



Knoxville, Tennessee

**TENNESSEE VALLEY AUTHORITY  
DIVISION OF ENGINEERING AND TECHNICAL SERVICES  
SINGLETON MATERIALS ENGINEERING LABORATORY**

TVA-00000953

KINGSTON STEAM PLANT

DIKE C

Table 1  
KINGSTON STEAM PLANT  
DIKE C  
BORING COORDINATES

<u>Boring</u>	<u>Coordinates</u>	
	<u>East</u>	<u>North</u>
SS-35	2,442,873	554,375
36	2,442,871	554,516
37	2,442,874	554,271
38	2,442,892	554,439
AH-1	2,442,869	554,084
2	2,442,873	554,714
3	2,442,874	554,917
4	2,442,875	555,118
5	2,442,862	555,226
6	2,442,732	555,606
7	2,442,599	555,985
8	2,442,464	556,364
9	2,442,326	556,743
10	2,441,965	557,082
11	2,441,532	557,335
12	2,440,750	557,808
13	2,442,640	553,906
14	2,441,862	553,673

A34173.2

UNITED STATES GOVERNMENT

# Memorandum

SME '85 0109 001

TENNESSEE VALLEY AUTHORITY

TO : O. P. Thornton, Project Manager, Fossil Design Projects, 102 SPT-K  
FROM : John A. Raulston, Chief Nuclear Engineer, W10C126 C-K  
DATE : **JAN 10 1985**  
SUBJECT: KINGSTON STEAM PLANT - DIKE C

Additional hand-auger borings and laboratory tests to supplement the soil investigation for dike C were completed as requested. Locations of the borings were selected by personnel from the Geological and Geotechnical Engineering Group of the Civil Engineering Branch.

Atterberg limits (ASTM D 4318) and grain-size tests (ASTM D 422) were performed on the auger samples. Test results and graphic logs are shown in the attachments.

Original signed by  
John A. Raulston

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John A. Raulston

YCC:BCJ

Attachments

cc (Attachments):

R. O. Barnett, W9D224 C-K

W. H. Childres, SME-K

MEDS, W5B63 C-K

Principally prepared by Yung C. Chung, extension 2771.


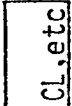
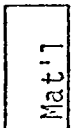
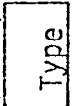

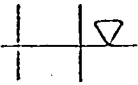

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**TENNESSEE VALLEY AUTHORITY**  
**SINGLETON MATERIALS ENGINEERING LABORATORY**  
**SOIL PROFILE LEGEND AND SYMBOLS**

DEPTH 1"=5'	EL	SPT (N)	LOG	W	LL	PI	X	REMARKS OR TEST RESULTS
Boring Depth and Scale	Elevation	Blows/Foot (SS Boring)	Lab Soil Type	Moisture Content	Liquid Limit	Plasticity Index	Soil Letter	

**LEGEND**

	Topsoil
	Soil Type (Unified Classification)
	Notation of Soil Not Sampled (SS, PA, HA Logs)
(Core) 	Bedrock (Note Core if Cored)
Assumed Material 	Refusal (Impractical to Penetrate with Boring Equipment Used)
	Watertable (Date)
	Explanation of UD Sampling Limits if Applicable

**BORING SYMBOLS**

- SS - 2" OD Splitspoon Boring
- SPT - Standard Penetration Test Blows Per Foot with 2" Splitspoon
- UD - Undisturbed Sample Boring
- PA - Power Auger Boring
- HA - Hand Auger Boring
- TP - Test Pit or Trench

IN BLOCKS BESIDE UD BORING SAMPLES		
Test	Engineering Test Results	
Q, R, R, S	Friction Angle (Degrees)	Cohesion (tsf)
UC	Unconfined Compressive Strength (tsf)	Sensitivity Ratio
C	Compression Index	Preconsolidation Pressure (tsf)
k	Coefficient of Permeability (cm/sec x 10 <sup>-4</sup> )	

Example: Blocks as Required:

Q	12.0	0.62	R	19.6	0.21	S	34.0	0
UC	4.0	2.6	C	0.27	2.0	k	5.6	

**SOIL TEST SYMBOLS**

- Q - Unconsolidated-Undrained Triaxial Compression
- R - Consolidated-Undrained Triaxial Compression
- R̄ - Effective Consolidated-Undrained Triaxial Compression
- S - Consolidated-Drained Direct Shear
- UC - Unconfined Compression
- C - Consolidation
- k - Permeability
- X - Letter Identification of Soil Type. Lower Case (a, etc.), By Index Tests. Capital (A, etc.), Subjected to Additional Tests.

