

May 21, 2014

REV. 1

**WSCF Laboratory**

PO Box 650 S3-30  
Richland, WA 99352



May 21, 2014

Scot Fitzgerald  
CH2M-HILL PRC  
PO Box 1600  
Richland, WA 99352

Dear Scot Fitzgerald,

REVISED140525 - 866049 [Report ID: 140525]

Reference: (1) SOW, Mod 2, #36587, Release 3  
(2) MSC-SD-CD-QAPP-017, current version, Waste Sampling & Characterization Facility Quality Assurance Program Plan

This letter contains the following information for sample delivery group WSCF140525

- \* Cover Sheet (Attachment 1)
- \* Narrative (Attachment 2)
- \* Analytical Results (Attachment 3)
- \* Sample Receipt Information (Attachment 4)

Very truly yours,

A handwritten signature in black ink, appearing to read "Joseph Hale", is written over a horizontal line.

Electronically signed by Joseph Hale

For Lab Manager, Dan T. Smith

WSCF Analytical Lab

(509) 373-4804

Attachments 4

CC: w/Attachments

File/LB

REVISED140525 -

ATTACHMENT 1

**COVER SHEET**

Consisting of 2 pages  
Including cover page

**WSCF SAF Number Cross Reference**

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Group # WSCF140525  
Data Deliverable Date 04/08/14

| SAF #   | Sample ID | Sample #  | Matrix | Sampled  | Received |
|---------|-----------|-----------|--------|----------|----------|
| I14-005 | B2RTJ9    | 140525001 | WATER  | 11/22/13 | 11/22/13 |
| I14-005 | B2RVH2    | 140525002 | WATER  | 11/22/13 | 11/22/13 |

ATTACHMENT 2

**NARRATIVE**

Consisting of 5 pages  
Including cover page

Attachment 2  
NarrativeRev1  
WSCF140525

**Revision 1: This case narrative replaces the prior in its entirety. It has been modified to address the P&D regarding missing 200.8 compound.**

### **Introduction RDR R8147**

Samples B2RTJ9 (131428006) and B2RVH2 (131428007) were selected for reanalysis at the WSCF Laboratory from 140320WSCF-R8147. The samples were analyzed for the analytes indicated on the attached copy of the RDR form in accordance with the *Statement of Work (SOW)*, *Master Contract 39818, Revision 3, "Laboratory Analytical Services to CHPRC Soil and Groundwater Remediation Project."*

The narrative (Attachment 2) will address sample characteristics, analyses requested and general information in performance of the analytical methods. A Data Summary Report (Attachment 3) includes analytical results, a comment report detailing method abnormalities, tentatively identified peaks if applicable, method references, and Laboratory QC information as applicable. Copies of the RDR and sample receipt documentation are included as Attachment 4.

It should be noted that the attached chain of custody was not stamped "ICED" by the WSCF Laboratory Sample Custodian during sample receiving. However, based on procedure LO-090-403 form "NOTICE OF IMPROPER SAMPLE SUBMITTAL" was not submitted and was not stamped "NOT ICED". No anomaly was noted during sample receipt.

The following generic data qualifiers (i.e., B, C, D, J and U) may be applicable to this report, as appropriate.

- **B** – Sample results with a concentration greater than the MDL but less than the PQL are B flagged (applies to inorganic and wet chemical analyses), as appropriate.
- **C** – Analyte was detected in the blank and was evaluated. Affected sample results in the batch were C flagged (applies to inorganic and wet chemical analyses).
- **D** – Sample results are D flagged if dilution(s) were required, as appropriate.
- **J** – Sample results with a concentration greater than the MDL but less than the PQL are J flagged (applies to organic analyses), as appropriate.
- **B (organic analyses)** – Analyte was detected in the blank and was evaluated. Affected sample results in the batch were B flagged.
- **U** – Analyzed for but not detected above limiting criteria. Relative Percent Difference (RPD) values associated with an analyte qualified with a "U" are not applicable.

### **Analytical Methodology for Requested Analyses**

Refer to *WSCF Method References Report* for a complete listing of approved analytical methods.

Attachment 2  
NarrativeRev1  
WSCF140525

**Inorganic Comments**

**ICP-MS Metals** – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- o No known reason for the discrepancies.
- o All applicable QC controls are within the established limits.

We certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this data package has been authorized by the Analytical Laboratory Manager (or designee) and the Client Services representative as verified by electronic signatures shown on the WSCF ANALYTICAL RESULTS REPORT.

