

# ALLENDER BUTZKE ENGINEERS INC.

GEOTECHNICAL • ENVIRONMENTAL • CONSTRUCTION Q.C.



Montgomery Watson  
Attn: Jeffrey L. Coon, P.E.  
11107 Aurora Avenue  
Des Moines, Iowa 50322-7938

June 28, 1993

RECEIVED  
JUL 01 1993  
MW/IOWA

Re: Laboratory Soil Analysis  
Project 1166.0180  
Rockwell International - Ralston Site  
PN 933127

*Ralston*  
1AD980632491  
3.3  
Allender Butzke  
6.28.93

Dear Mr. Coon:

Enclosed are the results of Standard Proctor compaction, grain size distribution, and falling head permeability tests performed on a potential soil liner sample submitted from Rockwell International Ralston Site. The soils submitted consisted of a bulk disturbed sample delivered on June 11, 1993.

A Standard Proctor (ASTM D698) test was conducted on a representative soil sample to evaluate compaction characteristics. A grain size test was also conducted on the soil sample. Results of the grain size and Standard Proctor tests are presented on the enclosed Figure Nos. 1 and 2.

Permeability characteristics of the potential soil liner sample was evaluated by conducting a falling head permeability test on soil remolded near 2 percent above optimum moisture content and compacted to approximately 91 percent of the determined maximum dry density. The remolded sample was 6 inches in length and the permeability test was conducted by passing water through the soil sample under water heads ranging from 6 to 10 feet. The results of the falling head permeability test are provided on the following Table A.

If there are any questions concerning these test results, please contact us at your convenience.

Respectfully

ALLENDER BUTZKE ENGINEERS, INC.

David Logemann, P.E.

DL/sjd  
2 PC Above



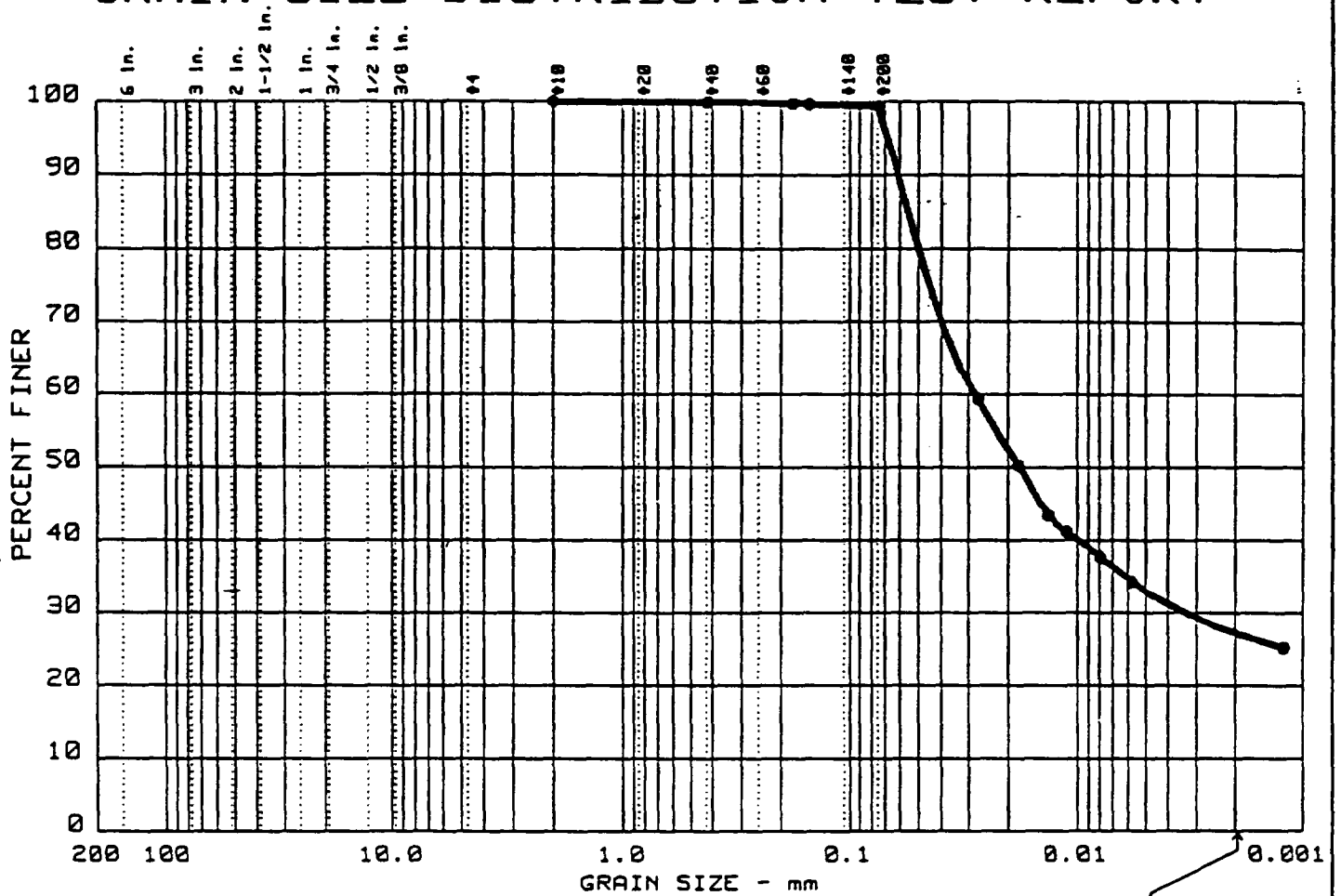
S00076076  
SUPERFUND RECORDS

TABLE A

LABORATORY SOIL TESTING SUMMARY  
ROCKWELL INTERNATIONAL PROJECT 1166.0180  
PN 933127

Sample Designation	Optimum Moisture Content (percent)	Maximum Dry Density (pcf)	Remolded Moisture Content (percent)	Remolded Dry Density (pcf)	Percent Compaction	Permeability cm/sec
Ralston	22.0	101.5	23.6	92.5	91.1	$4.0 \times 10^{-4}$

