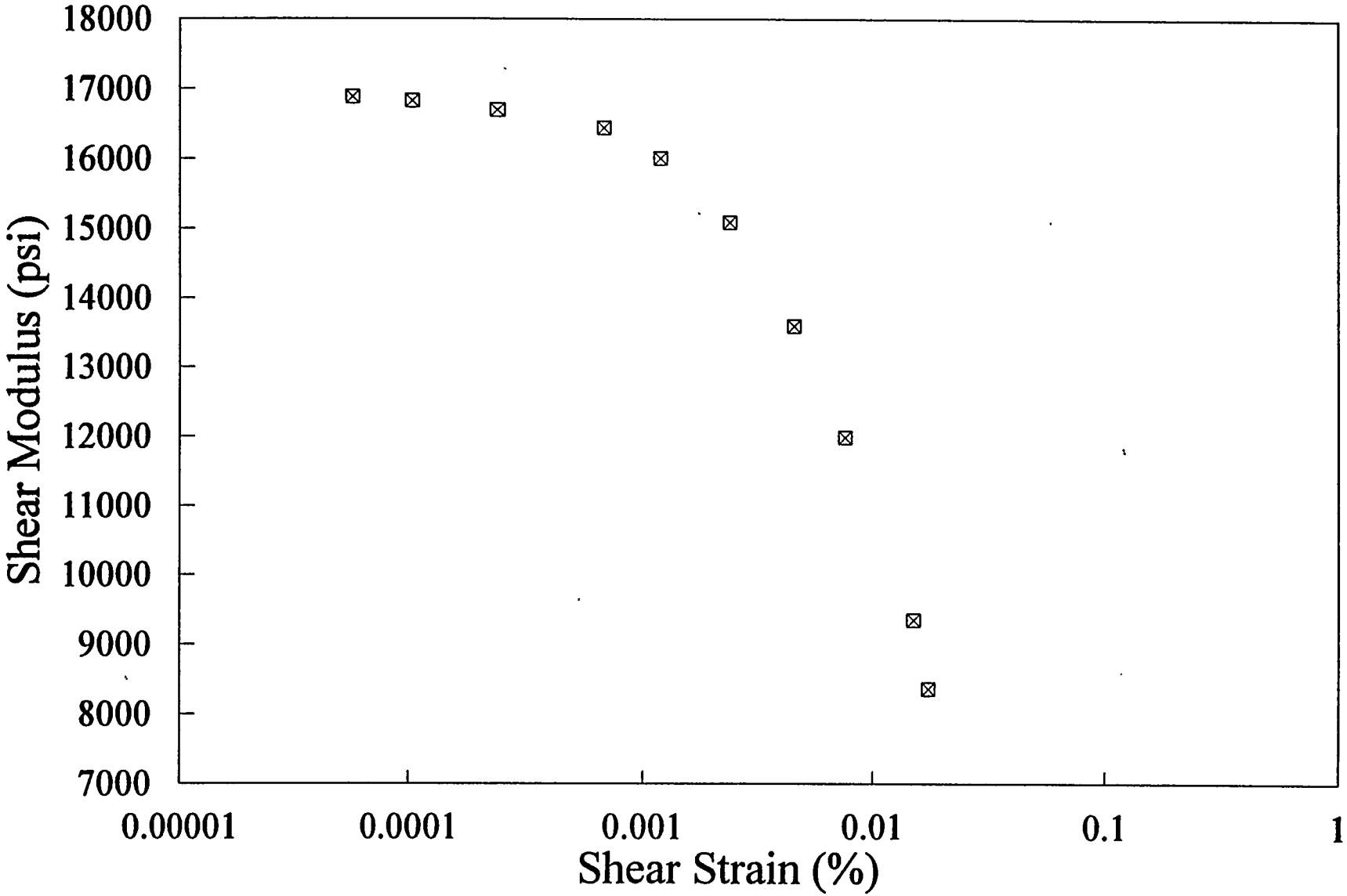
Project No.: 5810535301
Tested By: HEJ/JW
Test Date: 12/09/93-12/15/93
Reviewed By: JW/RLB
Reviewed Date: 12/27/93

Project Name: SRS-ITP
Boring No: H-Bor-23
Sample No.: PS-1
Depth: 28'8" - 30'6"
Sample Description: See classification data

Line No.	Effective Confining Stress [kPa]	Principal Stress Ratio	Void Ratio e	Longitudinal or Torsional	No. of Vibration Cycles	Shear Modulus G [Mpa]	Shear Strain Amplititude [%]	Damping Ratio [%]	Shear Modulus G [psi]
1	155.16	1.00	0.546	T	2960	116.37	0.00006	3.12	16889
2	155.16	1.00	0.546	T	2216	115.94	0.00010	3.19	16827
3	155.03	1.00	0.546	T	3678	115.03	0.00025	2.60	16695
4	154.75	1.00	0.546	T	3651	113.33	0.00068	2.75	16448
5	154.75	1.00	0.546	T	3242	110.30	0.00119	2.95	16009
6	154.34	1.00	0.546	T	3146	103.92	0.00238	3.59	15082
7	152.68	1.00	0.546	T	3982	93.61	0.00454	5.00	13586
8	145.93	1.00	0.546	T	2867	82.58	0.00756	6.00	11985
9	124.43	1.00	0.546	T	4074	64.42	0.01500	8.61	9350
10	115.75	1.00	0.546	T	1874	57.62	0.01733	9.45	8363

Shear Modulus vs. Shear Strain

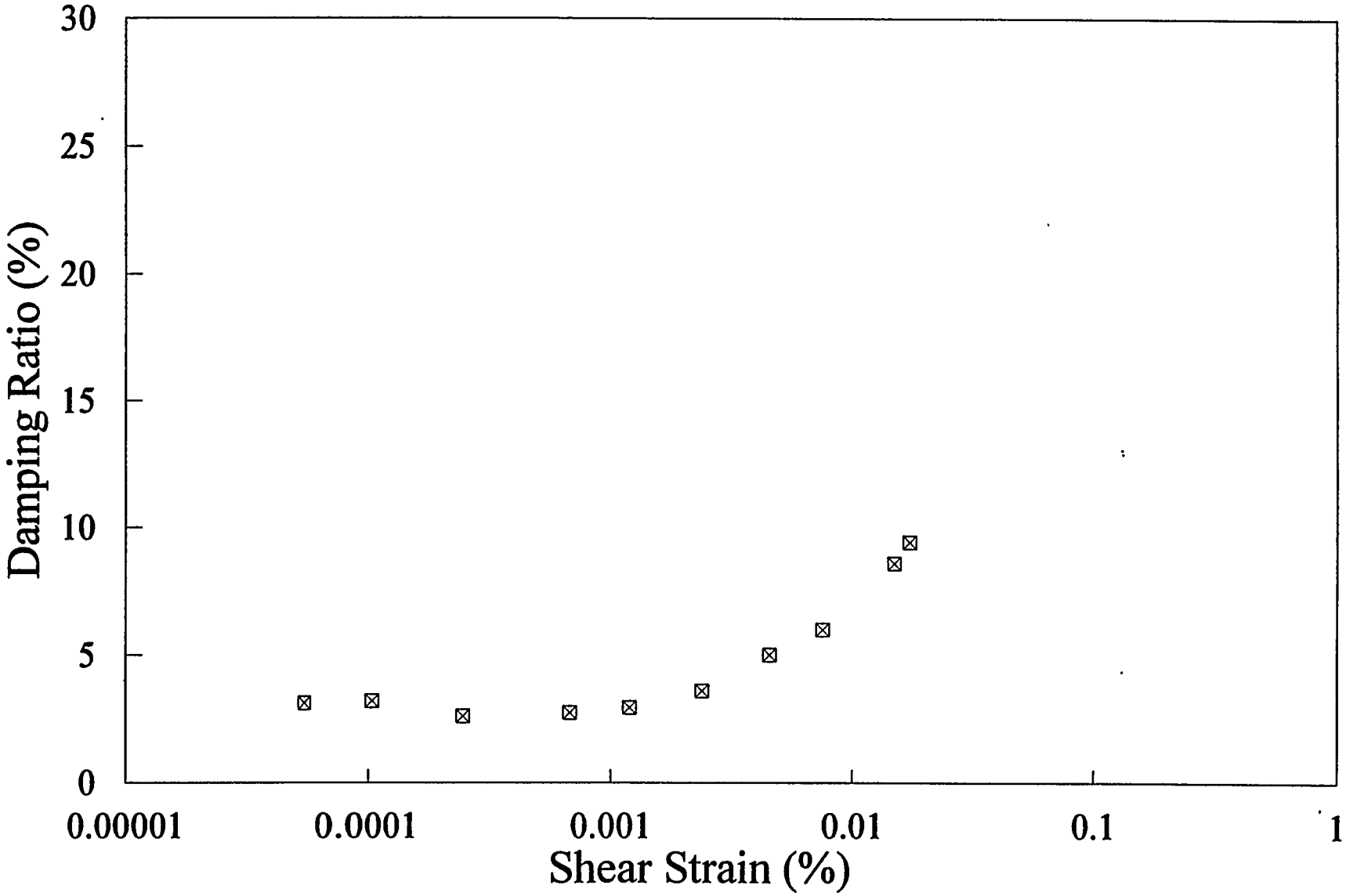
H-BOR-23, PS-1



Law Engineering Project No.: 5810535301
SRS-ITP: Resonant Column

Damping Ratio vs. Shear Strain

H-BOR-23, PS-1



Law Engineering Project No.: 5810535301
SRS-ITP: Resonant Column

CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-23
Test Date:	12/09/93-12/16/93	Sample No.:	PS-1
Reviewed By:	JW/RLB RLB	Depth:	28'8" - 30'6"
Review Date:	12/27/93	Sample Description:	See classification data

SPECIMEN DATA

Initial Conditions of Specimen

Diameters, in.		Area, sq. in.	6.45
Top	2.887	Volume, cubic in.	35.46
Middle	2.890	Mass of Specimen, grams	1168.56
Bottom	2.893		
Average	2.890	Moisture Content	
Membrane Thickness, in.	0.012	Pan No.	L-34
Net Diameter, in.	2.866	Wet Mass + Pan, grams	1261.66
		Dry Mass + Pan, grams	1056.14
Length, in.		Container Mass, grams	93.10
Location 1	8.083	Moisture Content, %	21.3
Location 2	8.158		
Location 3	8.182	Density, pcf	125.3
Average	8.141	Dry Density, pcf	103.3
Length of Top Platen	1.140	Specific Gravity	2.67
Length of Bottom Platen	1.505	Degree of Saturation, %	
Length of Specimen, in	5.496	Void Ratio	0.614

Conditions of Specimen After Saturation and Consolidation

After Saturation		After Consolidation	
Change in Length, in.	0.003	Change in Length, in.	0.006
Length, in.	5.493	Length, in.	5.487
Area, sq. in.	6.45	Change in Volume, cc	2.44
Volume, cubic in.	35.44	Volume, cubic in.	35.29
Back Pressure, psi	50.0	Area, sq. in.	6.43
B Value	0.98	Effe. Consoli.. Stress, psi	24.0
		Moisture Content, %	22.7
		Dry Density, pcf	103.7
		Void Ratio	0.606
		Degree of Saturation, %	100.0

CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

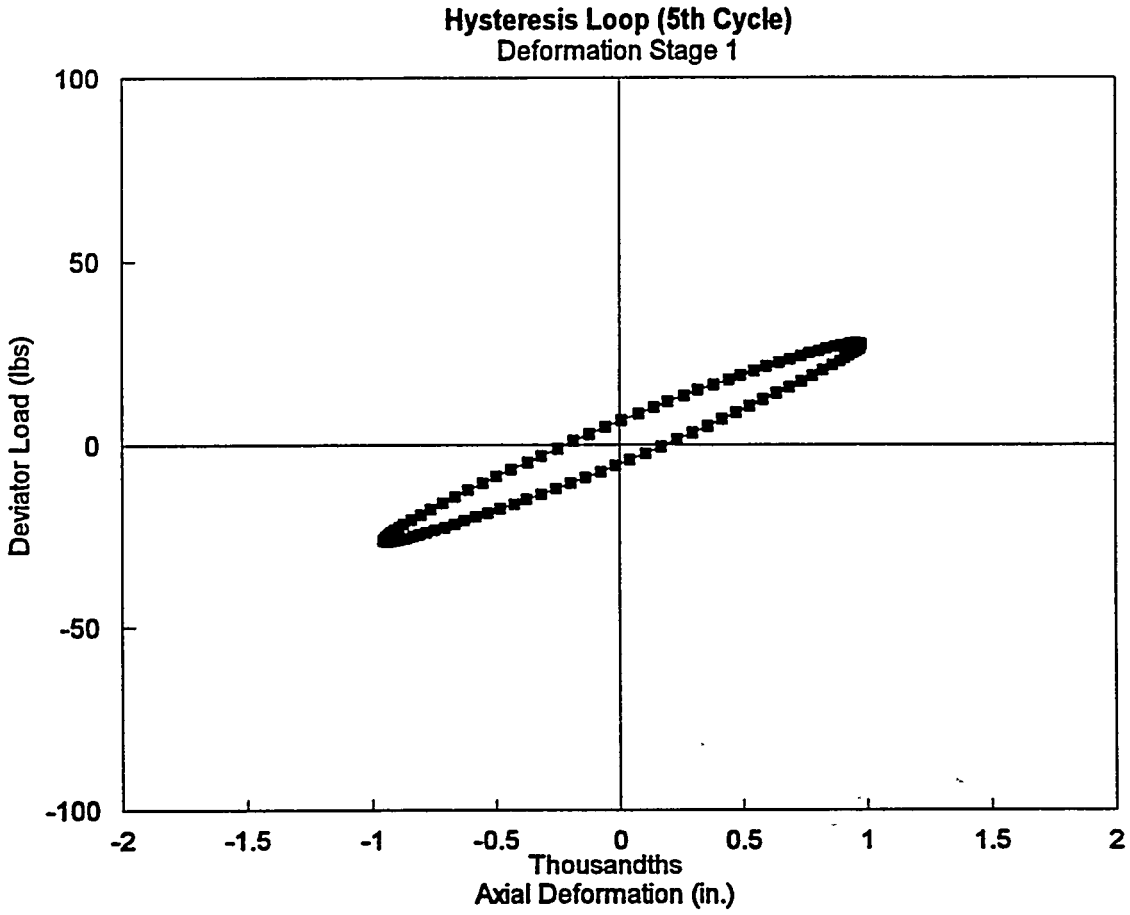
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-23
Test Date:	12/09/93-12/16/93	Sample No.:	PS-1
Reviewed By:	JW/RLB RLB	Depth:	28'8" - 30'6"
Review Date:	12/27/93	Sample Description:	See classification data

Area, A_c, in²	6.43		Effective Consolidation Stress, psi	24.0
Length, H_c, in.	5.49		Cyclic Load, P_c, lbs	27.07
			Cyclic Deviator Stress, psi	4.2

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
54.1	0.0019	23906	0.018

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
0.017	0.013	10.2



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

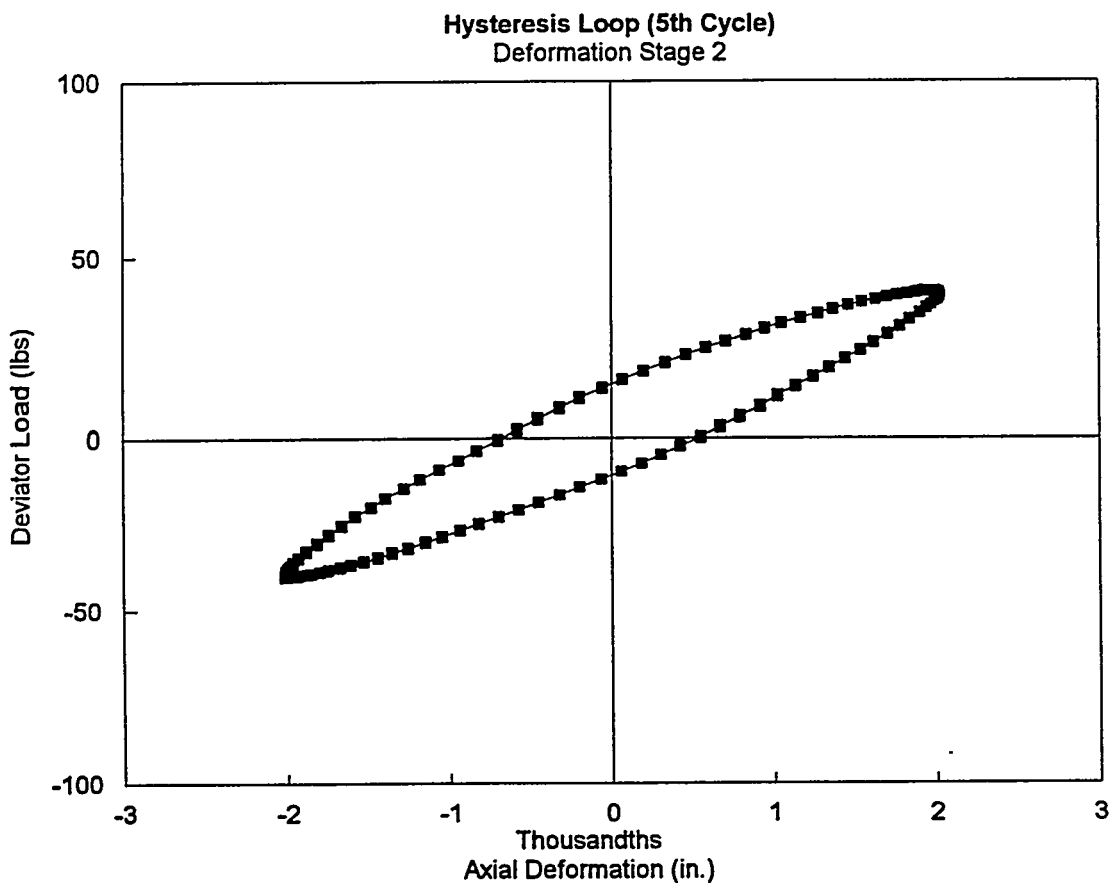
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-23
Test Date:	12/09/93-12/16/93	Sample No.:	PS-1
Reviewed By:	JW/RLB KLB	Depth:	28'8" - 30'6"
Review Date:	12/27/93	Sample Description:	See classification data

Area, A_c, in ^{2}	6.43		Effective Consolidation Stress, psi	24.0
Length, H_c, in.	5.49		Cyclic Load, P_c, lbs	40.18
			Cyclic Deviator Stress, psi	6.2

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
80.4	0.0040	16976	0.037

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
0.077	0.041	15.2



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

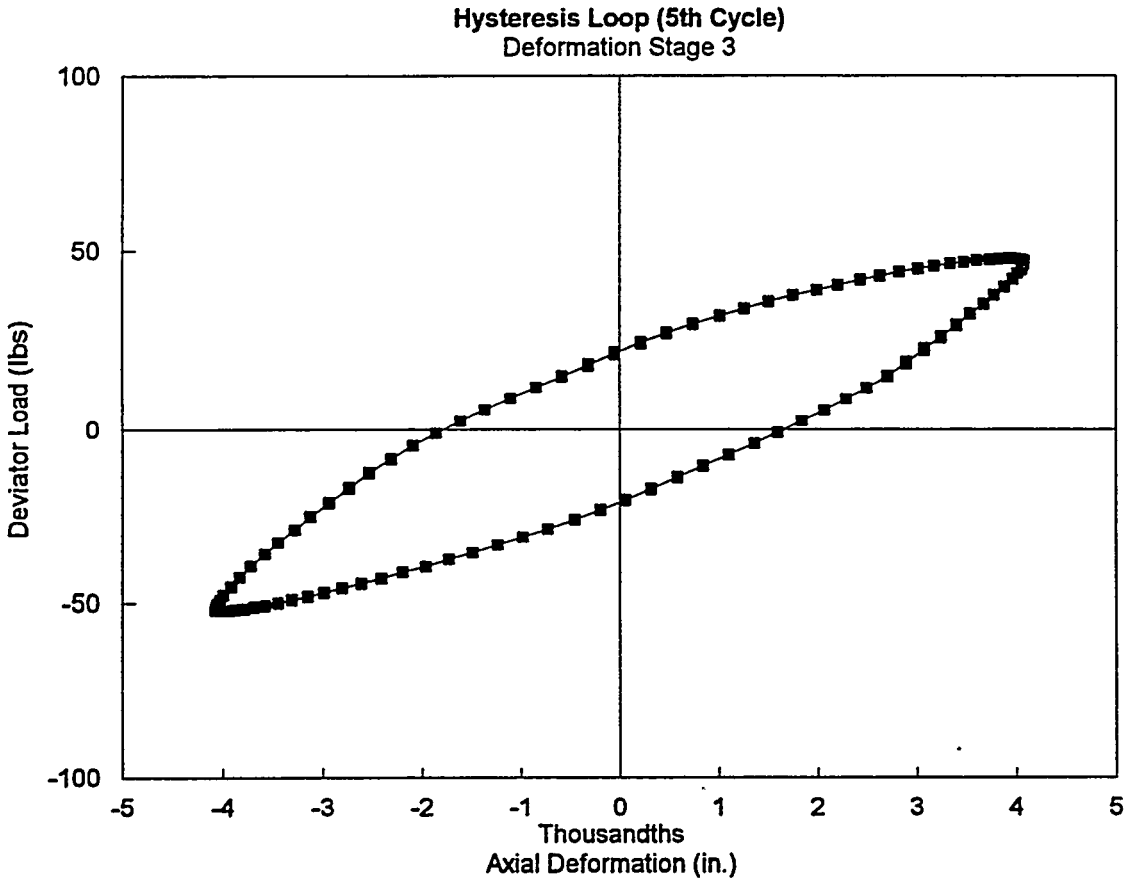
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-23
Test Date:	12/09/93-12/16/93	Sample No.:	PS-1
Reviewed By:	JW/RLB RLB	Depth:	28'8" - 30'6"
Review Date:	12/27/93	Sample Description:	See classification data

Area, A_c, in ^{2}	6.43		Effective Consolidation Stress, psi	24.0
Length, H_c, in.	5.49		Cyclic Load, P_c, lbs	49.90
			Cyclic Deviator Stress, psi	7.8

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
99.8	0.0082	10447	0.074

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
0.265	0.102	20.8



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

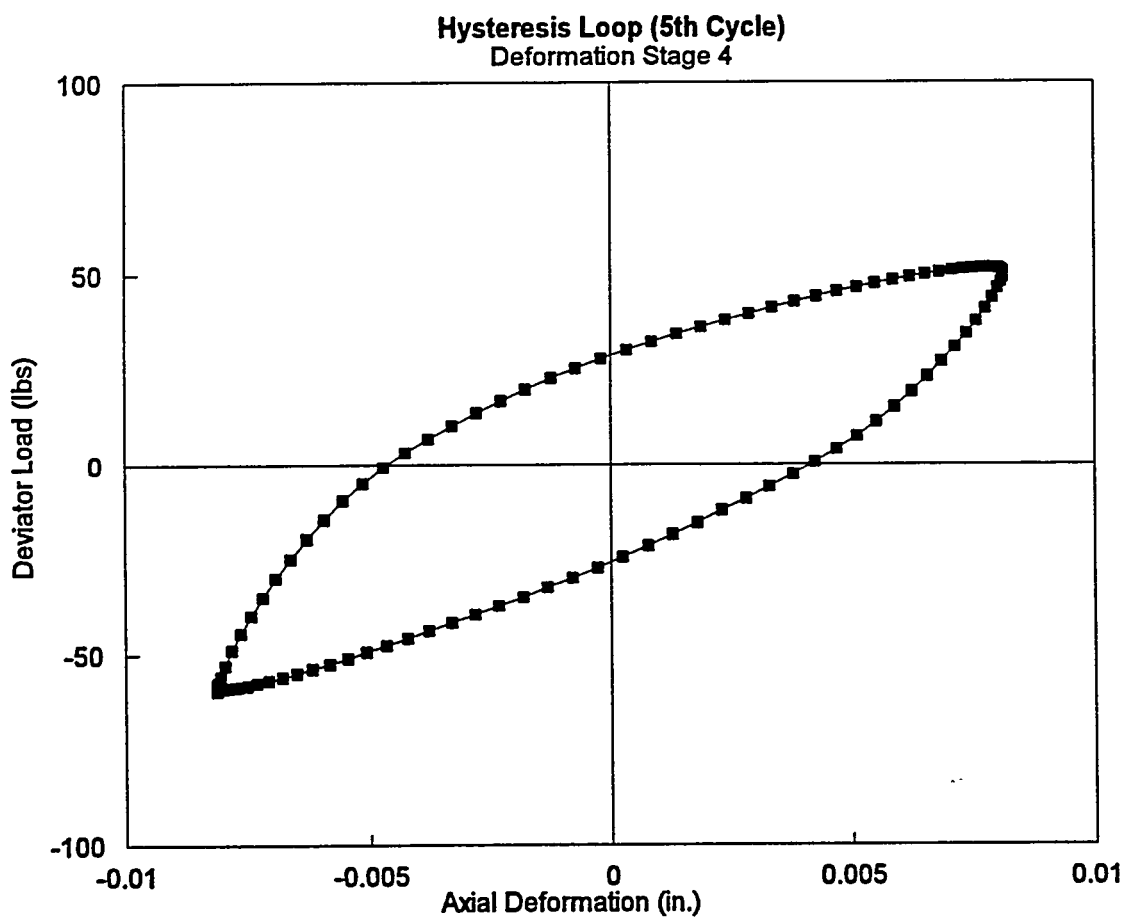
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-23
Test Date:	12/09/93-12/16/93	Sample No.:	PS-1
Reviewed By:	JW/RLB RLB	Depth:	28'8" - 30'6"
Review Date:	12/27/93	Sample Description:	See classification data

Area, A_c, in^2	6.43		Effective Consolidation Stress, psi	24.0
Length, H_c, in.	5.49		Cyclic Load, P_c, lbs	55.61
			Cyclic Deviator Stress, psi	8.6

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
111.2	0.0163	5830	0.148

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
0.716	0.226	25.2



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

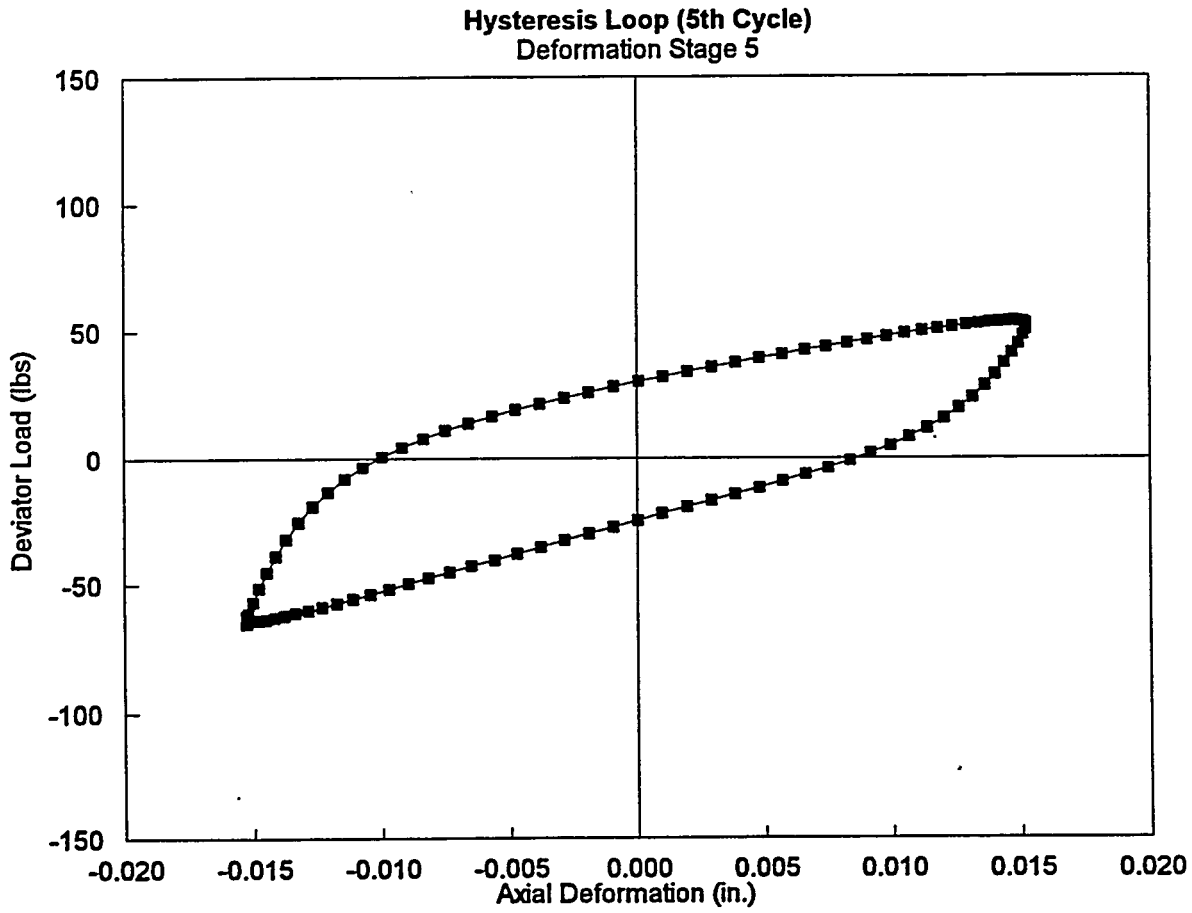
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-23
Test Date:	12/09/93-12/16/93	Sample No.:	PS-1
Reviewed By:	JW/RLB RLB	Depth:	28'8" - 30'6"
Review Date:	12/27/93	Sample Description:	See classification data

Area, A_c, in²	6.43		Effective Consolidation Stress, psi	24.0
Length, H_c, in.	5.49		Cyclic Load, P_c, lbs	59.55
			Cyclic Deviator Stress, psi	9.3

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
119.1	0.0305	3332	0.278

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
1.500	0.454	26.3



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

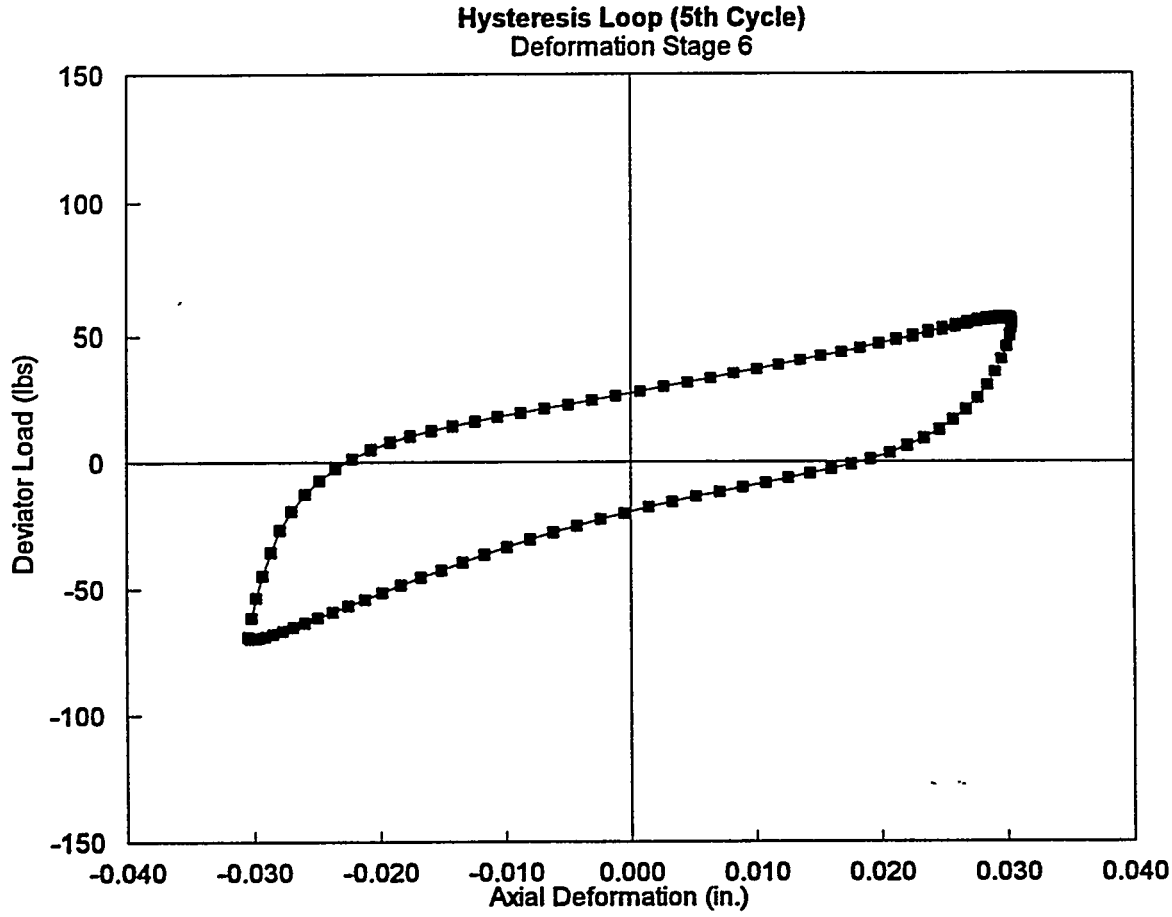
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-23
Test Date:	12/09/93-12/16/93	Sample No.:	PS-1
Reviewed By:	JW/RLB RLB	Depth:	28'8" - 30'6"
Review Date:	12/27/93	Sample Description:	See classification data

Area, A_c, in²	6.43		Effective Consolidation Stress, psi	24.0
Length, H_c, in.	5.49		Cyclic Load, P_c, lbs	64.60
			Cyclic Deviator Stress, psi	10.0

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
129.2	0.0609	1809	0.555

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
3.027	0.984	24.5



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

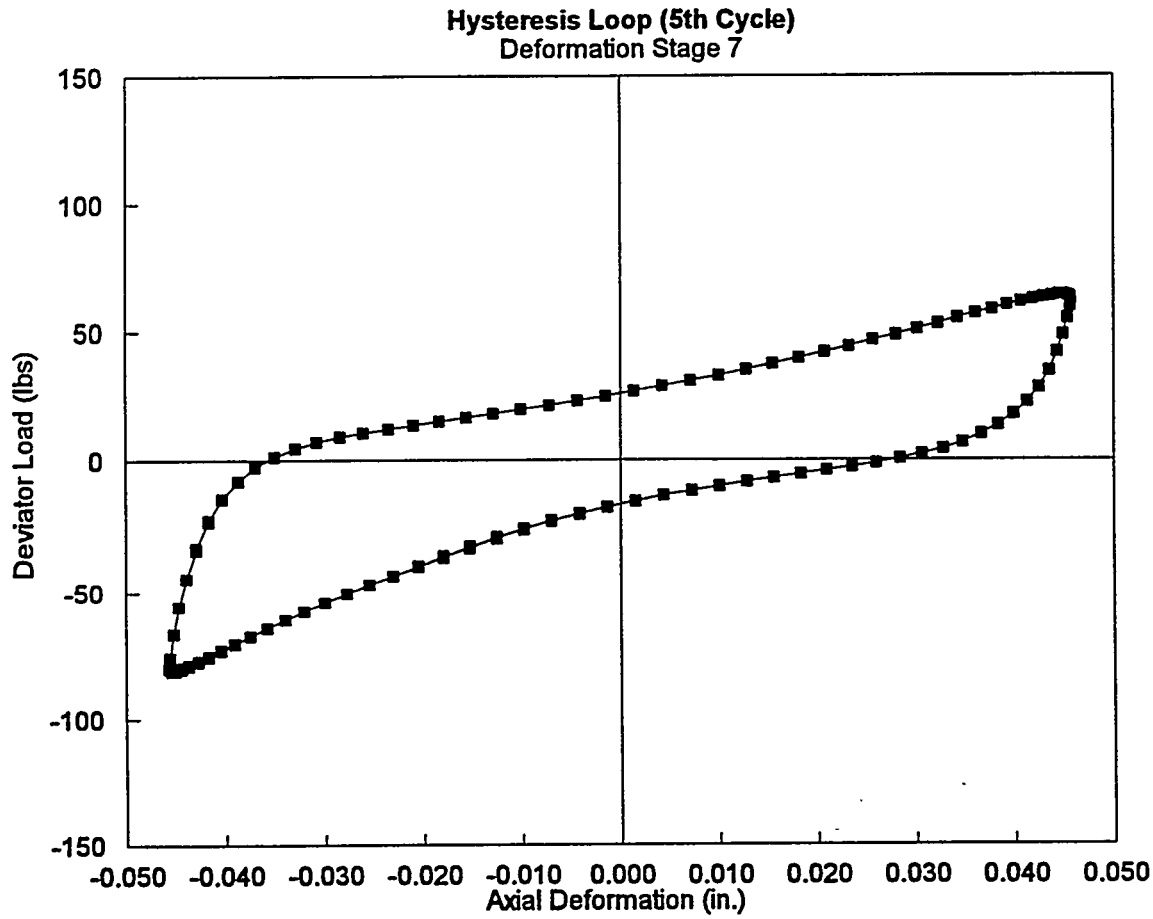
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-23
Test Date:	12/09/93-12/16/93	Sample No.:	PS-1
Reviewed By:	JW/RLB RLB	Depth:	28'8" - 30'6"
Review Date:	12/27/93	Sample Description:	See classification data

Area, A_c, in ^{2}	6.43		Effective Consolidation Stress, psi	24.0
Length, H_c, in.	5.49		Cyclic Load, P_c, lbs	74.88
			Cyclic Deviator Stress, psi	11.6

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
149.8	0.0915	1397	0.834

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
4.566	1.713	21.2



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

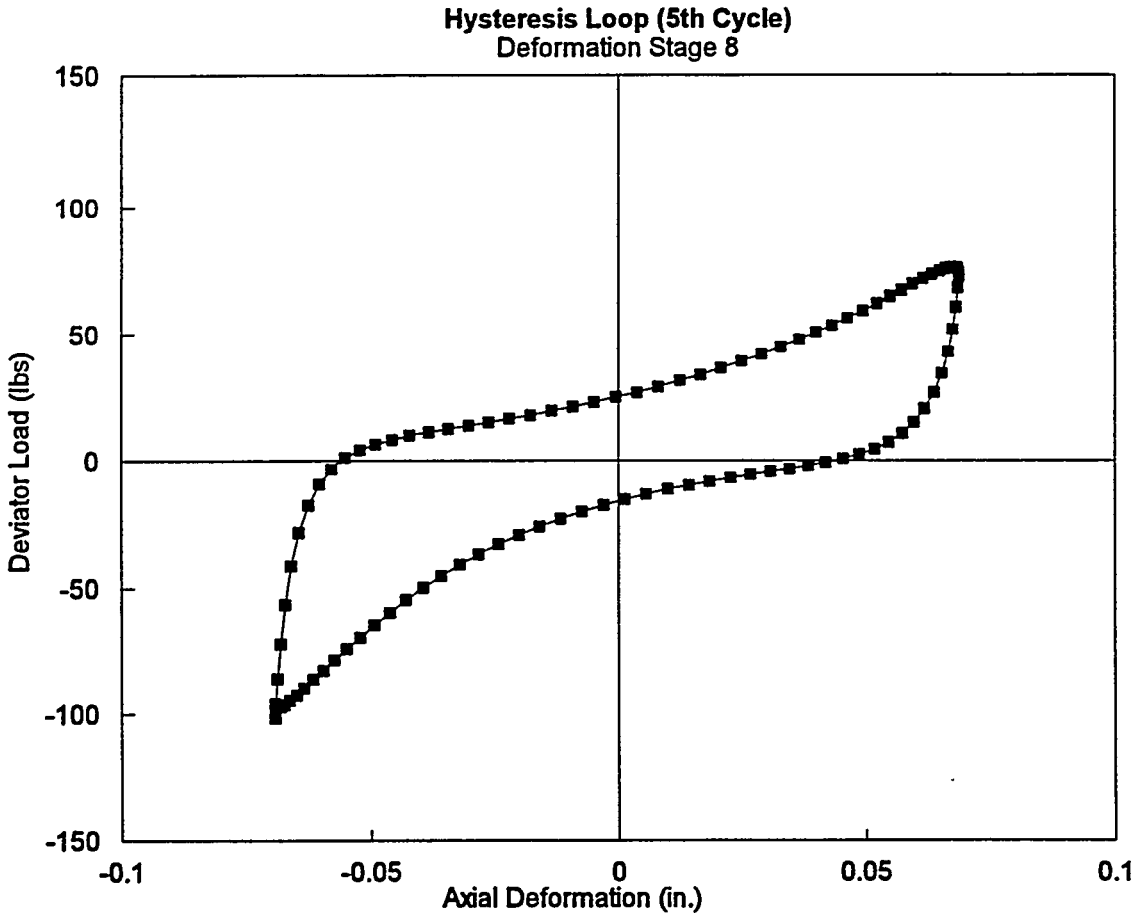
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-23
Test Date:	12/09/93-12/16/93	Sample No.:	PS-1
Reviewed By:	JW/RLB RLB	Depth:	28'8" - 30'6"
Review Date:	12/27/93	Sample Description:	See classification data

Area, A_c, in²	6.43		Effective Consolidation Stress, psi	24.0
Length, H_c, in.	5.49		Cyclic Load, P_c, lbs	88.73
			Cyclic Deviator Stress, psi	13.8

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
177.5	0.1380	1097	1.257

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
7.509	3.060	19.5



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

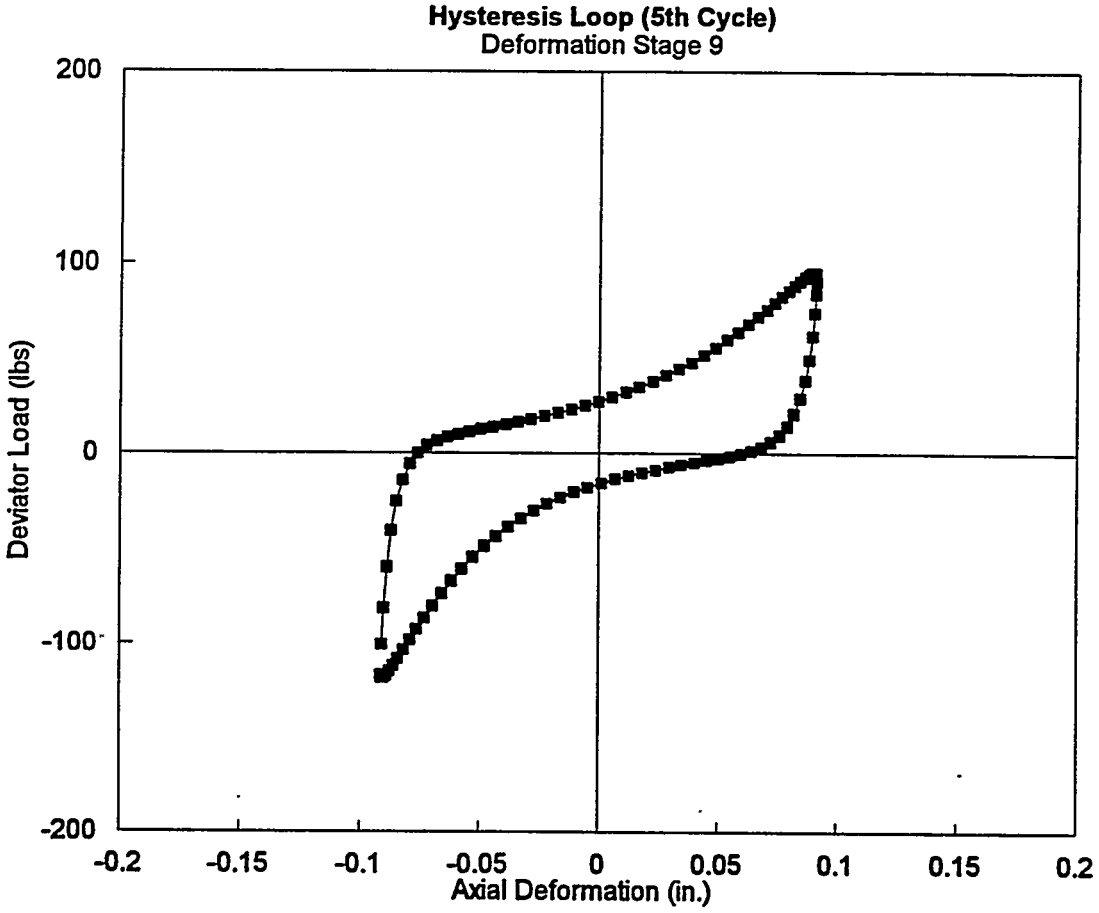
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-23
Test Date:	12/09/93-12/16/93	Sample No.:	PS-1
Reviewed By:	JW/RLB RLB	Depth:	28'8" - 30'6"
Review Date:	12/27/93	Sample Description:	See classification data

Area, A_c, in ^{2}	6.43		Effective Consolidation Stress, psi	24.0
Length, H_c, in.	5.49		Cyclic Load, P_c, lbs	109.38
			Cyclic Deviator Stress, psi	17.0

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
218.8	0.1825	1023	1.663

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
11.282	4.989	18.0



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

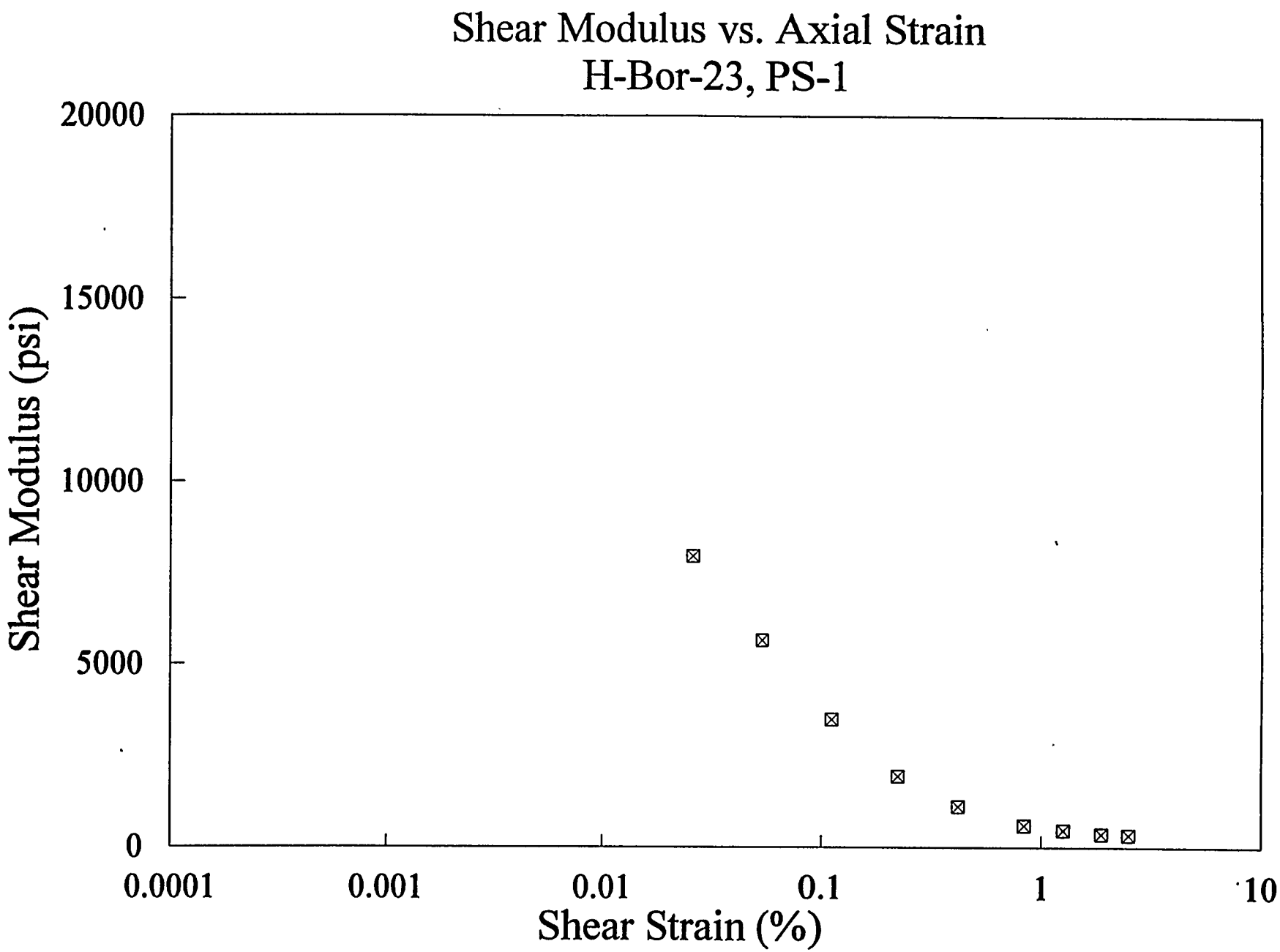
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-23
Test Date:	12/09/93-12/16/93	Sample No.:	PS-1
Reviewed By:	JW/RLB RLB	Depth:	28'8" - 30'6"
Review Date:	12/27/93	Sample Description:	See classification data

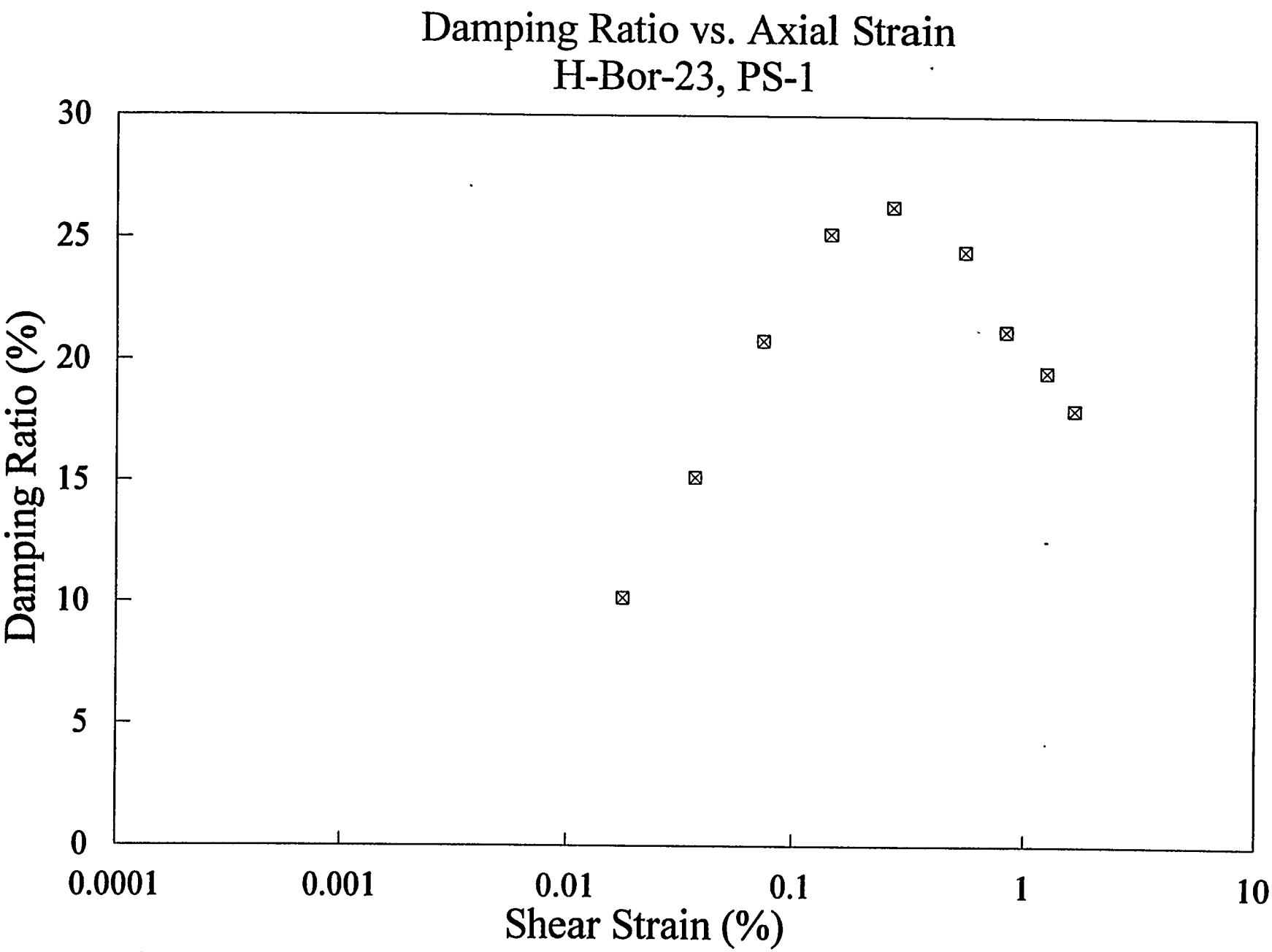
Effective Consolidation Stress 24 psi

Deformation Stage No.	Cyclic Stress (psi)	Axial Strain ε (%)	Young's Modulus E, (psi)	Damping Ratio D, (%)	Shear* Modulus G, (psi)	Shear* Strain γ (%)
1	4.2	0.018	23906	10.18	7969	0.026
2	6.2	0.037	16976	15.15	5659	0.055
3	7.8	0.074	10447	20.77	3482	0.111
4	8.6	0.148	5830	25.18	1943	0.222
5	9.3	0.278	3332	26.30	1111	0.417
6	10.0	0.555	1809	24.47	603	0.833
7	11.6	0.834	1397	21.22	466	1.251
8	13.8	1.257	1097	19.52	366	1.886
9	17.0	1.663	1023	17.99	341	2.494

* Calculated based on assumed Poisson's Ratio value, 0.5.
All calculations are based on 5th cycle.



Law Engineering Project No.: 5810535301
SRS-ITP: Strain Controlled Cyclic Triaxial



Law Engineering Project No: 5810535301
SRS-ITP: Strain Controlled Cyclic Triaxial

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

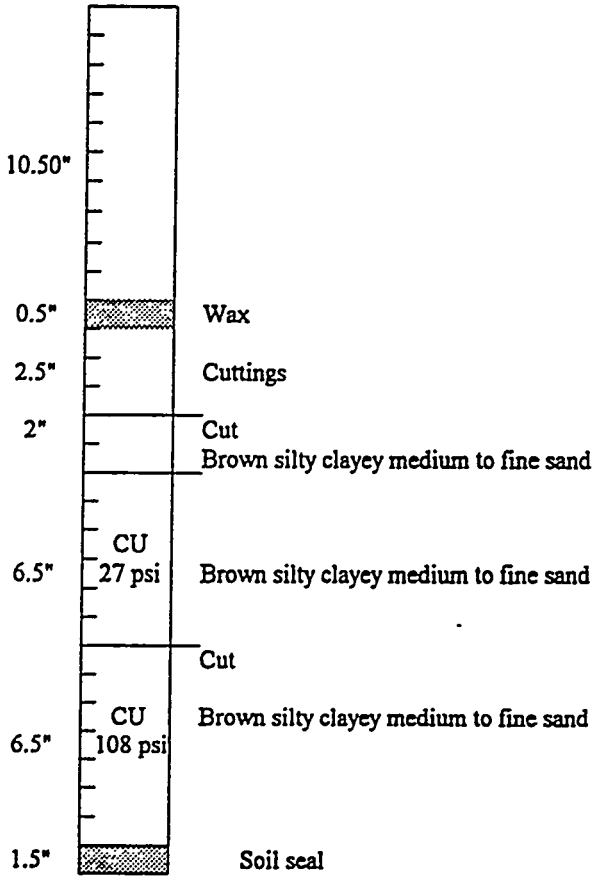
Project: SRS-ITP GEOTECHNICAL TESTING Date: 09-15-93

Boring No: H-Bor-23 Sample No: ST-2 Depth: 43' - 44' 11"

Method of Sample Extrusion: Horizontal cut / Verticle extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION

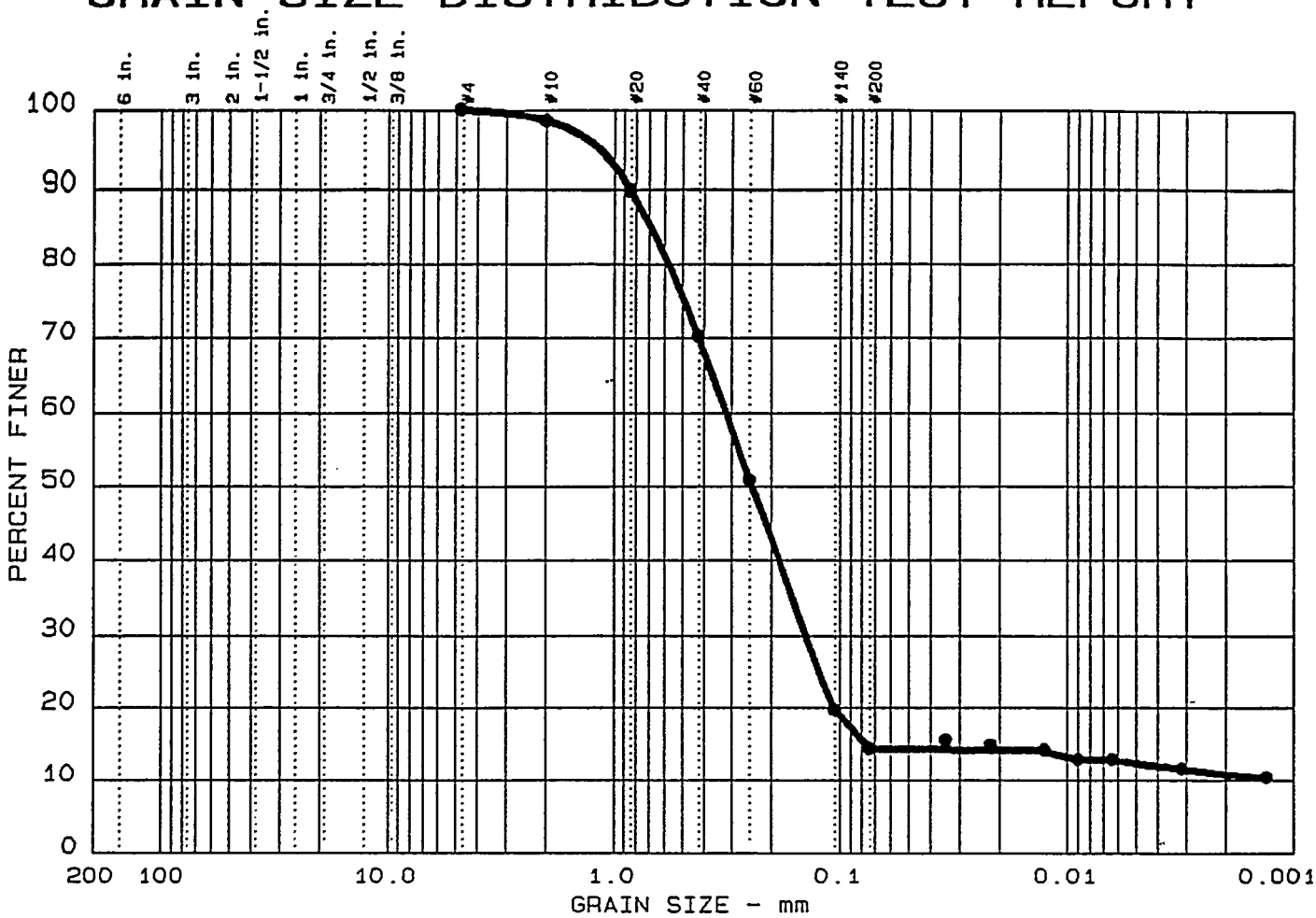


Remarks: Not enough recovery for third CU sample (54 psi)

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b23-st2.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	18	0.0	0.0	85.6	2.1	12.3

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.68	0.32	0.24	0.141	0.0767			

MATERIAL DESCRIPTION	USCS	AASHTO
● Red-Tan Clayey Medium to Fine Sand		

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-23 ST-2 @ 43'-44'11"

Date: October 1, 1993

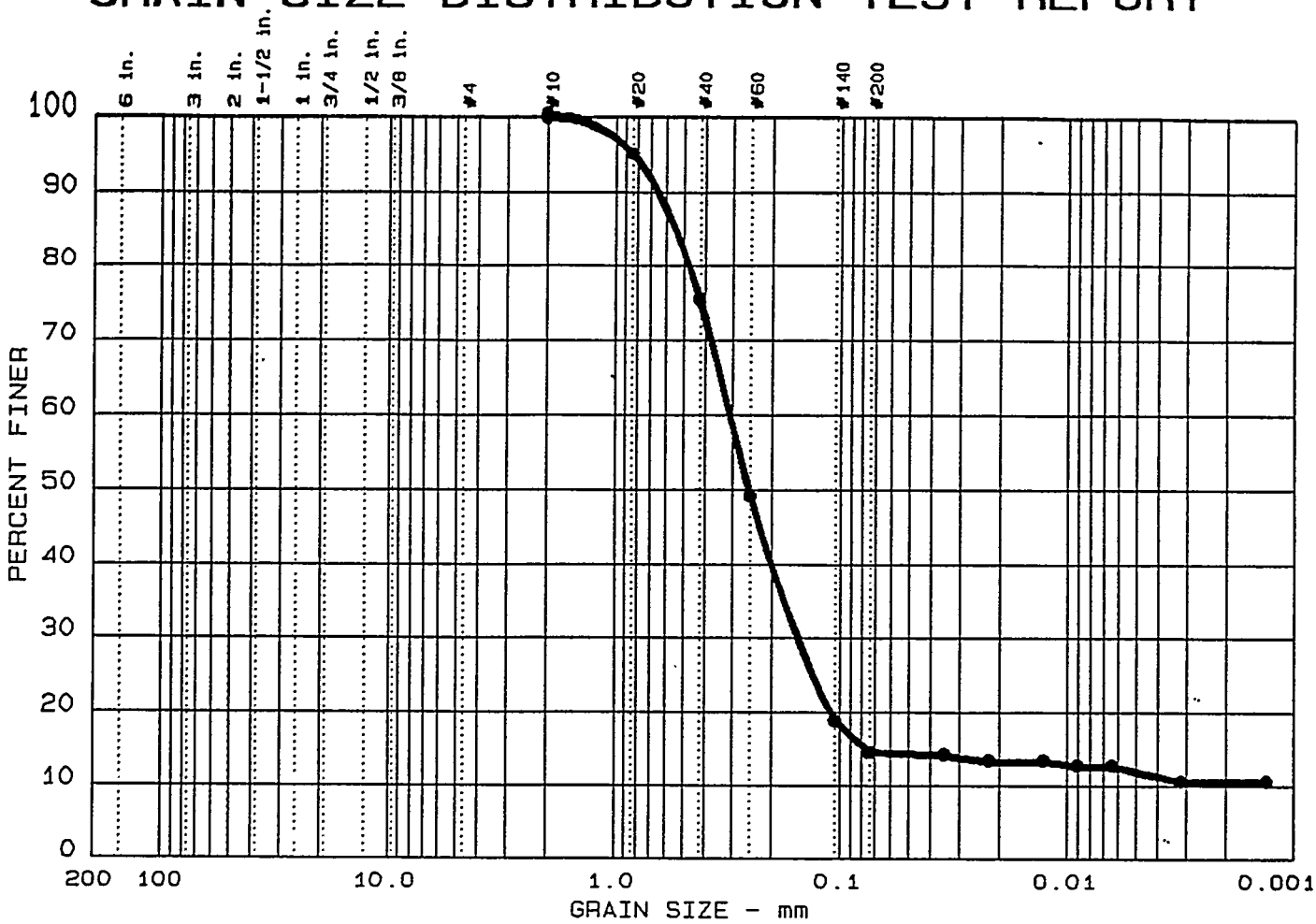
Remarks:
Tested by JRK Ckd by: RLB
CU-27 psi
Atterberg Limits -200
LL=168 PL=43 PI=125

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	19	0.0	0.0	85.5	2.6	11.9

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	41	19	0.54	0.31	0.25	0.153	0.0768			

MATERIAL DESCRIPTION	USCS	AASHTO
● Red Tan Clayey Medium to Fine Sand	SC	A-2-7 (0.0)

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-23 ST-2 @ 43'-44'11"

Date: October 1, 1993

Remarks:

Tested By: JRR

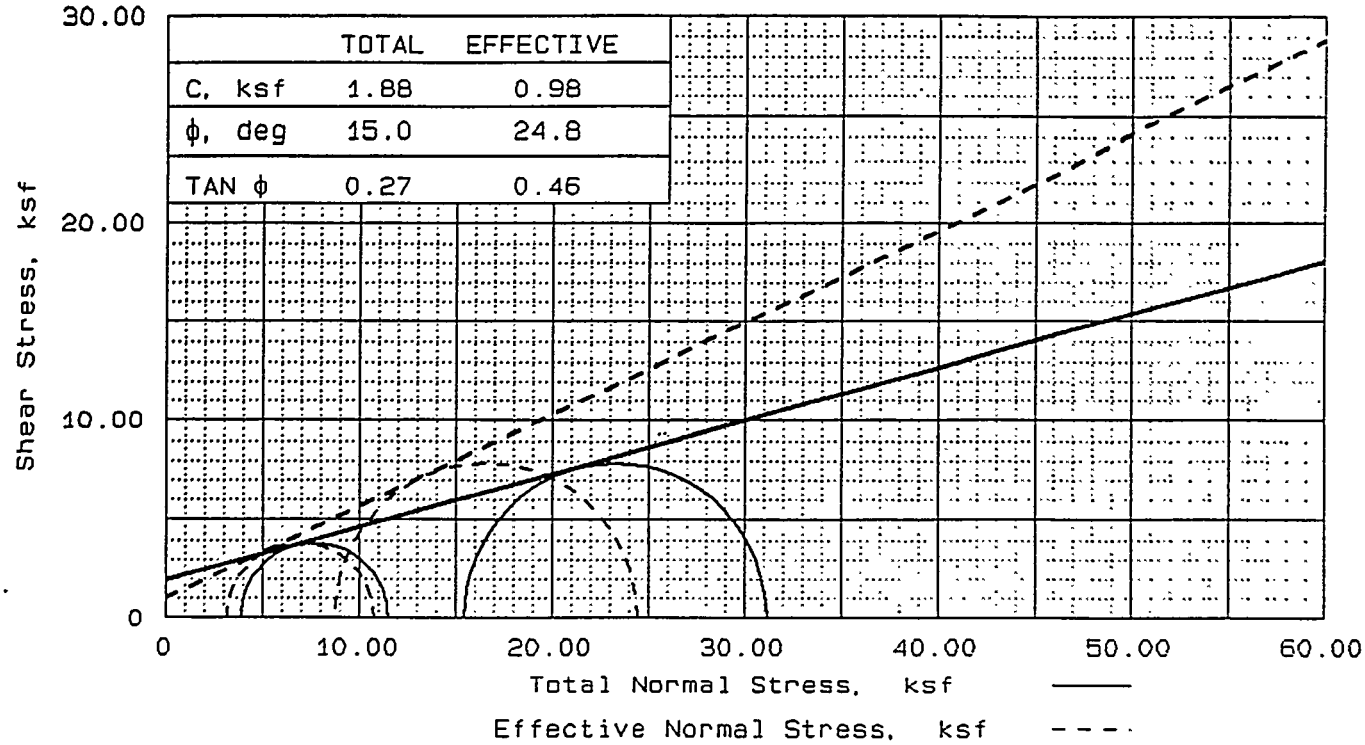
Reviewed By: RLB

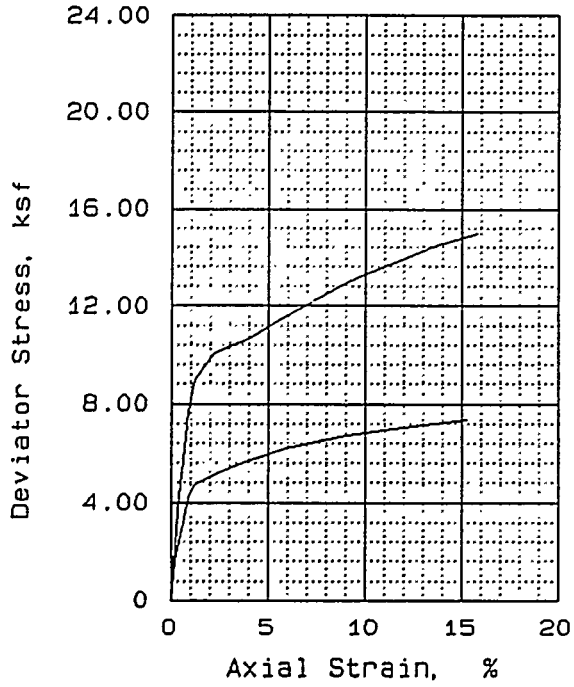
CU-108 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.





SAMPLE NO.		1	2
INITIAL	WATER CONTENT, %	22.0	21.6
	DRY DENSITY, pcf	99.7	100.3
	SATURATION, %	87.9	85.3
	VOID RATIO	0.666	0.687
	DIAMETER, in	2.88	2.88
	HEIGHT, in	5.99	5.99
AT TEST	WATER CONTENT, %	24.4	24.6
	DRY DENSITY, pcf	100.7	101.6
	SATURATION, %	100.0	100.0
	VOID RATIO	0.650	0.666
	DIAMETER, in	2.87	2.87
	HEIGHT, in	5.97	5.96
BACK PRESSURE, ksf		5.01	5.44
CELL PRESSURE, ksf		8.90	20.91
FAILURE STRESS, ksf		7.62	15.71
PORE PRESSURE, ksf		5.75	12.17
STRAIN RATE, %/min.		0.100	0.100
ULTIMATE STRESS, ksf			
PORE PRESSURE, ksf			
$\bar{\sigma}_1$ FAILURE, ksf		10.78	24.45
$\bar{\sigma}_3$ FAILURE, ksf		3.15	8.74

TYPE OF TEST:
CU with pore pressures
SAMPLE TYPE: Undisturbed
DESCRIPTION:
Atterberg Limits -200
LL= 168 PL= 43 PI= 125.0
SPECIFIC GRAVITY= 2.66
REMARKS: Tested by: HEJ

Reviewed by: RLB

CLIENT: SRS

PROJECT: SRS-ITP

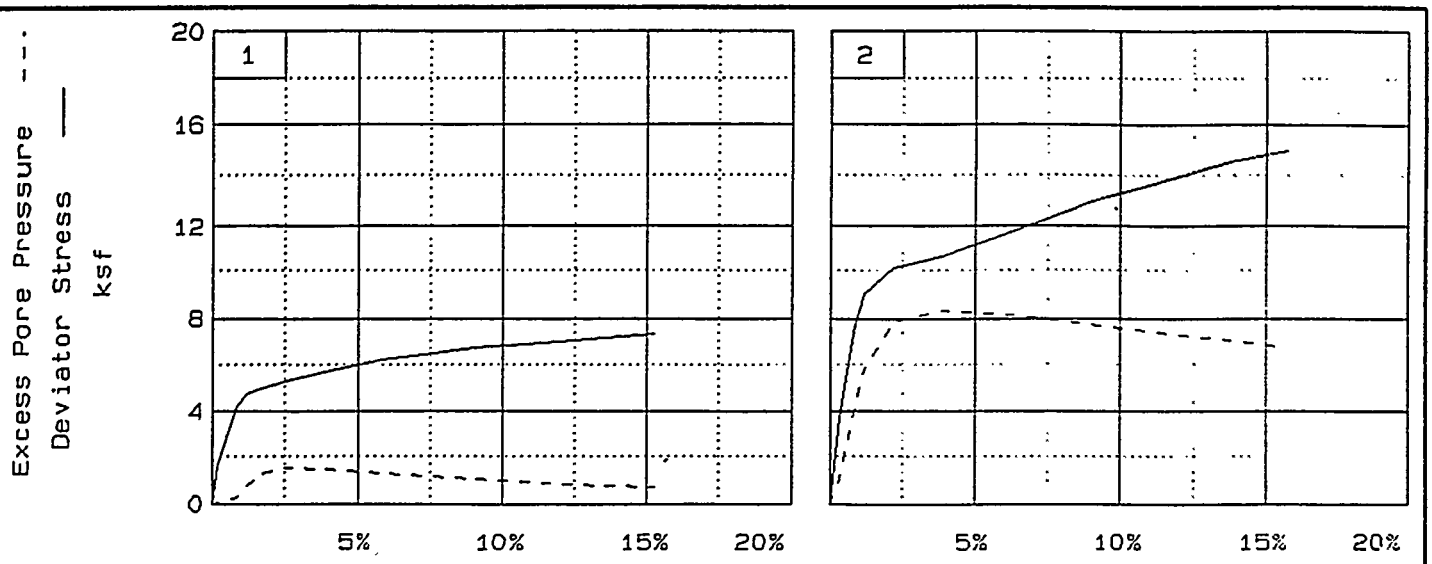
SAMPLE LOCATION: H-Bor-23 ST-2 @ 43-44'11"

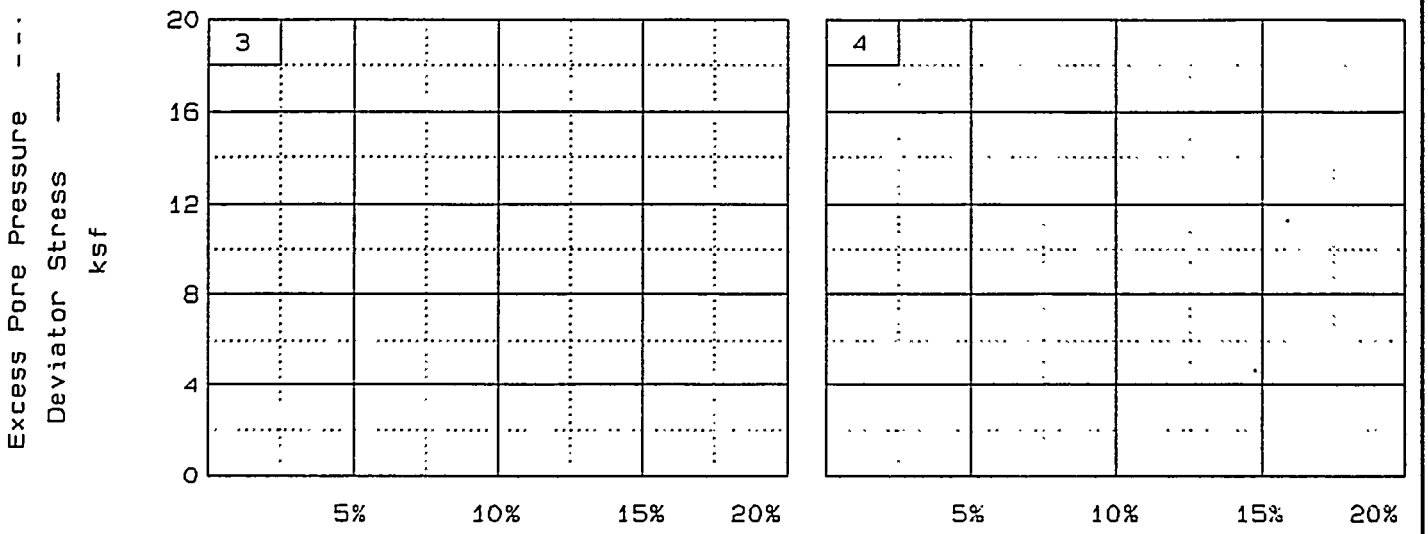
PROJ. NO.: 5810535301 DATE: 10/8/93

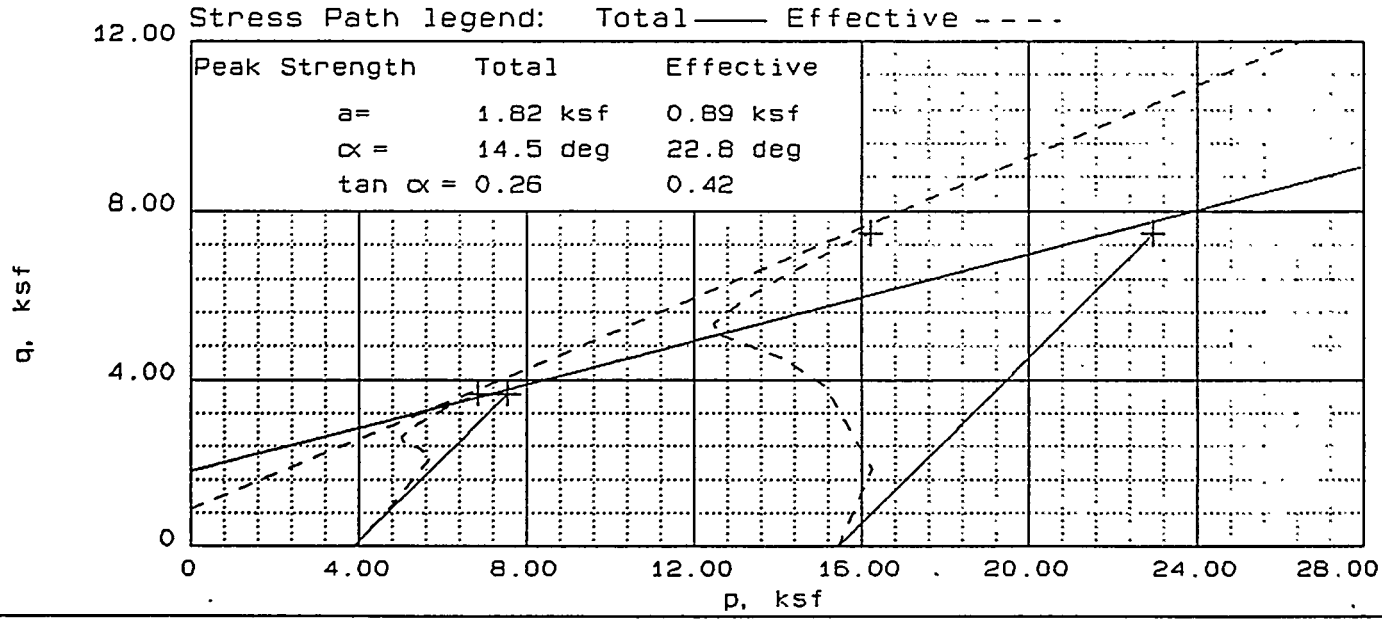
TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

FIG. NO. 6







Client: SRS

Project: SRS-ITP

Location: H-Bor-23 ST-2 @ 43-44'11"

File: SRS-ITP5 Project No.: 5810535301 Page 2/2 Fig. No. 6

TRIAXIAL COMPRESSION TEST
CU with pore pressures

12-07-1993
9:22 am

Project Data

Project No.: 5810535301 Date: 10/8/93 Data file: SRS-ITP5
Client: SRS
Project: SRS-ITP
Sample location: H-Bor-23 ST-2 @ 43-44'11"
Sample description: Atterberg Limits -200
Remarks: Tested by: HEJ
Reviewed by: RLB Fig No. 6

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.66 LL= 168 PL= 43 PI= 125

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.87	
Height change, in		0.02	
Height, in	5.99	5.97	
Weight, grams	1243.2		
Water volume change, cc		-24.56	
Moisture, %	22.0	24.4	22.6
Dry density, pcf	99.7	100.7	
Saturation, %	87.9	100.0	
Void ratio	0.666	0.650	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 61.8 psi
Consolidation back pressure = 34.8 psi
Consolidation effective confining stress = 3.888 ksf
Peak deviator stress = 7.62 ksf at reading no. 11
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	3.89	3.89	1.00	34.8	3.89	0.00
1	0.0100	0.010	72.00	72.0	0.2	1.60	3.83	5.43	1.42	35.2	4.63	0.80
2	0.0500	0.050	191.00	191.0	0.8	4.22	3.59	7.81	2.18	36.9	5.70	2.11
3	0.0700	0.070	214.00	214.0	1.2	4.72	3.10	7.81	2.52	40.3	5.45	2.36
	1000	0.100	226.00	226.0	1.7	4.95	2.59	7.55	2.91	43.8	5.07	2.48
	1500	0.150	242.00	242.0	2.5	5.26	2.39	7.65	3.20	45.2	5.02	2.63

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Effective Stresses Major ksf	Effective Stresses 1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
	.2300	0.230	264.00	264.0	3.9	5.66	2.40	8.06	3.35	45.1	5.23	2.83
	0.3500	0.350	296.00	296.0	5.9	6.21	2.58	8.79	3.41	43.9	5.68	3.11
8	0.5400	0.540	332.00	332.0	9.0	6.73	2.81	9.54	3.40	42.3	6.17	3.37
9	0.6800	0.680	354.00	354.0	11.4	6.99	2.97	9.96	3.36	41.2	6.46	3.50
10	0.8100	0.810	374.00	374.0	13.6	7.21	3.08	10.29	3.34	40.4	6.69	3.60
11	0.9100	0.910	388.00	388.0	15.2	7.33	3.15	10.49	3.32	39.9	6.82	3.67

TRIAXIAL COMPRESSION TEST
CU with pore pressures

2-24-1994
5:58 pm

Project Data

Project No.: 5810535301 Date: 10/8/93 Data file: SRS-ITP5
Client: SRS
Project: SRS-ITP
Sample location: H-Bor-23 ST-2 @ 43-44'11"
Sample description: Atterberg Limits -200
Remarks: Tested by: HES
Reviewed by: RLB Fig No. 6

Sample No. 2 Data

Type of sample: Undisturbed
Specific Gravity= 2.71 LL= 168 PL= 43 PI= 125

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.87	
Height change, in		0.03	
Height, in	5.99	5.96	
Weight, grams	1249.2		
Water volume change, cc		-30.34	
Moisture, %	21.6	24.6	20.8
Dry density, pcf	100.3	101.6	
Saturation, %	85.3	100.0	
Void ratio	0.687	0.666	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 145.2 psi
Consolidation back pressure = 37.8 psi
Consolidation effective confining stress = 15.4656 ksf
Peak deviator stress = 15.71 ksf at reading no. 9
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	15.47	15.47	1.00	37.8	15.47	0.00
1	0.0200	0.020	168.00	168.0	0.3	3.73	14.40	18.13	1.26	45.2	16.26	1.86
2	0.0500	0.050	348.00	348.0	0.8	7.69	11.30	18.99	1.68	66.7	15.15	3.84
3	0.0700	0.070	408.00	408.0	1.2	8.98	9.68	18.66	1.93	78.0	14.17	4.49
	[illegible]300	0.130	463.00	463.0	2.2	10.09	7.62	17.71	2.32	92.3	12.66	5.04
	[illegible]300	0.230	496.00	496.0	3.9	10.62	7.17	17.79	2.48	95.4	12.48	5.31

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Effective Stresses Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
	.3700	0.370	561.00	561.0	6.2	11.72	7.32	19.04	2.60	94.4	13.18	5.86
7	0.5300	0.530	636.00	636.0	8.9	12.91	7.69	20.60	2.68	91.8	14.14	6.45
8	0.8200	0.820	755.00	755.0	13.8	14.50	8.38	22.88	2.73	87.0	15.63	7.25
9	0.9400	0.940	798.00	798.0	15.8	14.97	8.74	23.71	2.71	84.5	16.23	7.49

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

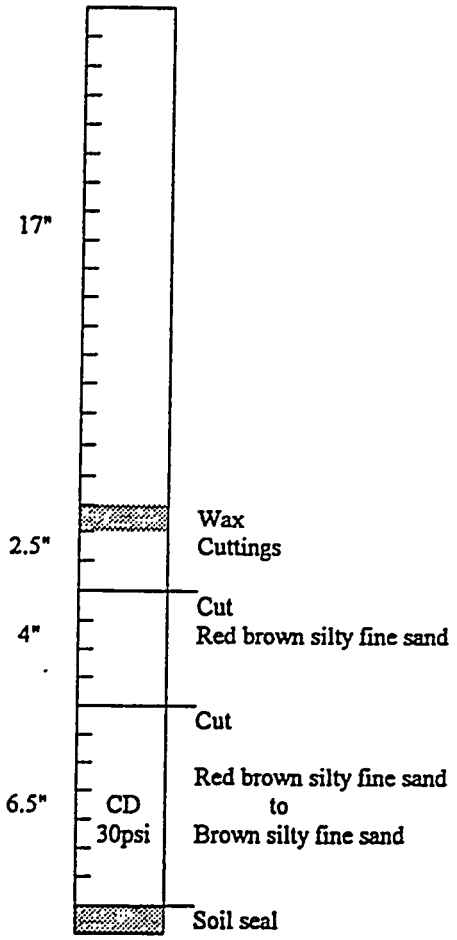
Project: SRS-ITP GEOTECHNICAL TESTING Date: 09-15-93

Boring No: H-Bor-23 Sample No: ST-3 Depth: 50' - 51' 3"

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

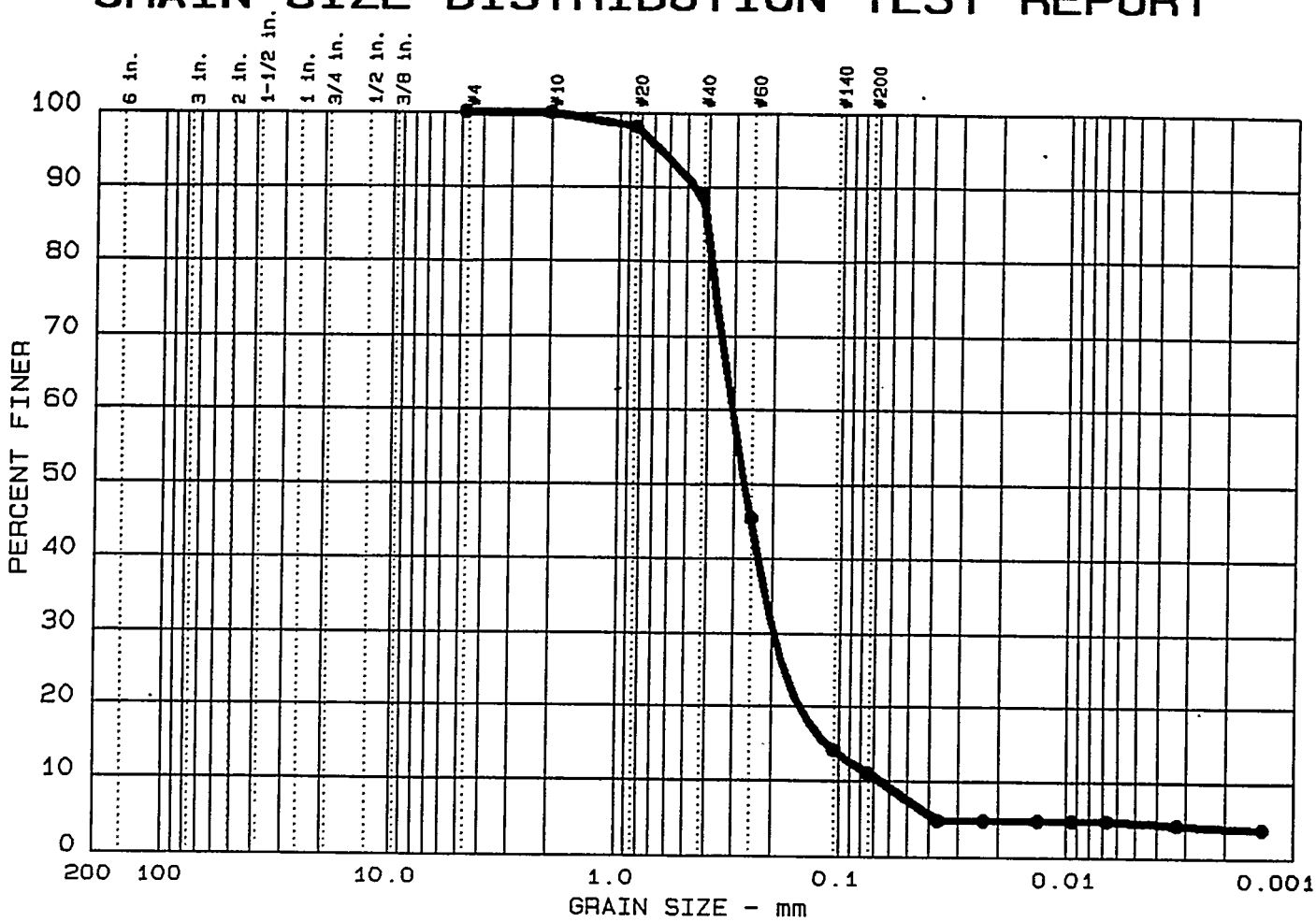
VISUAL DESCRIPTION



Remarks: CD 30psi sample never saturated, consumed untested

1028mf srs-itp-saif
7/22/93

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	14	0.0	0.0	89.0	6.2	4.8

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	NL	NP	0.40	0.31	0.27	0.197	0.1131	0.0651	1.94	4.7

MATERIAL DESCRIPTION	USCS	AASHTO
● Red Brown Silty Sand	SM	A-2-4 (0.4)

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-23 ST-3 @ 50-51.3 Ft.

Date: January 31, 1994

Remarks:

Tested by: CLG

Reviewed by: RLB

CD-30 psi (not tested)

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

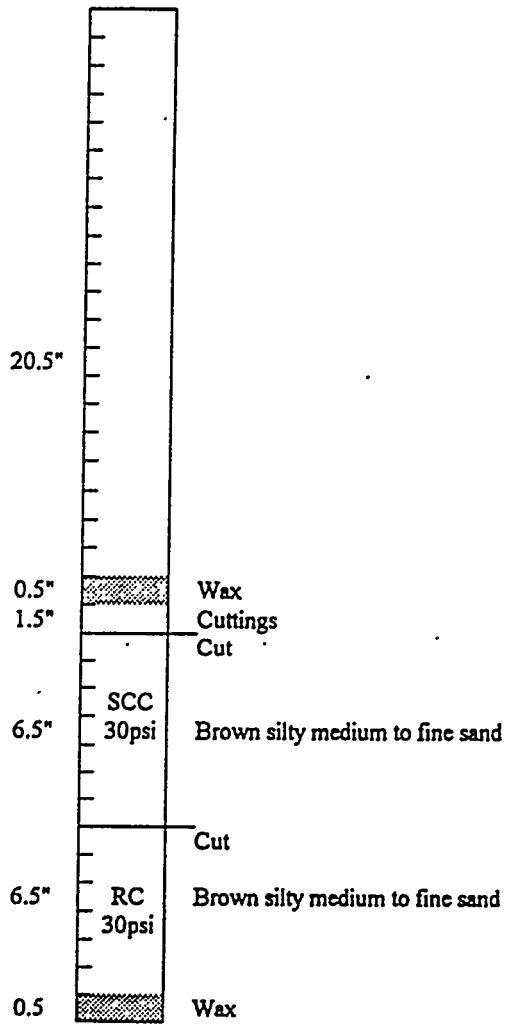
Project: SRS-ITP GEOTECHNICAL TESTING Date: 11-11-93

Boring No: H-Bor-23 Sample No: ST-4 Depth: 55' - 56' 3"

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 36.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION

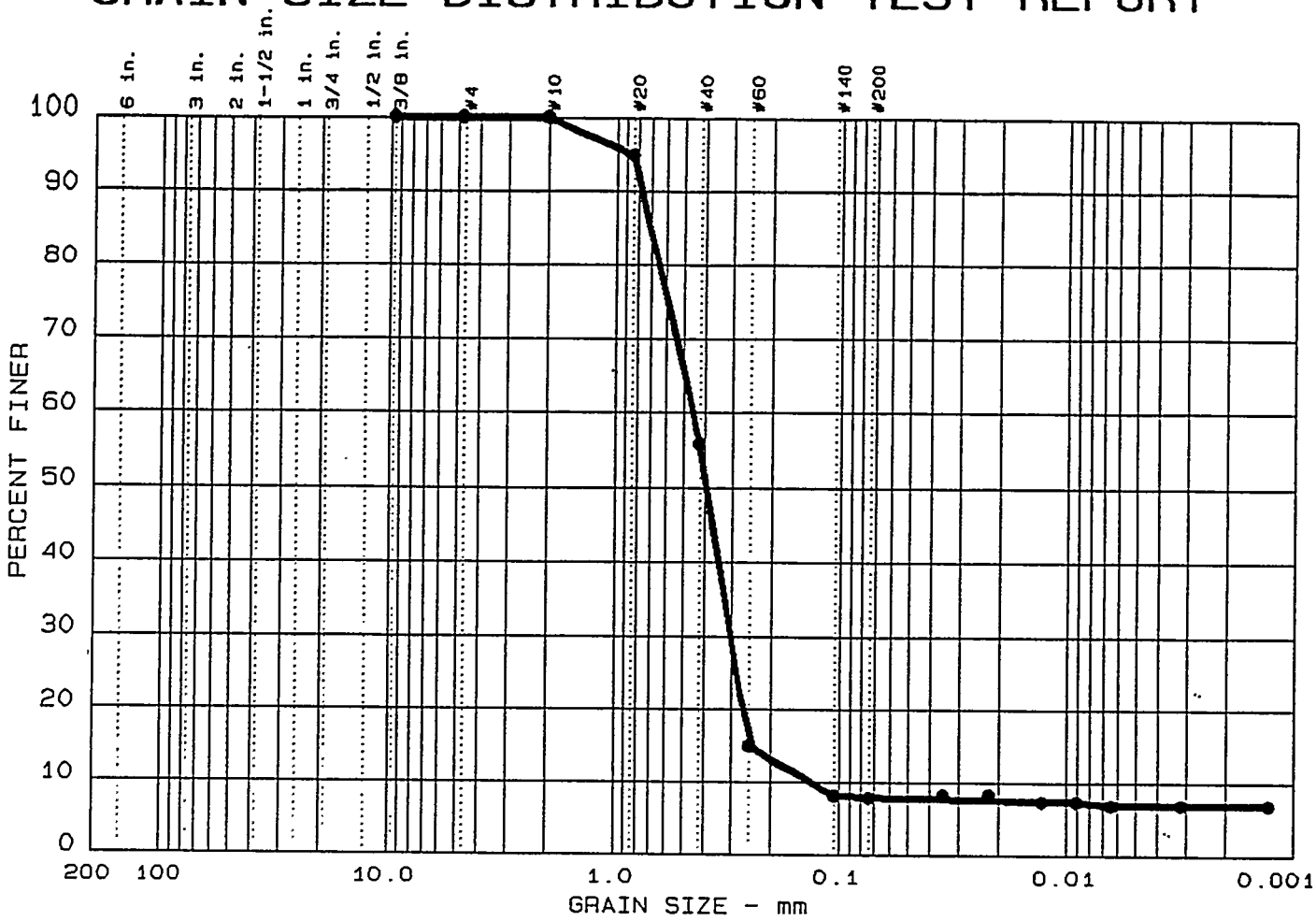


Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b23-st4.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	2	0.0	0.0	92.1	1.0	6.9

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	27	8	0.70	0.45	0.39	0.303	0.2489	0.1321	1.55	3.4

MATERIAL DESCRIPTION	USCS	AASHTO
● Yellow Brown Clayey Sand	SP-SC	A-2-4 (0.0)

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-23 ST-4 @ 55'56.3"

Date: December 8, 1993

Remarks:

Tested by:

Reviewed by:

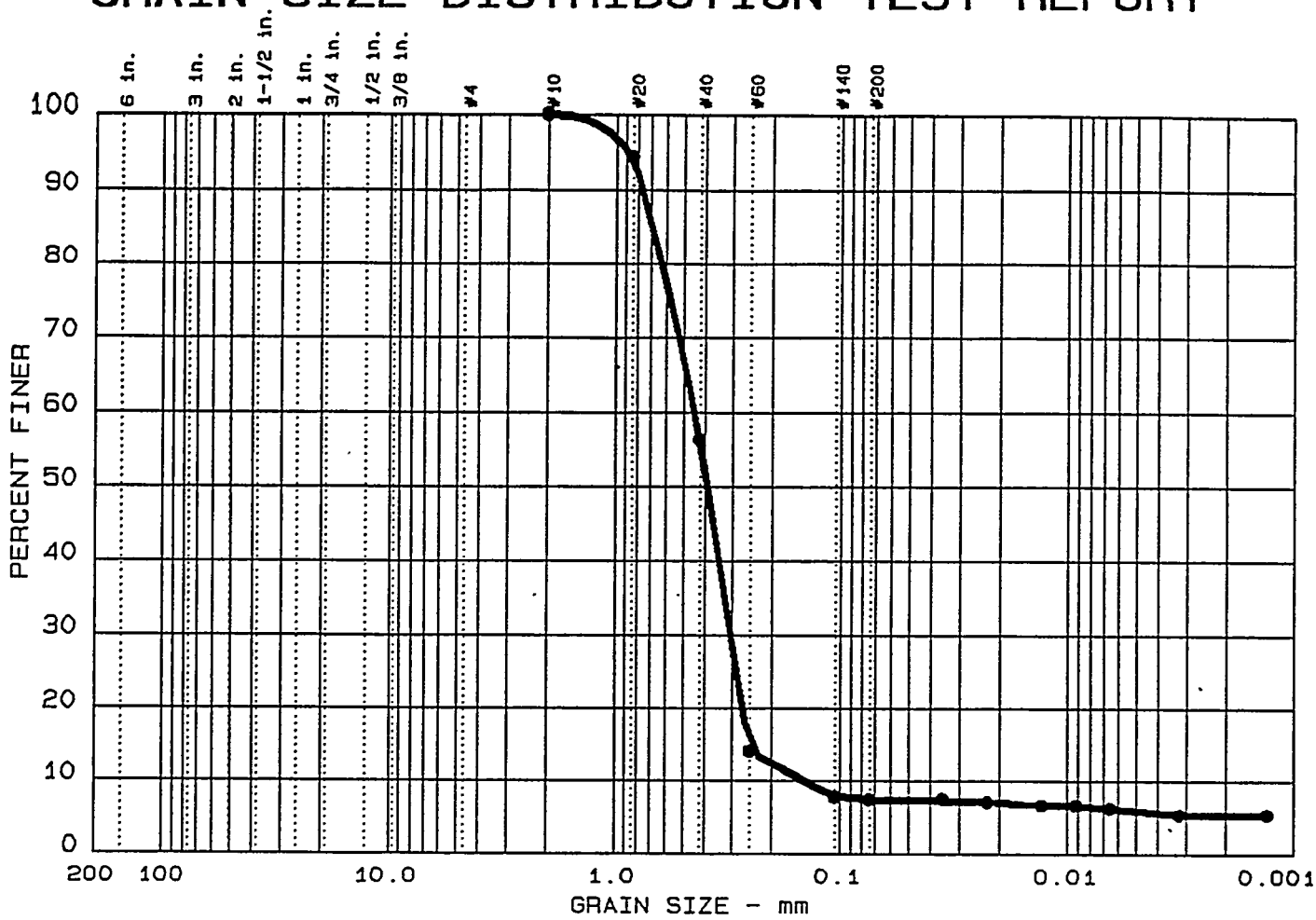
SC@ 30 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	19	0.0	0.0	92.6	1.5	5.9

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.69	0.44	0.39	0.304	0.2526	0.1404	1.48	3.2

MATERIAL DESCRIPTION	USCS	AASHTO
● Brown Poorly Graded Sand with Clay		

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-23 ST-4 @ 55-57 Ft.

Date: January 3, 1994

Remarks:
Tested by: JTK Reviewed by: RB
RC-30 psi
Atterberg Limits-#200
LL=127 PL=41 PI=86

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-23
Test Date:	11/15/93-11/18/93	Sample No.:	ST4
Reviewed By:	JW/RLB RLB	Depth:	55.0 - 56.3 ft.
Review Date:	11/22/93	Sample Description:	See classification data

SPECIMEN DATA

Initial Conditions of Specimen

Diameters, in.		Area , sq. in.	6.46
Top	2.891	Volume, cubic in.	38.53
Middle	2.891	Mass of Specimen, grams	1249.49
Bottom	2.893		
Average	2.892	Moisture Content	
Membrane Thickness, in.	0.012	Pan No.	L-31
Net Diameter, in.	2.868	Wet Mass + Pan, grams	1338.33
		Dry Mass + Pan, grams	1090.46
Length, in.		Container Mass, grams	88.84
Location 1	8.610	Moisture Content, %	24.7
Location 2	8.610		
Location 3	8.610	Density, pcf	123.3
Average	8.610	Dry Density, pcf	98.8
Length of Top Platen	1.140	Specific Gravity	2.69
Length of Bottom Platen	1.505	Degree of Saturation, %	95.3
Length of Specimen, in	5.965	Void Ratio	0.698

Conditions of Specimen After Saturation and Consolidation

After Saturation		After Consolidation	
Change in Length, in.	0.000	Change in Length, in.	0.005
Length, in.	5.965	Length, in.	5.960
Area, sq. in.	6.46	Change in Volume, cc	2.04
Volume, cubic in.	38.53	Volume, cubic in.	38.40
Back Pressure, psi	45.0	Area, sq. in.	6.44
B Value	0.96	Effe. Consoli.. Stress, psi	30.0
		Moisture Content, %	25.8
		Dry Density, pcf	99.2
		Void Ratio	0.693
		Degree of Saturation, %	100.0

CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

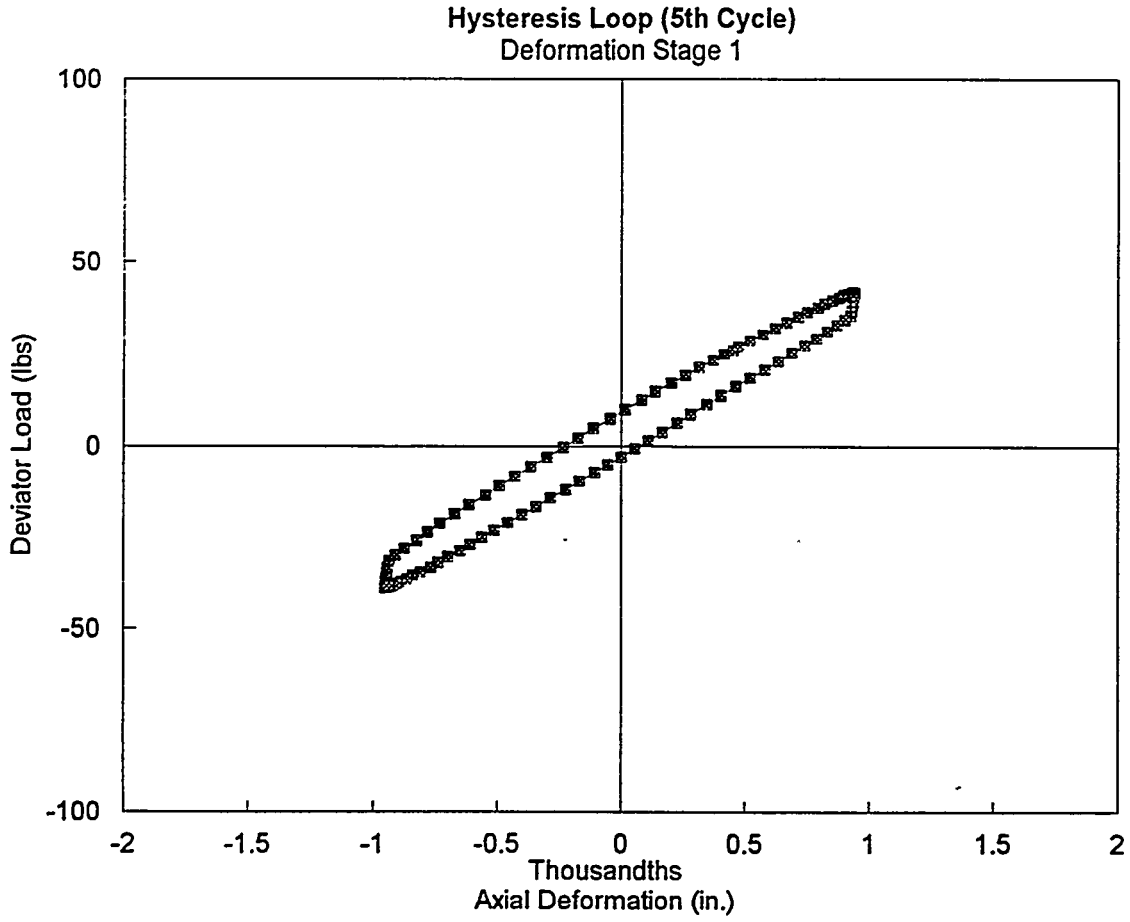
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-23
Test Date:	11/15/93-11/18/93	Sample No.:	ST4
Reviewed By:	JW/RLB RLB	Depth:	55.0 - 56.3 ft.
Review Date:	11/22/93	Sample Description:	See classification data

Area, A_c, in ^{2}	6.44		Effective Consolidation Stress, psi	30.0
Length, H_c, in.	5.96		Cyclic Load, P_c, lbs	40.23
			Cyclic Deviator Stress, psi	6.2

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
80.5	0.0019	39324	0.016

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
0.020	0.019	8.5



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

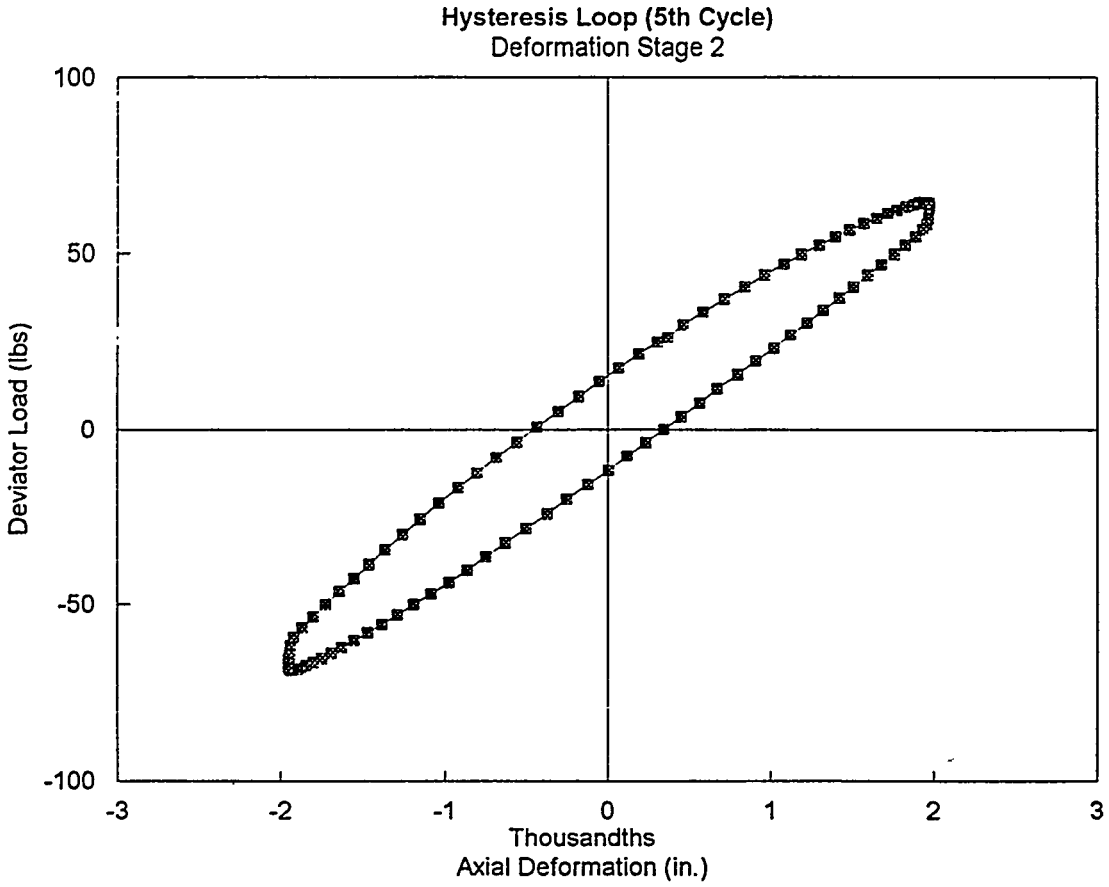
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-23
Test Date:	11/15/93-11/18/93	Sample No.:	ST4
Reviewed By:	JW/RLB RLB	Depth:	55.0 - 56.3 ft.
Review Date:	11/22/93	Sample Description:	See classification data

Area, A_c, in ²	6.44		Effective Consolidation Stress, psi	30.0
Length, H_c, in.	5.96		Cyclic Load, P_c, lbs	66.74
			Cyclic Deviator Stress, psi	10.4

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
133.5	0.0039	31429	0.033

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
0.084	0.066	10.3



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

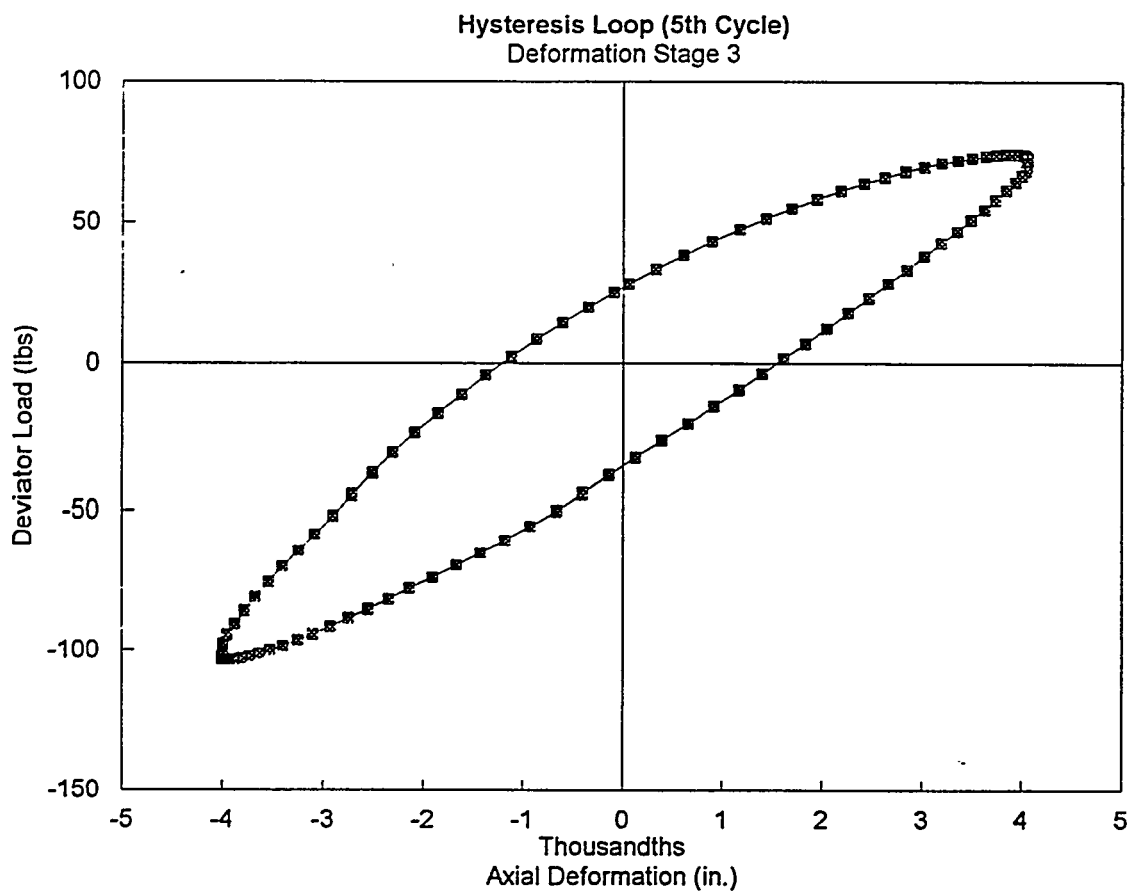
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-23
Test Date:	11/15/93-11/18/93	Sample No.:	ST4
Reviewed By:	JW/RLB RLB	Depth:	55.0 - 56.3 ft.
Review Date:	11/22/93	Sample Description:	See classification data

Area, A_c, in ^{2}	6.44		Effective Consolidation Stress, psi	30.0
Length, H_c, in.	5.96		Cyclic Load, P_c, lbs	88.79
			Cyclic Deviator Stress, psi	13.8

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
177.6	0.0081	20368	0.068

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
0.375	0.179	16.7



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

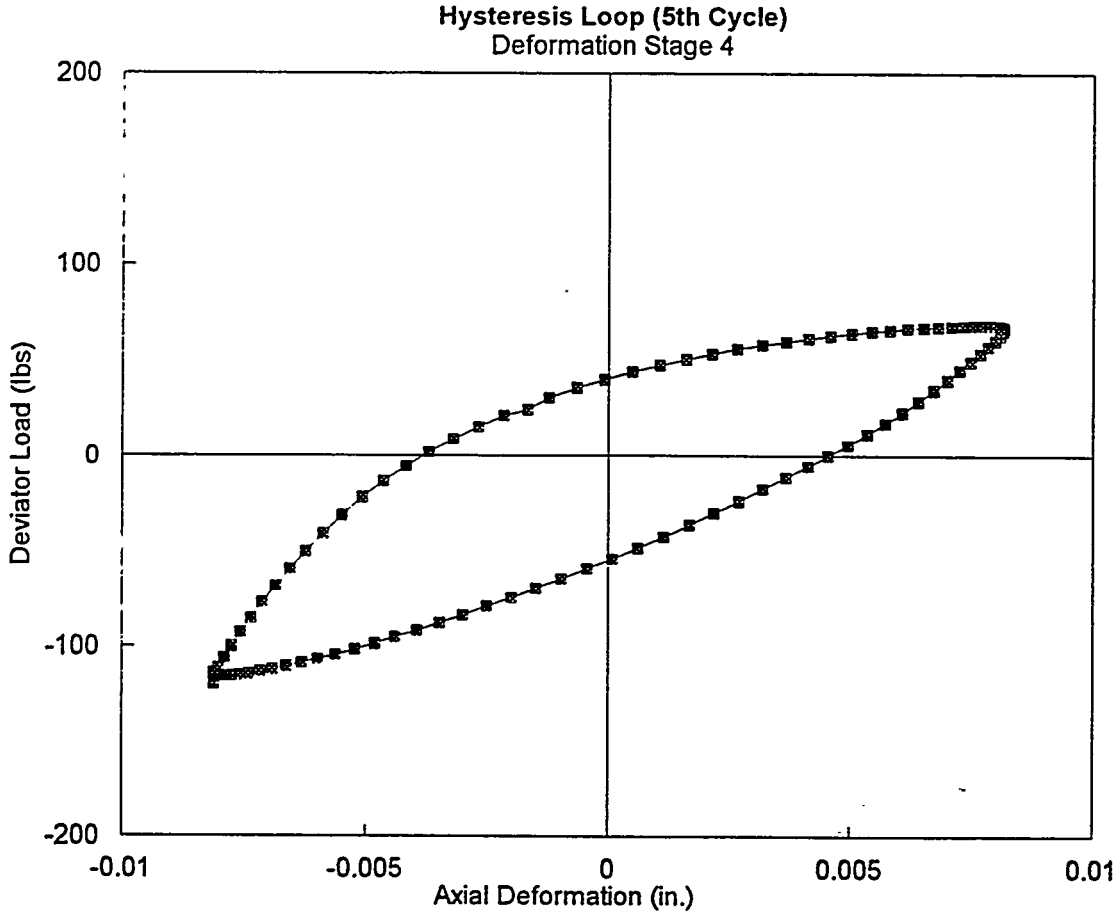
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-23
Test Date:	11/15/93-11/18/93	Sample No.:	ST4
Reviewed By:	JW/RLB RLB	Depth:	55.0 - 56.3 ft.
Review Date:	11/22/93	Sample Description:	See classification data

Area, A_c, in^2	6.44		Effective Consolidation Stress, psi	30.0
Length, H_c, in.	5.96		Cyclic Load, P_c, lbs	93.91
			Cyclic Deviator Stress, psi	14.6

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
187.8	0.0163	10663	0.137

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
1.184	0.383	24.6



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

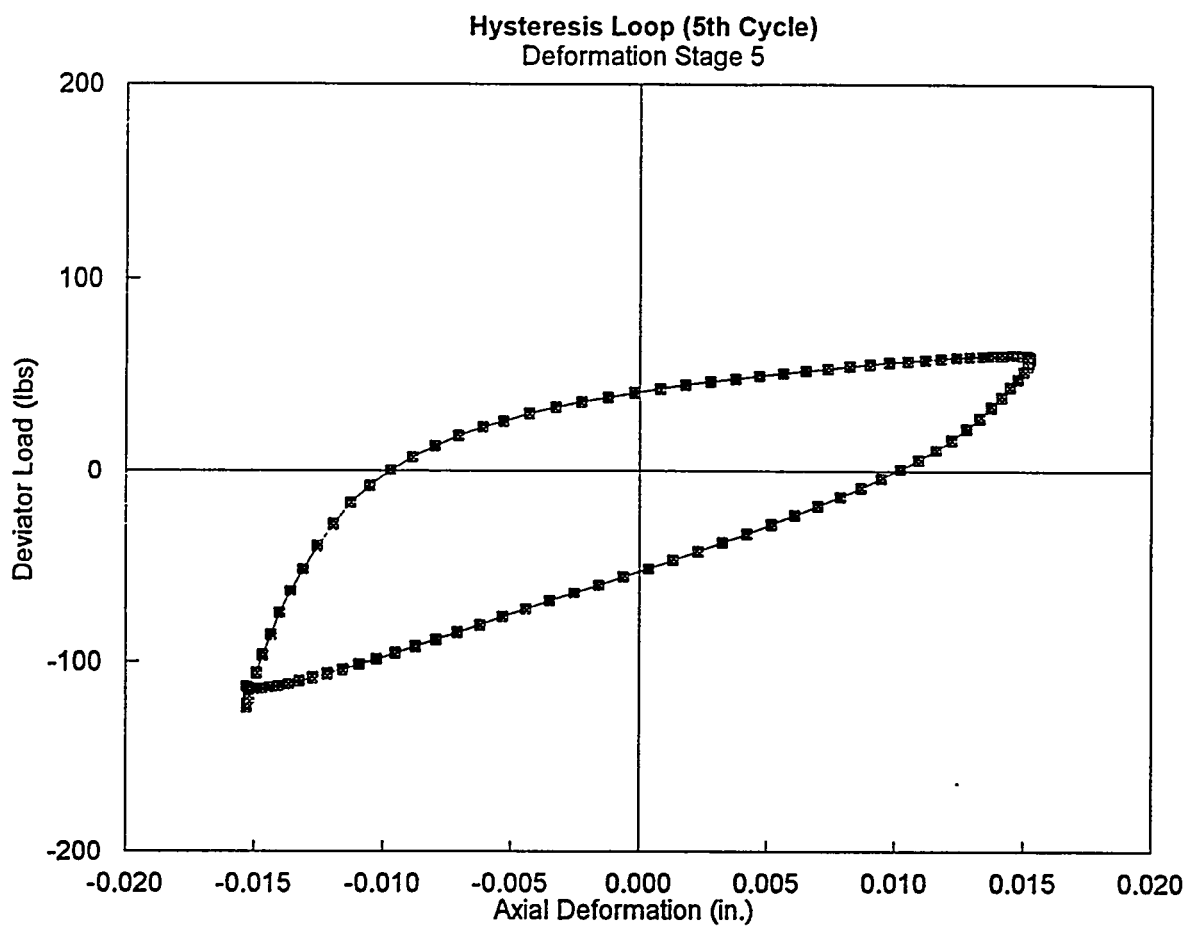
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-23
Test Date:	11/15/93-11/18/93	Sample No.:	ST4
Reviewed By:	JW/RLB RLB	Depth:	55.0 - 56.3 ft.
Review Date:	11/22/93	Sample Description:	See classification data

Area, A_c, in²	6.44		Effective Consolidation Stress, psi	30.0
Length, H_c, in.	5.96		Cyclic Load, P_c, lbs	92.39
			Cyclic Deviator Stress, psi	14.3

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
184.8	0.0305	5600	0.256

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
2.524	0.705	28.5



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)

(ASTM D 3999-91)

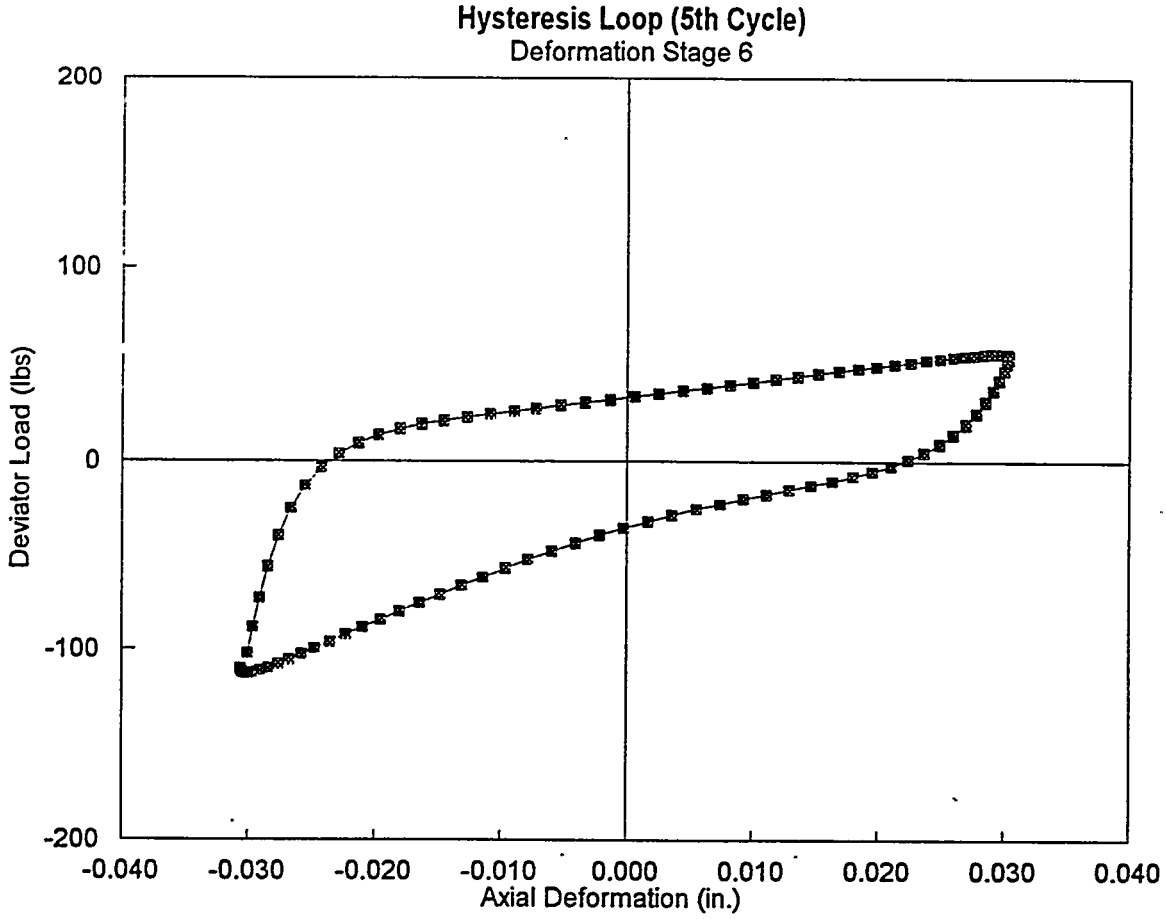
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-23
Test Date:	11/15/93-11/18/93	Sample No.:	ST4
Reviewed By:	JW/RLB RLB	Depth:	55.0 - 56.3 ft.
Review Date:	11/22/93	Sample Description:	See classification data

Area, A_c, in ^{2}	6.44		Effective Consolidation Stress, psi	30.0
Length, H_c, in.	5.96		Cyclio Load, P_c, lbs	90.63
			Cyclic Deviator Stress, psi	14.1

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
181.3	0.0610	2749	0.512

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
4.508	1.382	26.0



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

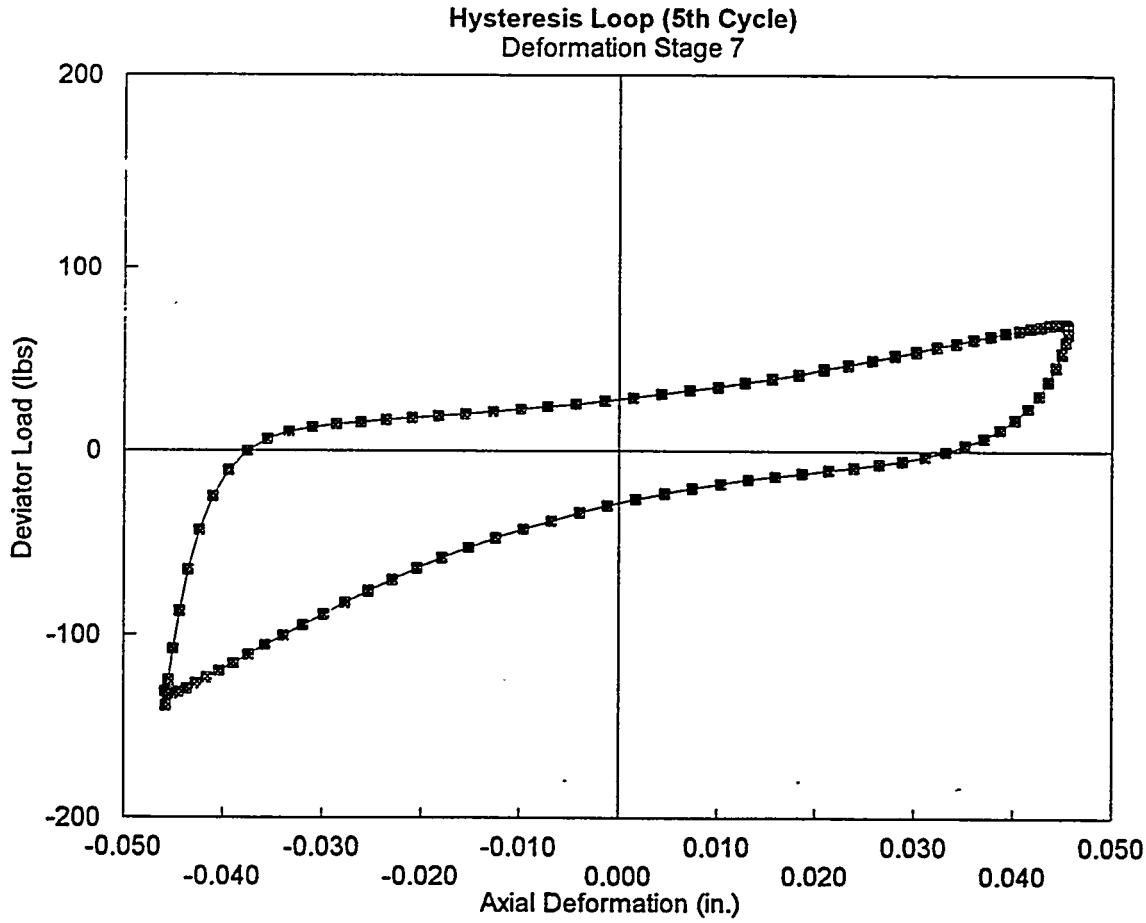
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-23
Test Date:	11/15/93-11/18/93	Sample No.:	ST4
Reviewed By:	JW/RLB RLB	Depth:	55.0 - 56.3 ft.
Review Date:	11/22/93	Sample Description:	See classification data

Area, A_c, in^2	6.44		Effective Consolidation Stress, psi	30.0
Length, Hc, in.	5.96		Cyclic Load, P_c, lbs	109.15
			Cyclic Deviator Stress, psi	16.9

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
218.3	0.0914	2209	0.767

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
7.061	2.494	22.5



WORKING COPY DATE

CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

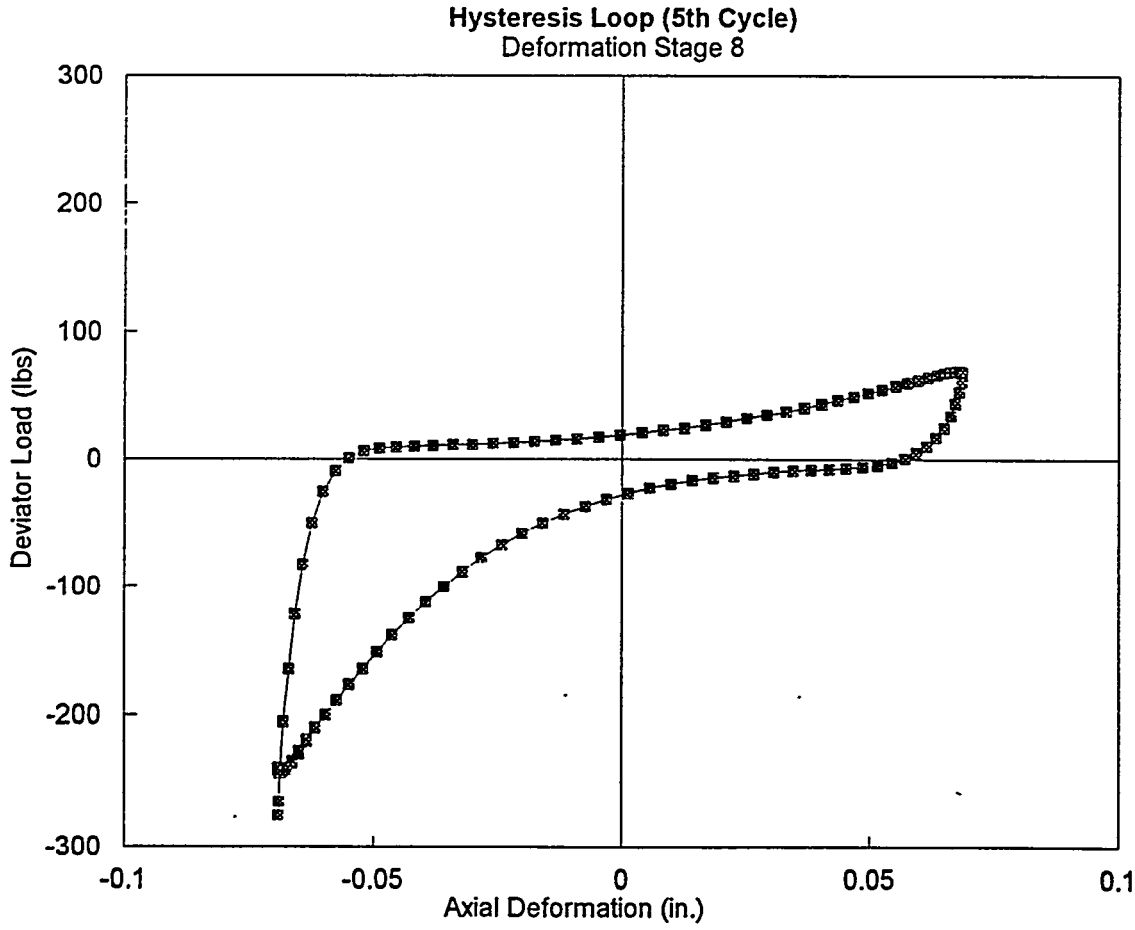
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-23
Test Date:	11/15/93-11/18/93	Sample No.:	ST4
Reviewed By:	JW/RLB RLB	Depth:	55.0 - 56.3 ft.
Review Date:	11/22/93	Sample Description:	See classification data

Area, A_c, in²	6.44		Effective Consolidation Stress, psi	30.0
Length, H_c, in.	5.96		Cyclic Load, P_c, lbs	172.04
			Cyclic Deviator Stress, psi	26.7

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
344.1	0.1377	2312	1.155

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
13.193	5.921	17.7



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

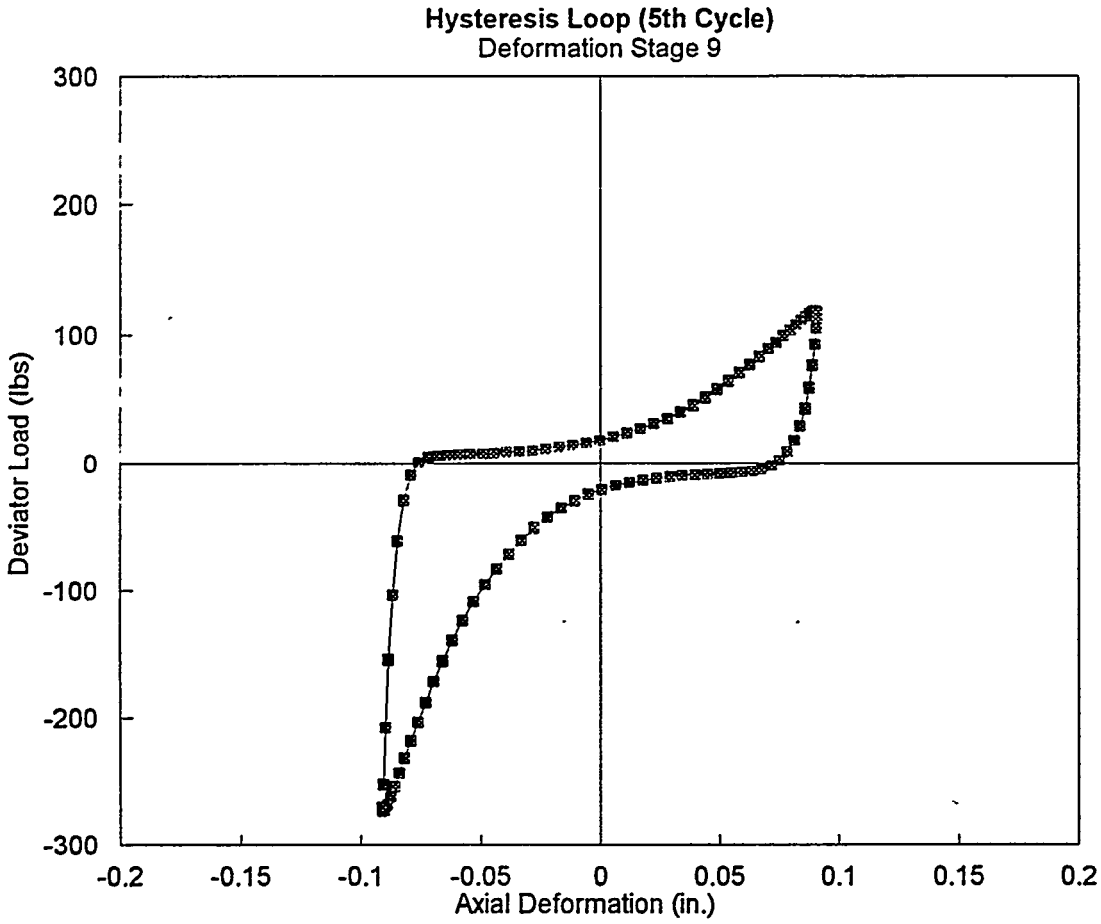
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-23
Test Date:	11/15/93-11/18/93	Sample No.:	ST4
Reviewed By:	JW/RLB RLB	Depth:	55.0 - 56.3 ft.
Review Date:	11/22/93	Sample Description:	See classification data

Area, A_c, in²	6.44		Effective Consolidation Stress, psi	30.0
Length, H_c, in.	5.96		Cyclic Load, P_c, lbs	211.43
			Cyclic Deviator Stress, psi	32.8

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
422.9	0.1821	2149	1.527

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
18.447	9.623	15.3



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

LAW ENGINEERING

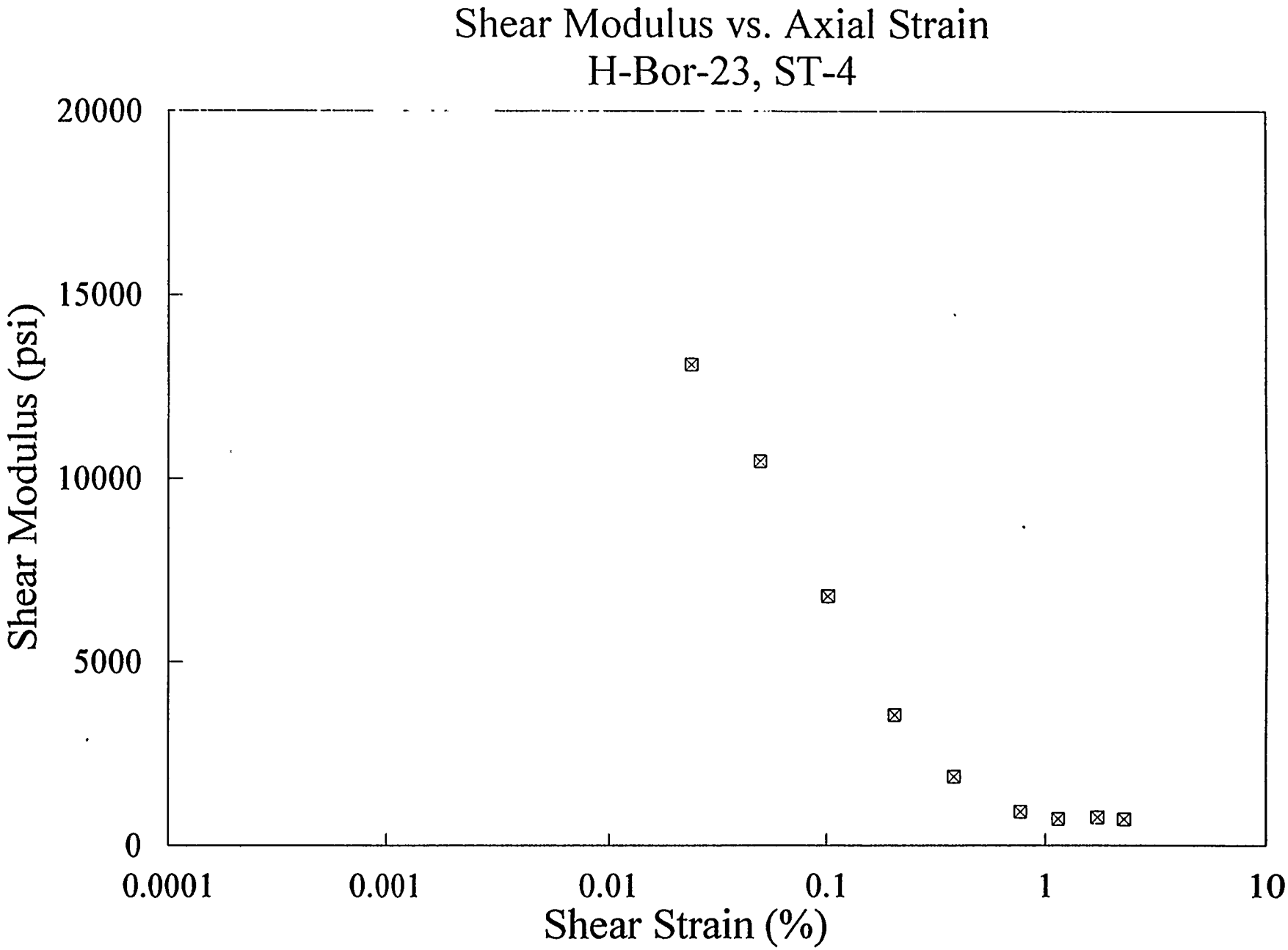
Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-23
Test Date:	11/15/93-11/18/93	Sample No.:	ST4
Reviewed By:	JW/RLB RLB	Depth:	55.0 - 56.3 ft.
Review Date:	11/22/93	Sample Description:	See classification data

Effective Consolidation Stress 30 psi

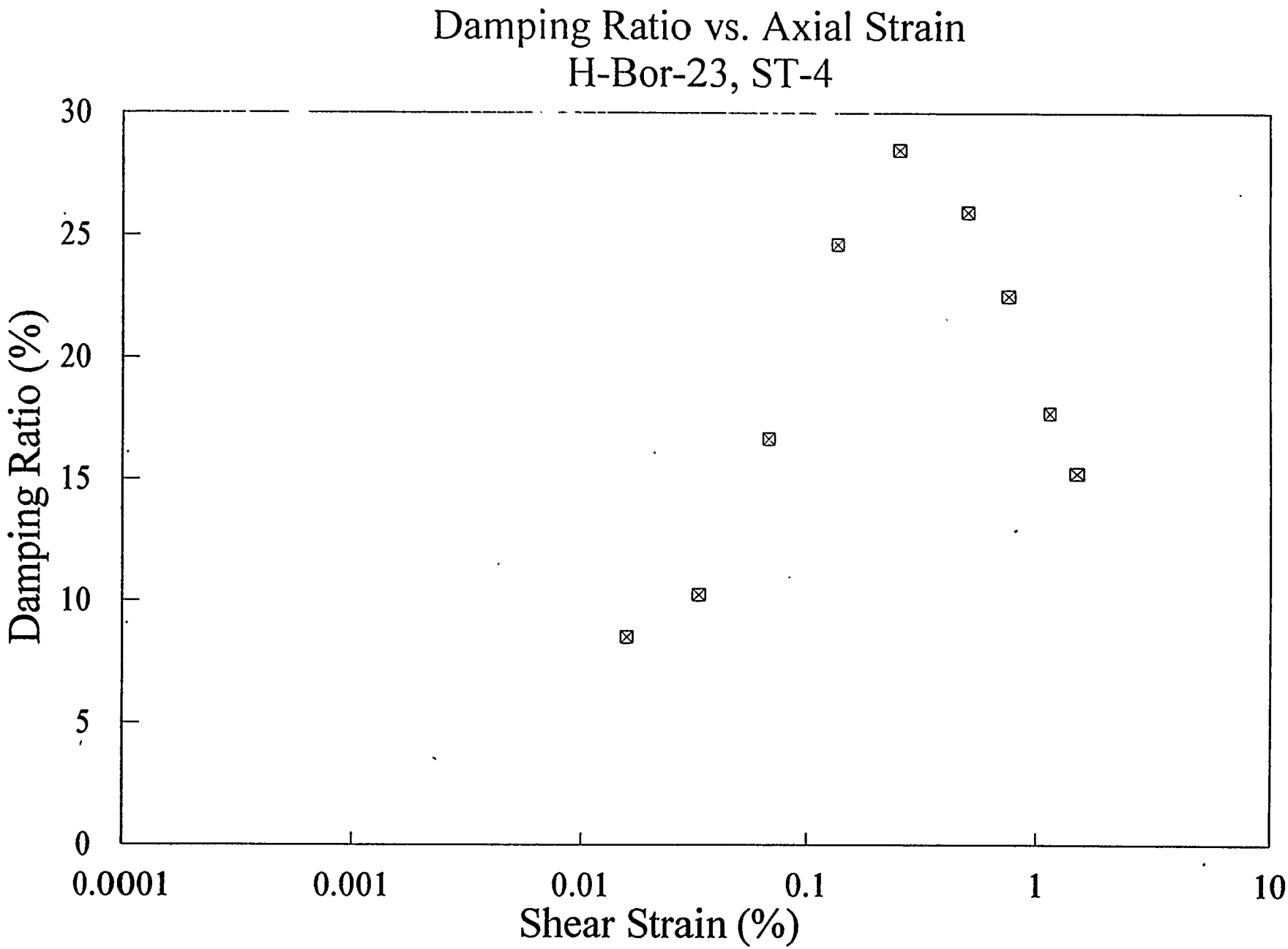
Deformation Stage No.	Cyclic Stress (psi)	Axial Strain ε (%)	Young's Modulus E, (psi)	Damping Ratio D, (%)	Shear* Modulus G, (psi)	Shear* Strain γ (%)
1	6.2	0.016	39324	8.53	13108	0.024
2	10.4	0.033	31429	10.25	10476	0.049
3	13.8	0.068	20368	16.66	6789	0.101
4	14.6	0.137	10663	24.63	3554	0.205
5	14.3	0.256	5600	28.49	1867	0.384
6	14.1	0.512	2749	25.95	916	0.768
7	16.9	0.767	2209	22.53	736	1.150
8	26.7	1.155	2312	17.73	771	1.732
9	32.8	1.527	2149	15.26	716	2.291

* Calculated based on assumed Poisson's Ratio value, 0.5.

All calculations are based on 5th cycle.



Law Engineering Project No.: 5810535301
SRS-ITP: Strain Controlled Cyclic Triaxial



Law Engineering Project No: 5810535301
SRS-ITP: Strain Controlled Cyclic Triaxial

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-23
Test Date:	11/11/93-11/19/93	Sample No.:	ST-4
Reviewed By:	JW/RLB	Depth:	55 - 57 ft
Reviewed Date:	11/22/93	Sample Description:	See classification data

Initial Specimen Data

Labels	Values	Units	Description	Labels	Values	Units	Description
Masses				Mass Density and Unit Weight			
M_{scb}	1216.75	g	*Mass of soil and container before*	Rho	1921.2	kg/m³	*Mass density of specimen* $= M_s/V*10^6$
M_{sca}	0.00	g	*Mass of soil and container after*				
M_s	1216.75	g	$M_{scb} - M_{sca}$ = *mass of soil*	U_{wt}	18.84	kN/m³	*Unit weight of specimen* = *Rho*9.806/1000*
Diameters				Moisture Content, mc			
D_t	73.53	mm	*Diameter near top of specimen*				
D_m	73.71	mm	*Diameter near middle of specimen*	No.	AB-1		*Container number*
D_b	73.74	mm	*Diameter near bottom of specimen*	M_{wscb}	1301.47	g	*Mass of wet soil + container*
T_{mem}	0.30	mm	*Single thickness of membrane*	M_{wsca}	1076.18	g	*Mass of dry soil + container*
D_{net}	73.05	mm	$(D_t + D_m + D_b)/3 - 2*T_{mem}$	M_{wat}	225.29	g	*Mass of water* $= M_{wscb} - M_{wsca}$
Lengths				M_{cont}	84.72	g	*Mass of container.*
L_{cbp}	199.06	mm	*Length between chamber bottom & top of top platen*	mc	22.7	%	$M_{wat}/(M_{wsca} - M_{cont})*100\%$
L_{tp}	23.95	mm	*Length of top platen*	Rho_d	1565.5	kg/m³	*Dry mass density* = *Rho/(1+mc)*
L_{bp}	24.00	mm	*Length of bottom platen*	G_s	2.68		*Specific gravity*
L_{net}	151.11	mm	*Length of Specimen* $= L_{cbp} - L_{tp} - L_{bp}$	e	0.712		*Void Ratio,* $[1000*G_s)]/Rho_d-1$
				S_r	85.5	%	*Degree of Saturation* $= mc*G_s/e$
Volume				J	0.000812	kg-m²	*Polar mass moment of inertia* $= (M_s/1000)*(D_{net}/1000)^2/8$
V	633327	mm³	$D^2_{net}*Pi*L_{net}/4$				

Conditions After Saturation				Conditions After Consolidation			
CL_s	0.12	mm	*Change in length*	CL_c	0.08	mm	*Change in length*
L_s	151.0	mm	*Length after saturation,* $L - CL_s$	L_c	150.9	mm	*Length after consolidation,* $L_s - CL_c$
A_s	4191.2	mm²	*Area of specimen*	CV_c	2142	mm³	*Change in volume*
V_s	632833	mm³	*Volume after saturation,* $A_s * L_s$	V_c	630691	mm³	*Volume,* $V_s - CV_c$
B	0.76		*B Value*	S_r	100.0	%	*Degree of Saturation* $= mc*G_s/e$
				e	0.705		*Void Ratio,* $[1000*G_s]/Rho_d-1$
				mc	26.3	%	*Moisture Content*
				Rho_d	1572	kg/m³	*Dry mass density,* Rho_d*V/V_c

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

INPUT DATA

Project No.: 5810535301
Tested By: HEJ/JW
Test Date: 11/11/93-11/19/93
Reviewed By: JW/RLB RLB
Reviewed Date: 11/22/93

Project Name: SRS-ITP
Boring No: H-Bor-23
Sample No.: ST-4
Depth: 55 - 57 ft
Sample Description: See classification data

Line No.	Elapsed Time [min]	Cell Pressure [unit]	Pore Pressure [unit]	Axial Load [unit]	Burette Reading [unit]	Length Reading [unit]	Longitudinal or Torsional	Force or Torque Reading [V_{rms}]	Transducer Reading [V_{rms}]	Resonant Period [msec]
1	0.5	115.0	85.3	0	6.4	-8.1590	T	0.005	0.029	7.167
2	1.0	115.0	85.3	0	6.4	-8.1590	T	0.012	0.063	7.178
3	1.8	115.0	85.3	0	6.4	-8.1590	T	0.020	0.103	7.182
4	2.3	115.0	85.3	0	6.4	-8.1590	T	0.048	0.227	7.224
5	2.8	115.0	85.3	0	6.4	-8.1590	T	0.093	0.397	7.271
6	3.4	115.0	85.3	0	6.4	-8.1590	T	0.186	0.680	7.343
7	4.0	115.0	85.5	0	6.4	-8.1590	T	0.384	1.150	7.500
8	4.8	115.0	85.7	0	6.4	-8.1820	T	0.817	1.996	7.813
9	5.7	115.0	88.9	0	6.4	-8.2320	T	1.486	2.710	8.396
10	6.4	115.0	93.7	0	6.4	-8.3100	T	3.110	3.710	9.197

Resonant Column Test (ASTM D4015-87)

INTERMEDIATE DATA

LAW ENGINEERING

Project No.: 5810535301
Tested By: HEJ/JW
Test Date: 11/11/93-11/19/93
Reviewed By: JW/RLB RLB
Reviewed Date: 11/22/93

Project Name: SRS-ITP
Boring No: H-Bor-23
Sample No.: ST-4
Depth: 55 - 57 ft
Sample Description: See classification data

Specimen Volume [mm³]	Specimen Length [mm]	Specimen Diameter [mm]	Specimen Mass [grams]	Mass Density [kg/m³]	Polar Inertia J [kg-m²]	Inertia Stiffness Ratio T	Apparatus Damping Factor ADF	Dimensionless Frequency F	Damping Factor A
630657	150.91	72.94	1252.66	1986.3	0.000833	3.8768	0.00499	0.487	8.45
630657	150.91	72.94	1252.66	1986.3	0.000833	3.8768	0.00500	0.487	8.45
630657	150.91	72.94	1252.66	1986.3	0.000833	3.8768	0.00500	0.487	8.45
630657	150.91	72.94	1252.66	1986.3	0.000833	3.8768	0.00503	0.487	8.45
630657	150.91	72.94	1252.66	1986.3	0.000833	3.8768	0.00506	0.487	8.45
630657	150.91	72.94	1252.66	1986.3	0.000833	3.8768	0.00511	0.487	8.45
630657	150.91	72.94	1252.66	1986.3	0.000833	3.8768	0.00522	0.487	8.45
630657	150.89	72.95	1252.66	1986.3	0.000833	3.8764	0.00544	0.487	8.45
630657	150.86	72.96	1252.66	1986.3	0.000833	3.8756	0.00584	0.487	8.45
630657	150.81	72.97	1252.66	1986.3	0.000834	3.8743	0.00640	0.488	8.45

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

TEST RESULTS SUMMARY

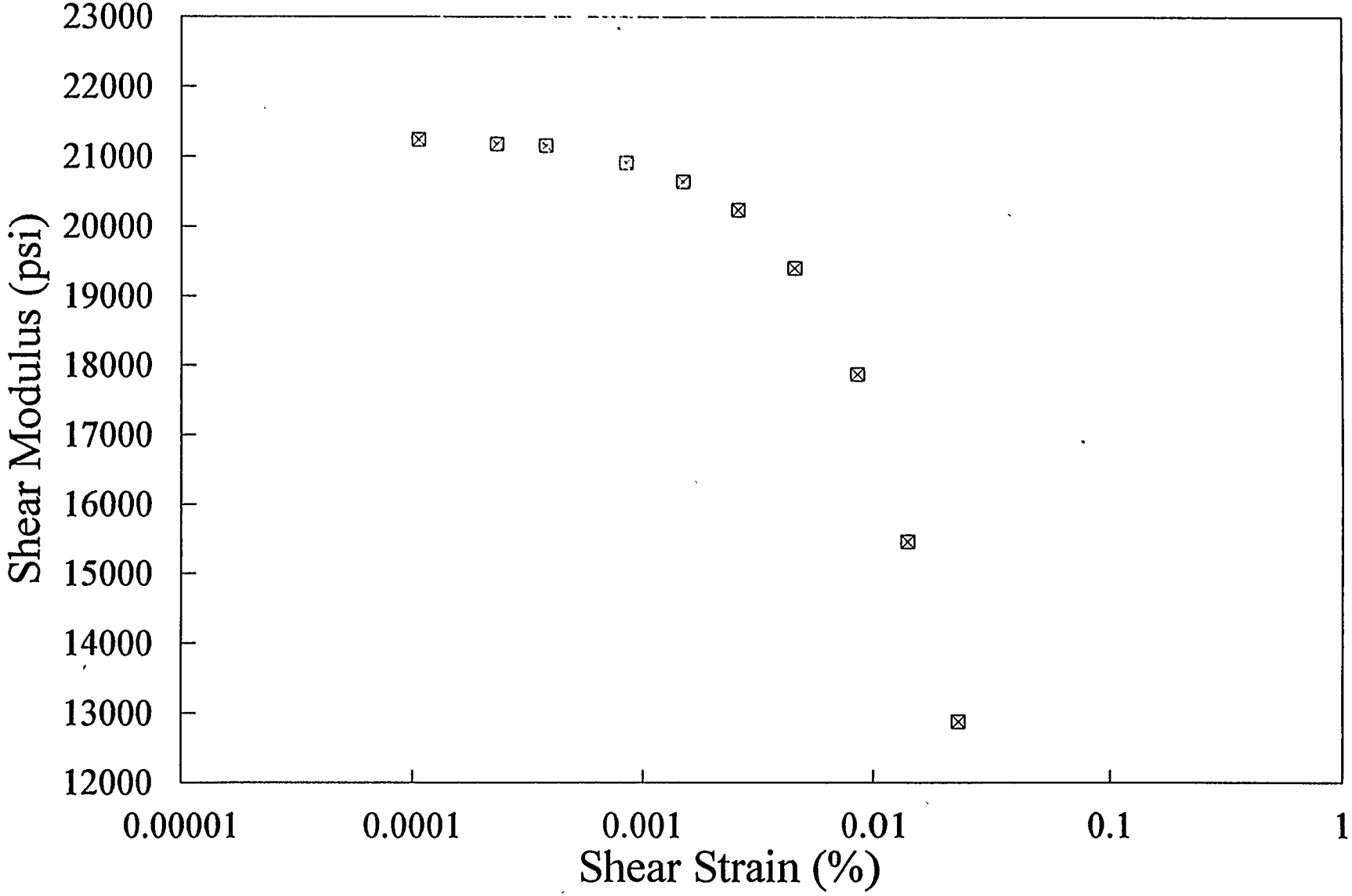
Project No.: 5810535301
Tested By: HEJ/JW
Test Date: 11/11/93-11/19/93
Reviewed By: JW/RLB RLB
Reviewed Date: 11/22/93

Project Name: SRS-ITP
Boring No: H-Bor-23
Sample No.: ST-4
Depth: 55 - 57 ft
Sample Description: See classification data

Line No.	Effective Confining Stress [kPa]	Principal Stress Ratio	Void Ratio e	Longitudinal or Torsional	No. of Vibration Cycles	Shear Modulus G [Mpa]	Shear Strain Amplititude [%]	Damping Ratio [%]	Shear Modulus G [psi]
1	204.50	1.00	0.705	T	3767	146.34	0.00011	0.76	21240
2	204.50	1.00	0.705	T	4932	145.89	0.00023	0.85	21175
3	204.50	1.00	0.705	T	6015	145.73	0.00038	0.87	21151
4	204.50	1.00	0.705	T	4153	144.04	0.00084	0.95	20906
5	204.50	1.00	0.705	T	4539	142.19	0.00149	1.06	20637
6	204.50	1.00	0.705	T	5148	139.41	0.00261	1.25	20234
7	203.39	1.00	0.705	T	4720	133.64	0.00461	1.54	19396
8	202.15	1.00	0.705	T	5683	123.11	0.00868	1.89	17868
9	179.97	1.00	0.705	T	6646	106.54	0.01361	2.56	15463
10	146.55	1.00	0.705	T	4828	88.71	0.02237	3.94	12875

Shear Modulus vs. Shear Strain

H-BOR-23, ST-4

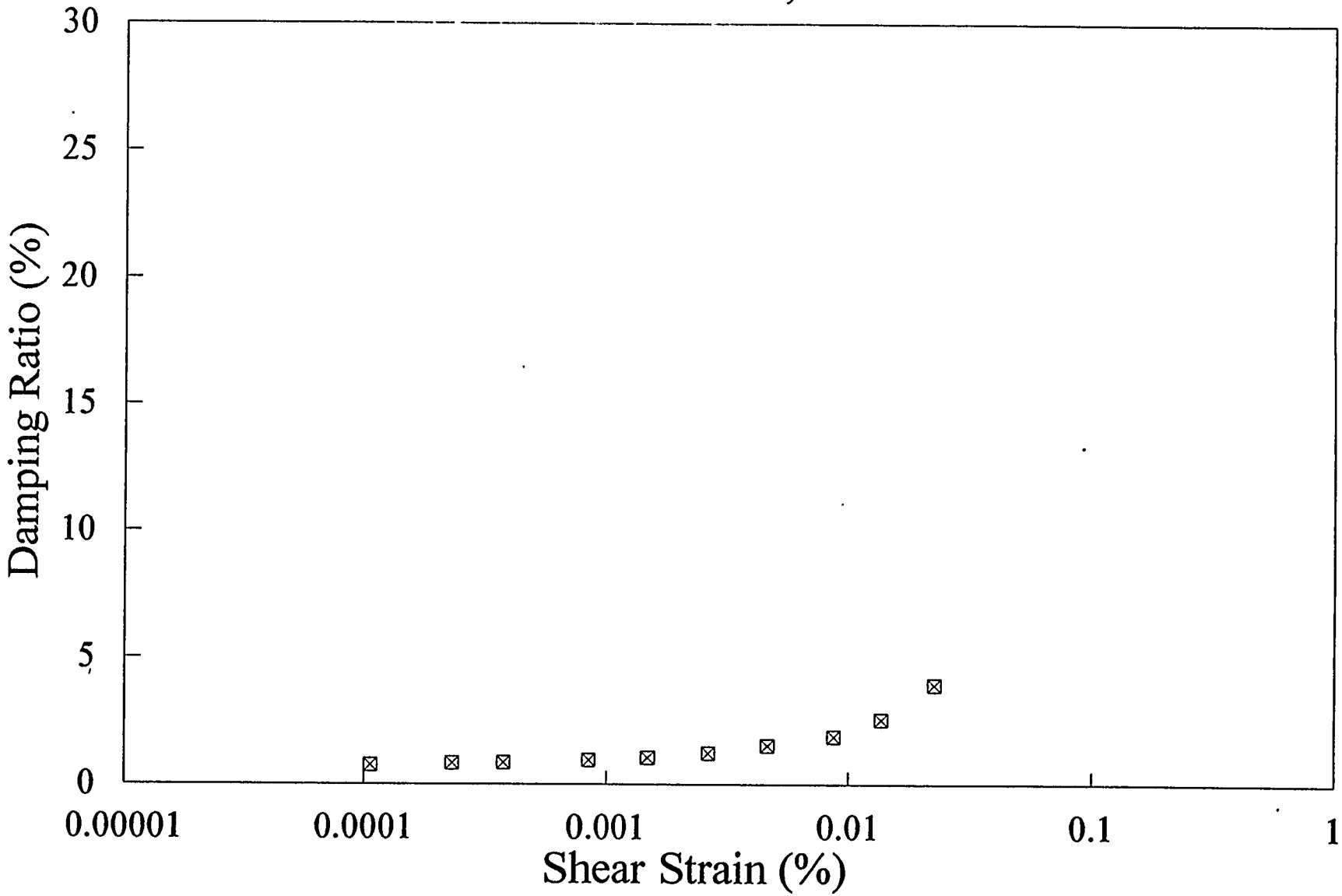


Law Engineering Project No.: 5810535301

SRS-ITP: Resonant Column

Damping Ratio vs. Shear Strain

H-BOR-23, ST-4



Law Engineering Project No.: 5810535301

SRS-ITP: Resonant Column

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

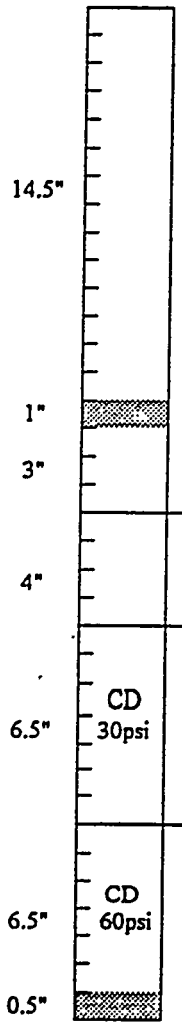
Project: SRS-ITP GEOTECHNICAL TESTING Date: 01-10-94

Boring No: H-Bor-23 Sample No: ST-5 Depth: 60 ft.

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L: 36.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION



Wax

Cuttings

Cut

Reddish brown clayey fine sand

Cut

Reddish brown clayey fine sand

Cut

Reddish brown clayey fine sand

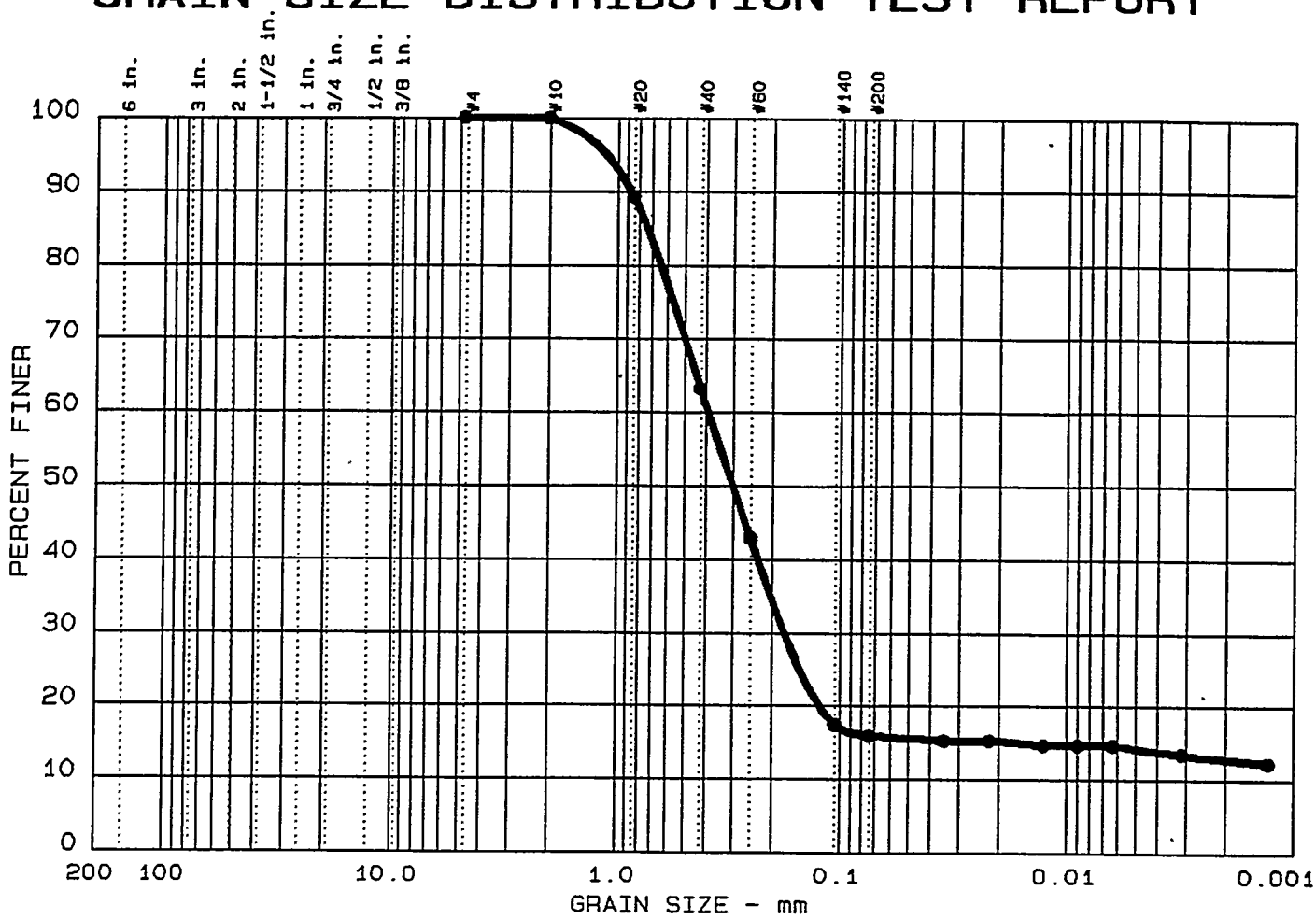
Wax

Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b23-st5.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	9	0.0	0.0	84.1	1.7	14.2

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	49	30	0.72	0.39	0.30	0.177	0.0173			

MATERIAL DESCRIPTION	USCS	AASHTO
● Red Brown Clayey Sand	SC	A-2-7 (0.2)

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-23 ST-5 @ 60 FT.

Date: January 19, 1994

Remarks:

Tested by: CLG

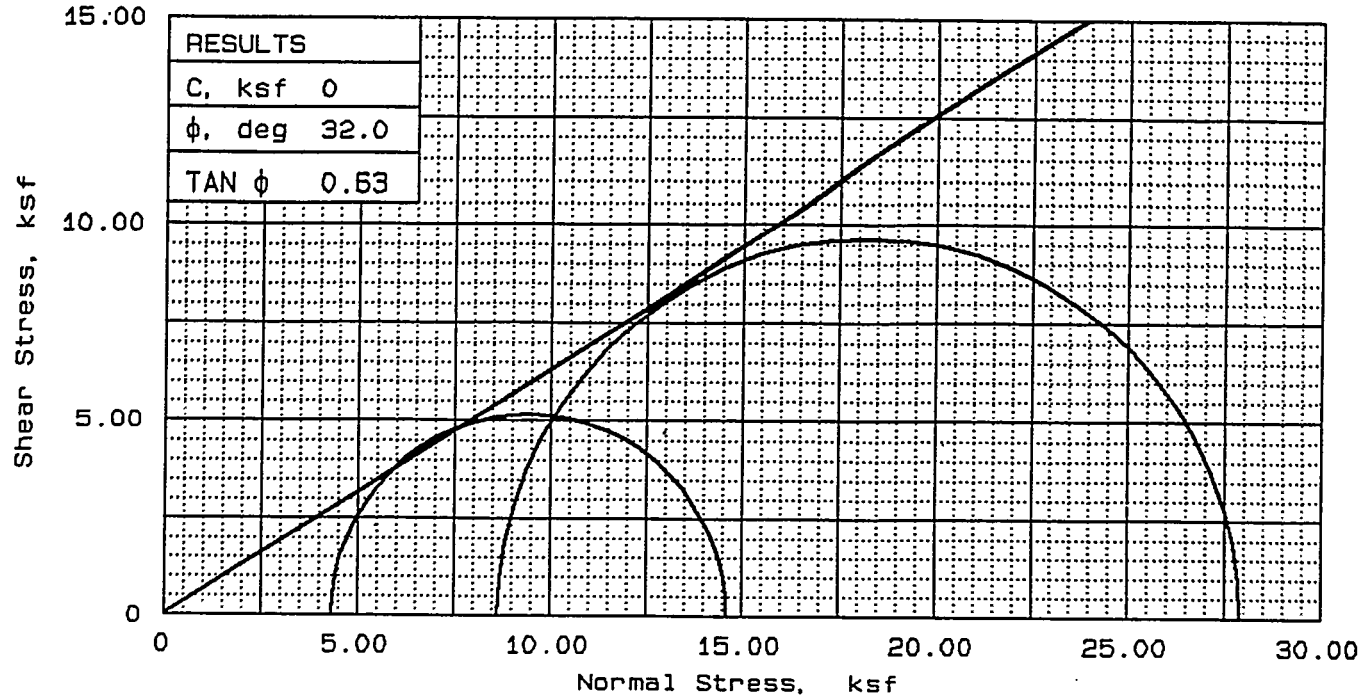
Reviewed by: RLB

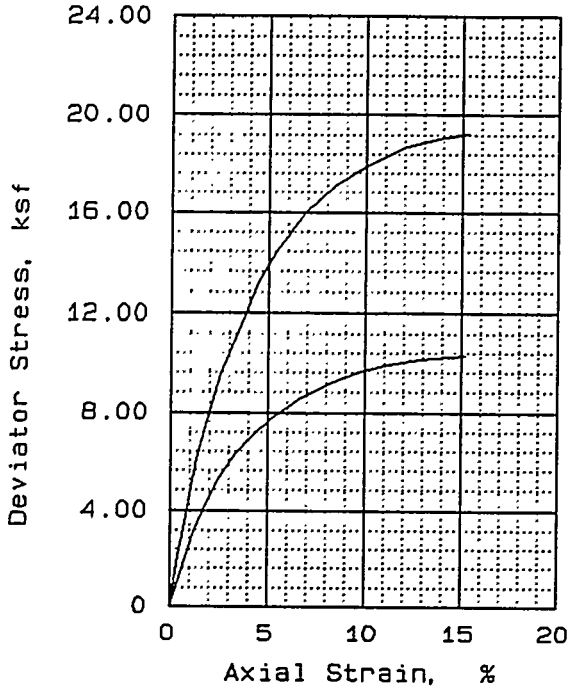
CD-30 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.





SAMPLE NO.		1	2
INITIAL	WATER CONTENT, %	23.4	22.7
	DRY DENSITY, pcf	97.7	96.4
	SATURATION, %	88.6	83.0
	VOID RATIO	0.706	0.729
	DIAMETER, in	2.88	2.88
	HEIGHT, in	6.00	6.00
AT TEST	WATER CONTENT, %	26.1	24.9
	DRY DENSITY, pcf	98.3	100.1
	SATURATION, %	100.0	100.0
	VOID RATIO	0.696	0.666
	DIAMETER, in	2.87	2.83
	HEIGHT, in	5.99	5.97
BACK PRESSURE, ksf		4.32	6.48
CELL PRESSURE, ksf		8.64	15.12
FAILURE STRESS, ksf		10.30	19.26
PORE PRESSURE, ksf			
STRAIN RATE, %/min.		0.100	0.100
ULTIMATE STRESS, ksf			
PORE PRESSURE, ksf			
σ_1 FAILURE, ksf		14.62	27.90
σ_3 FAILURE, ksf		4.32	8.64

TYPE OF TEST:
Consolidated drained
SAMPLE TYPE: Undisturbed
DESCRIPTION: See Grain Size

REMARKS: Tested by: RLB

Reviewed by: HEJ

FIG. NO.

CLIENT: SRS

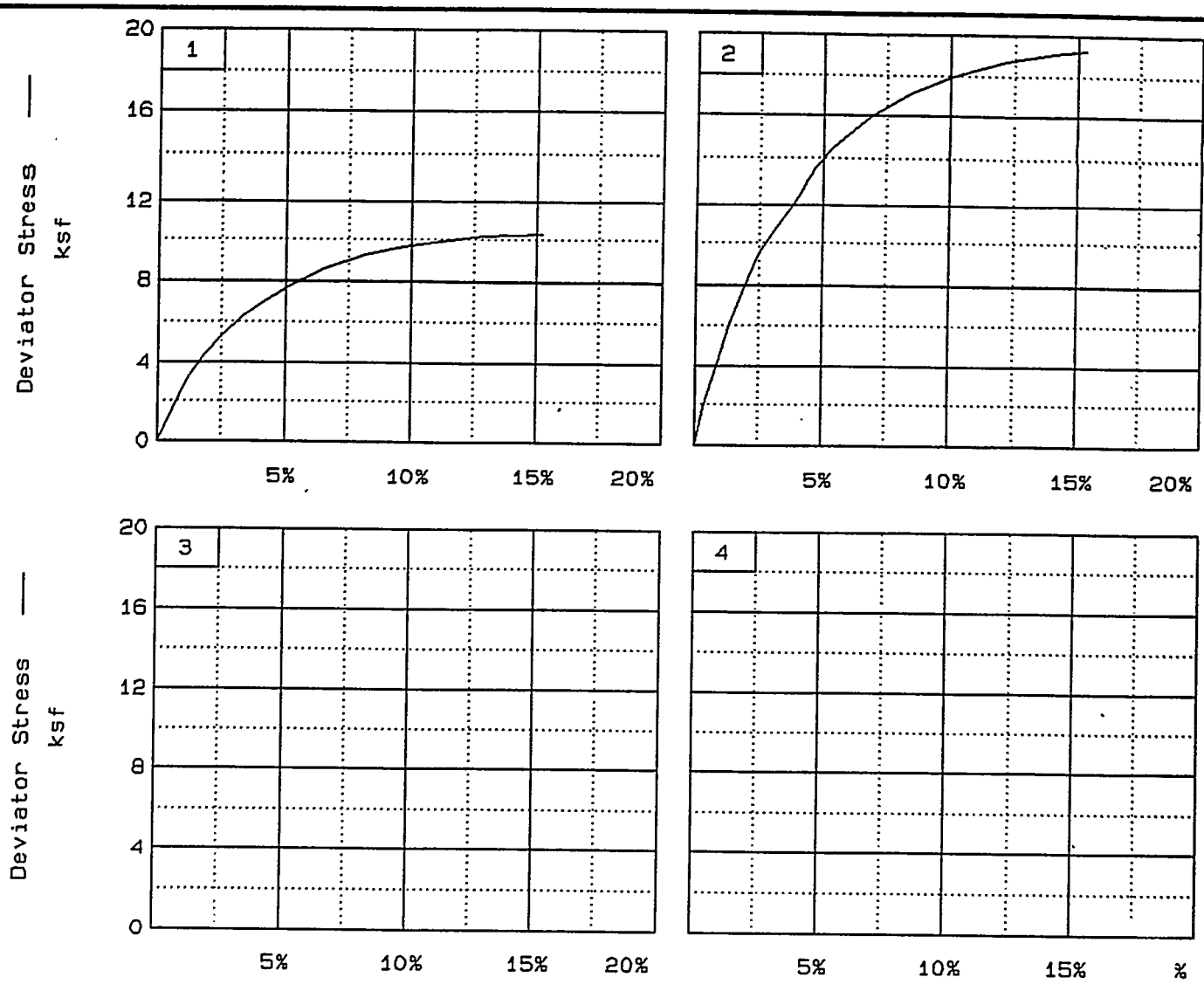
PROJECT: SRS-ITP

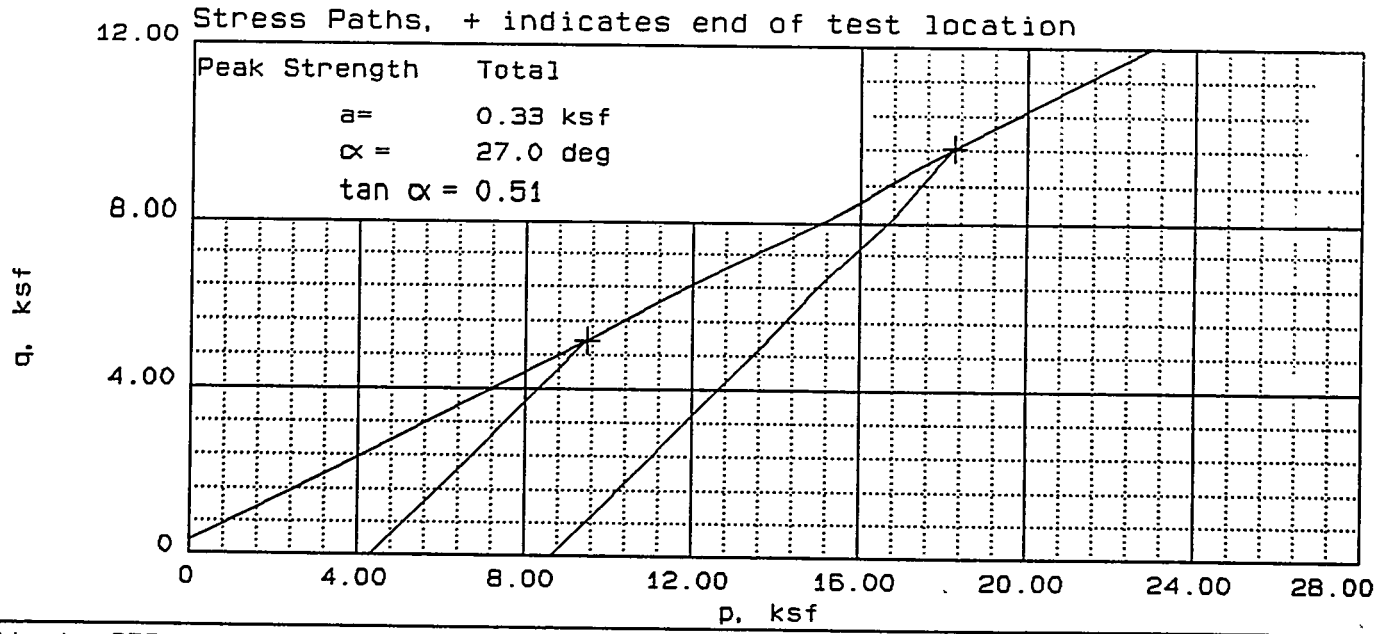
SAMPLE LOCATION: H Bor 23 ST-5 @ 50 Ft.

PROJ. NO.: 5810535301 DATE: 01/27/94

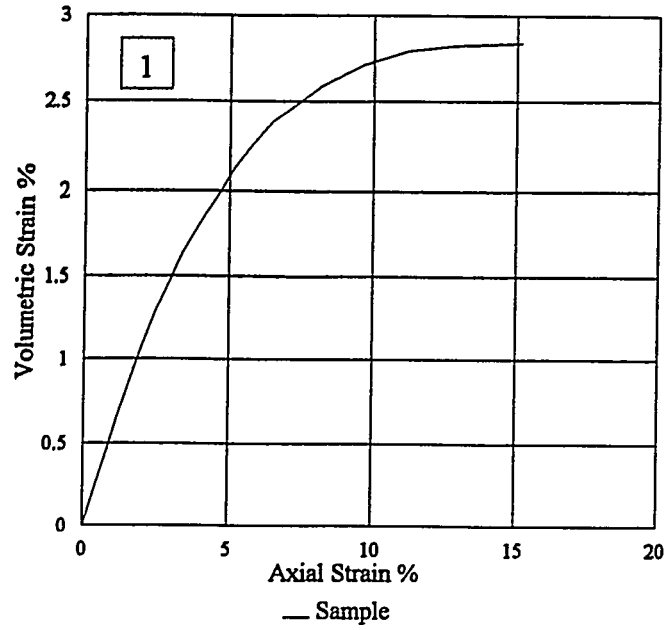
TRIAXIAL COMPRESSION TEST

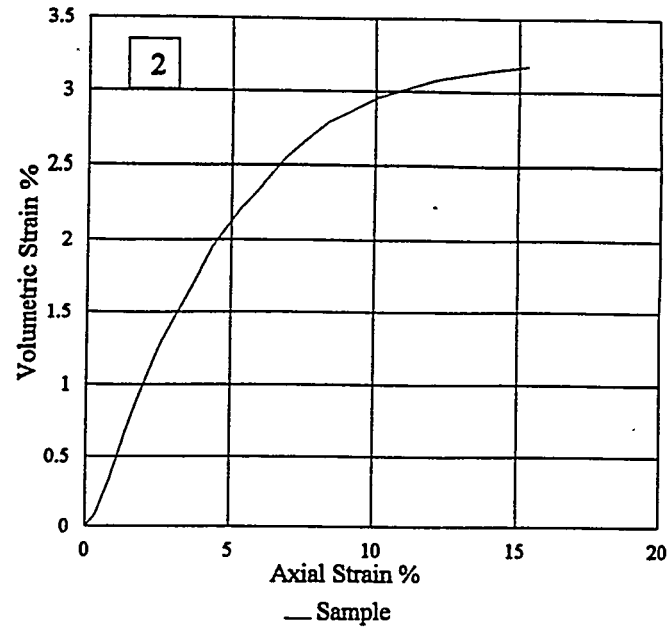
LAW ENGINEERING, INC.

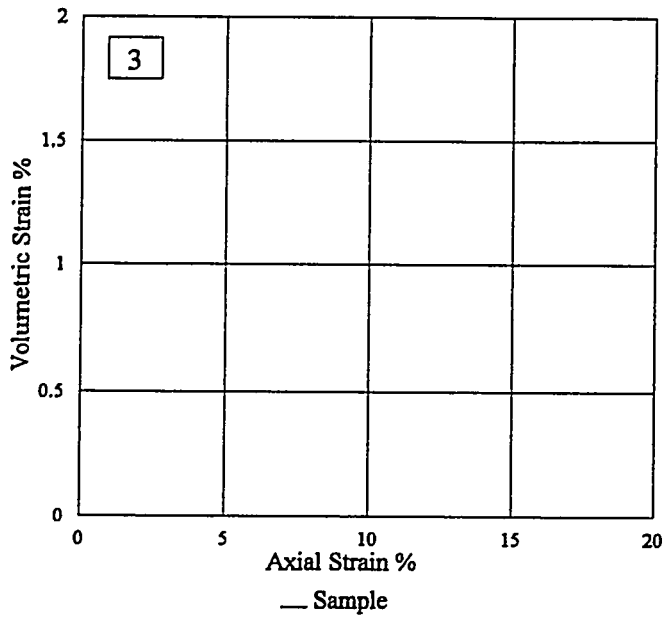


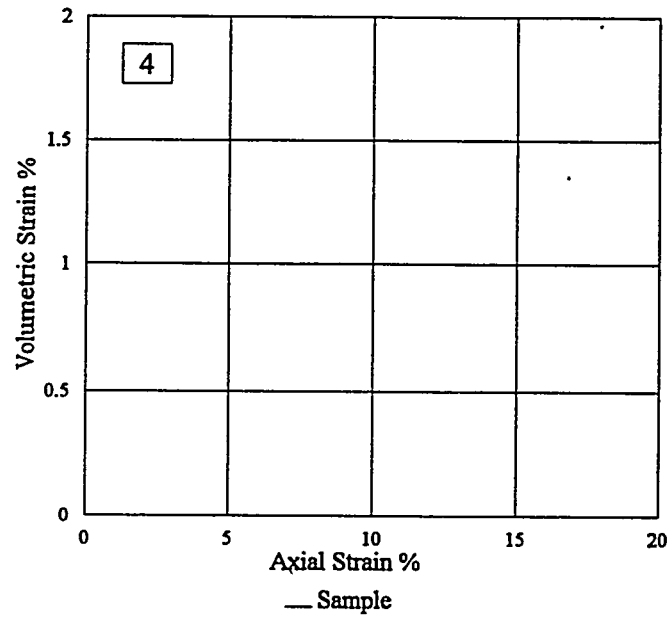


Client: SRS
Project: SRS-ITP
Location: H Bor 23 ST-5 @ 60 Ft.
File: 535301A Project No.: 5810535301 Page 2/2 Fig. No. ____









Client: Westinghouse Savannah River Co.
Project: ITP Geotechnical Testing
Location: H-Bor-23, ST-5 @ 60 ft.
File: Project No.: 5810535301 Page 2 / 2 Fig. No. _____

TRIAXIAL COMPRESSION TEST
Consolidated drained

2-01-1994
11:25 am

Project Data

Project No.: 5810535301 Date: 01/27/94 Data file: 535301R
Client: SRS
Project: SRS-ITP
Sample location: H Bor 23 ST-5 @ 60 Ft.
Sample description: See Grain Size
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.67 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.87	
Height change, in		0.01	
Height, in	6.00	5.99	
Weight, grams	1234.8		
Water volume change, cc		-26.50	
Moisture, %	23.4	26.1	22.4
Dry density, pcf	97.7	98.3	
Saturation, %	88.6	100.0	
Void ratio	0.706	0.696	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 60 psi
Consolidation back pressure = 30 psi
Consolidation effective confining stress = 4.32 ksf
Peak deviator stress = 10.30 ksf at reading no. 12
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	4.32	4.32	1.00	4.32	0.00
1	0.0700	0.070	144.00	144.0	1.2	3.17	4.32	7.49	1.73	5.90	1.58
2	0.1100	0.110	200.00	200.0	1.8	4.37	4.32	8.69	2.01	6.50	2.18
3	0.1500	0.150	246.00	246.0	2.5	5.34	4.32	9.66	2.23	6.99	2.67
	.2000	0.200	294.00	294.0	3.3	6.32	4.32	10.64	2.46	7.48	3.16
	.2500	0.250	330.00	330.0	4.2	7.03	4.32	11.35	2.63	7.84	3.52

LAW ENGINEERING, INC.

