

April 14, 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 # WA011020140001, Rev. 1**

Enclosed is the revised final report on geotechnical analyses performed by RJ Lee Group in conjunction with PBS Engineering and Environmental, Inc. (PBS) for Sample Data Group number (SDG #) WA011020140001. The report was revised as directed by the CHPRC Problem and Discrepancy (P&D) Report, dated April 6, 2015, provided in Attachment 1.

**General Set Comments**

RJ Lee Group received from CH2M-Hill Plateau Remediation Company (CHPRC) the first set of 16 samples to be tested for geotechnical analysis at the Columbia Basin Analytical Laboratories. On January 5, 2015, discussions took place about issues related to inadequate sample volumes for the provided samples in relation to ASTM procedures requested by CHPRC. CHPRC directed Columbia Basin Analytical Laboratories to work with the CHPRC project coordinator on addressing these issues. The CHPRC project coordinator provided clarification on the requested ASTM procedures on February 12, 2015. See Attachment 2 for the email from the project coordinator, David Todak, titled: “Hydraulic Conductivity, permeability, and carbonate analysis...” In addition, please see Attachment 3 for the CHPRC issued SIRs (SDR15-003, SDR15-004, and SDR15-005) requesting corrections to the HEIS numbers for three samples that corresponds to Geotechnical Lab sample numbers H-0001, H-0002, and H-0003 (see table below).

The first set of 16 CHPRC samples, in SDG # WA011020140001, have been assigned a PBS Geotechnical Lab Sample number per the below table.

| CHPRC Sample # | SDG #          | Geotechnical Lab Sample # |
|----------------|----------------|---------------------------|
| B2YF05         | WA011020140001 | H-0001                    |
| B2YF04         | WA011020140001 | H-0002                    |
| B2YF06         | WA011020140001 | H-0004                    |
| B2WB58         | WA011020140001 | H-0005                    |
| B2WB60         | WA011020140001 | H-0006                    |
| B2R2X0         | WA011020140001 | H-0007                    |
| B2T036         | WA011020140001 | H-0008                    |
| B2WB59         | WA011020140001 | H-0009                    |
| B2W317         | WA011020140001 | H-0010                    |
| B2W319         | WA011020140001 | H-0011                    |
| B2W321         | WA011020140001 | H-0012                    |
| B2W9Y4         | WA011020140001 | H-0013                    |
| B2XPH3         | WA011020140001 | H-0014                    |
| B2XPH6         | WA011020140001 | H-0015                    |
| B2XPH9         | WA011020140001 | H-0016                    |
| B2T1L2         | WA011020140001 | H-0017                    |

This project deliverable, provided in Attachment 4, contains the reports of the requested analytical results and copies of the associated chains of custody for the first set of 16 samples listed above.

The analytical results provided in this deliverable relate only to the items tested. Samples were 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 14, 2015

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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

CHPRC Problem and Discrepancy (P&D) Report, SDG # WA011020140001  
dated April 6, 2015

## Problem and Discrepancy Report

RJLee

SDG WA0110201401

04/06/15

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### The data package has the following issues:

1. The RJLee transmittal letter should only reference the number of samples in the SDG.
2. Provide the documentation to support the clarifications provided by the CHPRC SMR PC (referenced in the RJLee letter).
3. SDRs – completed by SMR and lab should be inserted in the report after the PBS narrative.
4. The sample IDs that were corrected on the COCs need to be corrected in the PBS report.
5. Please rescan/copy the COCs so the RJLee sample IDs are included.

**Resolution:** *Provide correction.*

### Lab Response:

Please correct the issue and resubmit the hard copy data package.

Attachment 2

Email from the CHPRC Project Coordinator, David Todak,  
dated February 12, 2015

**From:** Todak, David [David\_Todak@rl.gov]  
**Sent:** Thursday, February 12, 2015 12:38 PM  
**To:** Nathan Bowles  
**Cc:** Trent, Stephen J; Miller, Charles W; Lynch, Sherry A  
**Subject:** Hydraulic conductivity, permeability, and carbonate analyses (lions, tigers, and bears)

Nathan,

This email is just to follow up on our conversation this morning. Having talked to Chuck Miller and Steve Trent after that, we're all in agreement that ASTM Methods D5084 and D2434 should both be included on soil samples for which hydraulic conductivity is a desired data point, and it's up to the lab to determine which of those two methods is appropriate based on the coarseness of the sample. I will try to ensure all chains of custody reflect this going forward. Please treat samples you already have in house accordingly.

Additionally, I found the well for which the alkalinity (carbonate) analyses were inadvertently assigned to GEL when they should have come to you guys. The well is C8290, and the intervals of interest are 1, 3, and 5 (HEIS numbers B2XN93, B2XN94, and B2XN95 respectively). If you guys have sufficient sample material, could you please run these analyses on those residuals?

Thanks!

***David Todak***

Office: (509) 376-6427

Cell: (509) 947-1305

CHPRC Sample Management Office

Project Coordinator for:

*Plutonium Finishing Plant*

*Soil and Groundwater Remediation Project - Drilling*

*Decommissioning, Waste, Fuels, and Remediation Services*

Attachment 3

CHPRC issued SIRs (SDR15-003, SDR15-004, and SDR15-005),  
dated October 2, 2014

**SAMPLE ISSUE RESOLUTION**

|                       |           |
|-----------------------|-----------|
| <b>SIR NUM</b>        | SDR15-003 |
| <b>REV NUM</b>        | 0         |
| <b>DATE INITIATED</b> | 10/2/2014 |

**SAMPLE EVENT INFORMATION**

|                              |                      |
|------------------------------|----------------------|
| <b>SAF NUM(S)</b>            | F13-046              |
| <b>OPERABLE UNIT(S)</b>      | 100-KR-4             |
| <b>PROJECT(S)</b>            | 100-KR-4 RM ACT      |
| <b>SAMPLE EVENT TITLE(S)</b> | 100-K Area           |
| <b>LABORATORY</b>            | RJ EE - GEOTECHNICAL |

**SAMPLING INFORMATION**

|                          |                       |
|--------------------------|-----------------------|
| <b>NUMBER OF SAMPLES</b> | 1                     |
| <b>SAMPLE NUMBERS</b>    | B2YF06                |
| <b>SAMPLE MATRIX</b>     | SOIL                  |
| <b>COLLECTION DATE</b>   | 3/20/2014 - 3/20/2014 |
| <b>SDG NUM</b>           | WA0110201401          |

**ISSUE BACKGROUND**

|                    |  |
|--------------------|--|
| <b>CLASS</b>       | Sample Management Issues   |
| <b>TYPE</b>        | Other SDM issue (specify)  |
| <b>DESCRIPTION</b> | Chain of custody F13-046-040 lists an incorrect sample number(B2T036). |

**DISPOSITION**

|                    |   |
|--------------------|---|
| <b>DESCRIPTION</b> | Resolution: Line out incorrect number and replace with B2YF06 on original chain of custody. Send copy of corrected chain to ^CPP mailbox. |
|--------------------|---|

**JUSTIFICATION**

SUBMITTED BY: Scot Fitzgerald DATE: 10/02/2014  
ACCEPTED BY: Nathan Bowles DATE: 10/02/2014

**SAMPLE ISSUE RESOLUTION**

|                       |           |
|-----------------------|-----------|
| <b>SIR NUM</b>        | SDR15-004 |
| <b>REV NUM</b>        | 0         |
| <b>DATE INITIATED</b> | 10/2/2014 |

**SAMPLE EVENT INFORMATION**

|                              |                      |
|------------------------------|----------------------|
| <b>SAF NUM(S)</b>            | F13-046              |
| <b>OPERABLE UNIT(S)</b>      | 100-KR-4             |
| <b>PROJECT(S)</b>            | 100-KR-4 RM ACT      |
| <b>SAMPLE EVENT TITLE(S)</b> | 100-K Area           |
| <b>LABORATORY</b>            | RJ EE - GEOTECHNICAL |

**SAMPLING INFORMATION**

|                          |                       |
|--------------------------|-----------------------|
| <b>NUMBER OF SAMPLES</b> | 1                     |
| <b>SAMPLE NUMBERS</b>    | B2YF05                |
| <b>SAMPLE MATRIX</b>     | SOIL                  |
| <b>COLLECTION DATE</b>   | 10/9/2013 - 10/9/2013 |
| <b>SDG NUM</b>           | WA0110201401          |

**ISSUE BACKGROUND**

|                    |  |
|--------------------|--|
| <b>CLASS</b>       | Sample Management Issues   |
| <b>TYPE</b>        | Other SDM issue (specify)  |
| <b>DESCRIPTION</b> | Chain of custody F13-046-027 lists an incorrect sample number(B2T038). |

**DISPOSITION**

|                    |   |
|--------------------|---|
| <b>DESCRIPTION</b> | Resolution: Line out incorrect number and replace with B2YF05 on original chain of custody. Send copy of corrected chain to ^CPP mailbox. |
|--------------------|---|

**JUSTIFICATION**

SUBMITTED BY: Scot Fitzgerald DATE: 10/02/2014  
ACCEPTED BY: Nathan Bowles DATE: 10/02/2014

**SAMPLE ISSUE RESOLUTION**

|                       |           |
|-----------------------|-----------|
| <b>SIR NUM</b>        | SDR15-005 |
| <b>REV NUM</b>        | 0         |
| <b>DATE INITIATED</b> | 10/2/2014 |

