



August 4, 2016

CH2M HILL Plateau Remediation Company
 2420 Stevens Center Place
 P.O. Box 1600
 Richland, WA 99354
 Attn.: Tracey A. Burch

Subject: Geotechnical Laboratory Testing Services, Data Deliverable for SDG # W606077, Rev. 0

Enclosed is the final report on geotechnical analyses performed by RJ Lee Group in conjunction with PBS Engineering and Environmental, Inc. (PBS) for Sample Delivery Group number (SDG #) W606077.

General Set Comments

RJ Lee Group received from CH2M-Hill Plateau Remediation Company (CHPRC) 1 sample to be tested for geotechnical analysis at the Columbia Basin Analytical Laboratories. There are no SIRs associated with this SDG.

The CHPRC sample, in SDG # W606077, has been assigned a PBS Geotechnical Lab Sample number per the below table.

CHPRC Sample #	SDG #	Geotechnical Lab Sample #	Date Processed
B35YB9	W606077	H-0077	07/11/2016

This project deliverable, provided in Attachment 1, contains the reports of the requested analytical results and a copy of the associated chain of custody for the sample listed above.

The analytical results provided in this deliverable relate only to the items tested. The sample was received in acceptable condition unless otherwise noted in the attached report(s).

I certify that this analytical report is in compliance with the Hanford SOW, both technically and for completeness. Release of the data contained in this hard copy report has been authorized by the Laboratory Director or a designee as verified by the following signature.

Richard Westberg
 Laboratory Director, Columbia Basin Analytical Laboratories

08/04/2016

Date

If you have any questions, please feel free to contact us at 509-545-4989 or email at rwestberg@rjleegroup.com.

Attachment 1

PBS Geotechnical Laboratory Testing Results, SDG # W606077,
dated August 4, 2016



Engineering +
Environmental

July 21, 2016

RJ Lee Group, Inc.
Attn: Mr. Larry Lockrem
Columbia Basin Analytical Laboratories
2710 North 20th Avenue
Pasco, Washington 93301

Re: Geotechnical Laboratory Testing Results
Sample Delivery Group No. W606077
PBS Project No. 63797.000

Dear Mr. Lockrem:

In accordance with your request, PBS Engineering and Environmental Inc. (PBS) is providing you with the results of our recent geotechnical laboratory testing. Our services were provided in accordance with the request provided with Sample Delivery Group (SDG) number W606077.

We performed the following tests:

- Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass (ASTM D2216)
- Density of Soil in Place by the Drive-Cylinder Method (ASTM D2937)
- Grain Size Analysis - Hydrometer (ASTM D422)

The tests were performed in general accordance with the above-mentioned ASTM Standards, except for the following case:

- **Density of Soil in Place by the Drive-Cylinder Method (ASTM D2937):** The sample was received in a disturbed condition, which may not accurately represent in-situ soil conditions. The requested test was performed as-received, per the direction of RJ Lee and CHPRC.

400 Bradley Boulevard, Suite 300, Richland, WA 99352
509.942.1600 Main
866.727.0140 Fax
www.pbsenv.com

Bend | Boise | Coos Bay | Eugene | Portland | Seattle | Tri-Cities | Vancouver | Walla Walla

Mr. Larry Lockrem
Re: Geotechnical Laboratory Testing Results – W606077
July 21, 2016
Page 2 of 2

We trust this letter meets your current needs. If you have any questions, or wish to further discuss our observations, conclusions, and recommendations, please contact us at 509.942.1600.

Sincerely,
PBS Engineering and Environmental, Inc.



7/21/2016

A handwritten signature in black ink, appearing to read "Adam Swenson".

Adam M. Swenson, P.E.
Project Geotechnical Engineer

AS/rg

Attachments: Report of Laboratory Testing – Density by Drive Cylinder and Moisture Contents
 Report of Laboratory Testing – Grain-size Analysis - Hydrometer
 Chain of Custody



REPORT OF LABORATORY TESTING

Report to: CH2M-Hill - Plateau Remediation 2420 Stevens Center Place P.O. Box 1600 Richland, WA 99354	Date: 7/21/2016
	Sample Delivery Group No.: W606077
	Sample Authorization No.: F16-043

Project: CHPRC Laboratory	Project No.: 63797.000
Report of: Density by Drive Cylinder (ASTM D2937) Moisture Content (ASTM D2216)	Lab Technician: A. Jaimes

Items Received:

One sample was provided to us containing soil material obtained by you, the client. PBS performed the following tests:

Density by Drive Cylinder (ASTM D2937).

The dry densities (dry unit weight) of representative soils were determined in the laboratory using the relatively undisturbed soil samples.* The dimensions of the specimen were carefully measured, the volume calculated, and the specimen weighed. A representative sample was obtained from the specimen, weighed, and placed in the oven to dry. After oven drying, the representative sample was reweighed and the water content calculated. The dry density was then computed. The results of tests are included in the table below.

*The sample was received in a disturbed condition and may not be representative of in-situ soil conditions

Moisture Content (ASTM D2216).

