



September 15, 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 # W607044, 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 #) W607044.

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 is 1 (one) SIR associated with this SDG and it is attached.

The CHPRC sample, in SDG # W607044, has been assigned a PBS Geotechnical Lab Sample number per the below table.

CHPRC Sample #	SDG #	Geotechnical Lab Sample #	Date Processed
B367R3	W607044	H-0103	08/25/16

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.

Rich Westberg
 Laboratory Director, Columbia Basin Analytical Laboratories

09/15/2016

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 # W607044,
dated September 15, 2016



Engineering +
Environmental

August 25, 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. W607044
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 W607044.

We performed the following tests:

- Carbonate Content (ASTM D4373)
- Grain-Size Analysis (ASTM D422)

A permeability/hydraulic conductivity test (ASTM D2434 or D5084) was requested, but was not performed due to a lack of sufficient soil material to create a soil column for testing by either method. The hydrometer portion of the grain-size analysis was requested, but was not performed due to an insufficient amount of material passing the No. 10 sieve. The remaining requested 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.



08/25/2016

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

AS/rg

Attachments: Report of Laboratory Testing – Carbonate Content
Report of Laboratory Testing – Grain-size Analysis
Chain of Custody

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

SAMPLE ISSUE RESOLUTION

SIR NUM	SIR16-583
REV NUM	0
DATE INITIATED	8/22/2016

SAMPLE EVENT INFORMATION

SAF NUM(S) F16-037
OPERABLE UNIT(S) 100-KR-4
PROJECT(S) 100-KR-4 RM ACT
SAMPLE EVENT TITLE(S) 100-K Area
LABORATORY RJ LEE - GEOTECHNICAL

SAMPLING INFORMATION

NUMBER OF SAMPLES 1
SAMPLE NUMBERS B367R3
SAMPLE MATRIX SOIL
COLLECTION DATE 7/13/2016 - 7/13/2016
SDG NUM W607044

ISSUE BACKGROUND

CLASS General Laboratory Direction
TYPE Cancellation of Analyses
DESCRIPTION Unable to run permeability or hydraulic conductivity due to large size of gravel, Not enough soil passing #10 sieve to run particle size test.

DISPOSITION

DESCRIPTION Cancel the referenced permeability and hydraulic conductivity tests.
JUSTIFICATION Final Disposition: Accept proposed resolution.
 SUBMITTED BY: Antonio Jaimes DATE: 08/22/2016
 ACCEPTED BY: Dave Todak DATE: 08/22/2016



REPORT OF LABORATORY TESTING

Report to: CH2M-Hill - Plateau Remediation 2420 Stevens Center Place PO Box 1600 Richland, WA 99354	Date : 8/25/2016 Sample Delivery Group No. W607044 Sample Authorization No.: F16-037
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Project: CHPRC Laboratory Report of: Carbonate Content (ASTM D4373)	Project No.: 63797.000 Lab Technician: A. Jaimes
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Items Received:

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

Rapid Determination of Carbonate Content (ASTM D4373).

The test specimen was dried for a period of 12 to 24 hours and pulverized until all particles passed the No. 40 sieve. One gram of the pulverized sample was placed into the reactor along with 20mL of acid solution and gently mixed to initiate reaction. If there was no pressure response, but a minor reaction, the trial was repeated with 2, 5, or 10 grams of pulverized material and readings were altered accordingly. After 10 minutes of reaction time, the pressure value was read and recorded to obtain the carbonate content. If, necessary, the pressure was continually read until the change in calcite equivalent was less than 0.3% over a 10 minute time period, for a testing time of up to 120 minutes, or the change in calcite equivalent was less than 0.3% over a 30 minute time period for testing time greater than 120 minutes.

LABORATORY TEST RESULTS

Rapid Determination of Carbonate Content

Customer Sample Number	Quantity of sample used, (g)	CO ₂ Pressure (kPa)	Calcite Equivalent (%CaCO ₂)
B367R3	1.0	0.0	0.0



REPORT OF LABORATORY TESTING

Report to: CH2M-Hill - Plateau Remediation 2420 Stevens Center Place PO Box 1600 Richland, WA 99354	Date: 8/25/2016
	Sample Delivery Group No.: W607044
	Sample Authorization No.: F16-037

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. PBS performed the following test:

Particle/Grain Size Analysis - (ASTM D422):

Mechanical Grain Size Analyses (wet sieve) were conducted on each of the soil samples to determine their grain size distribution. The results of the mechanical grain size analyses are plotted on the attached Figure (Particle Size Analysis Test Results, pages 1 and 2).