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	0.3100	0.310	369.00	369.0	5.2	7.78	4.32	12.10	2.80	8.21	3.89
7	0.3900	0.390	410.00	410.0	6.5	8.53	4.32	12.85	2.97	8.58	4.26
8	0.4900	0.490	450.00	450.0	8.2	9.19	4.32	13.51	3.13	8.92	4.60
9	0.5800	0.580	478.00	478.0	9.7	9.60	4.32	13.92	3.22	9.12	4.80
10	0.6700	0.670	502.00	502.0	11.2	9.92	4.32	14.24	3.30	9.28	4.96
11	0.7700	0.770	524.00	524.0	12.9	10.16	4.32	14.48	3.35	9.40	5.08
12	0.9100	0.910	546.00	546.0	15.2	10.30	4.32	14.62	3.38	9.47	5.15

TRIAXIAL COMPRESSION TEST
Consolidated drained

2-01-1994
11:25 am

Project Data

Project No.: 5810535301 Date: 01/27/94 Data file: 535301R
Client: SRS
Project: SRS-ITP
Sample location: H Bor 23 ST-5 @ 60 Ft.
Sample description: See Grain Size
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 2 Data

Type of sample: Undisturbed
Specific Gravity= 2.67 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.83	
Height change, in		0.03	
Height, in	6.00	5.97	
Weight, grams	1212.7		
Water volume change, cc		-22.51	
Moisture, %	22.7	24.9	21.6
Dry density, pcf	96.4	100.1	
Saturation, %	83.0	100.0	
Void ratio	0.729	0.666	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 105 psi
Consolidation back pressure = 45 psi
Consolidation effective confining stress = 8.64 ksf
Peak deviator stress = 19.26 ksf at reading no. 13
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	8.64	8.64	1.00	8.64	0.00
1	0.0200	0.020	81.00	81.0	0.3	1.84	8.64	10.48	1.21	9.56	0.92
2	0.0500	0.050	180.00	180.0	0.8	4.08	8.64	12.72	1.47	10.68	2.04
[illegible]	0.0800	0.080	270.00	270.0	1.3	6.08	8.64	14.72	1.70	11.68	3.04
[illegible]	.1100	0.110	342.00	342.0	1.8	7.67	8.64	16.31	1.89	12.47	3.83
[illegible]	.1500	0.150	427.00	427.0	2.5	9.51	8.64	18.15	2.10	13.39	4.75

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	0.2600	0.260	600.00	600.0	4.4	13.11	8.64	21.75	2.52	15.19	6.55
7	0.3200	0.320	667.00	667.0	5.4	14.42	8.64	23.06	2.67	15.85	7.21
8	0.4100	0.410	750.00	750.0	6.9	15.95	8.64	24.59	2.85	16.62	7.98
9	0.5000	0.500	816.00	816.0	8.4	17.08	8.64	25.72	2.98	17.18	8.54
10	0.6000	0.600	873.00	873.0	10.1	17.93	8.64	26.57	3.08	17.61	8.97
11	0.7250	0.725	932.00	932.0	12.1	18.70	8.64	27.34	3.16	17.99	9.35
12	0.8400	0.840	972.00	972.0	14.1	19.08	8.64	27.72	3.21	18.18	9.54
13	0.9150	0.915	996.00	996.0	15.3	19.26	8.64	27.90	3.23	18.27	9.63

Client Westinghouse Savannah River Co.
Project: ITP Geotechnical Testing
Location: H-Bor-23, ST-5 @ 60 ft.
File: Project No.: 5810535301

No. of Circles
2

Circle No.1					
Consolidation Pressure, ksf	After Consolidation			Burette Cal. Factor	No. of Points
	Diameter, in.	Height, in.	Volume, cc		
4.32	2.88	5.99	638.11	1	13

		Sample		Cell	
LVDT Reading (in)	Axial Strain (in/in)	Burette Reading (div.)	Volumetric Strain (cc/cc)	Burette Reading (div.)	Volumetric Strain (cc/cc)
0.00	0.00	20.0	0.00	2.0	0.00
0.07	1.17	15.8	0.66	5.7	0.62
0.11	1.84	13.6	1.00	7.9	0.98
0.15	2.50	11.7	1.30	9.6	1.27
0.20	3.34	9.7	1.61	11.5	1.59
0.25	4.17	8.1	1.86	13.0	1.85
0.31	5.18	6.5	2.12	14.4	2.10
0.39	6.51	4.8	2.38	15.7	2.34
0.49	8.18	3.5	2.59	16.9	2.58
0.58	9.68	2.7	2.71	17.4	2.71
0.67	11.19	2.2	2.79	17.6	2.78
0.77	12.85	2.0	2.82	17.5	2.82
0.91	15.19	1.9	2.84	17.0	2.81

Client Westinghouse Savannah River Co.
Project: ITP Geotechnical Testing
Location: H-Bor-23, ST-5 @ 60 ft.
File: Project No.: 5810535301

Circle No.2					
Consolidation Pressure, ksf	After Consolidation			Burette Cal. Factor	No. of Points
	Diameter, in	Height, in.	Volume, cc		
8.64	2.88	5.97	636.87	1	14

		Sample		Cell	
LVDT Reading (in)	Axial Strain (in/in)	Burette Reading (div.)	Volumetric Strain (cc/cc)	Burette Reading (div.)	Volumetric Strain (cc/cc)
0.00	0.00	20.0	0.00	1.0	0.00
0.02	0.34	19.5	0.08	1.3	0.06
0.05	0.84	17.9	0.33	2.9	0.32
0.08	1.34	15.8	0.66	4.8	0.64
0.11	1.84	14.1	0.93	6.5	0.92
0.15	2.51	12.0	1.26	8.4	1.24
0.26	4.36	7.6	1.95	12.1	1.87
0.32	5.36	5.8	2.23	14.2	2.23
0.41	6.87	3.8	2.54	15.9	2.55
0.50	8.38	2.3	2.78	17.2	2.80
0.60	10.05	1.2	2.95	17.9	2.96
0.73	12.14	0.4	3.08	18.3	3.08
0.84	14.07	0.0	3.14	18.4	3.16
0.92	15.33	-0.2	3.17	18.3	3.18

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

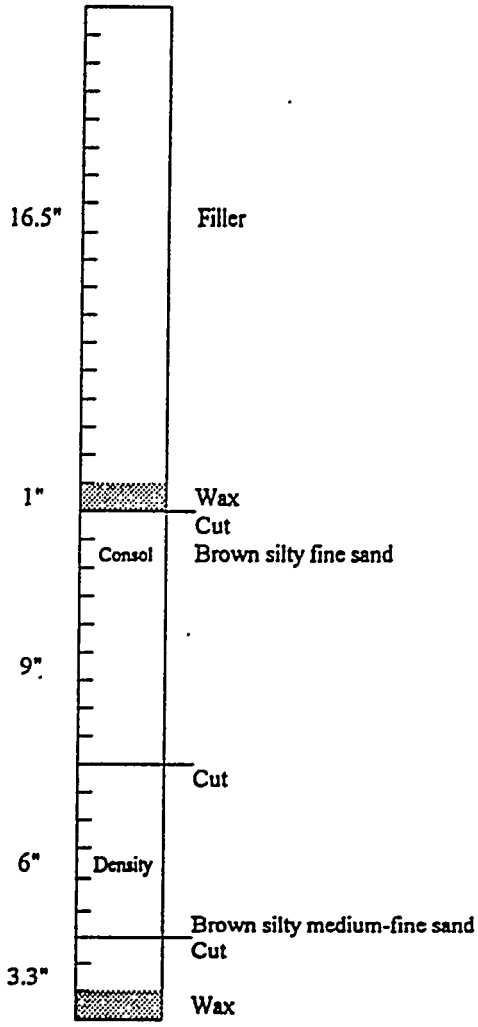
Project: SRS-ITP GEOTECHNICAL TESTING Date: 8-11-93

Boring No: H-Bor-23 Sample No: ST-6 Depth: 65' - 67' 2"

Method of Sample Extrusion: Horizontal cut / Verticle extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 36.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION



Remarks: Sealed with tube sealer at top and bottom

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b23-st6.wk3

ATTACHMENT 3

Tested by:	JTK	Reviewed by:	RLB	Law Job No.	5810535301
Date:	12/02/93	Date:	12/13/93	Job Name	SRS - ITP

TP-4A: UNIT WEIGHT OF SAMPLE
"TYPICAL"

Sample: Boring No.: H-Bor-23
Depth: 65' - 67'2"
Sample ID: ST-6

MEASUREMENTS (Nominal 6-inch cut sample height):

TOTAL SAMPLE HEIGHT (inches)		INSIDE DIAMETER OF CUT TUBE (inches)	
1	5.958		
2	5.973	top	2.868
3	5.969	bottom	2.879
Avg.	5.967 (H)	Avg.	2.874 (D)

MOISTURE CONTENT DETERMINATION

MOISTURE CONTENT	
Tare No.	C-30
Tare Weight	16.62 gm
Wet Wt. + Tare	104.32 gm
Dry Wt. + Tare	88.62 gm
Wt. of Water	15.70 gm
Dry Weight	72.00 gm
Moisture Content, w	21.8 %

TOTAL WEIGHT OF SOIL + TUBE SECTION	W_{s+t} =	1686.34 gm
WEIGHT OF CLEAN, DRY TUBE SECTION	W_t =	439.61 gm
WET WEIGHT OF SOIL, $[(W_{s+t} - W_t)/454]$	W_s =	2.746 lbs
VOLUME OF SAMPLE, $[(pi*D^2/4)*H/1728]$	V =	0.022 ft^3
WET DENSITY, $[W_s/V]$	**D_w=**	**122.6 pcf**
DRY DENSITY, $[D_w/(1+w/100)]$	**D_D=**	**100.7 pcf**

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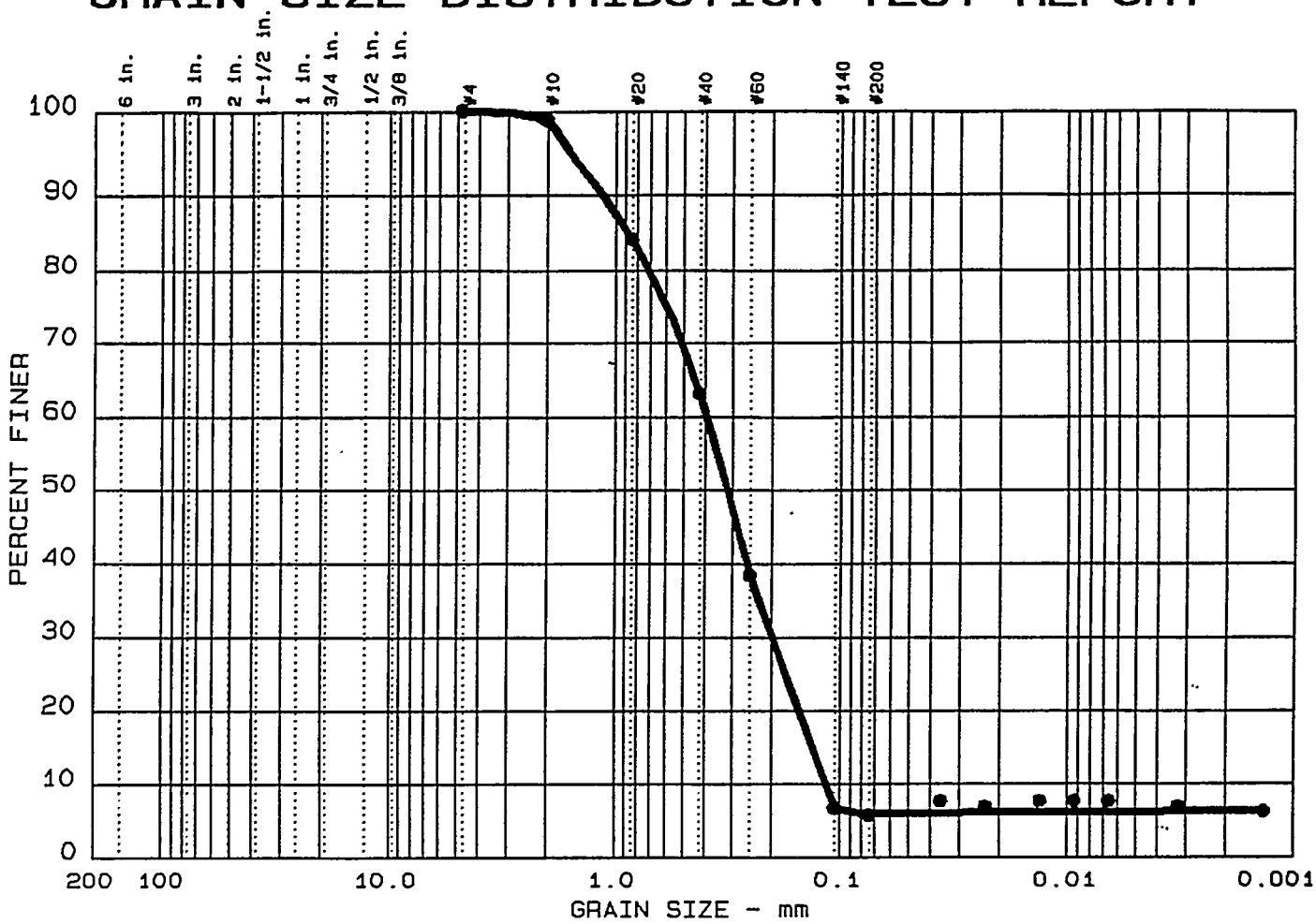
GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	15	0.0	0.0	94.3	5.7	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	112	73	0.87	0.39	0.31	0.198	0.1311	0.1148	0.88	3.4

MATERIAL DESCRIPTION	USCS	AASHTO
● Orange-Brown Silty Clayey Medium to Fine Sand		

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-23 ST-6 @ 65-67.17 Ft.

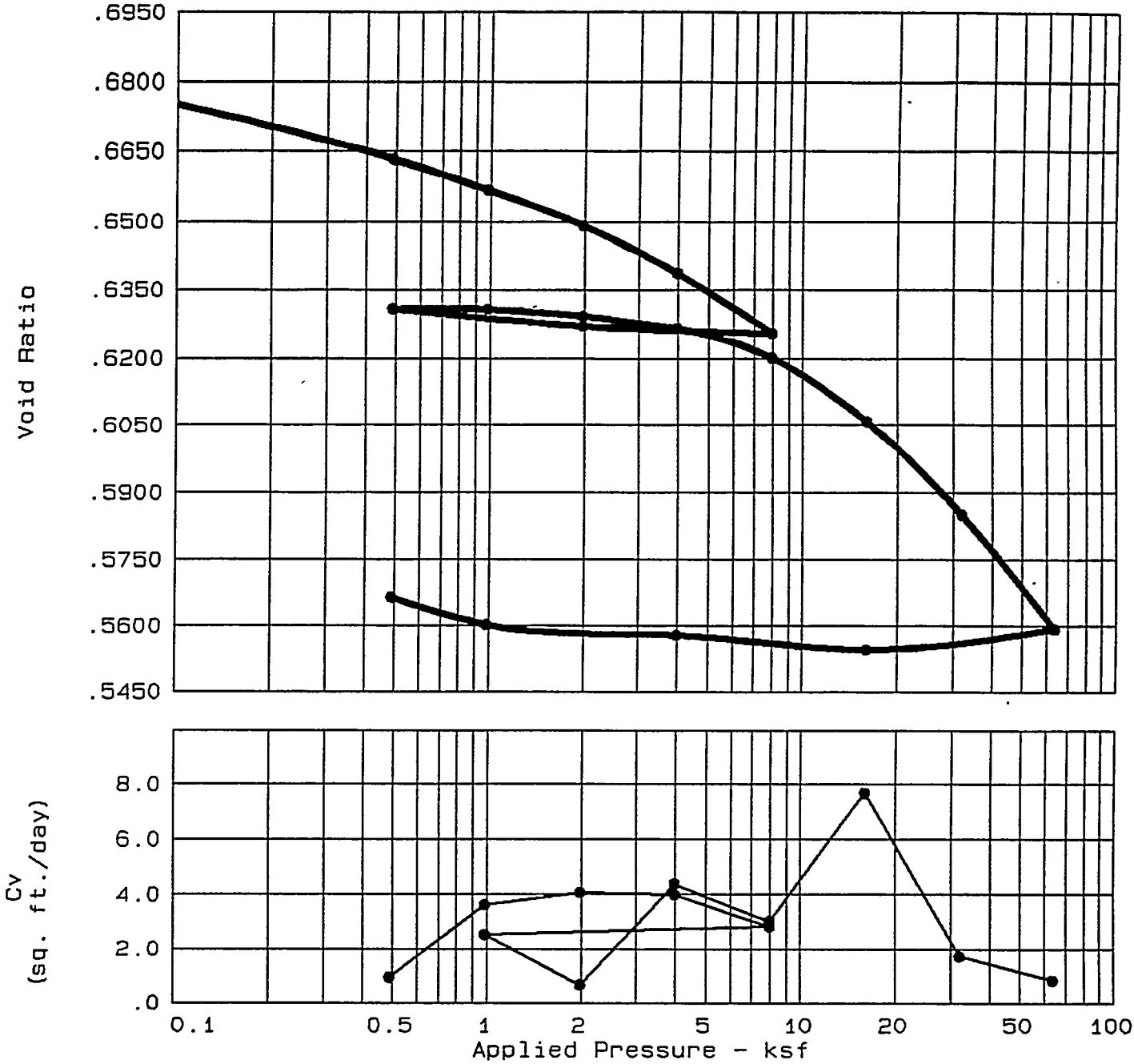
Date: September 23, 1993

Remarks:
Tested by: JRR
Reviewed by: RLB
Consol

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

CONSOLIDATION TEST REPORT



Swell press.	Nat. Sat.	Nat. Moist.	Dry Density	LL	PI	Sp.Gr.	Initial void ratio
	97.0 %	24.8	98.4	112	73	2.64	0.6751

TEST RESULTS	MATERIAL DESCRIPTION
	Orange Brown Silty Clayey M-F Sand Class: SP-SC
Project No.: 5810535301 Project: SRS ITP Location: H-Bor -23 ST-6 65-67'2" Date: 8/17/93	Remarks: Tested by: CCG Reviewed by: RLB
CONSOLIDATION TEST REPORT **LAW ENGINEERING, INC.**	Fig. No._____

13:41, 10-15-1993 CONSOLIDATION TEST PROJECT DATA Test No. 7

Project Number:	5810535301
Project:	SRS ITP
Date:	8/17/93
Location 1:	H-Bor -23 ST-6
2:	65-67'2"
Remarks 1:	Tested by: CCG
2:	Reviewed by: RLB
3:	
4:	
5:	
Material 1:	Orange Brown Silty
description 2:	Clayey M-F Sand
Classification:	SP-SC
Liquid limit:	112
Plasticity index:	73
Figure Number:	

CONSOLIDATION TEST SPECIMEN DATA

TOTAL SAMPLE	BEFORE TEST	AFTER TEST
Wet w+t = 345.06 g.	Oedometer No. = 6	Wet w+t = 342.72 g.
Dry w+t = 320.06 g	Machine No. = 9	Dry w+t = 320.06 g.
Tare wt. = 219.26 g.	Spec. Gravity = 2.64	Tare wt. = 219.26 g.
Height = 0.89 in.	Height = 0.89 in.	
Diameter = 2.36 in.	Diameter = 2.36 in.	
Weight = 125.80 g.		
Moisture = 24.8 %	Ht. Solids = 0.53 in.	Moisture = 22.5 %
Wet Den. = 122.8 pcf	Dry wt. = 100.80 g. *	Dry wt. = 100.80 g.
Dry Den. = 98.4 pcf	Void ratio = 0.6751	Void ratio = 0.5665
	Saturation = 97.0 %	Saturation = 104. %

* Initial dry weight used in calculations

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
Initial	0.02000			0.6751	
0.49	0.02665	0.0003	0.02635	0.6632	0.7 Comprs.
0.99	0.03040	0.0007	0.02970	0.6569	1.1 Comprs.
1.99	0.03530	0.0014	0.03390	0.6490	1.6 Comprs.
3.99	0.04180	0.0023	0.03950	0.6385	2.2 Comprs.
8.00	0.05040	0.0038	0.04660	0.6252	3.0 Comprs.
1.99	0.04710	0.0014	0.04570	0.6269	2.9 Comprs.
0.49	0.04400	0.0003	0.04370	0.6306	2.7 Comprs.
0.99	0.04445	0.0007	0.04375	0.6306	2.7 Comprs.
1.99	0.04600	0.0014	0.04460	0.6290	2.8 Comprs.

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
3.99	0.04830	0.0023	0.04600	0.6263	2.9 Comprs.
8.00	0.05320	0.0038	0.04940	0.6200	3.3 Comprs.
16.01	0.06240	0.0054	0.05700	0.6057	4.1 Comprs.
32.09	0.07540	0.0074	0.06800	0.5851	5.4 Comprs.
63.79	0.09390	0.0121	0.08180	0.5592	6.9 Comprs.
16.01	0.08970	0.0054	0.08430	0.5545	7.2 Comprs.
3.99	0.08485	0.0023	0.08255	0.5578	7.0 Comprs.
0.99	0.08200	0.0007	0.08130	0.5601	6.9 Comprs.
0.49	0.07820	0.0003	0.07790	0.5665	6.5 Comprs.

CONSOLIDATION TEST RESULTS

Compression index = NOT SELECTED
Preconsolidation pressure = NOT SELECTED

Load 0.49 ksf — CONSOLIDATION TEST READINGS — Load No. 1

Machine Deflection 0.0003

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.02000	11	60.00	0.02620
2	0.10	0.02520	12	1472.00	0.02665
3	0.25	0.02530			
4	0.50	0.02540			
5	1.00	0.02555			
6	2.00	0.02560			
7	4.00	0.02575			
8	8.00	0.02590			
9	15.00	0.02600			
10	30.00	0.02610			

Void Ratio: 0.6632 Compression: 0.7 %
D0 = 0.0247 D90 = 0.0254 D100 = 0.0254 T90 = 1.82 min.
Cv @ 1.8 min.= 0.92 sq. feet/day

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

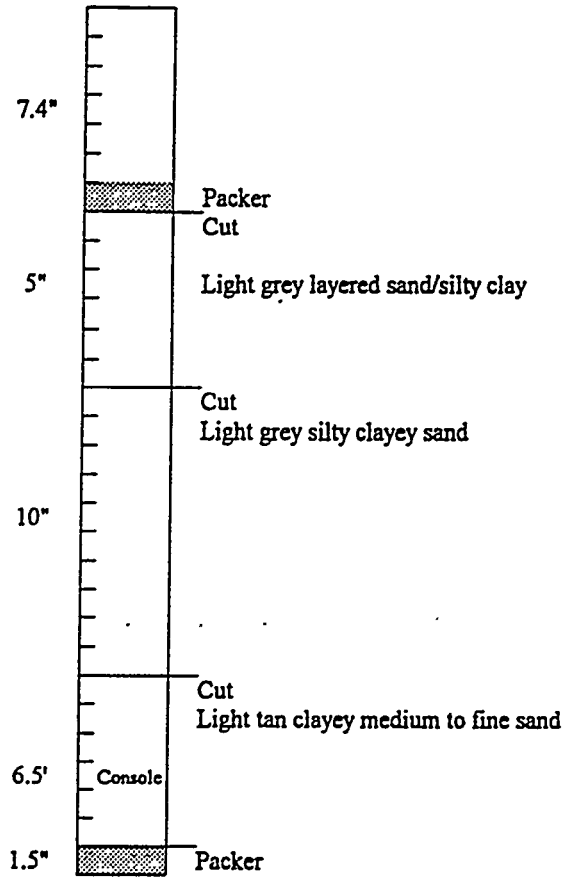
Project: SRS-ITP GEOTECHNICAL TESTING Date: 12-09-93

Boring No: H-Bor-23 Sample No: PS-5 Depth: 95'8"

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: CLG Checked By: RLB

VISUAL DESCRIPTION



Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b23-ps5.wk3

ATTACHMENT 2

Tested by:	CLG	Reviewed by:	RLB	Law Job No.:	5810535301
Date:	09/21/93	Date:	09/21/93	Job Name:	SRS - ITP

TP-4A: UNIT WEIGHT OF THIN WALL TUBE SAMPLES

"TYPICAL"

Sample: Boring No.: H-Bor-23
Depth: 95' 8"
Sample ID: PS-5

MEASUREMENTS (Entire Tube):

	FROM TOP OF TUBE			FROM BOTTOM OF TUBE			TOTAL TUBE LENGTH		INSIDE DIAMETER OF TUBE
	PACKER (inches)		SOIL (inches)	PACKER (inches)		SOIL (inches)		(inches)	(inches)
1.	7.42		7.73	0.84		1.36			
2.	7.40		7.75	0.84		1.41			
3.	7.36		7.70	0.85		1.43			
Avg.:	7.39	L_1 =	7.73	0.84	L_2 =	1.40	L_3 =	30.000 *	D_i = 2.887 *

TOTAL WEIGHT OF TUBE + PACKERS + SOIL	M_1 =	6,129.2	gm
WEIGHT OF PACKERS	M_2 =	151.6 *	gm
TOTAL WEIGHT OF TUBE	M_3 =	2,037.0 *	gm
WET WEIGHT OF SOIL COLUMN, [M_1-M_2-M_3]	M_4 =	3,940.6	gm

Denotes information supplied by WSRC/TO

MOISTURE CONTENTS (From assigned tests of same tube):

MOISTURE CONTENT		
Specimen 1:	35.5	% moisture
Specimen 2:	N/A	% moisture
Specimen 3:	N/A	% moisture
Average, (w):	35.5	% moisture

Notations:

Specimen 1 moisture content obtained from Consolidation test
Specimen 2 moisture content obtained from N/A test
Specimen 3 moisture content obtained from N/A test

CALCULATIONS:

CROSS-SECTIONAL AREA OF TUBE, [pi*(D_i^2)/4]	A_o=	6.55	in.^{2}
LENGTH OF SOIL COLUMN, [L_3 - L_2 - L_1]	L_s =	20.87	in.
VOLUME OF SOIL COLUMN, [L_s*A_o]	V_s =	136.64	in.^{3}
WET DENSITY, [(M_4/V_s)*3.810]	**D_w=**	**109.9**	**pcf**
DRY DENSITY, [D_w/(1+w/100)]	**D_D=**	**81.1**	**pcf**

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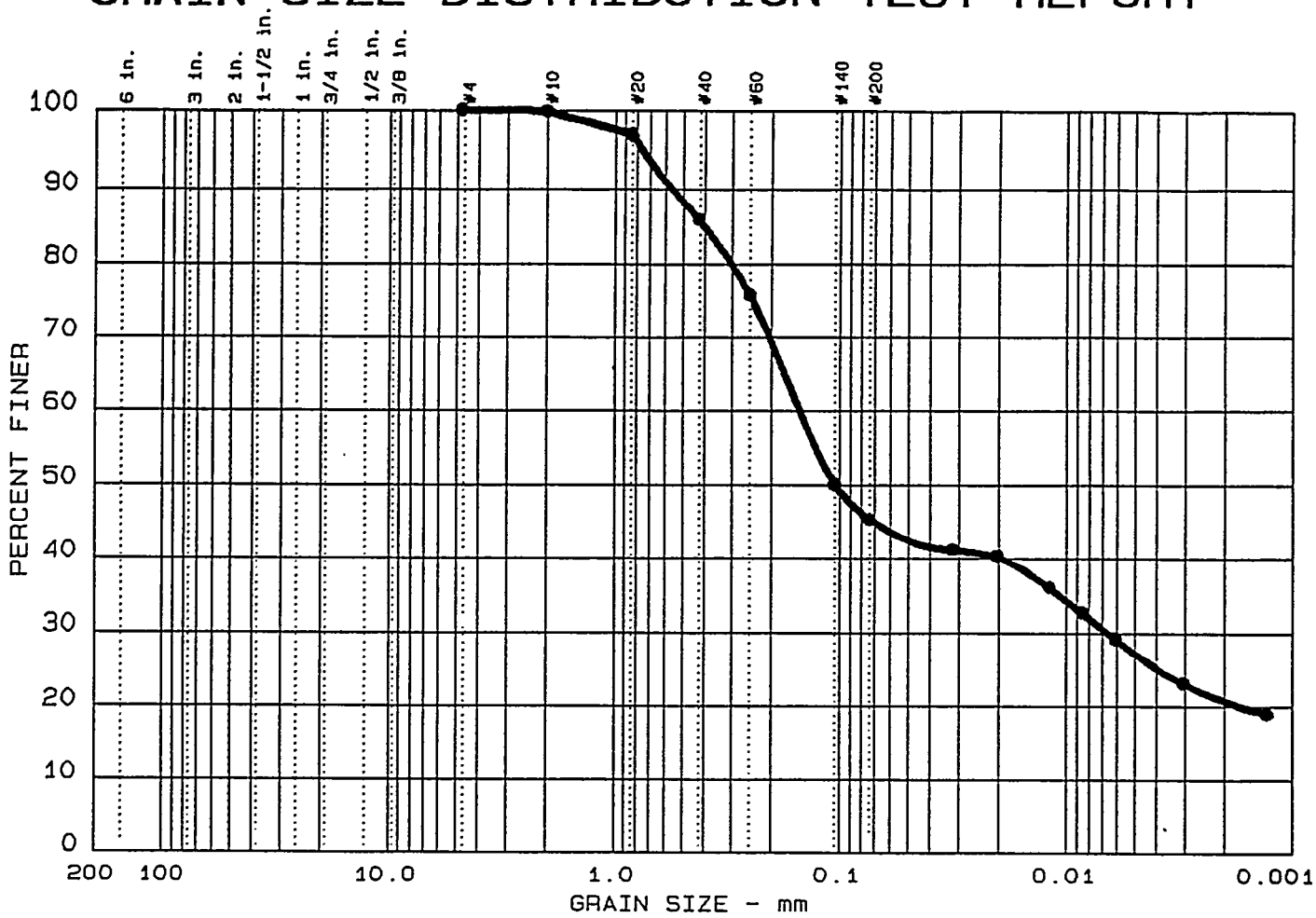
GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	20	0.0	0.0	54.7	18.0	27.3

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	66	50	0.40	0.15	0.10	0.007				

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Silty Clayey Medium to Fine Sand	SC	A-7-6 (15.3)

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-23 PS-5 @ 95-98 Ft.

Date: September 30, 1993

Remarks:

Tested By: JRR

Reviewed By: RLB

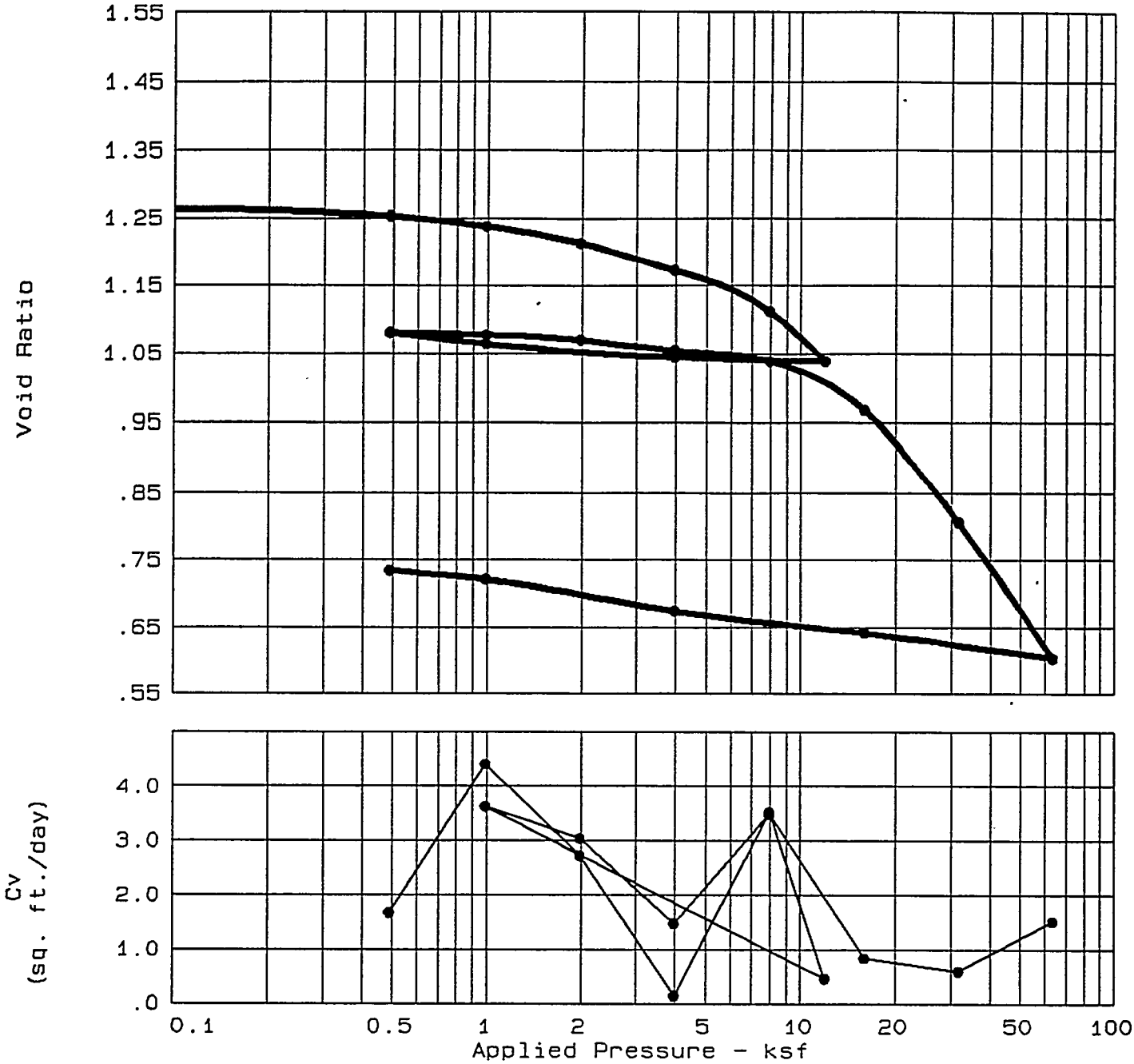
Consol

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

CONSOLIDATION TEST REPORT



Swell press.	Nat. Sat.	Nat. Moist.	Dry Density	LL	PI	Sp.Gr.	Initial void ratio
	75.4 %	35.5	74.0	66	50	2.68	1.2624

TEST RESULTS	MATERIAL DESCRIPTION
	Tan Silty Clayey Medium to Fine Sand Class: SC

Project No.: 5180535301
Project: SRS ITP
Location: H-Bor-23 PS-5
95.8 Ft.
Date: Sept. 24, 1993

Remarks:

Tested by: CLG
Reviewed by: RLB

CONSOLIDATION TEST REPORT

LAW ENGINEERING, INC.

Fig. No._____

18:27, 10-22-1993 CONSOLIDATION TEST PROJECT DATA Test No. 19

Project Number:	5180535301
Project:	SRS ITP
Date:	Sept. 24,1993
Location 1:	H-Bor-23 PS-5
2:	95.8 Ft.
Remarks 1:	Tested by: CLG
2:	Reviewed by: RLB
3:	
4:	
5:	
Material 1:	Tan Silty Clayey Medium
description 2:	to Fine Sand
Classification:	SC
Liquid limit:	66
Plasticity index:	50
Figure Number:	

CONSOLIDATION TEST SPECIMEN DATA

TOTAL SAMPLE	BEFORE TEST	AFTER TEST
Wet w+t = 322.15 g.	Oedometer No. = 8	Wet w+t = 320.10 g.
Dry w+t = 295.22 g	Machine No. = 8	Dry w+t = 295.22 g.
Tare wt. = 219.39 g.	Spec. Gravity = 2.68	Tare wt. = 219.39 g.
Height = 0.89 in.	Height = 0.89 in.	
Diameter = 2.36 in.	Diameter = 2.36 in.	
Weight = 102.76 g.		
Moisture = 35.5 %	Ht. Solids = 0.39 in.	Moisture = 32.8 %
Wet Den. = 100.2 pcf	Dry wt. = 75.83 g. *	Dry wt. = 75.83 g.
Dry Den. = 74.0 pcf	Void ratio = 1.2624	Void ratio = 0.7334
	Saturation = 75.4 %	Saturation = 119. %

* Initial dry weight used in calculations

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
Initial	0.02000			1.2624	
0.49	0.02430	0.0003	0.02400	1.2522	0.4 Comprs.
0.99	0.03070	0.0007	0.03000	1.2370	1.1 Comprs.
1.99	0.04130	0.0014	0.03990	1.2119	2.2 Comprs.
3.98	0.05850	0.0027	0.05580	1.1717	4.0 Comprs.
7.99	0.08420	0.0046	0.07960	1.1114	6.7 Comprs.
11.97	0.11450	0.0059	0.10860	1.0379	9.9 Comprs.
3.98	0.10920	0.0027	0.10650	1.0432	9.7 Comprs.
0.99	0.09860	0.0000	0.09860	1.0632	8.8 Comprs.
0.49	0.09240	0.0003	0.09210	1.0797	8.1 Comprs.

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
0.99	0.09405	0.0007	0.09335	1.0765	8.2 Comprs.
1.99	0.09770	0.0014	0.09630	1.0691	8.5 Comprs.
3.98	0.10530	0.0027	0.10260	1.0531	9.2 Comprs.
7.99	0.11310	0.0046	0.10850	1.0381	9.9 Comprs.
15.99	0.14390	0.0071	0.13680	0.9664	13.1 Comprs.
31.78	0.21020	0.0103	0.19990	0.8066	20.1 Comprs.
63.45	0.29320	0.0131	0.28010	0.6034	29.1 Comprs.
15.99	0.27235	0.0071	0.26525	0.6410	27.5 Comprs.
3.98	0.25490	0.0027	0.25220	0.6741	26.0 Comprs.
0.99	0.23455	0.0007	0.23385	0.7206	23.9 Comprs.
0.49	0.22910	0.0003	0.22880	0.7334	23.4 Comprs.

CONSOLIDATION TEST RESULTS

Compression index = NOT SELECTED
Preconsolidation pressure = NOT SELECTED

Load 0.49 ksf — CONSOLIDATION TEST READINGS — Load No. 1

achine Deflection 0.0003

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.02000	11	60.00	0.02360
2	0.10	0.02250	12	1485.00	0.02430
3	0.25	0.02270			
4	0.50	0.02290			
5	1.00	0.02300			
6	2.00	0.02310			
7	4.00	0.02320			
8	8.00	0.02330			
9	15.00	0.02340			
10	30.00	0.02350			

Void Ratio: 1.2522 Compression: 0.4 %
D0 = 0.0219 D90 = 0.0228 D100 = 0.0229 T90 = 1.01 min.
Cv @ 1 min.= 1.66 sq. feet/day

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

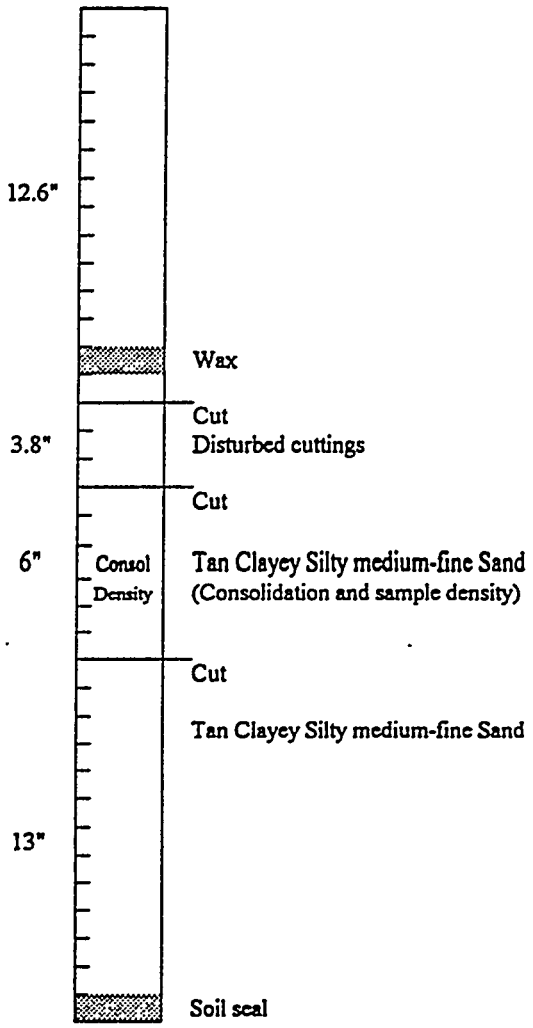
Project: SRS-ITP GEOTECHNICAL TESTING Date: 8-17-93

Boring No: H-Bor-23 Sample No: PB-4 Depth: 119'-121'

Method of Sample Extrusion: Horizontal cut / Verticle extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 36.0 By: CLG Checked By: RLB

VISUAL DESCRIPTION



Remarks:

1028mf srs-itp-aaif
7/22/93

rlb\itp\tubelog\b23-pb4.wk3

ATTACHMENT 3

Tested by:	CLG	Reviewed by:	RLB	Law Job No.	5810535301
Date:	08/18/93	Date:	08/18/93	Job Name	SRS - ITP

TP-4A: UNIT WEIGHT OF SAMPLE
"TYPICAL"

Sample: Boring No.: H-Bor-23
Depth: 119' - 121'
Sample ID: PB-4

MEASUREMENTS (Nominal 6-inch cut sample height):

TOTAL SAMPLE HEIGHT (inches)		INSIDE DIAMETER OF CUT TUBE (inches)	
1	6.100		
2	6.100	top	2.882
3	6.100	bottom	2.879
Avg.	6.100 (H)	Avg.	2.881 (D)

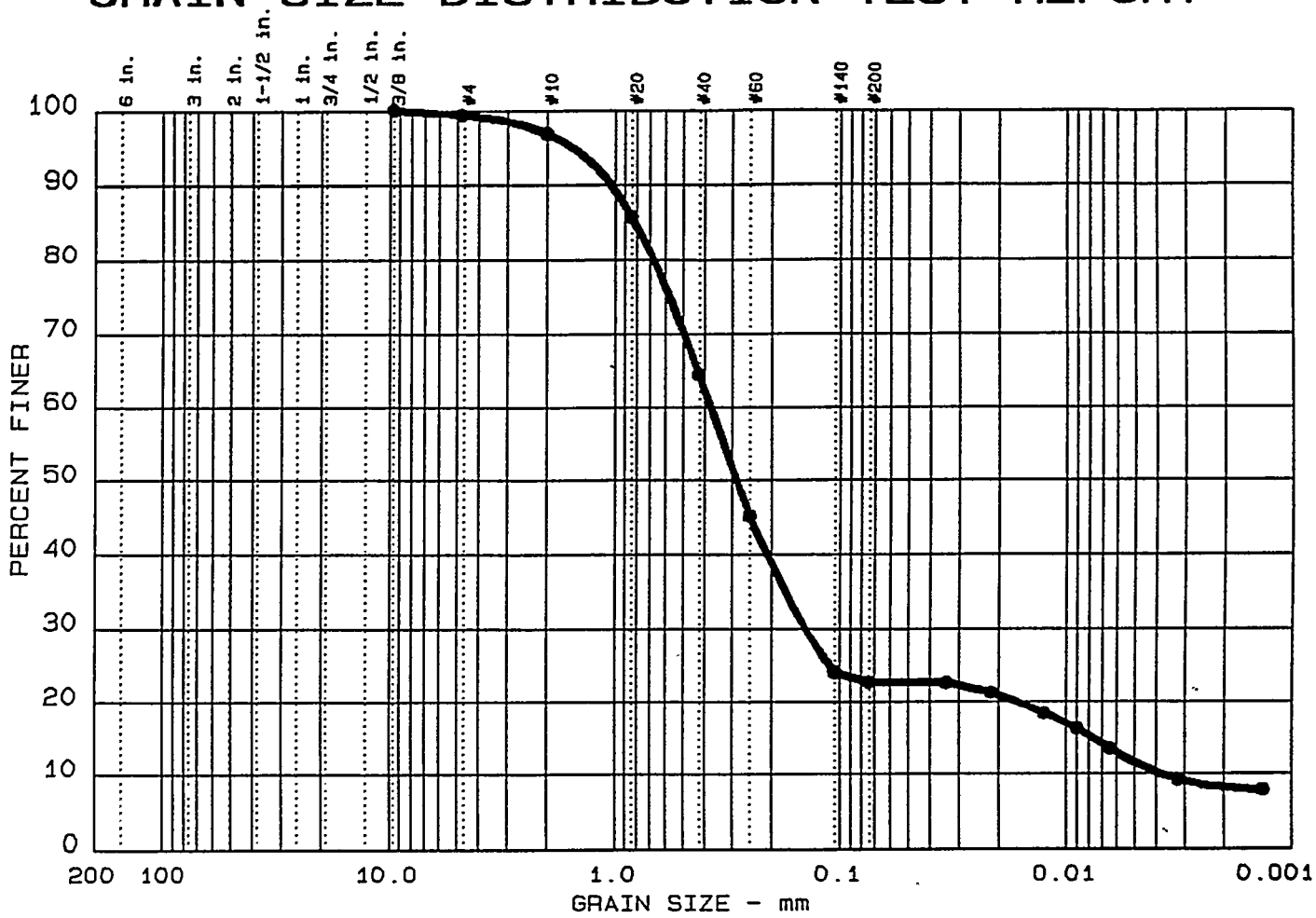
MOISTURE CONTENT DETERMINATION

MOISTURE CONTENT	
Tare No.	T-20
Tare Weight	50.51 gm
Wet Wt. + Tare	954.91 gm
Dry Wt. + Tare	788.94 gm
Wt. of Water	165.97 gm
Dry Weight	738.43 gm
Moisture Content, w	22.5 %

TOTAL WEIGHT OF SOIL + TUBE SECTION	W_{s+t} =	1731.96 gm
WEIGHT OF CLEAN, DRY TUBE SECTION	W_t =	440.03 gm
WET WEIGHT OF SOIL, [(W_{s+t} - W_t)/454]	W_s =	2.846 lbs
VOLUME OF SAMPLE, [(pi*D²/4)*H/1728]	V =	0.023 ft³
WET DENSITY, [W_s/V]	**D_w=**	**123.7 pcf**
DRY DENSITY, [D_w/(1+w/100)]	**D_D=**	**101.0 pcf**

h:\users\lab\rlb\itp\h23-pb4.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	16	0.0	0.7	76.6	11.2	11.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.80	0.37	0.29	0.141	0.0076	0.0038	14.13	97.7

MATERIAL DESCRIPTION	USCS	AASHTO
● Grey-Tan Silty Clayey Medium to Fine Sand		

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-23 PB-4 @ 119-121 Ft.

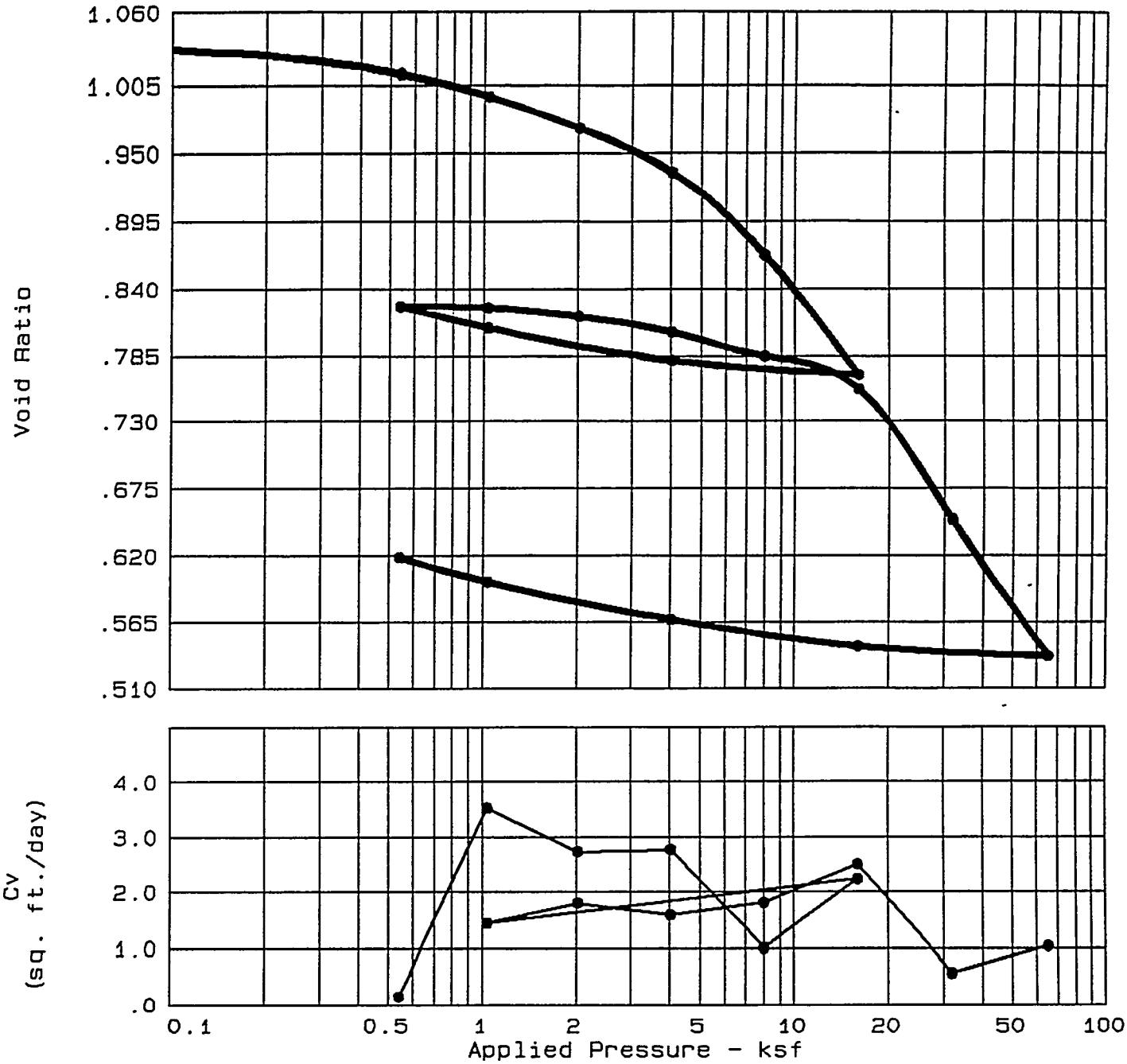
Date: September 23, 1993

Remarks:
Tested by: JRR
Reviewed by: RLB
Atterberg Limits -200
LL=110 PL=25 PI=85
Unit Wt.

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

CONSOLIDATION TEST REPORT



Swell press.	Nat. Sat.	Nat. Moist.	Dry Density	LL	PI	Sp.Gr.	Initial void ratio
	92.1 %	35.8	81.5			2.65	1.0303

TEST RESULTS	MATERIAL DESCRIPTION
	Gray-Tan Silty Clayey Medium to Fine Sand

Project No.: 5810535301
Project: SRS ITP
Location: H-Bor-23 PB-4 119-121 Ft.

Date: August 14, 1993

Remarks:
Tested by: CJC
Reviewed by: RLB
Atterberg Limits -200
LL=110 PL=25 PI=85

CONSOLIDATION TEST REPORT

LAW ENGINEERING, INC.

Fig. No._____

12:23, 10-15-1993 CONSOLIDATION TEST PROJECT DATA Test No. 9

Project Number:	5810535301
Project:	SRS ITP
Date:	August 14,1993
Location 1:	H-Bor-23 PB-4 119-121 Ft.
2:	
Remarks 1:	Tested by: CLB
2:	Reviewed by: RLB
3:	
4:	
5:	
Material 1:	Gray-Tan Silty Clayey
description 2:	Medium to Fine Sand
Classification:	
Liquid limit:	
Plasticity index:	
Figure Number:	

CONSOLIDATION TEST SPECIMEN DATA

TOTAL SAMPLE	BEFORE TEST	AFTER TEST
Wet w+t = 331.23 g.	Oedometer No. = 14	Wet w+t = 330.39 g.
Dry w+t = 303.01 g	Machine No. = 14	Dry w+t = 303.01 g.
Tare wt. = 224.16 g.	Spec. Gravity = 2.65	Tare wt. = 224.16 g.
Height = 0.75 in.	Height = 0.75 in.	
Diameter = 2.50 in.	Diameter = 2.50 in.	
Weight = 107.07 g.		
Moisture = 35.8 %	Ht. Solids = 0.37 in.	Moisture = 34.7 %
Wet Den. = 110.6 pcf	Dry wt. = 78.89 g. *	Dry wt. = 78.85 g.
Dry Den. = 81.5 pcf	Void ratio = 1.0303	Void ratio = 0.6186
	Saturation = 92.1 %	Saturation = 148. %

* Initial dry weight used in calculations

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
Initial	0.02000			1.0303	
0.54	0.02650	0.0000	0.02650	1.0127	0.9 Comprs.
1.04	0.03350	0.0006	0.03290	0.9954	1.7 Comprs.
2.04	0.04410	0.0014	0.04270	0.9690	3.0 Comprs.
4.04	0.05810	0.0026	0.05550	0.9344	4.7 Comprs.
8.04	0.08420	0.0038	0.08040	0.8672	8.0 Comprs.
16.03	0.12170	0.0047	0.11700	0.7684	12.9 Comprs.
4.04	0.11500	0.0026	0.11240	0.7808	12.3 Comprs.
1.04	0.10300	0.0006	0.10240	0.8078	11.0 Comprs.
0.54	0.09600	0.0000	0.09600	0.8251	10.1 Comprs.

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
1.04	0.09700	0.0006	0.09640	0.8240	10.2 Comprs.
2.04	0.10040	0.0014	0.09900	0.8170	10.5 Comprs.
4.04	0.10640	0.0026	0.10380	0.8040	11.1 Comprs.
8.04	0.11490	0.0038	0.11110	0.7843	12.1 Comprs.
16.03	0.12600	0.0047	0.12130	0.7568	13.5 Comprs.
32.03	0.16690	0.0058	0.16110	0.6493	18.8 Comprs.
65.59	0.21100	0.0081	0.20290	0.5365	24.3 Comprs.
16.03	0.20460	0.0047	0.19990	0.5446	23.9 Comprs.
4.04	0.19420	0.0026	0.19160	0.5670	22.8 Comprs.
1.04	0.18070	0.0006	0.18010	0.5980	21.3 Comprs.
0.54	0.17250	0.0000	0.17250	0.6186	20.3 Comprs.

CONSOLIDATION TEST RESULTS

Compression index = NOT SELECTED
Preconsolidation pressure = NOT SELECTED

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

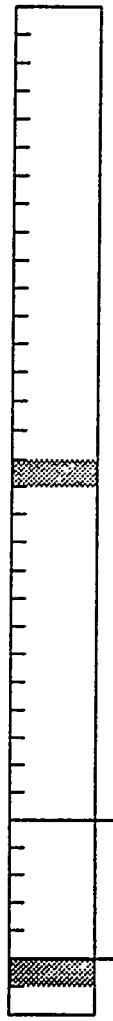
Project: SRS-ITP GEOTECHNICAL TESTING Date: 12-16-93

Boring No: H-Bor-23 Sample No: PB-8 Depth: 142'

Method of Sample Extrusion: Horizontal cut / Verticle extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 36.0 By: KPR Checked By: RLB

VISUAL DESCRIPTION

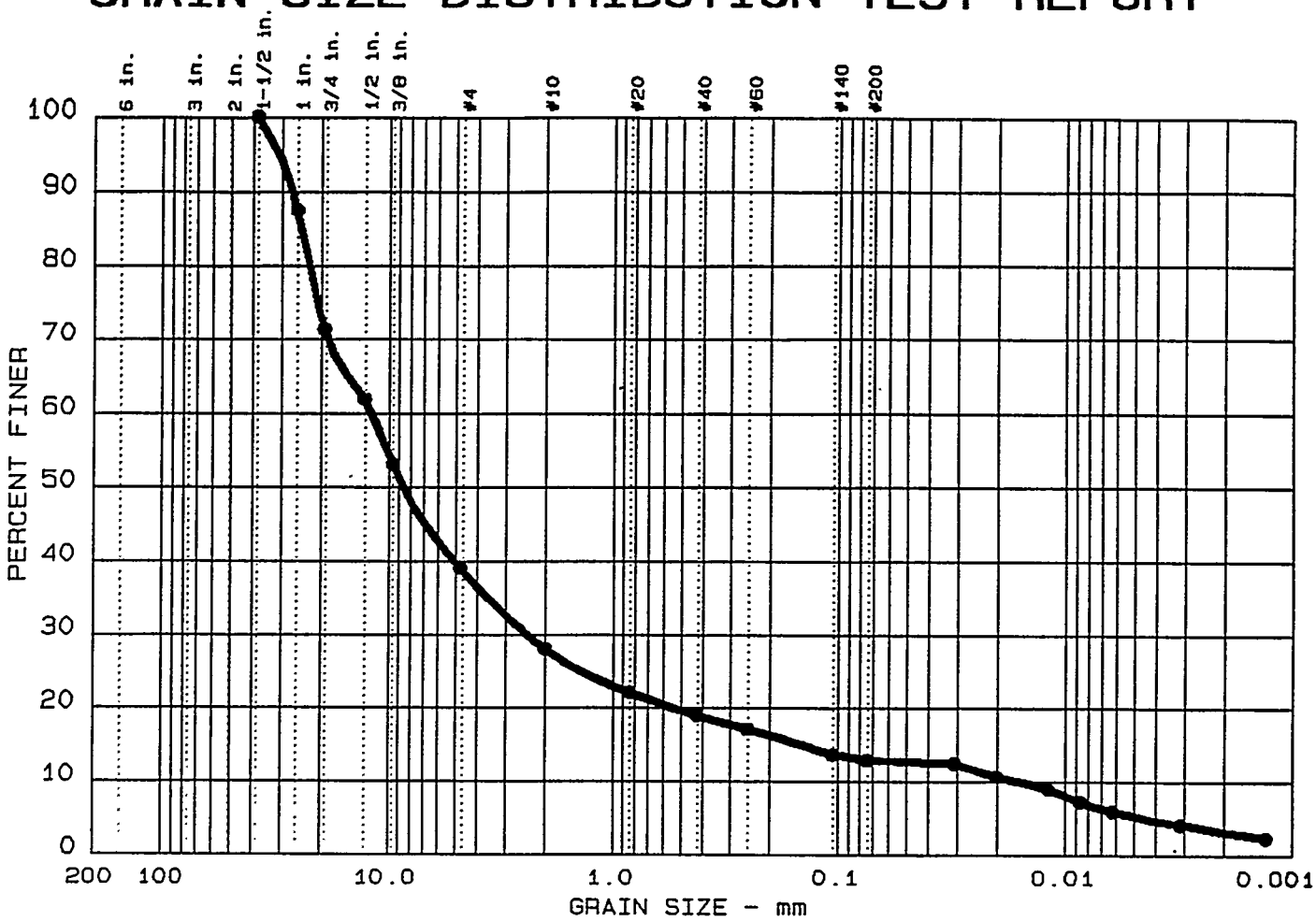


Remarks: Rocky and hard. Could not successfully trim a consolidation or sample density specimen.

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b23-pb8.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	7	0.0	61.0	26.2	7.6	5.2

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	29	13	24.27	11.83	8.55	2.382	0.1403	0.0157	30.48	751.6

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Clayey Gravel with Sand	GC	A-2-6 (0.0)

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-23 PB-8 @ 142-144 FT.

Date: January 19, 1994

Remarks:

Tested by: CLG

Reviewed by: RLB

Sample Density

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

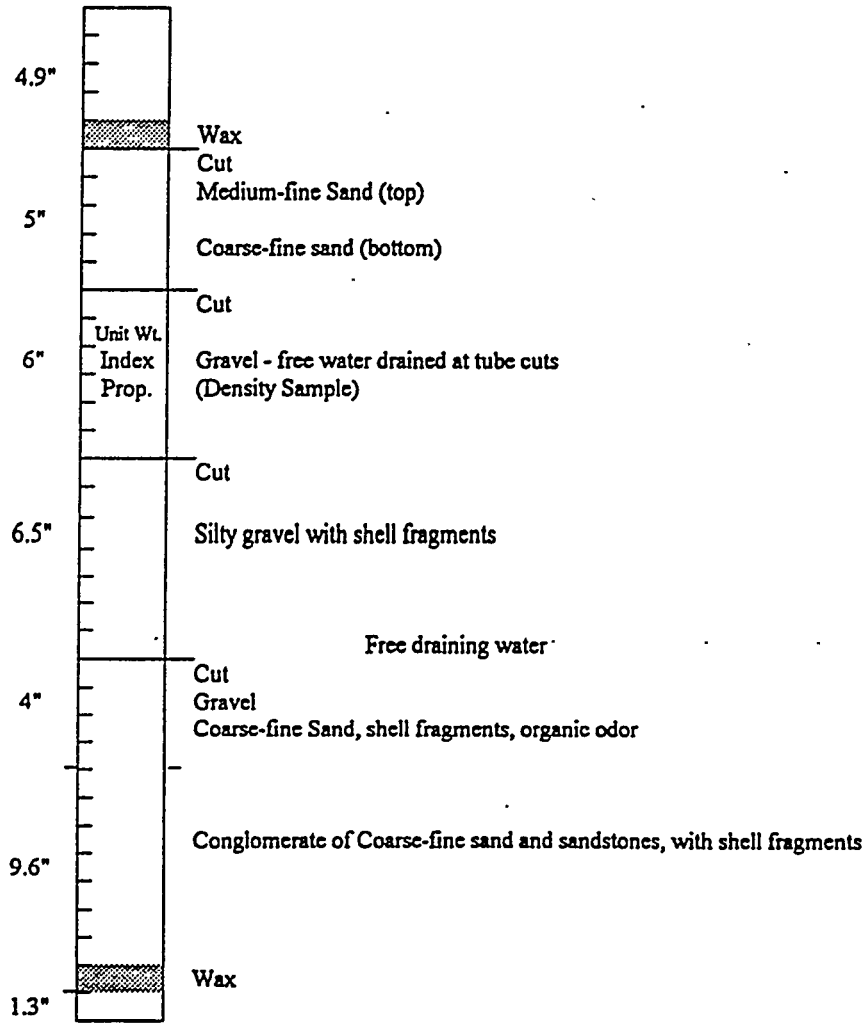
Project: SRS-ITP GEOTECHNICAL TESTING Date: 8-18-93

Boring No: H-Bor-23 Sample No: PB-9 Depth: 148'-149'8"

Method of Sample Extrusion: Horizontal cut / Verticle extrude At: Law Engr. - ATL

Total Length of Tube (inches), L: 36.0 By: CLG Checked By: RLB

VISUAL DESCRIPTION



Remarks: No sample saved.

1028mf srs-itp-saif
7/22/93

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ATTACHMENT 3

ested by:	CLG	Reviewed by:	RLB	Law Job No.	5810535301
Date:	08/18/93	Date:	08/18/93	Job Name	SRS - ITP

TP-4A: UNIT WEIGHT OF SAMPLE
"TYPICAL"

Sample: Boring No.: H-Bor-23
Depth: 148' - 149.8'
Sample ID: PB-9

MEASUREMENTS (Nominal 6-inch cut sample height):

TOTAL SAMPLE HEIGHT (inches)		INSIDE DIAMETER OF CUT TUBE (inches)	
1	6.220		
2	6.221	top	2.873
3	6.226	bottom	2.869
Avg.	6.222 (H)	Avg.	2.871 (D)

MOISTURE CONTENT DETERMINATION

MOISTURE CONTENT	
Tare No.	N-11
Tare Weight	49.20 gm
Wet Wt. + Tare	967.20 gm
Dry Wt. + Tare	855.49 gm
Wt. of Water	111.71 gm
Dry Weight	806.29 gm
Moisture Content, w	13.9 % *

* material observed to be free-flowing - large quantity of water drained from sample when tube was cut

TOTAL WEIGHT OF SOIL + TUBE SECTION	W_{s+t} =	1735.21 gm
WEIGHT OF CLEAN, DRY TUBE SECTION	W_t =	587.2 gm
WET WEIGHT OF SOIL, [(W_{s+t} - W_t)/454]	W_s =	2.529 lbs
VOLUME OF SAMPLE, [(pi*D²/4)*H/1728]	V =	0.023 ft³
WET DENSITY, [W_s/V]	**D_w=**	**108.5 pcf**
DRY DENSITY, [D_w/(1+w/100)]	**D_D=**	**95.3 pcf**

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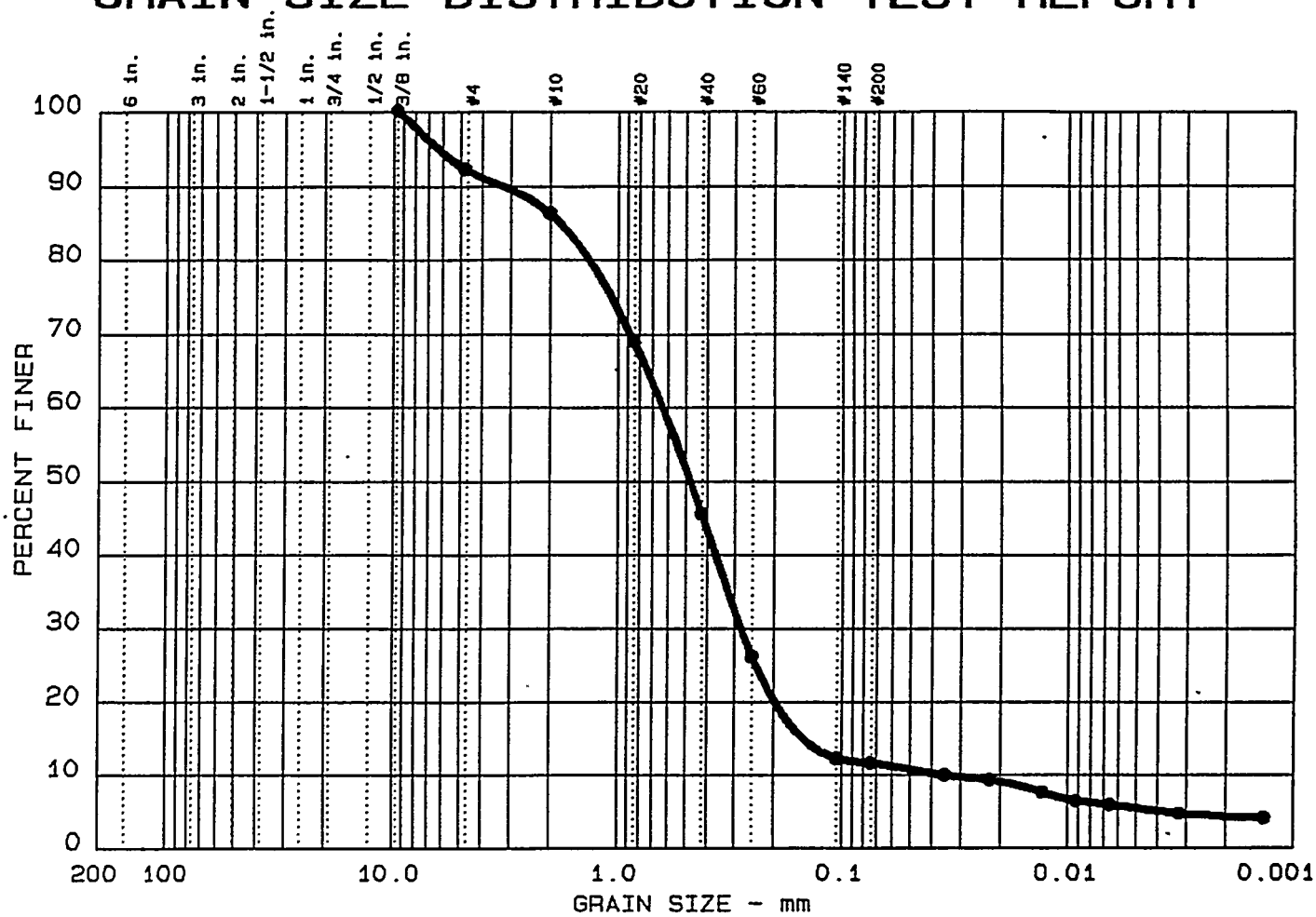
GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	17	0.0	7.5	80.9	6.2	5.4

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			1.78	0.63	0.47	0.280	0.1471	0.0361	3.47	17.4

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Clayey Silty Medium to Fine Sand		

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-23 PB-9 @ 148-149.75 Ft.

Date: September 23, 1993

Remarks:
Tested by: JRR
Reviewed by: RLB
Not Enough Material For
-200 Atterberg Limits
Unit Wt.

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

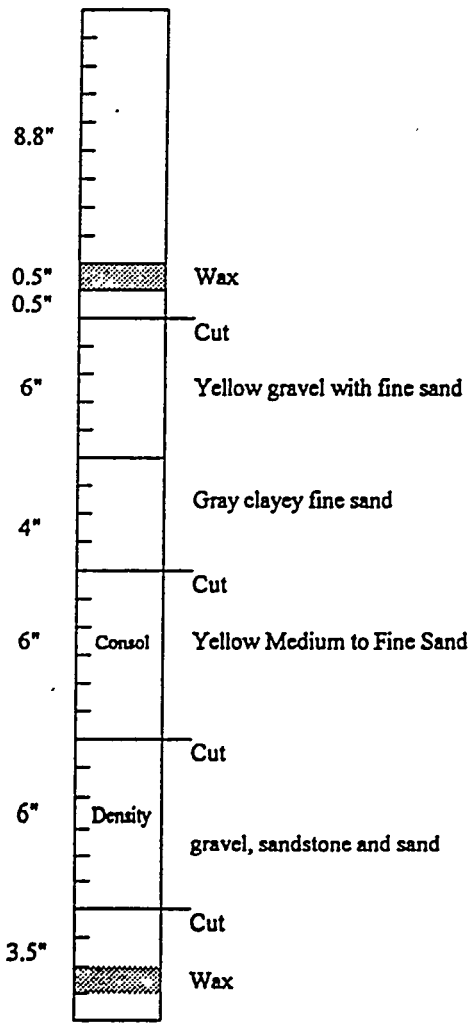
Project: SRS-ITP GEOTECHNICAL TESTING Date: 11-2-93

Boring No: H-Bor-23 Sample No: PB-11 Depth: 158-160.5 ft

Method of Sample Extrusion: Verticle At: Law Engr. - ATL

Total Length of Tube (inches), L : 36.0 By: Checked By: RLB

VISUAL DESCRIPTION



Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b23-pb11.wk3

ATTACHMENT 3

'ested by:	CLG	Reviewed by:	RLB	Law Job No.	5810535301
Date:	11/02/93	Date:	12/13/93	Job Name	SRS - ITP

TP-4A: UNIT WEIGHT OF SAMPLE
"TYPICAL"

Sample: Boring No.: H-Bor-23
Depth: 158' - 160.5'
Sample ID: PB-11

MEASUREMENTS (Nominal 6-inch cut sample height):

TOTAL SAMPLE HEIGHT (inches)		INSIDE DIAMETER OF CUT TUBE (inches)	
1	5.731		
2	5.728	top	2.876
3	5.723	bottom	2.873
Avg.	5.727 (H)	Avg.	2.875 (D)

MOISTURE CONTENT DETERMINATION

MOISTURE CONTENT	
Tare No.	AB-30
Tare Weight	83.70 gm
Wet Wt. + Tare	416.37 gm
Dry Wt. + Tare	317.36 gm
Wt. of Water	99.01 gm
Dry Weight	233.66 gm
Moisture Content, w	42.4 %

TOTAL WEIGHT OF SOIL + TUBE SECTION	W_{s+t} =	1392.43 gm
WEIGHT OF CLEAN, DRY TUBE SECTION	W_t =	413.98 gm
WET WEIGHT OF SOIL, $[(W_{s+t} - W_t)/454]$	W_s =	2.155 lbs
VOLUME OF SAMPLE, $[(pi*D^2/4)*H/1728]$	V =	0.022 ft^3
WET DENSITY, $[W_s/V]$	**D_w=**	**100.2 pcf**
DRY DENSITY, $[D_w/(1+w/100)]$	**D_D=**	**70.4 pcf**

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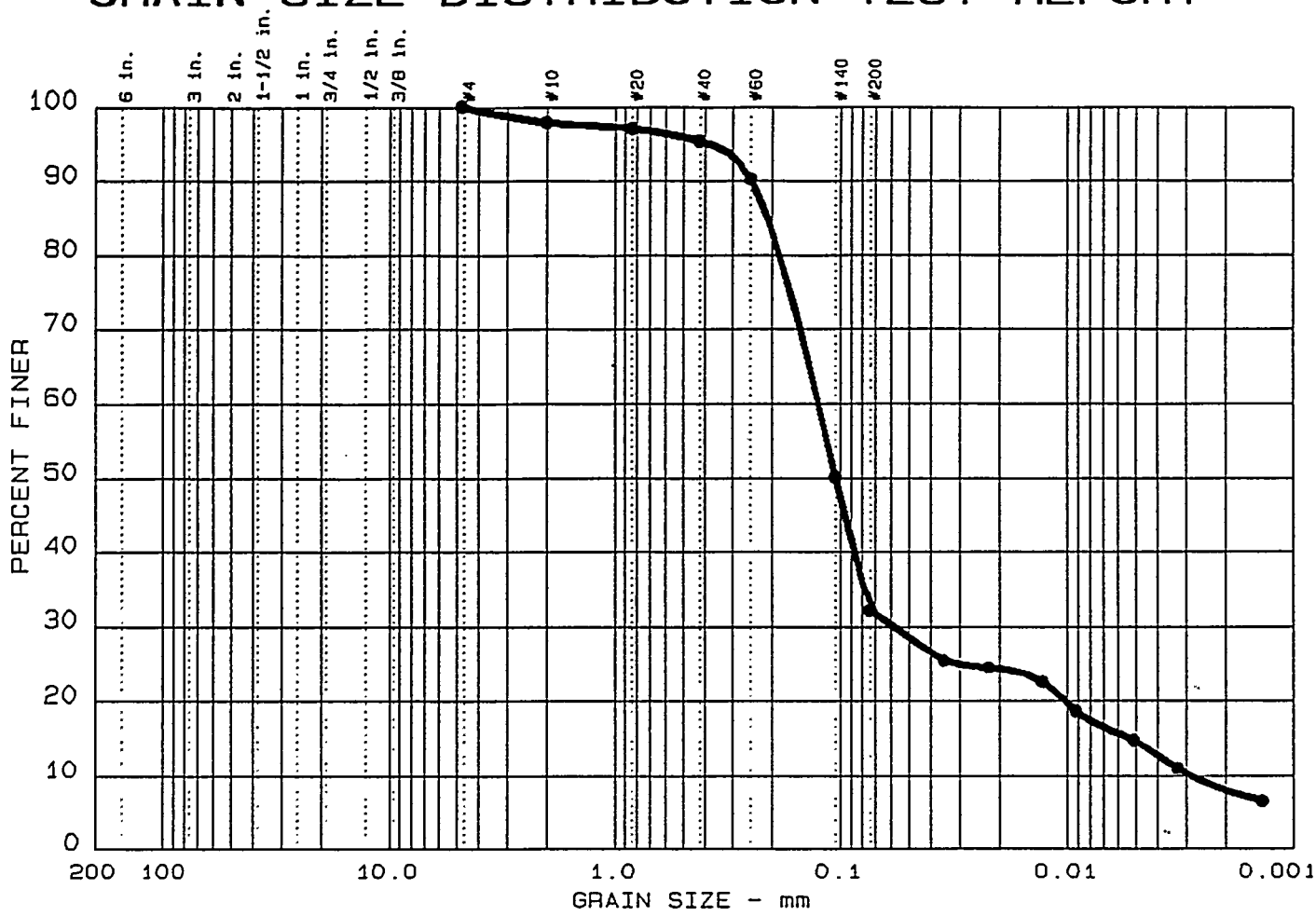
GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	17	0.0	0.0	67.9	17.3	14.8

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	NL	NP	0.21	0.12	0.10	0.058	0.0051	0.0028	9.66	44 2

MATERIAL DESCRIPTION	USCS	AASHTO
● Green Clayey Silty Medium to Fine Sand	SM	A-2-4 (0.0)

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-23 PB-11 @ 158'-160'6"

Date: November 19, 1993

Remarks:

Tested by: BNS

Reviewed by: RLB

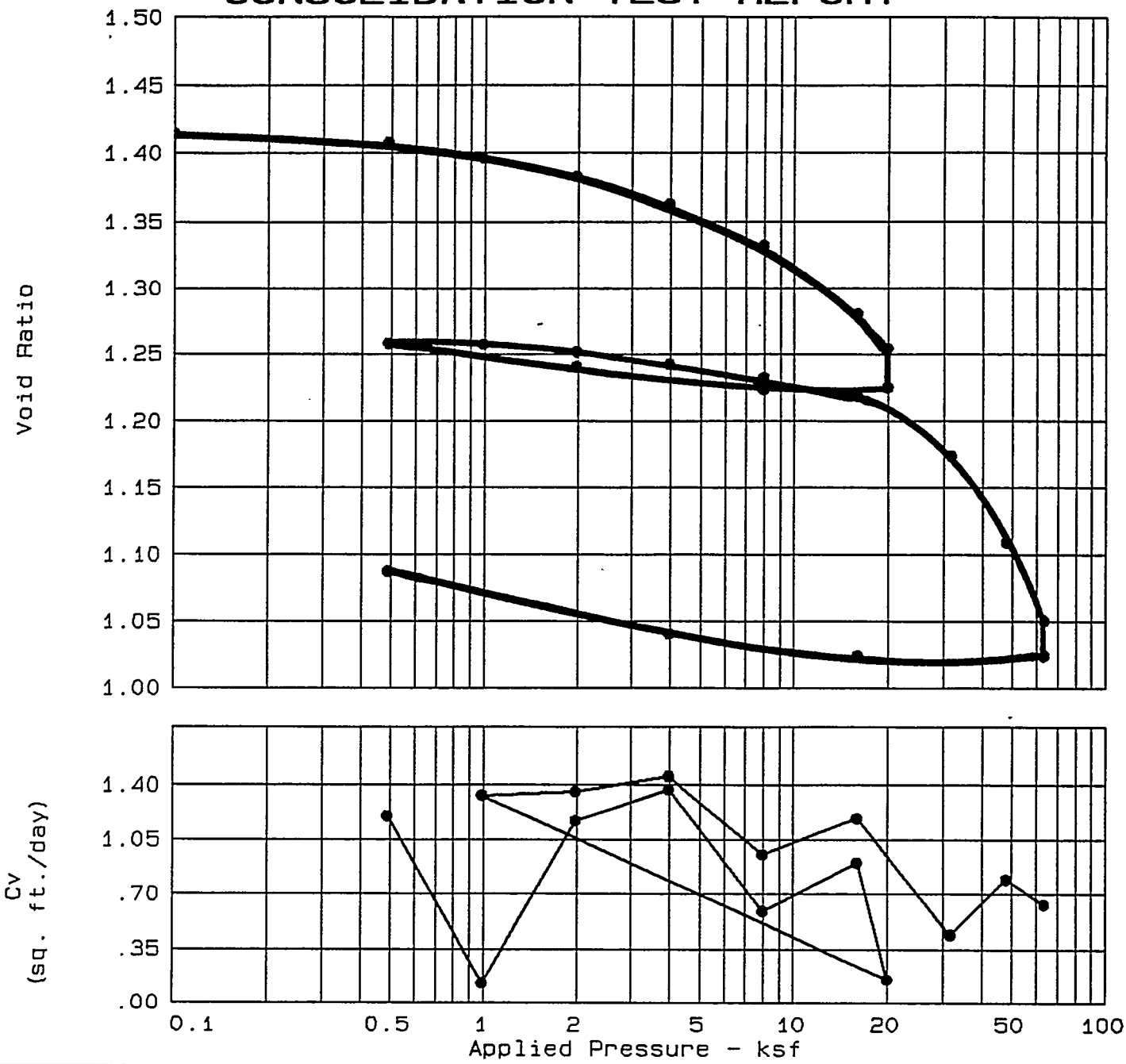
Consol.

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

CONSOLIDATION TEST REPORT



Clpse. %	Nat. Sat.	Nat. Moist.	Dry Density	LL	PI	Sp.Gr.	Initial void ratio
1.1	93.0 %	51.6	66.1	NL	NP	2.560	1.4191

TEST RESULTS	MATERIAL DESCRIPTION
	Green Clayey Silty Medium to Fine Sand Class: SM
Project No.: 5810535301 Project: SRS-ITP Location: H-Bor-23 PB-11 @ 158'-160.5' Date: NOV 8, 1993	Remarks: Tested By: CLG Reviewed By: RLB
CONSOLIDATION TEST REPORT LAW ENGINEERING, INC.	Fig. No._____

17:53, 2-01-1994 CONSOLIDATION TEST PROJECT DATA Test No. 30

Project Number:	5810535301
Project:	SRS-ITP
Date:	NOV 8,1993
Location 1:	H-Bor-23 PB-11 @ 158'-160.5'
2:	
Remarks 1:	Tested By:
2:	Reviewed By:
3:	
4:	
5:	
Material 1:	Green Clayey Silty
description 2:	Medium to Fine Sand
Classification:	SM
Liquid limit:	NL
Plasticity index:	NP
Figure Number:	

CONSOLIDATION TEST SPECIMEN DATA

TOTAL SAMPLE	BEFORE TEST	AFTER TEST
Wet w+t = 321.84 g.	Oedometer No. = 8	Wet w+t = 316.62 g.
Dry w+t = 286.92 g	Machine No. = 8	Dry w+t = 286.92 g.
Tare wt. = 219.18 g.	Spec. Gravity = 2.560	Tare wt. = 219.18 g.
Height = 0.8930 in.	Height = 0.8930 in.	
Diameter = 2.3600 in.	Diameter = 2.3600 in.	
Weight = 102.66 g.		
Moisture = 51.6 %	Ht. Solids = 0.3691 in.	Moisture = 43.8 %
Wet Den. = 100.1 pcf	Dry wt. = 67.74 g. *	Dry wt. = 67.74 g.
Dry Den. = 66.1 pcf	Void ratio = 1.4191	Void ratio = 1.0477
	Saturation = 93.0 %	Saturation = 107.1 %

* Initial dry weight used in calculations

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
Initial	0.02000			1.4191	
0.10	0.02180	0.0000	0.02180	1.4143	0.2 Comprs.
0.49	0.02540	0.0003	0.02510	1.4076*	0.5 Comprs.*
0.99	0.03070	0.0003	0.03040	1.3953*	1.0 Comprs.*
1.99	0.03610	0.0009	0.03520	1.3813*	1.6 Comprs.*
3.98	0.04460	0.0016	0.04300	1.3618*	2.4 Comprs.*
7.99	0.05895	0.0028	0.05615	1.3315*	3.6 Comprs.*
15.99	0.08200	0.0042	0.07780	1.2800*	5.8 Comprs.*
20.00	0.09970	0.0079	0.09180	1.2534*	6.8 Comprs.*
20.00	0.11030	0.0079	0.10240	1.2247	8.0 Comprs.
7.99	0.10580	0.0028	0.10300	1.2231	8.1 Comprs.
1.99	0.09760	0.0009	0.09670	1.2402	7.4 Comprs.
0.49	0.09070	0.0003	0.09040	1.2572	6.7 Comprs.
0.99	0.08050	0.0003	0.08020	1.2567*	6.7 Comprs.*

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
1.99	0.08340	0.0009	0.08250	1.2510*	6.9 Comprs.*
3.98	0.08730	0.0016	0.08570	1.2421*	7.3 Comprs.*
7.99	0.09270	0.0028	0.08990	1.2316*	7.8 Comprs.*
15.99	0.09910	0.0042	0.09490	1.2186*	8.3 Comprs.*
31.78	0.13020	0.0061	0.12410	1.1733*	10.2 Comprs.*
48.00	0.15800	0.0115	0.14650	1.1090*	12.8 Comprs.*
63.45	0.17900	0.0131	0.16590	1.0504*	15.2 Comprs.*
63.45	0.18550	0.0131	0.17240	1.0328	16.0 Comprs.
15.99	0.18000	0.0042	0.17580	1.0236	16.4 Comprs.
3.98	0.17130	0.0016	0.16970	1.0401	15.7 Comprs.
1.99	0.16690	0.0000	0.16690	1.0477	15.4 Comprs.

* CALCULATED USING D100 INSTEAD OF FINAL READING

CONSOLIDATION TEST RESULTS

Compression index = NOT SELECTED
Preconsolidation pressure = NOT SELECTED

Load 0.49 ksf CONSOLIDATION TEST READINGS Load No. 2

Machine Deflection 0.0003

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.02180	11	67.00	0.02505
2	0.10	0.02390	12	355.00	0.02540
3	0.25	0.02410			
4	0.50	0.02425			
5	1.00	0.02440			
6	2.00	0.02445			
7	4.00	0.02455			
8	8.00	0.02465			
9	15.00	0.02475			
10	30.00	0.02490			

Void Ratio: 1.4076 Compression: 0.5 % >>> CALCULATED USING D100
D0 = 0.0233 D90 = 0.0242 D100 = 0.0243 T90 = 1.40 min.
Cv @ 1.4 min.= 1.20 sq. feet/day

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

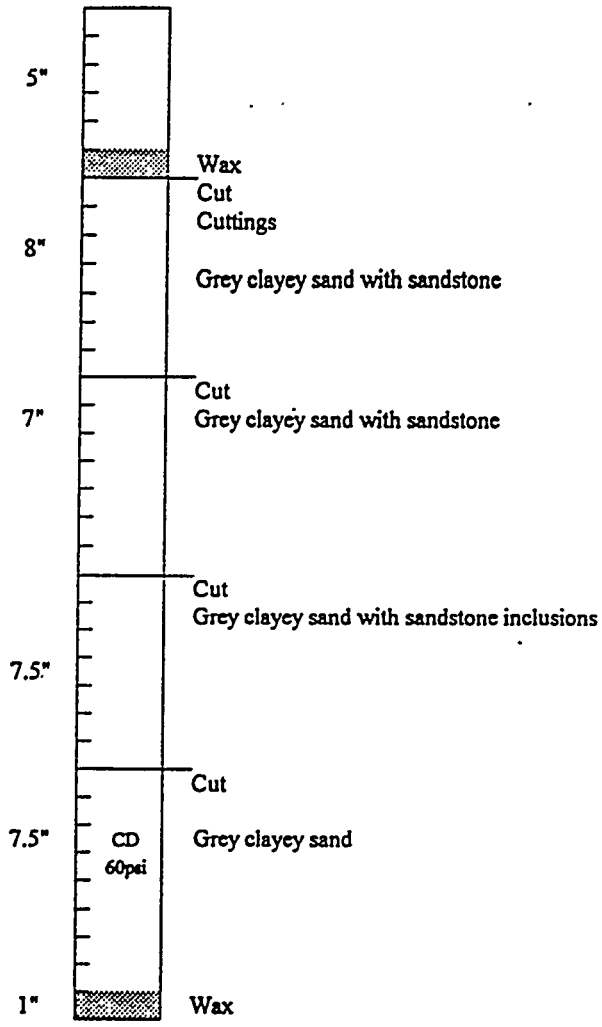
Project: SRS-ITP GEOTECHNICAL TESTING Date: 1/13/94

Boring No: H-Bor-23 Sample No: PB-12 Depth: 163-165 ft

Method of Sample Extrusion: Verticle At: Law Engr. - ATL

Total Length of Tube (inches), L : 36.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION

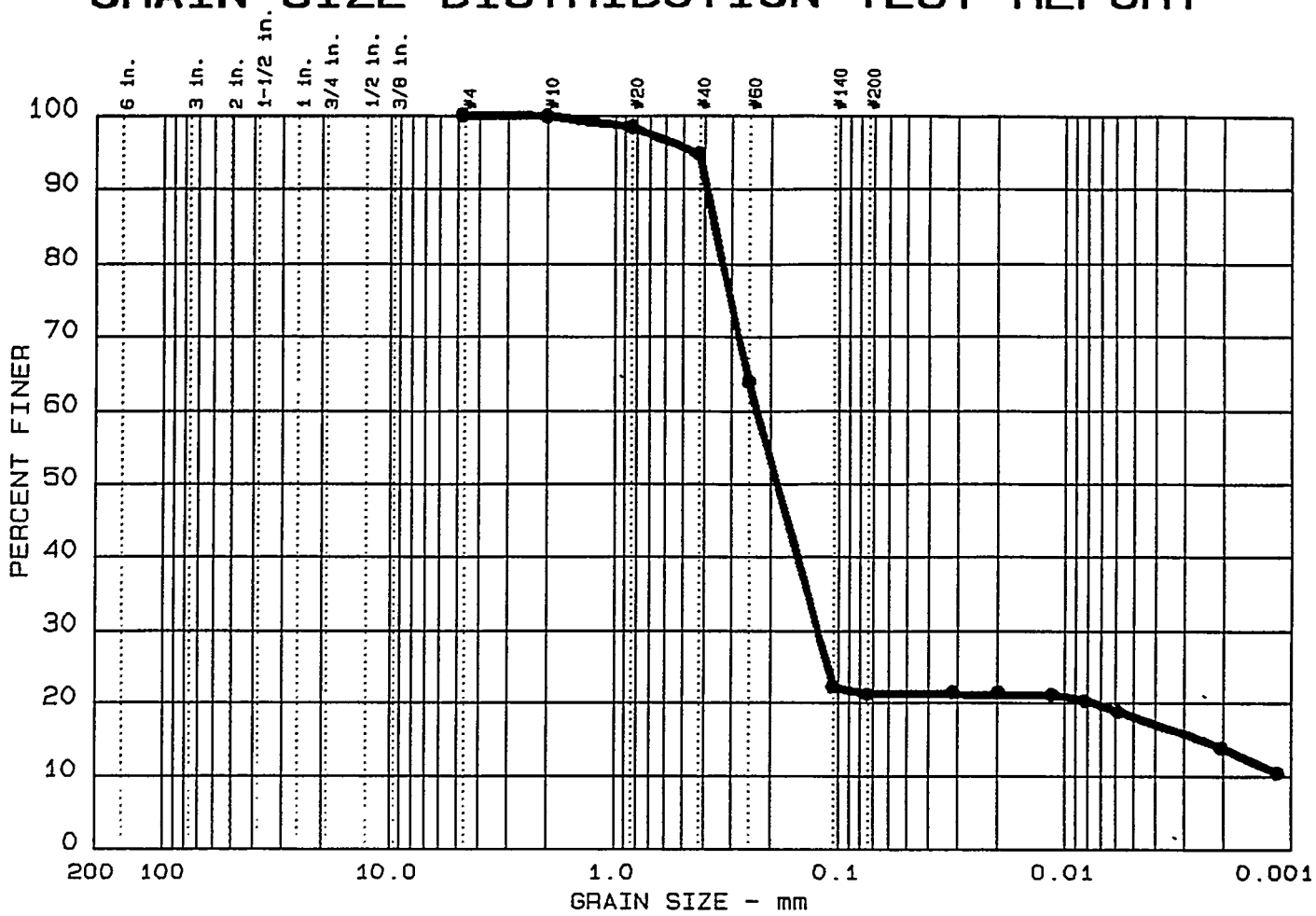


Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b23-pb12.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	20	0.0	0.0	78.8	3.1	18.1

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.36	0.23	0.19	0.123	0.0025			

MATERIAL DESCRIPTION	USCS	AASHTO
● Yellow Brown Clayey Sand		

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-23 PB-12 @ 163 Ft.

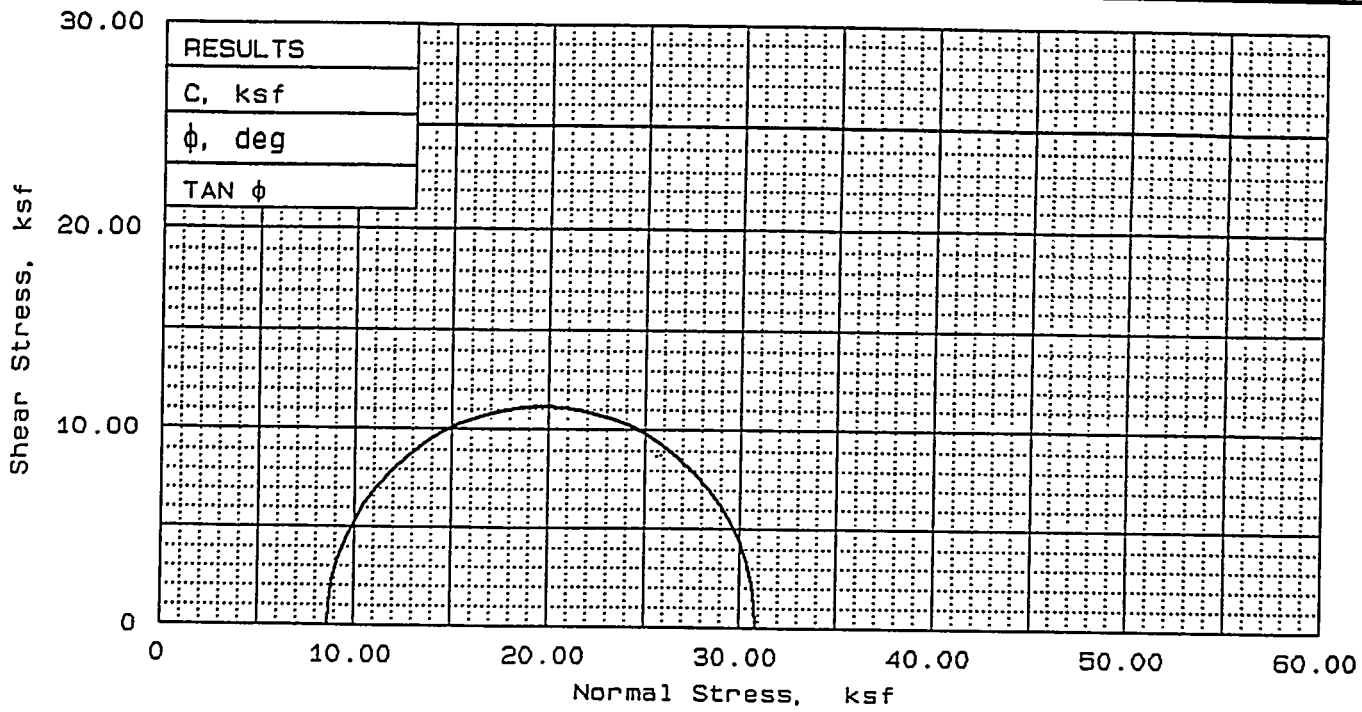
Date: January 19, 1994

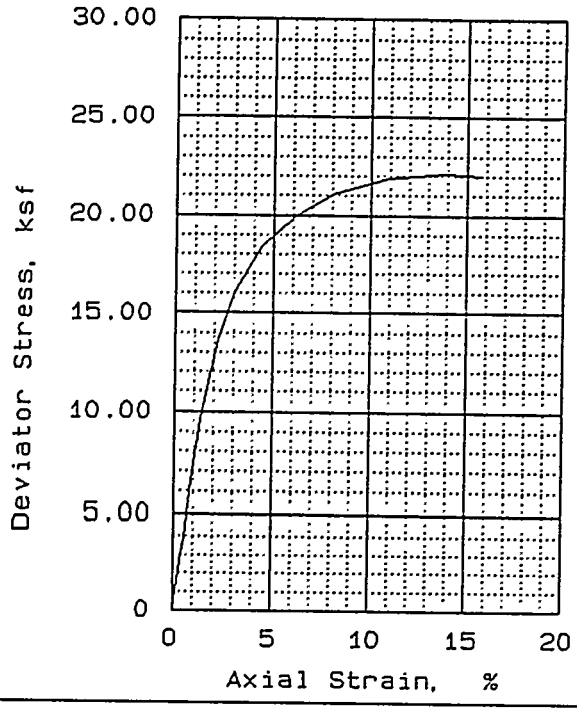
Remarks:
Tested by: HES Chkd by: KLB
CD -60 psi
Atterberg Limits -200
LL=138 PL=41 PI=97

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.





SAMPLE NO.		1
INITIAL	WATER CONTENT, %	27.0
	DRY DENSITY, pcf	93.3
	SATURATION, %	91.5
	VOID RATIO	0.786
	DIAMETER, in	2.88
	HEIGHT, in	6.00
AT TEST	WATER CONTENT, %	28.7
	DRY DENSITY, pcf	94.3
	SATURATION, %	100.0
	VOID RATIO	0.767
	DIAMETER, in	2.86
	HEIGHT, in	5.99
BACK PRESSURE, ksf		4.32
CELL PRESSURE, ksf		12.96
FAILURE STRESS, ksf		22.26
PORE PRESSURE, ksf		
STRAIN RATE, %/min.		0.100
ULTIMATE STRESS, ksf		
PORE PRESSURE, ksf		
σ_1 FAILURE, ksf		30.90
σ_3 FAILURE, ksf		8.64

TYPE OF TEST:
Consolidated drained
SAMPLE TYPE: Undisturbed
DESCRIPTION: See Grain Size

LL= PL= PI=
SPECIFIC GRAVITY= 2.67
REMARKS: Tested by: HGJ

Reviewed by: RLB

FIG. NO.

CLIENT: SRS

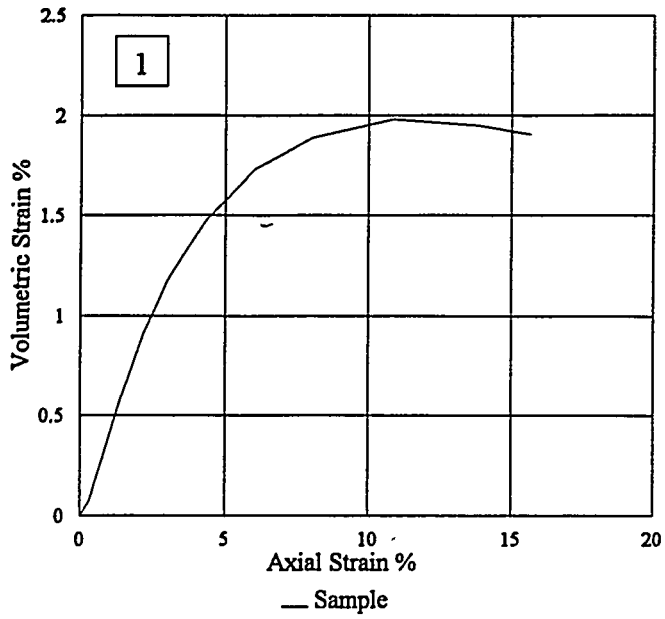
PROJECT: SRS-ITP

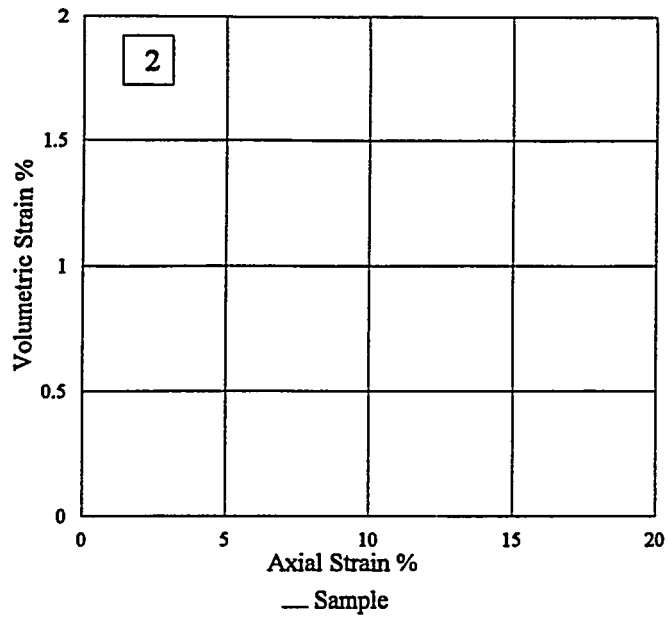
SAMPLE LOCATION: H Bor 23 PB-12 @ 163 Ft.

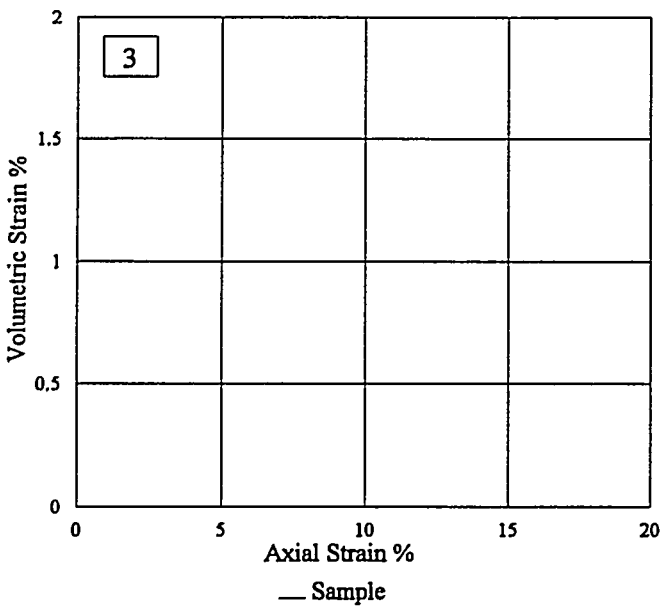
PROJ. NO.: 5810535301 DATE: 01/27/94

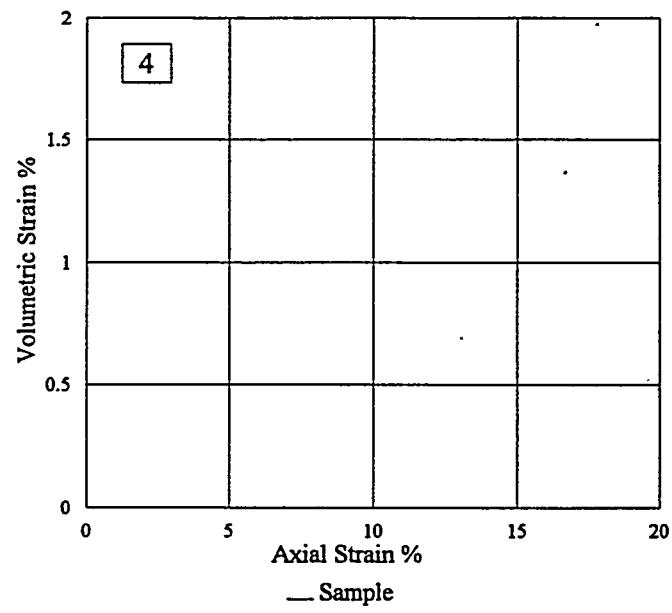
TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.









Client: Westinghouse Savannah River Co.
Project: ITP Geotechnical Testing
Location: H-Bor-23, PB-12 @ 163 ft.
File: Project No.: 5810535301 Page 2 / 2 Fig. No. _____

TRIAXIAL COMPRESSION TEST
Consolidated drained

2-24-1994
6:00 pm

Project Data

Project No.: 5810535301 Date: 01/27/94 Data file: 535301N
Client: SRS
Project: SRS-ITP
Sample location: H Bor 23 PB-12 @ 163 Ft.
Sample description: See Grain Size
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.67 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.86	
Height change, in		0.02	
Height, in	6.00	5.99	
Weight, grams	1211.2		
Water volume change, cc		-16.96	
Moisture, %	27.0	28.7	24.8
Dry density, pcf	93.3	94.3	
Saturation, %	91.5	100.0	
Void ratio	0.786	0.767	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 90 psi
Consolidation back pressure = 30 psi
Consolidation effective confining stress = 8.64 ksf
Peak deviator stress = 22.26 ksf at reading no. 11
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	8.64	8.64	1.00	8.64	0.00
1	0.0200	0.020	120.00	120.0	0.3	2.67	8.64	11.31	1.31	9.98	1.34
2	0.0300	0.030	174.00	174.0	0.5	3.87	8.64	12.51	1.45	10.58	1.94
3	0.0500	0.050	294.00	294.0	0.8	6.52	8.64	15.16	1.75	11.90	3.26
	.0800	0.080	438.00	438.0	1.3	9.67	8.64	18.31	2.12	13.47	4.83
	.1300	0.130	624.00	624.0	2.2	13.65	8.64	22.29	2.58	15.47	6.83

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	,.1800	0.180	738.00	738.0	3.0	16.01	8.64	24.65	2.85	16.64	8.00
7	0.2600	0.260	858.00	858.0	4.3	18.36	8.64	27.00	3.12	17.82	9.18
8	0.3600	0.360	948.00	948.0	6.0	19.93	8.64	28.57	3.31	18.60	9.96
9	0.4800	0.480	1026.00	1026.0	8.0	21.11	8.64	29.75	3.44	19.19	10.55
10	0.6500	0.650	1098.00	1098.0	10.9	21.89	8.64	30.53	3.53	19.59	10.95
11	0.8300	0.830	1148.00	1148.0	13.9	22.12	8.64	30.76	3.56	19.70	11.06
12	0.9400	0.940	1166.00	1166.0	15.7	21.98	8.64	30.62	3.54	19.63	10.99

Client Westinghouse Savannah River Co.
Project: ITP Geotechnical Testing
Location: H-Bor-23, PB-12 @ 163 ft.
File: Project No.: 5810535301

No. of Circles
1

Circle No.1					
Consolidation Pressure, ksf	After Consolidation			Burette Cal. Factor	No. of Points
	Diameter, in.	Height, in.	Volume, cc		
8.64	2.88	5.99	636.69	1	13

		Sample		Cell	
LVDT Reading (in)	Axial Strain (in/in)	Burette Reading (div.)	Volumetric Strain (cc/cc)	Burette Reading (div.)	Volumetric Strain (cc/cc)
0.00	0.00	20.0	0.00	2.0	0.00
0.02	0.33	19.5	0.08	2.3	0.06
0.03	0.50	19.0	0.16	2.7	0.13
0.05	0.84	18.0	0.31	3.8	0.31
0.08	1.34	16.4	0.57	5.3	0.56
0.13	2.17	14.2	0.91	7.3	0.90
0.18	3.01	12.5	1.18	8.9	1.17
0.26	4.34	10.6	1.48	10.5	1.47
0.36	6.02	9.0	1.73	11.8	1.72
0.48	8.02	8.0	1.88	12.5	1.89
0.65	10.86	7.4	1.98	12.5	1.98
0.83	13.87	7.6	1.95	11.7	1.94
0.94	15.71	7.9	1.90	11.2	1.92

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

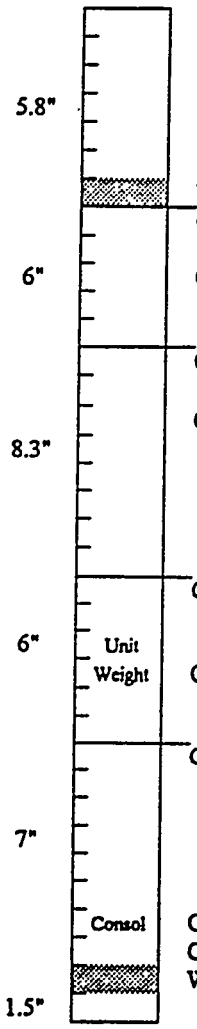
Project: SRS-ITP GEOTECHNICAL TESTING Date: 08/19/93

Boring No: H-Bor-23 Sample No: PB-14 Depth: 174.5 - 177 ft.

Method of Sample Extrusion: Verticle At: Law Engr. - ATL

Total Length of Tube (inches), L : 36.0 By: CLG Checked By: RLB

VISUAL DESCRIPTION



Remarks: No sample saved. Consolidation sample taken from bottom portion per request.

1028mf srs-itp-asif
7/22/93

rlb\itp\tubelog\b23-pb14.wk3

ATTACHMENT 3

Tested by:	CLG/JRR	Reviewed by:	RLB	Law Job No.	5810535301
Date:	09/20/93	Date:	09/20/93	Job Name	SRS - ITP

TP-4A: UNIT WEIGHT OF SAMPLE
"TYPICAL"

Sample: Boring No.: H-Bor-23
Depth: 174.5' - 177'
Sample ID: PB-14

MEASUREMENTS (Nominal 6-inch cut sample height):

TOTAL SAMPLE HEIGHT (inches)		INSIDE DIAMETER OF CUT TUBE (inches)	
1	6.160		
2	5.890	top	2.869
3	6.130	bottom	2.876
Avg.	6.060 (H)	Avg.	2.873 (D)

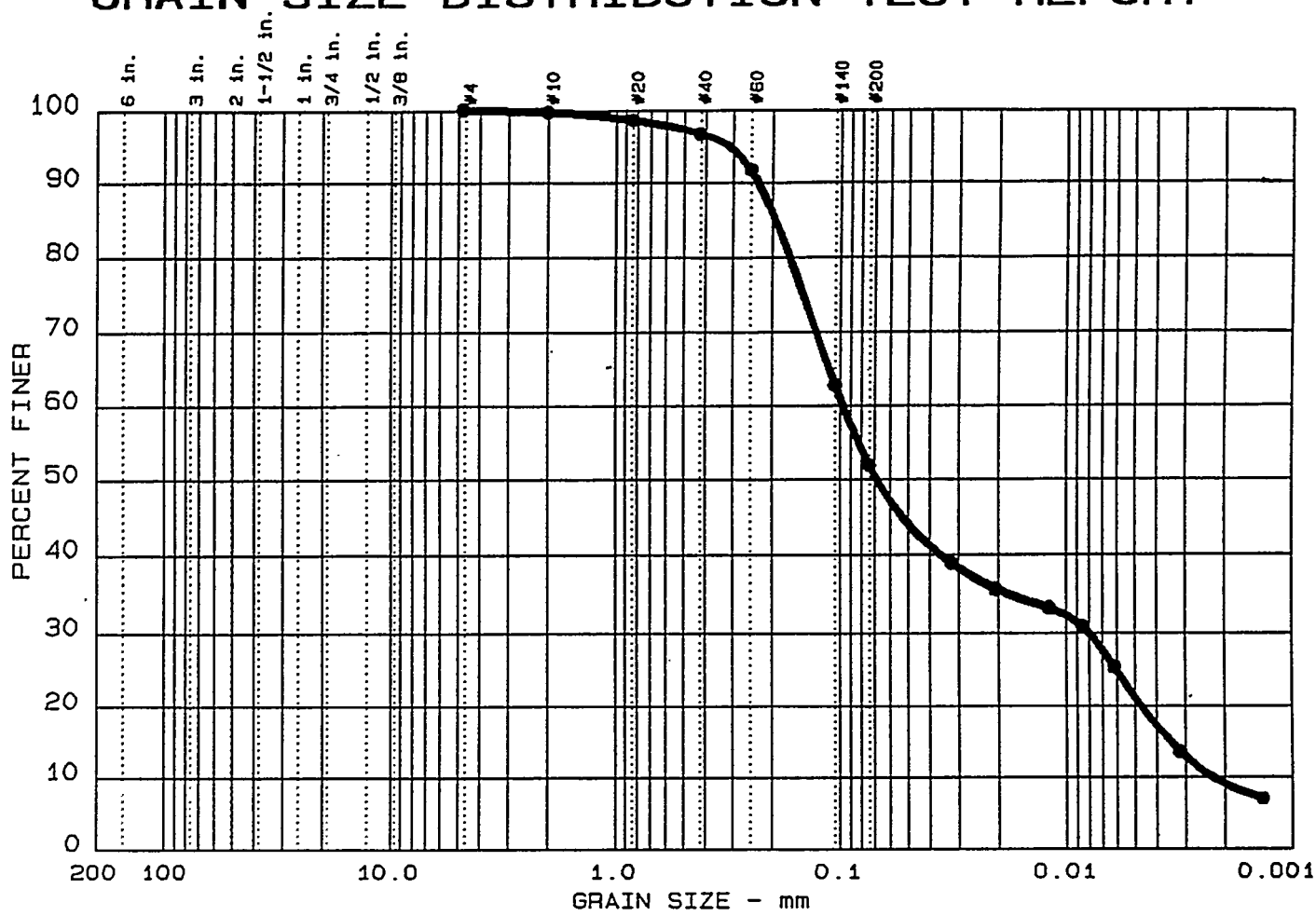
MOISTURE CONTENT DETERMINATION

MOISTURE CONTENT	
Tare No.	L-20
Tare Weight	91.24 gm
Wet Wt. + Tare	1269.32 gm
Dry Wt. + Tare	991.63 gm
Wt. of Water	277.69 gm
Dry Weight	900.39 gm
Moisture Content, w	30.8 %

TOTAL WEIGHT OF SOIL + TUBE SECTION	W_{s+t} =	1645.5 gm
WEIGHT OF CLEAN, DRY TUBE SECTION	W_t =	441.41 gm
WET WEIGHT OF SOIL, [(W_{s+t} - W_t)/454]	W_s =	2.652 lbs
VOLUME OF SAMPLE, [(pi*D²/4)*H/1728]	V =	0.023 ft³
WET DENSITY, [W_s/V]	**D_w=**	**116.7 pcf**
DRY DENSITY, [D_w/(1+w/100)]	**D_D=**	**89.2 pcf**

h:\users\lab\rlb\itp\h23-pb14.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	11	0.0	0.0	48.1	30.6	21.3

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	47	23	0.19	0.10	0.07	0.008	0.0035	0.0022	0.30	43.7

MATERIAL DESCRIPTION	USCS	AASHTO
● Dark Grey-Green Medium to Fine Sandy Clayey Silt	CL	A-7-6 (9.2)

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-23 PB-14 @ 174.5-177 Ft.

Date: September 23, 1993

Remarks:

Tested by: JRR

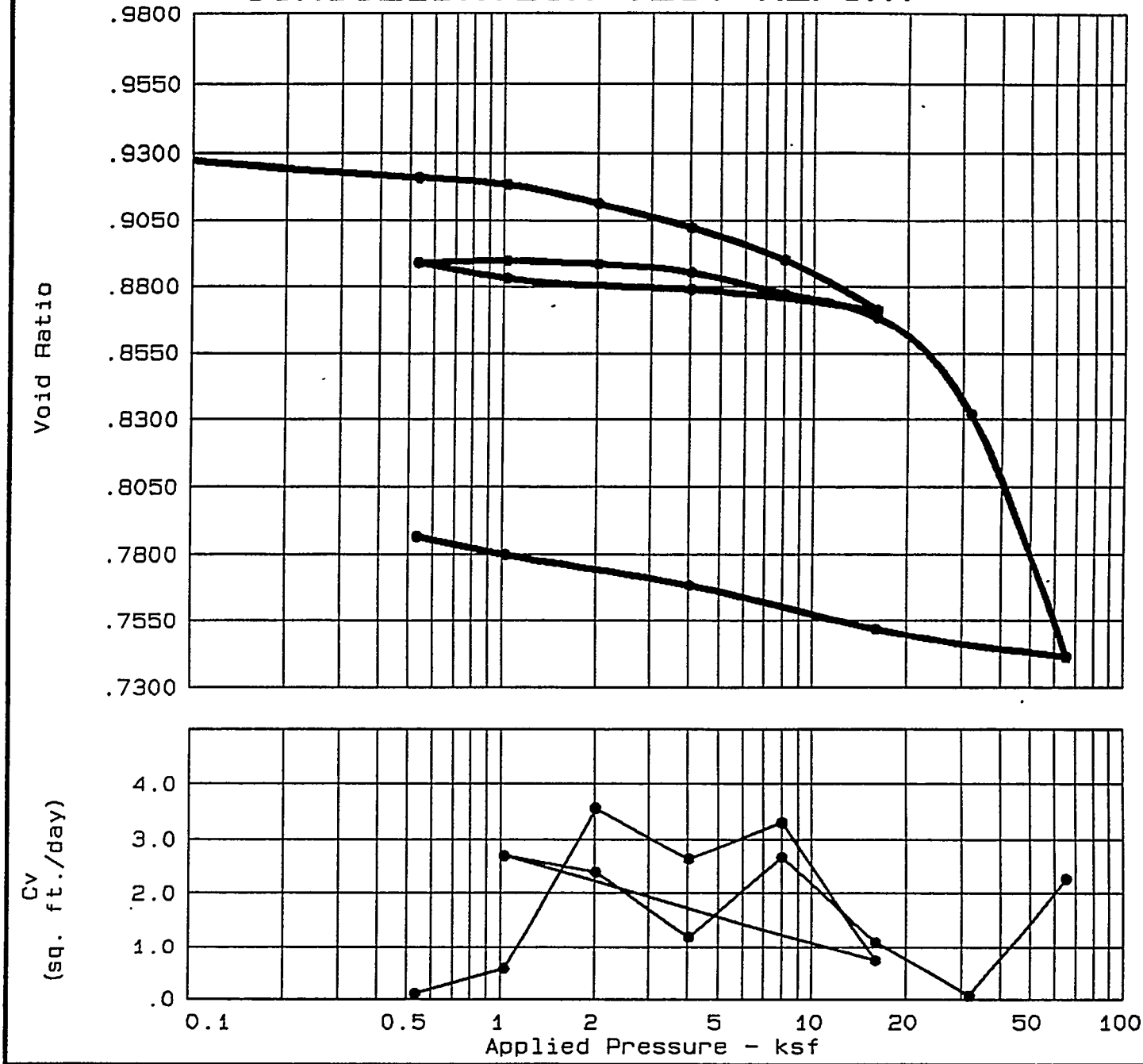
Reviewed by: RLB

Consol

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

CONSOLIDATION TEST REPORT



Swell press.	Nat. Sat.	Nat. Moist.	Dry Density	LL	PI	Sp.Gr.	Initial void ratio
	96.7 %	33.8	85.8	47	23	2.65	0.9271

TEST RESULTS	MATERIAL DESCRIPTION
	Dark Grey-Green M-F Sandy Clayey Silt Class: CL
Project No.: 5810535301 Project: SRS ITP Location: H-Bor-23 PB-14 174.5-177.0 Ft. Date: 8/19/93	Remarks: Tested by: CCG Reviewed by: RLB
CONSOLIDATION TEST REPORT **LAW ENGINEERING, INC.**	Fig. No._____

12:52, 10-15-1993 CONSOLIDATION TEST PROJECT DATA Test No. 11

oject Number:	5810535301
Project:	SRS ITP
Date:	8/19/93
Location 1:	H-Bor-23 PB-14
2:	174.5-177.0 Ft.
Remarks 1:	
2:	Tested by: CLG
3:	Reviewed by: KLB
4:	
5:	
Material 1:	Dark Grey-Green M-F
description 2:	Sandy Clayey Silt
Classification:	CL
Liquid limit:	47
Plasticity index:	23
Figure Number:	

CONSOLIDATION TEST SPECIMEN DATA

TOTAL SAMPLE	BEFORE TEST	AFTER TEST
Wet w+t = 334.70 g.	Oedometer No. = 13	Wet w+t = 332.77 g.
Dry w+t = 306.60 g	Machine No. = 13	Dry w+t = 306.60 g.
Tare wt. = 223.53 g.	Spec. Gravity = 2.65	Tare wt. = 223.53 g.
ht = 0.75 in.	Height = 0.75 in.	
eter = 2.50 in.	Diameter = 2.50 in.	
Weight = 111.17 g.		
Moisture = 33.8 %	Ht. Solids = 0.39 in.	Moisture = 31.5 %
Wet Den. = 114.9 pcf	Dry wt. = 83.07 g.	Dry wt. = 83.07 g. *
Dry Den. = 85.8 pcf	Void ratio = 0.9271	Void ratio = 0.7865
	Saturation = 96.7 %	Saturation = 106. %

* Final dry weight used in calculations

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
Initial	0.02000			0.9271	
0.54	0.02240	0.0000	0.02240	0.9210	0.3 Comprs.
1.03	0.02400	0.0006	0.02340	0.9184	0.5 Comprs.
2.03	0.02810	0.0019	0.02620	0.9112	0.8 Comprs.
4.05	0.03300	0.0032	0.02980	0.9020	1.3 Comprs.
8.05	0.03860	0.0040	0.03460	0.8897	1.9 Comprs.
16.04	0.04660	0.0048	0.04180	0.8712	2.9 Comprs.
4.05	0.04210	0.0032	0.03890	0.8786	2.5 Comprs.
1.03	0.03790	0.0006	0.03730	0.8827	2.3 Comprs.
0.54	0.03500	0.0000	0.03500	0.8886	2.0 Comprs.

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
1.03	0.03525	0.0006	0.03465	0.8895	2.0 Comprs.
2.03	0.03700	0.0019	0.03510	0.8884	2.0 Comprs.
4.05	0.03960	0.0032	0.03640	0.8851	2.2 Comprs.
8.05	0.04350	0.0040	0.03950	0.8771	2.6 Comprs.
16.04	0.04770	0.0048	0.04290	0.8684	3.0 Comprs.
32.04	0.06300	0.0058	0.05720	0.8317	5.0 Comprs.
65.60	0.09990	0.0075	0.09240	0.7414	9.6 Comprs.
16.04	0.09320	0.0048	0.08840	0.7516	9.1 Comprs.
4.05	0.08510	0.0032	0.08190	0.7683	8.2 Comprs.
1.03	0.07800	0.0006	0.07740	0.7798	7.6 Comprs.
0.54	0.07480	0.0000	0.07480	0.7865	7.3 Comprs.

CONSOLIDATION TEST RESULTS

Compression index = NOT SELECTED
Preconsolidation pressure = NOT SELECTED

Load 0.54 ksf CONSOLIDATION TEST READINGS Load No. 1

'achine Deflection 0.0000

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.02000	11	60.00	0.02180
2	0.10	0.02120	12	4285.00	0.02240
3	0.25	0.02130			
4	0.50	0.02135			
5	1.00	0.02140			
6	2.00	0.02140			
7	4.00	0.02135			
8	8.00	0.02150			
9	15.00	0.02160			
10	30.00	0.02170			

Void Ratio: 0.9210 Compression: 0.3 %
D0 = 0.0210 D90 = 0.0215 D100 = 0.0215 T90 = 13.95 min.
Cv @ 14 min.= 0.09 sq. feet/day

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

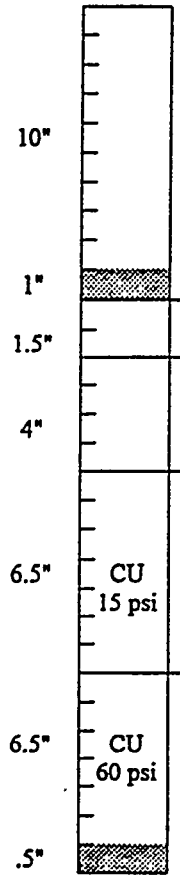
Project: SRS-ITP GEOTECHNICAL TESTING Date: 9-14-93

Boring No: H-Bor-23.1 Sample No: ST-3 Depth: 17'-19'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION



Wax

Cuttings

Cut

Brown silty clayey fine sand

Cut

Brown silty clayey fine sand

Cut

Brown silty fine sand

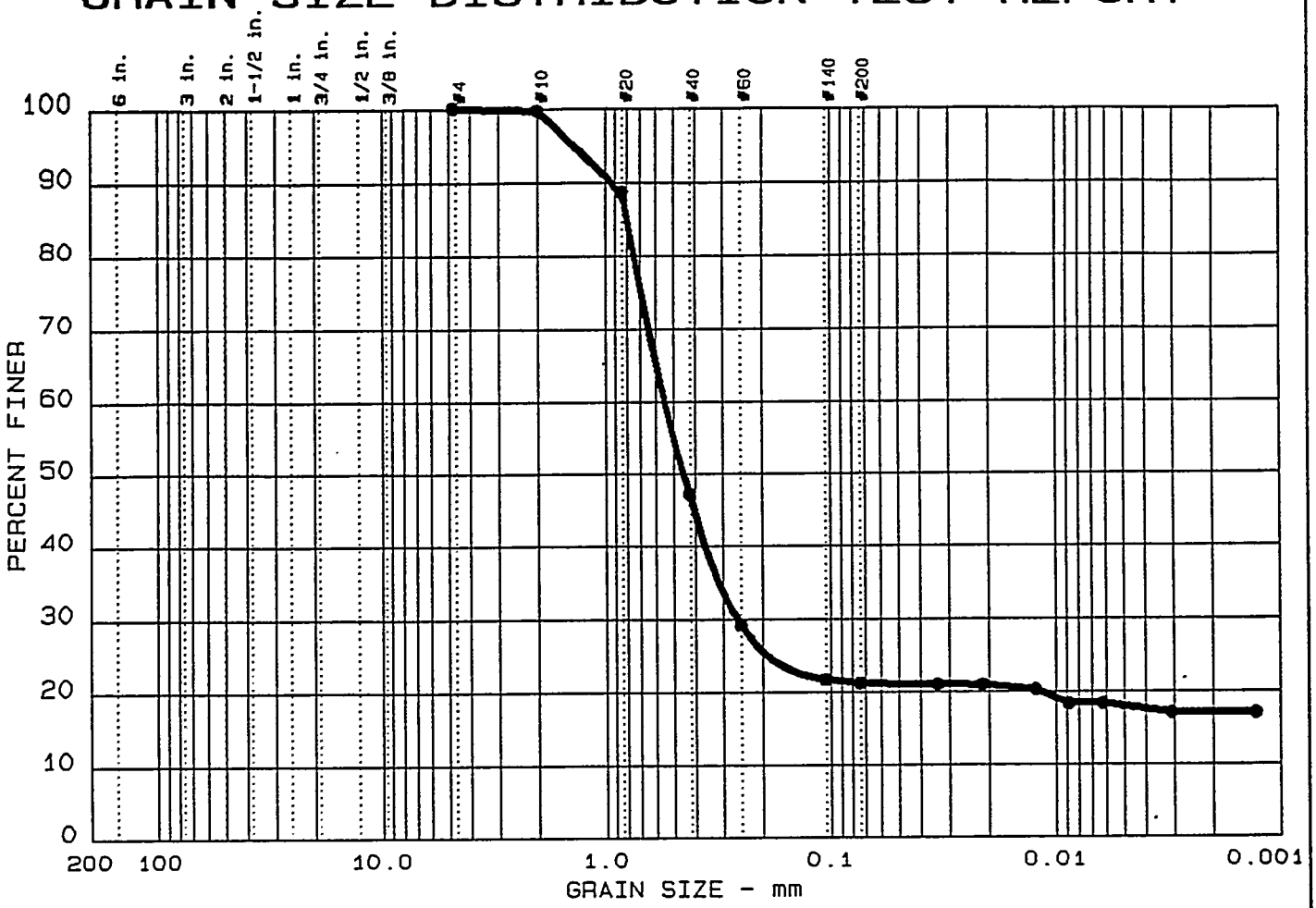
Wax

Remarks: Not enough recovery to obtain 3rd CU sample (at 30psi)

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b231-st3.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	2	0.0	0.0	78.8	3.2	18.0

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	44	25	0.79	0.54	0.45	0.259				

MATERIAL DESCRIPTION	USCS	AASHTO
● Orange Clayey Medium to Fine Sand	SC	A-2-7 (0.9)

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-23.1 ST-3 @ 17-19 Ft.

Date: October 1, 1993

Remarks:

Tested by: JRR

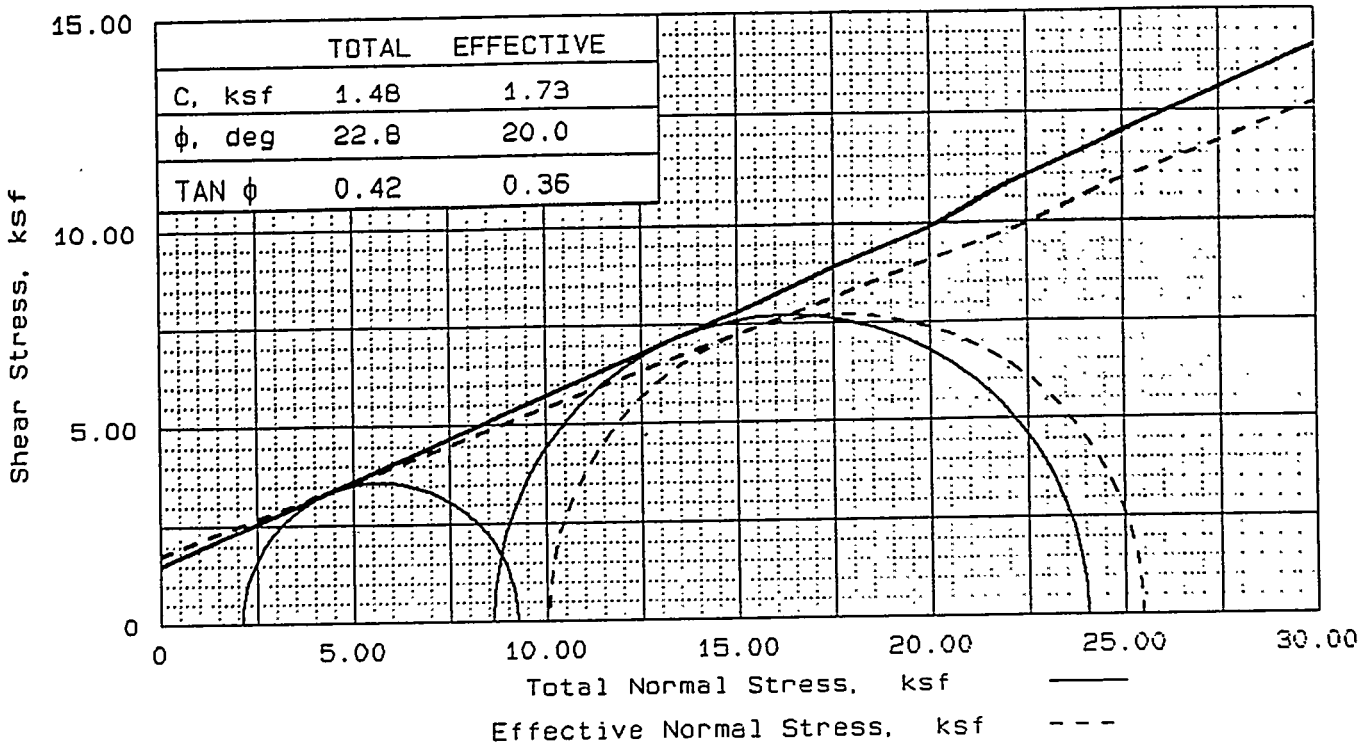
Reviewed by: RLB

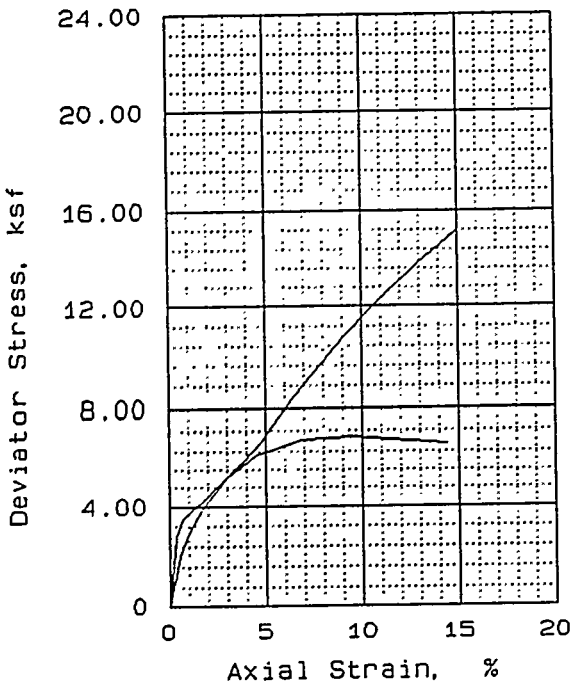
CU-15 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.





SAMPLE NO.		1	2
INITIAL	WATER CONTENT, %	17.4	18.0
	DRY DENSITY, pcf	110 0	110.1
	SATURATION, %	89.0	94.1
	VOID RATIO	0.527	0.509
	DIAMETER, in	2.88	2 88
	HEIGHT, in	5.99	5 99
AT TEST	WATER CONTENT, %	19.2	18.9
	DRY DENSITY, pcf	110 6	110.6
	SATURATION, %	100 0	100.0
	VOID RATIO	0.516	0.501
	DIAMETER, in	2.87	2.88
	HEIGHT, in	5.99	5.96
BACK PRESSURE, ksf		7.13	7.30
CELL PRESSURE, ksf		9.24	15.94
FAILURE STRESS, ksf		7.14	15.40
PORE PRESSURE, ksf		7.13	5.89
STRAIN RATE, %/min.		0.100	0.100
ULTIMATE STRESS, ksf			
PORE PRESSURE, ksf			
$\bar{\sigma}_1$ FAILURE, ksf		9.26	25 46
$\bar{\sigma}_3$ FAILURE, ksf		2.12	10.05

TYPE OF TEST:
CU with pore pressures
SAMPLE TYPE: Undisturbed
DESCRIPTION:

LL= 44 PL= 19 PI= 25.0
SPECIFIC GRAVITY= 2.66
REMARKS: Tested by: HES

Reviewed by: RLB

CLIENT: SRS

PROJECT: SRS-ITP

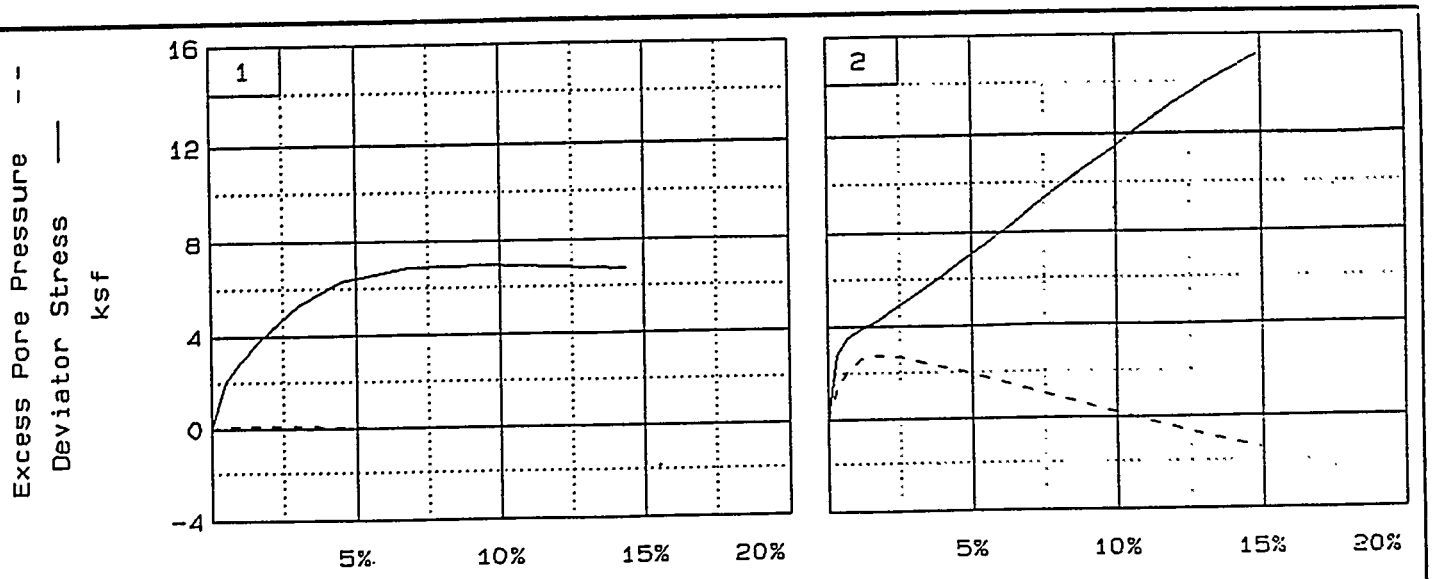
SAMPLE LOCATION: H-Bor 23.1 ST-3 @ 17'-19'

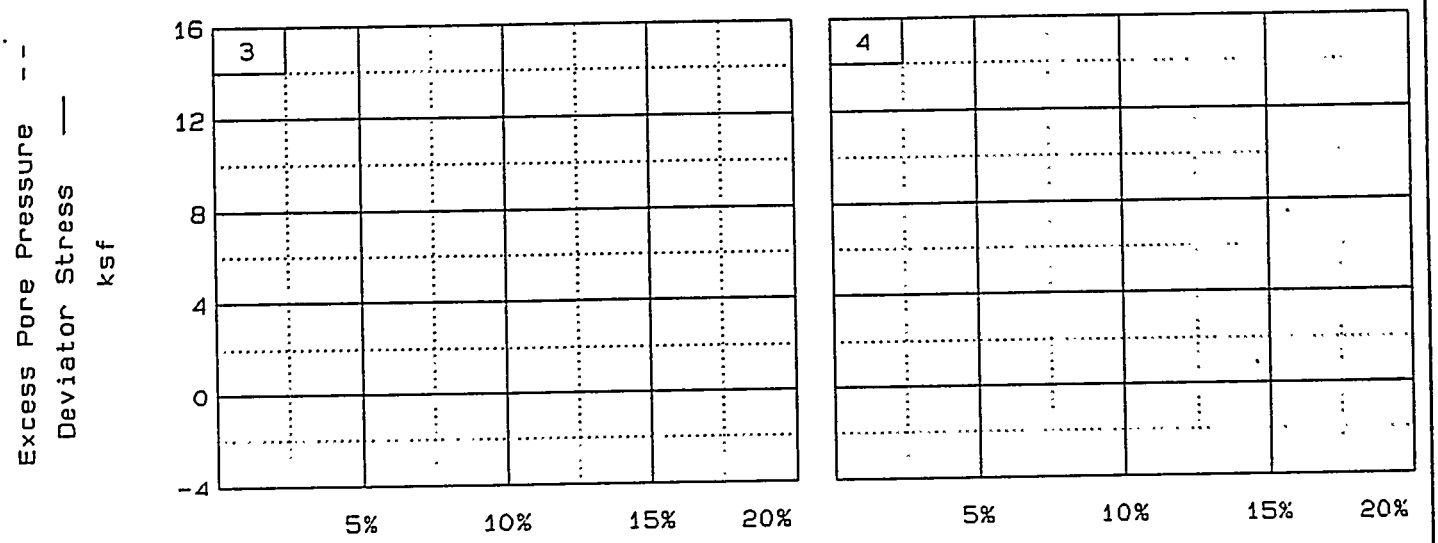
PROJ. NO.: 5810535301 DATE: 10/8/93

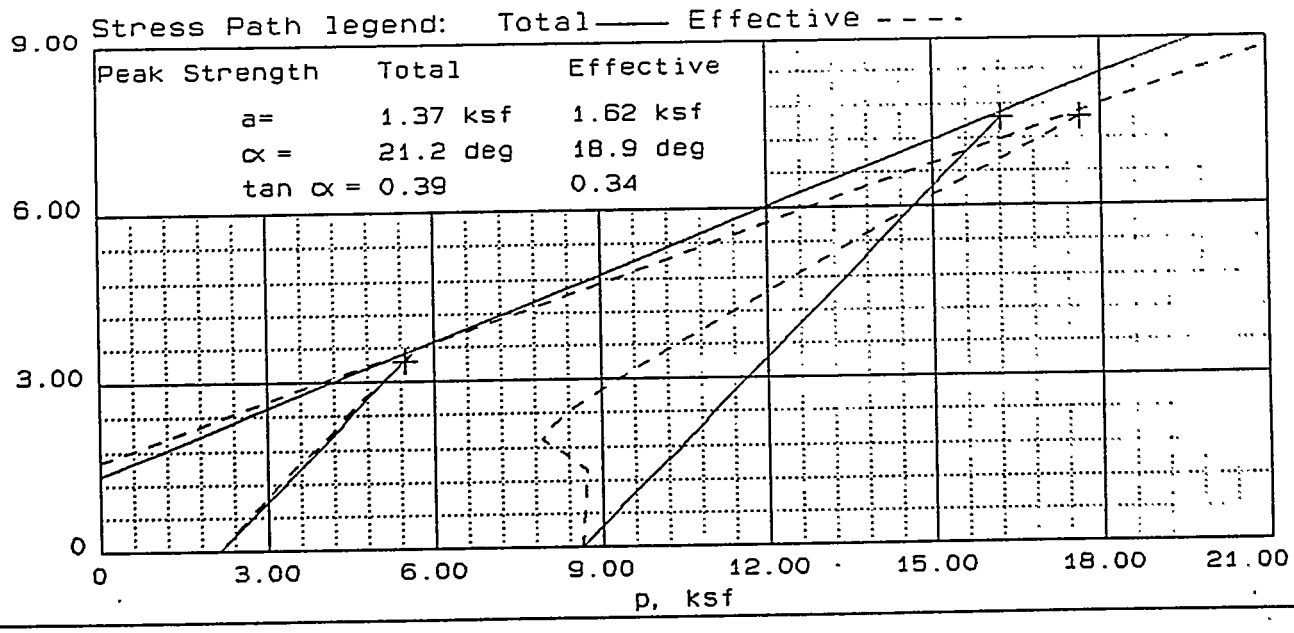
TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

FIG. NO. 7







Client: SRS
Project: SRS-ITP
Location: H-Bor 23.1 ST-3 @ 17'-19'
File: SRS-ITP6 Project No.: 5810535301 Page 2/2 Fig. No. 7

TRIAXIAL COMPRESSION TEST
CU with pore pressures

2-24-1994
6:03 pm

Project Data

Project No.: 5810535301 Date: 10/8/93 Data file: SRS-ITP6
Client: SRS
Project: SRS-ITP
Sample location: H-Bor 23.1 ST-3 @ 17'-19'
Sample description:
Remarks: Tested by: HES
Reviewed by: RLB Fig No. 7

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.69 LL= 44 PL= 19 PI= 25

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.87	
Height change, in		0.00	
Height, in	5.99	5.99	
Weight, grams	1320.8		
Water volume change, cc		-20.36	
Moisture, %	17.4	19.2	17.8
Dry density, pcf	110.0	110.6	
Saturation, %	89.0	100.0	
Void ratio	0.527	0.518	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 64.2 psi
Consolidation back pressure = 49.5 psi
Consolidation effective confining stress = 2.1168 ksf
Peak deviator stress = 7.14 ksf at reading no. 7
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Effective Stresses Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	2.12	2.12	1.00	49.5	2.12	0.00
1	0.0300	0.030	92.00	92.0	0.5	2.04	2.03	4.07	2.00	50.1	3.05	1.02
2	0.0600	0.060	132.00	132.0	1.0	2.91	2.02	4.93	2.44	50.2	3.47	1.46
3	0.1000	0.100	174.00	174.0	1.7	3.81	2.03	5.84	2.88	50.1	3.94	1.91
	1800	0.180	243.00	243.0	3.0	5.25	2.03	7.28	3.59	50.1	4.66	2.62
	:700	0.270	294.00	294.0	4.5	6.25	2.09	8.34	3.99	49.7	5.21	3.13

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
	0.4100	0.410	331.00	331.0	6.8	6.87	2.10	8.97	4.27	49.6	5.54	3.43
7	0.5700	0.570	346.00	346.0	9.5	6.97	2.12	9.09	4.29	49.5	5.60	3.49
8	0.8600	0.860	352.00	352.0	14.4	6.71	2.15	8.86	4.13	49.3	5.50	3.36

TRIAXIAL COMPRESSION TEST
CU with pore pressures

12-07-1993
9:35 am

Project Data

Project No.: 5810535301 Date: 10/8/93 Data file: SRS-ITP6
Client: SRS
Project: SRS-ITP
Sample location: H-Bor 23.1 ST-3 @ 17'-19'
Sample description:
Remarks: Tested by: HEJ
Reviewed by: RLB Fig No. 7

Sample No. 2 Data

Type of sample: Undisturbed
Specific Gravity= 2.66 LL= 44 PL= 19 PI= 25

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.88	
Height change, in		0.03	
Height, in	5.99	5.96	
Weight, grams	1328.5		
Water volume change, cc		-9.56	
Moisture, %	18.0	18.9	16.6
Dry density, pcf	110.1	110.6	
Saturation, %	94.1	100.0	
Void ratio	0.509	0.501	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 110.7 psi
Consolidation back pressure = 50.7 psi
Consolidation effective confining stress = 8.64 ksf
Peak deviator stress = 15.40 ksf at reading no. 13
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	8.64	8.64	1.00	50.7	8.64	0.00
1	0.0200	0.020	126.00	126.0	0.3	2.78	7.33	10.11	1.38	59.8	8.72	1.39
2	0.0400	0.040	157.00	157.0	0.7	3.45	6.60	10.05	1.52	64.9	8.32	1.73
3	0.0700	0.070	177.00	177.0	1.2	3.87	6.00	9.88	1.64	69.0	7.94	1.94
	0.1000	0.100	192.00	192.0	1.7	4.18	5.89	10.07	1.71	69.8	7.98	2.09
	1500	0.150	225.00	225.0	2.5	4.85	5.98	10.83	1.81	69.2	8.40	2.43

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Effective Stresses Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
	2300	0.230	282.00	282.0	3.9	6.00	6.32	12.32	1.95	66.8	9.32	3.00
7	0.2800	0.280	321.00	321.0	4.7	6.77	6.58	13.35	2.03	65.0	9.97	3.39
8	0.3600	0.360	387.00	387.0	6.0	8.05	7.07	15.12	2.14	61.6	11.09	4.02
9	0.4700	0.470	477.00	477.0	7.9	9.72	7.73	17.46	2.26	57.0	12.59	4.86
10	0.5400	0.540	534.00	534.0	9.1	10.75	8.15	18.90	2.32	54.1	13.52	5.37
11	0.6300	0.630	609.00	609.0	10.6	12.05	8.67	20.72	2.39	50.5	14.70	6.03
12	0.7700	0.770	717.00	717.0	12.9	13.82	9.45	23.26	2.46	45.1	16.36	6.91
13	0.8900	0.890	804.00	804.0	14.9	15.14	10.05	25.19	2.51	40.9	17.62	7.57

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

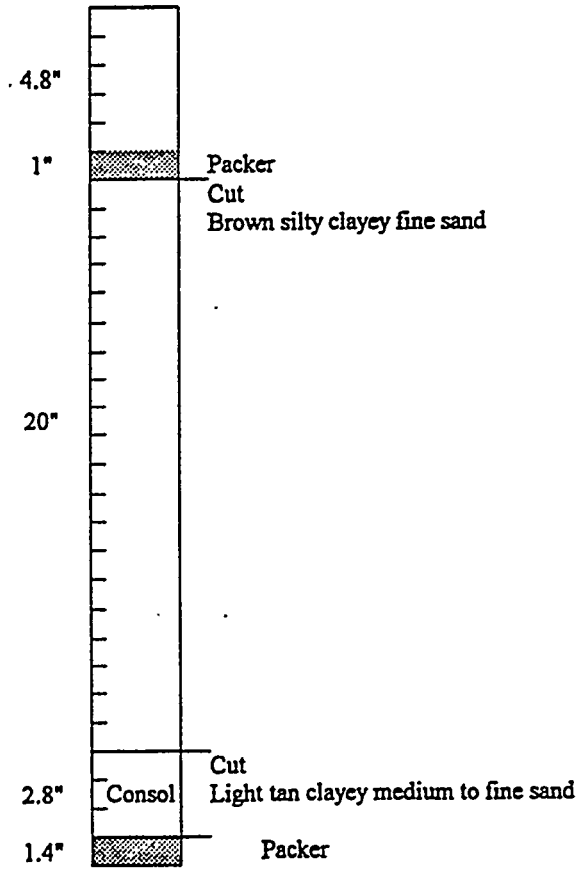
Project: SRS-ITP GEOTECHNICAL TESTING Date: 9/27/93

Boring No: H-Bor-23.1 Sample No: PS-2 Depth: 95'-8"

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: CLG Checked By:

VISUAL DESCRIPTION



Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b231-ps2.wk3

ATTACHMENT 2

Tested by:	CLG	Reviewed by:	RLB	Law Job No.:	5810535301
ate:	09/21/93	Date:	09/21/93	Job Name:	SRS - ITP

TP-4A: UNIT WEIGHT OF THIN WALL TUBE SAMPLES

"TYPICAL"

Sample: Boring No.: H-Bor-23.1
Depth: 95' 8"
Sample ID: PS-2

MEASUREMENTS (Entire Tube):

	FROM TOP OF TUBE		FROM BOTTOM OF TUBE		TOTAL TUBE LENGTH	INSIDE DIAMETER OF TUBE
	PACKER (inches)	SOIL (inches)	PACKER (inches)	SOIL (inches)	(inches)	(inches)
1.	5.64	5.82	0.81	1.38		
2.	5.38	5.85	0.90	1.58		
3.	5.47	5.89	0.84	1.44		
Avg.:	5.50 L_1 =	5.85	0.85 L_2 =	1.47	L_3 = 29.938 *	D_i = 2.868 *

TOTAL WEIGHT OF TUBE + PACKERS + SOIL	M_1 =	6,813.5	gm
WEIGHT OF PACKERS	M_2 =	154.1 *	gm
TOTAL WEIGHT OF TUBE	M_3 =	2,452.6 *	gm
WET WEIGHT OF SOIL COLUMN, [M_1-M_2-M_3]	M_4 =	4,206.8	gm

Denotes information supplied by WSRC/TO

MOISTURE CONTENTS (From assigned tests of same tube):

MOISTURE CONTENT		
Specimen 1:	32.1	% moisture
Specimen 2:	N/A	% moisture
Specimen 3:	N/A	% moisture
Average, (w):	32.1	% moisture

Notations:

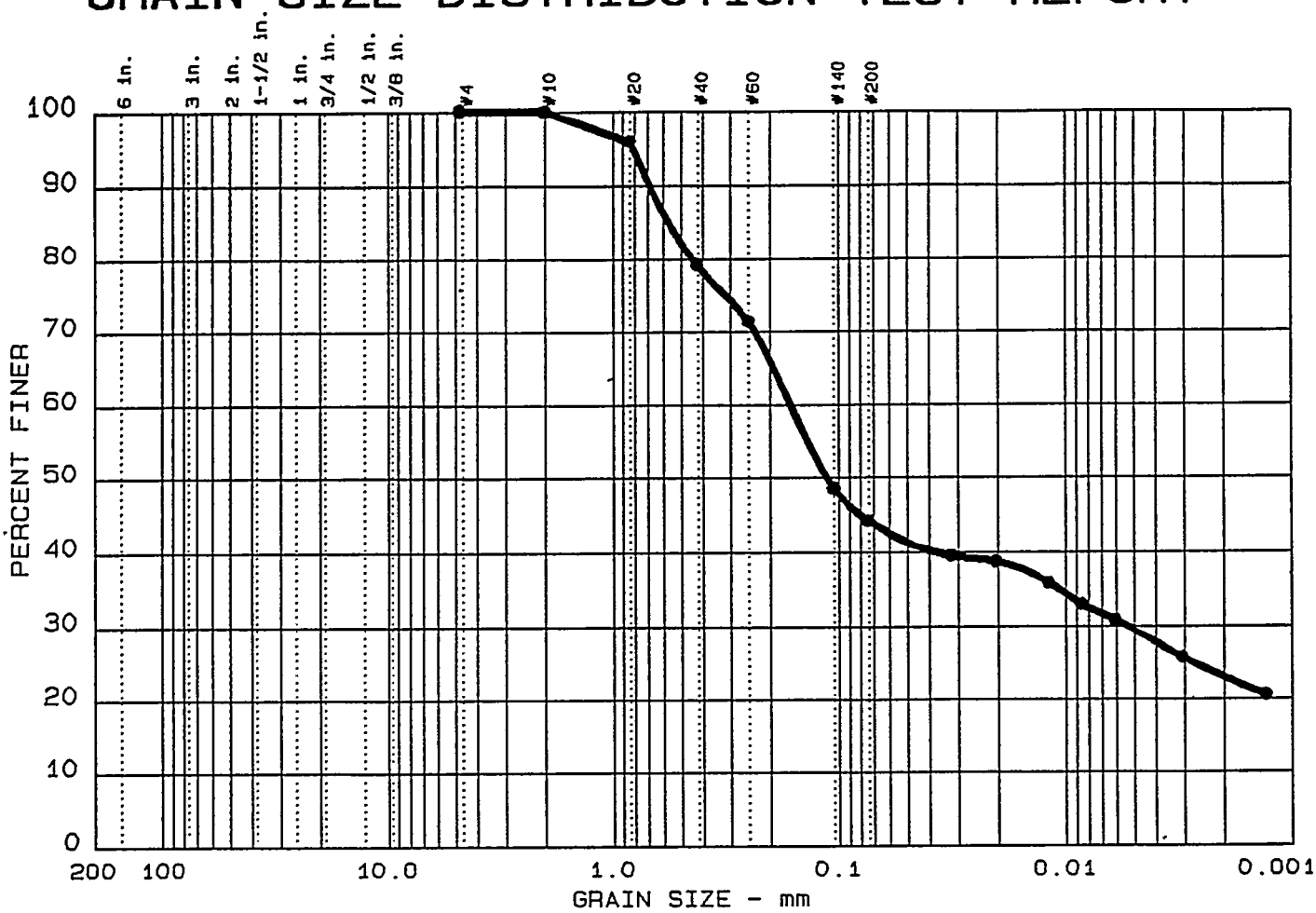
Specimen 1 moisture content obtained from Consolidation test
Specimen 2 moisture content obtained from N/A test
Specimen 3 moisture content obtained from N/A test

CALCULATIONS:

CROSS-SECTIONAL AREA OF TUBE, [pi*(D_i^2)/4]	A_o=	6.46	in.^{2}
LENGTH OF SOIL COLUMN, [L_3 - L_2 - L_1]	L_s =	22.62	in.
VOLUME OF SOIL COLUMN, [L_s*A_o]	V_s =	146.12	in.^{3}
WET DENSITY, [(M_4/V_s)*3.810]	**D_w=**	**109.7**	**pcf**
DRY DENSITY, [D_w/(1+w/100)]	**D_D=**	**83.0**	**pcf**

h:\users\lab\rlb\itp\b231-ps2.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	5	0.0	0.0	55.9	14.6	29.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	80	62	0.56	0.16	0.11	0.005				

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Silty Clayey Medium to Fine Sand	SC	A-7-6 (18.7)

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-23.1 PS-2 @ 95'6"-97'5"

Date: September 30, 1993

Remarks:

Tested by: JRR

Reviewed by: RLB

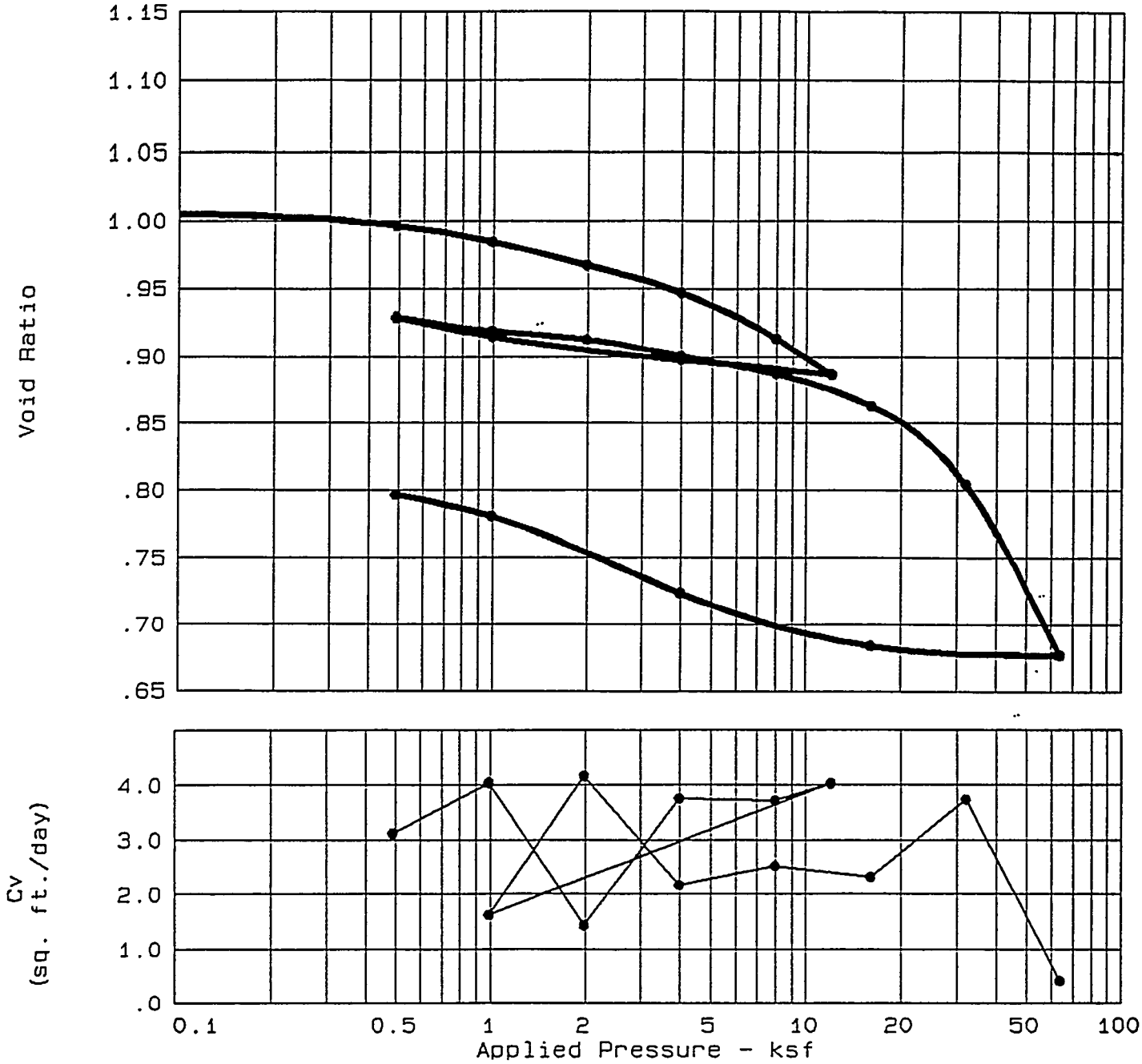
Consol

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

CONSOLIDATION TEST REPORT



Natural Saturation	Natural Moisture	Dry Density	LL	PI	Sp.Gr.	Initial void ratio
86.6 %	32.1	84.4	80	62	2.710	1.0047

TEST RESULTS	MATERIAL DESCRIPTION
	Tan Silty Clayey Medium to Fine Sand Class: SC
Project No.: 5810535301 Project: SRS ITP Location: H-Bor-23.1 PS-2 95'6"-97'5" Date: Sept. 24, 1993	Remarks: Tested by: CLG Reviewed by: RLB
CONSOLIDATION TEST REPORT LAW ENGINEERING, INC.	Fig. No._____

11:22, 3-01-1994 CONSOLIDATION TEST PROJECT DATA Test No. 16

roject Number: 5810535301
Project: SRS ITP
Date: Sept. 24,1993
Location 1: H-Bor-23.1 PS-2 95'6"-97'5"
2:
Remarks 1: Tested by:
2: Reviewed by:
3:
4:
5:
Material 1: Tan Silty Clayey Medium
description 2: to Fine Sand
Classification: SC
Liquid limit: 80
Plasticity index: 62
Figure Number:

CONSOLIDATION TEST SPECIMEN DATA

TOTAL SAMPLE	BEFORE TEST	AFTER TEST
Wet w+t = 332.86 g.	Oedometer No. = 7	Wet w+t = 330.72 g.
Dry w+t = 305.19 g	Machine No. = 7	Dry w+t = 305.19 g.
Tare wt. = 219.02 g.	Spec. Gravity = 2.710	Tare wt. = 219.02 g.
H ight = 0.8900 in.	Height = 0.8900 in.	
D meter = 2.3590 in.	Diameter = 2.3590 in.	
Weight = 113.84 g.		
Moisture = 32.1 %	Ht. Solids = 0.4440 in.	Moisture = 29.6 %
Wet Den. = 111.5 pcf	Dry wt. = 86.17 g.	Dry wt. = 86.17 g. *
Dry Den. = 84.4 pcf	Void ratio = 1.0047	Void ratio = 0.7965
	Saturation = 86.6 %	Saturation = 100.8 %

* Final dry weight used in calculations

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
Initial	0.02000			1.0047	
0.49	0.02480	0.0002	0.02460	0.9961*	0.4 Comprs.*
0.99	0.03080	0.0004	0.03040	0.9841*	1.0 Comprs.*
1.99	0.03990	0.0006	0.03930	0.9665*	1.9 Comprs.*
3.99	0.04970	0.0012	0.04850	0.9465*	2.9 Comprs.*
8.00	0.06680	0.0022	0.06460	0.9129*	4.6 Comprs.*
12.00	0.08060	0.0028	0.07780	0.8861*	5.9 Comprs.*
3.99	0.07400	0.0012	0.07280	0.8973	5.4 Comprs.
0.99	0.06570	0.0004	0.06530	0.9142	4.5 Comprs.
0.49	0.05920	0.0002	0.05900	0.9284	3.8 Comprs.
0.99	0.05900	0.0004	0.05860	0.9185*	4.3 Comprs.*
1.99	0.06290	0.0006	0.06230	0.9121*	4.6 Comprs.*
3.99	0.06870	0.0012	0.06750	0.9003*	5.2 Comprs.*
8.00	0.07620	0.0022	0.07400	0.8864*	5.9 Comprs.*

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
16.02	0.09040	0.0034	0.08700	0.8628*	7.1 Comprs.*
32.08	0.13030	0.0058	0.12450	0.8040*	10.0 Comprs.*
63.78	0.19900	0.0101	0.18890	0.6766*	16.4 Comprs.*
16.02	0.18930	0.0034	0.18590	0.6834	16.0 Comprs.
3.99	0.16920	0.0012	0.16800	0.7237	14.0 Comprs.
0.99	0.14335	0.0004	0.14295	0.7801	11.2 Comprs.
0.49	0.13590	0.0002	0.13570	0.7965	10.4 Comprs.

* CALCULATED USING D100 INSTEAD OF FINAL READING

CONSOLIDATION TEST RESULTS

Compression index = NOT SELECTED
Preconsolidation pressure = NOT SELECTED

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

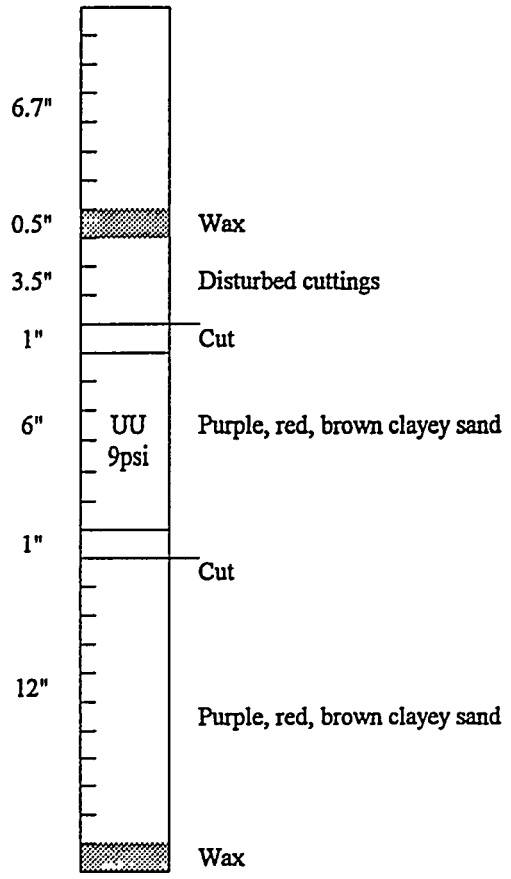
Project: SRS-ITP GEOTECHNICAL TESTING Date: 08-24-93

Boring No: H-Bor-29 Sample No: ST-1 Depth: 10' - 12'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: CLG Checked By: RLB

VISUAL DESCRIPTION

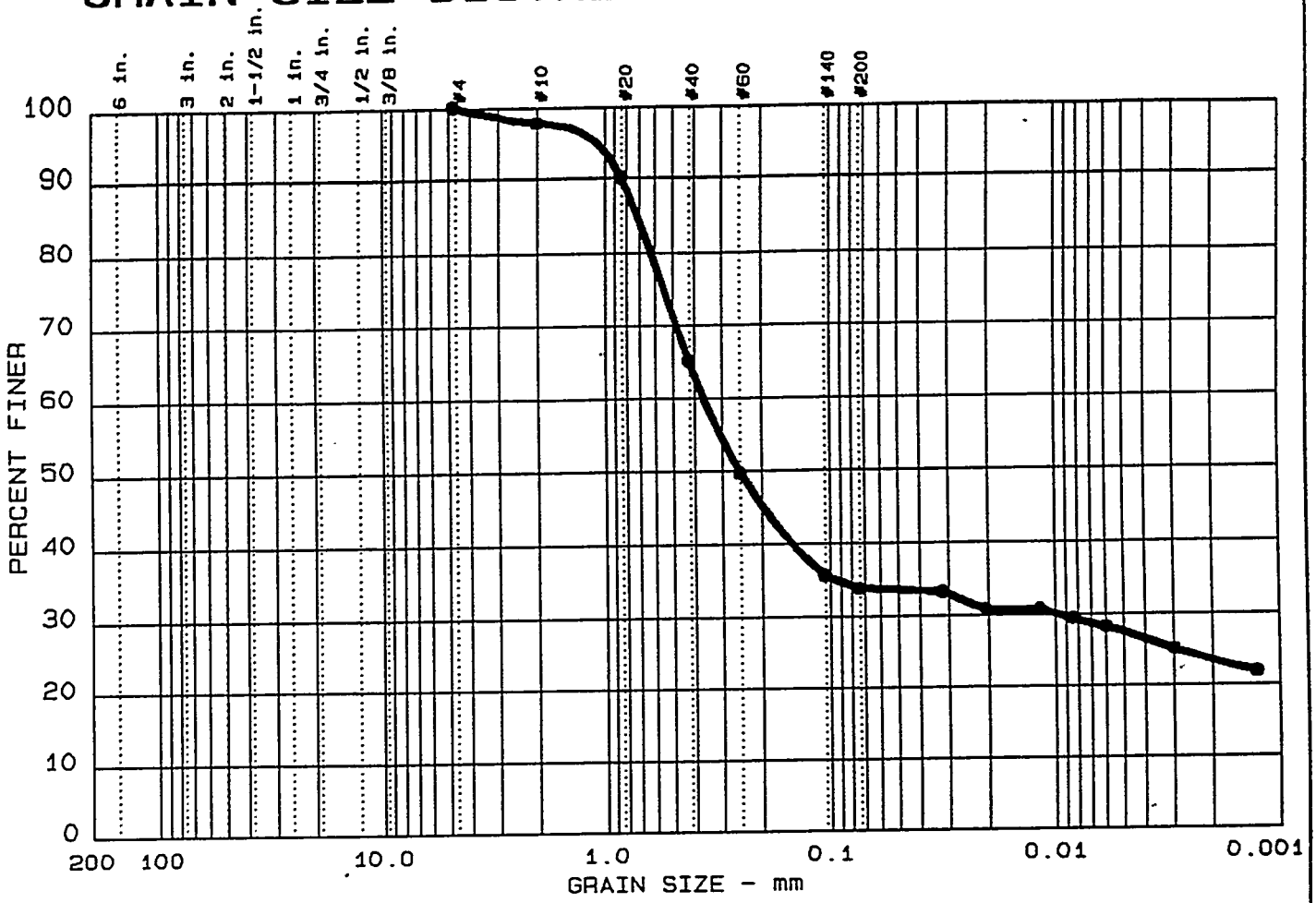


Remarks:

1028mf srs-itp-aaif
7/22/93

rlb\itp\tubelog\b29-st1.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	10	0.0	0.0	66.3	6.3	27.4

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	100	67	0.71	0.36	0.25	0.010				

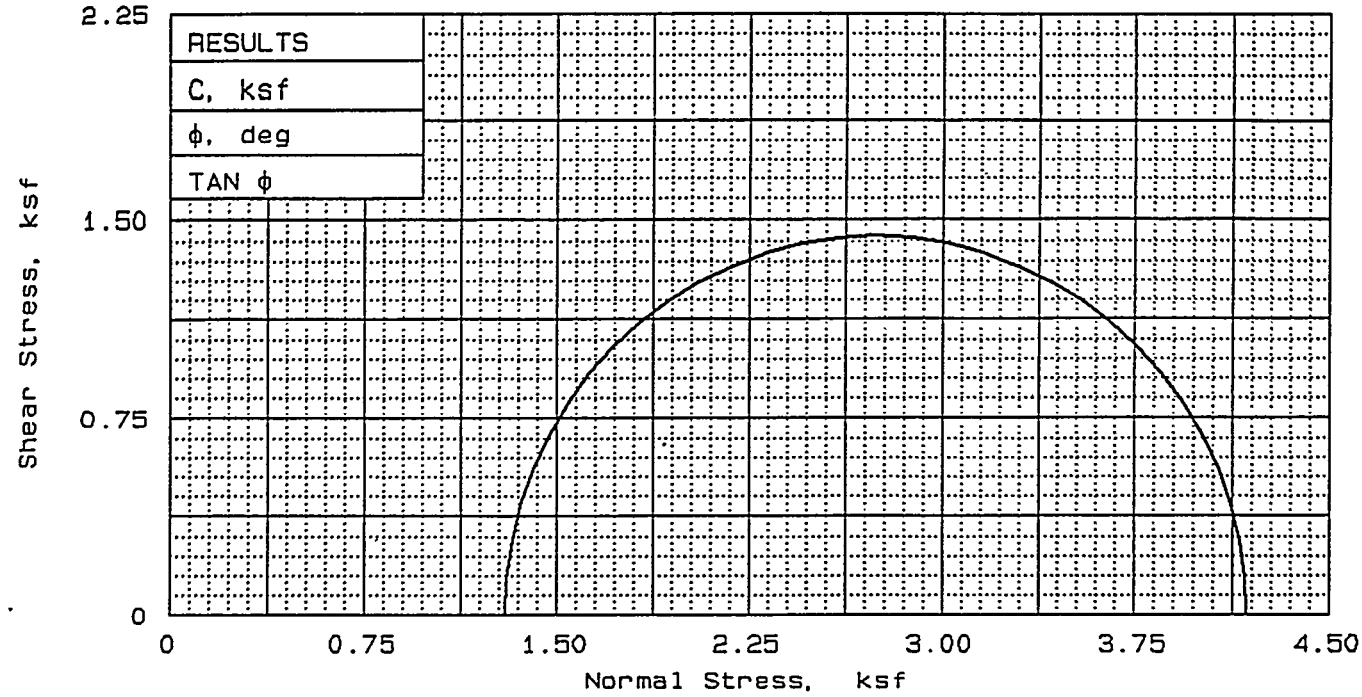
MATERIAL DESCRIPTION	USCS	AASHTO
● Grey Brown Silty Clayey Medium to Fine Sand	SC	A-2-7 (10.8)

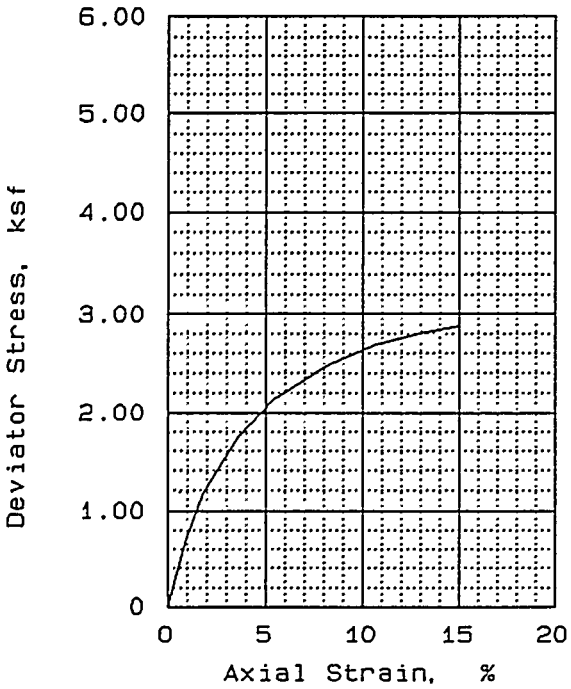
Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-29 ST-1 @ 10-12 Ft.

Date: September 23, 1993

Remarks:
Tested by: JRR
Reviewed by: RLB
UU @ 9 PSI

GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.





SAMPLE NO.		1
INITIAL	WATER CONTENT, %	23.2
	DRY DENSITY, pcf	100.0
	SATURATION, %	93.4
	VOID RATIO	0.661
	DIAMETER, in	2.87
	HEIGHT, in	5.61
AT TEST	WATER CONTENT, %	23.2
	DRY DENSITY, pcf	100.0
	SATURATION, %	93.4
	VOID RATIO	0.661
	DIAMETER, in	2.87
	HEIGHT, in	5.61
BACK PRESSURE, ksf		0.00
CELL PRESSURE, ksf		1.30
FAILURE STRESS, ksf		2.88
PORE PRESSURE, ksf		
STRAIN RATE, %/min.		1.000
ULTIMATE STRESS, ksf		
PORE PRESSURE, ksf		
σ_1 FAILURE, ksf		4.18
σ_3 FAILURE, ksf		1.3

TYPE OF TEST:
Unconsolidated undrained
SAMPLE TYPE: Undisturbed
DESCRIPTION: Gray Brown Silty Clayey Medium to Fine Sand
LL= 100 PL= 33 PI= 67.0
SPECIFIC GRAVITY= 2.66
REMARKS: Tested by: CLG

Reviewed by: RLB

FIG. NO.

CLIENT: SRS

PROJECT: SRS-ITP

SAMPLE LOCATION: H-Bor-29 ST-1 @ 10-12 Ft.

PROJ. NO.: 5810535301 DATE: 10/8/93

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

TRIAXIAL COMPRESSION TEST 2-24-1994
Unconsolidated undrained 6:08 pm

Project Data

Project No.: 5810535301 Date: 10/8/93 Data file: SRS-ITP8
Client: SRS
Project: SRS-ITP
Sample location: H-Bor-29 ST-1 @ 10-12 Ft.
Sample description: Gray Brown Silty Clayey Medium to Fine Sand
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.66 LL= 100 PL= 33 PI= 67

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.87	2.87	
Height change, in		0.00	
Height, in	5.61	5.61	
Weight, grams	1172.1		
Moisture, %	23.2	23.2	23.2
Dry density, pcf	100.0	100.0	
Saturation, %	93.4	93.4	
Void ratio	0.661	0.661	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 1.000 % per minute
Cell pressure = 9 psi
Back pressure = 0 psi
Effective confining stress = 1.296 ksf
Peak deviator stress = 2.88 ksf at reading no. 8
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	1.30	1.30	1.00	1.30	0.00
1	0.0500	0.050	32.00	32.0	0.9	0.71	1.30	2.00	1.55	1.65	0.35
2	0.1000	0.100	54.00	54.0	1.8	1.18	1.30	2.48	1.91	1.89	0.59
3	0.2000	0.200	81.00	81.0	3.6	1.74	1.30	3.04	2.34	2.17	0.87
4	0.3000	0.300	101.50	101.5	5.3	2.14	1.30	3.44	2.65	2.37	1.07
	4500	0.450	120.50	120.5	8.0	2.47	1.30	3.77	2.91	2.53	1.24
	5000	0.600	135.00	135.0	10.7	2.69	1.30	3.98	3.07	2.64	1.34

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	0.7200	0.720	144.00	144.0	12.8	2.80	1.30	4.09	3.16	2.69	1.40
8	0.8400	0.840	152.00	152.0	15.0	2.88	1.30	4.18	3.22	2.74	1.44

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

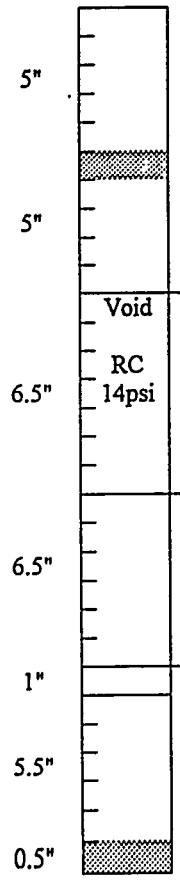
Project: SRS-ITP GEOTECHNICAL TESTING Date: 11-29-93

Boring No: H-Bor-29 Sample No: ST-2 Depth: 15' - 17'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION



Wax

Brown purple sandy clayey silt

Cut

Brown purple sandy clayey silt

Cut

Brown purple sandy clayey silt

rock fragment in side of extruded specimen

Cut

Specimen broke/seperated from possible compaction layer interface upon extrusion

Brown sandy clayey silt

Rock hole in side of extruded specimen

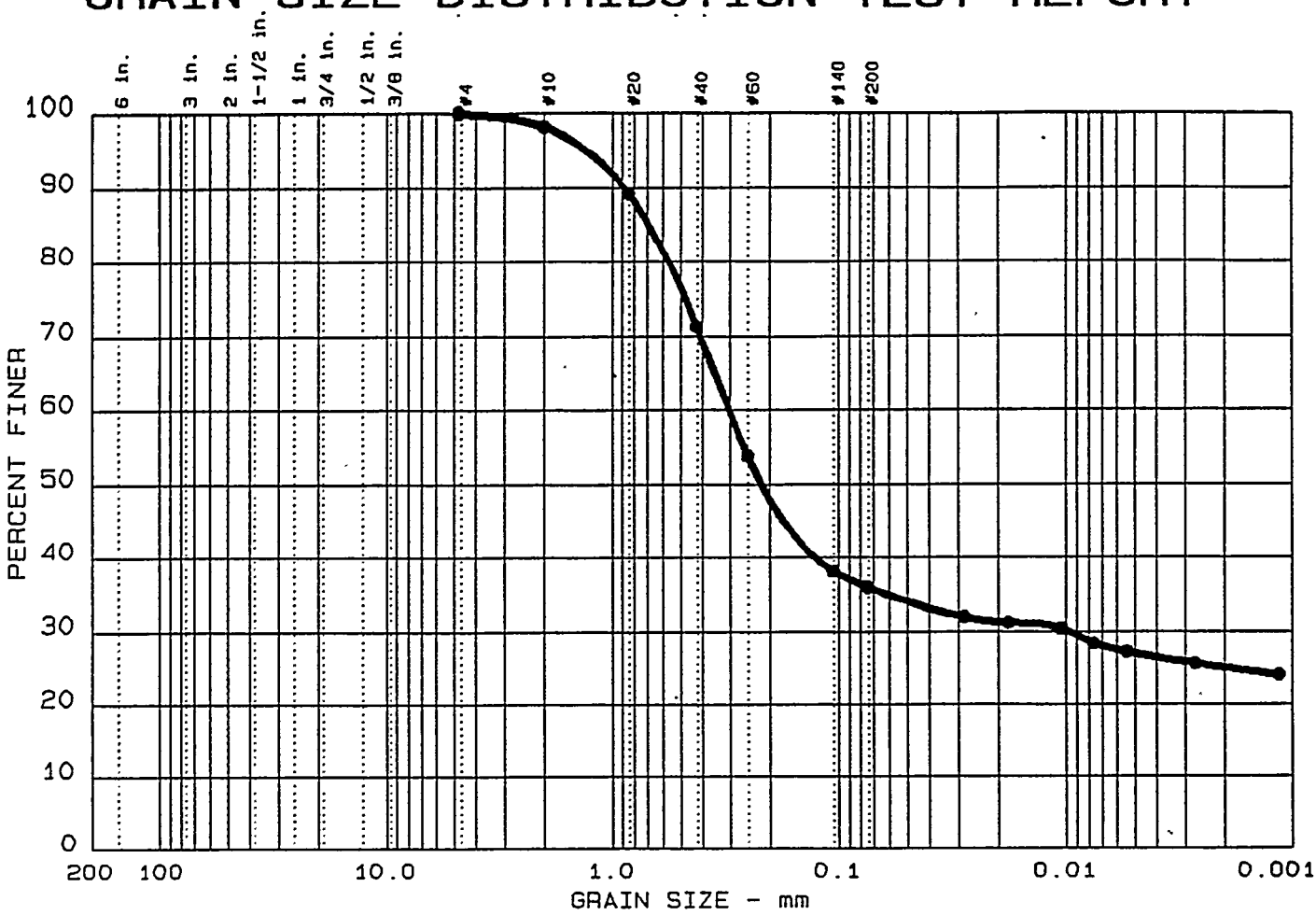
Wax

Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b29-st2.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	16	0.0	0.2	64.0	8.8	27.0

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	60	36	0.68	0.30	0.22	0.010				

MATERIAL DESCRIPTION	USCS	AASHTO
● Purple Brown Clayey Sand	SC	A-7-6 (5.8)

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-29 ST-2 @ 15-17 Ft.