SINGLETON MATERIALS ENGINEERING LABORATORY

FIELD LOG ABBREVIATIONS

<u>Typical Name</u>	<u>Abbreviation</u>	<u>Lithology and Mineralogy</u>	<u>Abbreviation</u>
Sandy gravel	sd Gv	Bedrock	br
Silty gravel	si Gv	Chert	cht
Clayey gravel	cl Gv	Dolomite	dol
Sand	Sd	Limestone	ls
Silty sand	si Sd	Manganese	mn
Clayey sand	cl Sd	Micaceous	mic
Sandy silt	sd Si	Pyrite	py
Clayey silt	cl Si	Quartz	qtz
Fat silt	ft Si	Sandstone	ss
Sandy clay	sd Cl	Shale	sh
Silty clay	si Cl	Bentonite	bent
Riprap	RR	Hematite	hem
Medium clay	md Cl		
Fat clay	ft Cl	<u>Color</u>	
Cobble	Cob	Black	blk
Boulder	Bld	Blue	blu
Topsoil	TS	Brown	brn
		Cream	crm
		Dark	dk
<u>Name Modifiers</u>		Gray	gy
Clean	cln	Green	grn
Coarse	crs	Light	lt
Dirty	dtv	Mottled	mott
Fine	fn	Pink	pk
Organic	org	Red	r
Poorly graded	pgd	Tan	tr
Well graded	wgd	White	wht
Degraded	degdd	Yellow	yel
		Purple	pur
<u>Gravel Shape</u>		<u>Moisture</u>	
Angular	ang	Dry	d
Platy	plty	Moist	mst
Rounded	rd	Very moist	V mst
Subangular	sb ang	Wet	w
Subrounded	sb rd		

<u>Structure</u>	<u>Abbreviation</u>	<u>Consistency</u>	<u>Abbreviation</u>
Blocky	blky	Dense	dns
Fissured	fis	Firm	f
Homogeneous	homo	Hard	hd
Laminated	lam	Loose	lse
Saprolitic	sapr	Soft	s
Shaly	shly	Stiff	stf
Slickensided	slsid	Very stiff	v stf
Stratified	strat		
<u>Origin</u>			
Alluvial	all		
Colluvial	coll		
Loess	lss		
Residual	resd		
<u>General Modifiers</u>			
Alternating	altng	Trace	tr
Angle	∠	Variable	var
Augering	augg	Vertical	vert
Contaminated	cont	Weathered	wth
Dip	dp	With	w/
Debris	dbr		
Discontinued	Disc		
Drilling mud	mud		
Drive	dr		
Elevation	El		
Feet	ft		
Fill	fl		
High	H		
Horizontal	hor		
Inch	in		
Inclusion	inc		
Incomplete recovery	IR		
Low	L		
Medium	Med		
Original	orig		
Partings	prtgs		
Roots	rts		
Rough	rou		
Slow	sl		
Small	sm		
Spoil	sp		
Thick	thk		
Thin	thn		

TENNESSEE VALLEY AUTHORITY  
 SINGLETON MATERIALS ENGINEERING LABORATORY  
 SOIL PROFILE (HAND AUGER HOLE)

SHEET 1 OF 1

PROJECT: KINGSTON S.P.  
 BORING: 16 STATION:  
 DATE DRILLED: 12/11/84 TO

FEATURE: ASH DIKE C, NORTH END  
 RANGE: SURFACE EL: 754.0  
 PREPARED BY: MHD CHECKED BY: BA

DEPTH ft.	EL	SPT (N)	* LOG	W	LL	PI	FIELD DESCRIPTION
			I O	20.8	63	37	BRN CL, MST, F, ±15% ANG CHT ROUGH AUGERING (GR 4)
5	750		I O	31.1	63	37	R BRN CL, MST, F, ±15% ANG. CHT, ROUGH AUGERING (GR.4)
10	745		I O	27.8	63	37	R BRN CL, MST, F, ±15% ANG CHT, ROUGH AUGERING (GR.4)
15	740						
20	735						
25	730						
30	725						
35	720						
1''=5'		* Lab. Classif.					