**SAMPLE EVENT INFORMATION**

|                              |                      |
|------------------------------|----------------------|
| <b>SAF NUM(S)</b>            | F13-046              |
| <b>OPERABLE UNIT(S)</b>      | 100-KR-4             |
| <b>PROJECT(S)</b>            | 100-KR-4 RM ACT      |
| <b>SAMPLE EVENT TITLE(S)</b> | 100-K Area           |
| <b>LABORATORY</b>            | RJ EE - GEOTECHNICAL |

**SAMPLING INFORMATION**

|                          |                       |
|--------------------------|-----------------------|
| <b>NUMBER OF SAMPLES</b> | 1                     |
| <b>SAMPLE NUMBERS</b>    | B2YF04                |
| <b>SAMPLE MATRIX</b>     | SOIL                  |
| <b>COLLECTION DATE</b>   | 10/3/2013 - 10/3/2013 |
| <b>SDG NUM</b>           | WA0110201401          |

**ISSUE BACKGROUND**

|                    |  |
|--------------------|--|
| <b>CLASS</b>       | Sample Management Issues   |
| <b>TYPE</b>        | Other SDM issue (specify)  |
| <b>DESCRIPTION</b> | Chain of custody F13-046-023 lists an incorrect sample number(B2T034). |

**DISPOSITION**

|                    |   |
|--------------------|---|
| <b>DESCRIPTION</b> | Resolution: Line out incorrect number and replace with B2YF04 on original chain of custody. Send copy of corrected chain to ^CPP mailbox. |
|--------------------|---|

**JUSTIFICATION**

SUBMITTED BY: Scot Fitzgerald DATE: 10/02/2014  
ACCEPTED BY: Nathan Bowles DATE: 10/02/2014

Attachment 4

PBS Geotechnical Laboratory Testing Results, Rev. 1, SDG # WA011020140001,  
dated April 9, 2015



Engineering +  
Environmental

April 9, 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 – Revision 1  
Sample Delivery Group No. WA011020140001  
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 WA011020140001.

We performed the following tests:

- Carbonate Content (ASTM D4373)
- 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, except for the following cases:

- **Grain Size Analysis - Hydrometer (ASTM D422):** Samples B2YF04, B2YF06, B2WB58, B2WB60, B2R2X0, B2WB59, B2W317, B2W319, B2W321, B2XPH3, B2XPH6, B2XPH9 and B2T1L2 did not contain the designated approximate minimum mass of sample based on the nominal diameter of the largest soil particles. The tests were performed on the sample mass available, per the direction of RJ Lee and CHPRC.
- **Hydraulic Conductivity – Constant Head (ASTM D2434):** Samples B2YF04, B2WB58, B2WB60, B2R2X0, B2WB59, B2W317, B2W319, B2W321 and B2T1L2 were 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 tests were performed in the closest appropriately sized cylinder available for the volume of sample provided, per the direction of RJ Lee and CHPRC.

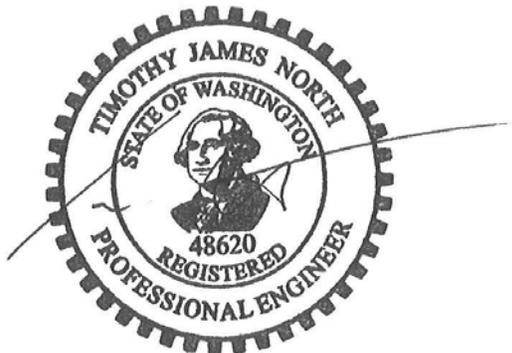
400 Bradley Boulevard, Suite 300, Richland, WA 99352  
509.942.1600 Main  
866.727.0140 Fax  
www.pbsenv.com

Mr. Larry Lockrem  
Re: Geotechnical Laboratory Testing Results – Revision 1 – WA011020140001  
April 9, 2015  
Page 2 of 2

In some cases, the samples provided were inadequate in terms of sample size in general or consisted primarily of large particle sizes, both of which should be considered when interpreting the results of the testing. Those samples are: **B2TYF04**, **B2WB58**, **B2R2XO**, **B2W317**, **B2W319**, **B2W321**, **B2XPH6** and **B2T1L2**. Photographs of the samples in question are attached.

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 Photographs
  - Report of Laboratory Testing – Carbonate Content
  - Report of Laboratory Testing – Grain-size Analysis - Hydrometer
  - Report of Laboratory Testing – Hydraulic Conductivity – Constant Head
  - Chains of Custody

Mr. Larry Lockrem

Re: Geotechnical Laboratory Testing Results – Revision 1 – WA011020140001

April 9, 2015



Photo 1. Sample No. B2YF04 (PBS Sample No. H-0002).



Photo 2. Sample No. B2WB58 (PBS Sample No. H-0005).



Photo 3. Sample No. B2R2X0 (PBS Sample No. H-0007).



Photo 4. Sample No. B2W317 (PBS Sample No. H-0010).

Mr. Larry Lockrem

Re: Geotechnical Laboratory Testing Results – Revision 1 – WA011020140001

April 9, 2015



Photo 5. Sample No. B2W319 (PBS Sample No. H-0011).



Photo 6. Sample No. B2W321 (PBS Sample No. H-0012).

Mr. Larry Lockrem

Re: Geotechnical Laboratory Testing Results – Revision 1 – WA011020140001

April 9, 2015



Photo 7. Sample No. B2XPH6 (PBS Sample No. H-0015).

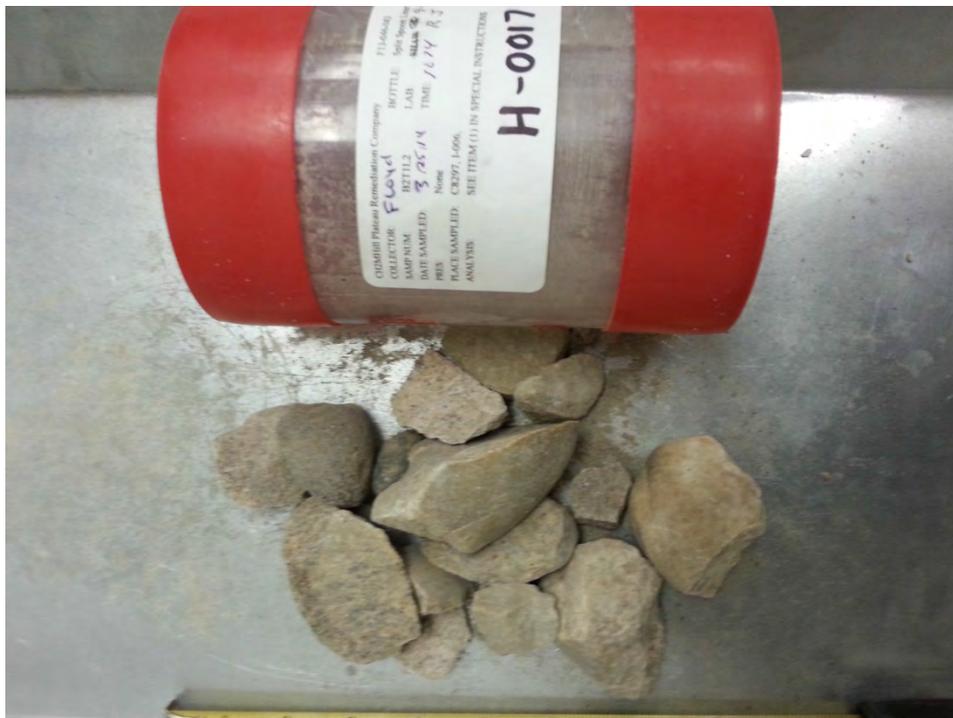


Photo 8. Sample No. B2T1L2 (PBS Sample No. H-0017).

**REPORT OF LABORATORY TESTING**

|   |   |
|---|---|
| <b>Report to:</b> CH2M-Hill - Plateau Remediation<br>2420 Stevens Center Place<br>P.O. Box 1600<br>Richland, WA 99352 | <b>Date:</b> 4/9/2015<br><b>Sample Delivery Group No.:</b> WA011020140001<br><b>Sample Authorization No.:</b> F13-046 |
|---|---|

|  |                                   |
|--|-----------------------------------|
| <b>Project:</b> CHPRC Laboratory                 | <b>Project No.:</b> 63797.000     |
| <b>Report of:</b> Carbonate Content (ASTM D4373) | <b>Lab Technician:</b> B. Russell |

**Items Received:**

16 samples were provided to us containing soil material obtained by you, the client.  
 We performed the following test:

Rapid Determination of Carbonate Content (ASTM D4373).

The test specimen was dried and pulverized to pass the No. 40 sieve. One gram of the pulverized sample was placed into the reactor along with the acid solution and gently mixed to initiate reaction. If there was no pressure response, but a minor reaction, the trial was repeated with larger sample sizes. After 10 minutes of reaction time, the pressure value was read and recorded. If, necessary, the pressure was read over longer periods of time in accordance with ASTM D4373.