Date: January 3, 1994

Remarks:

Tested by: JTK

Reviewed by: RLB

RC-14 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-29
Test Date:	12/02/93-12/09/93	Sample No.:	ST-2
Reviewed By:	JW/RLB RLB	Depth:	15 - 17 ft
Reviewed Date:	12/27/93	Sample Description:	See classification data

Initial Specimen Data

Labels	Values	Units	Description
			Masses
M_{scb}	1269.98	g	*Mass of soil and container before*
M_{sca}	0.00	g	*Mass of soil and container after*
M_s	1269.98	g	*$M_{scb} - M_{sca}$ = mass of soil*
			Diameters
D_t	73.41	mm	*Diameter near top of specimen*
D_m	73.33	mm	*Diameter near middle of specimen*
D_b	73.36	mm	*Diameter near bottom of specimen*
T_{mem}	0.30	mm	*Single thickness of membrane*
D_{net}	72.76	mm	*$(D_t + D_m + D_b)/3 - 2*T_{mem}$*
			Lengths
L_{cbp}	199.22	mm	*Length between chamber bottom & top of top platen*
L_{tp}	23.95	mm	*Length of top platen*
L_{bp}	24.00	mm	*Length of bottom platen*
L_{net}	151.27	mm	*Length of Specimen $= L_{cbp} - L_{tp} - L_{bp}$*
			Volume
V	628917	mm³	*$D^2_{net}*Pi*L_{net}/4$*

Labels	Values	Units	Description
			Mass Density and Unit Weight
Rho	2019.3	kg/m³	*Mass density of specimen $= M_s/V*10^6$*
U_{wt}	19.80	kN/m³	*Unit weight of specimen = Rho*9.806/1000*
			Moisture Content, mc
No.	L-20		*Container number*
M_{wscb}	1361.18	g	*Mass of wet soil + container*
M_{wsca}	1154.75	g	*Mass of dry soil + container*
M_{wat}	206.43	g	*Mass of water $= M_{wscb} - M_{wsca}$*
M_{cont}	91.20	g	*Mass of container.*
mc	19.4	%	*$M_{wat}/(M_{wsca} - M_{cont})*100\%$*
Rho_d	1691.1	kg/m³	*Dry mass density = Rho/(1+mc)*
G_s	2.66		*Specific gravity*
e	0.573		*Void Ratio, $[1000*G_s]/Rho_d-1$*
S_r	90.1	%	*Degree of Saturation $= mc*G_s/e$*
J	0.000840	kg-m²	*Polar mass moment of inertia $= (M_s/1000)*(D_{net}/1000)^2/8$*

Conditions After Saturation			
CL_s	0.53	mm	*Change in length*
L_s	150.7	mm	*Length after saturation, $L - CL_s$*
A_s	4157.6	mm²	*Area of specimen*
V_s	626701	mm³	*Volume after saturation, $A_s * L_s$*
B	0.96		*B Value*

Conditions After Consolidation			
CL_c	0.00	mm	*Change in length*
L_c	150.7	mm	*Length after consolidation, $L_s - CL_c$*
CV_c	0	mm³	*Change in volume*
V_c	626701	mm³	*Volume, $V_s - CV_c$*
S_r	100.0	%	*Degree of Saturation $= mc*G_s/e$*
e	0.567		*Void Ratio, $[1000*G_s]/Rho_d-1$*
mc	21.5	%	*Moisture Content*
Rho_d	1697	kg/m³	*Dry mass density, Rho_d*V/V_c*

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

INPUT DATA

Project No.: 5810535301
Tested By: HEJ/JW
Test Date: 12/02/93-12/09/93
Reviewed By: JW/RLB RLB
Reviewed Date: 12/27/93

Project Name: SRS-ITP
Boring No: H-Bor-29
Sample No.: ST-2
Depth: 15 - 17 ft
Sample Description: See classification data

Line No.	Elapsed Time [min]	Cell Pressure [unit]	Pore Pressure [unit]	Axial Load [unit]	Burette Reading [unit]	Length Reading [unit]	Longitudinal or Torsional	Force or Torque Reading [V_{rms}]	Transducer Reading [V_{rms}]	Resonant Period [msec]
1	1.0	66.0	51.3	0	10.3	-1.1210	T	0.017	0.011	6.569
2	1.3	66.0	51.3	0	10.3	-1.1210	T	0.030	0.018	6.540
3	1.9	66.0	51.3	0	10.3	-1.1210	T	0.078	0.046	6.541
4	2.6	66.0	51.3	0	10.3	-1.1210	T	0.147	0.089	6.537
5	3.1	66.0	51.3	0	10.3	-1.1210	T	0.372	0.221	6.560
6	3.8	66.0	51.3	0	10.3	-1.1210	T	0.769	0.435	6.648
7	4.4	66.0	51.2	0	10.3	-1.1210	T	1.422	0.760	6.723
8	5.5	66.0	51.2	0	10.3	-1.1210	T	3.170	1.480	7.301
9	5.9	66.0	51.3	0	10.3	-1.1190	T	3.720	1.640	7.469

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

INPUT DATA

Project No.: 5810535301
Tested By: HEJ/JW
Test Date: 12/02/93-12/09/93
Reviewed By: JW/RLB RLB
Reviewed Date: 12/27/93

Project Name: SRS-ITP
Boring No: H-Bor-29
Sample No.: ST-2
Depth: 15 - 17 ft
Sample Description: See classification data

Line No.	Elapsed Time [min]	Cell Pressure [unit]	Pore Pressure [unit]	Axial Load [unit]	Burette Reading [unit]	Length Reading [unit]	Longitudinal or Torsional	Force or Torque Reading [V_{rms}]	Transducer Reading [V_{rms}]	Resonant Period [msec]
1	1.0	66.0	51.3	0	10.3	-1.1210	T	0.017	0.011	6.569
2	1.3	66.0	51.3	0	10.3	-1.1210	T	0.030	0.018	6.540
3	1.9	66.0	51.3	0	10.3	-1.1210	T	0.078	0.046	6.541
4	2.6	66.0	51.3	0	10.3	-1.1210	T	0.147	0.089	6.537
5	3.1	66.0	51.3	0	10.3	-1.1210	T	0.372	0.221	6.560
6	3.8	66.0	51.3	0	10.3	-1.1210	T	0.769	0.435	6.648
7	4.4	66.0	51.2	0	10.3	-1.1210	T	1.422	0.760	6.723
8	5.5	66.0	51.2	0	10.3	-1.1210	T	3.170	1.480	7.301
9	5.9	66.0	51.3	0	10.3	-1.1190	T	3.720	1.640	7.469

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

INTERMEDIATE DATA

Project No.: 5810535301
Tested By: HEJ/JW
Test Date: 12/02/93-12/09/93
Reviewed By: JW/RLB RLB
Reviewed Date: 12/27/93

Project Name: SRS-ITP
Boring No: H-Bor-29
Sample No.: ST-2
Depth: 15 - 17 ft
Sample Description: See classification data

Specimen Volume [mm³]	Specimen Length [mm]	Specimen Diameter [mm]	Specimen Mass [grams]	Mass Density [kg/m³]	Polar Inertia J [kg-m²]	Inertia Stiffness Ratio T	Apparatus Damping Factor ADF	Dimensionless Frequency F	Damping Factor A
626701	150.74	72.76	1292.64	2062.6	0.000855	3.7763	0.00446	0.493	8.25
626701	150.74	72.76	1292.64	2062.6	0.000855	3.7763	0.00444	0.493	8.25
626701	150.74	72.76	1292.64	2062.6	0.000855	3.7763	0.00444	0.493	8.25
626701	150.74	72.76	1292.64	2062.6	0.000855	3.7763	0.00443	0.493	8.25
626701	150.74	72.76	1292.64	2062.6	0.000855	3.7763	0.00445	0.493	8.25
626701	150.74	72.76	1292.64	2062.6	0.000855	3.7763	0.00451	0.493	8.25
626701	150.74	72.76	1292.64	2062.6	0.000855	3.7763	0.00456	0.493	8.25
626701	150.74	72.76	1292.64	2062.6	0.000855	3.7763	0.00495	0.493	8.25
626701	150.74	72.76	1292.64	2062.6	0.000855	3.7763	0.00507	0.493	8.25

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

TEST RESULTS SUMMARY

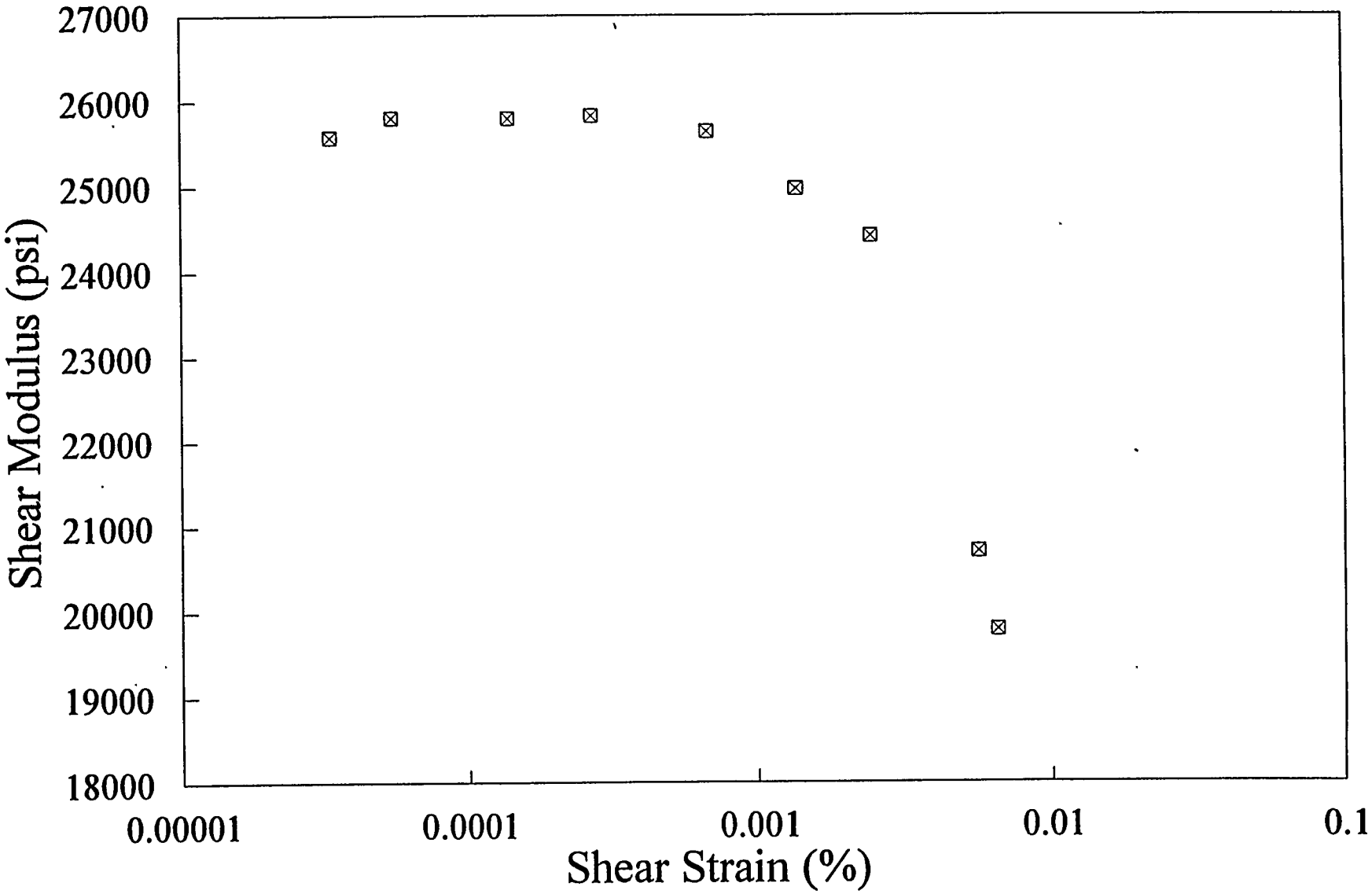
Project No.: 5810535301
Tested By: HEJ/JW
Test Date: 12/02/93-12/09/93
Reviewed By: JW/RLB RLB
Reviewed Date: 12/27/93

Project Name: SRS-ITP
Boring No: H-Bor-29
Sample No.: ST-2
Depth: 15 - 17 ft
Sample Description: See classification data

Line No.	Effective Confining Stress [kPa]	Principal Stress Ratio	Void Ratio e	Longitudinal or Torsional	No. of Vibration Cycles	Shear Modulus G [Mpa]	Shear Strain Amplititude [%]	Damping Ratio [%]	Shear Modulus G [psi]
1	101.15	1.00	0.567	T	9134	176.22	0.00003	7.33	25576
2	101.20	1.00	0.567	T	2752	177.79	0.00005	7.91	25803
3	101.28	1.00	0.567	T	5045	177.73	0.00014	8.05	25796
4	101.28	1.00	0.567	T	6517	177.95	0.00027	7.84	25827
5	101.42	1.00	0.567	T	5305	176.70	0.00068	7.99	25646
6	101.56	1.00	0.567	T	6318	172.06	0.00137	8.40	24972
7	101.70	1.00	0.567	T	5176	168.24	0.00244	8.89	24418
8	101.83	1.00	0.567	T	8711	142.65	0.00561	10.18	20705
9	101.42	1.00	0.567	T	3374	136.31	0.00651	10.78	19784

Shear Modulus vs. Shear Strain

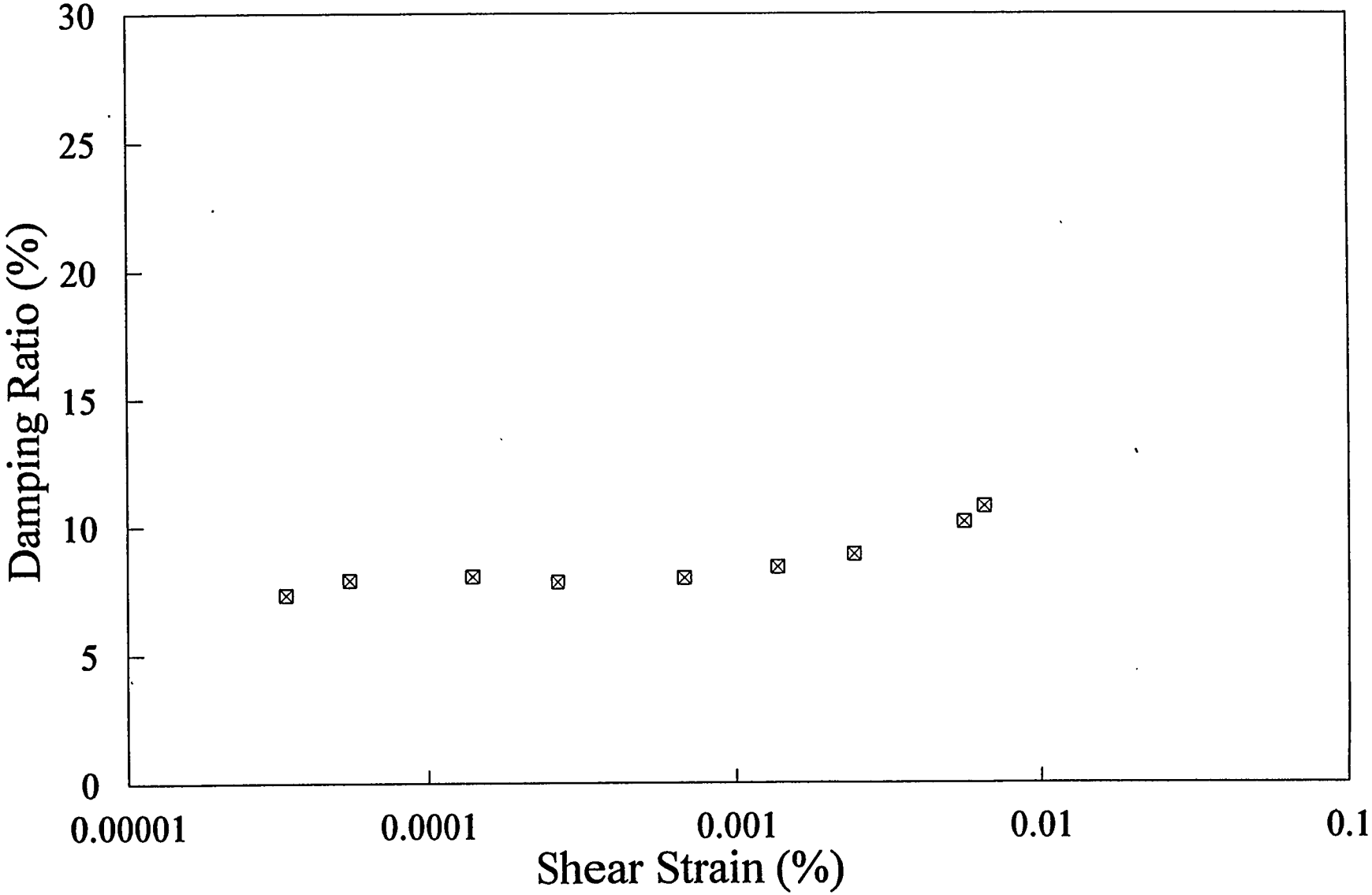
H-BOR-29, ST-2



Law Engineering Project No.: 5810535301
SRS-ITP: Resonant Column

Damping Ratio vs. Shear Strain

H-BOR-29, ST-2



Law Engineering Project No.: 5810535301
SRS-ITP: Resonant Column

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

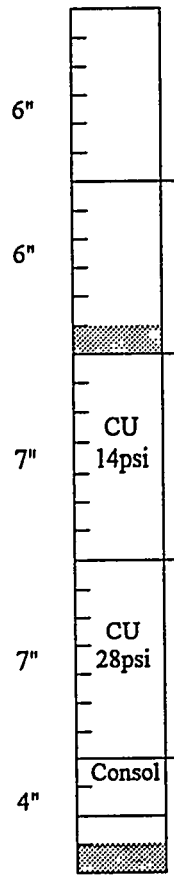
Project: SRS-ITP GEOTECHNICAL TESTING Date: 08-11-93

Boring No: H-Bor-29 Sample No: ST-3 Depth: 20' - 22'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION

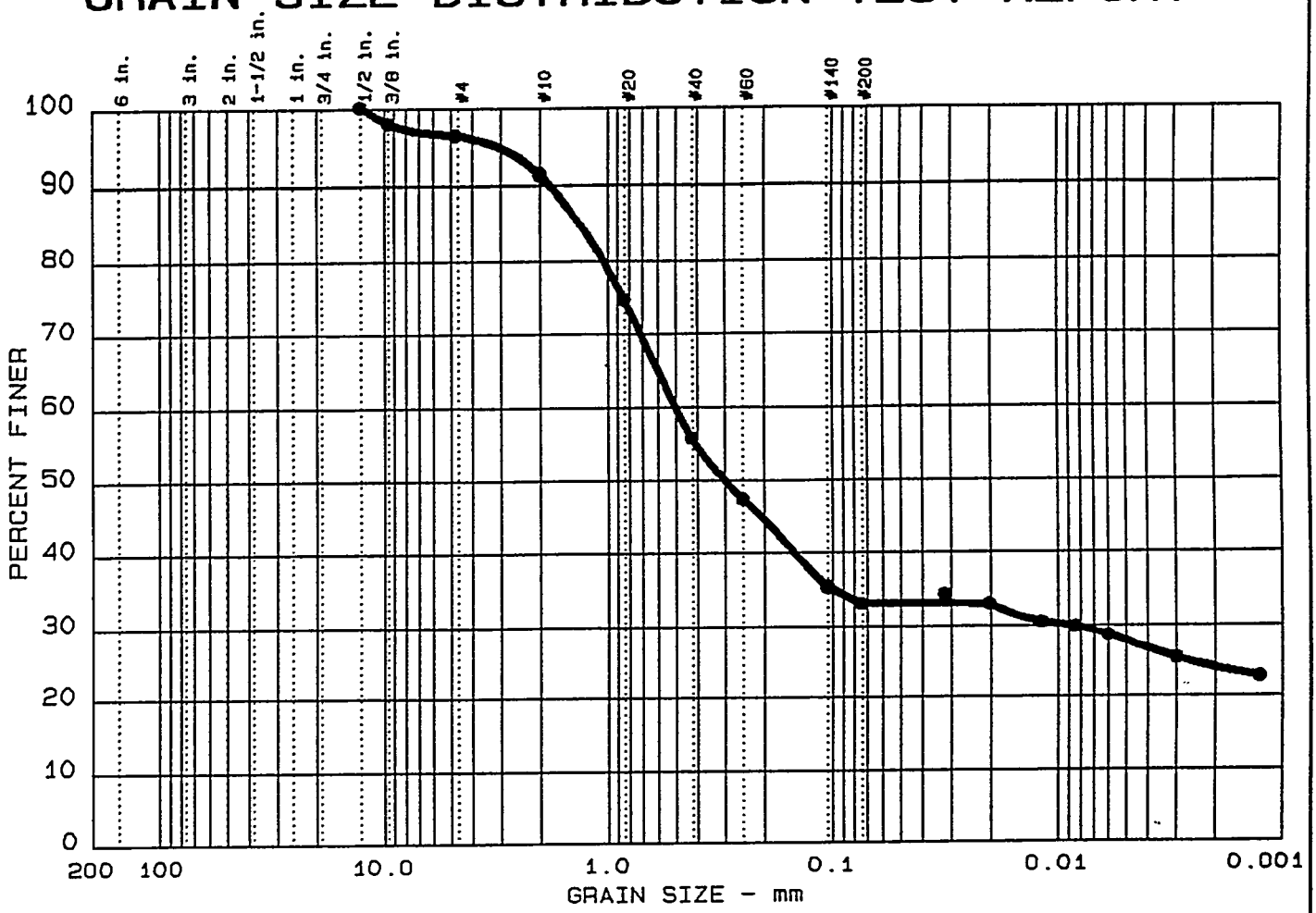


Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b29-st3.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	B	0.0	3.8	63.2	5.4	27.6

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	73	42	1.30	0.50	0.30	0.009				

MATERIAL DESCRIPTION	USCS	AASHTO
● Red Brown Silty Clayey Coarse to Fine Sand	SC	A-2-7 (5.8)

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-29 ST-3 @ 20-22 Ft.

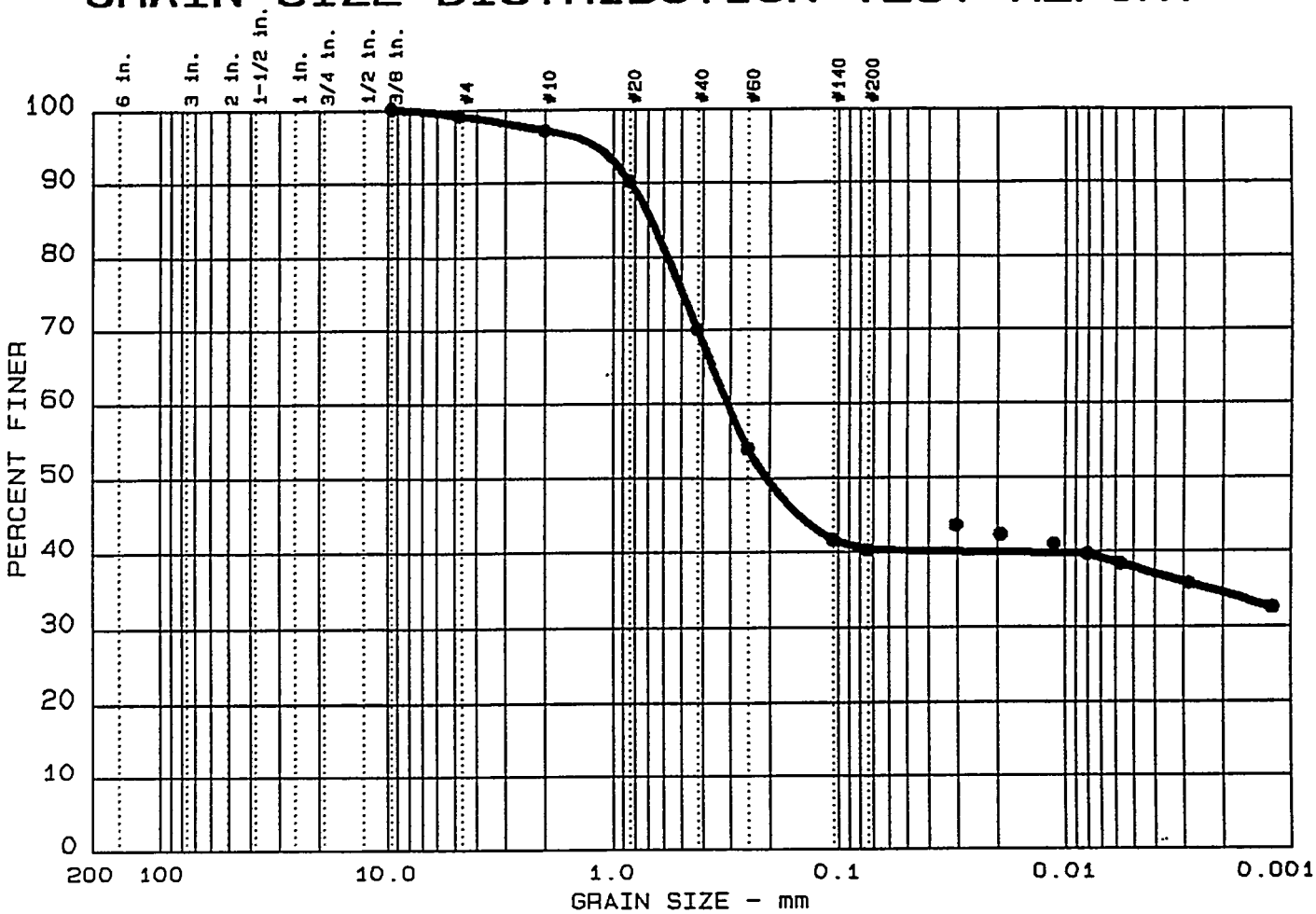
Date: September 23, 1993

Remarks:
Tested by: JRR
Reviewed by: KLB
CU @ 14.7 PSI

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	13	0.0	0.9	59.0	2.4	37.7

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.67	0.31	0.21					

MATERIAL DESCRIPTION	USCS	AASHTO
● Red Brown Clayey Medium to Fine Sand		

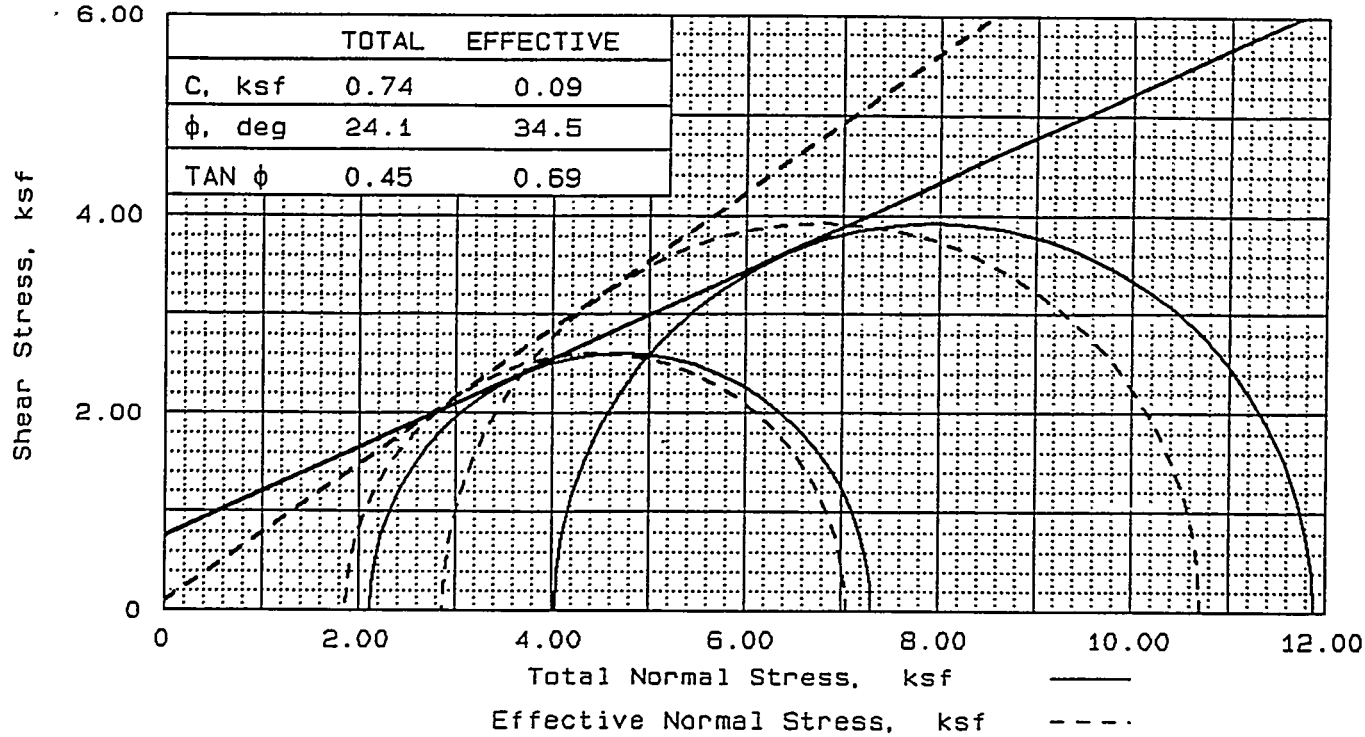
Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-29 ST-3 @ 20-22 Ft.

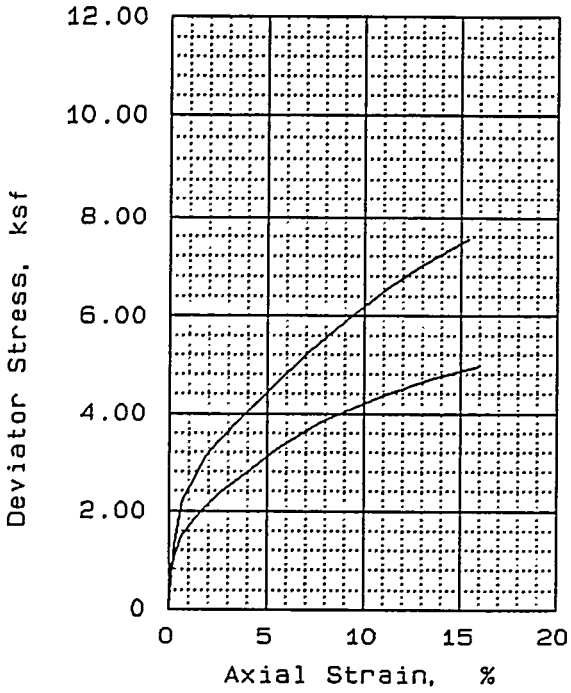
Date: September 23, 1993

Remarks:
Tested by: JRR
Chkd by: RLB CU @ 28 PSI
Atterberg Limits -200
LL=144 PL=44 PI=100

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.





SAMPLE NO.		1	2
INITIAL	WATER CONTENT, %	19.1	20.8
	DRY DENSITY, pcf	103.0	102.2
	SATURATION, %	82.6	88.3
	VOID RATIO	0.618	0.630
	DIAMETER, in	2.88	2.87
	HEIGHT, in	5.53	5.93
AT TEST	WATER CONTENT, %	23.2	23.2
	DRY DENSITY, pcf	103.0	102.9
	SATURATION, %	100.0	100.0
	VOID RATIO	0.618	0.621
	DIAMETER, in	2.88	2.87
	HEIGHT, in	5.53	5.91
BACK PRESSURE, ksf		3.01	2.30
CELL PRESSURE, ksf		5.13	6.34
FAILURE STRESS, ksf		5.20	7.84
PORE PRESSURE, ksf		3.27	3.47
STRAIN RATE, %/min.		0.100	0.100
ULTIMATE STRESS, ksf			
PORE PRESSURE, ksf			
$\bar{\sigma}_1$ FAILURE, ksf		7.06	10.70
$\bar{\sigma}_3$ FAILURE, ksf		1.86	2.87

TYPE OF TEST:
CU with pore pressures
SAMPLE TYPE: Undisturbed
DESCRIPTION: See Grain Size

REMARKS: Tested by: HEJ

Reviewed by: RLB

FIG. NO. 8

CLIENT: SRS

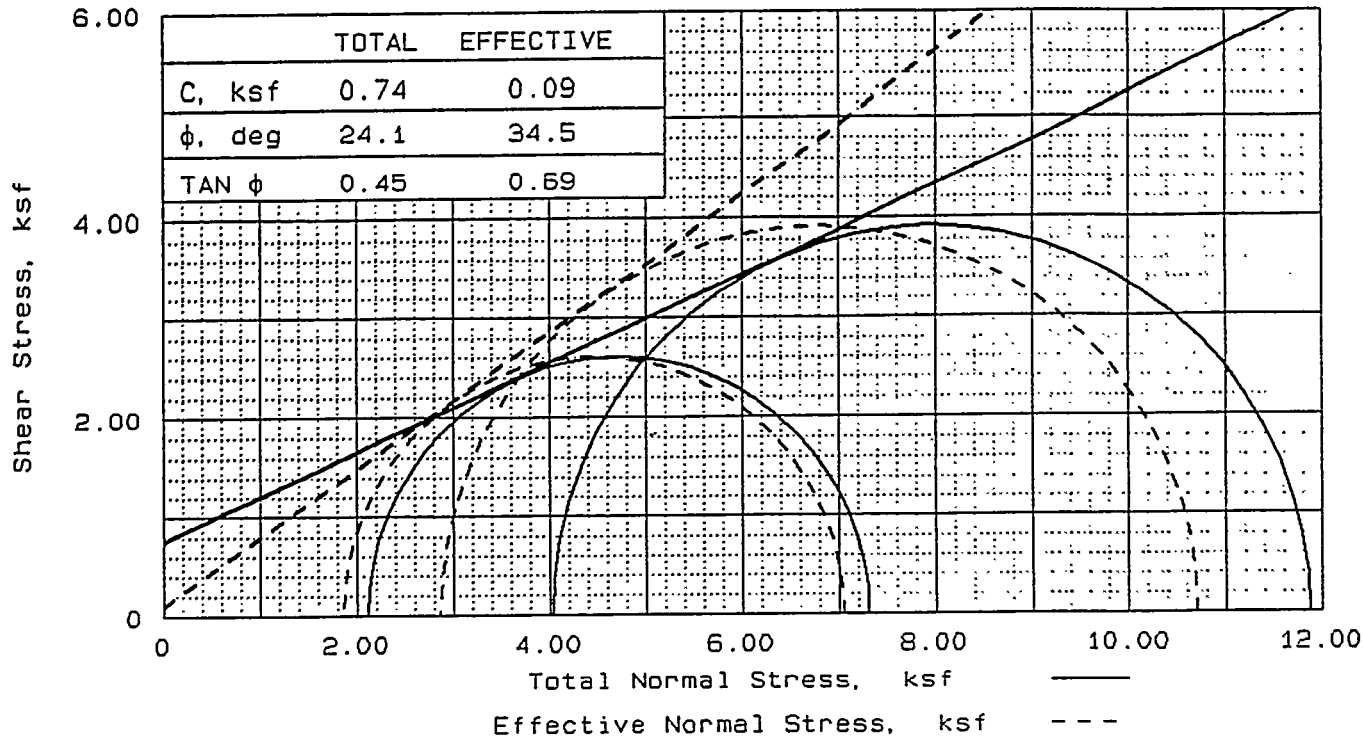
PROJECT: SRS-ITP

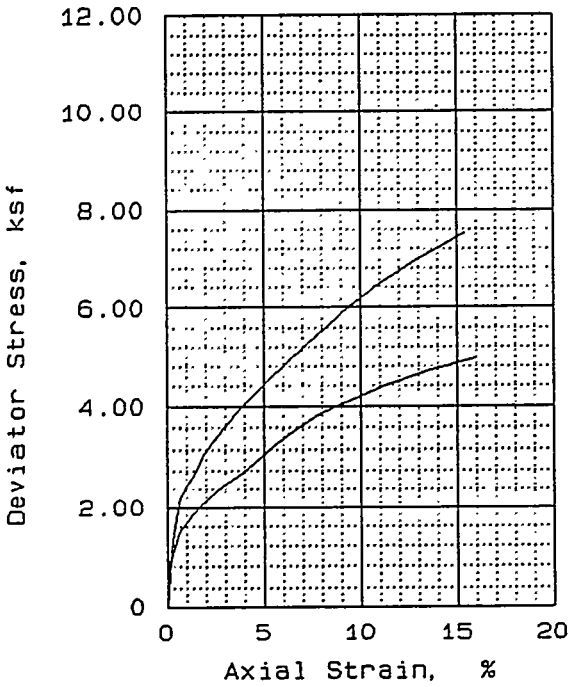
SAMPLE LOCATION: H-Bor 29 ST-3 @ 20-22 Ft.

PROJ. NO.: 5810535301 DATE: 10/8/93

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.





SAMPLE NO.		1	2
INITIAL	WATER CONTENT, %	19.1	20.8
	DRY DENSITY, pcf	103 0	102.2
	SATURATION, %	82.6	88.8
	VOID RATIO	0.618	0.624
	DIAMETER, in	2.88	2.87
	HEIGHT, in	5.53	5 93
AT TEST	WATER CONTENT, %	23.2	23.2
	DRY DENSITY, pcf	103.0	102.6
	SATURATION, %	100 0	100.0
	VOID RATIO	0.618	0.618
	DIAMETER, in	2.88	2.87
	HEIGHT, in	5.53	5.91
BACK PRESSURE, ksf		3.01	2.30
CELL PRESSURE, ksf		5.13	6.34
FAILURE STRESS, ksf		5.20	7.84
PORE PRESSURE, ksf		3.27	3.47
STRAIN RATE, %/min.		0.100	0.100
ULTIMATE STRESS, ksf			
PORE PRESSURE, ksf			
$\bar{\sigma}_1$ FAILURE, ksf		7.06	10.70
$\bar{\sigma}_3$ FAILURE, ksf		1.86	2.87

TYPE OF TEST:
CU with pore pressures
SAMPLE TYPE: Undisturbed
DESCRIPTION:

LL= 73 PL= 31 PI= 42.0
SPECIFIC GRAVITY= 2.66
REMARKS: Tested by: HES

Reviewed by: RLB

CLIENT: SRS

PROJECT: SRS-ITP

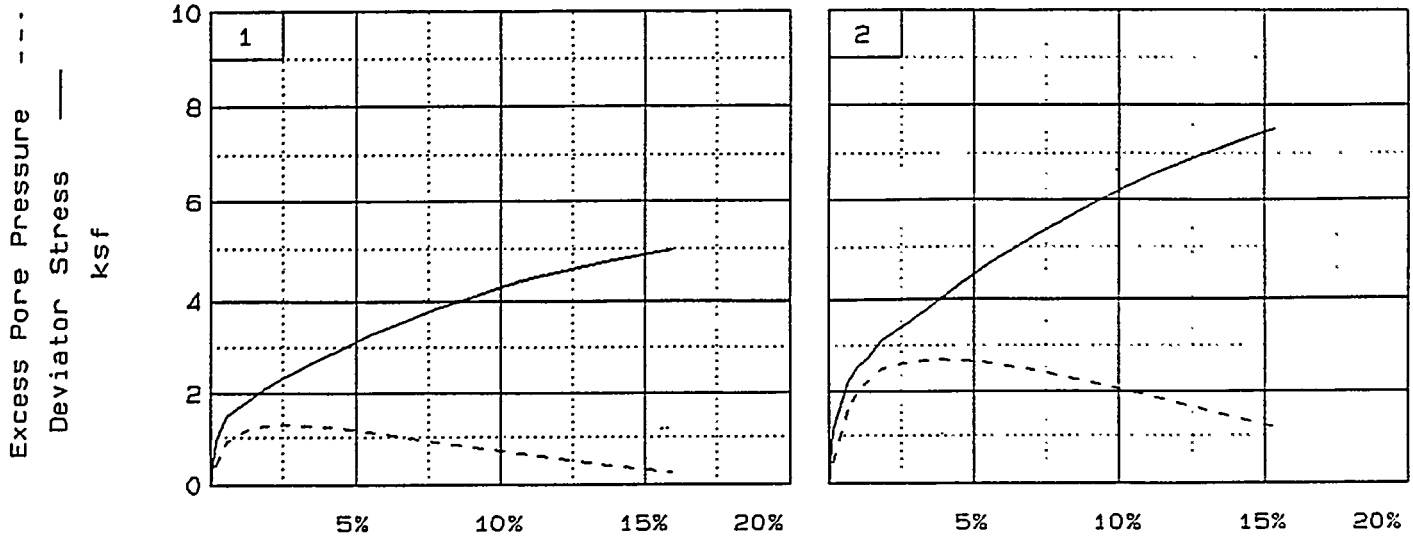
SAMPLE LOCATION: H-Bor 29 ST-3 @ 20-22 Ft.

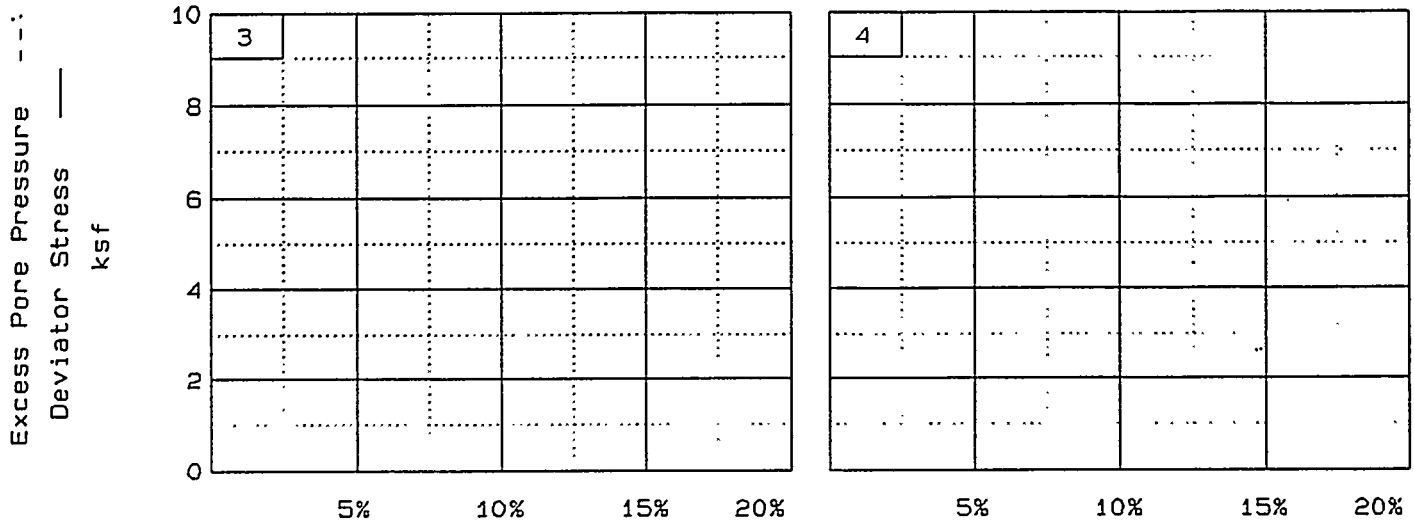
PROJ. NO.: 5810535301 DATE: 10/8/93

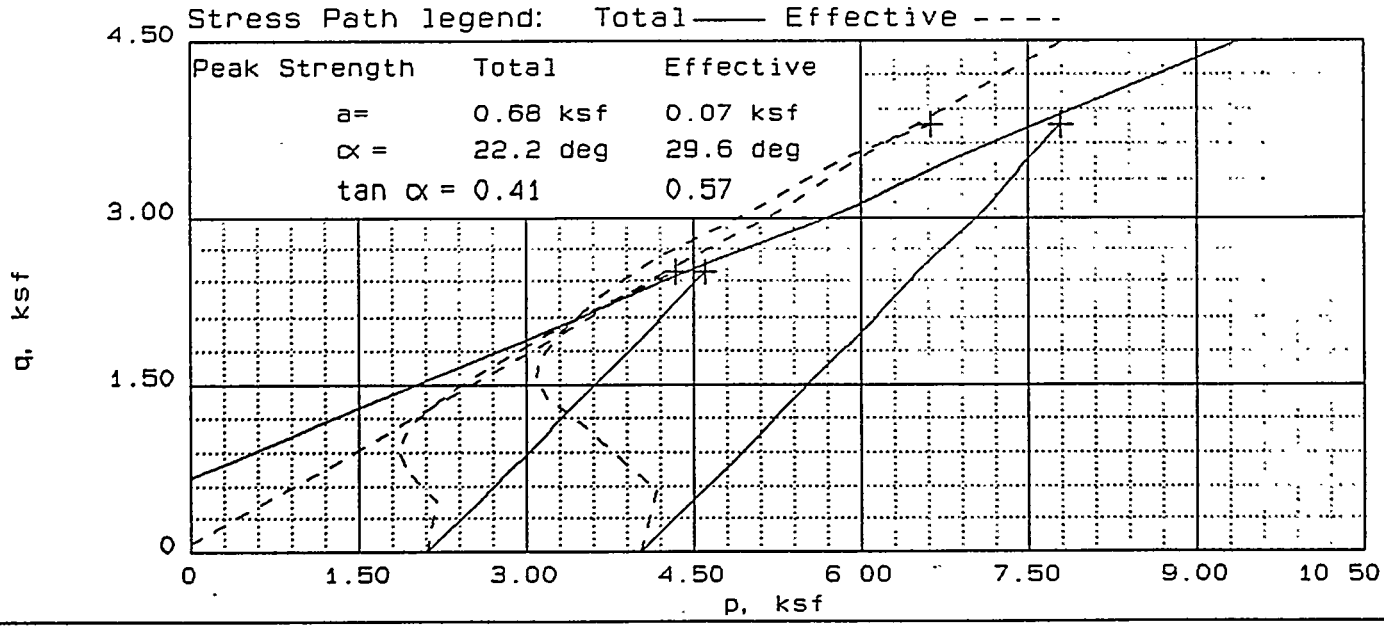
TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

FIG. NO. 8







Client: SRS

Project: SRS-ITP

Location: H-Bor 29 ST-3 @ 20-22 Ft.

File: SRS-ITP7 Project No.: 5810535301 Page 2/2 Fig. No. 8

TRIAXIAL COMPRESSION TEST
CU with pore pressures

12-07-1993
9:45 am

Project Data

Project No.: 5810535301 Date: 10/8/93 Data file: SRS-ITP7
Client: SRS
Project: SRS-ITP
Sample location: H-Bor 29 ST-3 @ 20-22 Ft.
Sample description:
Remarks: Tested by: HES
Reviewed by: RLB Fig No. 8

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.66 LL= 73 PL= 31 PI= 42

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.88	
Height change, in		0.00	
Height, in	5.53	5.53	
Weight, grams	1157.1		
Water volume change, cc		-39.22	
Moisture, %	19.1	23.2	21.5
Dry density, pcf	103.0	103.0	
Saturation, %	82.6	100.0	
Void ratio	0.618	0.618	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 35.6 psi
Consolidation back pressure = 20.9 psi
Consolidation effective confining stress = 2.1168 ksf
Peak deviator stress = 5.20 ksf at reading no. 11
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	2.12	2.12	1.00	20.9	2.12	0.00
1	0.0100	0.010	42.00	42.0	0.2	0.93	1.73	2.66	1.54	23.6	2.19	0.46
2	0.0300	0.030	66.00	66.0	0.5	1.46	1.21	2.66	2.20	27.2	1.94	0.73
3	0.0700	0.070	84.00	84.0	1.3	1.84	0.94	2.77	2.96	29.1	1.86	0.92
4	0.1000	0.100	96.00	96.0	1.8	2.09	0.86	2.95	3.42	29.6	1.91	1.04
	1400	0.140	109.00	109.0	2.5	2.35	0.84	3.19	3.82	29.8	2.01	1.18

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
	.300	0.230	135.00	135.0	4.2	2.87	0.89	3.76	4.21	29.4	2.33	1.43
7	0.3000	0.300	155.00	155.0	5.4	3.25	0.99	4.24	4.27	28.7	2.62	1.62
8	0.4300	0.430	188.00	188.0	7.8	3.84	1.21	5.05	4.18	27.2	3.13	1.92
9	0.6100	0.610	223.00	223.0	11.0	4.40	1.50	5.90	3.94	25.2	3.70	2.20
10	0.7400	0.740	245.00	245.0	13.4	4.70	1.68	6.39	3.79	23.9	4.04	2.35
11	0.8800	0.880	267.00	267.0	15.9	4.98	1.86	6.83	3.68	22.7	4.35	2.49

TRIAXIAL COMPRESSION TEST
CU with pore pressures

2-24-1994
6:10 pm

Project Data

Project No.: 5810535301 Date: 10/8/93 Data file: SRS-ITP7
Client: SRS
Project: SRS-ITP
Sample location: H-Bor 29 ST-3 @ 20-22 Ft.
Sample description:
Remarks: Tested by:
Reviewed by: Fig No. 8

Sample No. 2 Data

Type of sample: Undisturbed
Specific Gravity= 2.67 LL= 73 PL= 31 PI= 42

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.87	2.87	
Height change, in		0.02	
Height, in	5.93	5.91	
Weight, grams	1248.5		
Water volume change, cc		-24.78	
Moisture, %	20.8	23.2	22.2
Dry density, pcf	102.2	102.9	
Saturation, %	88.3	100.0	
Void ratio	0.630	0.621	

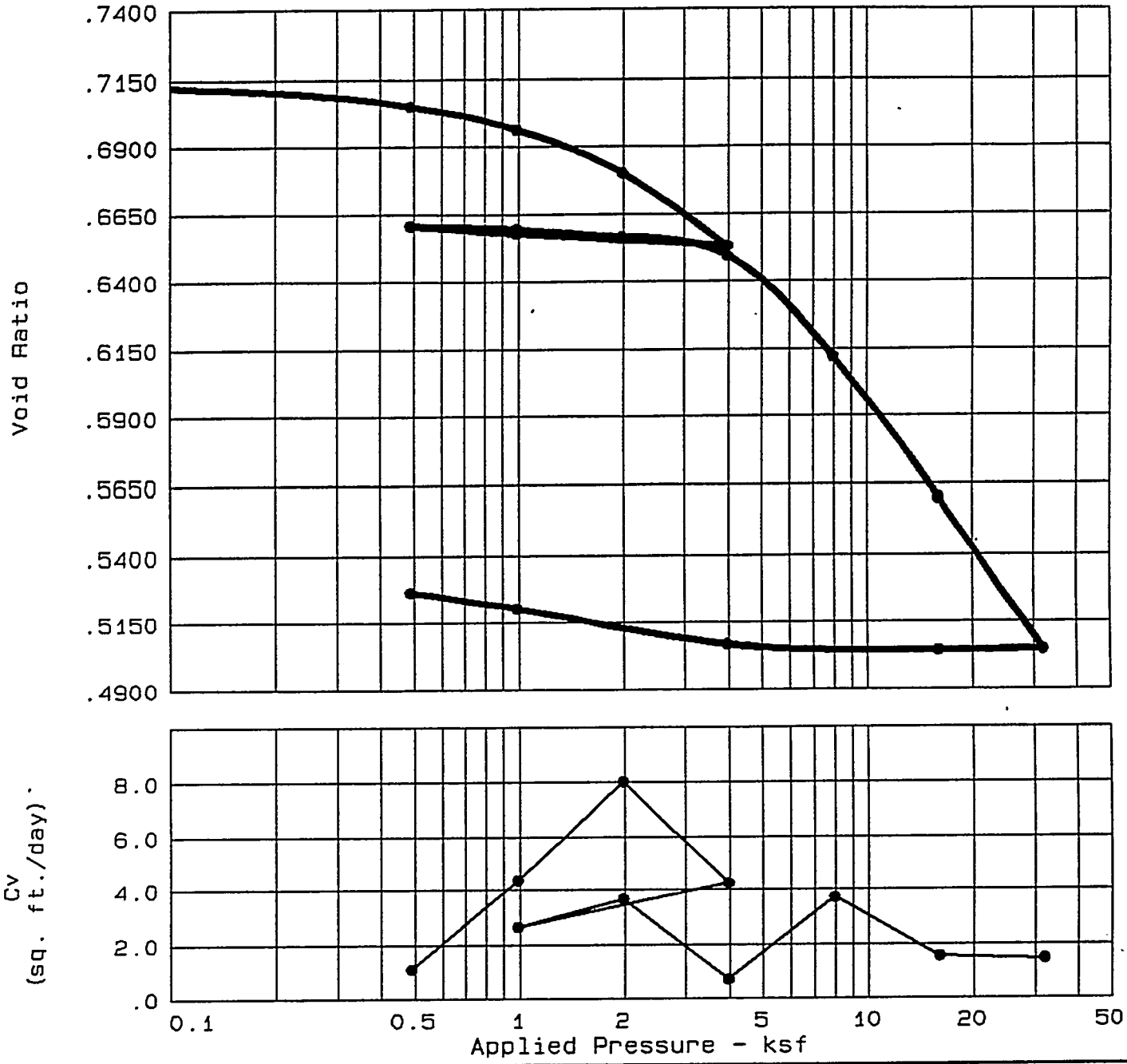
Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 44 psi
Consolidation back pressure = 16 psi
Consolidation effective confining stress = 4.032 ksf
Peak deviator stress = 7.84 ksf at reading no. 13
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Effective Stresses Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	4.03	4.03	1.00	16.0	4.03	0.00
1	0.0100	0.010	51.00	51.0	0.2	1.13	3.60	4.73	1.31	19.0	4.17	0.57
2	0.0400	0.040	101.00	101.0	0.7	2.23	2.43	4.67	1.92	27.1	3.55	1.12
3	0.0600	0.060	115.00	115.0	1.0	2.53	2.07	4.61	2.22	29.6	3.34	1.27
[illegible]	0800	0.080	125.00	125.0	1.4	2.74	1.81	4.56	2.51	31.4	3.19	1.37
[illegible]	1100	0.110	143.00	143.0	1.9	3.12	1.54	4.66	3.03	33.3	3.10	1.56

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
	0.1500	0.150	158.00	158.0	2.5	3.43	1.41	4.84	3.43	34.2	3.12	1.71
7	0.2200	0.220	184.00	184.0	3.7	3.94	1.34	5.28	3.94	34.7	3.31	1.97
8	0.3100	0.310	216.00	216.0	5.2	4.55	1.38	5.94	4.29	34.4	3.66	2.28
9	0.4200	0.420	254.00	254.0	7.1	5.25	1.57	6.82	4.35	33.1	4.20	2.63
10	0.5600	0.560	300.00	300.0	9.5	6.04	1.90	7.94	4.18	30.8	4.92	3.02
11	0.6600	0.660	332.00	332.0	11.2	6.56	2.16	8.72	4.04	29.0	5.44	3.28
12	0.7600	0.760	360.00	360.0	12.9	6.98	2.42	9.40	3.89	27.2	5.91	3.49
13	0.9100	0.910	400.00	400.0	15.4	7.53	2.87	10.40	3.63	24.1	6.63	3.77

CONSOLIDATION TEST REPORT



Swell press.	Nat. Sat.	Nat. Moist.	Dry Density	LL	PI	Sp.Gr.	Initial void ratio
	76.6 %	20.5	97.0	73	42	2.66	0.7122

TEST RESULTS	MATERIAL DESCRIPTION
	Red Brown Clayey Coarse to Fine Sand Class: SC

Project No.: 5810535301
Project: SRS ITP
Location: H-Bor-29 ST-3
20-22 Ft.
Date: 08/11/93

Remarks:

Tested by: ECG
Reviewed by: RLB

CONSOLIDATION TEST REPORT

LAW ENGINEERING, INC.

Fig. No._____

11:35, 10-15-1993 CONSOLIDATION TEST PROJECT DATA Test No. 8

oject Number:	5810535301
roject:	SRS ITP
Date:	08/11/93
Location 1:	H-Bor-29 ST-3
2:	20-22 Ft.
Remarks 1:	Tested by: CCG
2:	Reviewed by: RLB
3:	
4:	
5:	
Material 1:	Red Brown Clayey Coarse
description 2:	to Fine Sand
Classification:	SC
Liquid limit:	73
Plasticity index:	42
Figure Number:	

CONSOLIDATION TEST SPECIMEN DATA

TOTAL SAMPLE	BEFORE TEST	AFTER TEST
Wet w+t = 338.64 g.	Oedometer No. = 5	Wet w+t = 338.03 g.
Dry w+t = 318.27 g	Machine No. = 5	Dry w+t = 318.27 g.
Tare wt. = 218.95 g.	Spec. Gravity = 2.66	Tare wt. = 218.95 g.
F ht = 0.89 in.	Height = 0.89 in.	
L eter = 2.36 in.	Diameter = 2.36 in.	
Weight = 119.74 g.		
Moisture = 20.5 %	Ht. Solids = 0.52 in.	Moisture = 19.9 %
Wet Den. = 116.9 pcf	Dry wt. = 99.56 g. *	Dry wt. = 99.32 g.
Dry Den. = 97.0 pcf	Void ratio = 0.7122	Void ratio = 0.5268
	Saturation = 76.6 %	Saturation = 100. %

* Initial dry weight used in calculations

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
Initial	0.02000			0.7122	
0.49	0.02405	0.0003	0.02375	0.7050	0.4 Comprs.
0.99	0.02910	0.0007	0.02840	0.6961	0.9 Comprs.
1.99	0.03810	0.0012	0.03690	0.6799	1.9 Comprs.
3.99	0.05310	0.0021	0.05100	0.6529	3.5 Comprs.
0.99	0.04920	0.0007	0.04850	0.6576	3.2 Comprs.
0.49	0.04730	0.0003	0.04700	0.6605	3.0 Comprs.
0.99	0.04830	0.0007	0.04760	0.6594	3.1 Comprs.
1.99	0.05030	0.0012	0.04910	0.6565	3.3 Comprs.
3.99	0.05500	0.0021	0.05290	0.6492	3.7 Comprs.

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
8.00	0.07560	0.0032	0.07240	0.6119	5.9 Comprs.
16.00	0.10410	0.0048	0.09930	0.5604	8.9 Comprs.
32.04	0.13550	0.0071	0.12840	0.5046	12.1 Comprs.
16.00	0.13335	0.0048	0.12855	0.5043	12.1 Comprs.
3.99	0.12940	0.0021	0.12730	0.5067	12.0 Comprs.
0.99	0.12090	0.0007	0.12020	0.5203	11.2 Comprs.
0.49	0.11710	0.0003	0.11680	0.5268	10.8 Comprs.

CONSOLIDATION TEST RESULTS

Compression index = NOT SELECTED
Preconsolidation pressure = NOT SELECTED

Load 0.49 ksf — CONSOLIDATION TEST READINGS — Load No. 1

Machine Deflection 0.0003

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.02000	11	180.00	0.02375
2	0.10	0.02270	12	1446.00	0.02405
3	0.25	0.02280			
4	0.50	0.02290			
5	1.00	0.02300			
6	2.00	0.02310			
7	4.00	0.02320			
8	8.00	0.02330			
9	15.00	0.02340			
10	30.00	0.02345			

Void Ratio: 0.7050 Compression: 0.4 %
D0 = 0.0222 D90 = 0.0228 D100 = 0.0229 T90 = 1.55 min.
Cv @ 1.6 min.= 1.09 sq. feet/day

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

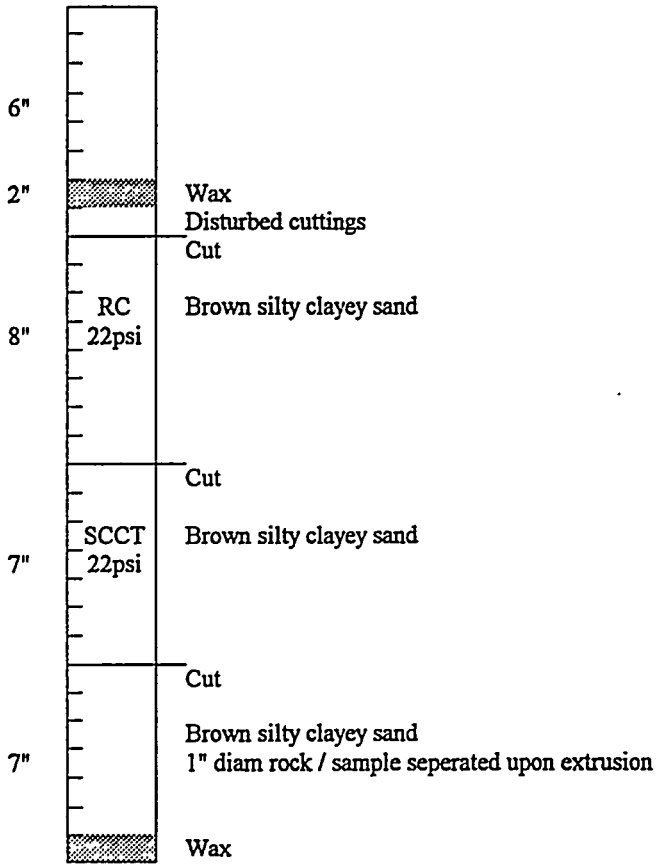
Project: SRS-ITP GEOTECHNICAL TESTING Date: 09-07-93

Boring No: H-Bor-29 Sample No: ST-4 Depth: 25' - 27'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION

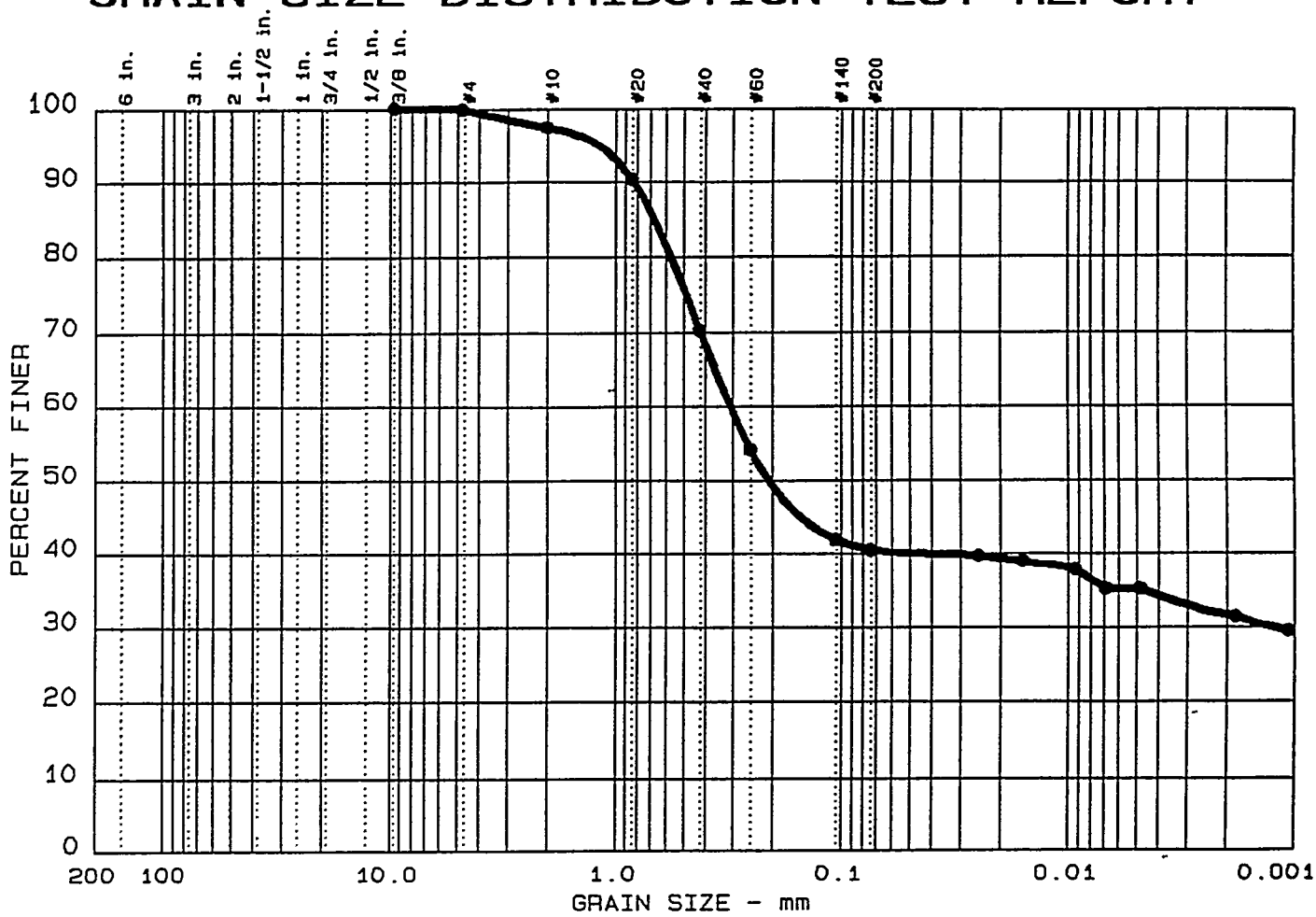


Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b29-st4.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	20	0.0	0.2	59.4	5.3	35.1

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.67	0.31	0.21	0.001				

MATERIAL DESCRIPTION	USCS	AASHTO
● Reddish Brown Silty Clayey Medium to Fine Sand		

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-29 ST-4 @25-27 Ft.

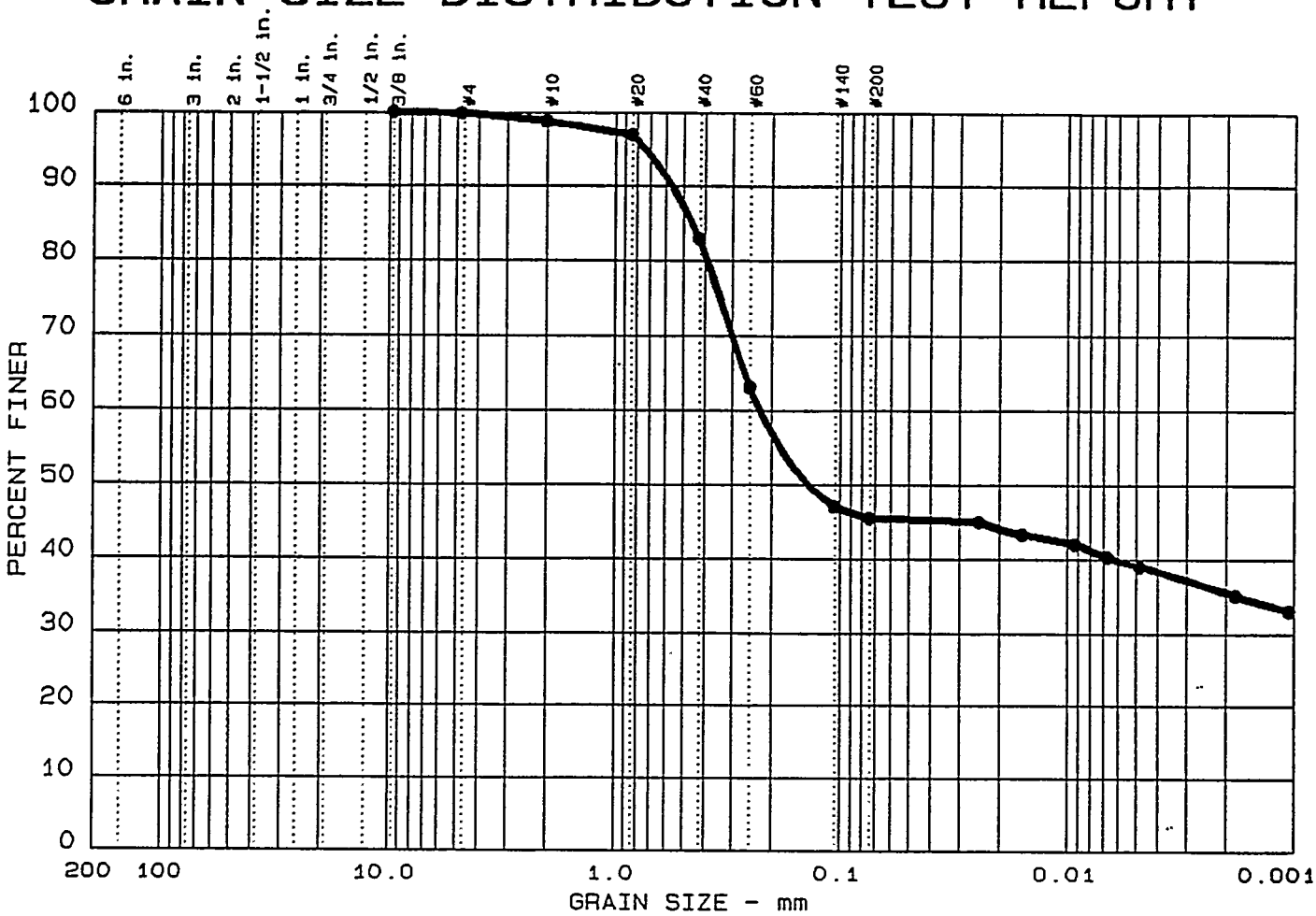
Date: September 27, 1993

Remarks:
Test: Resonant Column
Tested by JRR Chkd by RLB
Atterberg Limits -200
LL=110 PL=45 PI=65

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	8	0.0	0.2	54.5	6.2	39.1

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	55	32	0.45	0.23	0.14					

MATERIAL DESCRIPTION	USCS	AASHTO
● Brown Silty Clayey Medium to Fine Sand	SC	A-7-6 (9.4)

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-29 ST-4 @ 25-27 Ft.

Date: September 30, 1993

Remarks:

Tested By: JRK
Reviewed by: RLB

SCC-22 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-29
Test Date:	09/09&15/93	Sample No.:	ST4
Reviewed By:	JW/RLB RLB	Depth:	25.0 - 27.0 ft.
Review Date:	09/29/93	Sample Description:	See classification data

SPECIMEN DATA

Initial Conditions of Specimen

Diameters, in.		Area , sq. in.	6.48
Top	2.875	Volume, cubic in.	38.87
Middle	2.870	Mass of Specimen, grams	1211.20
Bottom	2.871		
Average	2.872	Moisture Content	
Membrane Thickness, in.	0.000	Pan No.	AB-28
Net Diameter, in.	2.872	Wet Mass + Pan, grams	1294.56
		Dry Mass + Pan, grams	1063.84
Length, in.		Container Mass, grams	83.36
Location 1	6.000	Moisture Content, %	23.5
Location 2	6.000		
Location 3	6.000	Density, pcf	118.5
Average	6.000	Dry Density, pcf	95.9
Length of Top Platen	0.000	Specific Gravity	2.66
Length of Bottom Platen	0.000	Degree of Saturation, %	85.6
Length of Specimen, in	6.000	Void Ratio	0.731

Conditions of Specimen After Saturation and Consolidation

After Saturation		After Consolidation	
Change in Length, in.	0.000	Change in Length, in.	0.015
Length, in.	6.000	Length, in.	5.985
Area, sq. in.	6.48	Change in Volume, cc	4.83
Volume, cubic in.	38.87	Volume, cubic in.	38.57
Back Pressure, psi	33.0	Area, sq. in.	6.45
B Value	0.98	Effe. Consoli.. Stress, psi	22.0
		Moisture Content, %	27.0
		Dry Density, pcf	96.6
		Void Ratio	0.718
		Degree of Saturation, %	100.0

CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

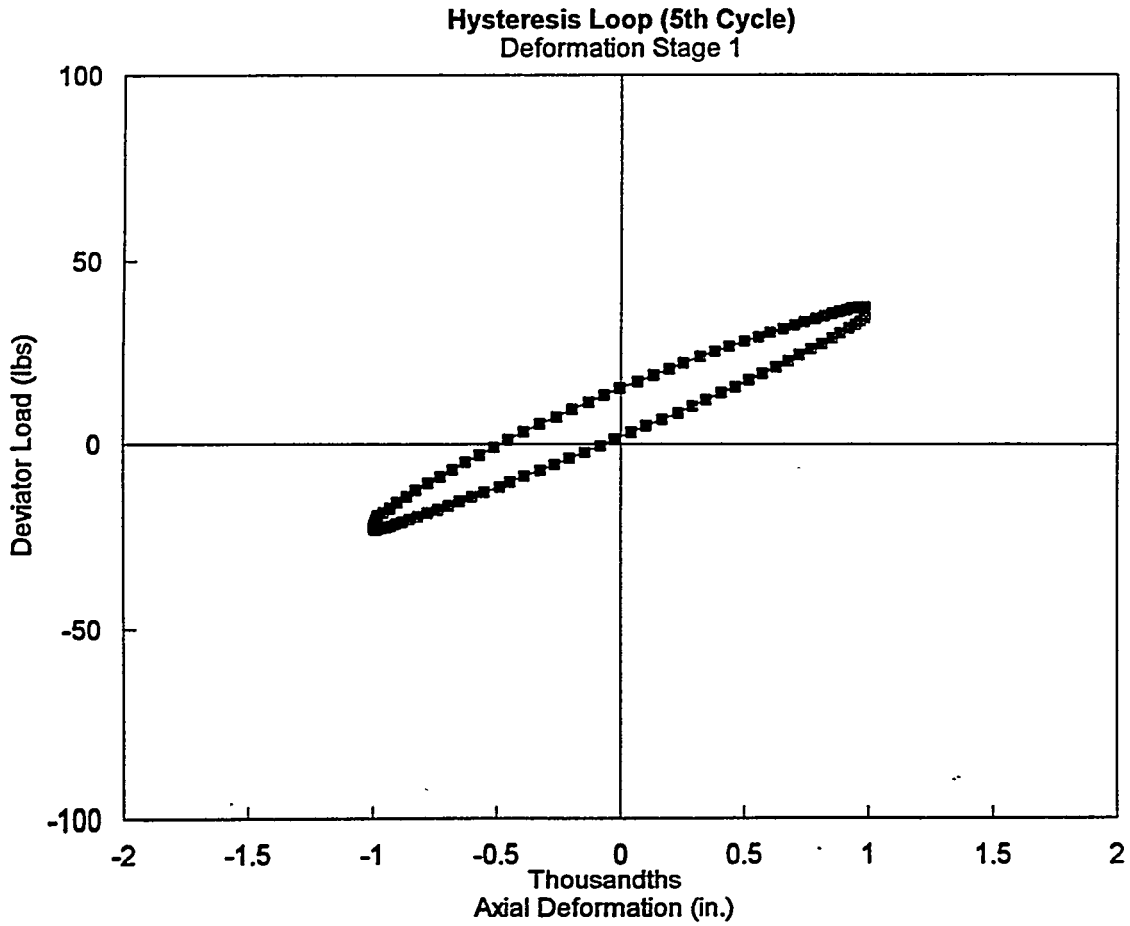
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-29
Test Date:	09/09&15/93	Sample No.:	ST4
Reviewed By:	JW/RLB RLB	Depth:	25.0 - 27.0 ft.
Review Date:	09/29/93	Sample Description:	See classification data

Area, A_c, in²	6.45		Effective Consolidation Stress, psi	22.0
Length, H_c, in.	5.98		Cyclic Load, P_c, lbs	30.25
			Cyclic Deviator Stress, psi	4.7

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
60.5	0.0020	28389	0.017

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
0.020	0.015	10.7



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

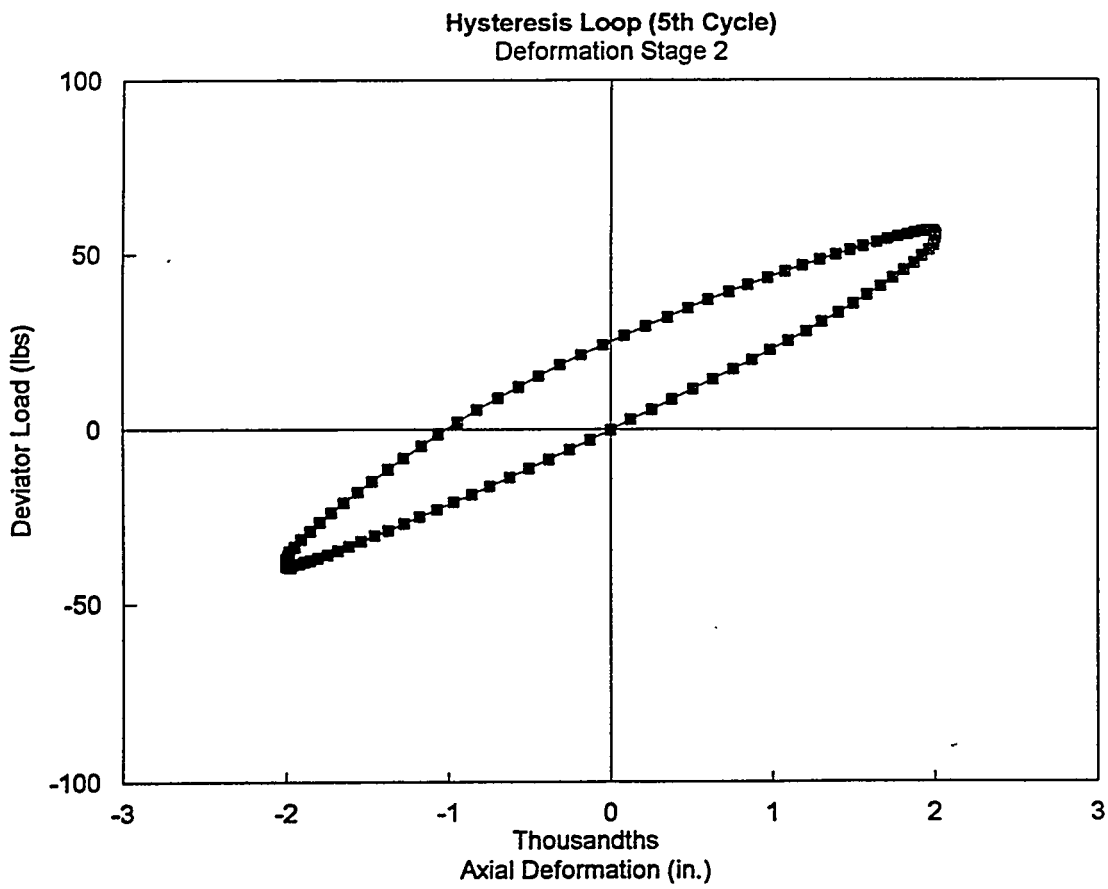
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-29
Test Date:	09/09&15/93	Sample No.:	ST4
Reviewed By:	JW/RLB RLB	Depth:	25.0 - 27.0 ft.
Review Date:	09/29/93	Sample Description:	See classification data

Area, A_c, in²	6.45		Effective Consolidation Stress, psi	22.0
Length, H_c, in.	5.98		Cyclic Load, P_c, lbs	48.27
			Cyclic Deviator Stress, psi	7.5

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
96.5	0.0040	22398	0.033

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
0.078	0.048	12.8



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

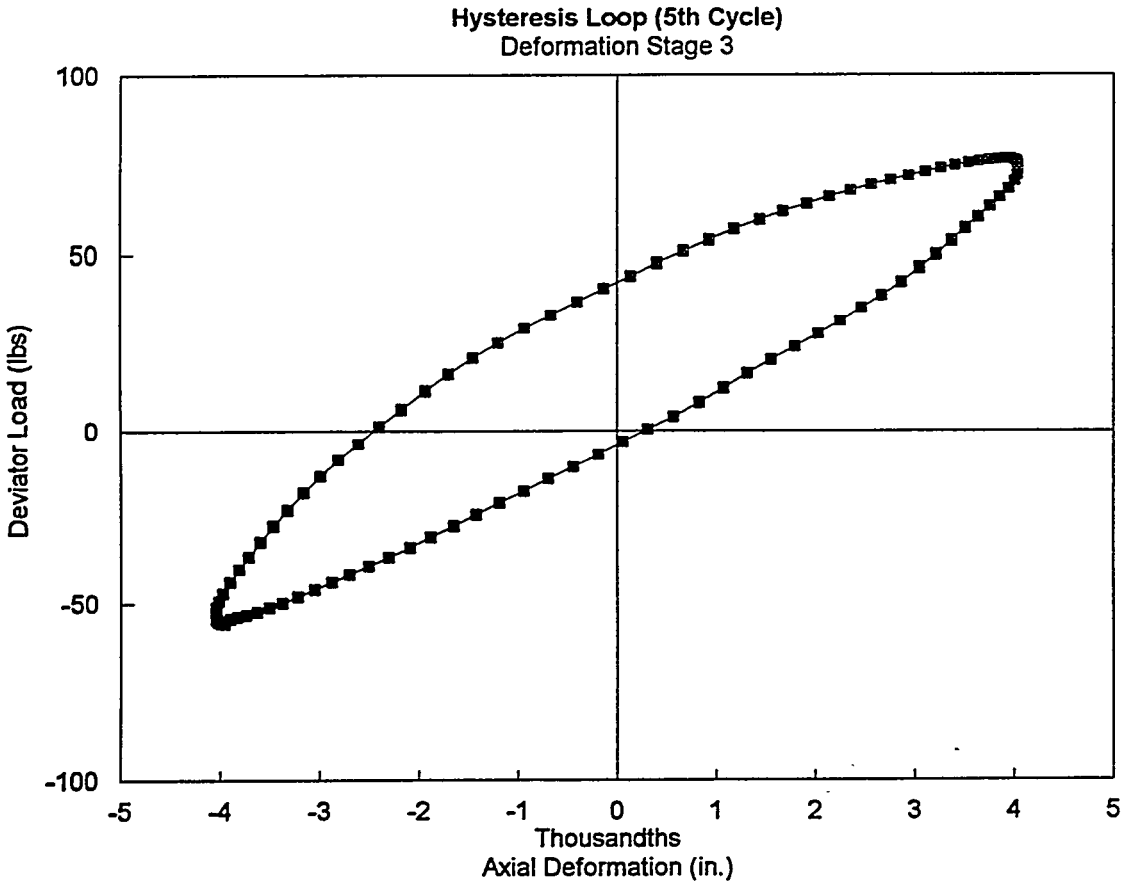
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-29
Test Date:	09/09&15/93	Sample No.:	ST4
Reviewed By:	JW/RLB RLB	Depth:	25.0 - 27.0 ft.
Review Date:	09/29/93	Sample Description:	See classification data

Area, A_c, in²	6.45		Effective Consolidation Stress, psi	22.0
Length, H_c, in.	5.98		Cyclic Load, P_c, lbs	66.74
			Cyclic Deviator Stress, psi	10.4

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
133.5	0.0081	15341	0.067

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
0.294	0.135	17.3



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

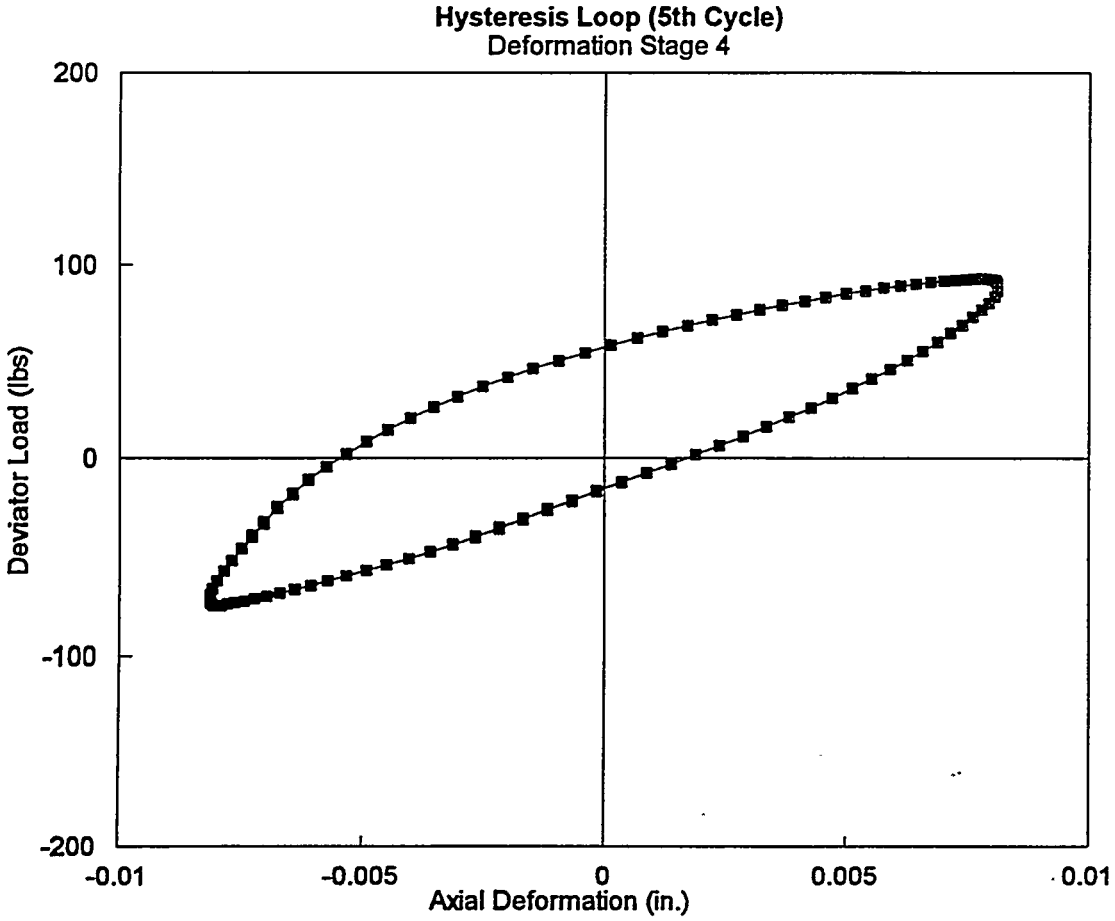
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-29
Test Date:	09/09&15/93	Sample No.:	ST4
Reviewed By:	JW/RLB RLB	Depth:	25.0 - 27.0 ft.
Review Date:	09/29/93	Sample Description:	See classification data

Area, A_c, in ^{2}	6.45		Effective Consolidation Stress, psi	22.0
Length, H_c, in.	5.98		Cyclic Load, P_c, lbs	83.88
			Cyclic Deviator Stress, psi	13.0

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
167.8	0.0162	9593	0.136

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
0.929	0.341	21.7



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

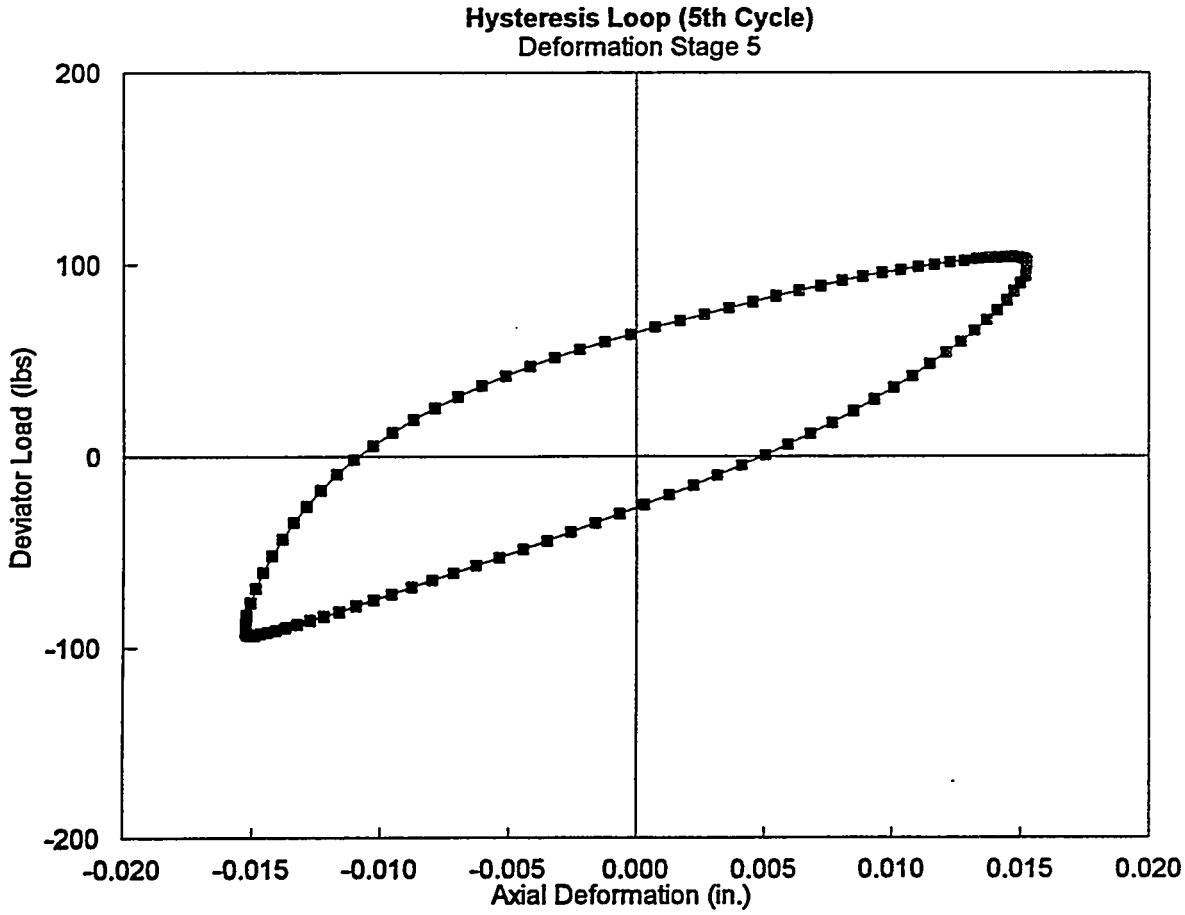
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-29
Test Date:	09/09&15/93	Sample No.:	ST4
Reviewed By:	JW/RLB RLB	Depth:	25.0 - 27.0 ft.
Review Date:	09/29/93	Sample Description:	See classification data

Area, A_c, in²	6.45		Effective Consolidation Stress, psi	22.0
Length, H_c, in.	5.98		Cyclic Load, P_c, lbs	98.73
			Cyclic Deviator Stress, psi	15.3

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
197.5	0.0305	6012	0.255

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
2.259	0.753	23.9



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

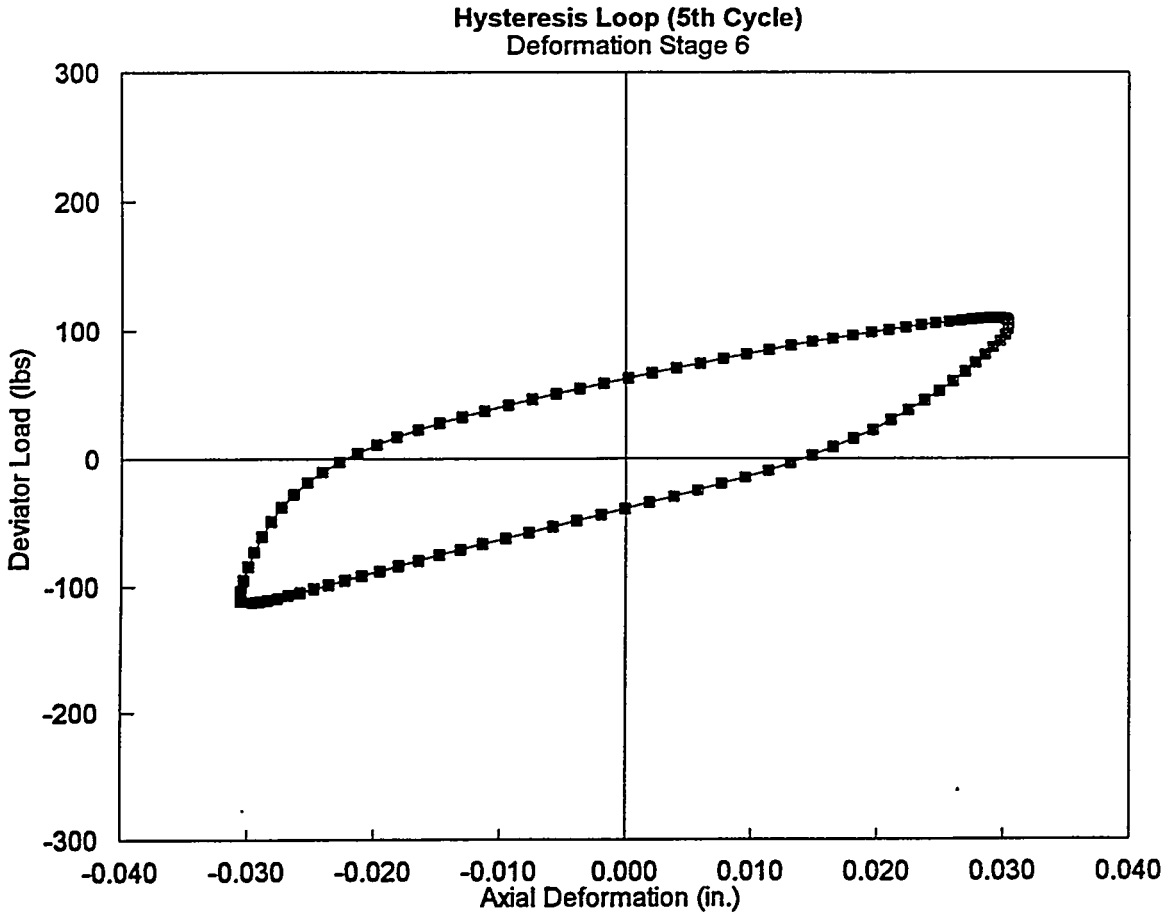
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-29
Test Date:	09/09&15/93	Sample No.:	ST4
Reviewed By:	JW/RLB RLB	Depth:	25.0 - 27.0 ft.
Review Date:	09/29/93	Sample Description:	See classification data

Area, A_c, in ^{2}	6.45		Effective Consolidation Stress, psi	22.0
Length, H_c, in.	5.98		Cyclic Load, P_c, lbs	112.62
			Cyclic Deviator Stress, psi	17.5

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
225.2	0.0610	3428	0.510

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
5.311	1.718	24.6



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

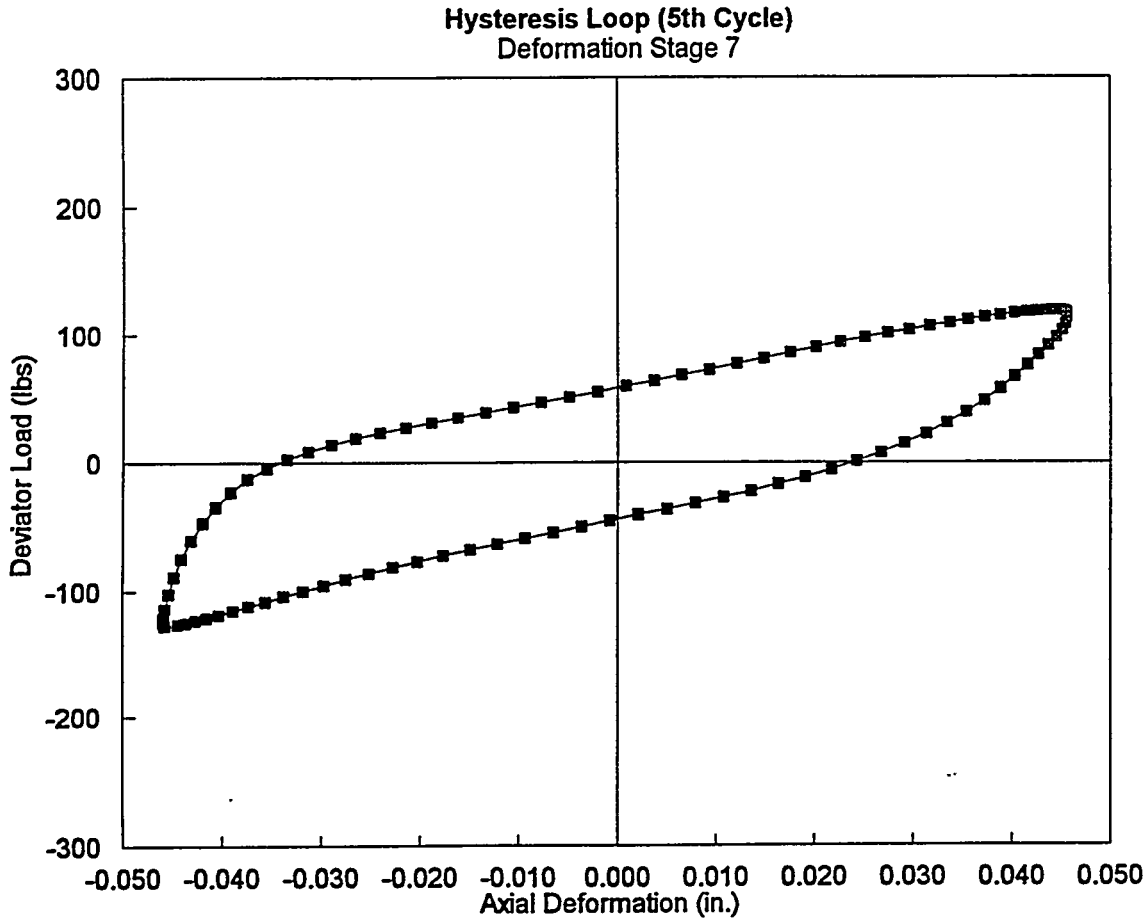
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-29
Test Date:	09/09&15/93	Sample No.:	ST4
Reviewed By:	JW/RLB RLB	Depth:	25.0 - 27.0 ft.
Review Date:	09/29/93	Sample Description:	See classification data

Area, A_c, in²	6.45		Effective Consolidation Stress, psi	22.0
Length, H_c, in.	5.98		Cyclic Load, P_c, lbs	124.42
			Cyclic Deviator Stress, psi	19.3

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
248.8	0.0915	2525	0.765

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
8.556	2.847	23.9



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

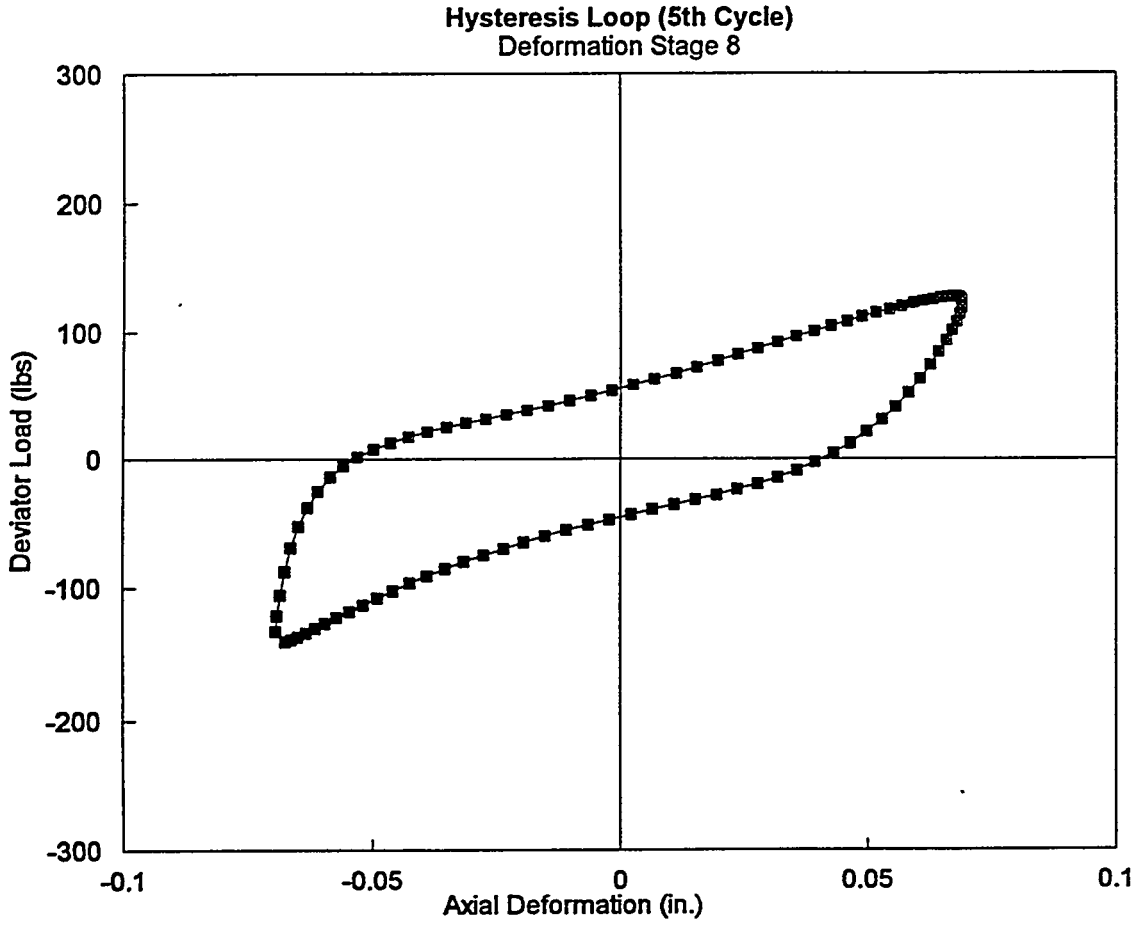
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-29
Test Date:	09/09&15/93	Sample No.:	ST4
Reviewed By:	JW/RLB RLB	Depth:	25.0 - 27.0 ft.
Review Date:	09/29/93	Sample Description:	See classification data

Area, A_c, in²	6.45		Effective Consolidation Stress, psi	22.0
Length, H_c, in.	5.98		Cyclic Load, P_c, lbs	136.41
			Cyclic Deviator Stress, psi	21.2

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
272.8	0.1382	1832	1.155

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
13.766	4.714	23.2



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

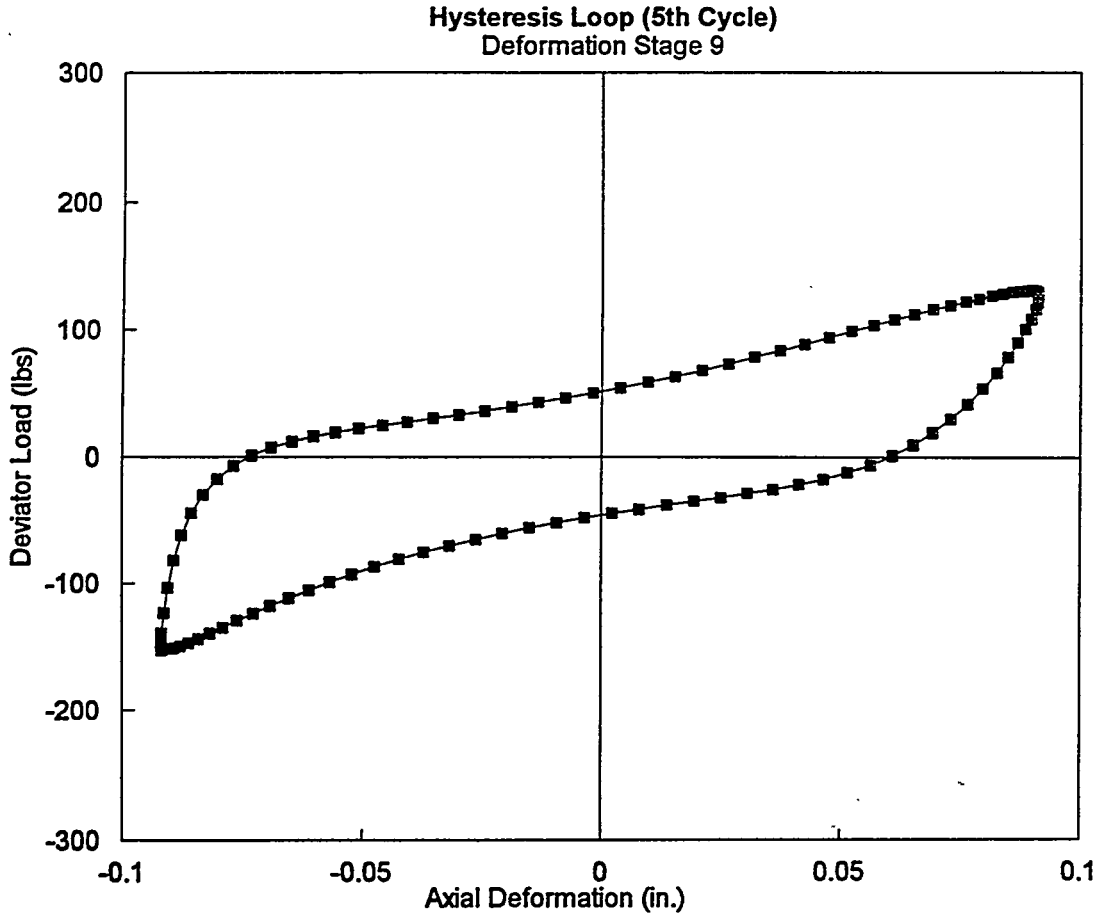
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-29
Test Date:	09/09&15/93	Sample No.:	ST4
Reviewed By:	JW/RLB RLB	Depth:	25.0 - 27.0 ft.
Review Date:	09/29/93	Sample Description:	See classification data

Area, A_c, in²	6.45		Effective Consolidation Stress, psi	22.0
Length, H_c, in.	5.98		Cyclic Load, P_c, lbs	143.08
			Cyclic Deviator Stress, psi	22.2

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
286.2	0.1830	1452	1.529

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
18.721	6.544	22.8



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

LAW ENGINEERING

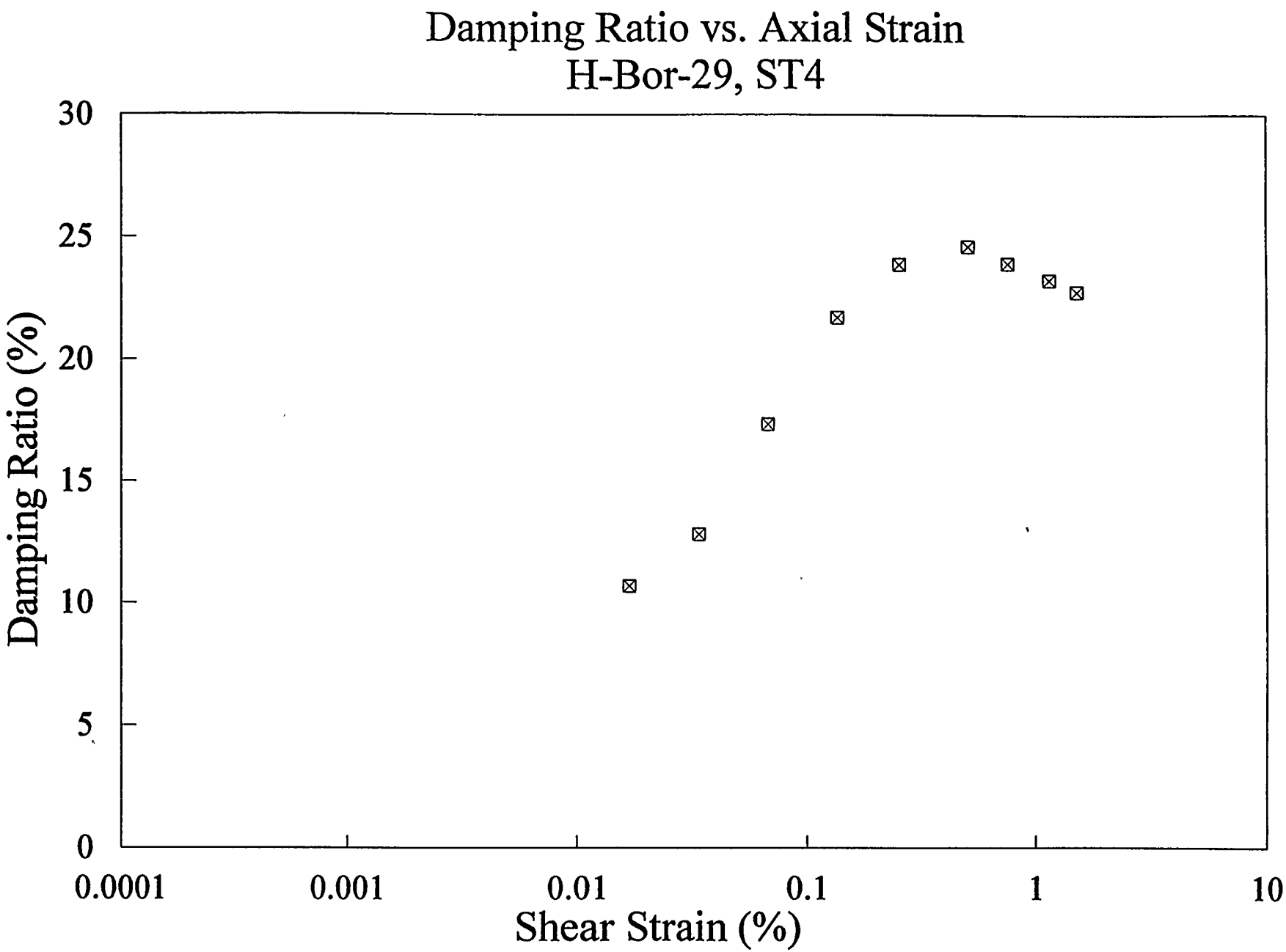
Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/RLB	Boring No.:	H-Bor-29
Test Date:	09/09&15/93	Sample No.:	ST4
Reviewed By:	JW/RLB RLB	Depth:	25.0 - 27.0 ft.
Review Date:	09/29/93	Sample Description:	See classification data

Effective Consolidation Stress .22 psi

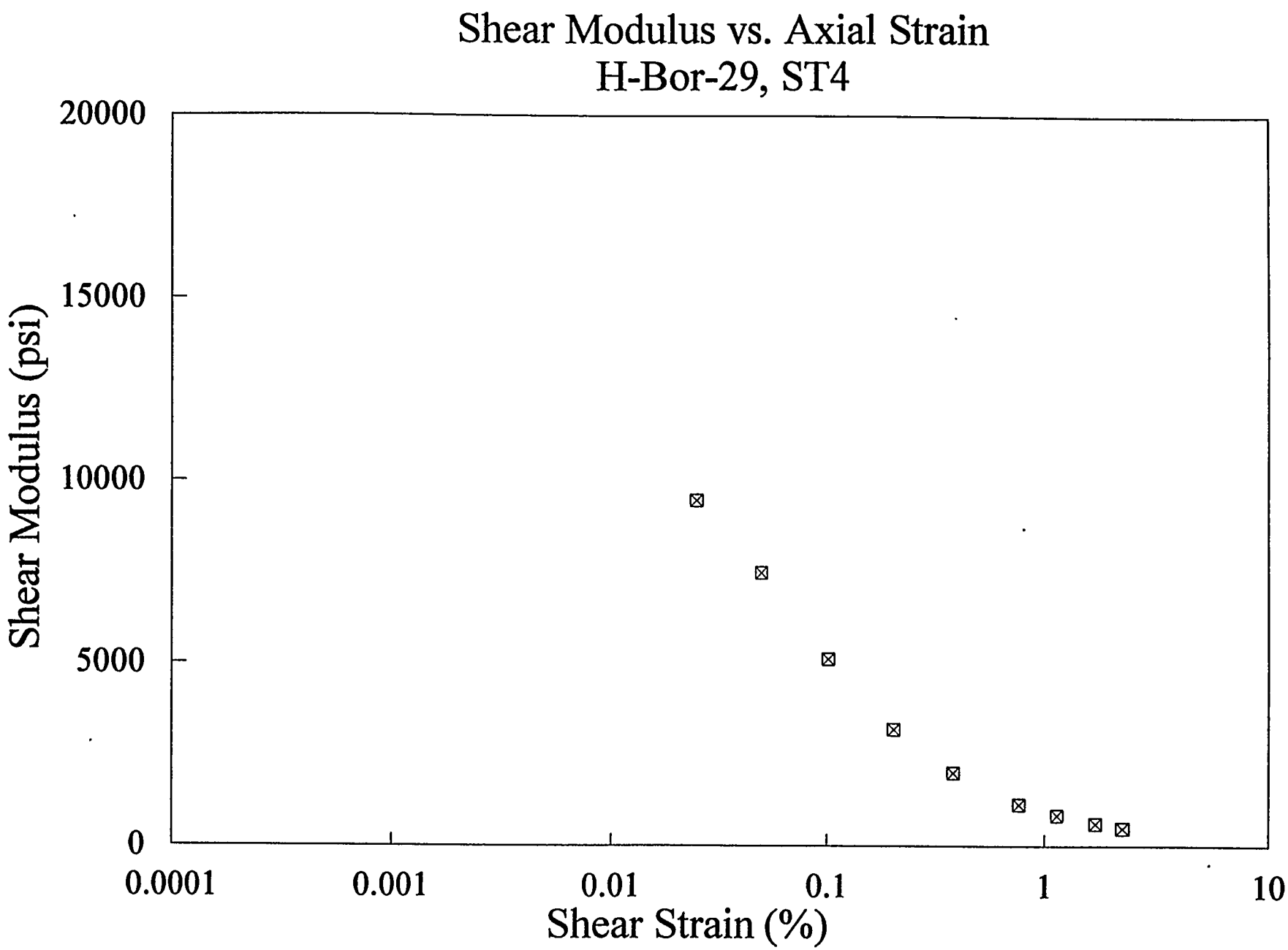
Deformation Stage No.	Cyclic Stress (psi)	Axial Strain ε (%)	Young's Modulus E, (psi)	Damping Ratio D, (%)	Shear* Modulus G, (psi)	Shear* Strain γ (%)
1	4.7	0.017	28389	10.71	9463	0.025
2	7.5	0.033	22398	12.84	7466	0.050
3	10.4	0.067	15341	17.34	5114	0.101
4	13.0	0.136	9593	21.71	3198	0.203
5	15.3	0.255	6012	23.88	2004	0.382
6	17.5	0.510	3428	24.60	1143	0.765
7	19.3	0.765	2525	23.92	842	1.147
8	21.2	1.155	1832	23.24	611	1.732
9	22.2	1.529	1452	22.76	484	2.293

* Calculated based on assumed Poisson's Ratio value, 0.5.

All calculations are based on 5th cycle.



Law Engineering Project No: 5810535301
SRS-ITP: Strain Controlled Cyclic Triaxial



Law Engineering Project No.: 5810535301
SRS-ITP: Strain Controlled Cyclic Triaxial

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-29
Test Date:	09/09&16/93	Sample No.:	ST4
Reviewed By:	JW/RLB RLB	Depth:	25.0 - 27.0 ft.
Reviewed Date:	09/29/93	Sample Description:	See classification data

Initial Specimen Data

Labels	Values	Units	Description	Labels	Values	Units	Description
Masses				Mass Density and Unit Weight			
M_{scb}	1127.66	g	*Mass of soil and container before*	Rho	1823.3	kg/m³	*Mass density of specimen*
M_{sca}	0.00	g	*Mass of soil and container after*				*= $M_s/V*10^6$*
M_s	1127.66	g	*$M_{scb} - M_{sca}$ = mass of soil*	U_{wt}	17.88	kN/m³	*Unit weight of specimen*
Diameters							*= Rho*9.806/1000*
D_t	72.01	mm	*Diameter near top of specimen*	Moisture Content, mc			
D_m	71.88	mm	*Diameter near middle of specimen*	No.	L-22		*Container number*
D_b	71.76	mm	*Diameter near bottom of specimen*	M_{wscb}	1219.22	g	*Mass of wet soil + container*
T_{mem}	0.00	mm	*Single thickness of membrane*	M_{wsca}	1033.00	g	*Mass of dry soil + container*
D_{net}	71.88	mm	*$(D_t + D_m + D_b)/3 - 2*T_{mem}$*	M_{wat}	186.22	g	*Mass of water = $M_{wscb} - M_{wsca}$*
Lengths				M_{cont}	91.56	g	*Mass of container.*
L_{cbp}	200.63	mm	*Length between chamber bottom & top of top platen*	mc	19.8	%	*$M_{wat}/(M_{wsca} - M_{cont})*100\%$*
L_{tp}	23.39	mm	*Length of top platen*	Rho_d	1522.2	kg/m³	*Dry mass density = Rho/(1+mc)*
L_{bp}	24.84	mm	*Length of bottom platen*	G_s	2.66		*Specific gravity*
L_{net}	152.40	mm	*Length of Specimen*	e	0.747		*Void Ratio, $[1000*G_s)]/Rho_d-1$*
			= $L_{cbp} - L_{tp} - L_{bp}$	S_r	70.4	%	*Degree of Saturation = $mc*G_s/e$*
Volume				J	0.000728	kg-m²	*Polar mass moment of inertia*
V	618465	mm³	*$D^2_{net}*Pi*L_{net}/4$*				*= $(M_s/1000)*(D_{net}/1000)^2/8$*

Conditions After Saturation				Conditions After Consolidation			
CL_s	0.00	mm	*Change in length*	CL_c	0.09	mm	*Change in length*
L_s	152.4	mm	*Length after saturation, $L - CL_s$*	L_c	152.3	mm	*Length after consolidation, $L_s - CL_c$*
A_s	4058.2	mm²	*Area of specimen*	CV_c	1394	mm³	*Change in volume*
V_s	618465	mm³	*Volume after saturation, $A_s * L_s$*	V_c	617071	mm³	*Volume, $V_s - CV_c$*
B	0.96		*B Value*	S_r	100.0	%	*Degree of Saturation = $mc*G_s/e$*
				e	0.744		*Void Ratio, $[1000*G_s]/Rho_d-1$*
				mc	28.0	%	*Moisture Content*
				Rho_d	1526	kg/m³	*Dry mass density, Rho_d*V/V_c*

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

INPUT DATA

Project No.: 5810535301
Tested By: HEJ/JW
Test Date: 09/09&16/93
Reviewed By: JW/RLB RLB
Reviewed Date: 09/29/93

Project Name: SRS-ITP
Boring No: H-Bor-29
Sample No.: ST4
Depth: 25.0 - 27.0 ft.
Sample Description: See classification data

Line No.	Elapsed Time [min]	Cell Pressure [unit]	Pore Pressure [unit]	Axial Load [unit]	Burette Reading [unit]	Length Reading [unit]	Longitudinal or Torsional	Force or Torque Reading [V_{rms}]	Transducer Reading [V_{rms}]	Resonant Period [msec]
1	0.4	68.1	46.2	0	0.0	-1.6470	T	0.014	0.013	8.233
2	1.4	68.1	46.2	0	0.0	-1.6470	T	0.026	0.022	8.233
3	2.0	68.1	46.2	0	0.0	-1.6470	T	0.053	0.041	8.262
4	2.7	68.1	46.5	0	0.0	-1.6470	T	0.111	0.085	8.244
5	3.6	68.1	46.5	0	0.0	-1.6470	T	0.234	0.177	8.238
6	4.1	68.1	46.6	0	0.0	-1.6470	T	0.464	0.337	8.376
7	4.8	68.1	46.6	0	0.0	-1.6480	T	1.035	0.673	8.639
8	5.7	68.1	47.3	0	0.0	-1.6440	T	2.064	1.073	9.298
9	6.1	68.1	48.0	0	0.0	1.6370	T	2.949	1.301	9.886
10	7.0	68.1	49.1	0	0.0	-1.6280	T	3.684	1.372	10.493
11	8.5	68.1	50.2	0	0.0	-1.6260	T	0.015	0.013	8.762

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

INTERMEDIATE DATA

Project No.: 5810535301
Tested By: HEJ/JW
Test Date: 09/09&16/93
Reviewed By: JW/RLB RLB
Reviewed Date: 09/29/93

Project Name: SRS-ITP
Boring No: H-Bor-29
Sample No.: ST4
Depth: 25.0 - 27.0 ft.
Sample Description: See classification data

Specimen Volume [mm³]	Specimen Length [mm]	Specimen Diameter [mm]	Specimen Mass [grams]	Mass Density [kg/m³]	Polar Inertia J [kg-m²]	Inertia Stiffness Ratio T	Apparatus Damping Factor ADF	Dimensionless Frequency F	Damping Factor A
617071	152.31	71.82	1204.59	1952.1	0.000777	4.1585	0.00615	0.472	9.02
617071	152.31	71.82	1204.59	1952.1	0.000777	4.1585	0.00615	0.472	9.02
617071	152.31	71.82	1204.59	1952.1	0.000777	4.1585	0.00617	0.472	9.02
617071	152.31	71.82	1204.59	1952.1	0.000777	4.1585	0.00616	0.472	9.02
617071	152.31	71.82	1204.59	1952.1	0.000777	4.1585	0.00615	0.472	9.02
617071	152.31	71.82	1204.59	1952.1	0.000777	4.1585	0.00626	0.472	9.02
617071	152.31	71.82	1204.59	1952.1	0.000777	4.1585	0.00645	0.472	9.02
617071	152.31	71.82	1204.59	1952.1	0.000777	4.1585	0.00694	0.472	9.02
617071	154.38	71.34	1204.59	1952.1	0.000766	4.2150	0.00748	0.469	9.13
617071	152.32	71.82	1204.59	1952.1	0.000777	4.1588	0.00784	0.472	9.02
617071	152.32	71.82	1204.59	1952.1	0.000777	4.1589	0.00654	0.472	9.02

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

TEST RESULTS SUMMARY

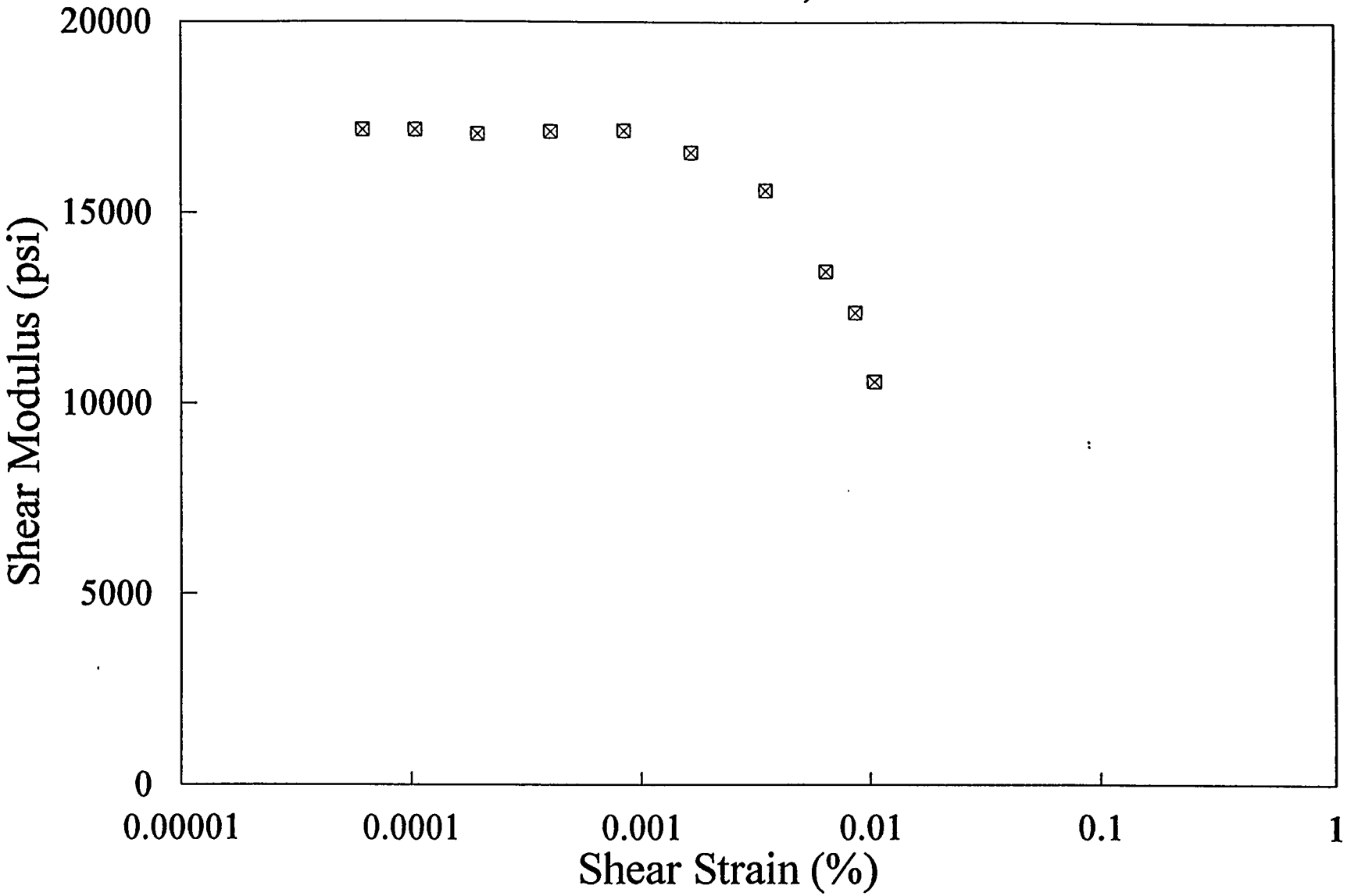
Project No.: 5810535301
Tested By: HEJ/JW
Test Date: 09/09&16/93
Reviewed By: JW/RLB RLB
Reviewed Date: 09/29/93

Project Name: SRS-ITP
Boring No: H-Bor-29
Sample No.: ST4
Depth: 25.0 - 27.0 ft.
Sample Description: See classification data

Line No.	Effective Confining Stress [kPa]	Principal Stress Ratio	Void Ratio e	Longitudinal or Torsional	No. of Vibration Cycles	Shear Modulus G [Mpa]	Shear Strain Amplititude [%]	Damping Ratio [%]	Shear Modulus G [psi]
1	151.17	1.00	0.744	T	2988	118.36	0.00006	5.12	17178
2	151.17	1.00	0.744	T	6996	118.36	0.00010	5.62	17178
3	150.62	1.00	0.744	T	4285	117.53	0.00019	6.16	17058
4	148.82	1.00	0.744	T	5095	118.04	0.00040	6.22	17132
5	148.82	1.00	0.744	T	6555	118.21	0.00083	6.30	17157
6	148.14	1.00	0.744	T	4155	114.35	0.00164	6.56	16597
7	148.14	1.00	0.744	T	4584	107.49	0.00349	7.34	15601
8	143.31	1.00	0.744	T	5614	92.80	0.00644	9.19	13469
9	138.49	1.00	0.744	T	2792	85.38	0.00866	10.85	12391
10	130.91	1.00	0.744	T	5089	72.88	0.01049	12.85	10578
11	123.33	1.00	0.744	T	9792	104.52	0.00007	5.49	15170

Shear Modulus vs. Shear Strain

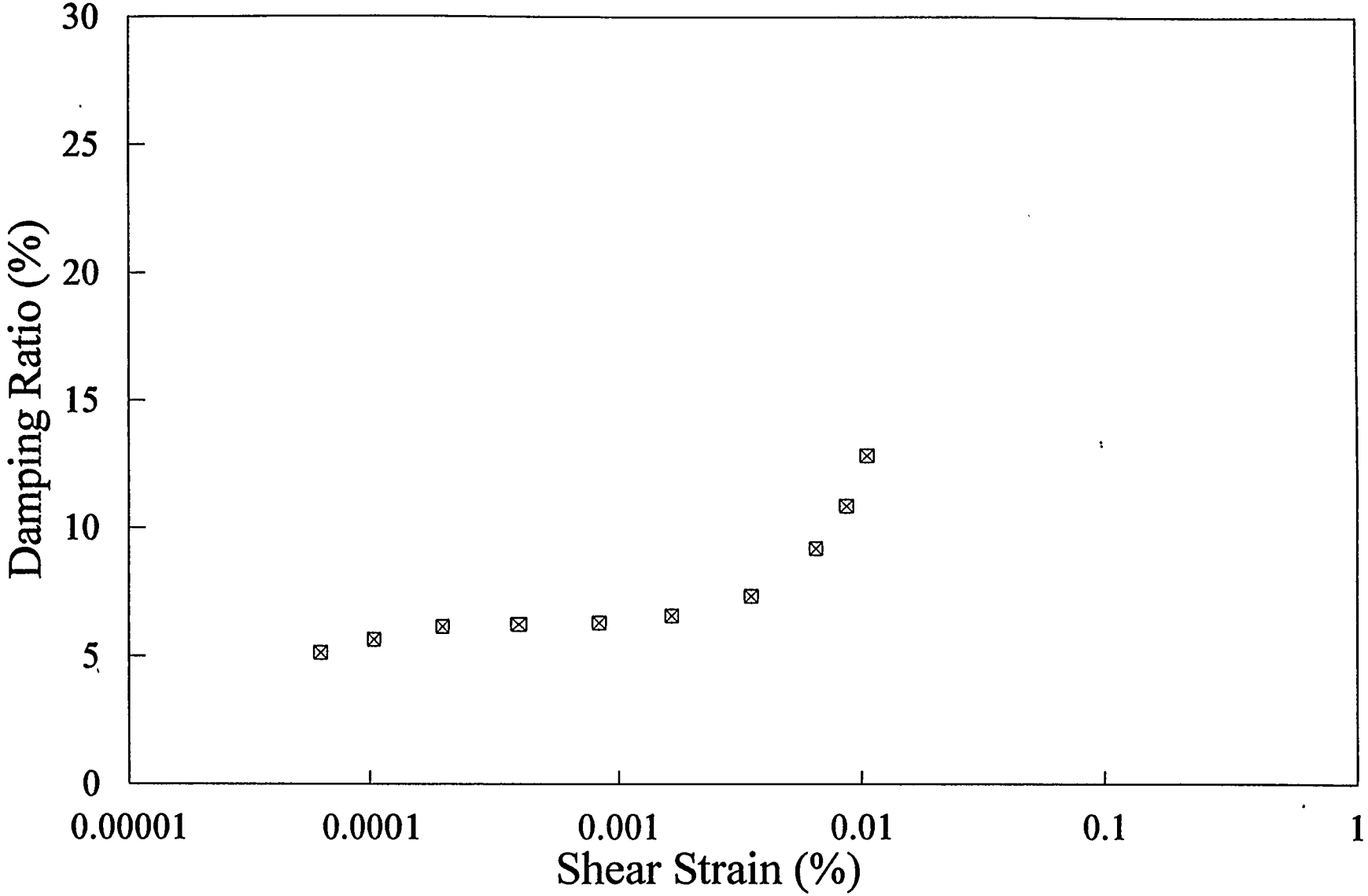
H-Bor-29, ST4



Law Engineering Project No.: 5810535301
SRS-ITP: Resonant Column

Damping Ratio vs. Shear Strain

H-Bor-29, ST4



Law Engineering Project No.: 5810535301
SRS-ITP: Resonant Column

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

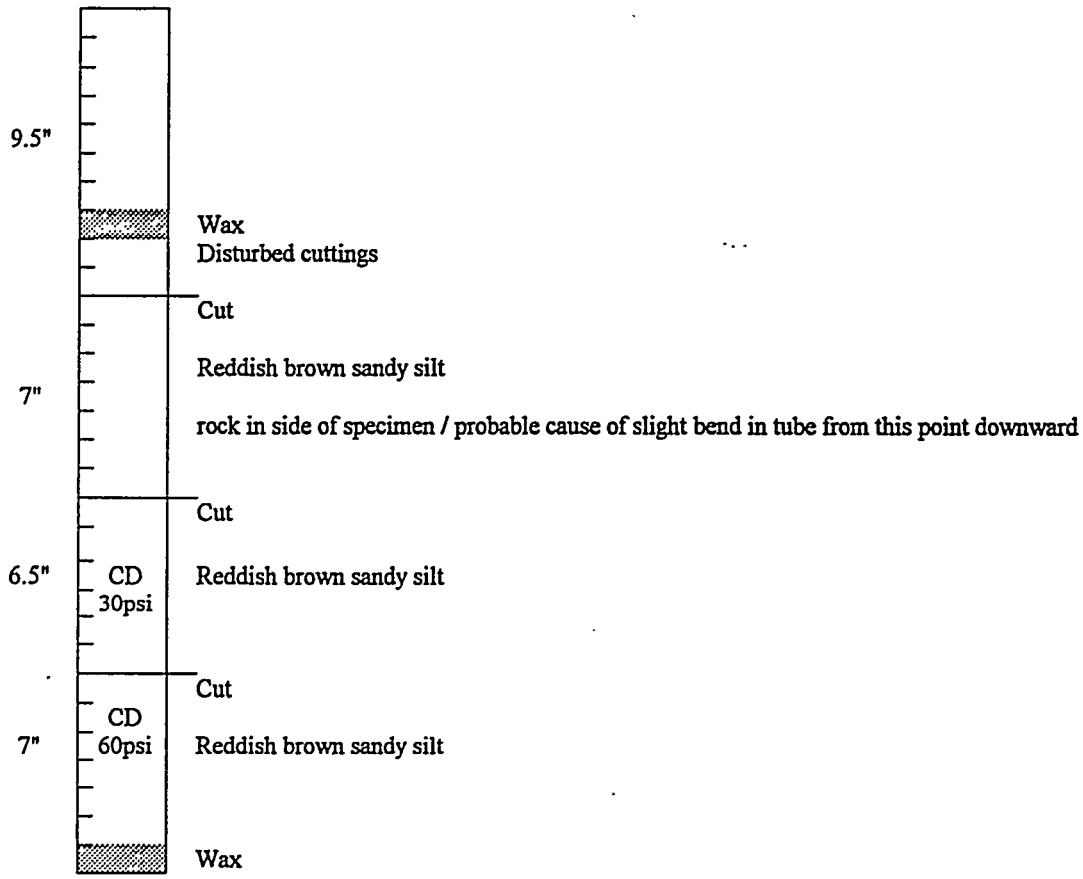
Project: SRS-ITP GEOTECHNICAL TESTING Date: 11-12-93

Boring No: H-Bor-29 Sample No: ST-5 Depth: 30' - 32'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION

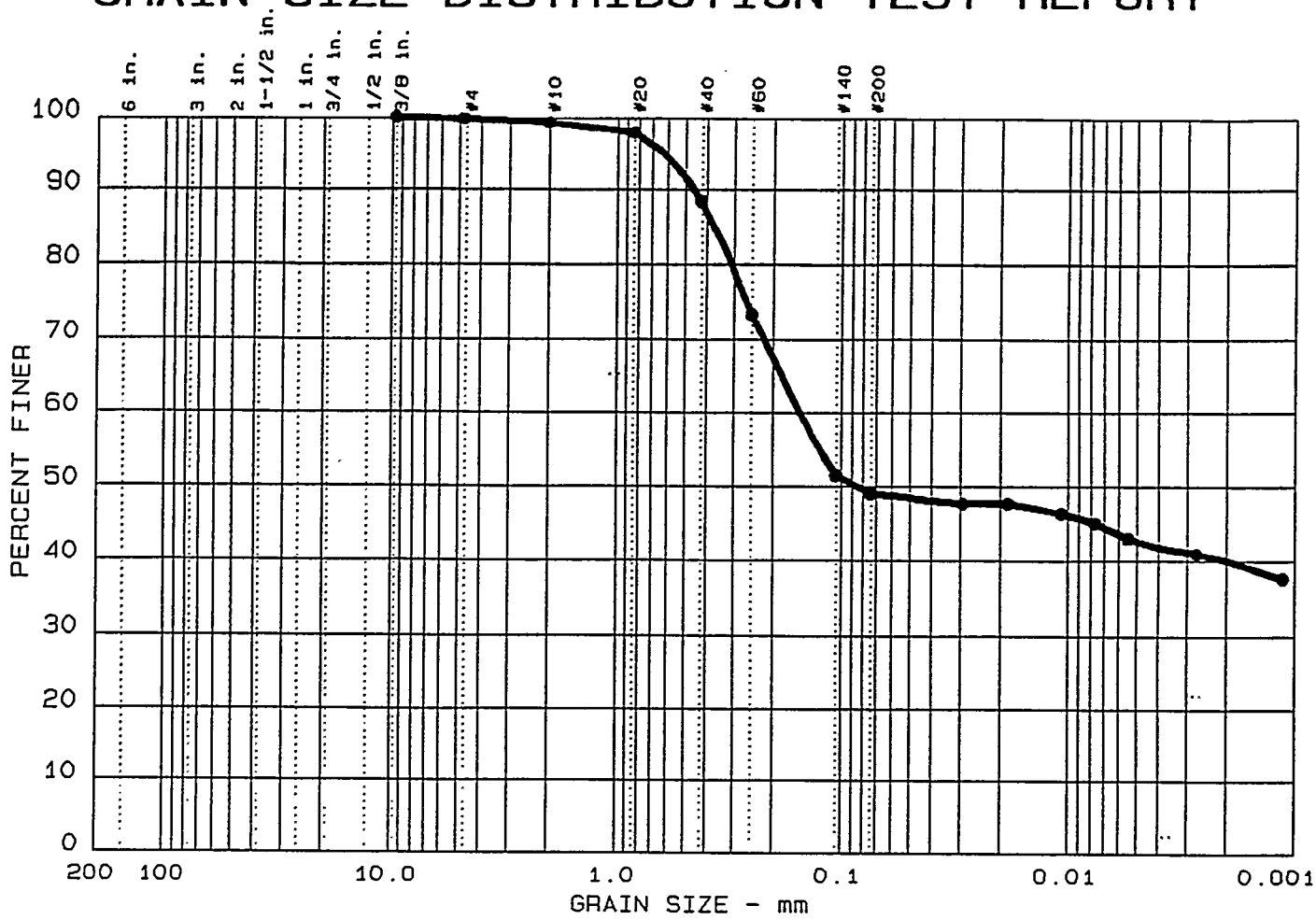


Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b29-st5.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	3	0.0	0.2	50.9	6.4	42.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.37	0.15	0.09					

MATERIAL DESCRIPTION	USCS	AASHTO
● Red Brown Silty Clayey Sand		

Project No.: 5810535301
Project: SRS-ITP
◆ Location: H-Bor-29 St-5 @ 30'32"

Date: December 8, 1993

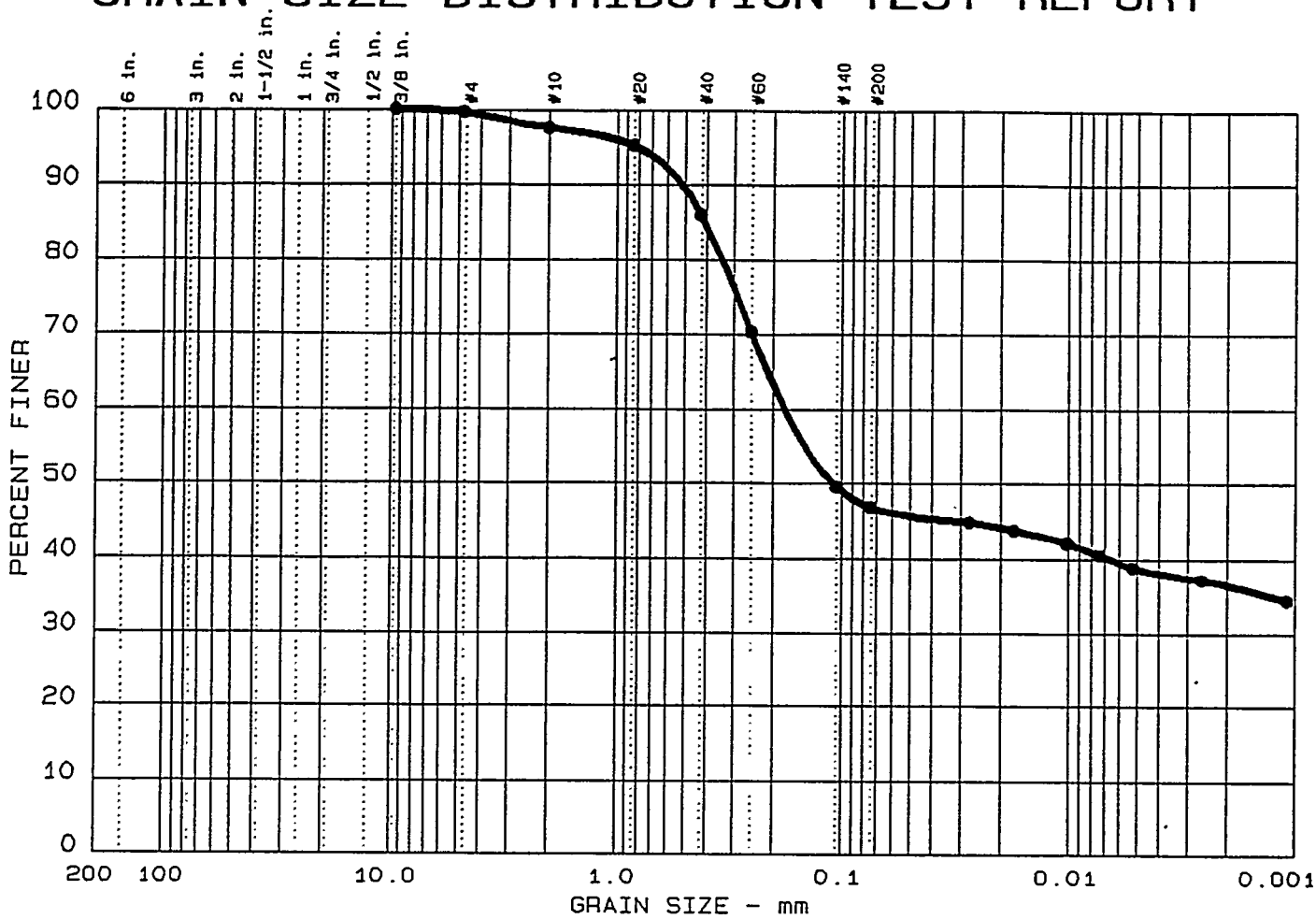
Remarks:
Tested by: BNS Ckd by: RLB
CD 30 psi
Atterberg Limits -200
LL=96 PL=39 PI=57

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	14	0.0	0.4	52.9	8.0	38.7

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	55	29	0.40	0.18	0.11					

MATERIAL DESCRIPTION	USCS	AASHTO
● Orange Brown Silty Clayey Sand	SC	A-7-6 (9.4)

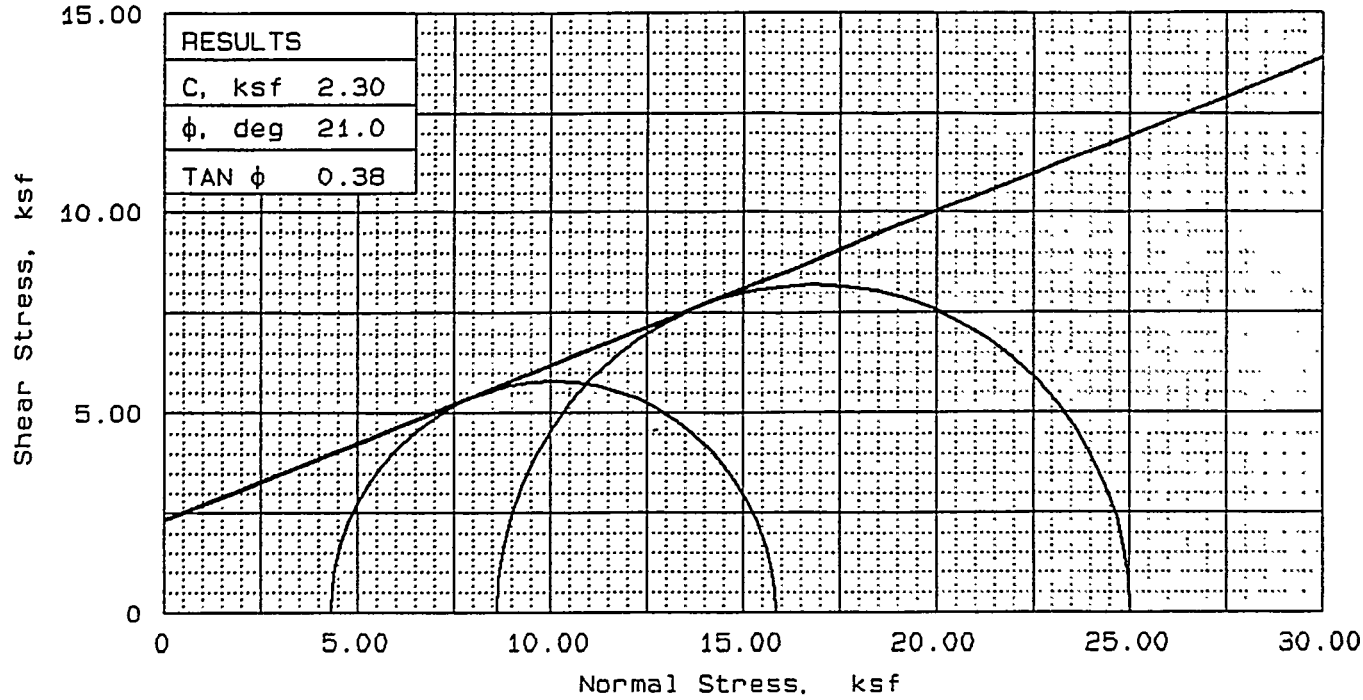
Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-29 ST-5 @ 30'32"

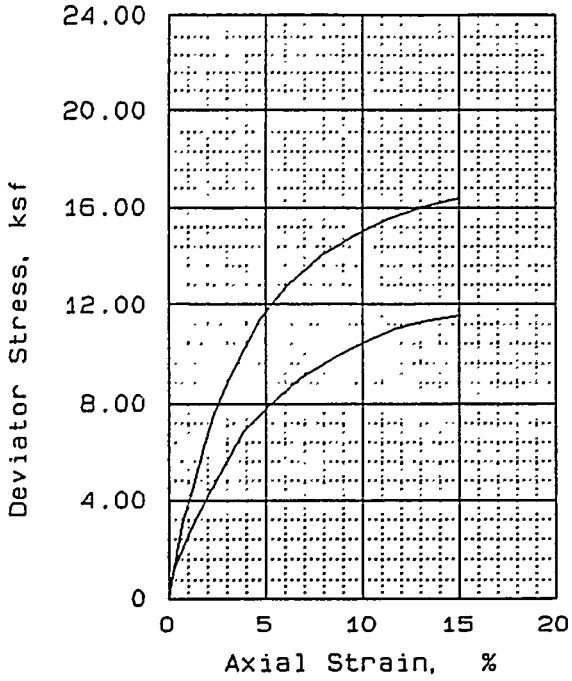
Date: December 8, 1993

Remarks:
Tested by: BNS
Reviewed by: RLB
CD 60 psi

GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Figure No.





SAMPLE NO.		1	2
INITIAL	WATER CONTENT, %	18.0	14.4
	DRY DENSITY, pcf	99.5	97.4
	SATURATION, %	71.0	52.7
	VOID RATIO	0.681	0.743
	DIAMETER, in	2.88	2 87
	HEIGHT, in	6.00	6 00
AT TEST	WATER CONTENT, %	25.0	25.9
	DRY DENSITY, pcf	100.2	99.7
	SATURATION, %	100 0	100.0
	VOID RATIO	0.669	0.704
	DIAMETER, in	2.87	2.85
	HEIGHT, in	5.99	5 98
BACK PRESSURE, ksf		6.48	8.64
CELL PRESSURE, ksf		10.80	17.28
FAILURE STRESS, ksf		11.54	16.38
PORE PRESSURE, ksf			
STRAIN RATE, %/min.		0.100	0.100
ULTIMATE STRESS, ksf			
PORE PRESSURE, ksf			
σ_1 FAILURE, ksf		15.86	25.02
σ_3 FAILURE, ksf		4.32	8.64

TYPE OF TEST:
Consolidated drained
SAMPLE TYPE: Undisturbed
DESCRIPTION:

~~LL= 55 PL= 26 PI= 29.0~~
~~SPECIFIC GRAVITY= 2.72~~
REMARKS: Tested by: HEJ

Reviewed by: RLB

FIG. NO.

CLIENT: SRS

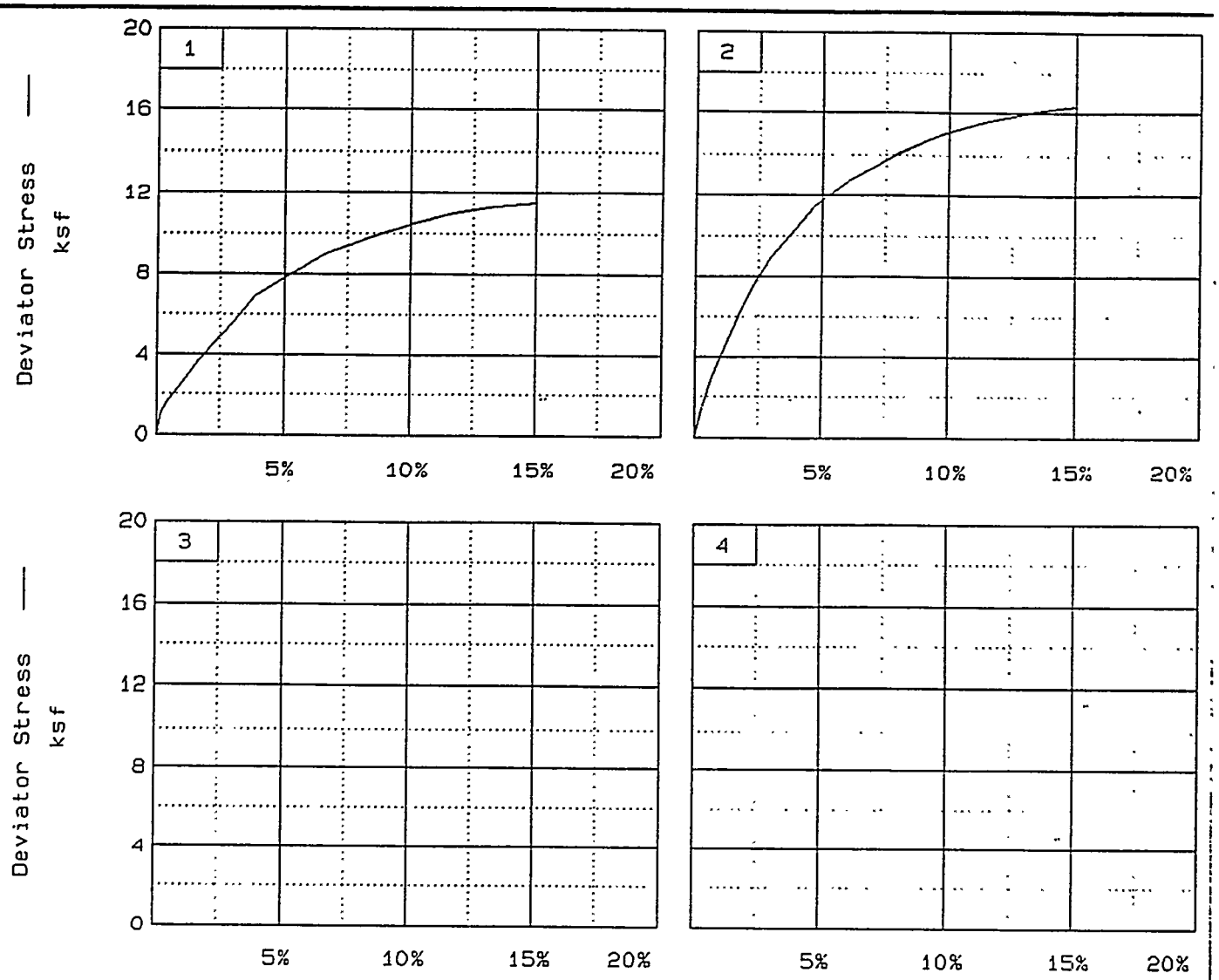
PROJECT: SRS-ITP

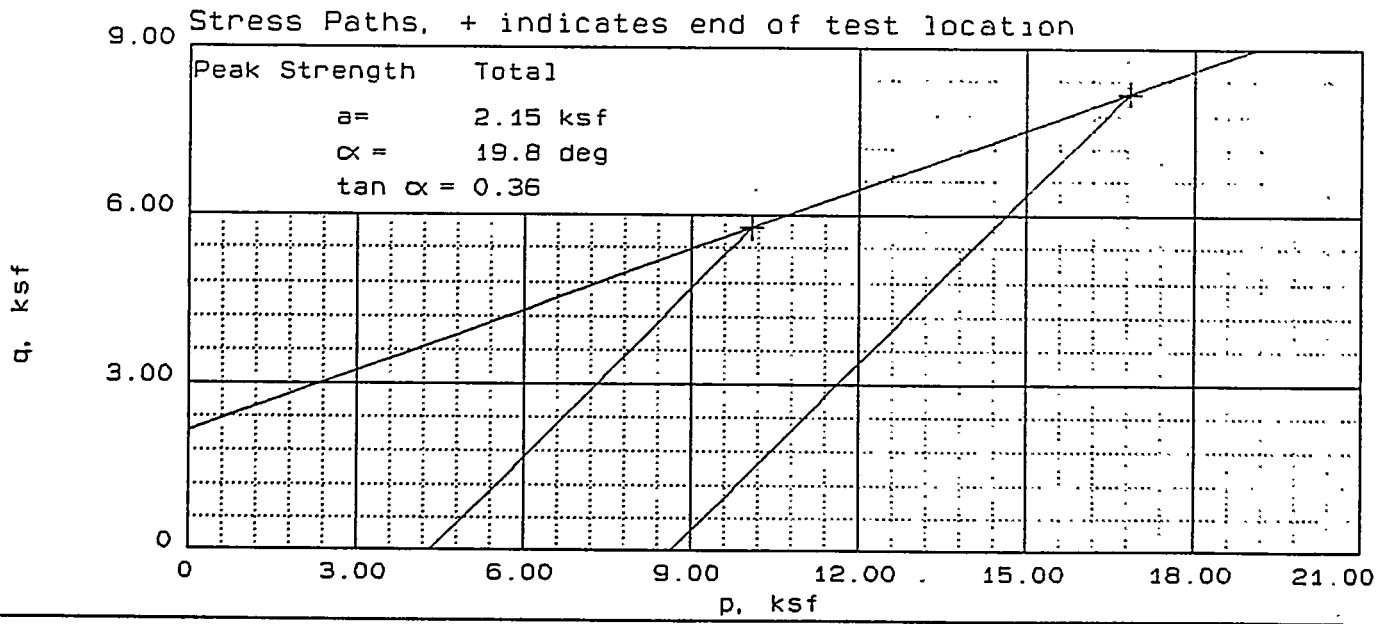
SAMPLE LOCATION: H Bor 29 ST-5 @ 30-32 Ft.

PROJ. NO.: 5810535301 DATE: Dec.13, 1993

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.



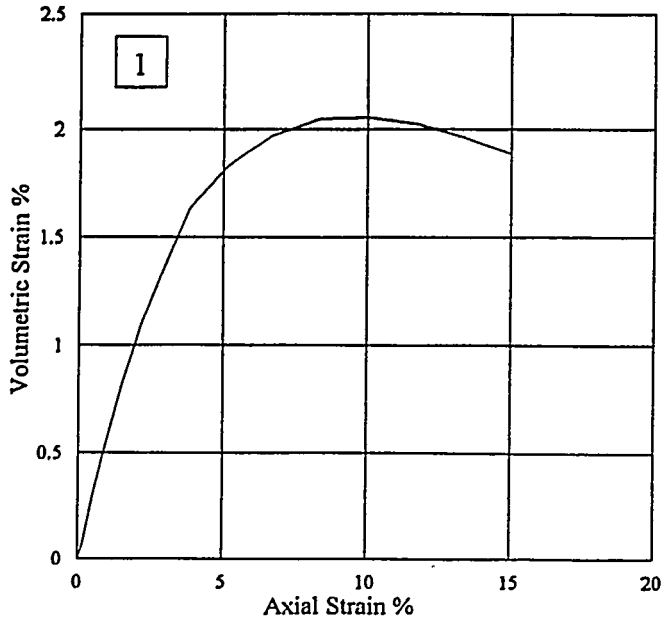


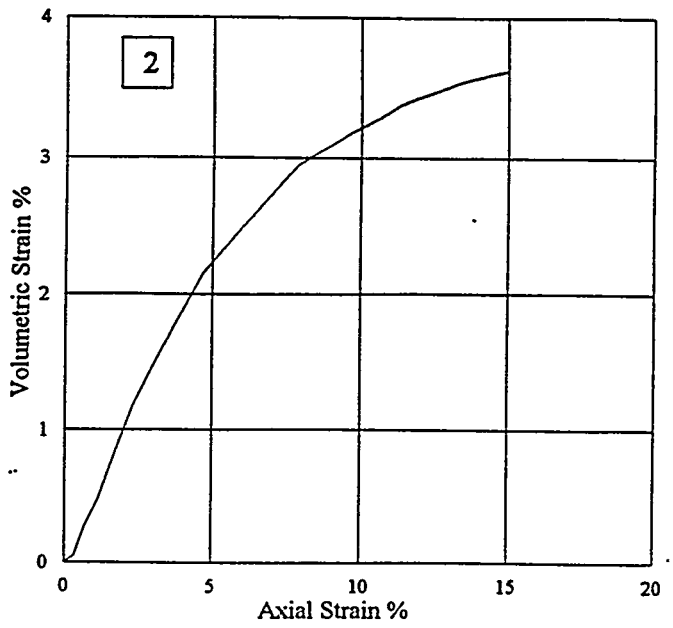
Client: SRS

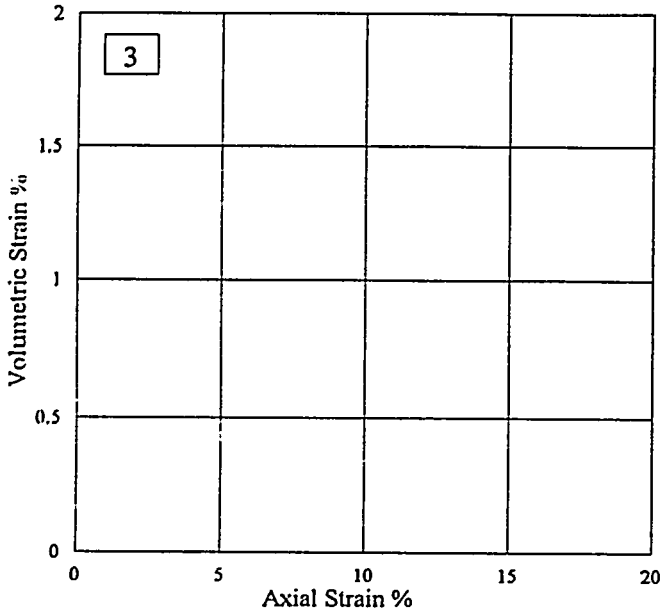
Project: SRS-ITP

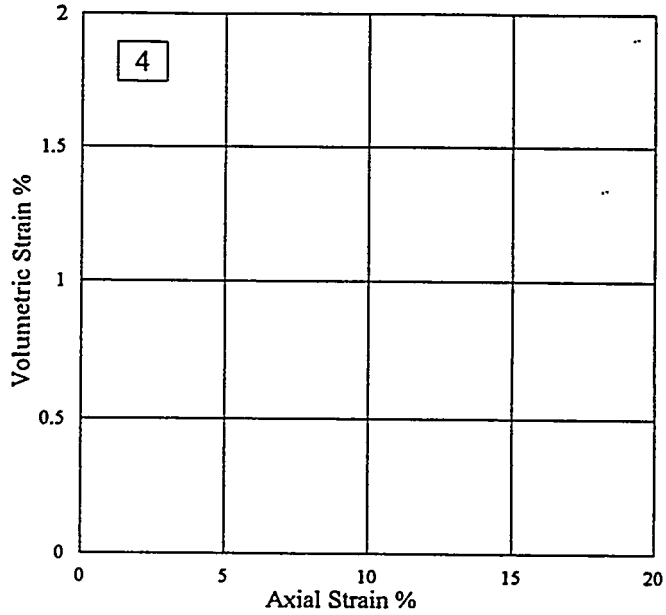
Location: H Bor 29 ST-5 @ 30-32 Ft.

File: 535301H Project No.: 5810535301 Page 2/2 Fig. No. ____









Client: SRS
Project: SRS-ITP
Location: H Bor 29 ST-5 @ 30-32 Ft.
File: Project No.: 5810535301 Page 2 / 2 Fig. No. _____

TRIAXIAL COMPRESSION TEST
Consolidated drained

12-13-1993
10:59 am

Project Data

Project No.: 5810535301 Date: Dec.13,1993 Data file: 535301H
Client: SRS
Project: SRS-ITP
Sample location: H Bor 29 ST-5 @ 30-32 Ft.
Sample description:
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.68 ~~LL= 55 PL= 26 PI= 29~~

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.87	
Height change, in		0.02	
Height, in	6.00	5.99	
Weight, grams	1202.0		
Water volume change, cc		-70.64	
Moisture, %	18.0	25.0	20.0 18.0
Dry density, pcf	99.5	100.2	
Saturation, %	71.0	100.0	
Void ratio	0.681	0.669	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 75 psi
Consolidation back pressure = 45 psi
Consolidation effective confining stress = 4.32 ksf
Peak deviator stress = 11.54 ksf at reading no. 14
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	4.32	4.32	1.00	4.32	0.00
1	0.0100	0.010	50.00	50.0	0.2	1.11	4.32	5.43	1.26	4.88	0.56
2	0.0300	0.030	78.00	78.0	0.5	1.73	4.32	6.05	1.40	5.18	0.86
3	0.0600	0.060	117.00	117.0	1.0	2.58	4.32	6.90	1.60	5.61	1.29
	^ 0900	0.090	156.00	156.0	1.5	3.42	4.32	7.74	1.79	6.03	1.71
	300	0.130	204.00	204.0	2.2	4.44	4.32	8.76	2.03	6.54	2.22

LAW ENGINEERING, INC.

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	.1800	0.180	260.00	260.0	3.0	5.61	4.32	9.93	2.30	7.13	2.81
7	0.2300	0.230	322.00	322.0	3.8	6.89	4.32	11.21	2.60	7.77	3.45
8	0.3100	0.310	375.00	375.0	5.2	7.92	4.32	12.24	2.83	8.28	3.96
9	0.4000	0.400	432.00	432.0	6.7	8.98	4.32	13.30	3.08	8.81	4.49
10	0.5000	0.500	480.00	480.0	8.4	9.79	4.32	14.11	3.27	9.22	4.90
11	0.6000	0.600	523.00	523.0	10.0	10.48	4.32	14.80	3.43	9.56	5.24
12	0.7000	0.700	560.00	560.0	11.7	11.01	4.32	15.33	3.55	9.83	5.51
13	0.8000	0.800	589.00	589.0	13.4	11.36	4.32	15.68	3.63	10.00	5.68
14	0.9000	0.900	610.00	610.0	15.0	11.54	4.32	15.86	3.67	10.09	5.77

TRIAXIAL COMPRESSION TEST
Consolidated drained

12-13-1993
11:01 am

Project Data

Project No.: 5810535301 Date: Dec.13,1993 Data file: 535301H
Client: SRS
Project: SRS-ITP
Sample location: H Bor 29 ST-5 @ 30-32 Ft.
Sample description:
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 2 Data

Type of sample: Undisturbed
Specific Gravity= 2.72 LL= 55 PL= 26 PI= 29

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.87	2.85	
Height change, in		0.03	
Height, in	6.00	5.98	
Weight, grams	1138.9		
Water volume change, cc		%-114.22	19.5
Moisture, %	14.4	25.9	14.4
Dry density, pcf	97.4	99.7	
Saturation, %	52.7	100.0	
Void ratio	0.743	0.704	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 120 psi
Consolidation back pressure = 60 psi
Consolidation effective confining stress = 8.64 ksf
Peak deviator stress = 16.38 ksf at reading no. 13
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	8.64	8.64	1.00	8.64	0.00
1	0.0200	0.020	69.00	69.0	0.3	1.56	8.64	10.20	1.18	9.42	0.78
2	0.0400	0.040	132.00	132.0	0.7	2.96	8.64	11.60	1.34	10.12	1.48
3	0.0700	0.070	198.00	198.0	1.2	4.42	8.64	13.06	1.51	10.85	2.21
	.1100	0.110	289.00	289.0	1.8	6.41	8.64	15.05	1.74	11.85	3.21
	.1400	0.140	344.00	344.0	2.3	7.60	8.64	16.24	1.88	12.44	3.80

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	1800	0.180	407.00	407.0	3.0	8.93	8.64	17.57	2.03	13.10	4.46
7	0.2800	0.280	531.00	531.0	4.7	11.44	8.64	20.08	2.32	14.36	5.72
8	0.3600	0.360	600.00	600.0	6.0	12.75	8.64	21.39	2.48	15.01	6.37
9	0.4700	0.470	673.00	673.0	7.9	14.02	8.64	22.66	2.62	15.65	7.01
10	0.5800	0.580	731.00	731.0	9.7	14.92	8.64	23.56	2.73	16.10	7.46
11	0.6800	0.680	776.00	776.0	11.4	15.55	8.64	24.19	2.80	16.41	7.77
12	0.8000	0.800	821.00	821.0	13.4	16.08	8.64	24.72	2.86	16.68	8.04
13	0.8950	0.895	852.00	852.0	15.0	16.38	8.64	25.02	2.90	16.83	8.19

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

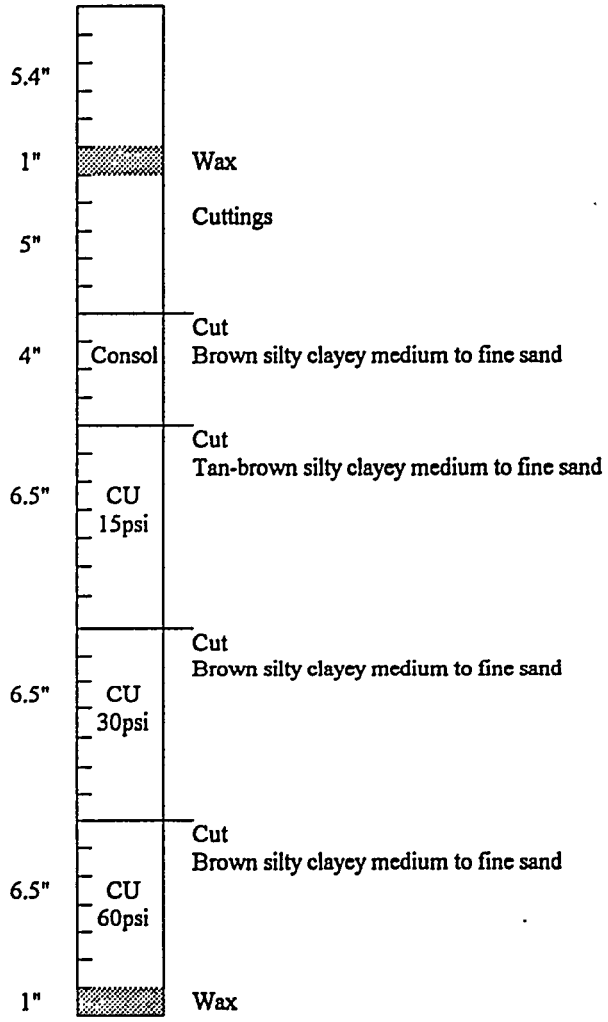
Project: SRS-ITP GEOTECHNICAL TESTING Date: 11-09-93

Boring No: H-Bor-29 Sample No: ST-6 Depth: 35' - 37'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 36.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION

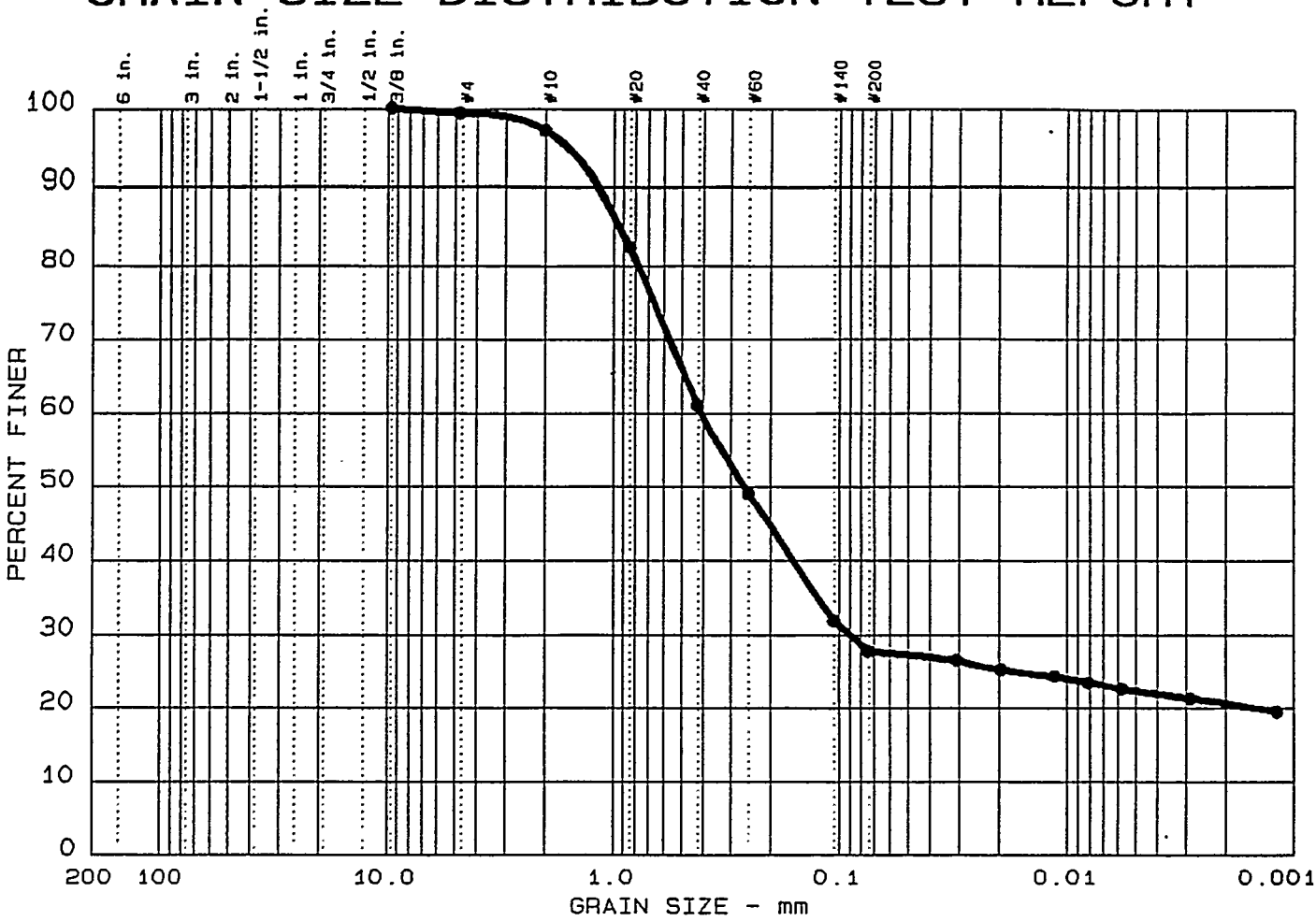


Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b29-st6.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	1	0.0	0.6	71.6	5.4	22.4

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	57	37	0.92	0.40	0.26	0.089				

MATERIAL DESCRIPTION	USCS	AASHTO
● Light Brown Yellow Silty Clayey Sand	SC	A-2-7 (3.5)

Project No.: 5810535301
Project: SRS-ITP
◆ Location: H-Bor-29 ST-6 @ 35 Ft

Date: December 8, 1993

Remarks:

Tested by: BNS

Reviewed by: RLB

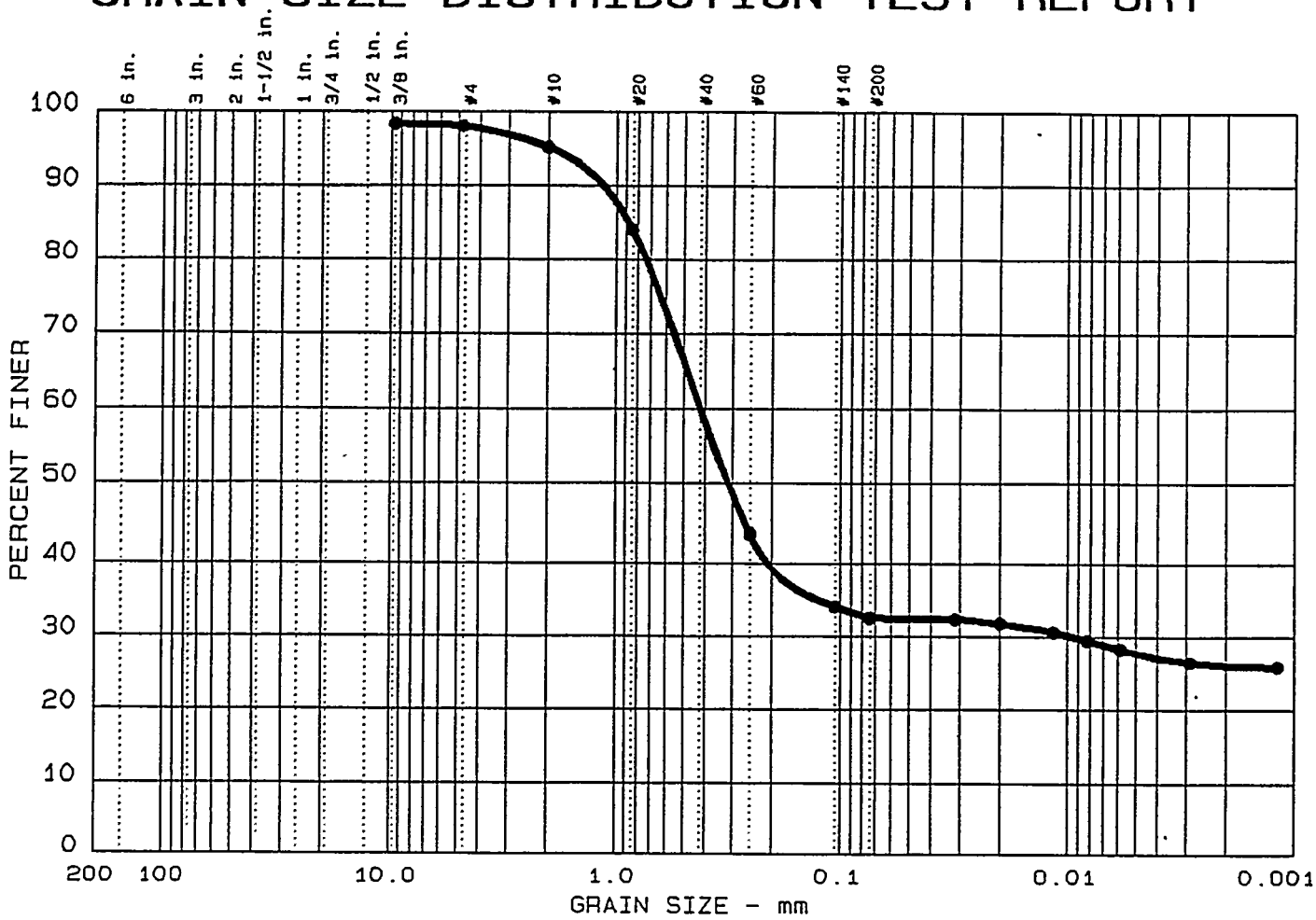
CU 15 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	16	0.0	2.1	65.6	4.6	27.7

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.87	0.42	0.31	0.010				

MATERIAL DESCRIPTION	USCS	AASHTO
● Orange Brown Clayey Sand		

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-29 ST-6 @ 35'

Date: December 8, 1993

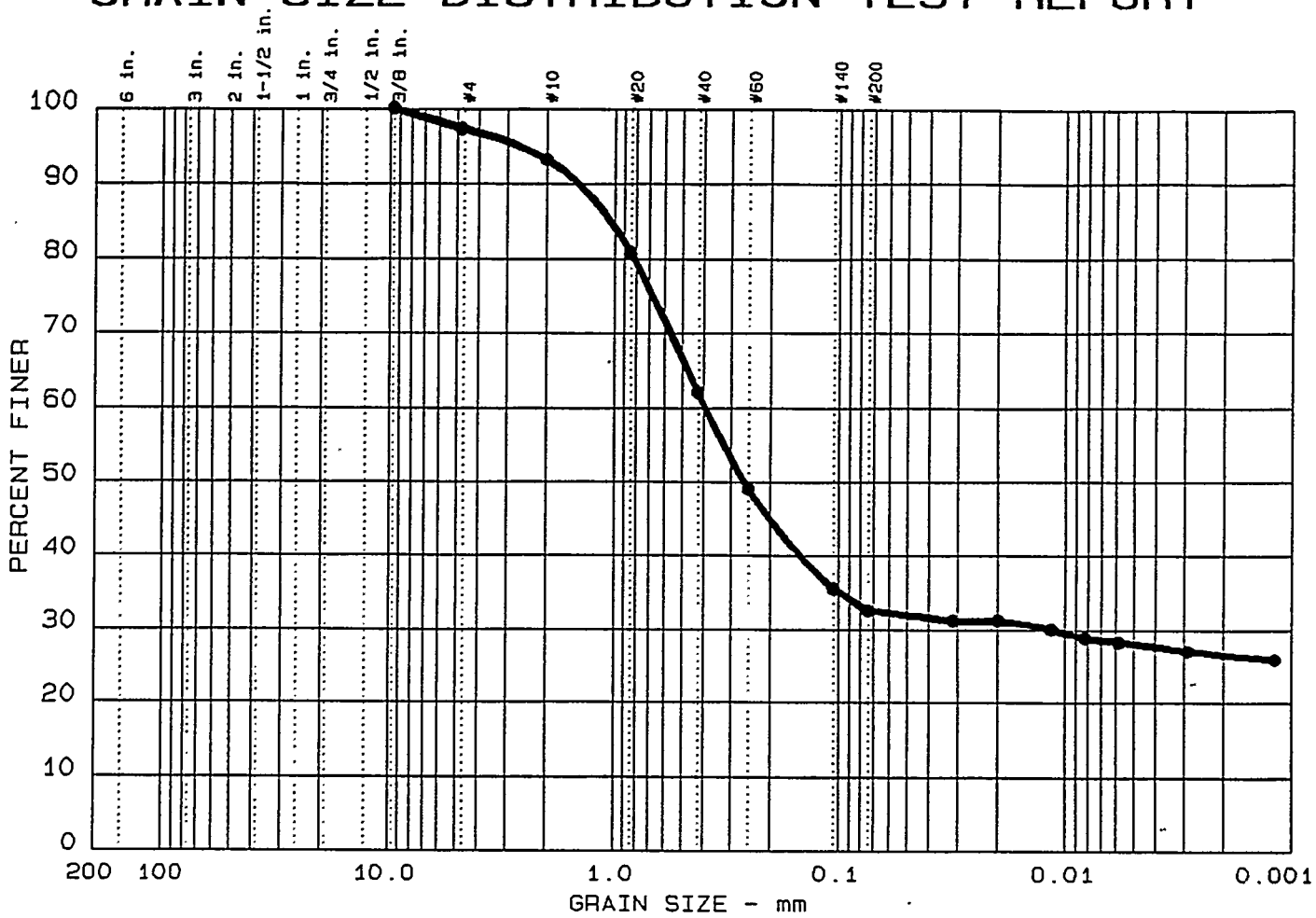
Remarks:
Tested by: GNS Ckd by: RLB
CU 30 psi
Atterberg Limits -200
LL=110 PL=36 PI=74

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	4	0.0	2.6	64.9	4.4	28.1

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	64	43	1.02	0.39	0.26	0.011				

MATERIAL DESCRIPTION	USCS	AASHTO
● Brown Clayey Sand	SC	A-2-7 (5.6)

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-29 ST-6 @ 35 Ft

Date: December 8, 1993

Remarks:

Tested by: BNS

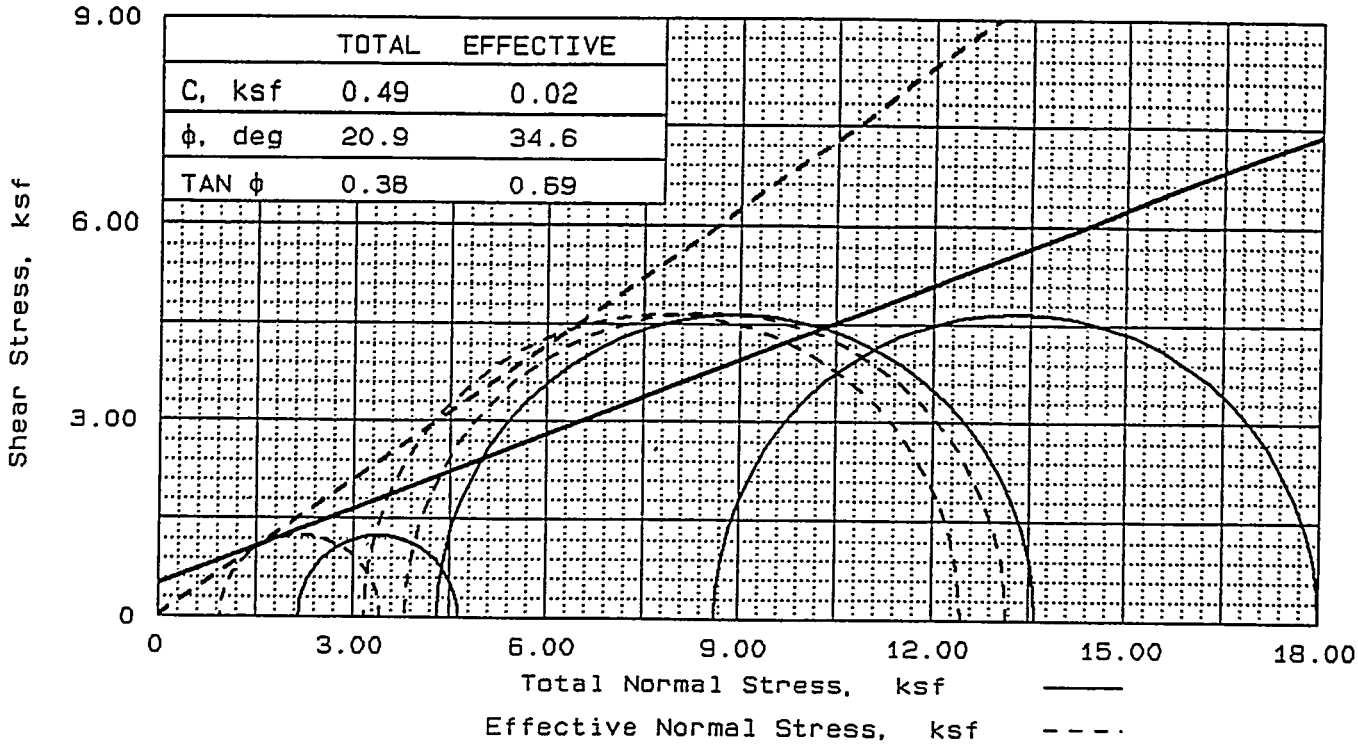
Reviewed by: RLB

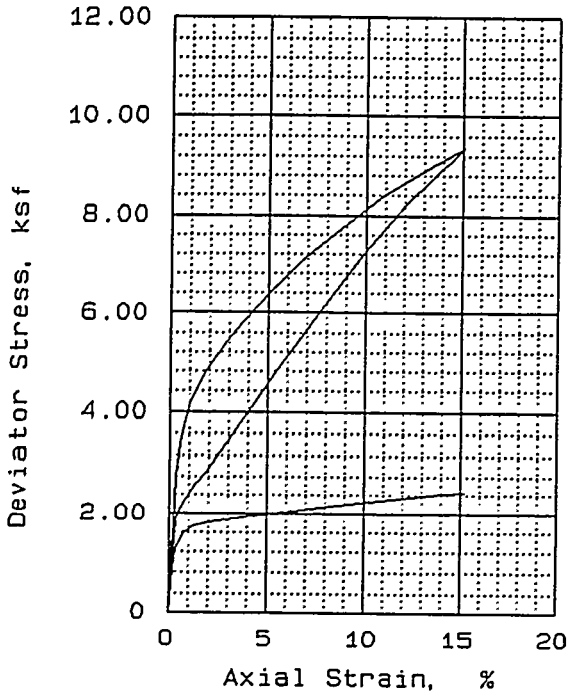
CU 60 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No. 1





SAMPLE NO.		1	2	3
INITIAL	WATER CONTENT, %	14.9	14.6	21.9
	DRY DENSITY, pcf	111.8	113.4	103.9
	SATURATION, %	81.6	84.0	97.5
	VOID RATIO	0.485	0.459	0.599
	DIAMETER, in	2.88	2.87	2.87
	HEIGHT, in	6.00	6.00	6.00
AT TEST	WATER CONTENT, %	16.0	16.1	22.5
	DRY DENSITY, pcf	116.4	116.0	103.8
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.426	0.426	0.599
	DIAMETER, in	2.83	2.84	2.87
	HEIGHT, in	5.97	5.99	6.00
BACK PRESSURE, ksf		8.04	7.26	8.01
CELL PRESSURE, ksf		16.68	11.58	10.17
FAILURE STRESS, ksf		9.35	9.29	2.47
PORE PRESSURE, ksf		12.86	8.41	9.22
STRAIN RATE, %/min.		0.100	0.100	0.100
ULTIMATE STRESS, ksf				
PORE PRESSURE, ksf				
$\bar{\sigma}_1$ FAILURE, ksf		13.17	12.46	3.42
$\bar{\sigma}_3$ FAILURE, ksf		3.82	3.17	0.95

TYPE OF TEST:
CU with pore pressures
SAMPLE TYPE: Undisturbed
DESCRIPTION:

REMARKS: Tested by: HEJ

Reviewed by: RLB

FIG. NO.

CLIENT: SRS

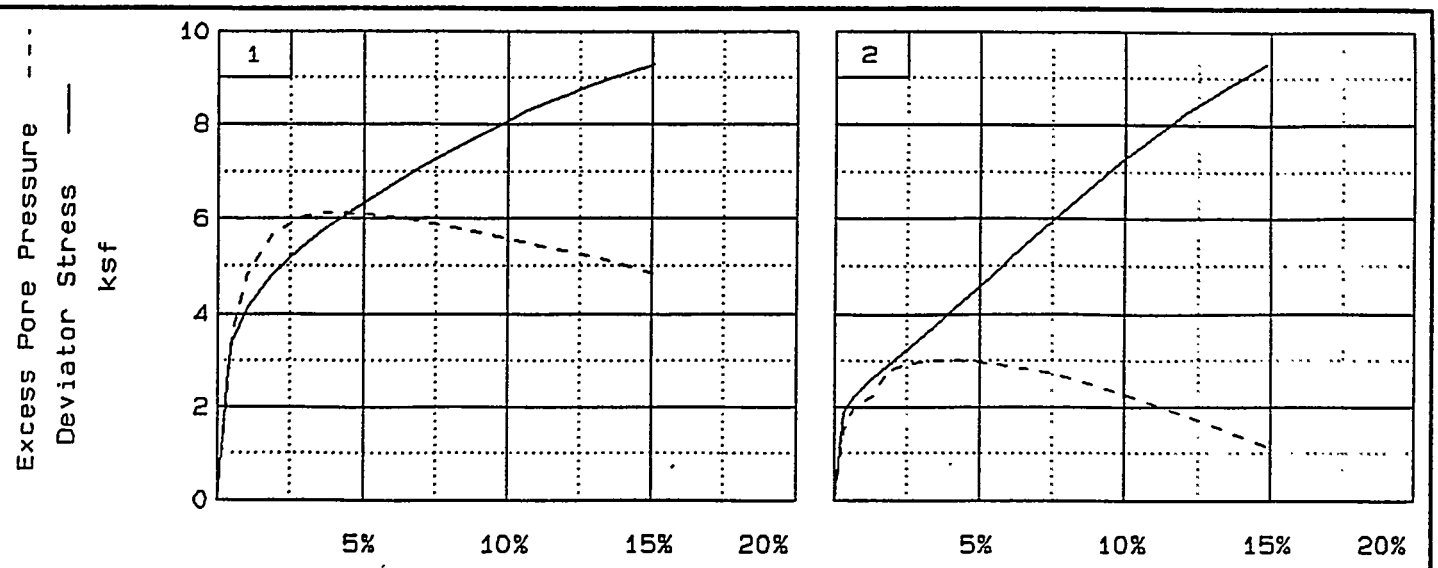
PROJECT: SRS ITP

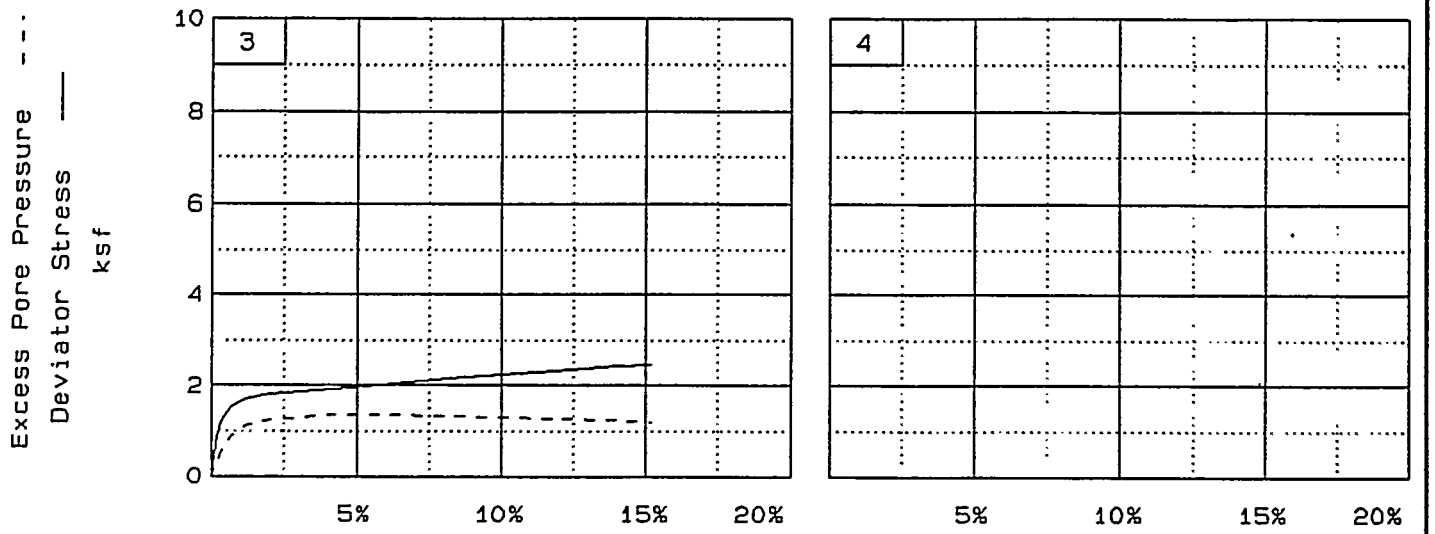
SAMPLE LOCATION: H Bor 29 ST-6 @ 35 Ft.

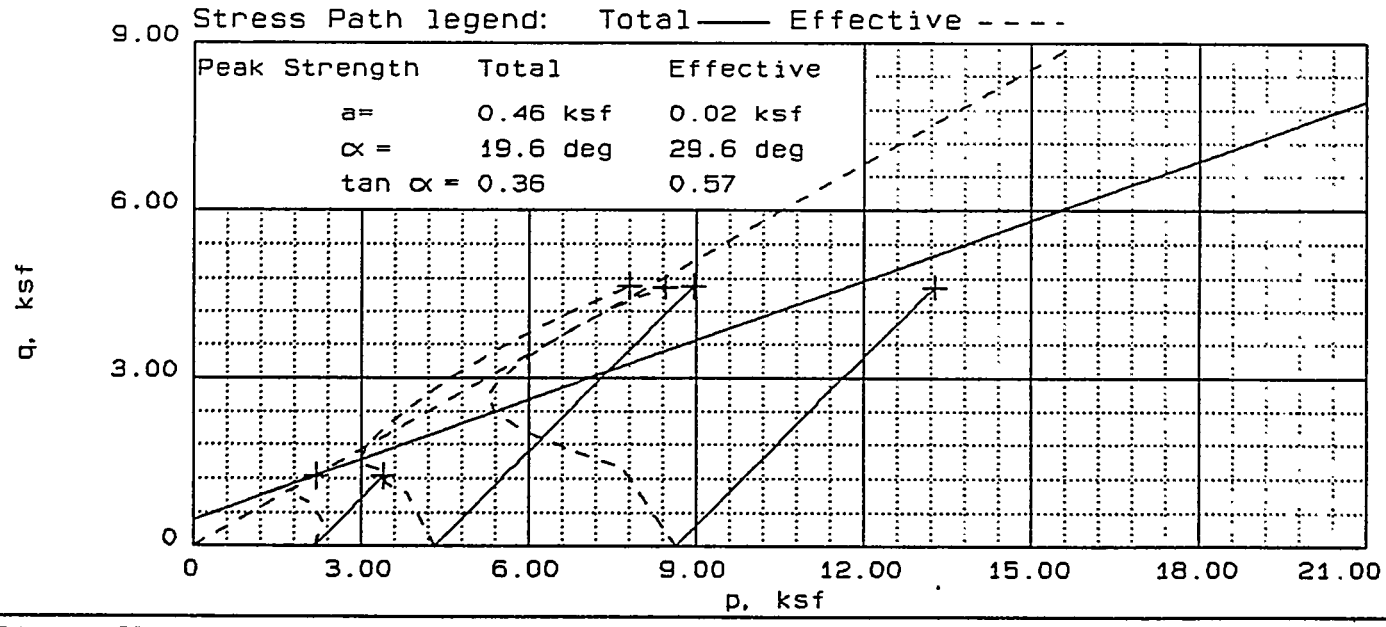
PROJ. NO.: 5810535301 DATE: Dec. 8, 1993

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.







Client: SRS

Project: SRS ITP

Location: H Bor 29 ST-6 @ 35 Ft.

File: 535301A Project No.: 5810535301 Page 2/2 Fig. No. ____

TRIAXIAL COMPRESSION TEST
CU with pore pressures

12-08-1993
3:16 pm

Project Data

Project No.: 5810535301 Date: Dec. 8,1993 Data file: 535301A
Client: SRS
Project: SRS ITP
Sample location: H Bor 29 ST-6 @ 35 Ft.
Sample description:
Remarks: Tested by: HET
Reviewed by: RLB Fig No.