TENNESSEE VALLEY AUTHORITY  
 SINGLETON MATERIALS ENGINEERING LABORATORY  
 SOIL PROFILE (HAND AUGER HOLE)

SHEET 1 OF 1

PROJECT: KINGSTON S.P.  
 BORING: 17 STATION:  
 DATE DRILLED: 12/11/84 TO

FEATURE: ASH DIKE C, NORTH END  
 RANGE: SURFACE EL: 754.0  
 PREPARED BY: MHD CHECKED BY: BA

DEPTH ft.	EL	SPT (N)	* LOG	W	LL	PI	FIELD DESCRIPTION
		---	I I O Σ	30.1	60	30	R BRN CL, MST, F, ±10% ANG CHT, ROUGH AUGERING (GR.5)
5	750	---	I I O Σ	30.9	60	30	R BRN CL, MST, F, ±10% ANG CHT, ROUGH AUGERING (GR.5)
		---	SM	25.5	NP	NP	FA, W, S, ±10% CRS ASH (GR.2)
		---		---			MIX FA+R BRN CL, MST, S, ±10% GV
10	745						
15	740						
20	735						
25	730						
30	725						
35	720						
1''=5'			* Lab. Classif.				

TENNESSEE VALLEY AUTHORITY  
 SINGLETON MATERIALS ENGINEERING LABORATORY  
 SOIL PROFILE (HAND AUGER HOLE)