Attachment 2  
 NarrativeRev1  
 WSCF140525

RECHECK, RECOUNT, OR REANALYSIS ORDER

03/20/2014

**Order Number: 140320W SCF-R8147**

Waste Sampling & Characterization  
 600 AREA Hanford, MSIN S3-28  
 Richland, WA 99352

Sample Delivery Group: WSCF131428

Sample(s):

Method Name: 200.8\_METALS\_ICPMS

Sample# B2RTJ9

Sample Date: 11/22/2013 11:19:00 AM

SAF #: 114-005

| Lab Sample ID                                                                            | RDR Action           | Start Date | Constituent | Action            | TAT (Hardcopy/EDD) |
|------------------------------------------------------------------------------------------|----------------------|------------|-------------|-------------------|--------------------|
| 131428006                                                                                | 3/20/2014 3:54:27 PM | Arsenic    | REANALYZE   | 15 Days / 15 Days |                    |
| Special Instructions: Please re-report all originally requested analytes. SLF 03/20/2014 |                      |            |             |                   |                    |
| 131428006                                                                                | 3/20/2014 3:54:27 PM | Vanadium   | REANALYZE   | 15 Days / 15 Days |                    |
| Special Instructions: Please re-report all originally requested analytes. SLF 03/20/2014 |                      |            |             |                   |                    |
| 131428006                                                                                | 3/20/2014 3:54:27 PM | Lead       | REANALYZE   | 15 Days / 15 Days |                    |
| Special Instructions: Please re-report all originally requested analytes. SLF 03/20/2014 |                      |            |             |                   |                    |
| 131428006                                                                                | 3/20/2014 3:54:27 PM | Uranium    | REANALYZE   | 15 Days / 15 Days |                    |
| Special Instructions: Please re-report all originally requested analytes. SLF 03/20/2014 |                      |            |             |                   |                    |
| 131428006                                                                                | 3/20/2014 3:54:27 PM | Manganese  | REANALYZE   | 15 Days / 15 Days |                    |
| Special Instructions: Please re-report all originally requested analytes. SLF 03/20/2014 |                      |            |             |                   |                    |
| 131428006                                                                                | 3/20/2014 3:54:27 PM | Zinc       | REANALYZE   | 15 Days / 15 Days |                    |
| Special Instructions: Please re-report all originally requested analytes. SLF 03/20/2014 |                      |            |             |                   |                    |

Sample# B2RVH2

Sample Date: 11/22/2013 1:17:00 PM

SAF #: 114-005

| Lab Sample ID                                                                            | RDR Action           | Start Date | Constituent | Action            | TAT (Hardcopy/EDD) |
|------------------------------------------------------------------------------------------|----------------------|------------|-------------|-------------------|--------------------|
| 131428007                                                                                | 3/20/2014 3:54:27 PM | Manganese  | REANALYZE   | 15 Days / 15 Days |                    |
| Special Instructions: Please re-report all originally requested analytes. SLF 03/20/2014 |                      |            |             |                   |                    |
| 131428007                                                                                | 3/20/2014 3:54:27 PM | Chromium   | REANALYZE   | 15 Days / 15 Days |                    |
| Special Instructions: Please re-report all originally requested analytes. SLF 03/20/2014 |                      |            |             |                   |                    |
| 131428007                                                                                | 3/20/2014 3:54:27 PM | Zinc       | REANALYZE   | 15 Days / 15 Days |                    |
| Special Instructions: Please re-report all originally requested analytes. SLF 03/20/2014 |                      |            |             |                   |                    |
| 131428007                                                                                | 3/20/2014 3:54:27 PM | Vanadium   | REANALYZE   | 15 Days / 15 Days |                    |
| Special Instructions: Please re-report all originally requested analytes. SLF 03/20/2014 |                      |            |             |                   |                    |
| 131428007                                                                                | 3/20/2014 3:54:27 PM | Lead       | REANALYZE   | 15 Days / 15 Days |                    |
| Special Instructions: Please re-report all originally requested analytes. SLF 03/20/2014 |                      |            |             |                   |                    |
| 131428007                                                                                | 3/20/2014 3:54:27 PM | Uranium    | REANALYZE   | 15 Days / 15 Days |                    |
| Special Instructions: Please re-report all originally requested analytes. SLF 03/20/2014 |                      |            |             |                   |                    |
| 131428007                                                                                | 3/20/2014 3:54:27 PM | Arsenic    | REANALYZE   | 15 Days / 15 Days |                    |
| Special Instructions: Please re-report all originally requested analytes. SLF 03/20/2014 |                      |            |             |                   |                    |

Deliver Report Results to: CHPRC

P.O. Box 1600  
 Richland, WA 99352  
 C/O Mr.Scot Fitzgerald

REVISED140525 -

Attachment 2  
NarrativeRev1  
WSCF140525

## Problem and Discrepancy Report

WSCF

SDG WSCF140525

05/13/14

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**1. The data package has the following issues:**

- a. Vanadium is missing from the rerun for 200.8 metals.

**Resolution:** *Provide appropriate correction*

**Lab Response:** **Vanadium has been added.**

Please correct the issues and resubmit the hard copy and electronic data package.