Sample No. 3 Data

Type of sample: Undisturbed
Specific Gravity= 2.66 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.87	2.87	
Height change, in		0.00	
Height, in	6.00	6.00	
Weight, grams	1290.4		
Water volume change, cc		-6.21	
Moisture, %	21.9	22.5	19.7
Dry density, pcf	103.9	103.8	
Saturation, %	97.5	100.0	
Void ratio	0.599	0.599	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 70.6 psi
Consolidation back pressure = 55.6 psi
Consolidation effective confining stress = 2.16 ksf
Peak deviator stress = 2.47 ksf at reading no. 11
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	2.16	2.16	1.00	55.6	2.16	0.00
1	0.0100	0.010	40.00	40.0	0.2	0.89	1.86	2.75	1.48	57.7	2.30	0.44
2	0.0200	0.020	57.00	57.0	0.3	1.26	1.57	2.83	1.81	59.7	2.20	0.63
3	0.0400	0.040	70.00	70.0	0.7	1.55	1.28	2.83	2.21	61.7	2.06	0.77
'	0.0700	0.070	78.00	78.0	1.2	1.72	1.05	2.77	2.63	63.3	1.91	0.86
	1200	0.120	83.00	83.0	2.0	1.81	0.89	2.70	3.03	64.4	1.80	0.91

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
	..2500	0.250	90.50	90.5	4.2	1.93	0.78	2.71	3.48	65.2	1.74	0.97
7	0.3500	0.350	96.00	96.0	5.8	2.01	0.79	2.80	3.54	65.1	1.80	1.01
8	0.4900	0.490	105.00	105.0	8.2	2.15	0.81	2.95	3.66	65.0	1.88	1.07
9	0.7100	0.710	118.50	118.5	11.8	2.33	0.88	3.20	3.65	64.5	2.04	1.16
10	0.8400	0.840	127.00	127.0	14.0	2.43	0.91	3.34	3.68	64.3	2.12	1.22
11	0.9100	0.910	131.00	131.0	15.2	2.47	0.95	3.42	3.60	64.0	2.19	1.24

TRIAXIAL COMPRESSION TEST
CU with pore pressures

2-24-1994
6:14 pm

Project Data

Project No.: 5810535301 Date: Dec. 8,1993 Data file: 535301A
Client: SRS
Project: SRS ITP
Sample location: H Bor 29 ST-6 @ 35 Ft.
Sample description:
Remarks: Tested by: HES
Reviewed by: RLB Fig No.

Sample No. 2 Data

Type of sample: Undisturbed
Specific Gravity= 2.65 LL= 64 PL= 21 PI= 43

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.87	2.84	
Height change, in		0.01	
Height, in	6.00	5.99	
Weight, grams	1327.3		
Water volume change, cc		-17.76	
Moisture, %	14.6	16.1	15.4
Dry density, pcf	113.4	116.0	
Saturation, %	84.0	100.0	
Void ratio	0.459	0.426	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 80.4 psi
Consolidation back pressure = 50.4 psi
Consolidation effective confining stress = 4.32 ksf
Peak deviator stress = 9.29 ksf at reading no. 13
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	4.32	4.32	1.00	50.4	4.32	0.00
1	0.0200	0.020	83.00	83.0	0.3	1.88	2.87	4.74	1.65	60.5	3.80	0.94
2	0.0400	0.040	98.00	98.0	0.7	2.21	2.33	4.54	1.95	64.2	3.44	1.10
3	0.0800	0.080	118.00	118.0	1.3	2.64	2.06	4.70	2.28	66.1	3.38	1.32
	0.1100	0.110	130.00	130.0	1.8	2.89	1.54	4.43	2.88	69.7	2.99	1.45
	0.1400	0.140	142.00	142.0	2.3	3.14	1.43	4.57	3.20	70.5	3.00	1.57

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
	0.1900	0.190	163.00	163.0	3.2	3.58	1.32	4.90	3.70	71.2	3.11	1.79
7	0.2500	0.250	189.00	189.0	4.2	4.11	1.31	5.42	4.13	71.3	3.36	2.05
8	0.3200	0.320	221.00	221.0	5.3	4.74	1.38	6.12	4.43	70.8	3.75	2.37
9	0.3900	0.390	255.00	255.0	6.5	5.40	1.48	6.89	4.64	70.1	4.19	2.70
10	0.4500	0.450	284.00	284.0	7.5	5.95	1.60	7.55	4.72	69.3	4.58	2.98
11	0.5900	0.590	352.00	352.0	9.8	7.19	2.00	9.19	4.59	66.5	5.60	3.60
12	0.7200	0.720	412.00	412.0	12.0	8.22	2.51	10.72	4.28	63.0	6.61	4.11
13	0.8900	0.890	480.00	480.0	14.9	9.26	3.17	12.43	3.92	58.4	7.80	4.63

TRIAXIAL COMPRESSION TEST 12-09-1993
CU with pore pressures 11:55 am

Project Data

Project No.: 5810535301 Date: Dec. 8,1993 Data file: 535301A
Client: SRS
Project: SRS ITP
Sample location: H Bor 29 ST-6 @ 35 Ft.
Sample description:
Remarks: Tested by: HEJ
Reviewed by: RLB Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.66 LL= 64 PL= 21 PI= 43

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.83	
Height change, in		0.03	
Height, in	6.00	5.97	
Weight, grams	1316.2		
Water volume change, cc		-13.02	
Moisture, %	14.9	16.0	15.7
Dry density, pcf	111.8	116.4	
Saturation, %	81.6	100.0	
Void ratio	0.485	0.426	

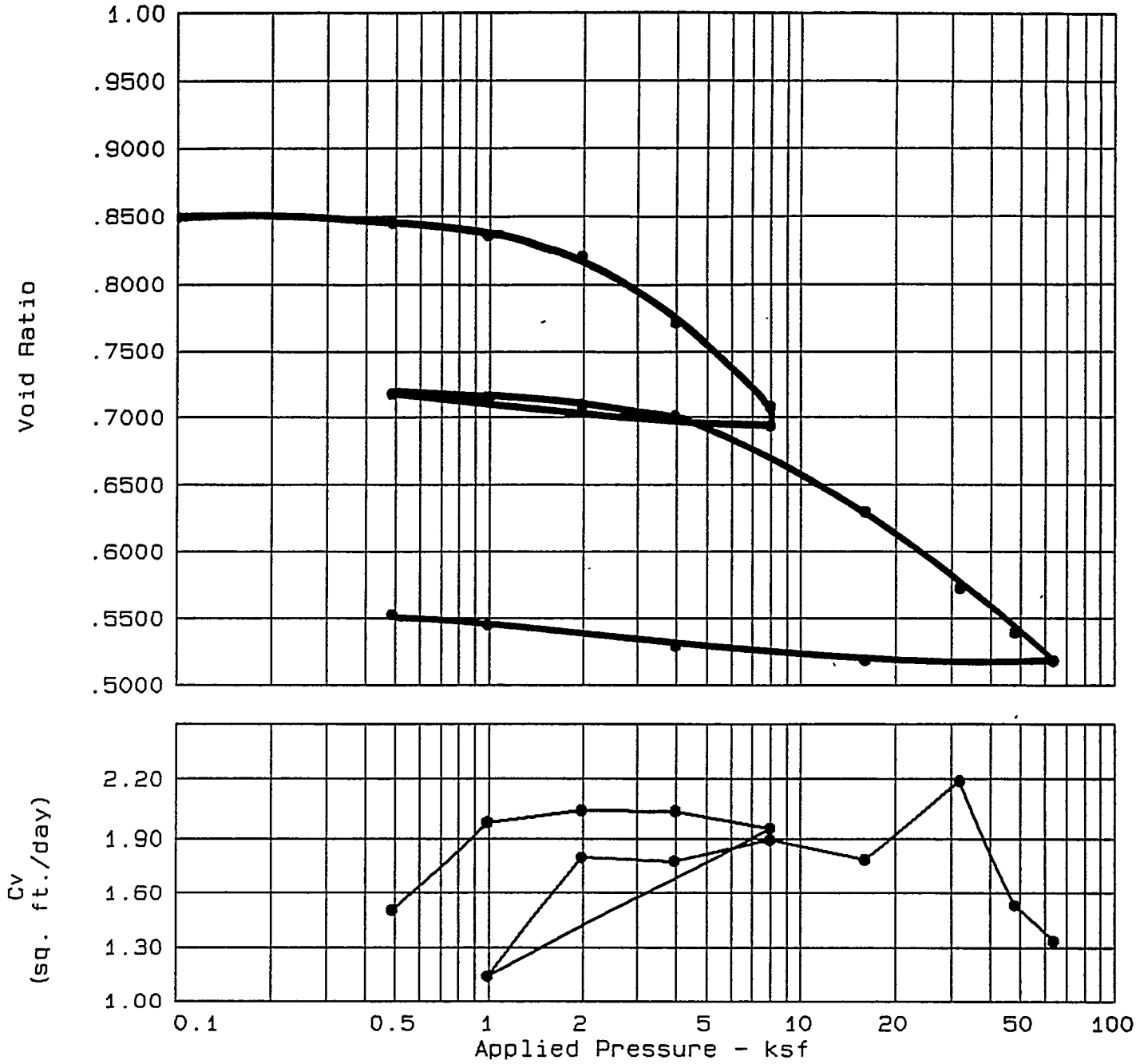
Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 115.8 psi
Consolidation back pressure = 55.8 psi
Consolidation effective confining stress = 8.64 ksf
Peak deviator stress = 9.35 ksf at reading no. 12
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	8.64	8.64	1.00	55.8	8.64	0.00
1	0.0200	0.020	124.00	124.0	0.3	2.83	6.25	9.08	1.45	72.4	7.67	1.42
2	0.0300	0.030	150.00	150.0	0.5	3.42	5.08	8.51	1.67	80.5	6.79	1.71
3	0.0600	0.060	183.00	183.0	1.0	4.16	3.82	7.97	2.09	89.3	5.89	2.08
4	0.1100	0.110	215.00	215.0	1.8	4.84	2.98	7.82	2.62	95.1	5.40	2.42
	1700	0.170	243.00	243.0	2.8	5.41	2.61	8.02	3.08	97.7	5.31	2.71

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Effective Stresses Major ksf	Effective Stresses 1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
	2200	0.220	264.00	264.0	3.7	5.83	2.52	8.35	3.31	98.3	5.44	2.92
7	0.3100	0.310	297.00	297.0	5.2	6.46	2.55	9.01	3.53	98.1	5.78	3.23
8	0.4100	0.410	333.00	333.0	6.9	7.11	2.69	9.81	3.64	97.1	6.25	3.56
9	0.5000	0.500	363.00	363.0	8.4	7.63	2.85	10.48	3.68	96.0	6.67	3.81
10	0.6400	0.640	408.00	408.0	10.7	8.35	3.15	11.51	3.65	93.9	7.33	4.18
11	0.8000	0.800	453.00	453.0	13.4	9.00	3.53	12.53	3.55	91.3	8.03	4.50
12	0.9000	0.900	480.00	480.0	15.1	9.35	3.82	13.17	3.45	89.3	8.49	4.67

CONSOLIDATION TEST REPORT



Clpse. %	Nat. Sat.	Nat. Moist.	Dry Density	LL	PI	Sp.Gr.	Initial void ratio
0.1	53.1 %	16.9	89.8	57	37	2.660	0.8491

TEST RESULTS	MATERIAL DESCRIPTION
	Light Brown Yellow Silty Sand Class: SC
Project No.: 5810535301 Project: SRS-ITP Location: H-Bor-29 ST-6 @ 35-37.5 Ft Date: Nov 15, 1993	Remarks: Tested By: CLG Reviewed By: RLB
CONSOLIDATION TEST REPORT LAW ENGINEERING, INC.	Fig. No._____

22:01, 2-01-1994 CONSOLIDATION TEST PROJECT DATA Test No. 31

Project Number:	5810535301
Project:	SRS-ITP
Date:	Nov 15,1993
Location 1:	H-Bor-29 ST-6 @ 35-37.5 Ft
2:	
Remarks 1:	Tested By:
2:	Reviewed By:
3:	
4:	
5:	
Material 1:	Light Brown Yellow
description 2:	Silty Sand
Classification:	SC
Liquid limit:	57
Plasticity index:	37
Figure Number:	

CONSOLIDATION TEST SPECIMEN DATA

TOTAL SAMPLE	BEFORE TEST	AFTER TEST
Wet w+t = 326.53 g.	Oedometer No. = 5	Wet w+t = 328.67 g.
Dry w+t = 310.92 g	Machine No. = 5	Dry w+t = 310.92 g.
Tare wt. = 218.81 g.	Spec. Gravity = 2.660	Tare wt. = 218.81 g.
ght = 0.8940 in.	Height = 0.8940 in.	
meter = 2.3590 in.	Diameter = 2.3600 in.	
Weight = 107.72 g.		
Moisture = 16.9 %	Ht. Solids = 0.4835 in.	Moisture = 19.3 %
Wet Den. = 105.0 pcf	Dry wt. = 92.19 g. *	Dry wt. = 92.11 g.
Dry Den. = 89.8 pcf	Void ratio = 0.8491	Void ratio = 0.5524
	Saturation = 53.1 %	Saturation = 92.8 %

* Initial dry weight used in calculations

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
Initial	0.02000			0.8491	
0.10	0.02000	0.0000	0.02000	0.8491	0.0
0.49	0.02275	0.0003	0.02245	0.8446*	0.2 Comprs.*
0.99	0.02785	0.0007	0.02715	0.8360*	0.7 Comprs.*
1.99	0.03610	0.0012	0.03490	0.8206*	1.5 Comprs.*
3.99	0.06210	0.0021	0.06000	0.7709*	4.2 Comprs.*
8.00	0.09390	0.0032	0.09070	0.7077*	7.6 Comprs.*
8.00	0.09410	0.0032	0.09090	0.7073	7.7 Comprs.
1.99	0.09150	0.0000	0.09150	0.7061	7.7 Comprs.
0.49	0.08600	0.0000	0.08600	0.7175	7.1 Comprs.
0.99	0.08690	0.0007	0.08620	0.7127*	7.4 Comprs.*
1.99	0.08905	0.0012	0.08785	0.7094*	7.6 Comprs.*
3.96	0.09220	0.0000	0.09220	0.7006*	8.0 Comprs.*
8.00	0.09955	0.0032	0.09635	0.6935*	8.4 Comprs.*

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
16.00	0.13390	0.0048	0.12910	0.6294*	11.9 Comprs.*
32.04	0.16360	0.0071	0.15650	0.5729*	14.9 Comprs.*
48.00	0.18250	0.0090	0.17350	0.5390*	16.8 Comprs.*
63.74	0.19440	0.0109	0.18350	0.5176*	17.9 Comprs.*
63.74	0.19440	0.0109	0.18350	0.5176	17.9 Comprs.
16.00	0.18800	0.0048	0.18320	0.5183	17.9 Comprs.
3.99	0.18010	0.0021	0.17800	0.5290	17.3 Comprs.
0.99	0.17110	0.0007	0.17040	0.5447	16.5 Comprs.
0.49	0.16700	0.0003	0.16670	0.5524	16.0 Comprs.

* CALCULATED USING D100 INSTEAD OF FINAL READING

CONSOLIDATION TEST RESULTS

Compression index = NOT SELECTED
Preconsolidation pressure = NOT SELECTED

Load 0.49 ksf — CONSOLIDATION TEST READINGS — Load No. 2

Machine Deflection 0.0003

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.02000	11	60.00	0.02270
2	0.10	0.02210	12	170.00	0.02275
3	0.25	0.02220			
4	0.50	0.02230			
5	1.00	0.02240			
6	2.00	0.02240			
7	4.00	0.02240			
8	8.00	0.02245			
9	15.00	0.02250			
10	30.00	0.02260			

Void Ratio: 0.8446 Compression: 0.2 % >>> CALCULATED USING D100
D0 = 0.0216 D90 = 0.0221 D100 = 0.0222 T90 = 1.13 min.
Cv @ 1.1 min.= 1.50 sq. feet/day

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

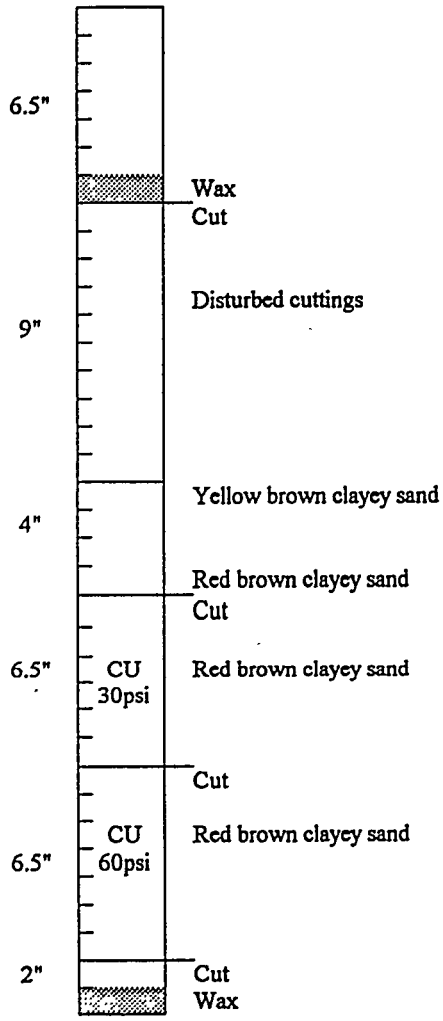
Project: SRS-ITP GEOTECHNICAL TESTING Date: 11-14-93

Boring No: H-Bor-29 Sample No: ST-7 Depth: 40' - 42'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 36.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION

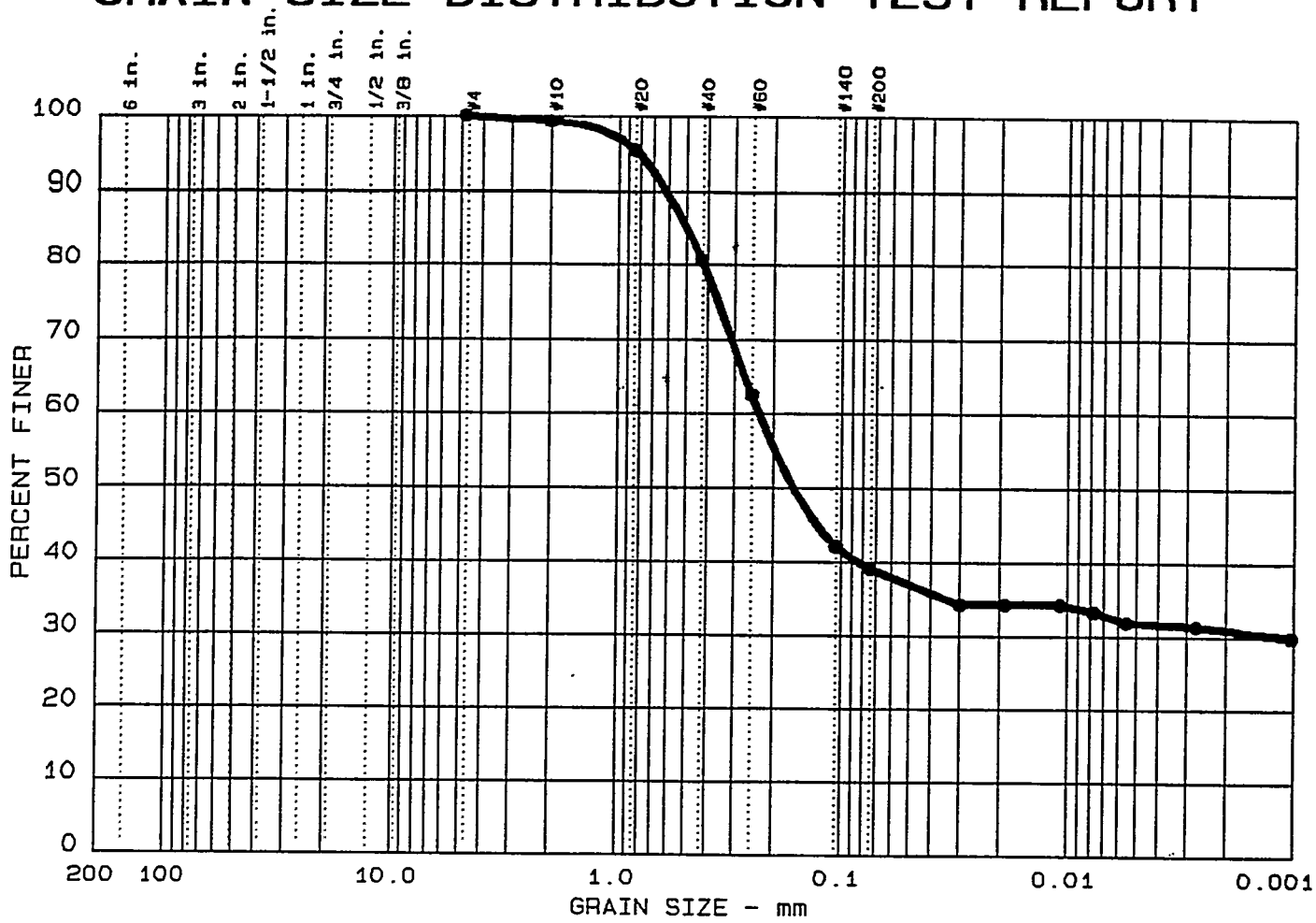


Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b29-st7.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	19	0.0	0.0	61.0	7.4	31.6

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	45	29	0.49	0.23	0.16	0.001				

MATERIAL DESCRIPTION	USCS	AASHTO
● Red Brown Clayey Sand	SC	A-7-6 (5.5)

Project No.: 5810535301
Project: 5810535301
● Location: H-Bor-29 ST-7 @ 40 FT.

Date: January 19, 1994

Remarks:

Tested by: CLG

Reviewed by: RLB

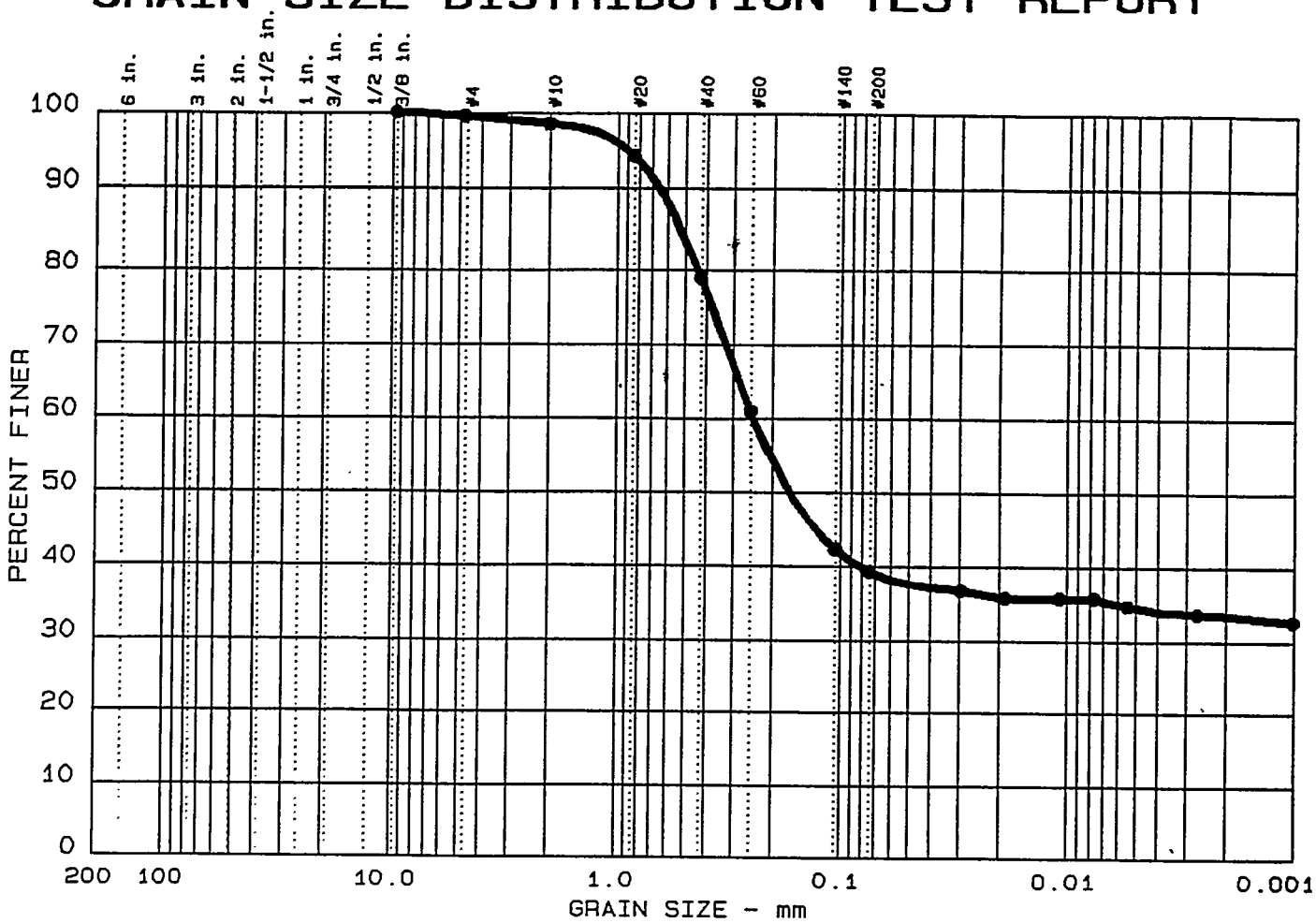
CU-30 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	18	0.0	0.5	60.3	4.8	34.4

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.52	0.24	0.17					

MATERIAL DESCRIPTION	USCS	AASHTO
● Red Brown Clayey Sand		

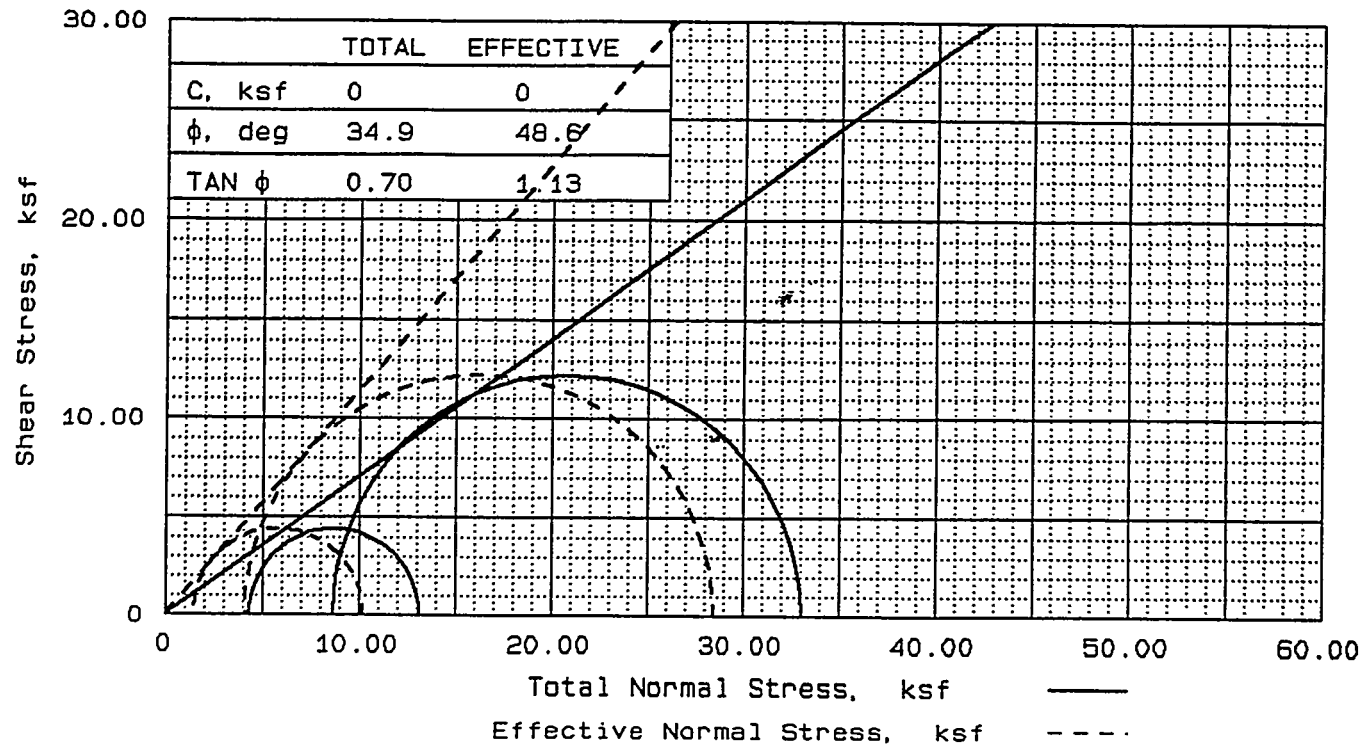
Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-29 ST-7 @ 40 Ft.

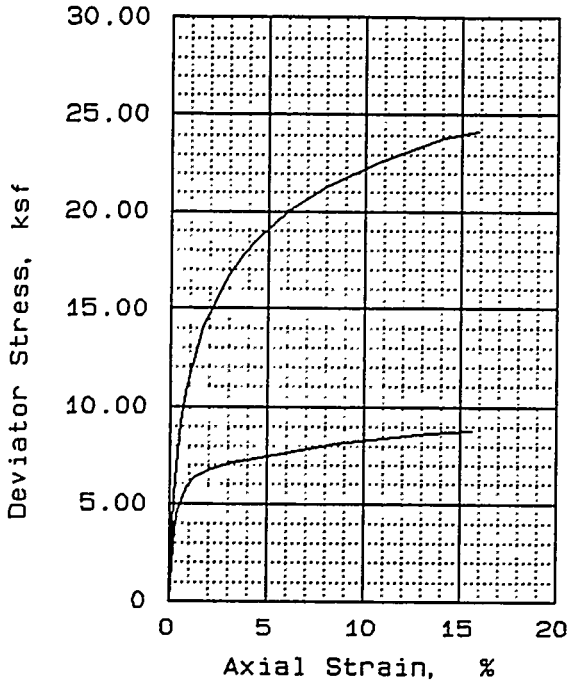
Date: January 19, 1994

Remarks:
Tested by: CLG Chkd by: RLB
CU-60 psi
Atterberg Limits -200
LL=89 PL=22 PI=67

GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Figure No.





SAMPLE NO.		1	2
INITIAL	WATER CONTENT, %	16.6	15.2
	DRY DENSITY, pcf	109.0	115.2
	SATURATION, %	81.6	90.9
	VOID RATIO	0.552	0.447
	DIAMETER, in	2.87	2.87
	HEIGHT, in	6.00	6.00
AT TEST	WATER CONTENT, %	19.7	16.2
	DRY DENSITY, pcf	110.3	116.4
	SATURATION, %	100.0	100.0
	VOID RATIO	0.534	0.432
	DIAMETER, in	2.86	2.86
	HEIGHT, in	5.99	5.98
BACK PRESSURE, ksf		7.98	6.54
CELL PRESSURE, ksf		12.30	15.18
FAILURE STRESS, ksf		8.80	24.42
PORE PRESSURE, ksf		10.89	11.10
STRAIN RATE, %/min.		0.100	0.100
ULTIMATE STRESS, ksf			
PORE PRESSURE, ksf			
$\bar{\sigma}_1$ FAILURE, ksf		10.21	28.49
$\bar{\sigma}_3$ FAILURE, ksf		1.41	4.08

TYPE OF TEST:
CU with pore pressures
SAMPLE TYPE: Undisturbed
DESCRIPTION: See Grain Size

REMARKS: Tested by: HEJ

Reviewed by: RLB

FIG. NO.

CLIENT: SRS

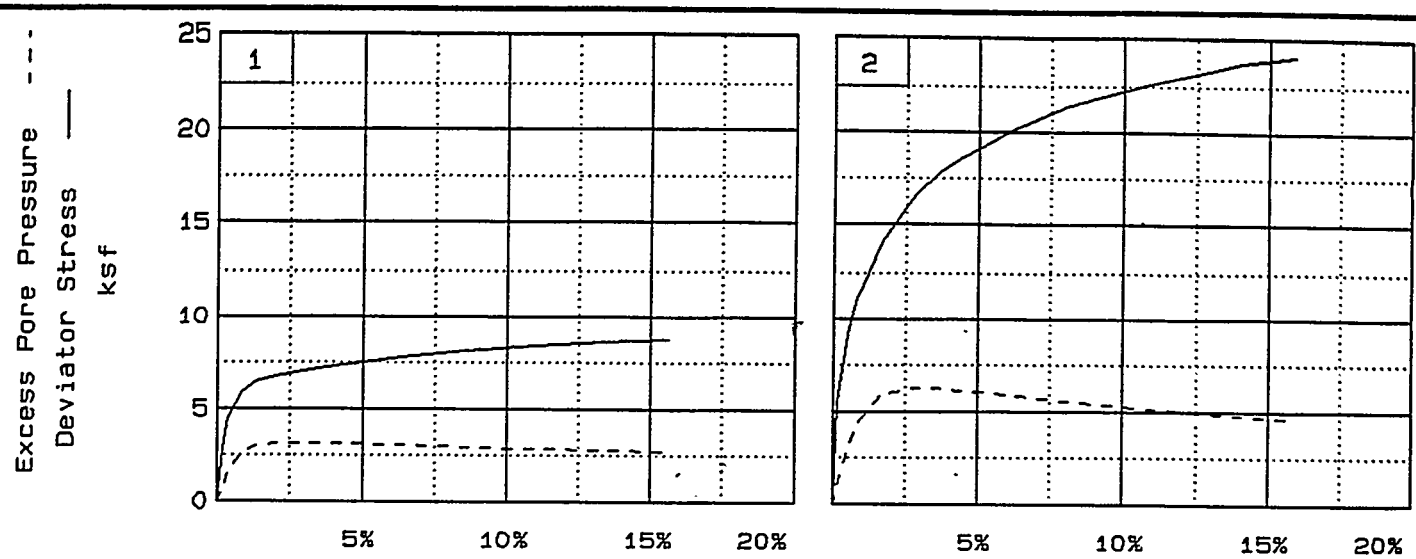
PROJECT: SRS-ITP

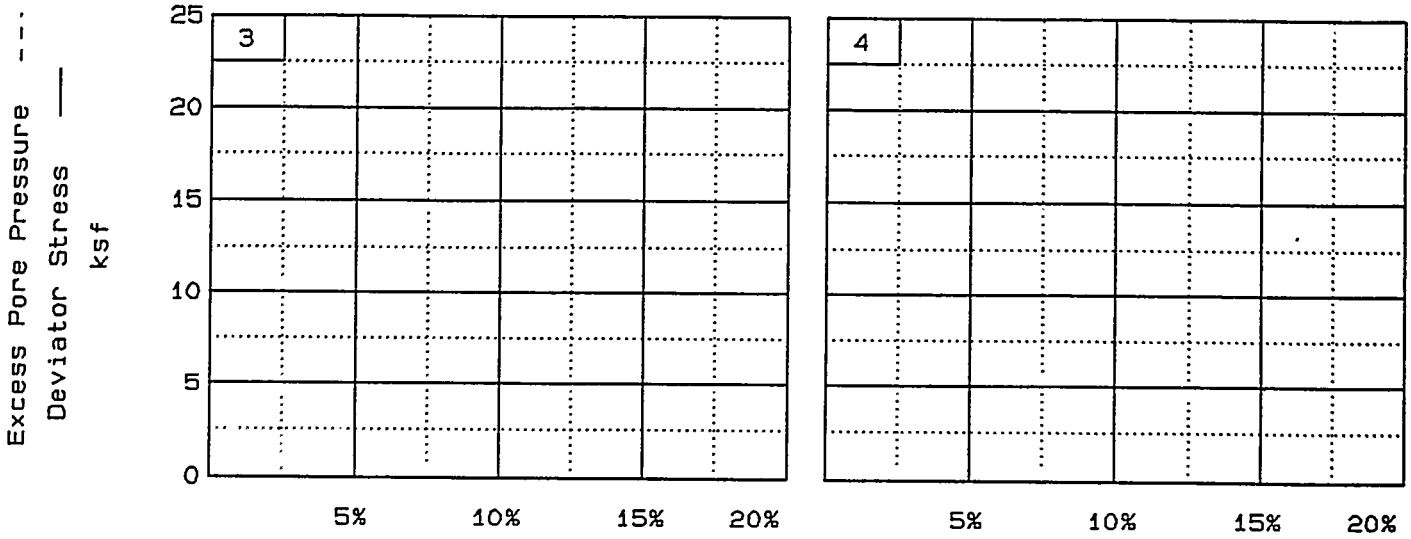
SAMPLE LOCATION: H Bor 29 ST-7 @ 40-42 Ft.

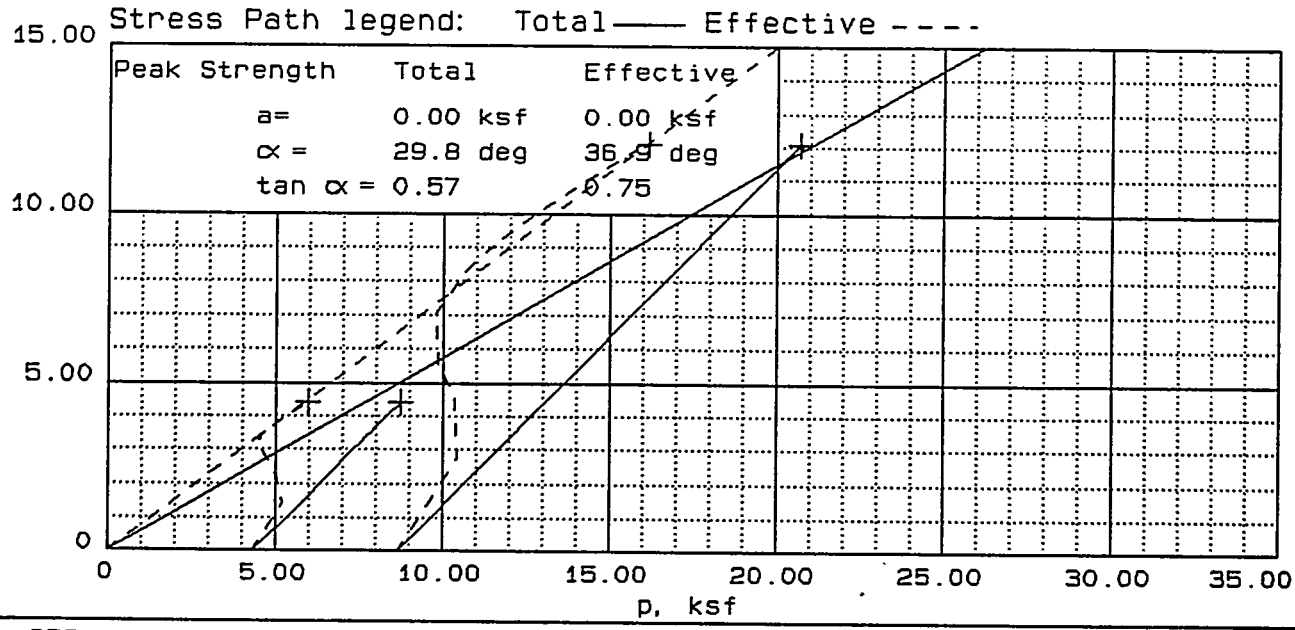
PROJ. NO.: 5810535301 DATE: 01/27/94

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.







Client: SRS

Project: SRS-ITP

Location: H Bor 29 ST-7 @ 40-42 Ft.

File: 5353010 Project No.: 5810535301 Page 2/2 Fig. No. ____

TRIAXIAL COMPRESSION TEST
CU with pore pressures

2-24-1994
6:15 pm

Project Data

Project No.: 5810535301 Date: 01/27/94 Data file: 5353010
Client: SRS
Project: SRS-ITP
Sample location: H Bor 29 ST-7 @ 40-42 Ft.
Sample description: See Grain Size
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.71 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.87	2.86	
Height change, in		0.01	
Height, in	6.00	5.99	
Weight, grams	1296.0		
Water volume change, cc		-33.99	
Moisture, %	16.6	19.7	18.0
Dry density, pcf	109.0	110.3	
Saturation, %	81.6	100.0	
Void ratio	0.552	0.534	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 85.4 psi
Consolidation back pressure = 55.4 psi
Consolidation effective confining stress = 4.32 ksf
Peak deviator stress = 8.80 ksf at reading no. 12
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	4.32	4.32	1.00	55.4	4.32	0.00
1	0.0100	0.010	128.00	128.0	0.2	2.87	3.74	6.62	1.77	59.4	5.18	1.44
2	0.0200	0.020	200.00	200.0	0.3	4.48	2.75	7.23	2.63	66.3	4.99	2.24
3	0.0500	0.050	266.00	266.0	0.8	5.93	1.63	7.56	4.64	74.1	4.59	2.96
	.0800	0.080	290.00	290.0	1.3	6.43	1.30	7.73	5.96	76.4	4.51	3.22
	1200	0.120	307.00	307.0	2.0	6.76	1.15	7.91	6.87	77.4	4.53	3.38

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Effective Stresses Major ksf	Effective Stresses 1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
	.1900	0.190	327.00	327.0	3.2	7.12	1.14	8.25	7.26	77.5	4.70	3.56
7	0.2600	0.260	343.00	343.0	4.3	7.37	1.18	8.56	7.25	77.2	4.87	3.69
8	0.3800	0.380	369.00	369.0	6.3	7.77	1.25	9.02	7.20	76.7	5.14	3.88
9	0.5100	0.510	395.00	395.0	8.5	8.12	1.34	9.46	7.07	76.1	5.40	4.06
10	0.6600	0.660	420.00	420.0	11.0	8.40	1.41	9.81	6.95	75.6	5.61	4.20
11	0.8000	0.800	444.00	444.0	13.4	8.65	1.48	10.13	6.83	75.1	5.81	4.32
12	0.9350	0.935	464.00	464.0	15.6	8.80	1.56	10.36	6.66	74.6	5.96	4.40

TRIAXIAL COMPRESSION TEST
CU with pore pressures

2-01-1994
1:53 pm

Project Data

Project No.: 5810535301 Date: 01/27/94 Data file: 5353010
Client: SRS
Project: SRS-ITP
Sample location: H Bor 29 ST-7 @ 40-42 Ft.
Sample description: See Grain Size
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.67 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.87	2.86	
Height change, in		0.01	
Height, in	6.00	5.99	
Weight, grams	1296.0		
Water volume change, cc		-33.99	
Moisture, %	16.6	19.7	18.0
Dry density, pcf	109.0	110.3	
Saturation, %	81.6	100.0	
Void ratio	0.552	0.534	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 85.4 psi
Consolidation back pressure = 55.4 psi
Consolidation effective confining stress = 4.32 ksf
Peak deviator stress = 8.80 ksf at reading no. 12
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	4.32	4.32	1.00	55.4	4.32	0.00
1	0.0100	0.010	128.00	128.0	0.2	2.87	3.74	6.62	1.77	59.4	5.18	1.44
2	0.0200	0.020	200.00	200.0	0.3	4.48	2.75	7.23	2.63	66.3	4.99	2.24
3	0.0500	0.050	266.00	266.0	0.8	5.93	1.63	7.56	4.64	74.1	4.59	2.96
	0.0800	0.080	290.00	290.0	1.3	6.43	1.30	7.73	5.96	76.4	4.51	3.22
	1200	0.120	307.00	307.0	2.0	6.76	1.15	7.91	6.87	77.4	4.53	3.38

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Effective Stresses Major ksf	Effective Stresses 1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
	1900	0.190	327.00	327.0	3.2	7.12	1.14	8.25	7.26	77.5	4.70	3.56
7	0.2600	0.260	343.00	343.0	4.3	7.37	1.18	8.56	7.25	77.2	4.87	3.69
8	0.3800	0.380	369.00	369.0	6.3	7.77	1.25	9.02	7.20	76.7	5.14	3.88
9	0.5100	0.510	395.00	395.0	8.5	8.12	1.34	9.46	7.07	76.1	5.40	4.06
10	0.6600	0.660	420.00	420.0	11.0	8.40	1.41	9.81	6.95	75.6	5.61	4.20
11	0.8000	0.800	444.00	444.0	13.4	8.65	1.48	10.13	6.83	75.1	5.81	4.32
12	0.9350	0.935	464.00	464.0	15.6	8.80	1.56	10.36	6.66	74.4	5.96	4.40

TRIAXIAL COMPRESSION TEST

CU with pore pressures

2-01-1994
1:53 pm

Project Data

Project No.: 5810535301 Date: 01/27/94 Data file: 5353010
Client: SRS
Project: SRS-ITP
Sample location: H Bor 29 ST-7 @ 40-42 Ft.
Sample description: See Grain Size
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 2 Data

Type of sample: Undisturbed
Specific Gravity= 2.67 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.87	2.86	
Height change, in		0.02	
Height, in	6.00	5.98	
Weight, grams	1350.4		
Water volume change, cc		-11.35	
Moisture, %	15.2	16.2	14.9
Dry density, pcf	115.2	116.4	
Saturation, %	90.9	100.0	
Void ratio	0.447	0.432	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 105.4 psi
Consolidation back pressure = 45.4 psi
Consolidation effective confining stress = 8.64 ksf
Peak deviator stress = 24.42 ksf at reading no. 12
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	8.64	8.64	1.00	45.4	8.64	0.00
1	0.0100	0.010	244.00	244.0	0.2	5.47	7.69	13.16	1.71	52.0	10.42	2.73
2	0.0300	0.030	410.00	410.0	0.5	9.16	5.76	14.92	2.59	65.4	10.34	4.58
3	0.0500	0.050	498.00	498.0	0.8	11.08	4.32	15.40	3.57	75.4	9.86	5.54
	0.1000	0.100	636.00	636.0	1.7	14.04	2.75	16.79	6.10	86.3	9.77	7.02
	1700	0.170	760.00	760.0	2.8	16.57	2.36	18.93	8.02	89.0	10.65	8.29

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
	.2200	0.220	824.00	824.0	3.7	17.81	2.42	20.23	8.36	88.6	11.33	8.91
7	0.2600	0.260	864.00	864.0	4.3	18.55	2.51	21.05	8.40	88.0	11.78	9.27
8	0.3600	0.360	950.00	950.0	6.0	20.04	2.78	22.82	8.21	86.1	12.80	10.02
9	0.4800	0.480	1034.00	1034.0	8.0	21.34	3.12	24.47	7.83	83.7	13.80	10.67
10	0.6500	0.650	1132.00	1132.0	10.9	22.65	3.48	26.13	7.50	81.2	14.81	11.32
11	0.8400	0.840	1235.00	1235.0	14.0	23.82	3.87	27.70	7.15	78.5	15.79	11.91
12	0.9500	0.950	1280.00	1280.0	15.9	24.16	4.08	28.24	6.93	77.1	16.16	12.08

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

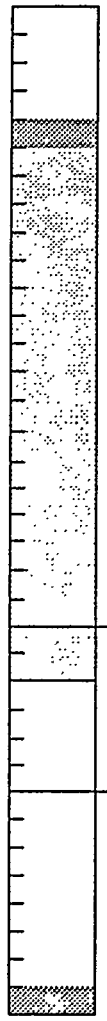
Project: SRS-ITP GEOTECHNICAL TESTING Date: 10-25-93

Boring No: H-Bor-29 Sample No: ST-8 Depth: 44'5" - 45'11"

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 36.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION



4.4" Wax

17.6" Red purple brown silty clayey sand
Very soft - possible disturbed cuttings

Cut

6.5" Red purple brown silty clayey sand

Cut

Red purple brown silty clayey sand

7.5"

Packer

Remarks: Tube out of round - could not extrude cut portions for testing

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

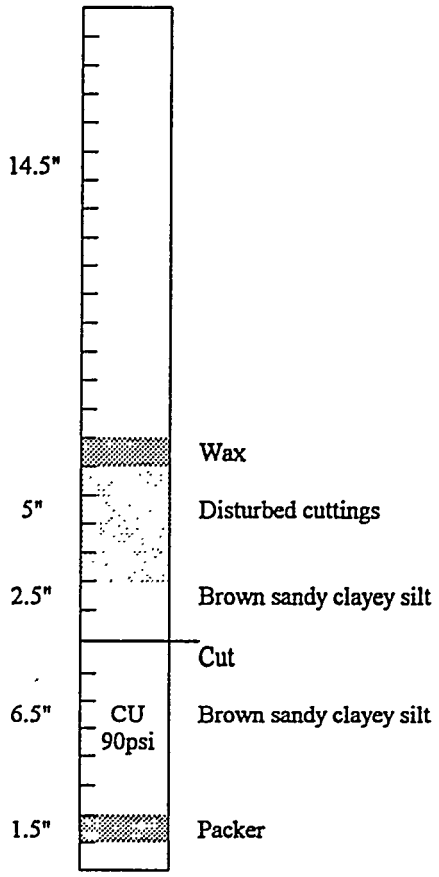
Project: SRS-ITP GEOTECHNICAL TESTING Date: 11-29-93

Boring No: H-Bor-29 Sample No: ST-9 Depth: 45.5' - 46.5'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION

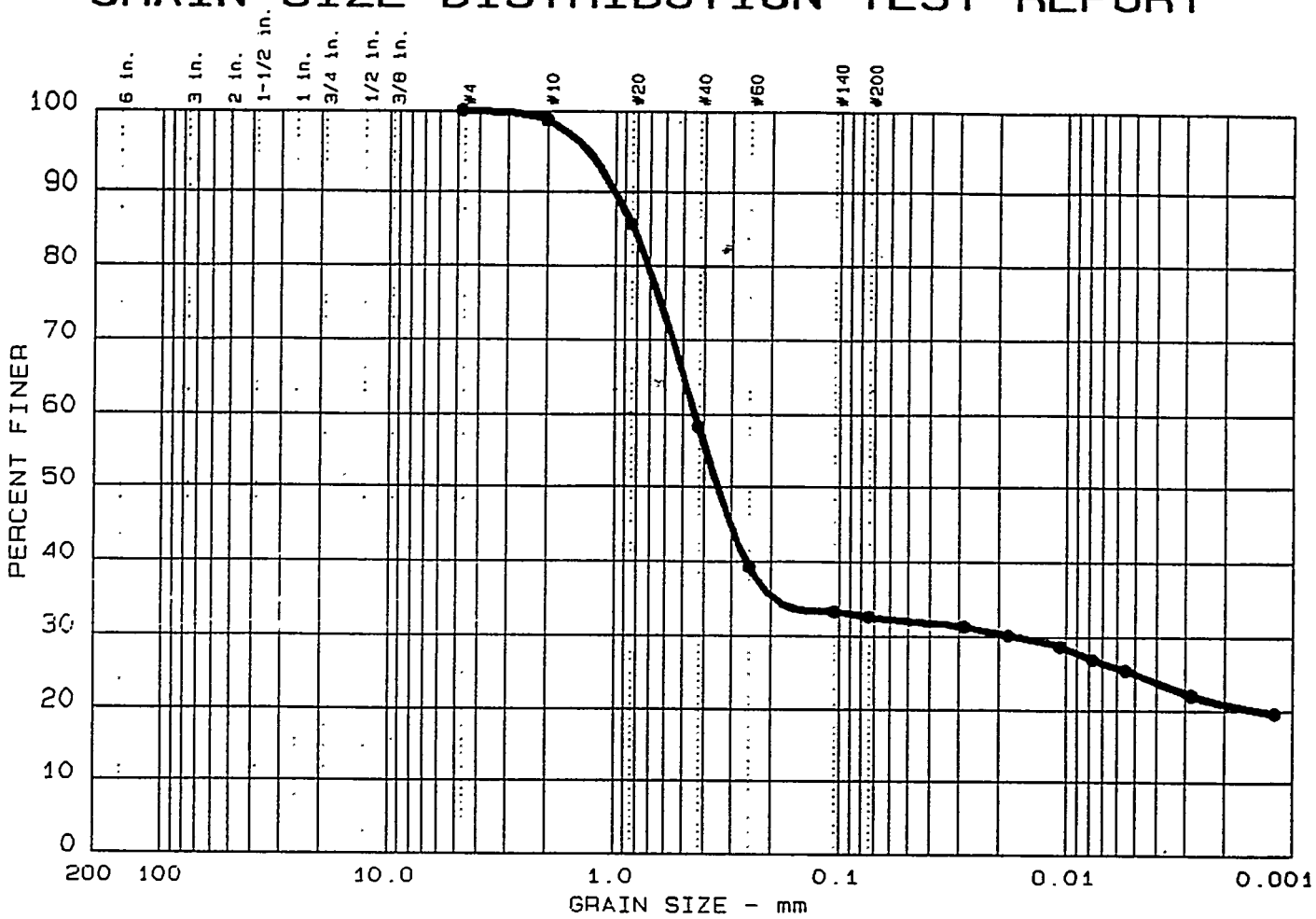


Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b29-st9.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	11	0.0	0.0	67.6	7.6	24.8

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	60	37	0.82	0.44	0.34	0.017				

MATERIAL DESCRIPTION	USCS	AASHTO
● Brown Clayey Sand	SC	A-2-7 (4.6)

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-29 ST-9 @ 45.5-46.5 Ft.

Date: December 30, 1993

Remarks:

Tested by: JTK

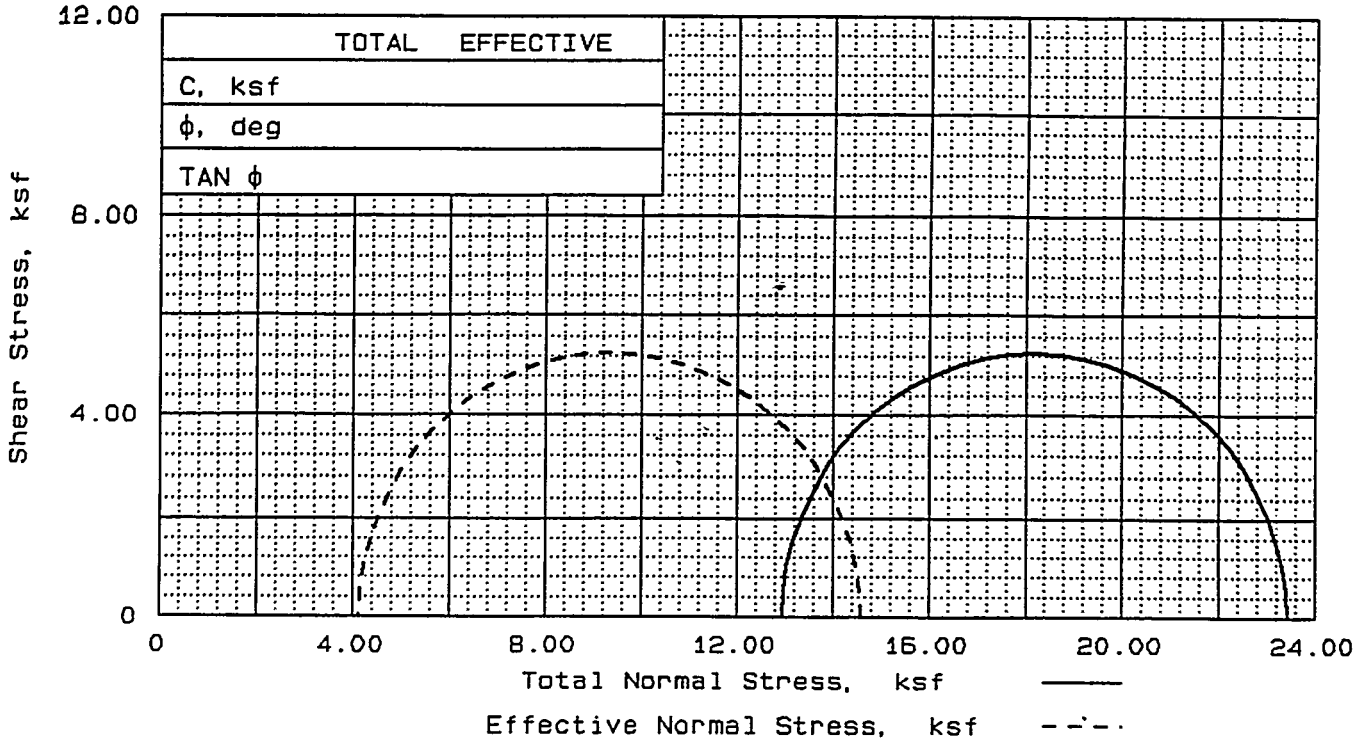
Reviewed by: RLB

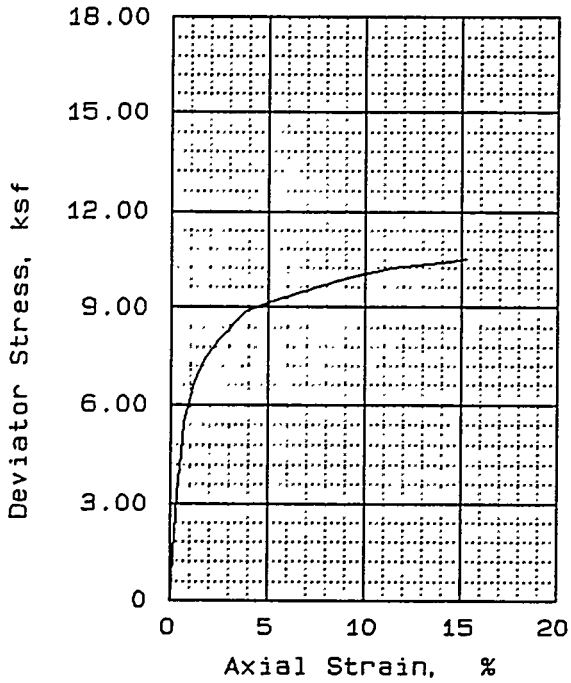
CU-90 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.





SAMPLE NO.		1
INITIAL	WATER CONTENT, %	17.3
	DRY DENSITY, pcf	97.3
	SATURATION, %	66.2
	VOID RATIO	0.687
	DIAMETER, in	2.86
	HEIGHT, in	6.00
AT TEST	WATER CONTENT, %	23.9
	DRY DENSITY, pcf	100.8
	SATURATION, %	100.0
	VOID RATIO	0.628
	DIAMETER, in	2.82
	HEIGHT, in	5.97
BACK PRESSURE, ksf		7.26
CELL PRESSURE, ksf		20.22
FAILURE STRESS, ksf		10.47
PORE PRESSURE, ksf		16.08
STRAIN RATE, %/min.		0.100
ULTIMATE STRESS, ksf		
PORE PRESSURE, ksf		
$\bar{\sigma}_1$ FAILURE, ksf		14.60
$\bar{\sigma}_3$ FAILURE, ksf		4.13

TYPE OF TEST:
CU with pore pressures
SAMPLE TYPE: Undisturbed
DESCRIPTION: See Grain Size

REMARKS: Tested by: HEJ

Reviewed by: RLB

FIG. NO.

CLIENT: SRS

PROJECT: SRS-ITP

SAMPLE LOCATION: H Bor 29 ST-9 @ 45.5-46.5 Ft.

PROJ. NO.: 5B10535301 DATE: 01/03/94

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

TRIAXIAL COMPRESSION TEST
CU with pore pressures

2-01-1994
11:43 am

Project Data

Project No.: 5810535301 Date: 01/03/94 Data file: 535301M
Client: SRS
Project: SRS-ITP
Sample location: H Bor 29 ST-9 @ 45.5-46.5 Ft.
Sample description: See Grain Size
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.63 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.86	2.82	
Height change, in		0.03	
Height, in	6.00	5.97	
Weight, grams	1156.0		
Water volume change, cc		-64.98	
Moisture, %	17.3	23.9	20.5
Dry density, pcf	97.3	100.8	
Saturation, %	66.2	100.0	
Void ratio	0.687	0.628	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 140.4 psi
Consolidation back pressure = 50.4 psi
Consolidation effective confining stress = 12.96 ksf
Peak deviator stress = 10.47 ksf at reading no. 14
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	12.96	12.96	1.00	50.4	12.96	0.00
1	0.0100	0.010	90.00	90.0	0.2	2.07	11.74	13.81	1.18	58.9	12.77	1.04
2	0.0200	0.020	144.00	144.0	0.3	3.31	10.20	13.51	1.33	69.6	11.85	1.66
3	0.0300	0.030	198.00	198.0	0.5	4.55	8.87	13.42	1.51	78.8	11.14	2.27
	0.0400	0.040	237.00	237.0	0.7	5.44	7.59	13.02	1.72	87.7	10.31	2.72
	.0700	0.070	294.00	294.0	1.2	6.71	5.66	12.37	2.19	101.1	9.01	3.35

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
	1.1000	0.100	325.00	325.0	1.7	7.38	4.69	12.07	2.57	107.8	8.38	3.69
7	0.1400	0.140	354.00	354.0	2.3	7.98	4.10	12.09	2.94	111.9	8.10	3.99
8	0.2300	0.230	401.00	401.0	3.9	8.90	3.80	12.70	3.34	114.0	8.25	4.45
9	0.3100	0.310	420.00	420.0	5.2	9.19	3.80	13.00	3.42	114.0	8.40	4.60
10	0.4500	0.450	450.00	450.0	7.5	9.61	3.92	13.52	3.45	113.2	8.72	4.80
11	0.5400	0.540	471.00	471.0	9.0	9.89	4.02	13.91	3.46	112.5	8.96	4.95
12	0.6800	0.680	498.00	498.0	11.4	10.19	4.13	14.32	3.47	111.7	9.23	5.09
13	0.8300	0.830	521.00	521.0	13.9	10.36	4.25	14.61	3.44	110.9	9.43	5.18
14	0.9100	0.910	535.00	535.0	15.2	10.47	4.33	14.80	3.42	110.3	9.57	5.24

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

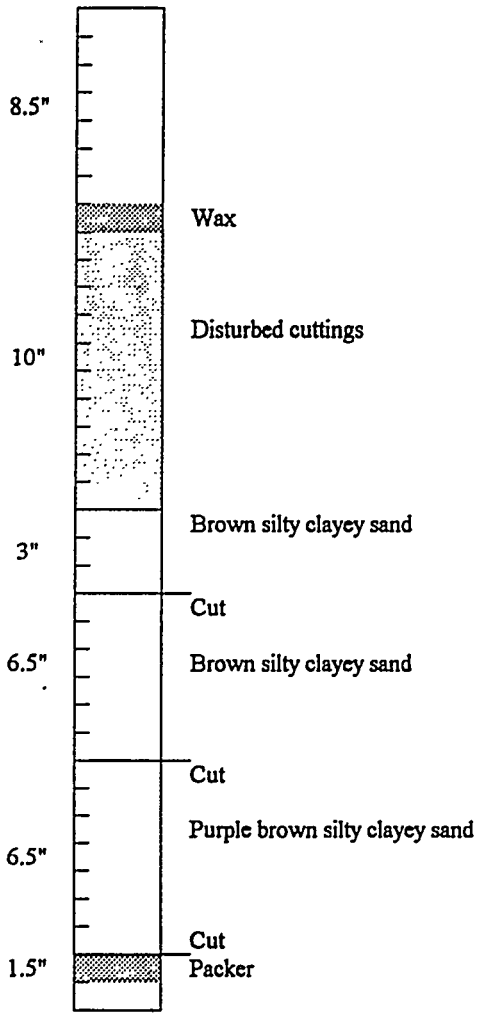
Project: SRS-ITP GEOTECHNICAL TESTING Date: 09-15-93

Boring No: H-Bor-29 Sample No: ST-10 Depth: 56' - 577"

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 36.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION



Remarks: Tube marked ST-10, caps marked ST-11. TO instructed LAW to cut tube and prepare as though the caps were the governing identifier. Were later informed by STR that WSRC had custody of H-Bor-29, ST-11. No testing was assigned for this tube - samples were disposed following completion of entire test program.

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b29-st10.wk3

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

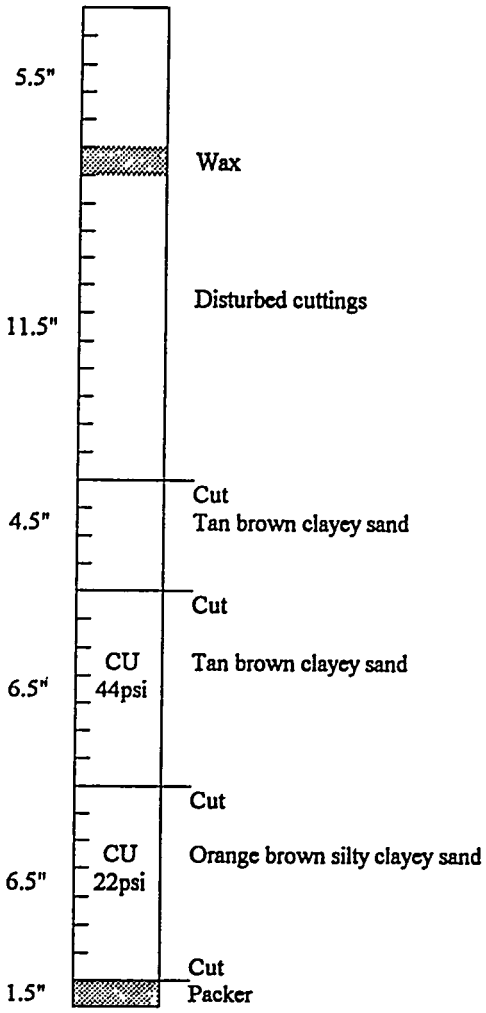
Project: SRS-ITP GEOTECHNICAL TESTING Date: 12-17-93

Boring No: H-Bor-29 Sample No: ST-11 Depth: 58' - 60'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 36.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION

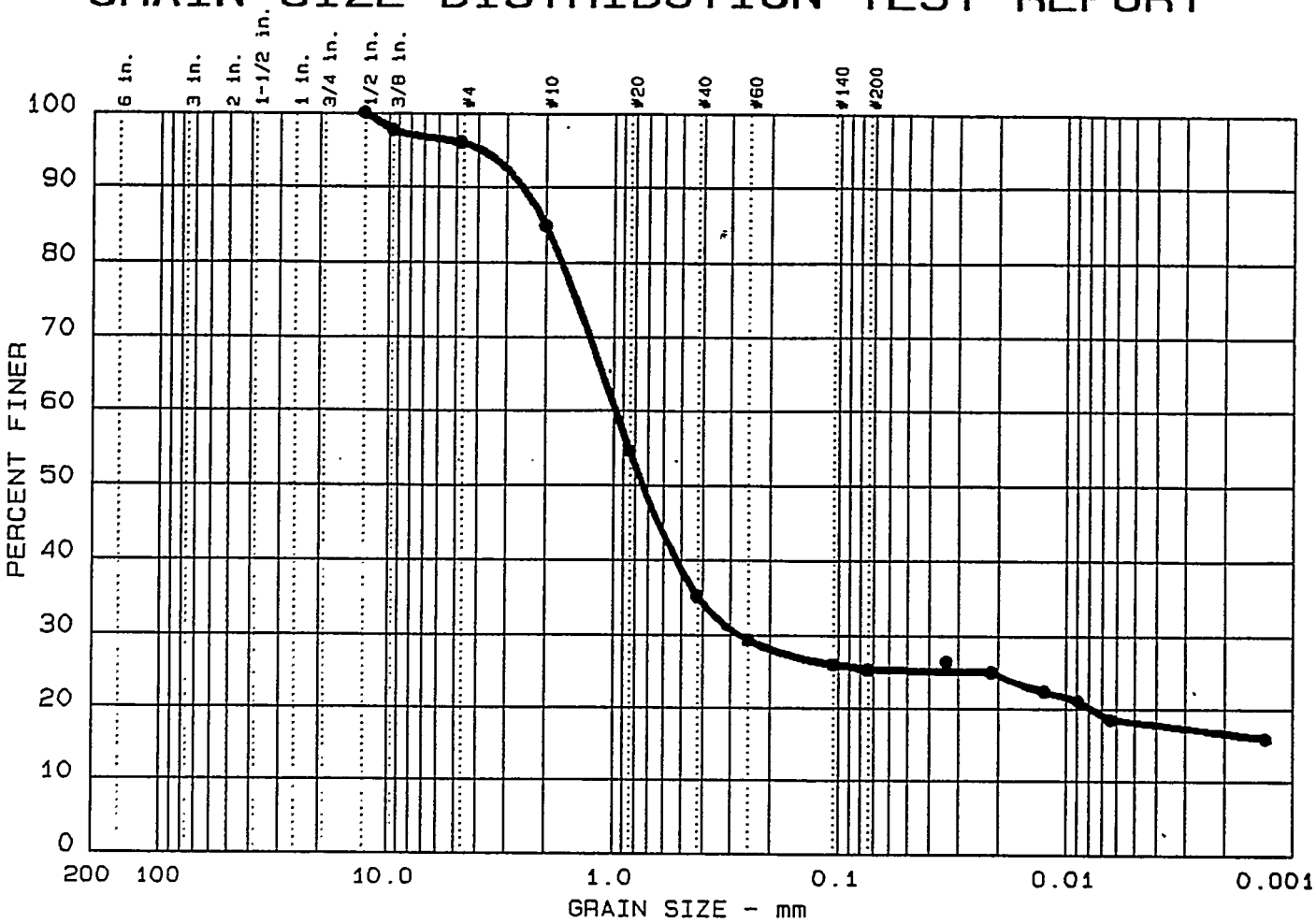


Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b29-st11.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	8	0.0	3.9	70.7	7.2	18.2

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	97	71	2.00	0.97	0.74	0.277				

MATERIAL DESCRIPTION	USCS	AASHTO
● Orange Brown Clayey Sand	SC	A-2-7 (6.1)

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-29 ST-11 @ 58 Ft.

Date: January 3, 1994

Remarks:

Tested by: JTK

Reviewed by: RLB

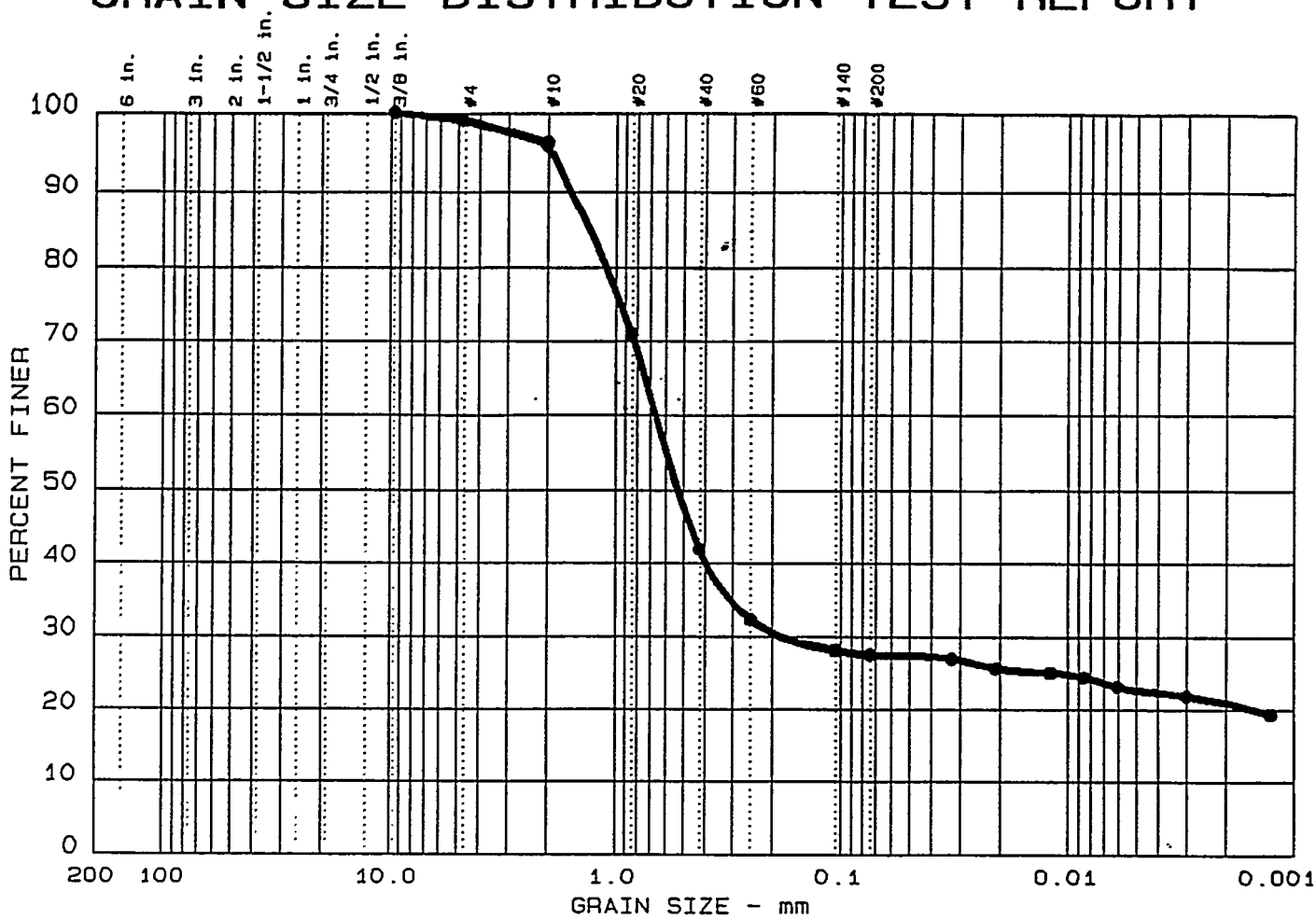
CU-22psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	10	0.0	0.9	71.5	4.8	22.8

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			1.30	0.66	0.52	0.186				

MATERIAL DESCRIPTION	USCS	AASHTO
● Light Brown Clayey Sand		

Project No.: 5810535301
Project: SRS-ITP
◆ Location: H-Bor-29 ST-11 @ 58 Ft.

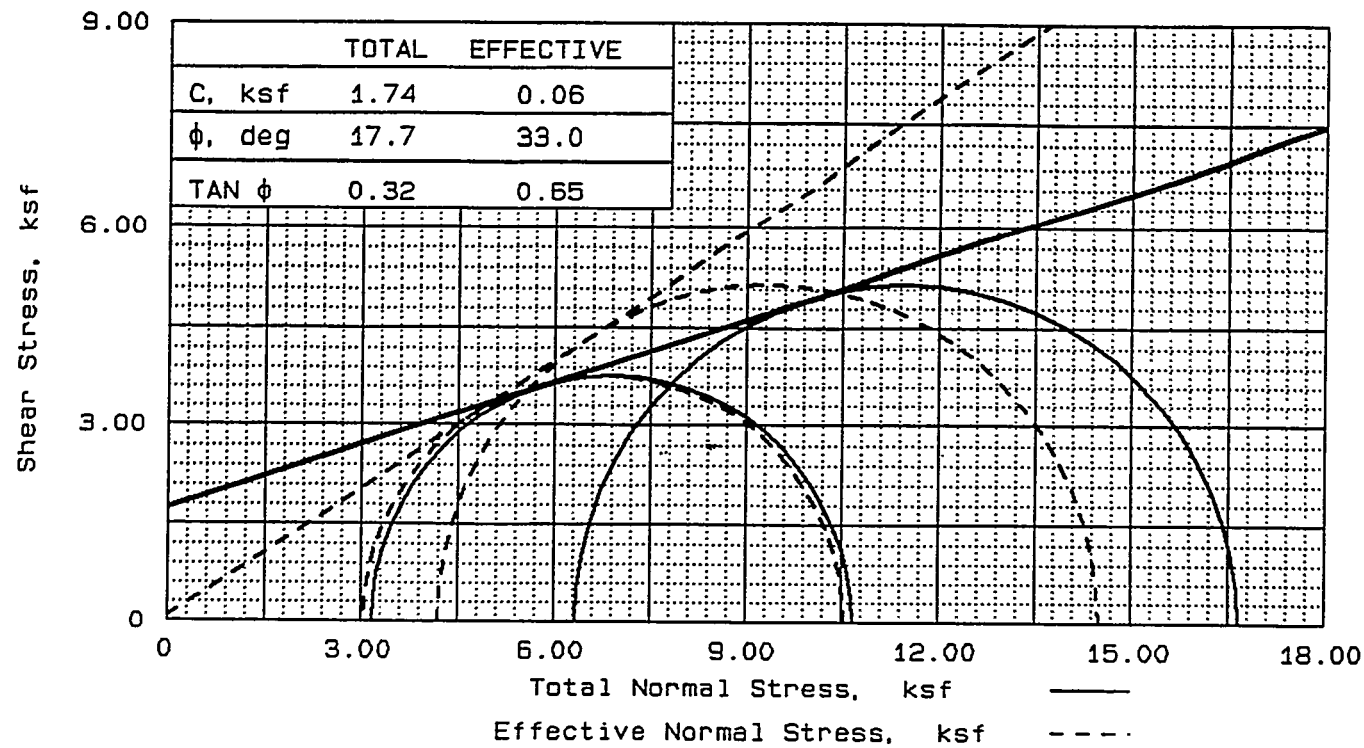
Date:

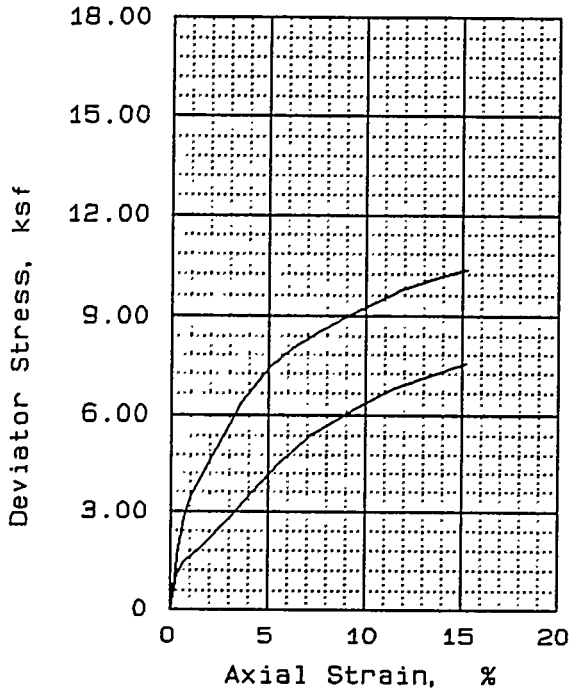
Remarks:
Tested by: JTK Reviewed by: RLB
Atterberg Limits -200
LL=169 PL=42 PI=127
CU-44 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.





SAMPLE NO.		1	2
INITIAL	WATER CONTENT, %	15.1	19.0
	DRY DENSITY, pcf	102.4	101.3
	SATURATION, %	66.3	79.8
	VOID RATIO	0.598	0.627
	DIAMETER, in	2.87	2.87
	HEIGHT, in	6.00	6.00
AT TEST	WATER CONTENT, %	22.7	22.6
	DRY DENSITY, pcf	102.6	103.2
	SATURATION, %	100.0	100.0
	VOID RATIO	0.594	0.597
	DIAMETER, in	2.87	2.85
	HEIGHT, in	5.99	5.98
BACK PRESSURE, ksf		4.46	4.44
CELL PRESSURE, ksf		7.63	10.77
FAILURE STRESS, ksf		7.51	10.31
PORE PRESSURE, ksf		4.59	6.58
STRAIN RATE, %/min.		0.100	0.100
ULTIMATE STRESS, ksf			
PORE PRESSURE, ksf			
$\bar{\sigma}_1$ FAILURE, ksf		10.55	14.50
$\bar{\sigma}_3$ FAILURE, ksf		3.04	4.19

TYPE OF TEST:
CU with pore pressures
SAMPLE TYPE: Undisturbed
DESCRIPTION: See Grain Size

REMARKS: Tested by: HEJ

Reviewed by RLB

FIG. NO.

CLIENT: SRS

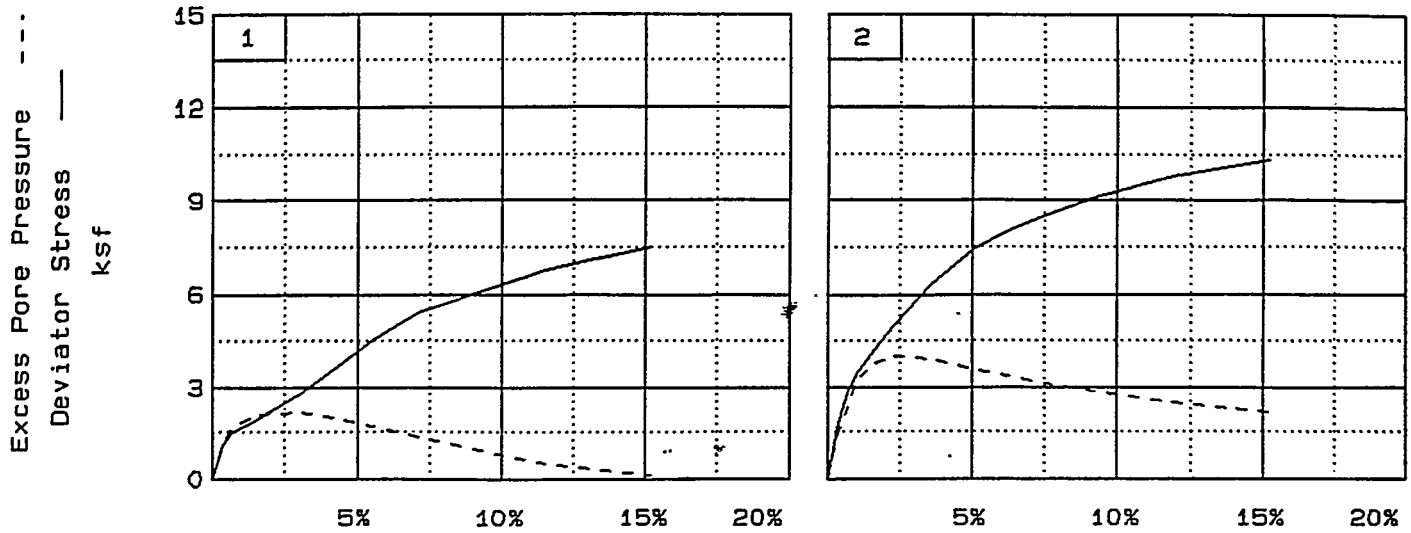
PROJECT: SRS-ITP

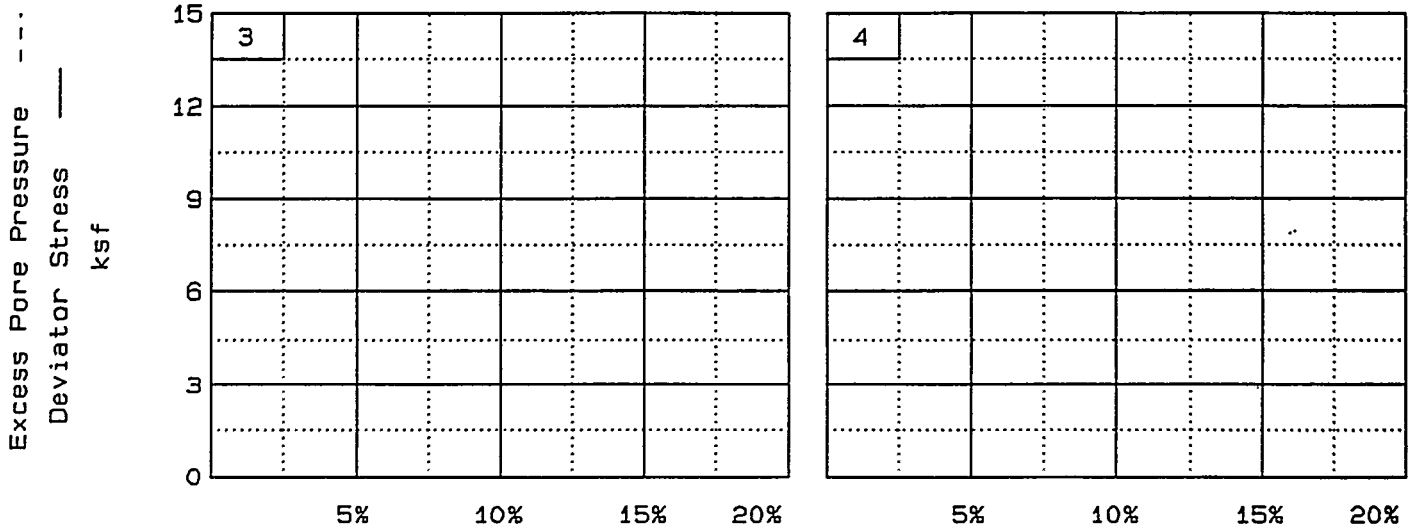
SAMPLE LOCATION: H Bor 29 ST-11 @ 58 FT.

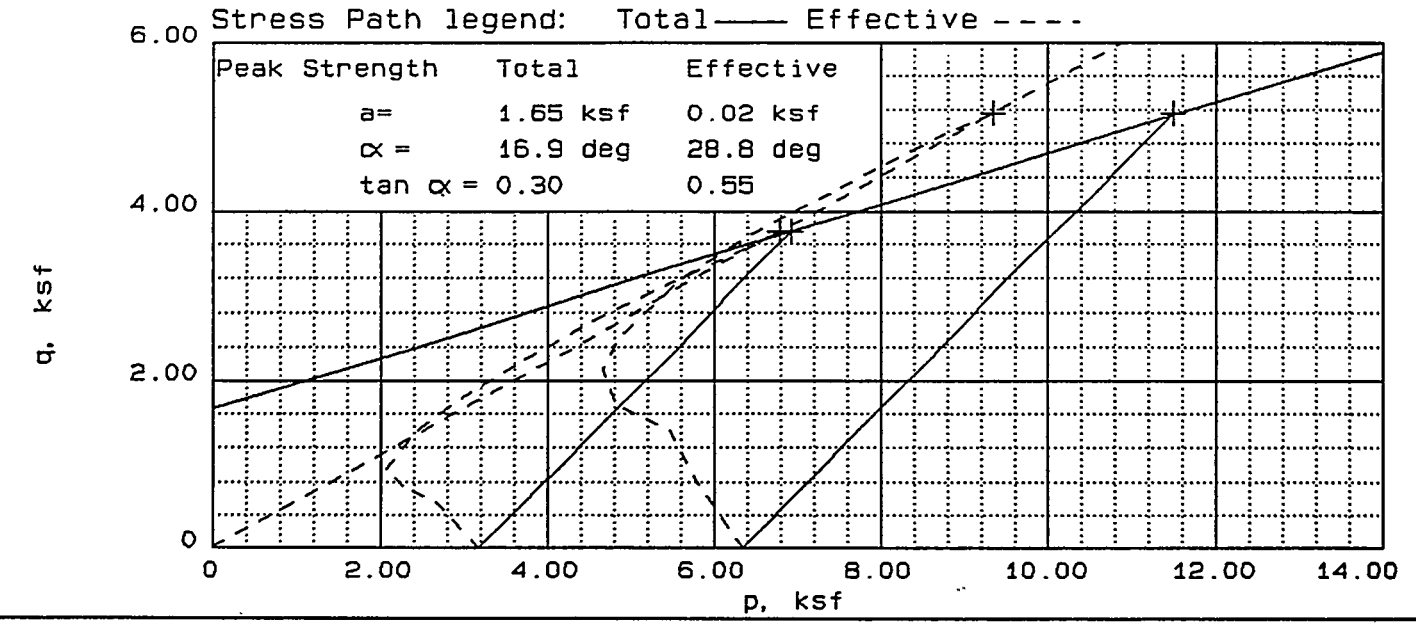
PROJ. NO.: 5810535301 DATE: 01/03/94

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.







Client: SRS

Project: SRS-ITP

Location: H Bor 29 ST-11 @ 58 FT.

File: 535301L Project No.: 5810535301 Page 2/2 Fig. No. ____

TRIAXIAL COMPRESSION TEST
CU with pore pressures

3-01-1994
1:36 pm

Project Data

Project No.: 5810535301 Date: 01/03/94 Data file: 535301L
Client: SRS
Project: SRS-ITP
Sample location: H Bor 29 ST-11 @ 58 FT.
Sample description: See Grain Size
Remarks: Tested by:
Reviewed by Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.62 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.87	2.87	
Height change, in		0.01	
Height, in	6.00	5.99	
Weight, grams	1202.6		
Water volume change, cc		-78.88	
Moisture, %	15.1	22.7	18.8
Dry density, pcf	102.4	102.6	
Saturation, %	66.3	100.0	
Void ratio	0.598	0.594	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 53 psi
Consolidation back pressure = 31 psi
Consolidation effective confining stress = 3.168 ksf
Peak deviator stress = 7.51 ksf at reading no. 10
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	3.17	3.17	1.00	31.0	3.17	0.00
1	0.0200	0.020	50.00	50.0	0.3	1.11	2.10	3.21	1.53	38.4	2.66	0.55
2	0.0400	0.040	66.00	66.0	0.7	1.46	1.54	3.00	1.95	42.3	2.27	0.73
3	0.0900	0.090	87.00	87.0	1.5	1.91	1.11	3.01	2.72	45.3	2.06	0.95
	.1800	0.180	129.00	129.0	3.0	2.78	1.02	3.81	3.72	45.9	2.41	1.39
	.2500	0.250	169.00	169.0	4.2	3.60	1.18	4.78	4.05	44.8	2.98	1.80

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Effective Stresses Major ksf	Effective Stresses 1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
	0.3300	0.330	215.00	215.0	5.5	4.52	1.47	5.99	4.08	42.8	3.73	2.26
7	0.4250	0.425	262.00	262.0	7.1	5.41	1.83	7.24	3.96	40.3	4.54	2.71
8	0.5900	0.590	314.00	314.0	9.8	6.30	2.36	8.66	3.67	36.6	5.51	3.15
9	0.6900	0.690	344.00	344.0	11.5	6.77	2.66	9.43	3.54	34.5	6.05	3.38
10	0.9100	0.910	398.00	398.0	15.2	7.51	3.04	10.55	3.47	31.9	6.79	3.75

TRIAXIAL COMPRESSION TEST 2-01-1994
CU with pore pressures 1:27 pm

Project Data

Project No.: 5810535301 Date: 01/03/94 Data file: 535301L
Client: SRS
Project: SRS-ITP
Sample location: H Bor 29 ST-11 @ 58 FT.
Sample description: See Grain Size
Remarks: Tested by:
Reviewed by Fig No.

Sample No. 2 Data

Type of sample: Undisturbed
Specific Gravity= 2.64 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.87	2.85	
Height change, in		0.03	
Height, in	6.00	5.98	
Weight, grams	1230.2		
Water volume change, cc		-38.00	
Moisture, %	19.0	22.6	20.4
Dry density, pcf	101.3	103.2	
Saturation, %	79.8	100.0	
Void ratio	0.627	0.597	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 74.8 psi
Consolidation back pressure = 30.8 psi
Consolidation effective confining stress = 6.336 ksf
Peak deviator stress = 10.31 ksf at reading no. 13
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Effective Stresses Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	6.34	6.34	1.00	30.8	6.34	0.00
1	0.0200	0.020	72.00	72.0	0.3	1.62	4.98	6.60	1.32	40.2	5.79	0.81
2	0.0400	0.040	125.00	125.0	0.7	2.80	4.06	6.86	1.69	46.6	5.46	1.40
3	0.0600	0.060	153.00	153.0	1.0	3.41	3.11	6.52	2.10	53.2	4.82	1.71
	[illegible].1000	0.100	192.00	192.0	1.7	4.25	2.53	6.79	2.68	57.2	4.66	2.13
	[illegible].1400	0.140	228.00	228.0	2.3	5.02	2.35	7.36	3.14	58.5	4.86	2.51

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
	0.2150	0.215	292.00	292.0	3.6	6.34	2.43	8.78	3.61	57.9	5.60	3.17
7	0.3000	0.300	346.00	346.0	5.0	7.40	2.74	10.14	3.71	55.8	6.44	3.70
8	0.3700	0.370	379.00	379.0	6.2	8.01	2.97	10.98	3.70	54.2	6.97	4.01
9	0.4500	0.450	409.00	409.0	7.5	8.52	3.21	11.73	3.65	52.5	7.47	4.26
10	0.5500	0.550	444.00	444.0	9.2	9.08	3.48	12.57	3.61	50.6	8.03	4.54
11	0.7100	0.710	493.00	493.0	11.9	9.79	3.83	13.62	3.56	48.2	8.72	4.89
12	0.8300	0.830	522.00	522.0	13.9	10.13	4.06	14.19	3.49	46.6	9.12	5.06
13	0.9100	0.910	540.00	540.0	15.2	10.31	4.19	14.50	3.46	45.7	9.35	5.16

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

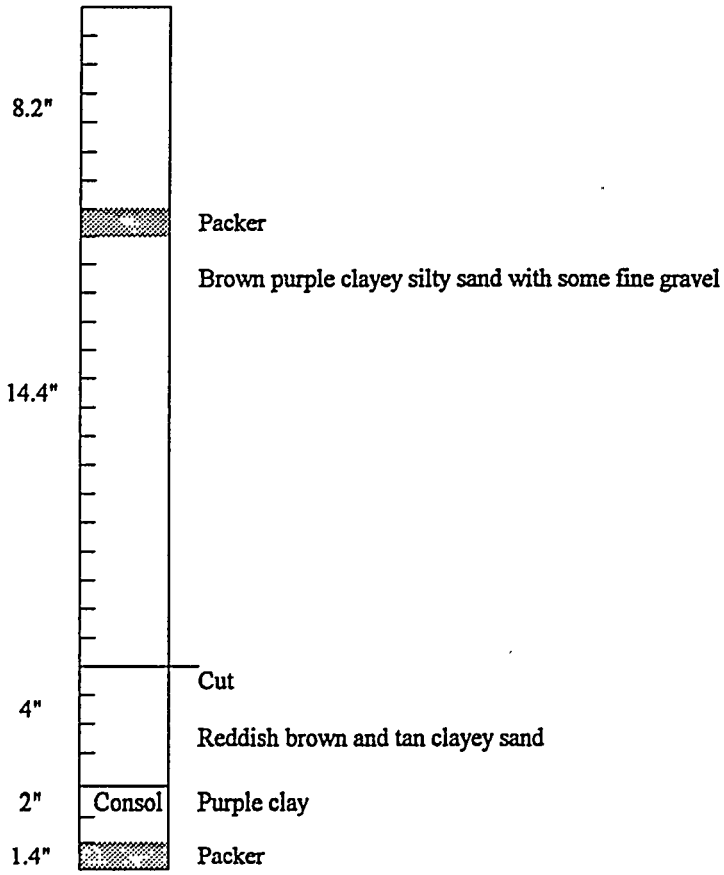
Project: SRS-ITP GEOTECHNICAL TESTING Date: 09-27-93

Boring No: H-Bor-29 Sample No: PS-4 Depth: 63'11.5"

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION



Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b29-ps4.wk3

ATTACHMENT 2

Tested by:	CLG	Reviewed by:	RLB	Law Job No.:	5810535301
Date:	09/21/93	Date:	09/21/93	Job Name:	SRS - ITP

TP-4A: UNIT WEIGHT OF THIN WALL TUBE SAMPLES
"TYPICAL"

Sample: Boring No.: H-Bor-29
Depth: 63' 11.5"
Sample ID: PS-4

MEASUREMENTS (Entire Tube):

	FROM TOP OF TUBE		FROM BOTTOM OF TUBE		TOTAL TUBE	INSIDE DIAMETER
	PACKER (inches)	SOIL (inches)	PACKER (inches)	SOIL (inches)	LENGTH (inches)	OF TUBE (inches)
1.	7.90	8.19	0.90	1.39		
2.	7.93	8.24	0.81	1.43		
3.	7.92	8.21	0.87	1.48		
Avg.:	7.92 L_1 =	8.21	0.86 L_2 =	1.43	L_3 = 29.969 *	D_i = 2.869 *

TOTAL WEIGHT OF TUBE + PACKERS + SOIL	M_1 =	6,850.9	gm
WEIGHT OF PACKERS	M_2 =	152.7 *	gm
TOTAL WEIGHT OF TUBE	M_3 =	2,498.4 *	gm
WET WEIGHT OF SOIL COLUMN, [M_1-M_2-M_3]	M_4 =	4,199.8	gm

* *Denotes information supplied by WSRC/TO*

MOISTURE CONTENTS (From assigned tests of same tube):

MOISTURE CONTENT		
Specimen 1:	31.5	% moisture
Specimen 2:	N/A	% moisture
Specimen 3:	N/A	% moisture
Average, (w):	31.5	% moisture

Notations:

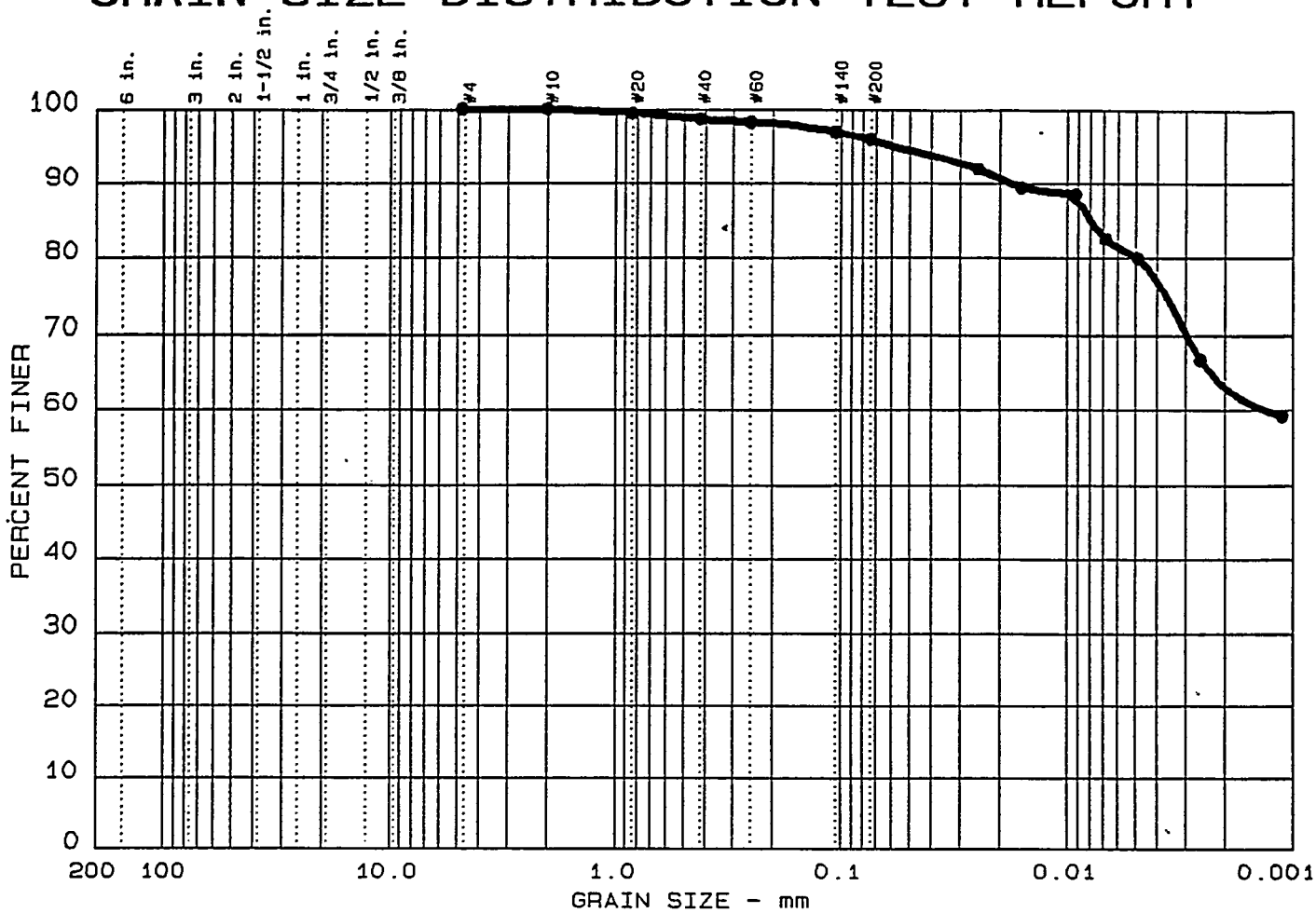
Specimen 1 moisture content obtained from Consolidation test
Specimen 2 moisture content obtained from N/A test
Specimen 3 moisture content obtained from N/A test

CALCULATIONS:

CROSS-SECTIONAL AREA OF TUBE, [pi*(D_i^2)/4]	A_o=	6.46	in.^{2}
LENGTH OF SOIL COLUMN, [L_3 - L_2 - L_1]	L_s =	20.32	in.
VOLUME OF SOIL COLUMN, [L_s*A_o]	V_s =	131.38	in.^{3}
WET DENSITY, [(M_4/V_s)*3.810]	**D_w=**	**121.8**	**pcf**
DRY DENSITY, [D_w/(1+w/100)]	**D_D=**	**92.6**	**pcf**

h:\users\lab\rlb\itp\b29-ps4.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	9	0.0	0.0	4.0	15.8	80.2

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	92	58								

MATERIAL DESCRIPTION	USCS	AASHTO
● Purple Silty Clay	CH	A-7-5 (66.9)

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-29 PS-4 @ 64 Ft.

Date: September 30, 1993

Remarks:

Tested By: JRR

Reviewed by: RLB

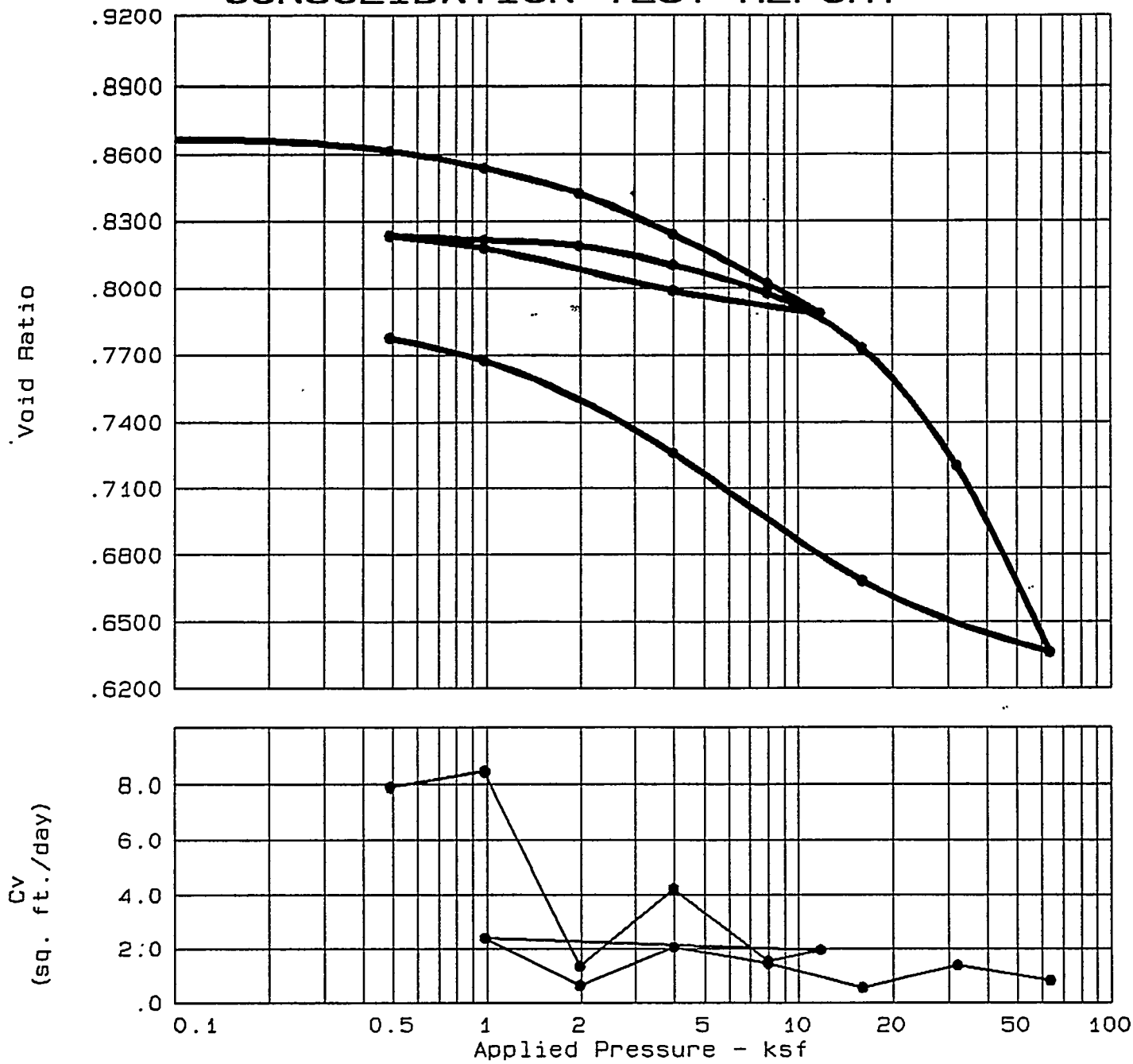
Consol

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

CONSOLIDATION TEST REPORT



Swell press.	Nat. Sat.	Nat. Moist.	Dry Density	LL	PI	Sp.Gr.	Initial void ratio
	96.9 %	31.5	89.3	92	58	2.67	0.8666

TEST RESULTS	MATERIAL DESCRIPTION
	Purple Silty Clay Class: CH

Project No.: 5810535301
Project: SRS ITP
Location: H-Bor-29 PS-4
64 Ft.
Date: Sept. 24, 1993

Remarks:

Tested by: CLG
Reviewed by: RLB

CONSOLIDATION TEST REPORT

LAW ENGINEERING, INC.

Fig. No._____

18:59, 10-22-1993 CONSOLIDATION TEST PROJECT DATA Test No. 18

.oject Number: 5810535301
Project: SRS ITP
Date: Sept. 24,1993
Location 1: H-Bor-29 PS-4
2: 64 Ft.
Remarks 1: Tested by: CLG
2: Reviewed by: RLB
3:
4:
5:
Material 1: Purple Silty Clay
description 2:
Classification: CH
Liquid limit: 92
Plasticity index: 58
Figure Number:

CONSOLIDATION TEST SPECIMEN DATA

TOTAL SAMPLE		BEFORE TEST		AFTER TEST	
Wet w+t	= 337.98 g.	Oedometer No.	= 9	Wet w+t	= 337.06 g.
Dry w+t	= 309.07 g	Machine No.	= 9	Dry w+t	= 309.07 g.
Tare wt.	= 217.20 g.	Spec. Gravity	= 2.67	Tare wt.	= 217.20 g.
'ht	= 0.90 in.	Height	= 0.90 in.		
Diameter	= 2.36 in.	Diameter	= 2.36 in.		
Weight	= 120.78 g.				
Moisture	= 31.5 %	Ht. Solids	= 0.48 in.	Moisture	= 30.5 %
Wet Den.	= 117.4 pcf	Dry wt.	= 92.10 g. *	Dry wt.	= 91.87 g.
Dry Den.	= 89.3 pcf	Void ratio	= 0.8666	Void ratio	= 0.7775
		Saturation	= 96.9 %	Saturation	= 104. %

* Initial dry weight used in calculations

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
Initial	0.02000			0.8666	
0.49	0.02280	0.0003	0.02250	0.8614	0.3 Comprs.
0.99	0.02710	0.0007	0.02640	0.8533	0.7 Comprs.
1.99	0.03350	0.0014	0.03210	0.8414	1.4 Comprs.
3.99	0.04280	0.0023	0.04050	0.8239	2.3 Comprs.
8.00	0.05490	0.0038	0.05110	0.8018	3.5 Comprs.
11.78	0.06220	0.0046	0.05760	0.7883	4.2 Comprs.
3.99	0.05490	0.0023	0.05260	0.7987	3.6 Comprs.
0.99	0.04420	0.0007	0.04350	0.8177	2.6 Comprs.
0.49	0.04110	0.0003	0.04080	0.8233	2.3 Comprs.

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
0.99	0.04240	0.0007	0.04170	0.8214	2.4 Comprs.
1.99	0.04440	0.0014	0.04300	0.8187	2.6 Comprs.
3.99	0.04940	0.0023	0.04710	0.8102	3.0 Comprs.
8.00	0.05710	0.0038	0.05330	0.7973	3.7 Comprs.
16.01	0.07050	0.0054	0.06510	0.7727	5.0 Comprs.
32.09	0.09785	0.0074	0.09045	0.7199	7.9 Comprs.
63.79	0.14280	0.0121	0.13070	0.6360	12.4 Comprs.
16.01	0.12060	0.0054	0.11520	0.6683	10.6 Comprs.
3.99	0.08990	0.0023	0.08760	0.7258	7.5 Comprs.
0.99	0.06850	0.0007	0.06780	0.7671	5.3 Comprs.
0.49	0.06310	0.0003	0.06280	0.7775	4.8 Comprs.

CONSOLIDATION TEST RESULTS

Compression index = NOT SELECTED
Preconsolidation pressure = NOT SELECTED

Load 0.49 ksf CONSOLIDATION TEST READINGS Load No. 1

achine Deflection 0.0003

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.02000	11	60.00	0.02240
2	0.10	0.02150	12	1540.00	0.02280
3	0.25	0.02170			
4	0.50	0.02180			
5	1.00	0.02190			
6	2.00	0.02205			
7	4.00	0.02220			
8	8.00	0.02225			
9	15.00	0.02230			
10	30.00	0.02235			

Void Ratio: 0.8614 Compression: 0.3 %
D0 = 0.0209 D90 = 0.0214 D100 = 0.0214 T90 = 0.21 min.
Cv @ 0.2 min.= 7.90 sq. feet/day

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

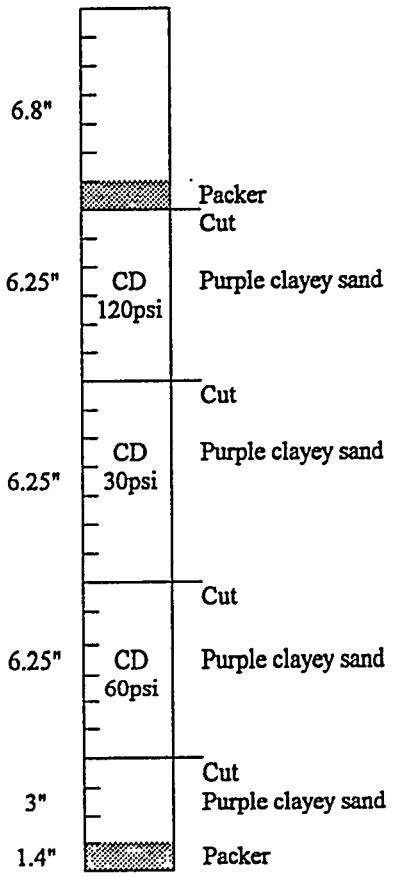
Project: SRS-ITP GEOTECHNICAL TESTING Date: 10-25-93

Boring No: H-Bor-29 Sample No: PS-5 Depth: 67'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION



Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b29-ps5.wk3

ATTACHMENT 2

Tested by:	CLG	Reviewed by:	RLB	Law Job No.:	5810535301
Date:	09/21/93	Date:	09/21/93	Job Name:	SRS - ITP

TP-4A: UNIT WEIGHT OF THIN WALL TUBE SAMPLES

"TYPICAL"

Sample: Boring No.: H-Bor-29
Depth: 67'
Sample ID: PS-5

MEASUREMENTS (Entire Tube):

	FROM TOP OF TUBE		FROM BOTTOM OF TUBE		TOTAL TUBE LENGTH (inches)	INSIDE DIAMETER OF TUBE (inches)
	PACKER (inches)	SOIL (inches)	PACKER (inches)	SOIL (inches)		
1.	6.49	6.66	0.80	1.48		
2.	6.59	6.79	0.83	1.39		
3.	6.43	6.93	0.73	1.43		
Avg.:	6.50	L_1 = 6.79	0.79	L_2 = 1.43	L_3 = 29.656 *	D_i = 2.866 *

TOTAL WEIGHT OF TUBE + PACKERS + SOIL	M_1 = 7,211.5	gm
WEIGHT OF PACKERS	M_2 = 152.8 *	gm
TOTAL WEIGHT OF TUBE	M_3 = 2,498.9 *	gm
WET WEIGHT OF SOIL COLUMN, [M_1-M_2-M_3]	M_4 = 4,559.8	gm

Denotes information supplied by WSRC/TO

MOISTURE CONTENTS (From assigned tests of same tube):

MOISTURE CONTENT		
Specimen 1:	20.1	% moisture
Specimen 2:	21.6	% moisture
Specimen 3:	19.4	% moisture
Average, (w):	20.4	% moisture

Notations:

Specimen 1 moisture content obtained from CD - 30psi test
Specimen 2 moisture content obtained from CD - 60psi test
Specimen 3 moisture content obtained from CD -120psi test

CALCULATIONS:

CROSS-SECTIONAL AREA OF TUBE, [pi*(D_i^2)/4]	A_o= 6.45	in.^{2}
LENGTH OF SOIL COLUMN, [L_3 - L_2 - L_1]	L_s = 21.43	in.
VOLUME OF SOIL COLUMN, [L_s*A_o]	V_s = 138.25	in.^{3}
WET DENSITY, [(M_4/V_s)*3.810]	**D_w= 125.7**	**pcf**
DRY DENSITY, [D_w/(1+w/100)]	**D_D= 104.4**	**pcf**

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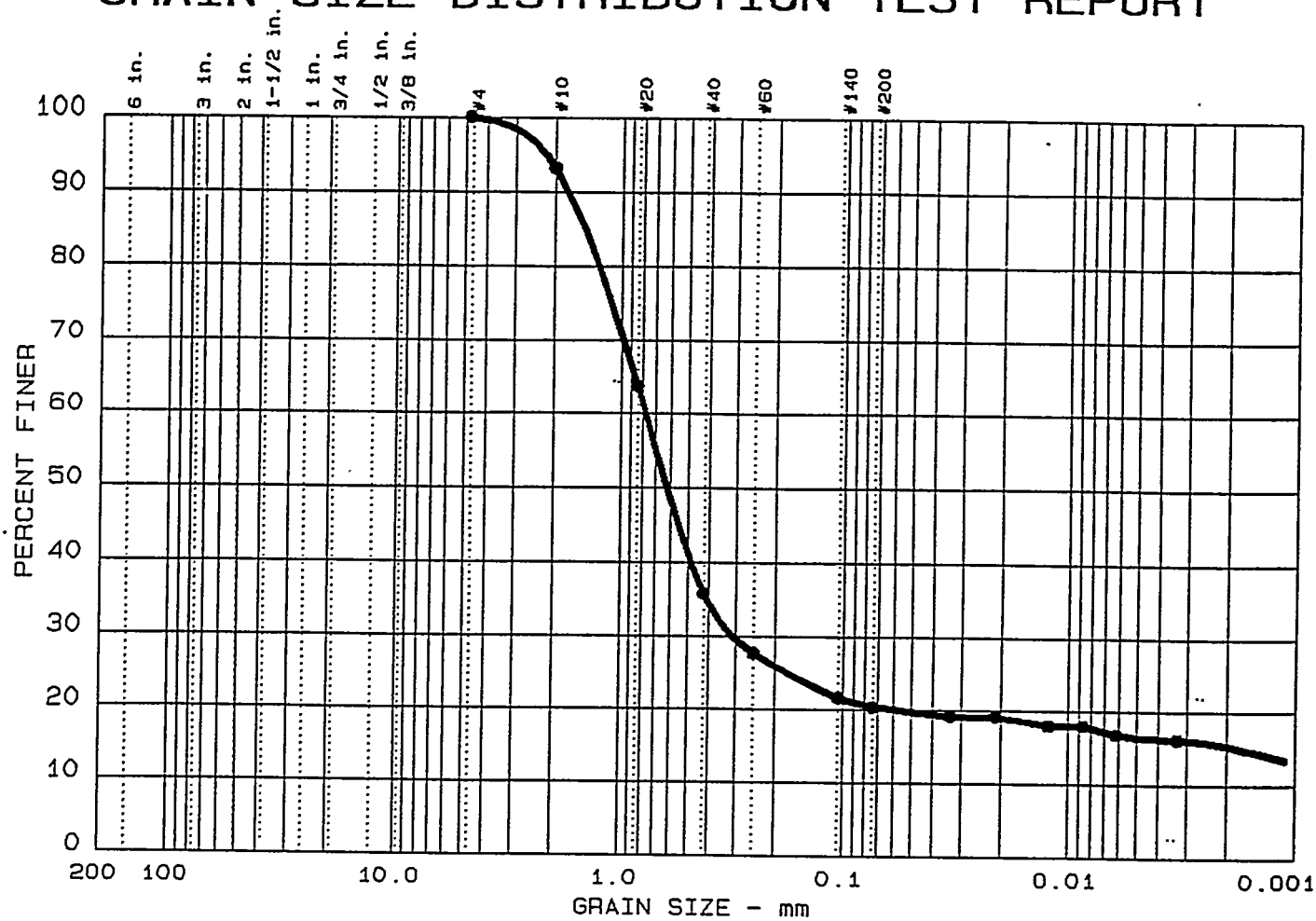
GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	7	0.0	0.0	79.7	4.0	16.3

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	104	79	1.46	0.77	0.62	0.310	0.0018			

MATERIAL DESCRIPTION	USCS	AASHTO
● Purple Brown & White Clayey Medium to Fine Sand	SC	A-2-7 (3.5)

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-29 PS-5 @ 67 Ft.

Date: November 15, 1993

Remarks:

Tested by: JRR

Reviewed by: RLB

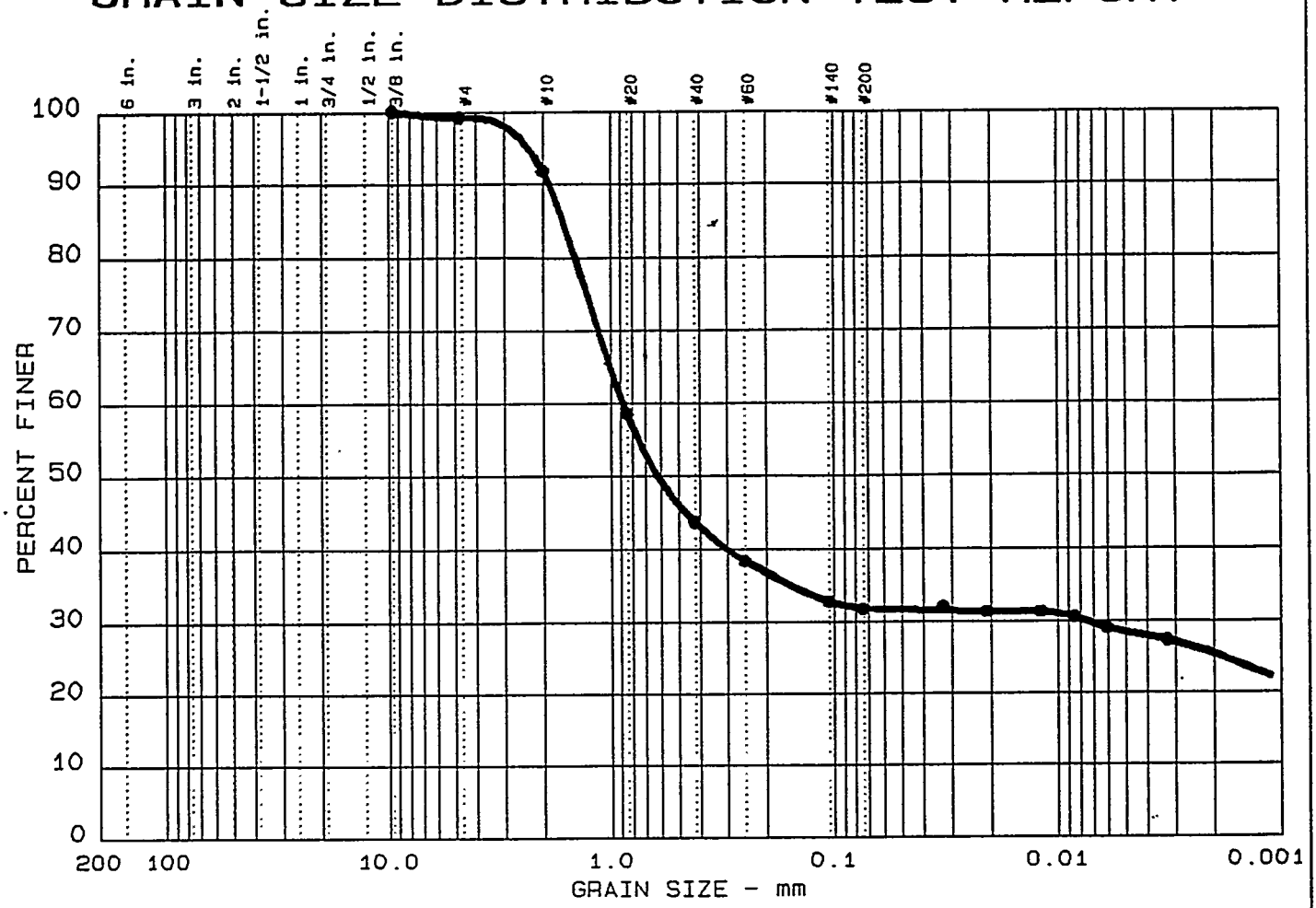
CD 30 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	10	0.0	0.8	67.6	3.4	28.2

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			1.62	0.88	0.61	0.007				

MATERIAL DESCRIPTION	USCS	AASHTO
● Purple Yellow White Clayey Medium to Fine Sand		

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-29 PS-5 @ 67 Ft

Date: November 15, 1993

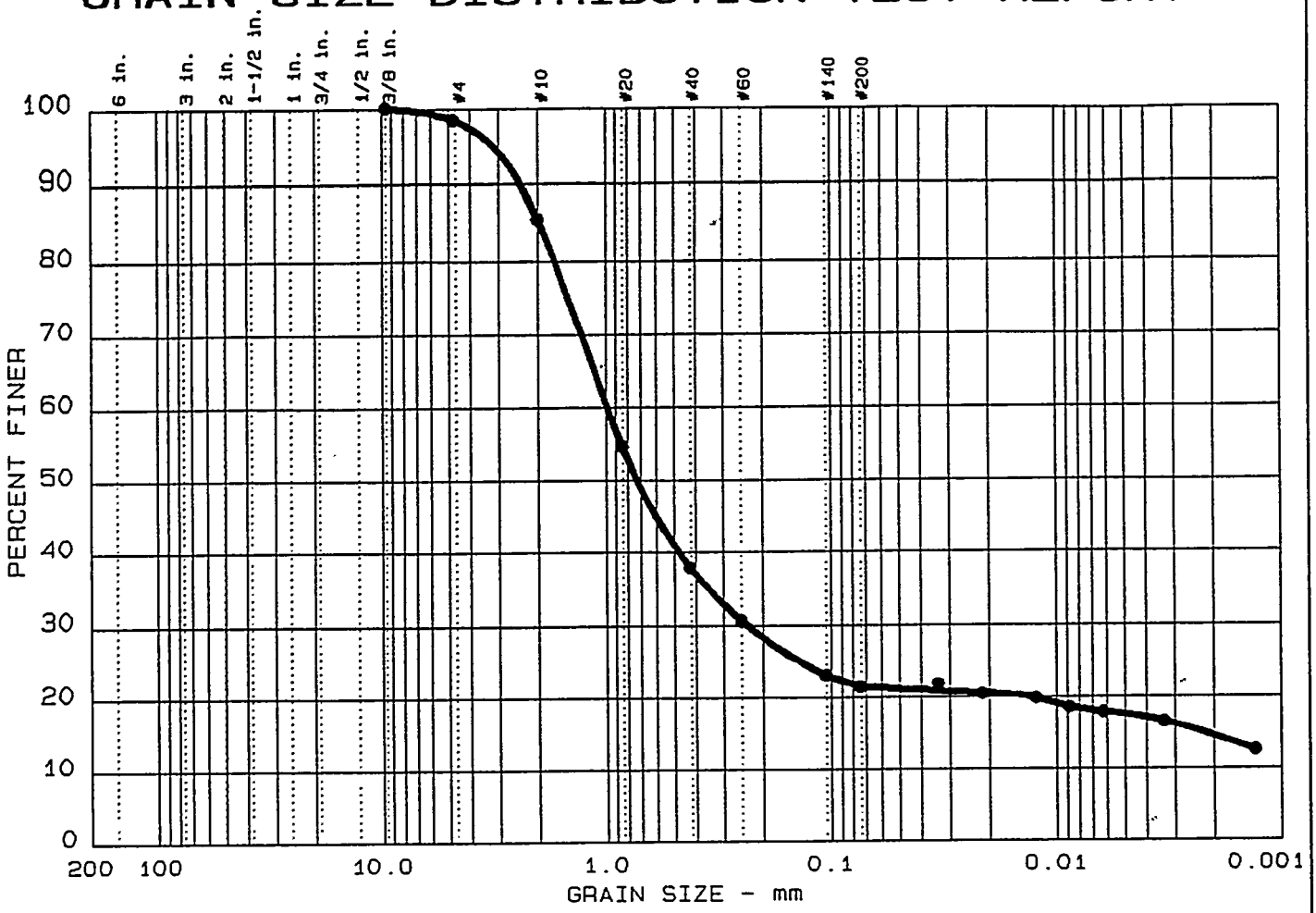
Remarks:
Tested by: BNS Ckd by. RLB
CD 60psi
Atterberg Limits -200
LL=150 PL=39 PI=111

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	20	0.0	1.6	76.9	4.0	17.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	89	66	1.95	0.98	0.73	0.235	0.0022			

MATERIAL DESCRIPTION	USCS	AASHTO
● Purple White Clayey Medium to Fine Sand	SC	A-2-4 (3.4)

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-29 PS-5 @ 67 Ft

Date: November 19, 1993

Remarks:

Tested by: JRR

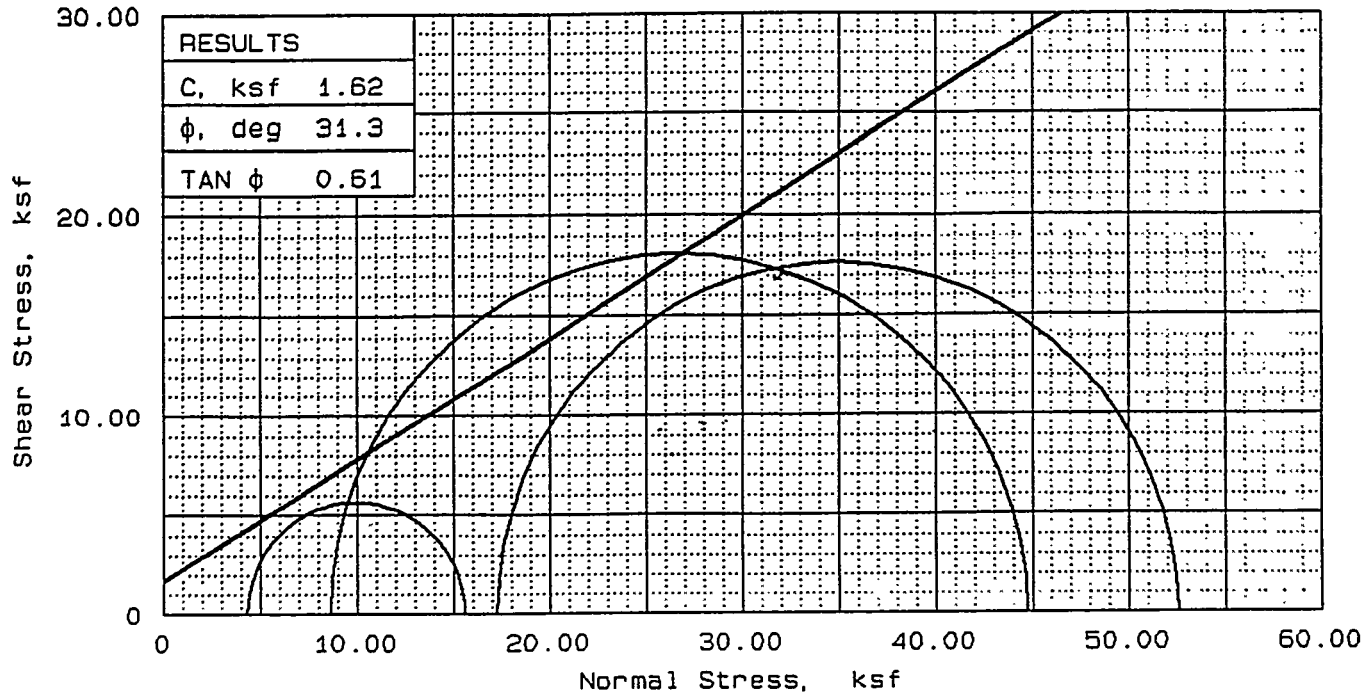
Reviewed by: RLB

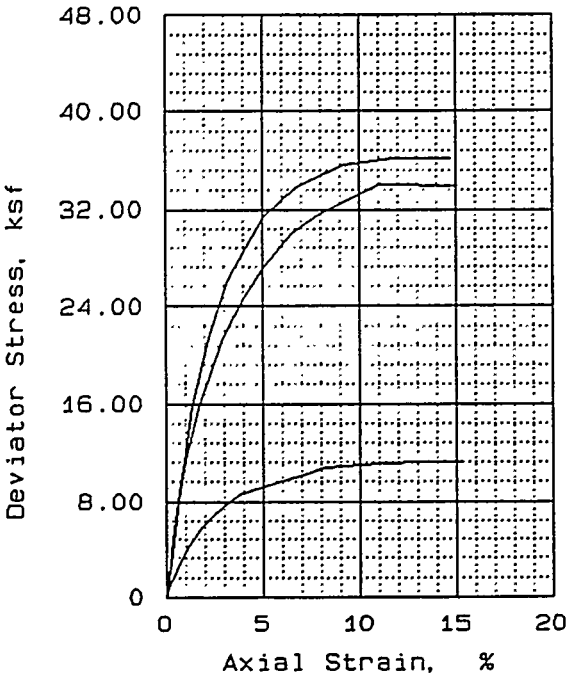
CD 120 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.





SAMPLE NO.		1	2	3
INITIAL	WATER CONTENT, %	20.1	21.6	19.4
	DRY DENSITY, pcf	100.5	102.1	104.8
	SATURATION, %	80.8	91.3	87.6
	VOID RATIO	0.665	0.633	0.591
	DIAMETER, in	2.88	2.88	2.88
	HEIGHT, in	6.00	6.00	6.00
AT TEST	WATER CONTENT, %	23.9	23.2	22.9
	DRY DENSITY, pcf	101.9	102.9	103.5
	SATURATION, %	100 0	100.0	100.0
	VOID RATIO	0.642	0.619	0.611
	DIAMETER, in	2.87	2.88	2.90
	HEIGHT, in	5.97	5.97	5.97
BACK PRESSURE, ksf		5.76	7.92	7.92
CELL PRESSURE, ksf		10.08	16.56	25.20
FAILURE STRESS, ksf		11.27	36.12	35.26
PORE PRESSURE, ksf				
STRAIN RATE, %/min.		0.100	0.100	0.100
ULTIMATE STRESS, ksf				
PORE PRESSURE, ksf				
σ_1 FAILURE, ksf		15.59	44.76	52.54
σ_3 FAILURE, ksf		4.32	8.64	17.28

TYPE OF TEST:
Consolidated drained
SAMPLE TYPE: Undisturbed
DESCRIPTION:

~~LL= 104 PL= 25 PI= 79.0~~
~~SPECIFIC GRAVITY= 2.67~~
REMARKS: Tested by: HEJ

Reviewed by: RLB

FIG. NO.

CLIENT: SRS

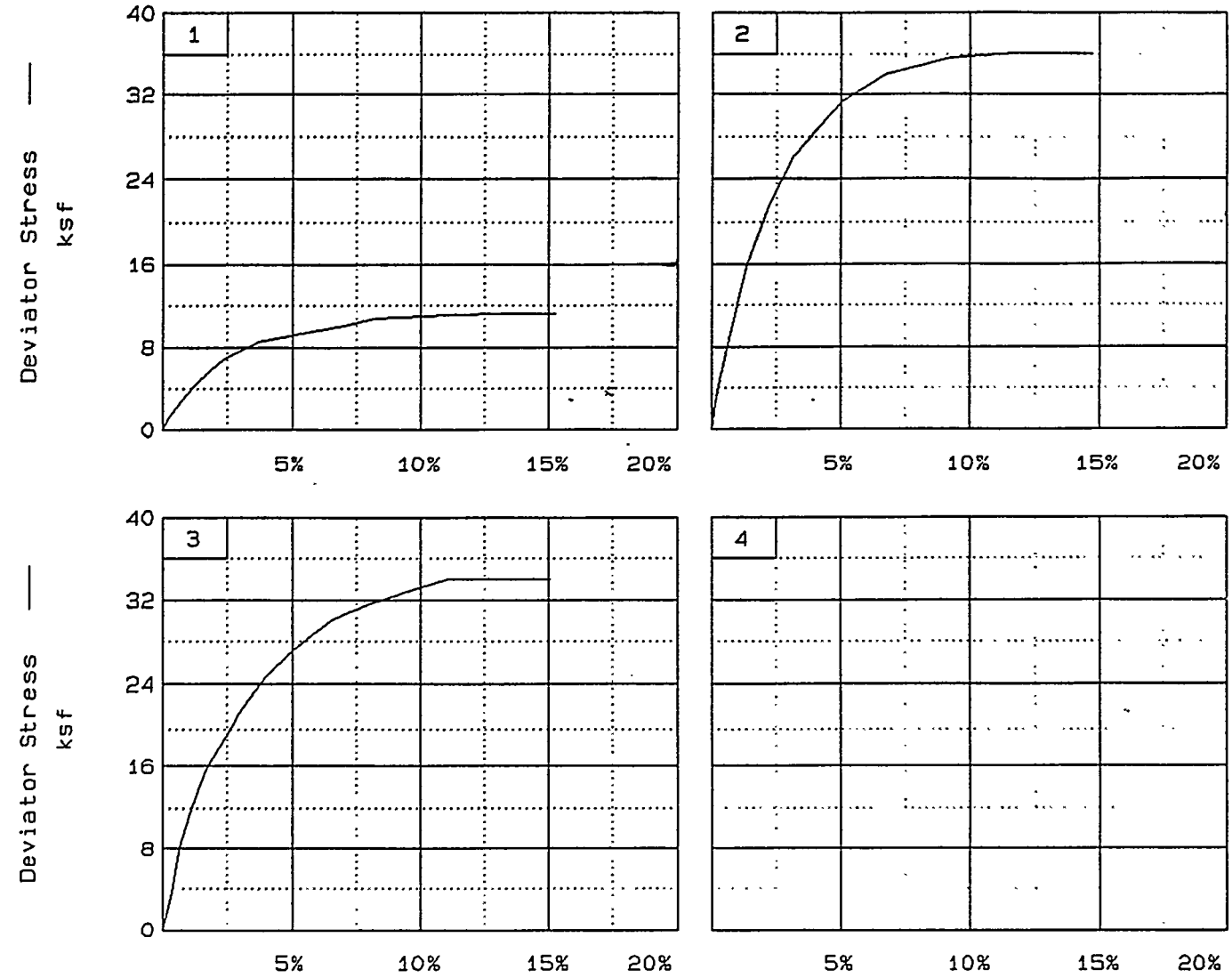
PROJECT: SRS-ITP

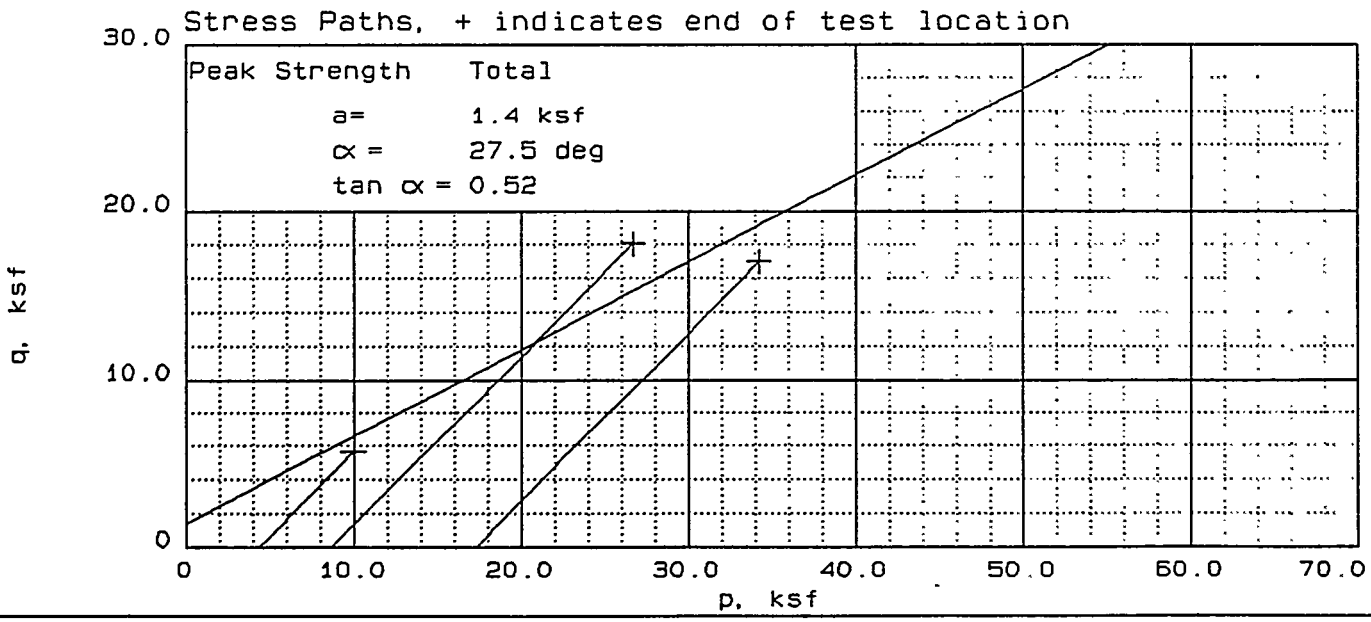
SAMPLE LOCATION: H Bor 29 PS-5 @ 67 Ft.

PROJ. NO.: 5810535301 DATE: Dec. 8, 1993

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.



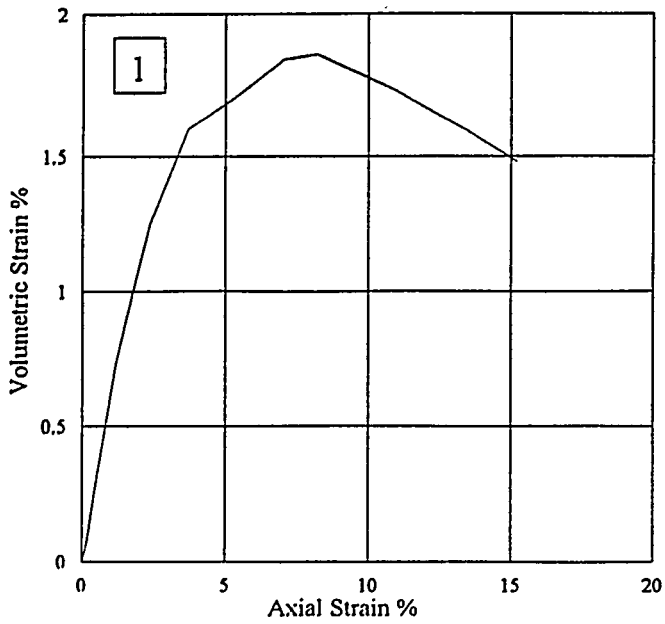


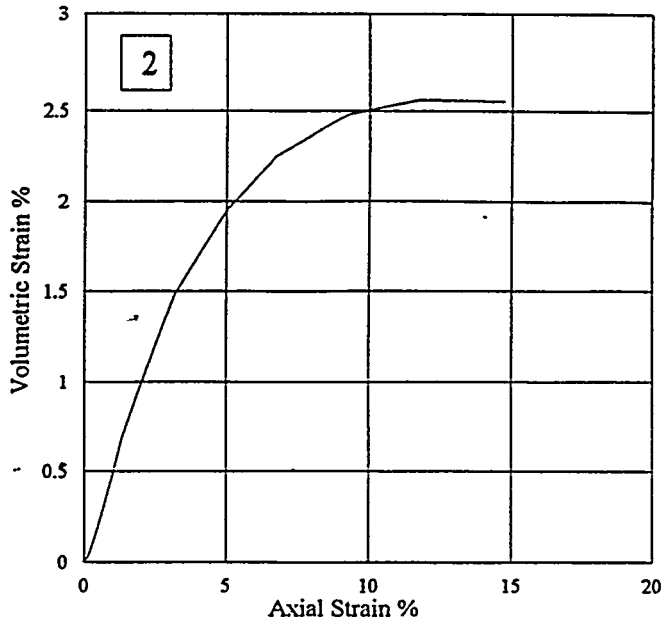
Client: SAS

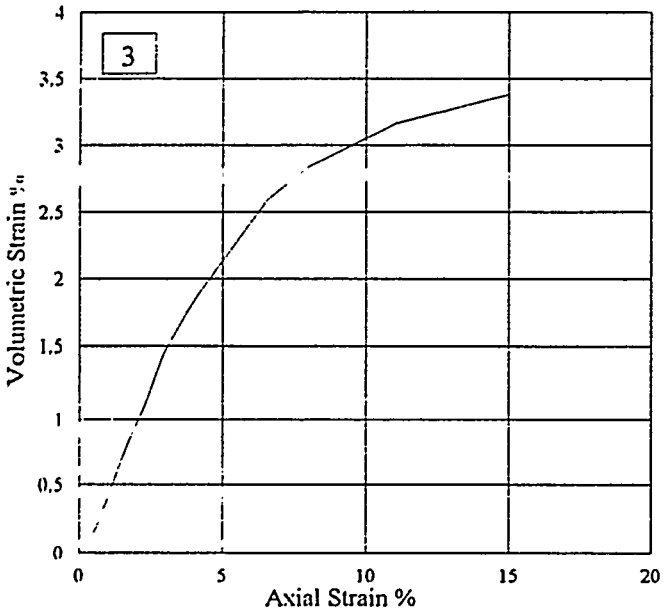
Project: SAS-ITP

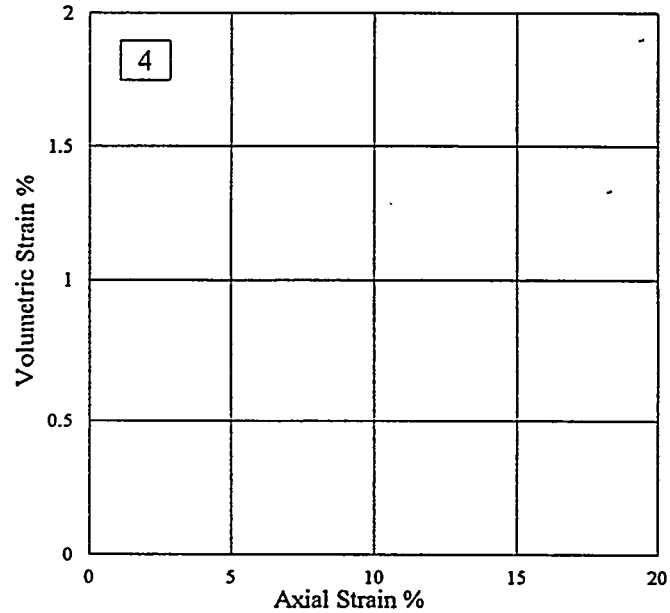
Location: H Bor 29 PS-5 @ 67 Ft.

File: 535301E Project No.: 5810535301 Page 2/2 Fig. No. ____









Client: SRS
Project: SRS-ITP
Location: H Bor 29 PS-5 @ 67 Ft.
File: Project No.: 5810535301 Page 2 / 2 Fig. No. _____

TRIAXIAL COMPRESSION TEST
Consolidated drained

12-14-1993
12:38 pm

Project Data

Project No.: 5810535301 Date: Dec. 8,1993 Data file: 535301E
Client: SRS
Project: SRS-ITP
Sample location: H Bor 29 PS-5 @ 67 Ft.
Sample description:
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.68 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.87	
Height change, in		0.03	
Height, in	6.00	5.97	
Weight, grams	1237.5		
Water volume change, cc		-40.02	
Moisture, %	20.1	23.9	20.5
Dry density, pcf	100.5	101.9	
Saturation, %	80.8	100.0	
Void ratio	0.665	0.642	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 70 psi
Consolidation back pressure = 40 psi
Consolidation effective confining stress = 4.32 ksf
Peak deviator stress = 11.27 ksf at reading no. 11
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	4.32	4.32	1.00	4.32	0.00
1	0.0100	0.010	45.00	45.0	0.2	1.00	4.32	5.32	1.23	4.82	0.50
2	0.0300	0.030	98.00	98.0	0.5	2.18	4.32	6.50	1.50	5.41	1.09
3	0.0700	0.070	193.00	193.0	1.2	4.26	4.32	8.58	1.99	6.45	2.13
'	0.1100	0.110	266.00	266.0	1.8	5.83	4.32	10.15	2.35	7.23	2.91
	1400	0.140	314.00	314.0	2.3	6.84	4.32	11.16	2.58	7.74	3.42

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	.2200	0.220	400.00	400.0	3.7	8.60	4.32	12.92	2.99	8.62	4.30
7	0.4200	0.420	490.00	490.0	7.0	10.16	4.32	14.48	3.35	9.40	5.08
8	0.4900	0.490	528.00	528.0	8.2	10.81	4.32	15.13	3.50	9.73	5.41
9	0.6600	0.660	562.00	562.0	11.1	11.15	4.32	15.47	3.58	9.90	5.58
10	0.8000	0.800	581.00	581.0	13.4	11.23	4.32	15.55	3.60	9.93	5.61
11	0.9100	0.910	596.00	596.0	15.2	11.27	4.32	15.59	3.61	9.96	5.64

TRIAXIAL COMPRESSION TEST
Consolidated drained

12-14-1993
12:39 pm

Project Data

Project No.: 5810535301 Date: Dec. 8,1993 Data file: 535301E
Client: SRS
Project: SRS-ITP
Sample location: H Bor 29 PS-5 @ 67 Ft.
Sample description:
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 2 Data

Type of sample: Undisturbed
Specific Gravity= 2.67 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.88	
Height change, in		0.03	
Height, in	6.00	5.97	
Weight, grams	1273.9		
Water volume change, cc		-16.32	
Moisture, %	21.6	23.2	19.1
Dry density, pcf	102.1	102.9	
Saturation, %	91.3	100.0	
Void ratio	0.633	0.619	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 115 psi
Consolidation back pressure = 55 psi
Consolidation effective confining stress = 8.64 ksf
Peak deviator stress = 36.12 ksf at reading no. 11
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	8.64	8.64	1.00	8.64	0.00
1	0.0100	0.010	116.00	116.0	0.2	2.57	8.64	11.21	1.30	9.92	1.28
2	0.0200	0.020	220.00	220.0	0.3	4.86	8.64	13.50	1.56	11.07	2.43
3	0.0400	0.040	400.00	400.0	0.7	8.81	8.64	17.45	2.02	13.05	4.41
'	0.0600	0.060	548.00	548.0	1.0	12.03	8.64	20.67	2.39	14.66	6.02
	0800	0.080	720.00	720.0	1.3	15.75	8.64	24.39	2.82	16.52	7.88

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	1300	0.130	988.00	988.0	2.2	21.44	8.64	30.08	3.48	19.36	10.72
7	0.1900	0.190	1220.00	1220.0	3.2	26.20	8.64	34.84	4.03	21.74	13.10
8	0.3000	0.300	1490.00	1490.0	5.0	31.39	8.64	40.03	4.63	24.33	15.69
9	0.4000	0.400	1638.00	1638.0	6.7	33.89	8.64	42.53	4.92	25.59	16.95
10	0.5500	0.550	1770.00	1770.0	9.2	35.64	8.64	44.28	5.12	26.46	17.82
11	0.7000	0.700	1845.00	1845.0	11.7	36.12	8.64	44.76	5.18	26.70	18.06
12	0.8800	0.880	1910.00	1910.0	14.7	36.12	8.64	44.76	5.18	26.70	18.06

TRIAXIAL COMPRESSION TEST
Consolidated drained

12-14-1993
12:42 pm

Project Data

Project No.: 5810535301 Date: Dec. 8,1993 Data file: 535301E
Client: SRS
Project: SRS-ITP
Sample location: H Bor 29 PS-5 @ 67 Ft.
Sample description:
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 3 Data

Type of sample: Undisturbed
Specific Gravity= 2.67 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.90	
Height change, in		0.03	
Height, in	6.00	5.97	
Weight, grams	1281.5		
Water volume change, cc		-37.35	
Moisture, %	19.4	22.9	15.5
Dry density, pcf	104.8	103.5	
Saturation, %	87.6	100.0	
Void ratio	0.591	0.611	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 175 psi
Consolidation back pressure = 55 psi
Consolidation effective confining stress = 17.28 ksf
Peak deviator stress = 35.26 ksf at reading no. 10
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	17.28	17.28	1.00	17.28	0.00
1	0.0200	0.020	162.00	162.0	0.3	3.51	17.28	20.79	1.20	19.04	1.76
2	0.0400	0.040	384.00	384.0	0.7	8.30	17.28	25.58	1.48	21.43	4.15
3	0.0600	0.060	528.00	528.0	1.0	11.37	17.28	28.65	1.66	22.97	5.69
	0.1000	0.100	732.00	732.0	1.7	15.66	17.28	32.94	1.91	25.11	7.83
	1750	0.175	1014.00	1014.0	2.9	21.42	17.28	38.70	2.24	27.99	10.71

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	2400	0.240	1190.00	1190.0	4.0	24.85	17.28	42.13	2.44	29.71	12.43
7	0.3000	0.300	1315.00	1315.0	5.0	27.17	17.28	44.45	2.57	30.87	13.59
8	0.3900	0.390	1480.00	1480.0	6.5	30.10	17.28	47.38	2.74	32.33	15.05
9	0.4800	0.480	1584.00	1584.0	8.0	31.69	17.28	48.97	2.83	33.13	15.85
10	0.6600	0.660	1758.00	1758.0	11.1	34.02	17.28	51.30	2.97	34.29	17.01
11	0.9000	0.900	1840.00	1840.0	15.1	34.00	17.28	51.28	2.97	34.28	17.00

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

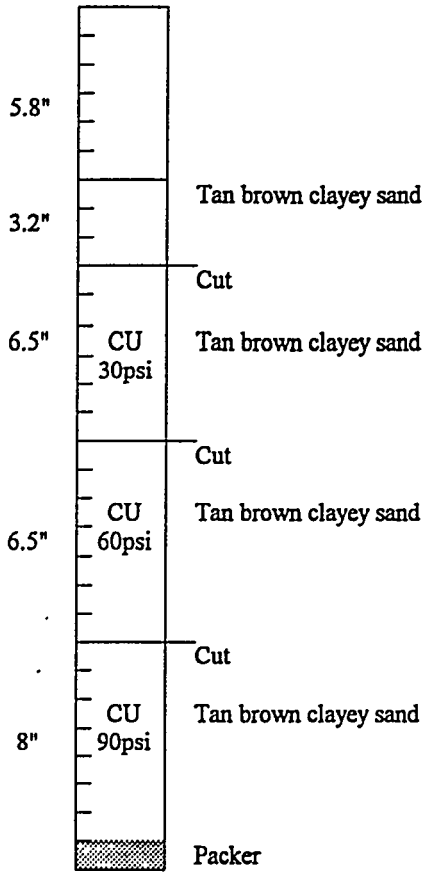
Project: SRS-ITP GEOTECHNICAL TESTING Date: 12-14-93

Boring No: H-Bor-29 Sample No: PS-8 Depth: 92'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION



Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b29-ps8.wk3

ATTACHMENT 2

Tested by:	HEJ	**Reviewed by:**	RLB	**Law Job No.:**	5810535301
Date:	12/14/93	**Date:**	12/16/93	**Job Name:**	SRS - ITP

TP-4A: UNIT WEIGHT OF THIN WALL TUBE SAMPLES

"TYPICAL"

Sample: Boring No.: H-Bor-29
Depth: 92'
Sample ID: PS-8

MEASUREMENTS (Entire Tube):

	FROM TOP OF TUBE			FROM BOTTOM OF TUBE			TOTAL TUBE LENGTH		INSIDE DIAMETER OF TUBE
	PACKER (inches)		SOIL (inches)	PACKER (inches)		SOIL (inches)	(inches)		(inches)
1.	N/A		5.78	0.95		1.33			
2.	N/A		5.75	0.77		1.58			
3.	N/A		5.78	0.91		1.52			
Avg.:	N/A	L_1 =	5.77	0.88	L_2 =	1.48	L_3 =	30.000 *	D_i = 2.873 *

Packer and retrieval wire on top of sample did not exist

TOTAL WEIGHT OF TUBE + PACKERS + SOIL	M_1 =	7,660.8	gm
WEIGHT OF PACKERS	M_2 =	97.7 *	gm
TOTAL WEIGHT OF TUBE	M_3 =	2,447.6 *	gm
WET WEIGHT OF SOIL COLUMN, [M_1-M_2-M_3]	M_4 =	5,115.5	gm

* *Denotes information supplied by WSRC/TO*

MOISTURE CONTENTS (From assigned tests of same tube):

MOISTURE CONTENT		
Specimen 1:	14.8	% moisture
Specimen 2:	18.3	% moisture
Specimen 3:	20.6	% moisture
Average, (w):	17.9	% moisture

Notations:

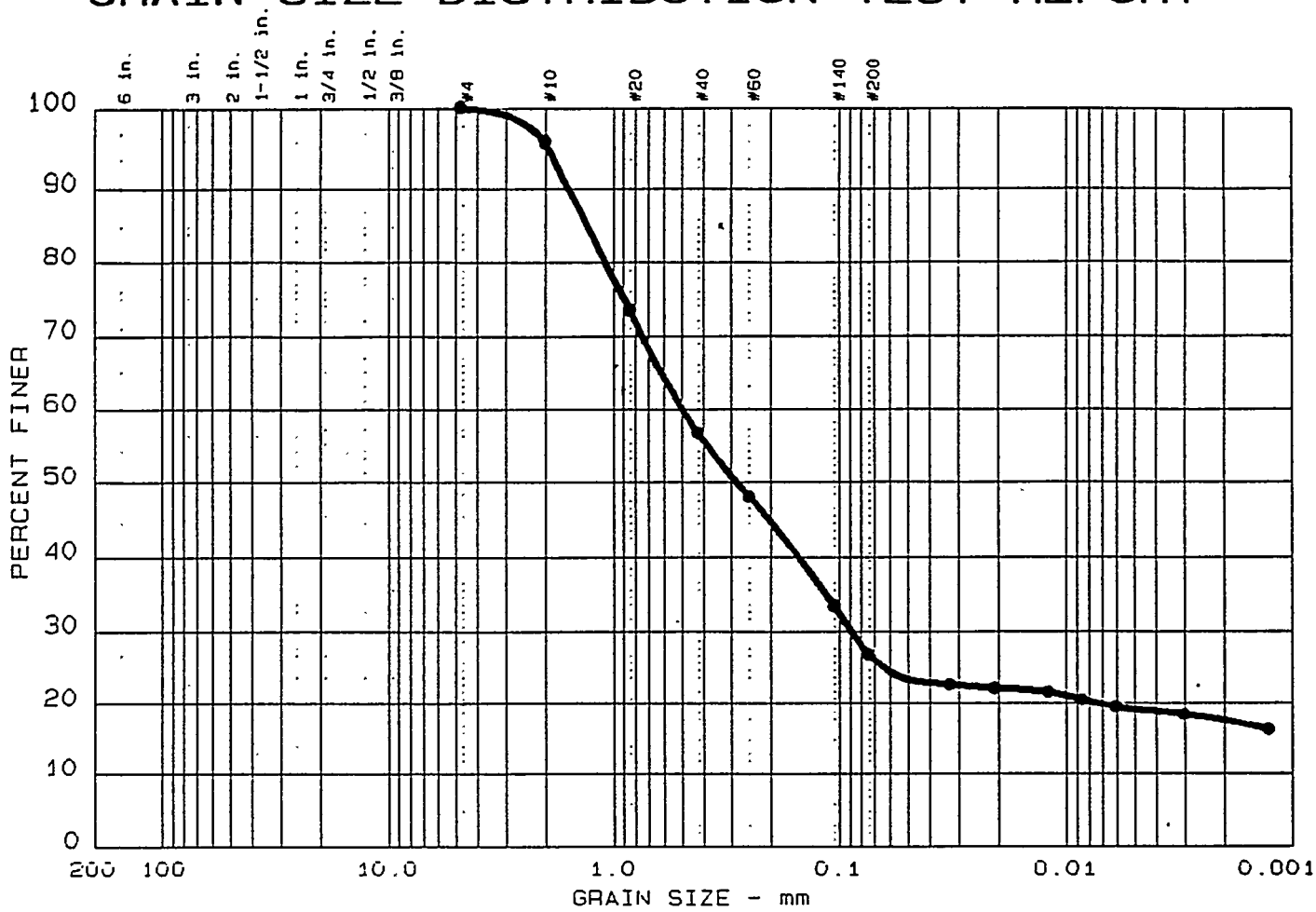
Specimen 1 moisture content obtained from CU- 30psi test
Specimen 2 moisture content obtained from CU -60psi test
Specimen 3 moisture content obtained from CU - 90psi test

CALCULATIONS:

CROSS-SECTIONAL AREA OF TUBE, [pi*(D_i^2)/4]	A_o=	6.48	in.^{2}
LENGTH OF SOIL COLUMN, [L_3 - L_2 - L_1]	L_s =	22.75	in.
VOLUME OF SOIL COLUMN, [L_s*A_o]	V_s =	147.50	in.^{3}
WET DENSITY, [(M_4/V_s)*3.810]	**D_w=**	**132.1**	**pcf**
DRY DENSITY, [D_w/(1+w/100)]	**D_D=**	**112.1**	**pcf**

h:\users\lab\cfb\itp\b29-ps8.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	11	0.0	0.0	73.3	7.7	19.0

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	51	28	1.30	0.49	0.28	0.089				

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Clayey Sand	SC	A-2-7 (2.2)

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-29 PS-8 @ 92 FT.

Date: January 5, 1994

Remarks:

Tested by: JTK

Reviewed by: RLB

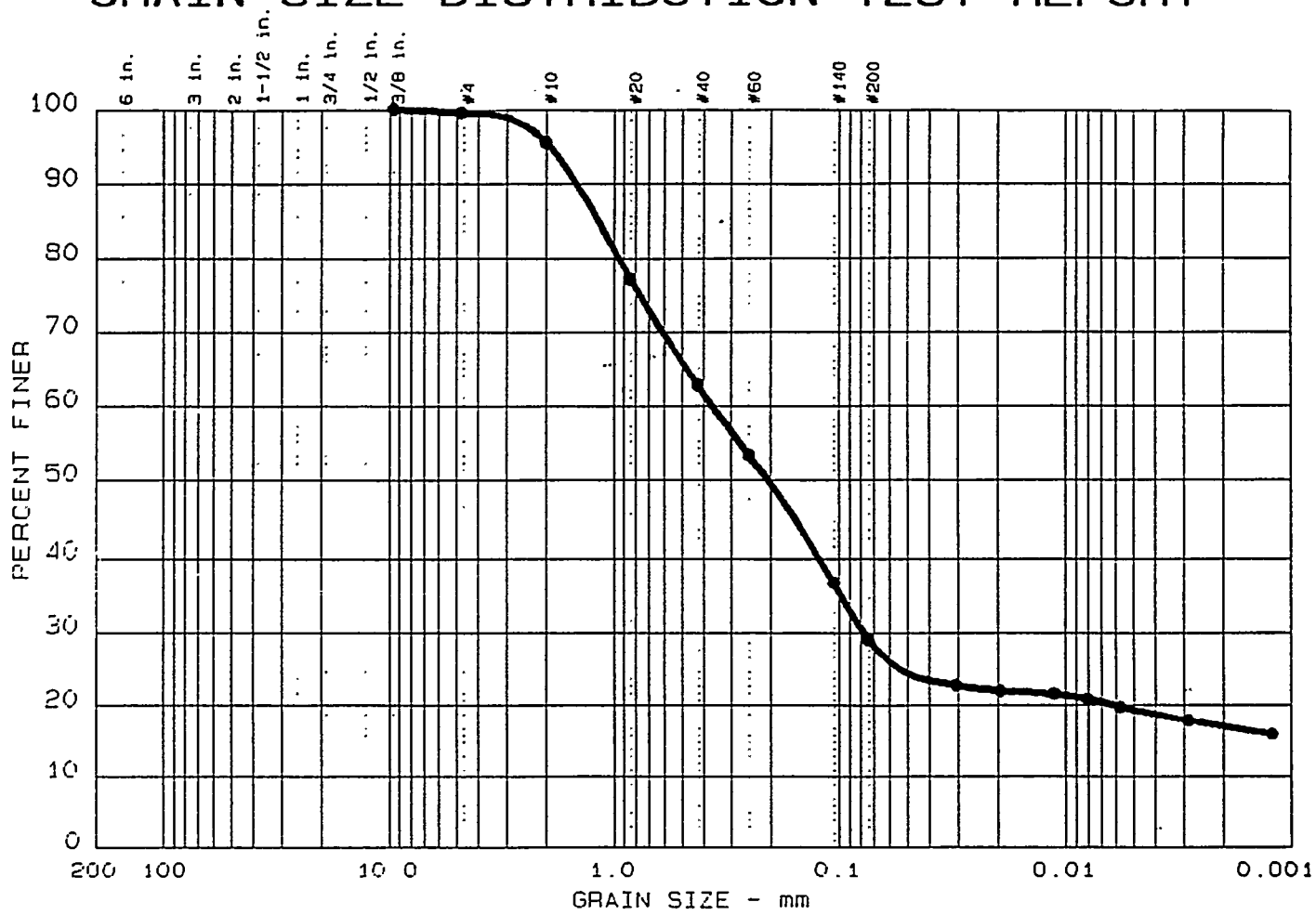
CU-30 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	14	0.0	0.4	70.5	9.7	19.4

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			1.16	0.36	0.21	0.078				

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Brown Clayey Sand		

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-29 PS-8 @ 92 Ft.

Date: January 5, 1994

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Remarks:

Tested by: JTK Reviewed by: RLB

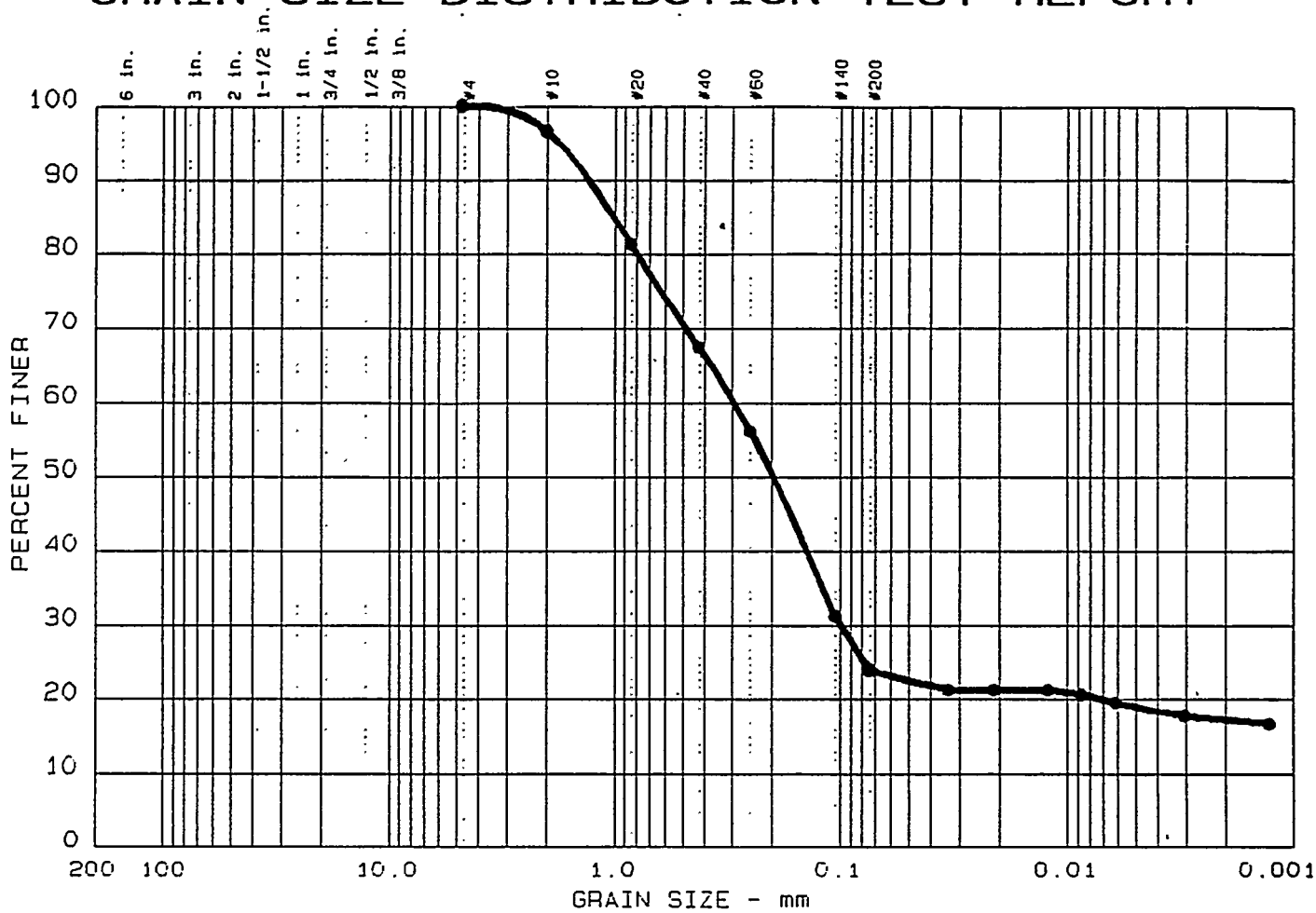
Atterberg Limits -200

LL=109 PL=33 PI=76

CU-60 psi

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	12	0.0	0.0	76.1	5.0	18.9

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	46	31	1.00	0.29	0.20	0.099				

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Clayey Sand	SC	A-2-7 (1.9)

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-29 PS-8 @ 92 Ft.

Date: January 5, 1994

Remarks:

Tested by: JTK

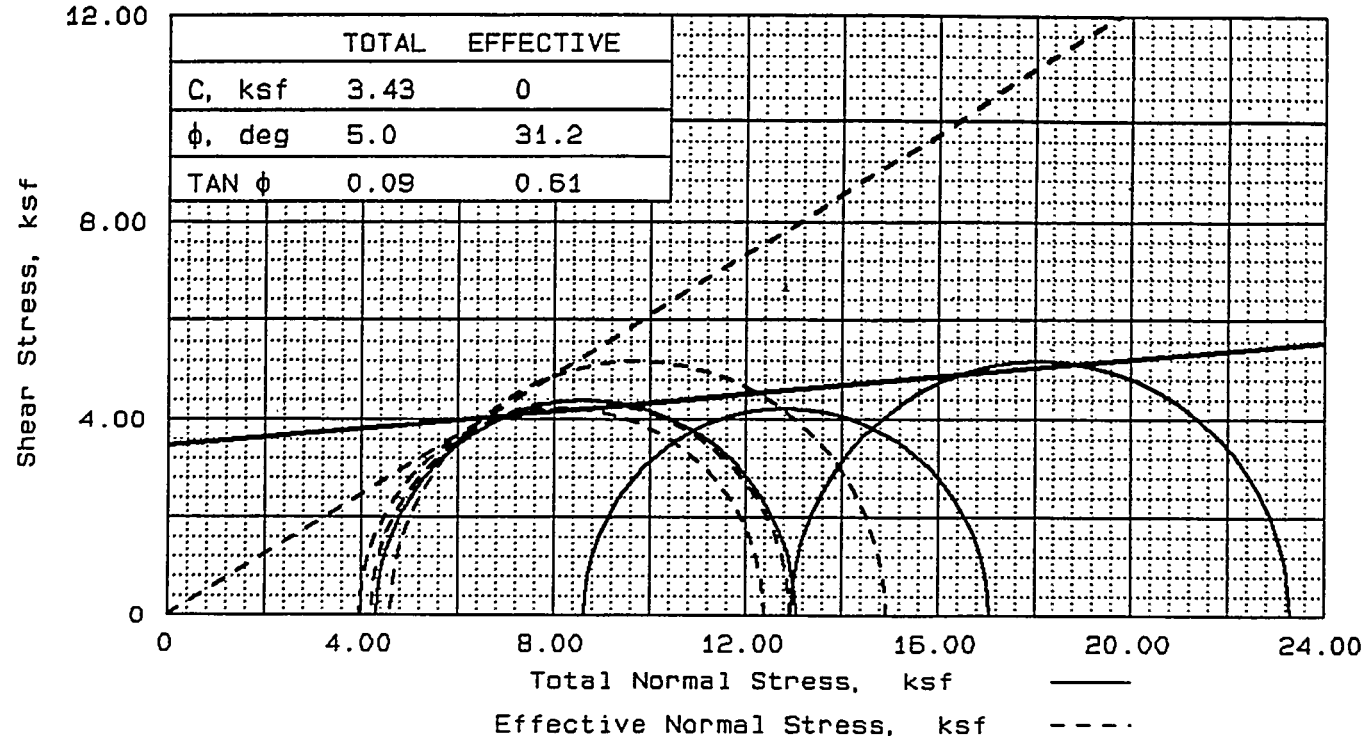
Reviewed by: RLB

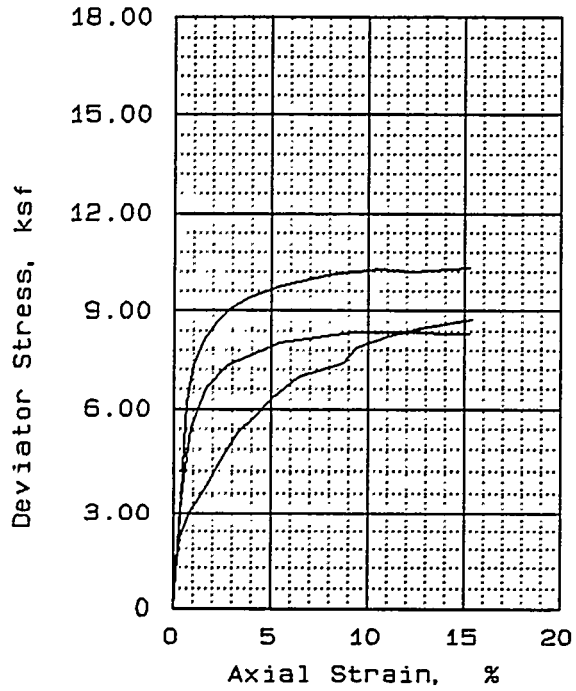
CU-90 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.





SAMPLE NO.		1	2	3
INITIAL	WATER CONTENT, %	14.8	18.3	20.6
	DRY DENSITY, pcf	113.0	110.0	106.4
	SATURATION, %	82.5	93.0	96.5
	VOID RATIO	0.481	0.533	0.572
	DIAMETER, in	2.87	2.88	2.87
	HEIGHT, in	6.00	6.00	6.00
AT TEST	WATER CONTENT, %	17.6	18.7	19.9
	DRY DENSITY, pcf	113.7	112.0	109.0
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.471	0.505	0.534
	DIAMETER, in	2.87	2.86	2.84
	HEIGHT, in	5.99	5.98	5.96
BACK PRESSURE, ksf		5.04	5.16	5.18
CELL PRESSURE, ksf		9.36	13.80	18.14
FAILURE STRESS, ksf		8.74	8.44	10.32
PORE PRESSURE, ksf		5.16	9.82	13.54
STRAIN RATE, %/min.		0.100	0.100	0.100
ULTIMATE STRESS, ksf				
PORE PRESSURE, ksf				
$\bar{\sigma}_1$ FAILURE, ksf		12.95	12.41	14.93
$\bar{\sigma}_3$ FAILURE, ksf		4.2	3.97	4.61

TYPE OF TEST:
CU with pore pressures
SAMPLE TYPE: Undisturbed
DESCRIPTION: See Grain Size

REMARKS: Tested by: HEJ

Reviewed by: RLB

FIG. NO.

CLIENT: SRS

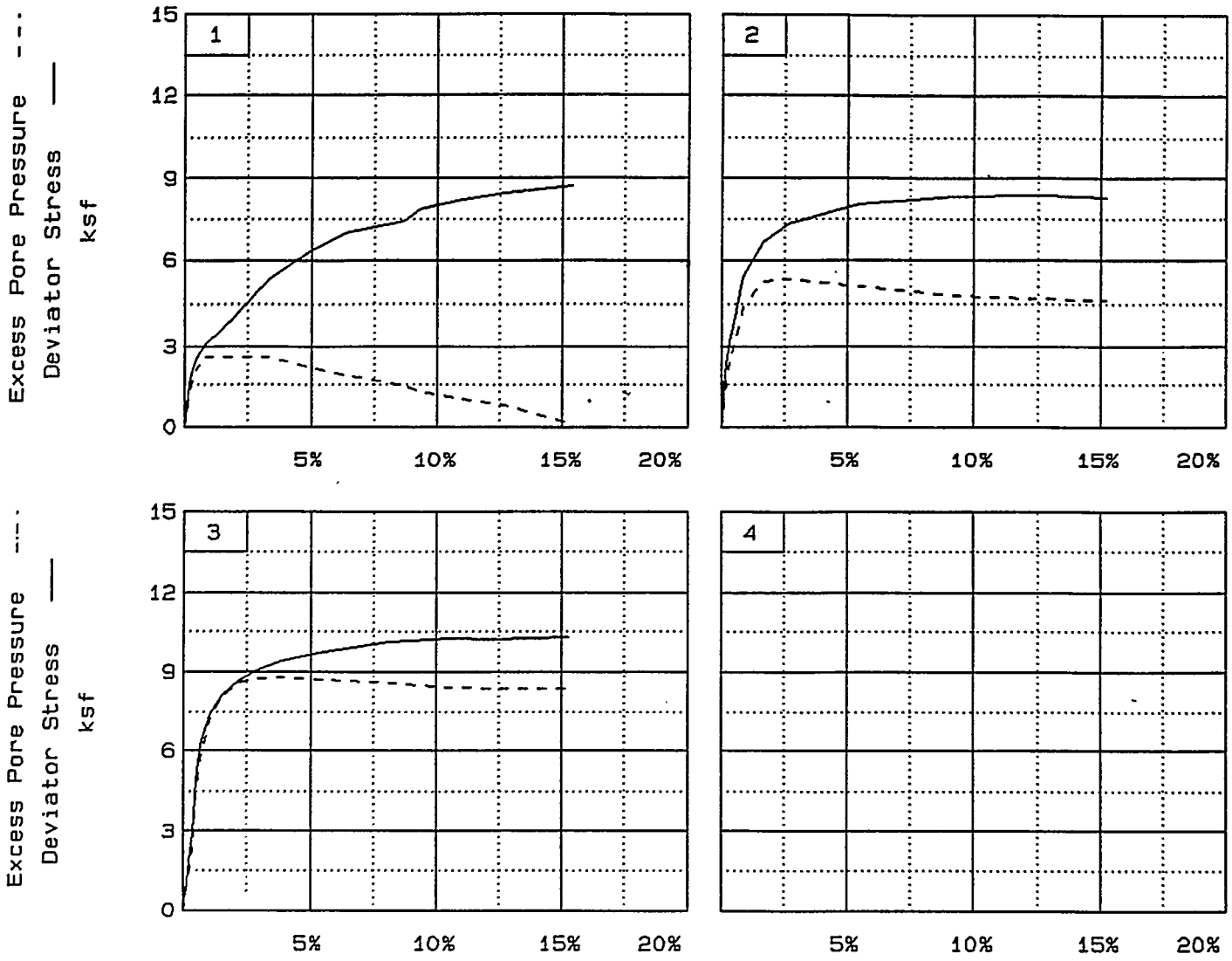
PROJECT: SRS ITP

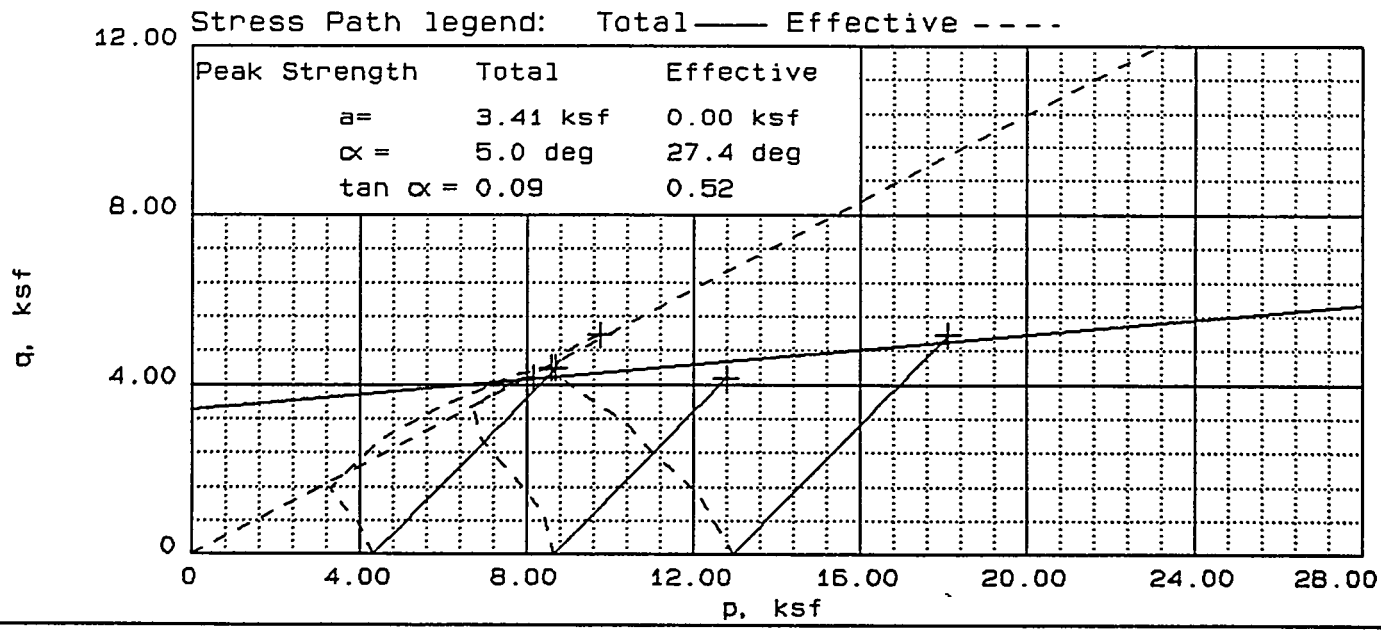
SAMPLE LOCATION: H Bor 29 PS-8 @ 92 Ft.

PROJ. NO.: 5810535301 DATE: 01/03/94

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.





Client: SRS

Project: SRS ITP

Location: H Bor 29 PS-8 @ 92 Ft.