SHEET 1 OF 1

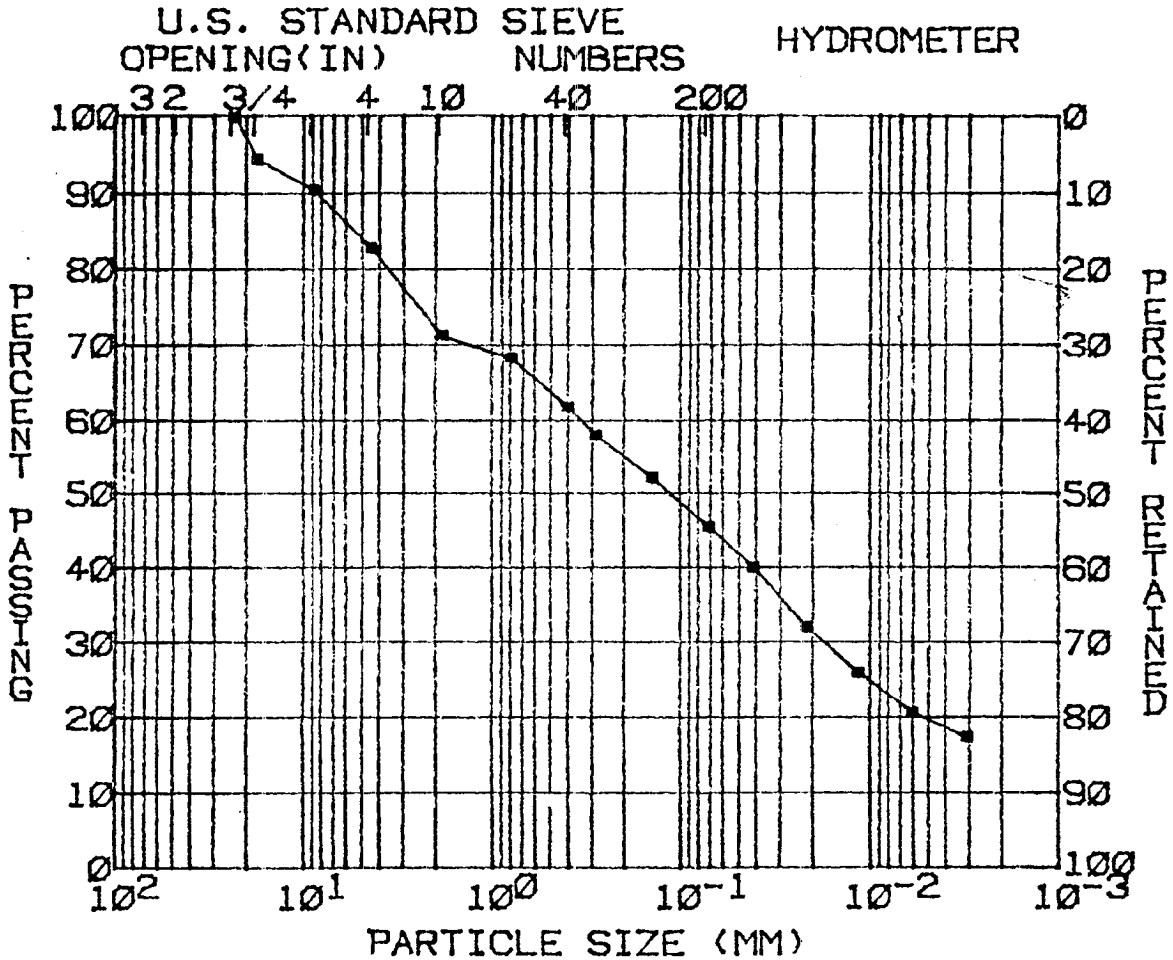
PROJECT: KINGSTON S.P.  
 BORING: 15 STATION:  
 DATE DRILLED: 12/11/84 TO

FEATURE: ASH DIKE C, NORTH END  
 RANGE: SURFACE EL: 754.0  
 PREPARED BY: MHD CHECKED BY: BA

DEPTH ft.	EL	SPT (N)	* LOG	W	LL	PI	FIELD DESCRIPTION
			U O	17.5	38	15	BRN CL, MST, F, ±10% ANG CHT, ROUGH AUGERING (GR.1)
5	750	---	I O	31.7	60	35	R BRN CL, MST, F, ±15% ANG CHT, ROUGH AUGERING (GR.3)
10	745	---	I O	39.2	60	35	R BRN CL, W, ±15% ANG CHT, S. MATL (GR.3)
							NOTE: WATER ENCOUNTERED AT 8.0'
15	740						
20	735						
25	730						
30	725						
35	720						
1"=5'			* Lab. Classif.				

TVA SINGLETON MATERIALS ENGINEERING LABORATORY  
 PARTICLE SIZE ANALYSIS

PROJECT: KINGSTON S.P.                      BORING: NORTH END  
 FEATURE: ASH DIKE C                      EL. :  
 STATION:                                      SAMPLE: GROUP 1  
 RANGE :                                      DATE : 12-21-84