**LABORATORY TEST RESULTS**

**Rapid Determination of Carbonate Content**

| Customer Sample Number | Laboratory Sample Number | Date of Analysis | Quantity of sample used, (g) | CO <sub>2</sub> Pressure (kPa) | Calcite Equivalent (%CaCO <sub>2</sub> ) |
|------------------------|--------------------------|------------------|------------------------------|--------------------------------|--|
| B2YF05                 | H-0001                   | 12/30/2014       | 1.00                         | 0.0                            | 0.0                                      |
| B2YF04                 | H-0002                   | 12/30/2014       | 1.00                         | 0.0                            | 0.0                                      |
| B2YF06                 | H-0004                   | 1/8/2015         | 1.00                         | 0.0                            | 0.0                                      |
| B2WB58                 | H-0005                   | 1/8/2015         | 1.00                         | 0.0                            | 0.0                                      |
| B2WB60                 | H-0006                   | 1/9/2015         | 1.00                         | 0.0                            | 0.0                                      |
| B2R2X0                 | H-0007                   | 1/12/2015        | 1.00                         | 0.0                            | 0.0                                      |
| B2T036                 | H-0008                   | 1/12/2015        | 1.00                         | 0.2                            | 2.2                                      |
| B2WB59                 | H-0009                   | 1/12/2015        | 1.00                         | 0.7                            | 3.1                                      |
| B2W317                 | H-0010                   | 1/13/2015        | 1.00                         | 0.0                            | 0.0                                      |
| B2W319                 | H-0011                   | 1/13/2015        | 1.00                         | 0.0                            | 0.0                                      |
| B2W321                 | H-0012                   | 1/14/2015        | 5.00                         | 0.0                            | 0.0                                      |
| B2W9Y4                 | H-0013                   | 1/14/2015        | 1.00                         | 0.0                            | 0.0                                      |
| B2XPH3                 | H-0014                   | 1/15/2015        | 1.00                         | 0.1                            | 2.1                                      |
| B2XPH6                 | H-0015                   | 1/15/2015        | 1.00                         | 0.0                            | 0.0                                      |
| B2XPH9                 | H-0016                   | 1/19/2015        | 1.00                         | 0.0                            | 0.0                                      |
| B2T1L2                 | H-0017                   | 1/19/2015        | 1.00                         | 0.0                            | 0.0                                      |



**REPORT OF LABORATORY TESTING**

**Report to:** CH2M-Hill - Plateau Remediation  
 2420 Stevens Center Place  
 P.O. Box 1600  
 Richland, WA 99352

**Date:** 4/9/2015  
**Sample Delivery Group No.:** WA011020140001  
**Sample Authorization No.:** F13-046

**Project:** CHPRC Laboratory

**Project No.:** 63797.000

**Report of:** Grain Size Analysis - Hydrometer (ASTM D422)

**Lab Technician:** B. Russell

**Items Received:**

16 samples were 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. 200 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 4).

**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. 100 | No. 140 | No. 200 |
| B2YF05                 | H-0001                   | 12/30/2014       | 100                           | 100    | 100   | 100   | 100   | 100    | 99.8   | 99.1   | 57.9    | 21.4    | 9.2     |
| B2YF04                 | H-0002                   | 12/30/2014       | 100                           | 71.3   | 60.5  | 40.8  | 29.5  | 21.3   | 16.2   | 11.5   | 7.5     | 4.9     | 3.3     |
| B2YF06                 | H-0004                   | 1/8/2015         | 100                           | 90.5   | 89    | 87.3  | 86.7  | 86.4   | 86.3   | 82     | 64.2    | 27.8    | 6.6     |
| B2WB58                 | H-0005                   | 1/8/2015         | 100                           | 85.7   | 66.3  | 51.2  | 42.5  | 35.8   | 31.4   | 27.5   | 16.1    | 11      | 7.2     |
| B2WB60                 | H-0006                   | 1/9/2015         | 100                           | 93.5   | 84.3  | 73.3  | 65.3  | 58.8   | 53.7   | 49.3   | 27.9    | 12.8    | 6.8     |
| B2R2X0                 | H-0007                   | 1/12/2015        | 100                           | 77.7   | 59.5  | 45.5  | 40.7  | 22.6   | 20.4   | 18.8   | 10.5    | 6.1     | 3.9     |
| B2T036                 | H-0008                   | 1/12/2015        | 100                           | 100    | 100   | 100   | 100   | 100    | 99.7   | 94.1   | 24.2    | 5.7     | 3.3     |
| B2WB59                 | H-0009                   | 1/12/2015        | 100                           | 91.7   | 73.1  | 57.7  | 51.4  | 45.9   | 41.8   | 33.8   | 21.3    | 16.4    | 11.5    |
| B2W317                 | H-0010                   | 1/13/2015        | 100                           | 87.8   | 58.2  | 42.9  | 36.7  | 32.4   | 29.9   | 28.2   | 15.7    | 8.6     | 5.4     |
| B2W319                 | H-0011                   | 1/13/2015        | 100                           | 95.4   | 70.1  | 48.6  | 36    | 27.1   | 23.1   | 20.2   | 12.4    | 8.8     | 4.9     |
| B2W321                 | H-0012                   | 1/14/2015        | 100                           | 84.3   | 56.9  | 42.2  | 34.4  | 28.3   | 26.3   | 24.6   | 16.2    | 8.9     | 5.6     |
| B2W9Y4                 | H-0013                   | 1/14/2015        | 100                           | 100    | 100   | 100   | 100   | 100    | 99.9   | 99.7   | 69.5    | 6.3     | 4.2     |
| B2T1L2                 | H-0017                   | 1/19/2015        | 100                           | 79.3   | 63.8  | 52.5  | 44.9  | 38.7   | 35.4   | 28.7   | 20.4    | 6.8     | 3.4     |



**REPORT OF LABORATORY TESTING**

|   |   |
|---|---|
| <b>Report to:</b> CH2M-Hill - Plateau Remediation<br>2420 Stevens Center Place<br>P.O. Box 1600<br>Richland, WA 99352 | <b>Date:</b> 4/9/2015<br><b>Sample Delivery Group No.:</b> WA011020140001<br><b>Sample Authorization No.:</b> F13-046 |
|---|---|

|  |                                   |
|--|-----------------------------------|
| <b>Project:</b> CHPRC Laboratory                               | <b>Project No.:</b> 63797.000     |
| <b>Report of:</b> Grain Size Analysis - Hydrometer (ASTM D422) | <b>Lab Technician:</b> B. Russell |

Particle/Grain Size Analysis - Hydrometer (ASTM D422):  
 See sheet 1 of 6

**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 (%) |
| B2YF05                 | H-0001            | 0.036               | 8.9       | 0.023     | 7.9       | 0.013     | 6.9       | 0.01      | 5.9       | 0.007     | 4.9       | 0.003     | 4.8       | 0.001     | 3.6       |
| B2YF04                 | H-0002            | 0.035               | 2.7       | 0.022     | 2.3       | 0.013     | 1.9       | 0.009     | 1.4       | 0.007     | 1.2       | 0.003     | 1.2       | 0.001     | 0.8       |
| B2YF06                 | H-0004            | 0.036               | 6         | 0.023     | 5.1       | 0.013     | 4.2       | 0.01      | 3.3       | 0.007     | 3.3       | 0.003     | 3.3       | 0.001     | 2.3       |
| B2WB58                 | H-0005            | 0.034               | 5.7       | 0.022     | 4.2       | 0.013     | 3.5       | 0.009     | 2.8       | 0.007     | 2.4       | 0.003     | 2.1       | 0.001     | 1.7       |
| B2WB60                 | H-0006            | 0.036               | 4.1       | 0.023     | 3.5       | 0.013     | 2.9       | 0.009     | 2.9       | 0.007     | 2.3       | 0.003     | 2.2       | 0.001     | 2.2       |
| B2R2X0                 | H-0007            | 0.035               | 2.9       | 0.022     | 2.4       | 0.013     | 1.7       | 0.009     | 1.5       | 0.007     | 1.3       | 0.003     | 0.8       | 0.001     | 0.8       |
| B2T036                 | H-0008            | 0.038               | 2.6       | 0.024     | 2.6       | 0.014     | 2.6       | 0.01      | 1.7       | 0.007     | 1.7       | 0.003     | 1.7       | 0.001     | 1.7       |
| B2WB59                 | H-0009            | 0.035               | 5.4       | 0.023     | 3.5       | 0.013     | 2.2       | 0.009     | 2.2       | 0.007     | 1.7       | 0.003     | 0.8       | 0.001     | 0         |
| B2W317                 | H-0010            | 0.036               | 2.9       | 0.023     | 2.2       | 0.013     | 1.6       | 0.009     | 1.5       | 0.007     | 0.9       | 0.003     | 0.5       | 0.001     | 0.2       |
| B2W319                 | H-0011            | 0.036               | 2.7       | 0.023     | 1.8       | 0.013     | 1.3       | 0.01      | 1         | 0.007     | 0.7       | 0.003     | 0.4       | 0.001     | 0         |
| B2W321                 | H-0012            | 0.036               | 3.1       | 0.023     | 2.2       | 0.013     | 1.6       | 0.01      | 1.4       | 0.007     | 1.1       | 0.003     | 0.5       | 0.001     | 0         |
| B2W9Y4                 | H-0013            | 0.037               | 3.9       | 0.023     | 3.9       | 0.013     | 3.8       | 0.01      | 2.8       | 0.007     | 2.8       | 0.003     | 2.7       | 0.001     | 2.6       |
| B2T1L2                 | H-0017            | 0.036               | 3.1       | 0.023     | 2.3       | 0.013     | 1.5       | 0.01      | 1.1       | 0.007     | 0.7       | 0.003     | 0.2       | 0.001     | 0         |