Natural moisture content determinations were made on the samples of the fine-grained soils (that is, silts, clays, and silty sands). The natural moisture content is defined as the ratio of the weight of water to dry weight of soil, expressed as a percentage.

LABORATORY TEST RESULTS

Density by Drive Cylinder (ASTM D2937)

Moisture Content (ASTM D2216)

Customer Sample Number	Laboratory Sample Number	Wet Density (lbs/ft ³)	Water Content (%)	Dry Density (lbs/ft ³)
B35YB9	H-0077	93.5	5.3	88.7

SHEET 1 OF 1

REVIEWED BY: A. Swenson, P.E.



REPORT OF LABORATORY TESTING

Report to: CH2M-Hill - Plateau Remediation 2420 Stevens Center Place P.O. Box 1600 Richland, WA 99354	Date: 7/21/2016 Sample Delivery Group No.: W606077 Sample Authorization No.: F16-043
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Project: CHPRC Laboratory	Project No.: 63797.000
Report of: Grain Size Analysis - Hydrometer (ASTM D422)	Lab Technician: A. Jaimes

Items Received:

One sample was provided to us containing soil material obtained by you, the client. We performed the following test:

Particle/Grain Size Analysis - Hydrometer (ASTM D422):

Mechanical Grain Size Analyses (wet sieve) were conducted on each of the soil samples to determine their grain size distribution. In addition, hydrometer tests were conducted on portions of the soil samples passing the No. 40 sieve. The results of the mechanical grain size analyses and hydrometer testing are plotted on the attached Figures (Particle Size Analysis Test Results - Hydrometer - Pages 1 through 3).

LABORATORY TEST RESULTS

Particle Grain Size Analysis - Hydrometer (ASTM D422) - Sieve Portion

Customer Sample Number	Laboratory Sample Number	Date of Analysis	Percent Passing by Sieve Size										
			3-in.	1½-in.	¾-in.	½-in.	No. 4	No. 10	No. 20	No. 40	No. 60	No. 100	No. 200
B35YB9	H-0077	7/11/2016	100.0	100.0	99.2	95.7	87.0	57.0	22.2	6.8	4.9	4.3	3.7