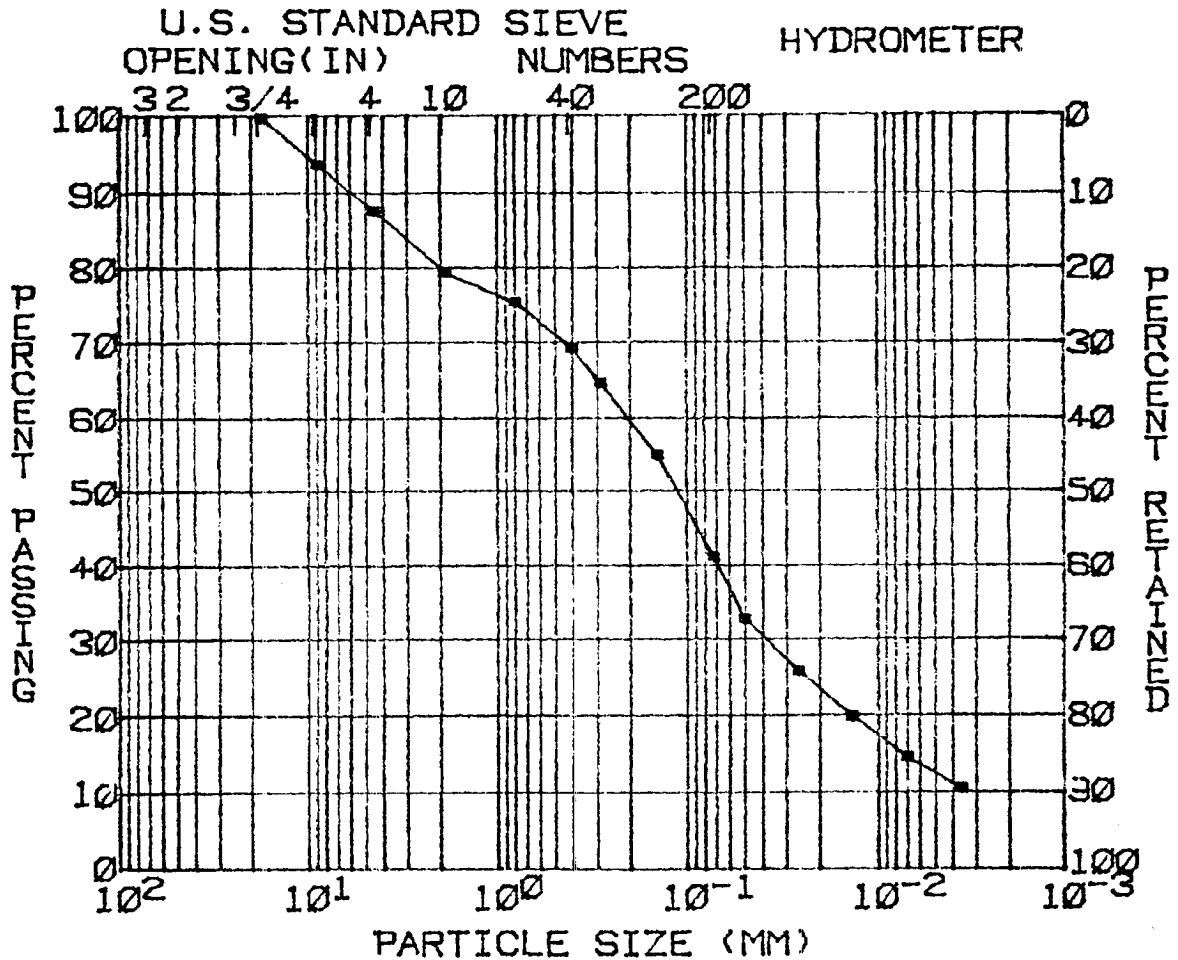
GRAVEL (%) = 16	D10 (MM) = 0.0007
SAND (%) = 38	D30 (MM) = 0.0177
SILT (%) = 26	D60 (MM) = 0.3383
CLAY (%) = 20	COEF UNIF > 100

SOIL SYMBOL = SC	L.L. (%) = 38
MOISTURE (%) = --	P.I. (%) = 15
SP. GR. = 2.71	

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY  
 PARTICLE SIZE ANALYSIS

PROJECT: KINGSTON S.P.                      BORING: NORTH END  
 FEATURE: ASH DIKE C                      EL. :  
 STATION:                                      SAMPLE: GROUP 2  
 RANGE :                                      DATE : 12-21-84



GRAVEL (%) = 11	D10 (MM) = 0.0032
SAND (%) = 47	D30 (MM) = 0.0376
SILT (%) = 29	D60 (MM) = 0.2079
CLAY (%) = 13	COEF UNIF = 64.0