ATTACHMENT 3

**ANALYTICAL RESULTS**

Consisting of 13 pages  
Including cover page

**WSCF ANALYTICAL RESULTS REPORT**

For

CH2M Hill Plateau Remediation

PO Box 1600  
Richland, WA 99352

Attention: Scot Fitzgerald

**Contract #** MOA-FH-CHPRC-2008  
**Group #** WSCF140525  
**Report Date** May 21, 2014

Analytical: Electronically signed by Joseph Hale

Client Services: Electronically signed by Marisol Avila

*Solid samples results that have a 'Percent Solid' test are reported on a "dry weight basis", except results of TCLP, Percent Solid, and Total Activity. If no 'Percent Solid' test is reported then the results are reported on an "as received" basis.*

This information is intended for the use of the addressee only. If the reader of this report is not the intended recipient or is not authorized by the recipient to receive the report, you are hereby notified that any dissemination, distribution or copying of this report is strictly prohibited. If you have received this report in error, please notify WSCF Laboratory immediately by telephone at (509) 373-7005. Information designation of this report is the responsibility of the customer.

**REVISED140525 -**

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF140525

| QC Batch | Analytical Batch | S# | Type   | Sample #  | Client Sample#       | Original  | Test                           |
|----------|------------------|----|--------|-----------|----------------------|-----------|--------------------------------|
| 230982   | 230994           | 4  | BLANK  | 108303    | BLANK                |           | ICP-2008 MS All possible metal |
| 230982   | 230994           | 5  | LCS    | 108304    | LCS                  |           | ICP-2008 MS All possible metal |
| 230982   | 230994           | 6  | SAMPLE | 140525001 | B2RTJ9               |           | ICP-2008 MS All possible metal |
| 230982   | 230994           | 7  | MS     | 108305    | B2RTJ9(140525001MS)  | 140525001 | ICP-2008 MS All possible metal |
| 230982   | 230994           | 8  | MSD    | 108306    | B2RTJ9(140525001MSD) | 140525001 | ICP-2008 MS All possible metal |
| 230982   | 230994           | 9  | SAMPLE | 140525002 | B2RVH2               |           | ICP-2008 MS All possible metal |

Method Reference

Attention Scot Fitzgerald  
Department Inorganic

Group # WSCF140525

The results provided in this report were generated using the following WSCF Laboratory procedures. For your convenience, this table provides a listing of the regulatory, industry methods or HEIS methods that are referenced by each of these WSCF procedures. Please note that the most recent version of the regulatory or industry method is listed here even though WSCF procedure may reference an older version of the method. Also, a reference to a regulatory or industry method here does not necessarily indicate a verbatim implementation of that method.

|            |                                                                             |                    |                                                                                               |
|------------|-----------------------------------------------------------------------------|--------------------|-----------------------------------------------------------------------------------------------|
| LA-505-412 | Determination of Trace Elements in Waters & Wastes by ICP Mass Spectrometry |                    |                                                                                               |
|            | EPA-600/R-94-111                                                            | 200.8              | Determination of Trace Elements in Waters and Waste by Inductively Coupled Plasma             |
|            | HEIS                                                                        | 200.8_METALS_ICPMS | Determination of Trace Elements in Waters and Waste by Inductively Coupled Plasma, Mass Spec. |

Note: A complete list of WSCF analytical procedures and reference regulatory or industry methods is available online at <http://www7.rl.gov/rapidweb/AS-DOL/index.cfm>

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF140525

Sample # 140525001  
 SAF# I14-005  
 Sample ID B2RTJ9

Matrix WATER  
 Sampled 11/22/13  
 Received 11/22/13

| Test Performed                        | CAS #     | Method     | RQ | Result | TP Err | Units | DF | MDL   | PQL  | Analyzed |
|---------------------------------------|-----------|------------|----|--------|--------|-------|----|-------|------|----------|
| <b>ICPMS Prep (W)</b>                 |           |            |    |        |        |       |    |       |      |          |
| <b>ICP-2008 MS All possible metal</b> |           |            |    |        |        |       |    |       |      |          |
| Aluminum                              | 7429-90-5 | LA-505-412 | U  | <10    |        | ug/L  | 1  | 10    | 50   | 04/04/14 |
| Manganese                             | 7439-96-5 | LA-505-412 | B  | 0.192  |        | ug/L  | 1  | 0.10  | 1.0  | 04/04/14 |
| Nickel                                | 7440-02-0 | LA-505-412 | B  | 0.294  |        | ug/L  | 1  | 0.10  | 1.0  | 04/04/14 |
| Silver                                | 7440-22-4 | LA-505-412 | U  | <0.050 |        | ug/L  | 1  | 0.050 | 0.50 | 04/04/14 |
| Antimony                              | 7440-36-0 | LA-505-412 | B  | 0.855  |        | ug/L  | 1  | 0.30  | 3.0  | 04/04/14 |
| Barium                                | 7440-39-3 | LA-505-412 |    | 24.0   |        | ug/L  | 1  | 0.20  | 2.0  | 04/04/14 |
| Beryllium                             | 7440-41-7 | LA-505-412 | U  | <0.10  |        | ug/L  | 1  | 0.10  | 1.0  | 04/04/14 |
| Cadmium                               | 7440-43-9 | LA-505-412 | U  | <0.050 |        | ug/L  | 1  | 0.050 | 0.50 | 04/04/14 |
| Chromium                              | 7440-47-3 | LA-505-412 |    | 3.41   |        | ug/L  | 1  | 0.10  | 1.0  | 04/04/14 |
| Cobalt                                | 7440-48-4 | LA-505-412 | B  | 0.0740 |        | ug/L  | 1  | 0.050 | 0.25 | 04/04/14 |
| Copper                                | 7440-50-8 | LA-505-412 | B  | 0.220  |        | ug/L  | 1  | 0.10  | 1.0  | 04/04/14 |
| Vanadium                              | 7440-62-2 | LA-505-412 |    | 6.42   |        | ug/L  | 1  | 0.20  | 2.0  | 04/04/14 |
| Zinc                                  | 7440-66-6 | LA-505-412 | B  | 2.21   |        | ug/L  | 1  | 2.0   | 10   | 04/04/14 |
| Lead                                  | 7439-92-1 | LA-505-412 | U  | <0.050 |        | ug/L  | 1  | 0.050 | 0.50 | 04/04/14 |
| Molybdenum                            | 7439-98-7 | LA-505-412 |    | 1.60   |        | ug/L  | 1  | 0.050 | 0.50 | 04/04/14 |
| Strontium                             | 7440-24-6 | LA-505-412 |    | 200    |        | ug/L  | 1  | 0.20  | 1.0  | 04/04/14 |
| Thallium                              | 7440-28-0 | LA-505-412 | U  | <0.050 |        | ug/L  | 1  | 0.050 | 0.50 | 04/04/14 |

