RJ LEE GROUP
DELIVERING SCIENTIFIC RESOLUTION

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 # W606104, 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 #) W606104.

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 # W606104, has been assigned a PBS Geotechnical Lab Sample number per the below table.

CHPRC Sample #	SDG #	Geotechnical Lab Sample #	Date Processed
B35FX0	W606104	H-0081	07/26/2016

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.

08/04/2016

Richard Westberg
Laboratory Director, Columbia Basin Analytical Laboratories

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 # W606104,
dated August 4, 2016

PBS | Engineering + Environmental

August 1, 2016

RJ Lee Group, Inc.
Attn: Mr. Larry Lockrem
Columbia Basin Analytical Laboratories
2710 North 20th Avenue
Pasco, Washington 99301

Re: Geotechnical Laboratory Testing Results
Sample Delivery Group No. W606104
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 W606104.

We performed the following tests:

- Grain Size Analysis – Hydrometer (ASTM D422)
- Hydraulic Conductivity – Constant Head (ASTM D2434)

The appropriate permeability/hydraulic conductivity test (ASTM D2434 or D5084) was selected based on the texture characteristics of the sample received, per section 3.2.2 of the contract. The tests were performed in general accordance with the above-mentioned ASTM Standards.

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.

8/1/2016

Ryan White, P.E.
Geotechnical Discipline Lead

RW/rg

Attachments: Report of Laboratory Testing – Grain-size Analysis
Report of Laboratory Testing – Hydraulic Conductivity – Constant Head
Chain of Custody

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

RJ LEE GROUP
DELIVERING SCIENTIFIC RESOLUTION

REPORT OF LABORATORY TESTING

Report to:	CH2M-Hill - Plateau Remediation 2420 Stevens Center Place P.O. Box 1600 Richland, WA 99354	**Date:** **Sample Delivery Group No.:** **Sample Authorization No.:**	8/1/2016 W606104 F16-040

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. 10 sieve. The results of the mechnical 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.	⅜-in.	No. 4	No. 10	No. 20	No. 40	No. 100	No. 140	No. 200
B35FX0	H-0081	7/26/2016	100.0	100.0	64.6	28.6	26.1	25.5	25.8	25.7	18.8	16.1	14.4

RJ LEE GROUP
DELIVERING SCIENTIFIC RESOLUTION

REPORT OF LABORATORY TESTING

Report to:	CH2M-Hill - Plateau Remediation 2420 Stevens Center Place P.O. Box 1600 Richland, WA 99354	**Date:** **Sample Delivery Group No.:** **Sample Authorization No.:**	8/1/2016 W606104 F16-040

Project:	CHPRC Laboratory	**Project No.:**	63797.000
Report of:	Grain Size Analysis - Hydrometer (ASTM D422)	**Lab Technician:**	A. Jaimes

Particle/Grain Size Analysis - Hydrometer (ASTM D422):
See sheet 1 of 3

LABORATORY TEST RESULTS

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

Customer Sample Number	Lab Sample Number	Hydrometer Readings													
		2 min		5min		15 min		30 min		60 min		250 min		1440 min	
		Dia. (mm)	Finer (%)	Dia. (mm)	Finer (%)	Dia. (mm)	Finer (%)	Dia. (mm)	Finer (%)	Dia. (mm)	Finer (%)	Dia. (mm)	Finer (%)	Dia. (mm)	Finer (%)
B35FX0	H-0081	0.034	4.1	0.023	2.3	0.013	1.3	0.010	0.8	0.007	0.5	0.003	0.3	0.001	0.1

SHEET 2 OF 3

REVIEWED BY: R. White, P.E.