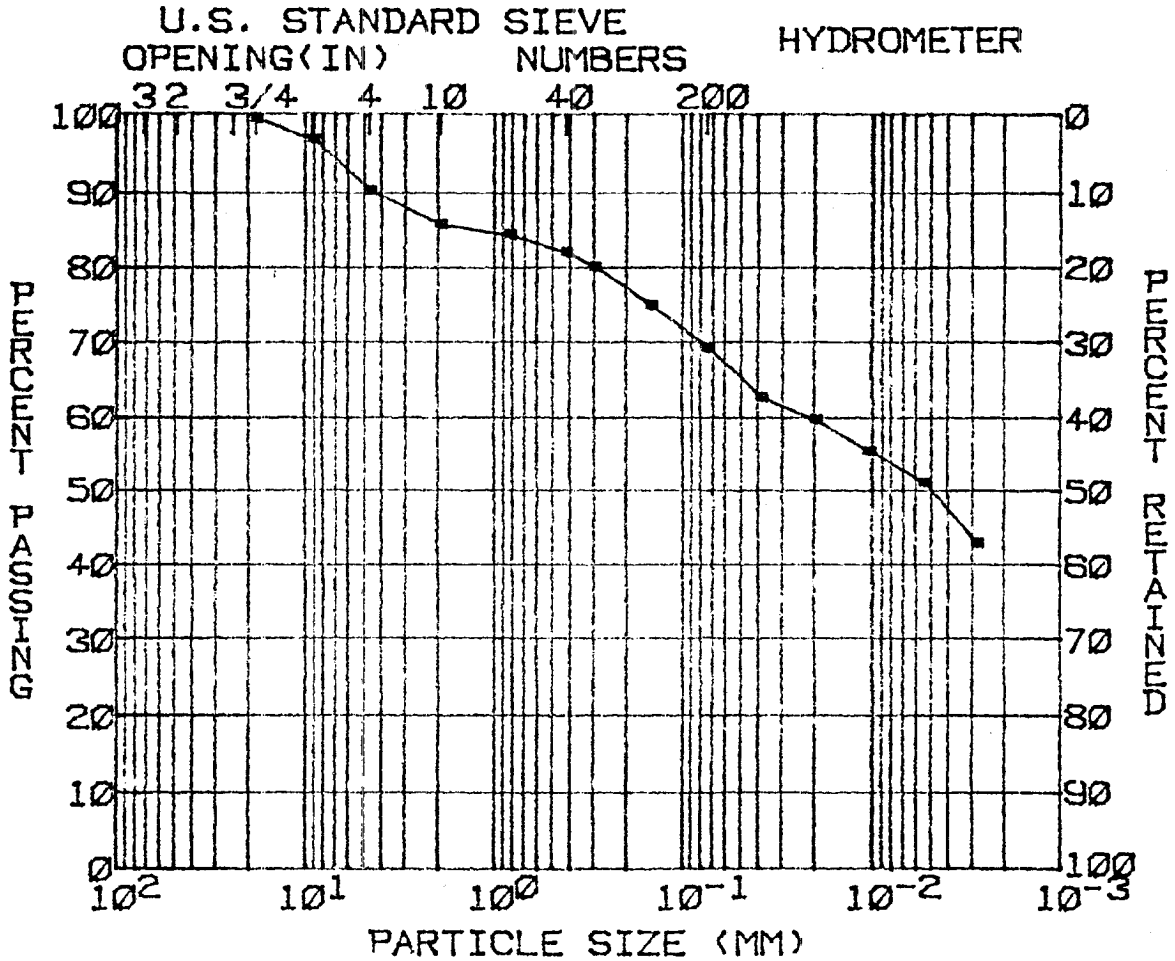
SOIL SYMBOL = SM	L.L. (%) = NP
MOISTURE (%) = --	P.I. (%) = NP
SP. GR. = 2.40	

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY  
 PARTICLE SIZE ANALYSIS

PROJECT: KINGSTONS. P.  
 FEATURE: ASH DIKE C  
 STATION:  
 RANGE :