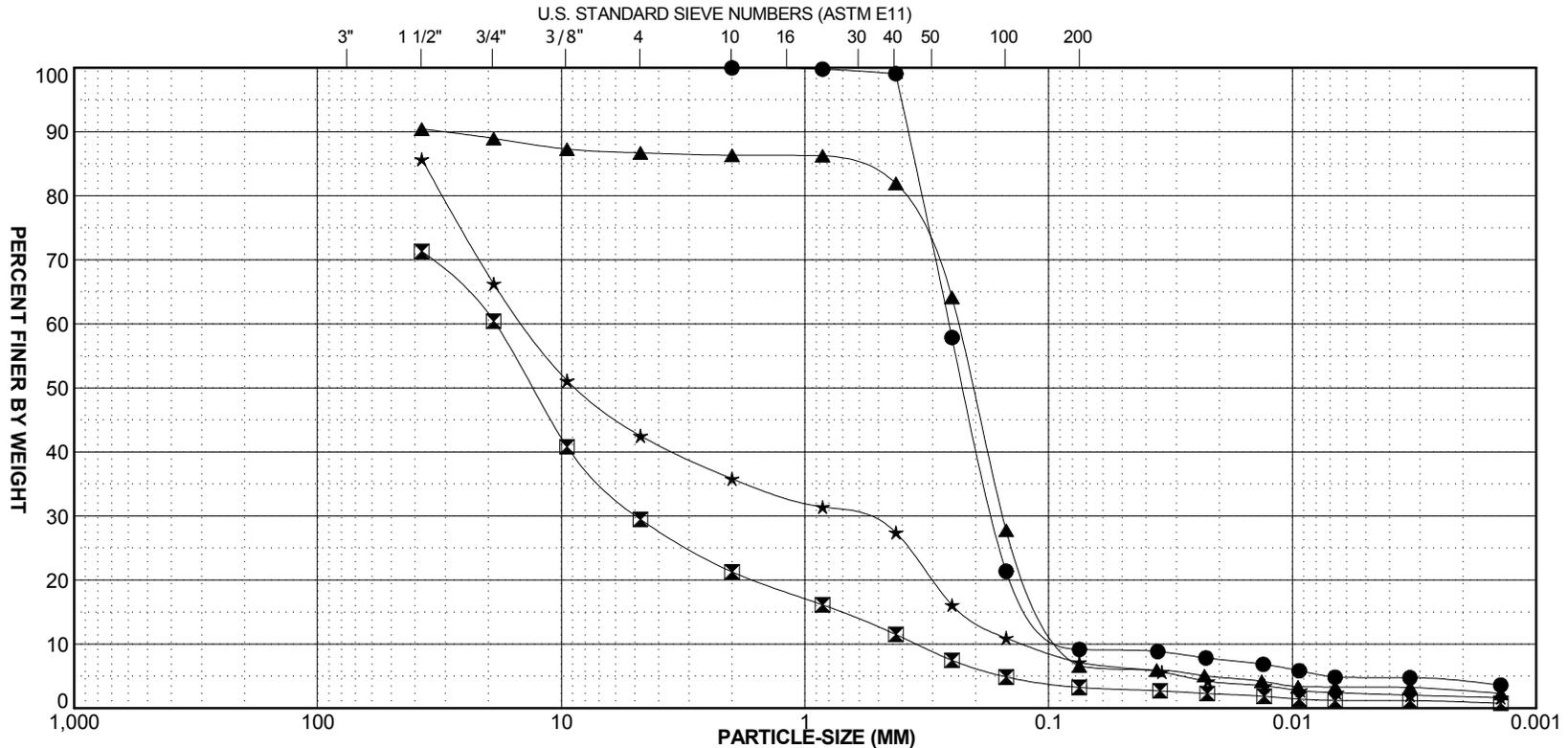
**PARTICLE-SIZE ANALYSIS TEST RESULTS**

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-001              | B2YF05        | 182.9               |                            | 0.3      | 0.2      | 0.2      | 0.08     | 0.01    |                  | 91             | 9               |
| ☒   | H-002              | B2YF04        | 105.0               |                            | 18.7     | 13.1     | 4.9      | 0.3      | 0.2     | 42               | 26             | 3               |
| ▲   | H-004              | B2YF06        | 60.3                |                            | 0.2      | 0.2      | 0.2      | 0.08     | 0.02    | 4                | 80             | 7               |
| ★   | H-005              | B2WB58        | 85.7                |                            | 14.2     | 8.7      | 0.7      | 0.1      | 0.03    | 43               | 35             | 7               |



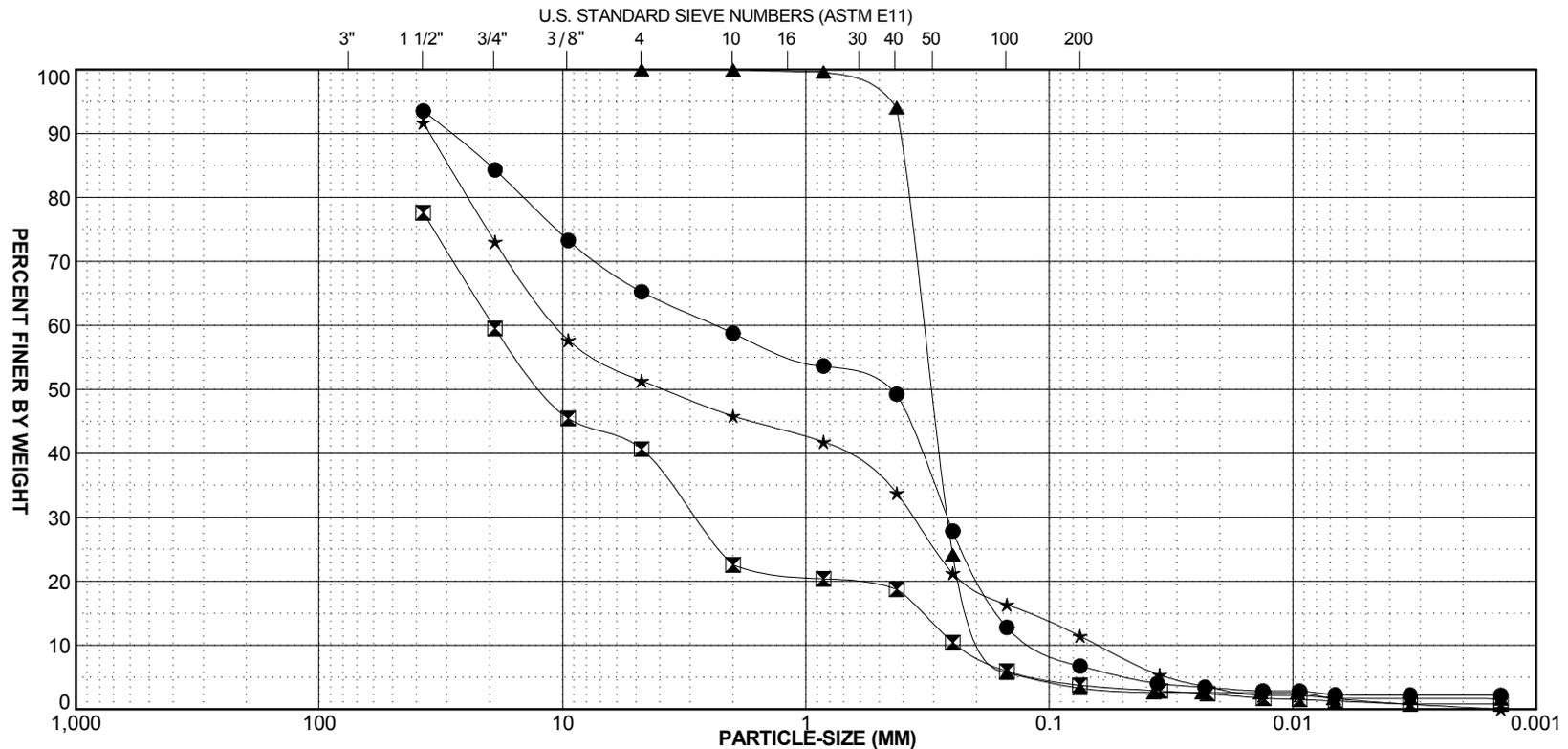
**PARTICLE-SIZE ANALYSIS TEST RESULTS**  
(continued)