LABORATORY TEST RESULTS

Particle Grain Size Analysis - (ASTM D422)

Customer Sample Number	Laboratory Sample Number	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. 140	No. 200
B367R3	H-0103	100	37.	18.3	8.3	3.7	1.6	1.0	0.7	0.6	0.5	0.4	0.0



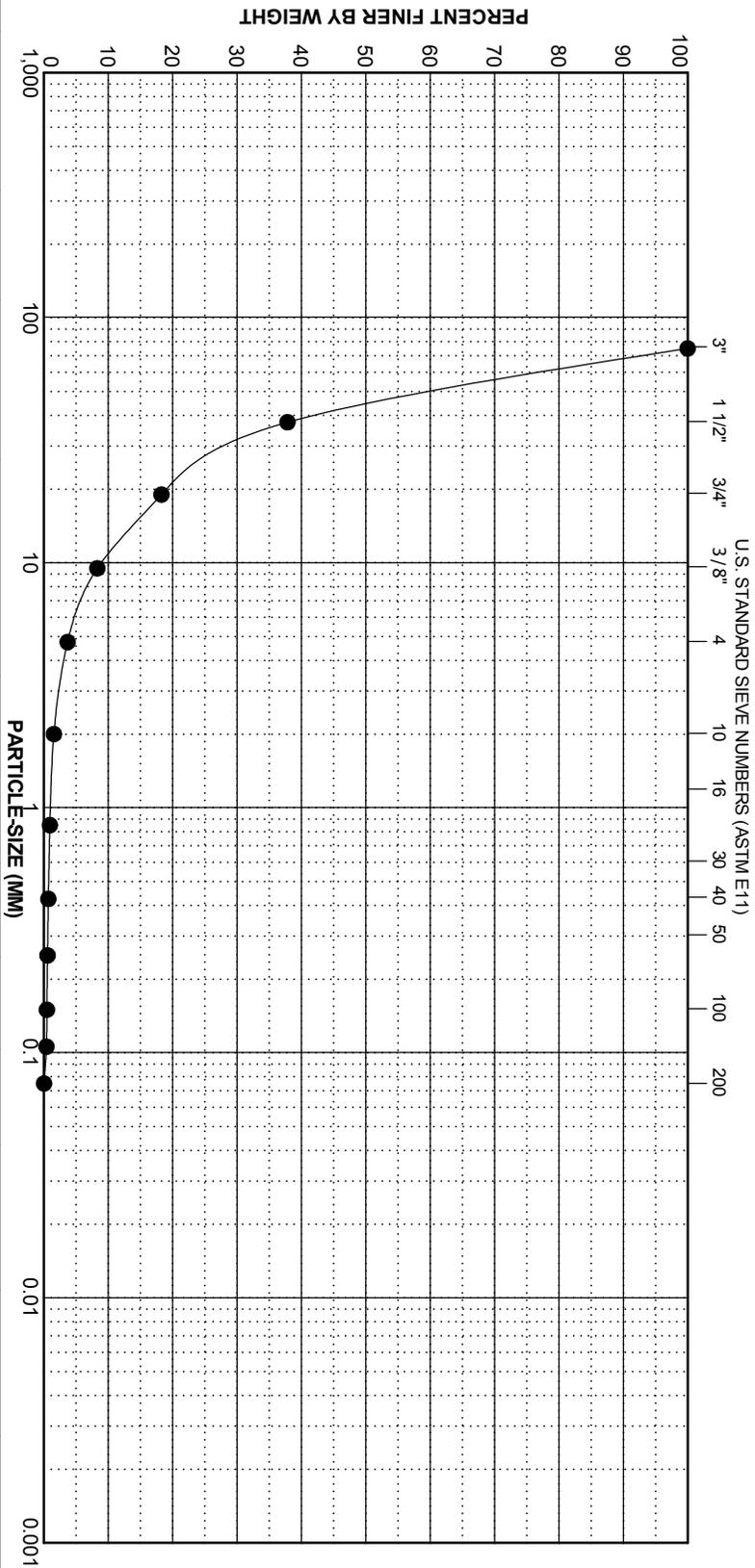
PARTICLE-SIZE ANALYSIS TEST RESULTS

CHPRC - GEOTECHNICAL LABORATORY

PBS PROJECT NUMBER:
63797

TEST METHOD: ASTM D422

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



CH2MHill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		Rev. 0 - SDG # W607044, Page 7 of 8 F16-037-057 PAGE 1 OF 1	
COLLECTOR Chris Fulton CHPRC	COMPANY CONTACT LYNCH, SA	TELEPHONE NO. 373-5586	PROJECT COORDINATOR TODAK, D	PRICE CODE 8H	DATA TURNAROUND 30 Days / 30 Days
SAMPLING LOCATION C9598, SAMPLE 1-001	PROJECT DESIGNATION 100-KR-4 Long Term & Interim Action Monitoring - Soil	FIELD LOGBOOK NO. HNF-N-645 4-125	ACTUAL SAMPLE DEPTH 42.36-93.86	SAF NO. F16-037	ORIGINAL
ICE CHEST NO. N/A	OFFSITE PROPERTY NO. N/A	COA 300085	BILL OF LADING/AIR BILL NO. N/A	METHOD OF SHIPMENT GOVERNMENT VEHICLE	
SHIPPED TO RU LEE - GEOTECHNICAL					

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.	PRESERVATION None	HOLDING TIME None	TYPE OF CONTAINER Split Spoon Liner	NO. OF CONTAINER(S) 21	VOLUME 1000g	SAMPLE ANALYSIS SEE ITEM (1) IN SPECIAL INSTRUCTIONS		
		SPECIAL HANDLING AND/OR STORAGE RADIOACTIVE TO-036799- 0.44 7112/16							
		SAMPLE NO. B367R3	MATRIX*	SAMPLE DATE JUL 13 2016	SAMPLE TIME 1239				
		only 50% recovery -							

W607044