MDL = Minimum Detection Limit  
 RQ = Result Qualifier  
 TP Err = Total Propagated Error  
 DF = Dilution Factor  
 + - Indicates more than nine qualifier

B - Analyte < the PQL(or EQL)but >= the IDL/MDL(Inorganic)  
 C - Analyte was found in the Associated Blank. (Inorganic)  
 D - Analyte was reported at a secondary dilution factor.  
 E - Analyte is an estimate, see comment section.  
 N - MS and/or MSD recovery outside control limits.

U - Analyzed for but not detected above limiting criteria.  
 X,Y or Z - See comment detail and/or narrative.  
 PQL is equivalent to Estimated Quantitation Limit (EQL)  
 o - LCS recovery outside established laboratory acceptance limits.

REVISED140525 -

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF140525

Sample # 140525001  
 SAF# 114-005  
 Sample ID B2RTJ9

Matrix WATER  
 Sampled 11/22/13  
 Received 11/22/13

| Test Performed | CAS #     | Method     | RQ | Result | TP Err | Units | DF | MDL   | PQL  | Analyzed |
|----------------|-----------|------------|----|--------|--------|-------|----|-------|------|----------|
| Tin            | 7440-31-5 | LA-505-412 | U  | <0.050 |        | ug/L  | 1  | 0.050 | 0.50 | 04/04/14 |
| Uranium        | 7440-61-1 | LA-505-412 | B  | 0.141  |        | ug/L  | 1  | 0.050 | 0.25 | 04/04/14 |
| Arsenic        | 7440-38-2 | LA-505-412 |    | 2.20   |        | ug/L  | 1  | 0.20  | 2.0  | 04/04/14 |
| Selenium       | 7782-49-2 | LA-505-412 | U  | <1.0   |        | ug/L  | 1  | 1.0   | 10   | 04/04/14 |
| Thorium        | 7440-29-1 | LA-505-412 | U  | <0.10  |        | ug/L  | 1  | 0.10  | 1.0  | 04/04/14 |
| Boron          | 7440-42-8 | LA-505-412 |    | 6.08   |        | ug/L  | 1  | 2.0   | 5.0  | 04/04/14 |

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 C - Analyte was found in the Associated Blank. (Inorganic)  
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 X,Y or Z - See comment detail and/or narrative.  
 PQL is equivalent to Estimated Quantitation Limit (EQL)  
 o - LCS recovery outside established laboratory acceptance limits.