CHPRC - GEOTECHNICAL LABORATORY

PBS PROJECT NUMBER:  
63797

TEST METHOD: ASTM C136

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





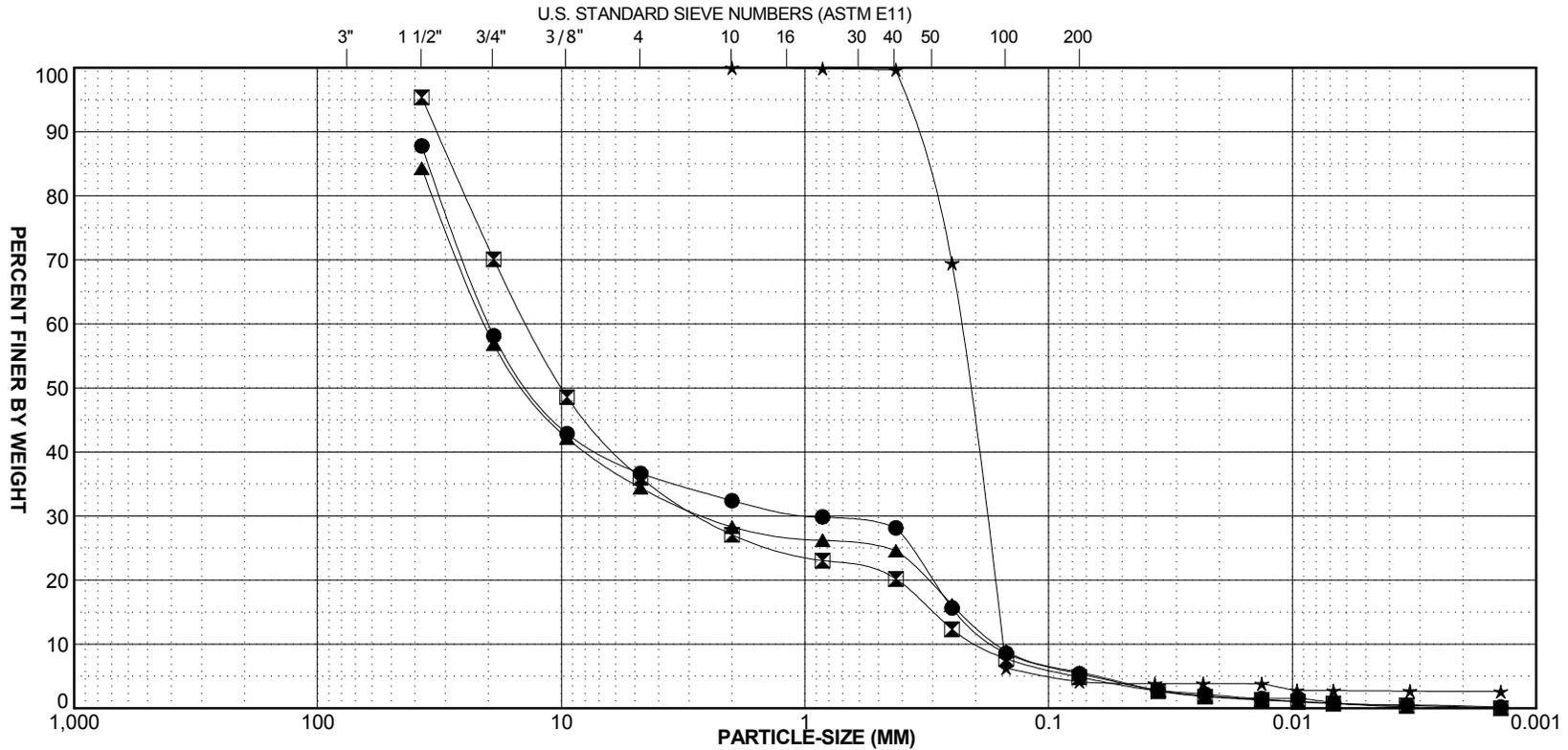
**PARTICLE-SIZE ANALYSIS TEST RESULTS**  
(continued)

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-010              | B2W317        | 39.5                |                            | 19.8     | 13.1     | 0.9      | 0.2      | 0.07    | 51               | 31             | 5               |
| ⊠   | H-011              | B2W319        | 59.8                |                            | 13.7     | 9.9      | 2.6      | 0.2      | 0.08    | 59               | 31             | 5               |
| ▲   | H-012              | B2W321        | 70.1                |                            | 20.5     | 13.7     | 2.5      | 0.2      | 0.06    | 50               | 29             | 6               |
| ★   | H-013              | B2W9Y4        | 109.5               |                            | 0.2      | 0.2      | 0.2      | 0.2      | 0.10    |                  | 96             | 4               |



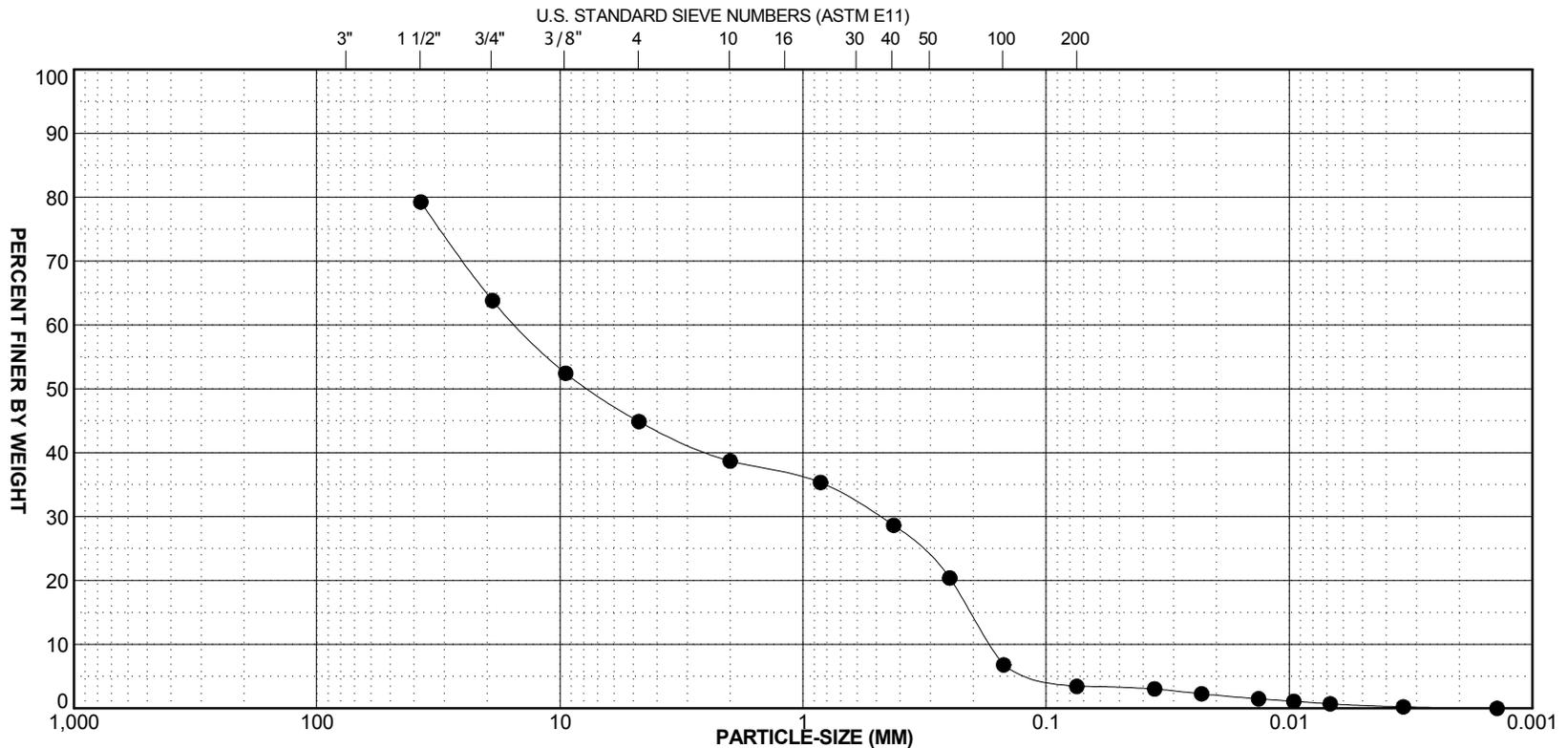
**PARTICLE-SIZE ANALYSIS TEST RESULTS**  
(continued)

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-017              | B2T1L2        | 84.7                |                            | 15.0     | 7.6      | 0.5      | 0.2      | 0.1     | 34               | 41             | 3               |
|     |                    |               |                     |                            |          |          |          |          |         |                  |                |                 |
|     |                    |               |                     |                            |          |          |          |          |         |                  |                |                 |

**REPORT OF LABORATORY TESTING**

|   |   |
|---|---|
| <b>Report to:</b> CH2M-Hill - Plateau Remediation<br>2420 Stevens Center Place<br>P.O. Box 1600<br>Richland, WA 99352 | <b>Date:</b> 4/9/2015<br><b>Sample Delivery Group No.:</b> WA011020140001<br><b>Sample Authorization No.:</b> F13-046 |
|---|---|

|   |                               |
|---|-------------------------------|
| <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:**

16 samples were 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) |
|------------------------|--------------------------|------------------|--|----------------------------------|-------------------------------------|-------------------------------|------------------------------------|---------------------------------------|
| B2YF05                 | H-0001                   | 12/29/2014       | 75   | 7.62                             | 45.843                              | 180                           | 33.8                               | 1.61E-03                              |
| B2YF04                 | H-0002                   | 1/7/2015         | 120  | 7.62                             | 45.843                              | 180                           | 46.1                               | 1.32E-01                              |
| B2YF06                 | H-0004                   | 1/7/2015         | 120  | 7.62                             | 45.843                              | 180                           | 46.1                               | 2.44E-03                              |
| B2WB58                 | H-0005                   | 1/8/2015         | 101  | 7.62                             | 45.843                              | 300                           | 81.6                               | 7.80E-04                              |
| B2WB60                 | H-0006                   | 1/9/2015         | 125  | 7.62                             | 45.843                              | 300                           | 58                                 | 1.23E-03                              |
| B2R2X0                 | H-0007                   | 1/23/2015        | 35   | 6.35                             | 31.48                               | 420                           | 65.1                               | 2.66E-05                              |
| B2T036                 | H-0008                   | 1/12/2015        | 1079   | 7.62                             | 45.843                              | 300                           | 38.7                               | 1.80E-02                              |
| B2WB59                 | H-0009                   | 1/13/2015        | 98   | 7.62                             | 45.843                              | 300                           | 86.9                               | 7.43E-04                              |
| B2W317                 | H-0010                   | 1/23/2015        | 70   | 6.35                             | 31.48                               | 300                           | 19.1                               | 2.79E-03                              |
| B2W319                 | H-0011                   | 1/14/2015        | 485  | 7.62                             | 45.843                              | 300                           | 15.1                               | 1.95E-02                              |
| B2W321                 | H-0012                   | 1/15/2015        | 82   | 7.62                             | 45.843                              | 300                           | 81                                 | 6.34E-04                              |
| B2W9Y4                 | H-0013                   | 1/16/2015        | 1400   | 7.62                             | 45.843                              | 300                           | 27.4                               | 2.90E-02                              |
| B2XPH3                 | H-0014                   | 1/19/2015        | 843  | 7.62                             | 45.843                              | 300                           | 47.4                               | 1.02E-02                              |
| B2XPH6                 | H-0015                   | 1/20/2015        | 107.5  | 6.35                             | 31.48                               | 360                           | 59.4                               | 1.13E-03                              |
| B2XPH9                 | H-0016                   | 1/21/2015        | 977  | 7.62                             | 45.843                              | 300                           | 45.6                               | 1.20E-02                              |
| B2T1L2                 | H-0017                   | 1/22/2015        | 157  | 7.62                             | 45.843                              | 300                           | 66.4                               | 1.33E-03                              |