__PARTICLE-SIZE ANALYSIS-RJ LEE GRP 63797_RESULTS.GPJ PBS_DATATMPL_GEO.GDT PRINT DATE: 8/1/16:RPG

RJ LEE GROUP
DELIVERING SCIENTIFIC RESOLUTION

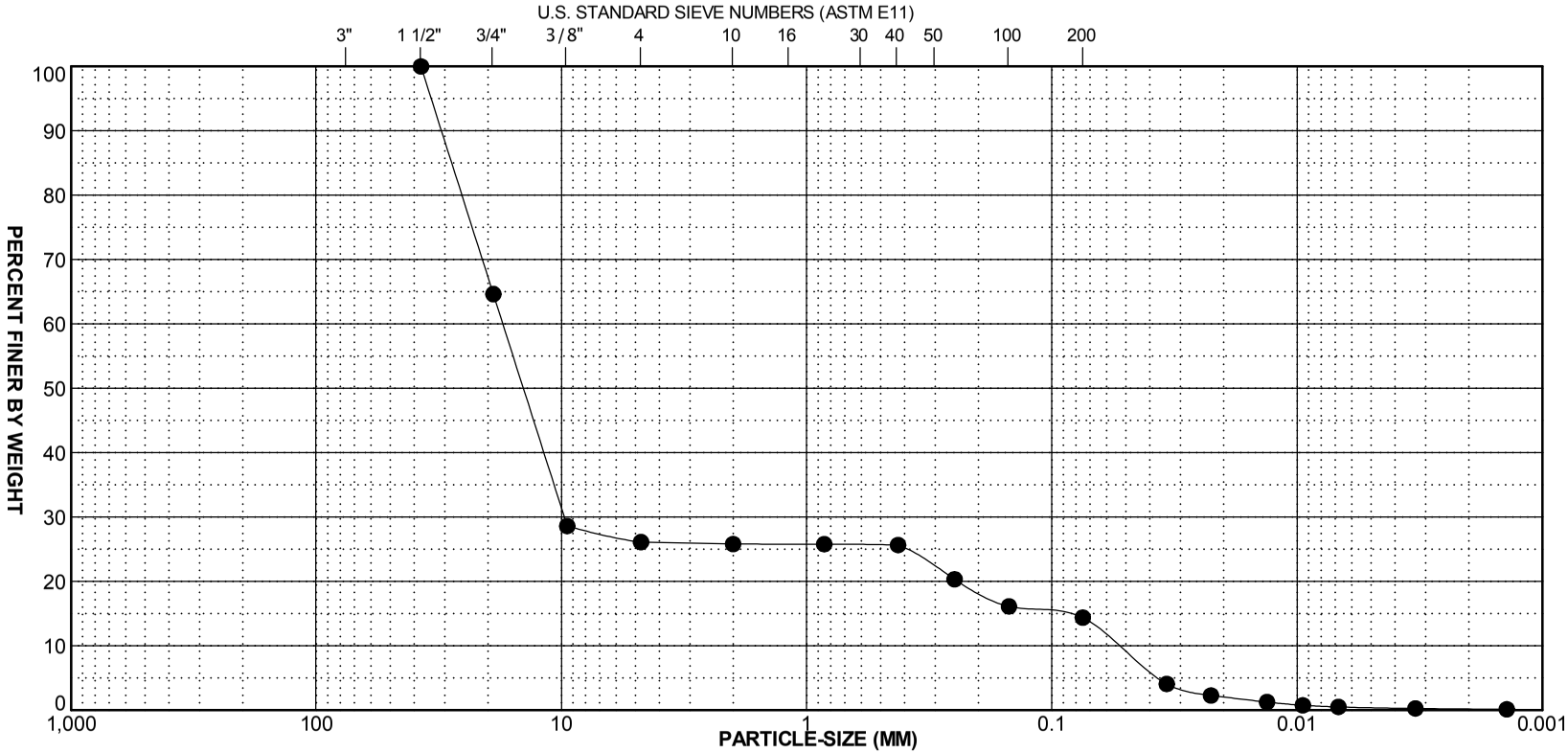
PARTICLE-SIZE ANALYSIS TEST RESULTS

CHPRC - GEOTECHNICAL LABORATORY

PBS PROJECT NUMBER:
63797

TEST METHOD: ASTM C136

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



KEY	EXPLORATION NUMBER	SAMPLE NUMBER	SAMPLE DEPTH (FEET)	MOISTURE CONTENT (PERCENT)	D60 (MM)	D50 (MM)	D30 (MM)	D10 (MM)	D5 (MM)	GRAVEL (PERCENT)	SAND (PERCENT)	FINES (PERCENT)
●	H-081	B35FX0	103.9	7	17.4	14.3	9.8	0.05	0.04	74	12	14