File: 535301K Project No.: 5810535301 Page 2/2 Fig. No. ____

TRIAXIAL COMPRESSION TEST 2-01-1994
CU with pore pressures 1:31 pm

Project Data

Project No.: 5810535301 Date: 01/03/94 Data file: 535301K
Client: SRS
Project: SRS ITP
Sample location: H Bor 29 PS-8 @ 92 Ft.
Sample description: See Grain Size
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.68 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.87	2.87	
Height change, in		0.02	
Height, in	6.00	5.99	
Weight, grams	1323.3		
Water volume change, cc		-32.19	
Moisture, %	14.8	17.6	16.7
Dry density, pcf	113.0	113.7	
Saturation, %	82.5	100.0	
Void ratio	0.481	0.471	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 65 psi
Consolidation back pressure = 35 psi
Consolidation effective confining stress = 4.32 ksf
Peak deviator stress = 8.74 ksf at reading no. 13
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	4.32	4.32	1.00	35.0	4.32	0.00
1	0.0100	0.010	68.00	68.0	0.2	1.51	3.20	4.71	1.47	42.8	3.95	0.76
2	0.0200	0.020	99.00	99.0	0.3	2.20	2.52	4.72	1.87	47.5	3.62	1.10
3	0.0300	0.030	115.00	115.0	0.5	2.55	2.19	4.74	2.17	49.8	3.47	1.28
	0.0500	0.050	141.00	141.0	0.8	3.12	1.74	4.86	2.79	52.9	3.30	1.56
	0.2000	0.200	247.00	247.0	3.3	5.33	1.76	7.08	4.03	52.8	4.42	2.66

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
	1.2400	0.240	267.00	267.0	4.0	5.72	1.92	7.63	3.99	51.7	4.77	2.86
7	0.3000	0.300	300.00	300.0	5.0	6.36	2.19	8.55	3.91	49.8	5.37	3.18
8	0.3800	0.380	334.00	334.0	6.3	6.98	2.48	9.46	3.82	47.8	5.97	3.49
9	0.5200	0.520	364.00	364.0	8.7	7.42	2.82	10.24	3.63	45.4	6.53	3.71
10	0.5600	0.560	390.00	390.0	9.4	7.89	3.07	10.96	3.57	43.7	7.01	3.94
11	0.6600	0.660	414.00	414.0	11.0	8.22	3.33	11.55	3.47	41.9	7.44	4.11
12	0.7600	0.760	435.00	435.0	12.7	8.47	3.50	11.97	3.42	40.7	7.74	4.24
13	0.9200	0.920	463.00	463.0	15.4	8.74	4.20	12.95	3.08	35.8	8.58	4.37

TRIAXIAL COMPRESSION TEST
CU with pore pressures

2-24-1994
6:17 pm

Project Data

Project No.: 5810535301 Date: 01/03/94 Data file: 535301K
Client: SRS
Project: SRS ITP
Sample location: H Bor 29 PS-8 @ 92 Ft.
Sample description: See Grain Size
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 2 Data

Type of sample: Undisturbed
Specific Gravity= 2.70 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.86	
Height change, in		0.03	
Height, in	6.00	5.98	
Weight, grams	1331.6		
Water volume change, cc		-4.25	
Moisture, %	18.3	18.7	17.5
Dry density, pcf	110.0	112.0	
Saturation, %	93.0	100.0	
Void ratio	0.533	0.505	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 95.8 psi
Consolidation back pressure = 35.8 psi
Consolidation effective confining stress = 8.64 ksf
Peak deviator stress = 8.44 ksf at reading no. 8
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	8.64	8.64	1.00	35.8	8.64	0.00
1	0.0100	0.010	86.00	86.0	0.2	1.93	7.43	9.36	1.26	44.2	8.40	0.96
2	0.0200	0.020	144.00	144.0	0.3	3.23	6.26	9.49	1.51	52.3	7.88	1.61
3	0.0500	0.050	242.00	242.0	0.8	5.39	4.22	9.61	2.28	66.5	6.92	2.70
	1000	0.100	302.00	302.0	1.7	6.67	3.40	10.07	2.96	72.2	6.74	3.34
	1600	0.160	335.00	335.0	2.7	7.33	3.31	10.64	3.21	72.8	6.98	3.66

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Effective Stresses Major ksf	Effective Stresses 1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
	0.3250	0.325	379.00	379.0	5.4	8.05	3.59	11.64	3.25	70.9	7.61	4.03
7	0.5500	0.550	409.00	409.0	9.2	8.35	3.86	12.20	3.16	69.0	8.03	4.17
8	0.7400	0.740	425.00	425.0	12.4	8.37	3.97	12.34	3.11	68.2	8.16	4.18
9	0.8500	0.850	432.00	432.0	14.2	8.33	3.99	12.32	3.09	68.1	8.15	4.16
10	0.9100	0.910	436.00	436.0	15.2	8.31	4.00	12.31	3.07	68.0	8.16	4.15

TRIAXIAL COMPRESSION TEST 2-01-1994
CU with pore pressures 1:31 pm

Project Data

Project No.: 5810535301 Date: 01/03/94 Data file: 535301K
Client: SRS
Project: SRS ITP
Sample location: H Bor 29 PS-8 @ 92 Ft.
Sample description: See Grain Size
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 3 Data

Type of sample: Undisturbed
Specific Gravity= 2.68 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.87	2.84	
Height change, in		0.04	
Height, in	6.00	5.96	
Weight, grams	1305.9		
Water volume change, cc		6.97	
Moisture, %	20.6	19.9	19.1
Dry density, pcf	106.4	109.0	
Saturation, %	96.5	100.0	
Void ratio	0.572	0.534	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 126 psi
Consolidation back pressure = 36 psi
Consolidation effective confining stress = 12.96 ksf
Peak deviator stress = 10.32 ksf at reading no. 13
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	12.96	12.96	1.00	36.0	12.96	0.00
1	0.0200	0.020	129.00	129.0	0.3	2.92	10.66	13.57	1.27	52.0	12.11	1.46
2	0.0300	0.030	218.00	218.0	0.5	4.92	8.51	13.43	1.58	66.9	10.97	2.46
3	0.0400	0.040	276.00	276.0	0.7	6.22	7.27	13.49	1.86	75.5	10.38	3.11
	0.0600	0.060	327.00	327.0	1.0	7.34	5.80	13.15	2.27	85.7	9.47	3.67
	.0900	0.090	363.00	363.0	1.5	8.11	4.90	13.01	2.66	92.0	8.95	4.05

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
	0.1300	0.130	391.00	391.0	2.2	8.68	4.38	13.05	2.98	95.6	8.72	4.34
7	0.1700	0.170	411.00	411.0	2.9	9.06	4.22	13.28	3.15	96.7	8.75	4.53
8	0.2300	0.230	432.00	432.0	3.9	9.42	4.16	13.58	3.26	97.1	8.87	4.71
9	0.3300	0.330	456.00	456.0	5.5	9.77	4.23	14.00	3.31	96.6	9.12	4.89
10	0.4850	0.485	486.00	486.0	8.1	10.13	4.38	14.50	3.31	95.6	9.44	5.06
11	0.6300	0.630	507.00	507.0	10.6	10.28	4.55	14.83	3.26	94.4	9.69	5.14
12	0.7300	0.730	513.00	513.0	12.2	10.21	4.59	14.80	3.22	94.1	9.70	5.11
13	0.9100	0.910	537.00	537.0	15.3	10.32	4.61	14.93	3.24	94.0	9.77	5.16

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

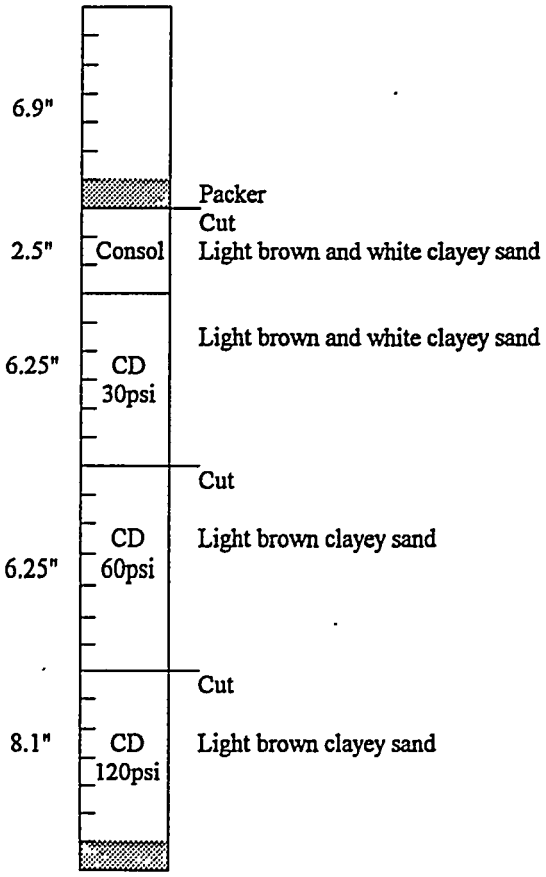
Project: SRS-ITP GEOTECHNICAL TESTING Date: 10-14-93

Boring No: H-Bor-29 Sample No: PS-9 Depth: 95'10"

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION



Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b29-ps9.wk3

ATTACHMENT 2

Tested by:	CLG	Reviewed by:	RLB	Law Job No.:	5810535301
ate:	09/21/93	Date:	09/21/93	Job Name:	SRS - ITP

TP-4A: UNIT WEIGHT OF THIN WALL TUBE SAMPLES

"TYPICAL"

Sample: Boring No.: H-Bor-29
Depth: 95' 10.5"
Sample ID: PS-9

MEASUREMENTS (Entire Tube):

	FROM TOP OF TUBE			FROM BOTTOM OF TUBE			TOTAL TUBE		INSIDE DIAMETER
	PACKER (inches)		SOIL (inches)	PACKER (inches)		SOIL (inches)	LENGTH (inches)		OF TUBE (inches)
1.	6.60		6.98	0.96		1.49			
2.	6.55		6.88	0.93		1.63			
3.	6.71		6.89	0.88		1.49			
Avg.:	6.62	L_1 =	6.92	0.92	L_2 =	1.54	L_3 = 30.000 *	D_i =	2.872 *

TOTAL WEIGHT OF TUBE + PACKERS + SOIL	M_1 =	7,197.8	gm
WEIGHT OF PACKERS	M_2 =	153.3 *	gm
TOTAL WEIGHT OF TUBE	M_3 =	2,455.7 *	gm
WET WEIGHT OF SOIL COLUMN, [M_1-M_2-M_3]	M_4 =	4,588.8	gm

Denotes information supplied by WSRC/TO

MOISTURE CONTENTS (From assigned tests of same tube):

MOISTURE CONTENT		
Specimen 1:	25.2	% moisture
Specimen 2:	22.7	% moisture
Specimen 3:	21.5	% moisture
Average, (w):	23.1	% moisture

Notations:

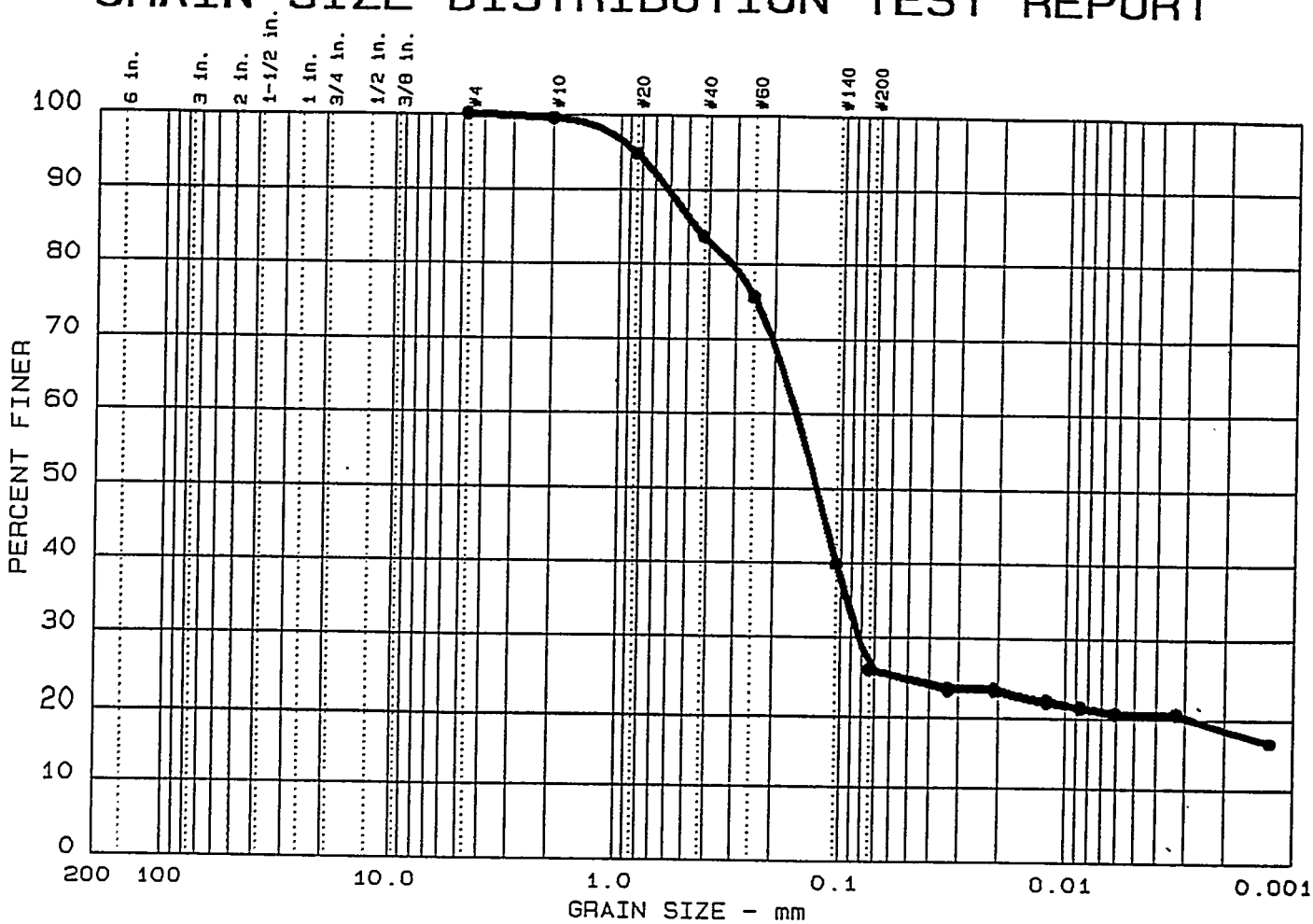
Specimen 1 moisture content obtained from CD - 30psi test
Specimen 2 moisture content obtained from CD - 60psi test
Specimen 3 moisture content obtained from CD - 120psi test

CALCULATIONS:

CROSS-SECTIONAL AREA OF TUBE, [pi*(D_i^2)/4]	A_o=	6.48	in.^{2}
LENGTH OF SOIL COLUMN, [L_3 - L_2 - L_1]	L_s =	21.55	in.
VOLUME OF SOIL COLUMN, [L_s*A_o]	V_s =	139.59	in.^{3}
WET DENSITY, [(M_4/V_s)*3.810]	**D_w=**	**125.3**	**pcf**
DRY DENSITY, [D_w/(1+w/100)]	**D_D=**	**101.7**	**pcf**

h:\users\lab\rlb\itp\b29-pe9.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	6	0.0	0.0	74.4	5.0	20.6

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	53	27	0.45	0.16	0.13	0.083				

MATERIAL DESCRIPTION	USCS	AASHTO
● Light Brown & White Clayey Medium to Fine Sand	SC	A-2-7 (1.9)

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-29 PS-9 @ 95'10"-97'8"

Date: October 20, 1993

Remarks:

Tested by: BNS

Reviewed by: RLB

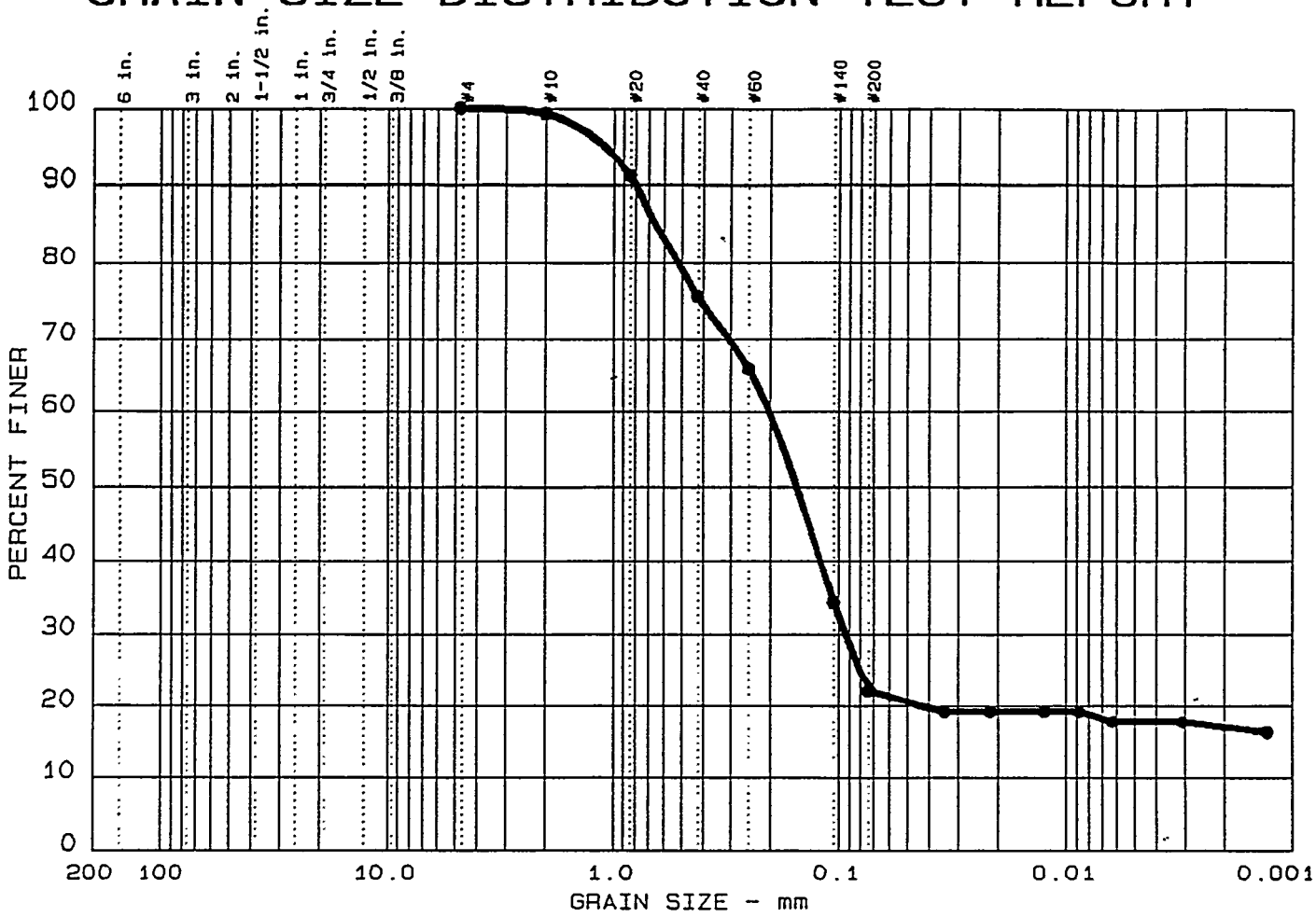
CD 30 psi (Consol.)

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	2	0.0	0.0	77.9	4.4	17.7

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.63	0.20	0.15	0.093				

MATERIAL DESCRIPTION	USCS	AASHTO
● Light Brown Clayey Medium to Fine Sand		

Project No.: 581535301
Project: SRS ITP
● Location: H-Bor-29 PS-9 @ 95'10"-97'8"

Date: OCTOBER 20, 1993

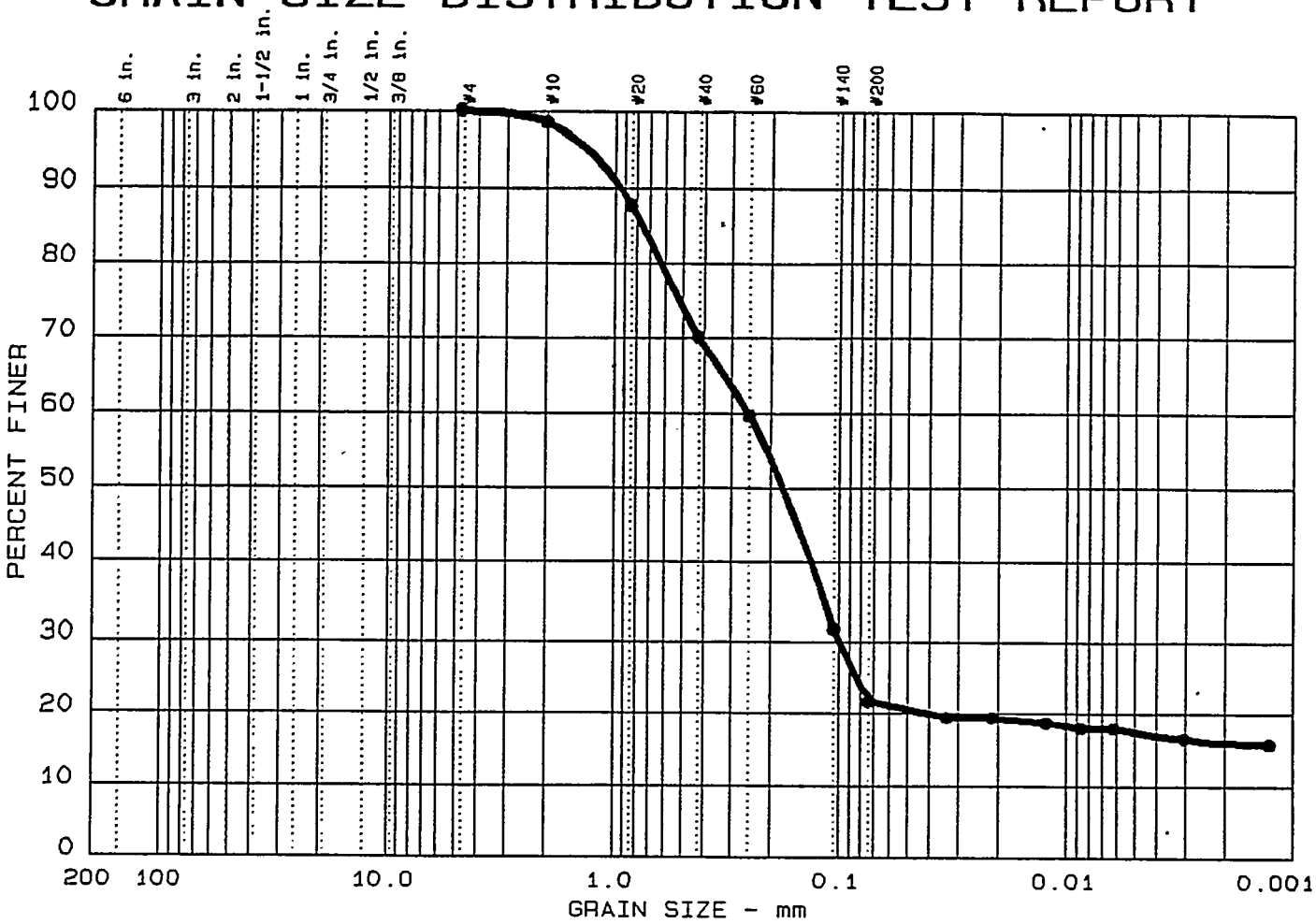
Remarks:
Tested by: JRR Ckd by: RLB
CD 60 psi
Atterberg Limits -200
LL=167 PL=39 PI=128

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	1	0.0	0.0	78.3	4.3	17.4

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	46	25	0.75	0.25	0.18	0.099				

MATERIAL DESCRIPTION	USCS	AASHTO
● Light Brown Clayey Medium to fine Sand	SC	A-2-7 (1.1)

Project No.: 581535301
Project: SRS ITP
● Location: H-Bor-29 PS-9 @ 95'11"-97'

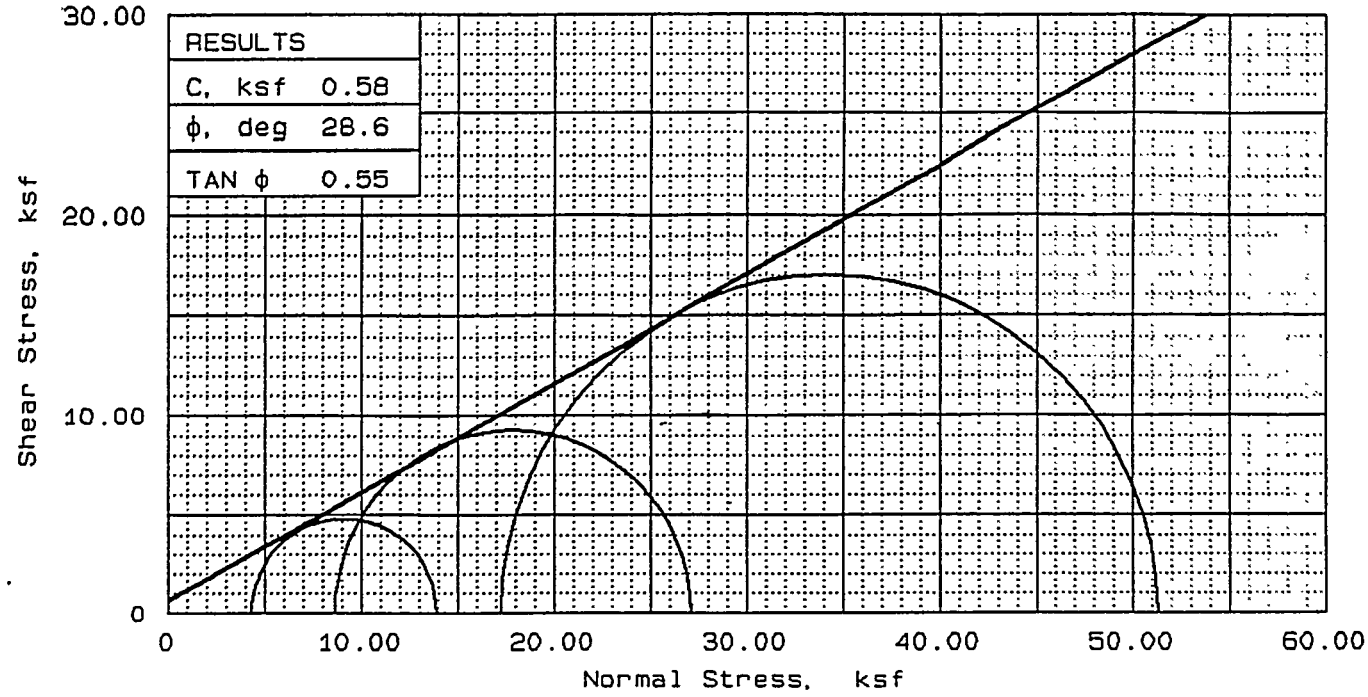
Date: OCTOBER 20, 1993

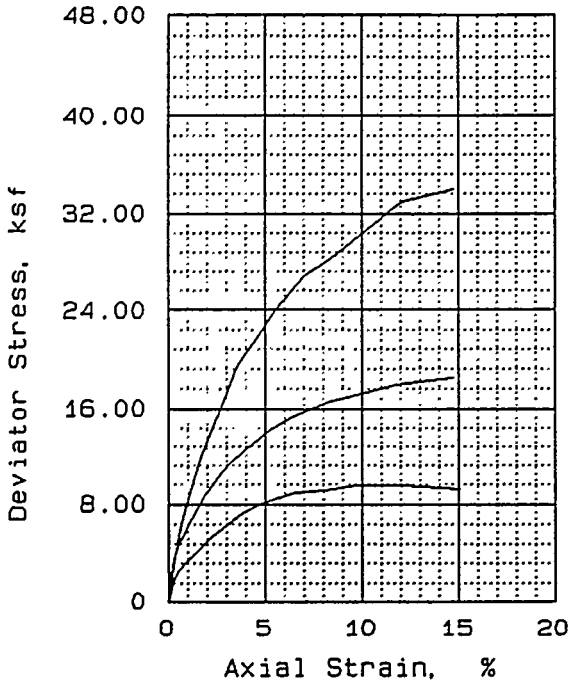
Remarks:
Tested by: JRR
Reviewed by: RLB
CD 120 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.





SAMPLE NO.		1	2	3
INITIAL	WATER CONTENT, %	25.2	22.7	21.5
	DRY DENSITY, pcf	98.4	103.0	103.8
	SATURATION, %	96.0	95.1	91.1
	VOID RATIO	0.706	0.649	0.647
	DIAMETER, in	2.88	2.86	2.88
	HEIGHT, in	6.00	6.00	6.00
AT TEST	WATER CONTENT, %	25.6	22.7	21.7
	DRY DENSITY, pcf	99.5	105.0	107.2
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.688	0.617	0.596
	DIAMETER, in	2.86	2.84	2.84
	HEIGHT, in	5.99	5.97	5.98
BACK PRESSURE, ksf		7.20	5.76	5.76
CELL PRESSURE, ksf		11.52	14.40	23.04
FAILURE STRESS, ksf		9.59	18.49	33.99
PORE PRESSURE, ksf				
STRAIN RATE, %/min.		0.100	0.100	0.100
ULTIMATE STRESS, ksf				
PORE PRESSURE, ksf				
σ_1 FAILURE, ksf		13.91	27.13	51.27
σ_3 FAILURE, ksf		4.32	8.64	17.28

TYPE OF TEST:
Consolidated drained
SAMPLE TYPE: Undisturbed
DESCRIPTION:

~~LL= 46 PL= 21 PI= 25.0~~
~~SPECIFIC GRAVITY= 2.74~~
REMARKS: Tested by: HEJ

Reviewed by: RLB

FIG. NO.

CLIENT: SRS

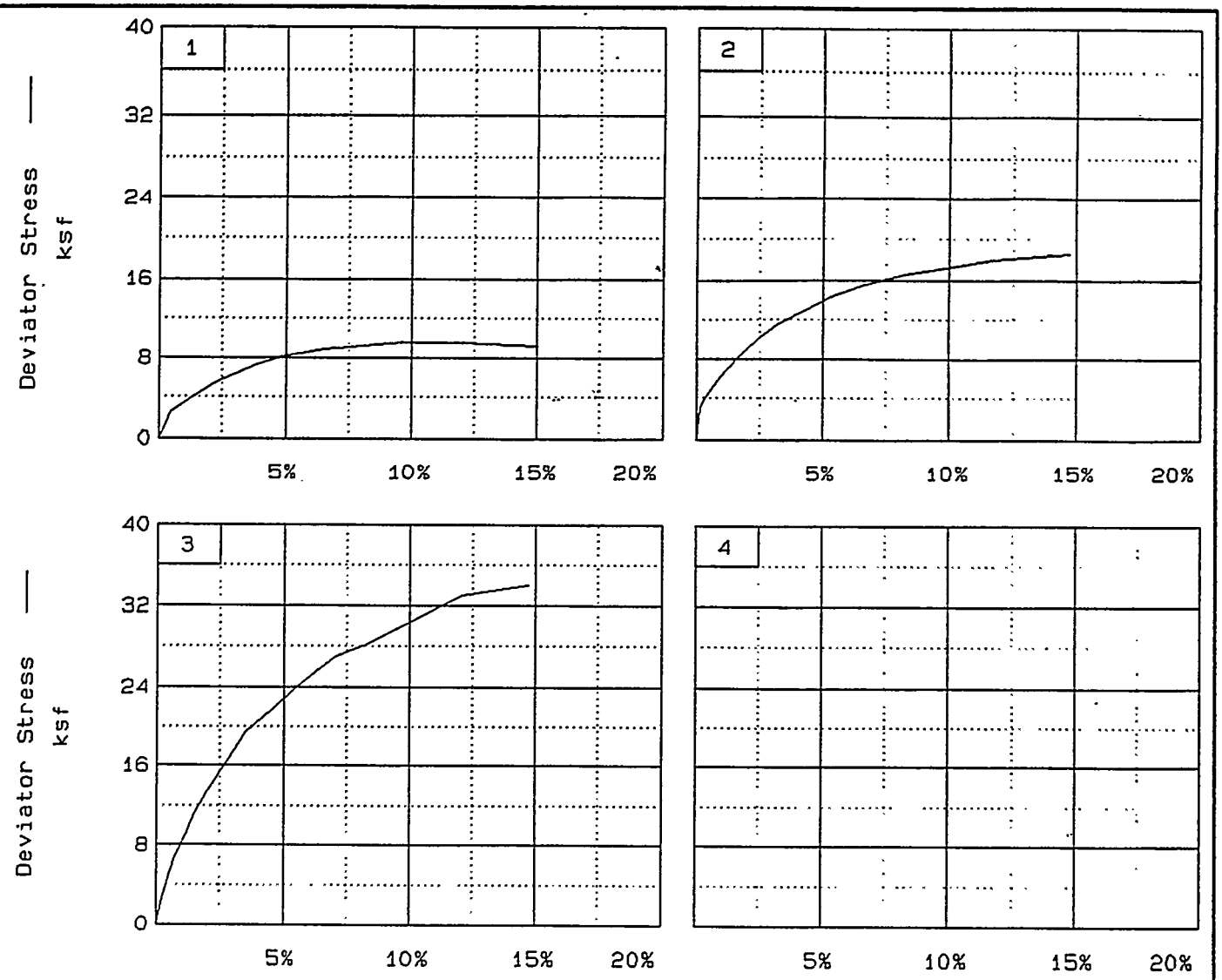
PROJECT: SRS-ITP

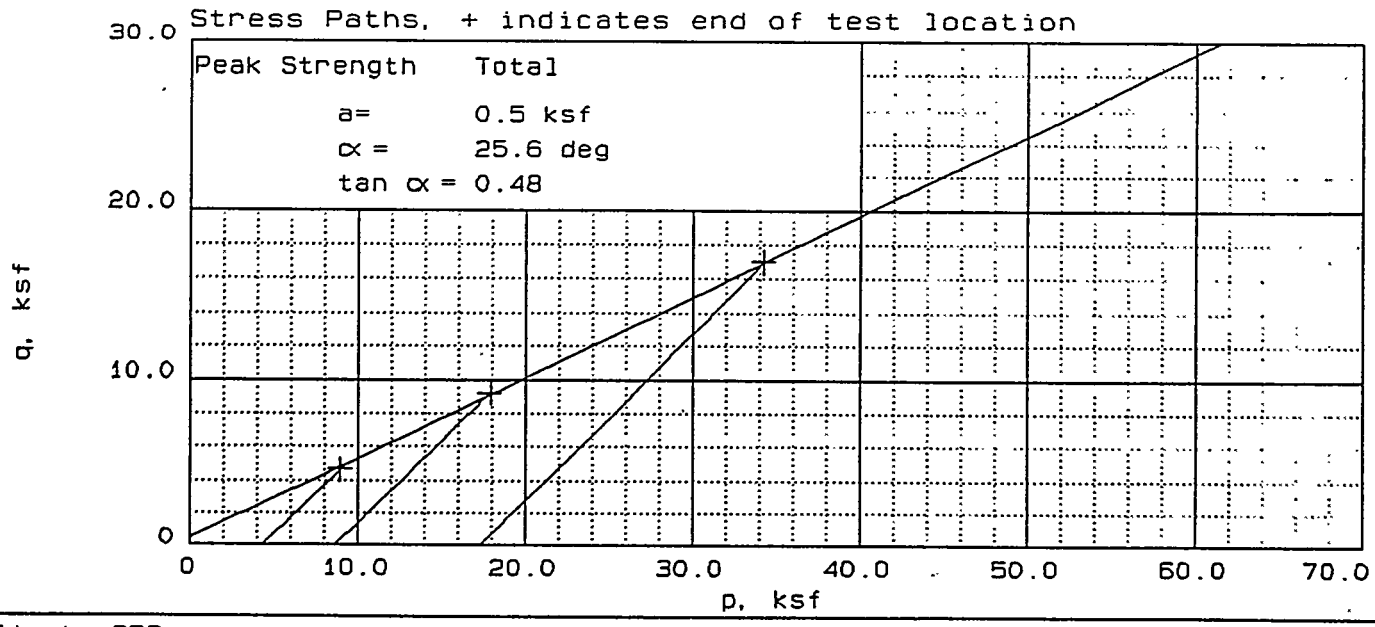
SAMPLE LOCATION: H Bor 29 PS-9 @ 95'10"-97'8"

PROJ. NO.: 5810535301 DATE: Dec. 8, 1993

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.



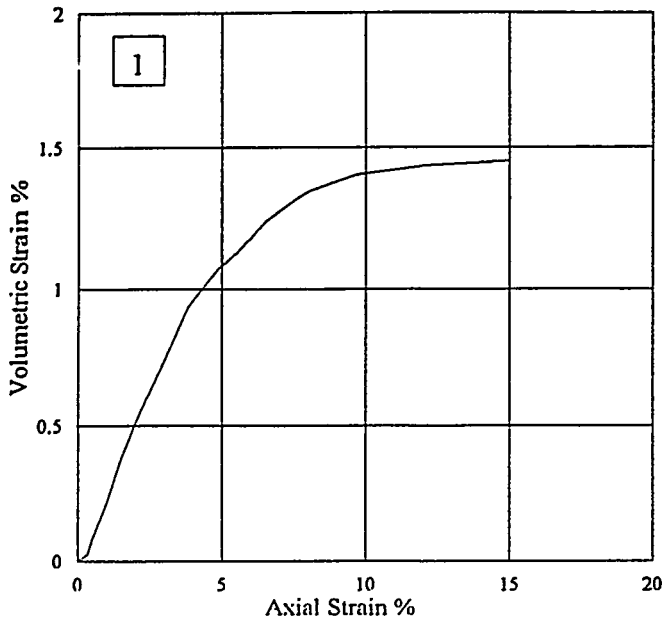


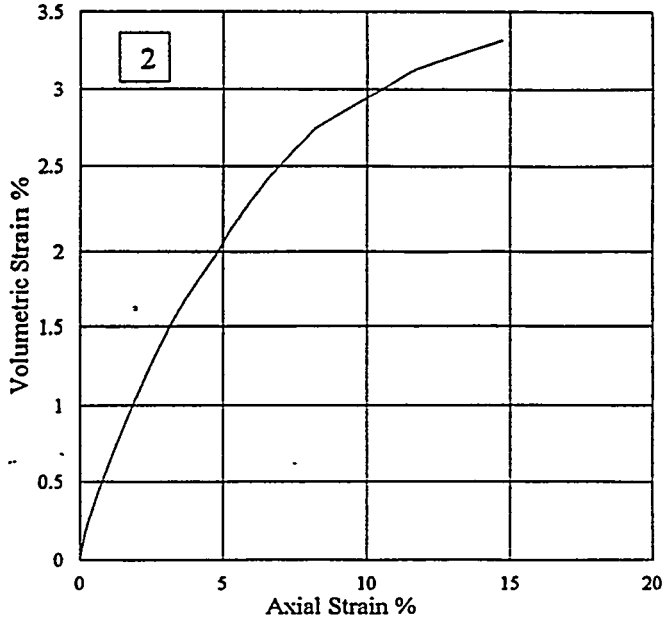
Client: SRS

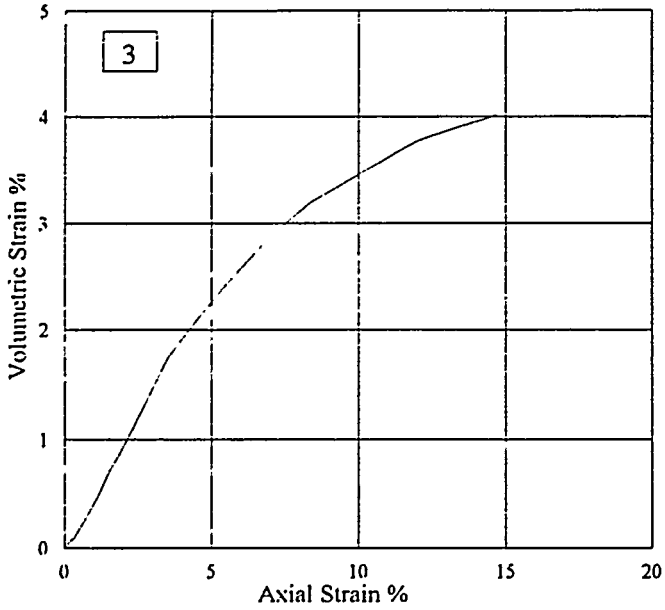
Project: SRS-ITP

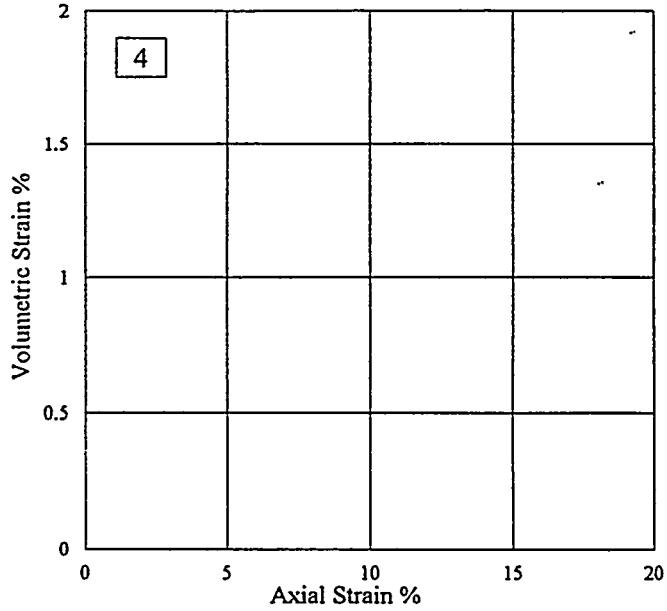
Location: H Bor 29 PS-9 @ 95'10"-97 '8"

File: 535301D Project No.: 5810535301 Page 2/2 Fig. No. ____









Client: SRS
Project: SRS-ITP
Location: H Bor 29 PS-9 @ 95'10"-97'8"
File: Project No.: 5810535301 Page 2 / 2 Fig. No. _____

TRIAXIAL COMPRESSION TEST
Consolidated drained

12-14-1993
12:28 pm

Project Data

Project No.: 5810535301 Date: Dec. 8,1993 Data file: 535301D
Client: SRS
Project: SRS-ITP
Sample location: H Bor 29 PS-9 @ 95'10"-97 '8"
Sample description:
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.69 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.86	
Height change, in		0.02	
Height, in	6.00	5.99	
Weight, grams	1259.9		
Water volume change, cc		-3.83	
Moisture, %	25.2	25.6	23.4
Dry density, pcf	98.4	99.5	
Saturation, %	96.0	100.0	
Void ratio	0.706	0.688	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 80 psi
Consolidation back pressure = 50 psi
Consolidation effective confining stress = 4.32 ksf
Peak deviator stress = 9.59 ksf at reading no. 10
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	4.32	4.32	1.00	4.32	0.00
1	0.0200	0.020	88.00	88.0	0.3	1.96	4.32	6.28	1.45	5.30	0.98
2	0.0300	0.030	115.00	115.0	0.5	2.56	4.32	6.88	1.59	5.60	1.28
3	0.0600	0.060	158.00	158.0	1.0	3.50	4.32	7.82	1.81	6.07	1.75
	^.0900	0.090	196.00	196.0	1.5	4.32	4.32	8.64	2.00	6.48	2.16
	1300	0.130	246.00	246.0	2.2	5.38	4.32	9.70	2.25	7.01	2.69

LAW ENGINEERING, INC.

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	.2300	0.230	340.00	340.0	3.8	7.31	4.32	11.63	2.69	7.98	3.66
7	0.2900	0.290	380.00	380.0	4.8	8.09	4.32	12.41	2.87	8.36	4.04
8	0.3900	0.390	426.00	426.0	6.5	8.91	4.32	13.23	3.06	8.77	4.45
9	0.4800	0.480	446.00	446.0	8.0	9.17	4.32	13.49	3.12	8.91	4.59
10	0.5800	0.580	475.00	475.0	9.7	9.59	4.32	13.91	3.22	9.12	4.80
11	0.7200	0.720	483.00	483.0	12.0	9.50	4.32	13.82	3.20	9.07	4.75
12	0.9000	0.900	487.00	487.0	15.0	9.25	4.32	13.57	3.14	8.95	4.63

TRIAXIAL COMPRESSION TEST
Consolidated drained

12-14-1993
12:30 pm

Project Data

Project No.: 5810535301 Date: Dec. 8,1993 Data file: 535301D
Client: SRS
Project: SRS-ITP
Sample location: H Bor 29 PS-9 @ 95'10"-97 '8"
Sample description:
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 2 Data

Type of sample: Undisturbed
Specific Gravity= 2.72 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.86	2.84	
Height change, in		0.03	
Height, in	6.00	5.97	
Weight, grams	1280.0		
Water volume change, cc		-0.06	
Moisture, %	22.7	22.7	19.5
Dry density, pcf	103.0	105.0	
Saturation, %	95.1	100.0	
Void ratio	0.649	0.617	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 100 psi
Consolidation back pressure = 40 psi
Consolidation effective confining stress = 8.64 ksf
Peak deviator stress = 18.49 ksf at reading no. 13
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	8.64	8.64	1.00	8.64	0.00
1	0.0100	0.010	132.00	132.0	0.2	2.99	8.64	11.63	1.35	10.14	1.50
2	0.0200	0.020	174.00	174.0	0.3	3.94	8.64	12.58	1.46	10.61	1.97
3	0.0400	0.040	232.00	232.0	0.7	5.23	8.64	13.87	1.61	11.26	2.62
7	0.0700	0.070	305.00	305.0	1.2	6.85	8.64	15.49	1.79	12.06	3.42
	1100	0.110	390.00	390.0	1.8	8.69	8.64	17.33	2.01	12.99	4.35

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No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	.1500	0.150	460.00	460.0	2.5	10.18	8.64	18.82	2.18	13.73	5.09
7	0.1900	0.190	520.00	520.0	3.2	11.43	8.64	20.07	2.32	14.36	5.72
8	0.2300	0.230	568.00	568.0	3.9	12.40	8.64	21.04	2.44	14.84	6.20
9	0.3100	0.310	658.00	658.0	5.2	14.17	8.64	22.81	2.64	15.72	7.08
10	0.3900	0.390	725.00	725.0	6.5	15.39	8.64	24.03	2.78	16.33	7.69
11	0.4900	0.490	792.00	792.0	8.2	16.51	8.64	25.15	2.91	16.90	8.26
12	0.7000	0.700	895.00	895.0	11.7	17.94	8.64	26.58	3.08	17.61	8.97
13	0.8800	0.880	955.00	955.0	14.7	18.49	8.64	27.13	3.14	17.89	9.25

TRIAXIAL COMPRESSION TEST
Consolidated drained

12-14-1993
12:32 pm

Project Data

Project No.: 5810535301 Date: Dec. 8,1993 Data file: 535301D
Client: SRS
Project: SRS-ITP
Sample location: H Bor 29 PS-9 @ 95'10"-97 '8"
Sample description:
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 3 Data

Type of sample: Undisturbed
Specific Gravity= 2.74 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.84	
Height change, in		0.02	
Height, in	6.00	5.98	
Weight, grams	1292.9		
Water volume change, cc		-2.37	
Moisture, %	21.5	21.7	17.0
Dry density, pcf	103.8	107.2	
Saturation, %	91.1	100.0	
Void ratio	0.647	0.596	

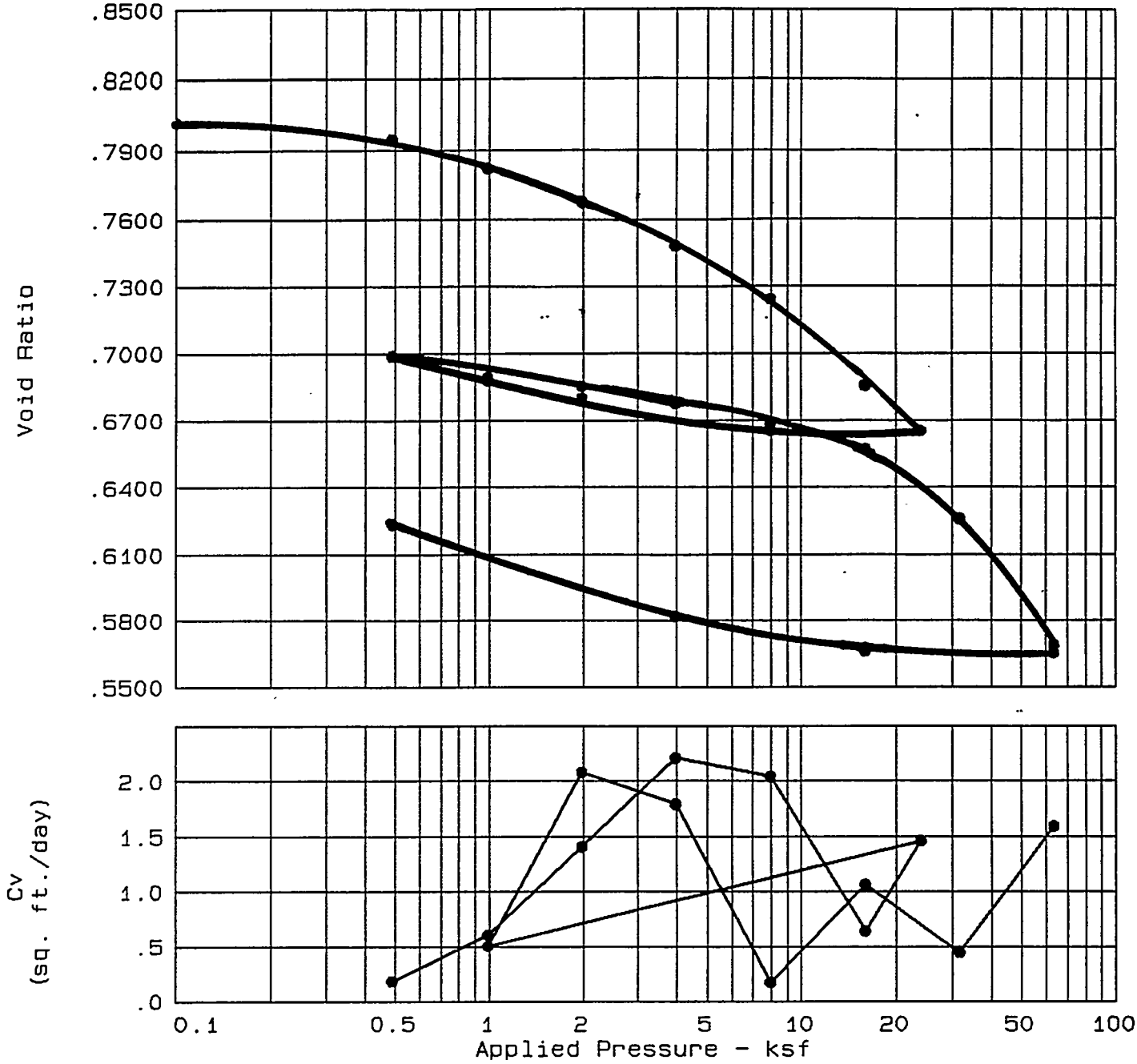
Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 160 psi
Consolidation back pressure = 40 psi
Consolidation effective confining stress = 17.28 ksf
Peak deviator stress = 33.99 ksf at reading no. 14
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	17.28	17.28	1.00	17.28	0.00
1	0.0100	0.010	96.00	96.0	0.2	2.18	17.28	19.46	1.13	18.37	1.09
2	0.0200	0.020	168.00	168.0	0.3	3.81	17.28	21.09	1.22	19.19	1.91
3	0.0400	0.040	285.00	285.0	0.7	6.45	17.28	23.73	1.37	20.50	3.22
	.0700	0.070	420.00	420.0	1.2	9.45	17.28	26.73	1.55	22.01	4.73
	.0900	0.090	502.00	502.0	1.5	11.26	17.28	28.54	1.65	22.91	5.63

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	.1200	0.120	600.00	600.0	2.0	13.39	17.28	30.67	1.77	23.98	6.70
7	0.1700	0.170	753.00	753.0	2.8	16.66	17.28	33.94	1.96	25.61	8.33
8	0.2100	0.210	885.00	885.0	3.5	19.45	17.28	36.73	2.13	27.00	9.72
9	0.2700	0.270	996.00	996.0	4.5	21.66	17.28	38.94	2.25	28.11	10.83
10	0.3300	0.330	1116.00	1116.0	5.5	24.01	17.28	41.29	2.39	29.29	12.01
11	0.4200	0.420	1272.00	1272.0	7.0	26.94	17.28	44.22	2.56	30.75	13.47
12	0.5000	0.500	1356.00	1356.0	8.4	28.30	17.28	45.58	2.64	31.43	14.15
13	0.7200	0.720	1650.00	1650.0	12.0	33.05	17.28	50.33	2.91	33.81	16.53
14	0.8800	0.880	1750.00	1750.0	14.7	33.99	17.28	51.27	2.97	34.28	17.00

CONSOLIDATION TEST REPORT



Clpse. %	Nat. Sat.	Nat. Moist.	Dry Density	LL	PI	Sp.Gr.	Initial void ratio
0.2	93.7 %	28.0	93.5	53	27	2.690	0.8029

TEST RESULTS	MATERIAL DESCRIPTION
	Light Brown & White Clayey Sand Class: SC
Project No.: 5810535301 Project: SRS-ITP Location: H-Bor-29 PS-9 @ 95'10"-97'8" Date: Oct. 19, 1993	Remarks: Tested by: CLG Reviewed by: RLB
CONSOLIDATION TEST REPORT LAW ENGINEERING, INC.	Fig. No._____

19:52, 2-01-1994 CONSOLIDATION TEST PROJECT DATA Test No. 21

roject Number: 5810535301
Project: SRS-ITP
Date: Oct. 19,1993
Location 1: H-Bor-29 PS-9 @ 95'10"-97'8"
2:
Remarks 1: Tested by:
2: Reviewed by:
3:
4:
5:
Material 1: Light Brown & White
description 2: Clayey Sand
Classification: SC
Liquid limit: 53
Plasticity index: 27
Figure Number:

CONSOLIDATION TEST SPECIMEN DATA

TOTAL SAMPLE	BEFORE TEST	AFTER TEST
Wet w+t = 341.60 g.	Oedometer No. = 8	Wet w+t = 338.42 g.
Dry w+t = 314.90 g	Machine No. = 8	Dry w+t = 314.90 g.
Tare wt. = 219.39 g.	Spec. Gravity = 2.690	Tare wt. = 219.39 g.
ght = 0.8900 in.	Height = 0.8930 in.	
Diameter = 2.3600 in.	Diameter = 2.3600 in.	
Weight = 122.28 g.		
Moisture = 28.0 %	Ht. Solids = 0.4953 in.	Moisture = 24.6 %
Wet Den. = 119.7 pcf	Dry wt. = 95.89 g.	Dry wt. = 95.51 g. *
Dry Den. = 93.5 pcf	Void ratio = 0.8029	Void ratio = 0.6235
	Saturation = 93.7 %	Saturation = 106.2 %

* Final dry weight used in calculations

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
Initial	0.02000			0.8029	
0.10	0.02010	0.0000	0.02010	0.8027	0.0 Comprs.
0.49	0.02550	0.0003	0.02520	0.7949*	0.4 Comprs.*
0.99	0.03230	0.0003	0.03200	0.7813*	1.2 Comprs.*
1.99	0.04000	0.0009	0.03910	0.7672*	2.0 Comprs.*
3.98	0.05020	0.0016	0.04860	0.7480*	3.0 Comprs.*
7.99	0.06365	0.0028	0.06085	0.7239*	4.4 Comprs.*
15.99	0.08490	0.0042	0.08070	0.6853*	6.5 Comprs.*
24.00	0.10040	0.0087	0.09170	0.6648*	7.7 Comprs.*
24.00	0.10040	0.0087	0.09170	0.6648	7.7 Comprs.
7.99	0.09445	0.0028	0.09165	0.6649	7.7 Comprs.
1.99	0.08520	0.0009	0.08430	0.6798	6.8 Comprs.
0.99	0.08075	0.0003	0.08045	0.6875	6.4 Comprs.
0.49	0.07530	0.0003	0.07500	0.6985	5.8 Comprs.

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
0.99	0.07689	0.0003	0.07659	0.6890*	6.3 Comprs.*
1.99	0.07970	0.0009	0.07880	0.6851*	6.5 Comprs.*
3.98	0.08440	0.0016	0.08280	0.6774*	7.0 Comprs.*
7.99	0.09080	0.0028	0.08800	0.6677*	7.5 Comprs.*
15.99	0.09760	0.0042	0.09340	0.6567*	8.1 Comprs.*
31.78	0.11710	0.0061	0.11100	0.6257*	9.8 Comprs.*
63.45	0.15250	0.0131	0.13940	0.5688*	13.0 Comprs.*
63.45	0.15435	0.0131	0.14125	0.5650	13.2 Comprs.
15.99	0.14500	0.0042	0.14080	0.5659	13.1 Comprs.
3.98	0.13460	0.0016	0.13300	0.5817	12.3 Comprs.
0.49	0.11260	0.0003	0.11230	0.6235	10.0 Comprs.

* CALCULATED USING D100 INSTEAD OF FINAL READING

CONSOLIDATION TEST RESULTS

Compression index = NOT SELECTED
Preconsolidation pressure = NOT SELECTED

Load 0.49 ksf CONSOLIDATION TEST READINGS Load No. 2

achine Deflection 0.0003

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.02010	11	60.00	0.02470
2	0.10	0.02300	12	4130.00	0.02550
3	0.25	0.02330			
4	0.50	0.02350			
5	1.00	0.02370			
6	2.00	0.02390			
7	4.00	0.02410			
8	8.00	0.02420			
9	15.00	0.02435			
10	30.00	0.02454			

Void Ratio: 0.7949 Compression: 0.4 % >>> CALCULATED USING D100
D0 = 0.0225 D90 = 0.0238 D100 = 0.0240 T90 = 9.48 min.
Cv @ 9.5 min.= 0.18 sq. feet/day

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

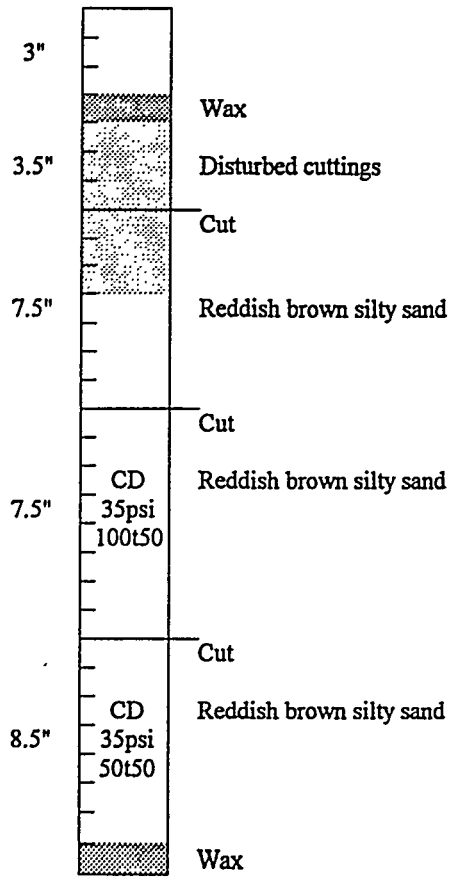
Project: SRS-ITP GEOTECHNICAL TESTING Date: 01-19-93

Boring No: H-Bor-29 Sample No: ST-18 Depth: 120'11" - 122'8"

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION

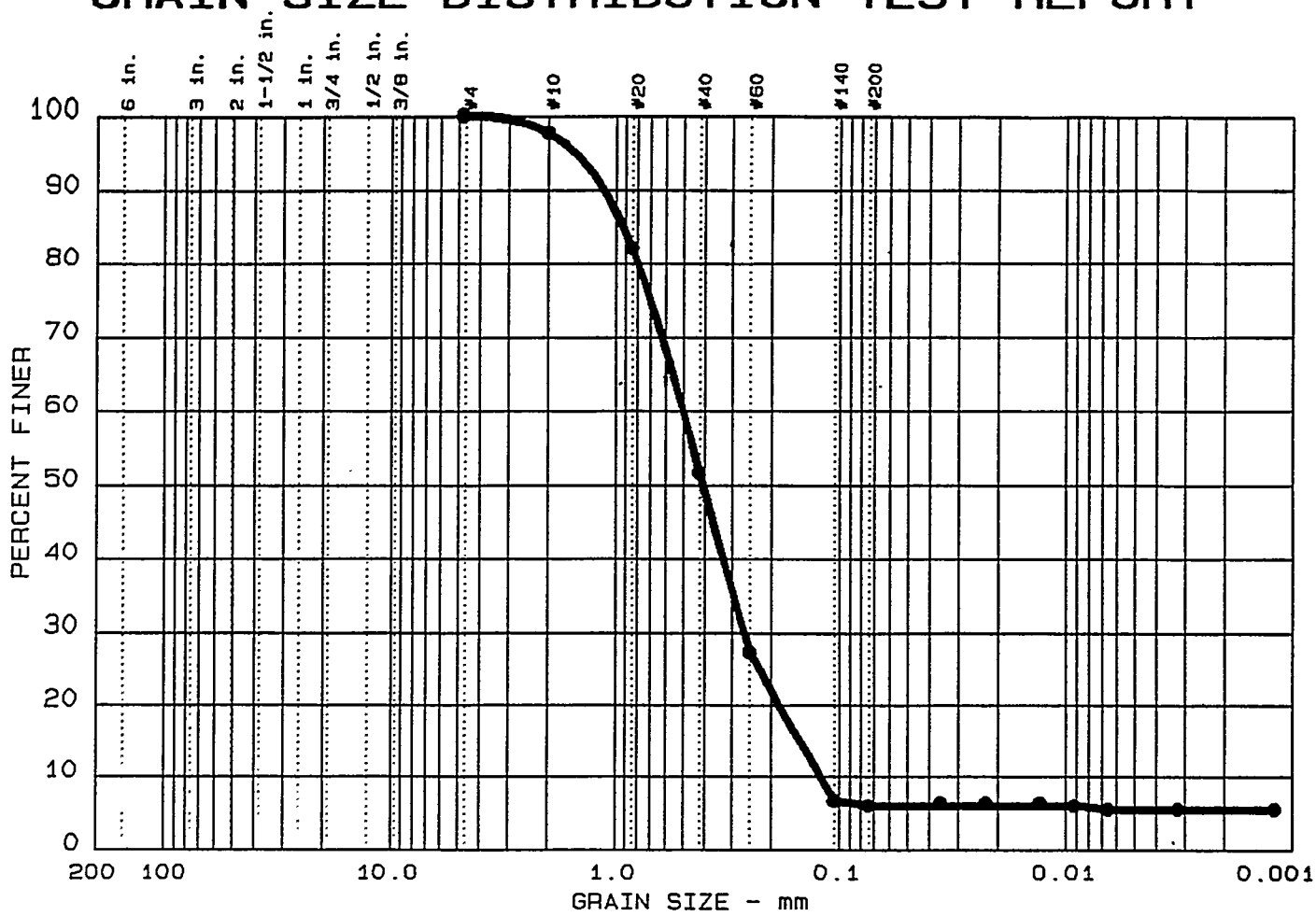


Remarks:

1028mf srs-itp-aaif
7/22/93

rlb\itp\tubelog\b29-st18.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	17	0.0	0.0	94.0	0.5	5.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.92	0.50	0.40	0.265	0.1488	0.1206	1.17	4.1

MATERIAL DESCRIPTION	USCS	AASHTO
● Red Brown Poorly Graded Sand		

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-29 ST-18 @ 121 Ft.

Date: January 19, 1994

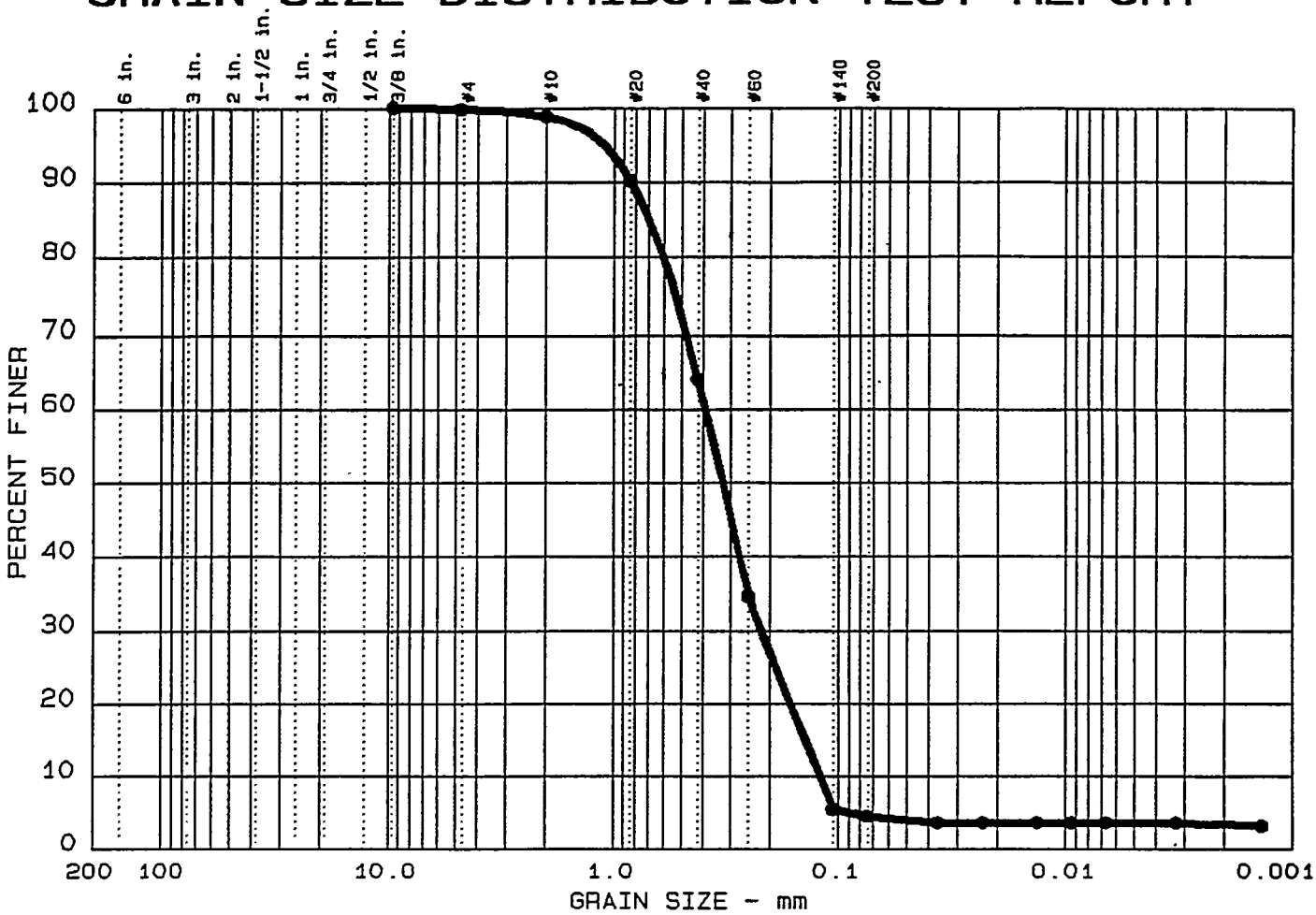
Remarks:
Tested by: CLG Chkd by: RLB
CD-35 psi 100t50
Atterberg Limits -200
LL=201 PL=32 PI=169

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	16	0.0	0.2	95.2	0.9	3.7

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	NL	NP	0.69	0.39	0.32	0.217	0.1384	0.1191	1.02	3.3

MATERIAL DESCRIPTION	USCS	AASHTO
● Red Brown Poorly Graded Sand	SP	A-3

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-29 ST-18 @ 121 FT.

Date: January 19, 1994

Remarks:

Tested by: CLG

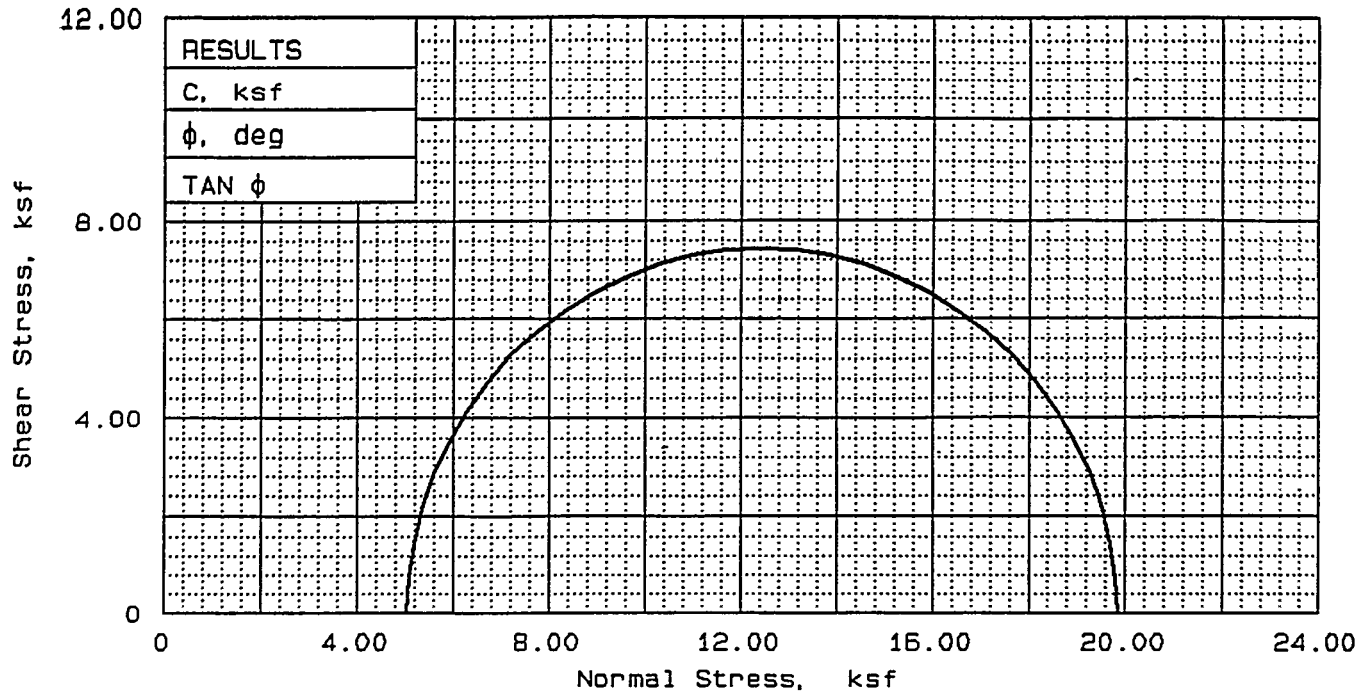
Reviewed by: RLB

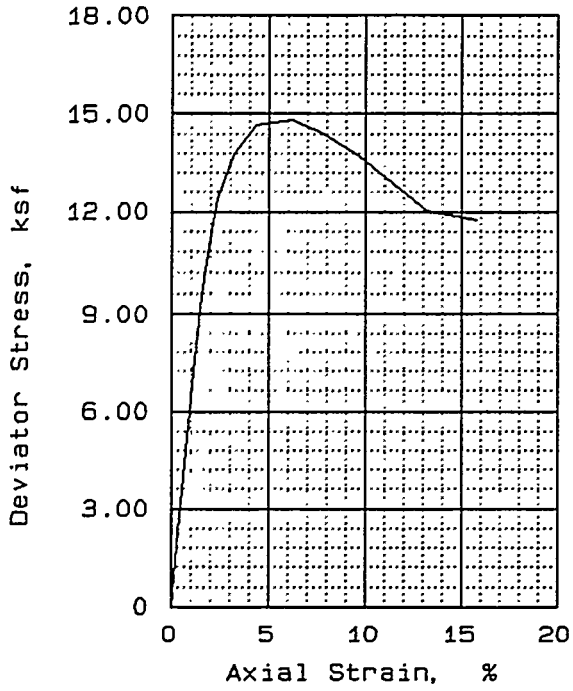
CD-35 psi 50t50

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.





SAMPLE NO.		1
INITIAL	WATER CONTENT, %	23.3
	DRY DENSITY, pcf	101.1
	SATURATION, %	96.6
	VOID RATIO	0.642
	DIAMETER, in	2.88
	HEIGHT, in	6.00
AT TEST	WATER CONTENT, %	23.9
	DRY DENSITY, pcf	101.5
	SATURATION, %	100 0
	VOID RATIO	0.636
	DIAMETER, in	2.87
	HEIGHT, in	5.99
BACK PRESSURE, ksf		4.32
CELL PRESSURE, ksf		9.36
FAILURE STRESS, ksf		14.80
PORE PRESSURE, ksf		
STRAIN RATE, %/min.		
ULTIMATE STRESS, ksf		
PORE PRESSURE, ksf		
σ_1 FAILURE, ksf		19.84
σ_3 FAILURE, ksf		5.04

TYPE OF TEST:
Consolidated drained
SAMPLE TYPE: Undisturbed
DESCRIPTION: See Grain Size

REMARKS: Tested by: HEJ

Reviewed by: RLB

50t50
FIG. NO.

CLIENT: SRS

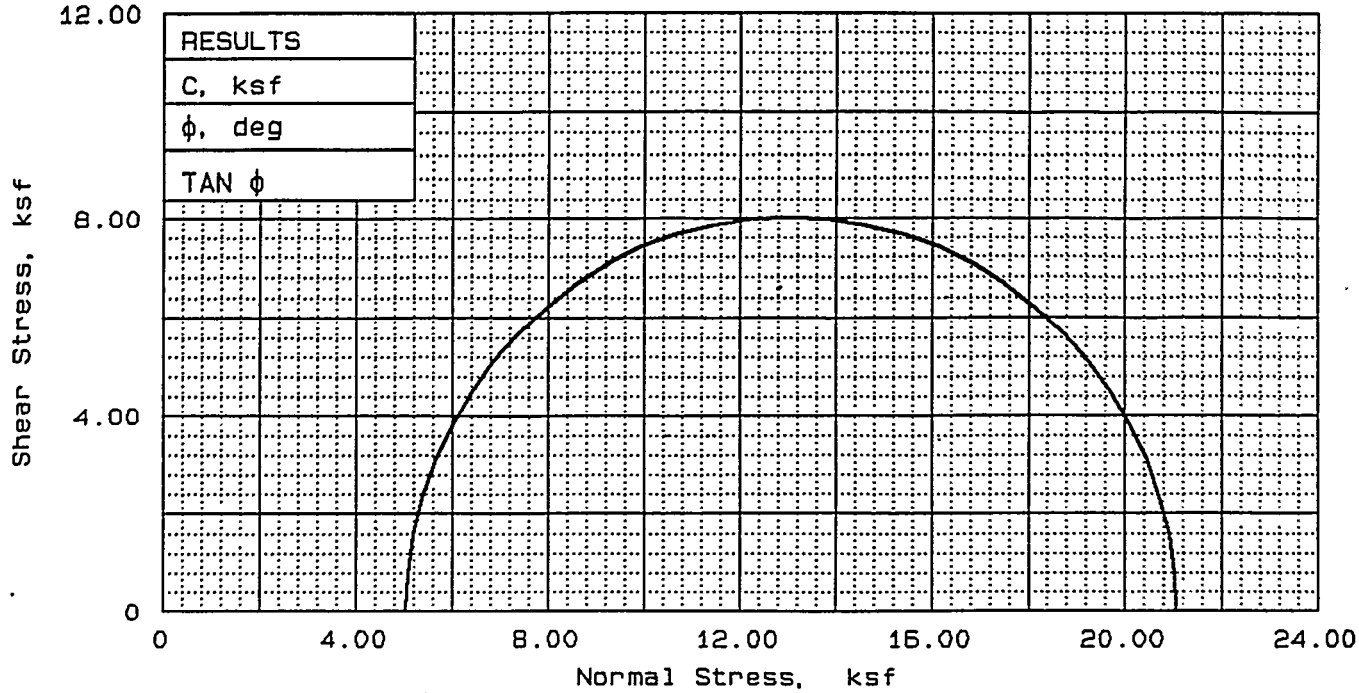
PROJECT: SRS-ITP

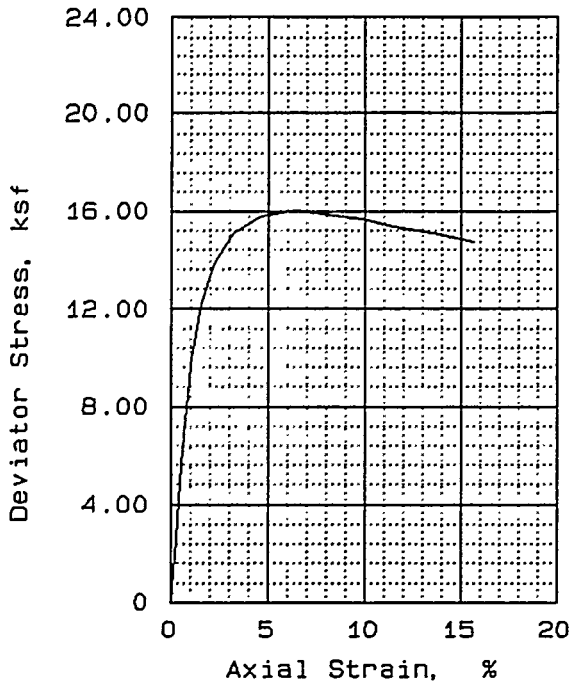
SAMPLE LOCATION: H Bor 29 ST-18 @ 120'11-122'7"

PROJ. NO.: 5810535301 DATE: 01/31/94

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.





SAMPLE NO.		1
INITIAL	WATER CONTENT, %	22.6
	DRY DENSITY, pcf	101.5
	SATURATION, %	93.4
	VOID RATIO	0.649
	DIAMETER, in	2.88
	HEIGHT, in	6.00
AT TEST	WATER CONTENT, %	23.0
	DRY DENSITY, pcf	103.5
	SATURATION, %	100.0
	VOID RATIO	0.616
	DIAMETER, in	2.85
	HEIGHT, in	5.99
BACK PRESSURE, ksf		5.76
CELL PRESSURE, ksf		10.80
FAILURE STRESS, ksf		16.03
PORE PRESSURE, ksf		
STRAIN RATE, %/min.		
ULTIMATE STRESS, ksf		
PORE PRESSURE, ksf		
σ_1 FAILURE, ksf		21.07
σ_3 FAILURE, ksf		5.04

TYPE OF TEST:
Consolidated drained
SAMPLE TYPE: Undisturbed
DESCRIPTION: See Grain Size

REMARKS: Tested by: HEJ

Reviewed by: RLB

100t50
FIG. NO.

CLIENT: SRS

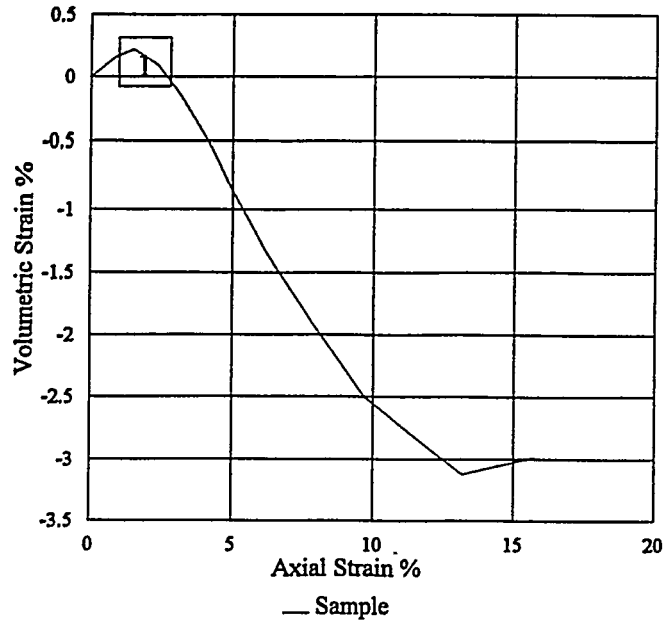
PROJECT: SRS-ITP

SAMPLE LOCATION: H Bor-29 ST-18 @ 120'11"-122'7"

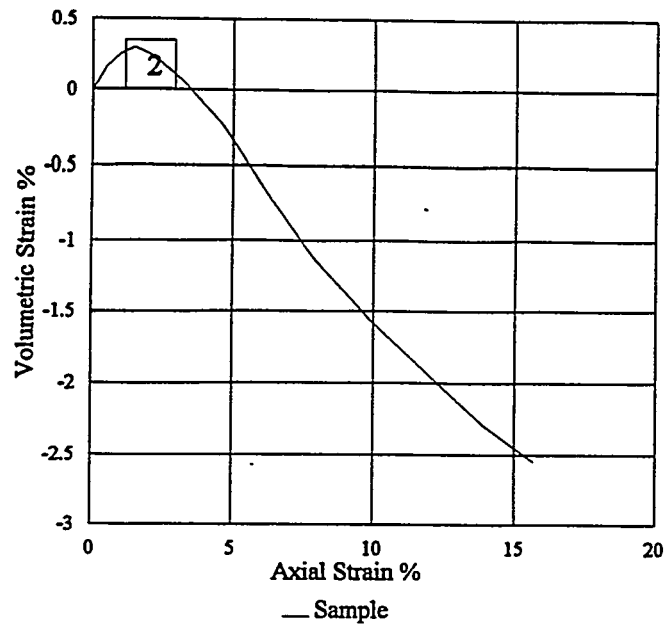
PROJ. NO.: 5810535301 DATE: 01/31/94

TRIAXIAL COMPRESSION TEST

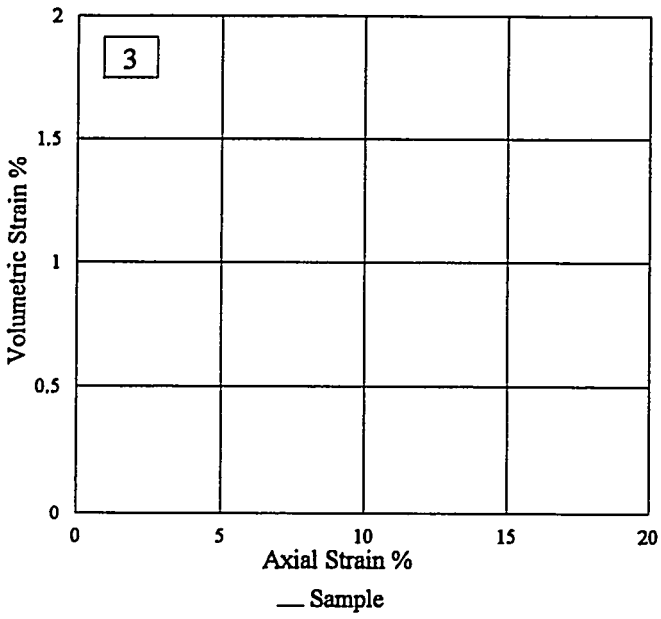
LAW ENGINEERING, INC.

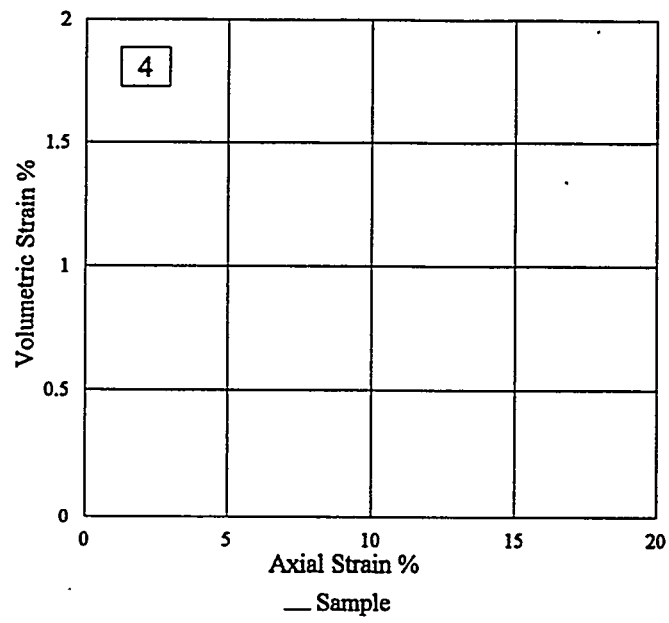


50t50



100t50





Client: Westinghouse Savannah River Co.
Project: ITP Geotechnical Testing
Location: H-Bor-29, ST-18 @ 120'11" - 122'7"
File: Project No.: 5810535301 Page 2 / 2 Fig. No. _____

TRIAXIAL COMPRESSION TEST
Consolidated drained

2-01-1994
1:39 pm

Project Data

Project No.: 5810535301 Date: 01/31/94 Data file: 535301S
Client: SRS
Project: SRS-ITP
Sample location: H Bor 29 ST-18 @ 120'11- 122'7"
Sample description: See Grain Size
Remarks: Tested by:
Reviewed by: 50t50 Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.66 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.87	
Height change, in		0.01	
Height, in	6.00	5.99	
Weight, grams	1275.1		
Water volume change, cc		-6.30	
Moisture, %	23.3	23.9	23.7
Dry density, pcf	101.1	101.5	
Saturation, %	96.6	100.0	
Void ratio	0.642	0.636	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units

Consolidation cell pressure = 65 psi
Consolidation back pressure = 30 psi
Consolidation effective confining stress = 5.04 ksf
Peak deviator stress = 14.80 ksf at reading no. 7
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	5.04	5.04	1.00	5.04	0.00
1	0.0200	0.020	105.00	105.0	0.3	2.33	5.04	7.37	1.46	6.20	1.16
2	0.0500	0.050	255.00	255.0	0.8	5.62	5.04	10.66	2.11	7.85	2.81
3	0.0900	0.090	435.00	435.0	1.5	9.52	5.04	14.56	2.89	9.80	4.76
	0.1400	0.140	570.00	570.0	2.3	12.37	5.04	17.41	3.45	11.22	6.18
	0.1900	0.190	642.00	642.0	3.2	13.81	5.04	18.85	3.74	11.95	6.91

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	0.2600	0.260	690.00	690.0	4.3	14.67	5.04	19.71	3.91	12.37	7.33
7	0.3700	0.370	710.00	710.0	6.2	14.80	5.04	19.84	3.94	12.44	7.40
8	0.4700	0.470	702.00	702.0	7.8	14.38	5.04	19.42	3.85	12.23	7.19
9	0.5800	0.580	684.00	684.0	9.7	13.73	5.04	18.77	3.72	11.90	6.86
10	0.7900	0.790	624.00	624.0	13.2	12.04	5.04	17.08	3.39	11.06	6.02
11	0.9450	0.945	628.00	628.0	15.8	11.75	5.04	16.79	3.33	10.92	5.88

TRIAXIAL COMPRESSION TEST
Consolidated drained

1-31-1994
10:20 am

Project Data

Project No.: 5810535301 Date: 01/31/94 Data file: 535301T
Client: SRS
Project: SRS-ITP
Sample location: H Bor-29 ST-18 @ 120'11"- 122'7"
Sample description:
Remarks: Tested by:
Reviewed by: 100t50 Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.68 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.85	
Height change, in		0.01	
Height, in	6.00	5.99	
Weight, grams	1274.8		
Water volume change, cc		-3.92	
Moisture, %	22.6	23.0	23.3
Dry density, pcf	101.5	103.5	
Saturation, %	93.4	100.0	
Void ratio	0.649	0.616	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 1 lbs. per input unit
Crossover reading for secondary load ring= 1 input units

Consolidation cell pressure = 75 psi
Consolidation back pressure = 40 psi
Consolidation effective confining stress = 5.04 ksf
Peak deviator stress = 16.03 ksf at reading no. 8
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	5.04	5.04	1.00	5.04	0.00
1	0.0100	0.010	84.00	84.0	0.2	1.89	5.04	6.93	1.38	5.99	0.95
2	0.0300	0.030	252.00	252.0	0.5	5.65	5.04	10.69	2.12	7.87	2.83
3	0.0600	0.060	432.00	432.0	1.0	9.64	5.04	14.68	2.91	9.86	4.82
	.0900	0.090	549.00	549.0	1.5	12.19	5.04	17.23	3.42	11.14	6.10
	1300	0.130	627.00	627.0	2.2	13.83	5.04	18.87	3.74	11.95	6.91

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	.1900	0.190	690.00	690.0	3.2	15.06	5.04	20.10	3.99	12.57	7.53
7	0.2750	0.275	732.00	732.0	4.6	15.74	5.04	20.78	4.12	12.91	7.87
8	0.3800	0.380	759.00	759.0	6.3	16.03	5.04	21.07	4.18	13.05	8.01
9	0.4700	0.470	764.00	764.0	7.8	15.87	5.04	20.91	4.15	12.98	7.94
10	0.5900	0.590	770.00	770.0	9.8	15.65	5.04	20.69	4.11	12.86	7.82
11	0.6900	0.690	770.00	770.0	11.5	15.36	5.04	20.40	4.05	12.72	7.68
12	0.8300	0.830	773.00	773.0	13.9	15.01	5.04	20.05	3.98	12.55	7.51
13	0.9400	0.940	774.00	774.0	15.7	14.71	5.04	19.75	3.92	12.40	7.36

Client Westinghouse Savannah River Co.
Project: ITP Geotechnical Testing
Location: H-Bor-29, ST-18 @ 120'11" - 122'7"
File: Project No.: 5810535301

No. of Circles
2

Circle No.1	50t50				
Consolidation Pressure, ksf	After Consolidation			Burette Cal. Factor	No. of Points
	Diameter, in.	Height, in.	Volume, cc		
5.04	2.88	5.99	637.23	1	12

		Sample		Cell	
LVDT Reading (in)	Axial Strain (in/in)	Burette Reading (div.)	Volumetric Strain (cc/cc)	Burette Reading (div.)	Volumetric Strain (cc/cc)
0.00	0.00	5.0	0.00	25.0	0.00
0.02	0.33	4.6	0.06	25.1	0.03
0.05	0.83	4.0	0.16	25.7	0.14
0.09	1.50	3.6	0.22	25.9	0.19
0.14	2.34	4.4	0.09	25.0	0.07
0.19	3.17	6.0	-0.16	23.3	-0.17
0.26	4.34	8.7	-0.58	20.4	-0.59
0.37	6.18	13.5	-1.33	15.2	-1.35
0.47	7.85	17.2	-1.91	11.0	-1.96
0.58	9.68	20.9	-2.50	7.3	-2.48
0.79	13.19	24.9	-3.12	3.5	-2.98
0.95	15.78	24.0	-2.98	2.3	-3.09

Client Westinghouse Savannah River Co.
Project: ITP Geotechnical Testing
Location: H-Bor-29, ST-18 @ 120'11" - 122'7"
File: Project No.: 5810535301

Circle No.2	100t50				
Consolidation Pressure, ksf	After Consolidation			Burette Cal. Factor	No. of Points
	Diameter, in	Height, in.	Volume, cc		
5.04	2.88	5.99	638.56	1	14

		Sample		Cell	
LVDT Reading (in)	Axial Strain (in/in)	Burette Reading (div.)	Volumetric Strain (cc/cc)	Burette Reading (div.)	Volumetric Strain (cc/cc)
0.00	0.00	10.0	0.00	21.0	0.00
0.01	0.17	9.7	0.05	21.1	0.02
0.03	0.50	9.0	0.16	21.7	0.12
0.06	1.00	8.4	0.25	22.3	0.23
0.09	1.50	8.1	0.30	22.4	0.26
0.13	2.17	8.5	0.23	22.0	0.22
0.19	3.17	9.6	0.06	20.6	0.03
0.28	4.59	11.5	-0.23	18.5	-0.25
0.38	6.34	14.5	-0.70	15.0	-0.75
0.47	7.85	17.1	-1.11	12.2	-1.14
0.59	9.85	19.9	-1.55	8.8	-1.61
0.69	11.52	21.9	-1.86	6.5	-1.92
0.83	13.86	24.6	-2.29	3.3	-2.35
0.94	15.69	26.3	-2.55	1.3	-2.61

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

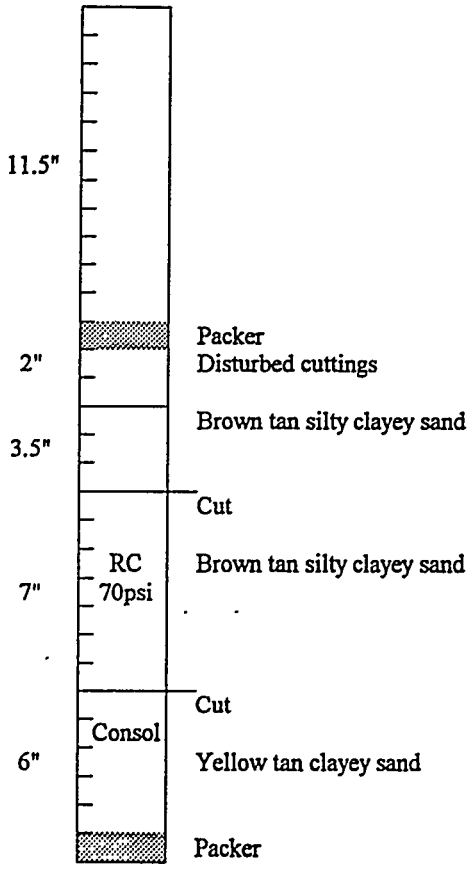
Project: SRS-ITP GEOTECHNICAL TESTING Date: 10-14-93

Boring No: H-Bor-29 Sample No: PS-10 Depth: 140'1" - 141' 11"

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION



Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b29-ps10.wk3

ATTACHMENT 2

Tested by:	CLG	**Reviewed by:**	RLB	**Law Job No.:**	5810535301
Date:	09/21/93	**Date:**	09/21/93	**Job Name:**	SRS - ITP

TP-4A: UNIT WEIGHT OF THIN WALL TUBE SAMPLES

"TYPICAL"

Sample: Boring No.: H-Bor-29
Depth: 140' 1"
Sample ID: PS-10

MEASUREMENTS (Entire Tube):

	FROM TOP OF TUBE			FROM BOTTOM OF TUBE			TOTAL TUBE LENGTH (inches)		INSIDE DIAMETER OF TUBE (inches)	
	PACKER (inches)		SOIL (inches)	PACKER (inches)		SOIL (inches)				
1.	11.39		11.83	0.89		1.56				
2.	11.48		11.79	0.96		1.54				
3.	11.50		11.83	0.88		1.56				
Avg.:	11.46	L_1 =	11.82	0.91	L_2 =	1.55	L_3 =	29.625 *	D_i =	2.869 *

TOTAL WEIGHT OF TUBE + PACKERS + SOIL	M_1 =	6,037.8	gm
WEIGHT OF PACKERS	M_2 =	149.6 *	gm
TOTAL WEIGHT OF TUBE	M_3 =	2,492.6 *	gm
WET WEIGHT OF SOIL COLUMN, [M_1-M_2-M_3]	M_4 =	3,395.6	gm

* *Denotes information supplied by WSRC/TO*

MOISTURE CONTENTS (From assigned tests of same tube):

MOISTURE CONTENT		
Specimen 1:	29.6	% moisture
Specimen 2:	25	% moisture
Specimen 3:	N/A	% moisture
Average, (w):	27.3	% moisture

Notations:

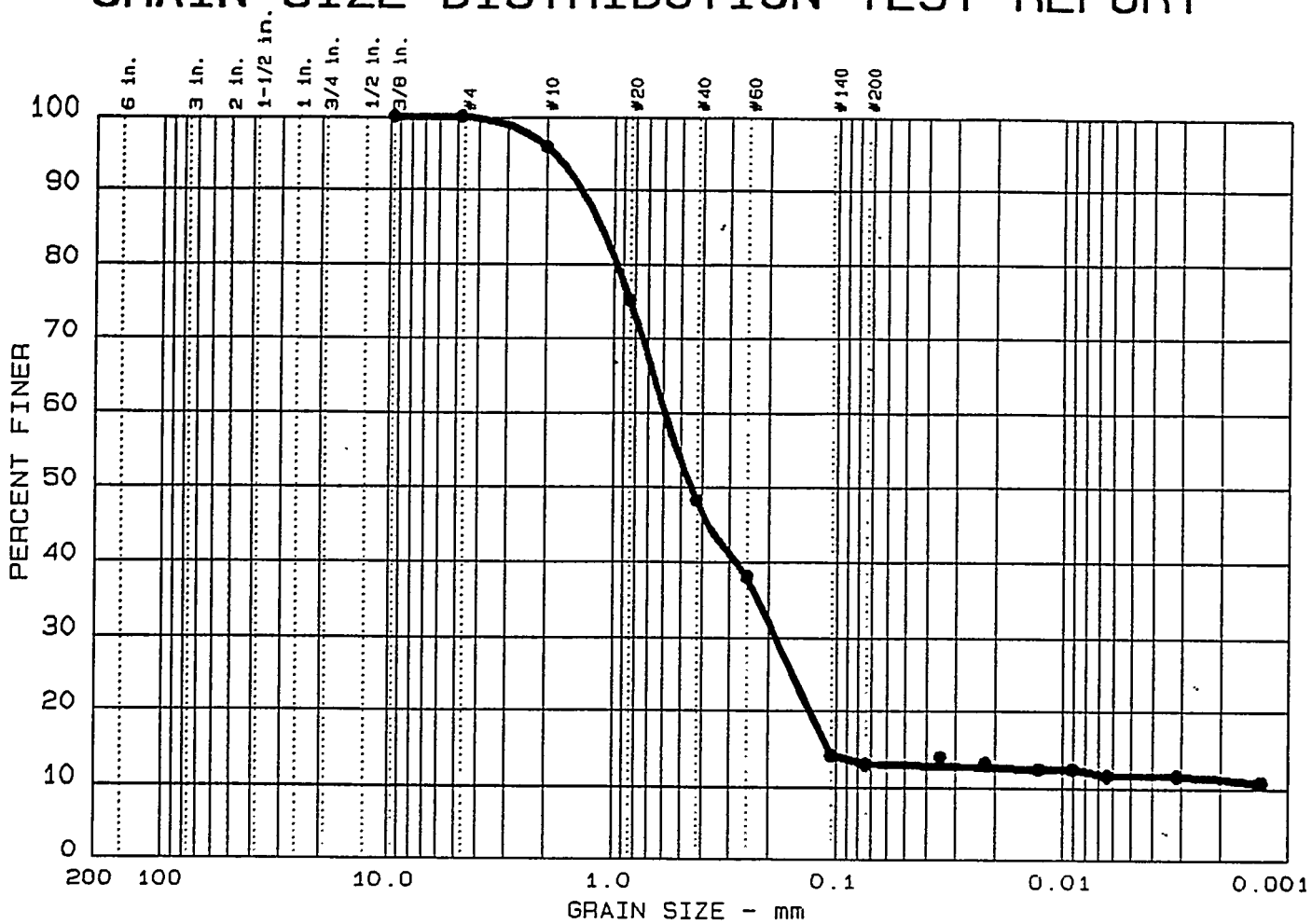
Specimen 1 moisture content obtained from Resonant Column test
Specimen 2 moisture content obtained from Consolidation test
Specimen 3 moisture content obtained from N/A test

CALCULATIONS:

CROSS-SECTIONAL AREA OF TUBE, [pi*(D_i^2)/4]	A_o=	6.46	in.^{2}
LENGTH OF SOIL COLUMN, [L_3 - L_2 - L_1]	L_s =	16.26	in.
VOLUME OF SOIL COLUMN, [L_s*A_o]	V_s =	105.08	in.^{3}
WET DENSITY, [(M_4/V_s)*3.810]	**D_w=**	**123.1**	**pcf**
DRY DENSITY, [D_w/(1+w/100)]	**D_D=**	**96.7**	**pcf**

h:\users\lab\rlb\itp\b29-ps10.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	9	0.0	0.0	87.2	1.3	11.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	46	25	1.13	0.58	0.45	0.186	0.1091			

MATERIAL DESCRIPTION	USCS	AASHTO
● Yellow Brown Clayey Medium to Fine Sand	SC	A-2-7 (0.0)

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-29 PS-10 @ 140 Ft.

Date: October 25, 1993

Remarks:

Tested by: JRR

Reviewed by: RLB

Consol

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-29
Test Date:	12/27/93-01/05/94	Sample No.:	PS-10
Reviewed By:	JW/RLB RLB	Depth:	140 ft
Reviewed Date:	01/06/93	Sample Description:	See classification data

Initial Specimen Data

Labels	Values	Units	Description
Masses			
M_{scb}	1221.63	g	*Mass of soil and container before*
M_{sca}	0.00	g	*Mass of soil and container after*
M_s	1221.63	g	*M_{scb} - M_{sca} = mass of soil*
Diameters			
D_t	73.53	mm	*Diameter near top of specimen*
D_m	73.48	mm	*Diameter near middle of specimen*
D_b	73.61	mm	*Diameter near bottom of specimen*
T_{mem}	0.30	mm	*Single thickness of membrane*
D_{net}	72.93	mm	*$(D_t + D_m + D_b)/3 - 2*T_{mem}$*
Lengths			
L_{cbp}	198.55	mm	*Length between chamber bottom & top of top platen*
L_{tp}	23.95	mm	*Length of top platen*
L_{bp}	24.00	mm	*Length of bottom platen*
L_{net}	150.60	mm	*Length of Specimen = L_{cbp} - L_{tp} - L_{bp}*
Volume			
V	629118	mm^3	*$D^2_{net}*Pi*L_{net}/4$*

Labels	Values	Units	Description
Mass Density and Unit Weight			
Rho	1941.8	kg/m^3	*Mass density of specimen = $M_s/V*10^6$*
U_{wt}	19.04	kN/m^3	*Unit weight of specimen = Rho*9.806/1000*
Moisture Content, mc			
No.	AB-6		*Container number*
M_{wscb}	1308.23	g	*Mass of wet soil + container*
M_{wsca}	1028.97	g	*Mass of dry soil + container*
M_{wat}	279.26	g	*Mass of water = M_{wscb} - M_{wsca}*
M_{cont}	86.60	g	*Mass of container.*
mc	29.6	%	*$M_{wat}/(M_{wsca} - M_{cont})*100\%$*
Rho_d	1497.9	kg/m^3	*Dry mass density = Rho/(1+mc)*
G_s	2.73		*Specific gravity*
e	0.823		*Void Ratio, $[1000*G_s)]/Rho_d$-1*
S_r	98.4	%	*Degree of Saturation = $mc*G_s/e$*
J	0.000812	$kg\text{-}m^2$	*Polar mass moment of inertia = $(M_s/1000)*(D_{net}/1000)^2/8$*

Conditions After Saturation				Conditions After Consolidation			
CL_s	0.81	mm	*Change in length*	CL_c	0.95	mm	*Change in length*
L_s	149.8	mm	*Length after saturation, L - CL_s*	L_c	148.8	mm	*Length after consolidation, L_s - CL_c*
A_s	4177.4	mm^2	*Area of specimen*	CV_c	9452	mm^3	*Change in volume*
V_s	625755	mm^3	*Volume after saturation, A_s * L_s*	V_c	616303	mm^3	*Volume, V_s - CV_c*
B	0.97		*B Value*	S_r	100.0	%	*Degree of Saturation = $mc*G_s/e$*
				e	0.785		*Void Ratio, $[1000*G_s]/Rho_d$-1*
				mc	29.1	%	*Moisture Content*
				Rho_d	1529	kg/m^3	*Dry mass density, Rhod*V/V_c*

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

INPUT DATA

Project No.: 5810535301
Tested By: HEJ/JW
Test Date: 12/27/93-01/05/94
Reviewed By: JW/RLB RLB
Reviewed Date: 01/06/93

Project Name: SRS-ITP
Boring No: H-Bor-29
Sample No.: PS-10
Depth: 140 ft
Sample Description: See classification data

Line No.	Elapsed Time [min]	Cell Pressure [unit]	Pore Pressure [unit]	Axial Load [unit]	Burette Reading [unit]	Length Reading [unit]	Longitudinal or Torsional	Force or Torque Reading [V_{rms}]	Transducer Reading [V_{rms}]	Resonant Period [msec]
1	0.4	110.0	41.8	0	27.8	-8.6250	T	0.026	0.018	7.030
2	1.0	110.0	42.9	0	27.8	-8.6250	T	0.051	0.034	7.026
3	1.7	110.0	43.7	0	27.8	-8.6250	T	0.093	0.064	7.030
4	2.4	110.0	44.2	0	27.8	-8.6250	T	0.204	0.136	7.045
5	3.0	110.0	44.8	0	27.8	-8.6250	T	0.437	0.269	7.116
6	3.8	110.0	45.3	0	27.8	-8.6250	T	0.825	0.509	7.130
7	4.5	110.0	45.8	0	27.8	-8.6250	T	1.413	0.914	7.361
8	5.4	110.0	46.5	0	27.8	-8.6250	T	2.742	1.805	7.626
9	5.9	110.0	46.8	0	27.8	-8.6250	T	3.490	2.087	7.852
10	6.3	110.0	47.1	0	27.8	-8.6250	T	3.720	2.288	7.857
11	6.7	110.0	47.4	0	27.8	-8.6250	T	0.026	0.017	7.363

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

INTERMEDIATE DATA

Project No.: 5810535301
Tested By: HEJ/JW
Test Date: 12/27/93-01/05/94
Reviewed By: JW/RLB RLB
Reviewed Date: 01/06/93

Project Name: SRS-ITP
Boring No: H-Bor-29
Sample No.: PS-10
Depth: 140 ft
Sample Description: See classification data

Specimen Volume [mm³]	Specimen Length [mm]	Specimen Diameter [mm]	Specimen Mass [grams]	Mass Density [kg/m³]	Polar Inertia J [kg-m²]	Inertia Stiffness Ratio T	Apparatus Damping Factor ADF	Dimensionless Frequency F	Damping Factor A
616303	148.30	72.74	1216.85	1974.4	0.000805	4.0133	0.00507	0.480	8.73
616303	148.30	72.74	1216.85	1974.4	0.000805	4.0133	0.00506	0.480	8.73
616303	148.30	72.74	1216.85	1974.4	0.000805	4.0133	0.00507	0.480	8.73
616303	148.30	72.74	1216.85	1974.4	0.000805	4.0133	0.00508	0.480	8.73
616303	148.30	72.74	1216.85	1974.4	0.000805	4.0133	0.00513	0.480	8.73
616303	148.30	72.74	1216.85	1974.4	0.000805	4.0133	0.00514	0.480	8.73
616303	148.30	72.74	1216.85	1974.4	0.000805	4.0133	0.00531	0.480	8.73
616303	148.30	72.74	1216.85	1974.4	0.000805	4.0133	0.00550	0.480	8.73
616303	148.30	72.74	1216.85	1974.4	0.000805	4.0133	0.00566	0.480	8.73
616303	148.30	72.74	1216.85	1974.4	0.000805	4.0133	0.00566	0.480	8.73
616303	148.30	72.74	1216.85	1974.4	0.000805	4.0133	0.00531	0.480	8.73

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

TEST RESULTS SUMMARY

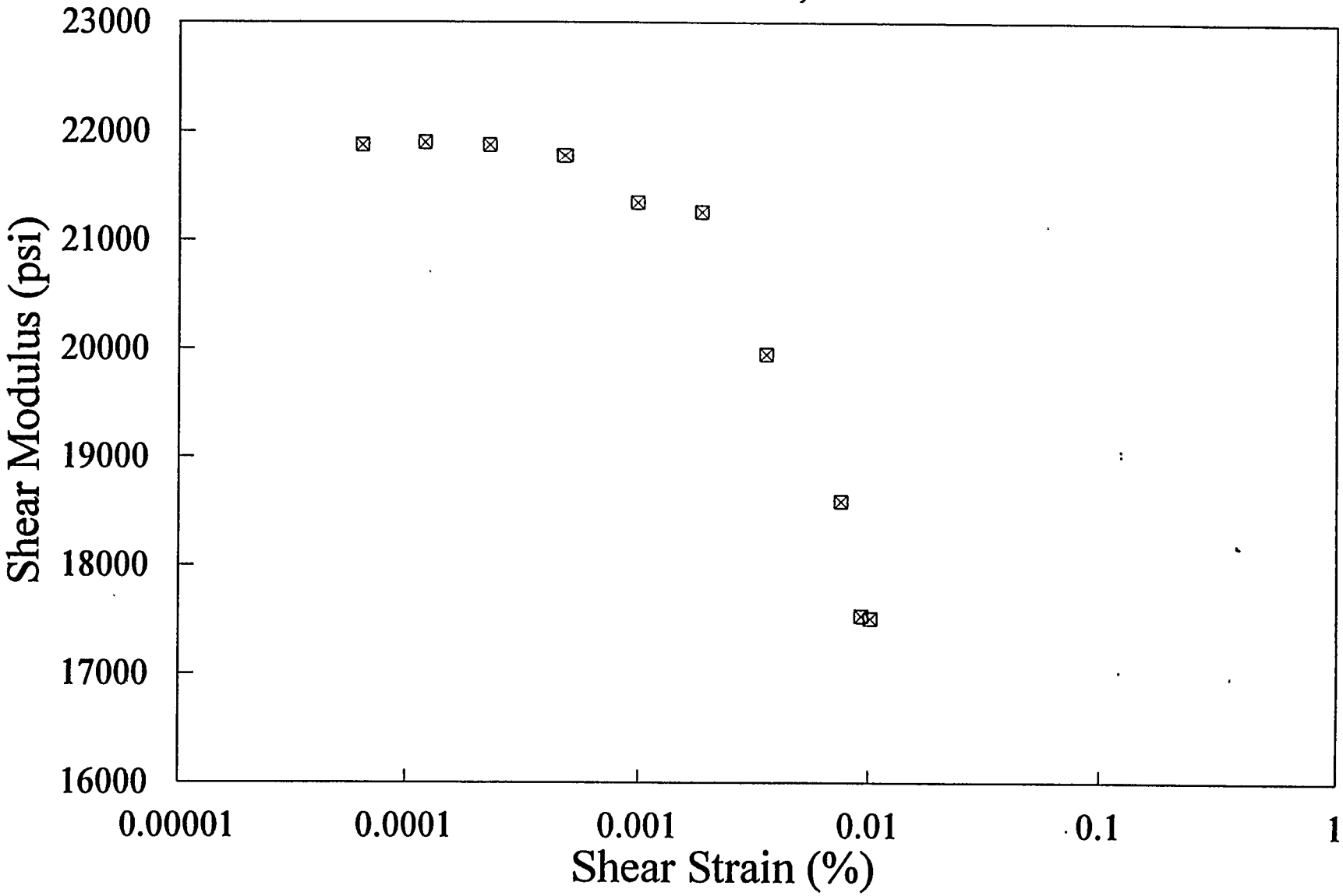
Project No.: 5810535301
Tested By: HEJ/JW
Test Date: 12/27/93-01/05/94
Reviewed By: JW/RLB RLB
Reviewed Date: 01/06/93

Project Name: SRS-ITP
Boring No: H-Bor-29
Sample No.: PS-10
Depth: 140 ft
Sample Description: See classification data

Line No.	Effective Confining Stress [kPa]	Principal Stress Ratio	Void Ratio e	Longitudinal or Torsional	No. of Vibration Cycles	Shear Modulus G [Mpa]	Shear Strain Amplititude [%]	Damping Ratio [%]	Shear Modulus G [psi]
1	470.17	1.00	0.785	T	3585	150.70	0.00006	6.88	21872
2	462.18	1.00	0.785	T	5124	150.87	0.00012	7.15	21897
3	456.81	1.00	0.785	T	5548	150.70	0.00023	6.92	21872
4	453.36	1.00	0.785	T	5877	150.06	0.00049	7.15	21779
5	449.50	1.00	0.785	T	5565	147.08	0.00098	7.75	21346
6	445.65	1.00	0.785	T	6732	146.50	0.00187	7.73	21263
7	442.61	1.00	0.785	T	5135	137.45	0.00358	7.37	19949
8	437.52	1.00	0.785	T	7160	128.06	0.00759	7.24	18587
9	435.31	1.00	0.785	T	4203	120.80	0.00930	7.97	17532
10	433.24	1.00	0.785	T	2826	120.64	0.01021	7.75	17510
11	431.04	1.00	0.785	T	3504	137.38	0.00007	7.29	19938

Shear Modulus vs. Shear Strain

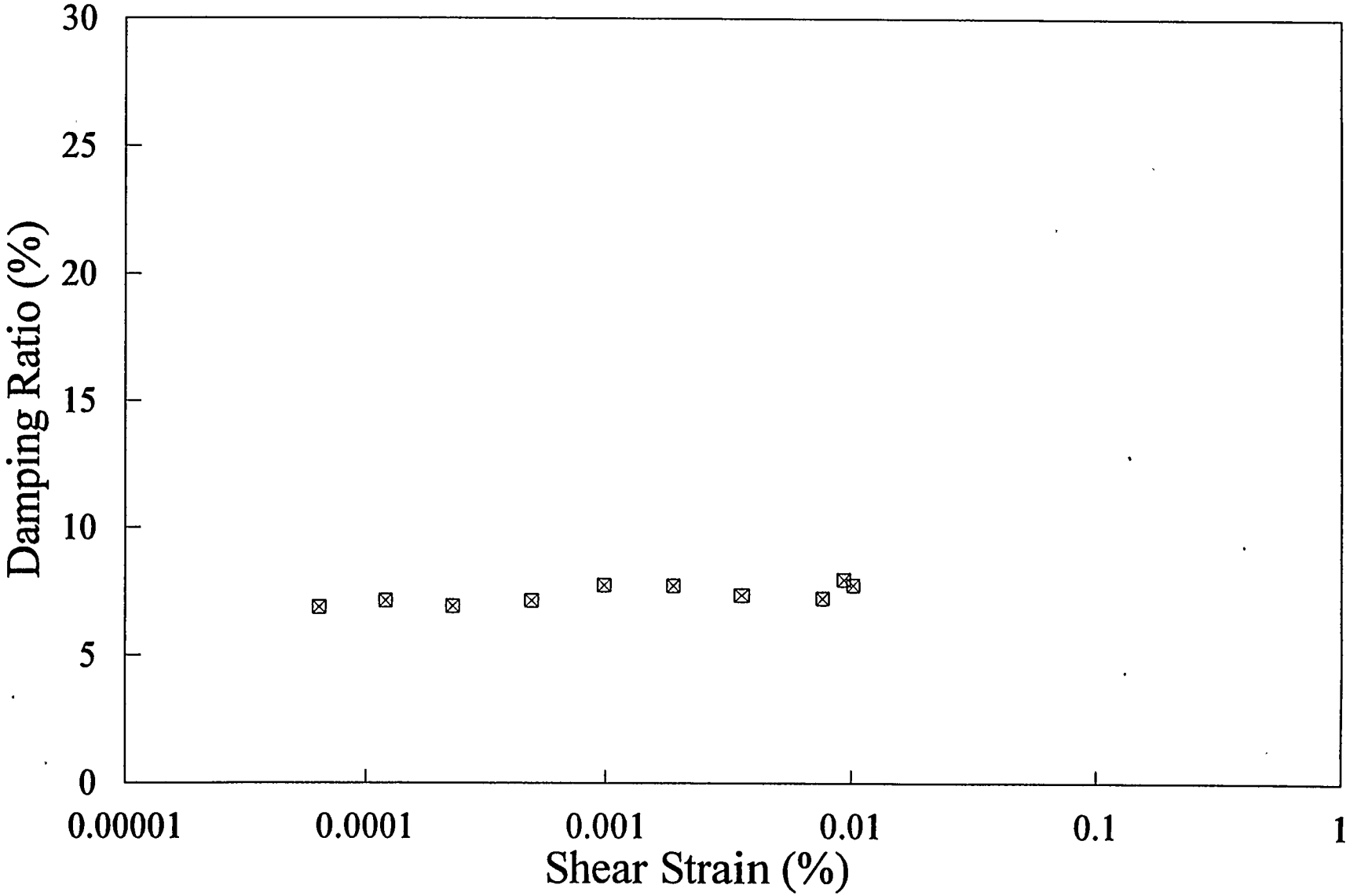
H-BOR-29, PS-10



Law Engineering Project No.: 5810535301
SRS-ITP: Resonant Column

Damping Ratio vs. Shear Strain

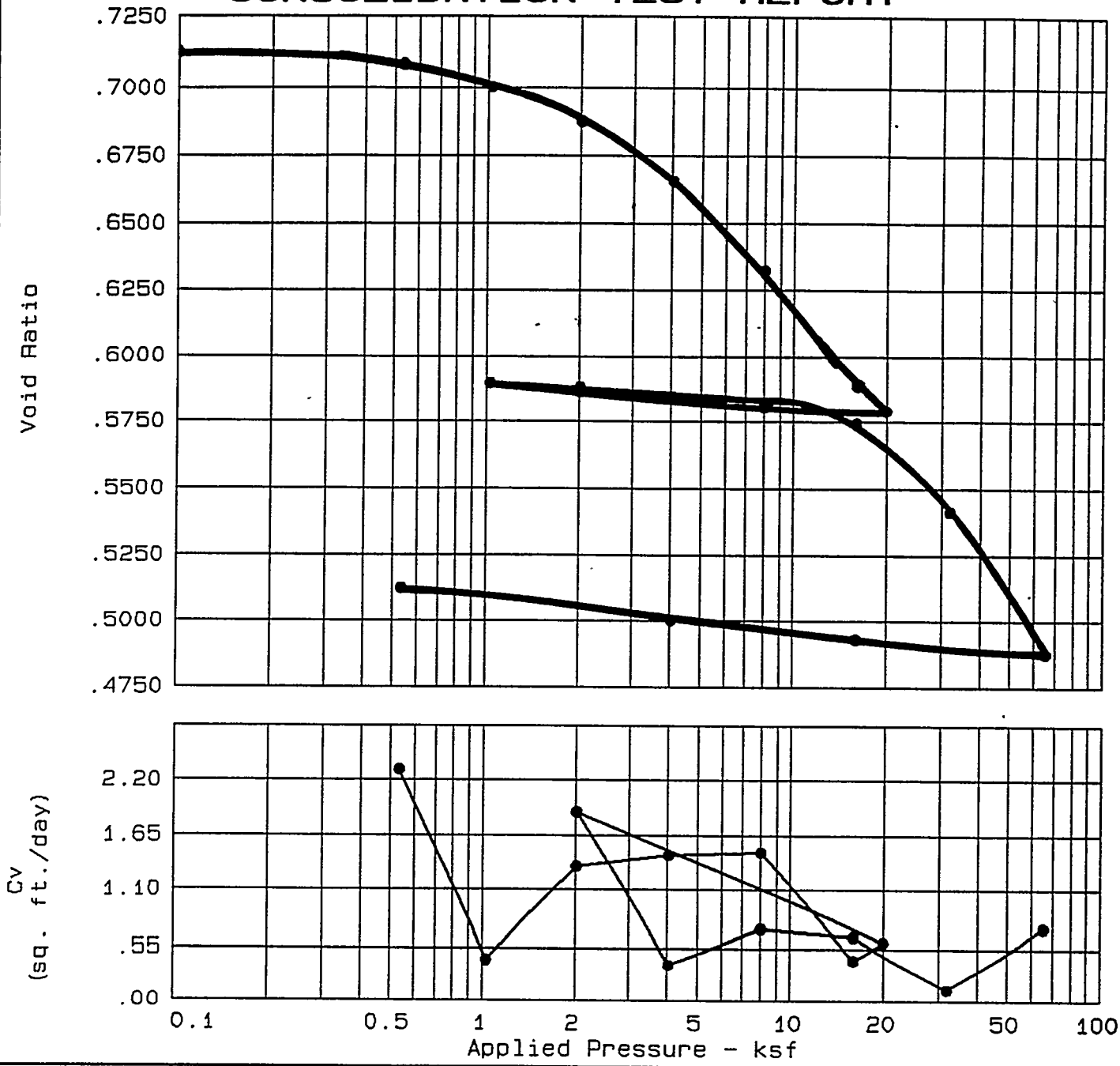
H-BOR-29, PS-10



Law Engineering Project No.: 5810535301

SRS-ITP: Resonant Column

CONSOLIDATION TEST REPORT



Natural Saturation	Natural Moisture	Dry Density	LL	PI	Sp.Gr.	Initial void ratio
95.9 %	25.0	99.5	46	25	2.730	0.7127

TEST RESULTS	MATERIAL DESCRIPTION
	Yellow Brown Medium to Fine Sand Class: SC
Project No.: 5810535301 Project: SRS ITP Location: H-Bor-29 PS-10 140'11"-141'11" Date: October 14, 1993	Remarks: Tested by: CLG Reviewed by: RLB
CONSOLIDATION TEST REPORT LAW ENGINEERING, INC.	Fig. No._____

18:17, 2-01-1994 CONSOLIDATION TEST PROJECT DATA Test No. 23

Project Number:	5810535301
Project:	SRS ITP
Date:	October 14,1993
Location 1:	H-Bor-29 PS-10
2:	140'11"-141'11"
Remarks 1:	Tested by:
2:	Reviewed by:
3:	
4:	
5:	
Material 1:	Yellow Brown Medium to
description 2:	Fine Sand
Classification:	SC
Liquid limit:	46
Plasticity index:	25
Figure Number:	

CONSOLIDATION TEST SPECIMEN DATA

TOTAL SAMPLE	BEFORE TEST	AFTER TEST
Wet w+t = 343.86 g.	Oedometer No. = 13	Wet w+t = 338.76 g.
Dry w+t = 319.76 g	Machine No. = 13	Dry w+t = 319.76 g.
Tare wt. = 223.47 g.	Spec. Gravity = 2.730	Tare wt. = 223.47 g.
Height = 0.7510 in.	Height = 0.7510 in.	
Diameter = 2.5000 in.	Diameter = 2.5000 in.	
Weight = 120.39 g.		
Moisture = 25.0 %	Ht. Solids = 0.4385 in.	Moisture = 19.7 %
Wet Den. = 124.4 pcf	Dry wt. = 96.29 g.	Dry wt. = 96.29 g. *
Dry Den. = 99.5 pcf	Void ratio = 0.7127	Void ratio = 0.5123
	Saturation = 95.9 %	Saturation = 105.1 %

* Final dry weight used in calculations

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
Initial	0.02000			0.7127	
0.10	0.02001	0.0000	0.02001	0.7127	0.0 Comprs.
0.54	0.02220	0.0000	0.02220	0.7086*	0.2 Comprs.*
1.03	0.02720	0.0006	0.02660	0.7003*	0.7 Comprs.*
2.03	0.03410	0.0019	0.03220	0.6874*	1.5 Comprs.*
4.05	0.04550	0.0032	0.04230	0.6648*	2.8 Comprs.*
8.05	0.06105	0.0040	0.05705	0.6319*	4.7 Comprs.*
16.04	0.08080	0.0048	0.07600	0.5888*	7.2 Comprs.*
20.00	0.08560	0.0051	0.08050	0.5790*	7.8 Comprs.*
20.00	0.08560	0.0051	0.08050	0.5790	7.8 Comprs.
8.05	0.08320	0.0040	0.07920	0.5820	7.6 Comprs.
2.03	0.07850	0.0019	0.07660	0.5879	7.3 Comprs.
1.03	0.07656	0.0006	0.07596	0.5894	7.2 Comprs.
2.03	0.07765	0.0019	0.07575	0.5899	7.2 Comprs.

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
4.05	0.07980	0.0032	0.07660	0.5844*	7.5 Comprs.*
8.05	0.08230	0.0040	0.07830	0.5802*	7.7 Comprs.*
16.04	0.08585	0.0048	0.08105	0.5745*	8.1 Comprs.*
32.04	0.10300	0.0058	0.09720	0.5414*	10.0 Comprs.*
65.60	0.12865	0.0075	0.12115	0.4876*	13.1 Comprs.*
65.60	0.12865	0.0075	0.12115	0.4876	13.1 Comprs.
16.04	0.12360	0.0048	0.11880	0.4929	12.8 Comprs.
4.05	0.11890	0.0032	0.11570	0.5000	12.4 Comprs.
0.54	0.11030	0.0000	0.11030	0.5123	11.7 Comprs.

* CALCULATED USING D100 INSTEAD OF FINAL READING

CONSOLIDATION TEST RESULTS

Compression index = NOT SELECTED
Preconsolidation pressure = NOT SELECTED

Load 0.54 ksf CONSOLIDATION TEST READINGS Load No. 2

Machine Deflection 0.0000

No.	Elapsed Time	Dial Reading
1	0.00	0.02000
2	0.10	0.02120
3	0.25	0.02150
4	0.50	0.02170
5	1.00	0.02180
6	2.00	0.02185
7	4.00	0.02190
8	8.00	0.02200
9	15.00	0.02210
10	30.00	0.02220

Void Ratio: 0.7086 Compression: 0.2 % >>> CALCULATED USING D100
D0 = 0.0207 D90 = 0.0217 D100 = 0.0218 T90 = 0.52 min.
Cv @ 0.5 min.= 2.30 sq. feet/day

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

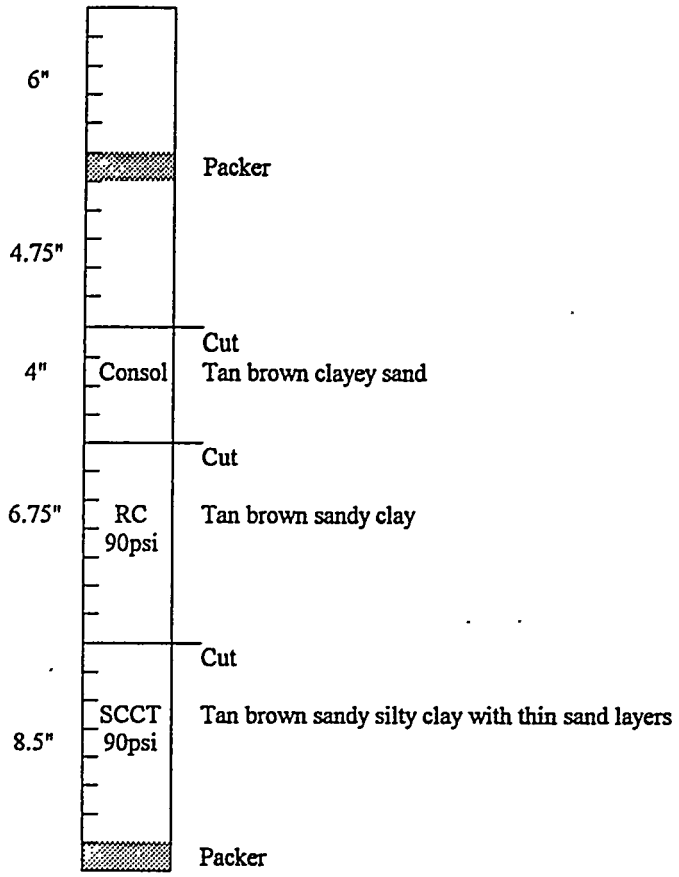
Project: SRS-ITP GEOTECHNICAL TESTING Date: 12-17-93

Boring No: H-Bor-29 Sample No: PS-12 Depth: 150'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION



Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b29-ps12.wk3

ATTACHMENT 2

Tested by:	CLG	Reviewed by:	RLB	Law Job No.:	5810535301
Date:	09/21/93	Date:	09/21/93	Job Name:	SRS - ITP

TP-4A: UNIT WEIGHT OF THIN WALL TUBE SAMPLES

"TYPICAL"

Sample: Boring No.: H-Bor-29
Depth: 150'
Sample ID: PS-12

MEASUREMENTS (Entire Tube):

	FROM TOP OF TUBE		FROM BOTTOM OF TUBE		TOTAL TUBE LENGTH	INSIDE DIAMETER OF TUBE
	PACKER (inches)	SOIL (inches)	PACKER (inches)	SOIL (inches)	(inches)	(inches)
1.	5.64	5.99	0.86	1.49		
2.	5.61	5.91	0.74	1.33		
3.	5.72	5.98	0.76	1.35		
Avg.:	5.66 L_1 =	5.96	0.79 L_2 =	1.39	L_3 = 29.938 *	D_i = 2.868 *

TOTAL WEIGHT OF TUBE + PACKERS + SOIL	M_1 =	6,500.0	gm
WEIGHT OF PACKERS	M_2 =	152.6 *	gm
TOTAL WEIGHT OF TUBE	M_3 =	2,458.8 *	gm
WET WEIGHT OF SOIL COLUMN, [M_1-M_2-M_3]	M_4 =	3,888.6	gm

* *Denotes information supplied by WSRC/TO*

MOISTURE CONTENTS (From assigned tests of same tube):

MOISTURE CONTENT		
Specimen 1:	92.8	% moisture
Specimen 2:	68.4	% moisture
Specimen 3:	51.3	% moisture
Average, (w):	70.8	% moisture

Notations:

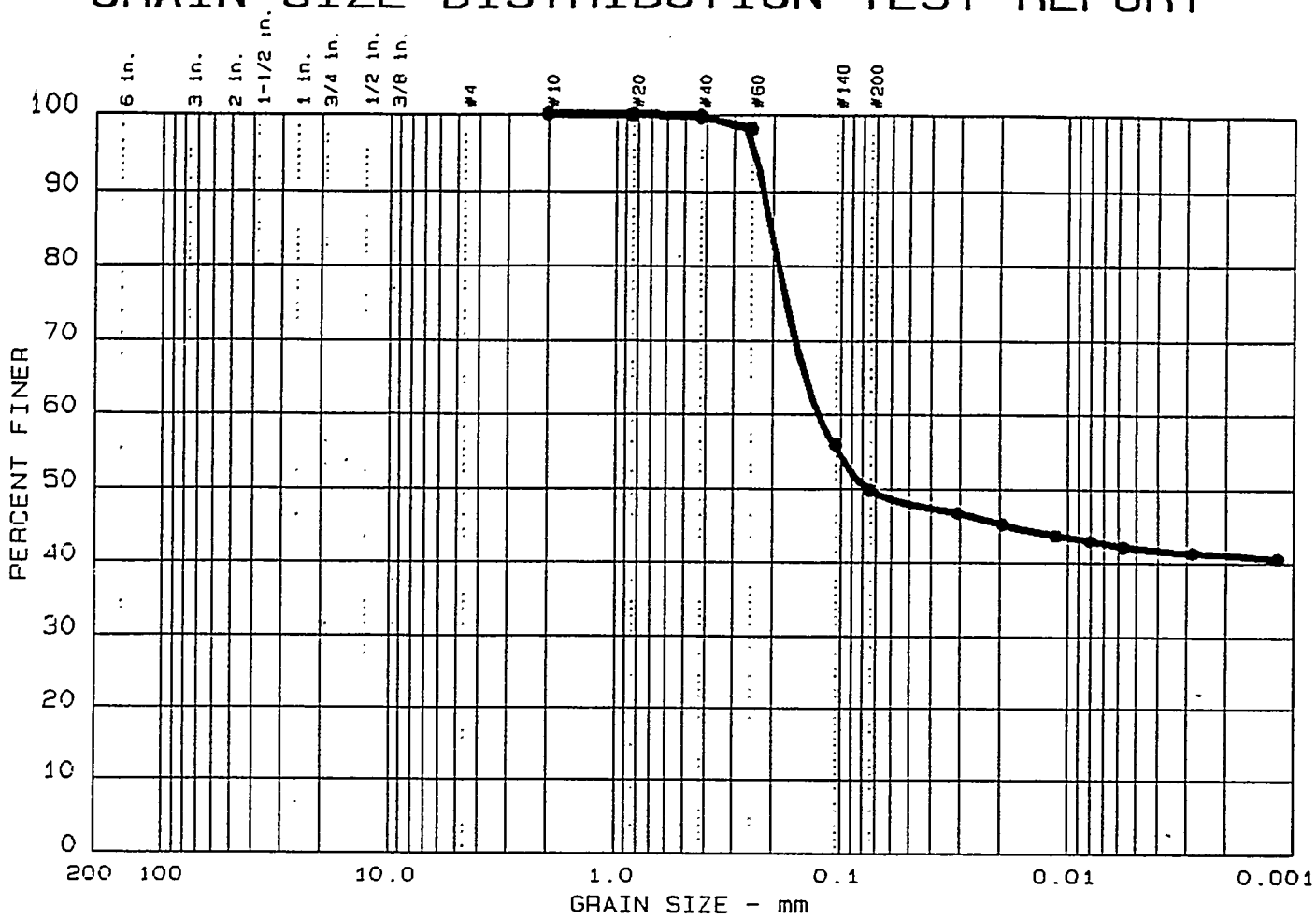
Specimen 1 moisture content obtained from Consolidation test
Specimen 2 moisture content obtained from Resonant Column test
Specimen 3 moisture content obtained from Strain-Control Cyclic Triaxial test

CALCULATIONS:

CROSS-SECTIONAL AREA OF TUBE, [pi*(D_i^2)/4]	A_o=	6.46	in.^{2}
LENGTH OF SOIL COLUMN, [L_3 - L_2 - L_1]	L_s =	22.59	in.
VOLUME OF SOIL COLUMN, [L_s*A_o]	V_s =	145.92	in.^{3}
WET DENSITY, [(M_4/V_s)*3.810]	**D_w=**	**101.5**	**pcf**
DRY DENSITY, [D_w/(1+w/100)]	**D_D=**	**59.4**	**pcf**

h:\users\lab\rlb\itp\b29-ps12.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	15	0.0	0.0	50.2	8.0	41.8

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	112	91	0.20	0.13	0.08					

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Brown Clayey Sand	SC	A-7-6 (36.8)

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-29 PS-12 @ 150 Ft.

Date: January 5, 1994

Remarks:

Tested by: JTK

Reviewed by: RLB

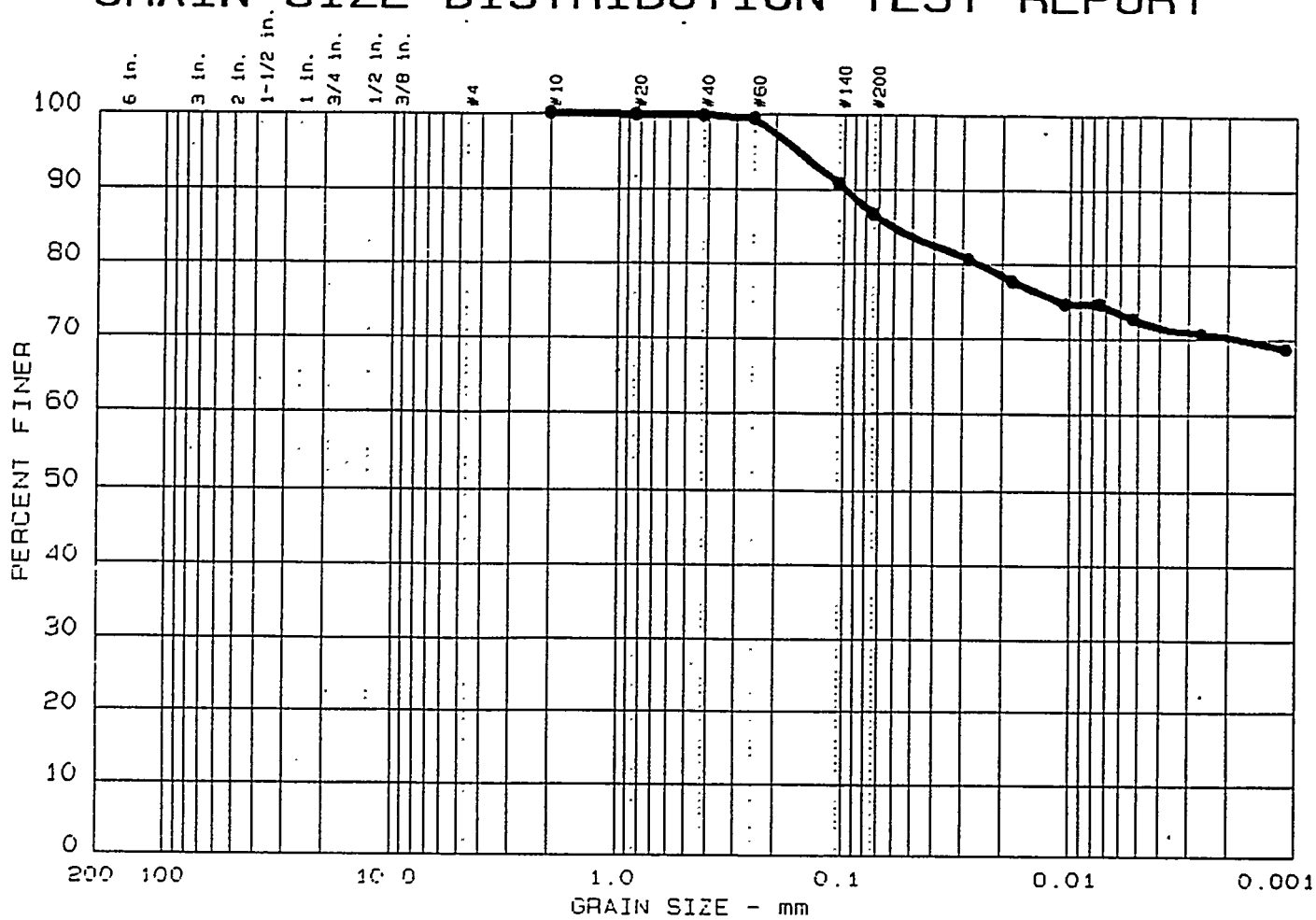
SCC-90 psi (Consol.)

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3	% GRAVEL	% SAND	% SILT	% CLAY
●	16	0.0	0.0	13.3	14.3	72.4

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●										

MATERIAL DESCRIPTION	USCS	AASHTO
● Light Brown Fat Clay		

Project No.: 5810535301
Project: SRS-ITP
● Location: H-Bor-29 PS-12 @ 150 FT.

Date: January 5, 1994

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Remarks:

Tested by: JTK Reviewed by: RB

Atterberg Limits -200

LL=205 PL=33 PI=172

RC-90 psi

Figure No.

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-29
Test Date:	12/17/93-12/22/93	Sample No.:	PS-12
Reviewed By:	JW/RLB RLB	Depth:	150 ft.
Reviewed Date:	12/28/93	Sample Description:	See classification data

Initial Specimen Data

Labels	Values	Units	Description
			Masses
M_{scb}	983.36	g	*Mass of soil and container before*
M_{sca}	0.00	g	*Mass of soil and container after*
M_s	983.36	g	*M_{scb} - M_{sca} = mass of soil*
			Diameters
D_t	73.40	mm	*Diameter near top of specimen*
D_m	73.48	mm	*Diameter near middle of specimen*
D_b	73.53	mm	*Diameter near bottom of specimen*
T_{mem}	0.30	mm	*Single thickness of membrane*
D_{net}	72.86	mm	*$(D_t + D_m + D_b)/3 - 2*T_{mem}$*
			Lengths
L_{cbp}	199.49	mm	*Length between chamber bottom & top of top platen*
L_{tp}	23.95	mm	*Length of top platen*
L_{bp}	24.00	mm	*Length of bottom platen*
L_{net}	151.54	mm	*Length of Specimen = L_{cbp} - L_{tp} - L_{bp}*
			Volume
V	631830	mm^3	*$D^2_{net}*Pi*L_{net}/4$*

Labels	Values	Units	Description
			Mass Density and Unit Weight
Rho	1556.4	kg/m^3	*Mass density of specimen = $M_s/V*10^6$*
U_{wt}	15.26	kN/m^3	*Unit weight of specimen = Rho*9.806/1000*
			Moisture Content, mc
No.	T-20		*Container number*
M_{wscb}	1033.78	g	*Mass of wet soil + container*
M_{wsca}	634.44	g	*Mass of dry soil + container*
M_{wat}	399.34	g	*Mass of water = M_{wscb} - M_{wsca}*
M_{cont}	50.42	g	*Mass of container.*
mc	68.4	%	*$M_{wat}/(M_{wsca} - M_{cont})*100\%$*
Rho_d	924.3	kg/m^3	*Dry mass density = Rho/(1+mc)*
G_s	2.69		*Specific gravity*
e	1.910		*Void Ratio, $[1000*G_s)]/Rho_d-1$*
S_r	96.3	%	*Degree of Saturation = $mc*G_s/e$*
J	0.000653	$kg\text{-}m^2$	*Polar mass moment of inertia = $(M_s/1000)*(D_{net}/1000)^2/8$*

Conditions After Saturation				Conditions After Consolidation			
CL_s	0.05	mm	*Change in length*	CL_c	2.07	mm	*Change in length*
L_s	151.5	mm	*Length after saturation, L - CL_s*	L_c	149.4	mm	*Length after consolidation, L_s - CL_c*
A_s	4169.4	mm^2	*Area of specimen*	CV_c	15504	mm^3	*Change in volume*
V_s	631605	mm^3	*Volume after saturation, A_s * L_s*	V_c	616101	mm^3	*Volume, V_s - CV_c*
B	0.61		*B Value*	S_r	100.0	%	*Degree of Saturation = $mc*G_s/e$*
				e	1.838		*Void Ratio, $[1000*G_s]/Rho_d-1$*
				mc	68.4	%	*Moisture Content*
				Rho_d	948	kg/m^3	*Dry mass density, Rhod*V/V_c*

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

INPUT DATA

Project No.: 5810535301
Tested By: HEJ/JW
Test Date: 12/17/93-12/22/93
Reviewed By: JW/RLB RLB
Reviewed Date: 12/28/93

Project Name: SRS-ITP
Boring No: H-Bor-29
Sample No.: PS-12
Depth: 150 ft.
Sample Description: See classification data

Line No.	Elapsed Time [min]	Cell Pressure [unit]	Pore Pressure [unit]	Axial Load [unit]	Burette Reading [unit]	Length Reading [unit]	Longitudinal or Torsional	Force or Torque Reading [V_{rms}]	Transducer Reading [V_{rms}]	Resonant Period [msec]
1	0.5	125.0	36.6	0	0.0	-3.1550	T	0.011	0.025	10.270
2	1.0	125.0	36.6	0	0.0	-3.1550	T	0.019	0.042	10.288
3	1.5	125.0	36.6	0	0.0	-3.1550	T	0.046	0.098	10.300
4	2.1	125.0	36.7	0	0.0	-3.1560	T	0.114	0.232	10.321
5	2.5	125.0	36.7	0	0.0	-3.1560	T	0.222	0.409	10.379
6	3.2	125.0	36.7	0	0.0	-3.1560	T	0.475	0.790	10.474
7	3.5	125.0	36.8	0	0.0	-3.1560	T	0.945	1.458	10.576
8	4.5	125.0	36.8	0	0.0	-3.1560	T	2.023	2.812	10.850
9	5.0	125.0	36.8	0	0.0	-3.1560	T	3.590	4.210	11.279
10	6.0	125.0	36.8	0	0.0	-3.1560	T	0.014	0.025	10.308

Resonant Column Test (ASTM D4015-87)

INTERMEDIATE DATA

LAW ENGINEERING

Project No.: 5810535301
Tested By: HEJ/JW
Test Date: 12/17/93-12/22/93
Reviewed By: JW/RLB RLB
Reviewed Date: 12/28/93

Project Name: SRS-ITP
Boring No: H-Bor-29
Sample No.: PS-12
Depth: 150 ft.
Sample Description: See classification data

Specimen Volume [mm³]	Specimen Length [mm]	Specimen Diameter [mm]	Specimen Mass [grams]	Mass Density [kg/m³]	Polar Inertia J [kg-m²]	Inertia Stiffness Ratio T	Apparatus Damping Factor ADF	Dimensionless Frequency F	Damping Factor A
616101	149.42	72.46	983.24	1595.9	0.000645	5.0057	0.00923	0.434	10.71
616101	149.42	72.46	983.24	1595.9	0.000645	5.0057	0.00925	0.434	10.71
616101	149.42	72.46	983.24	1595.9	0.000645	5.0057	0.00926	0.434	10.71
616101	149.42	72.46	983.24	1595.9	0.000645	5.0057	0.00928	0.434	10.71
616101	149.42	72.46	983.24	1595.9	0.000645	5.0057	0.00933	0.434	10.71
616101	149.42	72.46	983.24	1595.9	0.000645	5.0057	0.00942	0.434	10.71
616101	149.42	72.46	983.24	1595.9	0.000645	5.0057	0.00951	0.434	10.71
616101	149.42	72.46	983.24	1595.9	0.000645	5.0057	0.00975	0.434	10.71
616101	149.42	72.46	983.24	1595.9	0.000645	5.0057	0.01014	0.434	10.71
616101	149.42	72.46	983.24	1595.9	0.000645	5.0057	0.00927	0.434	10.71

Resonant Column Test (ASTM D4015-87)

TEST RESULTS SUMMARY

LAW ENGINEERING

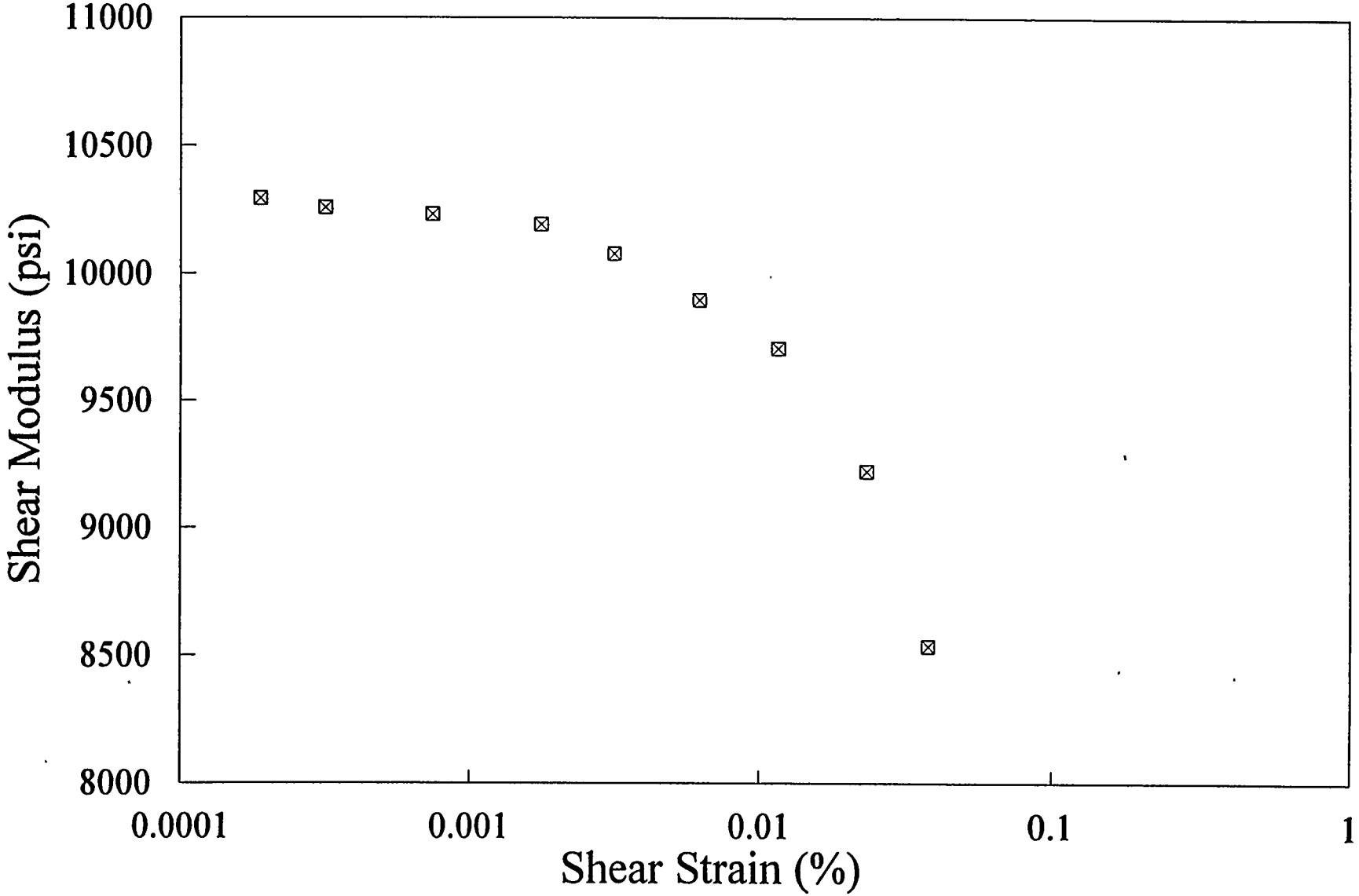
Project No.: 5810535301
Tested By: HEJ/JW
Test Date: 12/17/93-12/22/93
Reviewed By: JW/RLB RLB
Reviewed Date: 12/28/93

Project Name: SRS-ITP
Boring No: H-Bor-29
Sample No.: PS-12
Depth: 150 ft.
Sample Description: See classification data

Line No.	Effective Confining Stress [kPa]	Principal Stress Ratio	Void Ratio e	Longitudinal or Torsional	No. of Vibration Cycles	Shear Modulus G [Mpa]	Shear Strain Amplititude [%]	Damping Ratio [%]	Shear Modulus G [psi]
1	608.94	1.00	1.838	T	2921	70.93	0.00019	2.06	10294
2	608.94	1.00	1.838	T	2916	70.68	0.00032	2.12	10258
3	608.94	1.00	1.838	T	2913	70.51	0.00074	2.20	10234
4	608.39	1.00	1.838	T	3488	70.23	0.00177	2.31	10192
5	608.25	1.00	1.838	T	2312	69.44	0.00315	2.56	10079
6	608.11	1.00	1.838	T	4010	68.19	0.00619	2.85	9897
7	607.97	1.00	1.838	T	1702	66.88	0.01165	3.07	9707
8	607.84	1.00	1.838	T	5530	63.54	0.02365	3.42	9223
9	607.56	1.00	1.838	T	2660	58.80	0.03827	4.07	8535
10	607.56	1.00	1.838	T	5821	70.40	0.00019	2.65	10218

Shear Modulus vs. Shear Strain

H-BOR-29, PS-12

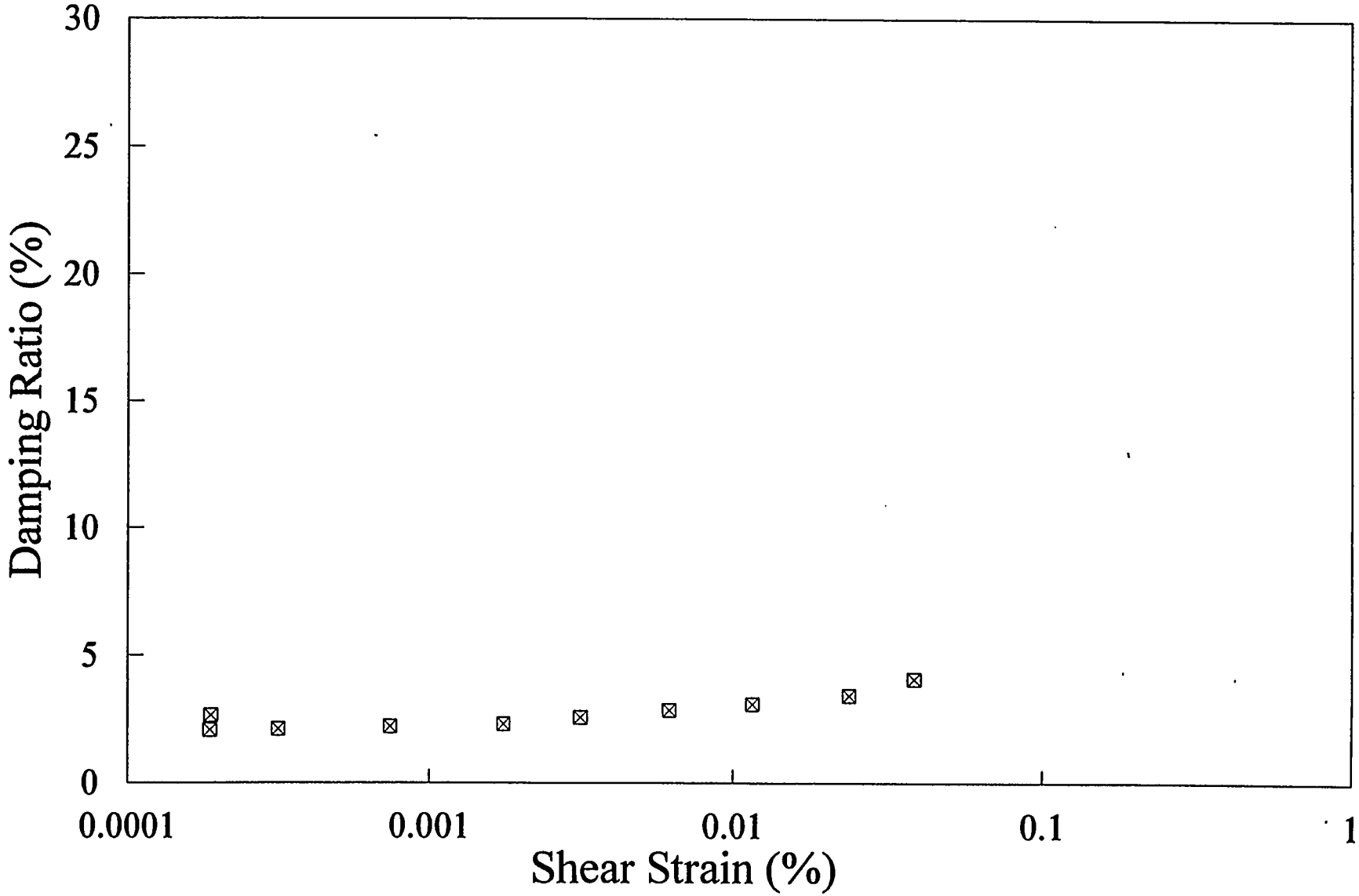


Law Engineering Project No.: 5810535301

SRS-ITP: Resonant Column

Damping Ratio vs. Shear Strain

H-BOR-29, PS-12



Law Engineering Project No.: 5810535301

SRS-ITP: Resonant Column

CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-29
Test Date:	12/17/93-12/27/93	Sample No.:	PS-12
Reviewed By:	JW/RLB RLB	Depth:	150 ft
Review Date:	12/28/93	Sample Description:	See classification data

SPECIMEN DATA

Initial Conditions of Specimen

Diameters, in.		Area , sq. in.	6.47
Top	2.895	Volume, cubic in.	38.63
Middle	2.893	Mass of Specimen, grams	1059.63
Bottom	2.894		
Average	2.894	Moisture Content	
Membrane Thickness, in.	0.012	Pan No.	AB-8
Net Diameter, in.	2.870	Wet Mass + Pan, grams	1146.43
		Dry Mass + Pan, grams	787.26
Length, in.		Container Mass, grams	86.80
Location 1	8.618	Moisture Content, %	51.3
Location 2	8.610		
Location 3	8.621	Density, pcf	104.3
Average	8.616	Dry Density, pcf	68.9
Length of Top Platen	1.140	Specific Gravity	2.70
Length of Bottom Platen	1.505	Degree of Saturation, %	95.9
Length of Specimen, in	5.971	Void Ratio	1.444

Conditions of Specimen After Saturation and Consolidation

After Saturation		After Consolidation	
Change in Length, in.	0.008	Change in Length, in.	0.118
Length, in.	5.963	Length, in.	5.846
Area, sq. in.	6.47	Change in Volume, cc	37.42
Volume, cubic in.	38.58	Volume, cubic in.	36.29
Back Pressure, psi	45.0	Area, sq. in.	6.21
B Value	0.42	Effe. Consoli.. Stress, psi	90.0
		Moisture Content, %	48.1
		Dry Density, pcf	73.4
		Void Ratio	1.296
		Degree of Saturation, %	100.0

CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

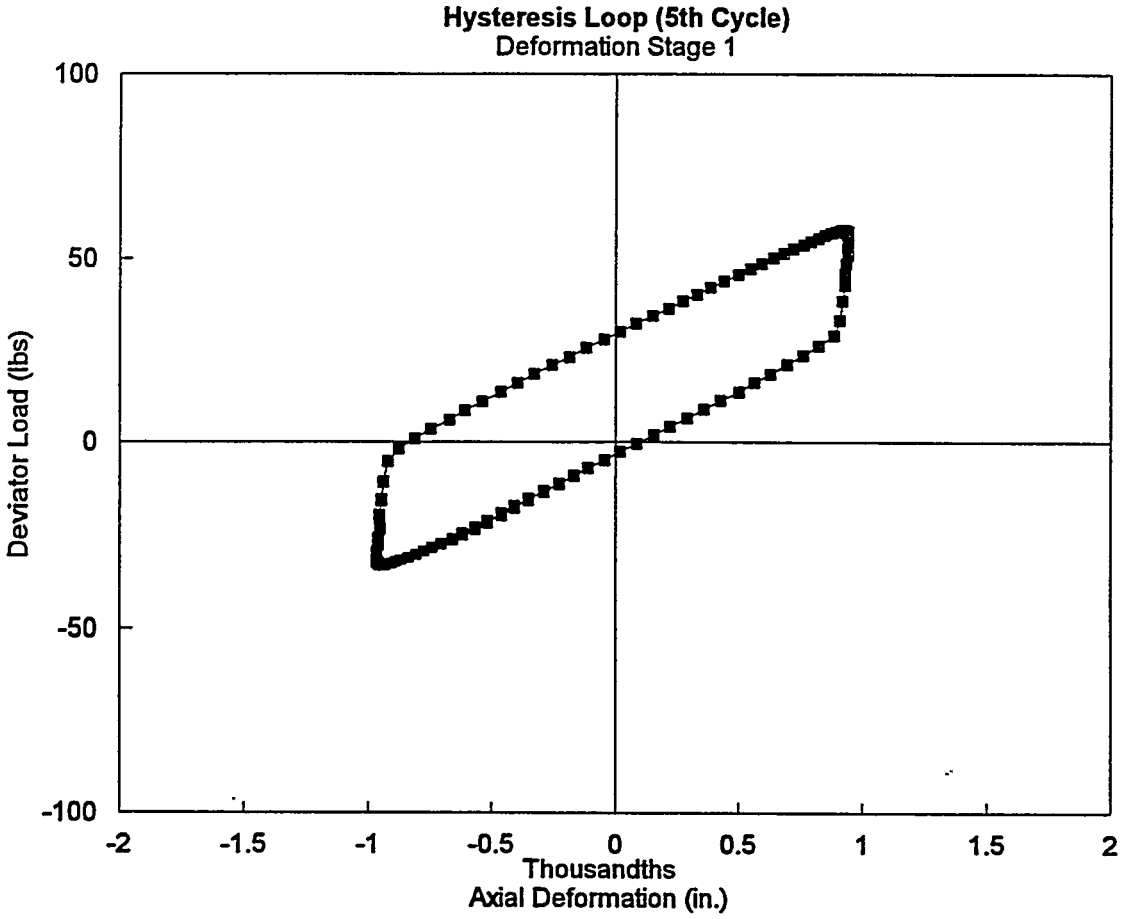
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-29
Test Date:	12/17/93-12/27/93	Sample No.:	PS-12
Reviewed By:	JW/RLB RLB	Depth:	150 ft
Review Date:	12/28/93	Sample Description:	See classification data

Area, A_c, in²	6.21		Effective Consolidation Stress, psi	90.0
Length, H_c, in.	5.85		Cyclic Load, P_c, lbs	44.96
			Cyclic Deviator Stress, psi	7.2

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
89.9	0.0019	44325	0.016

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
0.059	0.021	21.9



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

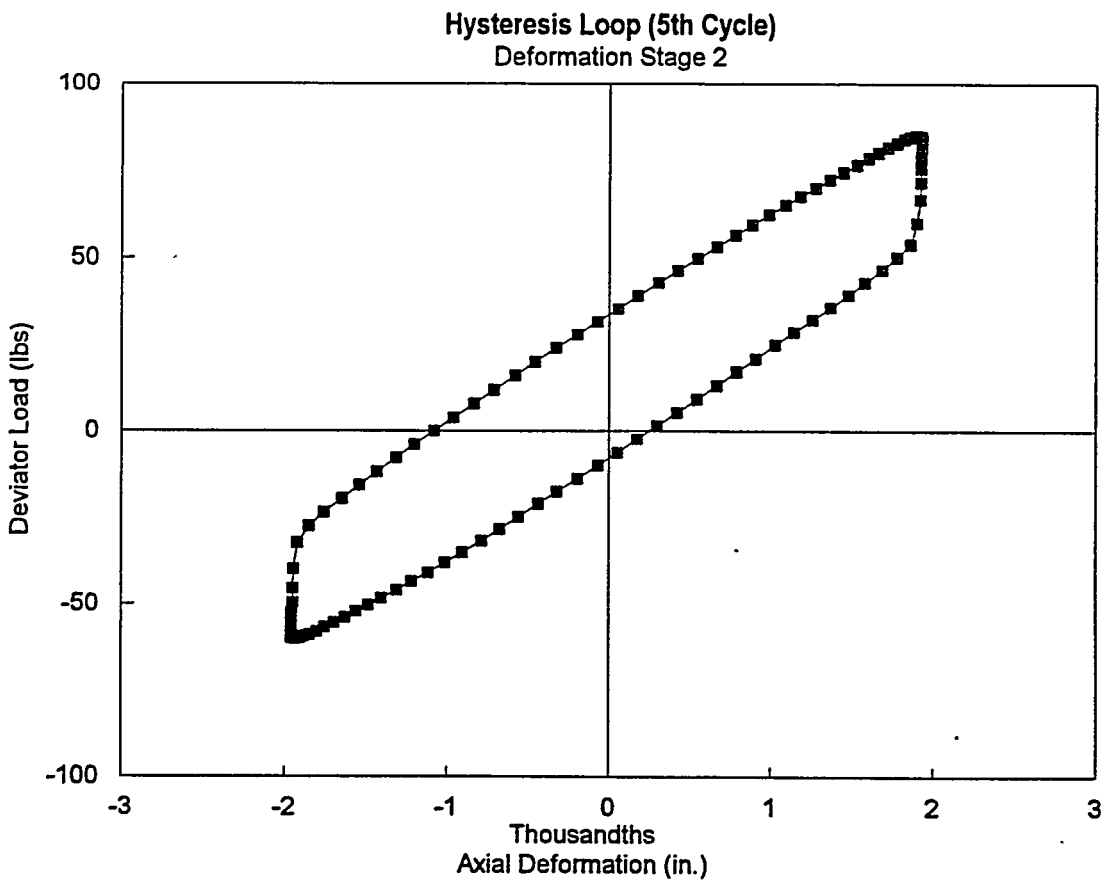
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-29
Test Date:	12/17/93-12/27/93	Sample No.:	PS-12
Reviewed By:	JW/RLB RLB	Depth:	150 ft
Review Date:	12/28/93	Sample Description:	See classification data

Area, A_c, in ^{2}	6.21		Effective Consolidation Stress, psi	90.0
Length, H_c, in.	5.85		Cyclic Load, P_c, lbs	72.26
			Cyclic Deviator Stress, psi	11.6

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
144.5	0.0039	34957	0.033

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
0.148	0.070	16.7



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

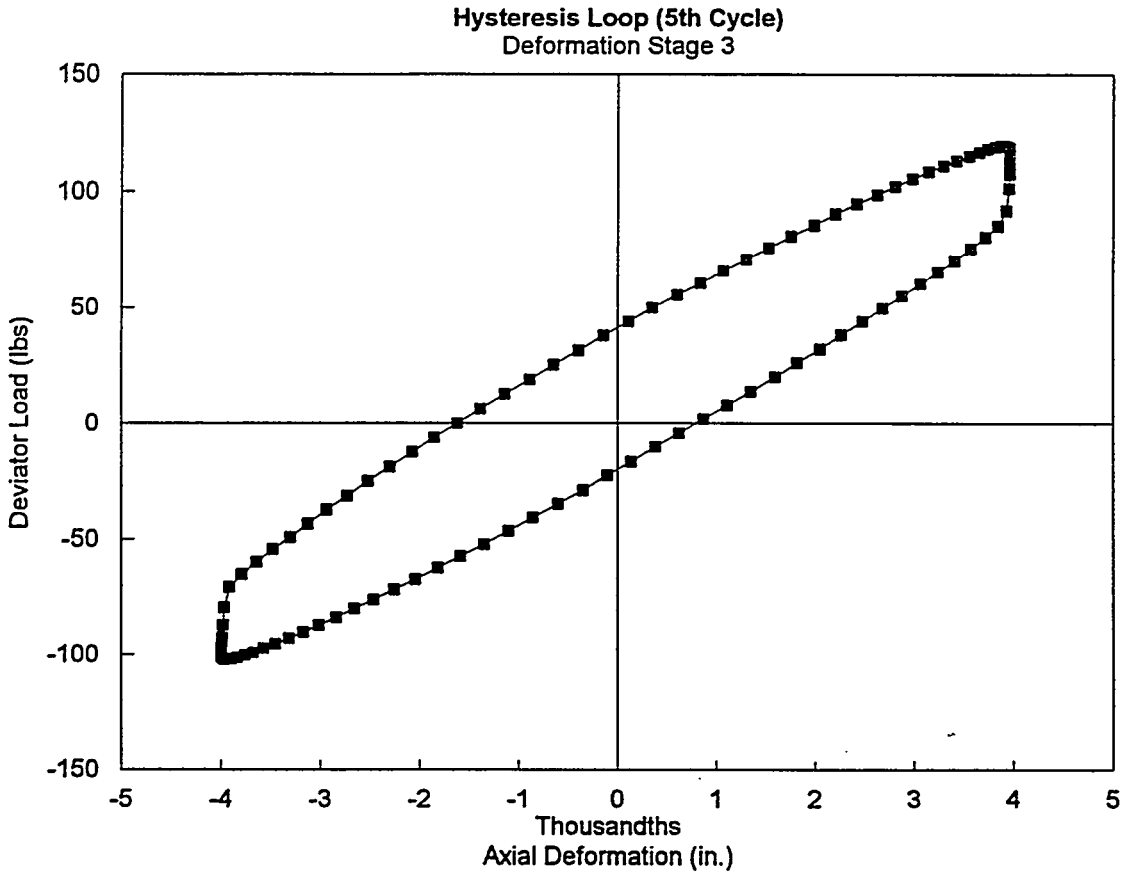
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-29
Test Date:	12/17/93-12/27/93	Sample No.:	PS-12
Reviewed By:	JW/RLB RLB	Depth:	150 ft
Review Date:	12/28/93	Sample Description:	See classification data

Area, A_c, in ^{2}	6.21		Effective Consolidation Stress, psi	90.0
Length, H_c, in.	5.85		Cyclic Load, P_c, lbs	111.00
			Cyclic Deviator Stress, psi	17.9

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
222.0	0.0080	26270	0.068

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
0.417	0.221	15.0



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

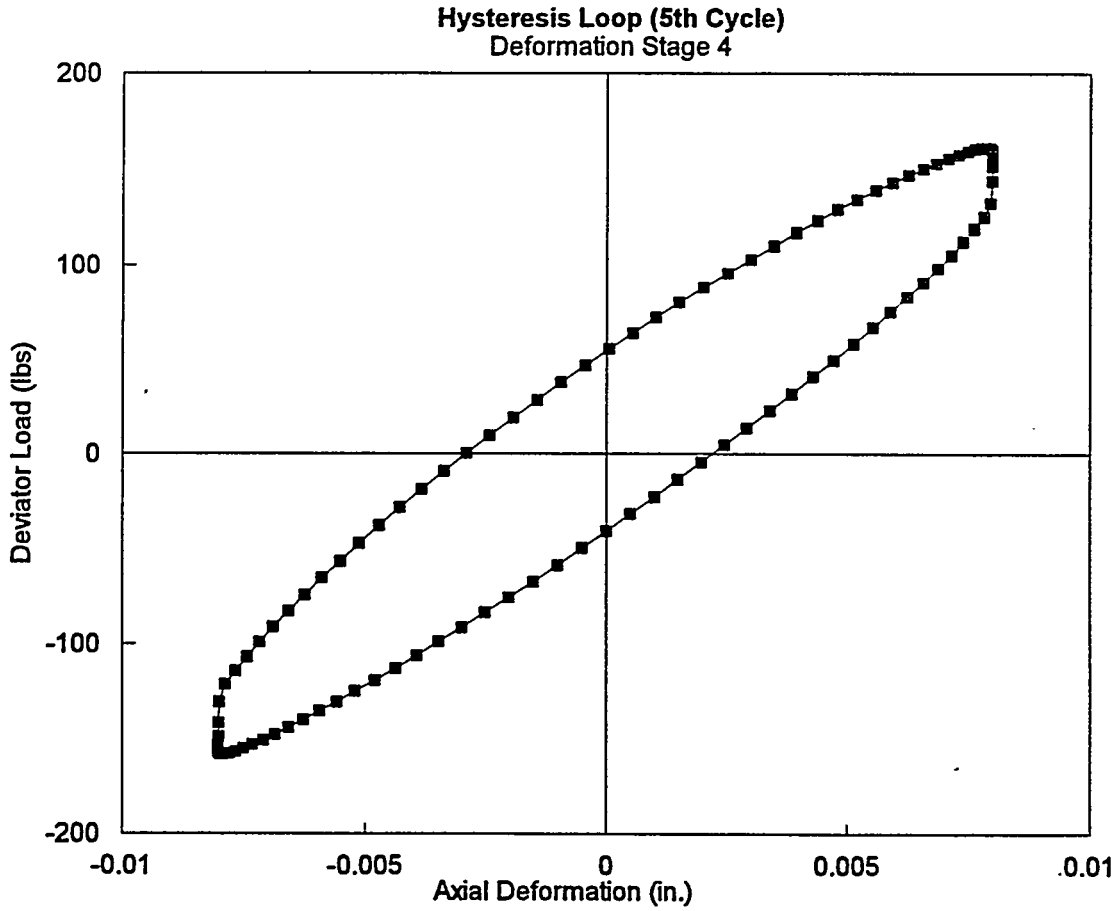
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-29
Test Date:	12/17/93-12/27/93	Sample No.:	PS-12
Reviewed By:	JW/RLB RLB	Depth:	150 ft
Review Date:	12/28/93	Sample Description:	See classification data

Area, A_c, in ^{2}	6.21		Effective Consolidation Stress, psi	90.0
Length, H_c, in.	5.85		Cyclic Load, P_c, lbs	159.89
			Cyclic Deviator Stress, psi	25.8

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
319.8	0.0160	18797	0.137

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
1.238	0.640	15.4



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

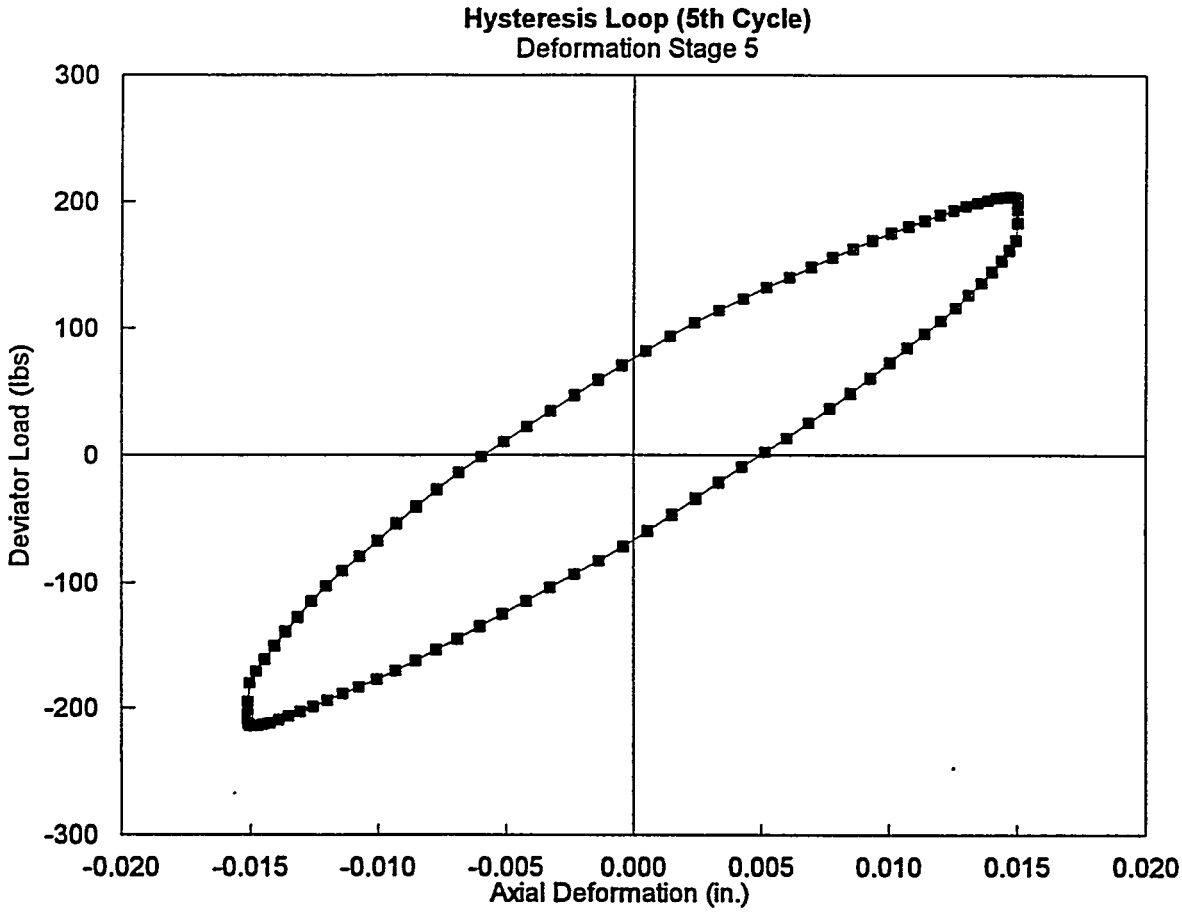
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-29
Test Date:	12/17/93-12/27/93	Sample No.:	PS-12
Reviewed By:	JW/RLB RLB	Depth:	150 ft
Review Date:	12/28/93	Sample Description:	See classification data

Area, A_c, in^2	6.21		Effective Consolidation Stress, psi	90.0
Length, H_c, in.	5.85		Cyclic Load, P_c, lbs	209.37
			Cyclic Deviator Stress, psi	33.7

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
418.7	0.0301	13092	0.258

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
3.365	1.576	17.0



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

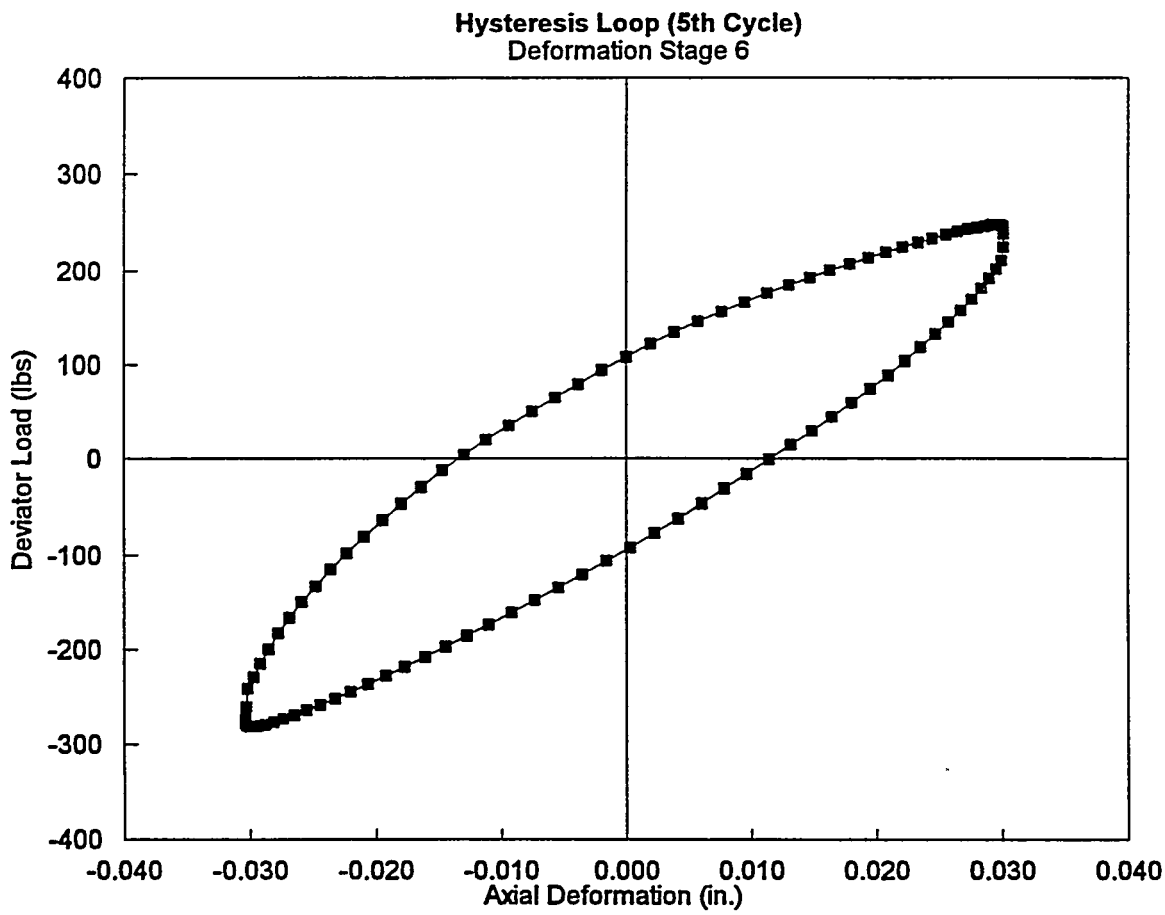
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-29
Test Date:	12/17/93-12/27/93	Sample No.:	PS-12
Reviewed By:	JW/RLB RLB	Depth:	150 ft
Review Date:	12/28/93	Sample Description:	See classification data

Area, A_c, in²	6.21		Effective Consolidation Stress, psi	90.0
Length, H_c, in.	5.85		Cyclic Load, P_c, lbs	265.11
			Cyclic Deviator Stress, psi	42.7

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
530.2	0.0605	8253	0.517

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
9.489	4.009	18.8



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

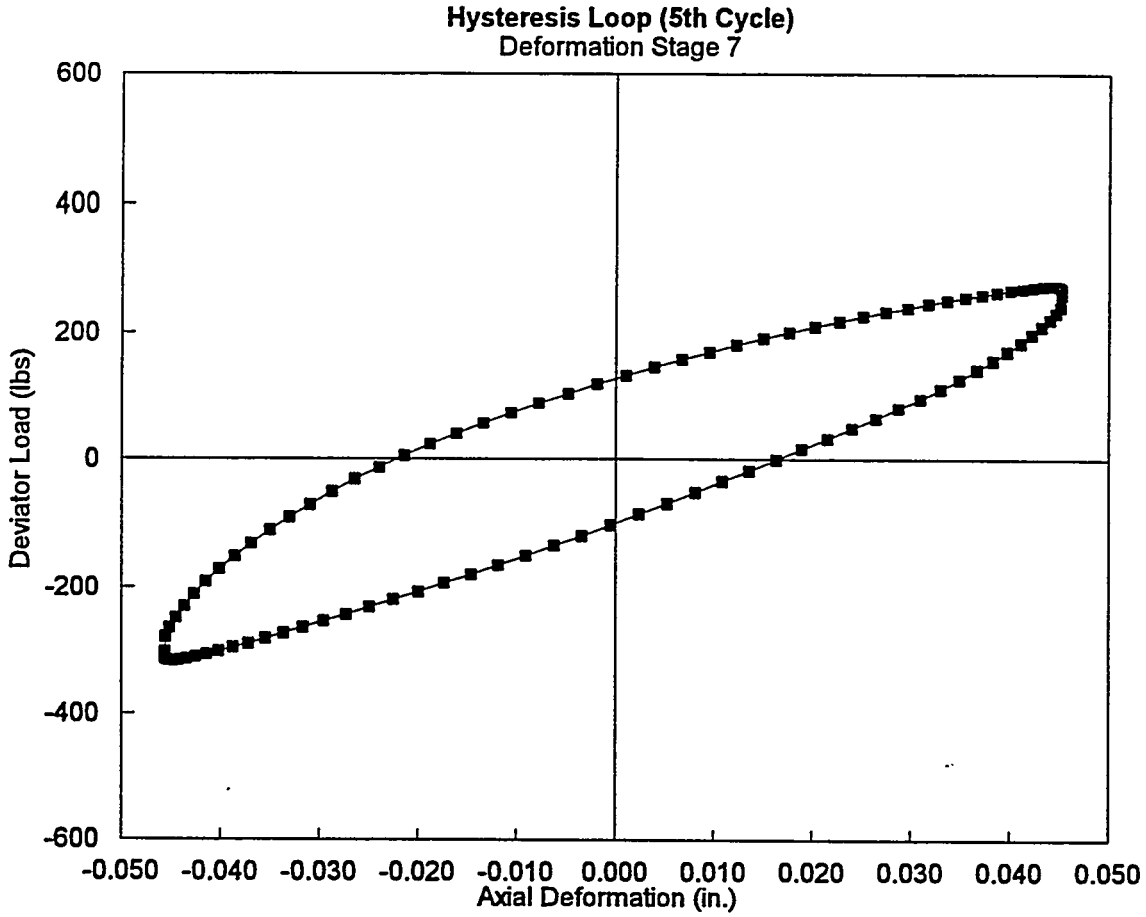
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-29
Test Date:	12/17/93-12/27/93	Sample No.:	PS-12
Reviewed By:	JW/RLB RLB	Depth:	150 ft
Review Date:	12/28/93	Sample Description:	See classification data

Area, A_c, in²	6.21		Effective Consolidation Stress, psi	90.0
Length, H_c, in.	5.85		Cyclic Load, P_c, lbs	295.55
			Cyclic Deviator Stress, psi	47.6

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
591.1	0.0909	6124	0.777

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
16.345	6.715	19.4



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

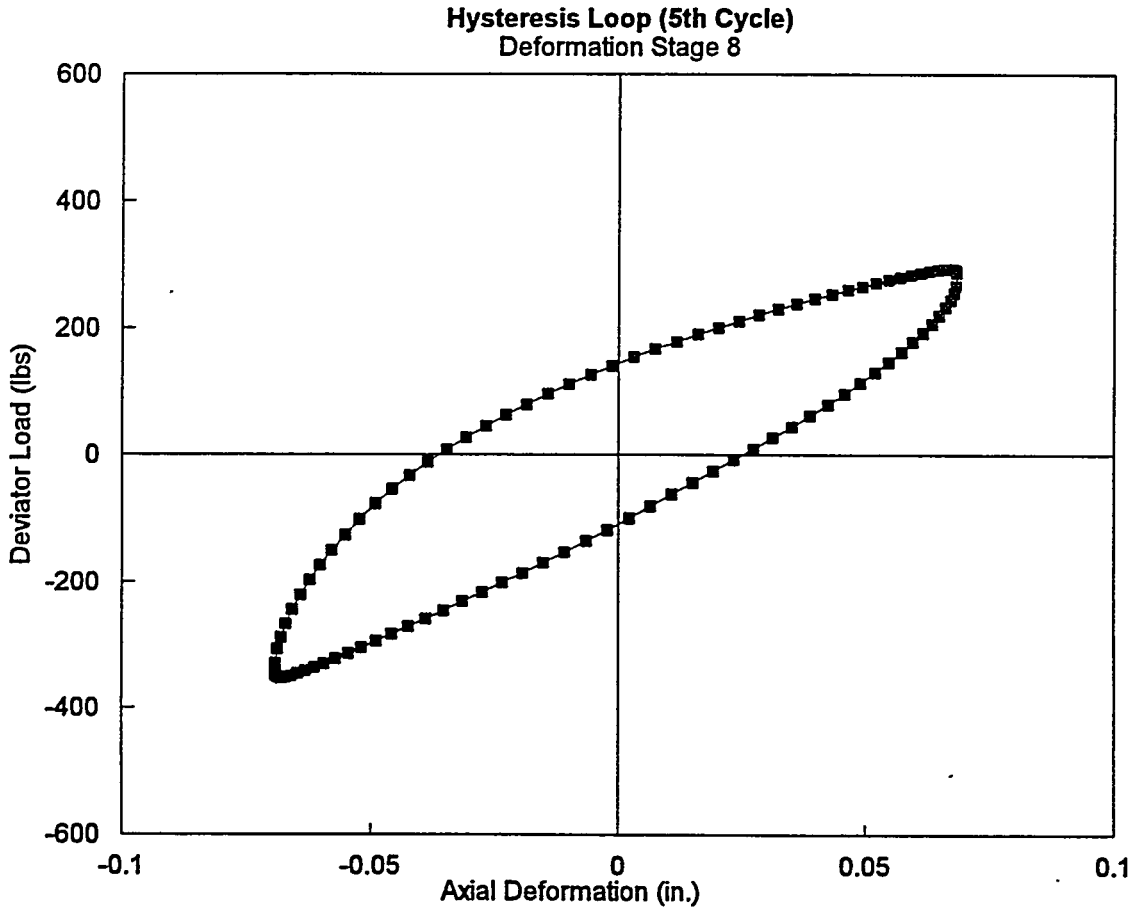
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-29
Test Date:	12/17/93-12/27/93	Sample No.:	PS-12
Reviewed By:	JW/RLB RLB	Depth:	150 ft
Review Date:	12/28/93	Sample Description:	See classification data

Area, A_c, in ^{2}	6.21		Effective Consolidation Stress, psi	90.0
Length, H_c, in.	5.85		Cyclic Load, P_c, lbs	323.56
			Cyclic Deviator Stress, psi	52.1

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
647.1	0.1374	4435	1.175

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
27.801	11.113	19.9



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

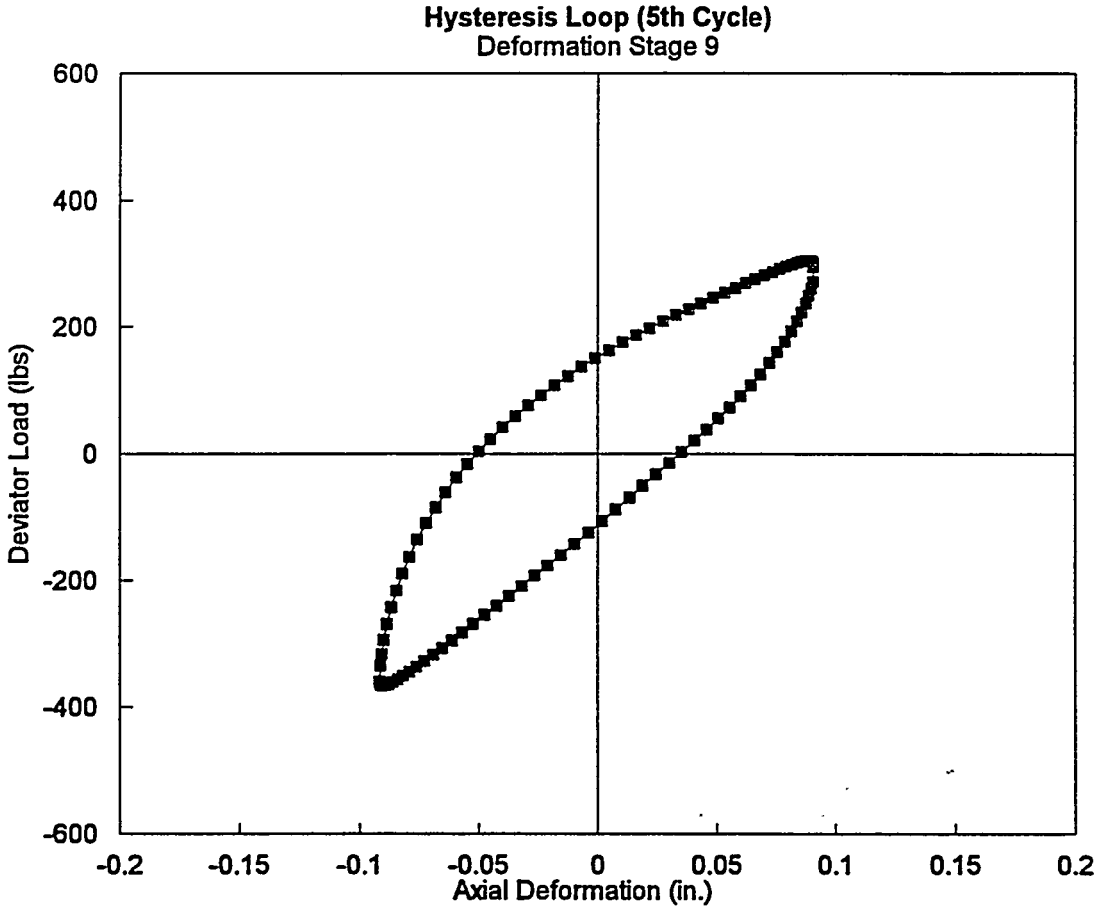
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-29
Test Date:	12/17/93-12/27/93	Sample No.:	PS-12
Reviewed By:	JW/RLB RLB	Depth:	150 ft
Review Date:	12/28/93	Sample Description:	See classification data

Area, A_c, in²	6.21		Effective Consolidation Stress, psi	90.0
Length, H_c, in.	5.85		Cyclic Load, P_c, lbs	335.46
			Cyclic Deviator Stress, psi	54.0

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
670.9	0.1819	3472	1.556

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
39.119	15.257	20.4



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

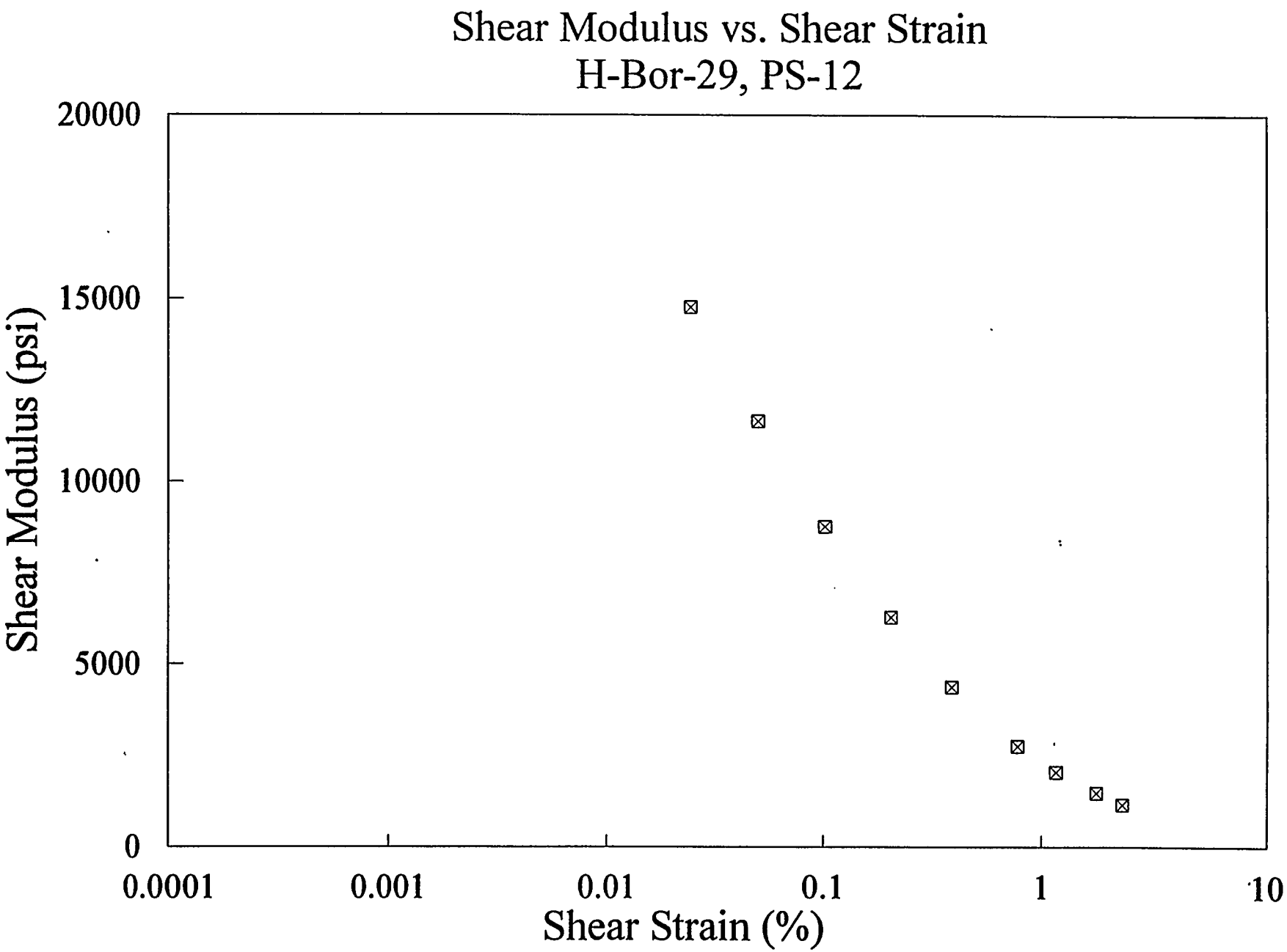
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-29
Test Date:	12/17/93-12/27/93	Sample No.:	PS-12
Reviewed By:	JW/RLB RLB	Depth:	150 ft
Review Date:	12/28/93	Sample Description:	See classification data

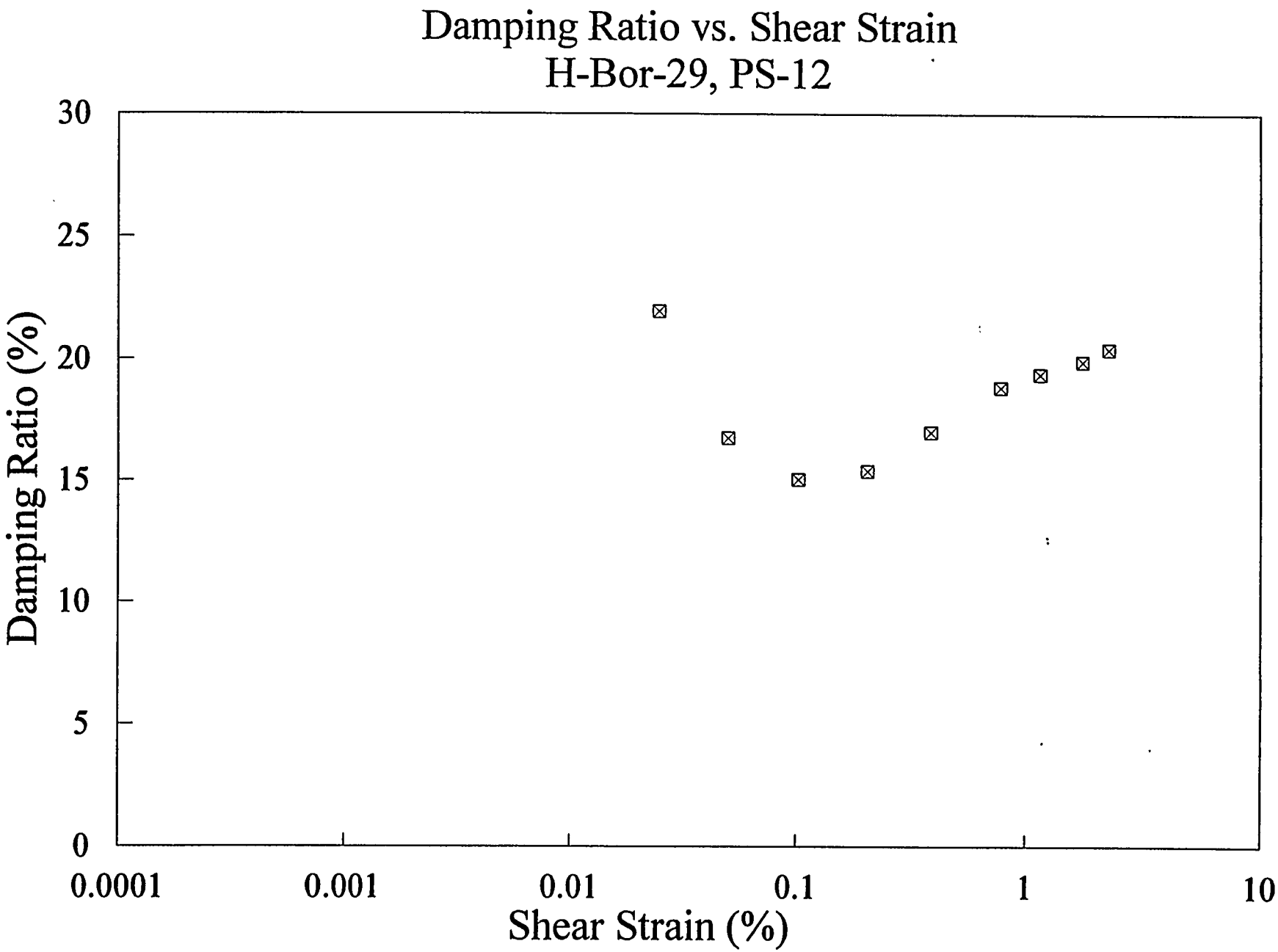
Effective Consolidation Stress 90 psi

Deformation Stage No.	Cyclic Stress (psi)	Axial Strain ε (%)	Young's Modulus E, (psi)	Damping Ratio D, (%)	Shear* Modulus G, (psi)	Shear* Strain γ (%)
1	7.2	0.016	44325	21.94	14775	0.025
2	11.6	0.033	34957	16.74	11652	0.050
3	17.9	0.068	26270	15.03	8757	0.102
4	25.8	0.137	18797	15.39	6266	0.205
5	33.7	0.258	13092	16.99	4364	0.386
6	42.7	0.517	8253	18.84	2751	0.776
7	47.6	0.777	6124	19.37	2041	1.166
8	52.1	1.175	4435	19.91	1478	1.763
9	54.0	1.556	3472	20.40	1157	2.334

* Calculated based on assumed Poisson's Ratio value, 0.5.
All calculations are based on 5th cycle.