REVISED140525 -

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF140525

Sample # 140525002  
 SAF# I14-005  
 Sample ID B2RVH2

Matrix WATER  
 Sampled 11/22/13  
 Received 11/22/13

| Test Performed                        | CAS #     | Method     | RQ | Result | TP Err | Units | DF | MDL  | PQL  | Analyzed        |
|---------------------------------------|-----------|------------|----|--------|--------|-------|----|------|------|-----------------|
| <b>ICPMS Prep (W)</b>                 |           |            |    |        |        |       |    |      |      | <b>04/03/14</b> |
| <b>ICP-2008 MS All possible metal</b> |           |            |    |        |        |       |    |      |      |                 |
| Aluminum                              | 7429-90-5 | LA-505-412 | UD | <20    |        | ug/L  | 2  | 20   | 100  | 04/04/14        |
| Manganese                             | 7439-96-5 | LA-505-412 | D  | 7.18   |        | ug/L  | 2  | 0.20 | 2.0  | 04/04/14        |
| Nickel                                | 7440-02-0 | LA-505-412 | BD | 0.284  |        | ug/L  | 2  | 0.20 | 2.0  | 04/04/14        |
| Silver                                | 7440-22-4 | LA-505-412 | UD | <0.10  |        | ug/L  | 2  | 0.10 | 1.0  | 04/04/14        |
| Antimony                              | 7440-36-0 | LA-505-412 | UD | <0.60  |        | ug/L  | 2  | 0.60 | 6.0  | 04/04/14        |
| Barium                                | 7440-39-3 | LA-505-412 | D  | 27.7   |        | ug/L  | 2  | 0.40 | 4.0  | 04/04/14        |
| Beryllium                             | 7440-41-7 | LA-505-412 | UD | <0.20  |        | ug/L  | 2  | 0.20 | 2.0  | 04/04/14        |
| Cadmium                               | 7440-43-9 | LA-505-412 | UD | <0.10  |        | ug/L  | 2  | 0.10 | 1.0  | 04/04/14        |
| Chromium                              | 7440-47-3 | LA-505-412 | D  | 5.30   |        | ug/L  | 2  | 0.20 | 2.0  | 04/04/14        |
| Cobalt                                | 7440-48-4 | LA-505-412 | BD | 0.152  |        | ug/L  | 2  | 0.10 | 0.50 | 04/04/14        |
| Copper                                | 7440-50-8 | LA-505-412 | UD | <0.20  |        | ug/L  | 2  | 0.20 | 2.0  | 04/04/14        |
| Vanadium                              | 7440-62-2 | LA-505-412 | BD | 2.29   |        | ug/L  | 2  | 0.40 | 4.0  | 04/04/14        |
| Zinc                                  | 7440-66-6 | LA-505-412 | D  | 298    |        | ug/L  | 2  | 4.0  | 20   | 04/04/14        |
| Lead                                  | 7439-92-1 | LA-505-412 | BD | 0.858  |        | ug/L  | 2  | 0.10 | 1.0  | 04/04/14        |
| Molybdenum                            | 7439-98-7 | LA-505-412 | D  | 1.61   |        | ug/L  | 2  | 0.10 | 1.0  | 04/04/14        |
| Strontium                             | 7440-24-6 | LA-505-412 | D  | 276    |        | ug/L  | 2  | 0.40 | 2.0  | 04/04/14        |
| Thallium                              | 7440-28-0 | LA-505-412 | UD | <0.10  |        | ug/L  | 2  | 0.10 | 1.0  | 04/04/14        |

MDL = Minimum Detection Limit  
 RQ = Result Qualifier  
 TP Err = Total Propagated Error  
 DF = Dilution Factor  
 + - Indicates more than nine qualifier

B - Analyte < the PQL(or EQL)but >= the IDL/MDL(Inorganic)  
 C - Analyte was found in the Associated Blank. (Inorganic)  
 D - Analyte was reported at a secondary dilution factor.  
 E - Analyte is an estimate, see comment section.  
 N - MS and/or MSD recovery outside control limits.

U - Analyzed for but not detected above limiting criteria.  
 X,Y or Z - See comment detail and/or narrative.  
 PQL is equivalent to Estimated Quantitation Limit (EQL)  
 o - LCS recovery outside established laboratory acceptance limits.

REVISED140525 -

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF140525

Sample # 140525002  
 SAF# 114-005  
 Sample ID B2RVH2

Matrix WATER  
 Sampled 11/22/13  
 Received 11/22/13

| Test Performed | CAS #     | Method     | RQ | Result | TP Err | Units | DF | MDL  | PQL  | Analyzed |
|----------------|-----------|------------|----|--------|--------|-------|----|------|------|----------|
| Tin            | 7440-31-5 | LA-505-412 | UD | <0.10  |        | ug/L  | 2  | 0.10 | 1.0  | 04/04/14 |
| Uranium        | 7440-61-1 | LA-505-412 | D  | 1.87   |        | ug/L  | 2  | 0.10 | 0.50 | 04/04/14 |
| Arsenic        | 7440-38-2 | LA-505-412 | BD | 0.924  |        | ug/L  | 2  | 0.40 | 4.0  | 04/04/14 |
| Selenium       | 7782-49-2 | LA-505-412 | UD | <2.0   |        | ug/L  | 2  | 2.0  | 20   | 04/04/14 |
| Thorium        | 7440-29-1 | LA-505-412 | UD | <0.20  |        | ug/L  | 2  | 0.20 | 2.0  | 04/04/14 |
| Boron          | 7440-42-8 | LA-505-412 | BD | 8.84   |        | ug/L  | 2  | 4.0  | 10   | 04/04/14 |

MDL = Minimum Detection Limit  
 RQ = Result Qualifier  
 TP Err = Total Propagated Error  
 DF = Dilution Factor  
 + - Indicates more than nine qualifier

B - Analyte < the PQL(or EQL)but >= the IDL/MDL(Inorganic)  
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 PQL is equivalent to Estimated Quantitation Limit (EQL)  
 o - LCS recovery outside established laboratory acceptance limits.

