T. FOIA 84-463

APR 30 1984

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Docket Nos. 50-524/525

MEMORANDUM FOR: Elinor Adensam, Chief
Licensing Branch #4, DL

FROM: Ronald L. Ballard, Chief
Environmental & Hydrologic Engineering Branch, DE

SUBJECT: ADDITIONAL SAFETY AND ENVIRONMENTAL QUESTIONS - VOGTLE PLANT

Plant Name: Vogtle Electric Generating Station
Licensing Stage: OL
Docket Nos.: 50-524/525
Project Manager: M. Miller

Attached are additional safety and environmental Hydrologic Engineering questions for the Vogtle Station.

These questions were prepared by Gary B. Staley of the Hydrologic Engineering Section, phone 492-8003.

Original signed by
Myron H. Fliegel

for Ronald L. Ballard, Chief
Environmental & Hydrologic
Engineering Branch
Division of Engineering

Attachment:
As stated

cc: W. Johnston
M. Fliegel
R. Samworth
M. Miller
L. G. Hulman
B. Jagannath
G. Staley

8405150301 XA

DE:EHEB	DE:EHEB	DE:EHEB
GBStaley:ws	MHFliegel	RLBallard
4/30/84	4/30/84	4/30/84

Hydrologic Engineering Safety Questions
Vogtle Station, 50-524/525

240.7 (SRP 2.4.12)	In addition to the information requested in Question 240.6, also provide a discussion and bases to show why other aquifers in the plant vicinity will not be affected by a tank spill.
240.8	Reference Figure 2.4.12-7, sheet 1. Label all groundwater contours with the proper elevation.
240.9 (Sect. 2.4.12.3.2)	Reference Figure 2.4.12-6, sheets 1 and 2. The quality of the base map used for sheet 2 is virtually illegible. You should use the same base map (and same scale) for both sheets 1 and 2 so comparisons can be made. You state in Section 2.4.12.2.3.2 that very little change has occurred (in the contour levels?) between 1971 and 1980. It appears to the staff that there may be as much as 25 feet of difference (increase) between the 1971 and 1980 contours. The well hydrograph for Well No. Sereven 3 on Figure 2.4.12-5 shows an 8 or 9 foot decline for the same period. Do you have any information that will explain these apparent differences?
240.10 (Sect. 2.4.12)	Provide a stratigraphic column for the formations under the main plant area showing the elevation and thickness of formations, geologic or soil properties, and identify the aquifers, aquicludes and aquitards. Reference this column in discussions of formation features and hydro-geologic properties, especially as they relate to the potential for contamination from the Vogtle plant.
240.11 (Sect. 2.4.13)	The groundwater velocity should be based on effective porosity rather than total porosity. Reference the figure that shows the location of Mathes Pond. Provide effective porosities for the permeabilities listed in FSAR Table 2.4.12-9.

Hydrologic Engineering Environmental Questions
Vogtle Station, 50-524/525

240.3E (Sect. 7A.4) The groundwater velocity and travel time should be based on effective porosity rather than total porosity. Revise your values and results accordingly. There is also an error in the table on page 7A-16. The half life for Cs-137 should be 30 years rather than 3 years as shown.

240.4E Groundwater is a very valuable natural resource and the local populace has expressed their concern regarding possible contamination of this resource. The subject thus warrants comprehensive consideration in the Environmental Report as well as in the FSAR.

Provide a general discussion in the Environmental Report addressing the potential for radioactive contamination of the several aquifers beneath and around the Vogtle site. Consider several potential scenarios other than the core melt, such as a surface spill and pipe leak. You could also cross reference the tank spill that is evaluated as the worst case design accident in the FSAR. Include a discussion of the possible methods of controlling and/or mitigating contamination of the aquifers.