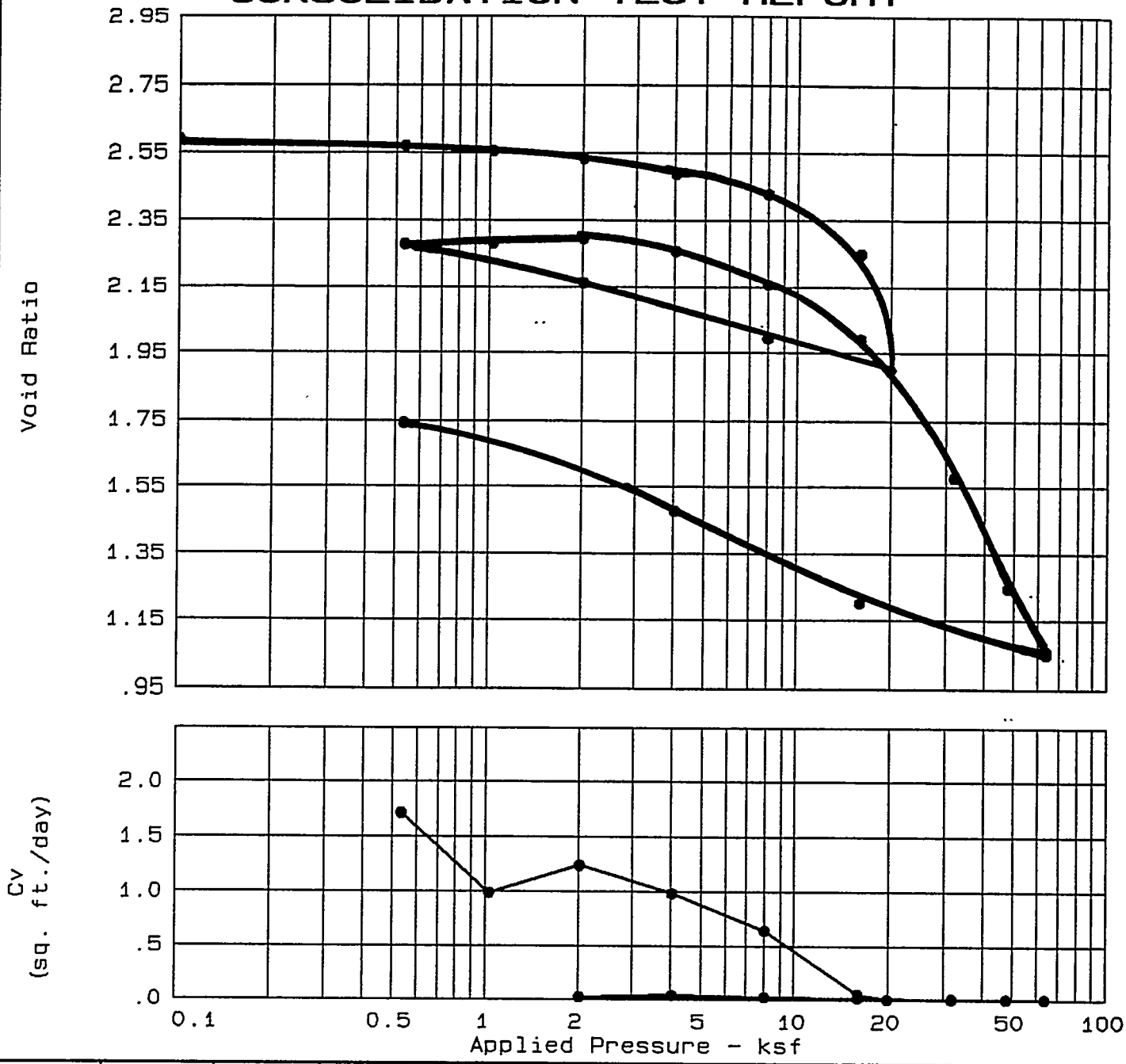


Law Engineering Project No.: 5810535301
SRS-ITP: Strain Controlled Cyclic Triaxial



Law Engineering Project No: 5810535301
SRS-ITP: Strain Controlled Cyclic Triaxial

CONSOLIDATION TEST REPORT



Clpse. %	Nat. Sat.	Nat. Moist.	Dry Density	LL	PI	Sp.Gr.	Initial void ratio
0.3	97.6 %	92.8	47.2	112	91	2.700	2.5683

TEST RESULTS	MATERIAL DESCRIPTION
	Tan Brown Clayey Sand
Project No.: 581.535301 Project: SRS-ITP Location: H-BOR-29 PS-12 @ 150 Ft. Date: 12-22-93	Class: SC Remarks: Tested by: CLG Reviewed by: KLB
CONSOLIDATION TEST REPORT LAW ENGINEERING, INC.	Fig. No._____

20:33, 2-01-1994 CONSOLIDATION TEST PROJECT DATA Test No. 41

Project Number: 581.535301
Project: SRS-ITP
Date: 12-22-93
Location 1: H-BOR-29 PS-12 @ 150 Ft.
2:
Remarks 1: Tested by:
2: Reviewed by:
3:
4:
5:
Material 1: Tan Brown Clayey Sand
description 2:
Classification: SC
Liquid limit:
Plasticity index:
Figure Number:

CONSOLIDATION TEST SPECIMEN DATA

TOTAL SAMPLE	BEFORE TEST	AFTER TEST
Wet w+t = 311.35 g.	Oedometer No. = 13	Wet w+t = 297.86 g.
Dry w+t = 268.97 g	Machine No. = 13	Dry w+t = 268.97 g.
Tare wt. = 223.32 g.	Spec. Gravity = 2.700	Tare wt. = 223.32 g.
Height = 0.7500 in.	Height = 0.7510 in.	
Diameter = 2.5000 in.	Diameter = 2.5000 in.	
Weight = 88.03 g.		
Moisture = 92.8 %	Ht. Solids = 0.2105 in.	Moisture = 63.3 %
Wet Den. = 91.1 pcf	Dry wt. = 45.71 g. *	Dry wt. = 45.65 g.
Dry Den. = 47.2 pcf	Void ratio = 2.5683	Void ratio = 1.7409
	Saturation = 97.6 %	Saturation = 98.2 %

* Initial dry weight used in calculations

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
Initial	0.02000			2.5683	
0.10	0.01560	0.0000	0.01560	2.5892	0.6 Swell
0.54	0.02050	0.0000	0.02050	2.5677*	0.0 Comprs.*
1.03	0.02500	0.0006	0.02440	2.5543*	0.4 Comprs.*
2.03	0.03285	0.0019	0.03095	2.5307*	1.1 Comprs.*
4.05	0.04470	0.0032	0.04150	2.4859*	2.3 Comprs.*
8.05	0.06320	0.0040	0.05920	2.4243*	4.0 Comprs.*
16.04	0.11790	0.0048	0.11310	2.2471*	9.0 Comprs.*
20.00	0.16110	0.0051	0.15600	1.8995*	18.7 Comprs.*
20.00	0.16120	0.0051	0.15610	1.8990	18.8 Comprs.
8.05	0.14020	0.0040	0.13620	1.9936	16.1 Comprs.
2.03	0.10300	0.0019	0.10110	2.1604	11.4 Comprs.
0.54	0.07655	0.0000	0.07655	2.2770	8.2 Comprs.
1.03	0.07655	0.0006	0.07595	2.2799	8.1 Comprs.

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
2.03	0.08030	0.0019	0.07840	2.2934*	7.7 Comprs.*
4.05	0.09350	0.0032	0.09030	2.2561*	8.7 Comprs.*
8.05	0.11580	0.0040	0.11180	2.1551*	11.6 Comprs.*
16.04	0.15310	0.0048	0.14830	1.9909*	16.2 Comprs.*
32.04	0.24820	0.0058	0.24240	1.5760*	27.8 Comprs.*
48.00	0.31180	0.0067	0.30510	1.2462*	37.1 Comprs.*
64.00	0.34670	0.0070	0.33970	1.0558*	42.4 Comprs.*
64.00	0.34870	0.0070	0.34170	1.0463	42.7 Comprs.
16.04	0.31400	0.0048	0.30920	1.2007	38.3 Comprs.
4.05	0.25420	0.0032	0.25100	1.4772	30.6 Comprs.
0.54	0.19550	0.0000	0.19550	1.7409	23.2 Comprs.

* CALCULATED USING D100 INSTEAD OF FINAL READING

CONSOLIDATION TEST RESULTS

Compression index = NOT SELECTED
Preconsolidation pressure = NOT SELECTED

Load 0.54 ksf — CONSOLIDATION TEST READINGS — Load No. 2

Machine Deflection 0.0000

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.02000	11	60.00	0.02040
2	0.10	0.02005	12	120.00	0.02050
3	0.25	0.02005			
4	0.50	0.02010			
5	1.00	0.02010			
6	2.00	0.02010			
7	4.00	0.02020			
8	8.00	0.02020			
9	15.00	0.02030			
10	30.00	0.02035			

Void Ratio: 2.5677 Compression: 0.0 % >>> CALCULATED USING D100
D0 = 0.0200 D90 = 0.0201 D100 = 0.0201 T90 = 0.70 min.
Cv @ 0.7 min.= 1.71 sq. feet/day

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

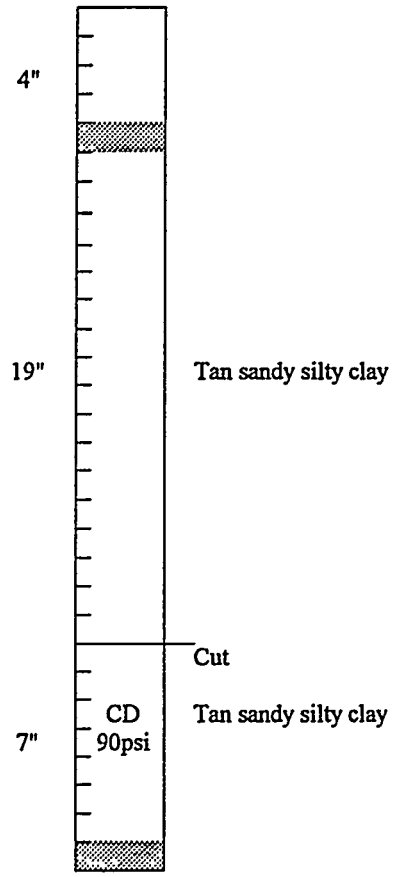
Project: SRS-ITP GEOTECHNICAL TESTING Date: 11-29-93

Boring No: H-Bor-29 Sample No: ST-20 Depth: 153.6' - 155.6'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION

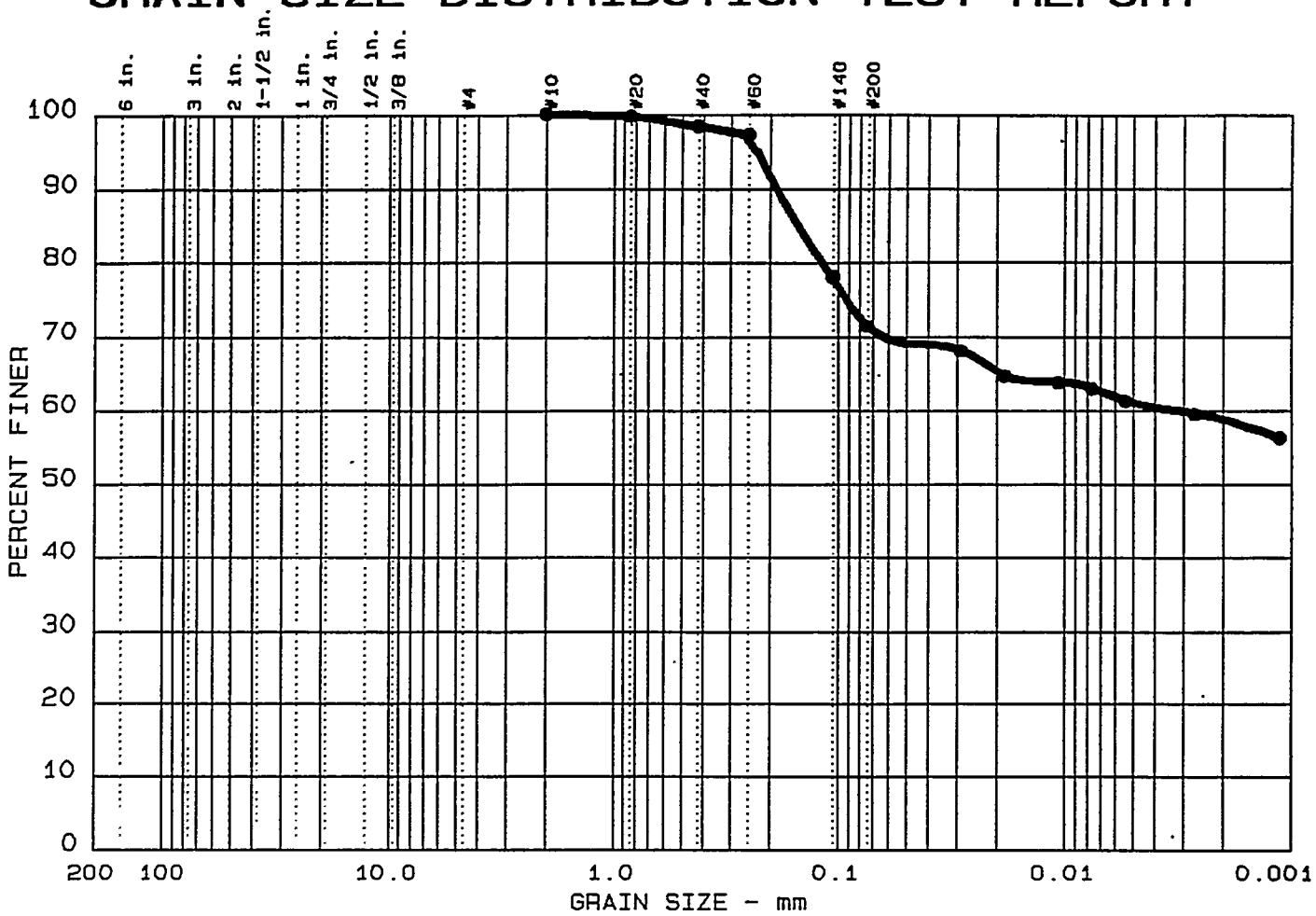


Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b29-st20.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	2	0.0	0.0	28.5	10.5	61.0

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.15							

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Sandy Clay		

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-29 ST-20 @ 153.6-155.6 Ft.

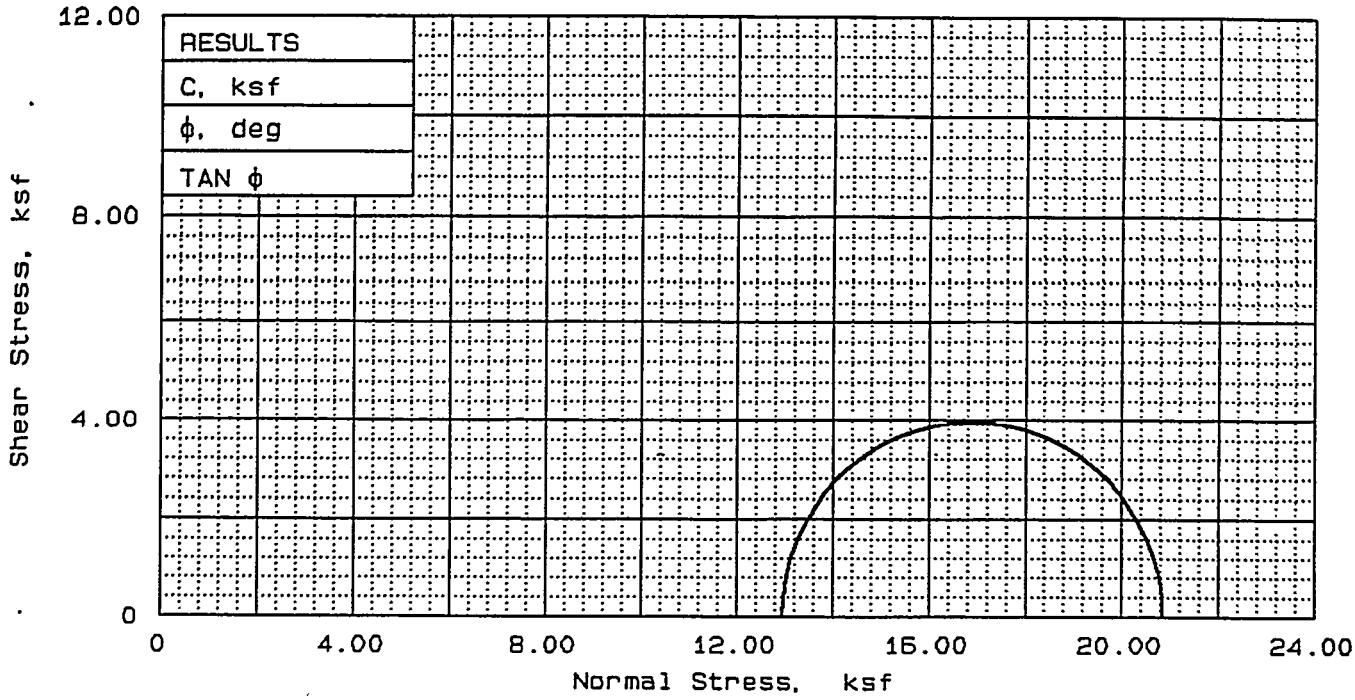
Date: January 3, 1994

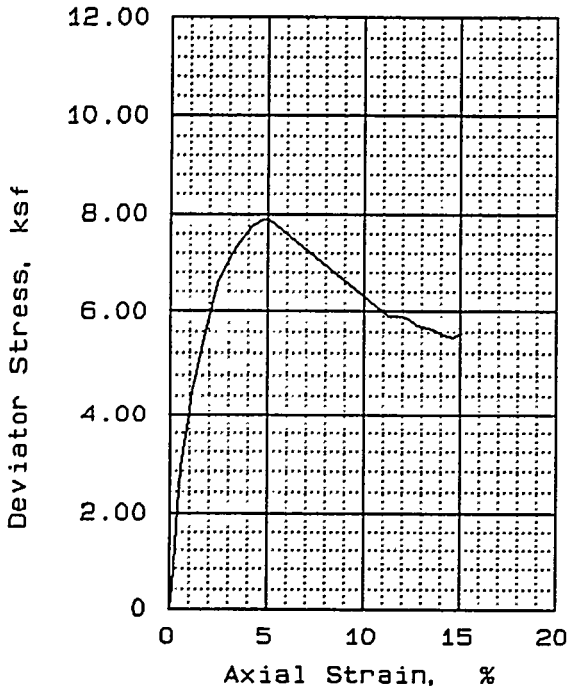
Remarks:
Tested by: CLG Chkd by: KLB
CD-90 psi
Atterberg Limits -200
LL=190 PL=58 PI=132

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.





SAMPLE NO.		1
INITIAL	WATER CONTENT, %	69.1
	DRY DENSITY, pcf	56.8
	SATURATION, %	94.6
	VOID RATIO	1.979
	DIAMETER, in	2.87
	HEIGHT, in	6.00
AT TEST	WATER CONTENT, %	66.9
	DRY DENSITY, pcf	60.1
	SATURATION, %	100.0
	VOID RATIO	1.814
	DIAMETER, in	2.80
	HEIGHT, in	5.97
BACK PRESSURE, ksf		4.32
CELL PRESSURE, ksf		17.28
FAILURE STRESS, ksf		7.89
PORE PRESSURE, ksf		
STRAIN RATE, %/min.		0.01
ULTIMATE STRESS, ksf		
PORE PRESSURE, ksf		
σ_1 FAILURE, ksf		20.85
σ_3 FAILURE, ksf		12.96

TYPE OF TEST:
Consolidated drained
SAMPLE TYPE: Undisturbed
DESCRIPTION: See Grain Size

REMARKS: Tested by: HEJ

Reviewed by RLG

FIG. NO.

CLIENT: SRS

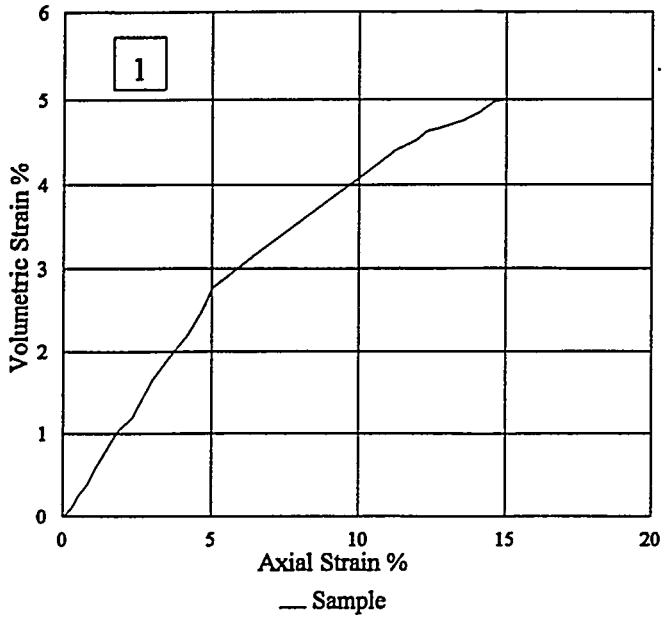
PROJECT: SRS-ITP

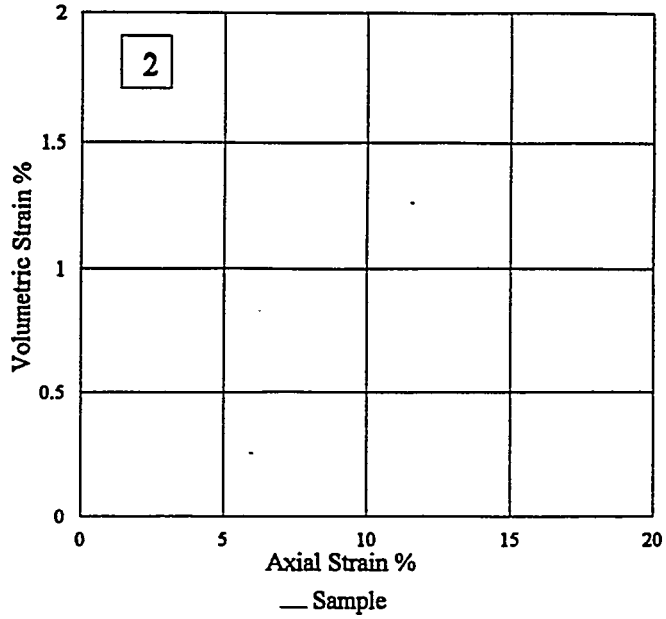
SAMPLE LOCATION: H Bor 29 ST-20 @ 153.6-155.6 Ft.

PROJ. NO.: 5810535301 DATE: 01/03/94

TRIAXIAL COMPRESSION TEST

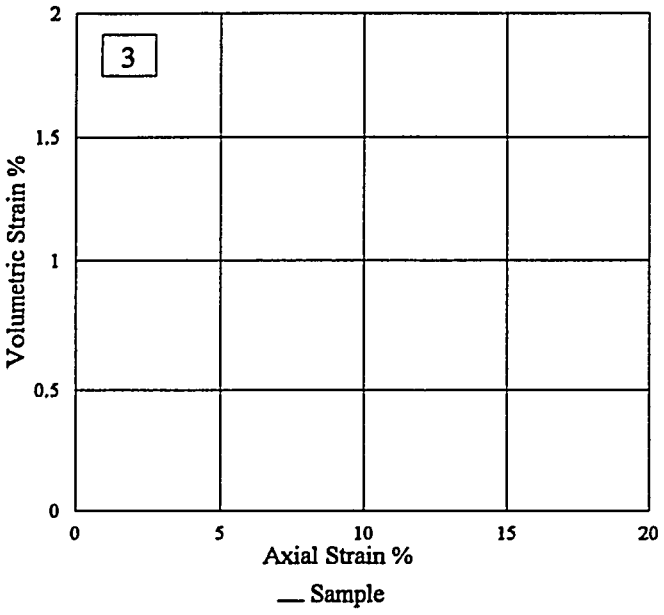
LAW ENGINEERING, INC.

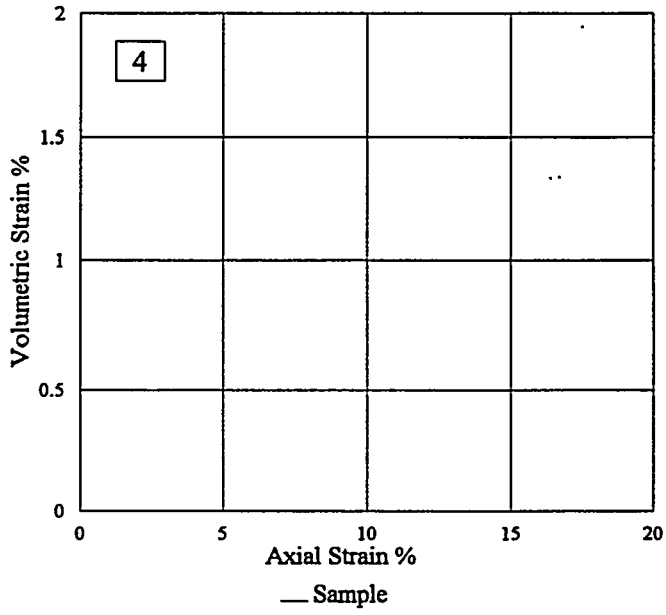




5 - 10% axial strain linearly interpreted

36 hr. shear time (middle 12 hrs. unattended)





Client: Westinghouse Savannah River Co.
Project: ITP Geotechnical Testing
Location: H-Bor-29, ST-20 @ 153.6 - 155.6 ft.
File: Project No.: 5810535301 Page 2 / 2 Fig. No. _____

TRIAXIAL COMPRESSION TEST
Consolidated drained

2-01-1994
1:35 pm

Project Data

Project No.: 5810535301 Date: 01/03/94 Data file: 535301I
Client: SRS
Project: SRS-ITP
Sample location: H Bor 29 ST-20 @ 153.6- 155.6 Ft.
Sample description: See Grain Size
Remarks: Tested by:
Reviewed by Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.71 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.87	2.80	
Height change, in		0.03	
Height, in	6.00	5.97	
Weight, grams	979.8		
Water volume change, cc		12.33	
Moisture, %	69.1	66.9	65.7
Dry density, pcf	56.8	60.1	
Saturation, %	94.6	100.0	
Void ratio	1.979	1.814	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units

Consolidation cell pressure = 120 psi
Consolidation back pressure = 30 psi
Consolidation effective confining stress = 12.96 ksf
Peak deviator stress = 7.89 ksf at reading no. 12
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	12.96	12.96	1.00	12.96	0.00
1	0.0080	0.008	18.00	18.0	0.1	0.42	12.96	13.38	1.03	13.17	0.21
2	0.0180	0.018	74.00	74.0	0.3	1.73	12.96	14.69	1.13	13.82	0.86
3	0.0300	0.030	123.00	123.0	0.5	2.86	12.96	15.82	1.22	14.39	1.43
	.0480	0.048	160.00	160.0	0.8	3.72	12.96	16.68	1.29	14.82	1.86
	.0670	0.067	195.00	195.0	1.1	4.51	12.96	17.47	1.35	15.22	2.26

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	,.1100	0.110	247.00	247.0	1.8	5.68	12.96	18.64	1.44	15.80	2.84
7	0.1400	0.140	287.00	287.0	2.3	6.56	12.96	19.52	1.51	16.24	3.28
8	0.1800	0.180	314.00	314.0	3.0	7.13	12.96	20.09	1.55	16.52	3.56
9	0.2100	0.210	328.00	328.0	3.5	7.41	12.96	20.37	1.57	16.66	3.70
10	0.2500	0.250	346.00	346.0	4.2	7.76	12.96	20.72	1.60	16.84	3.88
11	0.2800	0.280	353.00	353.0	4.7	7.88	12.96	20.84	1.61	16.90	3.94
12	0.3000	0.300	355.00	355.0	5.0	7.89	12.96	20.85	1.61	16.91	3.95
13	0.6700	0.670	285.00	285.0	11.2	5.92	12.96	18.88	1.46	15.92	2.96
14	0.7100	0.710	286.00	286.0	11.9	5.90	12.96	18.86	1.46	15.91	2.95
15	0.7350	0.735	285.00	285.0	12.3	5.85	12.96	18.81	1.45	15.89	2.93
16	0.7600	0.760	280.00	280.0	12.7	5.72	12.96	18.68	1.44	15.82	2.86
17	0.8100	0.810	279.00	279.0	13.6	5.65	12.96	18.61	1.44	15.78	2.82
18	0.8400	0.840	276.00	276.0	14.1	5.55	12.96	18.51	1.43	15.74	2.78
19	0.8700	0.870	275.00	275.0	14.6	5.50	12.96	18.46	1.42	15.71	2.75
20	0.9000	0.900	280.00	280.0	15.1	5.57	12.96	18.53	1.43	15.74	2.78

Client Westinghouse Savannah River Co.
Project: ITP Geotechnical Testing
Location: H-Bor-29, ST-20 @ 153.6 - 155.6 ft.
File: Project No.: 5810535301

No. of Circles
1

Circle No.1					
Consolidation Pressure, ksf	After Consolidation			Burette Cal. Factor	No. of Points
	Diameter, in.	Height, in.	Volume, cc		
12.96	2.87	5.97	633.77	1	21

		Sample		Cell	
LVDT Reading (in)	Axial Strain (in/in)	Burette Reading (div.)	Volumetric Strain (cc/cc)	Burette Reading (div.)	Volumetric Strain (cc/cc)
0.00	0.00	40.0	0.00	20.0	0.00
0.01	0.13	39.8	0.03	19.9	-0.01
0.02	0.30	39.3	0.11	20.2	0.04
0.03	0.50	38.4	0.25	20.7	0.13
0.05	0.80	37.5	0.39	21.5	0.26
0.07	1.12	36.2	0.60	22.4	0.41
0.11	1.84	33.5	1.03	24.5	0.77
0.14	2.35	32.4	1.20	25.5	0.94
0.18	3.02	29.5	1.66	27.6	1.29
0.21	3.52	27.9	1.91	29.2	1.56
0.25	4.19	26.0	2.21	30.9	1.85
0.28	4.69	24.1	2.51	32.5	2.11
0.30	5.03	22.4	2.78	34.1	2.38
0.67	11.22	12.1	4.40	42.7	3.92
0.71	11.89	11.4	4.51	43.3	4.04
0.74	12.31	10.7	4.62	43.9	4.14
0.76	12.73	10.5	4.65	44.2	4.20
0.81	13.57	9.9	4.75	44.6	4.29
0.84	14.07	9.3	4.84	44.9	4.36
0.87	14.57	8.5	4.97	45.2	4.42
0.90	15.08	8.2	5.02	45.4	4.46

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

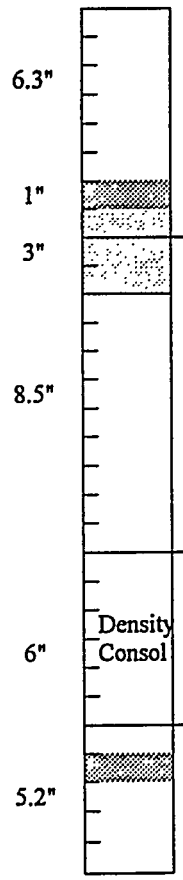
Project: SRS-ITP GEOTECHNICAL TESTING Date: 10-14-93

Boring No: H-Bor-29 Sample No: ST-22 Depth: 177'11"

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: CLG Checked By: RLB

VISUAL DESCRIPTION



Wax

Cut
Disturbed cuttings

Gray black silty sand

Tan silty sand

Cut
Tan silty sand

Tan clayey sand (Consol test performed on the clayey portion of the extruded specimen)

Cut
Wax

Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b29-st22.wk3

ATTACHMENT 3

'ested by:	CLG	Reviewed by:	RLB	Law Job No.	5810535301
Date:	10/14/93	Date:	10/15/93	Job Name	SRS - ITP

TP-4A: UNIT WEIGHT OF SAMPLE

"TYPICAL"

Sample: Boring No.: H-Bor-29
Depth: 177' 11"
Sample ID: ST-22

MEASUREMENTS (Nominal 6-inch cut sample height):

TOTAL SAMPLE HEIGHT (inches)		INSIDE DIAMETER OF CUT TUBE (inches)	
1	6.077		
2	6.061	top	2.895
3	6.022	bottom	2.896
Avg.	6.053 (H)	Avg.	2.896 (D)

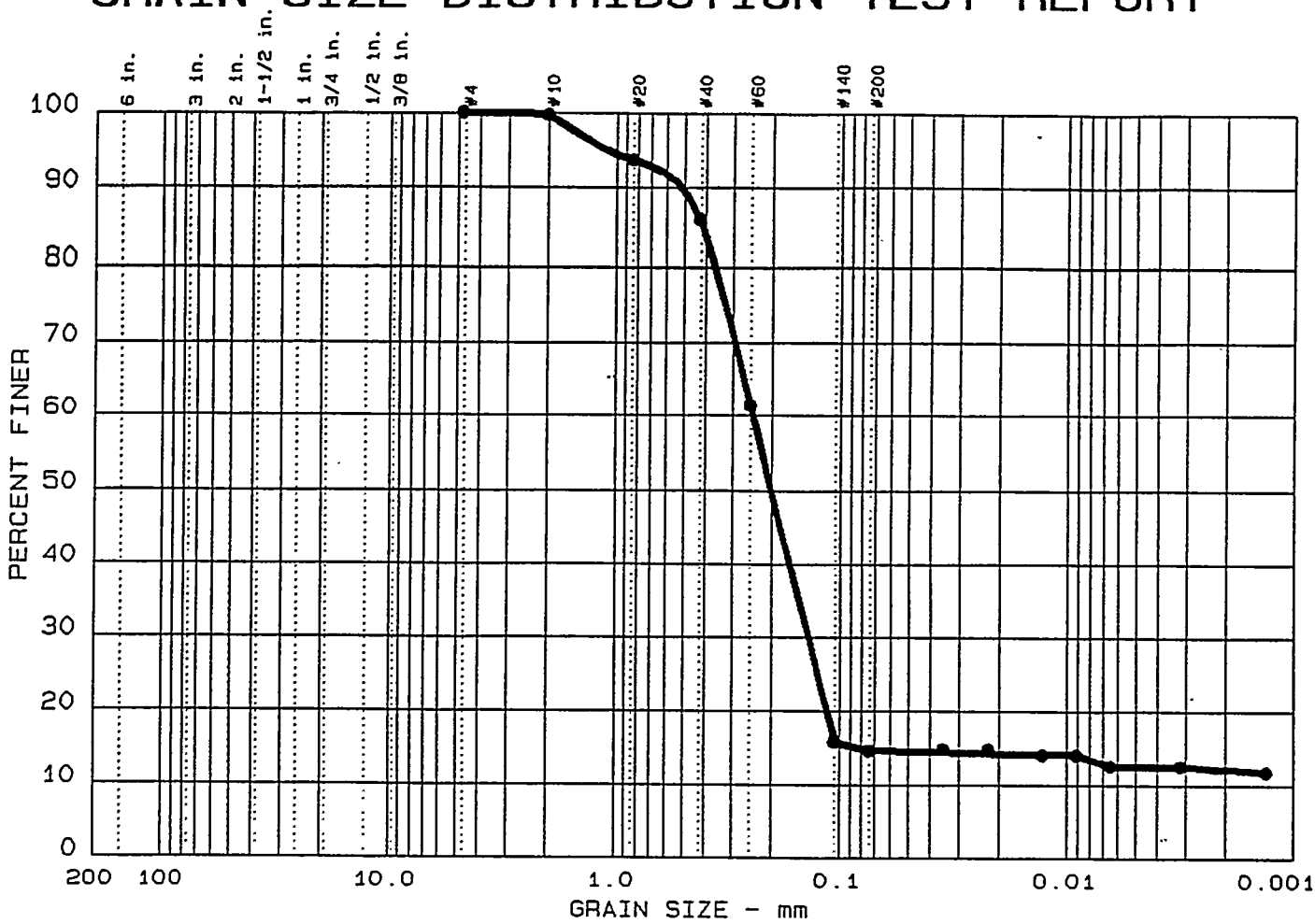
MOISTURE CONTENT DETERMINATION

MOISTURE CONTENT	
Tare No.	C-30
Tare Weight	16.63 gm
Wet Wt. + Tare	346.63 gm
Dry Wt. + Tare	278.29 gm
Wt. of Water	68.34 gm
Dry Weight	261.66 gm
Moisture Content, w	26.1 %

TOTAL WEIGHT OF SOIL + TUBE SECTION	W_{s+t} =	1679.64 gm
WEIGHT OF CLEAN, DRY TUBE SECTION	W_t =	402.15 gm
WET WEIGHT OF SOIL, [(W_{s+t} - W_t)/454]	W_s =	2.814 lbs
VOLUME OF SAMPLE, [(pi*D²/4)*H/1728]	V =	0.023 ft³
WET DENSITY, [W_s/V]	**D_w=**	**122.0 pcf**
DRY DENSITY, [D_w/(1+w/100)]	**D_D=**	**96.7 pcf**

h:\users\lab\rlb\itp\h29-st22.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	8	0.0	0.0	85.4	2.1	12.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	39	18	0.41	0.24	0.20	0.138	0.0819			

MATERIAL DESCRIPTION	USCS	AASHTO
● Dark Brown Clayey Medium to Fine Sand	SC	A-2-6 (0.0)

Project No.: 581535301
Project: SRS ITP
● Location: H-Bor-29 ST-22 @ 177'11"

Date: November 19, 1993

Remarks:

Tested by: JRR

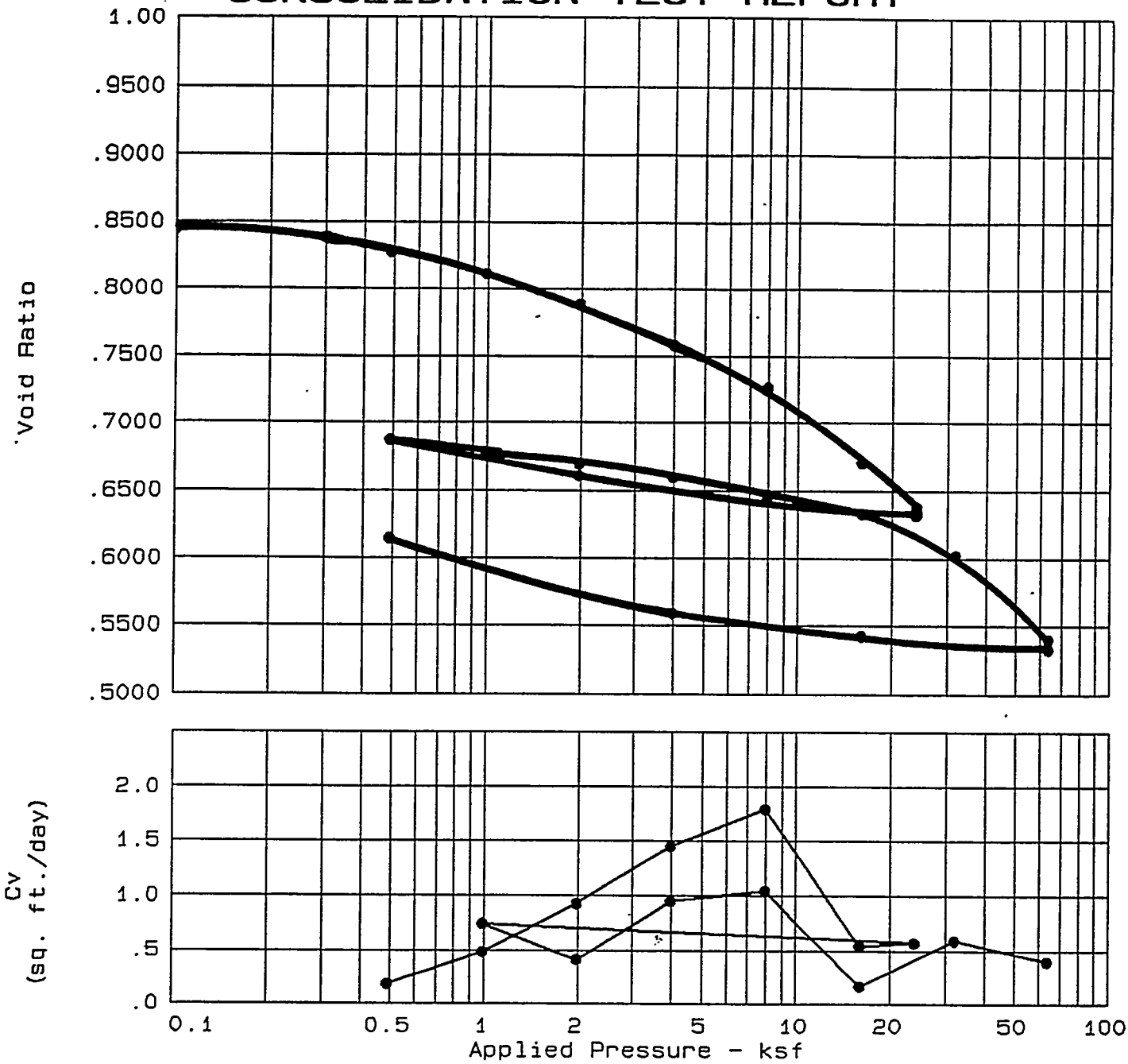
Reviewed by: RLB

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

CONSOLIDATION TEST REPORT



Clpse. %	Nat. Sat.	Nat. Moist.	Dry Density	LL	PI	Sp.Gr.	Initial void ratio
0.3	92.4 %	29.1	91.0	39	18	2.690	0.8458

TEST RESULTS	MATERIAL DESCRIPTION
	Dark Brown Clayey Medium to Fine Sand Class: SC
Project No.: 5810535301 Project: SRS-ITP Location: H-Bor-29 St-22 @ 177'11' Date: Oct.19, 1993	Remarks: Tested by: CLG Reviewed by: RLB
CONSOLIDATION TEST REPORT LAW ENGINEERING, INC.	Fig. No._____

16:21, 2-01-1994 CONSOLIDATION TEST PROJECT DATA Test No. 20

'oject Number:	5810535301
Project:	SRS-ITP
Date:	Oct.19,1993
Location 1:	H-Bor-29 St-22 @ 177'11'
2:	
Remarks 1:	Tested by:
2:	Reviewed by:
3:	
4:	
5:	
Material 1:	Dark Brown Clayey
description 2:	Medium to Fine Sand
Classification:	SC
Liquid limit:	39
Plasticity index:	18
Figure Number:	

CONSOLIDATION TEST SPECIMEN DATA

TOTAL SAMPLE	BEFORE TEST	AFTER TEST
Wet w+t = 339.66 g.	Oedometer No. = 7	Wet w+t = 334.58 g.
Dry w+t = 312.49 g	Machine No. = 7	Dry w+t = 312.49 g.
Tare wt. = 219.02 g.	Spec. Gravity = 2.690	Tare wt. = 219.02 g.
' ght = 0.8900 in.	Height = 0.8900 in.	
. eter = 2.3600 in.	Diameter = 2.3590 in.	
Weight = 120.00 g.		
Moisture = 29.1 %	Ht. Solids = 0.4822 in.	Moisture = 23.6 %
Wet Den. = 117.4 pcf	Dry wt. = 92.90 g. *	Dry wt. = 93.47 g.
Dry Den. = 91.0 pcf	Void ratio = 0.8458	Void ratio = 0.6146
	Saturation = 92.4 %	Saturation = 103.4 %

* Initial dry weight used in calculations

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
Initial	0.02000			0.8458	
0.10	0.02060	0.0000	0.02060	0.8446	0.1 Comprs.
0.49	0.03050	0.0002	0.03030	0.8272*	1.0 Comprs.*
0.99	0.03935	0.0004	0.03895	0.8105*	1.9 Comprs.*
1.99	0.05150	0.0006	0.05090	0.7881*	3.1 Comprs.*
3.99	0.06530	0.0000	0.06530	0.7574*	4.8 Comprs.*
8.00	0.08445	0.0022	0.08225	0.7260*	6.5 Comprs.*
16.02	0.11110	0.0034	0.10770	0.6704*	9.5 Comprs.*
24.00	0.12765	0.0046	0.12305	0.6385*	11.2 Comprs.*
24.00	0.13080	0.0046	0.12620	0.6319	11.6 Comprs.
8.00	0.12270	0.0022	0.12050	0.6438	10.9 Comprs.
1.99	0.11300	0.0006	0.11240	0.6606	10.0 Comprs.
0.49	0.09985	0.0002	0.09965	0.6870	8.6 Comprs.
0.99	0.10190	0.0004	0.10150	0.6779*	9.1 Comprs.*

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
1.99	0.10690	0.0006	0.10630	0.6691*	9.6 Comprs.*
3.99	0.11210	0.0012	0.11090	0.6596*	10.1 Comprs.*
8.00	0.11875	0.0022	0.11655	0.6470*	10.8 Comprs.*
16.02	0.12800	0.0034	0.12460	0.6332*	11.5 Comprs.*
32.08	0.14600	0.0058	0.14020	0.6023*	13.2 Comprs.*
63.78	0.18100	0.0101	0.17090	0.5401*	16.6 Comprs.*
63.78	0.18440	0.0101	0.17430	0.5331	16.9 Comprs.
16.02	0.17325	0.0034	0.16985	0.5423	16.4 Comprs.
3.99	0.16320	0.0012	0.16200	0.5586	15.6 Comprs.
0.49	0.13520	0.0002	0.13500	0.6146	12.5 Comprs.

* CALCULATED USING D100 INSTEAD OF FINAL READING

CONSOLIDATION TEST RESULTS

Compression index = NOT SELECTED
Preconsolidation pressure = NOT SELECTED

ATTACHMENT 1

Sheet No.: 1

UNDISTURBED SAMPLE LOG

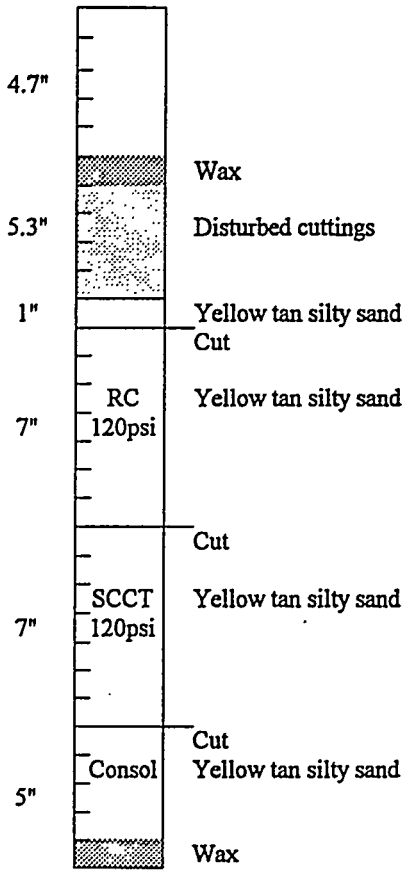
Project: SRS-ITP GEOTECHNICAL TESTING Date: 01-11-94

Boring No: H-Bor-29 Sample No: ST-24 Depth: 197' - 199'

Method of Sample Extrusion: Horizontal cut / Vertical extrude At: Law Engr. - ATL

Total Length of Tube (inches), L : 30.0 By: HEJ Checked By: RLB

VISUAL DESCRIPTION

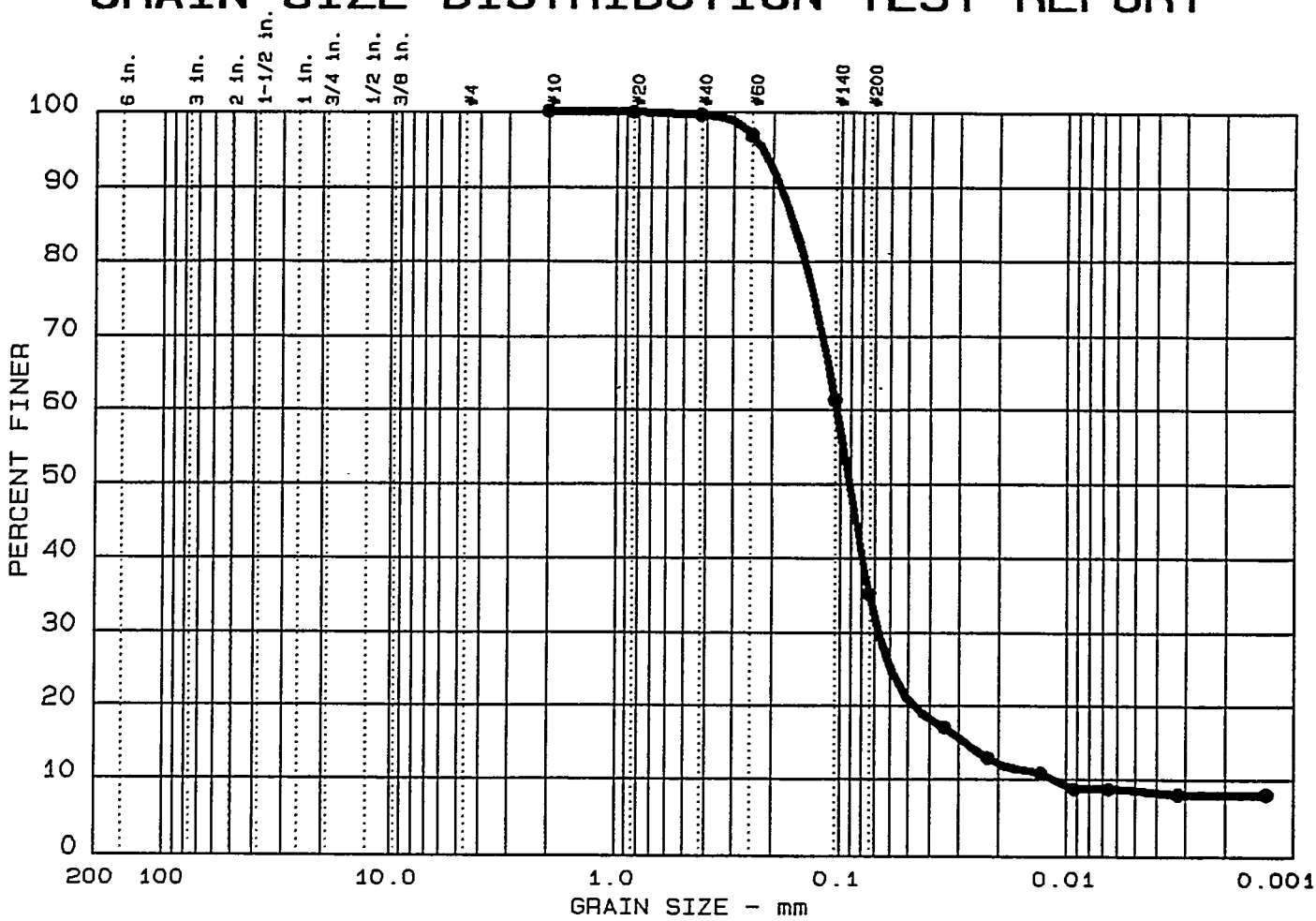


Remarks:

1028mf srs-itp-saif
7/22/93

rlb\itp\tubelog\b29-st24.wk3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	10	0.0	0.0	64.9	26.7	8.4

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	NL	NP	0.16	0.10	0.09	0.067	0.0277	0.0113	3.89	9.1

MATERIAL DESCRIPTION	USCS	AASHTO
● Yellow Tan Silty Sand	SM	A-2-4 (0.0)

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-29 ST-24 @ 197 FT.

Date: January 19, 1994

Remarks:

Tested by: CLG

Reviewed by: RLB

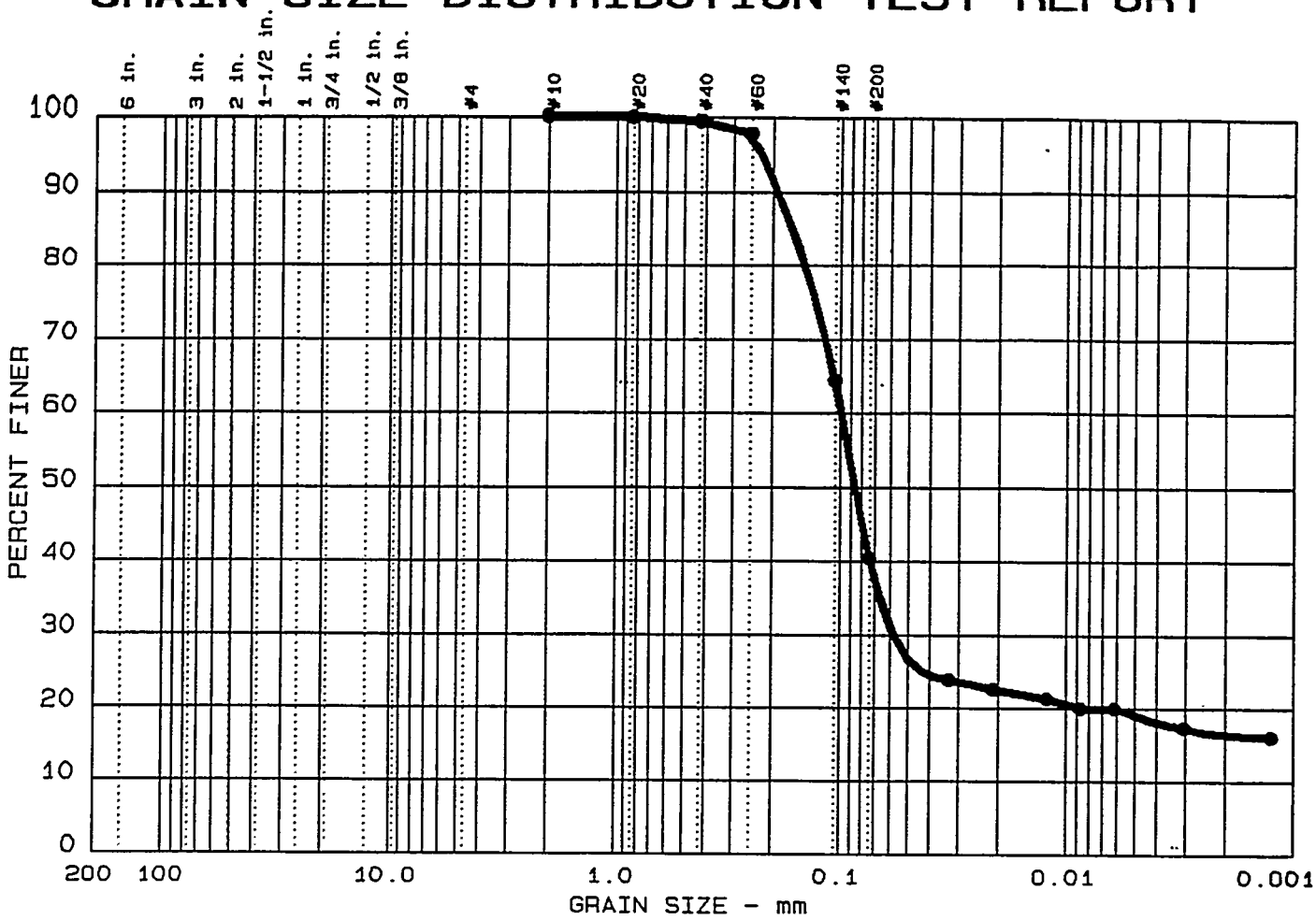
SCC-120 psi (Consol.)

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	5	0.0	0.0	59.6	21.3	19.1

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.16	0.10	0.09	0.057				

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Silty Sand		

Project No.: 5810535301
Project: SRS ITP
● Location: H-Bor-29 ST-24 @ 197 FT.

Date: January 19, 1994

GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Remarks:
Tested by: CLG Chkd by: RLB
RC-120 psi
Atterberg Limits -200
LL=89 PL=25 PI=64

Figure No.

CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-29
Test Date:	1/11/94-1/19/94	Sample No.:	ST-24
Reviewed By:	JW/RLB RLB	Depth:	197 ft.
Review Date:	1/20/94	Sample Description:	See classification data

SPECIMEN DATA

Initial Conditions of Specimen

Diameters, in.		Area , sq. in.	6.46
Top	2.880	Volume, cubic in.	38.31
Middle	2.890	Mass of Specimen, grams	1042.18
Bottom	2.904		
Average	2.891	Moisture Content	
Membrane Thickness, in.	0.012	Pan No.	L-31
Net Diameter, in.	2.867	Wet Mass + Pan, grams	1131.02
		Dry Mass + Pan, grams	807.92
Length, in.		Container Mass, grams	88.84
Location 1	8.585	Moisture Content, %	44.9
Location 2	8.575		
Location 3	8.573	Density, pcf	103.4
Average	8.578	Dry Density, pcf	71.4
Length of Top Platen	1.140	Specific Gravity	2.69
Length of Bottom Platen	1.505	Degree of Saturation, %	89.4
Length of Specimen, in	5.933	Void Ratio	1.352

Conditions of Specimen After Saturation and Consolidation

After Saturation		After Consolidation	
Change in Length, in.	0.002	Change in Length, in.	0.072
Length, in.	5.931	Length, in.	5.859
Area, sq. in.	6.46	Change in Volume, cc	38.05
Volume, cubic in.	38.30	Volume, cubic in.	35.97
Back Pressure, psi	55.0	Area, sq. in.	6.14
B Value	0.69	Effe. Consoli.. Stress, psi	120.0
		Moisture Content, %	45.0
		Dry Density, pcf	76.0
		Void Ratio	1.209
		Degree of Saturation, %	100.0

CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

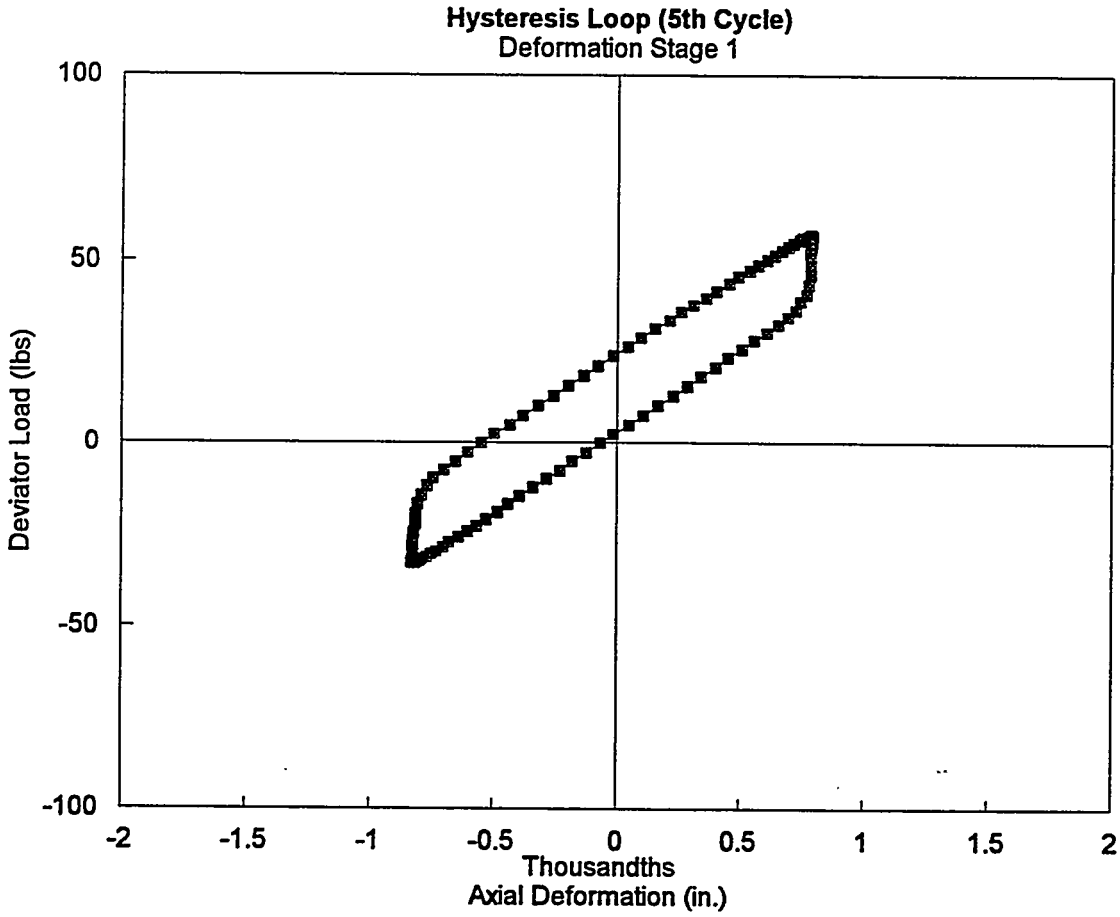
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-29
Test Date:	1/11/94-1/19/94	Sample No.:	ST-24
Reviewed By:	JW/RLB RLB	Depth:	197 ft.
Review Date:	1/20/94	Sample Description:	See classification data

Area, A_c, in ^{2}	6.14		Effective Consolidation Stress, psi	120.0
Length, H_c, in.	5.86		Cyclic Load, P_c, lbs	44.66
			Cyclic Deviator Stress, psi	7.3

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
89.3	0.0016	52501	0.014

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
0.033	0.018	14.5



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

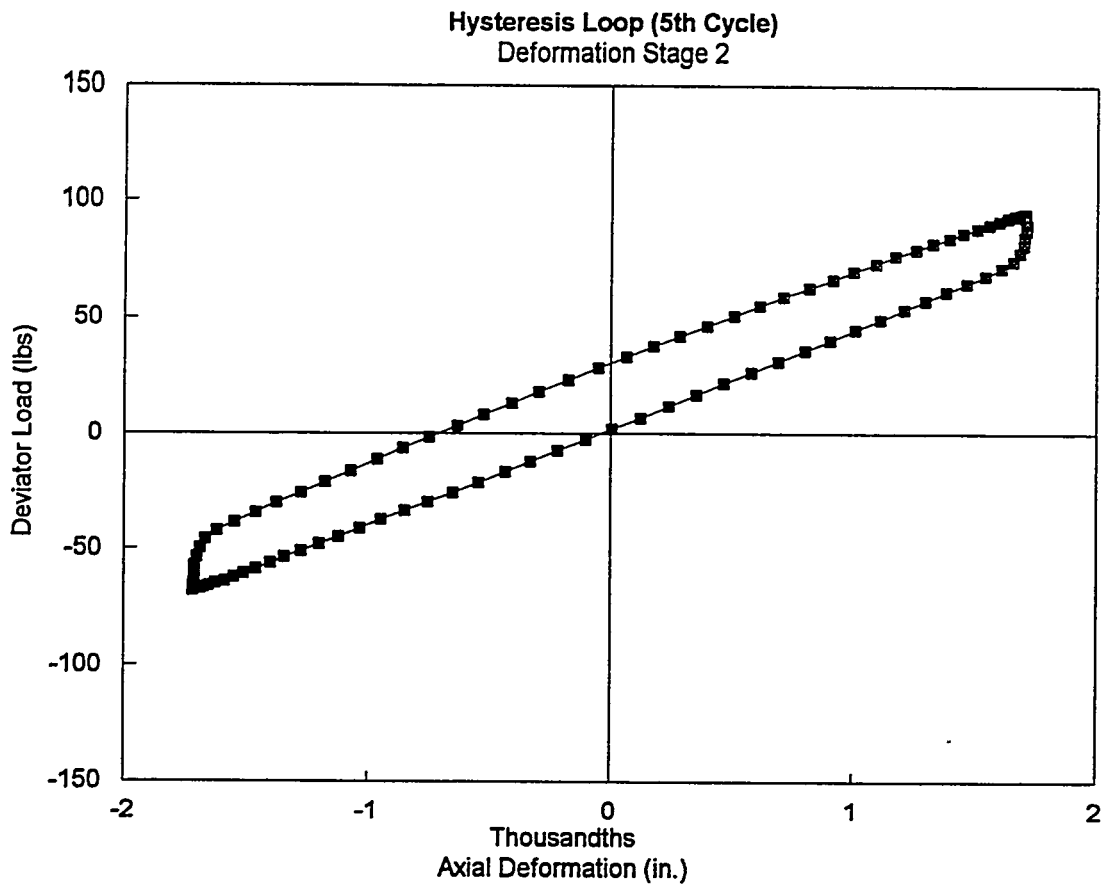
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-29
Test Date:	1/11/94-1/19/94	Sample No.:	ST-24
Reviewed By:	JW/RLB RLB	Depth:	197 ft.
Review Date:	1/20/94	Sample Description:	See classification data

Area, A_c, in ^{2}	6.14		Effective Consolidation Stress, psi	120.0
Length, H_c, in.	5.86		Cyclic Load, P_c, lbs	81.04
			Cyclic Deviator Stress, psi	13.2

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
162.1	0.0034	45080	0.029

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
0.092	0.070	10.6



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

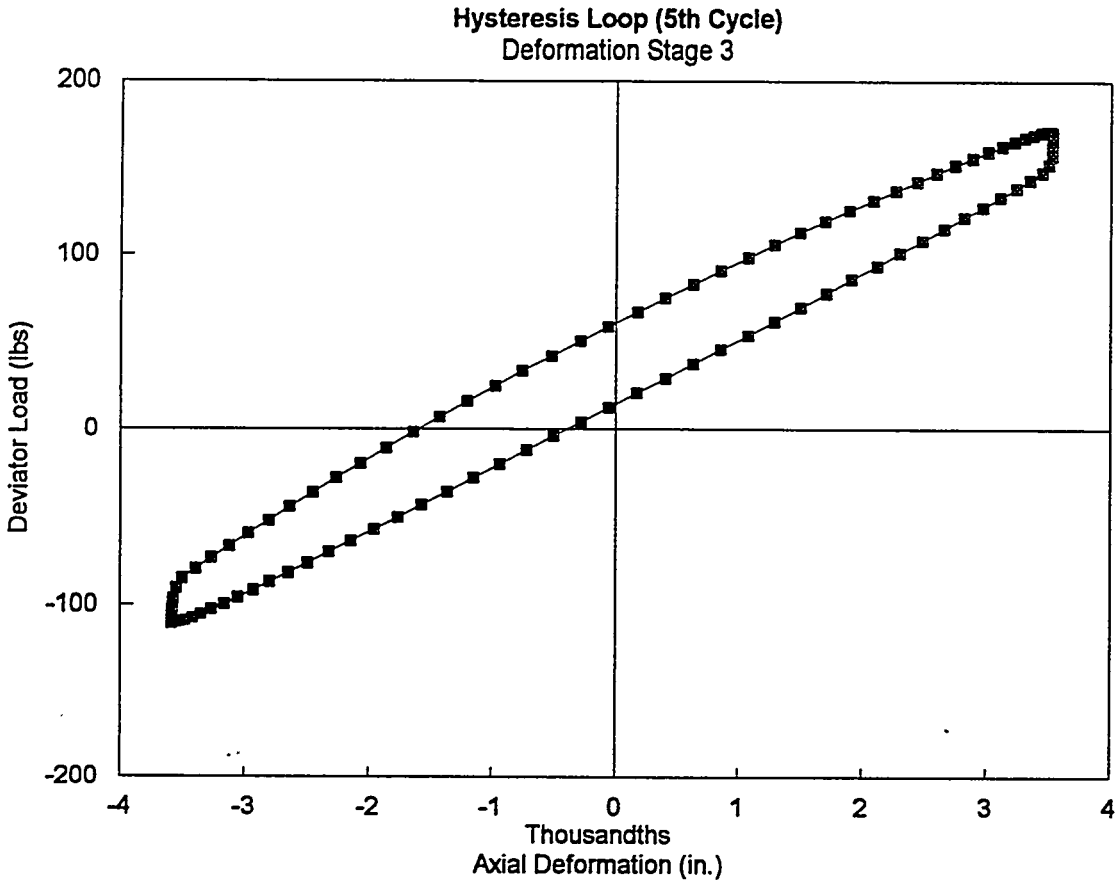
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-29
Test Date:	1/11/94-1/19/94	Sample No.:	ST-24
Reviewed By:	JW/RLB RLB	Depth:	197 ft.
Review Date:	1/20/94	Sample Description:	See classification data

Area, A_c, in ^{2}	6.14		Effective Consolidation Stress, psi	120.0
Length, H_c, in.	5.86		Cyclic Load, P_c, lbs	140.52
			Cyclic Deviator Stress, psi	22.9

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
281.0	0.0071	37687	0.061

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
0.290	0.250	9.2



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

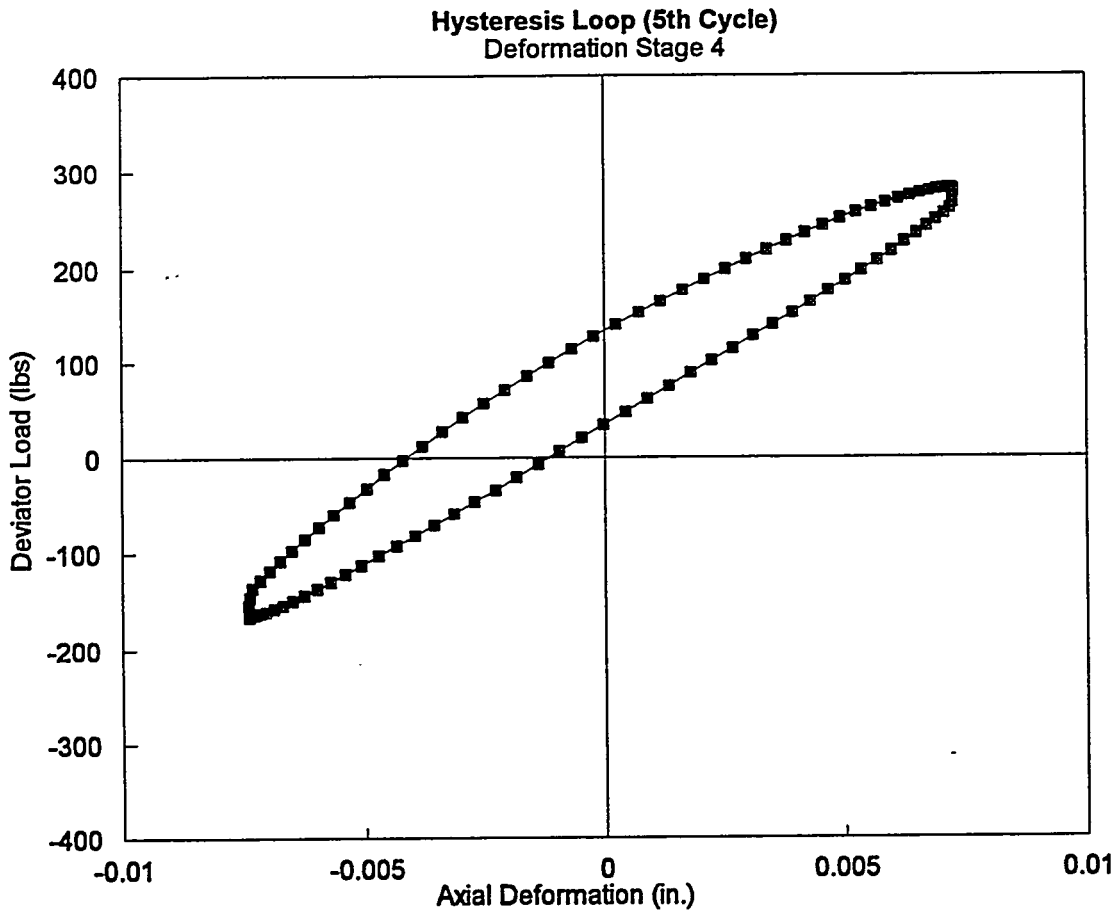
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-29
Test Date:	1/11/94-1/19/94	Sample No.:	ST-24
Reviewed By:	JW/RLB RLB	Depth:	197 ft.
Review Date:	1/20/94	Sample Description:	See classification data

Area, A_c, in ^{2}	6.14		Effective Consolidation Stress, psi	120.0
Length, H_c, in.	5.86		Cyclic Load, P_c, lbs	223.59
			Cyclic Deviator Stress, psi	36.4

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
447.2	0.0147	29090	0.125

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
1.175	0.820	11.4



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

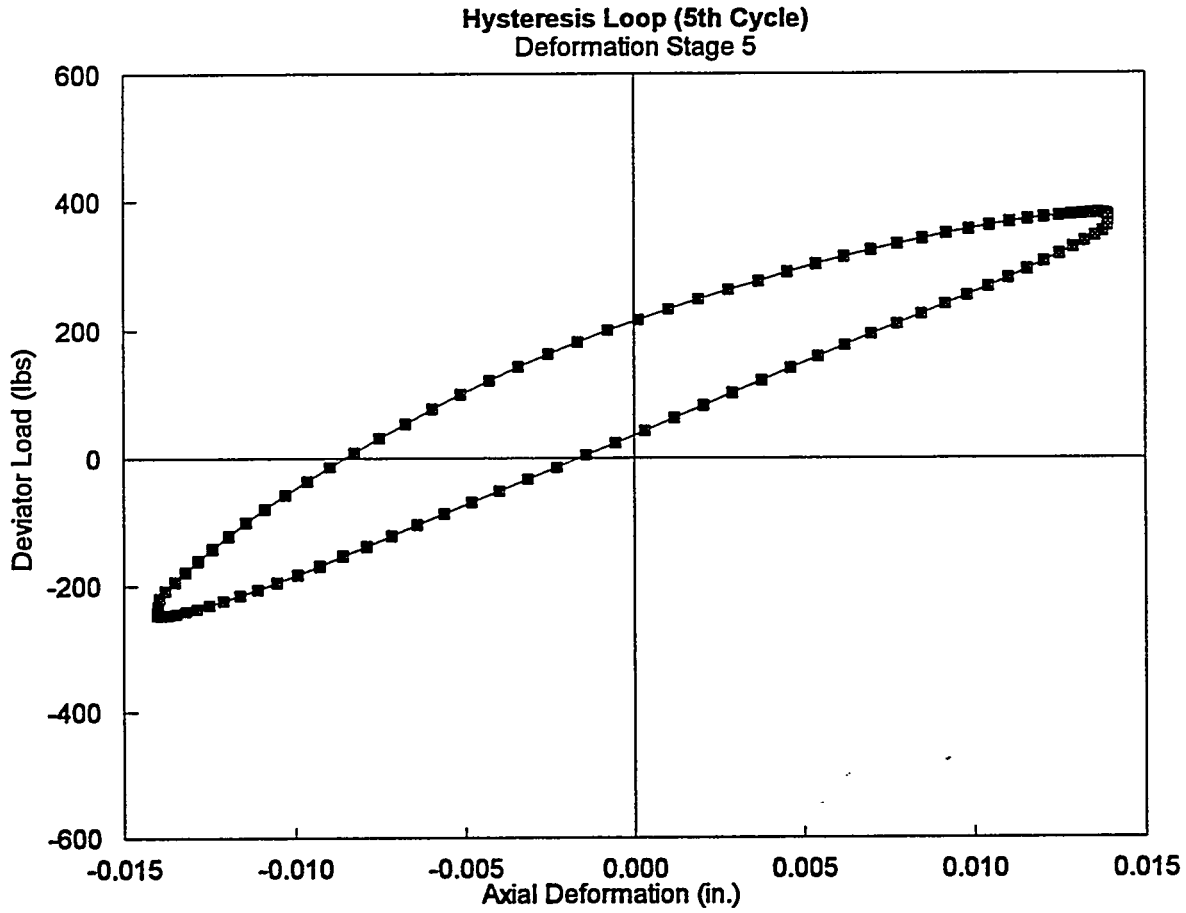
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-29
Test Date:	1/11/94-1/19/94	Sample No.:	ST-24
Reviewed By:	JW/RLB RLB	Depth:	197 ft.
Review Date:	1/20/94	Sample Description:	See classification data

Area, A_c, in²	6.14		Effective Consolidation Stress, psi	120.0
Length, H_c, in.	5.86		Cyclic Load, P_c, lbs	315.12
			Cyclic Deviator Stress, psi	51.3

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
630.2	0.0279	21519	0.239

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
3.827	2.202	13.8



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

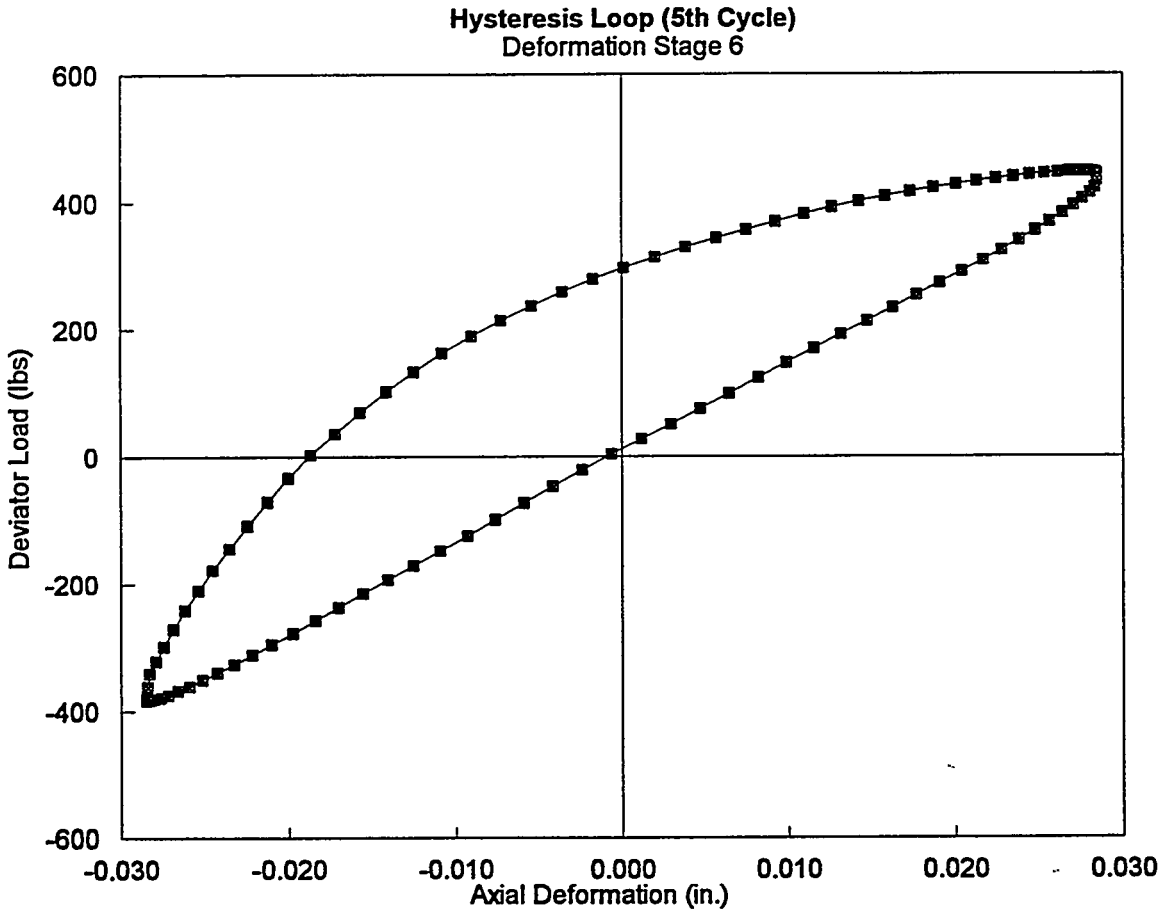
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-29
Test Date:	1/11/94-1/19/94	Sample No.:	ST-24
Reviewed By:	JW/RLB RLB	Depth:	197 ft.
Review Date:	1/20/94	Sample Description:	See classification data

Area, A_c, in ^{2}	6.14		Effective Consolidation Stress, psi	120.0
Length, H_c, in.	5.86		Cyclic Load, P_c, lbs	415.59
			Cyclic Deviator Stress, psi	67.7

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
831.2	0.0569	13928	0.486

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
12,620	5.917	17.0



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

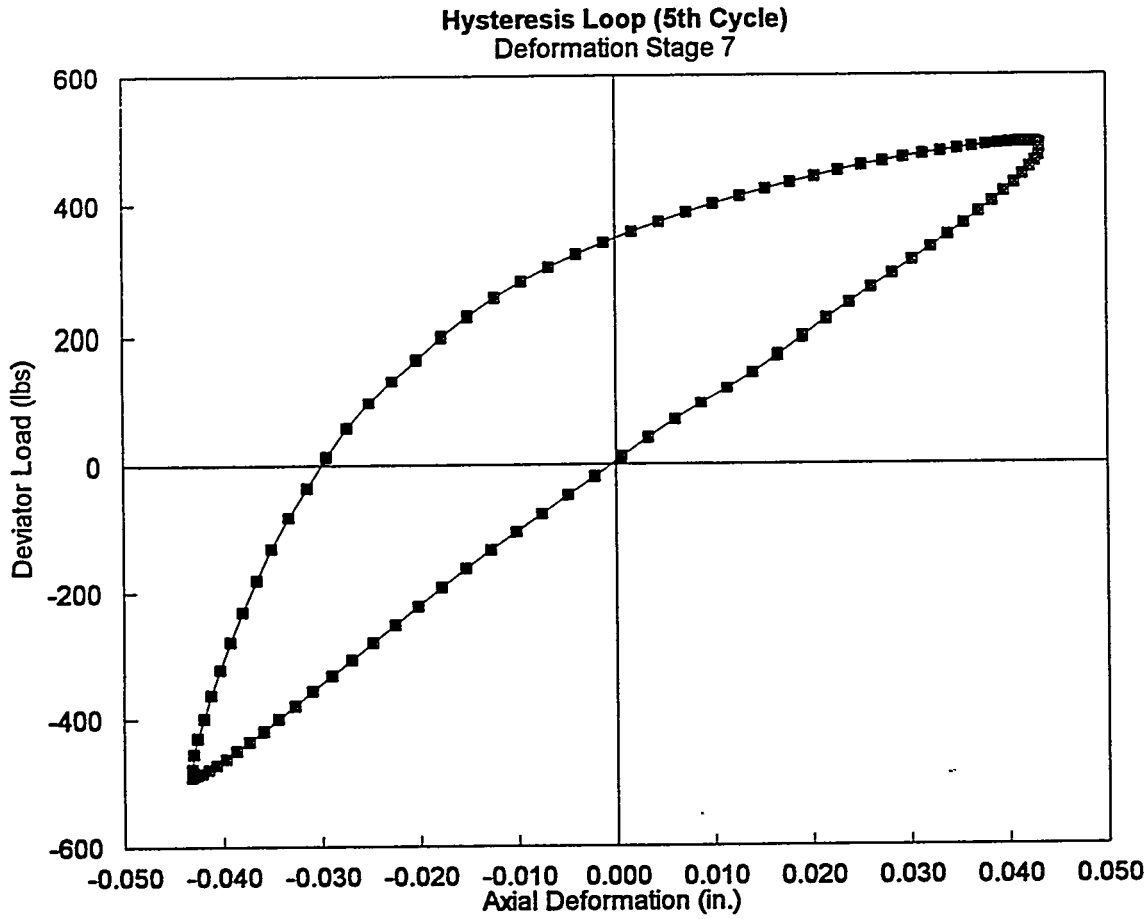
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-29
Test Date:	1/11/94-1/19/94	Sample No.:	ST-24
Reviewed By:	JW/RLB RLB	Depth:	197 ft.
Review Date:	1/20/94	Sample Description:	See classification data

Area, A_c, in²	6.14		Effective Consolidation Stress, psi	120.0
Length, H_c, in.	5.86		Cyclic Load, P_c, lbs	493.24
			Cyclic Deviator Stress, psi	80.3

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
986.5	0.0865	10889	0.738

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
23.932	10.660	17.9



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

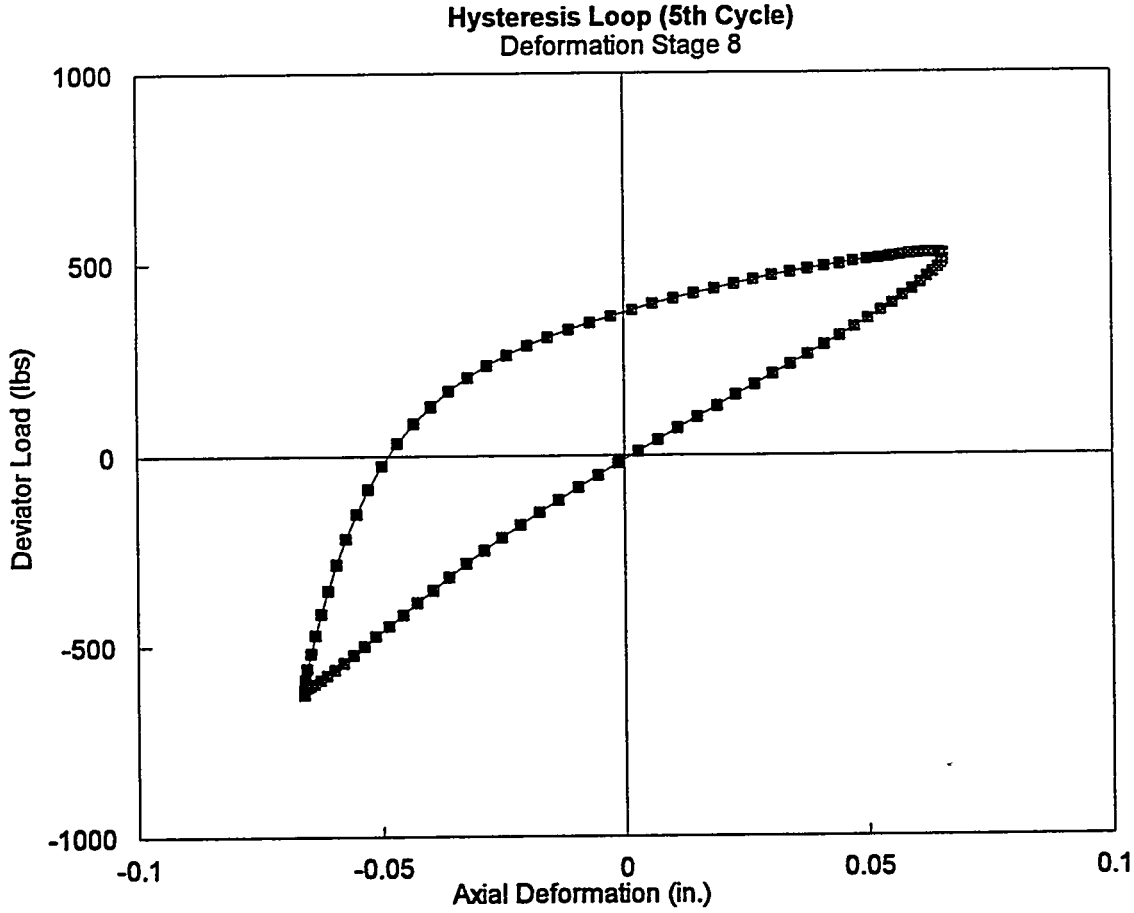
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-29
Test Date:	1/11/94-1/19/94	Sample No.:	ST-24
Reviewed By:	JW/RLB RLB	Depth:	197 ft.
Review Date:	1/20/94	Sample Description:	See classification data

Area, A_c, in²	6.14		Effective Consolidation Stress, psi	120.0
Length, H_c, in.	5.86		Cyclic Load, P_c, lbs	576.33
			Cyclic Deviator Stress, psi	93.9

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
1152.7	0.1317	8351	1.124

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
43.858	18.977	18.4



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

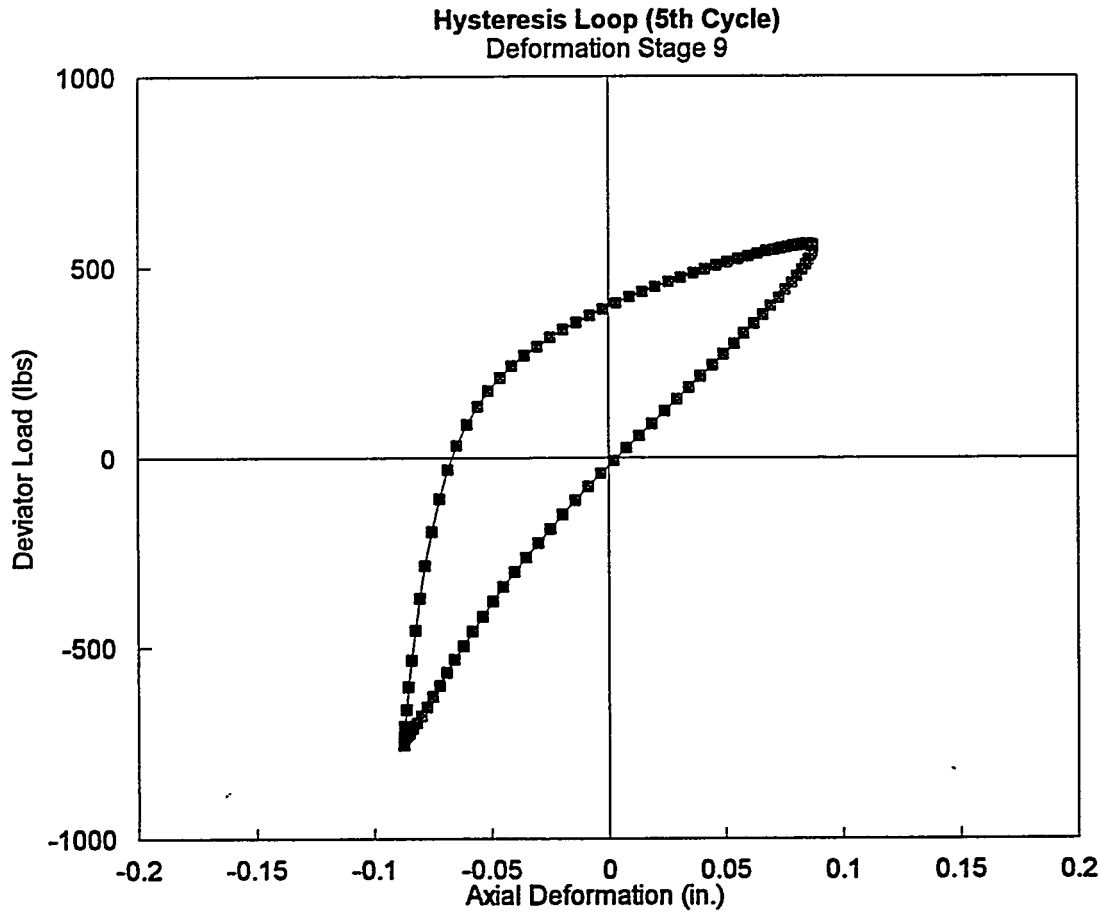
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-29
Test Date:	1/11/94-1/19/94	Sample No.:	ST-24
Reviewed By:	JW/RLB RLB	Depth:	197 ft.
Review Date:	1/20/94	Sample Description:	See classification data

Area, A_c, in²	6.14		Effective Consolidation Stress, psi	120.0
Length, H_c, in.	5.86		Cyclic Load, P_c, lbs	657.69
			Cyclic Deviator Stress, psi	107.1

Double Amplitude Load L_{DA} (lbs)	Double Ampli. Deformation S_{DA} (in.)	Young's Modulus E (psi)	Single Ampli. Axial Strain ε (%)
1315.4	0.1751	7170	1.494

Area of Hysteresis Loop A_L, (lb-in)	Area of Triangle A_T, (lb-in)	Damping Ratio D (%)
65.976	28.783	18.2



CYCLIC TRIAXIAL PROPERTIES TEST

(Deformation Controlled)
(ASTM D 3999-91)

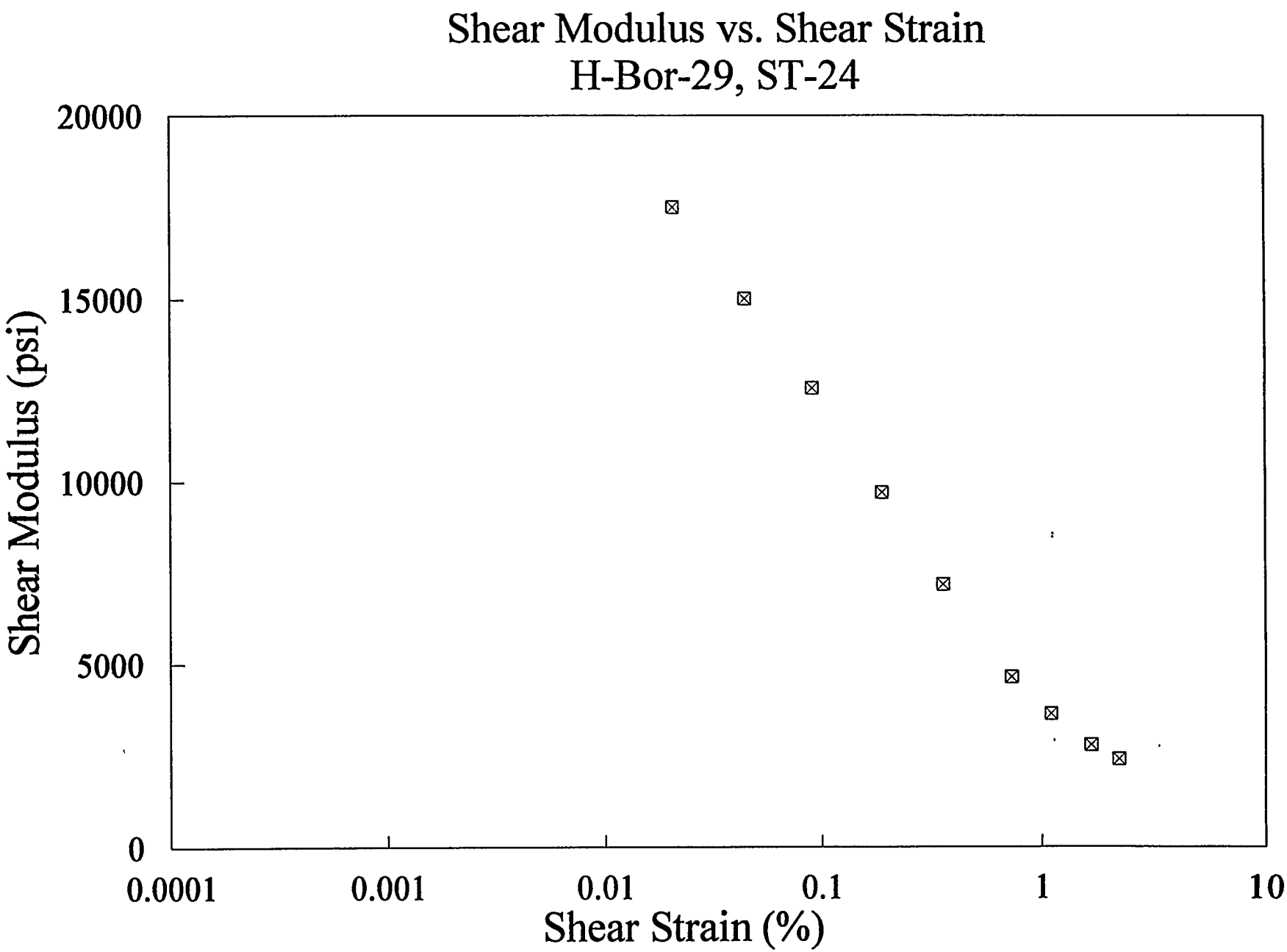
LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-29
Test Date:	1/11/94-1/19/94	Sample No.:	ST-24
Reviewed By:	JW/RLB RLB	Depth:	197 ft.
Review Date:	1/20/94	Sample Description:	See classification data

Effective Consolidation Stress 120 psi

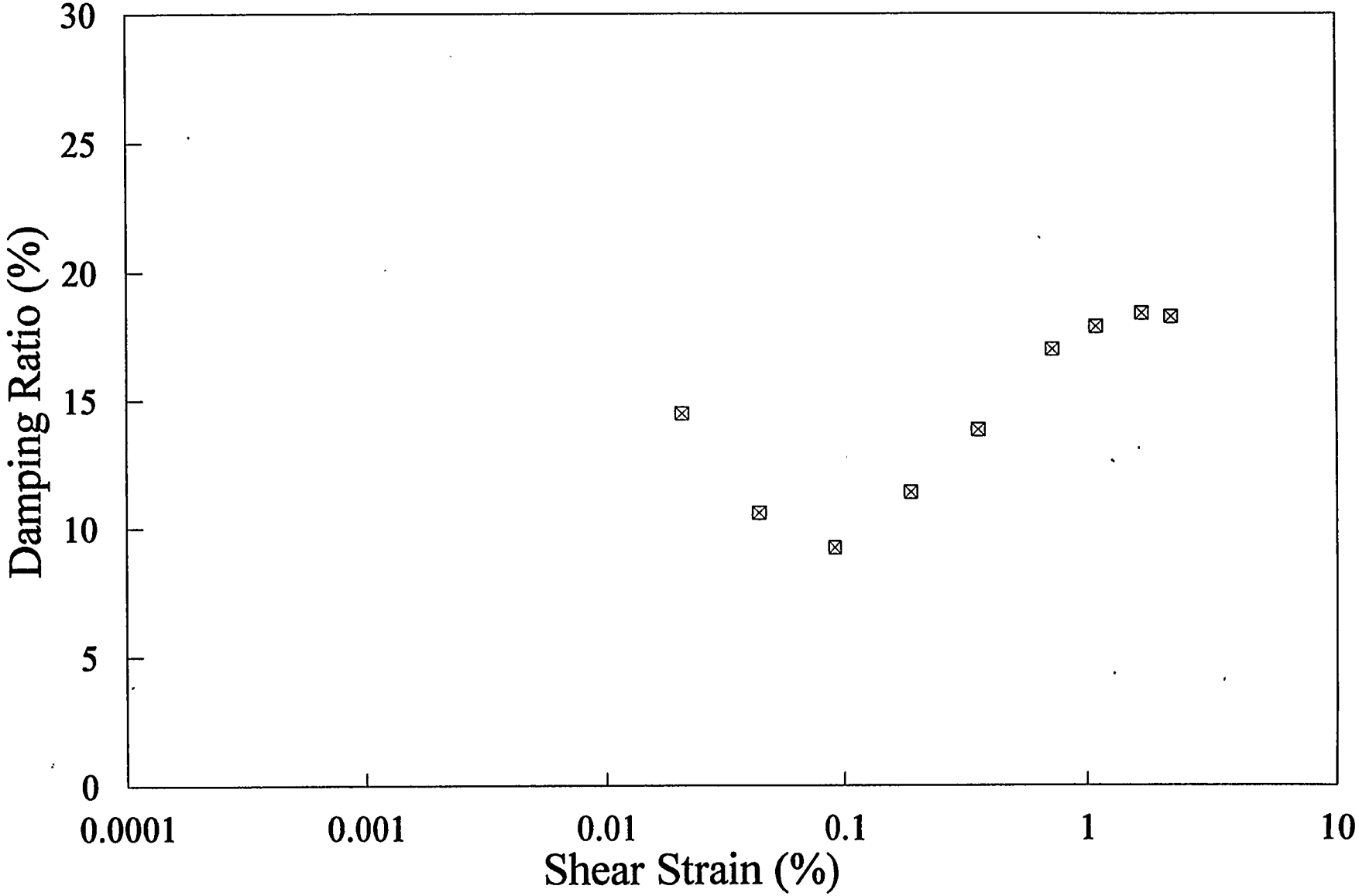
Deformation Stage No.	Cyclic Stress (psi)	Axial Strain ε (%)	Young's Modulus E, (psi)	Damping Ratio D, (%)	Shear* Modulus G, (psi)	Shear* Strain γ (%)
1	7.3	0.014	52501	14.48	17500	0.021
2	13.2	0.029	45080	10.58	15027	0.044
3	22.9	0.061	37687	9.23	12562	0.091
4	36.4	0.125	29090	11.40	9697	0.188
5	51.3	0.239	21519	13.83	7173	0.358
6	67.7	0.486	13928	16.97	4643	0.729
7	80.3	0.738	10889	17.86	3630	1.107
8	93.9	1.124	8351	18.39	2784	1.686
9	107.1	1.494	7170	18.24	2390	2.241

* Calculated based on assumed Poisson's Ratio value, 0.5.
All calculations are based on 5th cycle.



Law Engineering Project No.: 5810535301
SRS-ITP: Strain Controlled Cyclic Triaxial

Damping Ratio vs. Shear Strain
H-Bor-29, ST-24



Law Engineering Project No: 5810535301
SRS-ITP: Strain Controlled Cyclic Triaxial

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

Project No.:	5810535301	Project Name:	SRS-ITP
Tested By:	HEJ/JW	Boring No.:	H-Bor-29
Test Date:	1/7/94-1/11/94	Sample No.:	ST-24
Reviewed By:	JW/RLB RLB	Depth:	197 ft
Reviewed Date:	1/19/93	Sample Description:	See classification data

Initial Specimen Data

Labels	Values	Units	Description
Masses			
M_{scb}	1211.40	g	*Mass of soil and container before*
M_{sca}	0.00	g	*Mass of soil and container after*
M_s	1211.40	g	*M_{scb} - M_{sca} = mass of soil*
Diameters			
D_t	73.84	mm	*Diameter near top of specimen*
D_m	73.91	mm	*Diameter near middle of specimen*
D_b	73.91	mm	*Diameter near bottom of specimen*
T_{mem}	0.30	mm	*Single thickness of membrane*
D_{net}	73.28	mm	*$(D_t + D_m + D_b)/3 - 2*T_{mem}$*
Lengths			
L_{cbp}	199.65	mm	*Length between chamber bottom & top of top platen*
L_{tp}	23.95	mm	*Length of top platen*
L_{bp}	24.00	mm	*Length of bottom platen*
L_{net}	151.70	mm	*Length of Specimen = L_{cbp} - L_{tp} - L_{bp}*
Volume			
V	639752	mm³	*$D^2_{net}*Pi*L_{net}/4$*

Labels	Values	Units	Description
Mass Density and Unit Weight			
Rho	1893.5	kg/m³	*Mass density of specimen = $M_s/V*10^6$*
U_{wt}	18.57	kN/m³	*Unit weight of specimen = Rho*9.806/1000*
Moisture Content, mc			
No.	X-10		*Container number*
M_{wscb}	1258.68	g	*Mass of wet soil + container*
M_{wsca}	944.29	g	*Mass of dry soil + container*
M_{wat}	314.39	g	*Mass of water = M_{wscb} - M_{wsca}*
M_{cont}	47.28	g	*Mass of container.*
mc	35.0	%	*$M_{wat}/(M_{wsca} - M_{cont})*100\%$*
Rho_d	1402.1	kg/m³	*Dry mass density = Rho/(1+mc)*
G_s	2.72		*Specific gravity*
e	0.940		*Void Ratio, $[1000*G_s)]/Rho_d-1$*
S_r	101.4	%	*Degree of Saturation = $mc*G_s/e$*
J	0.000813	kg-m²	*Polar mass moment of inertia = $(M_s/1000)*(D_{net}/1000)^2/8$*

Conditions After Saturation				Conditions After Consolidation			
CL_s	0.09	mm	*Change in length*	CL_c	1.31	mm	*Change in length*
L_s	151.6	mm	*Length after saturation, L - CL_s*	L_c	150.3	mm	*Length after consolidation, L_s - CL_c*
A_s	4217.2	mm²	*Area of specimen*	CV_c	35700	mm³	*Change in volume*
V_s	639372	mm³	*Volume after saturation, A_s * L_s*	V_c	603672	mm³	*Volume, V_s - CV_c*
B	0.78		*B Value*	S_r	100.0	%	*Degree of Saturation = $mc*G_s/e$*
				e	0.831		*Void Ratio, $[1000*G_s]/Rho_d-1$*
				mc	30.6	%	*Moisture Content*
				Rho_d	1486	kg/m³	*Dry mass density, Rho_d*V/V_c*

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

INPUT DATA

Project No.: 5810535301
Tested By: HEJ/JW
Test Date: 1/7/94-1/11/94
Reviewed By: JW/RLB RLB
Reviewed Date: 1/19/93

Project Name: SRS-ITP
Boring No: H-Bor-29
Sample No.: ST-24
Depth: 197 ft
Sample Description: See classification data

Line No.	Elapsed Time [min]	Cell Pressure [unit]	Pore Pressure [unit]	Axial Load [unit]	Burette Reading [unit]	Length Reading [unit]	Longitudinal or Torsional	Force or Torque Reading [V_{rms}]	Transducer Reading [V_{rms}]	Resonant Period [msec]
1	0.5	150.0	30.4	0	0.0	-6.7380	T	0.024	0.034	6.238
2	1.0	150.0	30.4	0	0.0	-6.7380	T	0.033	0.063	6.301
3	1.5	150.0	30.4	0	0.0	-6.7380	T	0.062	0.158	6.340
4	2.0	150.0	31.0	0	0.0	-6.7380	T	0.117	0.325	6.379
5	2.5	150.0	31.1	0	0.0	-6.7380	T	0.236	0.628	6.428
6	3.0	150.0	31.0	0	0.0	-6.7380	T	0.501	1.204	6.527
7	3.5	150.0	30.8	0	0.0	-6.7380	T	0.996	2.131	6.618
8	4.0	150.0	30.6	0	0.0	-6.7380	T	1.987	3.460	6.826
9	4.5	150.0	30.6	0	0.0	-6.7380	T	3.115	4.510	7.022
10	5.0	150.0	30.7	0	0.0	-6.7390	T	3.660	4.820	7.169
11	5.5	150.0	30.5	0	0.0	-6.7350	T	0.021	0.058	6.670

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

INTERMEDIATE DATA

Project No.: 5810535301
Tested By: HEJ/JW
Test Date: 1/7/94-1/11/94
Reviewed By: JW/RLB RLB
Reviewed Date: 1/19/93

Project Name: SRS-ITP
Boring No: H-Bor-29
Sample No.: ST-24
Depth: 197 ft
Sample Description: See classification data

Specimen Volume [mm³]	Specimen Length [mm]	Specimen Diameter [mm]	Specimen Mass [grams]	Mass Density [kg/m³]	Polar Inertia J [kg-m²]	Inertia Stiffness Ratio T	Apparatus Damping Factor ADF	Dimensionless Frequency F	Damping Factor A
603672	150.07	71.57	1171.28	1940.3	0.000750	4.3075	0.00483	0.465	9.31
603672	150.07	71.57	1171.28	1940.3	0.000750	4.3075	0.00487	0.465	9.31
603672	150.07	71.57	1171.28	1940.3	0.000750	4.3075	0.00490	0.465	9.31
603672	150.07	71.57	1171.28	1940.3	0.000750	4.3075	0.00494	0.465	9.31
603672	150.07	71.57	1171.28	1940.3	0.000750	4.3075	0.00497	0.465	9.31
603672	150.07	71.57	1171.28	1940.3	0.000750	4.3075	0.00505	0.465	9.31
603672	150.07	71.57	1171.28	1940.3	0.000750	4.3075	0.00512	0.465	9.31
603672	150.07	71.57	1171.28	1940.3	0.000750	4.3075	0.00528	0.465	9.31
603672	150.07	71.57	1171.28	1940.3	0.000750	4.3075	0.00543	0.465	9.31
603672	150.07	71.57	1171.28	1940.3	0.000750	4.3075	0.00555	0.465	9.31
603672	150.08	71.57	1171.28	1940.3	0.000750	4.3075	0.00516	0.465	9.32

Resonant Column Test (ASTM D4015-87)

LAW ENGINEERING

TEST RESULTS SUMMARY

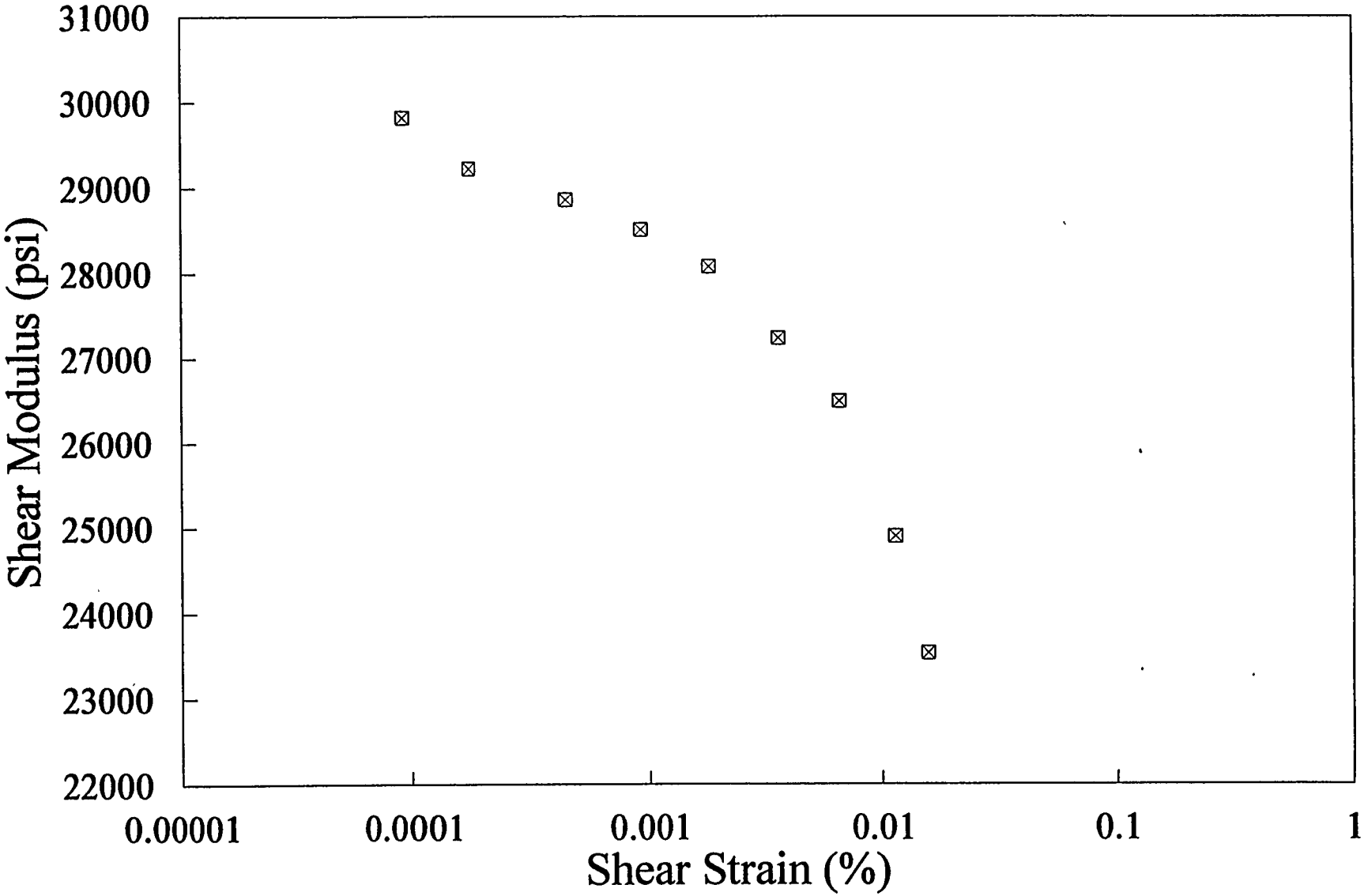
Project No.: 5810535301
Tested By: HEJ/JW
Test Date: 1/7/94-1/11/94
Reviewed By: JW/RLB RLB
Reviewed Date: 1/19/93

Project Name: SRS-ITP
Boring No: H-Bor-29
Sample No.: ST-24
Depth: 197 ft
Sample Description: See classification data

Line No.	Effective Confining Stress [kPa]	Principal Stress Ratio	Void Ratio e	Longitudinal or Torsional	No. of Vibration Cycles	Shear Modulus G [Mpa]	Shear Strain Amplititude [%]	Damping Ratio [%]	Shear Modulus G [psi]
1	824.18	1.00	0.831	T	4809	205.45	0.00009	3.36	29818
2	824.18	1.00	0.831	T	4761	201.36	0.00018	2.48	29225
3	824.18	1.00	0.831	T	4732	198.89	0.00045	1.84	28867
4	820.19	1.00	0.831	T	4703	196.47	0.00093	1.68	28515
5	819.22	1.00	0.831	T	4667	193.48	0.00182	1.76	28082
6	819.91	1.00	0.831	T	4596	187.66	0.00360	1.95	27236
7	821.01	1.00	0.831	T	4533	182.53	0.00656	2.20	26492
8	822.39	1.00	0.831	T	4395	171.58	0.01133	2.72	24902
9	822.53	1.00	0.831	T	4272	162.13	0.01562	3.28	23532
10	822.11	1.00	0.831	T	4185	155.55	0.01740	3.61	22576
11	823.49	1.00	0.831	T	4498	179.70	0.00018	1.69	26082

Shear Modulus vs. Shear Strain

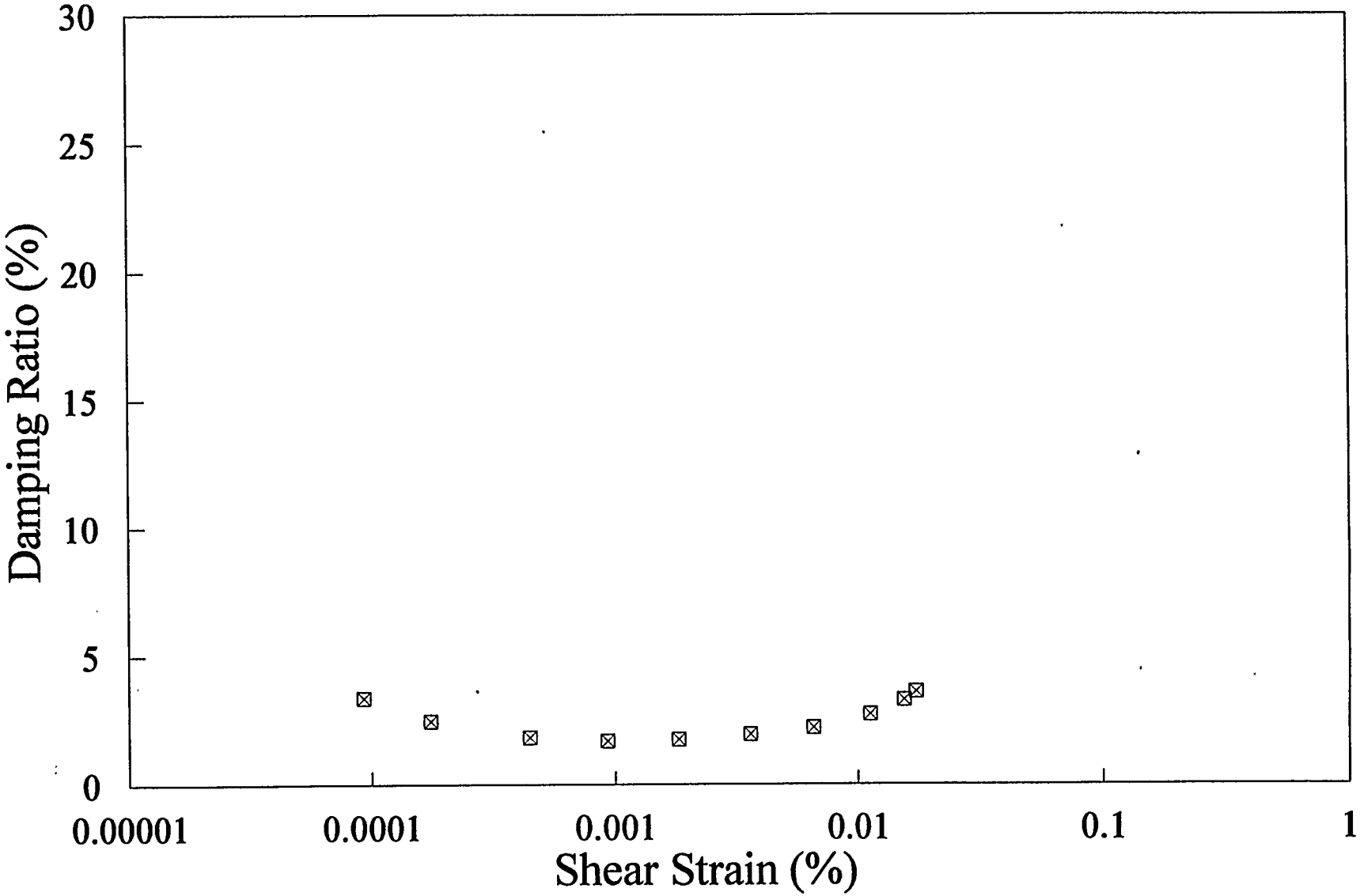
H-BOR-29, ST-24



Law Engineering Project No.: 5810535301
SRS-ITP: Resonant Column

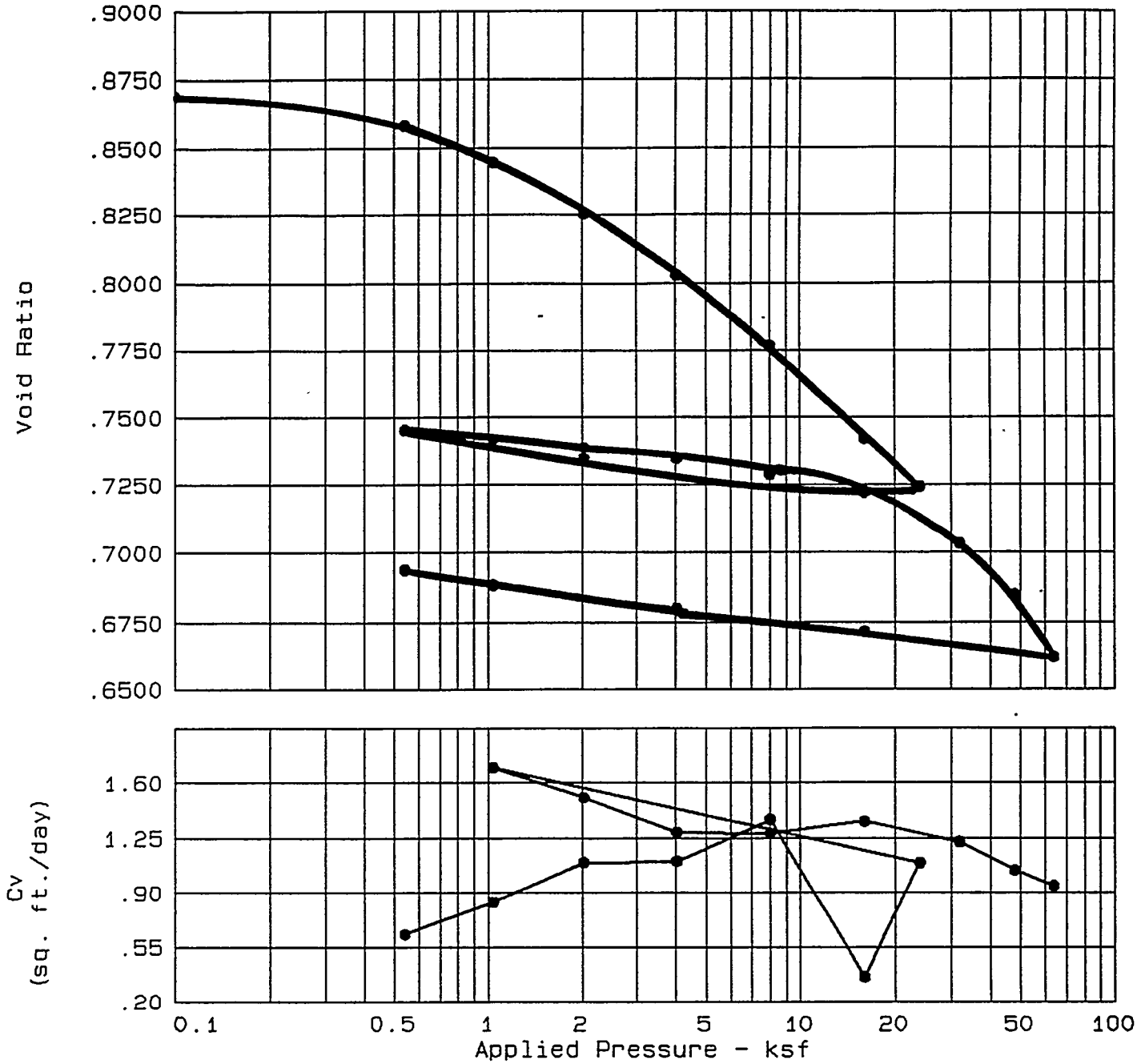
Damping Ratio vs. Shear Strain

H-BOR-29, ST-24



Law Engineering Project No.: 5810535301
SRS-ITP: Resonant Column

CONSOLIDATION TEST REPORT



Natural Saturation	Natural Moisture	Dry Density	LL	PI	Sp.Gr.	Initial void ratio
100.1 %	32.3	89.9	NL	NP	2.690	0.8689

TEST RESULTS	MATERIAL DESCRIPTION
	Yellow Tan Sily Sand Class: SM
Project No.: 5810535301 Project: SRS_ITP Location: H-BOR-29 ST-24 @ 197.5-199.5 Ft. Date: 12-22-93	Remarks: Tested by: CLG Reviewed by: RLE
CONSOLIDATION TEST REPORT LAW ENGINEERING, INC.	Fig. No._____

21:34, 2-01-1994 CONSOLIDATION TEST PROJECT DATA Test No. 40

Project Number: 5810535301
Project: SRS_ITP
Date: 12-22-93
Location 1: H-BOR-29 ST-24 @ 197.5-199.5 Ft.
2:
Remarks 1: Tested by:
2: Reviewed by:
3:
4:
5:
Material 1: Yellow Tan Sily Sand
description 2:
Classification: SM
Liquid limit: NL
Plasticity index: NP
Figure Number:

CONSOLIDATION TEST SPECIMEN DATA

TOTAL SAMPLE	BEFORE TEST	AFTER TEST
Wet w+t = 338.98 g.	Oedometer No. = 14	Wet w+t = 335.05 g.
Dry w+t = 310.86 g	Machine No. = 14	Dry w+t = 310.86 g.
Tare wt. = 223.91 g.	Spec. Gravity = 2.690	Tare wt. = 223.91 g.
Height = 0.7510 in.	Height = 0.7520 in.	
Diameter = 2.5000 in.	Diameter = 2.4990 in.	
Weight = 115.07 g.		
Moisture = 32.3 %	Ht. Solids = 0.4024 in.	Moisture = 27.8 %
Wet Den. = 118.9 pcf	Dry wt. = 87.00 g. *	Dry wt. = 86.95 g.
Dry Den. = 89.9 pcf	Void ratio = 0.8689	Void ratio = 0.6935
	Saturation = 100.1 %	Saturation = 107.9 %

* Initial dry weight used in calculations

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
Initial	0.03000			0.8689	
0.10	0.03000	0.0000	0.03000	0.8689	0.0
0.54	0.03550	0.0000	0.03550	0.8580*	0.6 Comprs.*
1.04	0.04215	0.0006	0.04155	0.8444*	1.3 Comprs.*
2.04	0.05060	0.0014	0.04920	0.8251*	2.3 Comprs.*
4.04	0.06080	0.0026	0.05820	0.8026*	3.5 Comprs.*
8.04	0.07290	0.0038	0.06910	0.7762*	5.0 Comprs.*
16.03	0.08740	0.0047	0.08270	0.7421*	6.8 Comprs.*
24.04	0.09540	0.0053	0.09010	0.7244*	7.7 Comprs.*
24.04	0.09550	0.0053	0.09020	0.7242	7.7 Comprs.
8.04	0.09220	0.0038	0.08840	0.7287	7.5 Comprs.
2.04	0.08740	0.0014	0.08600	0.7346	7.2 Comprs.
0.54	0.08170	0.0000	0.08170	0.7453	6.6 Comprs.
1.04	0.08200	0.0006	0.08140	0.7416*	6.8 Comprs.*

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
2.04	0.08420	0.0014	0.08280	0.7386*	7.0 Comprs.*
4.04	0.08690	0.0026	0.08430	0.7346*	7.2 Comprs.*
8.04	0.09020	0.0038	0.08640	0.7299*	7.4 Comprs.*
16.03	0.09450	0.0047	0.08980	0.7219*	7.9 Comprs.*
32.03	0.10410	0.0058	0.09830	0.7031*	8.9 Comprs.*
48.00	0.11430	0.0079	0.10640	0.6845*	9.9 Comprs.*
64.00	0.12220	0.0068	0.11540	0.6618*	11.1 Comprs.*
16.03	0.11620	0.0047	0.11150	0.6715	10.6 Comprs.
4.04	0.11080	0.0026	0.10820	0.6797	10.1 Comprs.
1.04	0.10545	0.0006	0.10485	0.6880	9.7 Comprs.
0.54	0.10265	0.0000	0.10265	0.6935	9.4 Comprs.

* CALCULATED USING D100 INSTEAD OF FINAL READING

CONSOLIDATION TEST RESULTS

Compression index = NOT SELECTED
Preconsolidation pressure = NOT SELECTED

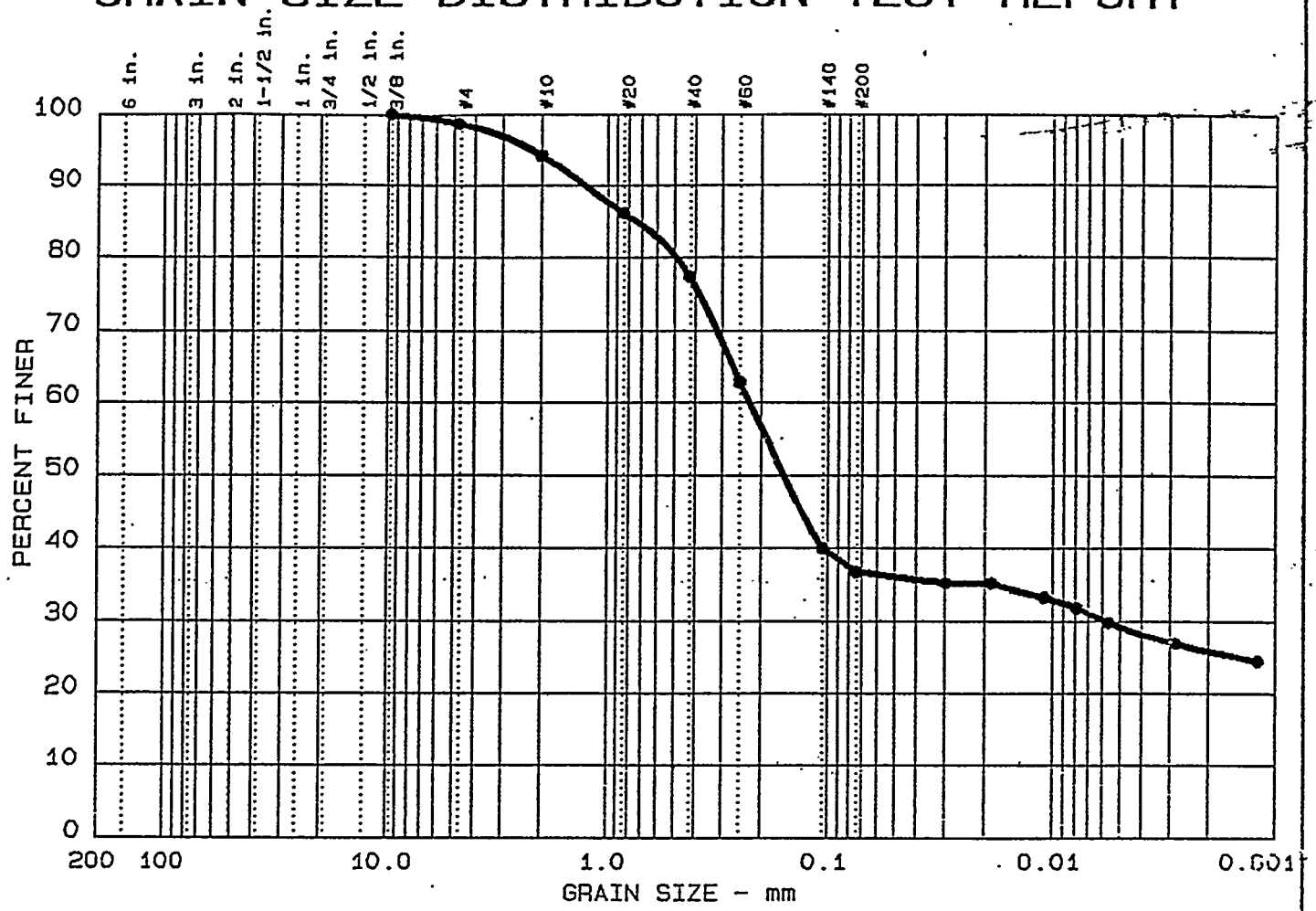
Load 0.54 ksf CONSOLIDATION TEST READINGS Load No. 2

'achine Deflection 0.0000

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.03000	11	60.00	0.03540
2	0.10	0.03180	12	120.00	0.03550
3	0.25	0.03220			
4	0.50	0.03280			
5	1.00	0.03340			
6	2.00	0.03410			
7	4.00	0.03460			
8	8.00	0.03490			
9	15.00	0.03510			
10	40.00	0.03530			

Void Ratio: 0.8580 Compression: 0.6 % >>> CALCULATED USING D100
D0 = 0.0310 D90 = 0.0340 D100 = 0.0344 T90 = 1.91 min.
Cv @ 1.9 min.= 0.62 sq. feet/day

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	1	0.0	1.3	62.1	7.5	29.1

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	50	30	0.74	0.23	0.16	0.006	-			

MATERIAL DESCRIPTION	USCS	AASHTO
● Brown & Purple Clayey Sand	SC	A-7-6 (4.9)

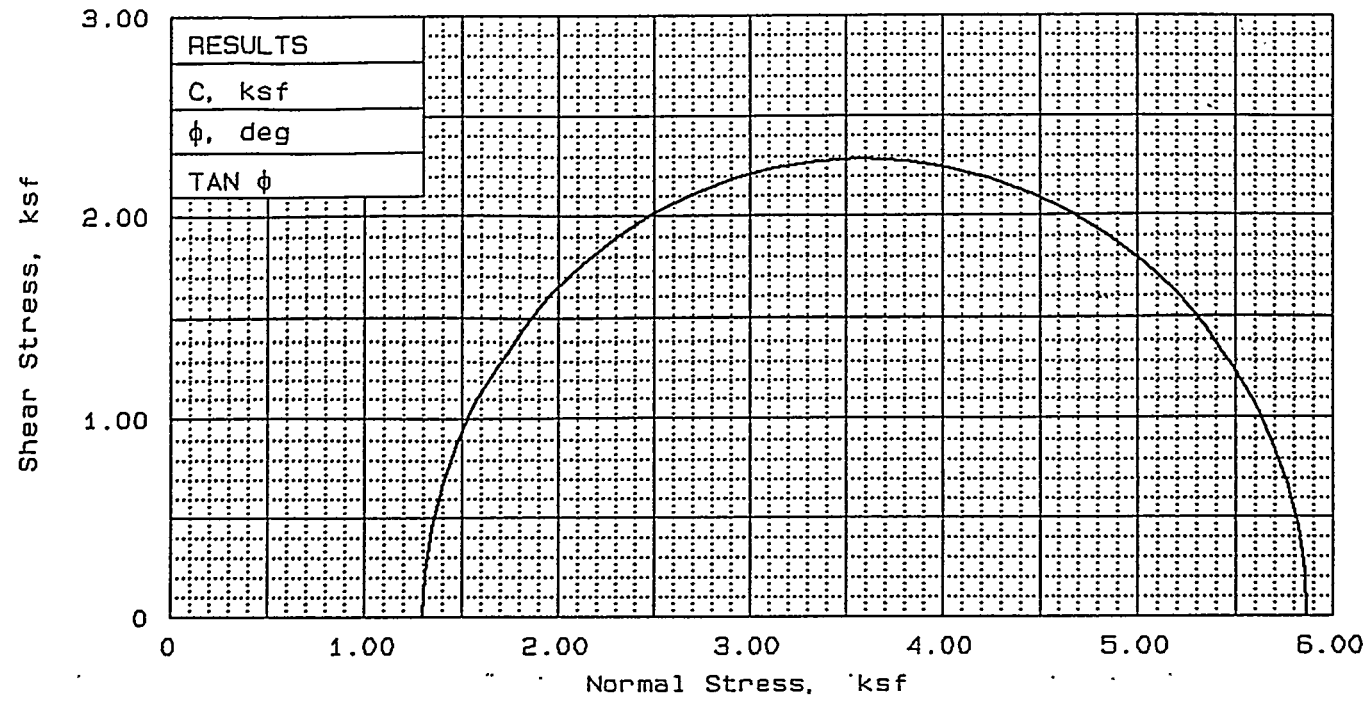
Project No.: 5810575606
Project: SRS ITP-P3
● Location: H-Bor-54 ST-1 @ 10-12 Ft.

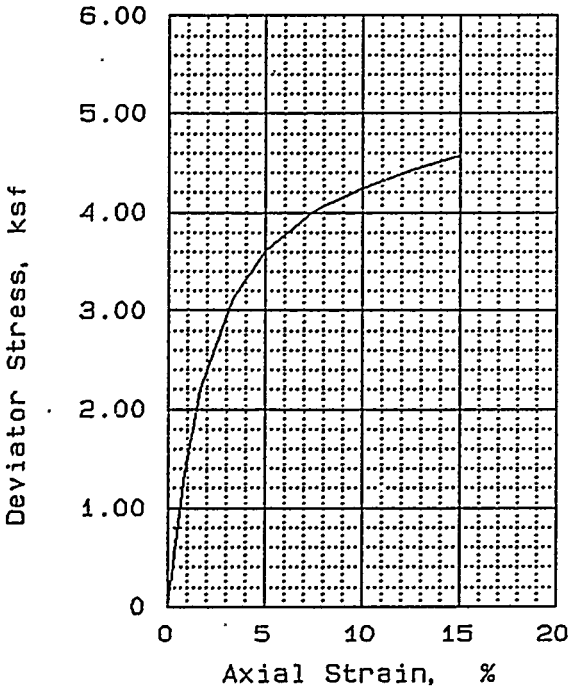
Date: June 16, 1994

Remarks:
Tested by: OMJ
Reviewed by: RLB
UU-9 psi

GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Figure No.





SAMPLE NO.		1
INITIAL	WATER CONTENT, %	19.9
	DRY DENSITY, pcf	105.8
	SATURATION, %	93.7
	VOID RATIO	0.564
	DIAMETER, in	2.86
	HEIGHT, in	6.00
AT TEST	WATER CONTENT, %	19.9
	DRY DENSITY, pcf	105.8
	SATURATION, %	93.7
	VOID RATIO	0.564
	DIAMETER, in	2.86
	HEIGHT, in	6.00
BACK PRESSURE, ksf		0.00
CELL PRESSURE, ksf		1.30
FAILURE STRESS, ksf		4.57
PORE PRESSURE, ksf		
STRAIN RATE, %/min.		0.500
ULTIMATE STRESS, ksf		
PORE PRESSURE, ksf		
σ_1 FAILURE, ksf		5.86
σ_3 FAILURE, ksf		1.3

TYPE OF TEST:
Unconsolidated undrained
SAMPLE TYPE: Undisturbed
DESCRIPTION: Brown & Purple
Clayey Sand
LL= 50 PL= 20 PI= 30.0
SPECIFIC GRAVITY= 2.65
REMARKS: Tested by: HS

Reviewed by: PLS

FIG. NO.

CLIENT: Westinghouse Savannah River Co.

PROJECT: Task Release 6

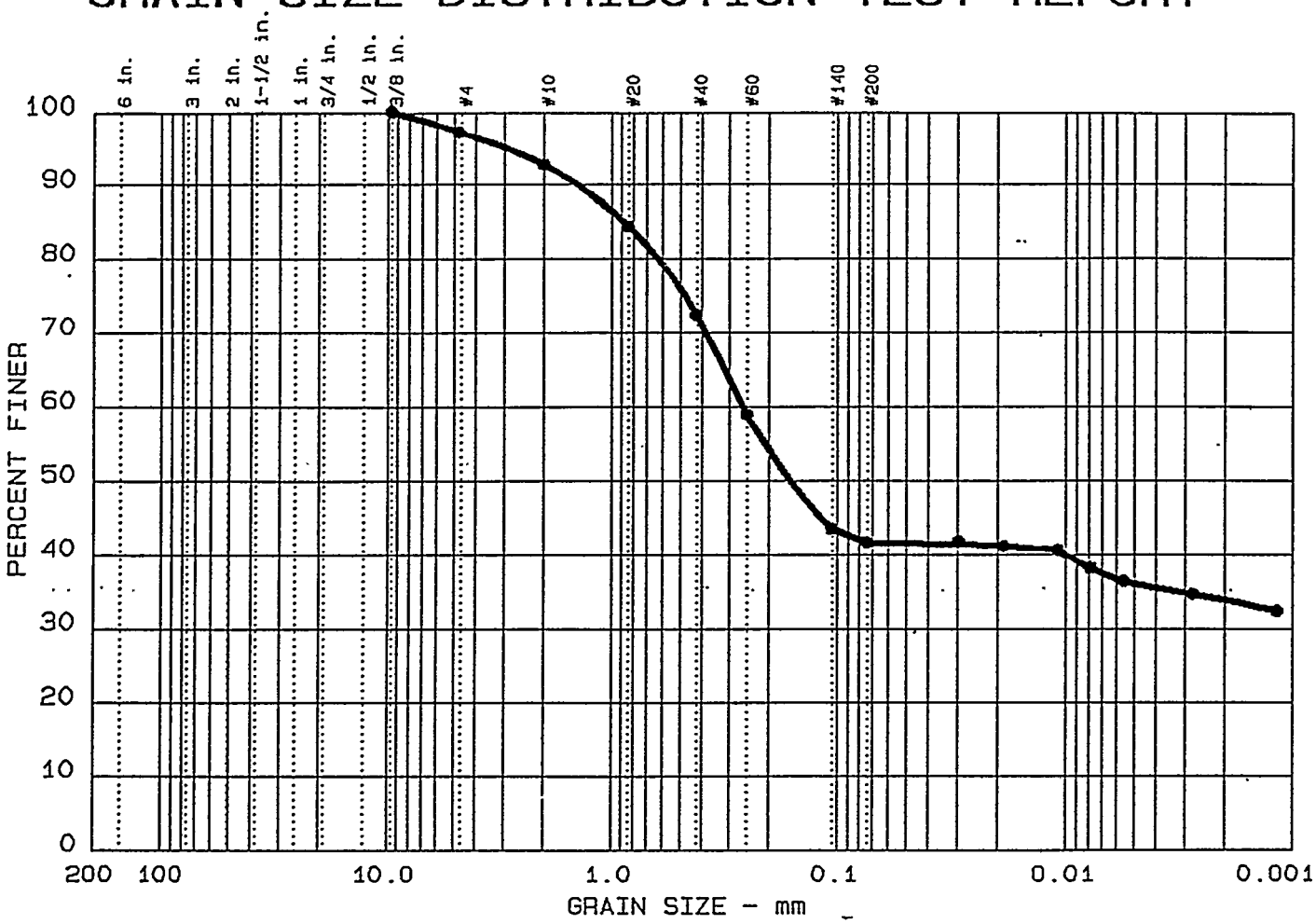
SAMPLE LOCATION: H Bor 54 St-1 @ 10-12 Ft.

PROJ. NO.: 5810575606 DATE: June 10, 1994

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	2	0.0	2.7	55.8	5.5	36.0

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	81	56	0.88	0.26	0.16					

MATERIAL DESCRIPTION	USCS	AASHTO
● Brown & Purple Clayey Sand	SC	A-7-6 (15.3)

Project No.: 5810575606
Project: SRS ITP-P3
● Location: H-Bor-54 ST-2 @ 15-17 Ft.

Date: June 16, 1994

Remarks:

Tested by: DMJ

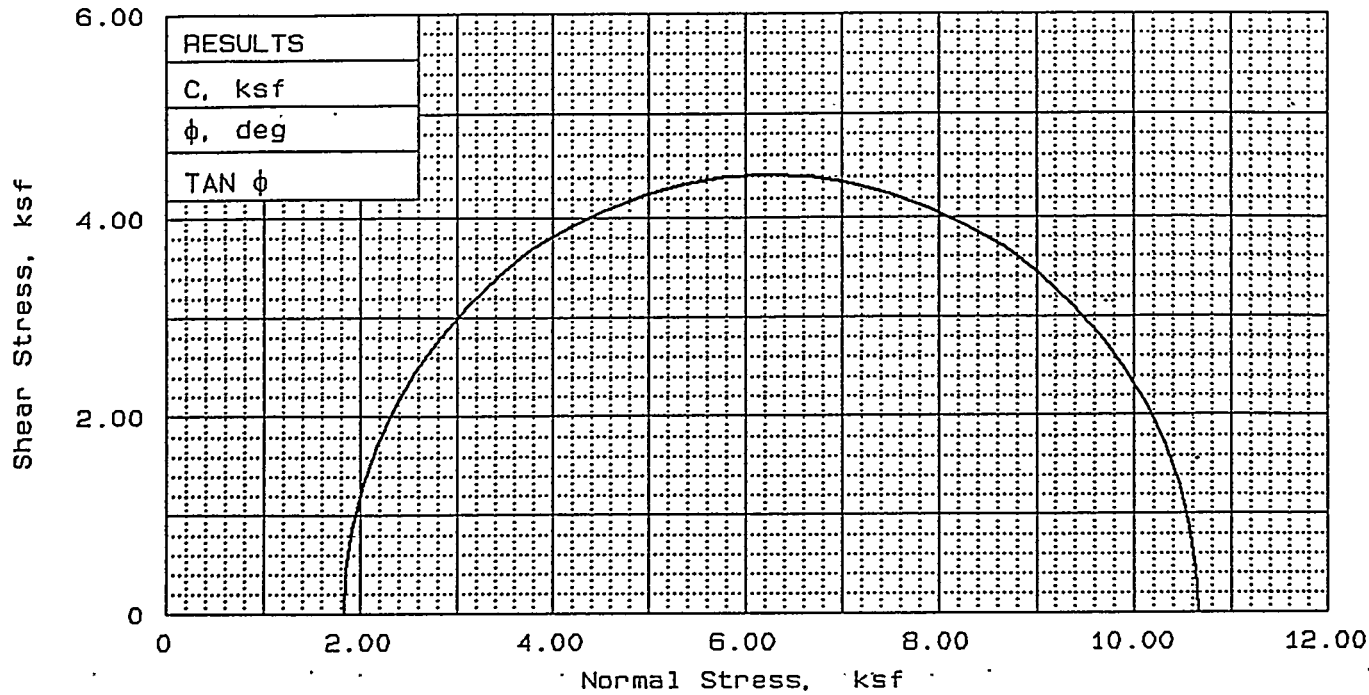
Reviewed by: RLB

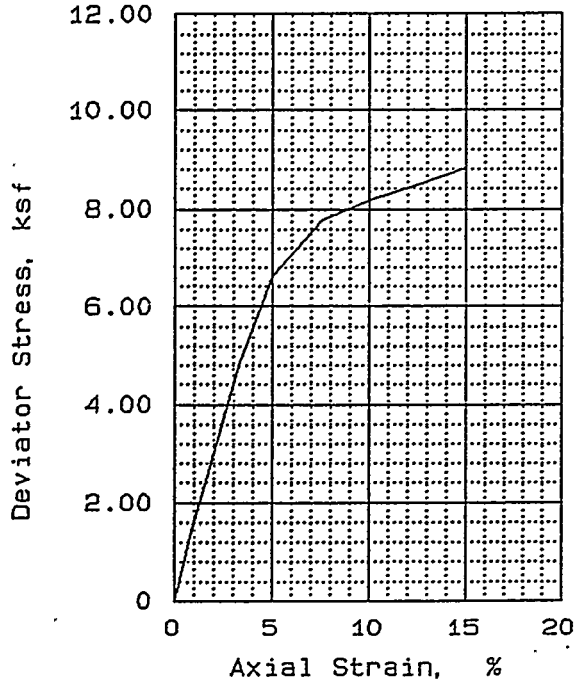
UU-13.2 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.





SAMPLE NO.		1
INITIAL	WATER CONTENT, %	18.1
	DRY DENSITY, pcf	107.7
	SATURATION, %	89.5
	VOID RATIO	0.535
	DIAMETER, in	2.86
	HEIGHT, in	6.00
AT TEST	WATER CONTENT, %	18.1
	DRY DENSITY, pcf	107.7
	SATURATION, %	89.5
	VOID RATIO	0.535
	DIAMETER, in	2.86
	HEIGHT, in	6.00
BACK PRESSURE, ksf		0.07
CELL PRESSURE, ksf		1.90
FAILURE STRESS, ksf		8.83
PORE PRESSURE, ksf		
STRAIN RATE, %/min.		
ULTIMATE STRESS, ksf		
PORE PRESSURE, ksf		
σ_1 FAILURE, ksf		10.66
σ_3 FAILURE, ksf		1.83

TYPE OF TEST:
Unconsolidated undrained
SAMPLE TYPE: Undisturbed
DESCRIPTION: Brown & Purple Clayey Sand
LL= 81 PL= 25 PI= 56.0
SPECIFIC GRAVITY= 2.66
REMARKS: Tested by: HS

Reviewed by: RLB

FIG. NO.

CLIENT: Westinghouse Savannah River Co.

PROJECT: Task Release 6

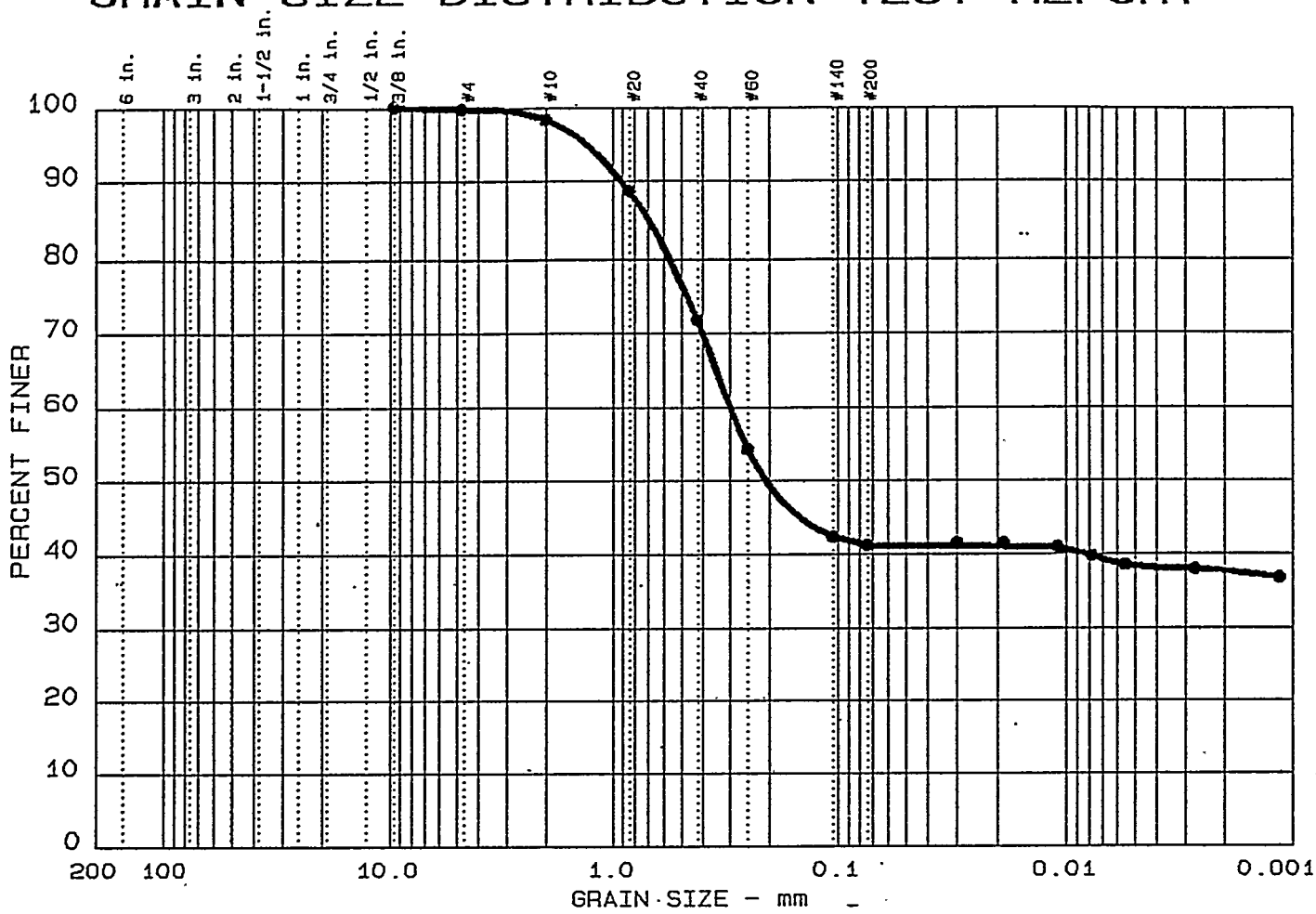
SAMPLE LOCATION: H Bor 54 St-2 @ 15-17 Ft.

PROJ. NO.: 5810575606 DATE: June 10, 1994

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	3	0.0	0.3	58.7	2.7	38.3

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	62	41	0.69	0.30	0.21					

MATERIAL DESCRIPTION	USCS	AASHTO
● Red Brown Clayey Sand	SC	A-7-6 (9.9)

Project No.: 5810575606
Project: SRS ITP-P3
● Location: H-Bor-54 ST-3 @ 20-22 Ft.

Date: June 16, 1994

Remarks:

Tested by: DMJ

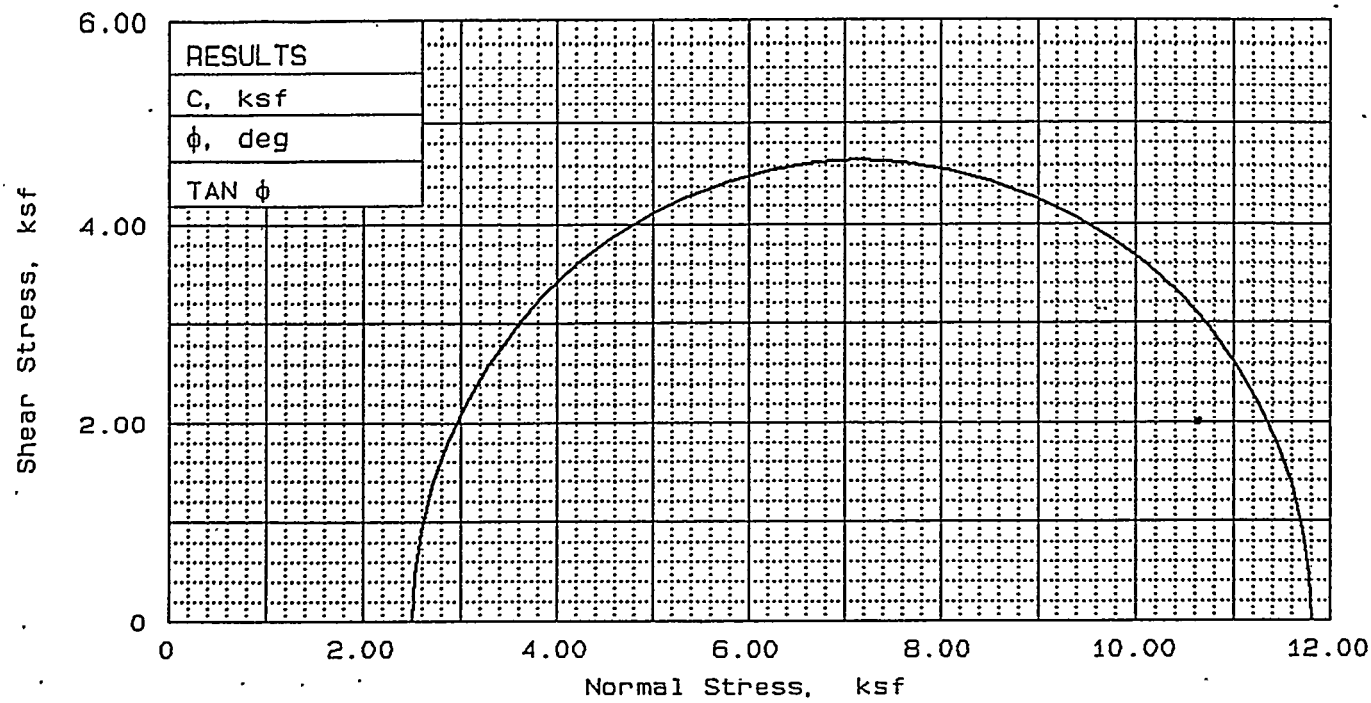
Reviewed by: RLB

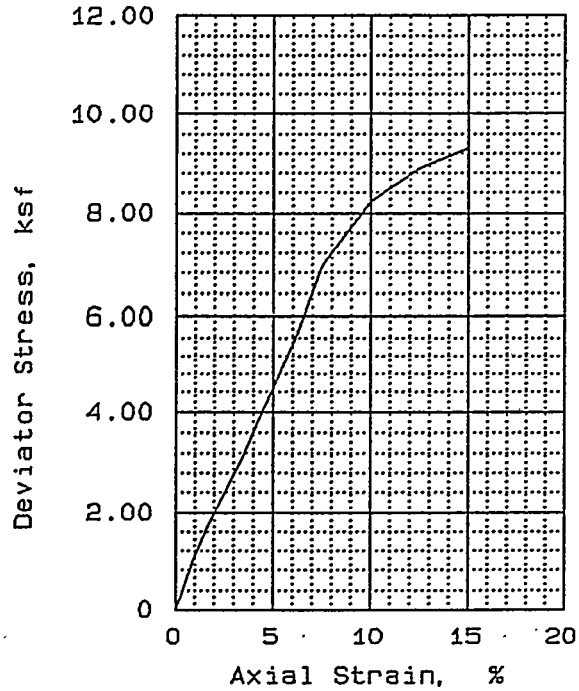
UU -17.4 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.





SAMPLE NO.		1
INITIAL	WATER CONTENT, %	17.6
	DRY DENSITY, pcf	108.1
	SATURATION, %	87.8
	VOID RATIO	0.530
	DIAMETER, in	2.81
	HEIGHT, in	6.00
AT TEST	WATER CONTENT, %	17.6
	DRY DENSITY, pcf	108.1
	SATURATION, %	87.8
	VOID RATIO	0.530
	DIAMETER, in	2.81
	HEIGHT, in	6.00
BACK PRESSURE, ksf		0.00
CELL PRESSURE, ksf		2.51
FAILURE STRESS, ksf		9.30
PORE PRESSURE, ksf		
STRAIN RATE, %/min.		0.500
ULTIMATE STRESS, ksf		
PORE PRESSURE, ksf		
σ_1 FAILURE, ksf		11.80
σ_3 FAILURE, ksf		2.51

TYPE OF TEST:
Unconsolidated undrained
SAMPLE TYPE: Undisturbed
DESCRIPTION: Red Brown Clayey Sand
LL= 62 PL= 21 PI= 41.0
SPECIFIC GRAVITY= 2.64
REMARKS: Tested by: HS

Reviewed by: RLB

FIG. NO.

CLIENT: Westinghouse Savannah River Co.

PROJECT: Task Release 6

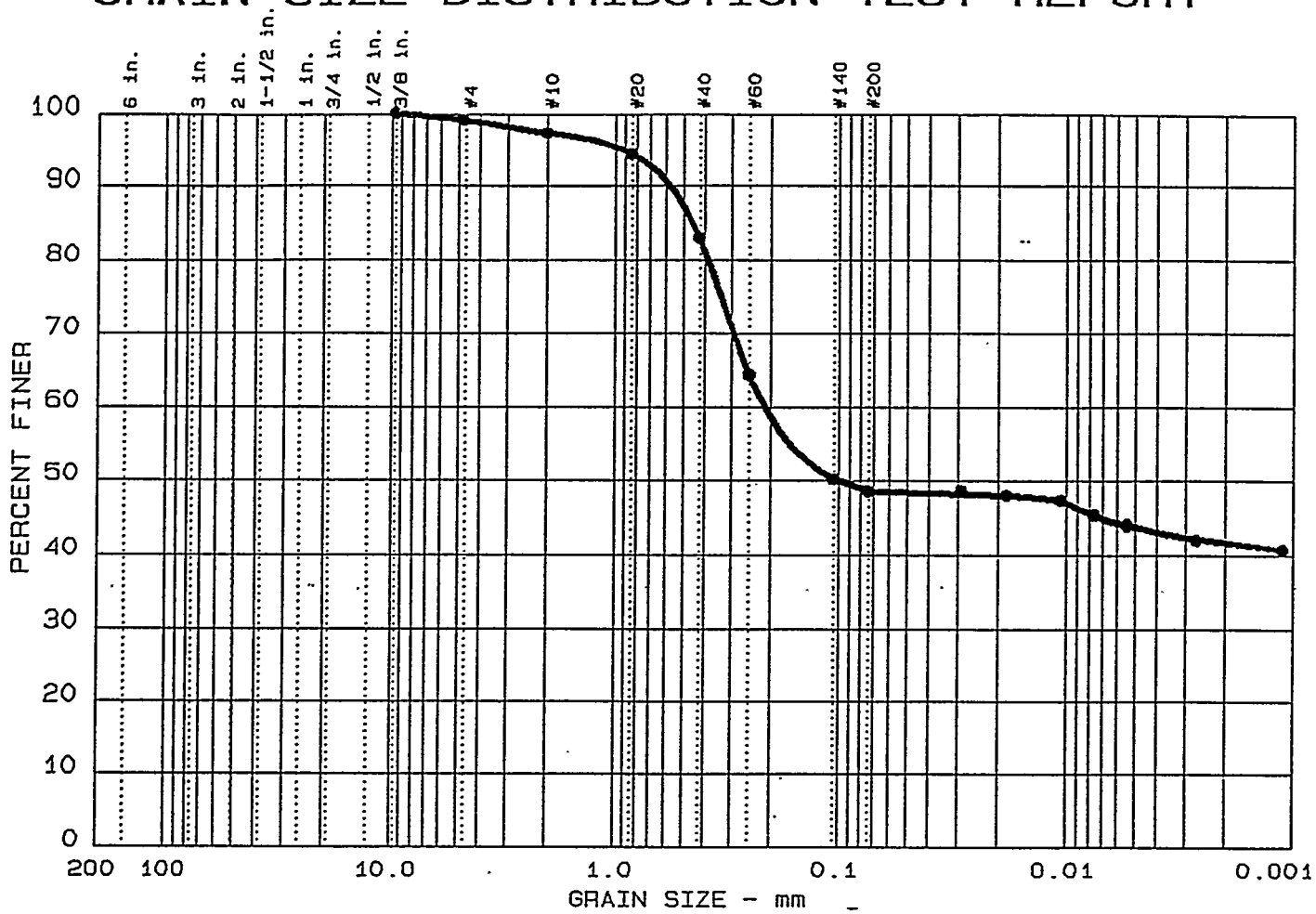
SAMPLE LOCATION: H Bor 54 St-3 @ 20-22 Ft.

PROJ. NO.: 5810575606 DATE: June 10, 1994

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	4	0.0	3.2	57.6	3.7	35.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	55	30	0.59	0.27	0.19					

MATERIAL DESCRIPTION	USCS	AASHTO
● Red Brown Clayey Sand	SC	A-7-6 (5.9)

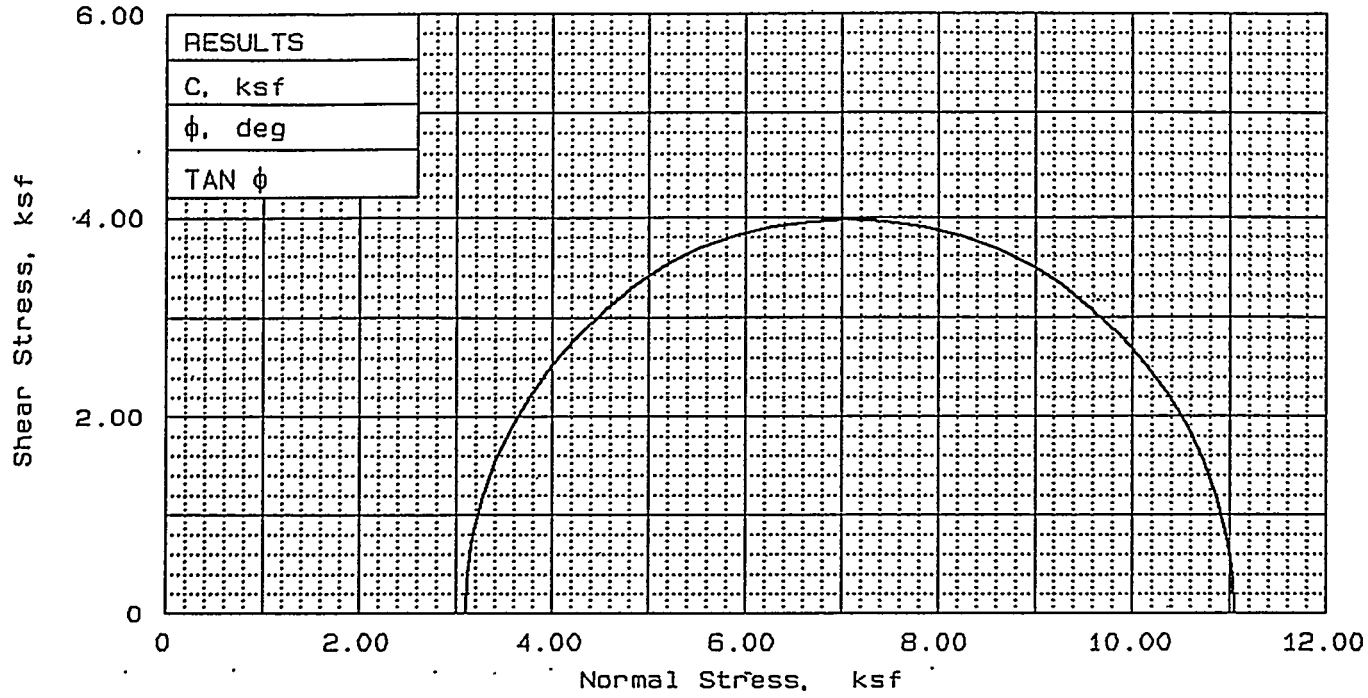
Project No.: 5810575606
Project: SRS ITP-P3
● Location: H-Bor-54 ST-4 @ 25-27 Ft.

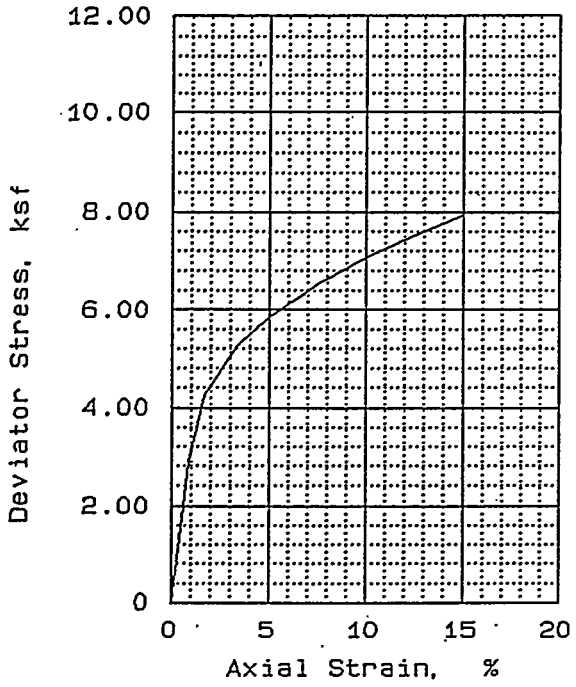
Date: June 16, 1994

Remarks:
Tested by: DMJ
Reviewed by: RLB
UU-21.5 psi

GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Figure No.





SAMPLE NO.		1
INITIAL	WATER CONTENT, %	18.1
	DRY DENSITY, pcf	109.5
	SATURATION, %	93.7
	VOID RATIO	0.511
	DIAMETER, in	2.86
	HEIGHT, in	6.00
AT TEST	WATER CONTENT, %	18.1
	DRY DENSITY, pcf	109.5
	SATURATION, %	93.7
	VOID RATIO	0.511
	DIAMETER, in	2.86
	HEIGHT, in	6.00
BACK PRESSURE, ksf		0.00
CELL PRESSURE, ksf		3.10
FAILURE STRESS, ksf		7.95
PORE PRESSURE, ksf		
STRAIN RATE, %/min.		0.500
ULTIMATE STRESS, ksf		
PORE PRESSURE, ksf		
σ_1 FAILURE, ksf		11.04
σ_3 FAILURE, ksf		3.1

TYPE OF TEST:
Unconsolidated undrained

SAMPLE TYPE: Undisturbed

DESCRIPTION: Red Brown Clayey Sand

LL= 55 PL= 25 PI= 30.0

SPECIFIC GRAVITY= 2.69

REMARKS: Tested by: HJ

Reviewed by: RLB

FIG. NO.

CLIENT: Westinghouse Savannah River Co.

PROJECT: Task Release 6

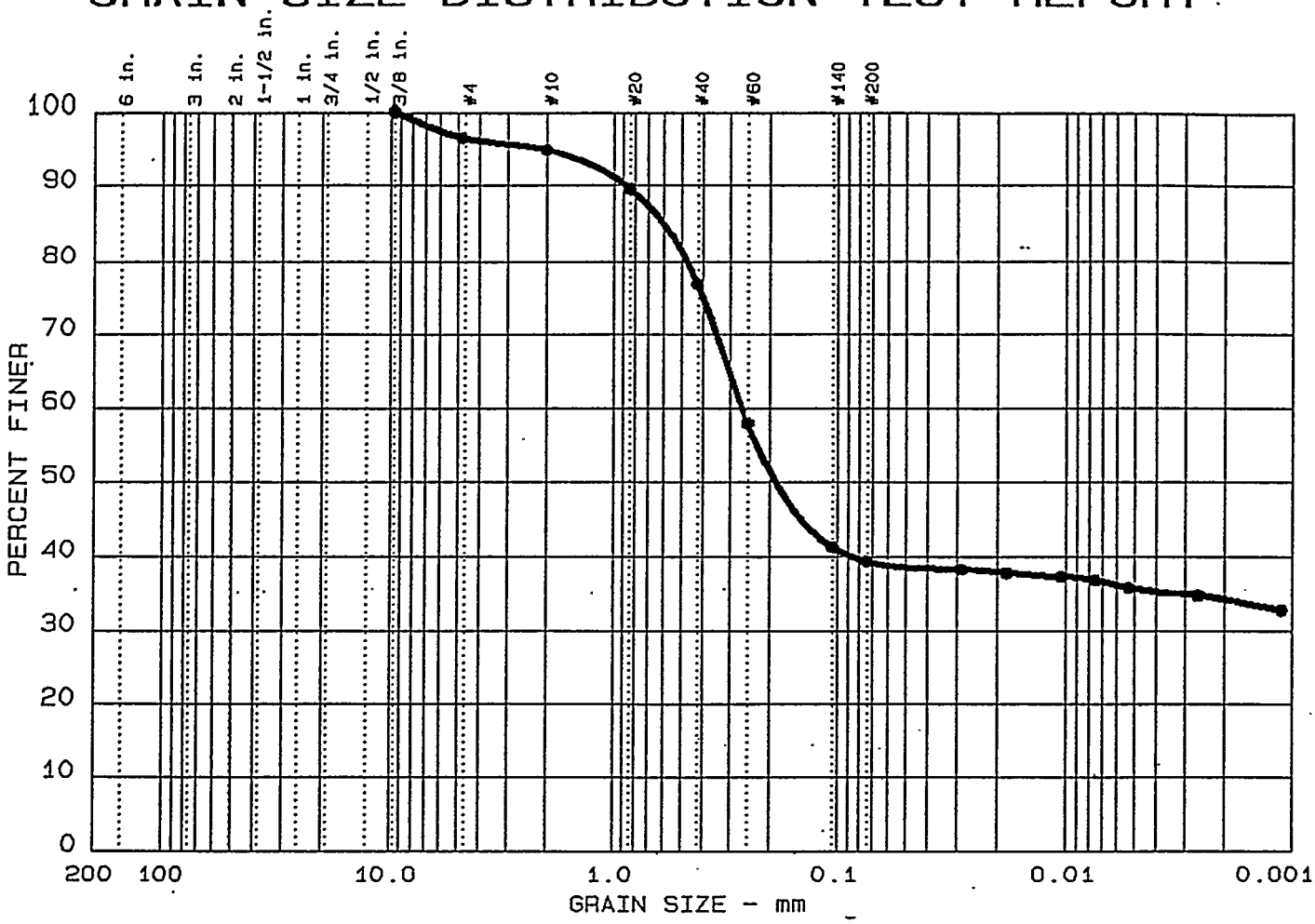
SAMPLE LOCATION: H Bor 54 St-4 @ 25-27 Ft.

PROJ. NO.: 5810575606 DATE: June 10, 1994

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	5	0.0	3.2	57.6	3.7	35.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	56	28	0.59	0.27	0.19					

MATERIAL DESCRIPTION	USCS	AASHTO
● Red Brown Clayey Sand	SC	A-7-6 (5.4)

Project No.: 5810575606
Project: SRS ITP-P3
◆ Location: H-Bor-54 ST-5 @ 30-32 Ft.

Date: June 19, 1994

Remarks:

Tested by: DMJ

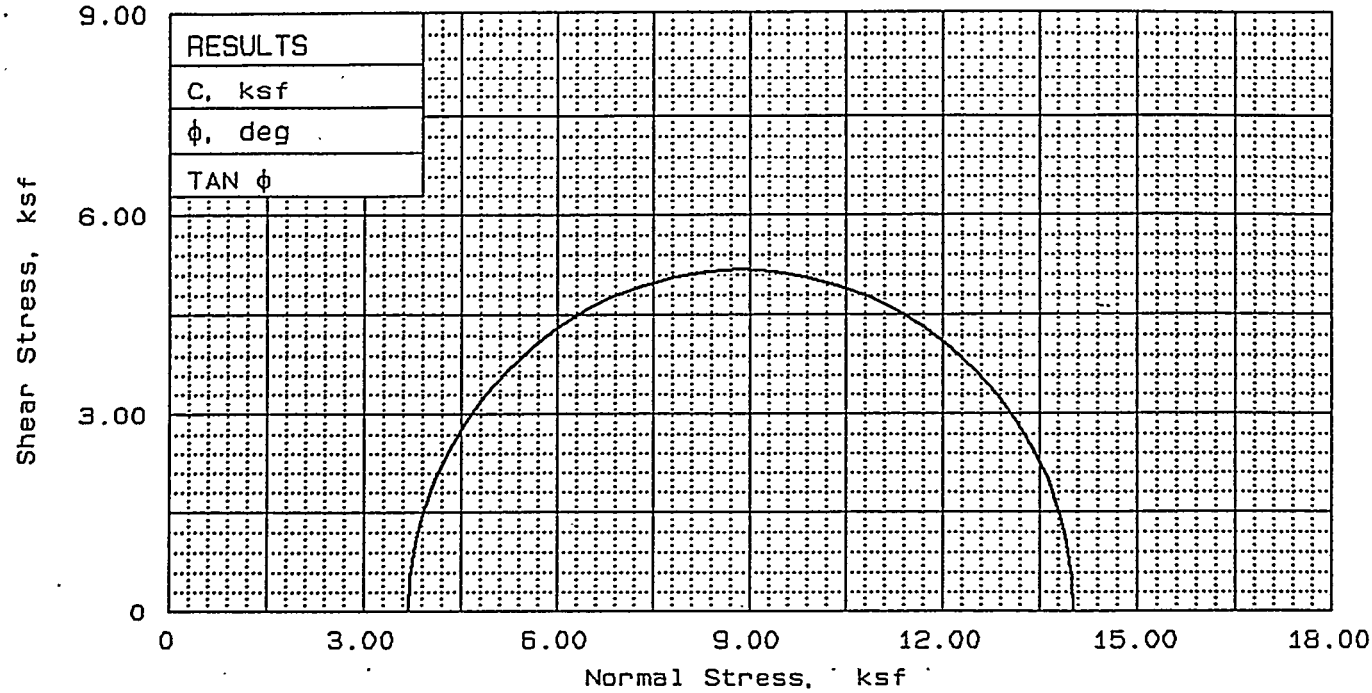
Reviewed by: RLB

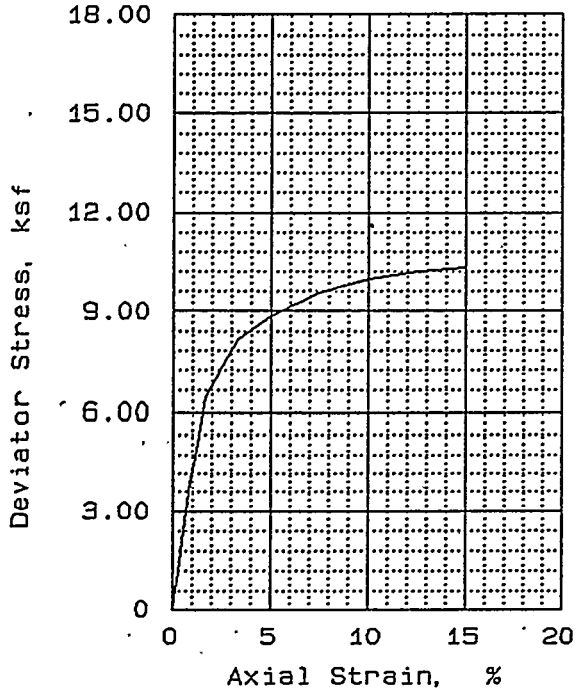
UU-25.7 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.





SAMPLE NO.		1
INITIAL	WATER CONTENT, %	16.4
	DRY DENSITY, pcf	108.3
	SATURATION, %	82.2
	VOID RATIO	0.527
	DIAMETER, in	2.86
	HEIGHT, in	6.00
AT TEST	WATER CONTENT, %	16.4
	DRY DENSITY, pcf	108.3
	SATURATION, %	82.2
	VOID RATIO	0.527
	DIAMETER, in	2.86
	HEIGHT, in	6.00
BACK PRESSURE, ksf		0.00
CELL PRESSURE, ksf		3.70
FAILURE STRESS, ksf		10.34
PORE PRESSURE, ksf		
STRAIN RATE, %/min.		0.500
ULTIMATE STRESS, ksf		
PORE PRESSURE, ksf		
σ_1 FAILURE, ksf		14.04
σ_3 FAILURE, ksf		3.7

TYPE OF TEST:
Unconsolidated undrained

SAMPLE TYPE: Undisturbed

DESCRIPTION: Red Brown Clayey Sand

LL= 56 PL= 28 PI= 28.0

SPECIFIC GRAVITY= 2.69

REMARKS: Tested by: HJ

Reviewed by: RLB

FIG. NO.

CLIENT: Westinghouse Savannah River Co.

PROJECT: Task Release 6

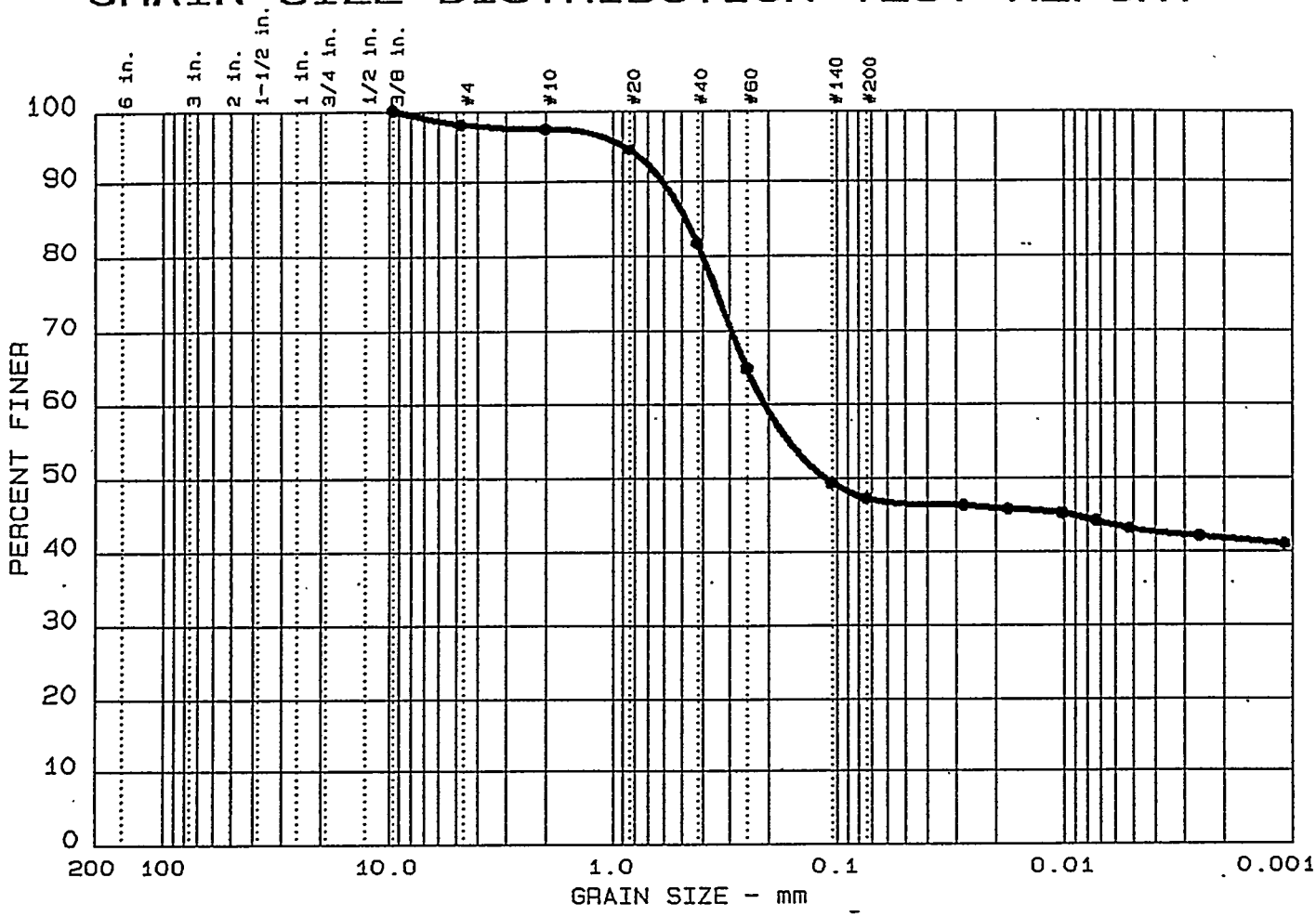
SAMPLE LOCATION: H Bor 54 St-5 @ 30-32 Ft.

PROJ. NO.: 5810575606 DATE: June 10, 1994

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	6	0.0	1.9	50.8	4.2	43.1

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	54	36	0.47	0.21	0.11					

MATERIAL DESCRIPTION	USCS	AASHTO
● Red Brown Clayey Sand	SC	A-7-6 (11.6)

Project No.: 5810575606

Project: SRS ITP-P3

◆ Location: H-Bor-54 ST-6 @ 35-37 Ft.

Date: June 19, 1994

Remarks:

Tested by: DMJ

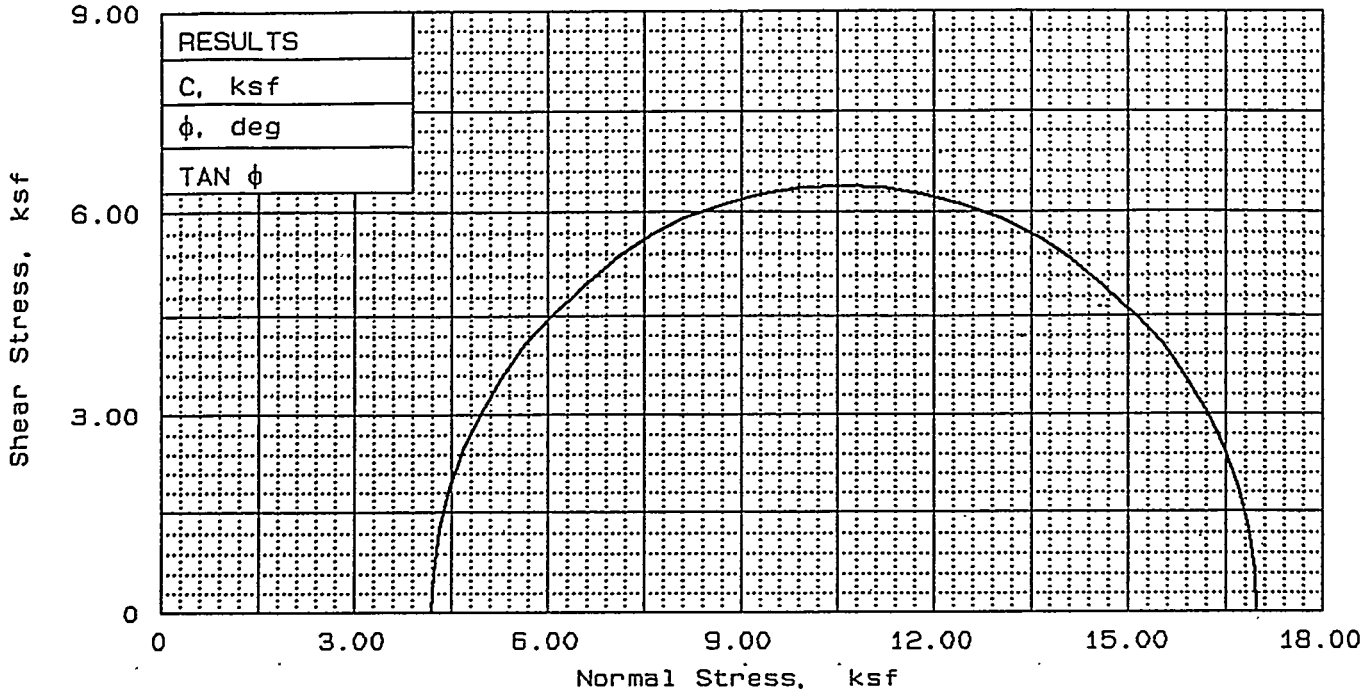
Reviewed by: RLB

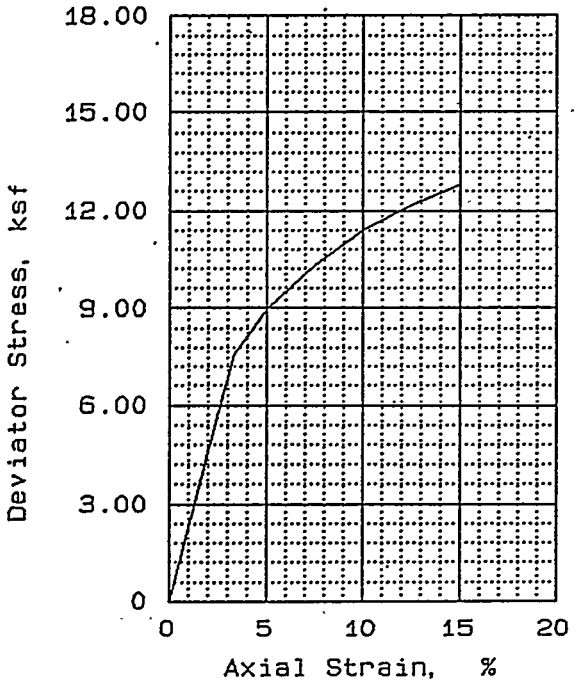
UU-29.2 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.