REVISED140525 -

Quality Control Report

May 21, 2014

REV. 1

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF140525

Analytical Batch 230994 (QC Batch: 230982) Test ICP-2008 MS All possible metal  
 Associated Samples 140525001, 140525002

| Analyte      | CAS #     | Original Found           | QC Found | Units | % Recov | Limits | RPD | RPD Limit | RQ | Analyzed |
|--------------|-----------|--------------------------|----------|-------|---------|--------|-----|-----------|----|----------|
| <b>BLANK</b> |           | <b>QC Sample #108303</b> |          |       |         |        |     |           |    |          |
| Aluminum     | 7429-90-5 | <10                      |          | ug/L  |         |        |     |           | U  | 04/04/14 |
| Manganese    | 7439-96-5 | <0.10                    |          | ug/L  |         |        |     |           | U  | 04/04/14 |
| Nickel       | 7440-02-0 | <0.10                    |          | ug/L  |         |        |     |           | U  | 04/04/14 |
| Silver       | 7440-22-4 | <0.050                   |          | ug/L  |         |        |     |           | U  | 04/04/14 |
| Antimony     | 7440-36-0 | <0.30                    |          | ug/L  |         |        |     |           | U  | 04/04/14 |
| Barium       | 7440-39-3 | <0.20                    |          | ug/L  |         |        |     |           | U  | 04/04/14 |
| Beryllium    | 7440-41-7 | <0.10                    |          | ug/L  |         |        |     |           | U  | 04/04/14 |
| Cadmium      | 7440-43-9 | <0.050                   |          | ug/L  |         |        |     |           | U  | 04/04/14 |
| Chromium     | 7440-47-3 | <0.10                    |          | ug/L  |         |        |     |           | U  | 04/04/14 |
| Cobalt       | 7440-48-4 | <0.050                   |          | ug/L  |         |        |     |           | U  | 04/04/14 |
| Copper       | 7440-50-8 | <0.10                    |          | ug/L  |         |        |     |           | U  | 04/04/14 |
| Vanadium     | 7440-62-2 | <0.20                    |          | ug/L  |         |        |     |           | U  | 04/04/14 |
| Zinc         | 7440-66-6 | <2.0                     |          | ug/L  |         |        |     |           | U  | 04/04/14 |
| Lead         | 7439-92-1 | <0.050                   |          | ug/L  |         |        |     |           | U  | 04/04/14 |
| Molybdenum   | 7439-98-7 | <0.050                   |          | ug/L  |         |        |     |           | U  | 04/04/14 |
| Strontium    | 7440-24-6 | <0.20                    |          | ug/L  |         |        |     |           | U  | 04/04/14 |
| Thallium     | 7440-28-0 | <0.050                   |          | ug/L  |         |        |     |           | U  | 04/04/14 |

\* - QC result out of range

n/a - Not Applicable

REVISED140525 -

Quality Control Report

May 21, 2014

REV. 1

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF140525

| Analyte    | CAS #     | Original Found | QC Found                 | Units | % Recov | Limits   | RPD | RPD Limit | RQ | Analyzed |
|------------|-----------|----------------|--------------------------|-------|---------|----------|-----|-----------|----|----------|
| Tin        | 7440-31-5 |                | <0.050                   | ug/L  |         |          |     |           | U  | 04/04/14 |
| Uranium    | 7440-61-1 |                | <0.050                   | ug/L  |         |          |     |           | U  | 04/04/14 |
| Arsenic    | 7440-38-2 |                | <0.20                    | ug/L  |         |          |     |           | U  | 04/04/14 |
| Selenium   | 7782-49-2 |                | <1.0                     | ug/L  |         |          |     |           | U  | 04/04/14 |
| Thorium    | 7440-29-1 |                | <0.10                    | ug/L  |         |          |     |           | U  | 04/04/14 |
| Boron      | 7440-42-8 |                | <2.0                     | ug/L  |         |          |     |           | U  | 04/04/14 |
| <b>LCS</b> |           |                | <b>QC Sample #108304</b> |       |         |          |     |           |    |          |
| Aluminum   | 7429-90-5 |                | 361                      | ug/L  | 90.2    | 85 - 115 |     |           |    | 04/04/14 |
| Manganese  | 7439-96-5 |                | 35.2                     | ug/L  | 88      | 85 - 115 |     |           |    | 04/04/14 |
| Nickel     | 7440-02-0 |                | 35.9                     | ug/L  | 89.7    | 85 - 115 |     |           |    | 04/04/14 |
| Silver     | 7440-22-4 |                | 35.3                     | ug/L  | 88.3    | 85 - 115 |     |           |    | 04/04/14 |
| Antimony   | 7440-36-0 |                | 35.6                     | ug/L  | 89      | 85 - 115 |     |           |    | 04/04/14 |
| Barium     | 7440-39-3 |                | 35.2                     | ug/L  | 88.1    | 85 - 115 |     |           |    | 04/04/14 |
| Beryllium  | 7440-41-7 |                | 36.0                     | ug/L  | 90.1    | 85 - 115 |     |           |    | 04/04/14 |
| Cadmium    | 7440-43-9 |                | 35.4                     | ug/L  | 88.5    | 85 - 115 |     |           |    | 04/04/14 |
| Chromium   | 7440-47-3 |                | 36.4                     | ug/L  | 91      | 85 - 115 |     |           |    | 04/04/14 |
| Cobalt     | 7440-48-4 |                | 35.9                     | ug/L  | 89.9    | 85 - 115 |     |           |    | 04/04/14 |
| Copper     | 7440-50-8 |                | 35.2                     | ug/L  | 88      | 85 - 115 |     |           |    | 04/04/14 |
| Vanadium   | 7440-62-2 |                | 36.1                     | ug/L  | 90.2    | 85 - 115 |     |           |    | 04/04/14 |
| Zinc       | 7440-66-6 |                | 35.0                     | ug/L  | 87.4    | 85 - 115 |     |           |    | 04/04/14 |
| Lead       | 7439-92-1 |                | 34.7                     | ug/L  | 86.7    | 85 - 115 |     |           |    | 04/04/14 |
| Molybdenum | 7439-98-7 |                | 36.2                     | ug/L  | 90.6    | 85 - 115 |     |           |    | 04/04/14 |

