

April 16, 2015

CH2M HILL Plateau Remediation Company  
2420 Stevens Center Place  
P.O. Box 1600  
Richland, WA 99352  
Attn.: Tracey A. Burch

**Subject: Geotechnical Laboratory Testing Services, Data Deliverable for SDG # W150228, 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 #) W150228.

**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.

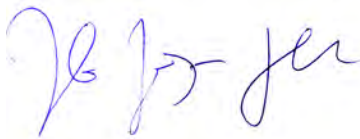
The CHPRC sample, in SDG # W150228, has been assigned a PBS Geotechnical Lab Sample number per the below table.

CHPRC Sample #	SDG #	Geotechnical Lab Sample #
B30C56	W150228	H-0027

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.



April 16, 2015

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Dr. Heinz Huber  
Laboratory Manager, Columbia Basin Analytical Laboratories

Date

If you have any questions, please feel free to contact us at 509-545-4989 or email at [hhuber@rjleegroup.com](mailto:hhuber@rjleegroup.com).

**Attachment 1**

PBS Geotechnical laboratory Testing Results, SDG # W150228,  
dated March 18, 2015

April 16, 2015



Engineering +  
Environmental

March 18, 2015

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

Re: Geotechnical Laboratory Testing Results  
Sample Delivery Group No. W150228  
PBS Project No. 63737.000

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 W150228.

We performed the following test:

- 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 test was performed in general accordance with the above-mentioned ASTM Standards, except for the following cases:

- **Hydraulic Conductivity – Constant Head (ASTM D2434):** The sample was not tested in a permeameter cylinder appropriately sized based on the maximum particle size of the soil due to the lack of adequate sample volumes provided. The test was performed in the closest appropriately sized cylinder available for the volume of sample provided, per the direction of RJ Lee and CHPRC.

The sample provided was inadequate in terms of sample size in general and consisted primarily of large particle sizes, both of which should be considered when interpreting the results of the testing. A photograph of the sample is attached.

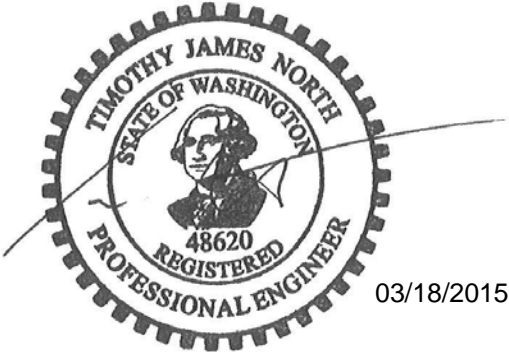
400 Bradley Boulevard, Suite 300, Richland, WA 99352  
509.942.1600 Main  
866.727.0140 Fax  
www.pbsenv.com

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Mr. Larry Lockrem  
Re: Geotechnical Laboratory Testing Results – W150228  
March 18, 2015  
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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.



Timothy J. North, P.E.  
Project Geotechnical Engineer

A handwritten signature in black ink, appearing to read "N.A. Bowles".

Nathan A. Bowles, P.E.  
Senior Engineer/Operations Manager

TN/NB

Attachments:     Sample Photograph  
                      Report of Laboratory Testing – Hydraulic Conductivity – Constant Head  
                      Chain of Custody

April 16, 2015

Mr. Larry Lockrem  
Re: Geotechnical Laboratory Testing Results – W150228  
March 18, 2015



Photo 1. Sample No. B30C56 (PBS Sample No. H-0027).

**REPORT OF LABORATORY TESTING**

<b>Report to:</b> CH2M-Hill - Plateau Remediation 2420 Stevens Center Place P.O. Box 1600 Richland, WA 99352	<b>Date:</b> 3/18/2015 <b>Sample Delivery Group No.:</b> W150228 <b>Sample Authorization No.:</b> F13-046
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<b>Project:</b> CHPRC Laboratory	<b>Project No.:</b> 63797.000
<b>Report of:</b> Hydraulic Conductivity - Constant Head (ASTM D2434)	<b>Lab Tech:</b> B. Russell

**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 <sup>3</sup> )	Dist. between manometers, L (cm)	Specimen area, A (cm <sup>2</sup> )	Total discharge time, t (sec)	Head dif. betw. manometers, h (cm)	Avg. Hydraulic Conductivity, k (cm/s)
B30C56	H-0027	2/17/2015	419	7.62	45.843	300	0.3	8.28E-01



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### Geotechnical Laboratory Sample Receipt

Date/Time Received: 2-12-15 9:45

SDG#: W150228

Work Order Number: \_\_\_\_\_

SAF# F13-046-084

Shipping Container Identification: GWS-276

- 1. Custody Seals on shipping container intact? Yes  No
- 2. Custody Seals dated and signed? Yes  No
- 3. Chain-of-Custody record present? Yes  No
- 4. Cooler temperature NA
- 5. Vermiculite/packing materials is Wet  Dry
- 6. Number of samples in shipping container: 1
- 7. Samples have:
  - tape  hazard labels
  - custody seals  appropriate sample labels
- 8. Samples are:
  - in good condition for the geotechnical tests required  leaking/desiccated
  - broken or disaggregated
- 9. Were any anomalies identified in sample receipt? Yes  No
- 10. Description of anomalies (include sample numbers): \_\_\_\_\_
- 11. Rad Screen Performed: NA
- 12. Chain of Custody # F13-046-084

Comments: \_\_\_\_\_

Sample Custodian/Laboratory: CLOPEZ Date: 2-12-15

Telephoned to: \_\_\_\_\_ On \_\_\_\_\_ by \_\_\_\_\_ 8 of 8