SAMPLE NO.		1
INITIAL	WATER CONTENT, %	17.7
	DRY DENSITY, pcf	111.2
	SATURATION, %	96.1
	VOID RATIO	0.487
	DIAMETER, in	2.85
	HEIGHT, in	6.00
AT TEST	WATER CONTENT, %	17.7
	DRY DENSITY, pcf	111.2
	SATURATION, %	96.1
	VOID RATIO	0.487
	DIAMETER, in	2.85
	HEIGHT, in	6.00
BACK PRESSURE, ksf		0.00
CELL PRESSURE, ksf		4.20
FAILURE STRESS, ksf		12.78
PORE PRESSURE, ksf		
STRAIN RATE, %/min.		0.500
ULTIMATE STRESS, ksf		
PORE PRESSURE, ksf		
σ_1 FAILURE, ksf		16.98
σ_3 FAILURE, ksf		4.2

TYPE OF TEST:
Unconsolidated undrained

SAMPLE TYPE: Undisturbed

DESCRIPTION: Red Brown Clayey Sand

LL= 54 PL= 18 PI= 36.0

SPECIFIC GRAVITY= 2.65

REMARKS: Tested by: HJ

Reviewed by: RLB

FIG. NO.

CLIENT: Westinghouse Savannah River Co.

PROJECT: Task Release 6

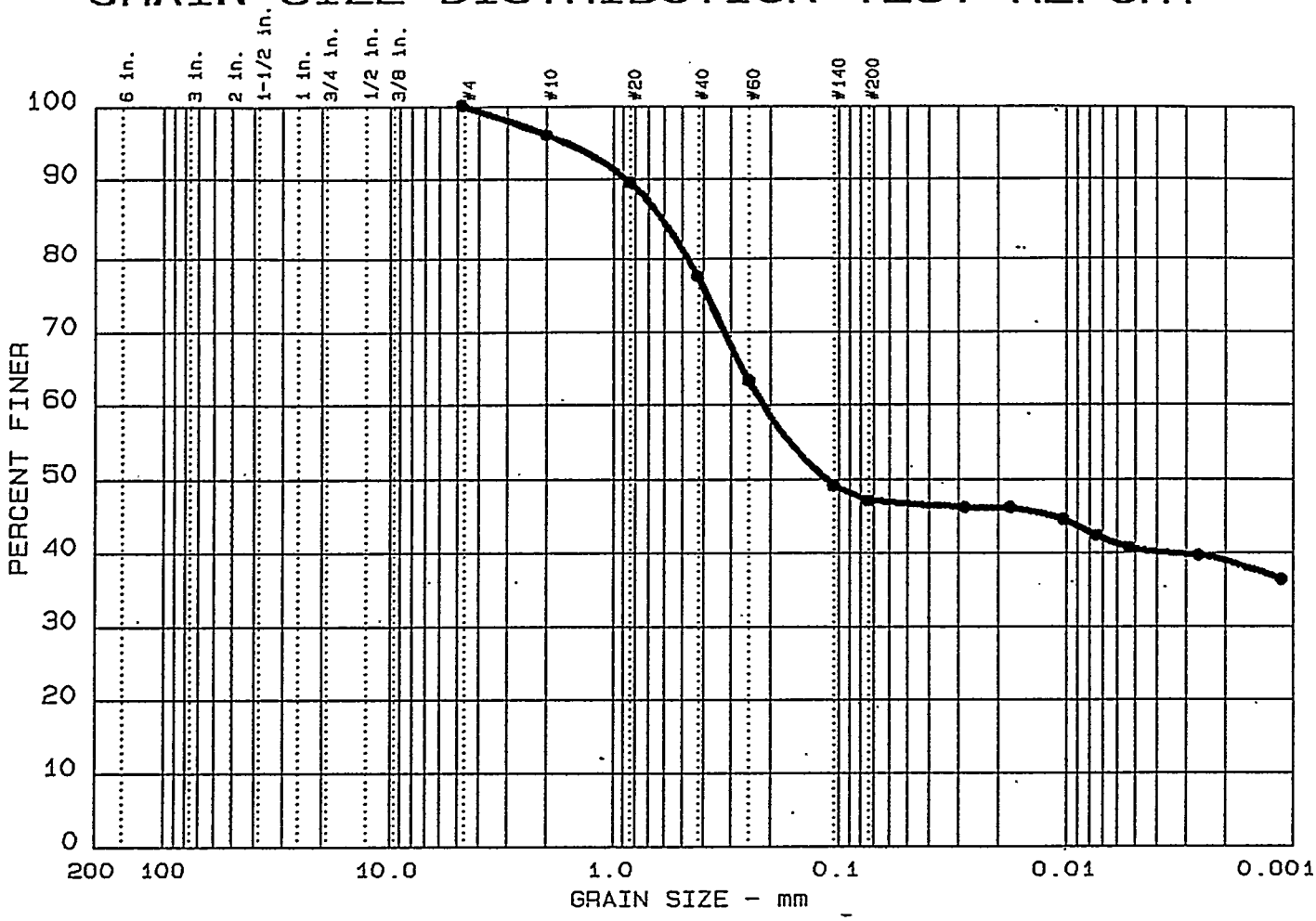
SAMPLE LOCATION: H Bor 54 St-6 @ 35-37 Ft.

PROJ. NO.: 5810575606 DATE: June 10, 1994

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	7	0.0	0.0	53.0	6.6	40.4

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	61	40	0.60	0.22	0.11					

MATERIAL DESCRIPTION	USCS	AASHTO
● Red Brown Clayey Sand	SC	A-7-6 (13.3)

Project No.: 5810575606
Project: SRS ITP-P3
● Location: H-Bor-54 ST-7 @ 39-41 Ft.

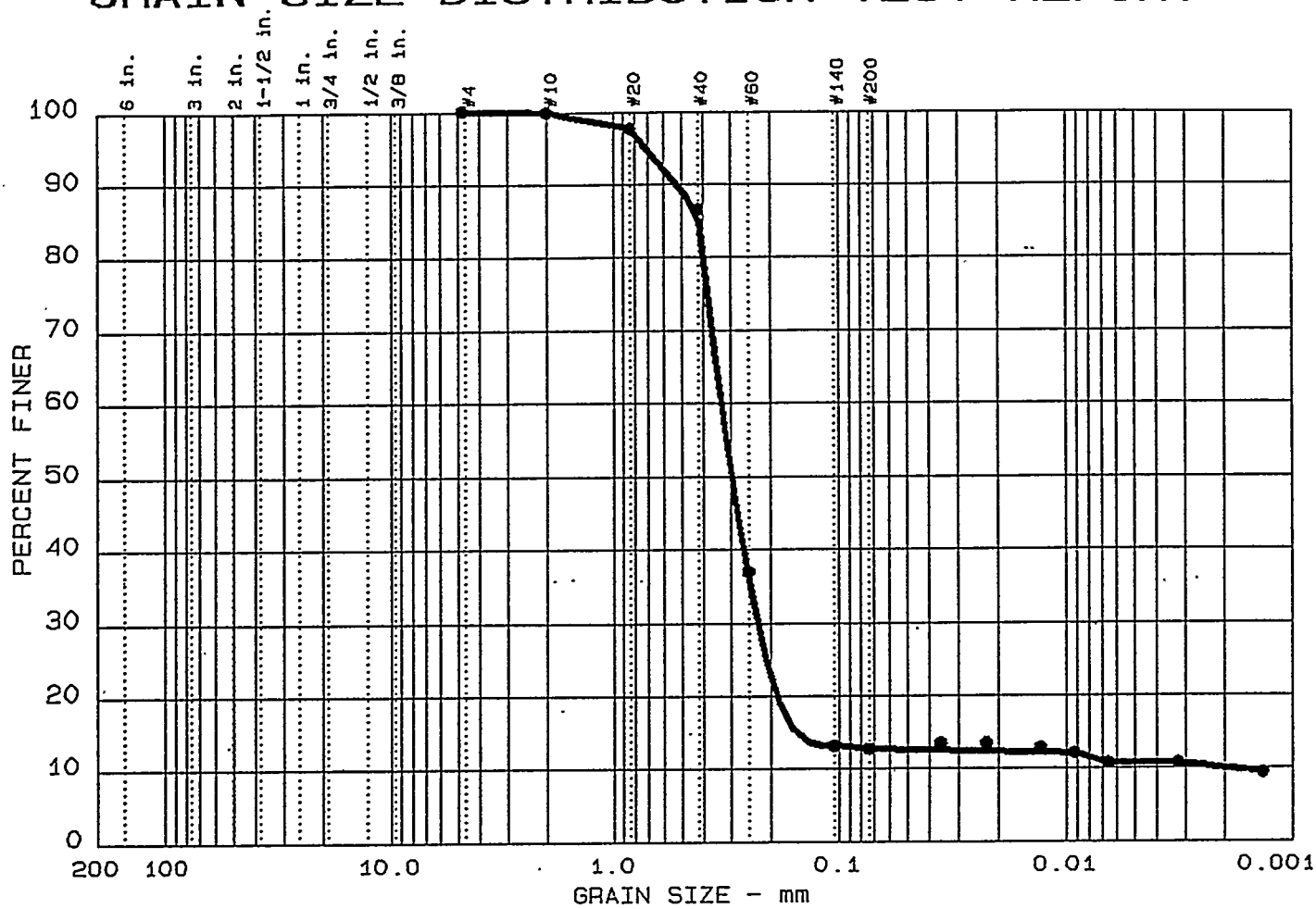
Date: June 19, 1994

Remarks:
Tested by: DMJ
Reviewed by: RLB
UU-33.5 psi

GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	19	0.0	0.0	87.3	2.0	10.7

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	NL	NP	0.41	0.33	0.30	0.228	0.1538	0.0020	78.43	164.2

MATERIAL DESCRIPTION	USCS	AASHTO
● Red Brown Silty Sand	SM	A-2-4 (0.2)

Project No.: 5810575606
Project: SRS ITP-P3
● Location: H-Bor 23.3 St-1 49-51.5 Ft.

Date: June 16, 1994

Remarks:

Tested by: CLG

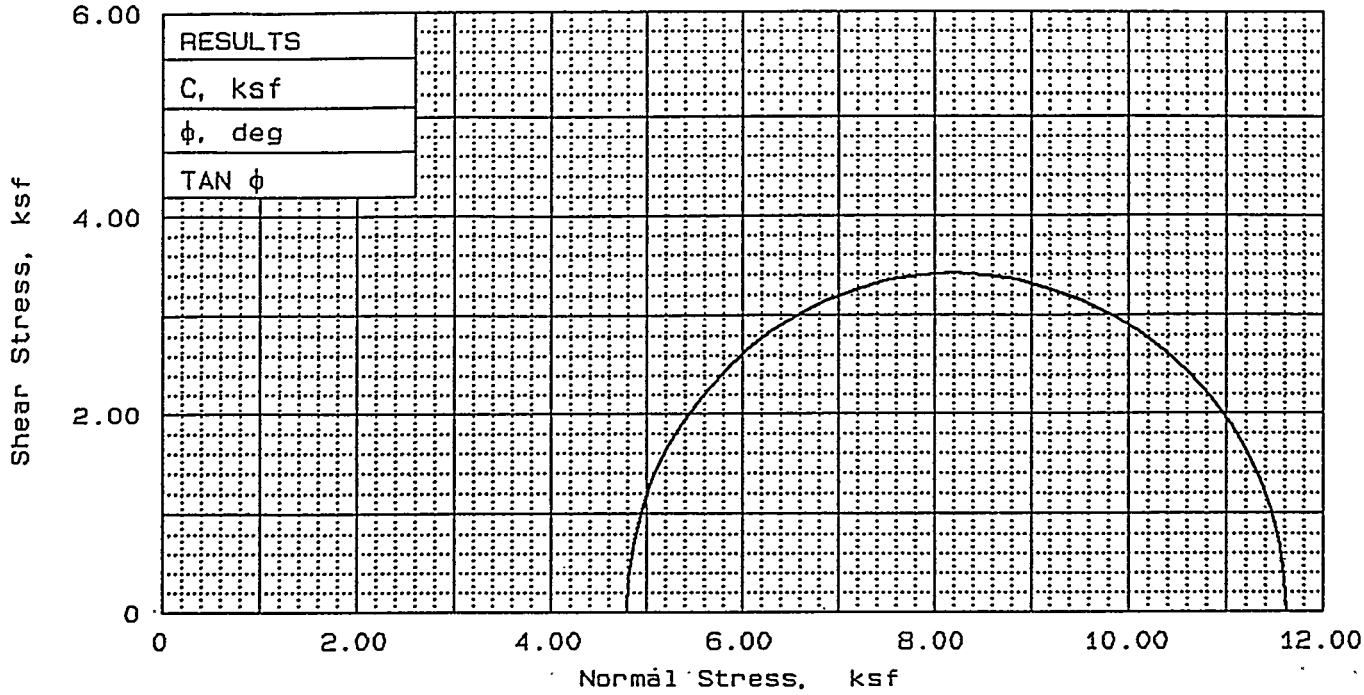
Reviewed by: RLB

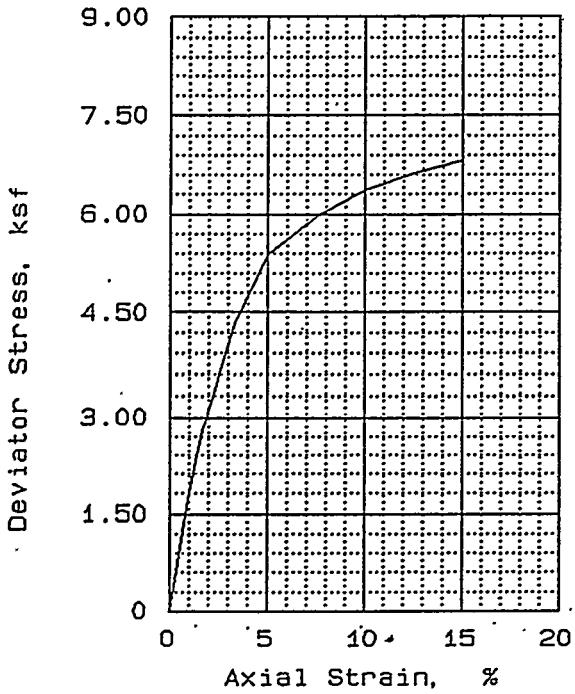
CD-40 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.





SAMPLE NO.		1
INITIAL	WATER CONTENT, %	20.9
	DRY DENSITY, pcf	101.6
	SATURATION, %	88.3
	VOID RATIO	0.629
	DIAMETER, in	2.85
	HEIGHT, in	6.00
AT TEST	WATER CONTENT, %	20.9
	DRY DENSITY, pcf	101.6
	SATURATION, %	88.3
	VOID RATIO	0.629
	DIAMETER, in	2.85
	HEIGHT, in	6.00
BACK PRESSURE, ksf		0.00
CELL PRESSURE, ksf		4.80
FAILURE STRESS, ksf		6.82
PORE PRESSURE, ksf		
STRAIN RATE, %/min.		0.500
ULTIMATE STRESS, ksf		
PORE PRESSURE, ksf		
σ_1 FAILURE, ksf		11.61
σ_3 FAILURE, ksf		4.8

TYPE OF TEST:
Unconsolidated undrained

SAMPLE TYPE: Undisturbed

DESCRIPTION: Red Brown Clayey Sand

LL= 61 PL= 21 PI= 40.0

SPECIFIC GRAVITY= 2.65

REMARKS: Tested by HB

Reviewed by: RLB

FIG. NO.

CLIENT: Westinghouse Savannah River Co.

PROJECT: Task Release 6

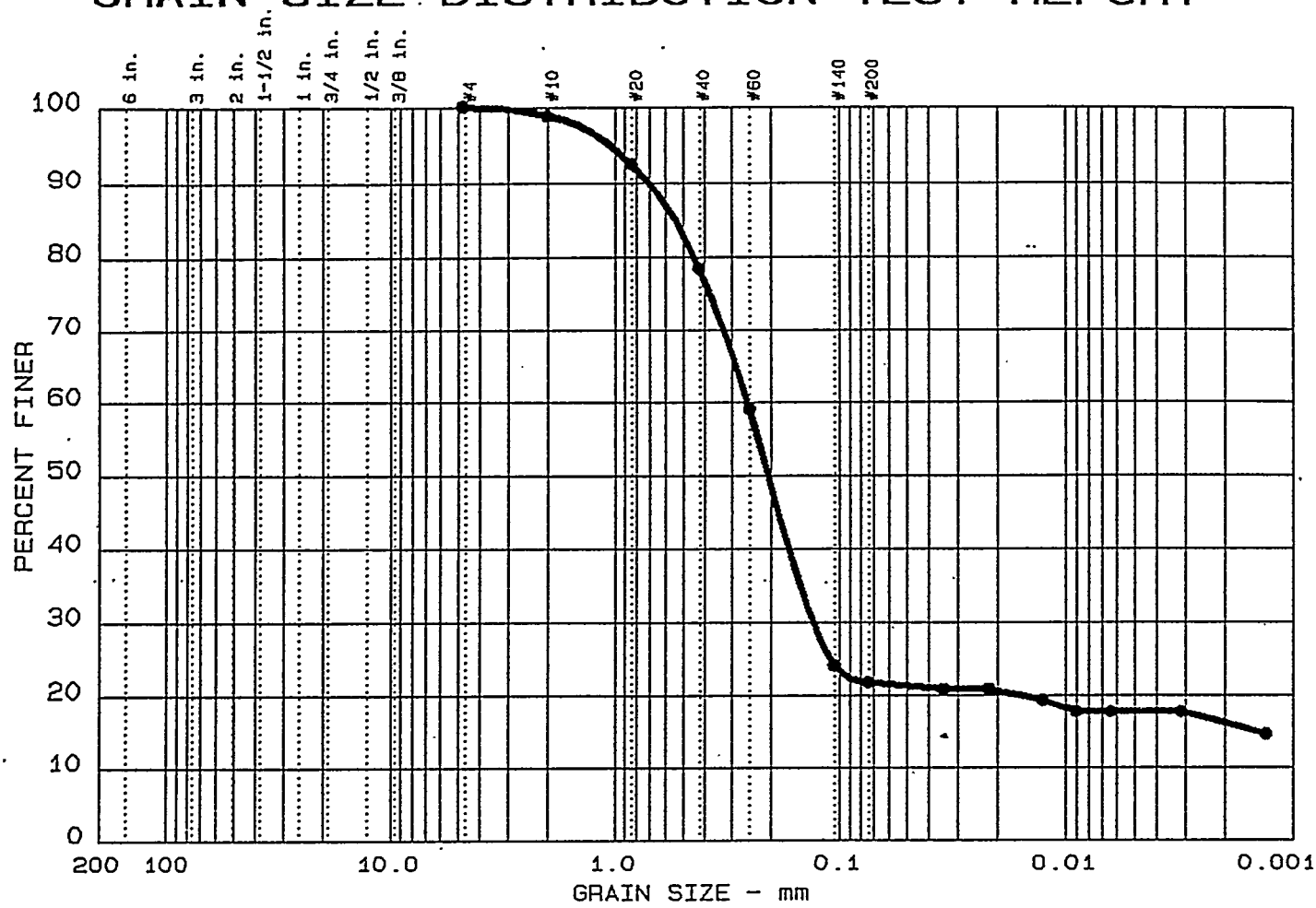
SAMPLE LOCATION: H Bor 54 St-7 @ 39-41 Ft.

PROJ. NO.: 5810575606 DATE: June 10, 1994

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	6	0.0	0.0	78.2	4.1	17.7

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	44	23	0.54	0.26	0.21	0.130	0.0015			

MATERIAL DESCRIPTION	USCS	AASHTO
● Light Brown & Purple Clayey Sand	SC	A-2-7 (0.9)

Project No.: 5810575606
Project: SRS ITP-P3
● Location: H-Bor-23.3 ST-1 @ 49-51.5 Ft.

Date: May 19, 1994

Remarks:

Tested by: CLG

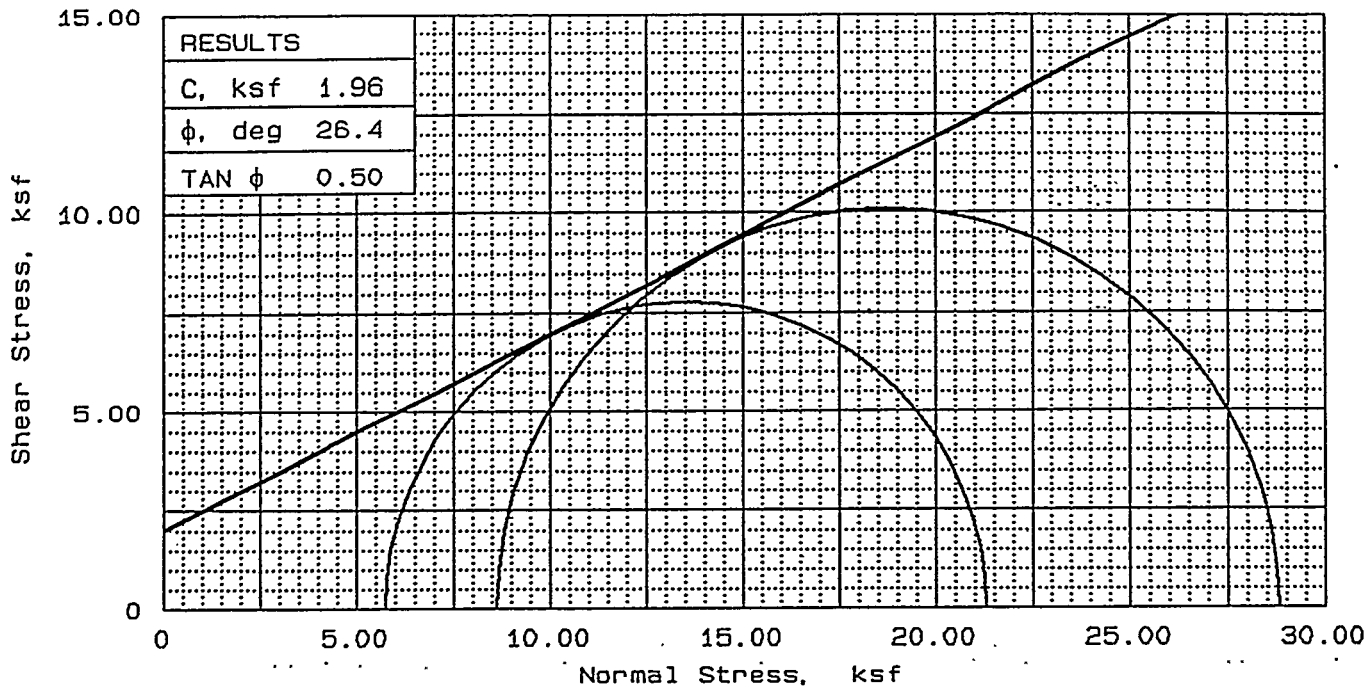
Reviewed by: RLB

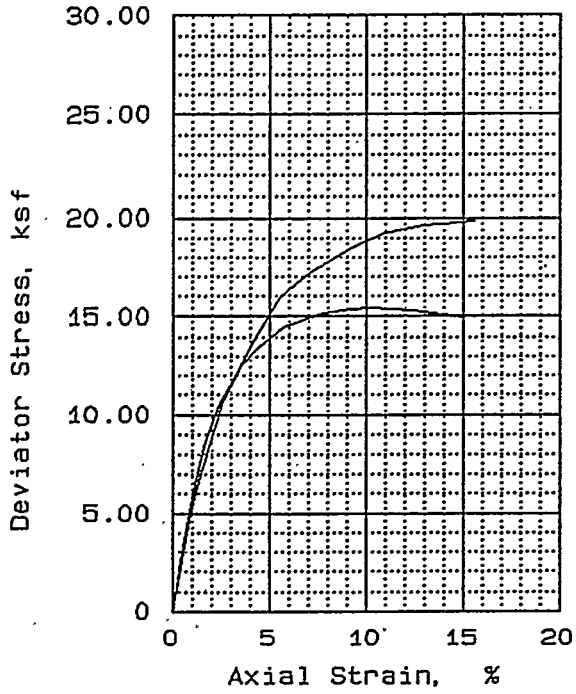
CD-60 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.





	SAMPLE NO.	1	2
INITIAL	WATER CONTENT, %	25.5	25.9
	DRY DENSITY, pcf	93.9	95.5
	SATURATION, %	87.8	92.7
	VOID RATIO	0.775	0.746
	DIAMETER, in	2.87	2.87
	HEIGHT, in	6.00	6.00
AT TEST	WATER CONTENT, %	28.4	26.3
	DRY DENSITY, pcf	94.8	97.9
	SATURATION, %	100.0	100.0
	VOID RATIO	0.759	0.702
	DIAMETER, in	2.86	2.85
	HEIGHT, in	5.98	5.96
BACK PRESSURE, ksf		4.32	4.03
CELL PRESSURE, ksf		10.08	12.67
FAILURE STRESS, ksf		15.56	20.18
PORE PRESSURE, ksf			
STRAIN RATE, %/min.		0.100	0.100
ULTIMATE STRESS, ksf			
PORE PRESSURE, ksf			
σ_1 FAILURE, ksf		21.32	28.82
σ_3 FAILURE, ksf		5.76	8.64

TYPE OF TEST:
Consolidated drained
SAMPLE TYPE: Undisturbed
DESCRIPTION:

LL= PL= PI=
SPECIFIC GRAVITY= 2.67
REMARKS: Tested by: HED

Reviewed by: RLB

FIG. NO.

CLIENT: Westinghouse Savannah River Co.

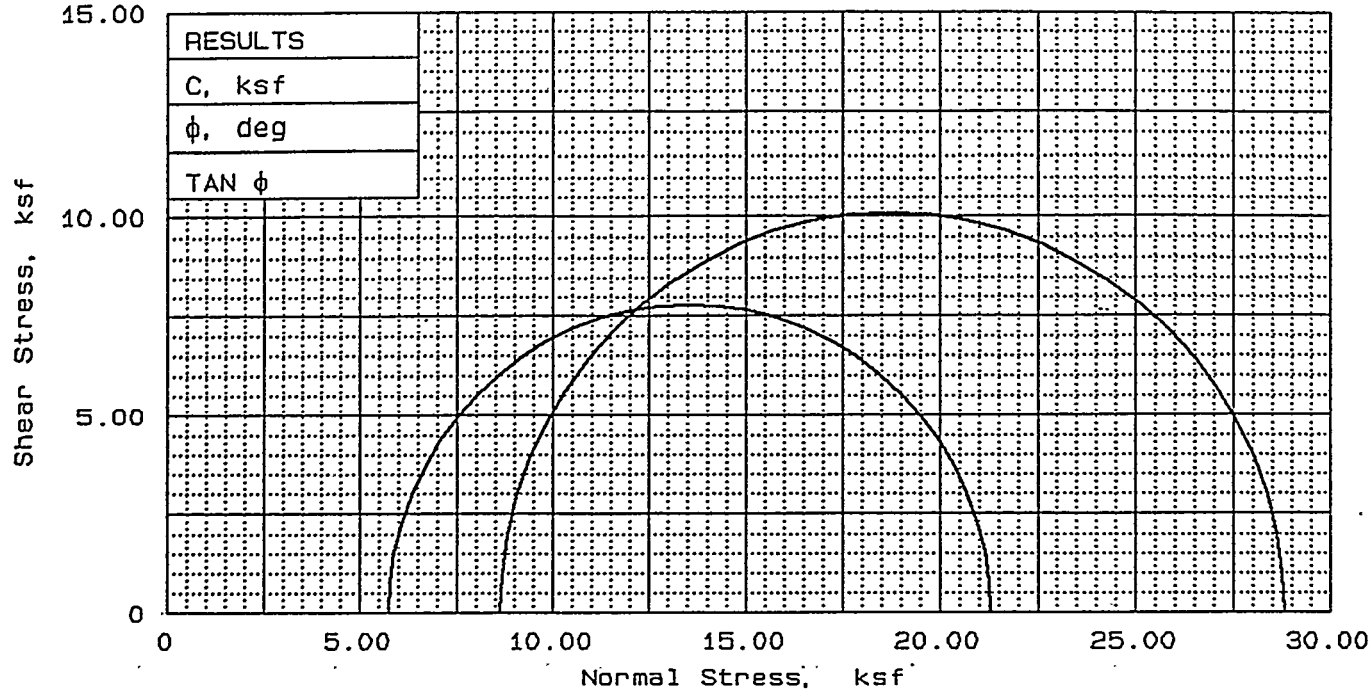
PROJECT: Task Release 6

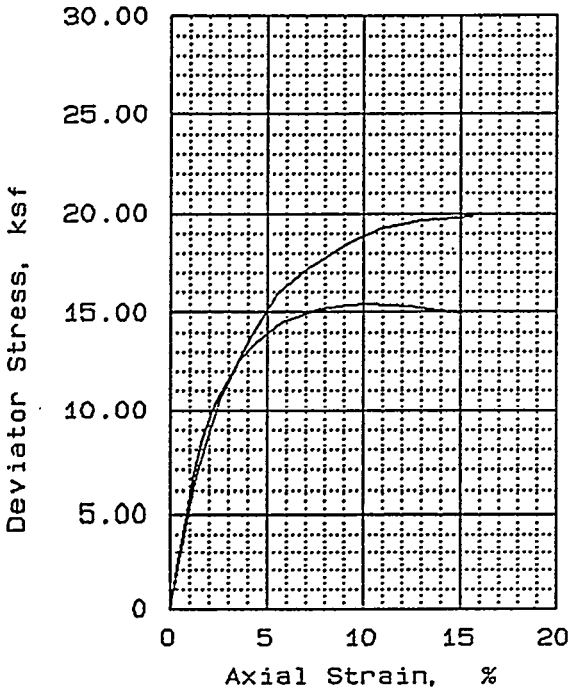
SAMPLE LOCATION: H Bor 23.3 ST-1-@
49-51.5 FT.

PROJ. NO.: 5810575606 DATE: May 27, 1994

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.





SAMPLE NO.		1	2
INITIAL	WATER CONTENT, %	25.5	25.9
	DRY DENSITY, pcf	93.9	95.5
	SATURATION, %	87.8	92.7
	VOID RATIO	0.775	0.746
	DIAMETER, in	2.87	2.87
	HEIGHT, in	6.00	6.00
AT TEST	WATER CONTENT, %	28.4	26.3
	DRY DENSITY, pcf	94.8	97.9
	SATURATION, %	100.0	100.0
	VOID RATIO	0.759	0.702
	DIAMETER, in	2.86	2.85
	HEIGHT, in	5.98	5.96
BACK PRESSURE, ksf		4.32	4.03
CELL PRESSURE, ksf		10.08	12.67
FAILURE STRESS, ksf		15.56	20.18
PORE PRESSURE, ksf			
STRAIN RATE, %/min.		0.100	0.100
ULTIMATE STRESS, ksf			
PORE PRESSURE, ksf			
σ_1 FAILURE, ksf		21.32	28.82
σ_3 FAILURE, ksf		5.76	8.64

TYPE OF TEST:
Consolidated drained
SAMPLE TYPE: Undisturbed
DESCRIPTION:

LL= PL= PI=
SPECIFIC GRAVITY= 2.67
REMARKS: Tested by: HEJ

Reviewed by: RUB

FIG. NO.

CLIENT: Westinghouse Savannah River Co.

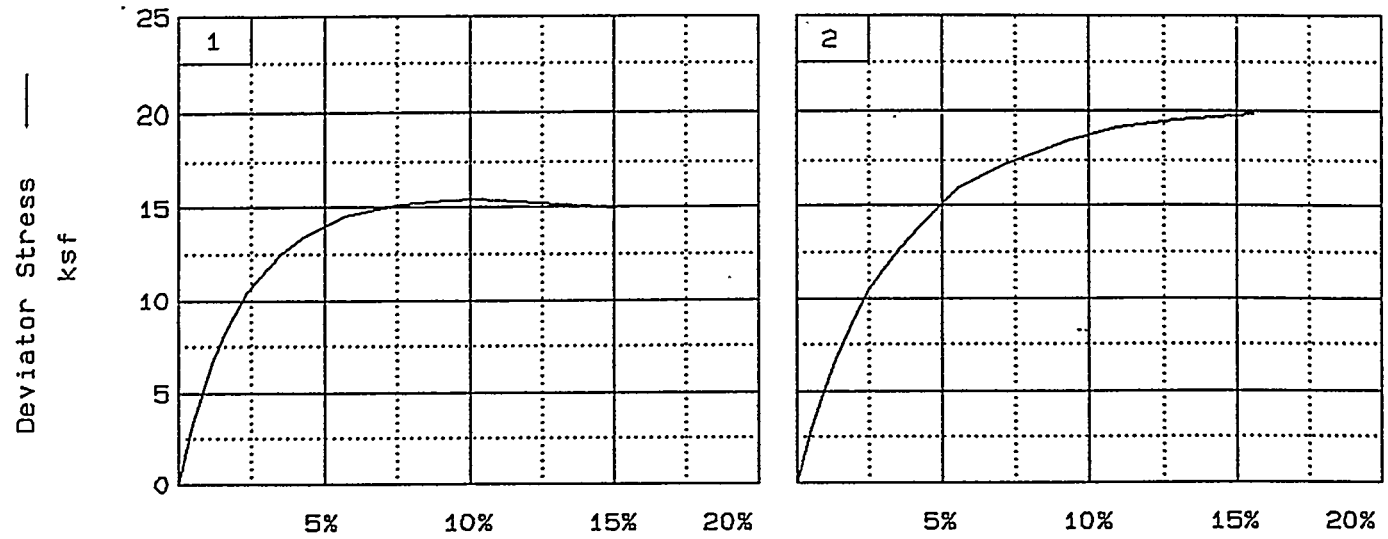
PROJECT: Task Release 6

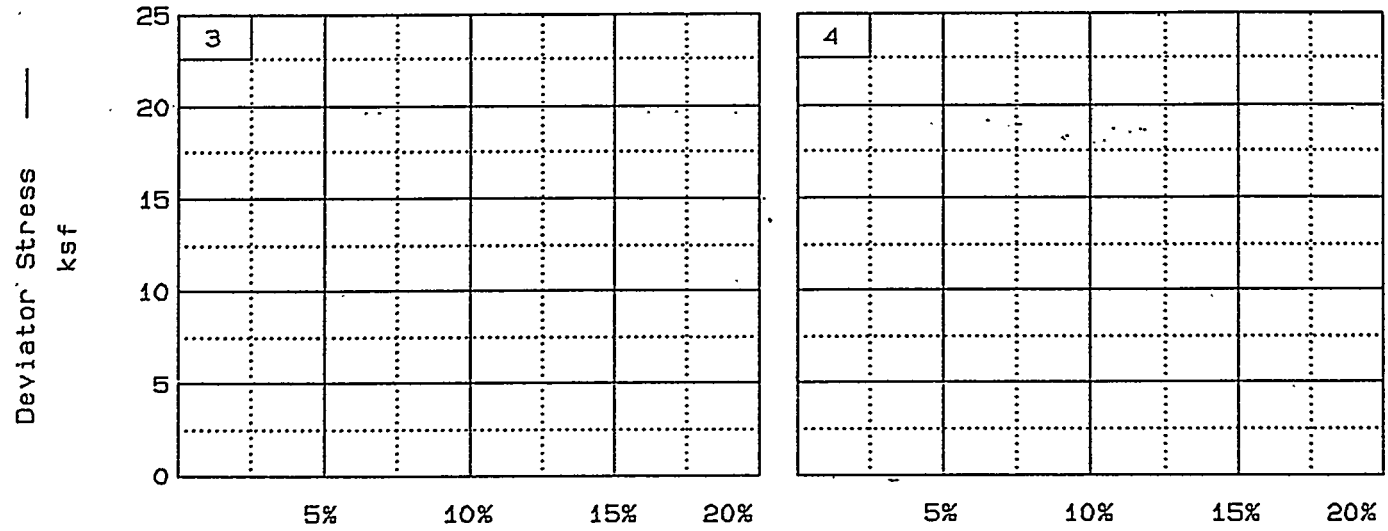
SAMPLE LOCATION: H Bor 23.3 ST-1-8
49-51.5 FT.

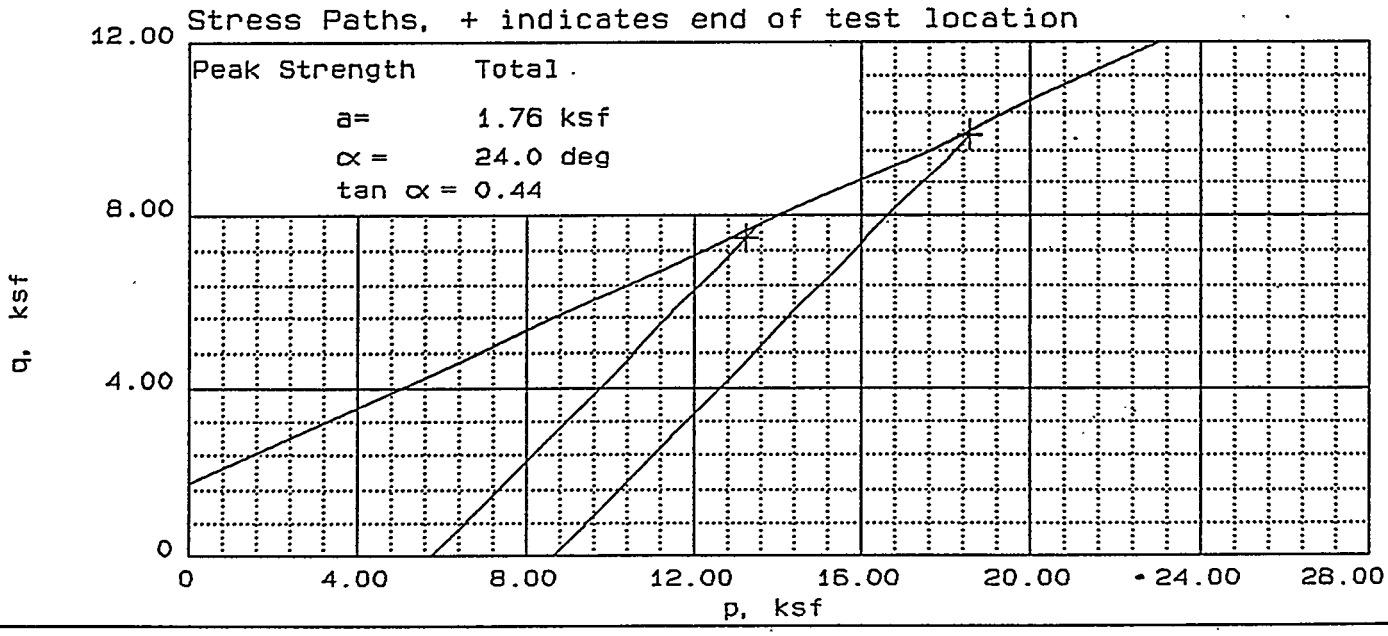
PROJ. NO.: 5810575606 DATE: May 27, 1994

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.





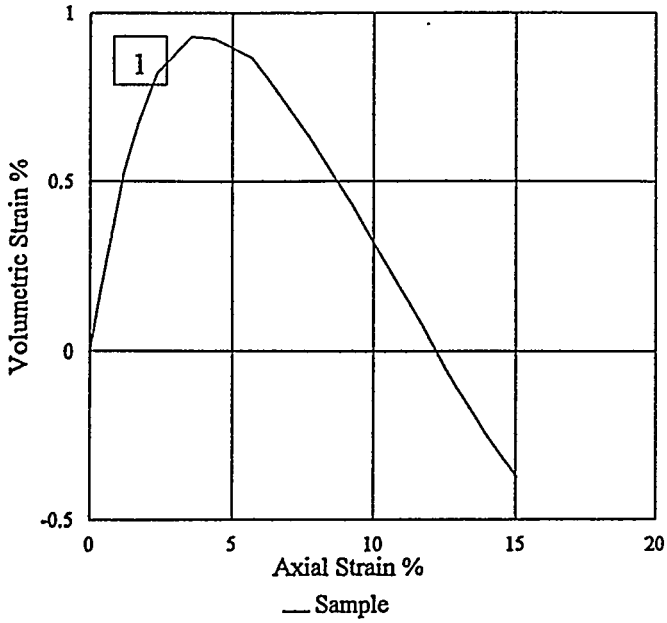


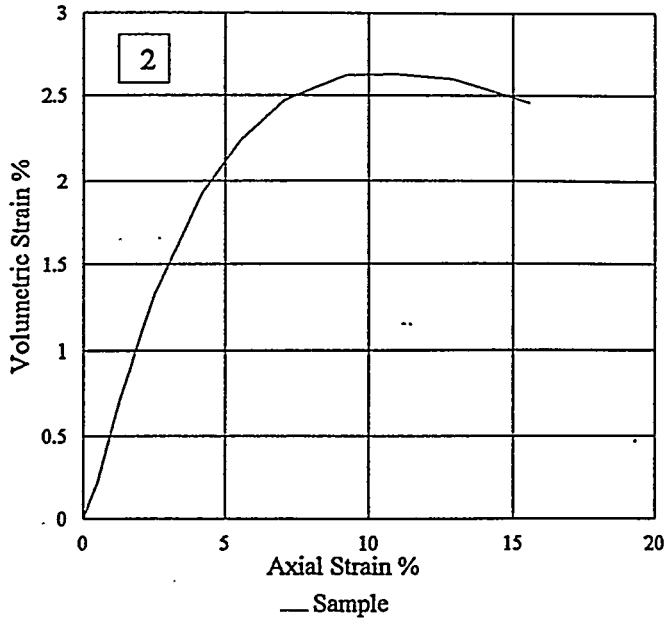
Client: Westinghouse Savannah River Co.

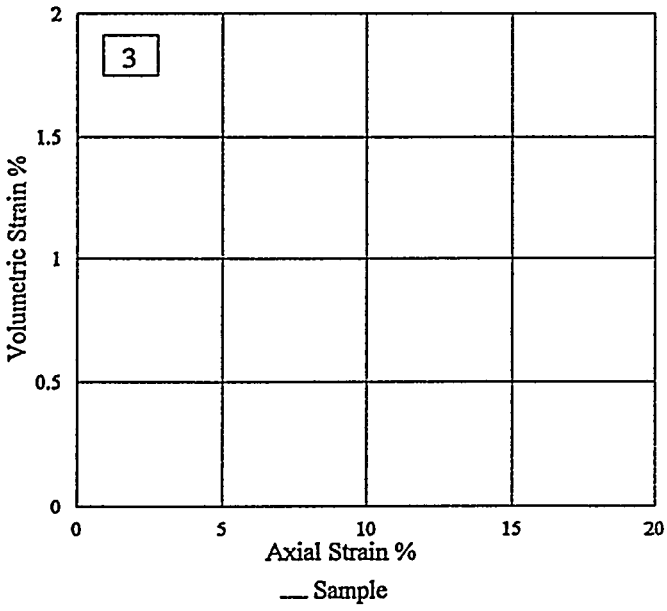
Project: Task Release 6

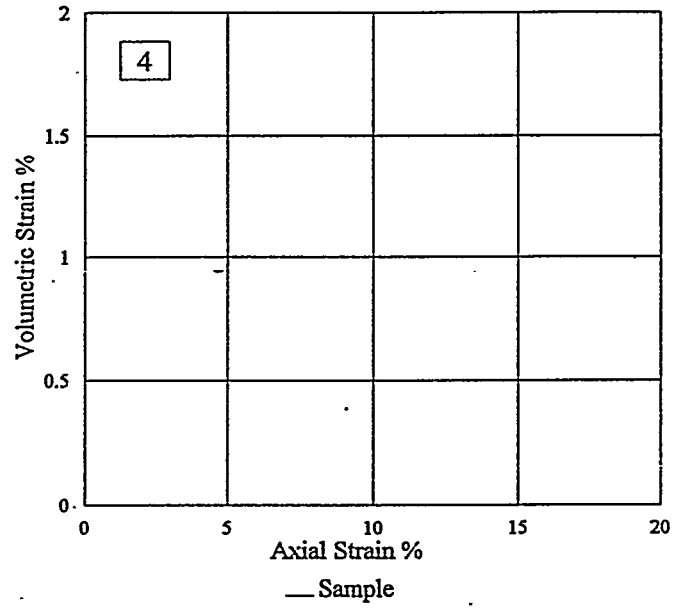
Location: H Bor 23.3 ST-1 @ 49-51.5 FT.

File: 575606E Project No.: 5810575606 Page 2/2 Fig. No. ____

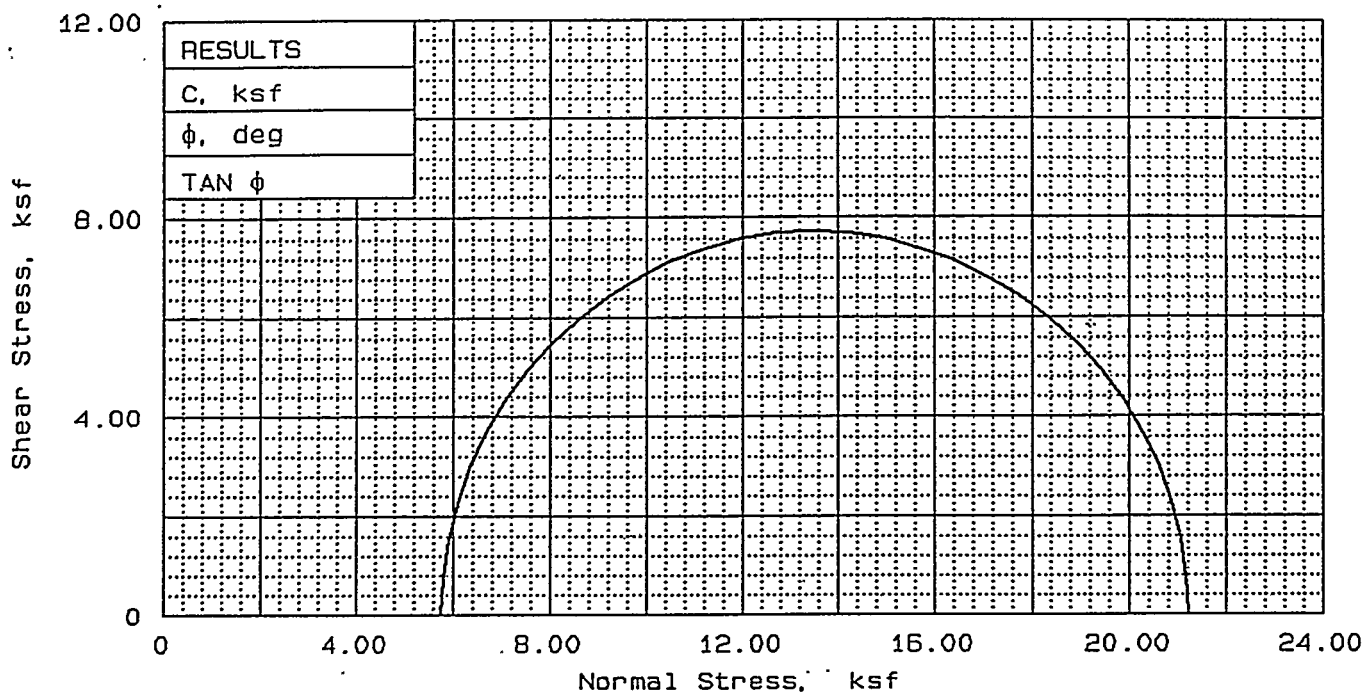


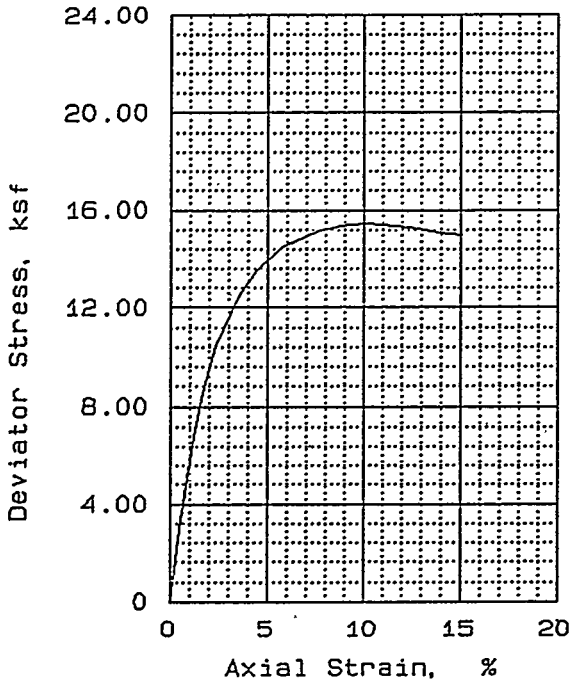






Client: Westinghouse Savannah River Co.
Project: Task Release No. 6
Location: H-Bor-23.3, ST-1 @ 49-51.5 ft.
File: Project No.: 5810575606 Page 2 / 2 Fig. No. _____





SAMPLE NO.		1
INITIAL	WATER CONTENT, %	25.5
	DRY DENSITY, pcf	93.9
	SATURATION, %	87.8
	VOID RATIO	0.775
	DIAMETER, in	2.87
	HEIGHT, in	6.00
AT TEST	WATER CONTENT, %	28.4
	DRY DENSITY, pcf	94.8
	SATURATION, %	100.0
	VOID RATIO	0.759
	DIAMETER, in	2.86
	HEIGHT, in	5.98
BACK PRESSURE, ksf		4.32
CELL PRESSURE, ksf		10.08
FAILURE STRESS, ksf		15.44
PORE PRESSURE, ksf		
STRAIN RATE, %/min.		0.100
ULTIMATE STRESS, ksf		
PORE PRESSURE, ksf		
σ_1 FAILURE, ksf		21.20
σ_3 FAILURE, ksf		5.76

TYPE OF TEST:
Consolidated drained
SAMPLE TYPE: Undisturbed
DESCRIPTION: Red Brown Silty Sand
LL= NL PL= NP PI=
SPECIFIC GRAVITY= 2.67
REMARKS: Tested by: HS

Reviewed by: RLB

FIG. NO.

CLIENT: Westinghouse Savannah River Co.

PROJECT: Task Release 6

SAMPLE LOCATION: H Bor 23.3 ST-1 @ 49-51.5 Ft.

PROJ. NO.: 5810575606 DATE: June 16, 1994

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

TRIAXIAL COMPRESSION TEST
Consolidated drained

6-17-1994
8:30 am

Project Data

Project No.: 5810575606 Date: June 16,1994 Data file: 575606X
Client: Westinghouse Savannah River Co.
Project: Task Release 6
Sample location: H Bor 23.3 ST-1 @ 49-51.5 Ft.
Sample description: Red Brown Silty Sand
Remarks: Tested by: HB
Reviewed by: Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.67 LL= NL PL= NP PI=

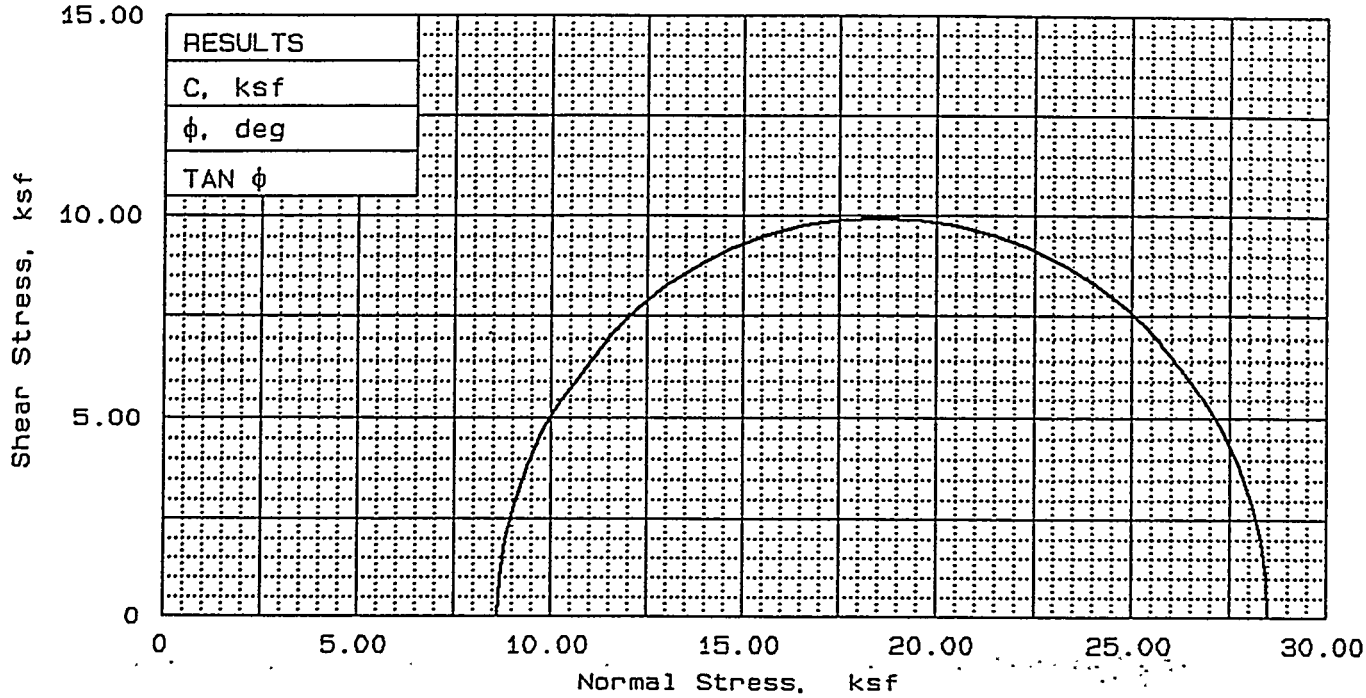
Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.87	2.86	
Height change, in		0.02	
Height, in	6.00	5.98	
Weight, grams	1200.1		
Water volume change, cc	-	-28.22	
Moisture, %	25.5	28.4	19.0
Dry density, pcf	93.9	94.8	
Saturation, %	87.8	100.0	
Void ratio	0.775	0.759	

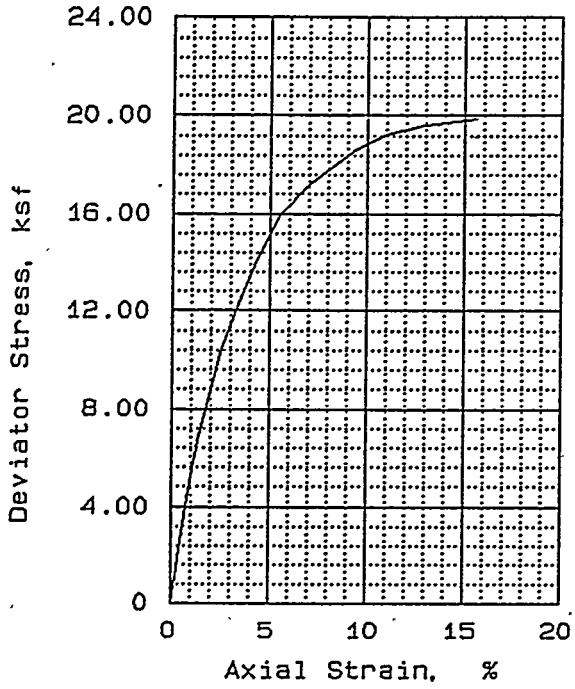
Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 70 psi
Consolidation back pressure = 30 psi
Consolidation effective confining stress = 5.76 ksf
Peak deviator stress = 15.44 ksf at reading no. 10
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	5.76	5.76	1.00	5.76	0.00
1	0.0300	0.030	150.00	150.0	0.5	3.34	5.76	9.10	1.58	7.43	1.67
2	0.0700	0.070	309.00	309.0	1.2	6.84	5.76	12.60	2.19	9.18	3.42
3	0.1000	0.100	390.00	390.0	1.7	8.59	5.76	14.35	2.49	10.05	4.29
4	0.1400	0.140	478.00	478.0	2.3	10.45	5.76	16.21	2.81	10.99	5.23
[illegible]	[illegible].2100	0.210	579.00	579.0	3.5	12.51	5.76	18.27	3.17	12.02	6.26

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	0.2600	0.260	630.00	630.0	4.3	13.50	5.76	19.26	3.34	12.51	6.75
	.3400	0.340	687.00	687.0	5.7	14.51	5.76	20.27	3.52	13.02	7.26
8	0.4600	0.460	735.00	735.0	7.7	15.19	5.76	20.95	3.64	13.36	7.60
9	0.5500	0.550	756.00	756.0	9.2	15.37	5.76	21.13	3.67	13.45	7.69
10	0.6100	0.610	768.00	768.0	10.2	15.44	5.76	21.20	3.68	13.48	7.72
11	0.7400	0.740	778.00	778.0	12.4	15.27	5.76	21.03	3.65	13.39	7.63
12	0.8300	0.830	782.00	782.0	13.9	15.08	5.76	20.84	3.62	13.30	7.54
13	0.9000	0.900	786.00	786.0	15.1	14.95	5.76	20.71	3.60	13.24	7.48





SAMPLE NO.		1
INITIAL	WATER CONTENT, %	25.9
	DRY DENSITY, pcf	95.5
	SATURATION, %	92.7
	VOID RATIO	0.746
	DIAMETER, in	2.87
	HEIGHT, in	6.00
AT TEST	WATER CONTENT, %	26.3
	DRY DENSITY, pcf	97.9
	SATURATION, %	100.0
	VOID RATIO	0.702
	DIAMETER, in	2.85
	HEIGHT, in	5.96
BACK PRESSURE, ksf		4.03
CELL PRESSURE, ksf		12.67
FAILURE STRESS, ksf		19.86
PORE PRESSURE, ksf		
STRAIN RATE, %/min.		0.100
ULTIMATE STRESS, ksf		
PORE PRESSURE, ksf		
σ_1 FAILURE, ksf		28.50
σ_3 FAILURE, ksf		8.64

TYPE OF TEST:
Consolidated drained
SAMPLE TYPE: Undisturbed
DESCRIPTION: Light Brown & Purple Clayey Sand
LL= 44 PL= 23 PI= 21.0
SPECIFIC GRAVITY= 2.67
REMARKS: Tested by: HEJ

Reviewed by: RLB

FIG. NO.

CLIENT: Westinghouse Savannah River Co.

PROJECT: Task Release 6

SAMPLE LOCATION: H Bor 23.3 St-1.@ 49-51.5 Ft.

PROJ. NO.: 5810575606 DATE: May 27, 1994

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

TRIAXIAL COMPRESSION TEST
Consolidated drained

6-08-1994
11:00 am

Project Data

Project No.: 5810575606 Date: May 27,1994 Data file: 575606H
Client: Westinghouse Savannah River Co.
Project: Task Release 6
Sample location: H Bor 23.3 St-1 @ 49-51.5 Ft.
Sample description: Light Brown & Purple Clayey Sand
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.67 LL= 44 PL= 23 PI= 21

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.87	2.85	
Height change, in		0.04	
Height, in	6.00	5.96	
Weight, grams	1227.3		
Water volume change, cc		-3.95	
Moisture, %	25.9	26.3	21.1
Dry density, pcf	95.5	97.9	
Saturation, %	92.7	100.0	
Void ratio	0.746	0.702	

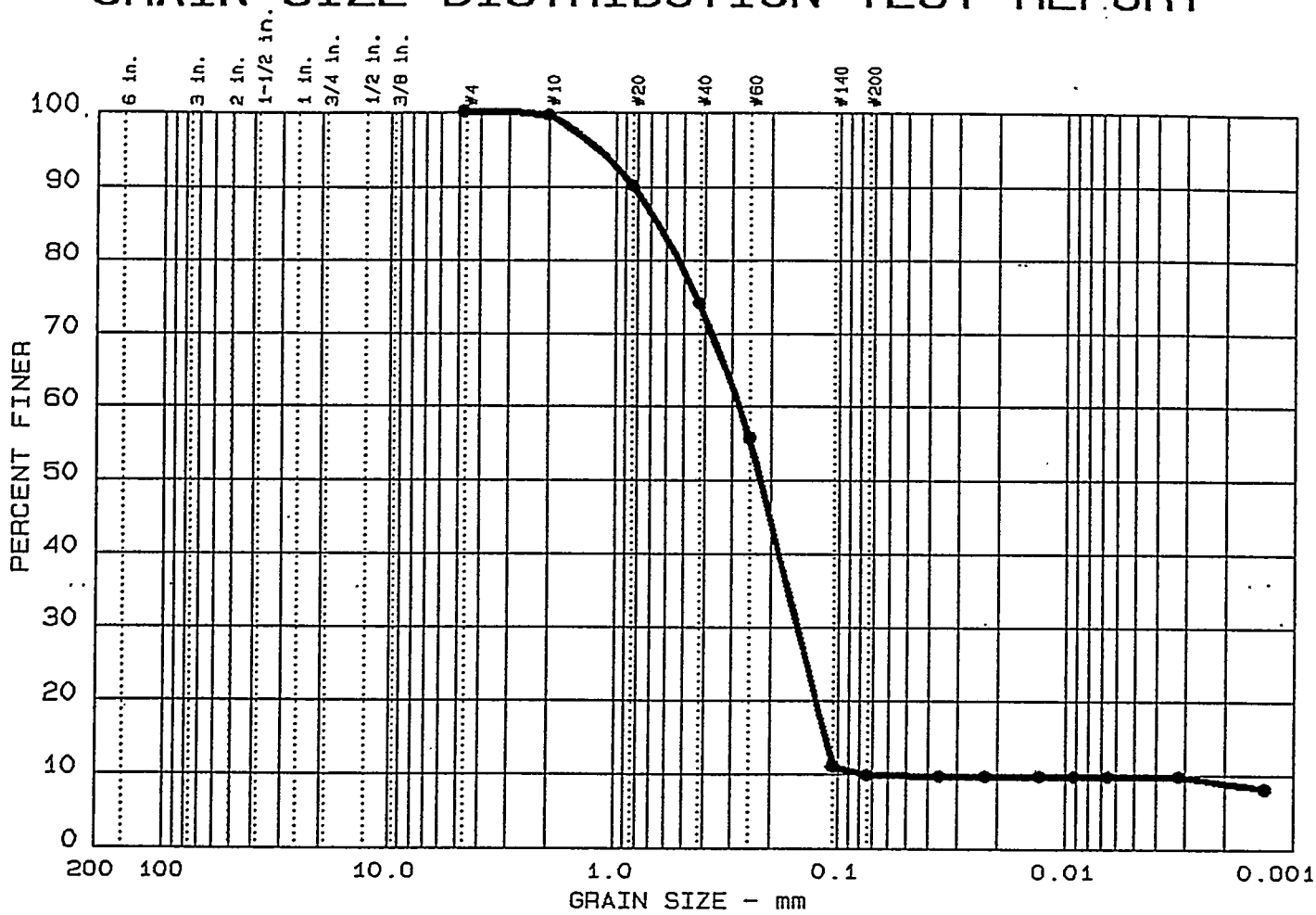
Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 88 psi
Consolidation back pressure = 28 psi
Consolidation effective confining stress = 8.64 ksf
Peak deviator stress = 19.86 ksf at reading no. 13
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	8.64	8.64	1.00	8.64	0.00
1	0.0300	0.030	132.00	132.0	0.5	2.97	8.64	11.61	1.34	10.13	1.49
2	0.0500	0.050	207.00	207.0	0.8	4.64	8.64	13.28	1.54	10.96	2.32
3	0.0800	0.080	300.00	300.0	1.3	6.70	8.64	15.34	1.78	11.99	3.35
4	0.1100	0.110	378.00	378.0	1.8	8.40	8.64	17.04	1.97	12.84	4.20
5	0.1500	0.150	475.00	475.0	2.5	10.48	8.64	19.12	2.21	13.88	5.24

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
6	0.2000	0.200	561.00	561.0	3.4	12.27	8.64	20.91	2.42	14.77	6.13
	0.2500	0.250	639.00	639.0	4.2	13.85	8.64	22.49	2.60	15.57	6.93
	0.3300	0.330	747.00	747.0	5.5	15.97	8.64	24.61	2.85	16.62	7.98
9	0.4200	0.420	819.00	819.0	7.0	17.23	8.64	25.87	2.99	17.25	8.61
10	0.5500	0.550	903.00	903.0	9.2	18.55	8.64	27.19	3.15	17.91	9.27
11	0.6500	0.650	955.00	955.0	10.9	19.25	8.64	27.89	3.23	18.27	9.63
12	0.7700	0.770	996.00	996.0	12.9	19.62	8.64	28.26	3.27	18.45	9.81
13	0.9300	0.930	1040.00	1040.0	15.6	19.86	8.64	28.50	3.30	18.57	9.93

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	5	0.0	0.0	90.1	0.2	9.7

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	34	17	0.65	0.28	0.22	0.152	0.1132	0.0757	1.09	3.7

MATERIAL DESCRIPTION	USCS	AASHTO
● Light Red Brown Poorly Graded Sand with Clay	SP-SC	A-2-6 (0.0)

Project No.: 5810575606
Project: SRS ITP-P3
● Location: H-Bor-23.3 ST-2 @ 64-65.5 Ft.

Date: May 19, 1994

Remarks:

Tested by: CLG

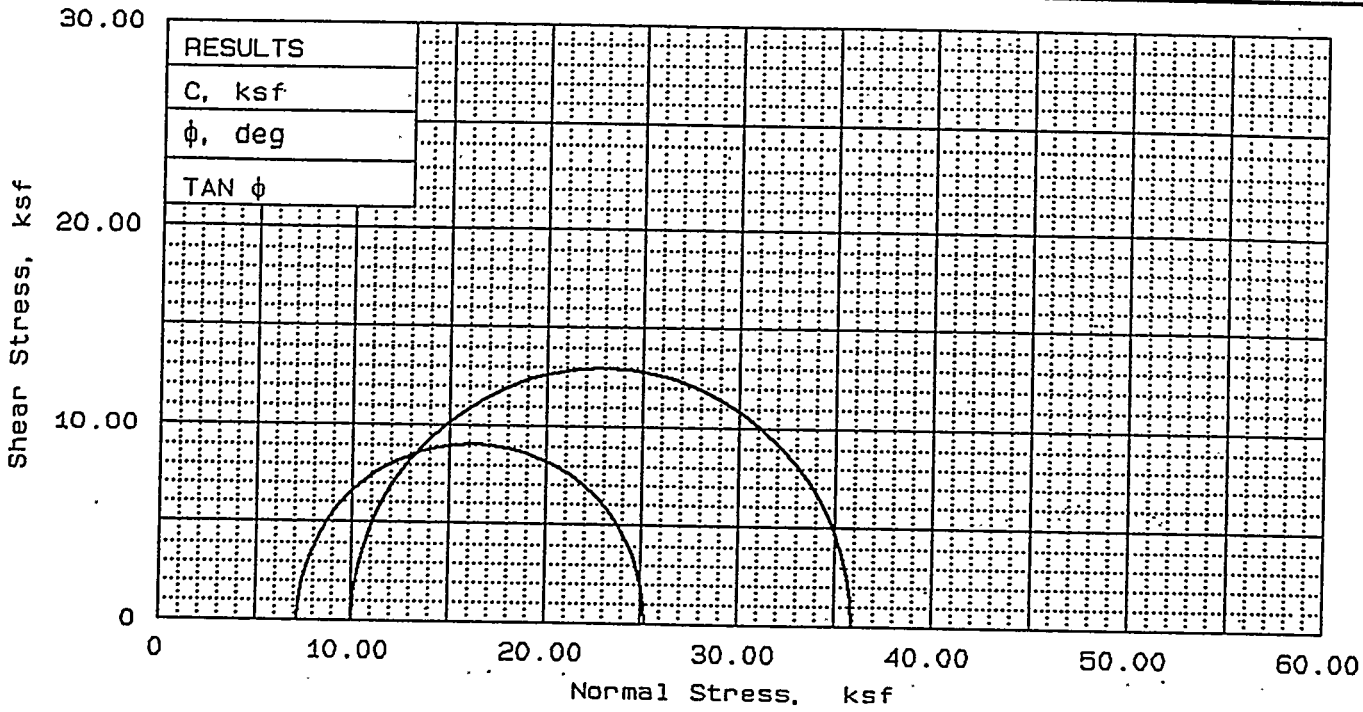
Reviewed by: RLB

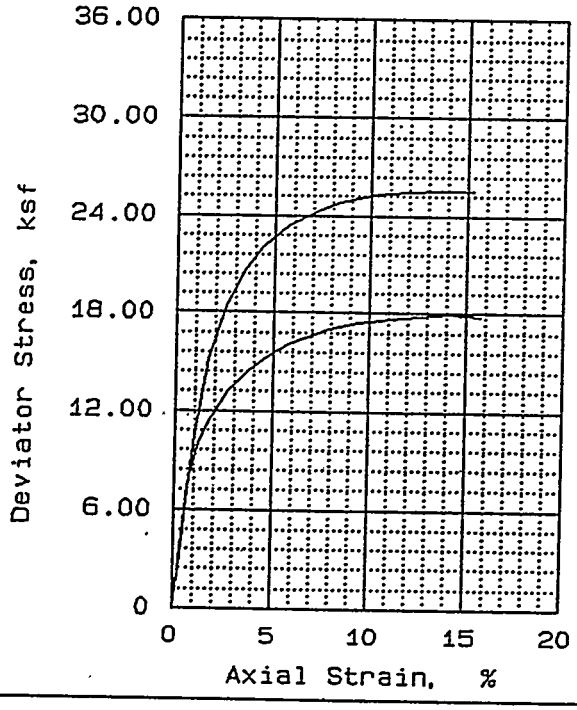
CD-50 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.





SAMPLE NO.		1	2
INITIAL	WATER CONTENT, %	26.0	22.6
	DRY DENSITY, pcf	94.7	100.3
	SATURATION, %	90.6	90.1
	VOID RATIO	0.774	0.674
	DIAMETER, in	2.87	2.87
	HEIGHT, in	6.00	6.00
AT TEST	WATER CONTENT, %	28.2	24.2
	DRY DENSITY, pcf	95.5	101.7
	SATURATION, %	100.0	100.0
	VOID RATIO	0.758	0.651
	DIAMETER, in	2.87	2.86
	HEIGHT, in	5.98	5.97
BACK PRESSURE, ksf		5.18	5.18
CELL PRESSURE, ksf		12.38	15.26
FAILURE STRESS, ksf		18.07	25.85
PORE PRESSURE, ksf			
STRAIN RATE, %/min.		0.100	0.100
ULTIMATE STRESS, ksf			
PORE PRESSURE, ksf			
σ_1 FAILURE, ksf		25.27	35.93
σ_3 FAILURE, ksf		7.2	10.08

TYPE OF TEST:
Consolidated drained

SAMPLE TYPE: Undisturbed

DESCRIPTION:

LL= PL= PI=

SPECIFIC GRAVITY= 2.69

REMARKS: Tested by: HEJ

Rviewed by: RLB

FIG. NO.

CLIENT: Westinghouse Savannah River Co.

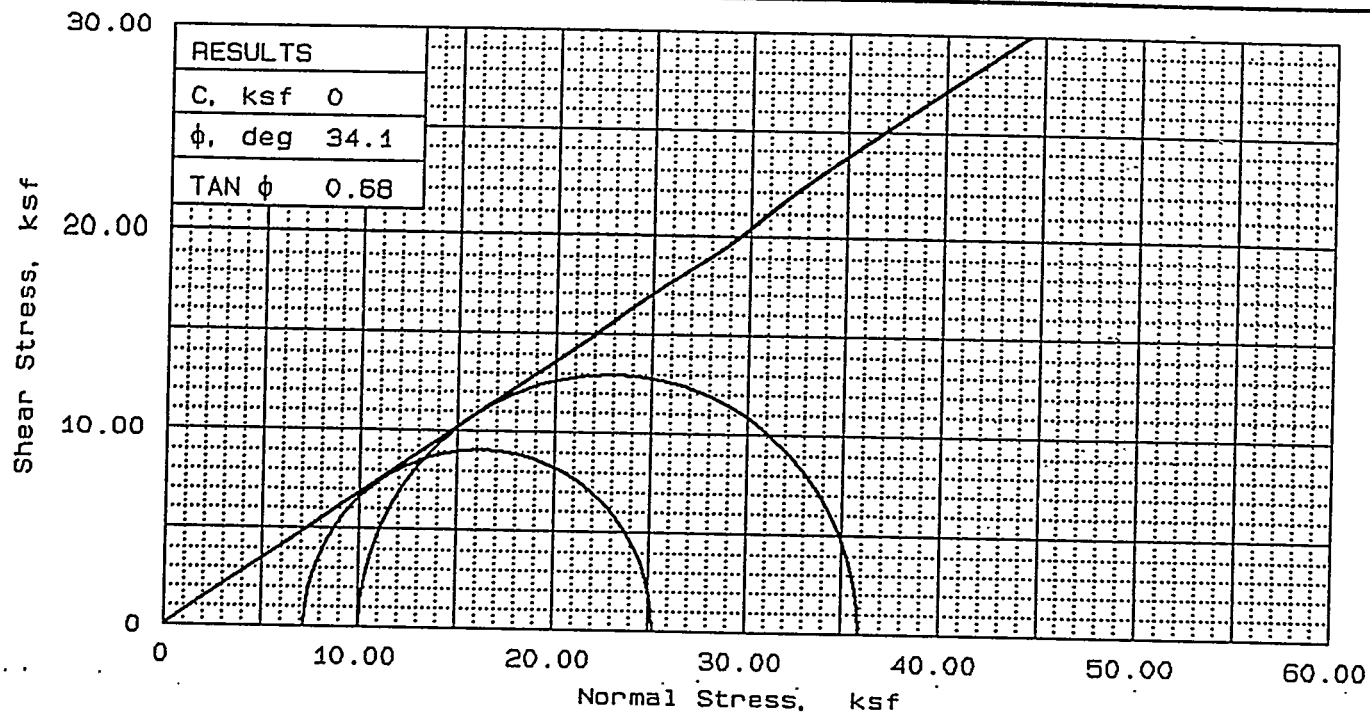
PROJECT: Task Release 6

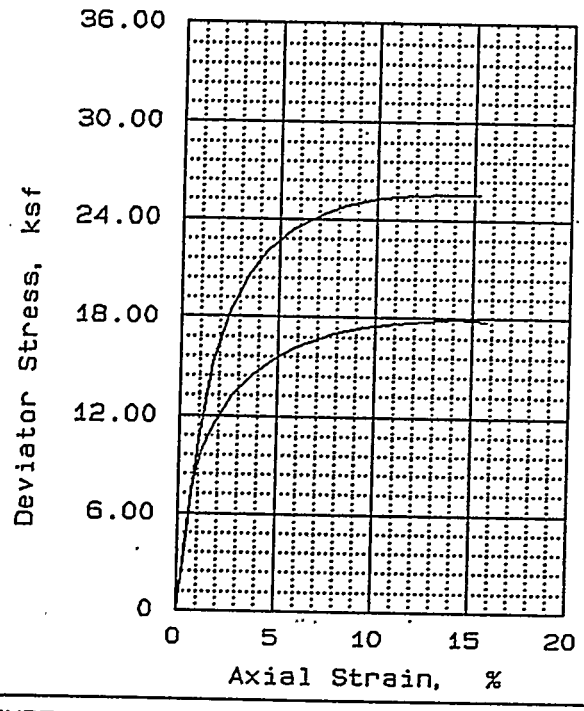
SAMPLE LOCATION: H Bor ST-2 @ 64-65.5 Ft.

PROJ. NO.: 581575606 DATE: May 26, 1994

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.





SAMPLE NO.		1	2
INITIAL	WATER CONTENT, %	26.0	22.6
	DRY DENSITY, pcf	94.7	100.3
	SATURATION, %	90.6	90.1
	VOID RATIO	0.774	0.674
	DIAMETER, in	2.87	2.87
	HEIGHT, in	6.00	6.00
AT TEST	WATER CONTENT, %	28.2	24.2
	DRY DENSITY, pcf	95.5	101.7
	SATURATION, %	100.0	100.0
	VOID RATIO	0.758	0.651
	DIAMETER, in	2.87	2.86
	HEIGHT, in	5.98	5.97
BACK PRESSURE, ksf		5.18	5.18
CELL PRESSURE, ksf		12.38	15.26
FAILURE STRESS, ksf		18.07	25.85
PORE PRESSURE, ksf			
STRAIN RATE, %/min.		0.100	0.100
ULTIMATE STRESS, ksf			
PORE PRESSURE, ksf			
σ_1 FAILURE, ksf		25.27	35.93
σ_3 FAILURE, ksf		7.2	10.08

TYPE OF TEST:
Consolidated drained
SAMPLE TYPE: Undisturbed
DESCRIPTION:

LL= PL= PI=
SPECIFIC GRAVITY= 2.69
REMARKS: Tested by: HED

Rviewed by: RLB

FIG. NO.

CLIENT: Westinghouse Savannah River Co.

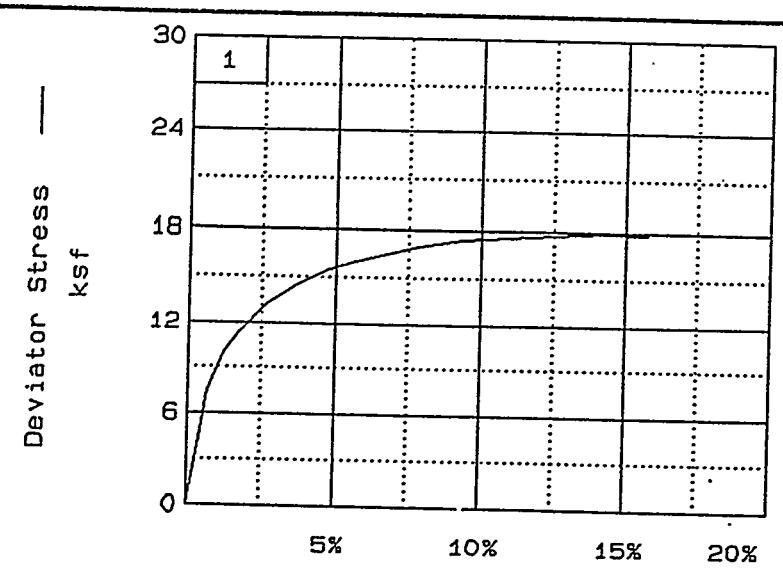
PROJECT: Task Release 6

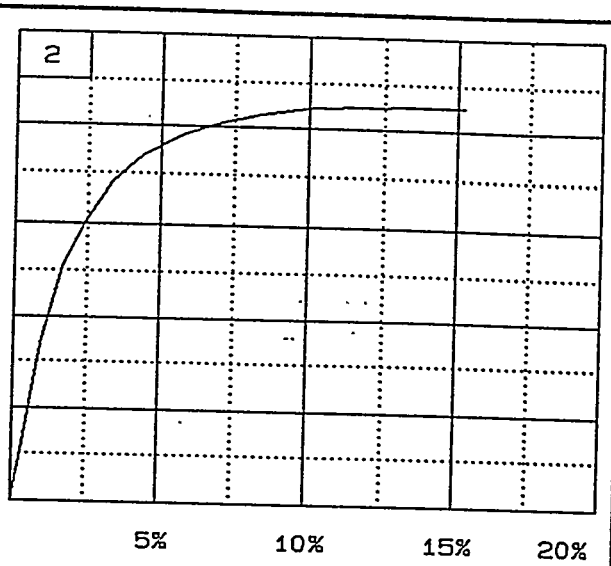
SAMPLE LOCATION: H Bor ST-2 @ 64-65.5 Ft.

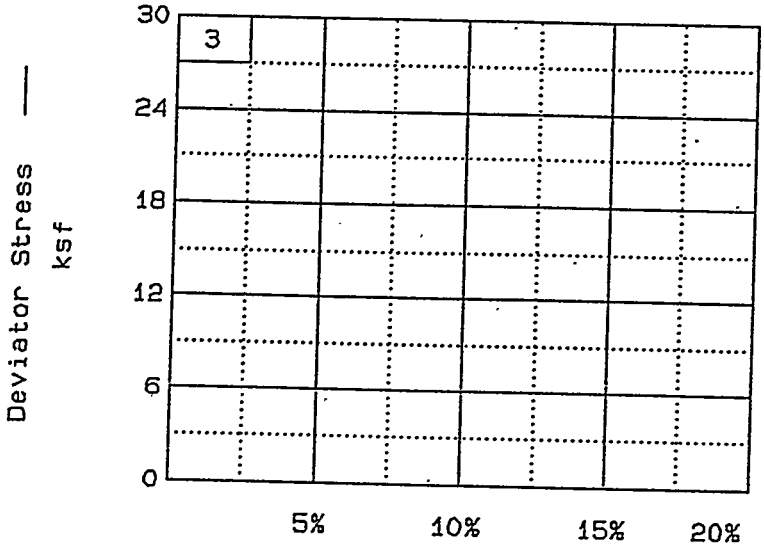
PROJ. NO.: 581575606 DATE: May 26, 1994

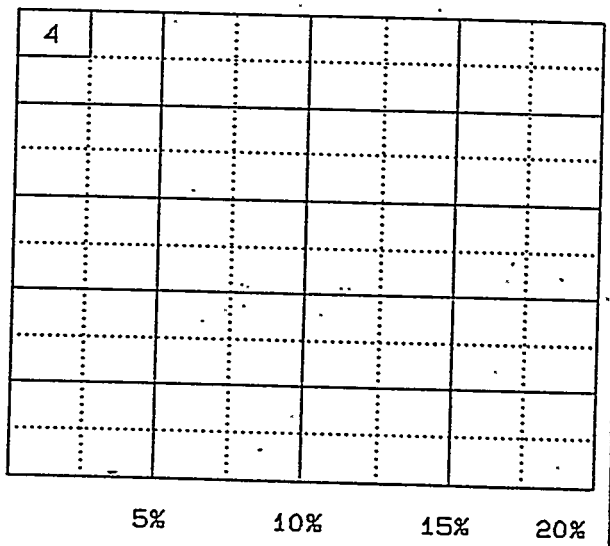
TRIAXIAL COMPRESSION TEST

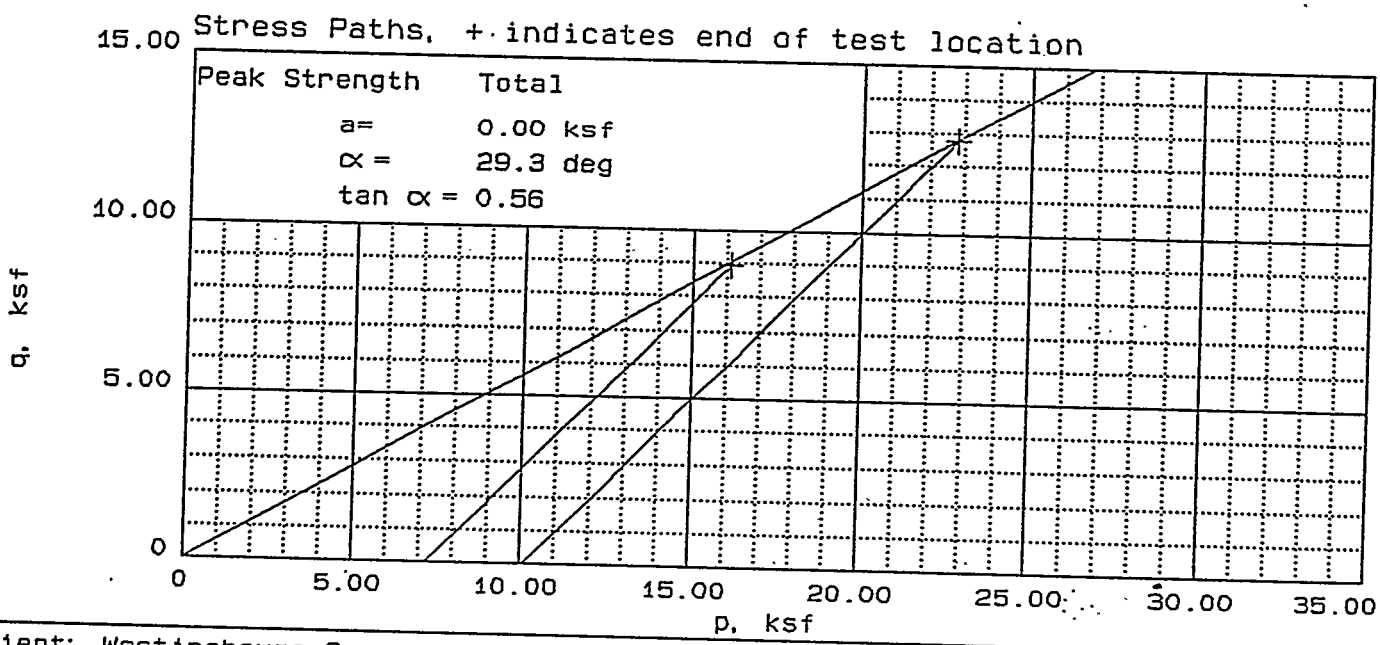
LAW ENGINEERING, INC.



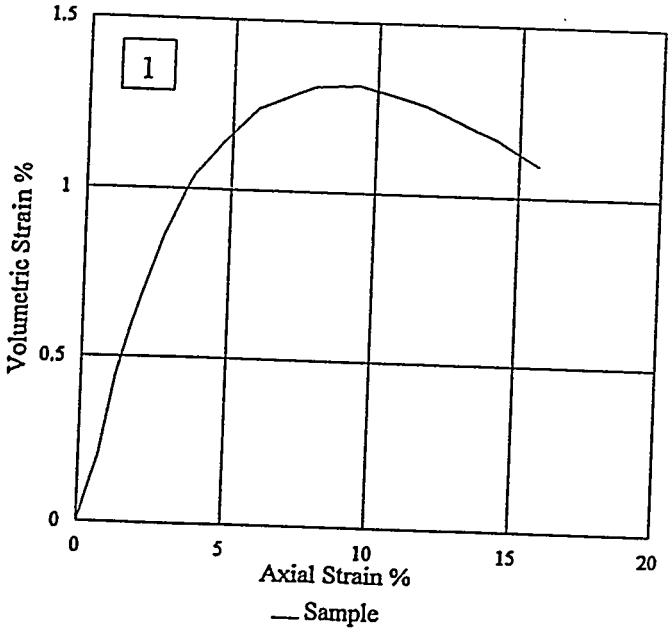


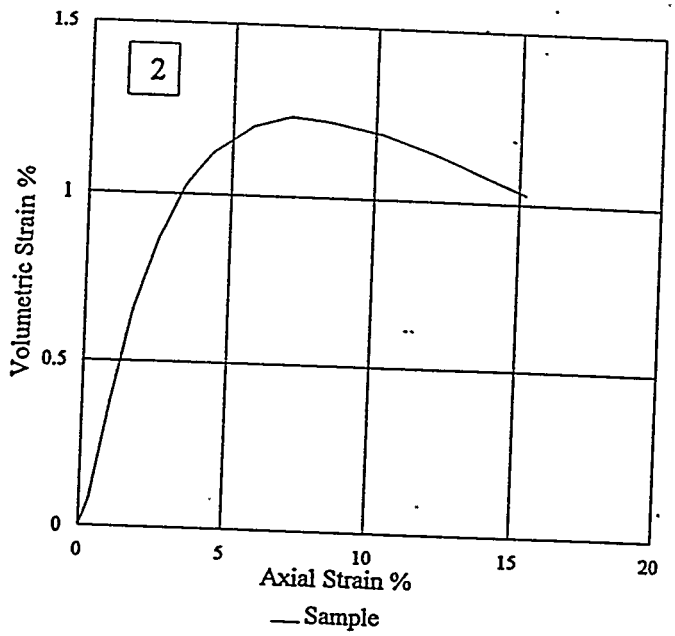


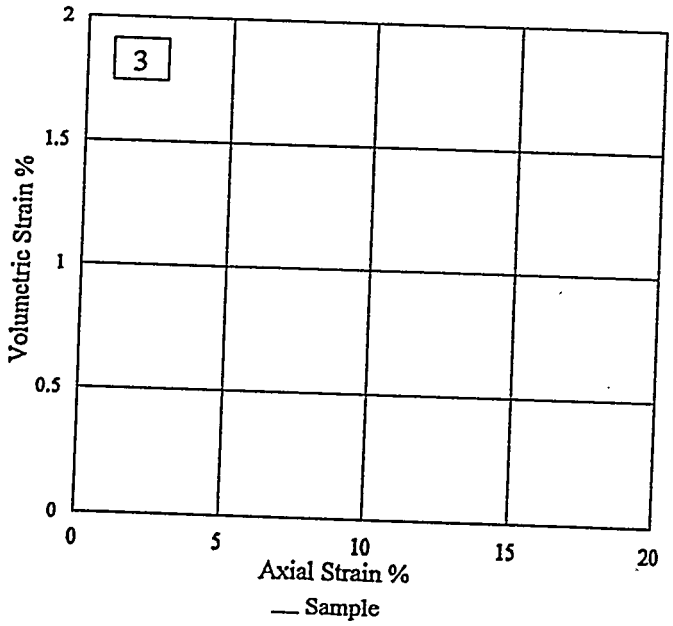


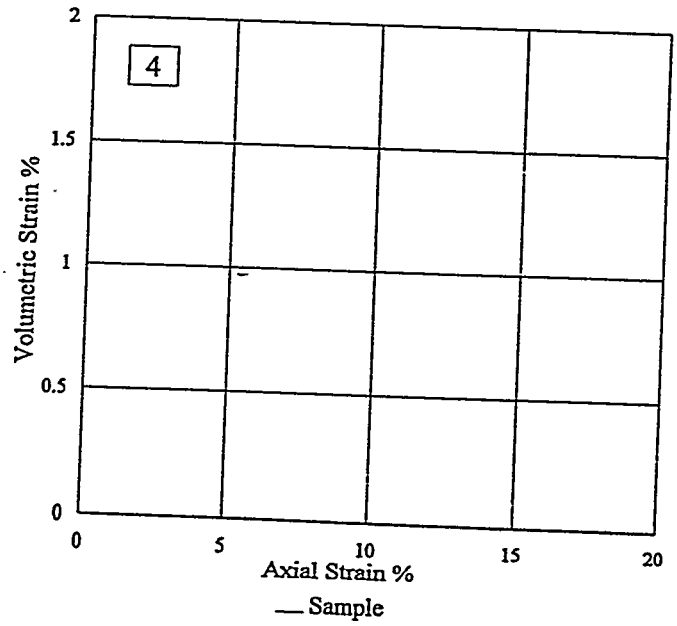


Client: Westinghouse Savannah River Co.
Project: Task Release 6
Location: H Bor ST-2 @ 64-65.5 Ft.
File: 575606D Project No.: 581575606 Page 2/2 Fig. No. ____

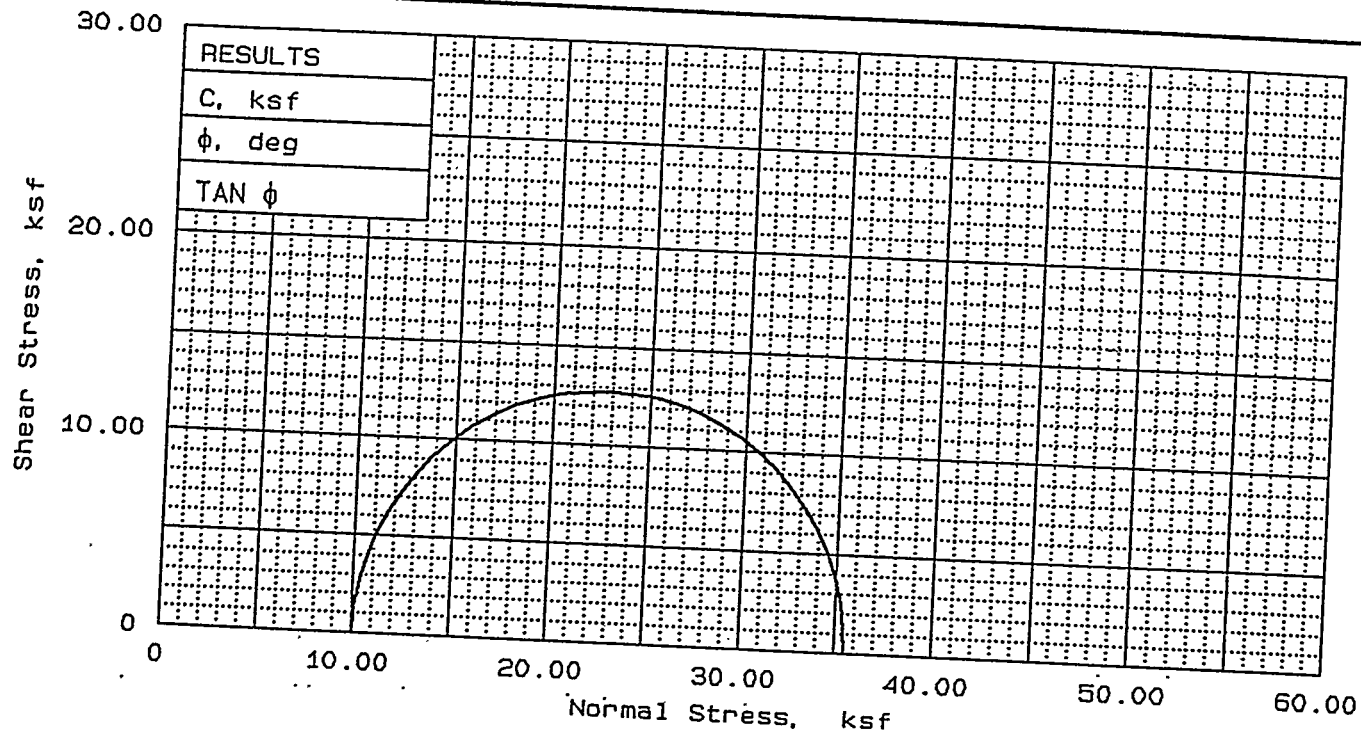


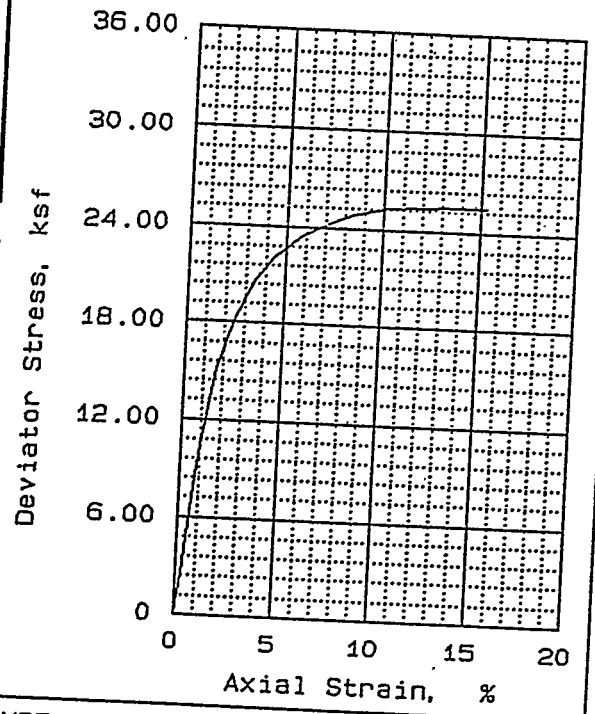






Client: Westinghouse Savannah River Co.
Project: Task Release No. 6
Location: H-Bor-23.3, ST-2 @ 64-65.5 ft.
File: Project No.: 5810575606 Page 2 / 2 Fig. No. _____





SAMPLE NO.		1
INITIAL	WATER CONTENT, %	22.6
	DRY DENSITY, pcf	100.3
	SATURATION, %	90.6
	VOID RATIO	0.668
	DIAMETER, in	2.87
	HEIGHT, in	6.00
AT TEST	WATER CONTENT, %	24.2
	DRY DENSITY, pcf	101.5
	SATURATION, %	100.0
	VOID RATIO	0.649
	DIAMETER, in	2.86
	HEIGHT, in	5.97
BACK PRESSURE, ksf		5.18
CELL PRESSURE, ks,		15.26
FAILURE STRESS, ksf		25.50
PORE PRESSURE, ksf		
STRAIN RATE, %/min.		0.100
ULTIMATE STRESS, ksf		
PORE PRESSURE, ksf		
σ_1 FAILURE, ksf		35.58
σ_3 FAILURE, ksf		10.08

TYPE OF TEST:
Consolidated drained
SAMPLE TYPE: Undisturbed
DESCRIPTION: Light Red Brown
Well Graded Sand with Clay
LL= 34 PL= 13 PI= 21.0
SPECIFIC GRAVITY= 2.68
REMARKS: Tested by: HEJ

Reviewed by: RLB

FIG. NO.

CLIENT: Westinghouse Savannah River Co.

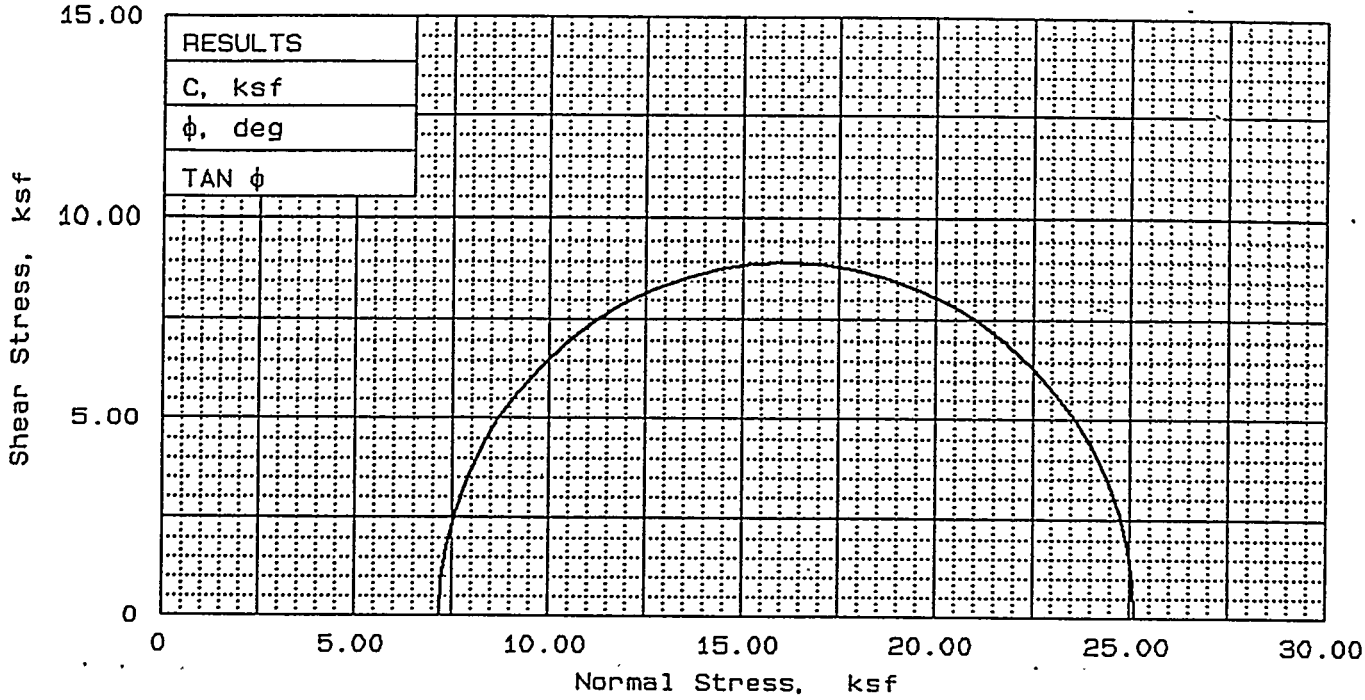
PROJECT: Task Release 6

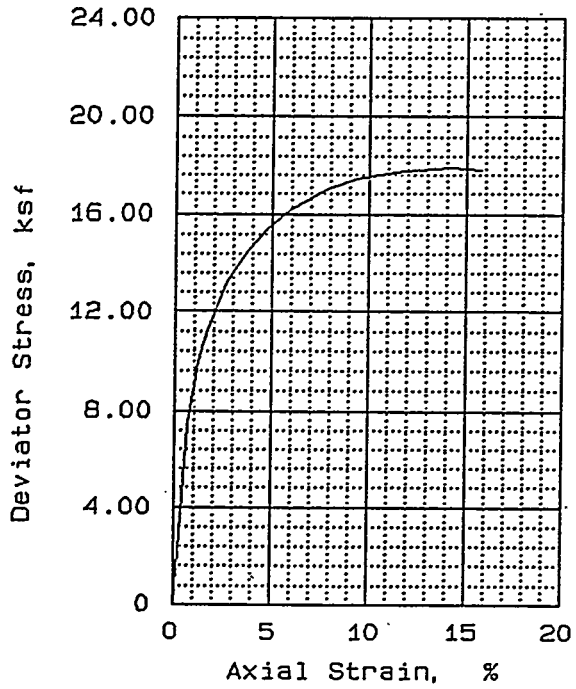
SAMPLE LOCATION: H Bor 23.3 St-2 @
64-65.5 Ft.

PROJ. NO.: 5810575606 DATE: May 26, 1994

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.





SAMPLE NO.		1
INITIAL	WATER CONTENT, %	26.0
	DRY DENSITY, pcf	94.7
	SATURATION, %	90.6
	VOID RATIO	0.774
	DIAMETER, in	2.87
	HEIGHT, in	6.00
AT TEST	WATER CONTENT, %	28.2
	DRY DENSITY, pcf	95.5
	SATURATION, %	100.0
	VOID RATIO	0.758
	DIAMETER, in	2.87
	HEIGHT, in	5.98
BACK PRESSURE, ksf		5.18
CELL PRESSURE, ksf		12.38
FAILURE STRESS, ksf		17.93
PORE PRESSURE, ksf		
STRAIN RATE, %/min.		0.100
ULTIMATE STRESS, ksf		
PORE PRESSURE, ksf		
σ_1 FAILURE, ksf		25.13
σ_3 FAILURE, ksf		7.2

TYPE OF TEST:
Consolidated drained
SAMPLE TYPE: Undisturbed
DESCRIPTION: Light Red Brown
Poorly Graded Sand with Clay
LL= 34 PL= 17 PI= 17.0
SPECIFIC GRAVITY= 2.69
REMARKS: Tested by: HEJ

Reviewed by: RLB

FIG. NO.

CLIENT: Westinghouse Savannah River Co.

PROJECT: Task Release 6

SAMPLE LOCATION: H Bor 23.3 St-2"ø
64-65.5 Ft.

PROJ. NO.: 5810575606 DATE: May 26, 1994

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

TRIAXIAL COMPRESSION TEST
Consolidated drained

6-08-1994
10:48 am

Project Data

Project No.: 5810575606 Date: May 26,1994 Data file: 575606G
Client: Westinghouse Savannah River Co.
Project: Task Release 6
Sample location: H Bor 23.3 St-2 @ 64-65.5 Ft.
Sample description: Light Red Brown Well Graded Sand with Clay
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.68 LL= 34 PL= 13 PI= 21

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.87	2.86	
Height change, in		0.03	
Height, in	6.00	5.97	
Weight, grams	1256.2		
Water volume change, cc		-16.70	
Moisture, %	22.6	24.2	21.6
Dry density, pcf	100.3	101.5	
Saturation, %	90.6	100.0	
Void ratio	0.668	0.649	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 106 psi
Consolidation back pressure = 36 psi
Consolidation effective confining stress = 10.08 ksf
Peak deviator stress = 25.50 ksf at reading no. 13
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	10.08	10.08	1.00	10.08	0.00
1	0.0200	0.020	144.00	144.0	0.3	3.21	10.08	13.29	1.32	11.68	1.60
2	0.0400	0.040	324.00	324.0	0.7	7.19	10.08	17.27	1.71	13.68	3.60
3	0.0600	0.060	474.00	474.0	1.0	10.49	10.08	20.57	2.04	15.32	5.24
4	0.1000	0.100	690.00	690.0	1.7	15.16	10.08	25.24	2.50	[illegible].66	7.58
[illegible]	1500	0.150	840.00	840.0	2.5	18.30	10.08	28.38	2.82	19.23	9.15

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	1.2000	0.200	948.00	948.0	3.4	20.47	10.08	30.55	3.03	20.32	10.24
	1.2600	0.260	1032.00	1032.0	4.4	22.06	10.08	32.14	3.19	21.11	11.03
8	0.3400	0.340	1110.00	1110.0	5.7	23.39	10.08	33.47	3.32	21.78	11.70
9	0.4200	0.420	1164.00	1164.0	7.0	24.18	10.08	34.26	3.40	22.17	12.09
10	0.5000	0.500	1212.00	1212.0	8.4	24.82	10.08	34.90	3.46	22.49	12.41
11	0.6100	0.610	1260.00	1260.0	10.2	25.28	10.08	35.36	3.51	22.72	12.64
12	0.7100	0.710	1290.00	1290.0	11.9	25.40	10.08	35.48	3.52	22.78	12.70
13	0.8100	0.810	1320.00	1320.0	13.6	25.50	10.08	35.58	3.53	22.83	12.75
14	0.9100	0.910	1344.00	1344.0	15.2	25.46	10.08	35.54	3.53	22.81	12.73

TRIAXIAL COMPRESSION TEST
Consolidated drained

6-08-1994
10:43 am

Project Data

Project No.: 5810575606 Date: May 26,1994 Data file: 575606G
Client: Westinghouse Savannah River Co.
Project: Task Release 6
Sample location: H Bor 23.3 St-2 @ 64-65.5 Ft.
Sample description: Light Red Brown Poorly Graded Sand with Clay
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.69 LL= 34 PL= 17 PI= 17

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.87	2.87	
Height change, in		0.02	
Height, in	6.00	5.98	
Weight, grams	1219.4		
Water volume change, cc		-20.50	
Moisture, %	26.0	28.2	24.1
Dry density, pcf	94.7	95.5	
Saturation, %	90.6	100.0	
Void ratio	0.774	0.758	

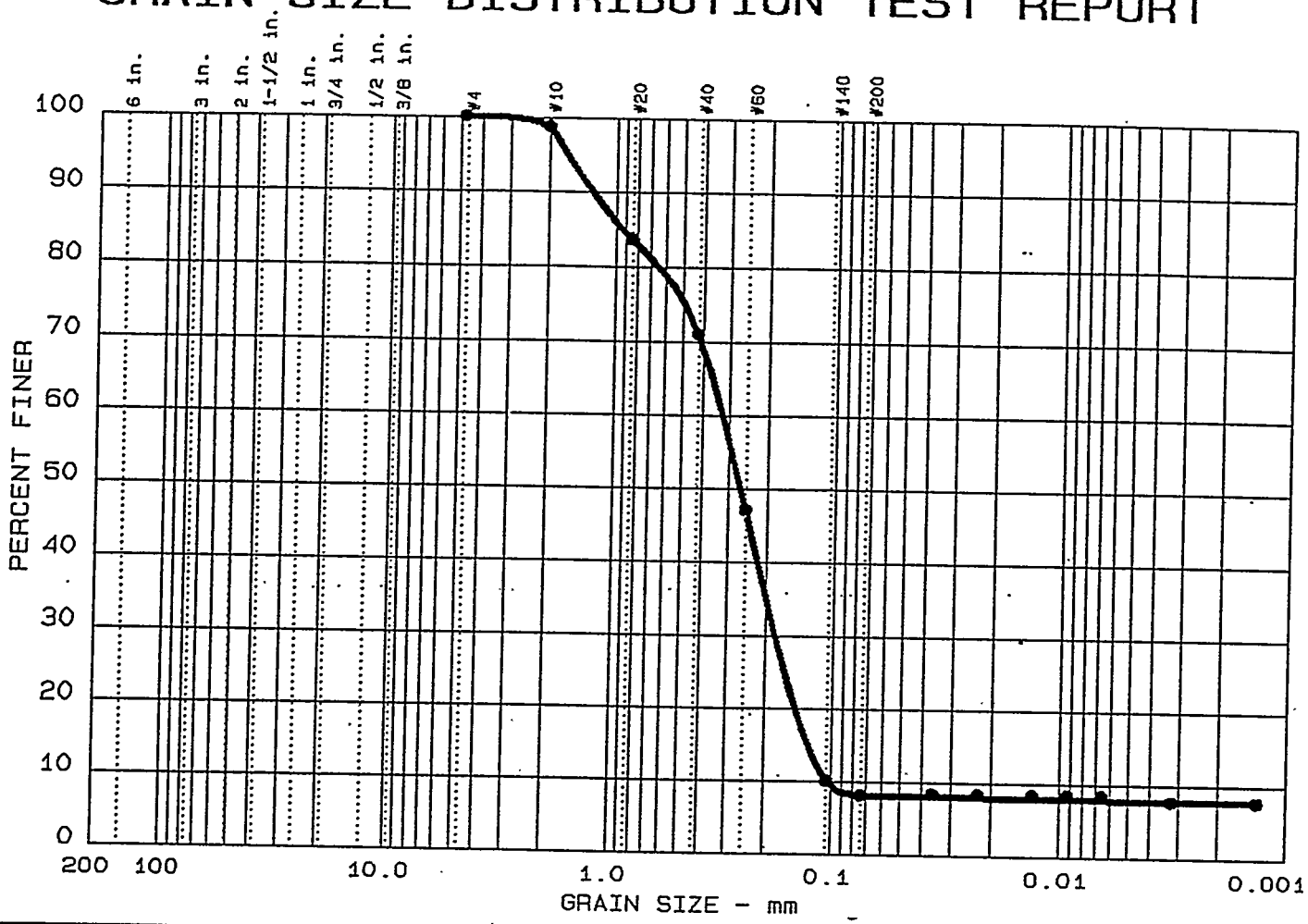
Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 86 psi
Consolidation back pressure = 36 psi
Consolidation effective confining stress = 7.2 ksf
Peak deviator stress = 17.93 ksf at reading no. 11
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	7.20	7.20	1.00	7.20	0.00
1	0.0400	0.040	336.00	336.0	0.7	7.45	7.20	14.65	2.03	10.93	3.73
2	0.0700	0.070	452.00	452.0	1.2	9.97	7.20	17.17	2.39	12.19	4.99
3	0.1000	0.100	513.00	513.0	1.7	11.26	7.20	18.46	2.56	12.83	5.63
4	0.1600	0.160	609.00	609.0	2.7	13.23	7.20	20.43	2.84	13.82	6.62
5	200	0.220	675.00	675.0	3.7	14.52	7.20	21.72	3.02	14.46	7.26

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	\.2800	0.280	723.00	723.0	4.7	15.39	7.20	22.59	3.14	14.89	7.69
	J.3500	0.350	768.00	768.0	5.9	16.14	7.20	23.34	3.24	15.27	8.07
8	0.4700	0.470	828.00	828.0	7.9	17.03	7.20	24.23	3.37	15.72	8.52
9	0.5600	0.560	861.00	861.0	9.4	17.42	7.20	24.62	3.42	15.91	8.71
10	0.7000	0.700	900.00	900.0	11.7	17.74	7.20	24.94	3.46	16.07	8.87
11	0.8500	0.850	936.00	936.0	14.2	17.93	7.20	25.13	3.49	16.16	8.96
12	0.9400	0.940	948.00	948.0	15.7	17.84	7.20	25.04	3.48	16.12	8.92

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	4	0.0	0.0	91.8	0.4	7.8

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	32	7	0.92	0.32	0.26	0.182	0.1271	0.1033	0.99	3.1

MATERIAL DESCRIPTION	USCS	AASHTO
● Green Tan Poorly Graded Sand with Silt	SP-SM	A-2-4 (0.0)

Project No.: 5810575606
Project: SRS ITP-P3
◆ Location: H-Bor-50 ST-5 @ 154.5-156.5 Ft.

Date: May 15, 1994

Remarks:

Tested by: CLG

Reviewed by: RLB

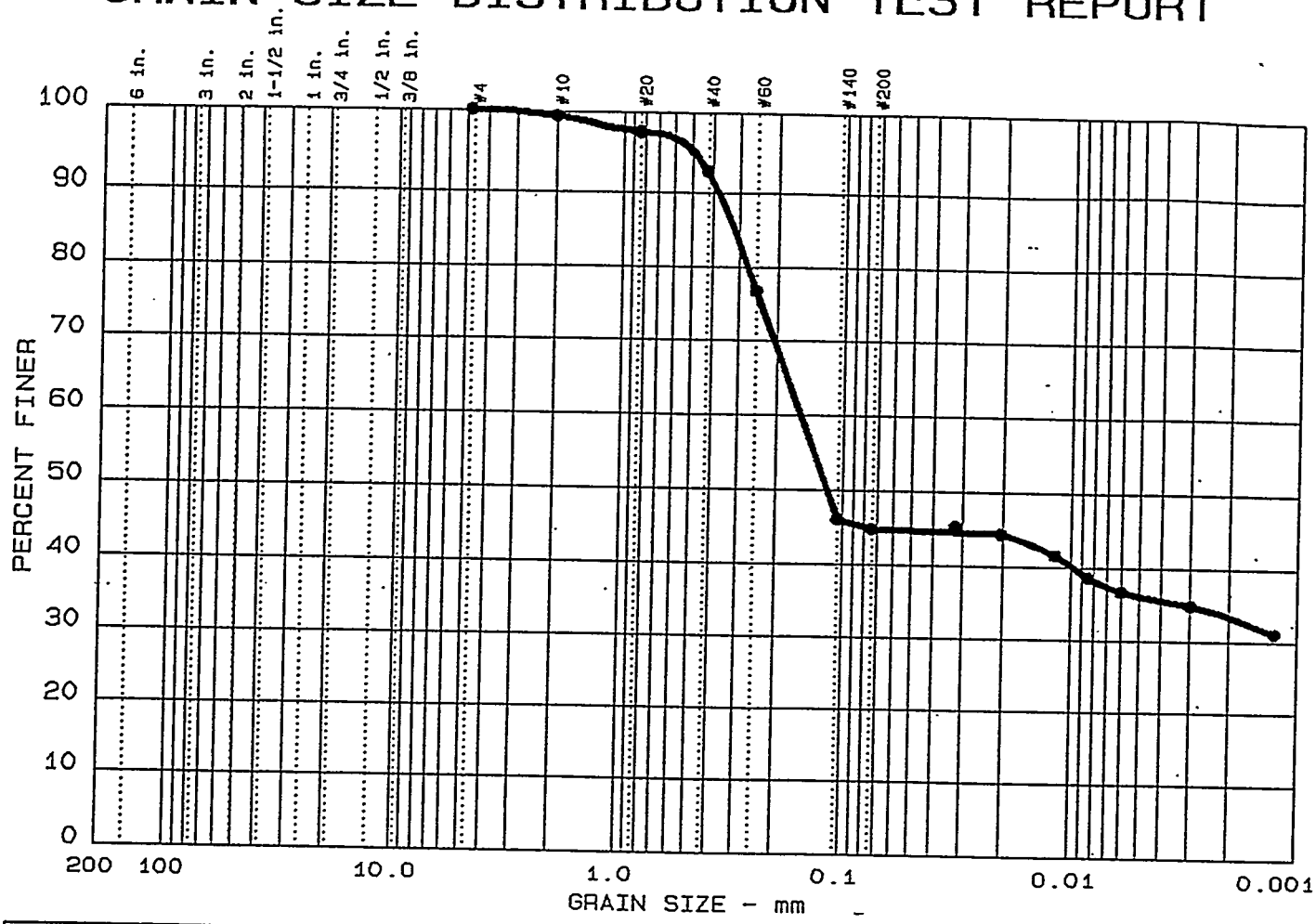
CD-80 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	3	0.0	0.0	55.2	8.7	36.1

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	52	34	0.31	0.16	0.12					

MATERIAL DESCRIPTION	USCS	AASHTO
● Green Tan Clayey Sand	SC	A-7-6 (9.8)

Project No.: 5810575606
Project: SRS ITP-P3
● Location: H-Bor-50 ST-5 @ 154.5-156.5 Ft.

Date: May 15, 1994

Remarks:

Tested by: KPR

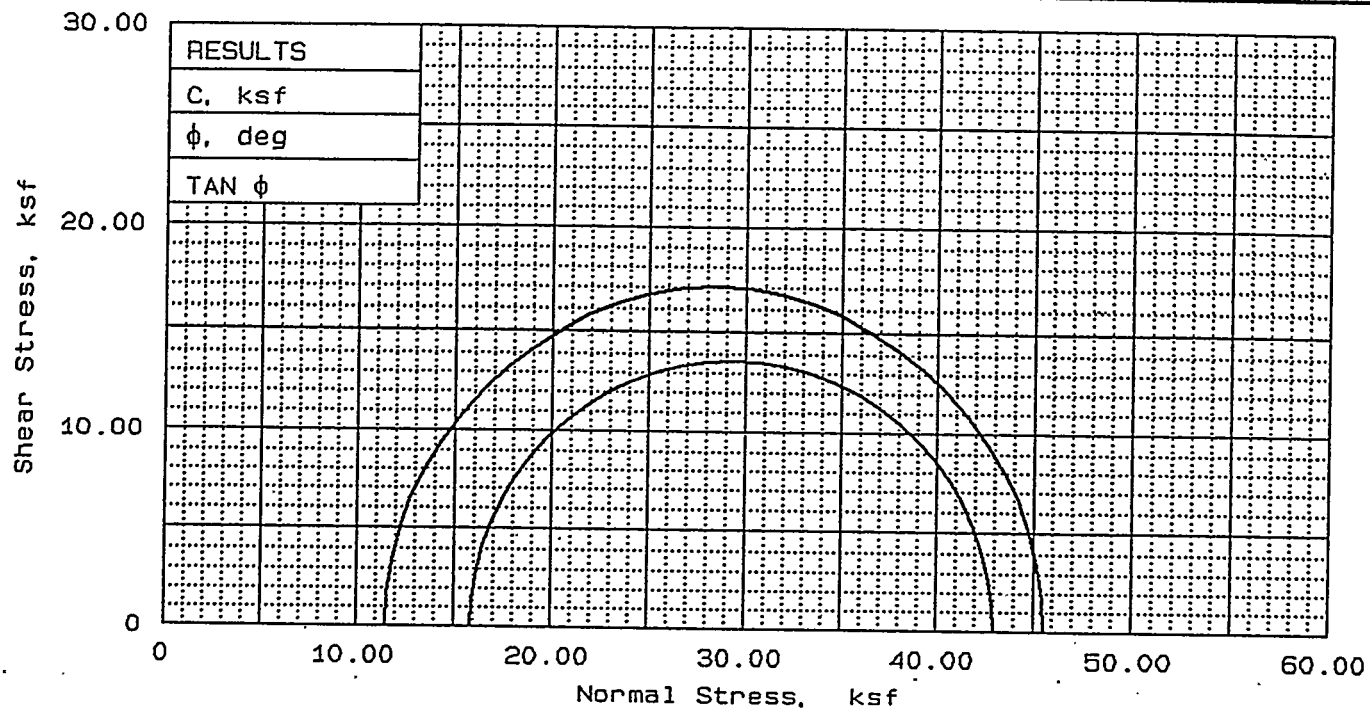
Reviewed by: RLB

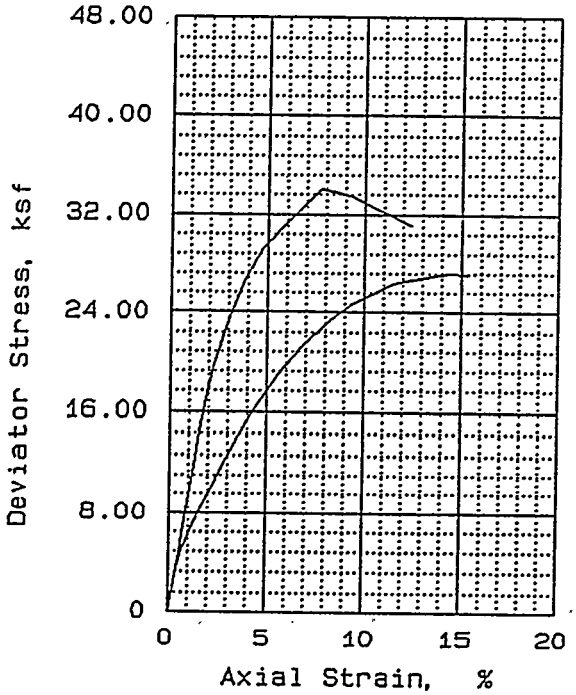
CD -110 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.





	SAMPLE NO.	1	2
INITIAL	WATER CONTENT, %	37.0	23.5
	DRY DENSITY, pcf	82.8	100.9
	SATURATION, %	96.6	94.9
	VOID RATIO	1.035	0.670
	DIAMETER, in	2.88	2.89
	HEIGHT, in	6.00	6.00
AT TEST	WATER CONTENT, %	36.3	23.6
	DRY DENSITY, pcf	85.2	103.0
	SATURATION, %	100.0	100.0
	VOID RATIO	0.979	0.637
	DIAMETER, in	2.86	2.87
	HEIGHT, in	5.93	5.98
	BACK PRESSURE, ksf	3.60	3.74
	CELL PRESSURE, ksf	19.44	15.26
	FAILURE STRESS, ksf	27.18	34.04
	PORE PRESSURE, ksf		
	STRAIN RATE, %/min.	0.100	0.100
	ULTIMATE STRESS, ksf		
	PORE PRESSURE, ksf		
	σ_1 FAILURE, ksf	43.02	45.56
	σ_3 FAILURE, ksf	15.84	11.52

TYPE OF TEST:
Consolidated drained
SAMPLE TYPE: Undisturbed
DESCRIPTION:

LL= PL= PI=
SPECIFIC GRAVITY= 2.70
REMARKS: Tested by: HEJ

Reviewed by: RLB

FIG. NO.

CLIENT: Westinghouse Savannah River Co.

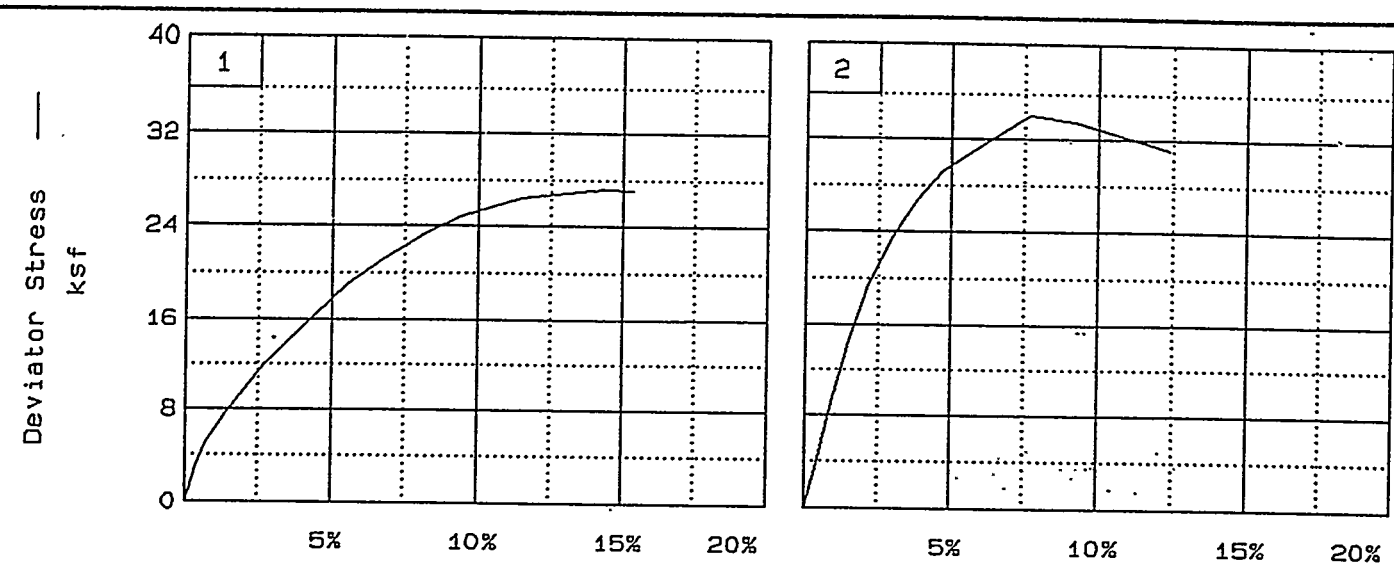
PROJECT: Task Release 6

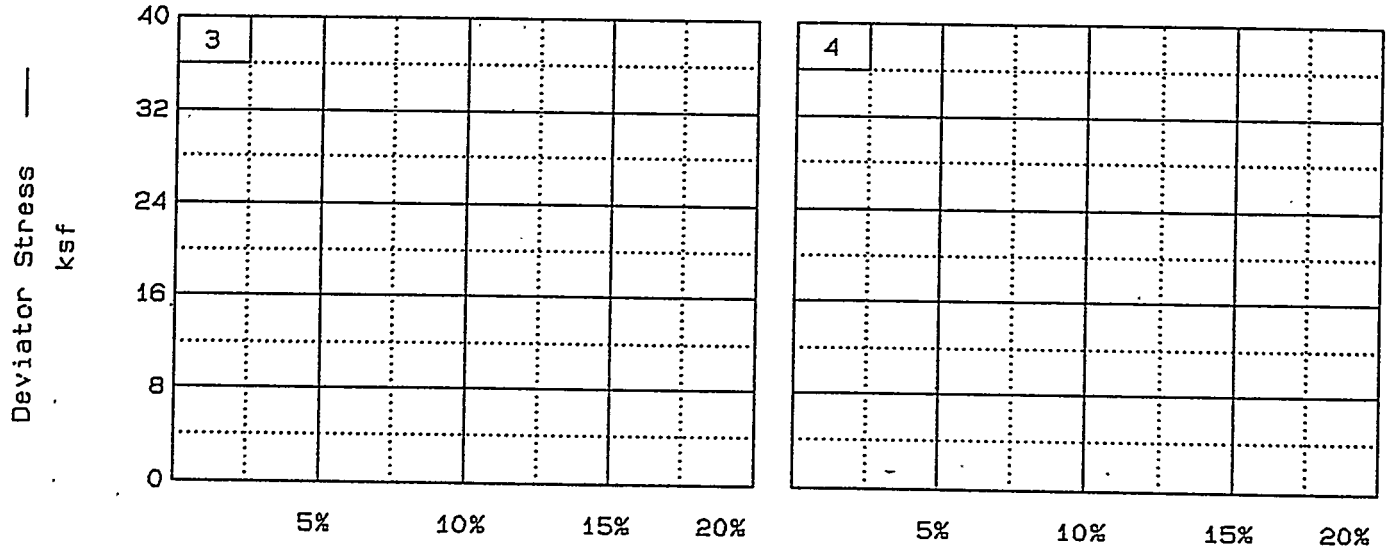
SAMPLE LOCATION: H Bor 50 St-5 @ 154.5-156.5 Ft.

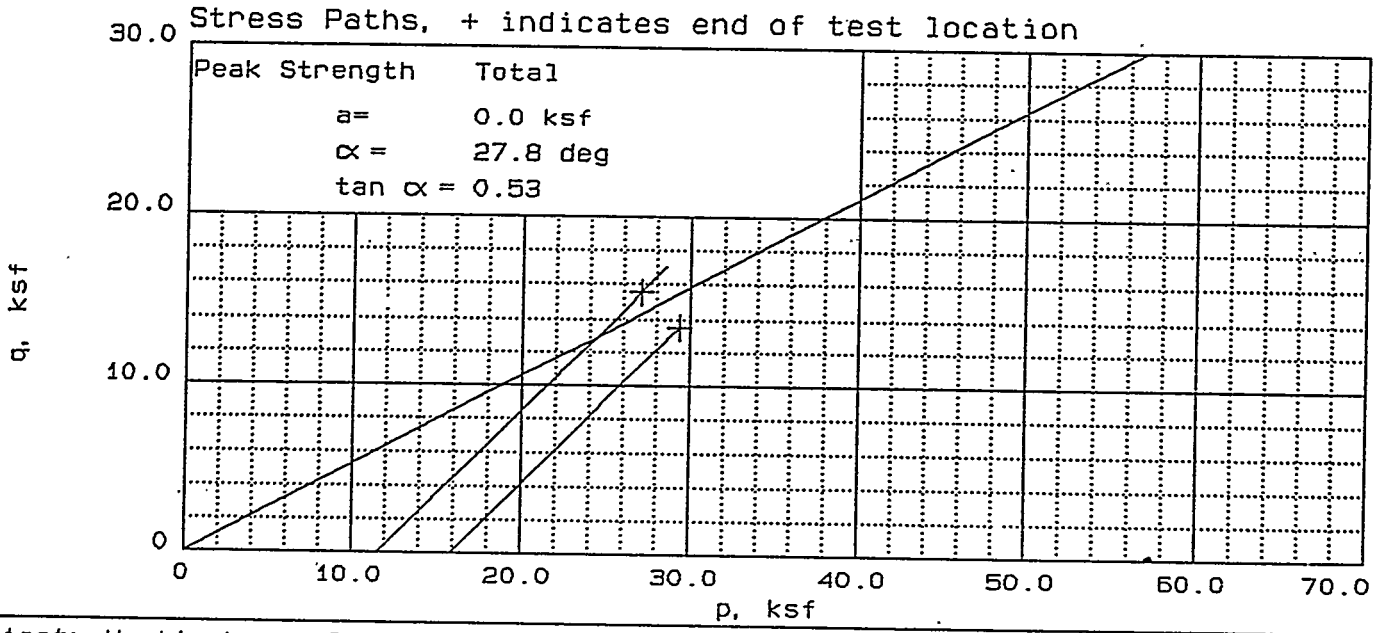
PROJ. NO.: 5810575606 DATE: May2, 1994

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.





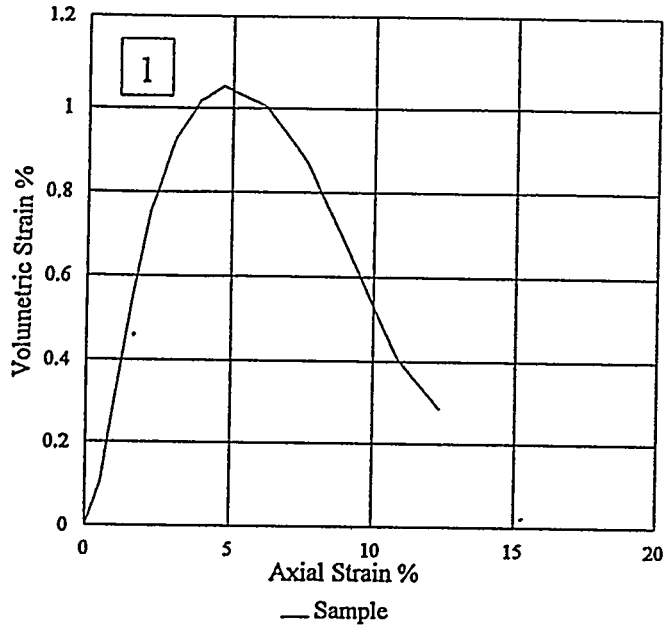


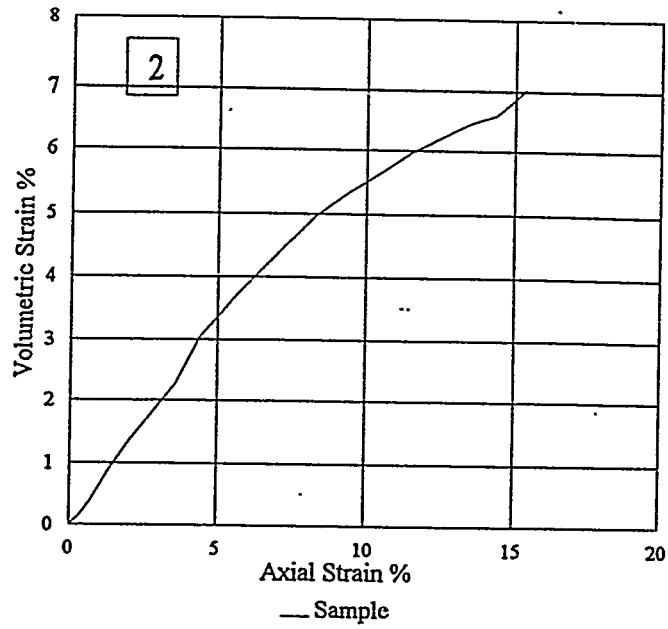
Client: Westinghouse Savannah River Co.

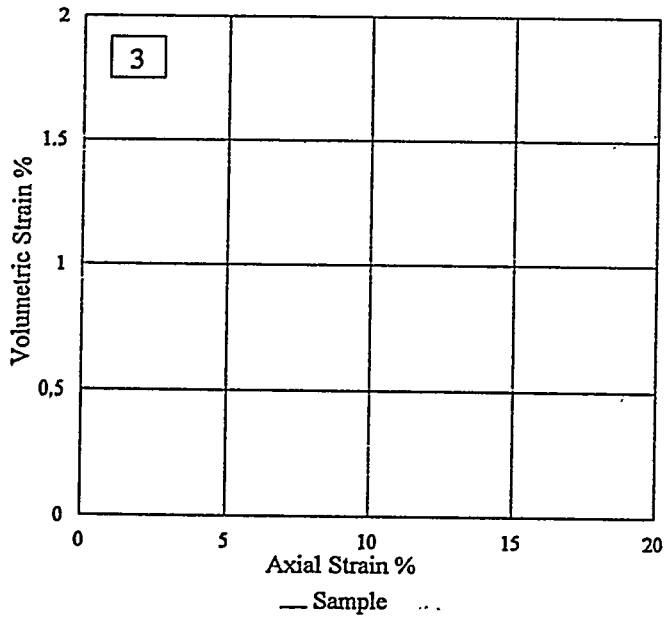
Project: Task Release 6

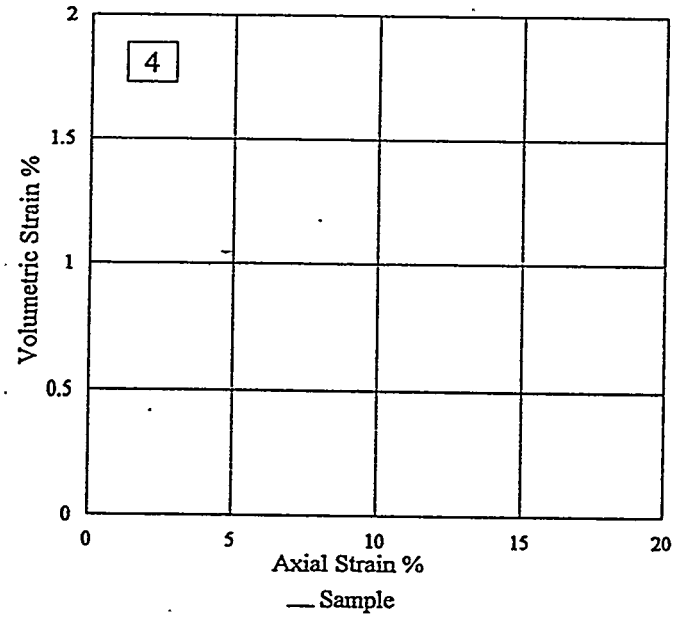
Location: H Bor 50 St-5 @ 154.5- 156.5 Ft.

File: 575606F Project No.: 5810575606 Page 2/2 Fig. No. ____

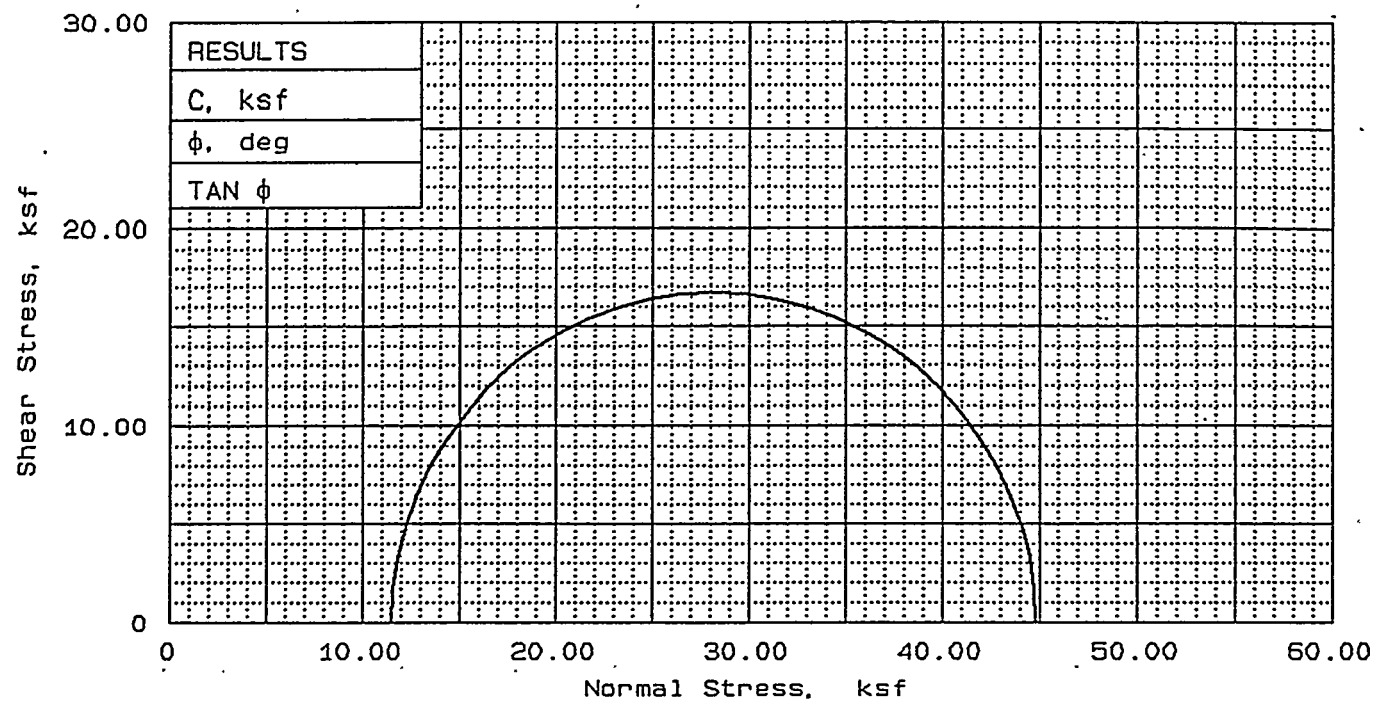


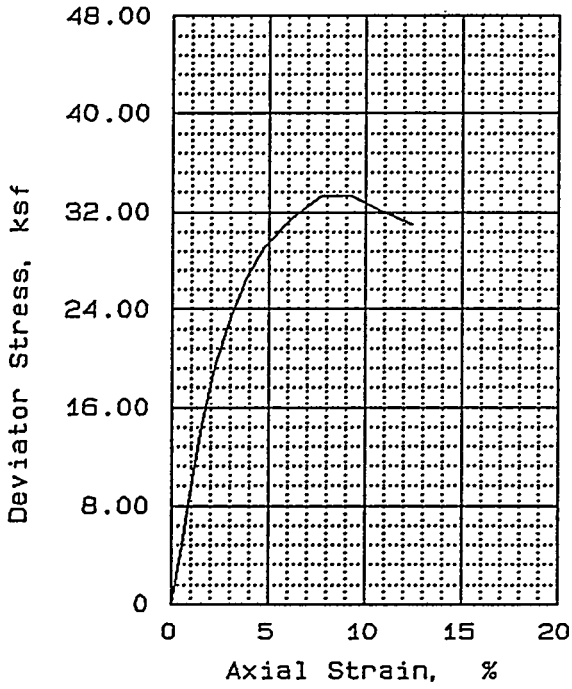






Client: Westinghouse Savannah River Co.
Project: Task Release No. 6
Location: H-Bor-50, ST-5 @ 154.5-156.5 ft.
File: Project No.: 5810575606 Page 2/2 Fig. No. _____





SAMPLE NO.		1
INITIAL	WATER CONTENT, %	23.5
	DRY DENSITY, pcf	100.9
	SATURATION, %	95.9
	VOID RATIO	0.657
	DIAMETER, in	2.89
	HEIGHT, in	6.00
AT TEST	WATER CONTENT, %	23.6
	DRY DENSITY, pcf	102.5
	SATURATION, %	100.0
	VOID RATIO	0.632
	DIAMETER, in	2.87
	HEIGHT, in	5.98
BACK PRESSURE, ksf		3.74
CELL PRESSURE, ksf		15.26
FAILURE STRESS, ksf		33.33
PORE PRESSURE, ksf		
STRAIN RATE, %/min.		0.100
ULTIMATE STRESS, ksf		
PORE PRESSURE, ksf		
σ_1 FAILURE, ksf		44.85
σ_3 FAILURE, ksf		11.52

TYPE OF TEST:
Consolidated drained

SAMPLE TYPE: Undisturbed

DESCRIPTION: Green Tan Poorly Graded Sand with Silt

LL= 32 PL= 7 PI= 25.0

SPECIFIC GRAVITY= 2.68

REMARKS: Tested by: HEJ

Reviewed by: RLB

FIG. NO.

CLIENT: Westinghouse Savannah River Co.

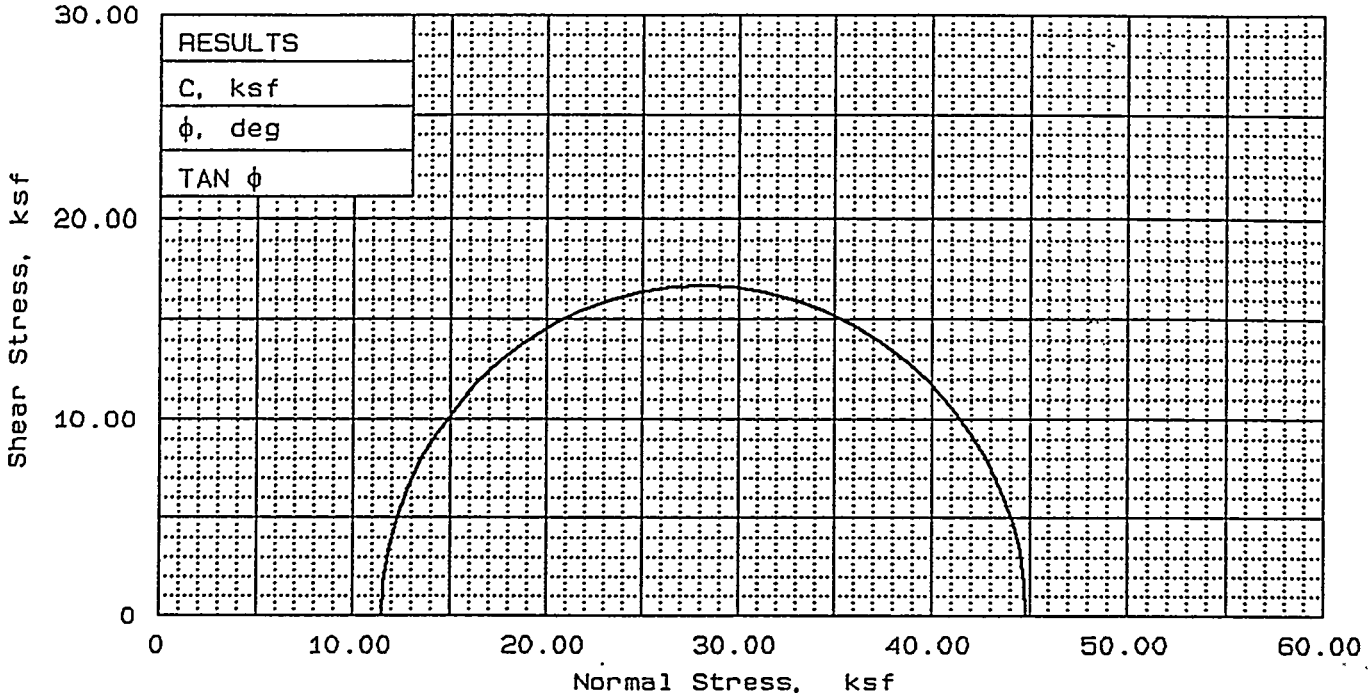
PROJECT: Task Release 6

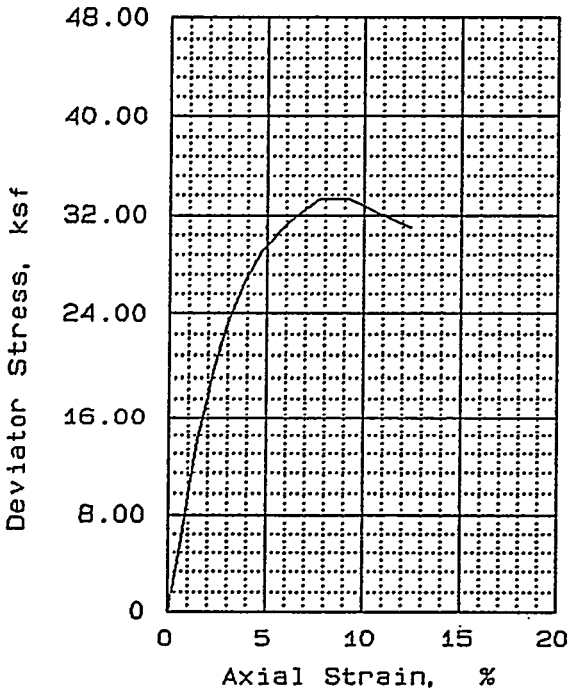
SAMPLE LOCATION: H Bor 50 St-5 @ 154.5-156.5 Ft.

PROJ. NO.: 5810575606 DATE: May2, 1994

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.





SAMPLE NO.		1
INITIAL	WATER CONTENT, %	23.5
	DRY DENSITY, pcf	100.9
	SATURATION, %	95.9
	VOID RATIO	0.657
	DIAMETER, in	2.89
	HEIGHT, in	6.00
AT TEST	WATER CONTENT, %	23.6
	DRY DENSITY, pcf	102.5
	SATURATION, %	100.0
	VOID RATIO	0.632
	DIAMETER, in	2.87
	HEIGHT, in	5.98
BACK PRESSURE, ksf		3.74
CELL PRESSURE, ksf		15.26
FAILURE STRESS, ksf		33.33
PORE PRESSURE, ksf		
STRAIN RATE, %/min.		0.100
ULTIMATE STRESS, ksf		
PORE PRESSURE, ksf		
σ_1 FAILURE, ksf		44.85
σ_3 FAILURE, ksf		11.52

TYPE OF TEST:
Consolidated drained
SAMPLE TYPE: Undisturbed
DESCRIPTION: Green Tan Poorly Graded Sand with Silt
LL= 32 PL= 7 PI= 25.0
SPECIFIC GRAVITY= 2.68
REMARKS: Tested by: HEJ

Reviewed by: RLB

FIG. NO.

CLIENT: Westinghouse Savannah River Co.

PROJECT: Task Release 6

SAMPLE LOCATION: H Bor 50 St-5 @ 154.5-156.5 Ft.

PROJ. NO.: 5810575606 DATE: May 2, 1994

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

TRIAXIAL COMPRESSION TEST
Consolidated drained

6-08-1994
9:33 am

Project Data

Project No.: 5810575606 Date: May2,1994 Data file: 575606F
Client: Westinghouse Savannah River Co.
Project: Task Release 6
Sample location: H Bor 50 St-5 @ 154.5- 156.5 Ft.
Sample description: Green Tan Poorly Graded Sand with Silt
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.68 LL= 32 PL= 7 PI= 25

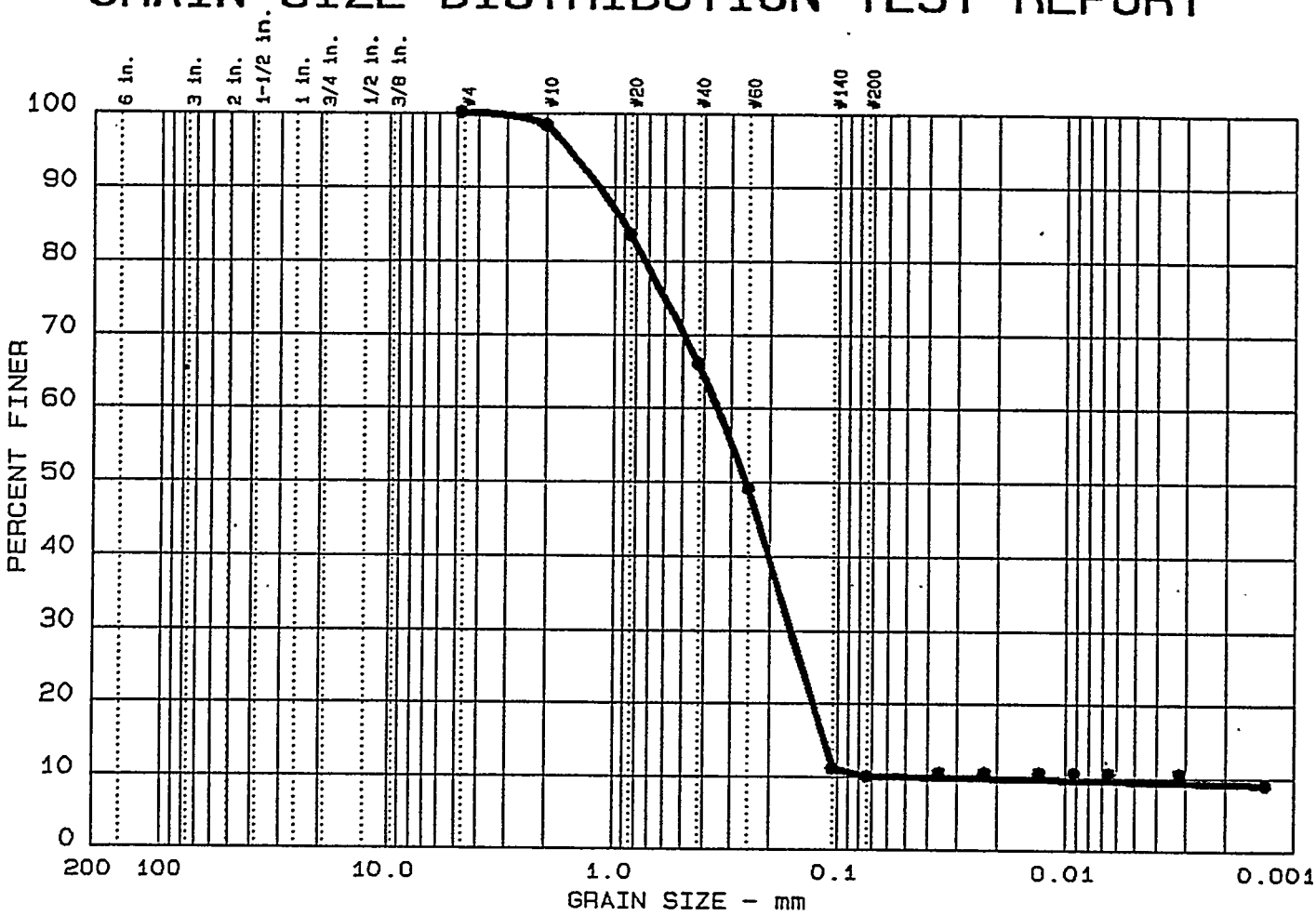
Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.89	2.87	
Height change, in		0.02	
Height, in	6.00	5.98	
Weight, grams	1288.3		
Water volume change, cc		-0.48	
Moisture, %	23.5	23.6	21.4
Dry density, pcf	100.9	102.5	
Saturation, %	95.9	100.0	
Void ratio	0.657	0.632	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 106 psi
Consolidation back pressure = 26 psi
Consolidation effective confining stress = 11.52 ksf
Peak deviator stress = 33.33 ksf at reading no. 10
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	11.52	11.52	1.00	11.52	0.00
1	0.0300	0.030	213.00	213.0	0.5	4.71	11.52	16.23	1.41	13.87	2.35
2	0.0500	0.050	372.00	372.0	0.8	8.20	11.52	19.72	1.71	15.62	4.10
3	0.0900	0.090	660.00	660.0	1.5	14.45	11.52	25.97	2.25	18.74	7.22
4	0.1300	0.130	888.00	888.0	2.2	19.30	11.52	30.82	2.68	21.17	9.65
	1.1800	0.180	1092.00	1092.0	3.0	23.54	11.52	35.06	3.04	23.29	11.77

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	7	0.0	0.0	89.9	0.6	9.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	34	13	0.89	0.35	0.26	0.161	0.1143	0.0466	1.62	7.4

MATERIAL DESCRIPTION	USCS	AASHTO
● Light Red Brown Well Graded Sand with Clay	SW-SC	A-2-6 (0.0)

Project No.: 5810575606
Project: SRS ITP-P3
● Location: H-Bor-23.3 ST-2 @ 64-65.5 Ft.

Date: May 19, 1994

Remarks:

Tested by: CLG

Reviewed by: RLB

CD-70 psi

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

TRIAXIAL COMPRESSION TEST
Consolidated drained

6-08-1994
9:41 am

Project Data

Project No.: 5810575606 Date: May2,1994 Data file: 575606F
Client: Westinghouse Savannah River Co.
Project: Task Release 6
Sample location: H Bor 50 St-5 @ 154.5- 156.5 Ft.
Sample description: Green Tan Clayey Sand
Remarks: Tested by:
Reviewed by: Fig No.

Sample No. 1 Data

Type of sample: Undisturbed
Specific Gravity= 2.70 LL= 52 PL= 34 PI= 18

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.88	2.86	
Height change, in		0.07	
Height, in	6.00	5.93	
Weight, grams	1167.7		
Water volume change, cc		6.69	
Moisture, %	37.0	36.3	27.7
Dry density, pcf	82.8	85.2	
Saturation, %	96.6	100.0	
Void ratio	1.035	0.979	

Test Data

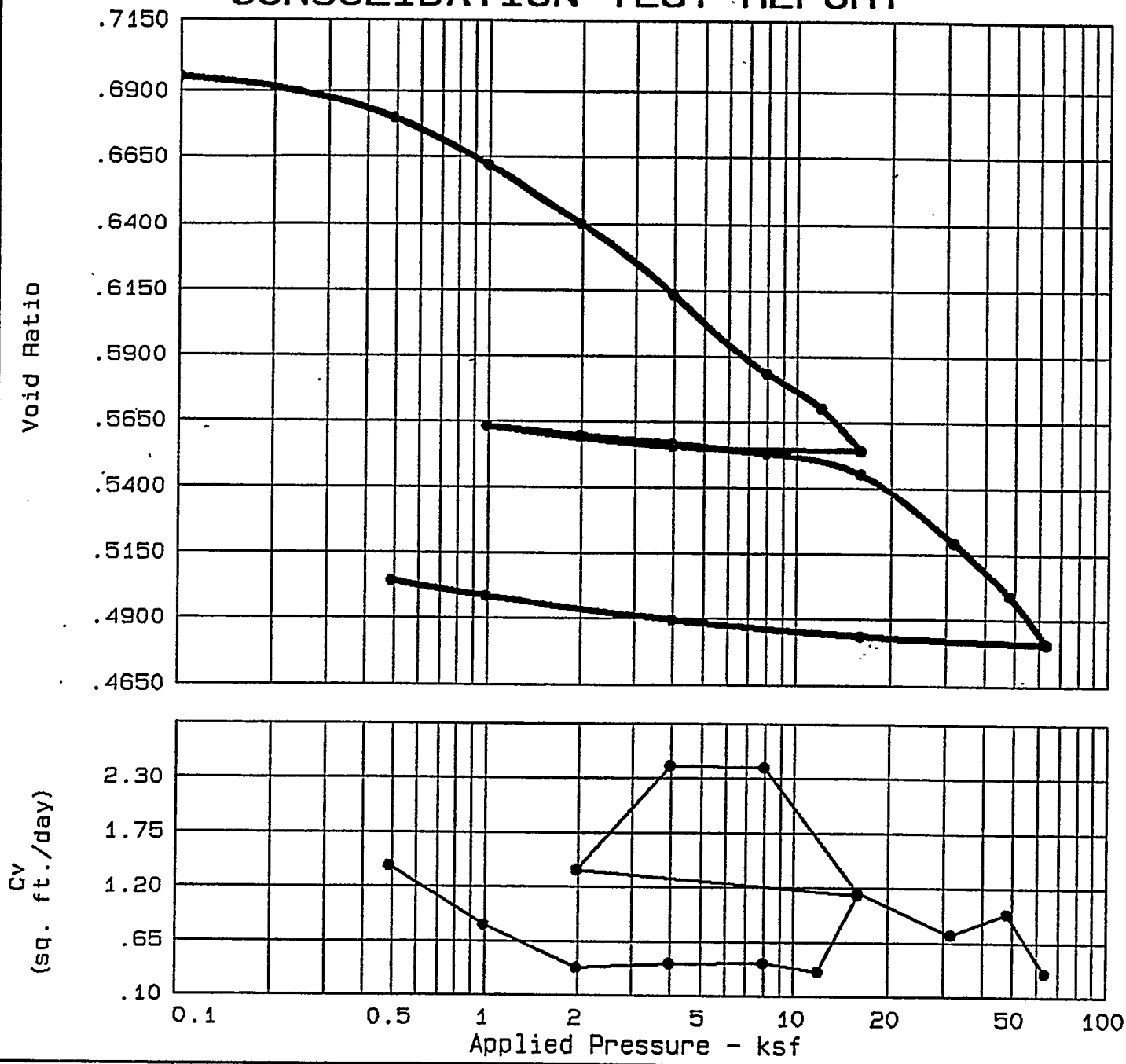
Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 135 psi
Consolidation back pressure = 25 psi
Consolidation effective confining stress = 15.84 ksf
Peak deviator stress = 27.18 ksf at reading no. 14
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	15.84	15.84	1.00	15.84	0.00
1	0.0200	0.020	138.00	138.0	0.3	3.08	15.84	18.92	1.19	17.38	1.54
2	0.0400	0.040	222.00	222.0	0.7	4.94	15.84	20.78	1.31	18.31	2.47
3	0.0800	0.080	348.00	348.0	1.3	7.69	15.84	23.53	1.49	19.69	3.85
4	0.1200	0.120	444.00	444.0	2.0	9.75	15.84	25.59	1.62	20.71	4.87
	.1600	0.160	552.00	552.0	2.7	12.03	15.84	27.87	1.76	21.86	6.02

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	0.2300	0.230	1248.00	1248.0	3.8	26.67	11.52	38.19	3.31	24.85	13.33
	0.2800	0.280	1374.00	1374.0	4.7	29.10	11.52	40.62	3.53	26.07	14.55
8	0.3700	0.370	1512.00	1512.0	6.2	31.52	11.52	43.04	3.74	27.28	15.76
9	0.4600	0.460	1623.00	1623.0	7.7	33.29	11.52	44.81	3.89	28.17	16.65
10	0.5500	0.550	1652.00	1652.0	9.2	33.33	11.52	44.85	3.89	28.19	16.67
11	0.6500	0.650	1620.00	1620.0	10.9	32.09	11.52	43.61	3.79	27.56	16.04
12	0.7400	0.740	1590.00	1590.0	12.4	30.96	11.52	42.48	3.69	27.00	15.48

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Principle Stresses Minor ksf	Major ksf	1:3 Ratio	P ksf	Q ksf
	0.2100	0.210	654.00	654.0	3.5	14.14	15.84	29.98	1.89	22.91	7.07
	0.2600	0.260	762.00	762.0	4.4	16.33	15.84	32.17	2.03	24.00	8.16
8	0.3300	0.330	897.00	897.0	5.6	18.98	15.84	34.82	2.20	25.33	9.49
9	0.4000	0.400	1012.00	1012.0	6.7	21.15	15.84	36.99	2.33	26.41	10.57
10	0.4900	0.490	1140.00	1140.0	8.3	23.43	15.84	39.27	2.48	27.56	11.72
11	0.5600	0.560	1224.00	1224.0	9.4	24.84	15.84	40.68	2.57	28.26	12.42
12	0.6800	0.680	1332.00	1332.0	11.5	26.42	15.84	42.26	2.67	29.05	13.21
13	0.8000	0.800	1392.00	1392.0	13.5	26.98	15.84	42.82	2.70	29.33	13.49
14	0.8500	0.850	1416.00	1416.0	14.3	27.18	15.84	43.02	2.72	29.43	13.59
15	0.9100	0.910	1428.00	1428.0	15.3	27.09	15.84	42.93	2.71	29.38	13.54

CONSOLIDATION TEST REPORT



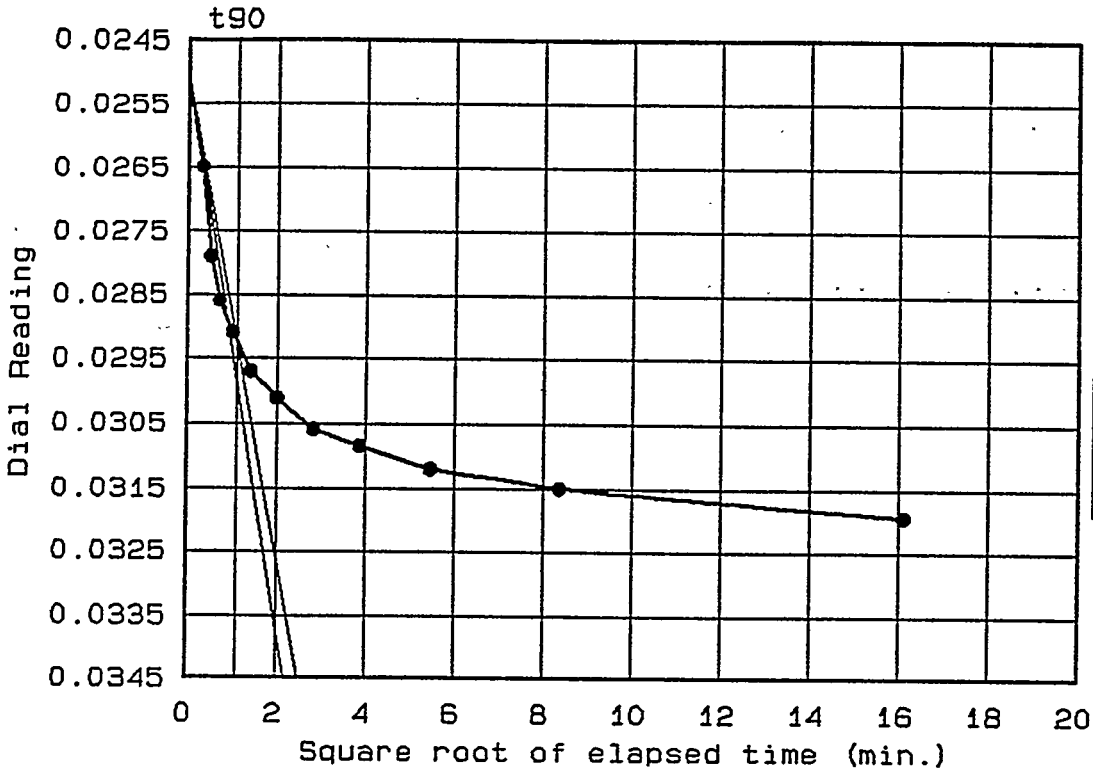
Natural Saturation	Natural Moisture	Dry Density	LL	PI	Sp.Gr.	Initial void ratio
98.2 %	25.7	98.2	44	23	2.670	0.6981

TEST RESULTS	MATERIAL DESCRIPTION
	Light Brown & Purple Clayey Sand Class: SC
Project No.: 5810575606 Project: Westinghouse Savannah River Location: H-Bor 23.3 St-1 @ 49-51.5 Ft. Date: May 16, 1994	Remarks: Tested by: HEJ Reviewed by: RLB
CONSOLIDATION TEST REPORT LAW ENGINEERING, INC.	Fig. No._____

Dial Reading vs. Time

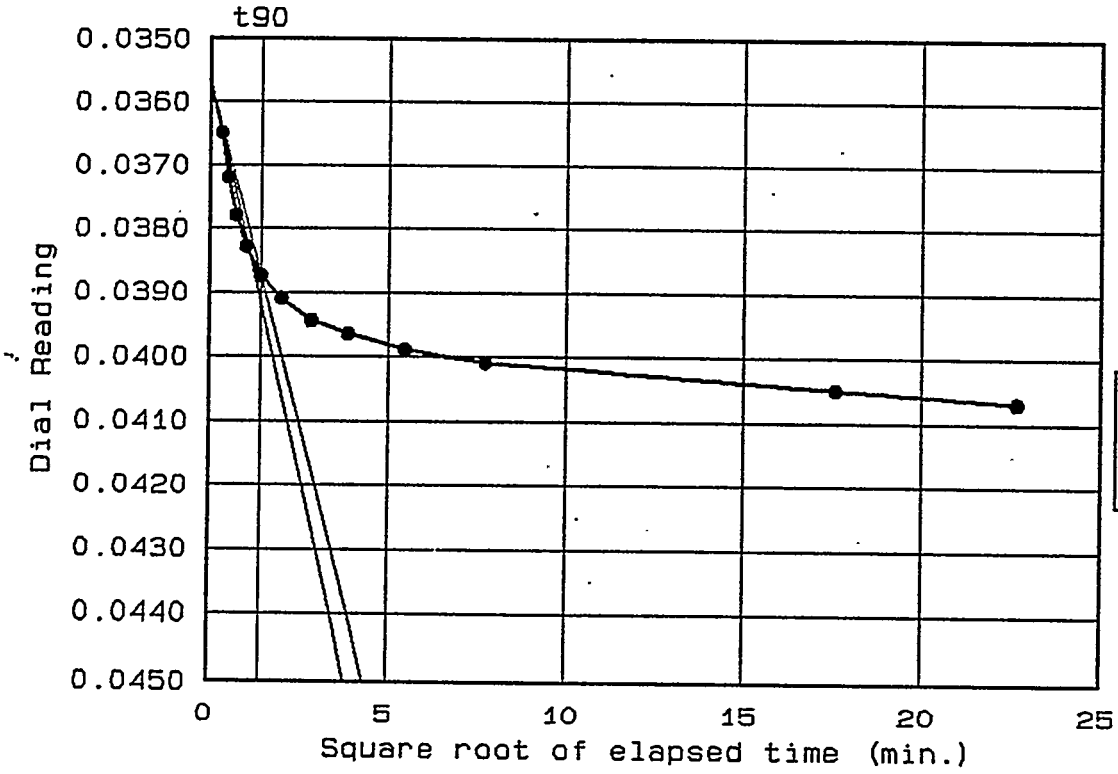
Project No.: 5810575606
Project: Westinghouse Savannah River
Location: H-Bor 23.3 St-1 @ 49-51.5 Ft.

Date: May 16, 1994



Load No.= 2
Load= 0.49 ksf
D_0 = 0.0251
D_{90} = 0.0292
D_{100}= 0.0297
T_{90}= 1.18 min.

C_v @ T_{90} =
1.41 ft^2/day



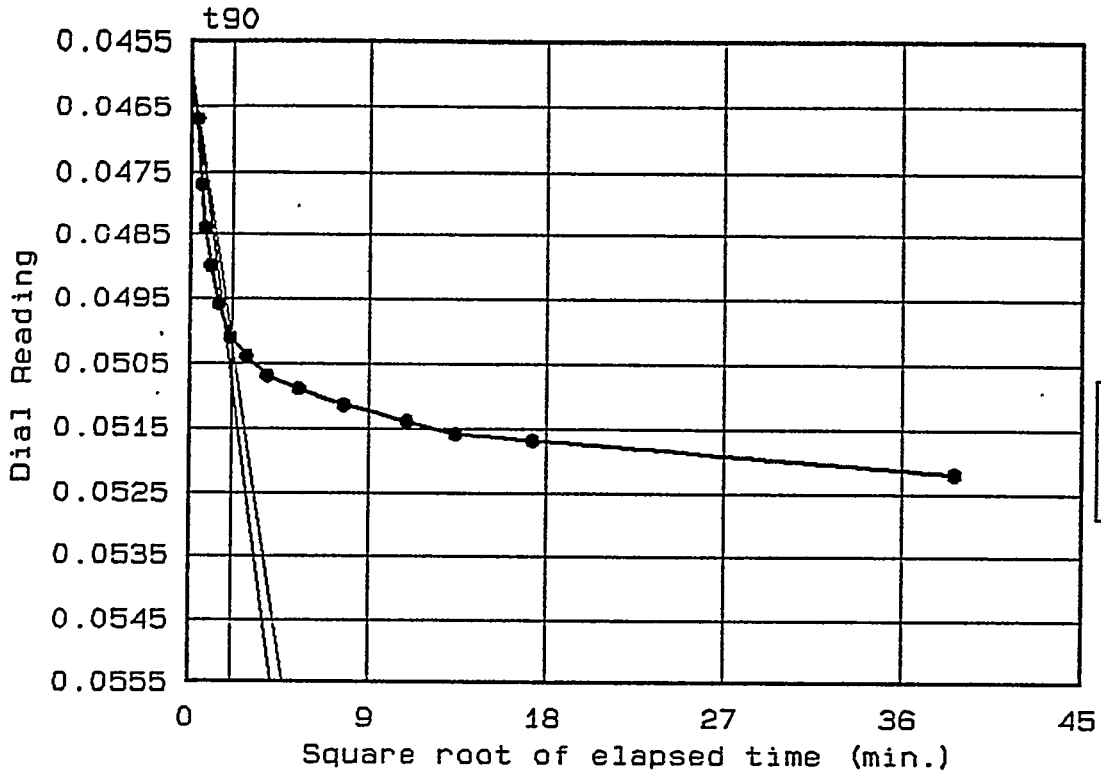
Load No.= 3
Load= 0.99 ksf
D_0 = 0.0357
D_{90} = 0.0388
D_{100}= 0.0391
T_{90}= 2.01 min.

C_v @ T_{90} =
.81 ft^2/day

Dial Reading vs. Time

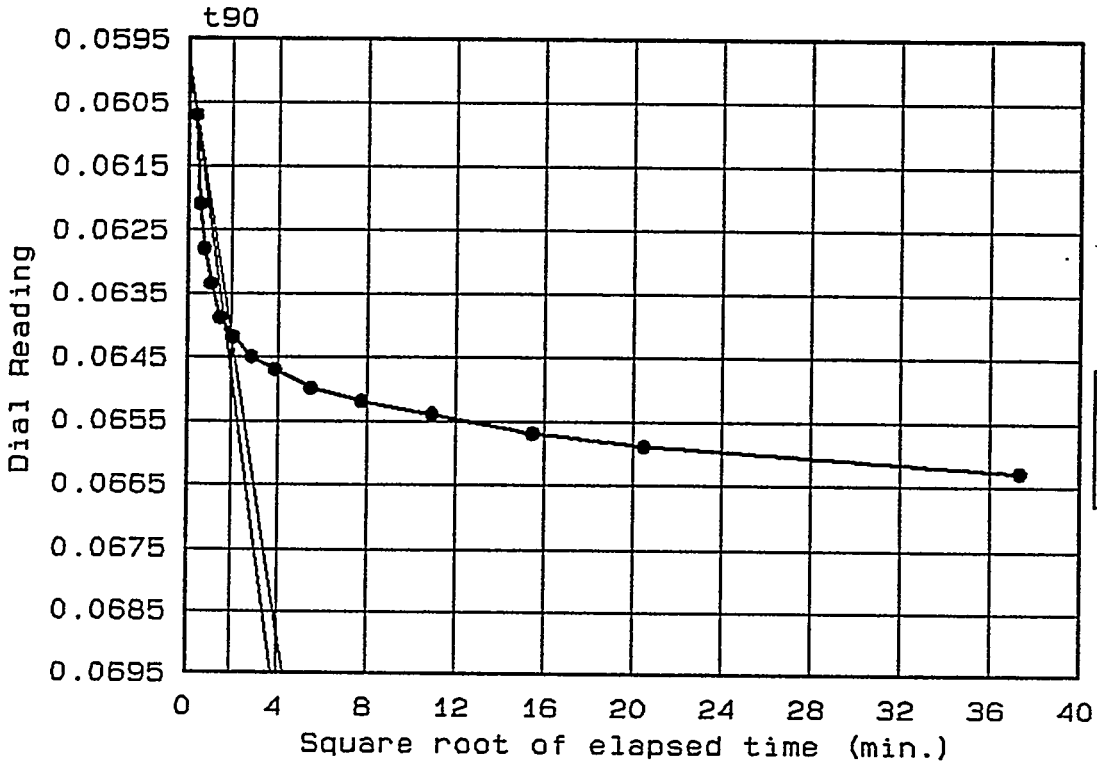
Project No.: 5810575606
Project: Westinghouse Savannah River
Location: H-Bor 23.3 St-1 @ 49-51.5 Ft.

Date: May 16, 1994



Load No.= 4
Load= 1.99 ksf
D_0 = 0.0460
D_{90} = 0.0501
D_{100}= 0.0506
T_{90}= 4.18 min.

C_v @ T_{90} =
.38 ft^2/day



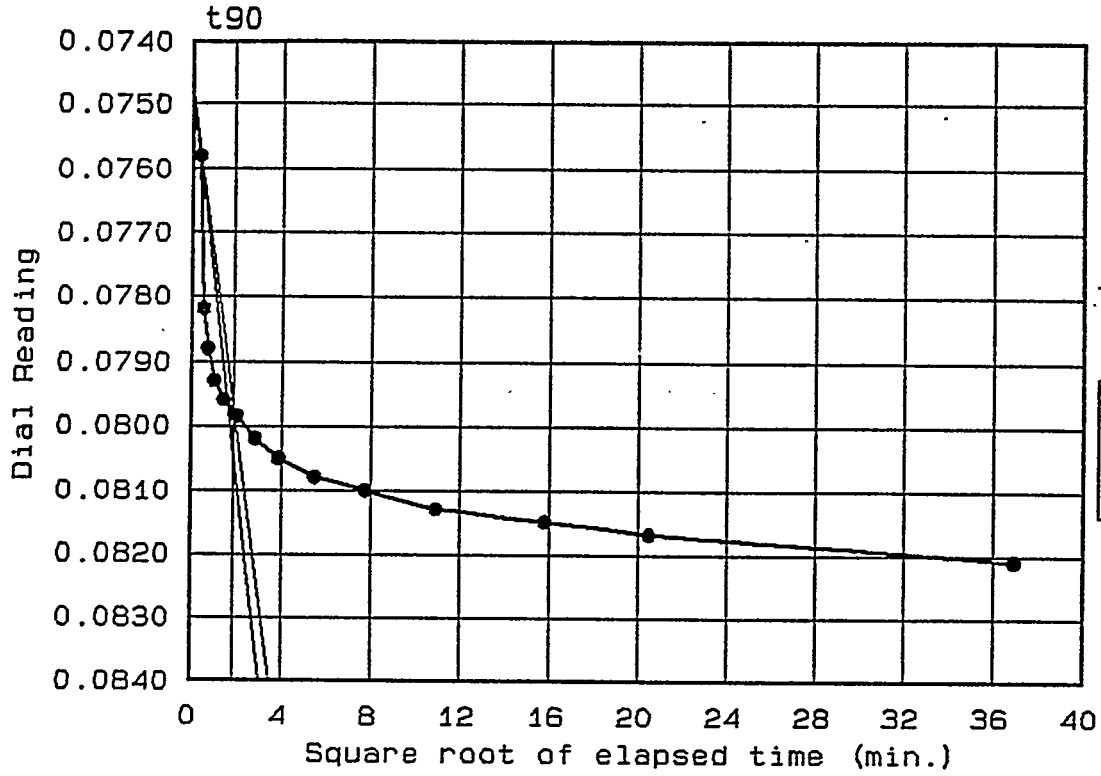
Load No.= 5
Load= 3.98 ksf
D_0 = 0.0599
D_{90} = 0.0642
D_{100}= 0.0646
T_{90}= 3.62 min.

C_v @ T_{90} =
.42 ft^2/day

Dial Reading vs. Time

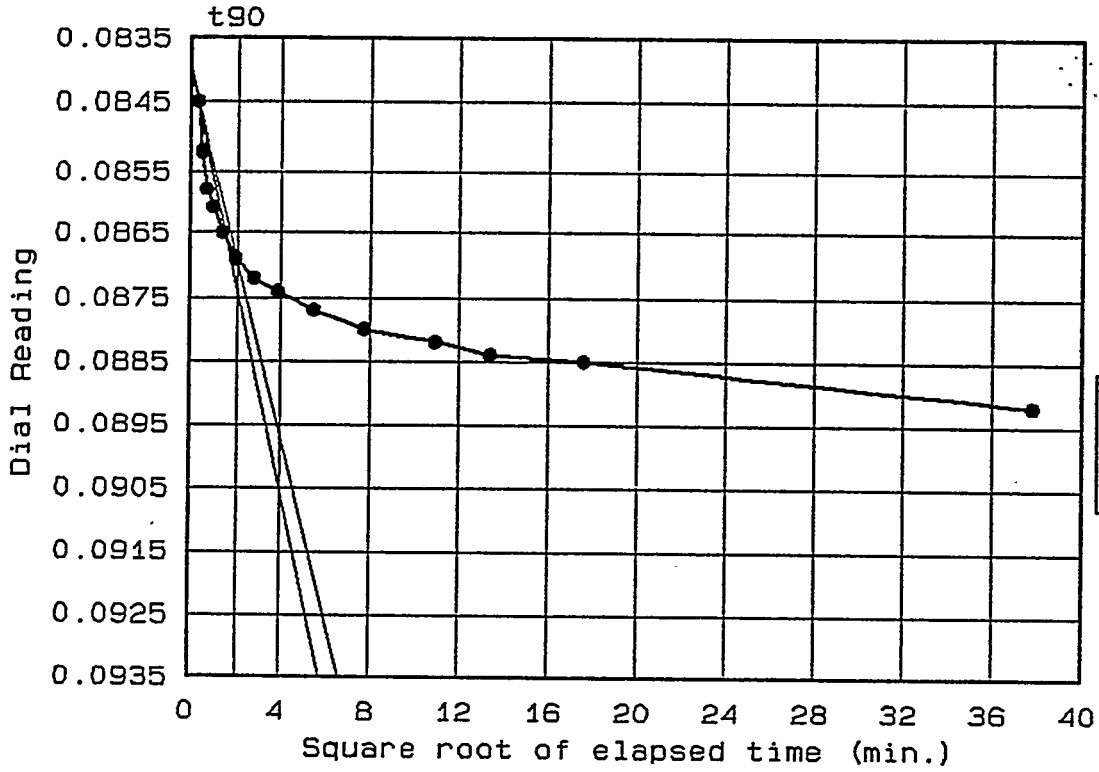
Project No.: 5810575606
Project: Westinghouse Savannah River
Location: H-Bor 23.3 St-1 @ 49-51.5 Ft.

Date: May 16, 1994



Load No.= 6
Load= 7.99 ksf
D_0 = 0.0748
D_{90} = 0.0798
D_{100}= 0.0803
T_{90}= 3.46 min.

C_v @ T_{90} =
.43 ft^2/day



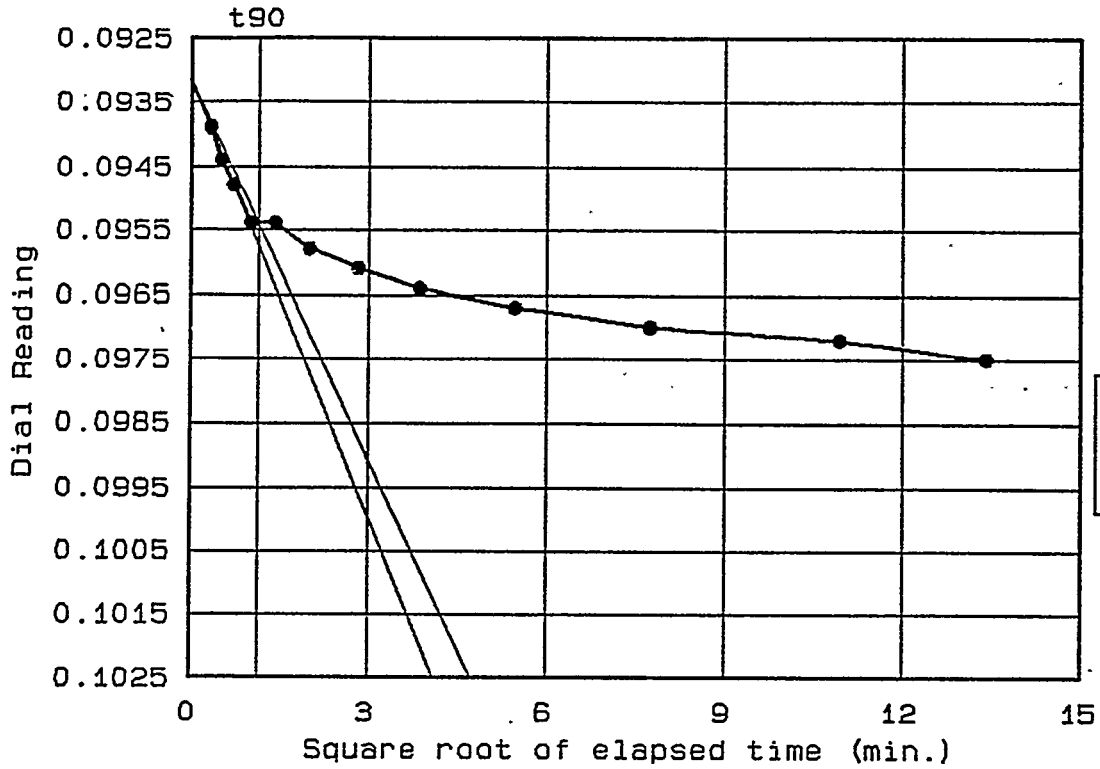
Load No.= 7
Load= 11.97 ksf
D_0 = 0.0840
D_{90} = 0.0869
D_{100}= 0.0872
T_{90}= 4.20 min.

C_v @ T_{90} =
.35 ft^2/day

Dial Reading vs. Time

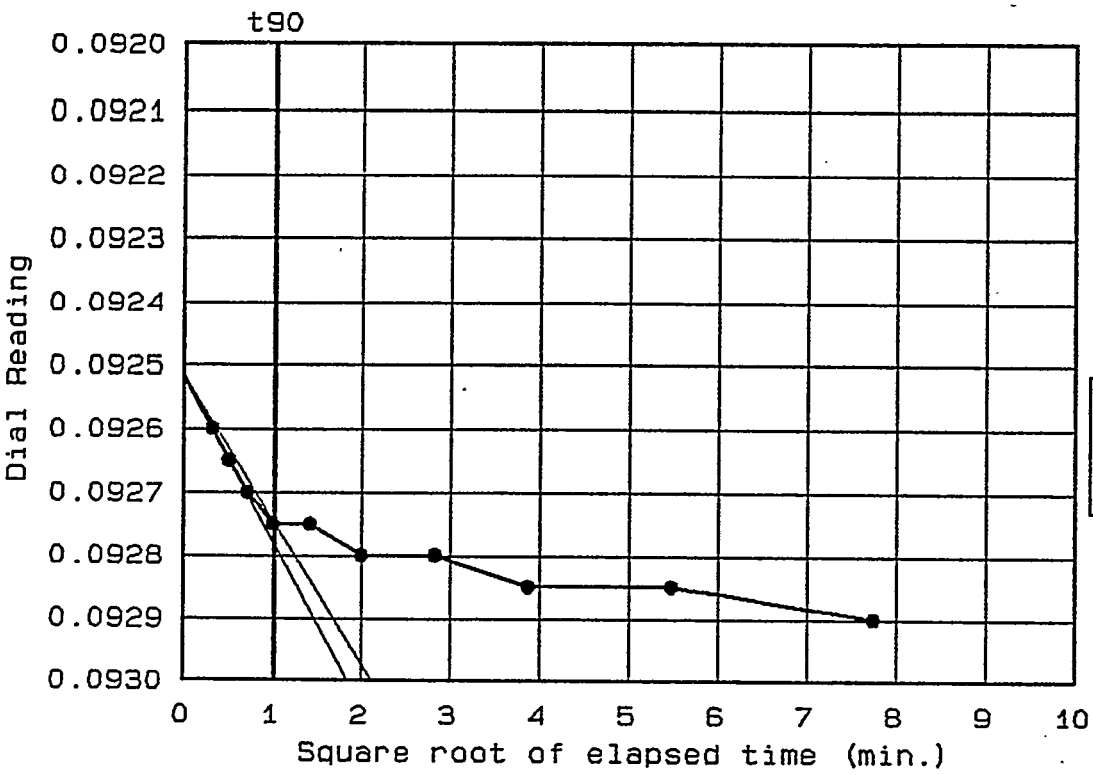
Project No.: 5810575606
Project: Westinghouse Savannah River
Location: H-Bor 23.3 St-1 @ 49-51.5 Ft.

Date: May 16, 1994



Load No.= 8
Load= 15.99 ksf
D_0 = 0.0932
D_{90} = 0.0954
D_{100}= 0.0956
T_{90}= 1.26 min.

C_v @ T_{90} =
1.12 ft^2/day



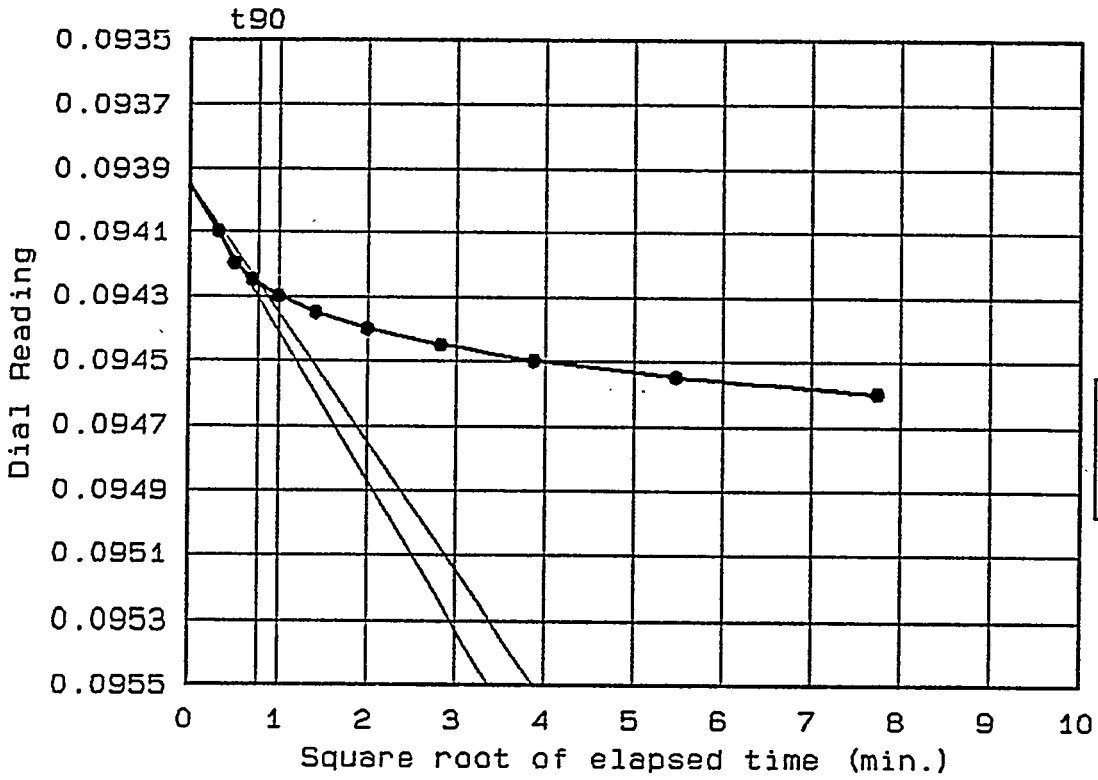
Load No.= 11
Load= 1.99 ksf
D_0 = 0.0925
D_{90} = 0.0928
D_{100}= 0.0928
T_{90}= 1.04 min.