### Geotechnical Laboratory Sample Receipt

Date/Time Received: 09/30/14 10:30 AM

SDG#: WA011020140001

Work Order Number: 300085ES10

\* SAF# F13-046-023

*F13-046*  
\* *-025, -027, -033, -035, -037*  
*-038, -040, -043, -044, -046, -049, -051,*  
*-059, -062, -065*

Shipping Container Identification: GWS-369

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 N/A
5. Vermiculite/packing materials is Wet [ ] Dry []
6. Number of samples in shipping container: 16
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: N/A
12. Chain of Custody # \*F13-046-023      See \* Above

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

Sample Custodian/Laboratory: C Lopez      Date: 09/30/14

Telephoned to: \_\_\_\_\_ On \_\_\_\_\_ by \_\_\_\_\_ 26 of 42

|  |   |   |  |  |   |
|--|---|---|--|--|---|
| <b>COLLECTOR</b><br>C. FULTON            | <b>COMPANY CONTACT</b><br>TODAK, D  | <b>TELEPHONE NO.</b><br>376-6427              | <b>PROJECT COORDINATOR</b><br>TODAK, D | <b>PRICE CODE</b><br>8H                        | <b>DATA TURNAROUND</b><br>30 Days / 30 Days     |
| <b>SAMPLING LOCATION</b><br>C8293, 1-005 | <b>PROJECT DESIGNATION</b><br>100-KR-4 Long Term & Interim Action Monitoring - Soil | <b>ACTUAL SAMPLE DEPTH</b><br>HNF-N-507-21-20 | <b>SAF NO.</b><br>F13-046              | <b>AIR QUALITY</b><br><input type="checkbox"/> | <b>METHOD OF SHIPMENT</b><br>GOVERNMENT VEHICLE |

|                             |   |                          |   |                 |
|-----------------------------|---|--------------------------|---|-----------------|
| <b>ICE CHEST NO.</b><br>N/A | <b>FIELD LOGBOOK NO.</b><br>HNF-N-507-21-20 | <b>COA</b><br>300085ES10 | <b>BILL OF LADING/AIR BILL NO.</b><br>SEE PTR | <b>ORIGINAL</b> |
|-----------------------------|---|--------------------------|---|-----------------|

|   |  |   |
|---|--|---|
| <b>SHIPPED TO</b><br>Environmental Sciences Laboratory - R5 Lee | <b>OFFSITE PROPERTY NO.</b><br>SEE PTR | <b>BILL OF LADING/AIR BILL NO.</b><br>SEE PTR |
|---|--|---|

|   |   |                             |                                 |                                   |                                 |                        |  |
|---|---|-----------------------------|---------------------------------|-----------------------------------|---------------------------------|------------------------|--|
| <b>MATRIX*</b><br>A=Air<br>DL=Drum<br>L=Liquid<br>DS=Drum<br>S=Soil<br>SE=Sediment<br>T=Tissue<br>V=Vegetation<br>W=Water<br>WI=Wipe<br>X=Other | <b>POSSIBLE SAMPLE HAZARDS/ REMARKS/4</b><br>**Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR/ATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.** | <b>PRESERVATION</b><br>None | <b>HOLDING TIME</b><br>6 Months | <b>TYPE OF CONTAINER</b><br>Liner | <b>NO. OF CONTAINER(S)</b><br>1 | <b>VOLUME</b><br>1000g | <b>SAMPLE ANALYSIS</b><br>SEE ITEM (1) IN SPECIAL INSTRUCTIONS |
|---|---|-----------------------------|---------------------------------|-----------------------------------|---------------------------------|------------------------|--|

|  |   |                        |                               |                            |                              |
|--|---|------------------------|-------------------------------|----------------------------|------------------------------|
| <b>SPECIAL HANDLING AND/OR STORAGE</b><br>RADIOACTIVE TIE TO: B2T037 | <b>SAMPLE NO.</b><br><del>82YFOS</del> 82YFOS | <b>MATRIX*</b><br>SOIL | <b>SAMPLE DATE</b><br>10/9/13 | <b>SAMPLE TIME</b><br>1547 | <b>DATE/TIME</b><br>10/31/14 |
|--|---|------------------------|-------------------------------|----------------------------|------------------------------|

April 14 2015

| CHAIN OF POSSESSION                       | SIGN/ PRINT NAMES               | SPECIAL INSTRUCTIONS  |
|---|---------------------------------|---|
| RELINQUISHED BY/REMOVED FROM<br>C. FULTON | RECEIVED BY/STORED IN<br>SSU    | ** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF. TRVL-13-111<br>(1) Particle Size (Dry Sieve) - D422; Saturated Hydraulic Conductivity {Hydraulic Conductivity}; AIR PERMEABILITY; Calcium Carbonate Content; |
| DATE/TIME<br>10/9/13 1515                 | DATE/TIME<br>10/9/13 1615       |   |
| RELINQUISHED BY/REMOVED FROM<br>SSU-1     | RECEIVED BY/STORED IN<br>CHPRC  |   |
| DATE/TIME<br>SEP 30 2014                  | DATE/TIME<br>SEP 30 2014        |   |
| RELINQUISHED BY/REMOVED FROM<br>CHPRC     | RECEIVED BY/STORED IN<br>THOMAS |   |
| DATE/TIME<br>SEP 30 2014                  | DATE/TIME<br>SEP 30 2014        |   |
| RELINQUISHED BY/REMOVED FROM<br>THOMAS    | RECEIVED BY/STORED IN<br>THOMAS |   |
| DATE/TIME<br>9/19 10:30                   | DATE/TIME<br>9/23/14 10:30      |   |
| RELINQUISHED BY/REMOVED FROM<br>THOMAS    | RECEIVED BY/STORED IN<br>THOMAS |   |
| DATE/TIME<br>9/19 10:30                   | DATE/TIME<br>9/23/14 10:30      |   |
| RELINQUISHED BY/REMOVED FROM<br>THOMAS    | RECEIVED BY/STORED IN<br>THOMAS |   |
| DATE/TIME<br>9/19 10:30                   | DATE/TIME<br>9/23/14 10:30      |   |

|                                 |                        |                    |
|---------------------------------|------------------------|--------------------|
| <b>LABORATORY SECTION</b>       | <b>RECEIVED BY</b>     | <b>TITLE</b>       |
| <b>FINAL SAMPLE DISPOSITION</b> | <b>DISPOSAL METHOD</b> | <b>DISPOSED BY</b> |



COLLECTOR

COMPANY CONTACT

TELEPHONE NO.

PROJECT COORDINATOR

PRICE CODE

8H

DATA TURNAROUND

C8297, I-003

TODAK, D

376-6427

TODAK, D

SAF NO.

30 Days / 30 Days

SAMPLING LOCATION

PROJECT DESIGNATION

100-KR-4 Long Term & Interim Action Monitoring - Soil

F13-046

AIR QUALITY

ORIGINAL

ICE CHEST NO.

FIELD LOGBOOK NO.

HNF-N507-26-65

ACTUAL SAMPLE DEPTH

COA

300085ES10

METHOD OF SHIPMENT

SHIPPED TO

OFFSITE PROPERTY NO.

SEE PTR

BILL OF LADING/AIR BILL NO.

SEE PTR

GOVERNMENT VEHICLE

29 of 42

*Shaw Group* *RS Lee KS 9/30/14*

*None*

*61.3*

*WDA011020140001*

*H-0004*

*1*

*1000g*

MATRIX\* POSSIBLE SAMPLE HAZARDS/ REMARKS

PRESERVATION

HOLDING TIME

TYPE OF CONTAINER

NO. OF CONTAINER(S)

VOLUME

SAMPLE ANALYSIS

A=Air

None

None

Split Spoon Liner

1

1000g

SEE ITEM (1) IN SPECIAL INSTRUCTIONS

DL=Drum

Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR/ATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

None

Split Spoon Liner

1

1000g

SEE ITEM (1) IN SPECIAL INSTRUCTIONS

DS=Drum

Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR/ATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

None

Split Spoon Liner

1

1000g

SEE ITEM (1) IN SPECIAL INSTRUCTIONS

L=Liquid

Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR/ATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

None

Split Spoon Liner

1

1000g

SEE ITEM (1) IN SPECIAL INSTRUCTIONS

O=Oil

Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR/ATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

None

Split Spoon Liner

1

1000g

SEE ITEM (1) IN SPECIAL INSTRUCTIONS

S=Soil

Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR/ATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

None

Split Spoon Liner

1

1000g

SEE ITEM (1) IN SPECIAL INSTRUCTIONS

T=Tissue

Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR/ATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

None

Split Spoon Liner

1

1000g

SEE ITEM (1) IN SPECIAL INSTRUCTIONS

V=Vegetation

Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR/ATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

None

Split Spoon Liner

1

1000g

SEE ITEM (1) IN SPECIAL INSTRUCTIONS

W=Water

Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR/ATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

None

Split Spoon Liner

1

1000g

SEE ITEM (1) IN SPECIAL INSTRUCTIONS

WI=Wipe

Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR/ATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

None

Split Spoon Liner

1

1000g

SEE ITEM (1) IN SPECIAL INSTRUCTIONS

X=Other

Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR/ATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

None

Split Spoon Liner

1

1000g

SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SPECIAL HANDLING AND/OR STORAGE RADIOACTIVE TIE TO: B2T038

SAMPLE NO.

MATRIX\*

SAMPLE DATE

SAMPLE TIME

✓

~~82456~~ 82456

SOIL

3/20/14

0925

*MS* 10/31/14

April 14 2015

CHAIN OF POSSESSION

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS

RELINQUISHED BY/REMOVED FROM

DATE/TIME

RECEIVED BY/STORED IN

DATE/TIME

\*\* The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF. TRVL-14-060, ~~DO NOT SHIP SAMPLE~~ (1) Particle Size (Dry Sieve) - D422; Permeability - D2434; Saturated Hydraulic Conductivity; Saturated Hydraulic Conductivity (Hydraulic Conductivity, No CAS); Calcium Carbonate Content;

*R Crow K Crow*

3/20/14

SSU #1

3/20/14

KS 9/30/14

RELINQUISHED BY/REMOVED FROM

DATE/TIME

RECEIVED BY/STORED IN

DATE/TIME

TRVL-14-060

*SSU-1*

SEP 3 0 2014

CHPRC

SEP 3 0 2014

TRVL-14-060

RELINQUISHED BY/REMOVED FROM

DATE/TIME

RECEIVED BY/STORED IN

DATE/TIME

TRVL-14-060

*CHPRC*

SEP 3 0 2014

CHPRC

SEP 3 0 2014

TRVL-14-060

RELINQUISHED BY/REMOVED FROM

DATE/TIME

RECEIVED BY/STORED IN

DATE/TIME

TRVL-14-060

*1*

DATE/TIME

RECEIVED BY/STORED IN

DATE/TIME

TRVL-14-060

RELINQUISHED BY/REMOVED FROM

DATE/TIME

RECEIVED BY/STORED IN

DATE/TIME

TRVL-14-060

LABORATORY SECTION

RECEIVED BY

TITLE

DATE/TIME

TRVL-14-060

FINAL SAMPLE DISPOSITION

DISPOSAL METHOD

DISPOSED BY

DATE/TIME

TRVL-14-060



**COLLECTOR** R. Notherton  
**SAMPLING LOCATION** C8795, 1-006,  
**ICE CHEST NO.** 12/14  
**SHIPPED TO** Environmental Sciences Laboratory  
**COMPANY CONTACT** TODAK, D  
**PROJECT DESIGNATION** 100-KR-4 Long Term & Interim Action Monitoring - Soil  
**FIELD LOGBOOK NO.** INF-N-507-28-116  
**OFFSITE PROPERTY NO.** SEE PTR  
**TELEPHONE NO.** 376-6427  
**PROJECT COORDINATOR** TODAK, D  
**PRICE CODE** 8H  
**AIR QUALITY**   
**METHOD OF SHIPMENT** GOVERNMENT VEHICLE  
**DATA TURNAROUND** 30 Days / 30 Days  
**ORIGINAL**

**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 may or may not be regulated for transportation per 49 CFR/ATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.\*\*  
**PRESERVATION** None  
**HOLDING TIME** 6 Months  
**TYPE OF CONTAINER** Liner  
**NO. OF CONTAINER(S)** 1  
**VOLUME** 1000g  
**SAMPLE ANALYSIS** SEE ITEM (1) IN SPECIAL INSTRUCTIONS  
**SPECIAL HANDLING AND/OR STORAGE** RADIOACTIVE TIE TO: B2TL13  
**WDA011020140001**  
**H-0006**

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME |
|------------|---------|-------------|-------------|
| B2TL13     | SOIL    | 4-17-14     | 1110        |

April 14 2015

| CHAIN OF POSSESSION                               | SIGN/PRINT NAMES                     | SPECIAL INSTRUCTIONS  |
|---|--------------------------------------|---|
| RELINQUISHED BY/REMOVED FROM<br>Brockton<br>SSU-1 | RECEIVED BY/STORED IN<br>SSU #1      | ** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF. TRVL-13-112□□** All requests for Hexavalent Chromium are to have a unique HEIS sample number and be assigned to a separate COC. TRVL-13-111<br>(1) Particle Size (Dry Sieve) - D422; Saturated Hydraulic Conductivity {Hydraulic Conductivity}; AIR PERMEABILITY; Calcium Carbonate Content;<br><br><b>TRVL-13-112</b> |
| RELINQUISHED BY/REMOVED FROM<br>SEP 30 2014       | RECEIVED BY/STORED IN<br>SEP 30 2014 |   |
| RELINQUISHED BY/REMOVED FROM<br>SEP 30 2014       | RECEIVED BY/STORED IN<br>SEP 30 2014 |   |
| RELINQUISHED BY/REMOVED FROM<br>SEP 30 2014       | RECEIVED BY/STORED IN<br>SEP 30 2014 |   |
| RELINQUISHED BY/REMOVED FROM<br>SEP 30 2014       | RECEIVED BY/STORED IN<br>SEP 30 2014 |   |



|  |   |   |  |  |   |
|--|---|---|--|--|---|
| <b>COLLECTOR</b><br>E. Koster 10/13/13   | <b>COMPANY CONTACT</b><br>TODAK, D  | <b>TELEPHONE NO.</b><br>376-6427            | <b>PROJECT COORDINATOR</b><br>TODAK, D | <b>PRICE CODE</b><br>8H                        | <b>DATA TURNAROUND</b><br>30 Days / 30 Days     |
| <b>SAMPLING LOCATION</b><br>C8293, 1-003 | <b>PROJECT DESIGNATION</b><br>100-KR-4 Long Term & Interim Action Monitoring - Soil | <b>ACTUAL SAMPLE DEPTH</b><br>1406-143.1 ft | <b>SAF NO.</b><br>F13-046              | <b>AIR QUALITY</b><br><input type="checkbox"/> | <b>METHOD OF SHIPMENT</b><br>GOVERNMENT VEHICLE |
| <b>ICE CHEST NO.</b><br>N/A              | <b>FIELD LOGBOOK NO.</b><br>HNF-N-50759-1B  | <b>OFFSITE PROPERTY NO.</b><br>SEE PTR      | <b>COA</b><br>300085ES10               | <b>BILL OF LADING/AIR BILL NO.</b><br>SEE PTR  |   |

**SHIPPED TO** *SHAW-Walsh RS Lee* *RS 9/30/14*  
**Environmental Sciences Laboratory**

| MATRIX*   | POSSIBLE SAMPLE HAZARDS/ REMARKS  | PRESERVATION | HOLDING TIME | TYPE OF CONTAINER | NO. OF CONTAINER(S) | VOLUME | SPECIAL HANDLING AND/OR STORAGE |
|---|---|--------------|--------------|-------------------|---------------------|--------|---------------------------------|
| A=Air<br>DL=Drum<br>Liquids<br>DS=Drum<br>Solids<br>L=Liquid<br>O=Oil<br>S=Soil<br>SE=Sealment<br>T=Tissue<br>V=Vegetation<br>W=Water<br>WT=Wipe<br>X=Other | **Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR/JATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.** | None         | 6 Months     | Liner             | 1                   | 1000g  | RADIOACTIVE TIE TO: B2T035      |

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME |
|------------|---------|-------------|-------------|
| B2T036     | SOIL    | 10/13/13    | 1050        |

*WAO1020140001*  
*H-0008*

April 14 2015

| CHAIN OF POSSESSION   | SIGN/ PRINT NAMES  | SPECIAL INSTRUCTIONS   |
|---|--|--|
| <p>RELINQUISHED BY/REMOVED FROM<br/><i>E. Koster</i> 10/13/13</p> <p>RELINQUISHED BY/REMOVED FROM<br/><i>SSU-1</i> SEP 30 2014</p> <p>RELINQUISHED BY/REMOVED FROM<br/><i>CHPRC</i> SEP 30 2014</p> <p>RELINQUISHED BY/REMOVED FROM<br/><i>CHPRC</i> SEP 30 2014</p> <p>RELINQUISHED BY/REMOVED FROM<br/><i>CHPRC</i> SEP 30 2014</p> | <p>RECEIVED BY/STORED IN<br/><i>SSU-1</i> 10/13/13</p> <p>RECEIVED BY/STORED IN<br/><i>CHPRC</i> SEP 30 2014</p> <p>RECEIVED BY/STORED IN<br/><i>CHPRC</i> SEP 30 2014</p> <p>RECEIVED BY/STORED IN<br/><i>CHPRC</i> SEP 30 2014</p> | <p>** The 100 Area S&amp;GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF. TRVL-13-111</p> <p>(1) Particle Size (Dry Sieve) - D422; Saturated Hydraulic Conductivity (Hydraulic Conductivity); AIR PERMEABILITY; Calcium Carbonate Content;</p> |

**TRVL-13-111**

|                   |   |                      |   |                             |                   |                     |                     |                    |                    |                 |                   |                          |
|-------------------|---|----------------------|---|-----------------------------|-------------------|---------------------|---------------------|--------------------|--------------------|-----------------|-------------------|--------------------------|
| COLLECTOR         | Robert Crow                                     | COMPANY CONTACT      | TODAK, D  | TELEPHONE NO.               | 376-6427          | PROJECT COORDINATOR | TODAK, D            | PRICE CODE         | 8H                 | DATA TURNAROUND | 30 Days / 30 Days |                          |
| SAMPLING LOCATION | C8795, I-004,                                   | PROJECT DESIGNATION  | 100-KR-4 Long Term & Interim Action Monitoring - Soil |                             | FIELD LOGBOOK NO. | INF-N-507-29-64     | ACTUAL SAMPLE DEPTH | 121.1-123.6        | SAF NO.            | F13-046         | AIR QUALITY       | <input type="checkbox"/> |
| ICE CHEST NO.     |   | OFFSITE PROPERTY NO. | SEE PTR   | BILL OF LADING/AIR BILL NO. | SEE PTR           | COA                 | 300085E510          | METHOD OF SHIPMENT | GOVERNMENT VEHICLE | <b>ORIGINAL</b> |                   |                          |
| SHIPPED TO        | Environmental Sciences Laboratory <i>RT Lee</i> | PRESERVATION         | None  | HOLDING TIME                | 6 Months          | NO. OF CONTAINER(S) | 1                   | VOLUME             | 1000g              |                 |                   |                          |

WRA011020140001  
H-00009

| MATRIX*  | POSSIBLE SAMPLE HAZARDS/REMARKS   | NO. OF CONTAINER(S) | VOLUME      | SAMPLE ANALYSIS | SEE ITEM (1) IN SPECIAL INSTRUCTIONS |
|--|---|---------------------|-------------|-----------------|--------------------------------------|
| A=Air<br>DL=Drum<br>L=Liquid<br>PS=Drum<br>Solids<br>L=Liquid<br>O=Oil<br>S=Sediment<br>SE=Sediment<br>T=Tissue<br>V=Vegetation<br>W=Water<br>WF=Wipe<br>X=Other | **Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR/TATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.** |                     |             |                 |                                      |
| SAMPLE NO.   | MATRIX*   | SAMPLE DATE         | SAMPLE TIME |                 |                                      |
| B2TL12-82MB59  | SOIL  | 4-10-14             | 1025        |                 | /                                    |

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| CHAIN OF POSSESSION                                | SIGN / PRINT NAMES                     | SPECIAL INSTRUCTIONS   |
|--|--|--|
| RELINQUISHED BY/REMOVED FROM<br><i>Robert Crow</i> | RECEIVED BY/STORED IN<br><i>SSU-1</i>  | ** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF. TRVL-13-112□□** All requests for Hexavalent Chromium are to have a unique HEIS sample number and be assigned to a separate COC. TRVL-13-111.<br>(1) Particle Size (Dry Sieve) - D422; Saturated Hydraulic Conductivity {Hydraulic Conductivity}; AIR PERMEABILITY; Calcium Carbonate Content; |
| DATE/TIME<br>APR 10 2014 1352                      | DATE/TIME<br>APR 10 2014 1352          |  |
| RELINQUISHED BY/REMOVED FROM<br><i>CHGRP</i>       | RECEIVED BY/STORED IN<br><i>CHGRP</i>  |  |
| DATE/TIME<br>SEP 30 2014                           | DATE/TIME<br>SEP 30 2014               |  |
| RELINQUISHED BY/REMOVED FROM<br><i>RT Lee</i>      | RECEIVED BY/STORED IN<br><i>RT Lee</i> |  |
| DATE/TIME<br>9/29/14 10:30                         | DATE/TIME<br>9/30/14 10:30             |  |
| RELINQUISHED BY/REMOVED FROM                       | RECEIVED BY/STORED IN                  |  |
| DATE/TIME  | DATE/TIME                              |  |
| RELINQUISHED BY/REMOVED FROM                       | RECEIVED BY/STORED IN                  |  |
| DATE/TIME  | DATE/TIME                              |  |
| RELINQUISHED BY/REMOVED FROM                       | RECEIVED BY/STORED IN                  |  |
| DATE/TIME  | DATE/TIME                              |  |

TRVL-13-112

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







COLLECTOR *White* COMPANY CONTACT TODAY, D TELEPHONE NO. 376-6427 PROJECT COORDINATOR TODAY, D PRICE CODE 8H DATA TURNAROUND 30 Days / 30 Days

SAMPLING LOCATION *White* PROJECT DESIGNATION 100-KR-4 Long Term & Interim Action Monitoring - Soil SAF NO. F13-046 AIR QUALITY  METHOD OF SHIPMENT GOVERNMENT VEHICLE ORIGINAL

ICE CHEST NO. *1012* FIELD LOGBOOK NO. *HNF-N-507-29* ACTUAL SAMPLE DEPTH *109.5-112.0 ft* COA 300085E510 BILL OF LADING/AIR BILL NO. SEE PTR

SHIPPED TO *RS Lee* OFFSITE PROPERTY NO. SEE PTR

MATRIX\* POSSIBLE SAMPLE HAZARDS/ REMARKS Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR/LATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME |
|------------|---------|-------------|-------------|
| B2W9Y4     | SOIL    | 4-1-14      | 1133        |

*WFO11020140001*  
*H-0013*

| CHAIN OF POSSESSION                                 | SIGN / PRINT NAMES                           | SPECIAL INSTRUCTIONS   |
|---|--|--|
| RELINQUISHED BY/REMOVED FROM<br><i>M White</i>      | RECEIVED BY/STORED IN<br><i>SSC #1</i>       | <p>** The 100 Area S&amp;GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF. TRVL-14-061; <del>DO NOT SHIP SAMPLE</del> (1) Particle Size (Dry Sieve) - D422; Permeability - D2434; Saturated Hydraulic Conductivity; Saturated Hydraulic Conductivity {Hydraulic Conductivity, No CAS}; Calcium Carbonate Content;</p> |
| RELINQUISHED BY/REMOVED FROM<br><i>SEP 3 0 2014</i> | RECEIVED BY/STORED IN<br><i>CHPRC</i>        |  |
| RELINQUISHED BY/REMOVED FROM<br><i>SEP 3 0 2014</i> | RECEIVED BY/STORED IN<br><i>SEP 3 0 2014</i> |  |
| RELINQUISHED BY/REMOVED FROM<br><i>SEP 3 0 2014</i> | RECEIVED BY/STORED IN<br><i>SEP 3 0 2014</i> |  |
| RELINQUISHED BY/REMOVED FROM<br><i>SEP 3 0 2014</i> | RECEIVED BY/STORED IN<br><i>SEP 3 0 2014</i> |  |

TRVL-14-060

LABORATORY SECTION RECEIVED BY DATE/TIME  
FINAL SAMPLE DISPOSITION DISPOSAL METHOD DATE/TIME  
PRINTED ON 4/1/2014 A-6003-618 (REV 2)

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COLLECTOR *J. Aviler* COMPANY CONTACT TODAY, D TELEPHONE NO. 376-6427 PROJECT COORDINATOR TODAY, D PRICE CODE 8H DATA TURNAROUND 30 Days / 30 Days

SAMPLING LOCATION CB291, I-005 PROJECT DESIGNATION 100-KR-4 Long Term & Interim Action Monitoring - Soil FIELD LOGBOOK NO. HNF-N-507-291-70 ACTUAL SAMPLE DEPTH 153.4" - 156.2" SAF NO. F13-046 AIR QUALITY  METHOD OF SHIPMENT FEDERAL EXPRESS ORIGINAL

SHIPPED TO *RS Lee* *RS 9/30/14* OFFSITE PROPERTY NO. SEE PTR BILL OF LADING/AIR BILL NO. SEE PTR

MATRIX\* POSSIBLE SAMPLE HAZARDS/ REMARKS \*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/JATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

DI=Drum LI=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water X=Other PRESERVATION None HOLDING TIME None TYPE OF CONTAINER Split Spoon Liner NO. OF CONTAINER(S) 1 VOLUME 1000g

| SAMPLE NO. | MATRIX* | SAMPLE DATE | SAMPLE TIME |
|------------|---------|-------------|-------------|
| B2XPH9     | SOIL    | 9-18-14     | 0840        |

SPECIAL HANDLING AND/OR STORAGE SAMPLE ANALYSIS SEE ITEM (1) IN SPECIAL INSTRUCTIONS

CHAIN OF POSSESSION SIGN/ PRINT NAMES

| RELINQUISHED BY/REMOVED FROM | DATE/TIME        | RECEIVED BY/STORED IN | DATE/TIME        | SPECIAL INSTRUCTIONS   |
|------------------------------|------------------|-----------------------|------------------|--|
| <i>J. Aviler</i>             | 9-18-14 1055     | <i>[Signature]</i>    | 9-18-14 1055     | TRVL-14-150 ** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF. ** 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) Particle Size (Dry Sieve) D422; Permeability D2434; Saturated Hydraulic Conductivity; Saturated Hydraulic Conductivity {Hydraulic Conductivity, No CAS}; Calcium Carbonate Content; P26+1Y |
| CHPRC                        | SEP 18 2014 1125 | CHPRC                 | SEP 18 2014 1125 |  |
| CHPRC                        | SEP 30 2014      | CHPRC                 | SEP 30 2014      |  |
| CHPRC                        | SEP 30 2014      | CHPRC                 | SEP 30 2014      |  |
| CHPRC                        | SEP 30 2014      | CHPRC                 | SEP 30 2014      |  |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME        | RECEIVED BY/STORED IN | DATE/TIME        |  |
| <i>KL Lee Group</i>          | 9/31/14 1030     | <i>KL Lee Group</i>   | 9/31/14 1030     |  |
| RELINQUISHED BY/REMOVED FROM | DATE/TIME        | RECEIVED BY/STORED IN | DATE/TIME        |  |
| <i>TRVL-14-150</i>           |                  |                       |                  |  |