CHAIN OF POSSESSION		SIGN / PRINT NAMES		SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM Chris Fulton CHPRC	DATE/TIME JUL 13 2016 1343	RECEIVED BY/STORED IN SSU-1	DATE/TIME JUL 13 2016 1243	** 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.** Laboratory shall perform the Particle Size (Dry Sieve) analysis to determine if they should proceed with Permeability by D2434 or Hydraulic Conductive by D5084. (1) D422_PARTICLE SIZE (Dry Sieve): COMMON; D2434_PERMEABILITY: COMMON; D5084_HYDRAULIC CONDUCTIVITY: COMMON; D4373_CARBONATE CONTENT: COMMON;	
RELINQUISHED BY/REMOVED FROM C. Fulton	DATE/TIME JUL 14 2016 0900	RECEIVED BY/STORED IN J.C. Fulton	DATE/TIME JUL 14 2016 0900		
RELINQUISHED BY/REMOVED FROM CHPRC	DATE/TIME JUL 14 2016 0937	RECEIVED BY/STORED IN CHPRC	DATE/TIME JUL 14 2016 0937		
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 DATE/TIME

FINAL SAMPLE DISPOSITION DISPOSAL METHOD DATE/TIME

PRINTED ON 7/12/2016 FSR ID = FSR34076 TRVL NUM = TRVL-16-192 A-6003-618 (REV 2)

SAMPLE ISSUE RESOLUTION	SIR NUM	SIR16-583
	REV NUM	0
	DATE INITIATED	8/22/2016

SAMPLE EVENT INFORMATION

SAF NUM(S) F16-037
OPERABLE UNIT(S) 100-KR-4
PROJECT(S) 100-KR-4 RM ACT
SAMPLE EVENT TITLE(S) 100-K Area
LABORATORY RJ LEE - GEOTECHNICAL

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DISPOSITION

DESCRIPTION Cancel the referenced permeability and hydraulic conductivity tests.

JUSTIFICATION Final Disposition: Accept proposed resolution.

SUBMITTED BY: Antonio Jaimes DATE: 08/22/2016
ACCEPTED BY: Dave Todak DATE: 08/22/2016