C_v @ T_{90} =
1.37 ft^2/day

Dial Reading vs. Time

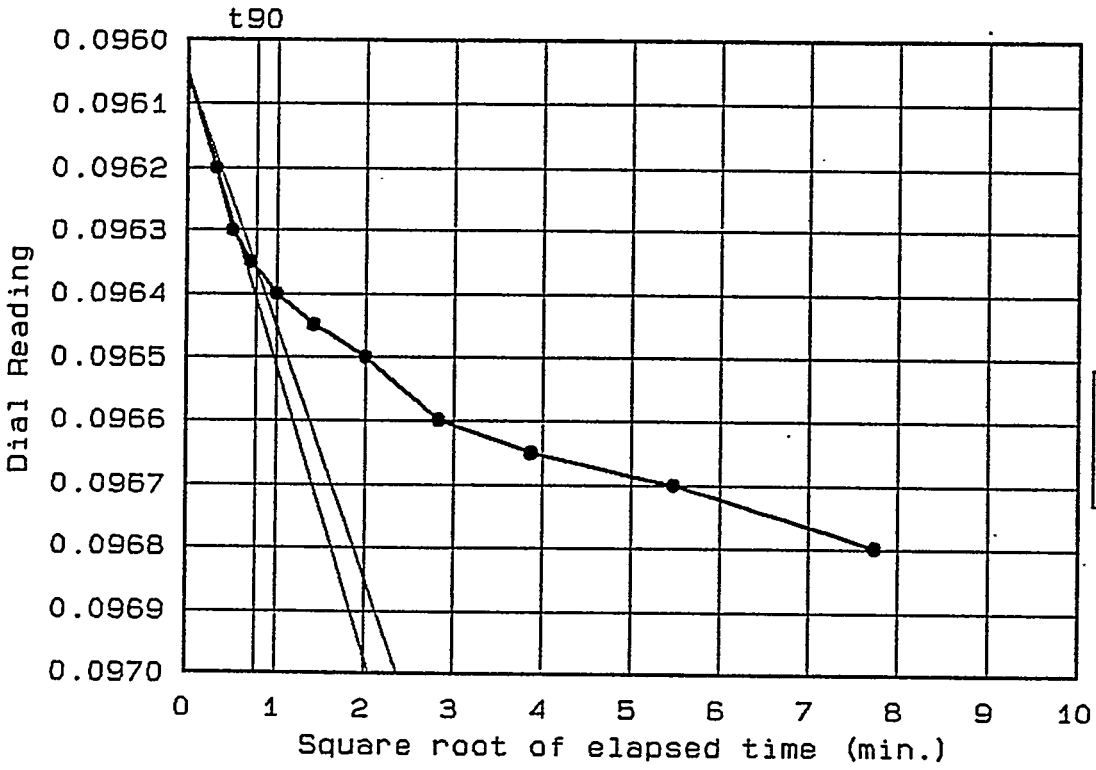
Project No.: 5810575606
Project: Westinghouse Savannah River
Location: H-Bor 23.3 St-1 @ 49-51.5 Ft.

Date: May 16, 1994



Load No.= 12
Load= 3.98 ksf
D_0 = 0.0940
D_{90} = 0.0943
D_{100}= 0.0943
T_{90}= 0.59 min.

C_v @ T_{90} =
2.42 ft^2/day



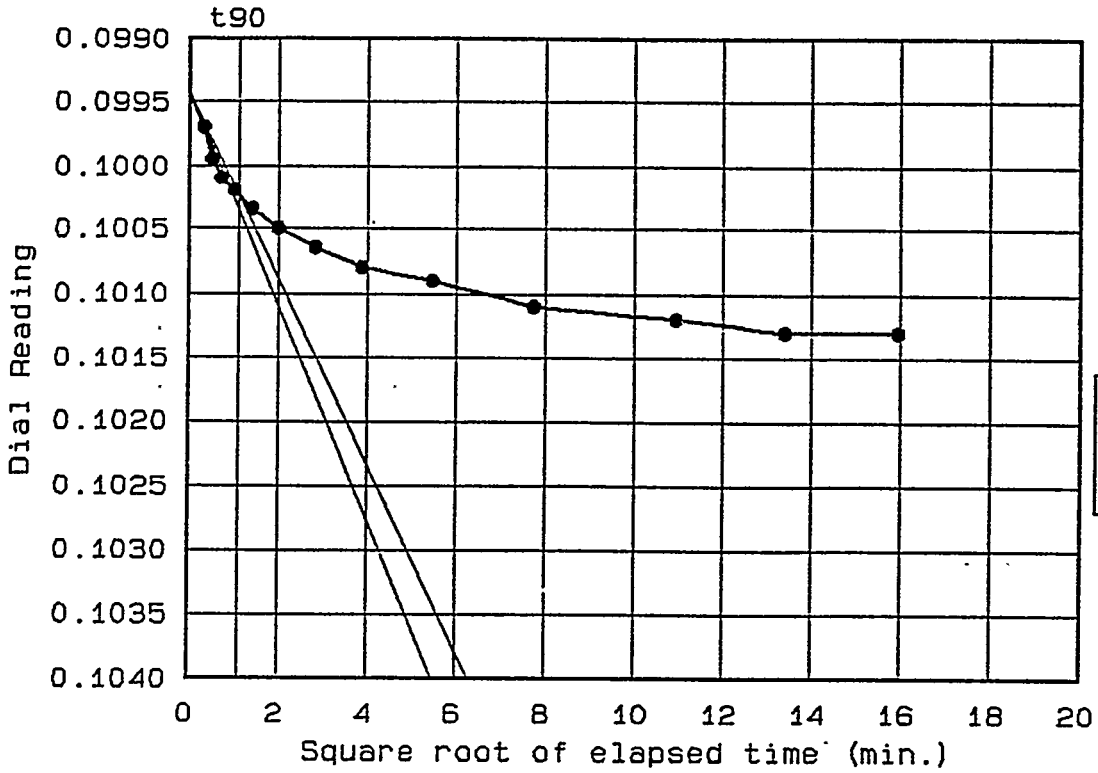
Load No.= 13
Load= 7.99 ksf
D_0 = 0.0961
D_{90} = 0.0964
D_{100}= 0.0964
T_{90}= 0.59 min.

C_v @ T_{90} =
2.41 ft^2/day

Dial Reading vs. Time

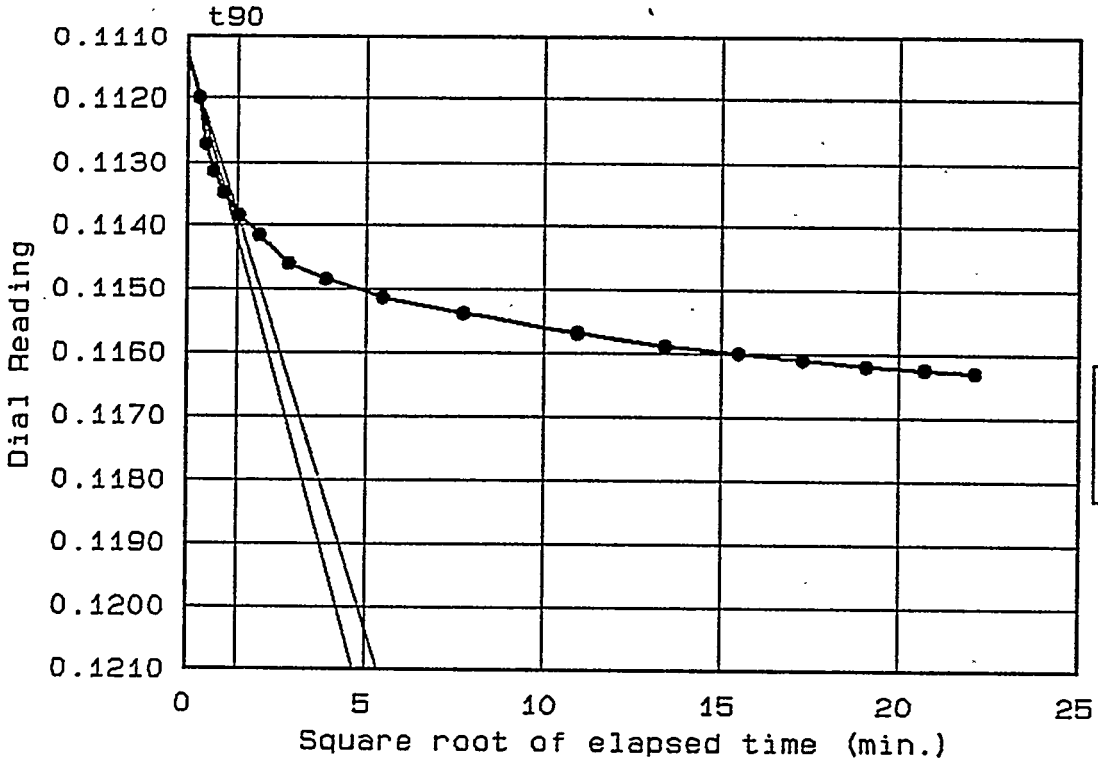
Project No.: 5810575606
Project: Westinghouse Savannah River
Location: H-Bor 23.3 St-1 @ 49-51.5 Ft.

Date: May 16, 1994



Load No.= 14
Load= 15.99 ksf
D_0 = 0.0994
D_{90} = 0.1002
D_{100}= 0.1003
T_{90}= 1.22 min.

C_v @ T_{90} =
1.15 ft^2/day



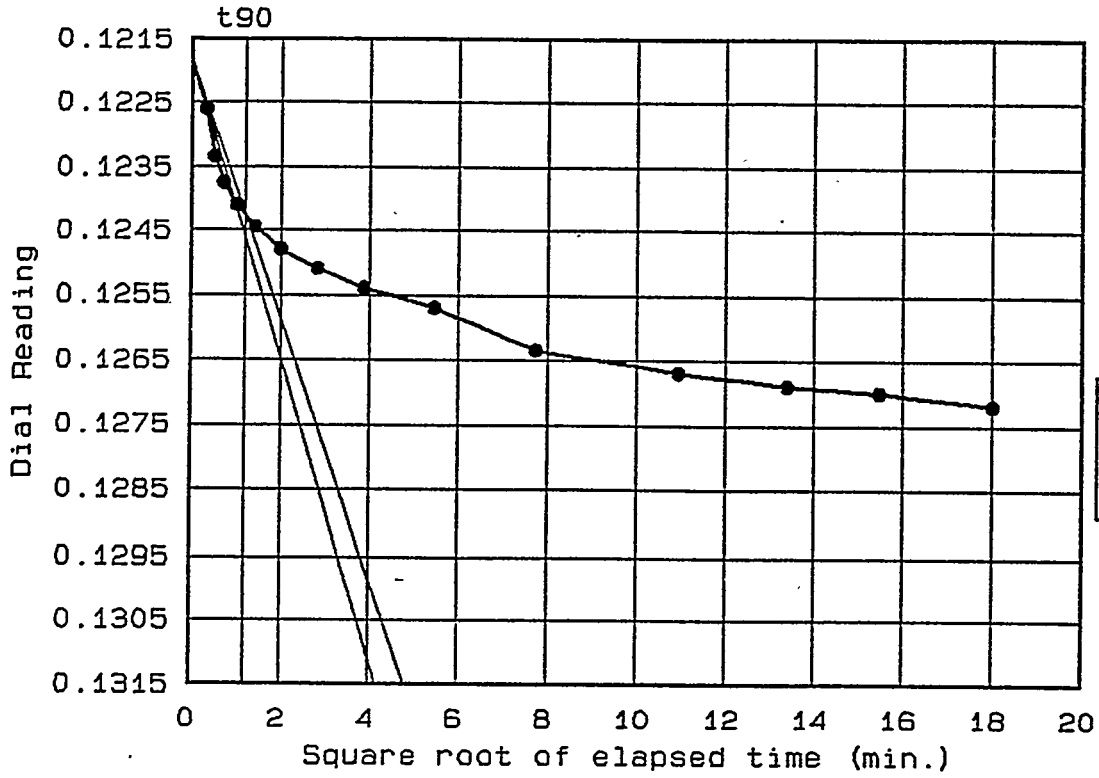
Load No.= 15
Load= 31.78 ksf
D_0 = 0.1113
D_{90} = 0.1138
D_{100}= 0.1141
T_{90}= 1.88 min.

C_v @ T_{90} =
.72 ft^2/day

Dial Reading vs. Time

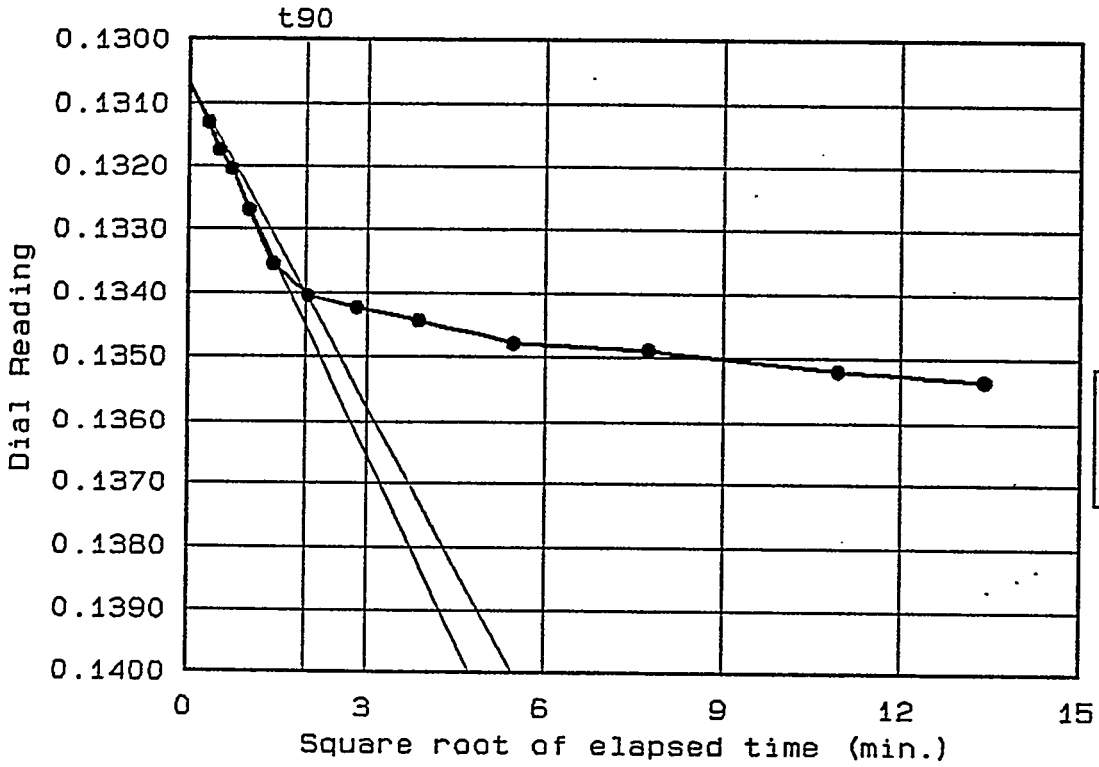
Project No.: 5810575606
Project: Westinghouse Savannah River
Location: H-Bor 23.3 St-1 @ 49-51.5 Ft.

Date: May 16, 1994



Load No.= 16
Load= 48.00 ksf
D_0 = 0.1219
D_{90} = 0.1243
D_{100}= 0.1245
T_{90}= 1.41 min.

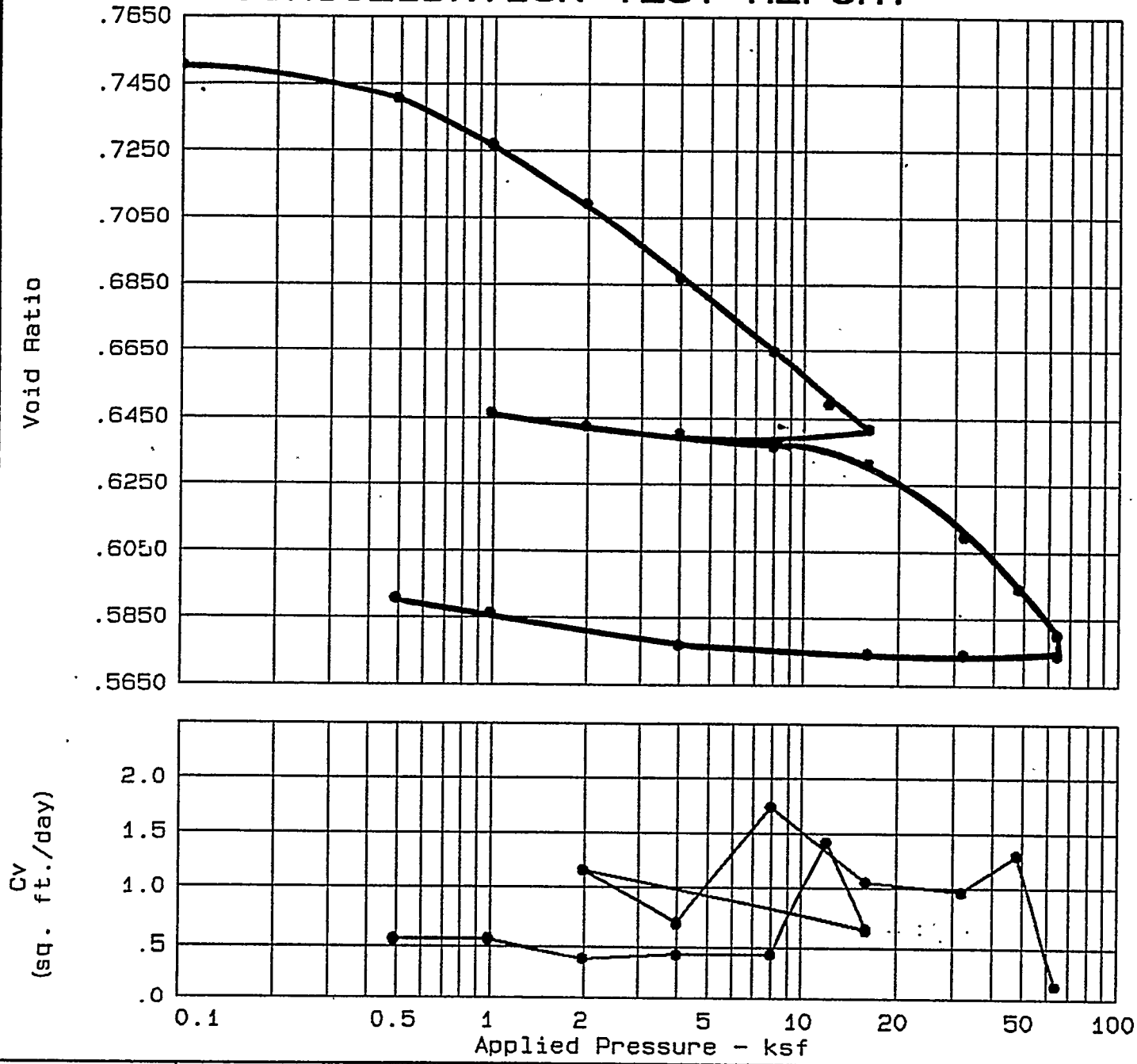
C_v @ T_{90} =
.94 ft^2/day



Load No.= 17
Load= 63.45 ksf
D_0 = 0.1307
D_{90} = 0.1340
D_{100}= 0.1344
T_{90}= 3.82 min.

C_v @ T_{90} =
.34 ft^2/day

CONSOLIDATION TEST REPORT



Natural Saturation	Natural Moisture	Dry Density	LL	PI	Sp.Gr.	Initial void ratio
90.6 %	25.4	95.6	34	13	2.680	0.7509

TEST RESULTS	MATERIAL DESCRIPTION
	light Red Brown Well Graded Sand with Clay

Project No.: 5810575606
Project: Westinghouse Savannah River
Location: H-Bor 23.3 St-2 @ 64-65.5 Ft.

Date: May 16, 1994

Remarks:

Tested by: HEJ
Reviewed by: RLB

CONSOLIDATION TEST REPORT

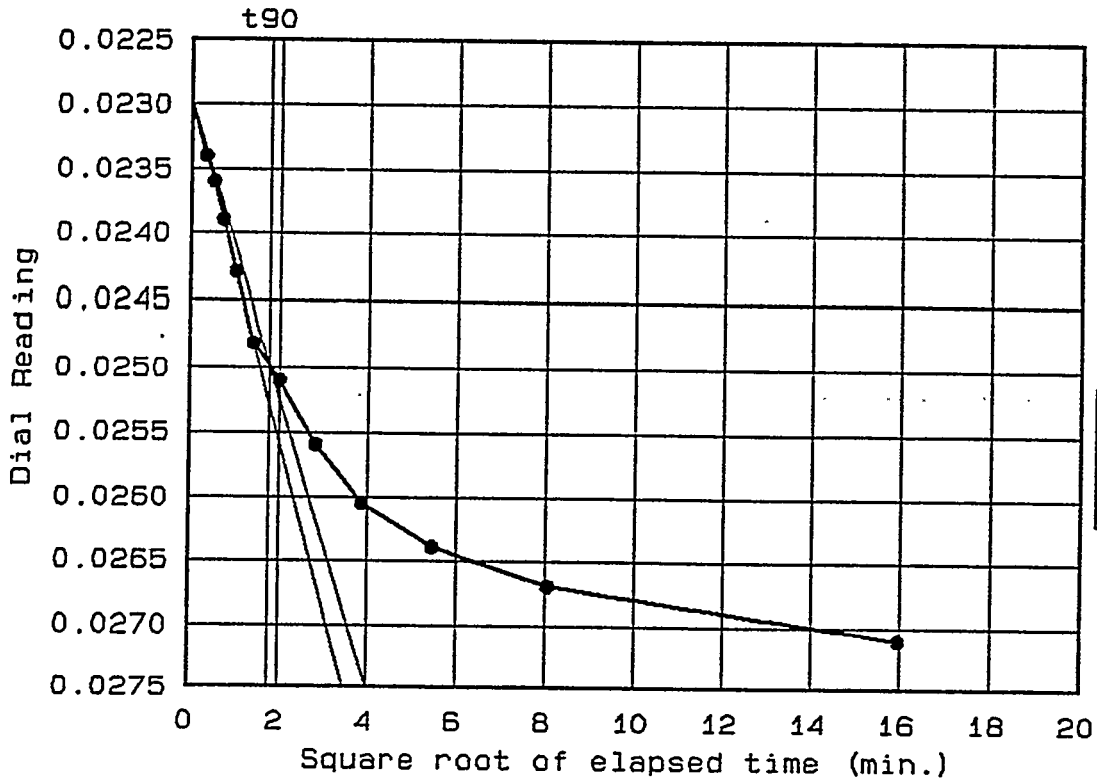
LAW ENGINEERING, INC.

Fig. No._____

Dial Reading vs. Time

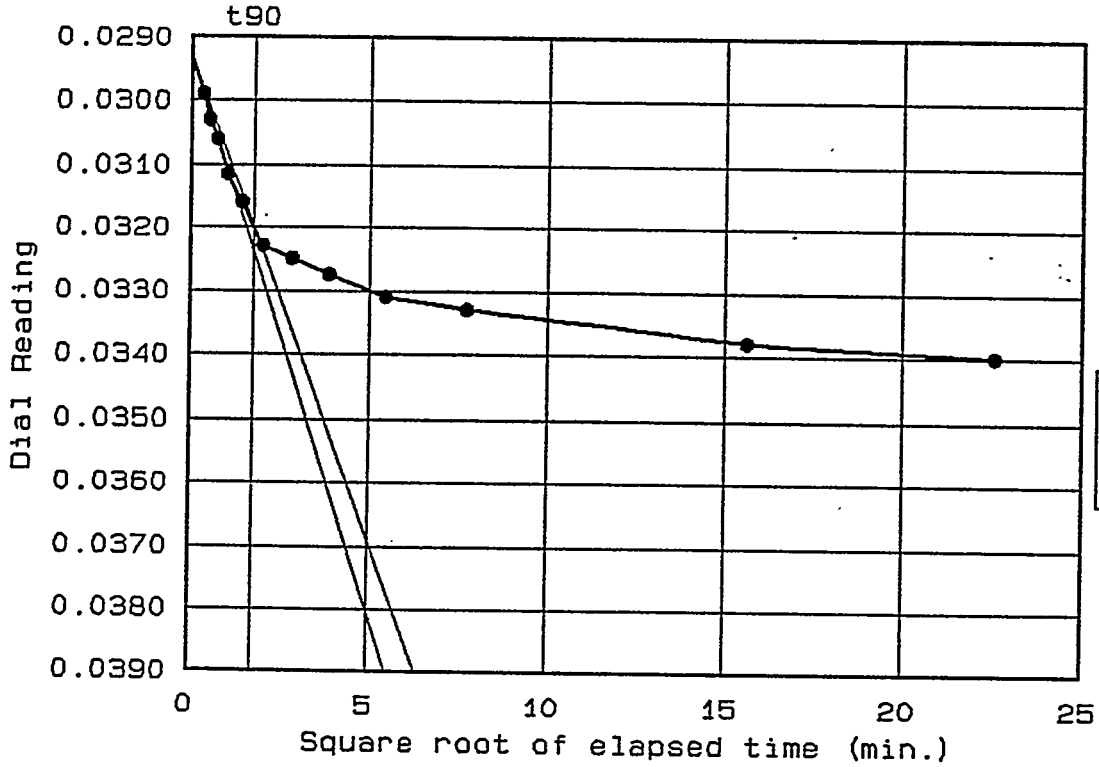
Project No.: 5810575606
Project: Westinghouse Savannah River
Location: H-Bor 23.3 St-2 @ 64-65.5 Ft.

Date: May 16, 1994



Load No.= 2
Load= 0.49 ksf
D_0 = 0.0230
D_{90} = 0.0250
D_{100}= 0.0252
T_{90}= 3.07 min.

C_v @ T_{90} =
.55 ft^2/day



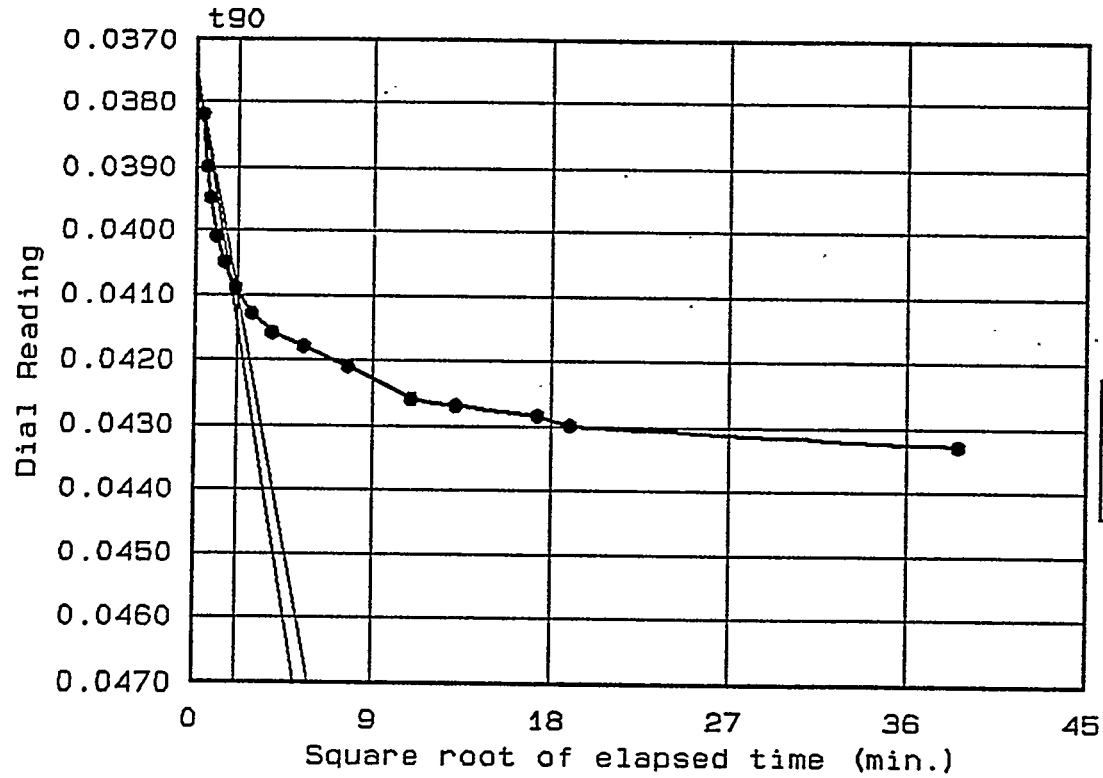
Load No.= 3
Load= 0.99 ksf
D_0 = 0.0293
D_{90} = 0.0320
D_{100}= 0.0323
T_{90}= 3.01 min.

C_v @ T_{90} =
.55 ft^2/day

Dial Reading vs. Time

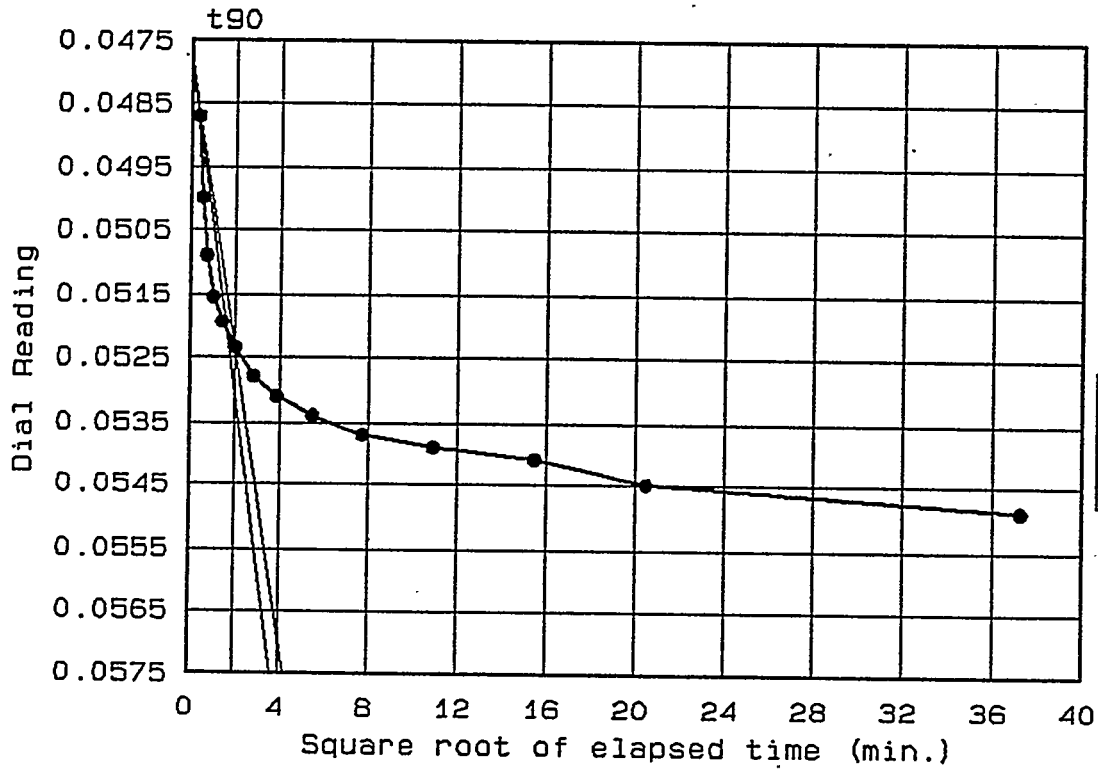
Project No.: 5810575606
Project: Westinghouse Savannah River
Location: H-Bor 23.3 St-2 @ 64-65.5 Ft.

Date: May 16, 1994



Load No.= 4
Load= 1.99 ksf
D_0 = 0.0376
D_{90} = 0.0409
D_{100}= 0.0413
T_{90}= 4.20 min.

C_v @ T_{90} =
.39 ft^2/day



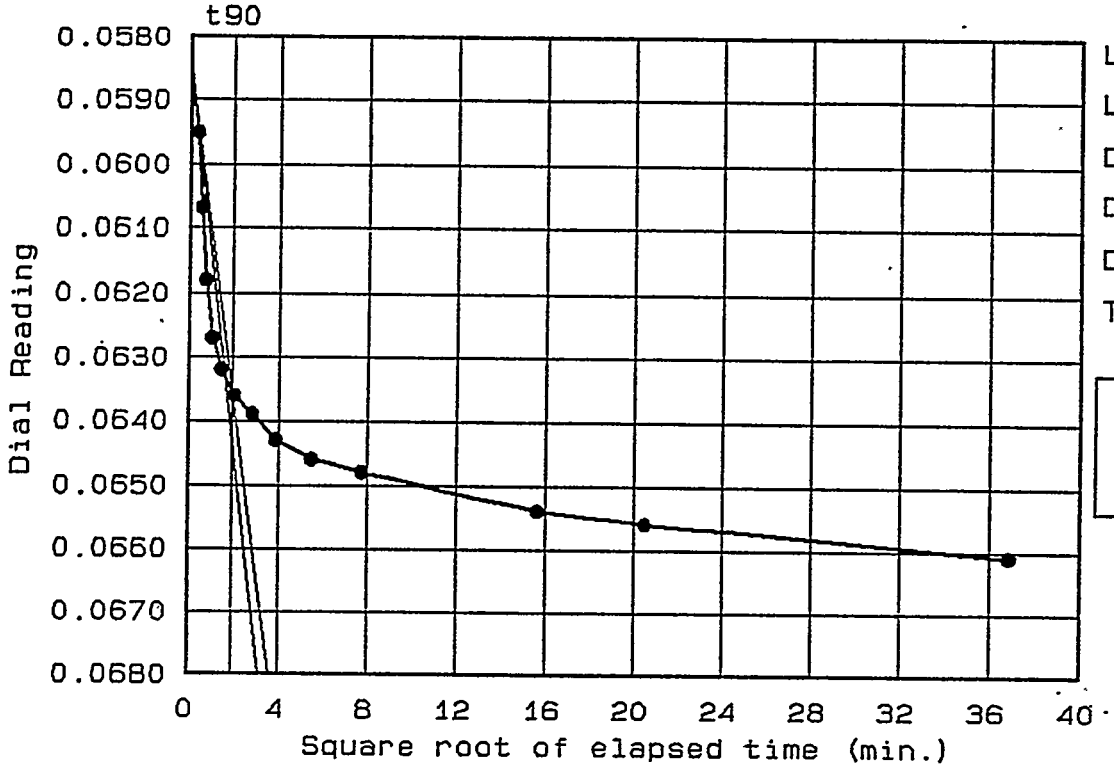
Load No.= 5
Load= 3.99 ksf
D_0 = 0.0479
D_{90} = 0.0523
D_{100}= 0.0528
T_{90}= 3.73 min.

C_v @ T_{90} =
.43 ft^2/day

Dial Reading vs. Time

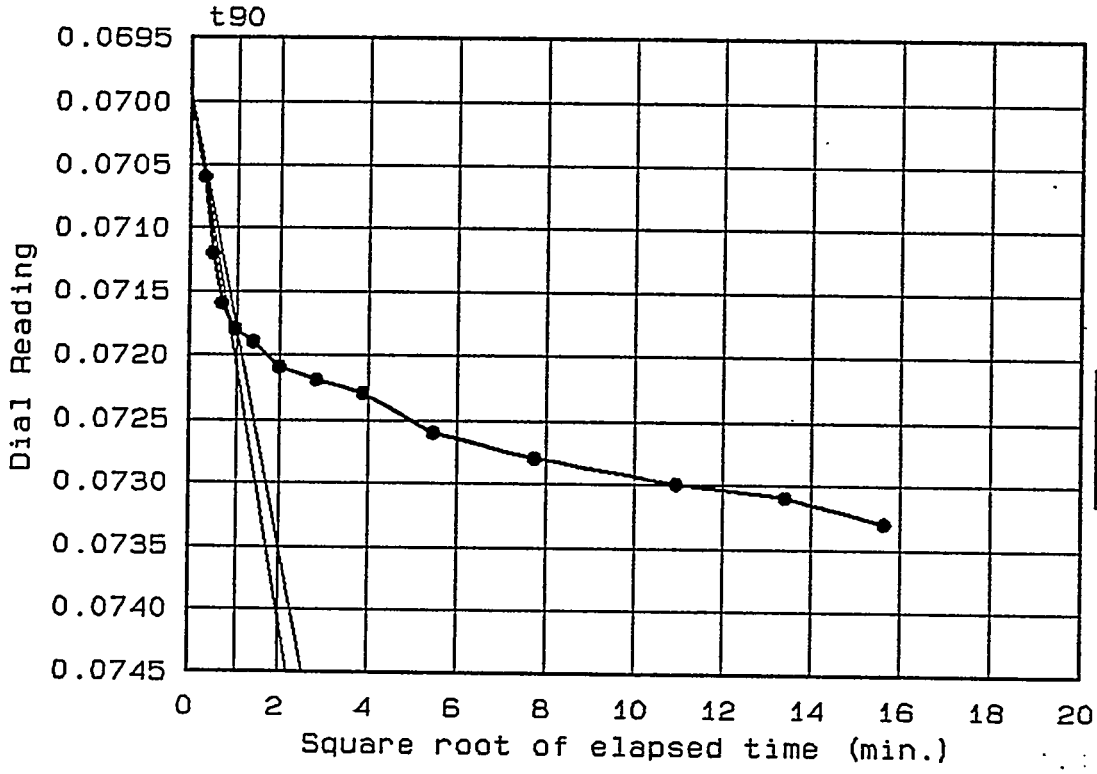
Project No.: 5810575606
Project: Westinghouse Savannah River
Location: H-Bor 23.3 St-2 @ 64-65.5 Ft.

Date: May 16, 1994



Load No.= 6
Load= 8.00 ksf
D_0 = 0.0585
D_{90} = 0.0635
D_{100}= 0.0641
T_{90}= 3.60 min.

C_v @ T_{90} =
.43 ft^2/day



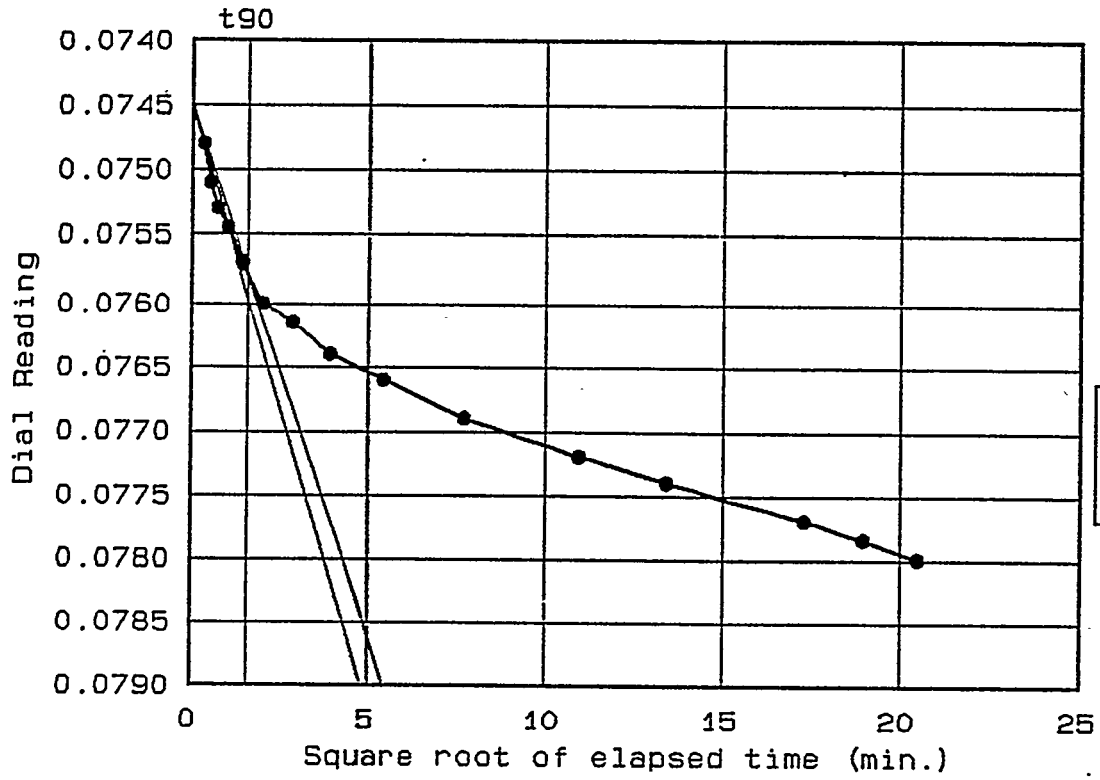
Load No.= 7
Load= 12.00 ksf
D_0 = 0.0699
D_{90} = 0.0718
D_{100}= 0.0720
T_{90}= 1.07 min.

C_v @ T_{90} =
1.41 ft^2/day

Dial Reading vs. Time

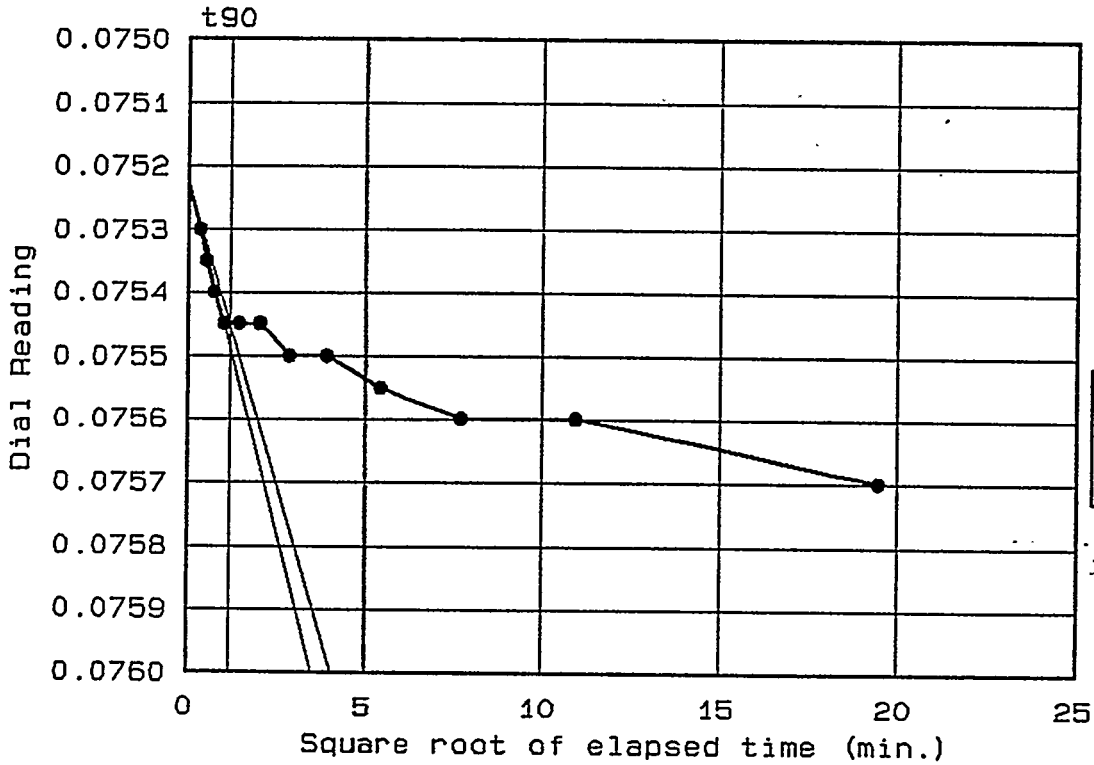
Project No.: 5810575606
Project: Westinghouse Savannah River
Location: H-Bor 23.3 St-2 @ 64-65.5 Ft.

Date: May 16, 1994



Load No.= 8
Load= 16.01 ksf
D_0 = 0.0745
D_{90} = 0.0758
D_{100}= 0.0759
T_{90}= 2.35 min.

C_v @ T_{90} =
.64 ft^2/day



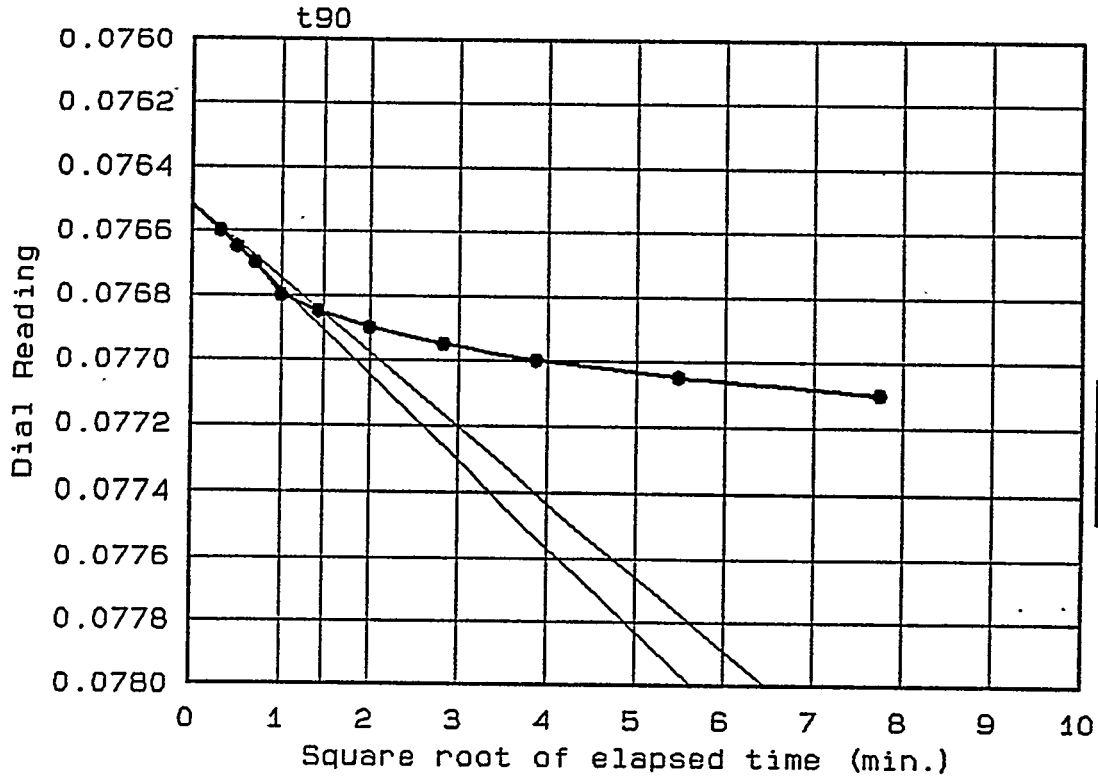
Load No.= 11
Load= 1.99 ksf
D_0 = 0.0752
D_{90} = 0.0755
D_{100}= 0.0755
T_{90}= 1.30 min.

C_v @ T_{90} =
1.15 ft^2/day

Dial Reading vs. Time

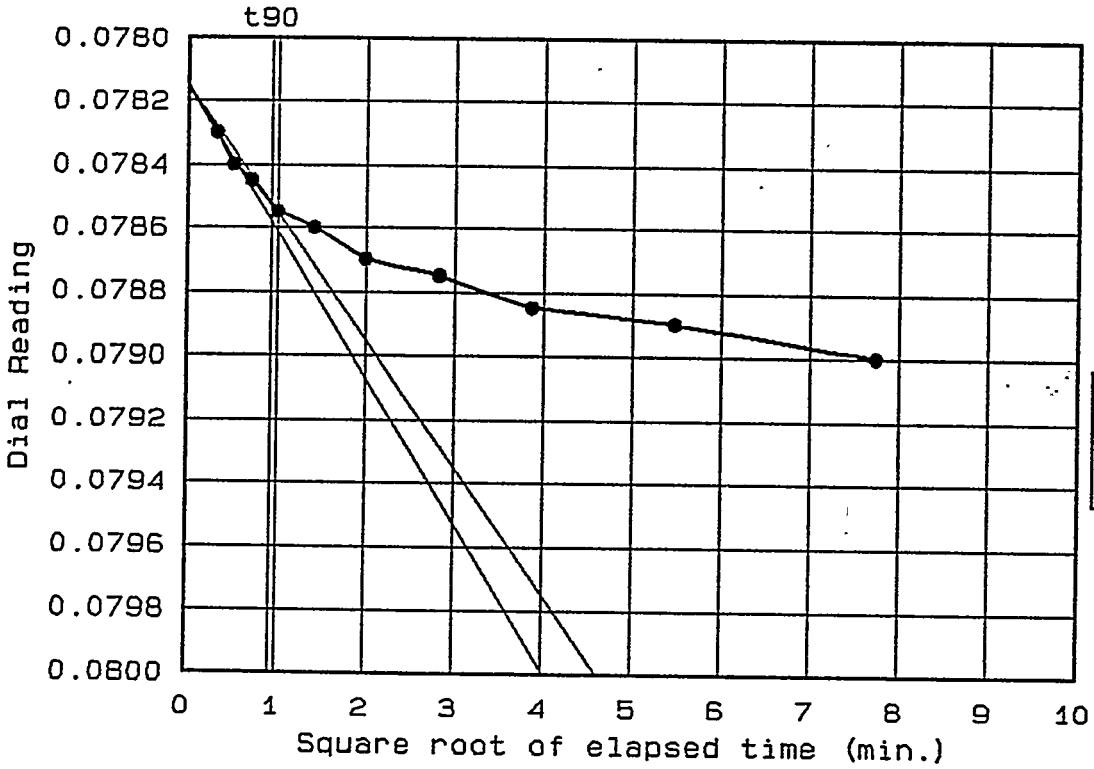
Project No.: 5810575606
Project: Westinghouse Savannah River
Location: H-Bor 23.3 St-2 @ 64-65.5 Ft.

Date: May 16, 1994



Load No.= 12
Load= 3.99 ksf
D_0 = 0.0765
D_{90} = 0.0769
D_{100}= 0.0769
T_{90}= 2.18 min.

C_v @ T_{90} =
.68 ft^2/day



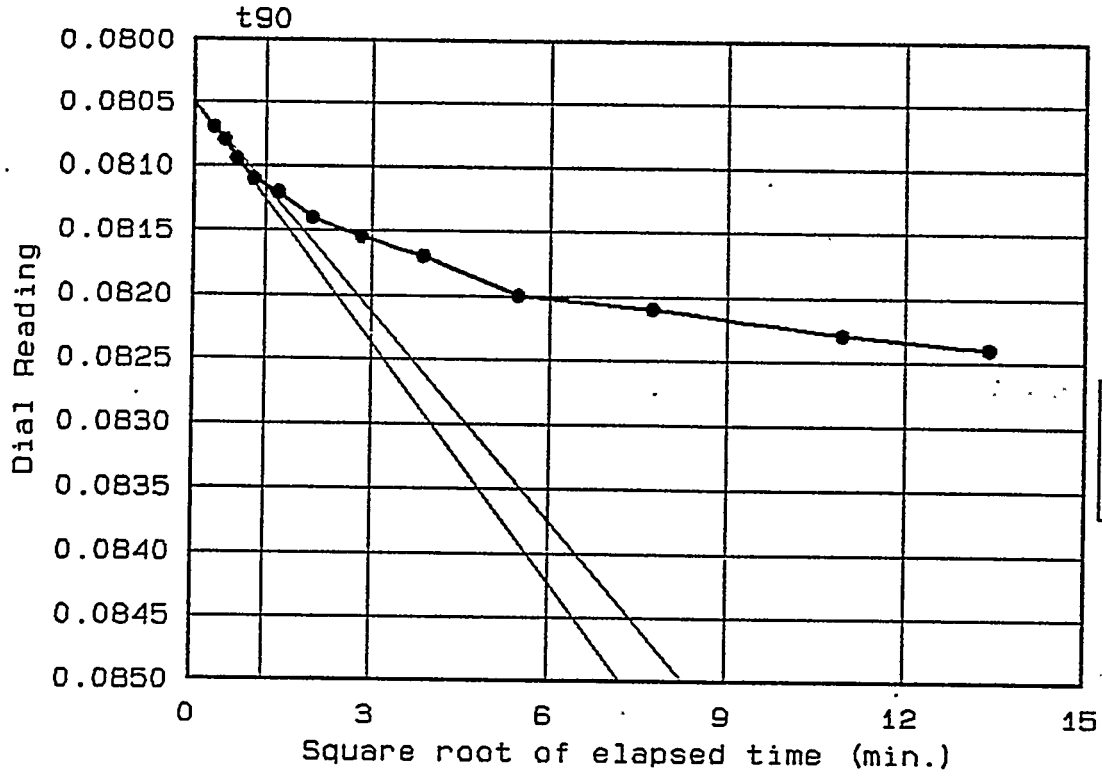
Load No.= 13
Load= 8.00 ksf
D_0 = 0.0782
D_{90} = 0.0785
D_{100}= 0.0786
T_{90}= 0.86 min.

C_v @ T_{90} =
1.74 ft^2/day

Dial Reading vs. Time

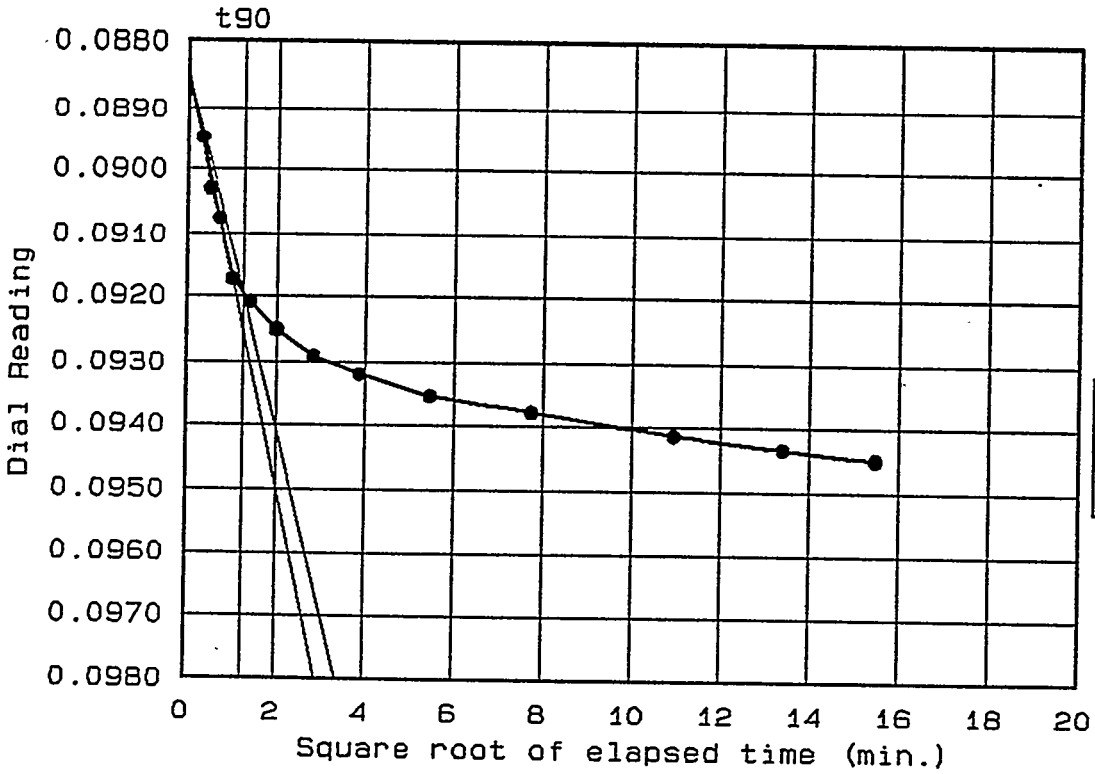
Project No.: 5810575606
Project: Westinghouse Savannah River
Location: H-Bor 23.3 St-2 @ 64-65.5 Ft.

Date: May 16, 1994



Load No.= 14
Load= 16.01 ksf
D_0 = 0.0805
D_{90} = 0.0811
D_{100}= 0.0812
T_{90}= 1.41 min.

C_v @ T_{90} =
1.05 ft^2/day



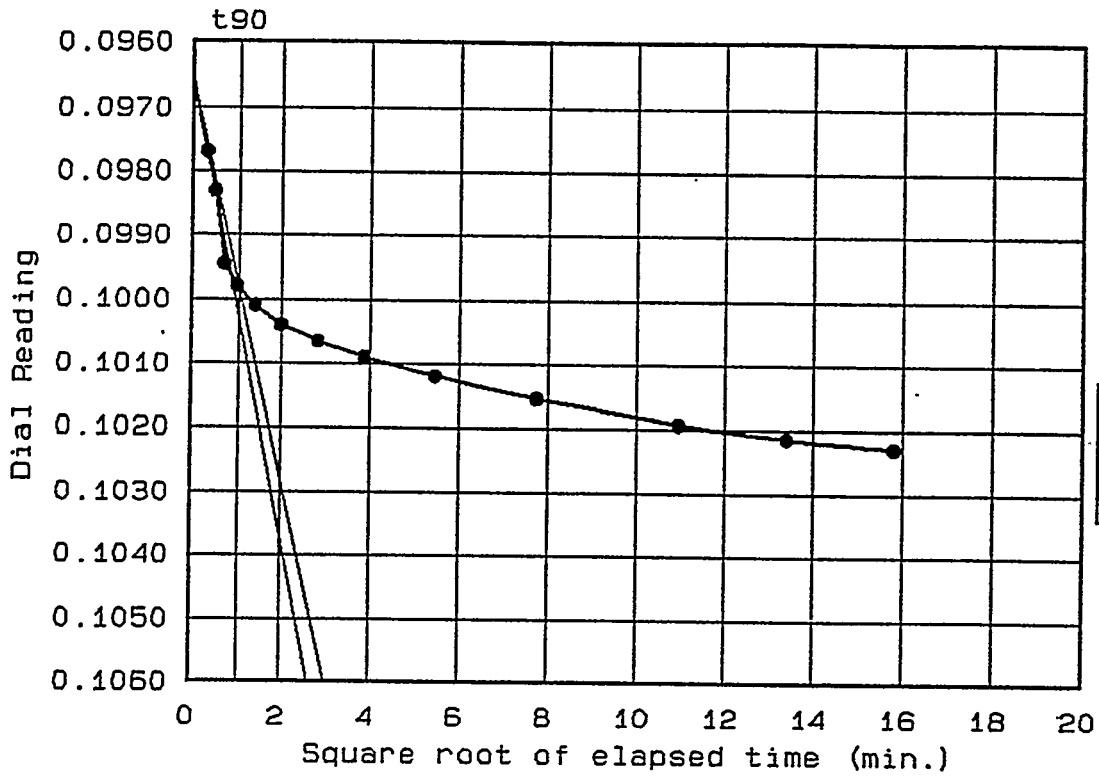
Load No.= 15
Load= 32.09 ksf
D_0 = 0.0885
D_{90} = 0.0919
D_{100}= 0.0923
T_{90}= 1.50 min.

C_v @ T_{90} =
.96 ft^2/day

Dial Reading vs. Time

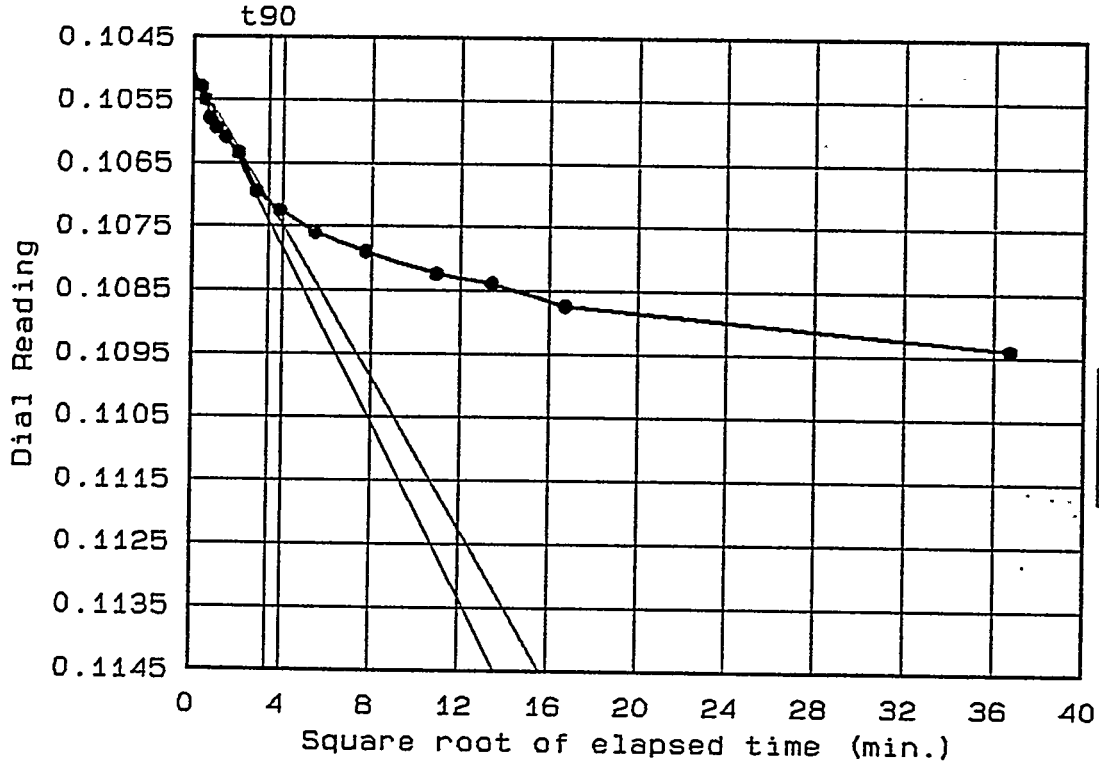
Project No.: 5810575606
Project: Westinghouse Savannah River
Location: H-Bor 23.3 St-2 @ 64-65.5 Ft.

Date: May 16, 1994



Load No.= 16
Load= 48.00 ksf
D_0 = 0.0966
D_{90} = 0.0998
D_{100}= 0.1002
T_{90}= 1.09 min.

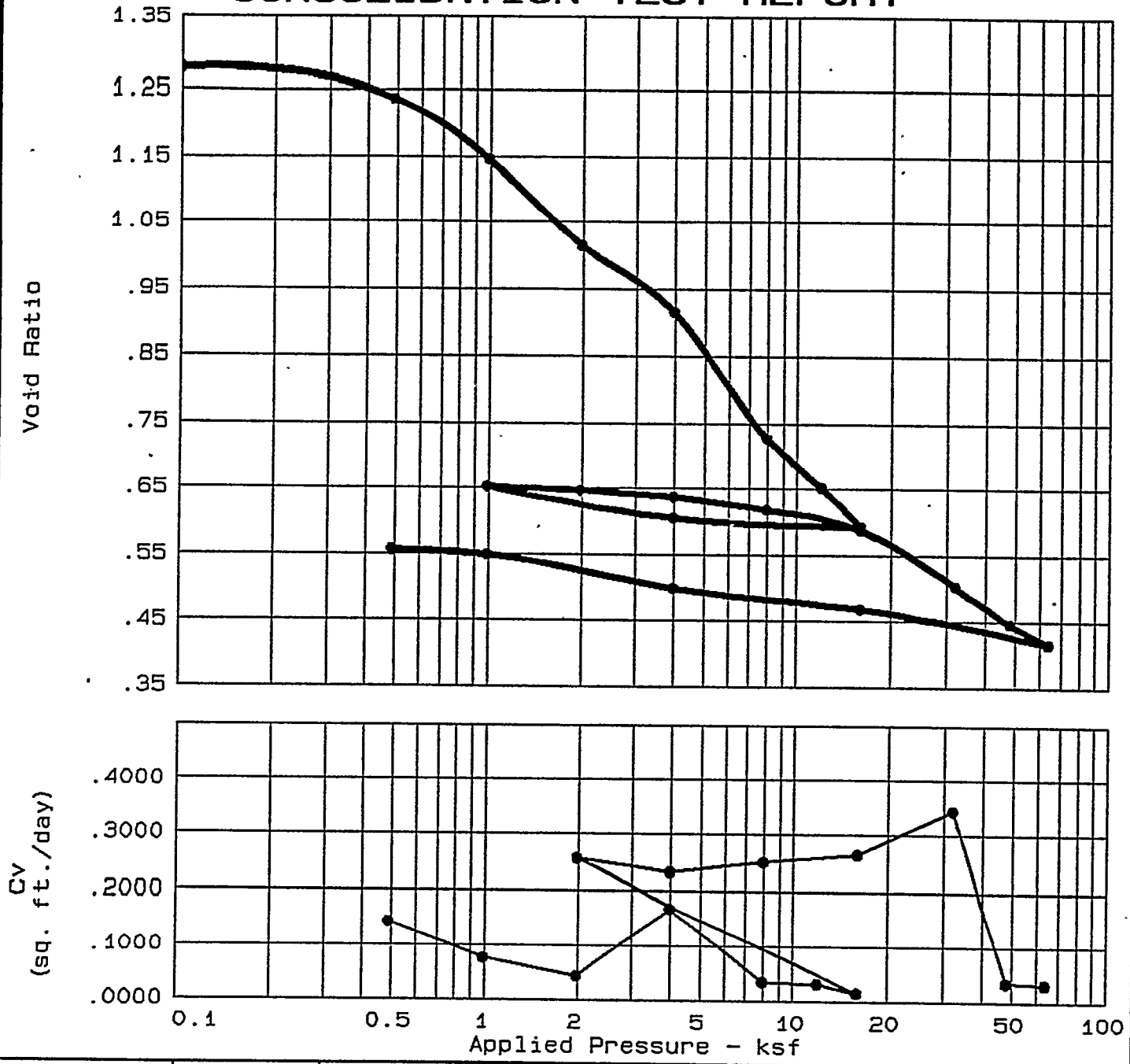
C_v @ T_{90} =
1.30 ft^2/day



Load No.= 17
Load= 63.79 ksf
D_0 = 0.1051
D_{90} = 0.1071
D_{100}= 0.1073
T_{90}= 11.36 min.

C_v @ T_{90} =
.12 ft^2/day

CONSOLIDATION TEST REPORT



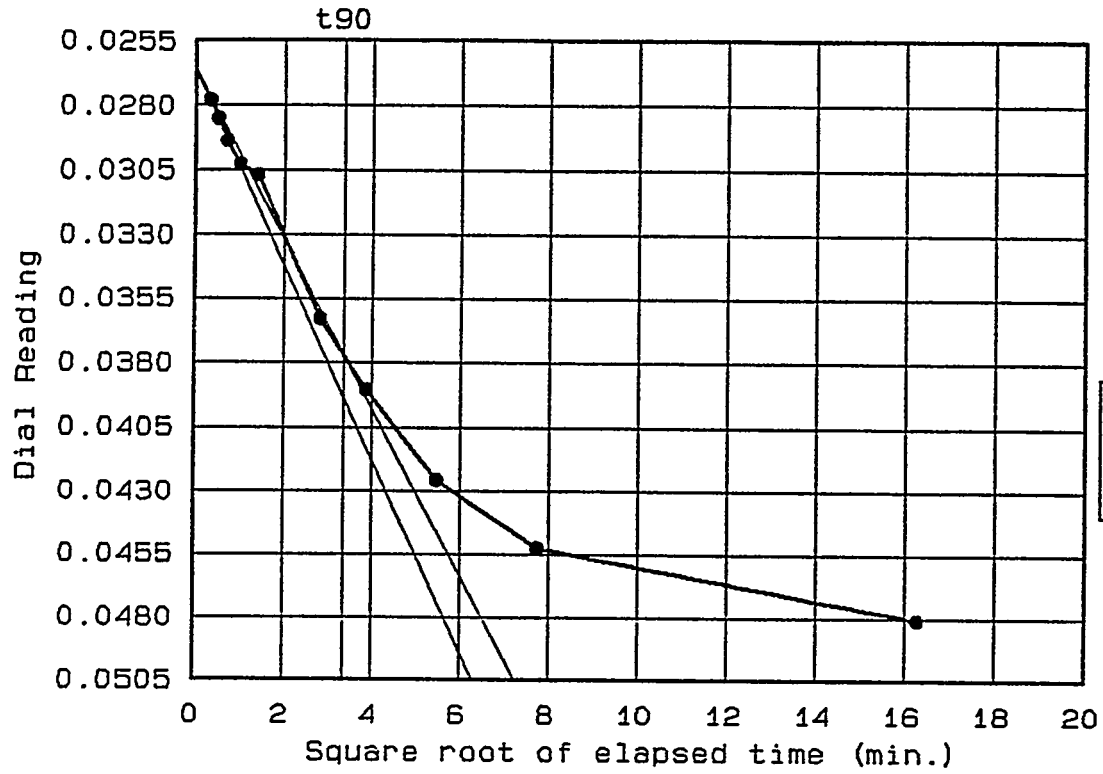
Natural Saturation	Natural Moisture	Dry Density	LL	PI	Sp.Gr.	Initial void ratio
100.2 %	47.7	73.8	52	34	2.700	1.2847

TEST RESULTS	MATERIAL DESCRIPTION
	Green Tan Clayey Sand
Project No.: 5810575606 Project: SRS-ITP3 Location: H-Bor-50 ST-5 @ 154.5-156.5 FT. Date: April 27, 1994	Class: SC Remarks: Tested by: HEJ Reviewed by: RLS
CONSOLIDATION TEST REPORT LAW ENGINEERING, INC.	Fig. No._____

Dial Reading vs. Time

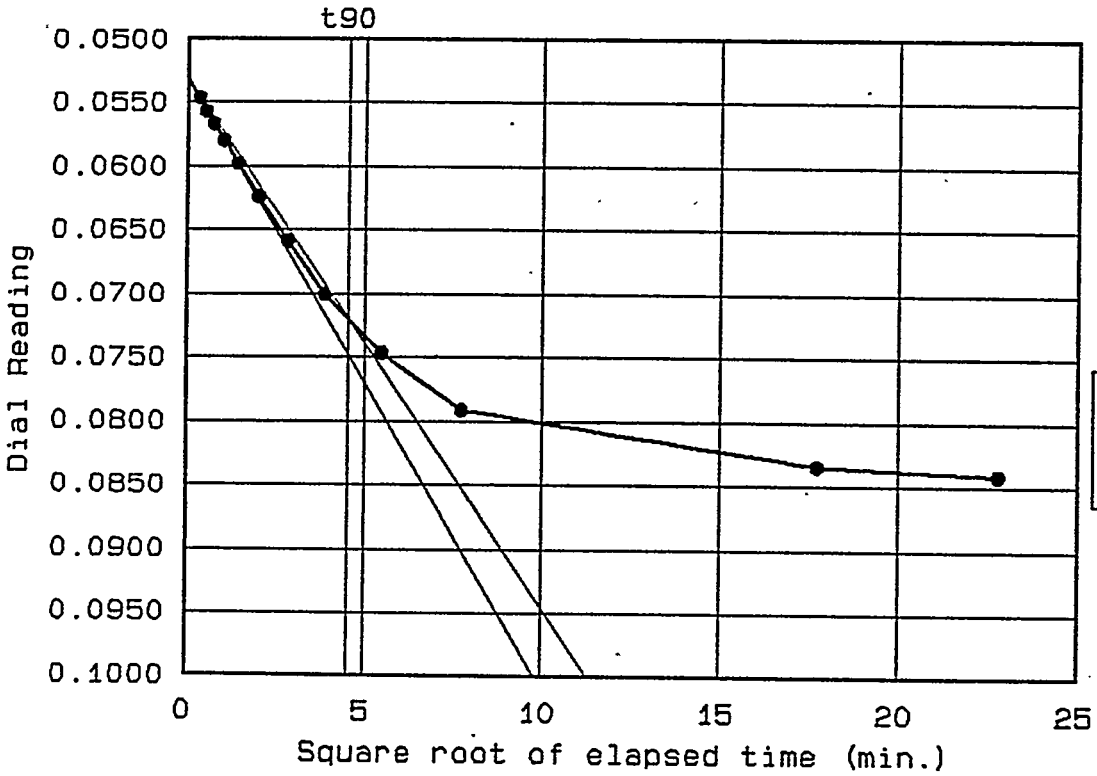
Project No.: 5810575606
Project: SRS-ITP3
Location: H-Bor-50 ST-5 @ 154.5-156.5 FT.

Date: April 27, 1994



Load No.= 2
Load= 0.49 ksf
D_0 = 0.0266
D_{90} = 0.0377
D_{100}= 0.0390
T_{90}= 11.34 min.

C_v @ T_{90} =
.14 ft^2/day



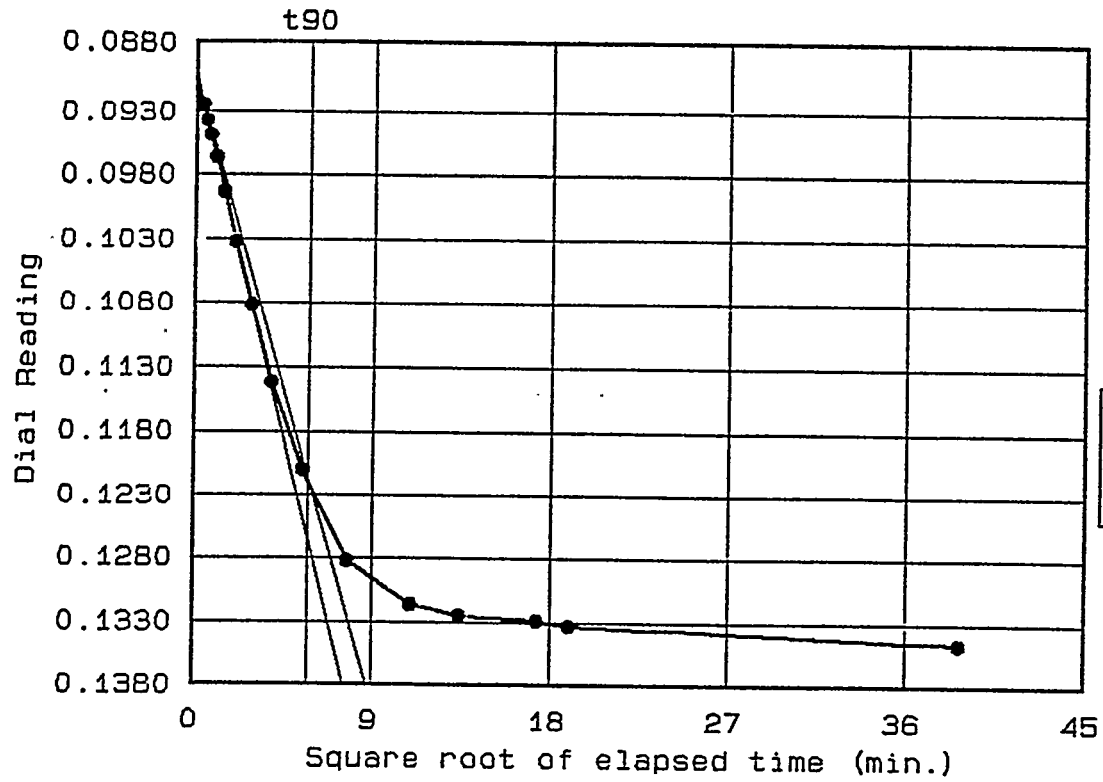
Load No.= 3
Load= 0.99 ksf
D_0 = 0.0532
D_{90} = 0.0720
D_{100}= 0.0741
T_{90}= 20.56 min.

C_v @ T_{90} =
.07 ft^2/day

Dial Reading vs. Time

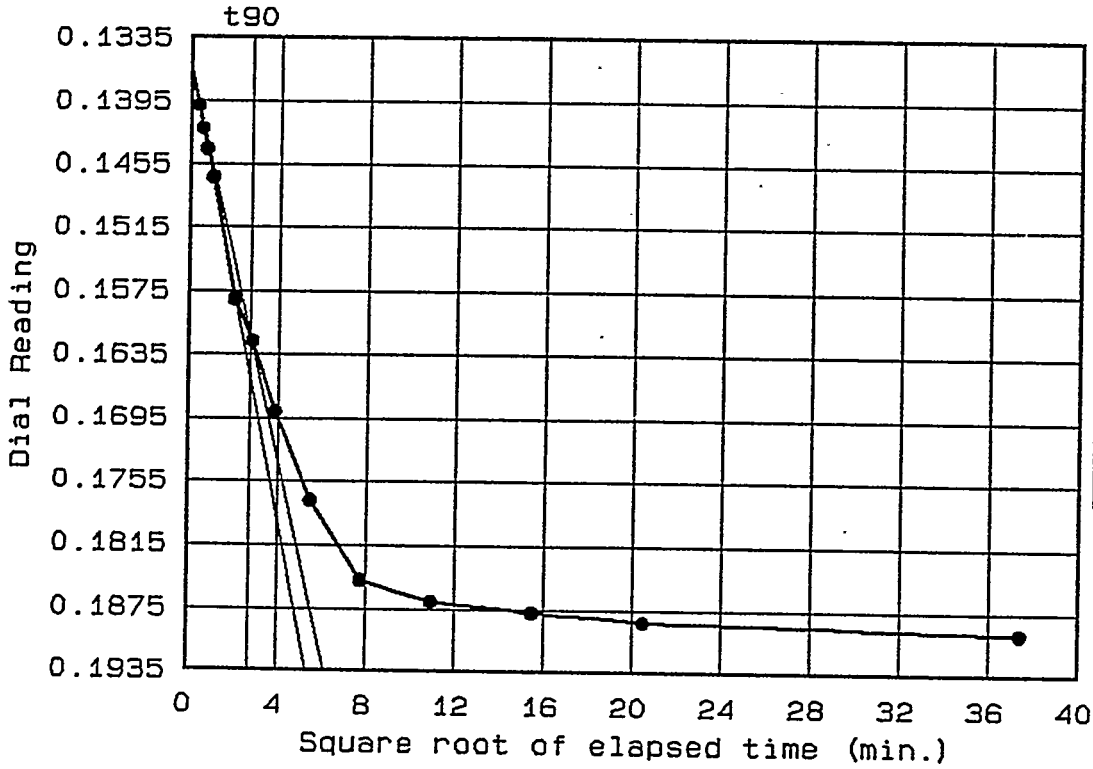
Project No.: 5810575606
Project: SRS-ITP3
Location: H-Bor-50 ST-5 @ 154.5-156.5 FT.

Date: April 27, 1994



Load No.= 4
Load= 1.99 ksf
D_0 = 0.0905
D_{90} = 0.1219
D_{100}= 0.1254
T_{90}= 33.05 min.

C_v @ T_{90} =
.04 ft^2/day



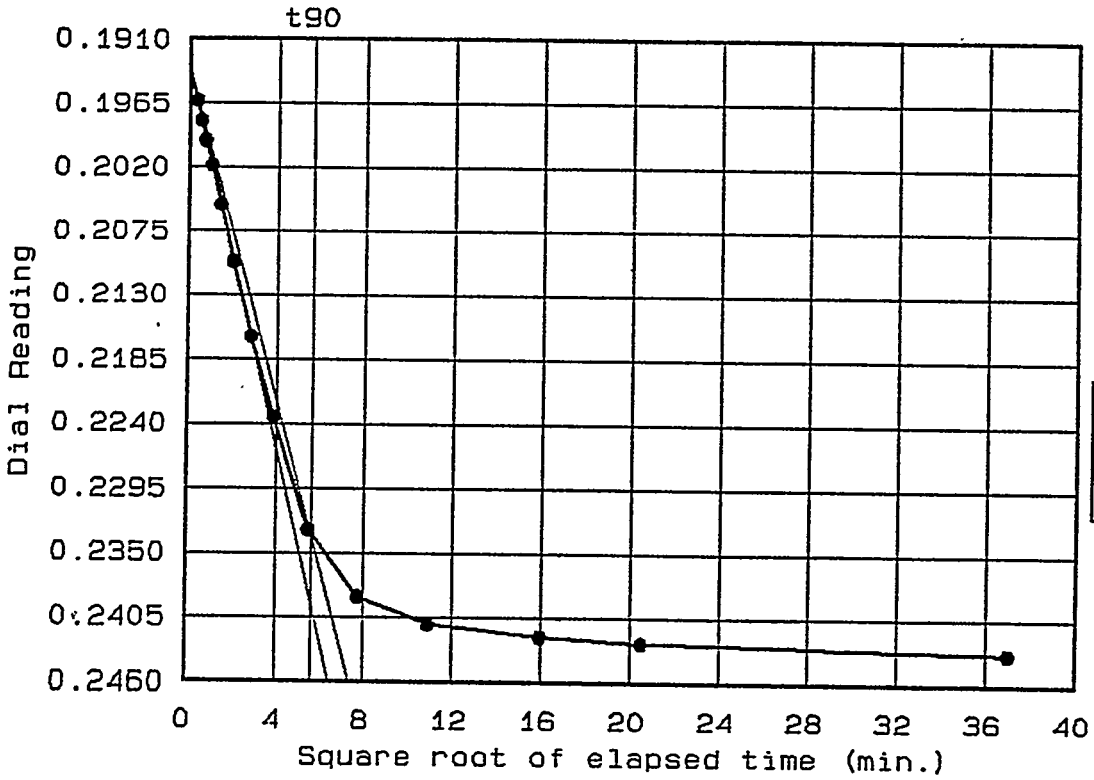
Load No.= 5
Load= 3.99 ksf
D_0 = 0.1365
D_{90} = 0.1616
D_{100}= 0.1644
T_{90}= 7.23 min.

C_v @ T_{90} =
...17 ft^2/day

Dial Reading vs. Time

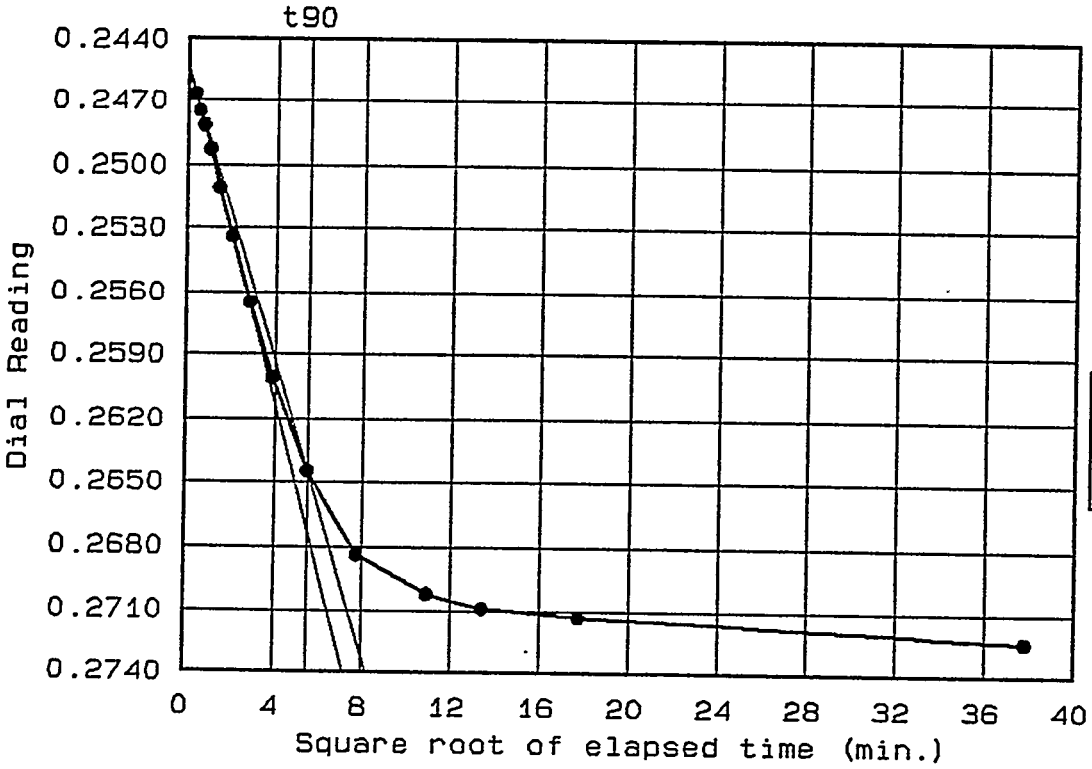
Project No.: 5810575606
Project: SRS-ITP3
Location: H-Bor-50 ST-5 @ 154.5-156.5 FT.

Date: April 27, 1994



Load No.= 6
Load= 8.00 ksf
D_0 = 0.1937
D_{90} = 0.2334
D_{100}= 0.2378
T_{90}= 31.22 min.

C_v @ T_{90} =
.03 ft^2/day



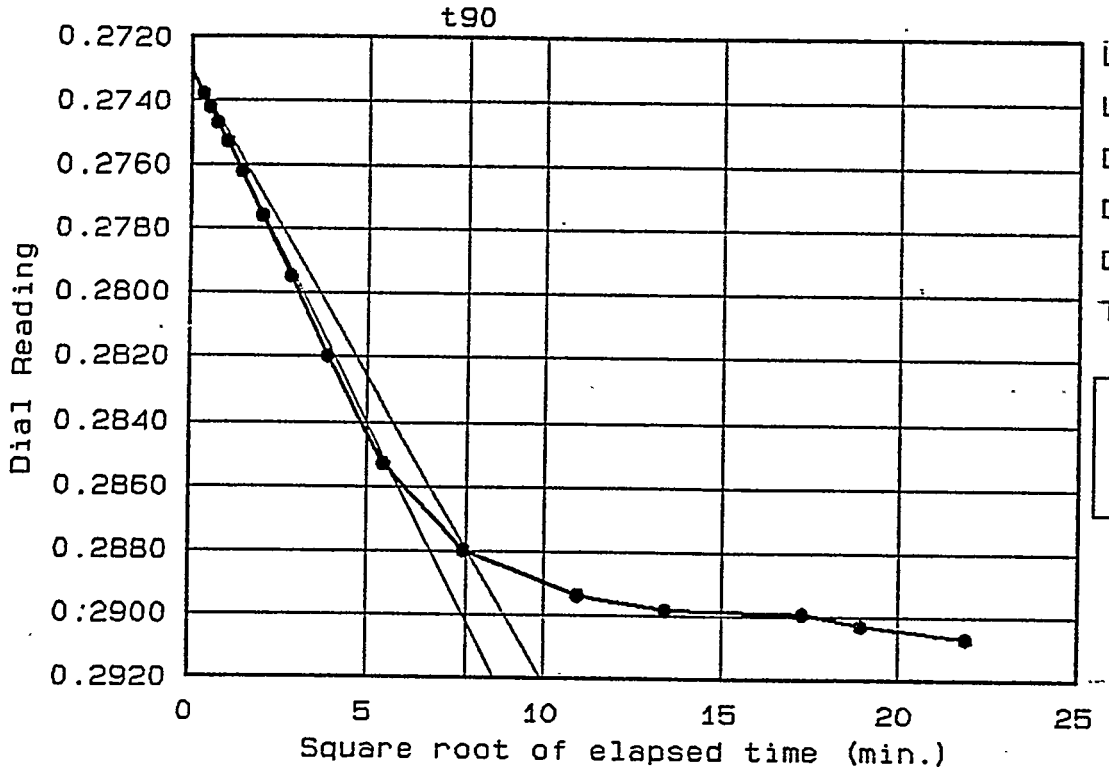
Load No.= 7
Load= 12.00 ksf
D_0 = 0.2454
D_{90} = 0.2645
D_{100}= 0.2667
T_{90}= 30.22 min.

C_v @ T_{90} =
.03 ft^2/day

Dial Reading vs. Time

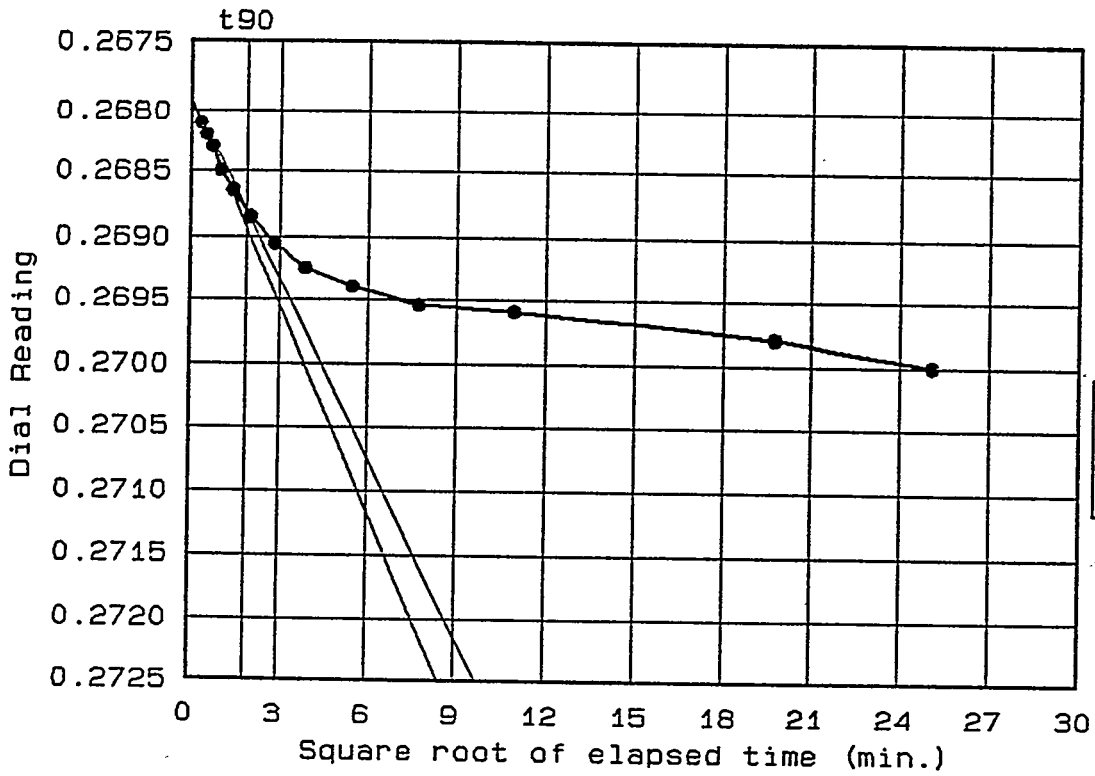
Project No.: 5810575606
Project: SRS-ITP3
Location: H-Bor-50 ST-5 @ 154.5-156.5 FT.

Date: April 27, 1994



Load No.= 8
Load= 16.02 ksf
D_0 = 0.2731
D_{90} = 0.2880
D_{100}= 0.2897
T_{90}= 61.37 min.

C_v @ T_{90} =
.01 ft^2/day



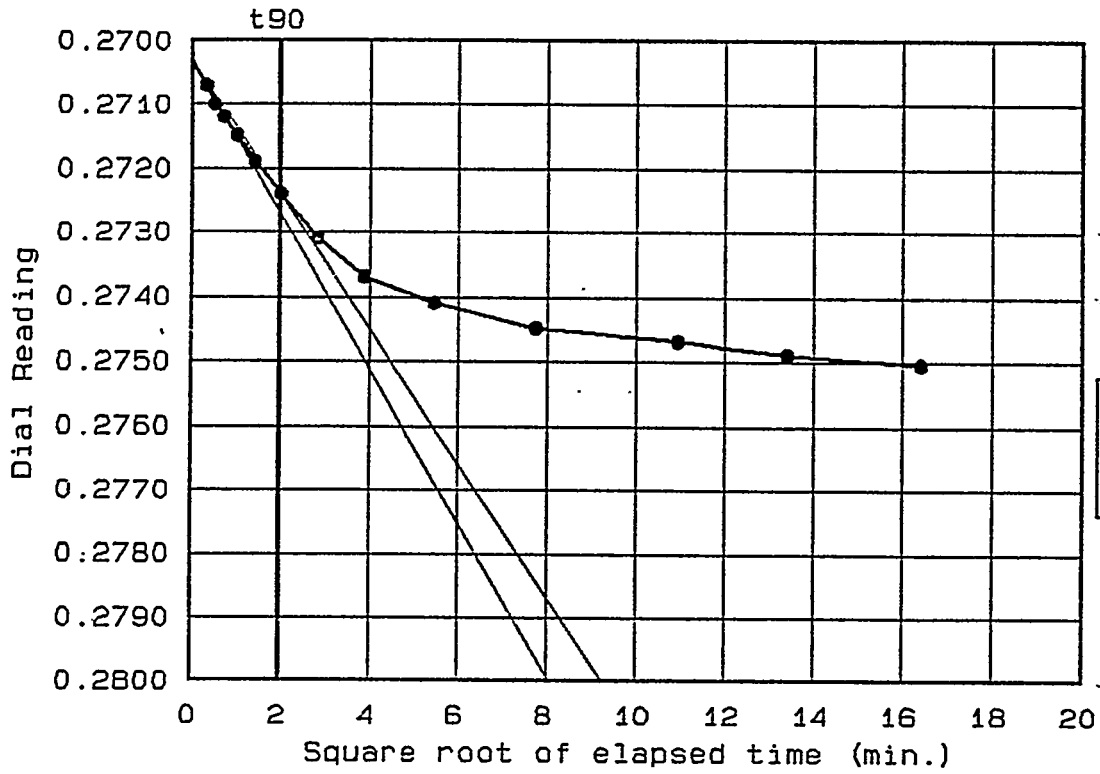
Load No.= 11
Load= 1.99 ksf
D_0 = 0.2679
D_{90} = 0.2688
D_{100}= 0.2689
T_{90}= 3.43 min.

C_v @ T_{90} =
.25 ft^2/day

Dial Reading vs. Time

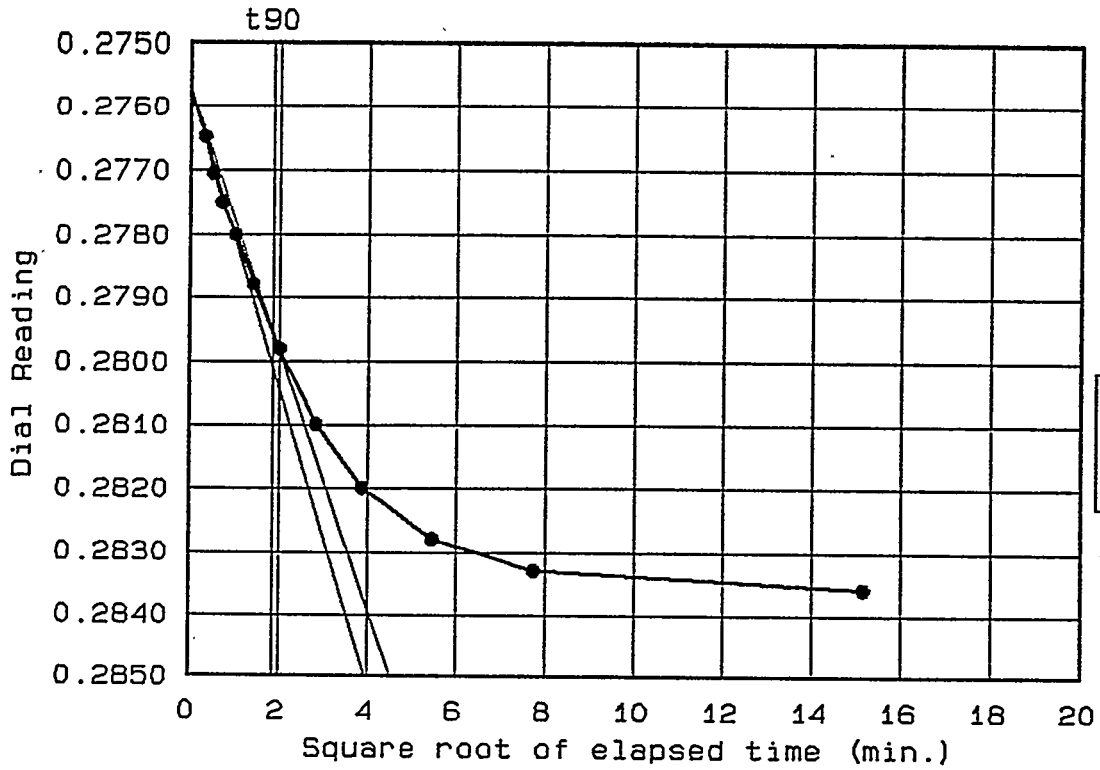
Project No.: 5810575606
Project: SRS-ITP3
Location: H-Bor-50 ST-5 @ 154.5-156.5 FT.

Date: April 27, 1994



Load No.= 12
Load= 3.99 ksf
D_0 = 0.2703
D_{90} = 0.2723
D_{100}= 0.2726
T_{90}= 3.75 min.

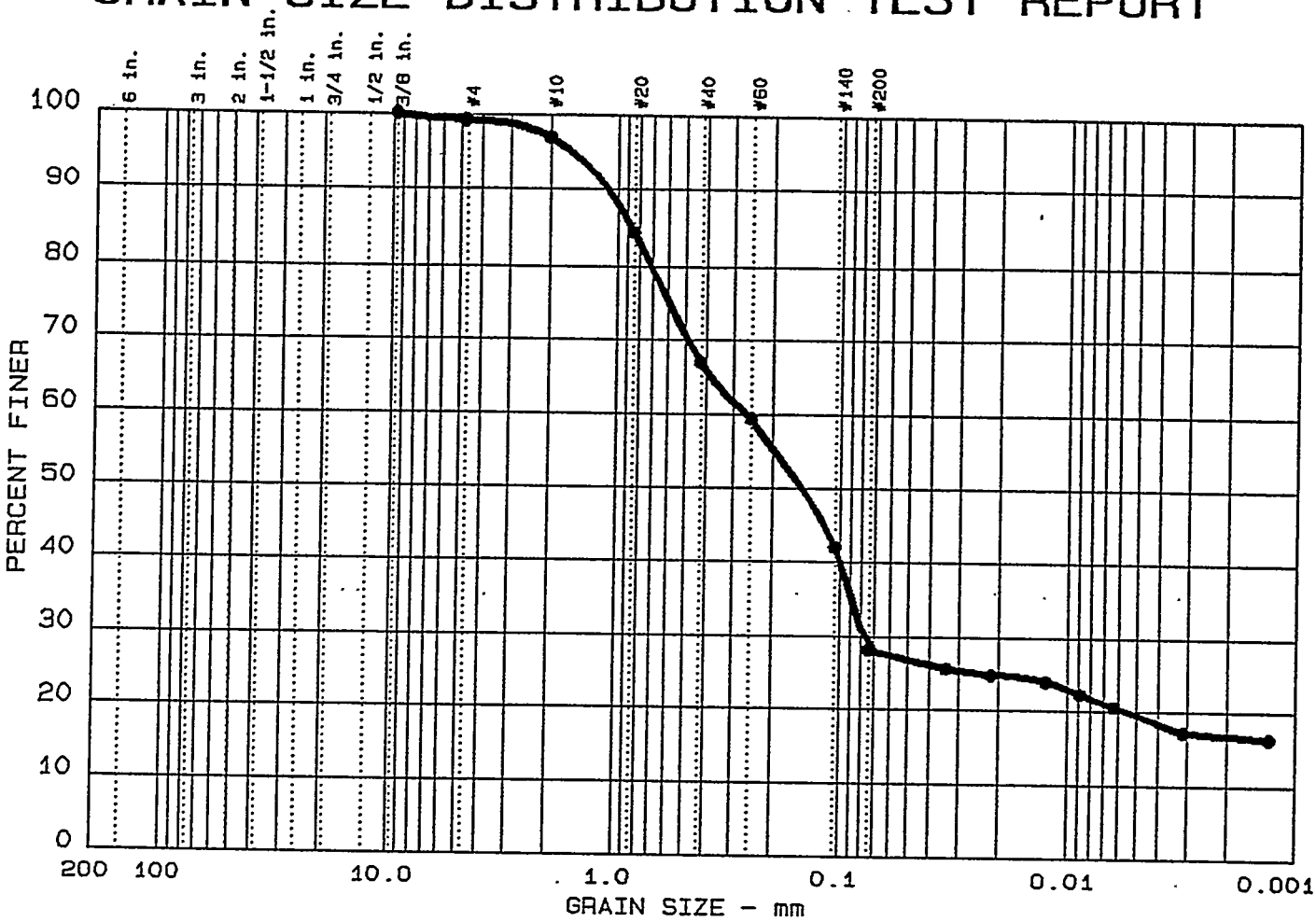
C_v @ T_{90} =
.23 ft^2/day



Load No.= 13
Load= 8.00 ksf
D_0 = 0.2758
D_{90} = 0.2795
D_{100}= 0.2800
T_{90}= 3.41 min.

C_v @ T_{90} =
.25 ft^2/day

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	19	0.0	0.8	71.2	8.5	19.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	41	22	0.86	0.26	0.15	0.077				

MATERIAL DESCRIPTION	USCS	AASHTO
● Purple Yellow Brown and White Clayey Sand	SC	A-2-7 (1.6)

Project No.: 5810575606
Project: SRS-ITP-P3
◆ Location: H-Bor-23.3, SS-19 @ 37-38.5 Ft.

Date: May 12, 1994

Remarks:

Tested by: CLG

Reviewed by: RLB

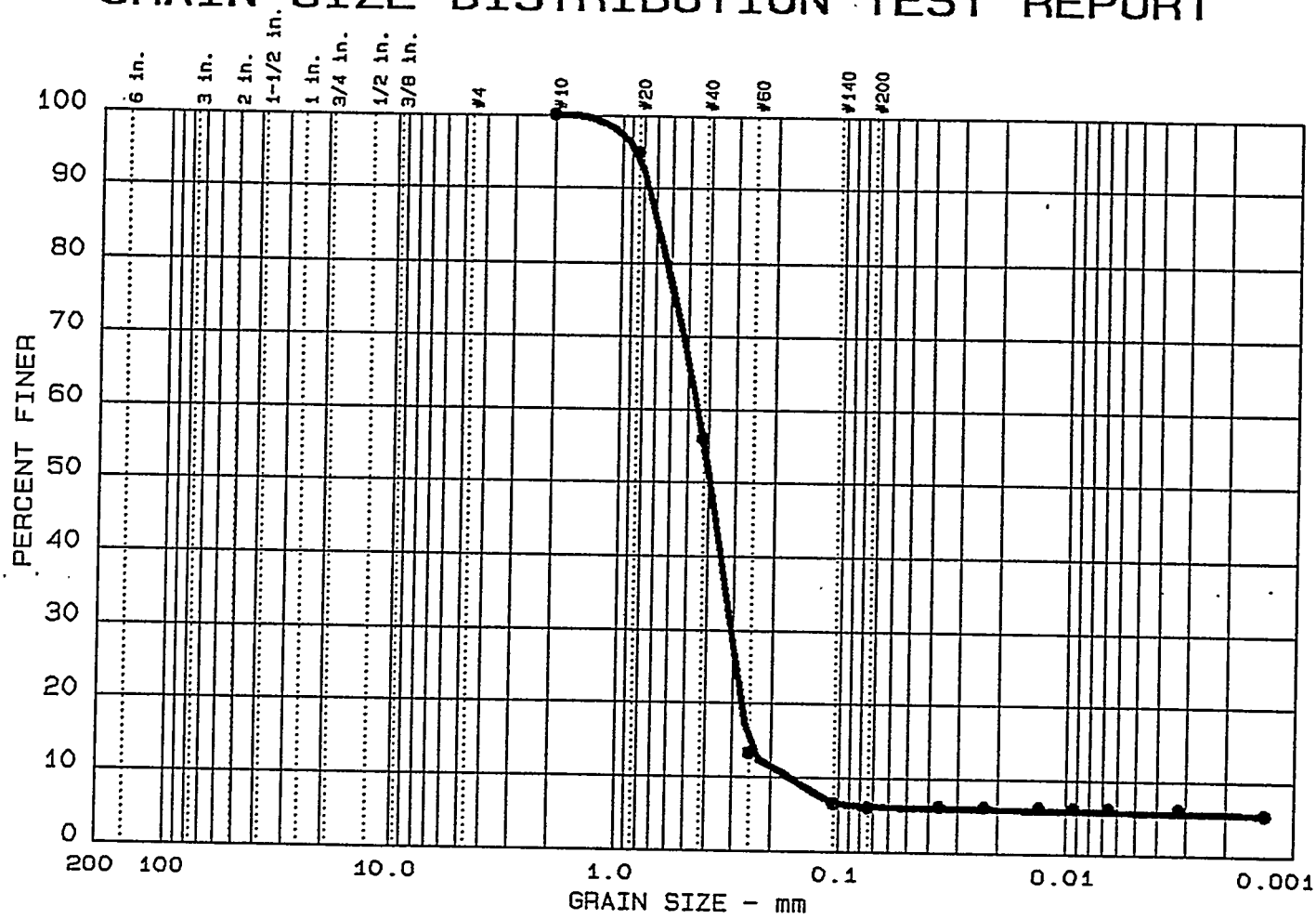
Moisture content= 19.8 %

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	5	0.0	0.0	93.9	0.4	5.7

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	33	10	0.68	0.45	0.39	0.306	0.2553	0.1648	1.28	2.7

MATERIAL DESCRIPTION	USCS	AASHTO
● Light Brown Poorly Graded Sand with Clay	SP-SC	A-2-4 (0.0)

Project No.: 5810575606
Project: SRS-ITP-P3
● Location: H-Bor-23.3, SS-31 @ 55.6-58 Ft.

Date: May 12, 1994

Remarks:

Tested by: CLG

Reviewed by: RLB

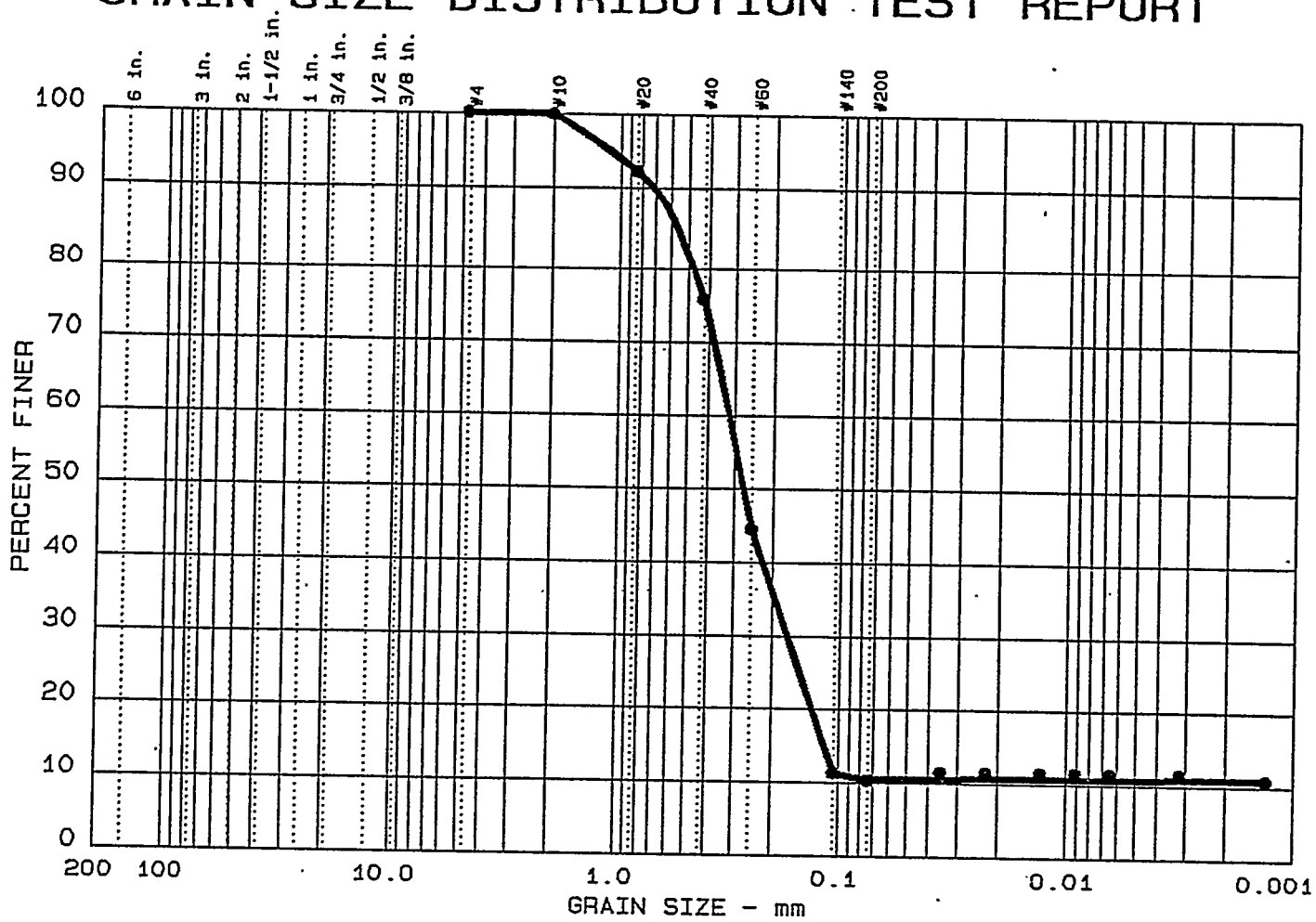
Moisture content= 27.1 %

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No. 2

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	4	0.0	0.0	89.6	10.4	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	34	16	0.54	0.32	0.27	0.171	0.1155			

MATERIAL DESCRIPTION	USCS	AASHTO
● Light Brown Poorly Graded Sand with Clay	SP-SC	A-2-6 (0.0)

Project No.: 5810575606
Project: SRS-ITP-P3
● Location: H-Bor-23.3, SS-34 @ 61-62.5 Ft.

Date: May 12, 1994

Remarks:

Tested by: CLG

Reviewed by: RLB

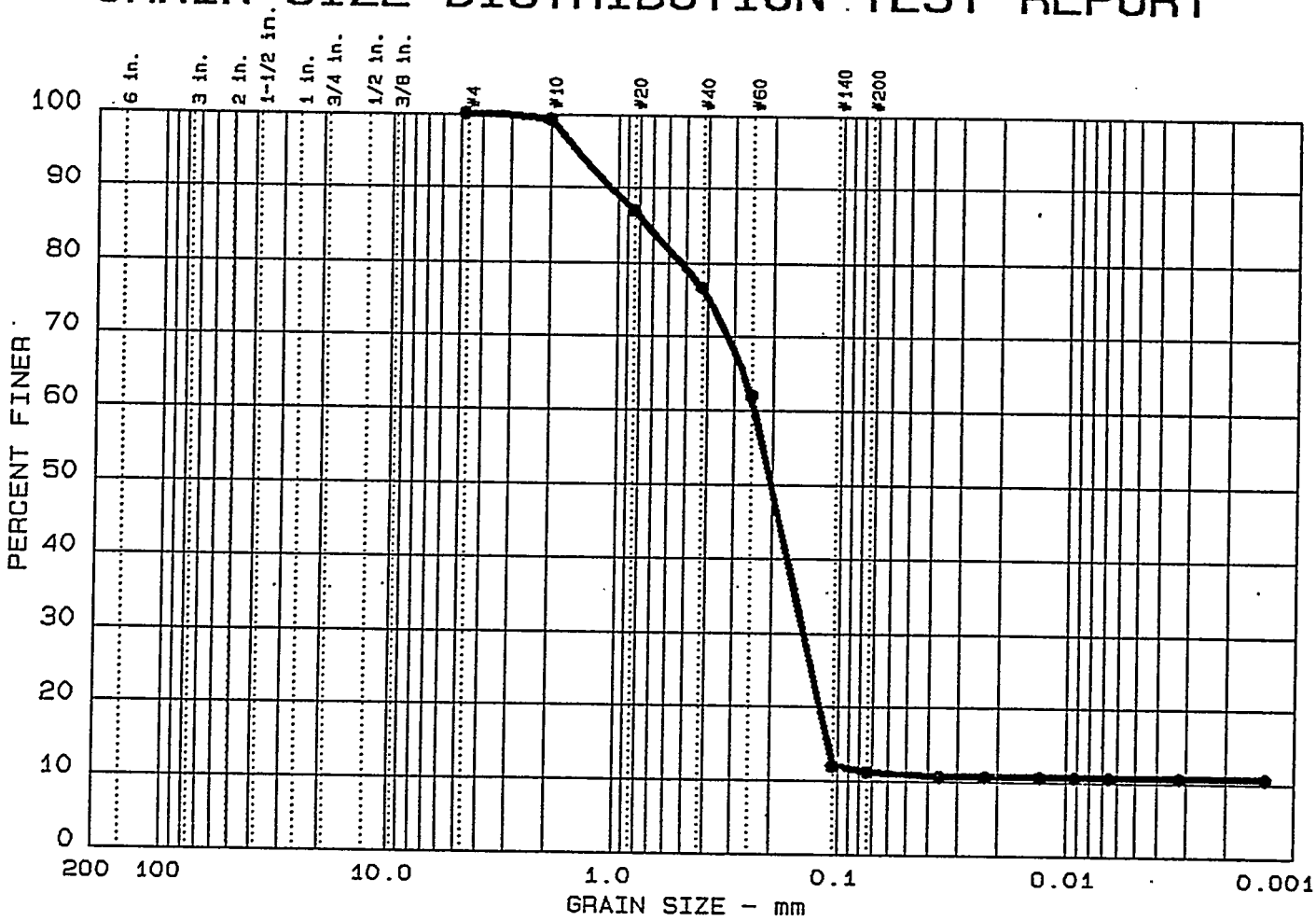
Moisture content= 28.5 %

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No. 2

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	2	0.0	0.0	88.8	0.5	10.7

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	33	9	0.74	0.24	0.20	0.144	0.1105			

MATERIAL DESCRIPTION	USCS	AASHTO
● Light Brown Poorly Graded Sand With Silt	SP-SM	A-2-4 (0.0)

Project No.: 5810575606
Project: SRS-ITP-P3
● Location: H-Bor-23.3, SS-35 @ 62.5-64 Ft.

Date: May 12, 1994

Remarks:

Tested by: CLG

Reviewed by: RLB

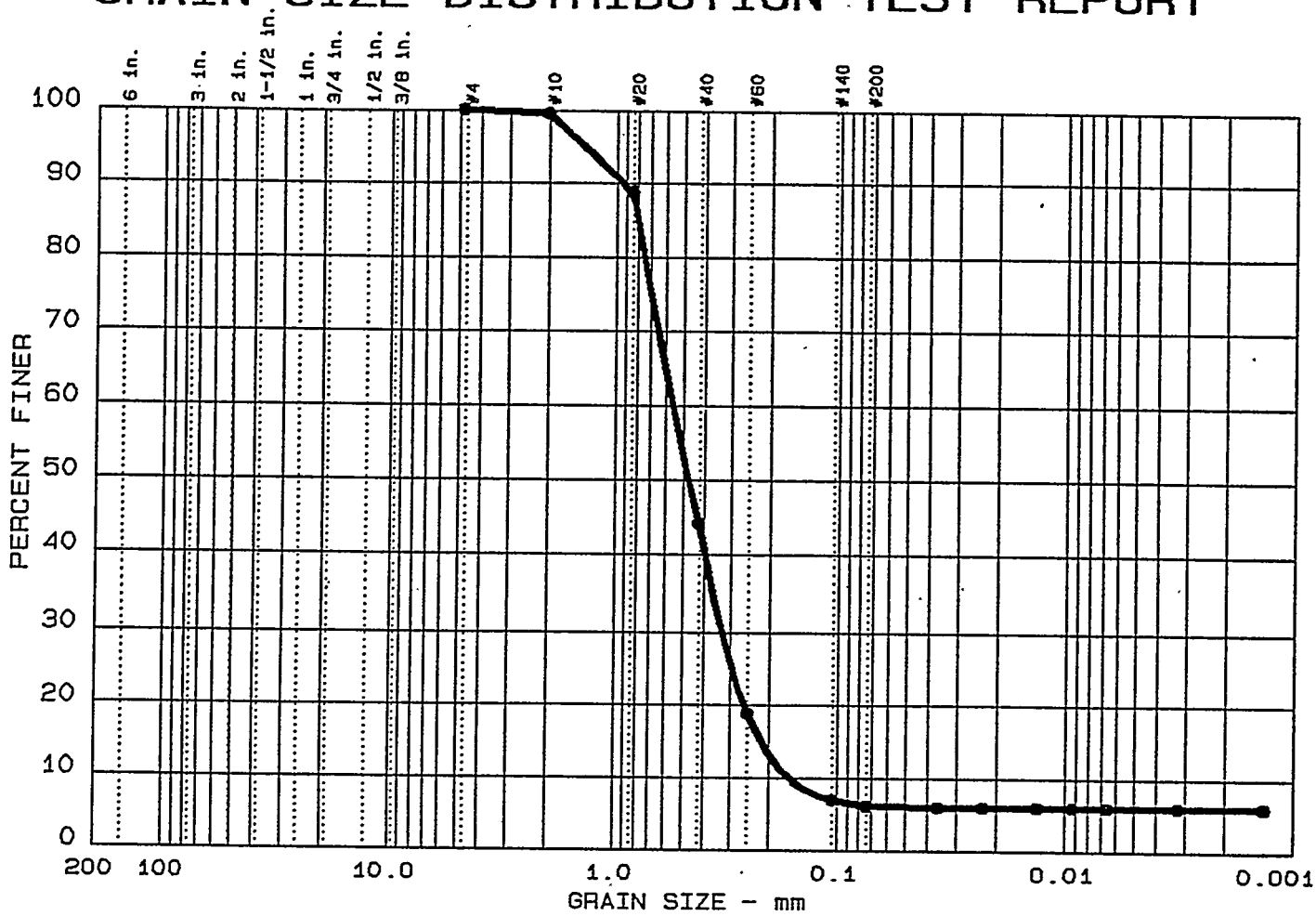
Moisture content= 25.7 %

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No. 2

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	2	0.0	0.0	93.9	0.2	5.9

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	NL	NP	0.79	0.55	0.47	0.328	0.2165	0.1624	1.20	3.4

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Brown Poorly Graded Sand with Silt	SP-SM	A-1-b

Project No.: 5810575606
Project: SRS ITP-P3
● Location: H-Bor-23.3, SS-40 @ 71.5-73 Ft.

Date: April 21, 1994

Remarks:

Tested by: CLG

Reviewed by: RLB

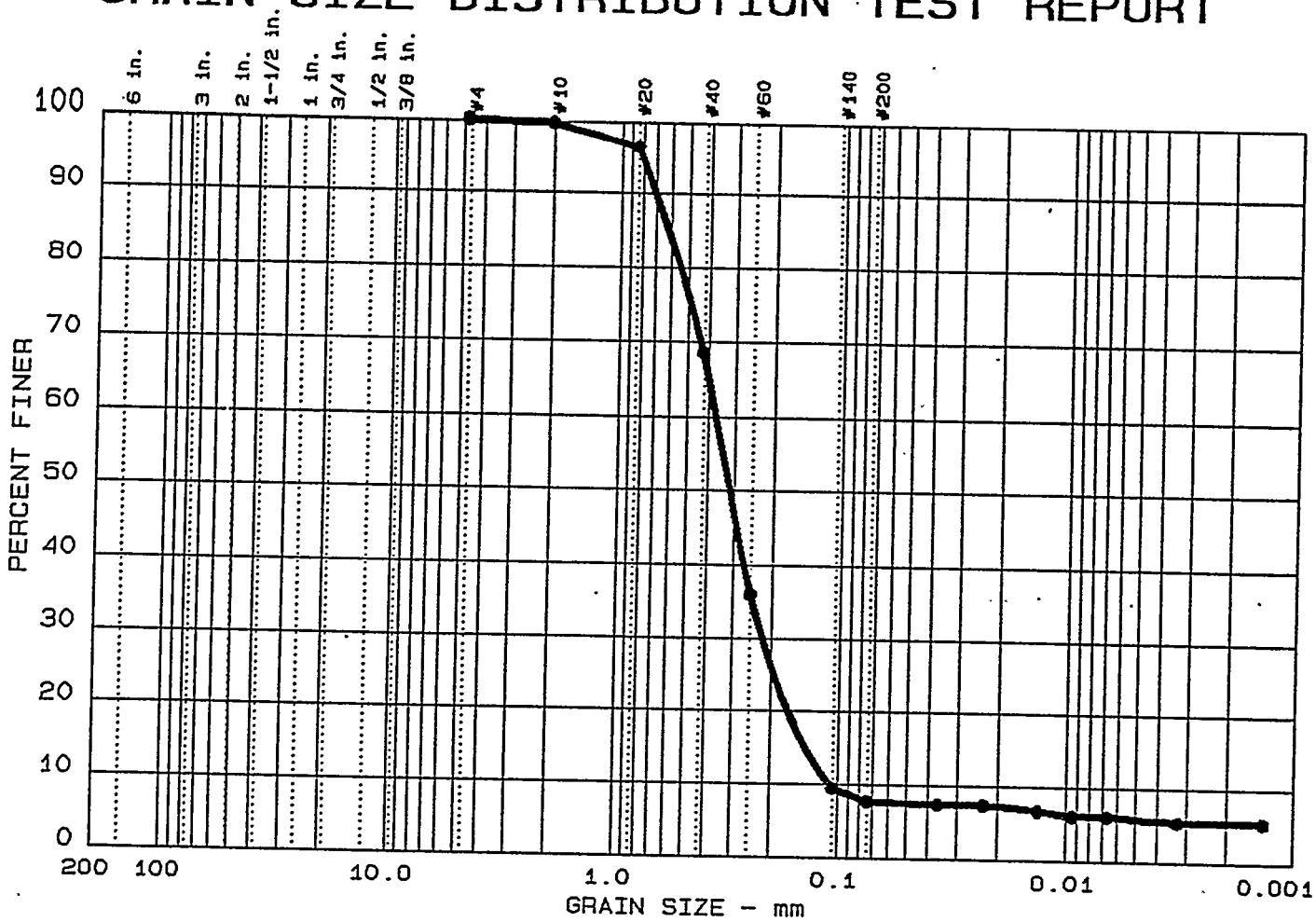
Moisture content= 20.2%

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	20	0.0	0.0	92.3	1.8	5.9

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	NL	NP	0.61	0.37	0.31	0.220	0.1388	0.1078	1.23	3.4

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Brown Poorly Graded Sand with Silt	SP-SM	A-3

Project No.: 5810575606
Project: SRS ITP-P3
● Location: H-Bor-23.3, SS-43 @ 76-77.5 Ft.

Date: April 21, 1994

Remarks:

Tested by: CLG

Reviewed by: RLB

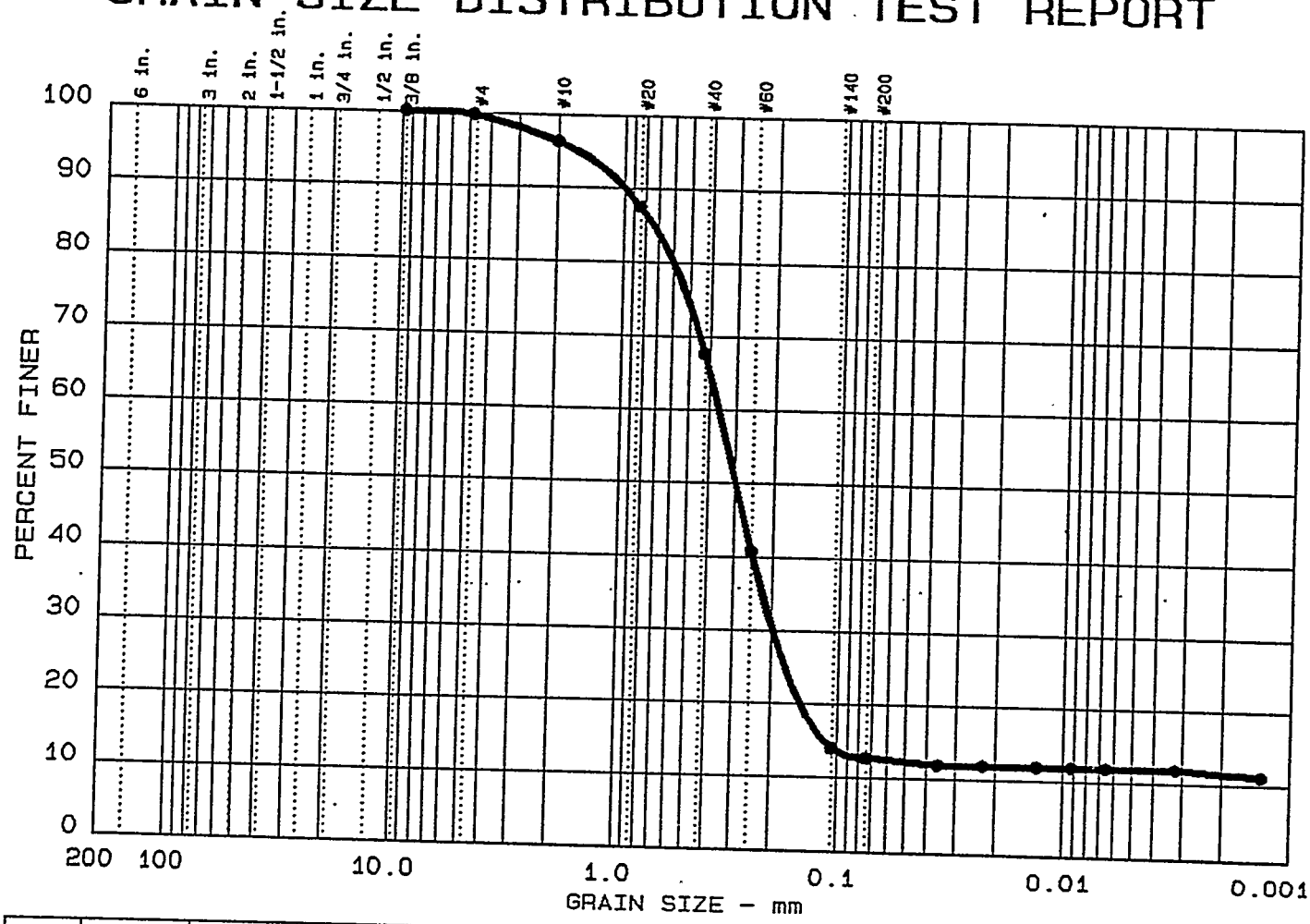
Moisture content= 21.6%

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	18	0.0	0.3	87.0	0.8	11.9

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	36	14	0.72	0.36	0.30	0.197	0.1146			

MATERIAL DESCRIPTION	USCS	AASHTO
● Yellow Brown Clayey Sand	SC	A-2-6 (0.0)

Project No.: 5810575606
Project: SRS-ITP-P3
◆ Location: H-Bor-23.3, SS-44 @ 75.5-79 Ft.

Date: May 12, 1994

Remarks:

Tested by: CLG

Reviewed by: RLP

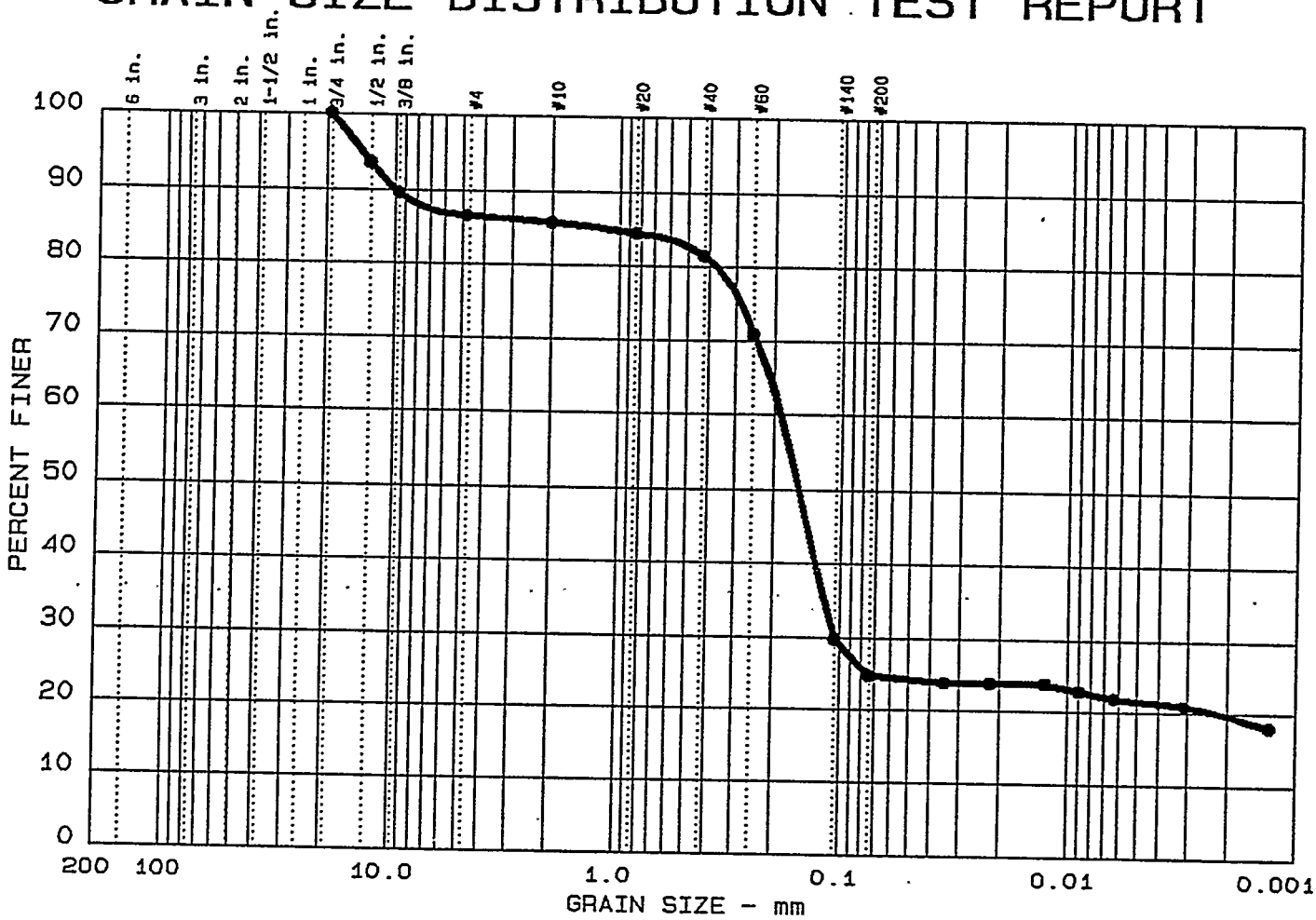
Moisture content= 27.3 %

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	17	0.0	13.4	61.8	3.3	21.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	84	65	1.12	0.19	0.15	0.105				

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Clayey Sand	SC	A-2-7 (5.5)

Project No.: 5810575606
Project: SRS-ITP-P3
● Location: H-Bor-23.3, SS-53 @ 91-92.3 Ft.

Date: May 12, 1994

Remarks:

Tested by: CLG

Reviewed by: RLB

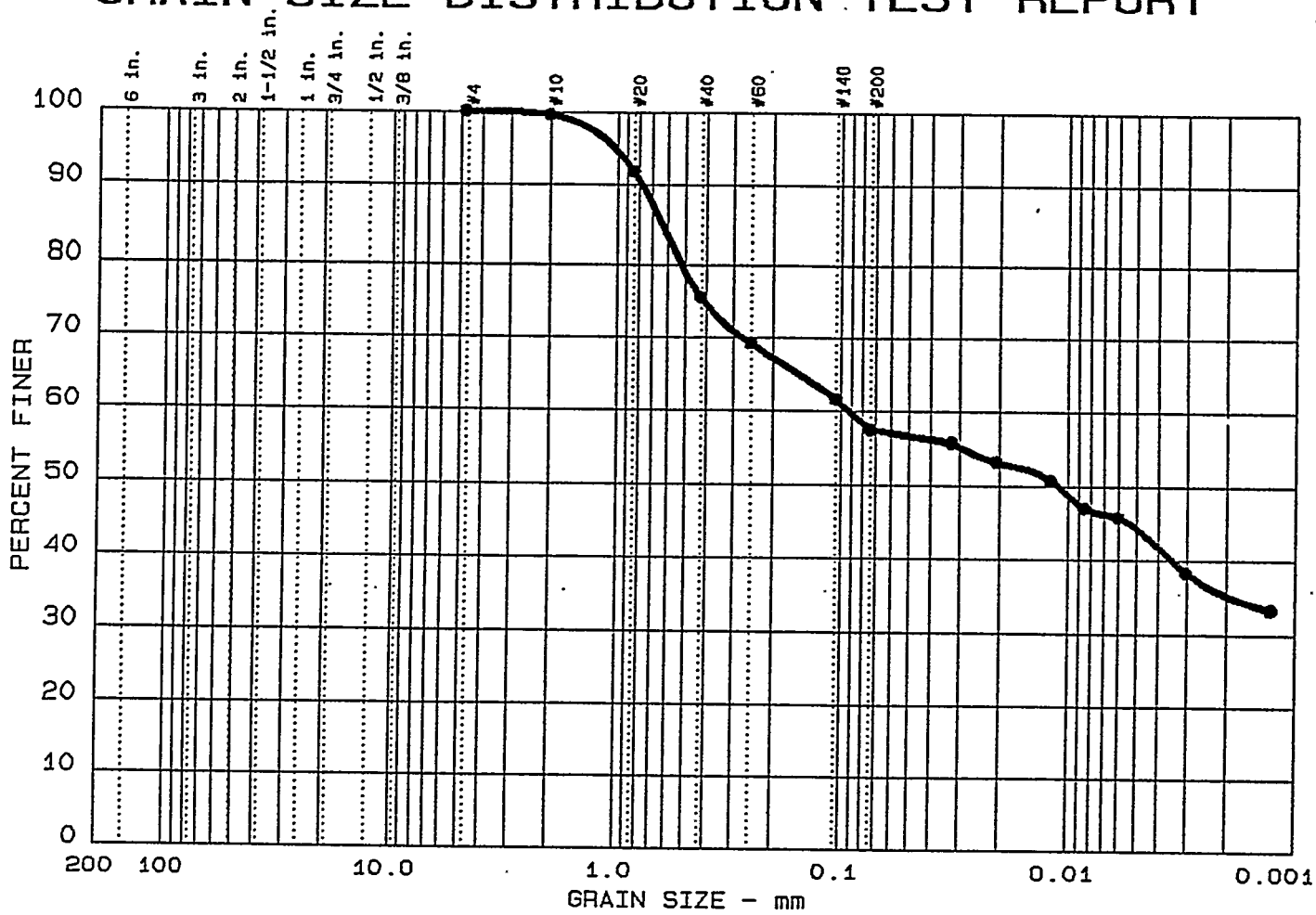
Moisture content= 39.1 %

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	1	0.0	0.0	42.6	13.1	44.3

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	128	100	0.62	0.09	0.01					

MATERIAL DESCRIPTION	USCS	AASHTO
● Greenish Tan Sandy Fat Clay	CH	A-7-6 (51.9)

Project No.: 5810575606
Project: SRS-ITP-P3
● Location: H-Bor-23.3, SS-65 @ 109-110.5 Ft.

Date: May 12, 1994

Remarks:

Tested by: CLG

Reviewed by: RLB

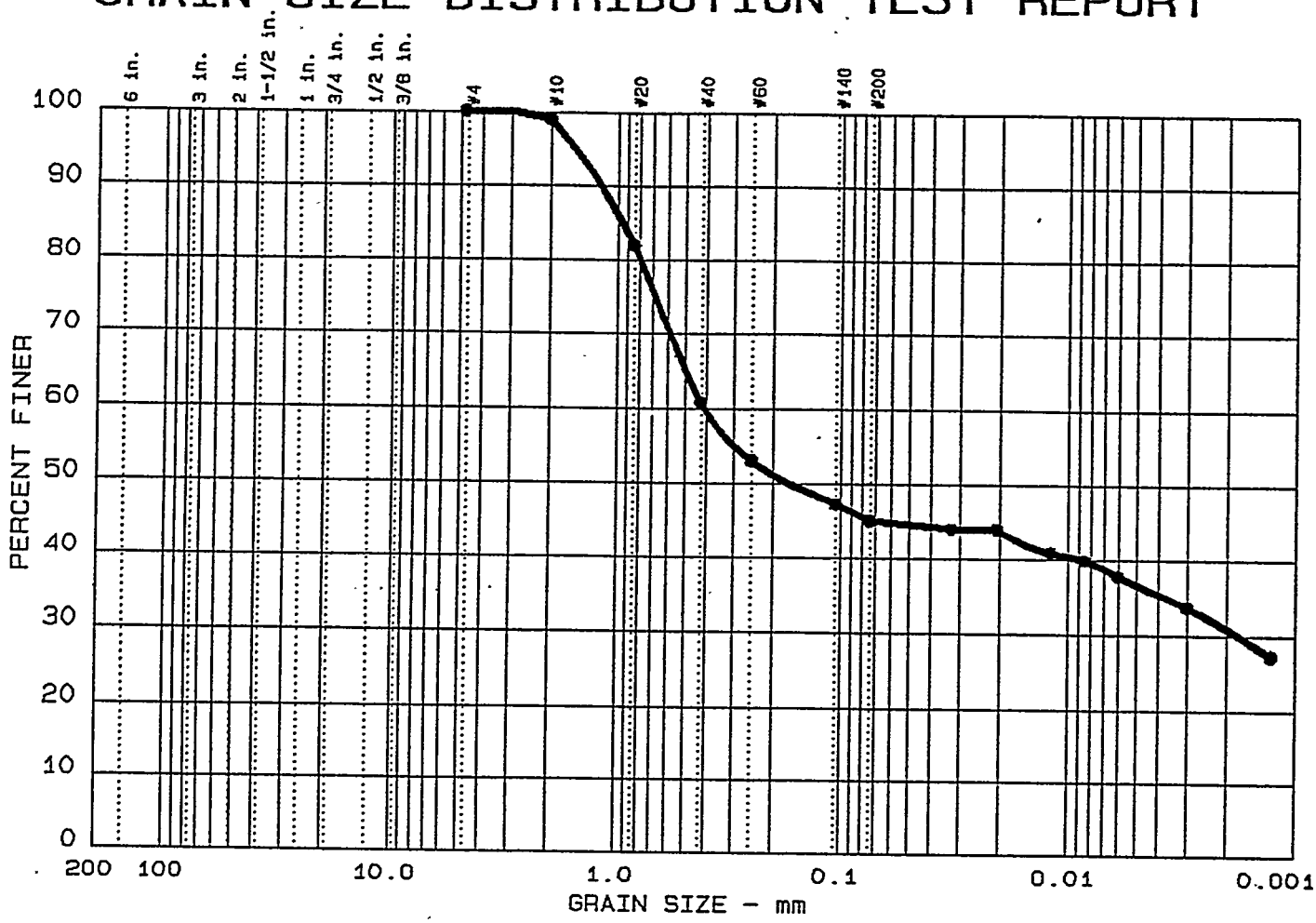
Moisture content= 78.9 %

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No. 2

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	3	0.0	0.0	55.0	8.4	36.6

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	144	120	0.94	0.40	0.17	0.002				

MATERIAL DESCRIPTION	USCS	AASHTO
● Green-Tan Clayey Sand	SC	A-7-6 (40.2)

Project No.: 5810575606
Project: SRS-IT.)-P3
● Location: H-Bor-23.3, SS-66 @ 110.5-112 FT.

Date: May 12, 1994

Remarks:

Tested by: CLG

Reviewed by: RLB

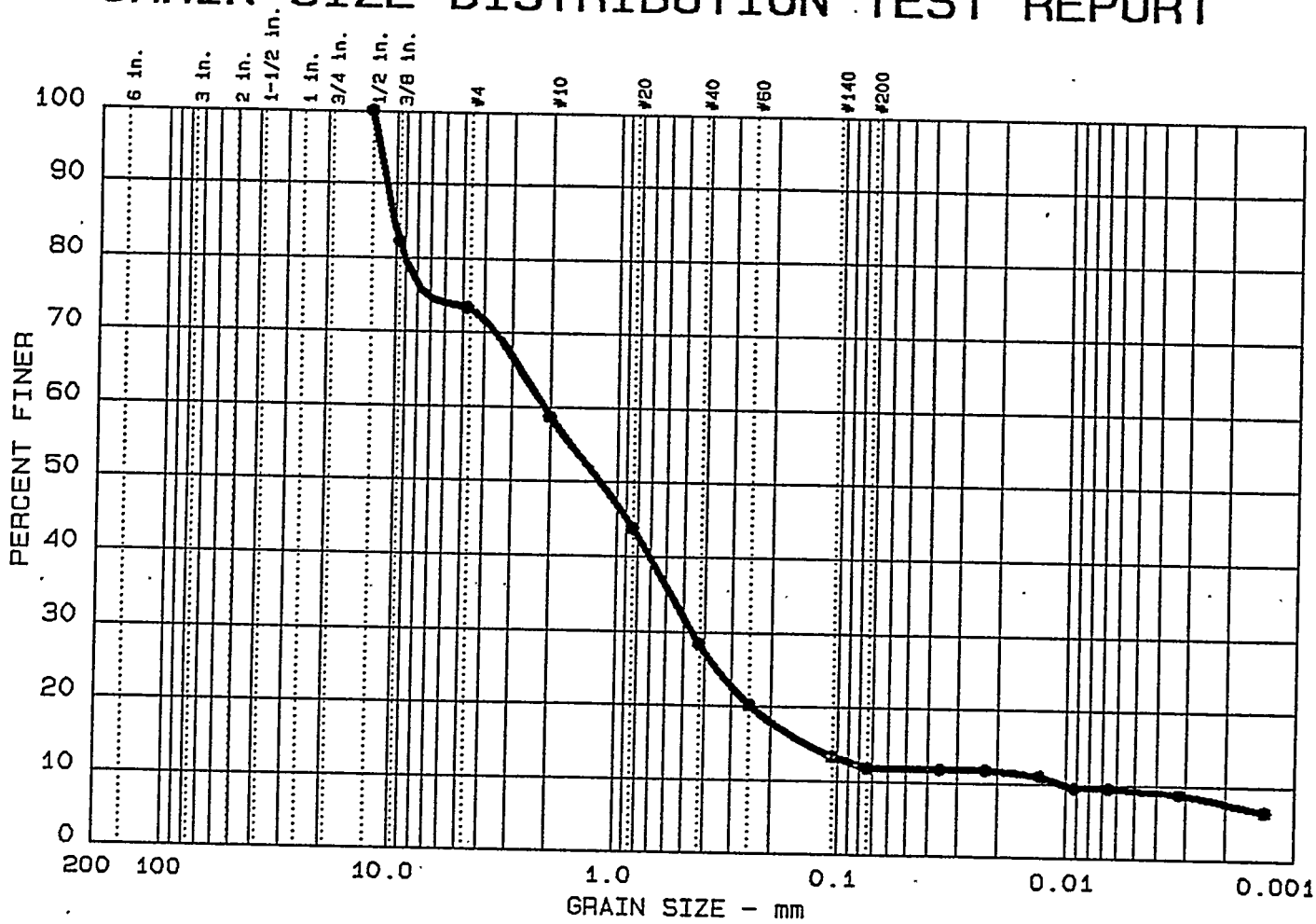
Moisture content= 27.2 %

GRAIN SIZE DISTRIBUTION TEST REPOr

LAW ENGINEERING, INC.

Figure No. 2

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	1	0.0	26.7	61.4	2.6	9.3

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	45	10	10.05	2.12	1.19	0.454	0.1371	0.0102	9.55	208.9

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan White Poorly Graded Sand with Silt and Gravel	SP-SM	A-2-5 (0.0)

Project No.: 5810575606
Project: SRS ITP-P3
● Location: H-Bor-23.3, SS-67 @ 112-113.5 Ft.

Date: April 21, 1994

Remarks:

Tested by: CLG

Reviewed by: RLB

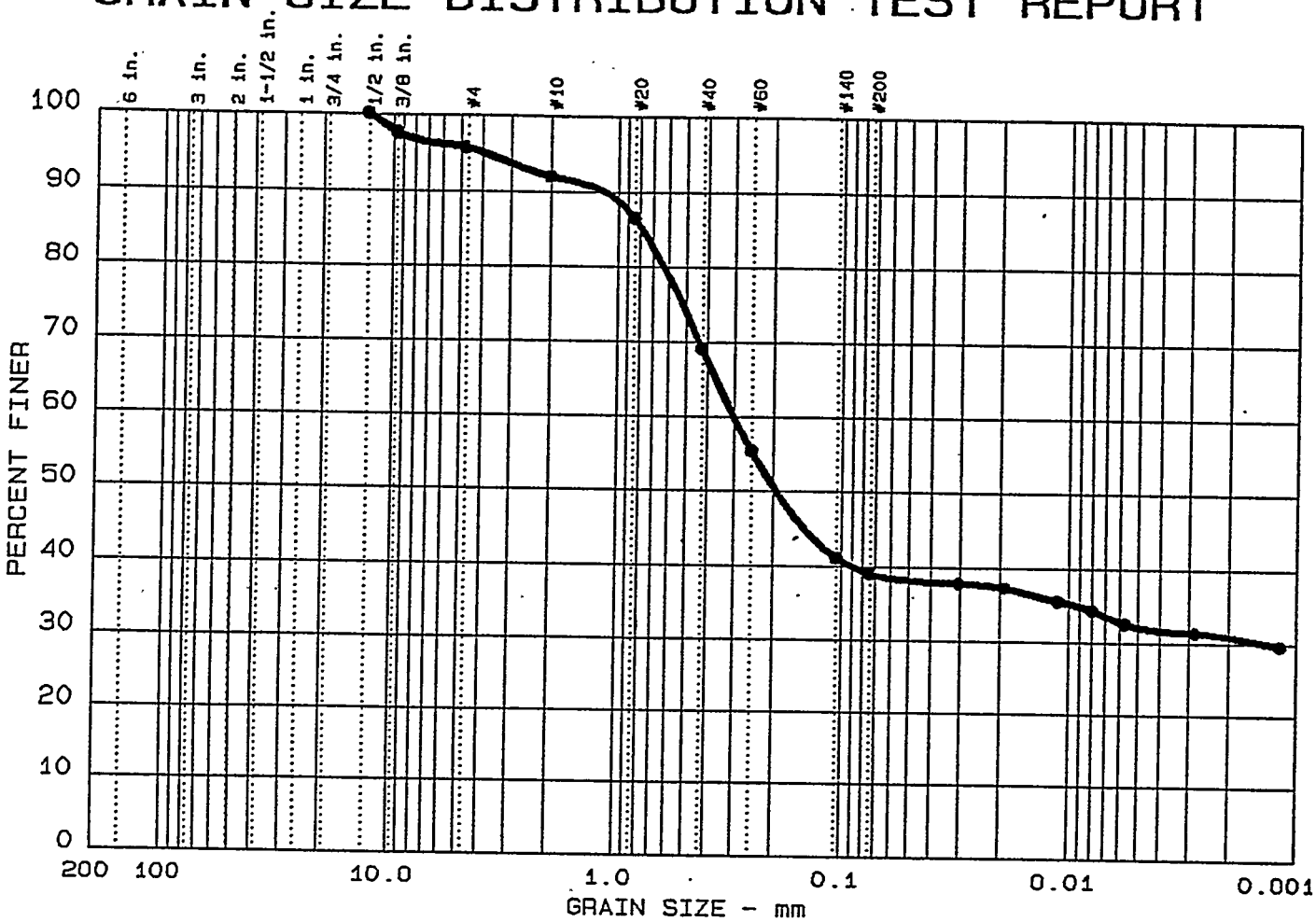
Moisture content= 27.3%

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	9	0.0	4.0	57.0	6.9	32.1

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	57	35	0.77	0.30	0.19	0.001				

MATERIAL DESCRIPTION	USCS	AASHTO
● Red Brown Clayey Sand	SC	A-7-6 (7.1)

Project No.: 5810575606
Project: SRS ITP-P3
● Location: H-Bor-34 ST-1 @ 30.5-32.5 Ft. (Bottom)

Date: May 12, 1994

Remarks:

Tested by: CLG

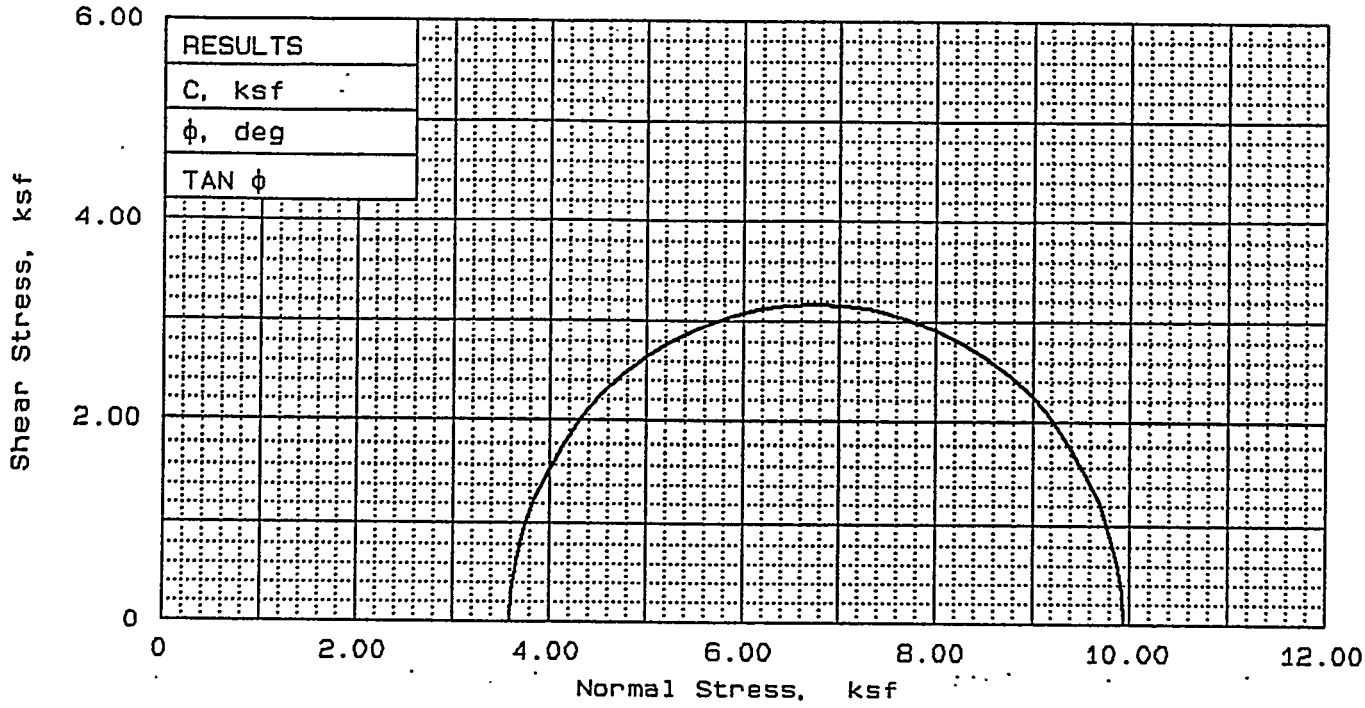
Reviewed by: RLB

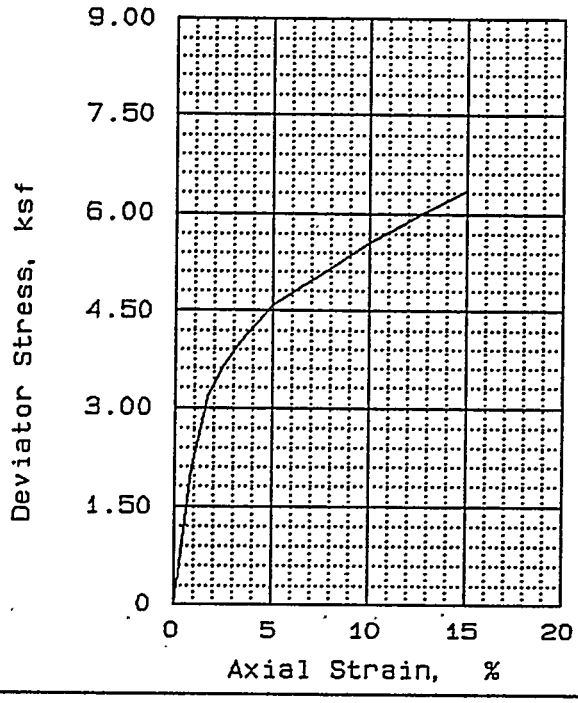
UU-25 PSI

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.





SAMPLE NO.		1
INITIAL	WATER CONTENT, %	20.2
	DRY DENSITY, pcf	105.4
	SATURATION, %	91.5
	VOID RATIO	0.593
	DIAMETER, in	2.88
	HEIGHT, in	6.00
AT TEST	WATER CONTENT, %	20.2
	DRY DENSITY, pcf	105.4
	SATURATION, %	91.5
	VOID RATIO	0.593
	DIAMETER, in	2.88
	HEIGHT, in	6.00
BACK PRESSURE, ksf		0.00
CELL PRESSURE, ksf		3.60
FAILURE STRESS, ksf		6.34
PORE PRESSURE, ksf		
STRAIN RATE, %/min.		0.500
ULTIMATE STRESS, ksf		
PORE PRESSURE, ksf		
σ_1 FAILURE, ksf		9.94
σ_3 FAILURE, ksf		3.6

TYPE OF TEST:
Unconsolidated undrained

SAMPLE TYPE: Undisturbed

DESCRIPTION: Red Brown Clayey Sand

LL= 57 PL= 35 PI= 22.0

SPECIFIC GRAVITY= 2.69

REMARKS: Tested by: HEJ

Reviewed by: RLB

FIG. NO.

CLIENT: Savannah River

PROJECT: SRS-ITP

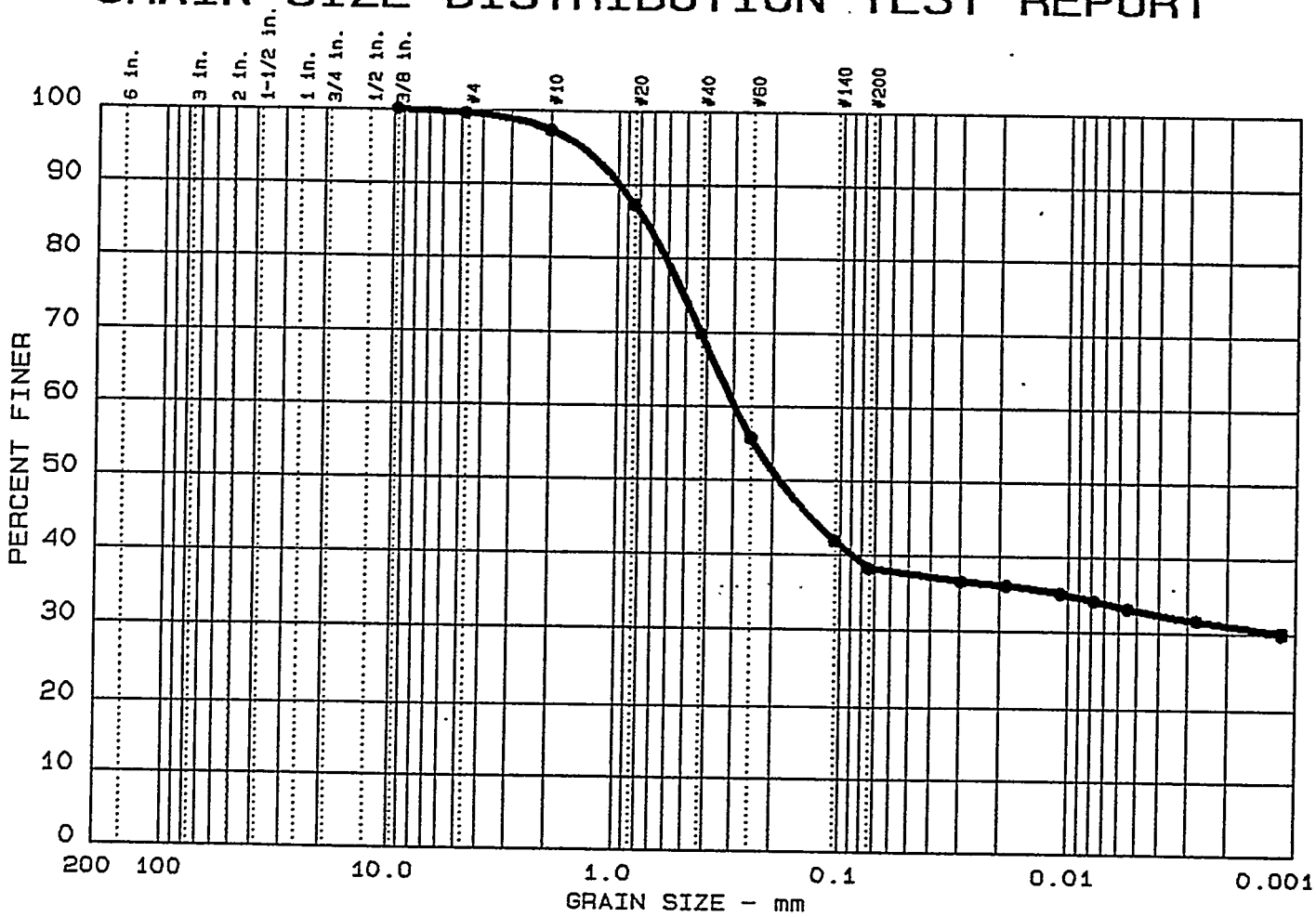
SAMPLE LOCATION:
H-Bor-34, ST-1 @ 30.5-32.5 Ft. (Bottom)

PROJ. NO.: 5810575606 DATE: May 2, 1994

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	11	0.0	0.5	61.4	5.4	32.7

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	60	38	0.75	0.30	0.19	0.001				

MATERIAL DESCRIPTION	USCS	AASHTO
● Red Brown Clayey Sand	SC	A-7-6 (7.3)

Project No.: 5810575606
Project: SRS ITP-P3
● Location: H-Bor-34 ST-2 @ 37-39 Ft. (Top)

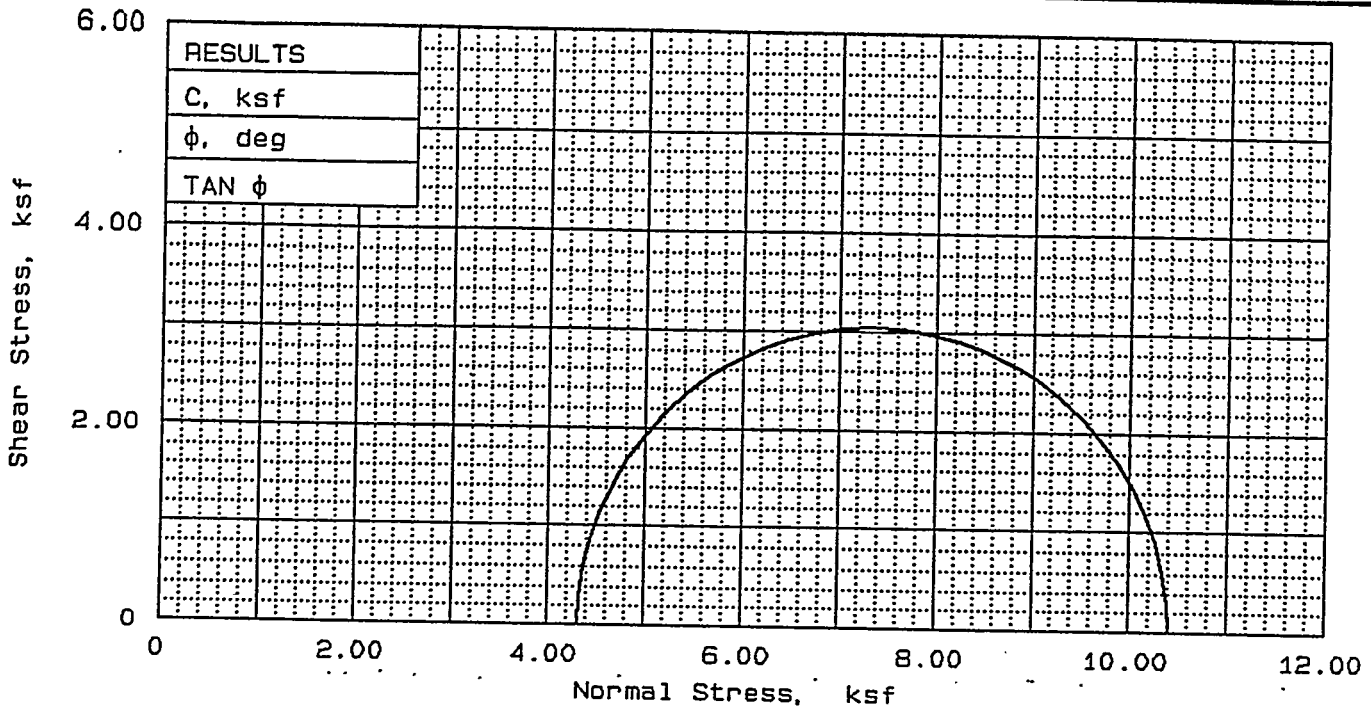
Date: May 12, 1994

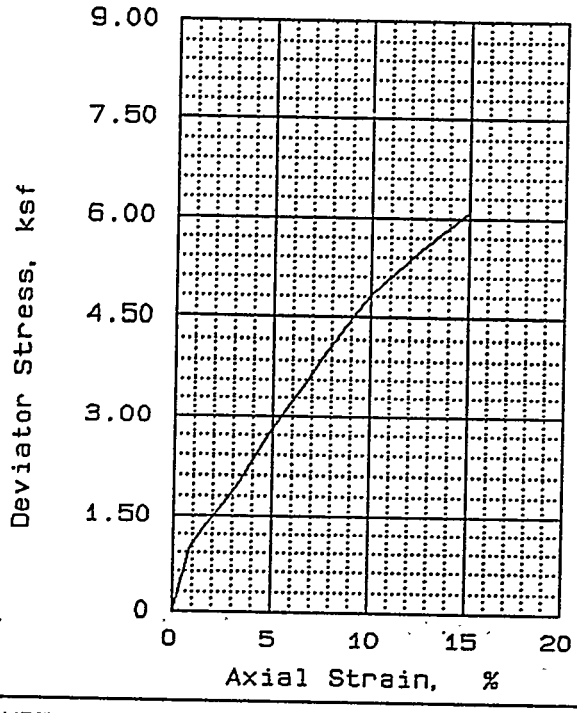
Remarks:
Tested by: CLG
Reviewed by: RLP
UU-30 PSI

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.





SAMPLE NO.		1
INITIAL	WATER CONTENT, %	16.9
	DRY DENSITY, pcf	112.4
	SATURATION, %	92.7
	VOID RATIO	0.489
	DIAMETER, in	2.88
	HEIGHT, in	6.00
AT TEST	WATER CONTENT, %	16.9
	DRY DENSITY, pcf	112.4
	SATURATION, %	92.7
	VOID RATIO	0.489
	DIAMETER, in	2.88
	HEIGHT, in	6.00
BACK PRESSURE, ksf		0.00
CELL PRESSURE, ksf		4.32
FAILURE STRESS, ksf		6.08
PORE PRESSURE, ksf		
STRAIN RATE, %/min.		0.500
ULTIMATE STRESS, ksf		
PORE PRESSURE, ksf		
σ_1 FAILURE, ksf		10.40
σ_3 FAILURE, ksf		4.32

TYPE OF TEST:
Unconsolidated undrained
SAMPLE TYPE: Undistrubed
DESCRIPTION: Red Brown Clayey Sand
LL= 60 PL= 38 PI= 22.0
SPECIFIC GRAVITY= 2.68
REMARKS: Tested by: HEJ

Reviewed by: RLB

FIG. NO.

CLIENT: Savannah River

PROJECT: SRS-ITP

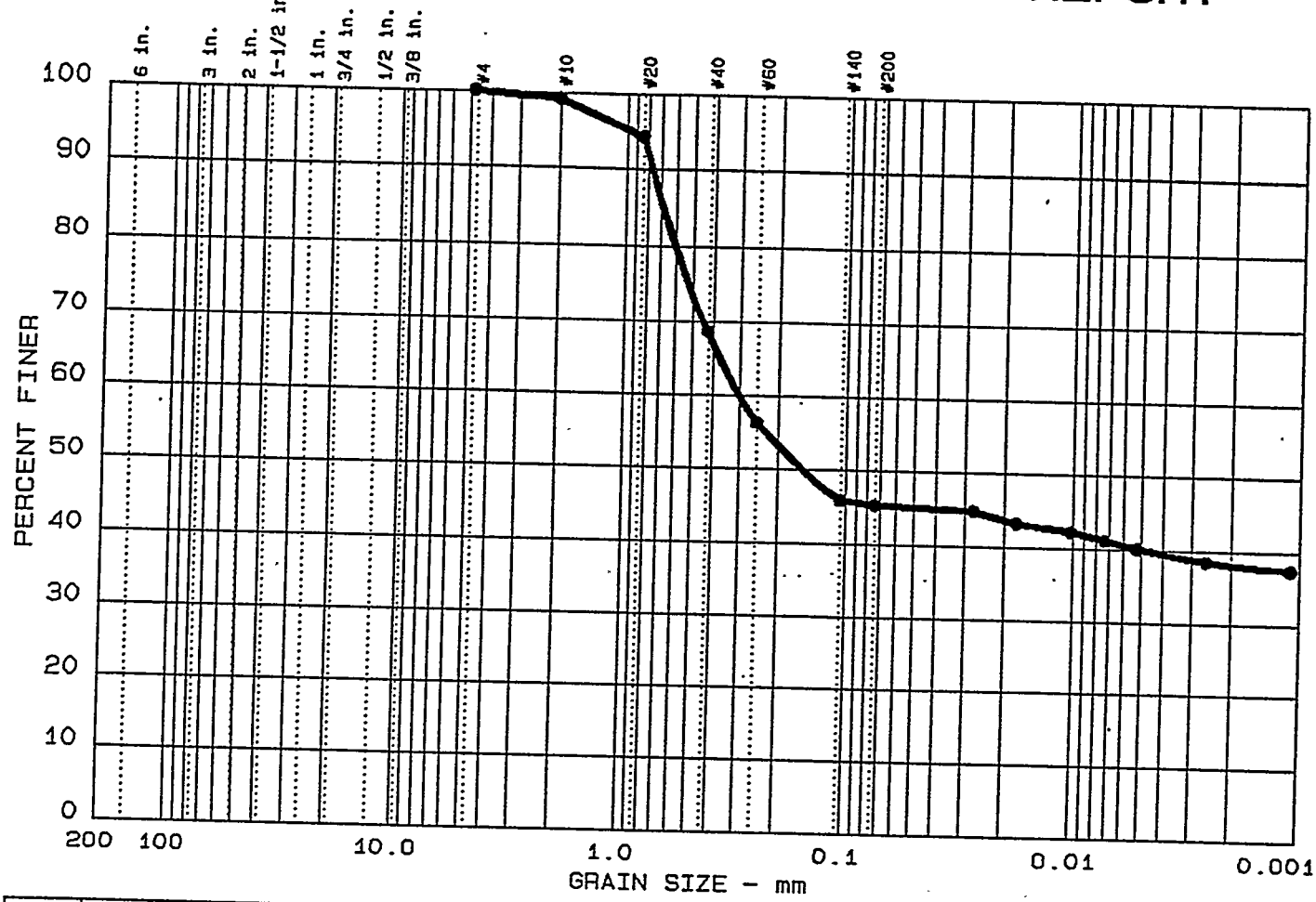
SAMPLE LOCATION:
H-Bor-34, ST-2 @ 37-39 Ft. (Top)

PROJ. NO.: 5810575606 DATE: May 2, 1994

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	10	0.0	0.0	54.7	5.3	40.0

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	41	22	0.67	0.30	0.16					

MATERIAL DESCRIPTION	USCS	AASHTO
● Red Brown Clayey Sand	SC	A-7-6 (5.7)

Project No.: 5810575606
Project: SRS ITP-P3
● Location: H-Bor-34 ST-3 @ 39-41 Ft. (Bottom)

Date: May 12, 1994

Remarks:

Tested by: CLG

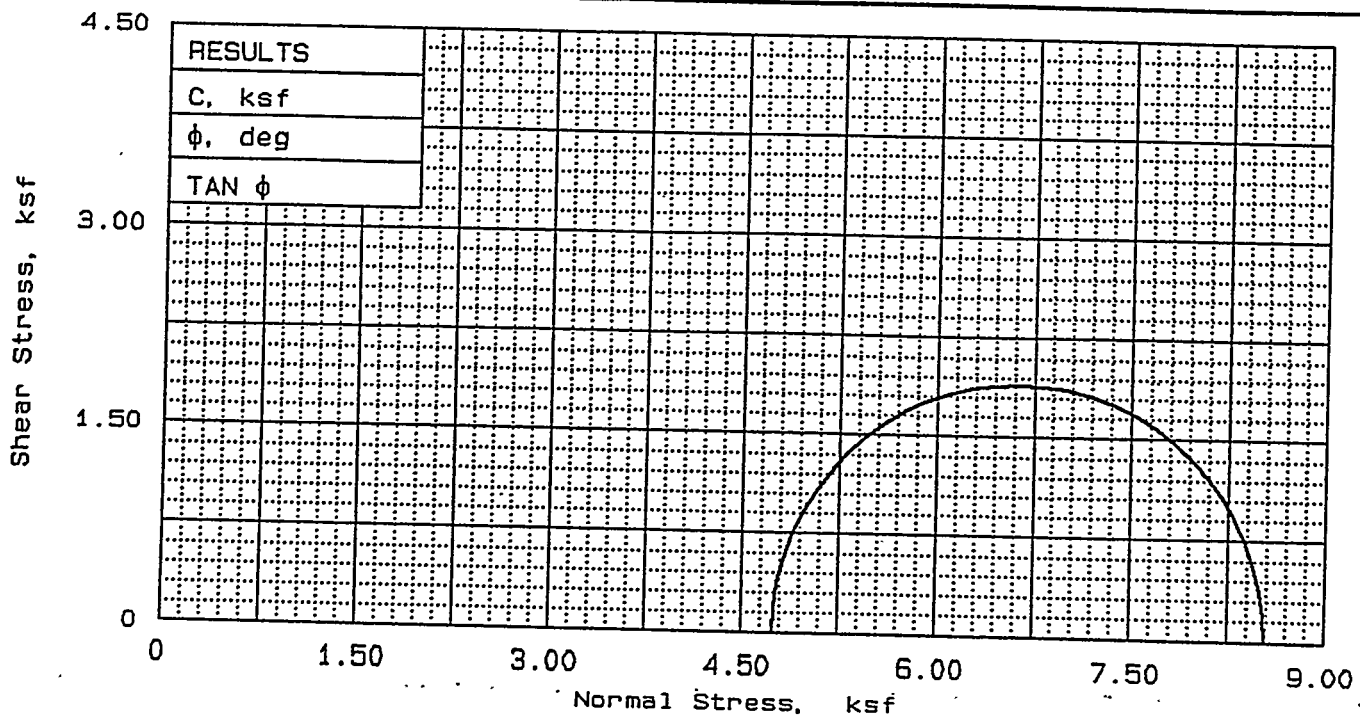
Reviewed by: RLB

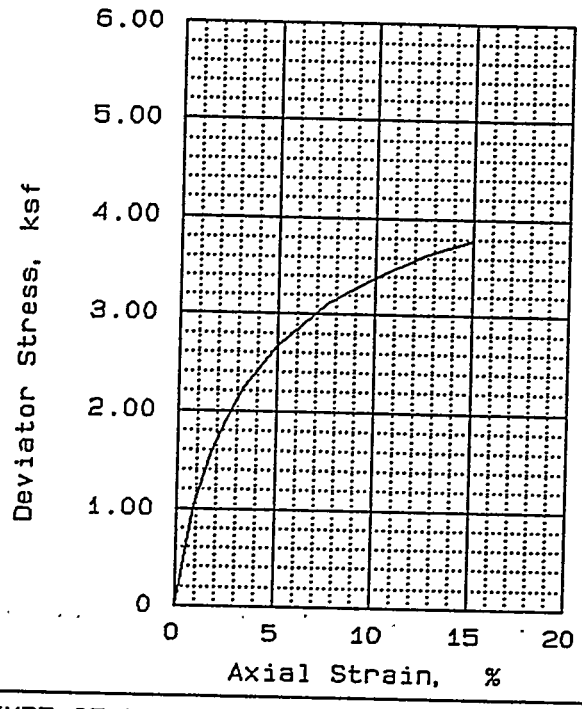
UU-33 PSI

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.





SAMPLE NO.		1
INITIAL	WATER CONTENT, %	27.0
	DRY DENSITY, pcf	102.4
	SATURATION, %	112.9
	VOID RATIO	0.647
	DIAMETER, in	2.88
	HEIGHT, in	6.00
AT TEST	WATER CONTENT, %	27.0
	DRY DENSITY, pcf	102.4
	SATURATION, %	112.9
	VOID RATIO	0.647
	DIAMETER, in	2.88
	HEIGHT, in	6.00
BACK PRESSURE, ksf		0.00
CELL PRESSURE, ksf		4.75
FAILURE STRESS, ksf		3.78
PORE PRESSURE, ksf		
STRAIN RATE, %/min.		0.500
ULTIMATE STRESS, ksf		
PORE PRESSURE, ksf		
σ_1 FAILURE, ksf		8.53
σ_3 FAILURE, ksf		4.75

TYPE OF TEST:
Unconsolidated undrained
SAMPLE TYPE: Undistrubed
DESCRIPTION: Red Brown Clayey Sand
LL= 41 PL= 22 PI= 19.0
SPECIFIC GRAVITY= 2.70
REMARKS: Tested by: HEJ

Reviewed by: RLB

FIG. NO.

CLIENT: Savannah River

PROJECT: SRS ITP

SAMPLE LOCATION:
H-Bor-34, ST-3 @ 39-41 Ft. (Bottom)

PROJ. NO.: 5810575606 DATE: May 2, 1994

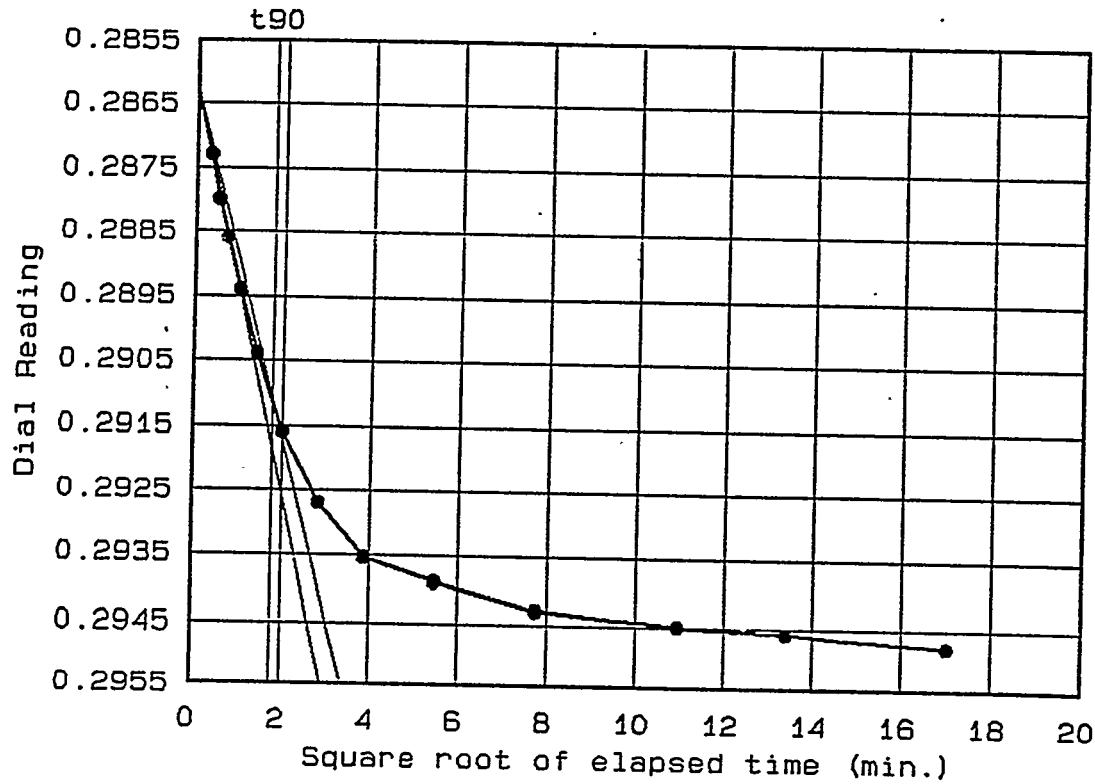
TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

Dial Reading vs. Time

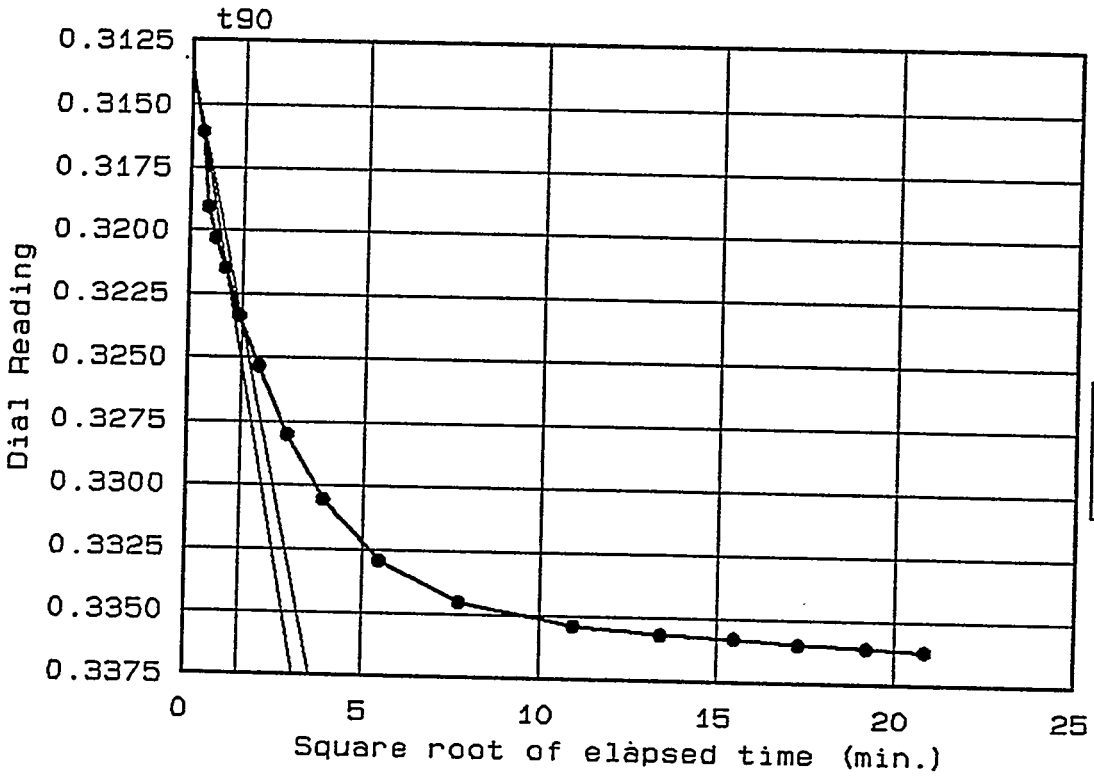
Project No.: 5810575606
Project: SRS-ITP3
Location: H-Bor-50 ST-5 @ 154.5-156.5 FT.

Date: April 27, 1994



Load No.= 14
Load= 16.02 ksf
D_0 = 0.2863
D_{90} = 0.2911
D_{100}= 0.2917
T_{90}= 3.11 min.

C_v @ T_{90} =
.26 ft^2/day



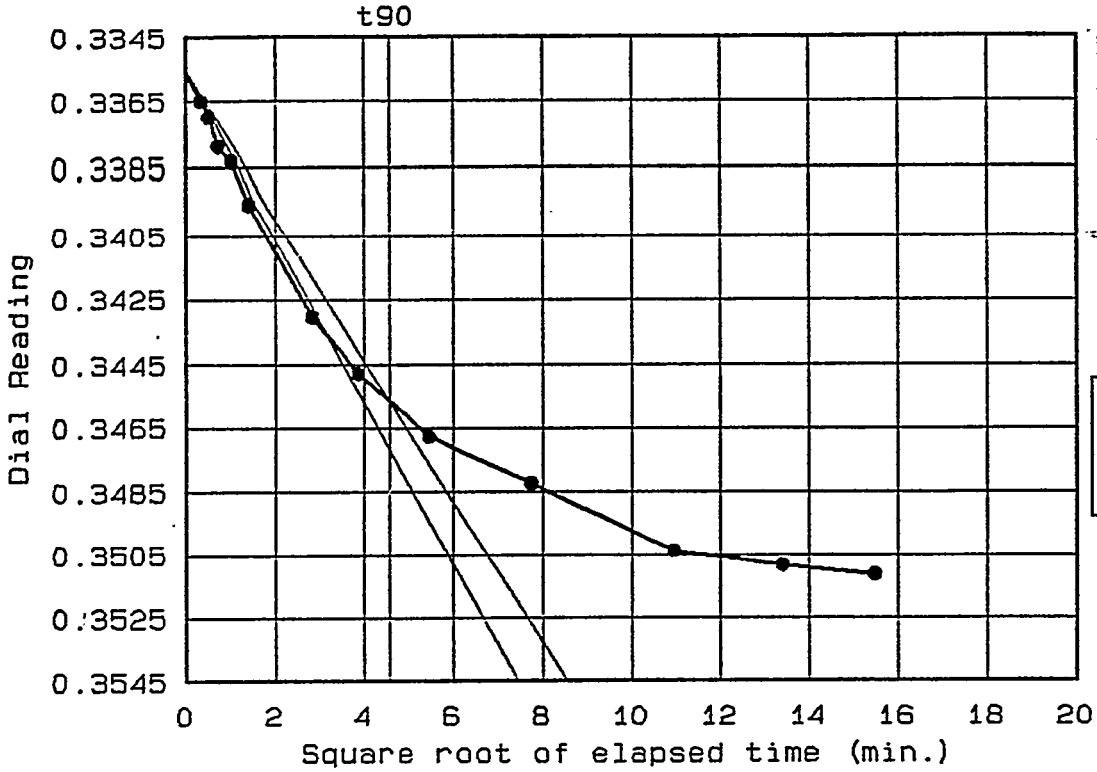
Load No.= 15
Load= 32.08 ksf
D_0 = 0.3136
D_{90} = 0.3236
D_{100}= 0.3247
T_{90}= 2.16 min.

C_v @ T_{90} =
.34 ft^2/day

Dial Reading vs. Time

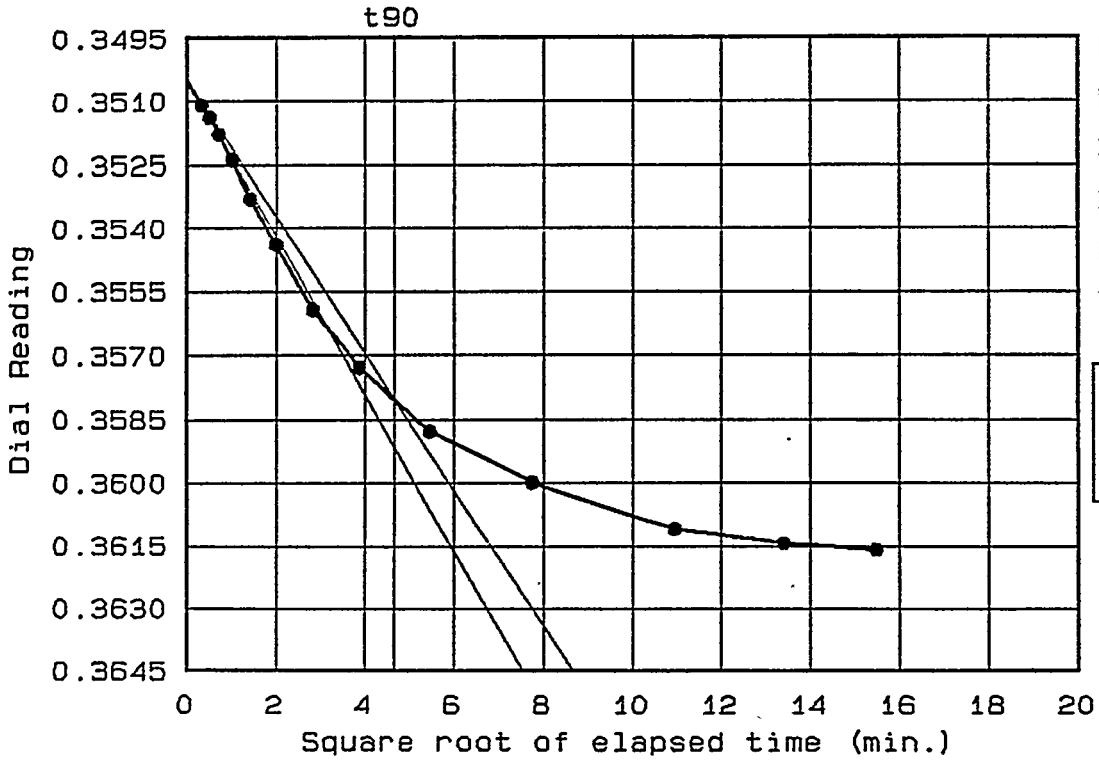
Project No.: 5810575606
Project: SRS-ITP3
Location: H-Bor-50 ST-5 @ 154.5-156.5 FT.

Date: April 27, 1994



Load No.= 16
Load= 48.00 ksf
D_0 = 0.3355
D_{90} = 0.3457
D_{100}= 0.3468
T_{90}= 20.80 min.

C_v @ T_{90} =
.03 ft^2/day



Load No.= 17
Load= 63.78 ksf
D_0 = 0.3505
D_{90} = 0.3580
D_{100}= 0.3589
T_{90}= 21.74 min.

C_v @ T_{90} =
.03 ft^2/day