RJ LEE GROUP
DELIVERING SCIENTIFIC RESOLUTION

REPORT OF LABORATORY TESTING

Report to:	CH2M-Hill - Plateau Remediation 2420 Stevens Center Place P.O. Box 1600 Richland, WA 99354	**Date:** **Sample Delivery Group No.:** **Sample Authorization No.:**	8/1/2016 W606104 F16-040

Project:	CHPRC Laboratory	**Project No.:**	63797.000
Report of:	Hydraulic Conductivity - Constant Head (ASTM D2434)	**Lab Tech:**	A. Jaimes

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

Hydraulic Conductivity - Constant Head (ASTM D2434).
The hydraulic conductivity of the representative soil was determined in the laboratory using the above referenced samples. The samples were prepared for the permeameter and all the required measures were taken. Air was evacuated from the samples and were then saturated with low mineral content water. The manometer system was attached and a stable head condition was attained. The quantity of flow, water temperature, water head and time were measured. This was repeated, if necessary, to establish an accurate region of laminar flow with velocity.

LABORATORY TEST RESULTS

Hydraulic Conductivity - Constant Head (ASTM D2434)

Customer Sample Number	Laboratory Sample Number	Date of Analysis	Quantity of flow discharged (cm^3)	Dist. between manometers, L (cm)	Specimen area, A (cm^2)	Total discharge time, t (sec)	Head dif. betw. manometers, h (cm)	Avg. Hydraulic Conductivity, k (cm/s)
B35FX0	H-0081	7/25/2016	195	7.62	45.843	300	89	1.22E-03

SHEET 1 OF 1

REVIEWED BY: Ryan White, P.E.

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F16-040-018	PAGE 1 OF 1
COLLECTOR B.E. Briggs CHPRC	COMPANY CONTACT TODAK, D	TELEPHONE NO. 376-6427	PROJECT COORDINATOR TODAK, D	PRICE CODE 8H / DATA TURNAROUND
SAMPLING LOCATION C9542, I-006	PROJECT DESIGNATION 100-HR-3 Long Term & Interim Action Monitoring - Soil		SAF NO. F16-040	AIR QUALITY ☐ / 30 Days / 30 Days
ICE CHEST NO. N/A	FIELD LOGBOOK NO. ~~HNF-N~~-645.5	ACTUAL SAMPLE DEPTH 103.9'-106.4'	COA 300115	METHOD OF SHIPMENT GOVERNMENT VEHICLE
SHIPPED TO RJ LEE - GEOTECHNICAL	OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. N/A	ORIGINAL

8 of 8

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 be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1. N/A

SPECIAL HANDLING AND/OR STORAGE

PRESERVATION	None
HOLDING TIME	6 Months
TYPE OF CONTAINER	Split Spoon Liner
NO. OF CONTAINER(S)	1
VOLUME	1000g
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

W606104

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B35FX0	SOIL	JUN 16 2016	1342	✓

8/4/2016

CHAIN OF POSSESSION	SIGN/ PRINT NAMES			
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	
B.E. Briggs CHPRC	JUN 16 2016 1500	SSU#1	JUN 16 2016 1500	
SSU#1	JUN 20 2016 0755	Troy Bacon CHPRC	JUN 20 2016 0755	
Troy Bacon CHPRC	JUN 20 2016 1005	J. LOPEZ RJ LEE GROUP	JUN 20 2016 1005	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	

SPECIAL INSTRUCTIONS
** Laboratory shall perform the Particle Size (Dry Sieve) analysis to determine if they should proceed with Permeability by D2434 or Hydraulic Conductive by D5
(1) D2434_PERMEABILTIY: COMMON; D422_PARTICLE SIZE (Dry Sieve): COMMON; D5084_HYRDRAULIC CONDUCTIVITY: COMMON;

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

PRINTED ON 5/2/2016 | FSR ID = FSR32092 | TRVL NUM = TRVL-16-133 | A-6003-618 (REV 2)