# GRAIN SIZE DISTRIBUTION TEST REPORT



% +3"	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	0.6	72.0	27.4

LL	PI	D <sub>85</sub>	D <sub>60</sub>	D <sub>50</sub>	D <sub>30</sub>	D <sub>15</sub>	D <sub>10</sub>	C <sub>c</sub>	C <sub>u</sub>
				0.02	0.003				

MATERIAL DESCRIPTION	USCS	AASHTO
● Brown Lean Clay		

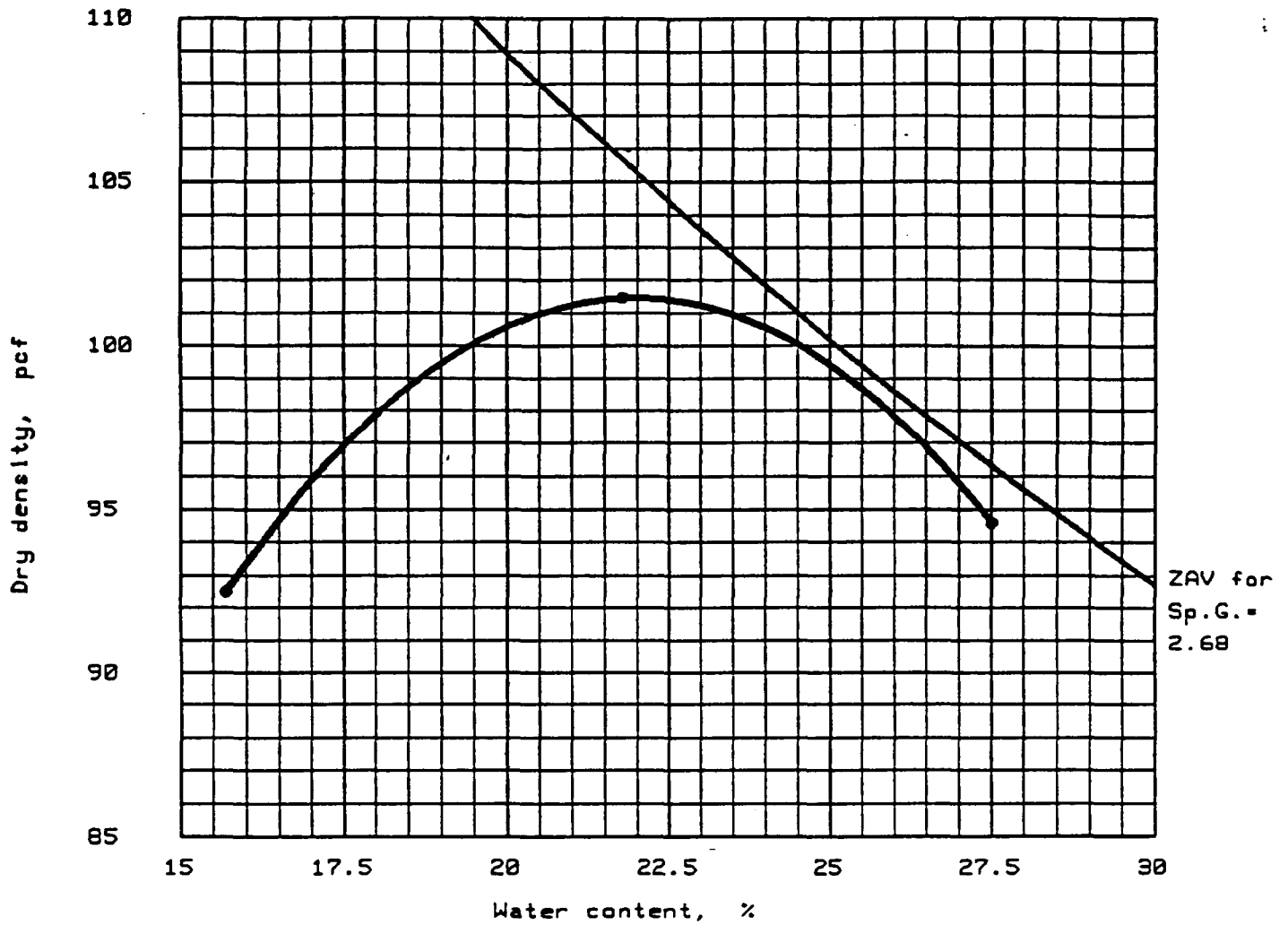
Project No.: 933127  
 Project: ROCKWELL INTERNATIONAL PROJECT 1166.0180  
 ● Location: RALSTON SITE

Date: 06/21/93

Remarks:

Figure No. 1

# PROCTOR TEST REPORT



\*Standard\* Proctor, ASTM D 698, Method A

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No. 4	% < No. 200
	USCS	AASHTO						
	CL	A-6(9.5)		2.68				

TEST RESULTS	MATERIAL DESCRIPTION
Optimum moisture = 22.0 % Maximum dry density = 101.5 pcf	

Project No.: 933127 Project: Rockwell International - Ralston Site Location:  Date: 06/14/93	Remarks: 933127A
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