ALLEN

Boiler Slag (Fine Reed Rejects)

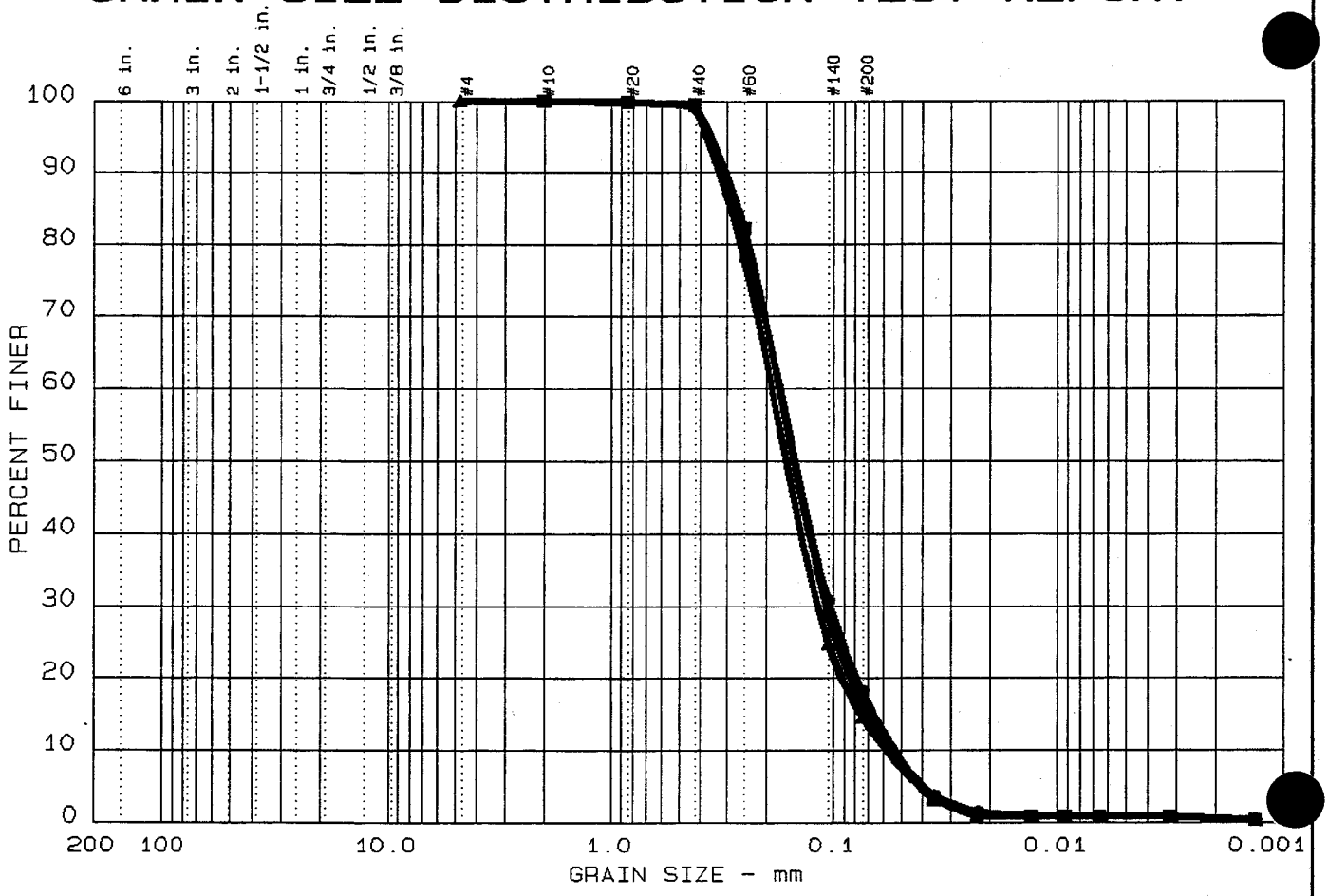
Grain Size Distribution Test Report
Moisture-Density Relationship (Standard Proctor)
Moisture-Density Relationship (Modified Proctor)
Consolidation Test Report
Hydraulic Conductivity - Falling Head (2 Pages)
Triaxial Compression Test (2 Pages)
Direct Shear Test
California Bearing Ratio
Resilient Modulus (Standard Proctor) (9 Pages)
Resilient Modulus (Modified Proctor) (9 Pages)

TVA - ALLEN
BOILER SLAG (FINE REED REJECTS)

Description	Test Method	Property	Sample 1	Sample 2	Sample 3
Grain Size	ASTM D 422	Percent Retained on the #4 Sieve Percent Passing the #200 Sieve Percent Passing the 0.005 mm Sieve	0.0 18.2 0.8	0.0 14.6 0.8	0.0 16.0 0.8
Atterberg Limits	ASTM D 4318	Liquid Limit Plastic Limit Plasticity Index	NL NP N/A	NL NP N/A	NL NP N/A
Specific Gravity	ASTM D 854	Specific Gravity at 20°C	2.75	2.79	2.81
Classification	ASTM D 2487 AASHTO M 145	Unified Soil Classification System (USCS) AASHTO Classification	SM A-2-4(0.0)	SM A-2-4(0.0)	SM A-2-4(0.0)
				Composite Sample	
Moisture-Density Relations (Standard Effort)	ASTM D 698	Maximum Dry Density, pcf Optimum Moisture Content, %		95.3 21.5	
Moisture-Density Relations (Modified Effort)	ASTM D 1557	Maximum Dry Density, pcf Optimum Moisture Content, %		102.6 23.2	
			Result	**Dry Density, pcf**	**Moisture Content, %**
Consolidation	ASTM D2435	Compression Index C_c	0.04	90.4	21.9
Hydraulic Conductivity	ASTM D 5084	Hydraulic Conductivity, cm/sec	9.0E-4	88.8	22.1
Triaxial Shear Strength Consolidated-Undrained (CU)	ASTM D4767	Effective Stress, Cohesion, c', ksf Effective Stress, Internal Friction Angle, ϕ', degrees	0.00 37.3	89.6	21.0
		Total Stress, Cohesion, c, ksf Total Stress, Internal Friction Angle, ϕ, degrees	1.15 39.2	89.6	21.0
Direct Shear Strength	ASTM D 3080	Cohesion, c, ksf Internal Friction Angle, ϕ, degrees	2.32 25.2	88.1	21.4
California Bearing Ratio	ASTM D 1883	CBR, %	37	95.0	21.2
Resilient Modulus (Standard Compactive Effort)	SHRP P46	Resilient Modulus at 4psi axial stress and 4psi confining pressure	6,419	88.8	20.8
Resilient Modulus (Modified Compactive Effort)	SHRP P46	Resilient Modulus at 4psi axial stress and 4psi confining pressure	6,110	94.0	22.2
Soil Resistivity	AASHTO T 288	Minimum Resistivity, Ohm-cm		30,000	
pH of Soil	AASHTO T 289	pH		7.5	
Water Soluble Sulfate Ion	AASHTO T 290	Sulfate Ion Content, mg/kg		43	
Water Soluble Chloride Ion	AASHTO T 290	Chloride Ion Content, mg/kg		<10	

alf-slag.xls

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	1	0.0	0.0	81.8	17.4	0.8
▲	2	0.0	0.0	85.4	13.8	0.8
■	3	0.0	0.0	84.0	15.2	0.8

	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	0.103	0.0658	0.0528	1.16	3.3
▲	NL	NP	0.29	0.19	0.16	0.118	0.0751	0.0576	1.27	3.3
■	NL	NP	0.27	0.17	0.15	0.108	0.0709	0.0557	1.20	3.1

MATERIAL DESCRIPTION	USCS	AASHTO
● Fine Reed Rejects	SM	A-2-4 (0.0)
▲ Fine Reed Rejects	SM	A-2-4 (0.0)
■ Fine Reed Rejects	SM	A-2-4 (0.0)

Project No.: 5810860101
Project: TVA - Allen
● Location: Boiler Slag A & B
▲ Location: Boiler Slag C & D
■ Location: Boiler Slag E & F
Date: July 18, 1995

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

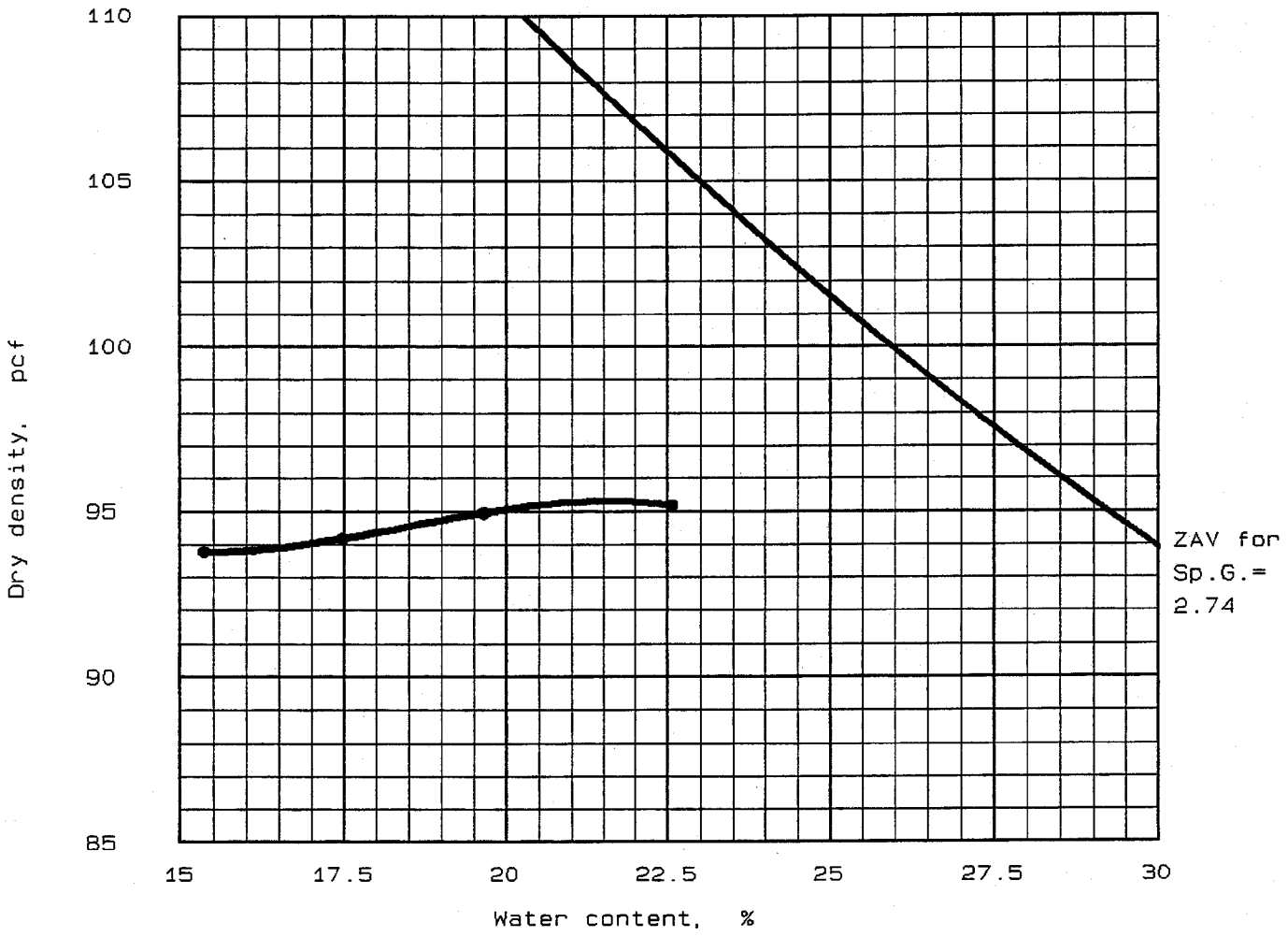
Remarks:

Tested by: JCR

Reviewed by: HJ

Figure No.

MOISTURE-DENSITY RELATIONSHIP



"Standard" Proctor, ASTM D 698, Method A

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
	SM	A-2-4(0.0)	.933 %	2.74	NL	NP	0 %	16.3 %

TEST RESULTS	MATERIAL DESCRIPTION
Optimum moisture = 21.5 % Maximum dry density = 95.3 pcf	

Project No.: 5810860101
Project: TVA - Allen
Location: Boiler Slag
Fine Reed Rejects
Date: July 25, 1995

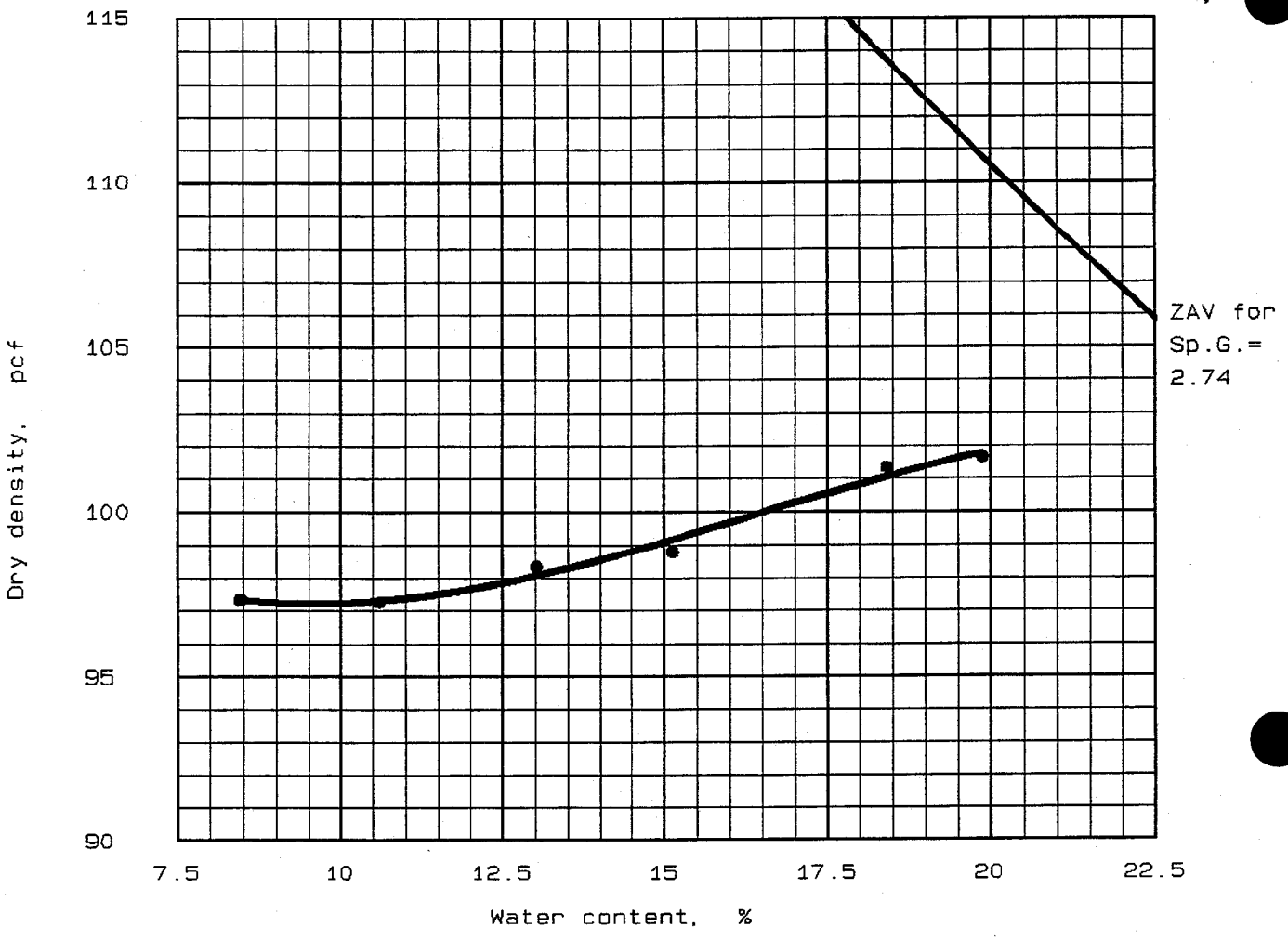
Remarks:
Tested by: JCR
Reviewed by: HJ

MOISTURE-DENSITY RELATIONSHIP

LAW ENGINEERING, INC.

Figure No. _____

MOISTURE-DENSITY RELATIONSHIP



"Modified" Proctor, ASTM D 1557, Method A

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
	SM	A-2-4 (0.0)	.933 %	2.74	NL	NP	0 %	16.3 %

TEST RESULTS	MATERIAL DESCRIPTION
Optimum moisture = 23.2 % Maximum dry density = 102.6 pcf	

Project No.: 5810860101
Project: TVA - Allen
Location: Boiler Slag
Fine Reed Rejects
Date: July 25, 1995

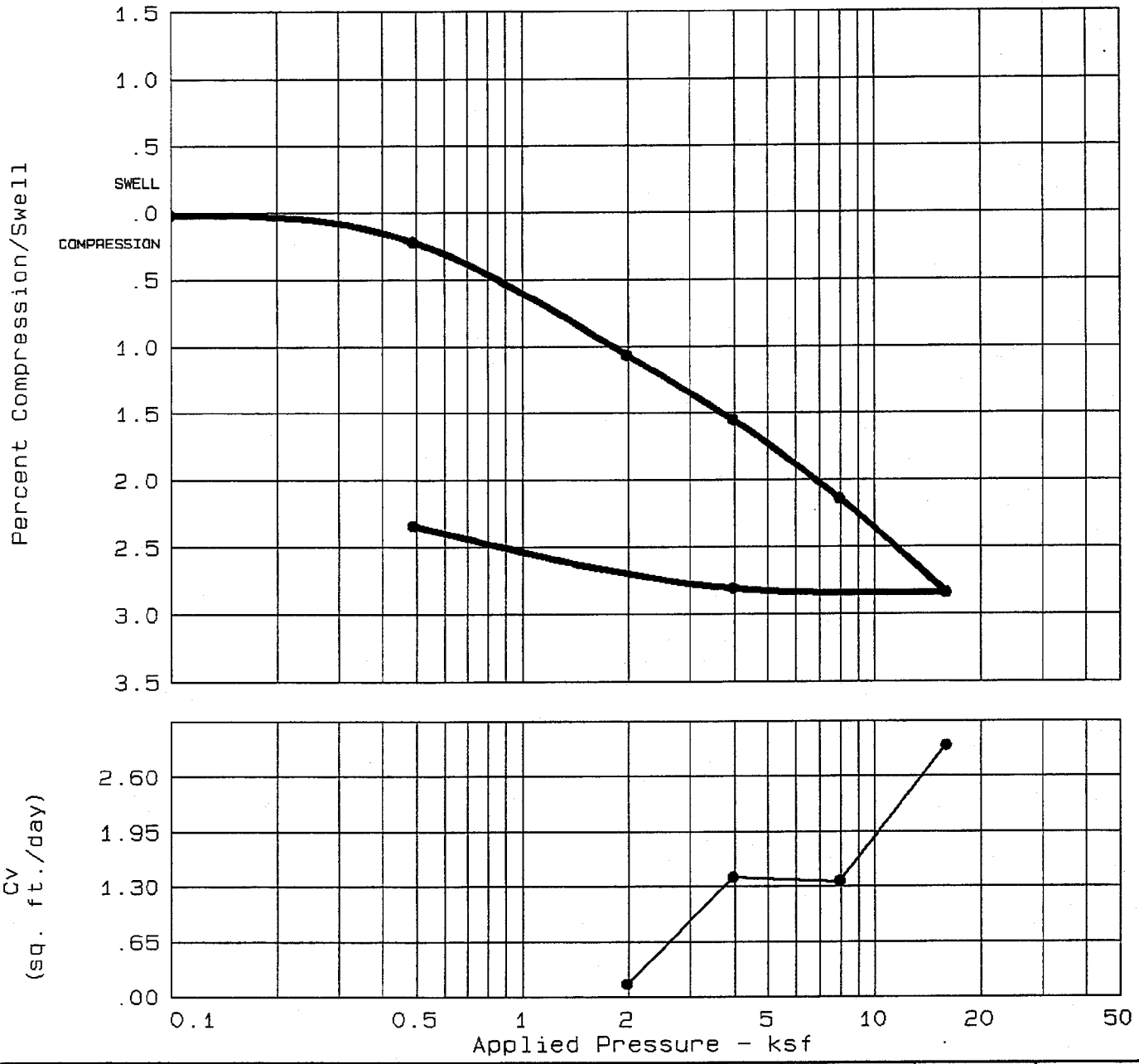
Remarks:
Tested by: JCR
Reviewed by: HS

MOISTURE-DENSITY RELATIONSHIP

LAW ENGINEERING, INC.

Figure No. _____

CONSOLIDATION TEST REPORT



Natural Saturation	Natural Moisture	Dry Density	LL	PI	Sp.Gr.	Precons. press.	C_c	e_o
67.3 %	21.9	90.4	NL	NP	2.740		0.04	0.8923

TEST RESULTS

Compression Index = 0.04

MATERIAL DESCRIPTION

Class: USCS: SM

Project No.: 5810860101
Project: TVA - Allen
Location: Boiler Slag
Fine Reed Rejects
Date: July 14, 1995

Remarks:

Tested by: AdK
Reviewed by: HJ

CONSOLIDATION TEST REPORT

LAW ENGINEERING, INC.

Fig. No. _____

HYDRAULIC CONDUCTIVITY

LAW ENGINEERING

Project No.	*5810860101*	Tested By	*HEJ*
Project Name	*TVA - Allen*	Test Date	*05/25/95*
Material (Source)	*Boiler Slag (Fine Reed Rejects)*	Reviewed By	*RLB*
		Review Date	*09/06/95*

ASTM D5084 - Falling Head

Sample Type:	*Remolded*
Sample Orientation:	*Vertical*
Initial Water Content, %:	*22.1*
Wet Unit Weight, pcf:	*108.4*
Dry Unit Weight, pcf:	*88.8*
Compaction, %:	*93.2*
Hydraulic Conductivity, cm/sec. @20 °C:	***9.0E-04***

PERMEABILITY TEST - FALLING HEAD
(ASTM D5084 - 90)

LAW ENGINEERING

Job Number	5810860101	Tested By	HEJ
Project Name	TVA - Allen	Test Date	05/25/95
Material (Source)	Boiler Slag (Fine Reed Rejects)	Reviewed By	RLB
		Review Date	09/06/95

Sample Data

Length, in		Diameter, in		Pan No.	
Location 1	6.000	Location 1	2.830	Dry Soil+Pan, grams	962.94
Location 2	6.000	Location 2	2.830	Pan Weight, grams	82.92
Location3	6.000	Location 3	2.830		
Average	6.000	Average	2.830	Moisture Content, %	22.1
		Wet Soil + Tare, grams	1074.19	Wet Unit Wt, pcf	108.4
		Tare Weight, grams	0.00	Dry Unit Wt, pcf	88.8

Chamber Pressure, psi	44
Back Pressure, psi	30
Confining Pressure, psi	14

Date Start	Date Finish	Time Start	Time Finish	Time (sec)	Division Start	Division Finish	H0 (cm)	Hf (cm)	k cm/sec	Temp (°C)	k cm/sec at 20 °C
				100	50.0	0.0	95.21	45.21	9.5E-04	21	9.3E-04
				103	50.0	0.0	95.21	45.21	9.2E-04	21	9.0E-04
				107	50.0	0.0	95.21	45.21	8.9E-04	21	8.7E-04

No. of Trial	Sample Type	Max. Density (pcf)	Compaction %	Sample Orientation
3	Remolded	95.3	93.2	Vertical

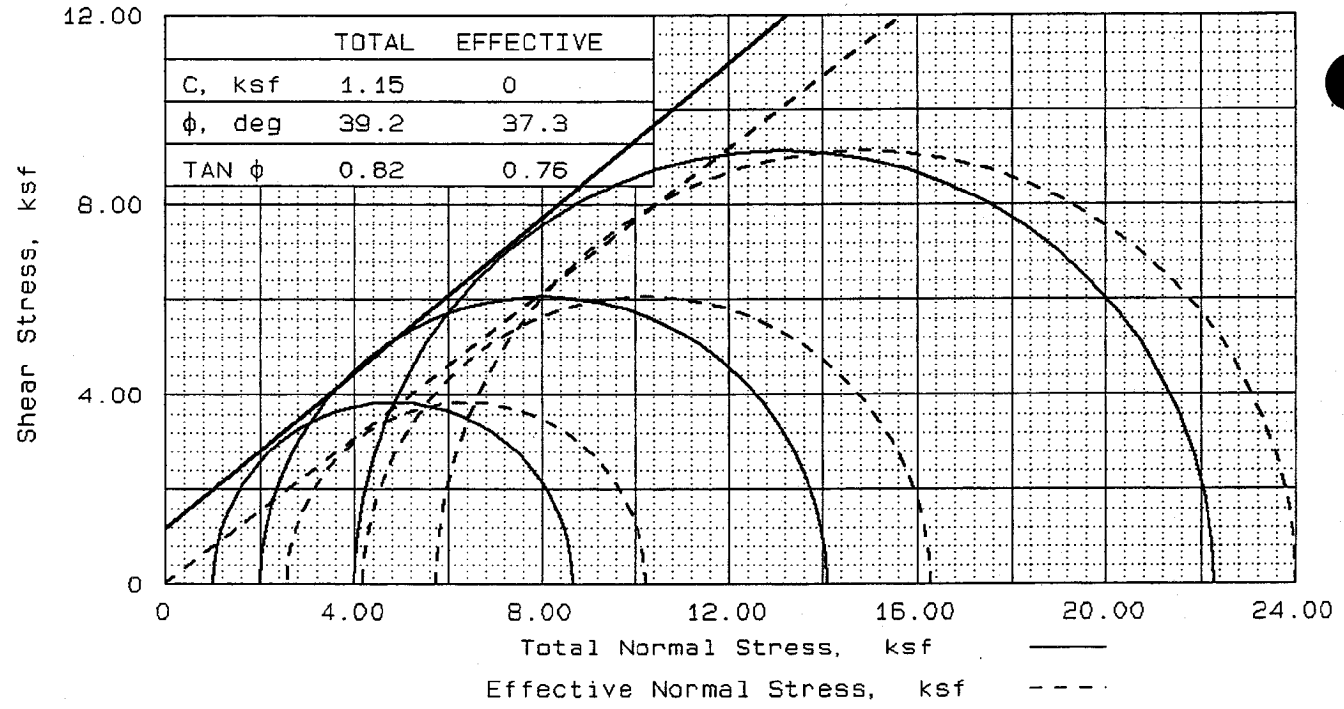
Avg. k at 20 °C 9.0E-04 cm/sec

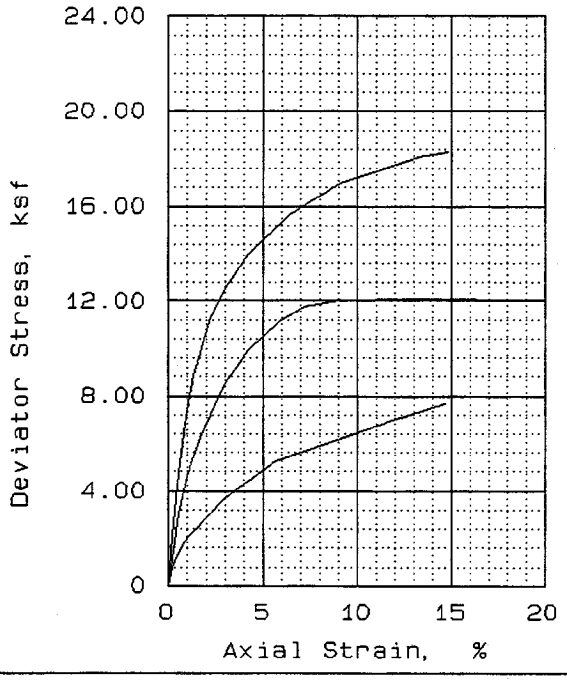
a = area of burette in cm²
L = length of sample in cm
A = area of sample in cm²

H0 = initial head in cm
Hf = final head in cm
t = time in seconds

a = 0.34 cm²
A = 40.582 cm²
L = 15.24 cm

TVA-00011710





SAMPLE NO.		1	2	3
INITIAL	WATER CONTENT, %	20.4	22.1	20.5
	DRY DENSITY, pcf	90.0	88.8	90.0
	SATURATION, %	60.8	64.1	61.0
	VOID RATIO	0.935	0.961	0.936
	DIAMETER, in	2.83	2.83	2.83
	HEIGHT, in	6.00	6.00	6.00
AT TEST	WATER CONTENT, %	20.4	22.1	20.5
	DRY DENSITY, pcf	90.3	89.3	91.8
	SATURATION, %	61.1	64.7	63.6
	VOID RATIO	0.930	0.951	0.897
	DIAMETER, in	2.83	2.83	2.81
	HEIGHT, in	6.00	5.99	5.96
BACK PRESSURE, ksf		4.29	4.26	4.38
CELL PRESSURE, ksf		5.29	6.26	8.38
FAILURE STRESS, ksf		7.67	12.10	18.27
PORE PRESSURE, ksf		2.72	2.07	2.65
STRAIN RATE, %/min.		0.100	0.100	0.100
ULTIMATE STRESS, ksf				
PORE PRESSURE, ksf				
$\bar{\sigma}_1$ FAILURE, ksf		10.24	16.29	24.00
$\bar{\sigma}_3$ FAILURE, ksf		2.57	4.19	5.73

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

LL= NL PL= NP PI=
SPECIFIC GRAVITY= 2.79
REMARKS: Tested by: HS

Reviewed by: RLB

FIG. NO.

CLIENT:

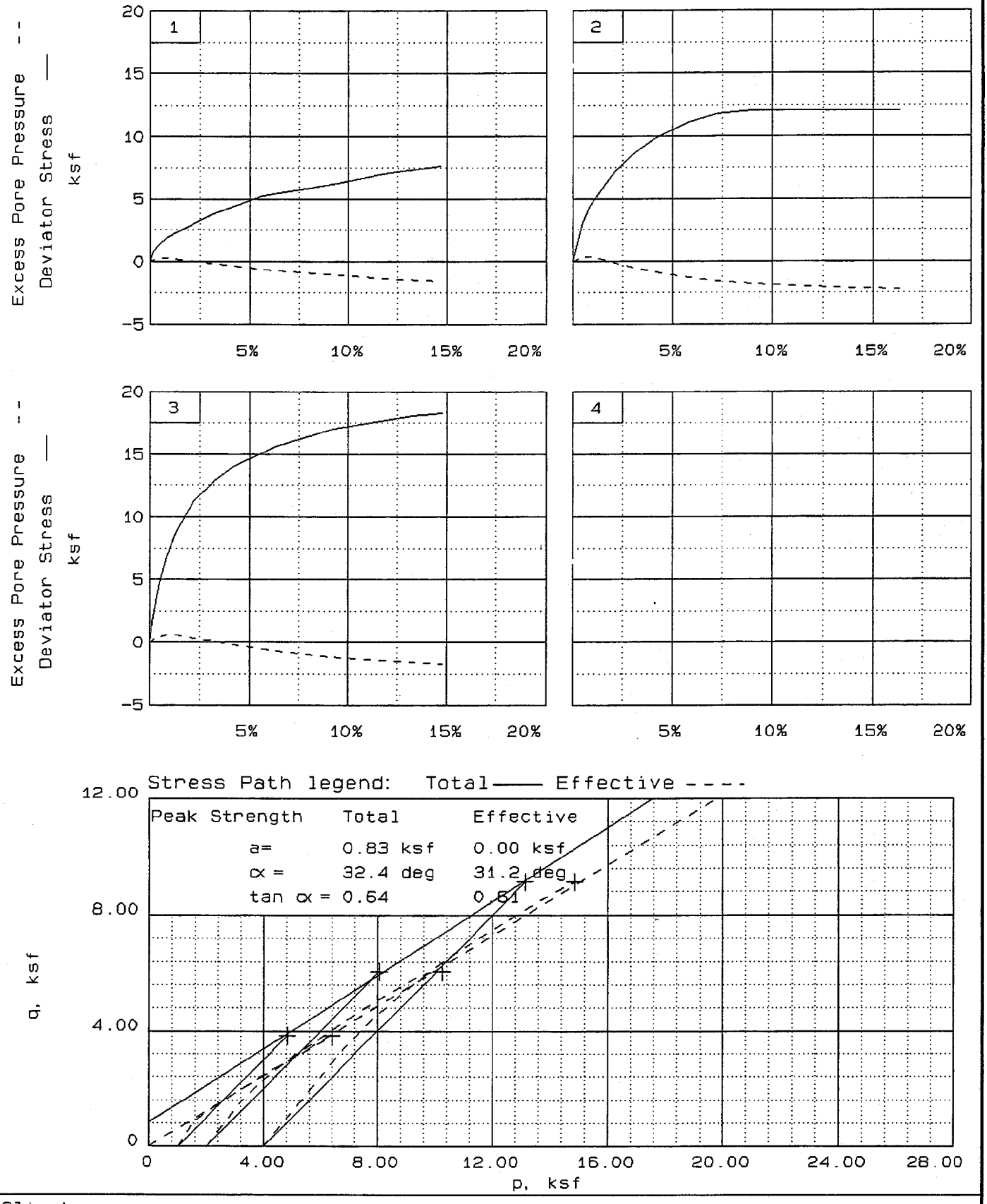
PROJECT: TVA - Allen

SAMPLE LOCATION: Boiler Slag
Fine Reed Rejects

PROJ. NO.: 5810860101 DATE: July 27, 1995

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

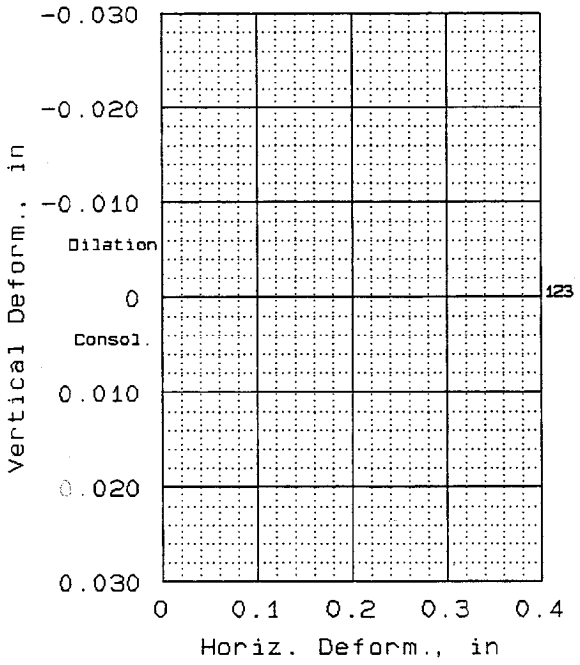


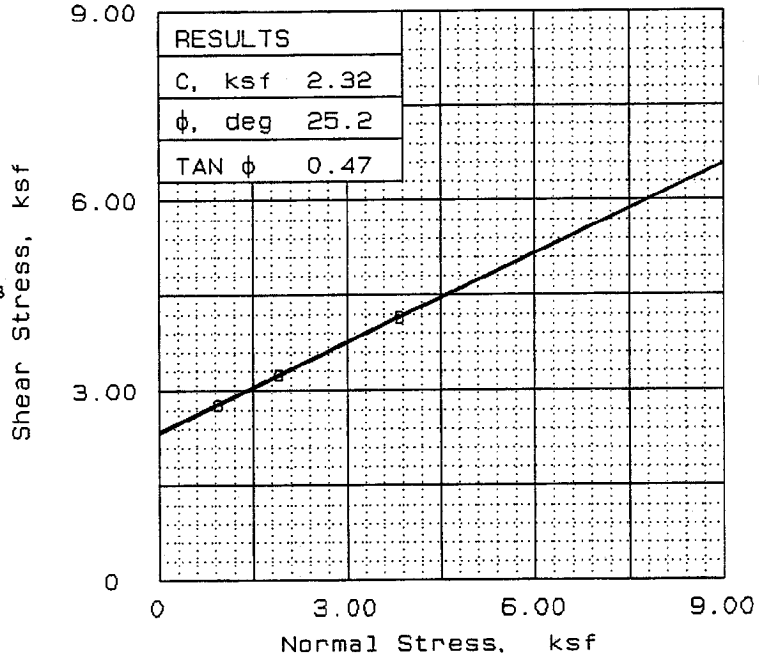
Client:

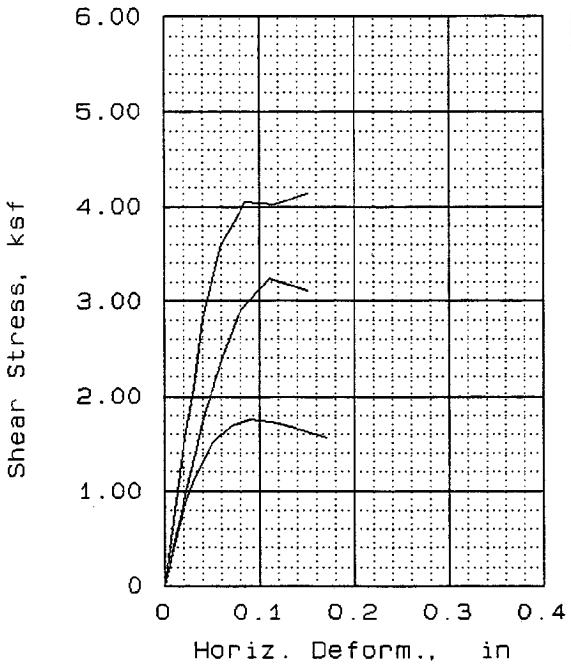
Project: TVA - Allen

Location: Boiler Slag Fine Reed Rejects

File: 8601A Project No.: 5810860101 Page 2/2 Fig. No. ____







SAMPLE NO.		1	2	3
INITIAL	WATER CONTENT, %	21.9	21.1	21.2
	DRY DENSITY, pcf	87.8	88.1	88.3
	SATURATION, %	62.2	60.4	61.0
	VOID RATIO	0.976	0.971	0.965
	DIAMETER, in	2.50	2.50	2.50
	HEIGHT, in	0.81	0.81	0.81
AT TEST	WATER CONTENT, %	21.9	21.1	21.2
	DRY DENSITY, pcf	87.8	88.1	88.3
	SATURATION, %	62.2	60.4	61.0
	VOID RATIO	0.976	0.971	0.965
	DIAMETER, in	2.50	2.50	2.50
	HEIGHT, in	0.81	0.81	0.81
NORMAL STRESS, ksf		0.97	1.94	3.88
MAX. SHEAR, ksf		2.77	3.25	4.14
STRAIN RATE, %/min.		0.500	0.500	0.500
ULT. SHEAR, ksf				

SAMPLE DATA

SAMPLE TYPE: Remolded

DESCRIPTION:

LL= NL PL= NP PI=

SPECIFIC GRAVITY= 2.78

REMARKS: Tested by: HD

Reviewed by: RLB

FIG. NO.

CLIENT:

PROJECT: TVA - ALLEN

SAMPLE LOCATION: Boiler Slag
Fine Reed Rejects

PROJ. NO.: 5810860101 DATE: August 22, 1995

DIRECT SHEAR TEST

LAW ENGINEERING, INC.

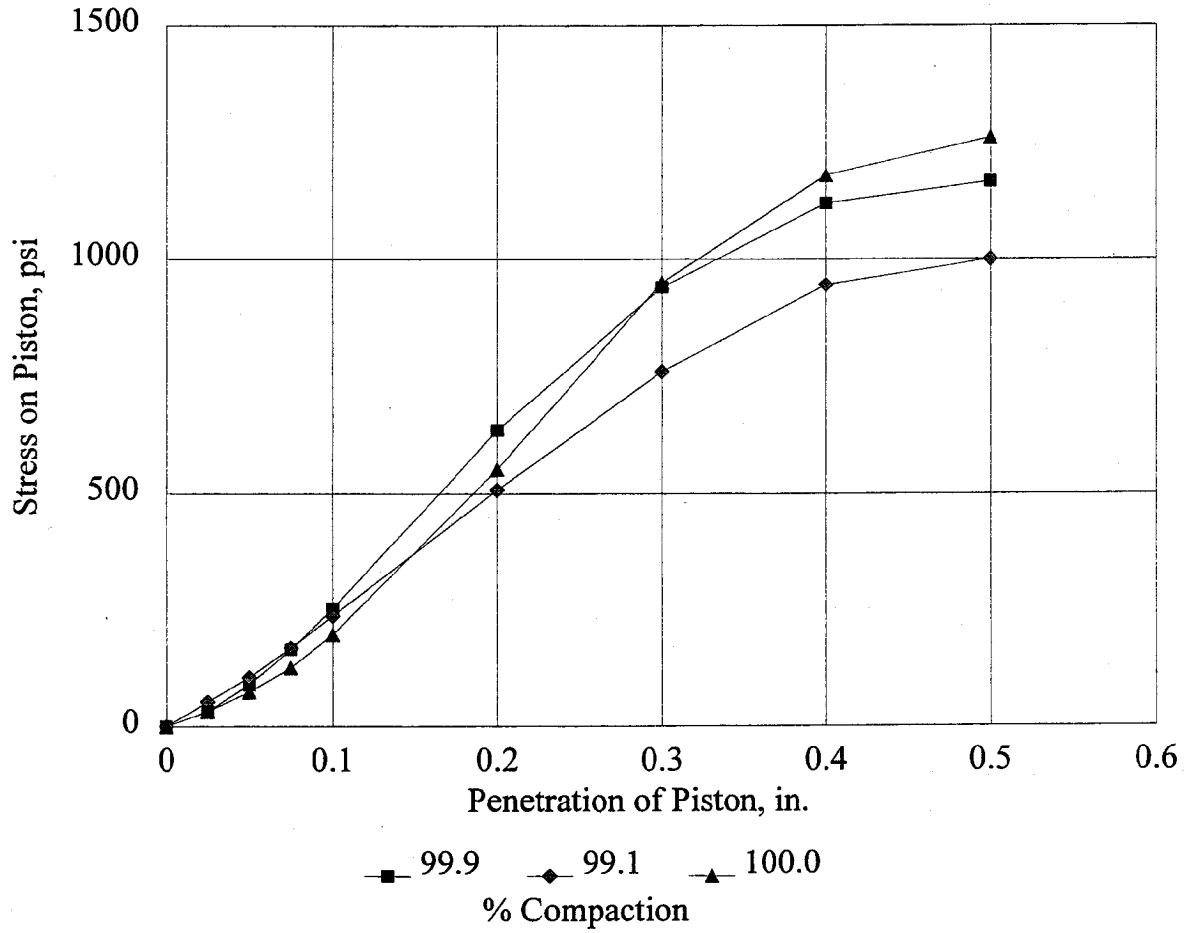
California Bearing Ratio

(ASTM D1883-92)

LAW ENGINEERING

Project No.	5810860101	**Tested By**	EM
Project Name	TVA - Allen	**Test Date**	07/17/95
Material (Source)	Boiler Slag (Fine Reed Rejects)	**Reviewed By**	RLB
		Review Date	08/16/95

Compaction, %	99.9	99.1	100.0
Before Soak Dry Density, pcf	95.2	94.4	95.3
Before Soak Moisture Content,	21.2	20.8	21.7
After Soak Dry Density, pcf	95.6	94.5	95.8
After Soak Moisture Content, %	22.1	24.0	24.4
CBR @ 0.1 in.	25.2	23.6	19.6
CBR @ 0.2 in.	42.3	33.9	36.8



LABORATORY MATERIAL HANDLING AND TESTING SHEET NO 1 OF 2

LABORATORY MATERIAL TEST DATA
RESILIENT MODULUS OF UNBOUND GRANULAR BASE/SUBBASE MATERIALS AND SUBGRADE SOILS
LAB DATA SHEET T46 - RECOMPACTED SAMPLES

UNBOUND GRANULAR BASE/SUBBASE LAYERS AND SUBGRADE SOILS
SHRP TEST DESIGNATION UG07, SS07/SHRP PROTOCOL P46

LABORATORY PERFORMING TEST: **LAW ENGINEERING, INC. - ATLANTA, GEORGIA**

PROJECT NAME: TVA - Fly Ash, Bottom Ash and Scrubber Gypsum Study

LAW PROJECT NO.: 5810860101

1.	*MATERIAL SOURCE:*	Allen
2.	*MATERIAL DESCRIPTION:*	Boiler Slag (Fine Reed Rejects)
3.	*REMOLDING TARGETS:*	95% Standard Dry Density at Optimum Moisture Content
4.	*MATERIAL TYPE* (Type 1 or Type 2)	2
5.	*TEST INFORMATION*	
	PRECONDITIONING - GREATER THAN 5% PERM. STRAIN? (Y = YES OR N = NO)	N
	TESTING - GREATER THAN 5% PERM. STRAIN? (Y = YES OR N = NO)	N
	TESTING - NUMBER OF LOAD SEQUENCES COMPLETED (0 - 15)	15
6.	*SPECIMEN INFO.:*	
	SPECIMEN DIAM., inch	
	TOP	2.85
	MIDDLE	2.86
	BOTTOM	2.86
	AVERAGE	2.86
	MEMBRANE THICKNESS (1), inch	0.01
	MEMBRANE THICKNESS (2), inch	0.01
	NET DIAM., inch	2.83
	HEIGHT OF SPECIMEN, CAP AND BASE, inch	6.07
	HEIGHT OF CAP AND BASE, inch	0.00
	INITIAL LENGTH, L_0, inch	6.07
	INITIAL AREA, A_0, in^2	6.30
	INITIAL VOLUME A_0L_0, in^3	38.27
7.	*SOIL SPECIMEN WEIGHT*:	
	INITIAL WEIGHT OF CONTAINER AND WET SOIL, grams	1805.50
	FINAL WEIGHT OF CONTAINER AND WET SOIL, grams	727.20
	WEIGHT OF WET SOIL USED, grams	1078.30
8.	*SOIL PROPERTIES.:*	
	IN SITU MOISTURE CONTENT (NUCLEAR), %	N/A
	IN SITU WET DENSITY (NUCLEAR), pcf	N/A
	or	
	OPTIMUM MOISTURE CONTENT, %	21.5
	MAX. DRY DENSITY, pcf	95.3
	95 % MAX. DRY DENSITY, pcf	90.5
9.	*SPECIMEN PROPERTIES:*	
	COMPACTION MOISTURE CONTENT, %	20.8
	MOISTURE CONTENT AFTER RESILIENT MODULUS TESTING, %	21.0
	COMPACTION DRY DENSITY, γ_d pcf	88.8
10.	*QUICK SHEAR TEST*	
	STRESS - STRAIN PLOT ATTACHED (Y = YES, N = NO)	Y
	TRIAXIAL SHEAR MAXIMUM STRENGTH (MAX. LOAD/X-SECTION AREA), psi	23.1
	SPECIMEN FAIL DURING TRIAXIAL SHEAR? (Y = YES, N = NO)	N
11.	*COMMENTS* (Section 10.4 of Protocol P46)	
	(a) *CODE*	0 0 0 0 0 0
	(b) *NOTE*	
12.	*TEST DATE*	07-17-1995

GENERAL REMARKS:

SUBMITTED BY, DATE

Richard T. Bradham 8/24/95

LABORATORY MANAGER

PROJECT NAME: TVA - Fly Ash, Bottom Ash and Scrubber Gypsum Study
LAW PROJECT NO.: 5810860101
1. *MATERIAL SOURCE:* Allen
2. *MATERIAL DESCRIPTION:* Boiler Slag (Fine Reed Rejects)
3. *REMOLDING TARGETS:* 95% Standard Dry Density at Optimum Moisture Content
4. *MATERIAL TYPE* 2
5. *TEST DATE* 07-17-1995
6. *RESILIENT MODULUS TESTING*

COLUMN #	1	2	3	4	5	6	7	8	9	10	11	12	13	14
PARAMETER	*Chamber Confining Pressure*	*Nominal Maximum Axial Stress*	*Cycle No.*	*Actual Applied Max. Axial Load*	*Actual Applied Cyclic Load*	*Actual Applied Contact Load*	*Actual Applied Max. Axial Stress*	*Actual Applied Cyclic Stress*	*Actual Applied Contact Stress*	*Recov. Def. LVDT #1 Reading*	*Recov. Def. LVDT #2 Reading*	*Average Recov Def. LVDT 1 and 2*	*Resilient Strain*	*Resilient Modulus*
DESIGNATION	S_3	S_{cyclic}	c_1	P_{max}	P_{cyclic}	$P_{contact}$	S_{max}	S_{cyclic}	$S_{contact}$	H_1	H_2	H_{avg}	ε	
UNIT	psi	psi	---	lbs	lbs	lbs	psi	psi	psi	in.	in.	in.	in/in	psi
PRECISION	___._	___._	_	____._	____._	___._	___._	___._	__._	_._____	_._____	_._____	_._____	___.
SEQUENCE 1	6.0	2.0	1	12.8	11.5	1.3	2.0	1.8	0.2	0.00135	0.00137	0.00136	0.00022	8,167
			2	12.8	11.6	1.2	2.0	1.8	0.2	0.00134	0.00137	0.00135	0.00022	8,241
			3	12.8	11.5	1.3	2.0	1.8	0.2	0.00134	0.00136	0.00135	0.00022	8,222
			4	12.8	11.5	1.3	2.0	1.8	0.2	0.00135	0.00138	0.00136	0.00022	8,144
			5	12.8	11.5	1.2	2.0	1.8	0.2	0.00132	0.00135	0.00134	0.00022	8,294
	COLUMN AVERAGE			12.8	11.5	1.2	2.0	1.8	0.2	0.00134	0.00136	0.00135	0.00022	8,214
	STANDARD DEV.			0.0	0.0	0.0	0.0	0.0	0.0	0.00001	0.00001	0.00001	0.00000	60

Source: Allen Description: Boiler Slag (Fine Reed Rejects) 95% Standard Dry Density at Optimum Moisture Content

SEQUENCE 2	6.0	4.0	1	25.3	22.9	2.4	4.0	3.6	0.4	0.00243	0.00249	0.00246	0.00041	8,970
			2	25.3	22.9	2.5	4.0	3.6	0.4	0.00245	0.00249	0.00247	0.00041	8,914
			3	25.3	22.9	2.4	4.0	3.6	0.4	0.00245	0.00249	0.00247	0.00041	8,907
			4	25.4	23.0	2.4	4.0	3.6	0.4	0.00243	0.00252	0.00247	0.00041	8,949
			5	25.4	23.0	2.5	4.0	3.6	0.4	0.00242	0.00248	0.00245	0.00040	9,020
	COLUMN AVERAGE			25.3	22.9	2.4	4.0	3.6	0.4	0.00244	0.00250	0.00247	0.00041	8,952
	STANDARD DEV.			0.0	0.0	0.0	0.0	0.0	0.0	0.00001	0.00001	0.00001	0.00000	46
SEQUENCE 3	6.0	6.0	1	37.7	34.1	3.6	6.0	5.4	0.6	0.00354	0.00368	0.00361	0.00059	9,106
			2	37.7	34.1	3.6	6.0	5.4	0.6	0.00356	0.00368	0.00362	0.00060	9,091
			3	37.7	34.1	3.6	6.0	5.4	0.6	0.00356	0.00370	0.00363	0.00060	9,062
			4	37.6	34.1	3.6	6.0	5.4	0.6	0.00355	0.00370	0.00363	0.00060	9,047
			5	37.6	34.0	3.6	6.0	5.4	0.6	0.00355	0.00369	0.00362	0.00060	9,055
	COLUMN AVERAGE			37.7	34.1	3.6	6.0	5.4	0.6	0.00355	0.00369	0.00362	0.00060	9,072
	STANDARD DEV.			0.0	0.0	0.0	0.0	0.0	0.0	0.00001	0.00001	0.00001	0.00000	25
SEQUENCE 4	6.0	8.0	1	50.3	45.5	4.9	8.0	7.2	0.8	0.00467	0.00484	0.00476	0.00078	9,204
			2	50.3	45.4	4.9	8.0	7.2	0.8	0.00466	0.00484	0.00475	0.00078	9,209
			3	50.4	45.5	4.9	8.0	7.2	0.8	0.00468	0.00487	0.00477	0.00079	9,186
			4	50.4	45.5	4.9	8.0	7.2	0.8	0.00467	0.00485	0.00476	0.00078	9,210
			5	50.5	45.6	4.9	8.0	7.2	0.8	0.00468	0.00484	0.00476	0.00078	9,224
	COLUMN AVERAGE			50.4	45.5	4.9	8.0	7.2	0.8	0.00467	0.00485	0.00476	0.00078	9,207
	STANDARD DEV.			0.1	0.1	0.0	0.0	0.0	0.0	0.00001	0.00001	0.00001	0.00000	14

Source: Allen Description: Boiler Slag (Fine Reed Rejects) 95% Standard Dry Density at Optimum Moisture Content

SEQUENCE 5	6.0	10.0	1	62.8	56.7	6.1	10.0	9.0	1.0	0.00577	0.00591	0.00584	0.00096	9,342
			2	62.8	56.7	6.1	10.0	9.0	1.0	0.00580	0.00592	0.00586	0.00097	9,313
			3	62.8	56.8	6.1	10.0	9.0	1.0	0.00578	0.00592	0.00585	0.00096	9,343
			4	62.8	56.7	6.1	10.0	9.0	1.0	0.00575	0.00591	0.00583	0.00096	9,376
			5	62.9	56.9	6.1	10.0	9.0	1.0	0.00577	0.00592	0.00584	0.00096	9,373
	COLUMN AVERAGE			62.8	56.7	6.1	10.0	9.0	1.0	0.00577	0.00592	0.00585	0.00096	9,349
	STANDARD DEV.			0.1	0.1	0.0	0.0	0.0	0.0	0.00002	0.00001	0.00001	0.00000	26
SEQUENCE 6	4.0	2.0	1	12.9	11.6	1.3	2.0	1.8	0.2	0.00166	0.00167	0.00166	0.00027	6,731
			2	12.9	11.6	1.3	2.0	1.8	0.2	0.00169	0.00170	0.00169	0.00028	6,617
			3	12.7	11.4	1.2	2.0	1.8	0.2	0.00168	0.00167	0.00168	0.00028	6,564
			4	12.9	11.7	1.2	2.0	1.9	0.2	0.00171	0.00171	0.00171	0.00028	6,586
			5	12.7	11.4	1.3	2.0	1.8	0.2	0.00165	0.00166	0.00165	0.00027	6,665
	COLUMN AVERAGE			12.8	11.6	1.3	2.0	1.8	0.2	0.00168	0.00168	0.00168	0.00028	6,633
	STANDARD DEV.			0.1	0.1	0.0	0.0	0.0	0.0	0.00002	0.00002	0.00002	0.00000	67
SEQUENCE 7	4.0	4.0	1	25.2	22.9	2.3	4.0	3.6	0.4	0.00318	0.00329	0.00324	0.00053	6,823
			2	25.2	23.0	2.3	4.0	3.6	0.4	0.00319	0.00330	0.00325	0.00053	6,820
			3	25.2	22.9	2.3	4.0	3.6	0.4	0.00320	0.00330	0.00325	0.00054	6,783
			4	25.2	22.9	2.3	4.0	3.6	0.4	0.00319	0.00328	0.00324	0.00053	6,823
			5	25.2	23.0	2.3	4.0	3.6	0.4	0.00320	0.00329	0.00325	0.00053	6,816
	COLUMN AVERAGE			25.2	22.9	2.3	4.0	3.6	0.4	0.00319	0.00329	0.00324	0.00053	6,813
	STANDARD DEV.			0.0	0.0	0.0	0.0	0.0	0.0	0.00001	0.00001	0.00001	0.00000	17

Source: Allen Description: Boiler Slag (Fine Reed Rejects) 95% Standard Dry Density at Optimum Moisture Content

SEQUENCE 8	4.0	6.0	1	37.8	34.3	3.5	6.0	5.4	0.6	0.00458	0.00474	0.00466	0.00077	7,088
			2	37.9	34.4	3.6	6.0	5.5	0.6	0.00455	0.00472	0.00463	0.00076	7,140
			3	37.9	34.3	3.6	6.0	5.4	0.6	0.00458	0.00474	0.00466	0.00077	7,091
			4	37.9	34.3	3.6	6.0	5.4	0.6	0.00459	0.00473	0.00466	0.00077	7,096
			5	37.9	34.4	3.6	6.0	5.5	0.6	0.00458	0.00473	0.00466	0.00077	7,107
	COLUMN AVERAGE			37.9	34.3	3.6	6.0	5.4	0.6	0.00458	0.00473	0.00465	0.00077	7,104
	STANDARD DEV.			0.0	0.0	0.0	0.0	0.0	0.0	0.00002	0.00001	0.00001	0.00000	21
SEQUENCE 9	4.0	8.0	1	50.1	45.3	4.9	8.0	7.2	0.8	0.00579	0.00594	0.00586	0.00097	7,439
			2	50.2	45.3	4.9	8.0	7.2	0.8	0.00573	0.00592	0.00583	0.00096	7,487
			3	50.2	45.3	4.8	8.0	7.2	0.8	0.00577	0.00594	0.00586	0.00096	7,454
			4	50.2	45.4	4.9	8.0	7.2	0.8	0.00575	0.00591	0.00583	0.00096	7,492
			5	50.4	45.5	4.8	8.0	7.2	0.8	0.00578	0.00595	0.00586	0.00097	7,480
	COLUMN AVERAGE			50.2	45.4	4.8	8.0	7.2	0.8	0.00577	0.00593	0.00585	0.00096	7,470
	STANDARD DEV.			0.1	0.1	0.0	0.0	0.0	0.0	0.00002	0.00002	0.00002	0.00000	23
SEQUENCE 10	4.0	10.0	1	63.0	56.9	6.1	10.0	9.0	1.0	0.00678	0.00696	0.00687	0.00113	7,972
			2	63.0	56.9	6.1	10.0	9.0	1.0	0.00680	0.00698	0.00689	0.00113	7,957
			3	62.9	56.8	6.1	10.0	9.0	1.0	0.00678	0.00697	0.00687	0.00113	7,963
			4	62.9	56.8	6.1	10.0	9.0	1.0	0.00679	0.00698	0.00688	0.00113	7,951
			5	63.0	56.8	6.1	10.0	9.0	1.0	0.00678	0.00696	0.00687	0.00113	7,970
	COLUMN AVERAGE			63.0	56.9	6.1	10.0	9.0	1.0	0.00678	0.00697	0.00688	0.00113	7,963
	STANDARD DEV.			0.0	0.0	0.0	0.0	0.0	0.0	0.00001	0.00001	0.00001	0.00000	9

Source: Allen Description: Boiler Slag (Fine Reed Rejects) 95% Standard Dry Density at Optimum Moisture Content

SEQUENCE 11	2.0	2.0	1	13.6	11.6	2.0	2.2	1.8	0.3	0.00213	0.00215	0.00214	0.00035	5,229
			2	13.7	11.7	2.0	2.2	1.9	0.3	0.00212	0.00214	0.00213	0.00035	5,273
			3	13.6	11.6	2.0	2.2	1.8	0.3	0.00213	0.00215	0.00214	0.00035	5,205
			4	13.6	11.6	2.0	2.2	1.8	0.3	0.00212	0.00214	0.00213	0.00035	5,261
			5	13.6	11.6	2.0	2.2	1.8	0.3	0.00212	0.00216	0.00214	0.00035	5,212
	COLUMN AVERAGE			13.6	11.6	2.0	2.2	1.8	0.3	0.00212	0.00215	0.00214	0.00035	5,236
	STANDARD DEV.			0.0	0.0	0.0	0.0	0.0	0.0	0.00000	0.00001	0.00001	0.00000	30
SEQUENCE 12	2.0	4.0	1	25.2	22.8	2.4	4.0	3.6	0.4	0.00414	0.00423	0.00418	0.00069	5,252
			2	25.2	22.8	2.4	4.0	3.6	0.4	0.00412	0.00422	0.00417	0.00069	5,277
			3	25.2	22.9	2.4	4.0	3.6	0.4	0.00414	0.00423	0.00419	0.00069	5,262
			4	25.3	22.9	2.4	4.0	3.6	0.4	0.00413	0.00421	0.00417	0.00069	5,284
			5	25.2	22.8	2.4	4.0	3.6	0.4	0.00415	0.00423	0.00419	0.00069	5,234
	COLUMN AVERAGE			25.2	22.8	2.4	4.0	3.6	0.4	0.00414	0.00423	0.00418	0.00069	5,262
	STANDARD DEV.			0.0	0.0	0.0	0.0	0.0	0.0	0.00001	0.00001	0.00001	0.00000	20
SEQUENCE 13	2.0	6.0	1	37.5	33.9	3.6	5.9	5.4	0.6	0.00567	0.00578	0.00572	0.00094	5,708
			2	37.4	33.8	3.6	5.9	5.4	0.6	0.00564	0.00577	0.00571	0.00094	5,711
			3	37.4	33.8	3.6	5.9	5.4	0.6	0.00568	0.00579	0.00573	0.00094	5,678
			4	37.4	33.8	3.6	5.9	5.4	0.6	0.00565	0.00578	0.00571	0.00094	5,697
			5	37.4	33.8	3.6	5.9	5.4	0.6	0.00568	0.00581	0.00575	0.00095	5,660
	COLUMN AVERAGE			37.4	33.8	3.6	5.9	5.4	0.6	0.00566	0.00579	0.00572	0.00094	5,691
	STANDARD DEV.			0.1	0.1	0.0	0.0	0.0	0.0	0.00002	0.00002	0.00002	0.00000	21

Source: Allen Description: Boiler Slag (Fine Reed Rejects) 95% Standard Dry Density at Optimum Moisture Content

SEQUENCE 14	2.0	8.0	1	49.8	45.0	4.8	7.9	7.1	0.8	0.00708	0.00715	0.00712	0.00117	6,094
			2	49.8	45.0	4.8	7.9	7.1	0.8	0.00705	0.00715	0.00710	0.00117	6,105
			3	49.8	45.0	4.8	7.9	7.1	0.8	0.00707	0.00715	0.00711	0.00117	6,095
			4	49.8	44.9	4.8	7.9	7.1	0.8	0.00709	0.00715	0.00712	0.00117	6,079
			5	49.8	45.0	4.8	7.9	7.1	0.8	0.00705	0.00716	0.00711	0.00117	6,095
	COLUMN AVERAGE			49.8	45.0	4.8	7.9	7.1	0.8	0.00707	0.00715	0.00711	0.00117	6,094
	STANDARD DEV.			0.0	0.0	0.0	0.0	0.0	0.0	0.00002	0.00001	0.00001	0.00000	9
SEQUENCE 15	2.0	10.0	1	61.1	55.1	6.0	9.7	8.7	1.0	0.00895	0.00899	0.00897	0.00148	5,915
			2	61.2	55.2	6.0	9.7	8.7	1.0	0.00896	0.00901	0.00899	0.00148	5,912
			3	61.3	55.2	6.1	9.7	8.8	1.0	0.00896	0.00902	0.00899	0.00148	5,913
			4	61.4	55.3	6.1	9.7	8.8	1.0	0.00893	0.00898	0.00895	0.00147	5,947
			5	61.4	55.4	6.0	9.7	8.8	1.0	0.00890	0.00897	0.00894	0.00147	5,968
	COLUMN AVERAGE			61.3	55.2	6.1	9.7	8.8	1.0	0.00894	0.00899	0.00897	0.00148	5,931
	STANDARD DEV.			0.1	0.1	0.0	0.0	0.0	0.0	0.00003	0.00002	0.00002	0.00000	25

SUBMITTED BY, DATE

Michael S. Bordeaux 8/24/95

LABORATORY CHIEF

FIGURE 1 - Logarithmic Plot of Resilient Modulus (M_R) vs Cyclic Stress (S_C)

PROJECT NAME:		TVA - Fly Ash, Bottom Ash and Scrubber Gypsum Study
LAW PROJECT NO.:		5810860101
1.	*MATERIAL SOURCE:*	Allen
2.	*MATERIAL DESCRIPTION:*	Boiler Slag (Fine Reed Rejects)
3.	*REMOLDING TARGETS:*	95% Standard Dry Density at Optimum Moisture Content
4.	*MATERIAL TYPE*	2
5.	*TEST DATE*	07-17-1995

$$M_R = K1\,(S_C)^{K2}\,(1+S_3)^{K5}$$

K1 =	2,662
K2 =	0.09516
K5 =	0.53980
R^2 =	0.98

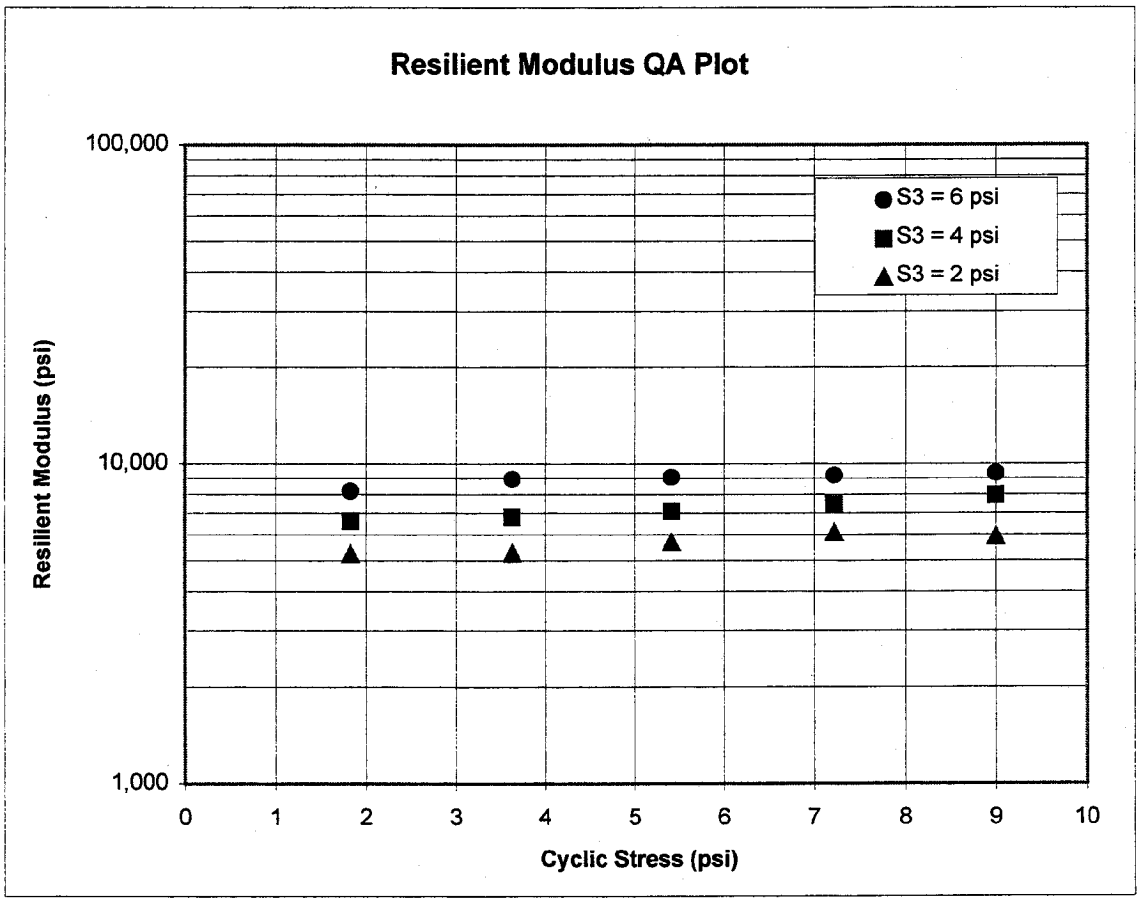
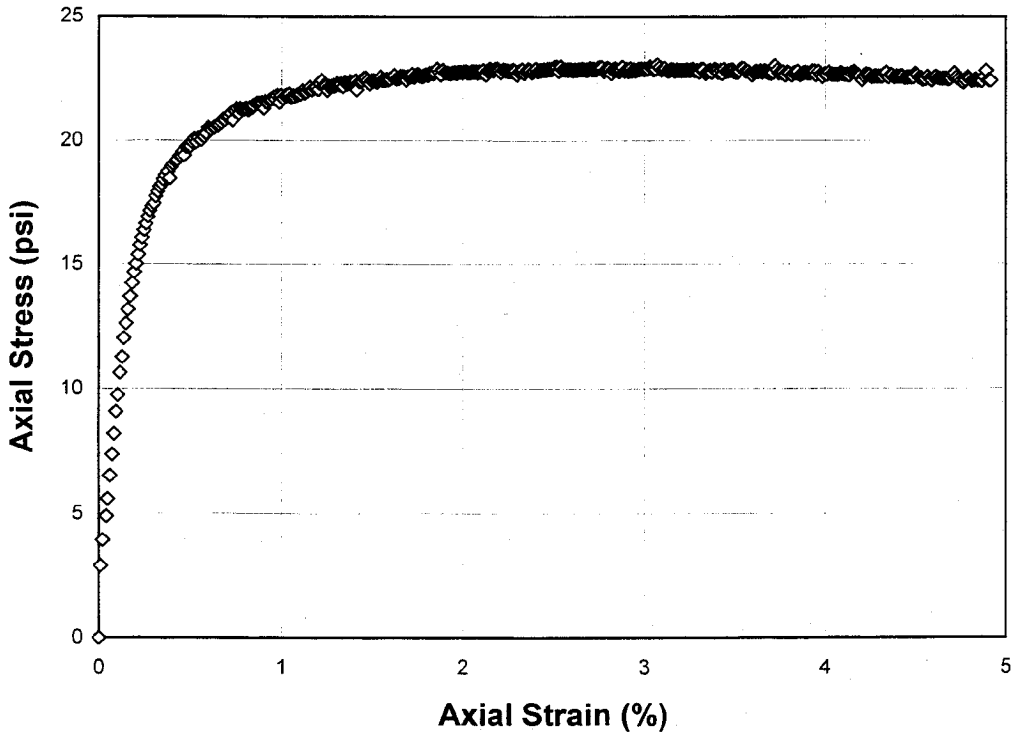


FIGURE 2 - Quick Shear Stress vs Strain

PROJECT NAME:		TVA - Fly Ash, Bottom Ash and Scrubber Gypsum Study
LAW PROJECT NO.:		5810860101
1.	*MATERIAL SOURCE:*	Allen
2.	*MATERIAL DESCRIPTION:*	Boiler Slag (Fine Reed Rejects)
3.	*REMOLDING TARGETS:*	95% Standard Dry Density at Optimum Moisture Content
4.	*MATERIAL TYPE*	2
5.	*TEST DATE*	07-17-1995



LABORATORY MATERIAL HANDLING AND TESTING

LABORATORY MATERIAL TEST DATA
RESILIENT MODULUS OF UNBOUND GRANULAR BASE/SUBBASE MATERIALS AND SUBGRADE SOILS
LAB DATA SHEET T46 - RECOMPACTED SAMPLES

UNBOUND GRANULAR BASE/SUBBASE LAYERS AND SUBGRADE SOILS
SHRP TEST DESIGNATION UG07, SS07/SHRP PROTOCOL P46

LABORATORY PERFORMING TEST: **LAW ENGINEERING, INC. - ATLANTA, GEORGIA**

PROJECT NAME: TVA - Fly Ash, Bottom Ash and Scrubber Gypsum Study

LAW PROJECT NO.: 5810860101

1.	*MATERIAL SOURCE:*	Allen
2.	*MATERIAL DESCRIPTION:*	Boiler Slag (Fine Reed Rejects)
3.	*REMOLDING TARGETS:*	95% Modified Dry Density at Optimum Moisture Content
4.	*MATERIAL TYPE* (Type 1 or Type 2)	2
5.	*TEST INFORMATION*	
	PRECONDITIONING - GREATER THAN 5% PERM. STRAIN? (Y = YES OR N = NO)	N
	TESTING - GREATER THAN 5% PERM. STRAIN? (Y = YES OR N = NO)	N
	TESTING - NUMBER OF LOAD SEQUENCES COMPLETED (0 - 15)	15
6.	*SPECIMEN INFO.*:	
	SPECIMEN DIAM., inch	
	TOP	2.86
	MIDDLE	2.85
	BOTTOM	2.85
	AVERAGE	2.85
	MEMBRANE THICKNESS (1), inch	0.01
	MEMBRANE THICKNESS (2), inch	0.01
	NET DIAM., inch	2.83
	HEIGHT OF SPECIMEN, CAP AND BASE, inch	6.08
	HEIGHT OF CAP AND BASE, inch	0.00
	INITIAL LENGTH, L_0, inch	6.08
	INITIAL AREA, A_0, in^2	6.29
	INITIAL VOLUME $A_0 L_0$, in^3	38.28
7.	*SOIL SPECIMEN WEIGHT*:	
	INITIAL WEIGHT OF CONTAINER AND WET SOIL, grams	1155.71
	FINAL WEIGHT OF CONTAINER AND WET SOIL, grams	0.00
	WEIGHT OF WET SOIL USED, grams	1155.71
8.	*SOIL PROPERTIES.*:	
	IN SITU MOISTURE CONTENT (NUCLEAR), %	N/A
	IN SITU WET DENSITY (NUCLEAR), pcf	N/A
	or	
	OPTIMUM MOISTURE CONTENT, %	23.2
	MAX. DRY DENSITY, pcf	102.6
	95 % MAX. DRY DENSITY, pcf	97.5
9.	*SPECIMEN PROPERTIES:*	
	COMPACTION MOISTURE CONTENT, %	22.2
	MOISTURE CONTENT AFTER RESILIENT MODULUS TESTING, %	20.1
	COMPACTION DRY DENSITY, γ_d pcf	94.0
10.	*QUICK SHEAR TEST*	
	STRESS - STRAIN PLOT ATTACHED (Y = YES, N = NO)	Y
	TRIAXIAL SHEAR MAXIMUM STRENGTH (MAX. LOAD/X-SECTION AREA), psi	27.7
	SPECIMEN FAIL DURING TRIAXIAL SHEAR? (Y = YES, N = NO)	N
11.	*COMMENTS* (Section 10.4 of Protocol P46)	
	(a) *CODE*	0 0 0 0 0 0
	(b) *NOTE*	
12.	*TEST DATE*	07-18-1995

GENERAL REMARKS:

SUBMITTED BY, DATE

Michael P. Bouchelle 8/24/95

LABORATORY MANAGER

PROJECT NAME: TVA - Fly Ash, Bottom Ash and Scrubber Gypsum Study
LAW PROJECT NO.: 5810860101
1. *MATERIAL SOURCE:* Allen
2. *MATERIAL DESCRIPTION:* Boiler Slag (Fine Reed Rejects)
3. *REMOLDING TARGETS:* 95% Modified Dry Density at Optimum Moisture Content
4. *MATERIAL TYPE* 2
5. *TEST DATE* 07-18-1995
6. *RESILIENT MODULUS TESTING*

COLUMN #	1	2	3	4	5	6	7	8	9	10	11	12	13	14
PARAMETER	*Chamber Confining Pressure*	*Nominal Maximum Axial Stress*	*Cycle No.*	*Actual Applied Max. Axial Load*	*Actual Applied Cyclic Load*	*Actual Applied Contact Load*	*Actual Applied Max. Axial Stress*	*Actual Applied Cyclic Stress*	*Actual Applied Contact Stress*	*Recov. Def. LVDT #1 Reading*	*Recov. Def. LVDT #2 Reading*	*Average Recov Def. LVDT 1 and 2*	*Resilient Strain*	*Resilient Modulus*
DESIGNATION	S_3	S_{cyclic}	c_1	P_{max}	P_{cyclic}	$P_{contact}$	S_{max}	S_{cyclic}	$S_{contact}$	H_1	H_2	H_{avg}	ε	
UNIT	psi	psi	---	lbs	lbs	lbs	psi	psi	psi	in.	in.	in.	in/in	psi
PRECISION	_ _ _ ._	_ _ _ ._	_	_ _ _ _ ._	_ _ _ ._	_ _ _ ._	_ _ _ ._	_ _ _ ._	_ _ ._	_ ._ _ _ _ _	_ ._ _ _ _ _	_ ._ _ _ _ _	_ ._ _ _ _	_ _ _ .
SEQUENCE 1	6.0	2.0	1	12.7	11.5	1.2	2.0	1.8	0.2	0.00143	0.00149	0.00146	0.00024	7,629
			2	12.7	11.5	1.2	2.0	1.8	0.2	0.00143	0.00151	0.00147	0.00024	7,555
			3	12.6	11.4	1.2	2.0	1.8	0.2	0.00144	0.00151	0.00148	0.00024	7,424
			4	12.6	11.4	1.2	2.0	1.8	0.2	0.00143	0.00148	0.00146	0.00024	7,581
			5	12.7	11.5	1.2	2.0	1.8	0.2	0.00143	0.00151	0.00147	0.00024	7,557
	COLUMN AVERAGE			12.7	11.5	1.2	2.0	1.8	0.2	0.00143	0.00150	0.00147	0.00024	7,549
	STANDARD DEV.			0.1	0.1	0.0	0.0	0.0	0.0	0.00001	0.00001	0.00001	0.00000	76

Source: Allen Description: Boiler Slag (Fine Reed Rejects) 95% Modified Dry Density at Optimum Moisture Content

SEQUENCE 2	6.0	4.0	1	25.2	22.9	2.4	4.0	3.6	0.4	0.00254	0.00272	0.00263	0.00043	8,414
			2	25.3	22.9	2.4	4.0	3.6	0.4	0.00254	0.00274	0.00264	0.00043	8,398
			3	25.2	22.9	2.4	4.0	3.6	0.4	0.00255	0.00272	0.00264	0.00043	8,387
			4	25.3	22.9	2.4	4.0	3.6	0.4	0.00255	0.00273	0.00264	0.00043	8,394
			5	25.3	22.9	2.4	4.0	3.6	0.4	0.00253	0.00272	0.00263	0.00043	8,415
	COLUMN AVERAGE			25.3	22.9	2.4	4.0	3.6	0.4	0.00254	0.00273	0.00263	0.00043	8,402
	STANDARD DEV.			0.0	0.0	0.0	0.0	0.0	0.0	0.00001	0.00001	0.00000	0.00000	13
SEQUENCE 3	6.0	6.0	1	37.7	34.1	3.7	6.0	5.4	0.6	0.00368	0.00388	0.00378	0.00062	8,703
			2	37.8	34.1	3.7	6.0	5.4	0.6	0.00368	0.00389	0.00379	0.00062	8,701
			3	37.8	34.1	3.7	6.0	5.4	0.6	0.00370	0.00389	0.00379	0.00062	8,687
			4	37.8	34.1	3.7	6.0	5.4	0.6	0.00370	0.00390	0.00380	0.00062	8,665
			5	37.8	34.1	3.7	6.0	5.4	0.6	0.00371	0.00390	0.00381	0.00063	8,661
	COLUMN AVERAGE			37.8	34.1	3.7	6.0	5.4	0.6	0.00369	0.00389	0.00379	0.00062	8,683
	STANDARD DEV.			0.0	0.0	0.0	0.0	0.0	0.0	0.00001	0.00001	0.00001	0.00000	20
SEQUENCE 4	6.0	8.0	1	50.2	45.3	4.9	8.0	7.2	0.8	0.00489	0.00510	0.00500	0.00082	8,777
			2	50.2	45.3	4.9	8.0	7.2	0.8	0.00489	0.00510	0.00499	0.00082	8,766
			3	50.1	45.2	4.9	8.0	7.2	0.8	0.00488	0.00509	0.00499	0.00082	8,772
			4	50.1	45.2	4.9	8.0	7.2	0.8	0.00488	0.00509	0.00498	0.00082	8,768
			5	50.1	45.2	4.9	8.0	7.2	0.8	0.00486	0.00506	0.00496	0.00082	8,815
	COLUMN AVERAGE			50.1	45.2	4.9	8.0	7.2	0.8	0.00488	0.00509	0.00498	0.00082	8,780
	STANDARD DEV.			0.1	0.1	0.0	0.0	0.0	0.0	0.00001	0.00002	0.00001	0.00000	20

Source: Allen Description: Boiler Slag (Fine Reed Rejects) 95% Modified Dry Density at Optimum Moisture Content

SEQUENCE 5	6.0	10.0	1	62.8	56.6	6.1	10.0	9.0	1.0	0.00595	0.00617	0.00606	0.00100	9,038
			2	62.7	56.6	6.1	10.0	9.0	1.0	0.00597	0.00620	0.00608	0.00100	8,999
			3	62.7	56.6	6.1	10.0	9.0	1.0	0.00596	0.00618	0.00607	0.00100	9,013
			4	62.8	56.6	6.1	10.0	9.0	1.0	0.00593	0.00615	0.00604	0.00099	9,064
			5	62.8	56.7	6.1	10.0	9.0	1.0	0.00597	0.00620	0.00608	0.00100	9,006
	COLUMN AVERAGE			62.8	56.6	6.1	10.0	9.0	1.0	0.00596	0.00618	0.00607	0.00100	9,024
	STANDARD DEV.			0.0	0.0	0.0	0.0	0.0	0.0	0.00002	0.00002	0.00002	0.00000	27
SEQUENCE 6	4.0	2.0	1	13.1	11.4	1.6	2.1	1.8	0.3	0.00176	0.00182	0.00179	0.00029	6,189
			2	13.1	11.5	1.6	2.1	1.8	0.3	0.00174	0.00179	0.00177	0.00029	6,291
			3	13.1	11.4	1.6	2.1	1.8	0.3	0.00176	0.00181	0.00178	0.00029	6,200
			4	13.0	11.4	1.6	2.1	1.8	0.3	0.00175	0.00179	0.00177	0.00029	6,233
			5	13.0	11.4	1.6	2.1	1.8	0.3	0.00175	0.00182	0.00178	0.00029	6,156
	COLUMN AVERAGE			13.1	11.4	1.6	2.1	1.8	0.3	0.00175	0.00181	0.00178	0.00029	6,214
	STANDARD DEV.			0.0	0.0	0.0	0.0	0.0	0.0	0.00001	0.00002	0.00001	0.00000	51
SEQUENCE 7	4.0	4.0	1	25.1	22.6	2.5	4.0	3.6	0.4	0.00340	0.00351	0.00346	0.00057	6,327
			2	25.1	22.6	2.5	4.0	3.6	0.4	0.00339	0.00353	0.00346	0.00057	6,316
			3	25.1	22.6	2.5	4.0	3.6	0.4	0.00339	0.00351	0.00345	0.00057	6,343
			4	25.2	22.7	2.5	4.0	3.6	0.4	0.00338	0.00349	0.00344	0.00056	6,386
			5	25.2	22.7	2.5	4.0	3.6	0.4	0.00336	0.00350	0.00343	0.00056	6,404
	COLUMN AVERAGE			25.1	22.7	2.5	4.0	3.6	0.4	0.00338	0.00351	0.00345	0.00057	6,355
	STANDARD DEV.			0.0	0.1	0.0	0.0	0.0	0.0	0.00002	0.00001	0.00001	0.00000	38

Source: Allen Description: Boiler Slag (Fine Reed Rejects) 95% Modified Dry Density at Optimum Moisture Content

SEQUENCE 8	4.0	6.0	1	37.7	34.1	3.6	6.0	5.4	0.6	0.00480	0.00500	0.00490	0.00080	6,734
			2	37.7	34.1	3.6	6.0	5.4	0.6	0.00479	0.00496	0.00488	0.00080	6,759
			3	37.7	34.1	3.6	6.0	5.4	0.6	0.00481	0.00499	0.00490	0.00081	6,722
			4	37.7	34.0	3.6	6.0	5.4	0.6	0.00483	0.00499	0.00491	0.00081	6,700
			5	37.7	34.1	3.6	6.0	5.4	0.6	0.00482	0.00500	0.00491	0.00081	6,716
	COLUMN AVERAGE			37.7	34.1	3.6	6.0	5.4	0.6	0.00481	0.00499	0.00490	0.00081	6,726
	STANDARD DEV.			0.0	0.0	0.0	0.0	0.0	0.0	0.00002	0.00001	0.00001	0.00000	22
SEQUENCE 9	4.0	8.0	1	49.9	45.3	4.5	7.9	7.2	0.7	0.00599	0.00619	0.00609	0.00100	7,201
			2	49.9	45.4	4.5	7.9	7.2	0.7	0.00603	0.00623	0.00613	0.00101	7,159
			3	49.9	45.4	4.5	7.9	7.2	0.7	0.00600	0.00619	0.00610	0.00100	7,206
			4	49.9	45.5	4.5	7.9	7.2	0.7	0.00601	0.00619	0.00610	0.00100	7,205
			5	50.2	45.7	4.5	8.0	7.3	0.7	0.00604	0.00623	0.00614	0.00101	7,200
	COLUMN AVERAGE			50.0	45.5	4.5	7.9	7.2	0.7	0.00601	0.00621	0.00611	0.00100	7,194
	STANDARD DEV.			0.1	0.1	0.0	0.0	0.0	0.0	0.00002	0.00002	0.00002	0.00000	20
SEQUENCE 10	4.0	10.0	1	62.6	56.8	5.8	9.9	9.0	0.9	0.00705	0.00725	0.00715	0.00118	7,679
			2	62.5	56.7	5.8	9.9	9.0	0.9	0.00706	0.00724	0.00715	0.00118	7,673
			3	62.5	56.7	5.8	9.9	9.0	0.9	0.00705	0.00727	0.00716	0.00118	7,651
			4	62.5	56.7	5.8	9.9	9.0	0.9	0.00706	0.00726	0.00716	0.00118	7,662
			5	62.6	56.8	5.8	9.9	9.0	0.9	0.00707	0.00728	0.00717	0.00118	7,653
	COLUMN AVERAGE			62.5	56.7	5.8	9.9	9.0	0.9	0.00706	0.00726	0.00716	0.00118	7,663
	STANDARD DEV.			0.0	0.0	0.0	0.0	0.0	0.0	0.00001	0.00001	0.00001	0.00000	12

Source: Allen Description: Boiler Slag (Fine Reed Rejects) 95% Modified Dry Density at Optimum Moisture Content

SEQUENCE 11	2.0	2.0	1	13.4	11.4	2.0	2.1	1.8	0.3	0.00233	0.00234	0.00233	0.00038	4,725
			2	13.5	11.4	2.0	2.1	1.8	0.3	0.00230	0.00233	0.00232	0.00038	4,766
			3	13.4	11.4	2.0	2.1	1.8	0.3	0.00234	0.00236	0.00235	0.00039	4,690
			4	13.5	11.4	2.1	2.1	1.8	0.3	0.00230	0.00233	0.00232	0.00038	4,770
			5	13.5	11.4	2.0	2.1	1.8	0.3	0.00231	0.00236	0.00234	0.00038	4,722
	COLUMN AVERAGE			13.4	11.4	2.0	2.1	1.8	0.3	0.00232	0.00235	0.00233	0.00038	4,735
	STANDARD DEV.			0.0	0.0	0.0	0.0	0.0	0.0	0.00002	0.00002	0.00002	0.00000	34
SEQUENCE 12	2.0	4.0	1	25.2	22.8	2.4	4.0	3.6	0.4	0.00445	0.00456	0.00451	0.00074	4,886
			2	25.2	22.8	2.4	4.0	3.6	0.4	0.00446	0.00455	0.00450	0.00074	4,891
			3	25.1	22.7	2.4	4.0	3.6	0.4	0.00445	0.00457	0.00451	0.00074	4,874
			4	25.2	22.8	2.4	4.0	3.6	0.4	0.00445	0.00459	0.00452	0.00074	4,878
			5	25.2	22.8	2.4	4.0	3.6	0.4	0.00447	0.00456	0.00451	0.00074	4,884
	COLUMN AVERAGE			25.2	22.8	2.4	4.0	3.6	0.4	0.00445	0.00457	0.00451	0.00074	4,882
	STANDARD DEV.			0.0	0.0	0.0	0.0	0.0	0.0	0.00001	0.00001	0.00001	0.00000	7
SEQUENCE 13	2.0	6.0	1	37.7	34.1	3.7	6.0	5.4	0.6	0.00599	0.00613	0.00606	0.00100	5,438
			2	37.7	34.1	3.7	6.0	5.4	0.6	0.00601	0.00614	0.00608	0.00100	5,420
			3	37.7	34.1	3.7	6.0	5.4	0.6	0.00602	0.00616	0.00609	0.00100	5,409
			4	37.8	34.1	3.7	6.0	5.4	0.6	0.00598	0.00614	0.00606	0.00100	5,443
			5	37.8	34.1	3.7	6.0	5.4	0.6	0.00601	0.00614	0.00608	0.00100	5,429
	COLUMN AVERAGE			37.7	34.1	3.7	6.0	5.4	0.6	0.00600	0.00614	0.00607	0.00100	5,428
	STANDARD DEV.			0.0	0.0	0.0	0.0	0.0	0.0	0.00002	0.00001	0.00001	0.00000	14

Source: Allen Description: Boiler Slag (Fine Reed Rejects) 95% Modified Dry Density at Optimum Moisture Content

SEQUENCE 14	2.0	8.0	1	50.1	45.2	4.9	8.0	7.2	0.8	0.00716	0.00731	0.00724	0.00119	6,046
			2	50.2	45.3	4.9	8.0	7.2	0.8	0.00714	0.00730	0.00722	0.00119	6,067
			3	50.2	45.3	4.9	8.0	7.2	0.8	0.00713	0.00729	0.00721	0.00119	6,073
			4	50.2	45.3	4.9	8.0	7.2	0.8	0.00716	0.00729	0.00723	0.00119	6,062
			5	50.1	45.2	4.9	8.0	7.2	0.8	0.00717	0.00732	0.00725	0.00119	6,034
	COLUMN AVERAGE			50.2	45.3	4.9	8.0	7.2	0.8	0.00715	0.00730	0.00723	0.00119	6,056
	STANDARD DEV.			0.0	0.0	0.0	0.0	0.0	0.0	0.00002	0.00001	0.00001	0.00000	16
SEQUENCE 15	2.0	10.0	1	62.4	56.2	6.1	9.9	8.9	1.0	0.00848	0.00859	0.00854	0.00140	6,370
			2	62.4	56.3	6.2	9.9	8.9	1.0	0.00846	0.00857	0.00852	0.00140	6,390
			3	62.5	56.3	6.1	9.9	8.9	1.0	0.00843	0.00854	0.00848	0.00139	6,419
			4	62.4	56.3	6.1	9.9	8.9	1.0	0.00846	0.00856	0.00851	0.00140	6,396
			5	62.4	56.3	6.1	9.9	8.9	1.0	0.00848	0.00857	0.00852	0.00140	6,386
	COLUMN AVERAGE			62.4	56.3	6.1	9.9	8.9	1.0	0.00846	0.00857	0.00851	0.00140	6,392
	STANDARD DEV.			0.0	0.0	0.0	0.0	0.0	0.0	0.00002	0.00002	0.00002	0.00000	18

SUBMITTED BY, DATE

Richard S. Bradham 8/24/95

LABORATORY CHIEF

FIGURE 1 - Logarithmic Plot of Resilient Modulus (M_R) vs Cyclic Stress (S_C)

PROJECT NAME:		TVA - Fly Ash, Bottom Ash and Scrubber Gypsum Study
LAW PROJECT NO.:		5810860101
1.	*MATERIAL SOURCE:*	Allen
2.	*MATERIAL DESCRIPTION:*	Boiler Slag (Fine Reed Rejects)
3.	*REMOLDING TARGETS:*	95% Modified Dry Density at Optimum Moisture Content
4.	*MATERIAL TYPE*	2
5.	*TEST DATE*	07-18-1995

$$M_R = K1\,(S_C)^{K2}\,(1+S_3)^{K5}$$

K1 =	2,468
K2 =	0.14322
K5 =	0.51069
R^2 =	0.96

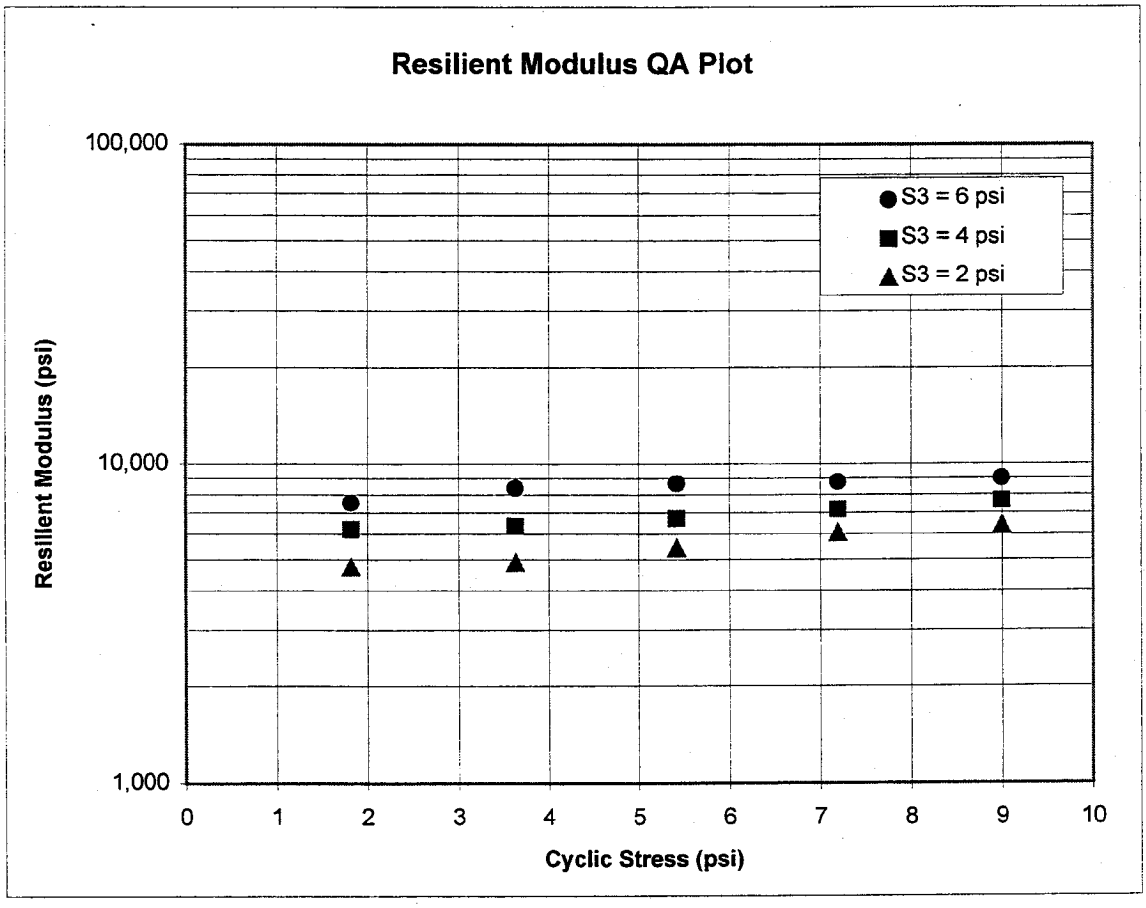


FIGURE 2 - Quick Shear Stress vs Strain

PROJECT NAME:		TVA - Fly Ash, Bottom Ash and Scrubber Gypsum Study
LAW PROJECT NO.:		5810860101
1.	*MATERIAL SOURCE:*	Allen
2.	*MATERIAL DESCRIPTION:*	Boiler Slag (Fine Reed Rejects)
3.	*REMOLDING TARGETS:*	95% Modified Dry Density at Optimum Moisture Content
4.	*MATERIAL TYPE*	2
5.	*TEST DATE*	07-18-1995