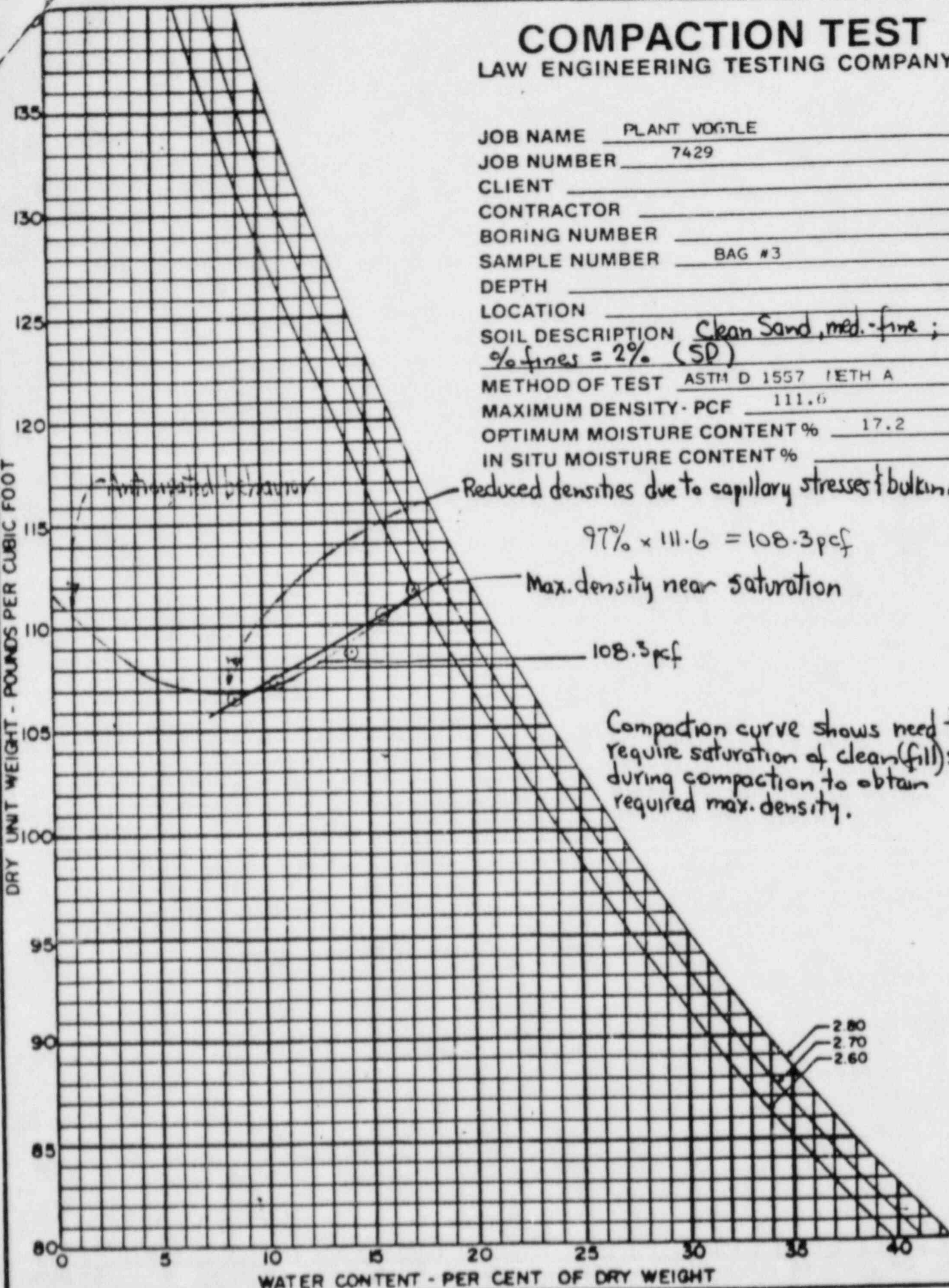
8, FOIA 84-403

5/1/84

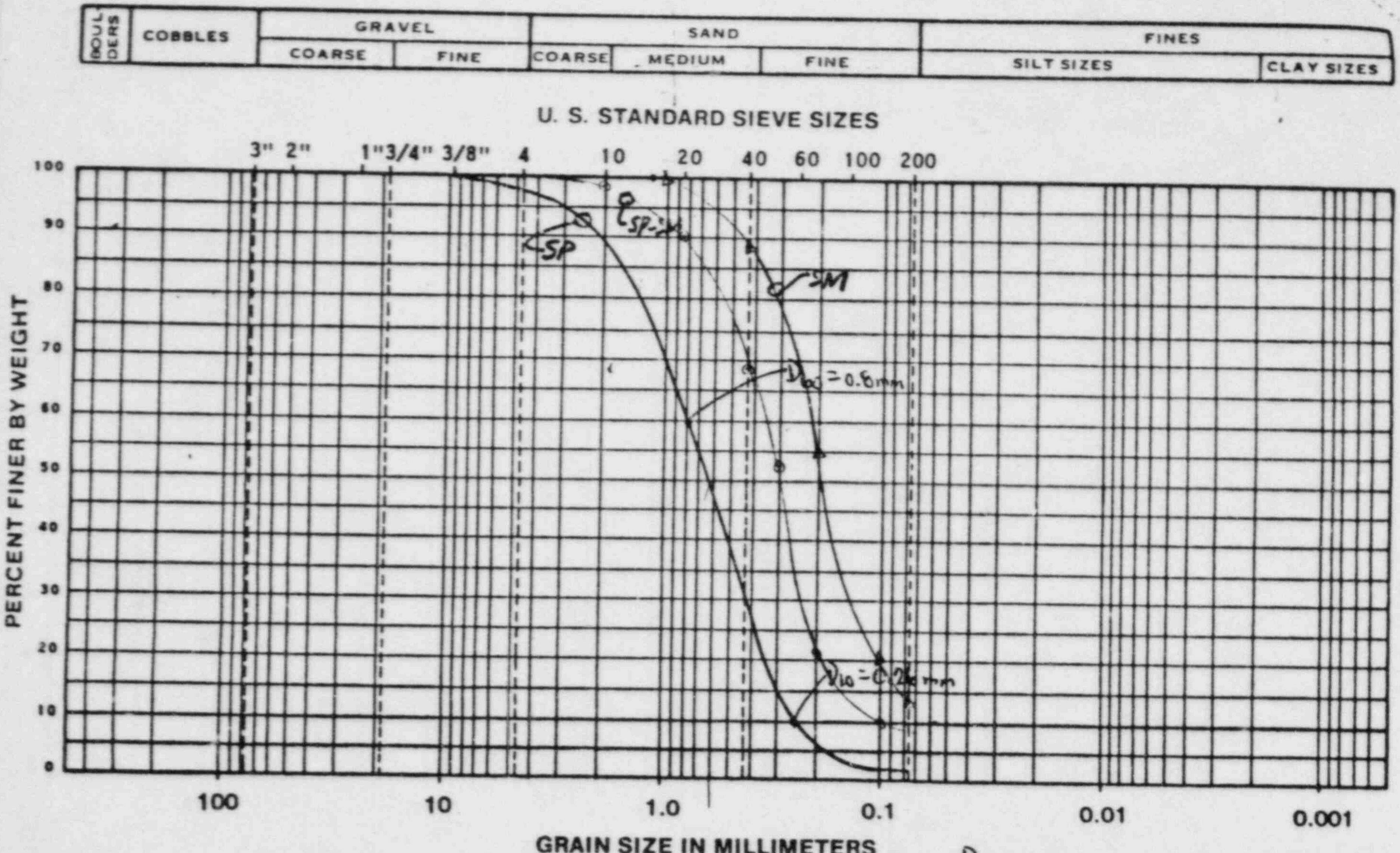
COMPACTION TEST

LAW ENGINEERING TESTING COMPANY.

JOB NAME PLANT VOGTLE
JOB NUMBER 7429
CLIENT
CONTRACTOR
BORING NUMBER
SAMPLE NUMBER BAG #3
DEPTH
LOCATION
SOIL DESCRIPTION Clean Sand, med.-fine ; % fines = 2% (SP)
METHOD OF TEST ASTM D 1557 METH A
MAXIMUM DENSITY - PCF 111.6
OPTIMUM MOISTURE CONTENT % 17.2
IN SITU MOISTURE CONTENT %



From Attachment 3 to Sept. 8, 1983 letter from D. Foster, GPC to E. Adensam
"Compaction Around Pipes in Category 1 Backfill"



Uniformity Coefficient $C_u = \frac{D_{60}}{D_{10}} = \frac{0.80}{0.26} = 3.08$

Law Engineering Testing Company

Grain Size Distribution

BORING NO.	DEPTH	NAT WC	LL	PL	PI	DESCRIPTION OR CLASSIFICATION
BAG #3						Clean Sand, med. to fine %fines = 2% (SP)
JOB NO.						$\gamma_{max.dry}$ = 111.6 pcf
7429	N/A					opt. m.c. = 17.2% (near saturation)

COMPACTION TEST

LAW ENGINEERING TESTING COMPANY.

DATE 3/2/77

JOB NAME Plant Vogtle

JOB NUMBER SA-1429

CLIENT Georgia Power Company

CONTRACTOR

BORING NUMBER TA-2

SAMPLE NUMBER S-3

DEPTH 0.5' - 20.0'

LOCATION

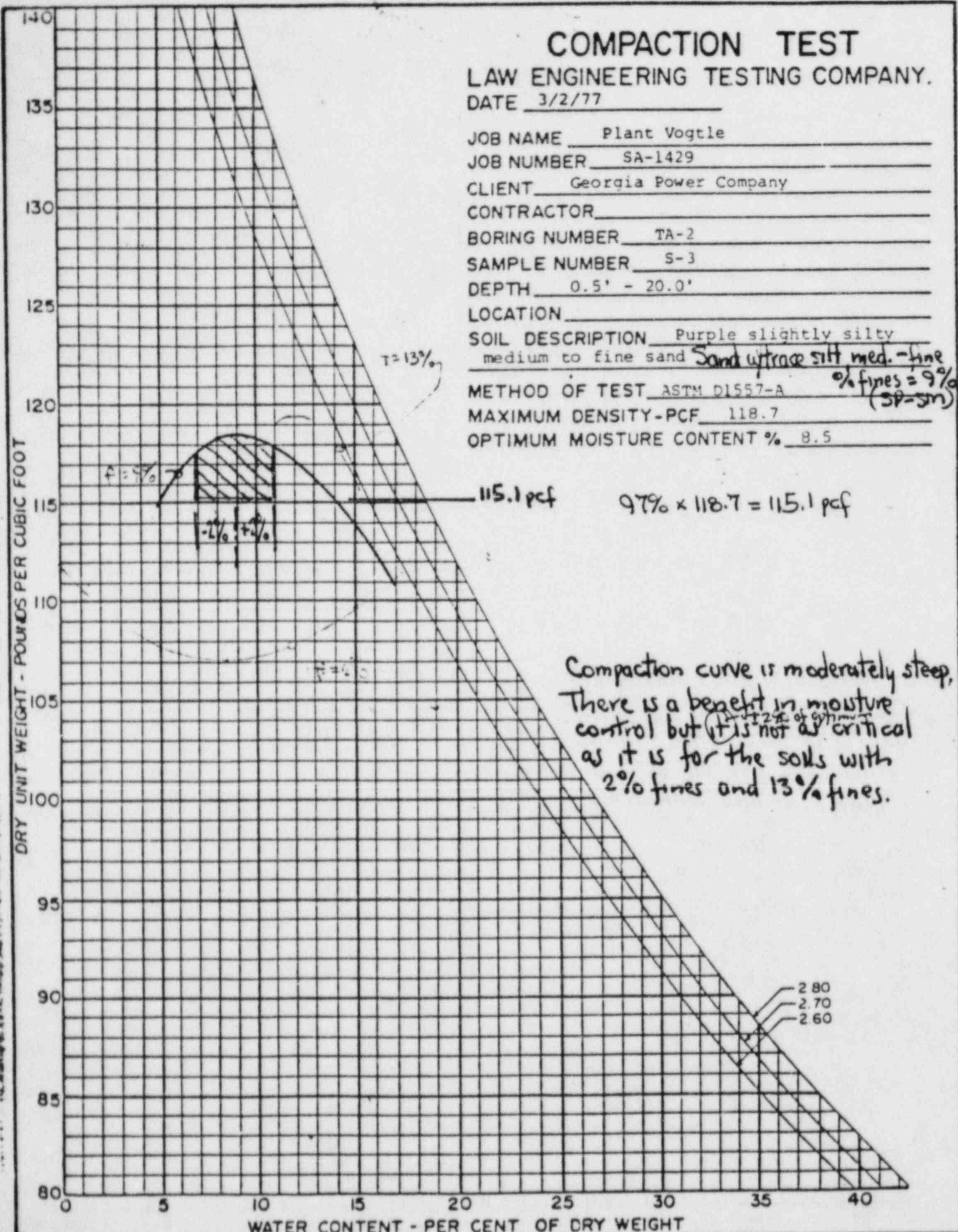
SOIL DESCRIPTION Purple slightly silty medium to fine sand Sand w/trace silt med.-fine

%fines = 9% (SP-SM)

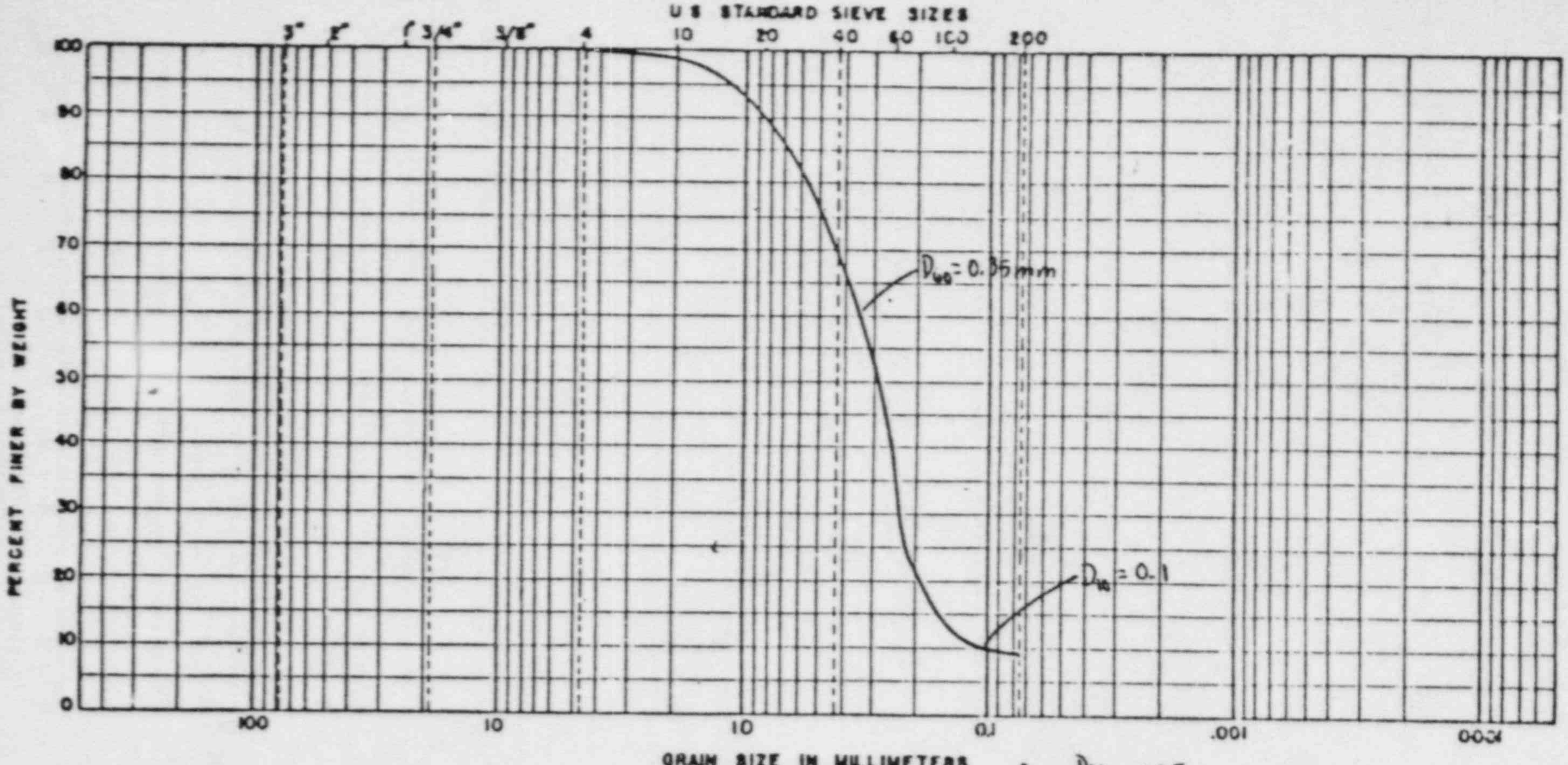
METHOD OF TEST ASTM D1557-A

MAXIMUM DENSITY-PCF 118.7

OPTIMUM MOISTURE CONTENT % 8.5



From



$C_u = \frac{D_{60}}{D_{10}} = \frac{0.35}{0.10} = 3.5$

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO	ELEV OR DEPTH	NAT WC	LL	PL	PI	DESCRIPTION OR CLASSIFICATION
TA-2 S-3	0.5'-20.0'	9.3				PURPLE SLIGHTLY SILTY MEDIUM TO FINE SAND (SP-SM) (S.G.=2.67)

GRAIN SIZE DISTRIBUTION

JOB NO. SA-1429

LAW ENGINEERING TESTING COMPANY

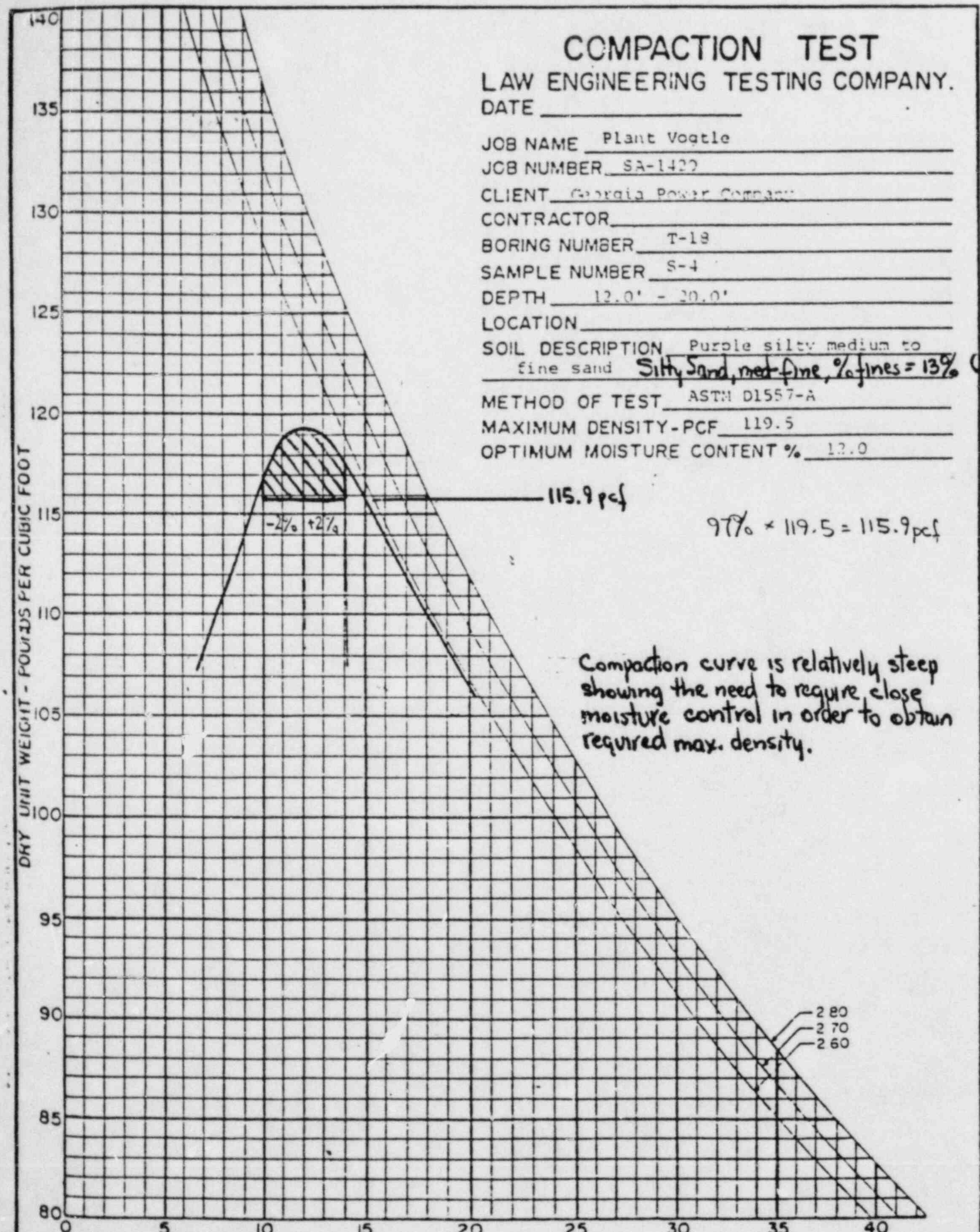
A-100

Sand w/trace silt, med-fine

% fines = 9% (SP-SM)

$\gamma_{max.\ dry}$ = 118.7 pcf

opt. m.c. = 8.5% (≈ 9%)



COMPACTION TEST

LAW ENGINEERING TESTING COMPANY.

DATE ____________________

JOB NAME Plant Vogtle

JOB NUMBER SA-1422

CLIENT Georgia Power Company

CONTRACTOR ____________________

BORING NUMBER T-18

SAMPLE NUMBER S-4

DEPTH 12.0' - 20.0'

LOCATION ____________________

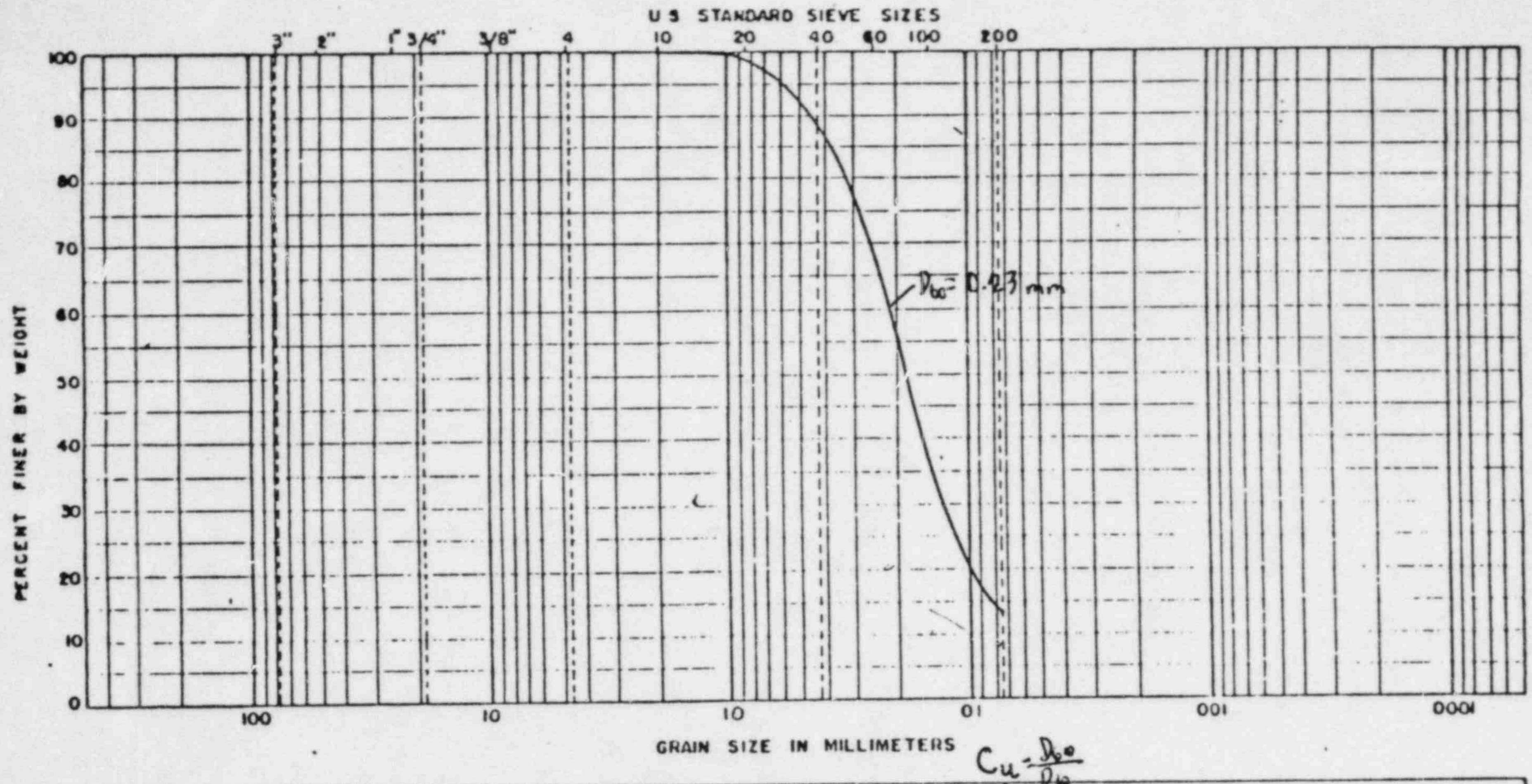
SOIL DESCRIPTION Purple silty medium to fine sand Silty Sand, med-fine, % fines = 13% (SM)

METHOD OF TEST ASTM D1557-A

MAXIMUM DENSITY-PCF 119.5

OPTIMUM MOISTURE CONTENT % 12.0

From "Report on Backfill Material Investigations, Vol II, Part 1 Jan. 1978



BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO	ELEV OR DEPTH	NAT WC	L L	PL	P I	DESCRIPTION OR CLASSIFICATION
T-16 S-4	12.0'-20.0'	8.6				PURPLE SILTY MEDIUM TO FINE SAND (SM) (S.G.-2.65)

GRAIN SIZE DISTRIBUTION

JOB NO. SA-1429

LAW ENGINEERING TESTING COMPANY

Silty SAND, med-fine

% fines = 13% (SM)

$\gamma_{max.\,dry}$ = 119.5 pcf

opt. m.c. = 12%

Conclusions:

1. The majority of the fill soils with percent fines greater than 8% would be acceptable (density) if moisture content was @ 12% and they were compacted to 95% of Modified density.

2. In the field it would be difficult to visually judge the difference between a med-fine SAND having 8% fines and one having 13% fines but yet the compaction test results show the optimum moisture content to range between 8.5% and 12% for these materials, respectively. This difficulty, therefore, shows the importance of running the lab compaction test quickly where max. dry density and opt. moisture content can be established early in order to control fill placement.

5/1/84
1 of
J. Kane

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