BORING: NORTH END  
 EL. :  
 SAMPLE: GROUP 3  
 DATE : 12-21-84



GRAVEL (%) = 9	D10 (MM) = --
SAND (%) = 21	D30 (MM) = --
SILT (%) = 19	D60 (MM) = --
CLAY (%) = 51	COEF UNIF = --

SOIL SYMBOL = CH	L.L. (%) = 60
MOISTURE (%) = --	P.I. (%) = 35
SP. GR. = 2.83	

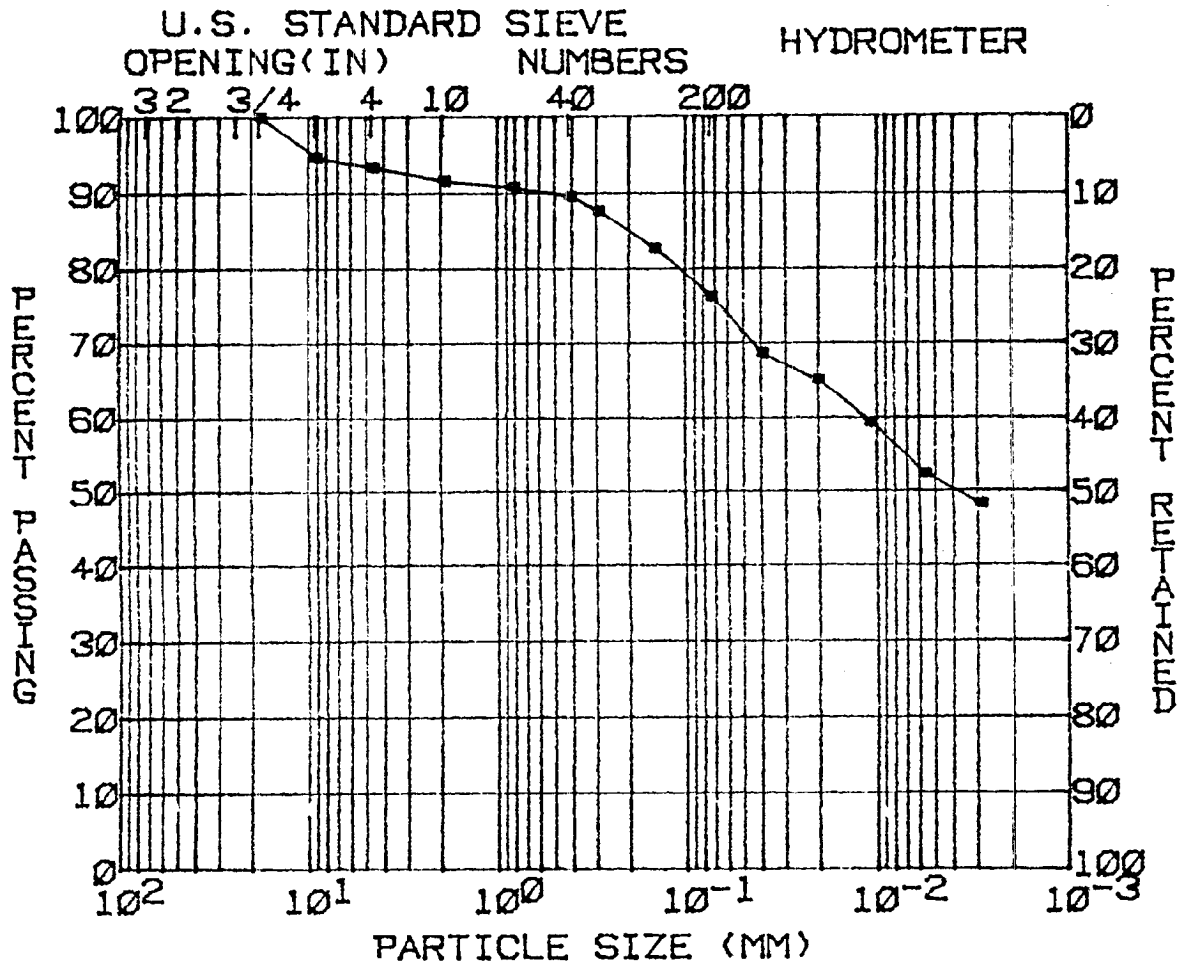
REMARKS:



TVA SINGLETON MATERIALS ENGINEERING LABORATORY  
 PARTICLE SIZE ANALYSIS

PROJECT: KINGSTON S.P.  
 FEATURE: ASH DIKE C  
 STATION:  
 RANGE :

BORING: NORTH END  
 EL. :  
 SAMPLE: GROUP 5  
 DATE : 12-24-84



GRAVEL (%) = 6  
 SAND (%) = 18  
 SILT (%) = 25  
 CLAY (%) = 51

D10 (MM) = --  
 D30 (MM) = --  
 D60 (MM) = --  
 COEF UNIF = --

SOIL SYMBOL = CH-MH  
 MOISTURE (%) = --  
 SP. GR. = 2.72

L.L. (%) = 60  
 P.I. (%) = 30

REMARKS: