# SAF-RC-206
# Remedial Action of the 100-C-7 & 100-C-7:1 Waste Sites – Full Soil Protocol
# FINAL DATA PACKAGE

**COMPLETE COPY OF DATA PACKAGE TO:**

Kathy Wendt H4-21 KW 3/6/13
INITIAL/DATE

**COMMENTS:**

**SDG K4041 SAF-RC-206**

Rad only ☑ Chem only Rad & Chem

☑ Complete Partial

**Sample Location: 100-C-7:1 (West Sidewall Expansion)**

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

264 Welsh Pool Road
Exton, Pennsylvania 19341
Phone (610) 280-3000
Fax (610) 280-3041

5 March 2013

Joan Kessner
WC-Hanford, Inc.
2620 Fermi Avenue
MSIN H4-21
Richland, WA 99354

Subject: Analytical Data Package

Dear Ms. Kessner:

Enclosed are the hard copy analytical reports for the batch number/fraction indicated (marked X) in the following table:

| | |
|---|---|
| LvLI Batch # | 1301001 |
| SDG # | K4041 |
| SAF # | RC-206 |
| Date Received | 12/31/12 |
| # Samples | 7 |
| Matrix | SOIL |
| Volatiles | |
| Semivolatiles | |
| Pest/PCB | |
| Glycols | |
| DRO/KRO/GRO | |
| PAHs | |
| Herbicides | |
| Metals | X |
| Inorganics | X |

The electronic data deliverable (EDD) has been emailed. If you have any questions, please don't hesitate to contact me at (610) 280-3012.

Sincerely,

Lionville Laboratory
A Division of Eberline Analytical Corporation

Orlette S. Johnson
Project Manager

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 31 pages.

R:\GROUP\PM\ORLETTE\Hanford\Data\B_ltrs.DOC

# CHAIN OF CUSTODY

Lionville Laboratory Use Only: 1301001

# Custody Transfer Record/Lab Work Request

Page 1 of 1

**FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS**

Lionville Laboratory
A Division of Eberline Analytical Corporation

Client: WC-Hanford RC-206
Est. Final Proj. Sampling Date:
Project#:
Project Contact/Phone#:
Lionville Laboratory Project Manager: Q. Johnson
QC: SW Del: Std TAT: 21
Date Rec'd: 12-31-12 Date Due: 1-23-12

| Refrigerator # | | | | | | | | | A | | B | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| #/Type Container | Liquid | | | | | | | | 2 | | 2 | | | | | |
| | Solid | | | | | | | | P | | P | | | | | |
| Volume | Liquid | | | | | | | | | | | | | | | |
| | Solid | | | | | | | | 125 | | 125 | | | | | |
| Preservatives | | | | | | | | | | | | | | | | |
| ANALYSES REQUESTED → | | ORGANIC | | | | | | | INORG | | | | | | | |
| | | VOA | BNA | Pest/PCB | Herb | | | | Metal | CN | | | | | | |
| | | Lionville Laboratory Use Only | | | | | | | | | | | | | | |
| | | | | | | | | | METALS | | Cr6 | | | | | |

MATRIX CODES:
W Water
WW Waste Water
GW Groundwater
WST Waste
WI Wipe
SO Solid
S Soil
SL Sludge
SE Sediment
PC Paint Chips
O Oil
NAL Non-Aqueous Liquid
L Leachate
A Air
T Tissue
F Fish

| Lab ID | Client ID/Description | Matrix QC Chosen (✓) MS | MSD | Matrix | Date Collected | Time Collected | METALS | Cr6 |
|---|---|---|---|---|---|---|---|---|
| 01 | JIR613 | | | S | 12-29-12 | 0950 | X | X |
| 02 | JIR615 | | | | | 0955 | X | X |
| 03 | JIR619 | | | | | 0925 | X | X |
| 04 | JIR 620 | | | | | 0940 | X | X |
| 05 | JIR 622 | | | | | 0945 | X | X |
| 06 | JIR 625 | | | | | 0940 | X | X |
| 07 | JIR 626 | | | | | 0935 | X | |

Special Instructions: MATRIX QC
METALS = HSL + B, Mo, Si

Special Instructions:
1.
2.
3.
4.
5.
6.

Temp 5°C

| Relinquished by | Received by | Date | Time |
|---|---|---|---|
| FEDEX | Martin Ford/OS | 12-31-12 | 0845 |
| | | | |

| Relinquished by | Received by | Date | Time |
|---|---|---|---|
| | | | |
| | | | |

| Relinquished by | Received by | Date | Time |
|---|---|---|---|
| | | | |
| | | | |

~~1212077~~ 1301001 OS; 1/2/13

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | | RC-206-067 | Page 1 of 3 |
|---|---|---|---|---|
| Collector<br>R. Brackett | Company Contact<br>J. Kessner | Telephone No.<br>509-375-4688 | Project Coordinator<br>KESSNER, JH | Price Code 8L — Data Turnaround 21 Days |
| Project Designation<br>Remedial Action of the 100-C-7 & 100-C-7:1 Waste Sites - F | Sampling Location<br>100-C-7:1 (West Sidewall Expansion) | | SAF No.<br>RC-206 | |
| Ice Chest No.<br>RCC-07-022 | Field Logbook No.<br>EL-1655-07 | COA<br>R00C712000 | Method of Shipment<br>Fed Ex | |
| Shipped To<br>EBERLINE SERVICES / LIONVILLE | Offsite Property No. A120686 | | Bill of Lading/Air Bill No.<br>See OSPC | |

0000000004

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*None*

**Special Handling and/or Storage**

*Cool 4 degrees centigrade*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | Cool 4C | Cool 4C | | | | | | | | | |
| Type of Container | G/P | G/P | | | | | | | | | |
| No. of Container(s) | 1 | 1 | | | | | | | | | |
| Volume | 125mL | 125mL | | | | | | | | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Chromium Hex - 7196 | | | | | | | | | |

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J1R613 | SOIL | 12-27-12 | 0950 | X | X | | | | | | | | |
| ~~J1R614~~ OS 12/27/12 | ~~SOIL~~ | | | | | | | | | | | | |
| J1R615 | SOIL | 12/27/12 | 0955 | X | X | | | | | | | | |
| ~~J1R616~~ 12/27/12 | ~~SOIL~~ | | | | | | | | | | | | |
| J1R617 | ~~SOIL~~ | | | | | | | | | | | | |

**CHAIN OF POSSESSION** — Sign/Print Names

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| Rob Brackett | 12-27-12 1005 | Don Heidelberg | 12/27/12 1005 |
| Don Heidelberg | 12/27/12 1040 | DWShea DWSHEA | 12/27/12 1040 |
| DWShea DWSHEA | 12/27/12 1252 | Fed Ex | |
| Fed Ex | 12-31-12 0845 | | 12/31/12 0845 |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS**

(1) ICP Metals - 6010TR (Close-out List) {Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc}; Mercury - 7471 - (CV) {Mercury}

REVIEWED BY E. M. Weiss DATE 12/27/12

Matrix *
S=Soil
SE=Sediment
SO=Solid
Sl=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
Wi=Wipe
L=Liquid
V=Vegetation
X=Other

| | | | |
|---|---|---|---|
| LABORATORY SECTION | Received By | Title | Date/Time 05; 1/2/13 |
| FINAL SAMPLE DISPOSITION | Disposal Method | Disposed By | Date/Time 12/31/12 ~~12/31/12~~ 0845 |

WCH-EE-011

L: 1212078 1301001 05; 1/2/13

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-206-067 | Page 2 of 3 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: R. Brackett | Company Contact: J. Kessner — Telephone No.: 509-375-4688 | Project Coordinator: KESSNER, JH | Price Code: 8L — Data Turnaround: 21 Days |
| Project Designation: Remedial Action of the 100-C-7 & 100-C-7:1 Waste Sites - F | Sampling Location: 100-C-7:1 (West Sidewall Expansion) | SAF No.: RC-206 | |
| Ice Chest No.: RCC-07-022 | Field Logbook No.: EL-1655-07 — COA: R00C712000 | Method of Shipment: Fed Ex | |
| Shipped To: EBERLINE SERVICES / LIONVILLE | Offsite Property No.: A120686 | Bill of Lading/Air Bill No.: See OSPC | |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*None*

**Special Handling and/or Storage**

*Cool 4 degrees centigrade*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | Cool 4C | Cool 4C | | | | | | | | | |
| Type of Container | G/P | G/P | | | | | | | | | |
| No. of Container(s) | 1 | 1 | | | | | | | | | |
| Volume | 125mL | 125mL | | | | | | | | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Chromium Hex - 7196 | | | | | | | | | |

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J1R618 | SOIL | | | | | | | | | | | | |
| J1R619 | SOIL | 12/27/12 | 0925 | X | X | | | | | | | | |
| J1R620 | SOIL | 12/27/12 | 0940 | X | X | | | | | | | | |
| J1R621 | SOIL | | | | | | | | | | | | |
| J1R622 | SOIL | 12/27/12 | 0945 | X | X | | | | | | | | |

**CHAIN OF POSSESSION** — **Sign/Print Names**

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| Rob Brackett | 12-27-12 1005 | Don Heidelberg | 12/27/12 1005 |
| Don Heidelberg | 12/27/12 1040 | DWSHEA DWSHEA | 12/27/12 1040 |
| DWSHEA DWSHEA | 12/27/12 1252 | Fed EX | |
| FEDEX | 12/31/12 0845 | | 12/31/12 0845 |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS**

(1) ICP Metals - 6010TR (Close-out List) {Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc}; Mercury - 7471 - (CV) {Mercury}

REVIEWED BY E.M. Weiss DATE 12/27/12

Matrix *
S=Soil
SE=Sediment
SO=Solid
SI=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

| | | | |
|---|---|---|---|
| LABORATORY SECTION | Received By | Title: Temp 50c | Date/Time: 12/31/12 0845 |
| FINAL SAMPLE DISPOSITION | Disposal Method | Disposed By | Date/Time |

WCH-EE-011

~~1212079~~ C 1301001 OSJ 1/2/31

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-206-067 | Page 3 of 3 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: R. Brackett | Company Contact: J. Kessner — Telephone No.: 509-375-4688 | Project Coordinator: KESSNER, JH | Price Code: 8L — Data Turnaround: 21 Days |
| Project Designation: Remedial Action of the 100-C-7 & 100-C-7:1 Waste Sites - F | Sampling Location: 100-C-7:1 (West Sidewall Expansion) | SAF No.: RC-206 | |
| Ice Chest No.: RCG07-002 | Field Logbook No.: EL-1655-07 — COA: R00C712000 | Method of Shipment: Fed Ex | |
| Shipped To: EBERLINE SERVICES / LIONVILLE | Offsite Property No.: A120686 | Bill of Lading/Air Bill No.: See OSPC | |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*None*

**Special Handling and/or Storage**

*Cool 4 degrees centigrade*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | Cool 4C | Cool 4C | | | | | | | | | |
| Type of Container | G/P | G/P | | | | | | | | | |
| No. of Container(s) | 1 | 1 | | | | | | | | | |
| Volume | 125mL | 125mL | | | | | | | | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Chromium Hex - 7196 | | | | | | | | | |

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~~J1R623~~ | SOIL | | | | | | | | | | | |
| J1R624 12/27/12 | ~~SOIL~~ | | | | | | | | | | | |
| J1R625 | SOIL | 12/27/12 | 0940 | X | X | | | | | | | |
| J1R626 | SOIL | 12/27/12 | 0935 | X | N/A | | | | | | | |
| | | | | | | | | | | | | |

| CHAIN OF POSSESSION | Date/Time | Sign/Print Names: Received By/Stored In | Date/Time |
|---|---|---|---|
| Relinquished By/Removed From: R. BRACKETT | 12-27-12 1005 | Received By/Stored In: Don Heidelberg | 12/27/12 1005 |
| Relinquished By/Removed From: Don Heidelberg | 12/27/12 1040 | Received By/Stored In: DWOSHEA DWOSHEA | 12/27/12 1040 |
| Relinquished By/Removed From: DWOSHEA DWOSHEA | 12/27/12 1252 | Received By/Stored In: Fed Ex | |
| Relinquished By/Removed From: FEDEX | 12/31/12 0845 | Received By/Stored In: Martin Ford (OS) | 12/31/12 0845 |
| Relinquished By/Removed From | | Received By/Stored In | |
| Relinquished By/Removed From | | Received By/Stored In | |

**SPECIAL INSTRUCTIONS**

(1) ICP Metals - 6010TR (Close-out List) {Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc}; Mercury - 7471 - (CV) {Mercury}

REVIEWED BY E.M. Weiss DATE 12/27/12

Temp

Matrix *
S=Soil
SE=Sediment
SO=Solid
SI=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

| | | | |
|---|---|---|---|
| LABORATORY SECTION | Received By: [signature] | Title: Temp 5°C | Date/Time: 12/31/12 0848 |
| FINAL SAMPLE DISPOSITION | Disposal Method | Disposed By | Date/Time |

WCH-EE-011

Lionville Laboratory

# SAMPLE RECEIPT CHECKLIST (SRC)

**CLIENT:** WC Hanford **Date:** 12/31/12

Project/SAF/SOW/Release #:

**LvL Batch #:** ~~1212077~~ 1301001 ~~12~~ (05) 1/21/13 **Sample Custodian:** Martino Ford

NOTE: EXPLAIN ALL DISCREPANCIES

| | | | |
|---|---|---|---|
| **1.** Samples Hand Delivered or Shipped? | Carrier Fedex | | Airbill # 7944 0242 1153 |
| **2.** Custody Seals on coolers or shipping containers intact, signed & dated? | ☒ Yes | ☐ No | ☐ No Seals |
| **3.** Outside of coolers or shipping containers are free from damage? | ☒ Yes | ☐ No | *Comments:* |
| **4.** All expected paperwork received (coc & other client specific information) sealed in plactic bag and easily accessible? | ☒ Yes | ☐ No | |
| **5.** Samples received cooled or ambient? | **Temp** 5°C | °C | Cooler # RCC-07-002 RCC-07-022 |
| How was the temperature taken? | ☒ IR | ☐ Temp. Blank | ☐ Other (Specify): |
| Is the Temp. Criteria met for these samples? (Hg in soils @ 4°C) | ☒ Yes | ☐ No | |
| **6.** Custody seals on sample containers intact, signed and dated? | ☒ Yes | ☐ No | ☐ No Seals |
| **7.** COC (Client & LvL) signed & dated? | ☒ Yes | ☐ No | |
| **8.** Sample containers are intact? | ☒ Yes | ☐ No | |
| **9.** All samples on COC received? | ☒ Yes | ☐ No | |
| All samples received on COC? | ☒ Yes | ☐ No | |
| **10.** All sample label information matches COC? | ☒ Yes | ☐ No | |
| **11.** Samples properly preserved? (If #5 is no, then this is no.) | ☒ Yes | ☐ No | |
| **12.** Samples received within hold times? | ☒ Yes | ☐ No | |
| Short holds taken to wet lab? | ☐ Yes | ☐ No | ☒ N/A |
| **13.** VOA, TOC, TOX, RSK-175, Sulfides, Non-Halogenated VOAs (Alcohol/Glycol) free of headspace? | ☐ Yes | ☐ No | ☒ N/A |
| **14.** QC stickers placed on bottles designated by client? | ☐ Yes | ☐ No | ☒ N/A |
| **15.** Shipment meets LvL Sample Acceptance Policy? (Identify all bottles that do not meet the policy, which is on the reverse of this page.) | ☒ Yes | ☐ No | |
| **16.** Project Manager contacted concerning any discrepancies? | ☐ Yes | ☐ No | ☐ N/A |

Person Contacted_____ Date_____

SR-002-B-1112.doc

# METALS

264 Welsh Pool Road
Exton, PA 19341
Phone: 610-280-3000
Fax: 610-280-3041

| | | |
|---|---|---|
| WC-Hanford, Inc.<br>2620 Fermi Avenue<br>Richland WA, 99354 | Project: RC-206<br>Project Number: K4041<br>Project Manager: Joan Kessner | **Reported:**<br>01/22/2013 17:10 |

## Analytical Report for Metals by SW846 6000/7000 series

| Sample ID | Laboratory ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| J1R613 | 1301001-01 | Soil | 12/27/2012 09:50 | 12/31/2012 08:45 |
| J1R615 | 1301001-02 | Soil | 12/27/2012 09:55 | 12/31/2012 08:45 |
| J1R619 | 1301001-03 | Soil | 12/27/2012 09:25 | 12/31/2012 08:45 |
| J1R620 | 1301001-04 | Soil | 12/27/2012 09:40 | 12/31/2012 08:45 |
| J1R622 | 1301001-05 | Soil | 12/27/2012 09:45 | 12/31/2012 08:45 |
| J1R625 | 1301001-06 | Soil | 12/27/2012 09:40 | 12/31/2012 08:45 |
| J1R626 | 1301001-07 | Soil | 12/27/2012 09:35 | 12/31/2012 08:45 |

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

264 Welsh Pool Road
Exton, Pennsylvania 19341
Phone (610) 280-3000
Fax (610) 280-3041

# Case Narrative

**Client:** WC-HANFORD RC-206
**LVL#:** 1301001
**SDG/SAF#:** K4041/RC-206

**W.O.#:** 60049-001-001-0001-00
**Date Received:** 12-31-12

## METALS

The following is a summary of the QC results accompanying the sample results. Lionville Laboratory (LvL) certifies that all test results meet the requirements of NELAC except as noted below.

All soil samples are reported on a dry weight basis unless requested by the client, required by the method, or noted otherwise.

1. This narrative covers the analyses of 7 soil samples.

2. The samples were prepared and analyzed in accordance with methods listed on the data report forms.

   All samples, with the exception of sample J1R626, were analyzed and reported with 3-fold dilutions for ICP metals due to sample matrix.

3. All analyses were performed within the required holding times.

4. Please refer to the Sample Receipt Check List for any sample discrepancies in LvL's sample acceptance policy.

5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits (80-120% for Mercury).

6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits.

7. All preparation/method blanks (MB) were within method criteria {less than the Limit of Quantitation, samples were greater than 20X MB value}.

8. All ICP Interference Check Standards were within control limits.

9. All Standard Reference Material (SRM) analytes were within the Prediction Interval control limits supplied by the manufacturer.

10. The matrix spike (MS) recoveries for 6 analytes were outside the 75-125% control limits.


The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of pages.

11. For analytes where the MS is out of control, a post-digestion MS (PDS) is performed. A PDS was prepared at meaningful concentration levels for the following analytes: Aluminum, Antimony, Copper, Iron, Magnesium, and Silicon. The Copper post digestion spike recovery was outside the 75-125% control limit possibly due to matrix effect.

12. The duplicate analyses for 2 analytes were outside the 20% Relative Percent Difference (RPD) control limit critieria. The ± 20% RPD control limit applies to sample results greater than ten times the MDL.

13. For the purposes of this report, the data have been reported to the Limit of Detection (LOD). Values between the LOD and the Limit of Quantitation (LOQ) are acquired in a region of less-certain quantification.

14. LvL is NELAP accredited by the State of Pennsylvania. For a complete listing of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager.

15. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Iain Daniels
Laboratory Manager
Lionville Laboratory

1/30/13
Date

jjw/01-001

264 Welsh Pool Road
Exton, PA 19341
Phone: 610-280-3000
Fax: 610-280-3041

| | | |
|---|---|---|
| WC-Hanford, Inc.<br>2620 Fermi Avenue<br>Richland WA, 99354 | Project: RC-206<br>Project Number: K4041<br>Project Manager: Joan Kessner | **Reported:**<br>01/22/2013 17:10 |

## Notes and Definitions

| | |
|---|---|
| U | Analyte included in the analysis, but not detected |
| J | Detected but below the Reporting Limit; therefore, result is an estimated concentration (CLP J-Flag). |
| B | Detected but below the Reporting Limit; therefore, result is an estimated concentration (CLP J-Flag) |
| * | Value outside QC acceptance criteria |
| DET | Analyte DETECTED |
| ND | Analyte NOT DETECTED at or above the reporting limit |
| NR | Not Reported |
| dry | Sample results reported on a dry weight basis |
| wet | Sample results reported on a wet weight basis |
| RPD | Relative Percent Difference |

264 Welsh Pool Road
Exton, PA 19341
Phone: 610-280-3000
Fax: 610-280-3041

| | | |
|---|---|---|
| WC-Hanford, Inc.<br>2620 Fermi Avenue<br>Richland WA, 99354 | Project: RC-206<br>Project Number: K4041<br>Project Manager: Joan Kessner | **Reported:**<br>01/22/2013 17:10 |

## J1R613
### 1301001-01 (Soil)

| Analyte | Result and Qualifier | | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method |
|---|---|---|---|---|---|---|---|---|---|
| **Lionville Laboratory** | | | | | | | | | |
| **Metals by SW846 6000/7000 series** | | | | | | | | | |
| **Aluminum** | **7540** | | 13.6 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Antimony | 1.63 | U | 1.63 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Arsenic** | **2.02** | B | 2.72 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Barium** | **59.3** | | 1.36 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Beryllium** | **0.288** | B | 0.544 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Boron | 5.44 | U | 5.44 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Cadmium | 0.544 | U | 0.544 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Calcium** | **4650** | | 272 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Chromium** | **9.31** | | 0.544 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Cobalt** | **8.30** | | 5.44 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Copper** | **26.1** | | 2.72 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Iron** | **26300** | | 54.4 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Lead** | **3.72** | | 1.36 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Magnesium** | **4930** | | 204 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Manganese** | **375** | | 13.6 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Molybdenum | 5.44 | U | 5.44 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Nickel** | **9.37** | B | 10.9 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Potassium** | **1320** | | 1090 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Selenium | 0.816 | U | 0.816 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Silicon** | **539** | | 5.44 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Silver | 0.544 | U | 0.544 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Sodium** | **229** | | 136 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Vanadium** | **57.0** | | 6.80 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Zinc** | **42.8** | | 27.2 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Mercury | 0.0259 | U | 0.0259 | mg/kg dry | 1 | L301130 | 01/18/2013 | 01/18/2013 | 7471A |

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|---|---|---|
| WC-Hanford, Inc.<br>2620 Fermi Avenue<br>Richland WA, 99354 | Project: RC-206<br>Project Number: K4041<br>Project Manager: Joan Kessner | **Reported:**<br>01/22/2013 17:10 |

## J1R615

### 1301001-02 (Soil)

| Analyte | Result and Qualifier | | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method |
|---|---|---|---|---|---|---|---|---|---|
| **Lionville Laboratory** | | | | | | | | | |
| **Metals by SW846 6000/7000 series** | | | | | | | | | |
| **Aluminum** | **6460** | | 14.7 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Antimony | 1.76 | U | 1.76 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Arsenic** | **2.35** | B | 2.94 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Barium** | **82.6** | | 1.47 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Beryllium** | **0.213** | B | 0.587 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Boron | 5.87 | U | 5.87 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Cadmium | 0.587 | U | 0.587 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Calcium** | **5620** | | 294 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Chromium** | **16.0** | | 0.587 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Cobalt** | **8.74** | | 5.87 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Copper** | **16.6** | | 2.94 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Iron** | **24200** | | 58.7 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Lead** | **2.95** | | 1.47 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Magnesium** | **4710** | | 220 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Manganese** | **350** | | 14.7 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Molybdenum | 5.87 | U | 5.87 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Nickel** | **8.79** | B | 11.7 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Potassium** | **1540** | | 1170 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Selenium | 0.881 | U | 0.881 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Silicon** | **379** | | 5.87 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Silver | 0.587 | U | 0.587 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Sodium** | **343** | | 147 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Vanadium** | **62.3** | | 7.34 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Zinc** | **43.9** | | 29.4 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Mercury** | **0.00953** | B | 0.0277 | mg/kg dry | 1 | L301130 | 01/18/2013 | 01/18/2013 | 7471A |

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| | | |
|---|---|---|
| WC-Hanford, Inc. | Project: RC-206 | |
| 2620 Fermi Avenue | Project Number: K4041 | **Reported:** |
| Richland WA, 99354 | Project Manager: Joan Kessner | 01/22/2013 17:10 |

## J1R619

### 1301001-03 (Soil)

### Lionville Laboratory

**Metals by SW846 6000/7000 series**

| Analyte | Result and Qualifier | | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **5330** | | 14.2 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Antimony | 1.71 | U | 1.71 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Arsenic** | **1.29** | B | 2.85 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Barium** | **38.5** | | 1.42 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Beryllium** | **0.235** | B | 0.570 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Boron | 5.70 | U | 5.70 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Cadmium | 0.570 | U | 0.570 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Calcium** | **5200** | | 285 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Chromium** | **4.19** | | 0.570 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Cobalt** | **9.27** | | 5.70 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Copper** | **16.4** | | 2.85 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Iron** | **23600** | | 57.0 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Lead** | **2.48** | | 1.42 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Magnesium** | **4140** | | 214 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Manganese** | **260** | | 14.2 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Molybdenum | 5.70 | U | 5.70 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Nickel** | **7.44** | B | 11.4 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Potassium** | **712** | B | 1140 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Selenium | 0.855 | U | 0.855 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Silicon** | **253** | | 5.70 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Silver | 0.570 | U | 0.570 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Sodium** | **383** | | 142 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Vanadium** | **57.8** | | 7.12 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Zinc** | **44.2** | | 28.5 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Mercury | 0.0266 | U | 0.0266 | mg/kg dry | 1 | L301130 | 01/18/2013 | 01/18/2013 | 7471A |

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| | | |
|---|---|---|
| WC-Hanford, Inc. | Project: RC-206 | |
| 2620 Fermi Avenue | Project Number: K4041 | **Reported:** |
| Richland WA, 99354 | Project Manager: Joan Kessner | 01/22/2013 17:10 |

## J1R620

### 1301001-04 (Soil)

### Lionville Laboratory

**Metals by SW846 6000/7000 series**

| Analyte | Result and Qualifier | | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **10100** | | 13.4 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Antimony | 1.60 | U | 1.60 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Arsenic** | **2.99** | | 2.67 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Barium** | **62.4** | | 1.34 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Beryllium** | **0.307** | B | 0.535 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Boron | 5.35 | U | 5.35 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Cadmium | 0.535 | U | 0.535 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Calcium** | **8570** | | 267 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Chromium** | **10.4** | | 0.535 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Cobalt** | **7.75** | | 5.35 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Copper** | **17.2** | | 2.67 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Iron** | **22600** | | 53.5 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Lead** | **4.16** | | 1.34 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Magnesium** | **4830** | | 200 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Manganese** | **307** | | 13.4 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Molybdenum | 5.35 | U | 5.35 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Nickel** | **11.0** | | 10.7 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Potassium** | **1250** | | 1070 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Selenium | 0.802 | U | 0.802 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Silicon** | **908** | | 5.35 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Silver | 0.535 | U | 0.535 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Sodium** | **749** | | 134 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Vanadium** | **58.3** | | 6.68 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Zinc** | **41.8** | | 26.7 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Mercury** | **0.0117** | B | 0.0257 | mg/kg dry | 1 | L301130 | 01/18/2013 | 01/18/2013 | 7471A |

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Fax: 610-280-3041

| | | |
|---|---|---|
| WC-Hanford, Inc. | Project: RC-206 | |
| 2620 Fermi Avenue | Project Number: K4041 | **Reported:** |
| Richland WA, 99354 | Project Manager: Joan Kessner | 01/22/2013 17:10 |

## J1R622
### 1301001-05 (Soil)

### Lionville Laboratory

**Metals by SW846 6000/7000 series**

| Analyte | Result and Qualifier | | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **5220** | | 15.2 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Antimony | 1.82 | U | 1.82 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Arsenic** | **2.10** | B | 3.04 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Barium** | **34.4** | | 1.52 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Beryllium** | **0.226** | B | 0.608 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Boron | 6.08 | U | 6.08 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Cadmium | 0.608 | U | 0.608 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Calcium** | **7280** | | 304 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Chromium** | **4.88** | | 0.608 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Cobalt** | **8.82** | | 6.08 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Copper** | **14.7** | | 3.04 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Iron** | **27200** | | 60.8 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Lead** | **2.65** | | 1.52 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Magnesium** | **4320** | | 228 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Manganese** | **305** | | 15.2 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Molybdenum | 6.08 | U | 6.08 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Nickel** | **6.85** | B | 12.2 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Potassium** | **831** | B | 1220 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Selenium | 0.912 | U | 0.912 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Silicon** | **433** | | 6.08 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Silver | 0.608 | U | 0.608 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Sodium** | **431** | | 152 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Vanadium** | **77.1** | | 7.60 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Zinc** | **46.4** | | 30.4 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Mercury** | **0.0115** | B | 0.0284 | mg/kg dry | 1 | L301130 | 01/18/2013 | 01/18/2013 | 7471A |

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|---|---|---|
| WC-Hanford, Inc.<br>2620 Fermi Avenue<br>Richland WA, 99354 | Project: RC-206<br>Project Number: K4041<br>Project Manager: Joan Kessner | **Reported:**<br>01/22/2013 17:10 |

## J1R625
### 1301001-06 (Soil)

| Analyte | Result and Qualifier | | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method |
|---|---|---|---|---|---|---|---|---|---|
| **Lionville Laboratory** | | | | | | | | | |
| **Metals by SW846 6000/7000 series** | | | | | | | | | |
| **Aluminum** | **8290** | | 14.0 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Antimony | 1.68 | U | 1.68 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Arsenic** | **3.01** | | 2.79 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Barium** | **65.5** | | 1.40 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Beryllium** | **0.317** | B | 0.558 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Boron | 5.58 | U | 5.58 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Cadmium | 0.558 | U | 0.558 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Calcium** | **7450** | | 279 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Chromium** | **10.9** | | 0.558 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Cobalt** | **8.20** | | 5.58 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Copper** | **16.3** | | 2.79 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Iron** | **23900** | | 55.8 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Lead** | **4.39** | | 1.40 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Magnesium** | **5180** | | 209 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Manganese** | **346** | | 14.0 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Molybdenum | 5.58 | U | 5.58 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Nickel** | **12.2** | | 11.2 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Potassium** | **1250** | | 1120 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Selenium | 0.838 | U | 0.838 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Silicon** | **994** | | 5.58 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Silver | 0.558 | U | 0.558 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Sodium** | **403** | | 140 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Vanadium** | **66.6** | | 6.98 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Zinc** | **47.0** | | 27.9 | mg/kg dry | 3 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Mercury** | **0.0108** | B | 0.0260 | mg/kg dry | 1 | L301130 | 01/18/2013 | 01/18/2013 | 7471A |

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| | | |
|---|---|---|
| WC-Hanford, Inc.<br>2620 Fermi Avenue<br>Richland WA, 99354 | Project: RC-206<br>Project Number: K4041<br>Project Manager: Joan Kessner | **Reported:**<br>01/22/2013 17:10 |

## J1R626
### 1301001-07 (Soil)

| Analyte | Result and Qualifier | | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method |
|---|---|---|---|---|---|---|---|---|---|
| **Lionville Laboratory** | | | | | | | | | |
| **Metals by SW846 6000/7000 series** | | | | | | | | | |
| **Aluminum** | **257** | | 4.39 | mg/kg dry | 1 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Antimony | 0.526 | U | 0.526 | mg/kg dry | 1 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Arsenic | 0.877 | U | 0.877 | mg/kg dry | 1 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Barium** | **2.10** | | 0.439 | mg/kg dry | 1 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Beryllium | 0.175 | U | 0.175 | mg/kg dry | 1 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Boron | 1.75 | U | 1.75 | mg/kg dry | 1 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Cadmium | 0.175 | U | 0.175 | mg/kg dry | 1 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Calcium** | **35.0** | B | 87.7 | mg/kg dry | 1 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Chromium | 0.175 | U | 0.175 | mg/kg dry | 1 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Cobalt | 1.75 | U | 1.75 | mg/kg dry | 1 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Copper | 0.877 | U | 0.877 | mg/kg dry | 1 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Iron** | **311** | | 17.5 | mg/kg dry | 1 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Lead** | **0.476** | | 0.439 | mg/kg dry | 1 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Magnesium** | **24.8** | B | 65.8 | mg/kg dry | 1 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Manganese** | **5.87** | | 4.39 | mg/kg dry | 1 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Molybdenum | 1.75 | U | 1.75 | mg/kg dry | 1 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Nickel | 3.51 | U | 3.51 | mg/kg dry | 1 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Potassium** | **54.2** | B | 351 | mg/kg dry | 1 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Selenium | 0.263 | U | 0.263 | mg/kg dry | 1 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Silicon** | **178** | | 1.75 | mg/kg dry | 1 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Silver | 0.175 | U | 0.175 | mg/kg dry | 1 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Sodium | 43.9 | U | 43.9 | mg/kg dry | 1 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Vanadium** | **0.329** | B | 2.19 | mg/kg dry | 1 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| **Zinc** | **1.13** | B | 8.77 | mg/kg dry | 1 | L301131 | 01/17/2013 | 01/18/2013 | 6010B |
| Mercury | 0.0237 | U | 0.0237 | mg/kg dry | 1 | L301130 | 01/18/2013 | 01/18/2013 | 7471A |

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Fax: 610-280-3041

| | | |
|---|---|---|
| WC-Hanford, Inc. | Project: RC-206 | |
| 2620 Fermi Avenue | Project Number: K4041 | **Reported:** |
| Richland WA, 99354 | Project Manager: Joan Kessner | 01/22/2013 17:10 |

# Metals by SW846 6000/7000 series - Quality Control

## Lionville Laboratory

| Analyte | Result and Qualifiers | | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch L301130 - SW 7471A Prep** | | | | | | | | | | |
| **Blank (L301130-BLK1)** | | | | Prepared & Analyzed: 01/18/2013 | | | | | | |
| Mercury | 0.0300 | U | 0.0300 | mg/kg wet | | | | | | |
| **Duplicate (L301130-DUP1)** | | **Source: 1301001-01** | | Prepared & Analyzed: 01/18/2013 | | | | | | |
| Mercury | 0.0161 | B | 0.0259 | mg/kg dry | | 0.0259 U | | | | 20 |
| **Matrix Spike (L301130-MS1)** | | **Source: 1301001-01** | | Prepared & Analyzed: 01/18/2013 | | | | | | |
| Mercury | 0.177 | | 0.0266 | mg/kg dry | 0.14787 | 0.0259 U | 120 | 75-125 | | 20 |
| **Reference (L301130-SRM1)** | | | | Prepared & Analyzed: 01/18/2013 | | | | | | |
| Mercury | 1.33 | | 0.0300 | mg/kg wet | 1.2900 | | 103 | 62.6-138 | | |
| **Batch L301131 - SW 3050B** | | | | | | | | | | |
| **Blank (L301131-BLK1)** | | | | Prepared: 01/17/2013 Analyzed: 01/18/2013 | | | | | | |
| Aluminum | 4.90 | U | 4.90 | mg/kg wet | | | | | | |
| Antimony | 0.588 | U | 0.588 | mg/kg wet | | | | | | |
| Arsenic | 0.980 | U | 0.980 | mg/kg wet | | | | | | |
| Barium | 0.490 | U | 0.490 | mg/kg wet | | | | | | |
| Beryllium | 0.196 | U | 0.196 | mg/kg wet | | | | | | |
| Boron | 1.96 | U | 1.96 | mg/kg wet | | | | | | |
| Cadmium | 0.196 | U | 0.196 | mg/kg wet | | | | | | |
| Calcium | 98.0 | U | 98.0 | mg/kg wet | | | | | | |
| Chromium | 0.196 | U | 0.196 | mg/kg wet | | | | | | |
| Cobalt | 1.96 | U | 1.96 | mg/kg wet | | | | | | |
| Copper | 0.980 | U | 0.980 | mg/kg wet | | | | | | |
| Iron | 19.6 | U | 19.6 | mg/kg wet | | | | | | |
| Lead | 0.490 | U | 0.490 | mg/kg wet | | | | | | |
| Magnesium | 6.09 | B | 73.5 | mg/kg wet | | | | | | |
| Manganese | 4.90 | U | 4.90 | mg/kg wet | | | | | | |
| Molybdenum | 1.96 | U | 1.96 | mg/kg wet | | | | | | |
| Nickel | 3.92 | U | 3.92 | mg/kg wet | | | | | | |
| Potassium | 392 | U | 392 | mg/kg wet | | | | | | |
| Selenium | 0.294 | U | 0.294 | mg/kg wet | | | | | | |
| Silicon | 1.96 | U | 1.96 | mg/kg wet | | | | | | |
| Silver | 0.196 | U | 0.196 | mg/kg wet | | | | | | |
| Sodium | 49.0 | U | 49.0 | mg/kg wet | | | | | | |
| Vanadium | 2.45 | U | 2.45 | mg/kg wet | | | | | | |
| Zinc | 9.80 | U | 9.80 | mg/kg wet | | | | | | |

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| | | |
|---|---|---|
| WC-Hanford, Inc. | Project: RC-206 | |
| 2620 Fermi Avenue | Project Number: K4041 | **Reported:** |
| Richland WA, 99354 | Project Manager: Joan Kessner | 01/22/2013 17:10 |

# Metals by SW846 6000/7000 series - Quality Control

## Lionville Laboratory

| Analyte | Result and Qualifiers | | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch L301131 - SW 3050B** | | | | | | | | | | |
| **Duplicate (L301131-DUP1)** | | **Source: 1301001-01** | | Prepared: 01/17/2013 Analyzed: 01/18/2013 | | | | | | |
| Aluminum | 9290 | | 14.8 | mg/kg dry | | 7540 | | | 21* | 20 |
| Antimony | 1.77 | U | 1.77 | mg/kg dry | | 1.63 U | | | | 20 |
| Arsenic | 2.26 | B | 2.96 | mg/kg dry | | 2.02 | | | 11 | 20 |
| Barium | 70.1 | | 1.48 | mg/kg dry | | 59.3 | | | 17 | 20 |
| Beryllium | 0.291 | B | 0.591 | mg/kg dry | | 0.288 | | | 0.9 | 20 |
| Boron | 1.67 | B | 5.91 | mg/kg dry | | 5.44 U | | | | 20 |
| Cadmium | 0.591 | U | 0.591 | mg/kg dry | | 0.544 U | | | | 20 |
| Calcium | 4210 | | 296 | mg/kg dry | | 4650 | | | 10 | 20 |
| Chromium | 11.3 | | 0.591 | mg/kg dry | | 9.31 | | | 19 | 20 |
| Cobalt | 7.48 | | 5.91 | mg/kg dry | | 8.30 | | | 10 | 20 |
| Copper | 27.1 | | 2.96 | mg/kg dry | | 26.1 | | | 4 | 20 |
| Iron | 22700 | | 59.1 | mg/kg dry | | 26300 | | | 15 | 20 |
| Lead | 4.14 | | 1.48 | mg/kg dry | | 3.72 | | | 11 | 20 |
| Magnesium | 4160 | | 222 | mg/kg dry | | 4930 | | | 17 | 20 |
| Manganese | 346 | | 14.8 | mg/kg dry | | 375 | | | 8 | 20 |
| Molybdenum | 5.91 | U | 5.91 | mg/kg dry | | 5.44 U | | | | 20 |
| Nickel | 10.1 | B | 11.8 | mg/kg dry | | 9.37 | | | 8 | 20 |
| Potassium | 1600 | | 1180 | mg/kg dry | | 1320 | | | 19 | 20 |
| Selenium | 0.887 | U | 0.887 | mg/kg dry | | 0.816 U | | | | 20 |
| Silicon | 725 | | 5.91 | mg/kg dry | | 539 | | | 29* | 20 |
| Silver | 0.591 | U | 0.591 | mg/kg dry | | 0.544 U | | | | 20 |
| Sodium | 267 | | 148 | mg/kg dry | | 229 | | | 15 | 20 |
| Vanadium | 58.6 | | 7.39 | mg/kg dry | | 57.0 | | | 3 | 20 |
| Zinc | 40.0 | | 29.6 | mg/kg dry | | 42.8 | | | 7 | 20 |
| **Matrix Spike (L301131-MS1)** | | **Source: 1301001-01** | | Prepared: 01/17/2013 Analyzed: 01/18/2013 | | | | | | |
| Aluminum | 10300 | | 13.6 | mg/kg dry | 181.26 | 7540 | 1540* | 75-125 | | |
| Antimony | 15.3 | | 1.63 | mg/kg dry | 45.315 | 1.63 U | 34* | 75-125 | | |
| Arsenic | 163 | | 2.72 | mg/kg dry | 181.26 | 2.02 | 89 | 75-125 | | |
| Barium | 239 | | 1.36 | mg/kg dry | 181.26 | 59.3 | 99 | 75-125 | | |
| Beryllium | 4.49 | | 0.544 | mg/kg dry | 4.5315 | 0.288 | 93 | 75-125 | | |
| Boron | 79.0 | | 5.44 | mg/kg dry | 90.629 | 5.44 U | 87 | 75-125 | | |
| Cadmium | 4.63 | | 0.544 | mg/kg dry | 4.5315 | 0.544 U | 102 | 75-125 | | |
| Calcium | 6880 | | 272 | mg/kg dry | 2265.7 | 4650 | 98 | 75-125 | | |
| Chromium | 28.2 | | 0.544 | mg/kg dry | 18.126 | 9.31 | 104 | 75-125 | | |
| Cobalt | 48.2 | | 5.44 | mg/kg dry | 45.315 | 8.30 | 88 | 75-125 | | |
| Copper | 35.1 | | 2.72 | mg/kg dry | 22.657 | 26.1 | 40* | 75-125 | | |

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| | | |
|---|---|---|
| WC-Hanford, Inc. | Project: RC-206 | |
| 2620 Fermi Avenue | Project Number: K4041 | **Reported:** |
| Richland WA, 99354 | Project Manager: Joan Kessner | 01/22/2013 17:10 |

# Metals by SW846 6000/7000 series - Quality Control

## Lionville Laboratory

| Analyte | Result and Qualifiers | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|
| **Batch L301131 - SW 3050B** | | | | | | | | | |
| **Matrix Spike (L301131-MS1)** | | **Source: 1301001-01** | Prepared: 01/17/2013 Analyzed: 01/18/2013 | | | | | | |
| Iron | 24200 | 54.4 | mg/kg dry | 90.629 | 26300 | -2350* | 75-125 | | |
| Lead | 44.4 | 1.36 | mg/kg dry | 45.315 | 3.72 | 90 | 75-125 | | |
| Magnesium | 6560 | 204 | mg/kg dry | 2265.7 | 4930 | 72* | 75-125 | | |
| Manganese | 418 | 13.6 | mg/kg dry | 45.315 | 375 | 95 | 75-125 | | |
| Molybdenum | 78.5 | 5.44 | mg/kg dry | 90.629 | 5.44 U | 87 | 75-125 | | |
| Nickel | 52.6 | 10.9 | mg/kg dry | 45.315 | 9.37 | 95 | 75-125 | | |
| Potassium | 3650 | 1090 | mg/kg dry | 2265.7 | 1320 | 103 | 75-125 | | |
| Selenium | 158 | 0.816 | mg/kg dry | 181.26 | 0.816 U | 87 | 75-125 | | |
| Silicon | 806 | 5.44 | mg/kg dry | 90.629 | 539 | 295* | 75-125 | | |
| Silver | 3.92 | 0.544 | mg/kg dry | 4.5315 | 0.544 U | 87 | 75-125 | | |
| Sodium | 2460 | 136 | mg/kg dry | 2265.7 | 229 | 99 | 75-125 | | |
| Vanadium | 101 | 6.80 | mg/kg dry | 45.315 | 57.0 | 98 | 75-125 | | |
| Zinc | 82.8 | 27.2 | mg/kg dry | 45.315 | 42.8 | 88 | 75-125 | | |
| **Post Spike (L301131-PS1)** | | **Source: 1301001-01** | Prepared: 01/17/2013 Analyzed: 01/18/2013 | | | | | | |
| Aluminum | 141000 | | ug/L | 66000 | 83200 | 88 | 75-125 | | |
| Antimony | 295 | | ug/L | 300.00 | 1.05 | 98 | 75-125 | | |
| Copper | 469 | | ug/L | 300.00 | 288 | 60* | 75-125 | | |
| Iron | 394000 | | ug/L | 126000 | 290000 | 82 | 75-125 | | |
| Magnesium | 113000 | | ug/L | 64800 | 54400 | 90 | 75-125 | | |
| Silicon | 12000 | | ug/L | 6300.0 | 5950 | 96 | 75-125 | | |
| **Reference (L301131-SRM1)** | | | Prepared: 01/17/2013 Analyzed: 01/18/2013 | | | | | | |
| Aluminum | 12300 | 14.4 | mg/kg wet | 6670.0 | | 184 | 0-200.89 | | |
| Antimony | 43.8 | 1.73 | mg/kg wet | 53.000 | | 83 | 0-235.8 | | |
| Arsenic | 113 | 2.88 | mg/kg wet | 114.00 | | 99 | 82.8-117.54 | | |
| Barium | 311 | 1.44 | mg/kg wet | 307.00 | | 101 | 79.8-120.2 | | |
| Beryllium | 109 | 0.577 | mg/kg wet | 108.00 | | 101 | 82.8-117.6 | | |
| Boron | 78.1 | 5.77 | mg/kg wet | 85.100 | | 92 | 67.5-132.8 | | |
| Cadmium | 222 | 0.577 | mg/kg wet | 225.00 | | 99 | 83.6-116.4 | | |
| Calcium | 3450 | 288 | mg/kg wet | 3360.0 | | 103 | 83.3-116.9 | | |
| Chromium | 85.5 | 0.577 | mg/kg wet | 77.200 | | 111 | 73.3-126.4 | | |
| Cobalt | 162 | 5.77 | mg/kg wet | 166.00 | | 98 | 80.7-118.7 | | |
| Copper | 267 | 2.88 | mg/kg wet | 271.00 | | 99 | 80.8-119.2 | | |
| Iron | 8860 | 57.7 | mg/kg wet | 8420.0 | | 105 | 78.6-121.1 | | |
| Lead | 188 | 1.44 | mg/kg wet | 190.00 | | 99 | 81.6-118.4 | | |
| Magnesium | 8580 | 216 | mg/kg wet | 8570.0 | | 100 | 83.2-116.7 | | |
| Manganese | 907 | 14.4 | mg/kg wet | 965.00 | | 94 | 69.3-130.5 | | |

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| | | |
|---|---|---|
| WC-Hanford, Inc. | Project: RC-206 | |
| 2620 Fermi Avenue | Project Number: K4041 | **Reported:** |
| Richland WA, 99354 | Project Manager: Joan Kessner | 01/22/2013 17:10 |

## Metals by SW846 6000/7000 series - Quality Control

## Lionville Laboratory

| Analyte | Result and Qualifiers | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|
| **Batch L301131 - SW 3050B** | | | | | | | | | |
| **Reference (L301131-SRM1)** | | | Prepared: 01/17/2013 Analyzed: 01/18/2013 | | | | | | |
| Molybdenum | 229 | 5.77 | mg/kg wet | 235.00 | | 98 | 76.2-123.8 | | |
| Nickel | 220 | 11.5 | mg/kg wet | 221.00 | | 99 | 79.6-120.8 | | |
| Potassium | 14300 | 1150 | mg/kg wet | 14400 | | 99 | 81.9-118.1 | | |
| Selenium | 186 | 0.865 | mg/kg wet | 187.00 | | 99 | 75.9-124.6 | | |
| Silicon | 1750 | 5.77 | mg/kg wet | 807.00 | | 217 | 0-219.3 | | |
| Silver | 82.6 | 0.577 | mg/kg wet | 83.500 | | 99 | 82.7-117.1 | | |
| Sodium | 9500 | 144 | mg/kg wet | 9730.0 | | 98 | 82.5-117.2 | | |
| Vanadium | 108 | 7.21 | mg/kg wet | 98.700 | | 110 | 75.9-123.6 | | |
| Zinc | 196 | 28.8 | mg/kg wet | 199.00 | | 99 | 78.4-121.6 | | |

**Lionville Laboratory** **Logbook #:** 1194

# SAMPLE DIGESTION RECORD

Digestion Batch #: L301131
Date/Time Initiated: 1/17/13 1940
Date/Time Completed: 1/18/13 1350
Analyst: MW
Matrix (circle): Soil / Water Other
Method (circle one): 3005A 3010A 3050 200.7 (1994)
pH/Turbidity: N/A for Solids.
**NOTE:** All temperatures are recorded as corrected temperatures

Digested / Undigested (circle one)
Balance #: 614
Balance Cal Verification: Y NA
Temp: 95°
BLOCK 1 2 3 (circle one)

| Work Order # | Spike Vol (mL) | Initial Wt/Vol (g/mL) | Final Vol (mL) | pH <2 | Type: To/Sol/ TC | Texture | Color / Appearance | Artifact | Turb |
|---|---|---|---|---|---|---|---|---|---|
| 1301001-01 | | 0.62 | 50 | | TO | not fine | brown, sandy | rocks | |
| L301131-DUP1 | | 0.57 | 50 | | | ↓ | ↓ | ↓ | |
| MS1 | 0.5 | 0.67 | 50 | | | ↓ | ↓ | ↓ | |
| 1301001-02 | | 0.55 | 50 | | | coarse | brown, gravelly | rocks, moisture | |
| 03 | | 0.56 | 50 | | | coarse | brown, gravelly | rocks, moisture | |
| 04 | | 0.61 | 50 | | | not fine | brown, sandy | rocks | |
| 05 | | 0.53 | 50 | | | not fine | dark brown, sandy | rocks!! | |
| 06 | | 0.59 | 50 | | | coarse | brown, sandy | rocks | |
| 07 | | 0.57 | 50 | | | not fine | Ottawa sand | N/A | |
| 1301018-01 | | 0.56 | 50 | | | coarse | brown, gravelly | rocks, wet | |
| L301131-DUP2 | | 0.58 | 50 | | | ↓ | ↓ | ↓ | |
| MS2 | 0.5 | 0.56 | 50 | | | ↓ | ↓ | ↓ | |
| 1301018-02 | | 0.61 | 50 | | | coarse | brown, gravelly | rocks, wet | |
| 03 | | 0.65 | 50 | | | coarse | brown, gravelly, muddy | rocks | |
| 04 | | 0.62 | 50 | | | not fine | Ottawa sand | N/A | |
| L301131-BLK1 | | 0.51 | 50 | | | coarse | boiling chips | | |
| SRM1 | * | 0.52 | 50 | | | fine | pink sandy | | |

MW 1/17/13

Spiking IDs / Expiration Date:
MS#: 1201581
LCS#: 1201014 *

Reagent IDs:
$HNO_3$ 0000003390
HCl
$H_2O_2$
1:1 $HNO_3$ 637-076-07
1:1 HCl

File ID#:

Data Review By/Date:
PMP, 01/24/13

R:\group\QA\SOP\
Signed\SPI\Metals Digestion log.doc

Page #:

Lionville Laboratory

# MERCURY PREPARATION

Logbook # 1198

Analyst: [illegible]
Date 1/17/13-1/18/13
Start Time/Temp: 1020/97°
End Time/Temp: 1050/95°

Instrument ID: HG1.3
Balance # B14 /NA
Pipette Calibration (Daily) (Y) ____

Prep Batch: L301130
Worksheet: HG011803
SOP No. ME-HgCVAA
BLOCK (1) 2 (circle one)

**NOTE: All temperatures are recorded as corrected temperatures.**

| LvL Work Order# | pH < 2 (Liq) | Spike Vol (mL) | Spike Conc. (µg/L) | Initial Wt. or Vol (g or mL) | Final Sample Vol (mL) | Comments, % Solids, etc. |
|---|---|---|---|---|---|---|
| Blank | | | | 10 ml | 50 | |
| 0.2 µg/L | | 0.100 | | 10 ml | 50 | |
| 1.0 µg/L | | 0.500 | | 10 ml | 50 | |
| 2.0 µg/L | | 1.000 | | 10 ml | 50 | |
| 5.0 µg/L | | 2.500 | | 10 ml | 50 | |
| 10.0 µg/L | | 5.000 | | 10 ml | 50 | |
| ICV | | 0.125 | 2.5 | 10 ml | 50 | |
| CCV | | 0.250 | 5.0 | 10 ml | 50 | |
| ICB/CCB | | | | 10 ml | 50 | |
| L301130-BLK1 | | | | 0.30 | 50 | |
| SRM1 | | (illegible) | (illegible) | 0.30 | 50 | |
| 1301001-01 | | | | 0.39 | 50 | |
| L301130-DUP1 | | | | 0.39 | 50 | |
| MS1 | | 0.500 | 1.0 | 0.38 | 50 | |
| 1301001-02 | | | | 0.35 | 50 | |
| 03 | | | | 0.36 | 50 | |
| 04 | | | | 0.38 | 50 | |
| 05 | | | | 0.34 | 50 | |
| 06 | | | | 0.38 | 50 | |
| 07 | | | | 0.38 | 50 | |
| 1301018-01 | | | | 0.36 | 50 | |
| L301130-DUP2 | | | | 0.37 | 50 | |
| MS2 | | 0.500 | 1.0 | 0.38 | 50 | |
| 1301018-02 | | | | 0.36 | 50 | |
| 03 | | | | 0.35 | 50 | |
| 04 | | | | 0.37 | 50 | |
| | | MM | 1/17/13 | | | |

| Standard: | ID | Prep Date/Time |
|---|---|---|
| ICAL/MS | RI 1201235 | 1/17/13 1115 |
| ICV/CCV/LCS | (I.V. 1201411) | N/A |

Reviewed By/Date: PMP, 01/24/13

se book # 1198 for std traceability information

Soil LCS True Value = 1.29 mg/Kg
Standard # 1201014

Water Matrix Spiking Solution Concentration = 0.1 µg/ml
Soil LCS Spiking Concentration: 1.0 µg/ml

# WET CHEMISTRY

Lionville Laboratory, PADEP Lab ID# 15-00009
264 Welsh Pool Road
Exton, PA 19341
Phone: 610-280-3000
Fax: 610-280-3041

| | | |
|---|---|---|
| WC-Hanford, Inc. | Project: RC-206 | |
| 2620 Fermi Avenue | Project Number: K4041 | **Reported:** |
| Richland WA, 99354 | Project Manager: Joan Kessner | 01/15/2013 11:33 |

## Analytical Report for Wet Chemistry

| Sample ID | Laboratory ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| J1R613 | 1301001-01 | Soil | 12/27/2012 09:50 | 12/31/2012 08:45 |
| J1R615 | 1301001-02 | Soil | 12/27/2012 09:55 | 12/31/2012 08:45 |
| J1R619 | 1301001-03 | Soil | 12/27/2012 09:25 | 12/31/2012 08:45 |
| J1R620 | 1301001-04 | Soil | 12/27/2012 09:40 | 12/31/2012 08:45 |
| J1R622 | 1301001-05 | Soil | 12/27/2012 09:45 | 12/31/2012 08:45 |
| J1R625 | 1301001-06 | Soil | 12/27/2012 09:40 | 12/31/2012 08:45 |
| J1R626 | 1301001-07 | Soil | 12/27/2012 09:35 | 12/31/2012 08:45 |

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

264 Welsh Pool Road
Exton, Pennsylvania 19341
Phone (610) 280-3000
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**Case Narrative**

**Client:** WC-HANFORD RC-206 K4041
**LVL#:** 1301001 **Date Received:** 12-31-12

**INORGANIC NARRATIVE**

1. This narrative covers the analyses of 7 soil samples.

2. The samples were prepared and analyzed in accordance with the methods indicated on the data summary report.

   Lionville Lab (LvL) is NELAP accredited by the State of Pennsylvania. For a complete list of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager. LvL certifies that all test results meet the requirements of NELAC with any exception noted in the following statements.

3. Sample holding times as required by the method and/or contract were met.

4. The results presented in this report are derived from samples that met LvL's sample acceptance policy.

5. The method blank for Hexavalent Chromium ($Cr^{6+}$) was within the method criteria.

6. The Laboratory Control Samples (LCS) for $Cr^{6+}$ were within the laboratory control limits.

7. The matrix spike recoveries for $Cr^{6+}$ were within the 75-125% control limits.

8. The replicate analyses were within the 20% Relative Percent Difference (RPD) control limit.

9. Results for soil samples are reported on a dry weight basis.

10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard copy package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Iain Daniels
Laboratory Manager
Lionville Laboratory

1/30/13
Date

njp\i01-001

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 10 pages.

Lionville Laboratory, PADEP Lab ID# 15-00009
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Exton, PA 19341
Phone: 610-280-3000
Fax: 610-280-3041

| | | |
|---|---|---|
| WC-Hanford, Inc.<br>2620 Fermi Avenue<br>Richland WA, 99354 | Project: RC-206<br>Project Number: K4041<br>Project Manager: Joan Kessner | **Reported:**<br>01/15/2013 11:33 |

## Notes and Definitions

| | |
|---|---|
| U | Analyte included in the analysis, but not detected |
| D | Results reported from a dilution; related reporting limits are elevated due to the presence of an interference or a high target value. |
| * | Value outside QC acceptance criteria |
| DET | Analyte DETECTED |
| ND | Analyte NOT DETECTED at or above the reporting limit |
| NR | Not Reported |
| Dry | Sample results reported on a dry weight basis |
| Wet | Sample results reported on a wet weight basis |
| RPD | Relative Percent Difference |
| LOD | Limit of Detection (LOD): the minimum estimated concentration of a target analyte that can be detected reliably. Concentrations at the LOD or between the LOD and LOQ are flagged estimated with either a 'J' qualifier or client-specific qualifier. |
| LOQ | Limit of Quantitation (LOQ): the minimum concentration of a target analyte that can be quantified reliably |

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| | | |
|---|---|---|
| WC-Hanford, Inc. | Project: RC-206 | |
| 2620 Fermi Avenue | Project Number: K4041 | **Reported:** |
| Richland WA, 99354 | Project Manager: Joan Kessner | 01/15/2013 11:33 |

# Wet Chemistry
## Lionville Laboratory

| Analyte | Result and Qualifier | | LOD | LOQ | Units | Dilution | Batch | Prepared | Analyzed | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| **J1R613 (1301001-01) Soil** | | | | | | | | | | |
| **%Solids** | **89.0** | | | 0.1 | % by Weight | 1 | L301010 | 01/02/2013 14:38 | 01/02/2013 14:38 | SM2540G |
| Hexavalent Chromium | 0.22 | U | 0.22 | 0.56 | mg/kg dry | 1 | L301024 | 01/04/2013 12:25 | 01/08/2013 14:30 | SW846 7196A |
| **J1R615 (1301001-02) Soil** | | | | | | | | | | |
| **%Solids** | **92.9** | | | 0.1 | % by Weight | 1 | L301010 | 01/02/2013 14:38 | 01/02/2013 14:38 | SM2540G |
| Hexavalent Chromium | 0.22 | U | 0.22 | 0.54 | mg/kg dry | 1 | L301024 | 01/04/2013 13:40 | 01/08/2013 14:30 | SW846 7196A |
| **J1R619 (1301001-03) Soil** | | | | | | | | | | |
| **%Solids** | **94.0** | | | 0.1 | % by Weight | 1 | L301010 | 01/02/2013 14:38 | 01/02/2013 14:38 | SM2540G |
| Hexavalent Chromium | 0.21 | U | 0.21 | 0.53 | mg/kg dry | 1 | L301024 | 01/04/2013 13:40 | 01/08/2013 14:30 | SW846 7196A |
| **J1R620 (1301001-04) Soil** | | | | | | | | | | |
| **%Solids** | **92.0** | | | 0.1 | % by Weight | 1 | L301010 | 01/02/2013 14:38 | 01/02/2013 14:38 | SM2540G |
| Hexavalent Chromium | 0.22 | U | 0.22 | 0.54 | mg/kg dry | 1 | L301024 | 01/04/2013 13:40 | 01/08/2013 14:30 | SW846 7196A |
| **J1R622 (1301001-05) Soil** | | | | | | | | | | |
| **%Solids** | **93.1** | | | 0.1 | % by Weight | 1 | L301010 | 01/02/2013 14:38 | 01/02/2013 14:38 | SM2540G |
| Hexavalent Chromium | 0.21 | U | 0.21 | 0.54 | mg/kg dry | 1 | L301024 | 01/04/2013 13:40 | 01/08/2013 14:30 | SW846 7196A |
| **J1R625 (1301001-06) Soil** | | | | | | | | | | |
| **%Solids** | **91.1** | | | 0.1 | % by Weight | 1 | L301010 | 01/02/2013 14:38 | 01/02/2013 14:38 | SM2540G |
| Hexavalent Chromium | 0.22 | U | 0.22 | 0.55 | mg/kg dry | 1 | L301024 | 01/04/2013 13:40 | 01/08/2013 14:30 | SW846 7196A |
| **J1R626 (1301001-07) Soil** | | | | | | | | | | |
| **%Solids** | **100** | | | 0.1 | % by Weight | 1 | L301010 | 01/02/2013 14:38 | 01/02/2013 14:38 | SM2540G |

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| | | |
|---|---|---|
| WC-Hanford, Inc.<br>2620 Fermi Avenue<br>Richland WA, 99354 | Project: RC-206<br>Project Number: K4041<br>Project Manager: Joan Kessner | **Reported:**<br>01/15/2013 11:33 |

# Wet Chemistry - Quality Control

## Lionville Laboratory

| Analyte | Result and Qualifiers | LOD | LOQ | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch L301010 - NO PREP** | | | | | | | | | | |
| **Duplicate (L301010-DUP1)** | | **Source: 1301001-01** | | Prepared & Analyzed: 01/02/2013 14:38 | | | | | | |
| %Solids | 89.3 | | 0.1 | % by Weight | | 89.0 | | | 0.4 | 20 |
| **Batch L301024 - Default Prep GenChem** | | | | | | | | | | |
| **Blank (L301024-BLK1)** | | | | Prepared: 01/04/2013 12:25 Analyzed: 01/08/2013 14:30 | | | | | | |
| Hexavalent Chromium | 0.20 U | 0.20 | 0.50 | mg/kg wet | | | | | | |
| **LCS (L301024-BS1)** | | | | Prepared: 01/04/2013 12:25 Analyzed: 01/08/2013 14:30 | | | | | | |
| Hexavalent Chromium | 4.17 | 0.20 | 0.50 | mg/kg wet | 4.0000 | | 104 | 80-120 | | |
| **LCS (L301024-BS2)** | | | | Prepared: 01/04/2013 12:25 Analyzed: 01/08/2013 14:30 | | | | | | |
| Hexavalent Chromium | 1020 D | 20.0 | 50.0 | mg/kg wet | 1191.4 | | 86 | 80-120 | | |
| **Duplicate (L301024-DUP1)** | | **Source: 1301001-01** | | Prepared: 01/04/2013 12:25 Analyzed: 01/08/2013 14:30 | | | | | | |
| Hexavalent Chromium | 0.22 U | 0.22 | 0.56 | mg/kg dry | | 0.22 U | | | | 20 |
| **Matrix Spike (L301024-MS1)** | | **Source: 1301001-01** | | Prepared: 01/04/2013 12:25 Analyzed: 01/08/2013 14:30 | | | | | | |
| Hexavalent Chromium | 3.43 | 0.22 | 0.56 | mg/kg dry | 4.4952 | 0.22 U | 76 | 75-125 | | |
| **Matrix Spike (L301024-MS2)** | | **Source: 1301001-01** | | Prepared: 01/04/2013 12:25 Analyzed: 01/08/2013 14:30 | | | | | | |
| Hexavalent Chromium | 980 D | 22.5 | 56.2 | mg/kg dry | 1208.6 | 0.22 U | 81 | 75-125 | | |