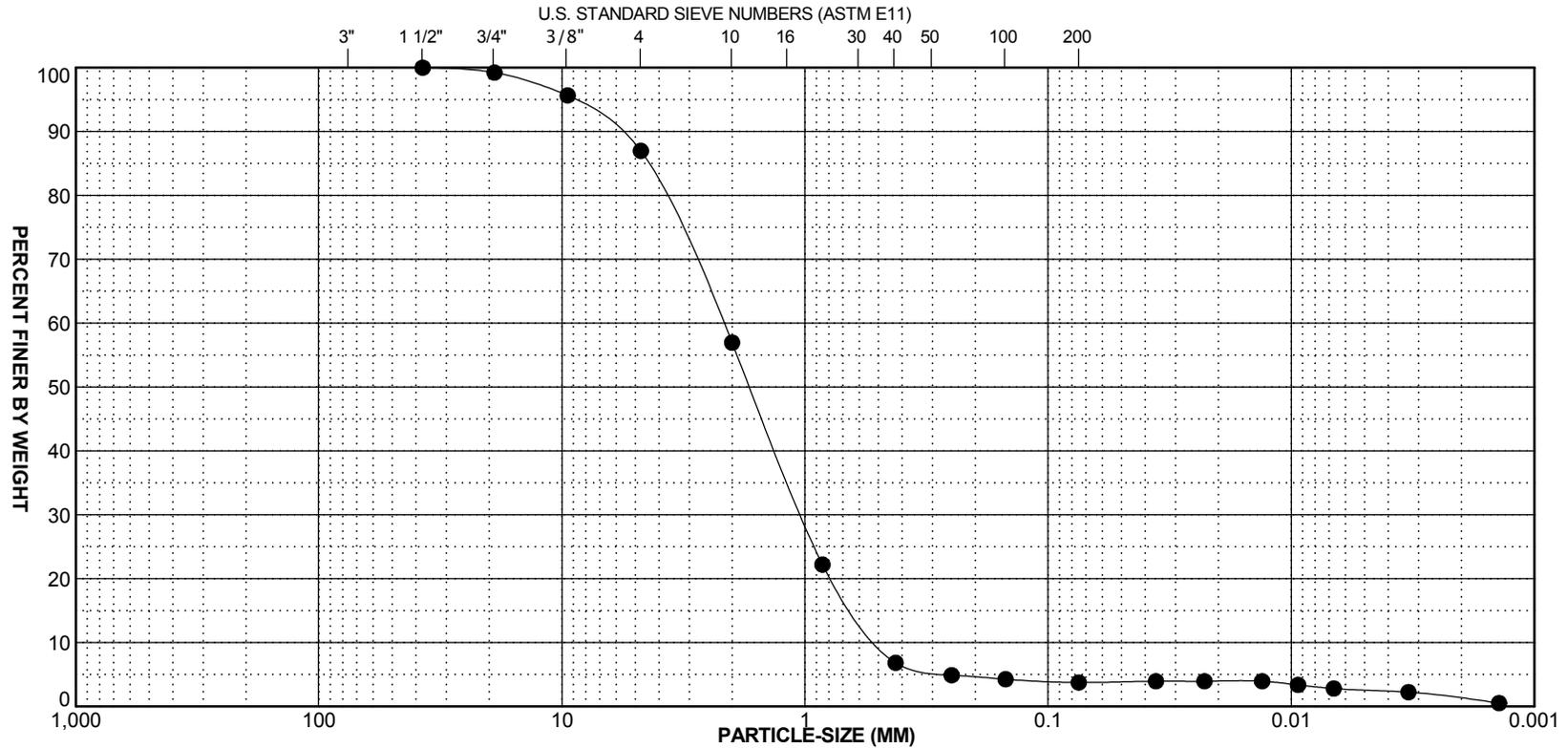
PARTICLE-SIZE ANALYSIS TEST RESULTS

CHPRC - GEOTECHNICAL LABORATORY

PBS PROJECT NUMBER:
63797

TEST METHOD: ASTM C136

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



8/4/2016

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F16-043-066	PAGE 1 OF 2
COLLECTOR E.L. Kauef/CHPRC	COMPANY CONTACT TODAK, D	TELEPHONE NO. 376-6427	PROJECT COORDINATOR TODAK, D	PRICE CODE 8H	DATA TURNAROUND 30 Days / 30 Days
SAMPLING LOCATION C9402, I-002	PROJECT DESIGNATION 100-NR-2 Drilling - Soil	FIELD LOGBOOK NO. HNF-N-645	ACTUAL SAMPLE DEPTH 30.2 - 32.7	SAF NO. F16-043	AIR QUALITY <input type="checkbox"/>
ICE CHEST NO. 6005-472	OFFSITE PROPERTY NO. N/A	NO. OF CONTAINER(S) 1	COA 304070	METHOD OF SHIPMENT GOVERNMENT VEHICLE	ORIGINAL
SHIPPED TO RJ LEE - GEOTECHNICAL	PRESERVATION None	HOLDING TIME None	BILL OF LADING/AIR BILL NO. N/A		

MATRIX* A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	POSSIBLE SAMPLE HAZARDS/ REMARKS *Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1. NA	NO. OF CONTAINER(S) 1	VOLUME 1000g	SAMPLE ANALYSIS SEE ITEM (1) IN SPECIAL INSTRUCTIONS
SAMPLE NO. B35VB9	MATRIX* SOIL	SAMPLE DATE 6-14-16	SAMPLE TIME 1120	

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM E.L. Kauef/CHPRC	DATE/TIME JUN 14 2016	RECEIVED BY/STORED IN SSU-1	DATE/TIME JUN 14 2016	SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM SSU-1	DATE/TIME JUN 15 2016 0900	RECEIVED BY/STORED IN Ladly West	DATE/TIME JUN 15 2016 0900		
RELINQUISHED BY/REMOVED FROM Ladly West	DATE/TIME JUN 15 2016 1511	RECEIVED BY/STORED IN Ladly West	DATE/TIME JUN 15 2016 1511		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		

LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

8/4/2016

CH2MHill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F16-043-066	PAGE 2 OF 2
COLLECTOR E.L. Kauer/CHPRC	COMPANY CONTACT TODAK, D	TELEPHONE NO. 376-6427	PROJECT COORDINATOR TODAK, D	PRICE CODE 8H	DATA TURNAROUND 30 Days / 30 Days
SAMPLING LOCATION C9402, I-002	PROJECT DESIGNATION 100-NR-2 Drilling - Soil	FIELD LOGBOOK NO. HNF-N-645	SAF NO. F16-043	AIR QUALITY <input type="checkbox"/>	ORIGINAL
ICE CHEST NO. 6005-472	ACTUAL SAMPLE DEPTH 30.2 - 32.7	OFFSITE PROPERTY NO. N/A	COA 304070	BILL OF LADING/AIR BILL NO. N/A	
SHIPPED TO RJ LEE - GEOTECHNICAL					
SPECIAL INSTRUCTIONS					

SAMPLE B35YB9 WILL BE SAMPLED FROM SPLIT SPOON PORTION C OR D BASED ON WHICHEVER LINER HAS BETTER PERCENT RECOVERY;** All requests for Geotechnical Parameters will be given a unique HEIS sample number and be assigned to a separate COC. In addition, all split spoon sleeves will be properly stored until authorized for shipment.
 (1) D2937_ DENSITY: COMMON {Bulk density - dry, Bulk density - wet}; D422 PARTICLE SIZE (Dry Sieve): COMMON {Percent passing 1.5 inch sieve, Percent passing 3 inch sieve, Percent passing 3/4 inch sieve, Percent passing 3/8 inch sieve, Percent passing No.10 sieve, Percent passing No.100 sieve, Percent passing No.140 sieve, Percent passing No.20 sieve, Percent passing No.200 sieve, Percent passing No.4 sieve, Percent passing No.40 sieve};