\* - QC result out of range

n/a - Not Applicable

REVISED140525 -





Quality Control Report

May 21, 2014

REV. 1

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF140525

| Analyte    | CAS #     | Original Found | QC Found | Units | % Recov | Limits   | RPD  | RPD Limit | RQ | Analyzed |
|------------|-----------|----------------|----------|-------|---------|----------|------|-----------|----|----------|
| Vanadium   | 7440-62-2 | 6.42           | 34.1     | ug/L  | 85.3    | 70 - 130 | 3.50 | 20        |    | 04/04/14 |
| Zinc       | 7440-66-6 | 2.21           | 33.1     | ug/L  | 82.8    | 70 - 130 | 2.80 | 20        |    | 04/04/14 |
| Lead       | 7439-92-1 | <0.050         | 37.1     | ug/L  | 92.6    | 70 - 130 | 6.60 | 20        |    | 04/04/14 |
| Molybdenum | 7439-98-7 | 1.60           | 40.7     | ug/L  | 101.8   | 70 - 130 | 5.80 | 20        |    | 04/04/14 |
| Strontium  | 7440-24-6 | 200            | 361      | ug/L  | 90.3    | 70 - 130 | 4.40 | 20        |    | 04/04/14 |
| Thallium   | 7440-28-0 | <0.050         | 37.8     | ug/L  | 94.6    | 70 - 130 | 7.20 | 20        |    | 04/04/14 |
| Tin        | 7440-31-5 | <0.050         | 40.5     | ug/L  | 101.1   | 70 - 130 | 6.60 | 20        |    | 04/04/14 |
| Uranium    | 7440-61-1 | 0.141          | 38.4     | ug/L  | 96.1    | 70 - 130 | 7.20 | 20        |    | 04/04/14 |
| Arsenic    | 7440-38-2 | 2.20           | 39.3     | ug/L  | 98.3    | 70 - 130 | 7.90 | 20        |    | 04/04/14 |
| Selenium   | 7782-49-2 | <1.0           | 37.4     | ug/L  | 93.4    | 70 - 130 | 0.60 | 20        |    | 04/04/14 |
| Thorium    | 7440-29-1 | <0.10          | 37.7     | ug/L  | 94.2    | 70 - 130 | 6.80 | 20        |    | 04/04/14 |
| Boron      | 7440-42-8 | 6.08           | 39.1     | ug/L  | 97.8    | 70 - 130 | 6.50 | 20        |    | 04/04/14 |

\* - QC result out of range

n/a - Not Applicable

ATTACHMENT4

**SAMPLE RECEIPT**

Consisting of 4 pages  
Including cover page

**Waste Sampling and Characterization Facility**  
**P.O. Box 650 S3-30, Richland WA 99352**  
**Phone: (509) 373-7005/FAX: (509) 372-0456**

## ACKNOWLEDGEMENT OF SAMPLES RECEIVED

### WSCF Laboratory

PO Box 650 S3-30  
 Richland, WA 99352

**ATTN:** Scot Fitzgerald

**Customer Code:** CHPRC  
**CA CN:** 401647  
**Work Order #:** 140525  
**Customer Work ID:** I14-005-185 R8147  
**Due Date:** 04/08/2014 **(L15)**

The following samples were received from you on 11/22/2013 1:50:00 PM. They have been scheduled for the tests listed below each sample. If this information is incorrect, please contact WSCF Client Services. Thank you for using Waste Sampling and Characterization Facility.

| Sample #                        | Sample ID | Matrix               | Collected        | Received         |
|---------------------------------|-----------|----------------------|------------------|------------------|
| 140525001                       | B2RTJ9    | WATER                | 11/22/2013 11:19 | 11/22/2013 13:50 |
| <b>Procedure</b>                |           | <b>Compound List</b> |                  |                  |
| ICP-2008 M S All possible metal |           | 200.8 ICPM S GW01    |                  |                  |
| Sample #                        | Sample ID | Matrix               | Collected        | Received         |
| 140525002                       | B2RVH2    | WATER                | 11/22/2013 13:17 | 11/22/2013 13:50 |
| <b>Procedure</b>                |           | <b>Compound List</b> |                  |                  |
| ICP-2008 M S All possible metal |           | 200.8 ICPM S GW01    |                  |                  |

Chain of Custody

RECHECK, RECOUNT, OR REANALYSIS ORDER

03/20/2014

*Rerun*

*140525*

*Login Date: 3-24-14*

*tel*

Order Number: 140320WSCF-R8147  
Waste Sampling & Characterization  
600 AREA Hanford, MSIN 53-28  
Richland, WA 99352

Sample Delivery Group: WSCF131428

Sample(s):

Method Name: 200.8\_METALS\_ICPMS

Sample#: B2RTJ9      Sample Date: 11/22/2013 11 19:00 AM      SAF #:114-005

| Lab Sample ID         | RDR Action Start Date                                              | Constituent | Action    | TAT (Hardcopy/EDD) |
|-----------------------|--------------------------------------------------------------------|-------------|-----------|--------------------|
| 131428006             | 3/20/2014 3:54:27 PM                                               | Arsenic     | REANALYZE | 15 Days / 15 Days  |
| Special Instructions: | Please re-report all originally requested analytes. SLF 03/20/2014 |             |           |                    |
| 131428006             | 3/20/2014 3:54:27 PM                                               | Vanadium    | REANALYZE | 15 Days / 15 Days  |
| Special Instructions: | Please re-report all originally requested analytes. SLF 03/20/2014 |             |           |                    |
| 131428006             | 3/20/2014 3:54:27 PM                                               | Lead        | REANALYZE | 15 Days / 15 Days  |
| Special Instructions: | Please re-report all originally requested analytes. SLF 03/20/2014 |             |           |                    |
| 131428006             | 3/20/2014 3:54:27 PM                                               | Uranium     | REANALYZE | 15 Days / 15 Days  |
| Special Instructions: | Please re-report all originally requested analytes. SLF 03/20/2014 |             |           |                    |
| 131428006             | 3/20/2014 3:54:27 PM                                               | Manganese   | REANALYZE | 15 Days / 15 Days  |
| Special Instructions: | Please re-report all originally requested analytes. SLF 03/20/2014 |             |           |                    |
| 131428006             | 3/20/2014 3:54:27 PM                                               | Zinc        | REANALYZE | 15 Days / 15 Days  |
| Special Instructions: | Please re-report all originally requested analytes. SLF 03/20/2014 |             |           |                    |

*140528001*

Sample#: B2RVH2      Sample Date: 11/22/2013 1:17:00 PM      SAF #:114-005

| Lab Sample ID         | RDR Action Start Date                                              | Constituent | Action    | TAT (Hardcopy/EDD) |
|-----------------------|--------------------------------------------------------------------|-------------|-----------|--------------------|
| 131428007             | 3/20/2014 3:54:27 PM                                               | Manganese   | REANALYZE | 15 Days / 15 Days  |
| Special Instructions: | Please re-report all originally requested analytes. SLF 03/20/2014 |             |           |                    |
| 131428007             | 3/20/2014 3:54:27 PM                                               | Chromium    | REANALYZE | 15 Days / 15 Days  |
| Special Instructions: | Please re-report all originally requested analytes. SLF 03/20/2014 |             |           |                    |
| 131428007             | 3/20/2014 3:54:27 PM                                               | Zinc        | REANALYZE | 15 Days / 15 Days  |
| Special Instructions: | Please re-report all originally requested analytes. SLF 03/20/2014 |             |           |                    |
| 131428007             | 3/20/2014 3:54:27 PM                                               | Vanadium    | REANALYZE | 15 Days / 15 Days  |
| Special Instructions: | Please re-report all originally requested analytes. SLF 03/20/2014 |             |           |                    |
| 131428007             | 3/20/2014 3:54:27 PM                                               | Lead        | REANALYZE | 15 Days / 15 Days  |
| Special Instructions: | Please re-report all originally requested analytes. SLF 03/20/2014 |             |           |                    |
| 131428007             | 3/20/2014 3:54:27 PM                                               | Uranium     | REANALYZE | 15 Days / 15 Days  |
| Special Instructions: | Please re-report all originally requested analytes. SLF 03/20/2014 |             |           |                    |

*140528001*

Deliver Report Results to: CHPRC

P.O. Box 1600  
Richland, WA 99352  
C/O Mr. Scot Fitzgerald

REVISED140525 -

Chain of Custody

RECHECK, RECOUNT, OR REANALYSIS ORDER

03/20/2014

131428007 3/20/2014 3:54:27 PM Arsenic REANALYZE 15 Days / 15 Days

Special Instructions: Please re-report all originally requested analytes. SLF 03/20/2014

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Deliver Report Results to:CHPRC

P.O. Box 1600  
Richland, WA 99352  
C/O Mr Scot Fitzgerald

REVISED140525 -