

SAF-RC-233
100-IU-2 & 100-IU-6 Remaining
Waste Sites – Soil In-Process
FINAL DATA PACKAGE

COMPLETE COPY OF DATA PACKAGE TO:

Kathy Wendt

H4-21

KW 3/18/13
INITIAL/DATE

COMMENTS:

SDG K4062

SAF-RC-233

Rad only

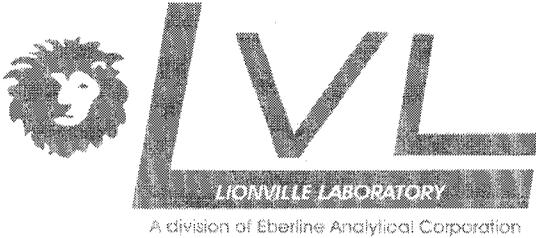
Chem only

Rad & Chem

Complete

Partial

Sample Location: 600-379



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

12 March 2013

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

Subject: Analytical Data Package

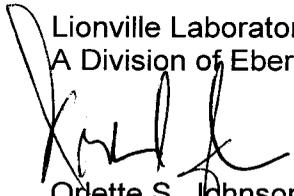
Dear Ms. Kessner:

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

LvLI Batch #	1302014
SDG #	K4062
SAF #	RC-233
Date Received	02/01/13
# Samples	1
Matrix	SOIL
Volatiles	
Semivolatiles	
Pest/PCB	
Glycols	
DRO/KRO/GRO	X
PAHs	X
Herbicides	
Metals	X
Inorganics	

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 30 pages.

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

000000001

CHAIN OF CUSTODY

Collector ~~Ad 1-30-13~~ **DUNN, A** Company Contact **Joan Kessner** Telephone No. **509-375-4688** Project Coordinator **KESSNER, JH** Price Code **8C** Data Turnaround **15 Days**

Project Designation **100-IU-2 & 100-IU-6 Remaining Waste Sites - Soil In-Proce** Sampling Location **600-379** Field Logbook No. **EL-1666** COA **0603792600** Method of Shipment **fed EX**

Ice Chest No. **RCC-08-028** Offsite Property No. **A 120731** Bill of Lading/Air Bill No. **See OSPC**

Shipped To **EBERLINE SERVICES (LIONVILLE)**

POSSIBLE SAMPLE HAZARDS/REMARKS
 May contain hazardous substances at levels that present risk to humans and/or the environment
 Special Handling and/or Storage **Maintain preservation as indicated in header**

Sample No.	Matrix *	Sample Date	Sample Time	Preservation	Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	TPH-D/leesl Range - WTPH-D +	PAHs - 8310
J1RD81	SOIL	1/29/13	1230	G/P	1	1	1	1	1		

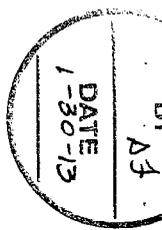
SAMPLE ANALYSIS

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
<i>[Signature]</i>	1-29-13 1230	BHUDSON	1/29/13 1250
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
BHUDSON	1/29/13 1345	<i>[Signature]</i>	1-29-13 1345
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
<i>[Signature]</i>	1-30-13 1135	FEA	EX
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
<i>[Signature]</i>	2-1-13 0950	MICHAEL HERNANDEZ	2-1-13 0950
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

** Please leach and hold TCLP until directed to run analysis by Joan Kessner

- (1) ICP Metals - 6010TR (Client List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7471 - (CV) (Mercury)
- (2) Metals by ICP (TCLP) - 1311/6010 (Arsenic, Barium, Beryllium, Cadmium, Chromium, Lead, Selenium, Silver); Mercury (TCLP) - 1311/7470 (Mercury)



LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposed Method	Disposed By	Date/Time

Lionville Laboratory
SAMPLE RECEIPT CHECKLIST (SRC)

CLIENT: WC Hanford
 Project/SAF/SOW/Release #: RC-233

Date: 2-1-13

LvL Batch #: 1302014

Sample Custodian: _____

NOTE: EXPLAIN ALL DISCREPANCIES

- | | | | |
|--|---|--------------------------------|---|
| 1. Samples Hand Delivered or Shipped? | Carrier <u>FedEx</u> | Airbill # <u>7946 39807977</u> | |
| 2. Custody Seals on coolers or shipping containers intact, signed & dated? | <input type="checkbox"/> Yes <input type="checkbox"/> No | | <input type="checkbox"/> No Seals |
| 3. Outside of coolers or shipping containers are free from damage? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | | Comments: |
| 4. All expected paperwork received (coc & other client specific information) sealed in plastic bag and easily accessible? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 5. Samples received cooled or ambient? | Temp <u>2-3</u> °C | Cooler # <u>RCC-08-028</u> | |
| How was the temperature taken? | <input checked="" type="checkbox"/> IR <input type="checkbox"/> Temp. Blank | | <input type="checkbox"/> Other (Specify): |
| Is the Temp. Criteria met for these samples? (Hg in soils @ 4°C) | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 6. Custody seals on sample containers intact, signed and dated? | <input type="checkbox"/> Yes <input type="checkbox"/> No | | <input type="checkbox"/> No Seals |
| 7. COC (Client & LvL) signed & dated? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 8. Sample containers are intact? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 9. All samples on COC received? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | | |
| All samples received on COC? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 10. All sample label information matches COC? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 11. Samples properly preserved? (If #5 is no, then this is no.) | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 12. Samples received within hold times? | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| Short holds taken to wet lab? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | | <input checked="" type="checkbox"/> N/A |
| 13. VOA, TOC, TOX, RSK-175, Sulfides, Non-Halogenated VOAs (Alcohol/Glycol) free of headspace? | <input type="checkbox"/> Yes <input type="checkbox"/> No | | <input checked="" type="checkbox"/> N/A |
| 14. QC stickers placed on bottles designated by client? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | | <input type="checkbox"/> 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.) | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 16. Project Manager contacted concerning any discrepancies? | <input type="checkbox"/> Yes <input type="checkbox"/> No | | <input checked="" type="checkbox"/> N/A |

Person Contacted _____

Date _____

DRO/MO



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

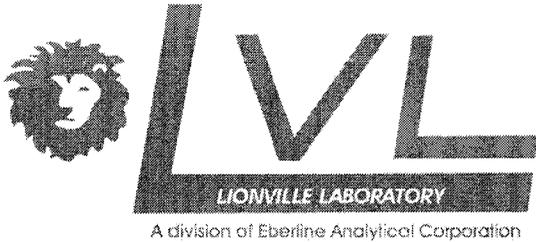
WC-Hanford, Inc.
2620 Fermi Avenue
Richland WA, 99354

Project: RC-233
Project Number: K4062
Project Manager: Joan Kessner

Reported:
02/14/2013 14:38

Analytical Report for Extractable Petroleum Hydrocarbons by SW846 8015

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
JIRD81	1302014-01	Soil	01/29/2013 12:30	02/01/2013 09:50



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

Case Narrative

Client: WC-HANFORD RC-233 K4062
LVL #: 1302014

W.O. #: 60049-001-001-0001-00
Date Received: 02-01-2013

DIESEL RANGE ORGANICS

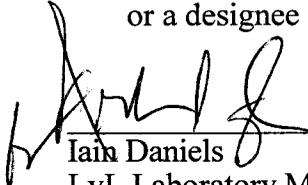
One (1) soil sample was collected on 01-29-2013.

The sample and associated QC samples were extracted 02-11-2013 and analyzed 02-12,13-2013 according to criteria set forth in Lionville Laboratory SOPs. The extraction procedure was based on SW846 Method 3540C and the analysis procedure was based on SW846 Method 8015B for Diesel Range Organics. The sample and associated QC had an elevated final volume of 4 mLs due to sample matrix. Reporting limits have been adjusted to reflect the necessary dilutions.

Lionville Laboratory (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. LvL certifies that all test results meet the requirements of NELAC with any exception noted in the following statements:

1. The results presented in this report are derived from a sample that met LvL's sample acceptance.
2. All required holding times for extraction and analysis have been met.
3. All surrogate recoveries were within QC acceptance criteria.
4. The method blank was below the reporting limits for all target compounds.
5. All blank spike recoveries were within QC acceptance criteria.
6. Matrix spike recoveries were unobtainable due to high concentration of target analytes and dilution required for analysis. A copy of the Sample Discrepancy Report (SDR# 13GC022) has been enclosed.
7. The sample and associated QC required a 4-fold instrument dilution due to high concentration of target analytes. Reporting limits have been adjusted to reflect the necessary dilutions.
8. All initial calibrations associated with this data set were within acceptance criteria.
9. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.
10. The samples were reported on a dry weight basis.

11. 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 hardcopy data package has been authorized by the laboratory manager or a designee as verified by the following signature.


Iain Daniels
LvL Laboratory Manager

3/12/13
Date

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 13G0022

Initiator: Catherine Carey
 Date: 02/13/2013
 Client: WC Hansford

Batch: 1302014
 Samples: MS3 MS03
 Method: SW846/MCAWWW/CLP/

Parameter: DRO
 Matrix: SOIL
 Prep Batch: L302095

1. Reason for SDR

a. COC Discrepancy Tech Profile Error Client Request Sampler Error on C-O-C
 Transcription Error Wrong Test Code Other _____

b. General Discrepancy
 Missing Sample/Extract Container Broken Wrong Sample Pulled Label ID's Illegible
 Hold Time Exceeded Insufficient Sample Preservation Wrong Received Past Hold
 Improper Bottle Type Not Amenable to Analysis

Note: Verified by [Log-In] or [Prep Group] (circle)...signature/date: _____

c. Problem (Include all relevant specific results; attach data if necessary)

spike recoveries outside qc limits

2. Known or Probable Causes(s)

High concentration of target analytes in sample

3. Discussion and Proposed Action

Other Description:

- Re-log
- Entire Batch
- Following Samples: _____
- Re-leach
- Re-extract
- Re-digest
- Revise EDD
- Change Test Code to _____
- Place On/Take Off Hold (circle)

Narrate

JD
[Signature] 3/14/13

4. Project Manager Instructions...signature/date: _____

- Concur with Proposed Action
- Disagree with Proposed Action; See Instruction
- Include in Case Narrative
- Client Contacted:
- Date/Person _____
- Add
- Cancel

[Signature] 3/12/13

5. Final Action...signature/date: _____

Other Explanation:

- Verified re-[log][leach][extract][digest][analysis] (circle)
- Included in Case Narrative
- Hard Copy COC Revised
- Electronic COC Revised
- EDD Corrections Completed

When Final Action has been recorded, forward original to QA for disposition.

Route

- Lab Manager: Daniels
- Project Mgr (circle): Johnson / Stone
- Sample Prep (circle): Ford
- Log-in: King

Route

- Metals: Welsh / _____
- Inorganic: Perrone / _____
- GC/LC: Carey / _____
- MS VOA: Rubino / _____
- MS BNA: Carden / _____
- Other: _____



GLOSSARY OF DATA

DATA QUALIFIERS

- U** = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J** = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I** = Interference.
- .I** = Indicates an interference on one analytical column only. Result is reported from remaining analytical column.
- P** = This flag is used for a dual column analysis (i.e. pesticides/PCB/herbicides) when there is greater than 40% difference for detected concentrations between the two GC columns; the lower of the two values is reported on Form 1 and flagged with a "P".
- D** = This flag identifies all compounds identified in an analysis at a secondary dilution factor.
- C** = This flag applies to a compound that has been confirmed by GC/MS.

ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD** = Indicates blank spike duplicate.
- MS** = Indicates matrix spike.
- MSD** = Indicates matrix spike duplicate.
- DL** = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- NS** = Not Spiked.
- SP** = Indicates Spiked Compound.
- NPM** = No pattern match for multi-component target analytes.



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

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-233 Project Number: K4062 Project Manager: Joan Kessner	Reported: 02/14/2013 14:38
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J1RD81
1302014-01 (Soil)

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
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Lionville Laboratory

Extractable Petroleum Hydrocarbons by SW846 8015

Diesel Range Organics	1050000	60600	ug/kg dry	4	L302095	02/11/2013	02/13/2013	8015M
Motor Oil	2700000	182000	ug/kg dry	4	L302095	02/11/2013	02/13/2013	8015M
<i>Surrogate: p-Terphenyl</i>	<i>75 %</i>	<i>39-129</i>			<i>L302095</i>	<i>02/11/2013</i>	<i>02/13/2013</i>	<i>8015M</i>



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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-233 Project Number: K4062 Project Manager: Joan Kessner	Reported: 02/14/2013 14:38
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Extractable Petroleum Hydrocarbons by SW846 8015 - Quality Control
Lionville Laboratory

Analyte	Result and Qualifiers	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L302095 - SW 3540C									
Blank (L302095-BLK1)				Prepared: 02/11/2013 Analyzed: 02/12/2013					
Diesel Range Organics	3330 U	3330	ug/kg wet						
Motor Oil	10000 U	10000	ug/kg wet						
Surrogate: p-Terphenyl	5060		ug/kg wet	6666.7		76	39-129		
LCS (L302095-BS1)				Prepared: 02/11/2013 Analyzed: 02/12/2013					
Diesel Range Organics	51100	3330	ug/kg wet	66667		77	42-133		
Surrogate: p-Terphenyl	5580		ug/kg wet	6666.7		84	39-129		
Matrix Spike (L302095-MS3)				Source: 1302014-01 Prepared: 02/11/2013 Analyzed: 02/13/2013					
Diesel Range Organics	1500000	61000	ug/kg dry	76276	1050000	589*	42-133		
Surrogate: p-Terphenyl	6510		ug/kg dry	7627.6		85	39-129		
Matrix Spike Dup (L302095-MSD3)				Source: 1302014-01 Prepared: 02/11/2013 Analyzed: 02/13/2013					
Diesel Range Organics	1040000	60400	ug/kg dry	75526	1050000	-6*	42-133	204*	40
Surrogate: p-Terphenyl	5520		ug/kg dry	7552.6		73	39-129		

PREPARATION BENCH SHEET

L302095

Lionville Laboratory

Printed: 2/12/2013 2:04:08PM

Matrix: Solid

Prepared using: GC - SW 3540C

Surrogate used: 1300029

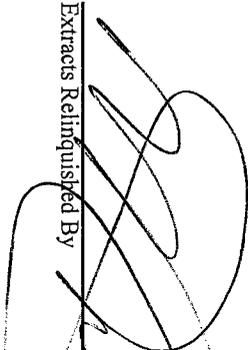
Lab Number	Analysis	Prepared	Initial (g)	Final (ml)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
L302003-01	8015M DRO	02/11/2013 14:40	30.02	4				1000	WC-Hanford, Inc.	
L302004-01	8015M DRO	02/11/2013 14:40	30.03	1				1000	WC-Hanford, Inc.	
L302014-01	8015M DRO	02/11/2013 14:40	30.42	4				1000	WC-Hanford, Inc.	
L302015-01	8015M DRO	02/11/2013 14:40	30.63	1				1000	WC-Hanford, Inc.	
L302015-02	8015M DRO	02/11/2013 14:40	30	1				1000	WC-Hanford, Inc.	
L302095-BLK1	QC	02/11/2013 14:40	30	1				1000		
L302095-BS1	QC	02/11/2013 14:40	30	1	1201538		1000	1000		
L302095-MS1	QC	02/11/2013 14:40	30.01	4	1201538	1302003-01	1000	1000		
L302095-MS2	QC	02/11/2013 14:40	30.15	1	1201538	1302004-01	1000	1000		
L302095-MS3	QC	02/11/2013 14:40	30.2	4	1201538	1302014-01	1000	1000		
L302095-MS4	QC	02/11/2013 14:40	30	1	1201538	1302015-01	1000	1000		
L302095-MSD1	QC	02/11/2013 14:40	30.19	4	1201538	1302003-01	1000	1000		
L302095-MSD2	QC	02/11/2013 14:40	30.16	1	1201538	1302004-01	1000	1000		
L302095-MSD3	QC	02/11/2013 14:40	30.5	4	1201538	1302014-01	1000	1000		
L302095-MSD4	QC	02/11/2013 14:40	30	1	1201538	1302015-01	1000	1000		

Extracts Relinquished By

Date

Extracts Received By

Date

 2/12/13 1425

PAHs

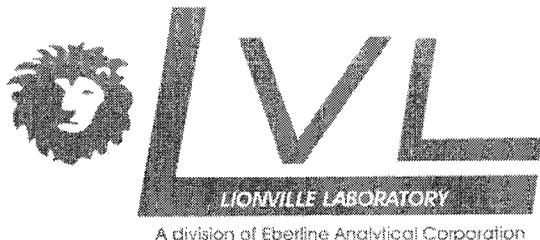


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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-233 Project Number: K4062 Project Manager: Joan Kessner	Reported: 02/15/2013 12:25
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Analytical Report for Polynuclear Aromatic Compounds by SW846 8310

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
JIRD81	1302014-01	Soil	01/29/2013 12:30	02/01/2013 09:50



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

Case Narrative

Client: WC-HANFORD RC-233 K4062
LVL #: 1302014

W.O. #: 60049-001-001-0001-00
Date Received: 02-01-2013

POLYNUCLEAR AROMATIC HYDROCARBONS (PAH)

One (1) soil sample was collected on 01-29-2013.

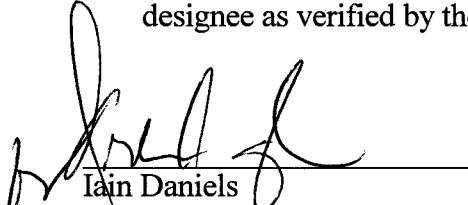
The sample and associated QC samples were extracted 02-11-2013 and analyzed 02-14,15-2013 according to criteria set forth in Lionville Laboratory SOPs. The extraction procedure was based on SW846 Method 3540C and the analysis procedure was based on SW846 Method 8310. The sample and associated QC had an elevated final volume of 40mLs due to sample matrix. Reporting limits have been adjusted for the necessary dilutions.

Lionville Laboratory (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. LvL certifies that all test results meet the requirements of NELAC with any exception noted in the following statements:

1. The results presented in this report are derived from a sample that met LvL's sample acceptance policy.
2. All required holding times for extraction and analysis have been met.
3. Two (2) of five (5) surrogate recoveries were outside QC acceptance criteria. A copy of the Sample Discrepancy Report (SDR# 13GC026) has been enclosed
4. The method blank was below the reporting limits for all target compounds.
5. All blank spike recoveries were within QC acceptance criteria.
6. Thirty-two (32) of thirty-two (32) matrix spike recoveries were outside QC acceptance criteria. Matrix spike recoveries were unobtainable due to dilution required for analysis due to high concentration of non-target analytes. A copy of the Sample Discrepancy Report (SDR# 13GC026) has been enclosed.
7. The sample and associated QC required a 100-fold instrument dilution due to high concentration of target analytes and sample matrix. Reporting limits have been adjusted to reflect the necessary dilutions.
8. The initial calibrations associated with this data set were within acceptance criteria.
9. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria. Per SW846 Method 8000B, the attached table lists compounds where the % difference or drift was greater than 15% and the mean across all compounds was used for evaluation of the continuing calibration. Results associated with these compounds are considered to have greater uncertainty.

10. The sample was reported on a dry weight basis.

11. 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
LvL Laboratory Manager

3/12/13
Date

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 1360026

Initiator: Catherine Corey
 Date: 02/16/13
 Client: WGC Hartford

Batch: 1302014
 Samples: 01, ms4, msd4
 Method: SWB46/MCAWWW/CLPI

Parameter: PAH
 Matrix: soil
 Prep Batch: L302092

1. Reason for SDR

a. COC Discrepancy Tech Profile Error Client Request Sampler Error on C-O-C
 Transcription Error Wrong Test Code Other _____

b. General Discrepancy

Missing Sample/Extract Container Broken Wrong Sample Pulled Label ID's Illegible
 Hold Time Exceeded Insufficient Sample Preservation Wrong Received Past Hold
 Improper Bottle Type Not Amenable to Analysis

Note: Verified by [Log-In] or [Prep Group] (circle)...signature/date: _____

c. Problem (Include all relevant specific results; attach data if necessary)

surrogate recoveries high in samples 01 and msd4
 multiple spike recoveries outside QC limits in ms4, msd4

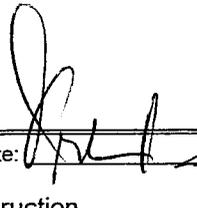
2. Known or Probable Causes(s)

high dilution (100x)

3. Discussion and Proposed Action

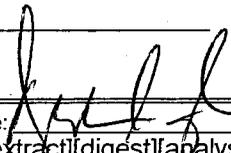
Other Description:

Re-log
 Entire Batch
 Following Samples: _____
 Re-leach
 Re-extract
 Re-digest
 Revise EDD
 Change Test Code to _____
 Place On/Take Off Hold (circle)

Narrative


4. Project Manager Instructions...signature/date:

Concur with Proposed Action
 Disagree with Proposed Action; See Instruction
 Include in Case Narrative
 Client Contacted:
 Date/Person _____
 Add
 Cancel

 2/20/13

5. Final Action...signature/date:

Verified re-[log][leach][extract][digest][analysis] (circle)
 Included in Case Narrative
 Hard Copy COC Revised
 Electronic COC Revised
 EDD Corrections Completed

Other Explanation:

When Final Action has been recorded, forward original to QA for disposition.

Route

Lab Manager: Daniels
 Project Mgr (circle) Johnson / Stone
 Sample Prep (circle): Ford
 Log-in: King

Route

Metals: Welsh /
 Inorganic: Perrone /
 GC/LC: Carey /
 MS VOA: Rubino /
 MS BNA: Carden /
 Other: _____

8310 PAH

Analytes with %Difference or %Drift >15%, Where Mean is Used for Continuing Calibration

Analyte	02.14.13 10:39:49 am CCV1	02.14.13 3:07:39 pm CCV2	2-14-13 7:17:30 pm CCV3	2-14-13 9:29:19 pm CCV4	CCV5	CCV6	CCV7	CCV8
Triphenylene (surrogate)								
Naphthalene								
Acenaphthylene								
Acenaphthene								
Fluorene								
Phenanthrene								
Anthracene								
Fluoranthene								
Indeno[1,2,3-cd]pyrene								
Pyrene								
Benz[a]anthracene								
Chrysene								
Benzo[b]fluoranthene								
Benzo[k]fluoranthene								
Benzo[a]pyrene	-17.5		-31.5	-31.9				
Dibenz[a,h]anthracene								
Benzo[g,h,i]perylene								
Mean %D or %Drift	1.2/2.3	2.7/0.2	0.2/-3.2	5.0/-3.3				

Sample results reported from affected CCV:

CCV1: L302092 - BIK1, BS1, 1301065-01, 1301066-01, L301202-MS3 MS, MS3, MS4

CCV2: _____

CCV3: 1302014-01

CCV4: _____

CCV5: _____

CCV6: _____

CCV7: _____

CCV8: _____



GLOSSARY OF DATA

DATA QUALIFIERS

- U = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I = Interference.
- .I = Indicates an interference on one analytical column only. Result is reported from remaining analytical column.
- P = This flag is used for a dual column analysis (i.e. pesticides/PCB/herbicides) when there is greater than 40% difference for detected concentrations between the two GC columns; the lower of the two values is reported on Form 1 and flagged with a "P".
- D = This flag identifies all compounds identified in an analysis at a secondary dilution factor.
- C = This flag applies to a compound that has been confirmed by GC/MS.

ABBREVIATIONS

- BS = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD = Indicates blank spike duplicate.
- MS = Indicates matrix spike.
- MSD = Indicates matrix spike duplicate.
- DL = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA = Not Applicable.
- DF = Dilution Factor.
- NR = Not Required.
- NS = Not Spiked.
- SP = Indicates Spiked Compound.
- NPM = No pattern match for multi-component target analytes.



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

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-233 Project Number: K4062 Project Manager: Joan Kessner	Reported: 02/15/2013 12:25
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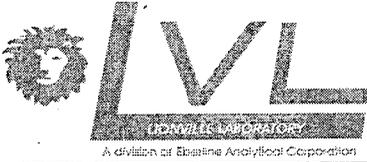
J1RD81
1302014-01 (Soil)

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
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Lionville Laboratory

Polynuclear Aromatic Compounds by SW846 8310

Naphthalene	3010 U	3010	ug/kg dry	100	L302092	02/11/2013	02/14/2013	8310
Acenaphthylene	1230 J, D	3010	ug/kg dry	100	L302092	02/11/2013	02/14/2013	8310
Acenaphthene	3010 U	3010	ug/kg dry	100	L302092	02/11/2013	02/14/2013	8310
Fluorene	3010 U	3010	ug/kg dry	100	L302092	02/11/2013	02/14/2013	8310
Phenanthrene	4820 D	3010	ug/kg dry	100	L302092	02/11/2013	02/14/2013	8310
Anthracene	3010 U	3010	ug/kg dry	100	L302092	02/11/2013	02/14/2013	8310
Fluoranthene	1560 J, D	3010	ug/kg dry	100	L302092	02/11/2013	02/14/2013	8310
Indeno[1,2,3-cd]pyrene	3010 U	3010	ug/kg dry	100	L302092	02/11/2013	02/14/2013	8310
Pyrene	3010 U	3010	ug/kg dry	100	L302092	02/11/2013	02/14/2013	8310
Benzo[a]anthracene	3010 U	3010	ug/kg dry	100	L302092	02/11/2013	02/14/2013	8310
Chrysene	3010 U	3010	ug/kg dry	100	L302092	02/11/2013	02/14/2013	8310
Benzo[b] fluoranthene	3010 U	3010	ug/kg dry	100	L302092	02/11/2013	02/14/2013	8310
Benzo[k] fluoranthene	3010 U	3010	ug/kg dry	100	L302092	02/11/2013	02/14/2013	8310
Benzo[a] pyrene	3010 U	3010	ug/kg dry	100	L302092	02/11/2013	02/14/2013	8310
Dibenz[a,h]anthracene	3010 U	3010	ug/kg dry	100	L302092	02/11/2013	02/14/2013	8310
Benzo[g,h,i] perylene	3010 U	3010	ug/kg dry	100	L302092	02/11/2013	02/14/2013	8310
Surrogate: Triphenylene	215 % *	68-129			L302092	02/11/2013	02/14/2013	8310



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 Fax: 610-280-3041

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-233 Project Number: K4062 Project Manager: Joan Kessner	Reported: 02/15/2013 12:25
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Polynuclear Aromatic Compounds by SW846 8310 - Quality Control
Lionville Laboratory

Analyte	Result and Qualifiers	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
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Batch L302092 - SW 3540C

Blank (L302092-BLK1)			Prepared: 02/11/2013 Analyzed: 02/14/2013						
Naphthalene	3.33 U	3.33	ug/kg wet						
Acenaphthylene	3.33 U	3.33	ug/kg wet						
Acenaphthene	3.33 U	3.33	ug/kg wet						
Fluorene	3.33 U	3.33	ug/kg wet						
Phenanthrene	3.33 U	3.33	ug/kg wet						
Anthracene	3.33 U	3.33	ug/kg wet						
Fluoranthene	3.33 U	3.33	ug/kg wet						
Indeno[1,2,3-cd]pyrene	3.33 U	3.33	ug/kg wet						
Pyrene	3.33 U	3.33	ug/kg wet						
Benz[a]anthracene	3.33 U	3.33	ug/kg wet						
Chrysene	3.33 U	3.33	ug/kg wet						
Benzo[b] fluoranthene	3.33 U	3.33	ug/kg wet						
Benzo[k] fluoranthene	3.33 U	3.33	ug/kg wet						
Benzo[a] pyrene	3.33 U	3.33	ug/kg wet						
Dibenz[a,h]anthracene	3.33 U	3.33	ug/kg wet						
Benzo[g,h,i] perylene	3.33 U	3.33	ug/kg wet						
<i>Surrogate: Triphenylene</i>	143		ug/kg wet	166.67		86	68-129		

LCS (L302092-BS1)			Prepared: 02/11/2013 Analyzed: 02/14/2013						
Naphthalene	186	3.33	ug/kg wet	166.67		111	0-127		
Acenaphthylene	143	3.33	ug/kg wet	166.67		86	50-140		
Acenaphthene	145	3.33	ug/kg wet	166.67		87	17-139		
Fluorene	138	3.33	ug/kg wet	166.67		83	28-145		
Phenanthrene	140	3.33	ug/kg wet	166.67		84	30-152		
Anthracene	133	3.33	ug/kg wet	166.67		80	19-171		
Fluoranthene	144	3.33	ug/kg wet	166.67		86	34-159		
Indeno[1,2,3-cd]pyrene	145	3.33	ug/kg wet	166.67		87	31-156		
Pyrene	149	3.33	ug/kg wet	166.67		89	33-152		
Benz[a]anthracene	145	3.33	ug/kg wet	166.67		87	32-157		
Chrysene	146	3.33	ug/kg wet	166.67		88	31-159		
Benzo[b] fluoranthene	148	3.33	ug/kg wet	166.67		89	33-164		
Benzo[k] fluoranthene	148	3.33	ug/kg wet	166.67		89	28-161		
Benzo[a] pyrene	122	3.33	ug/kg wet	166.67		73	29-149		
Dibenz[a,h]anthracene	150	3.33	ug/kg wet	166.67		90	27-153		
Benzo[g,h,i] perylene	154	3.33	ug/kg wet	166.67		92	32-157		
<i>Surrogate: Triphenylene</i>	147		ug/kg wet	166.67		88	68-129		



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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-233 Project Number: K4062 Project Manager: Joan Kessner	Reported: 02/15/2013 12:25
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Polynuclear Aromatic Compounds by SW846 8310 - Quality Control
Lionville Laboratory

Analyte	Result and Qualifiers	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
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Batch L302092 - SW 3540C

Matrix Spike (L302092-MS4)	Source: 1302014-01			Prepared: 02/11/2013		Analyzed: 02/15/2013			
Naphthalene	3030	U	3030	ug/kg dry	189.75	3010 U	0-127		
Acenaphthylene	3030	U	3030	ug/kg dry	189.75	1230 -650*	50-140		
Acenaphthene	3030	U	3030	ug/kg dry	189.75	3010 U *	17-139		
Fluorene	3030	U	3030	ug/kg dry	189.75	3010 U *	28-145		
Phenanthrene	3030	U	3030	ug/kg dry	189.75	4820 -2540*	30-152		
Anthracene	3030	U	3030	ug/kg dry	189.75	3010 U *	19-171		
Fluoranthene	3030	U	3030	ug/kg dry	189.75	1560 -823*	34-159		
Indeno[1,2,3-cd]pyrene	3030	U	3030	ug/kg dry	189.75	3010 U *	31-156		
Pyrene	3030	U	3030	ug/kg dry	189.75	3010 U *	33-152		
Benz[a]anthracene	793	J, D	3030	ug/kg dry	189.75	3010 U 418*	32-157		
Chrysene	3030	U	3030	ug/kg dry	189.75	3010 U *	31-159		
Benzo[b] fluoranthene	3030	U	3030	ug/kg dry	189.75	3010 U *	33-164		
Benzo[k] fluoranthene	3030	U	3030	ug/kg dry	189.75	3010 U *	28-161		
Benzo[a] pyrene	3030	U	3030	ug/kg dry	189.75	3010 U *	29-149		
Dibenz[a,h]anthracene	3030	U	3030	ug/kg dry	189.75	3010 U *	27-153		
Benzo[g,h,i] perylene	3030	U	3030	ug/kg dry	189.75	3010 U *	32-157		
<i>Surrogate: Triphenylene</i>	187			ug/kg dry	189.75	99	68-129		

Matrix Spike Dup (L302092-MSD4)	Source: 1302014-01			Prepared: 02/11/2013		Analyzed: 02/15/2013			
Naphthalene	1010	J, D	3050	ug/kg dry	191.01	3010 U 526*	0-127		40
Acenaphthylene	3050	U	3050	ug/kg dry	191.01	1230 -646*	50-140	-0.7	40
Acenaphthene	984	J, D	3050	ug/kg dry	191.01	3010 U 515*	17-139		40
Fluorene	3050	U	3050	ug/kg dry	191.01	3010 U *	28-145		40
Phenanthrene	3050	U	3050	ug/kg dry	191.01	4820 -2520*	30-152	-0.7	40
Anthracene	3050	U	3050	ug/kg dry	191.01	3010 U *	19-171		40
Fluoranthene	3050	U	3050	ug/kg dry	191.01	1560 -818*	34-159	-0.7	40
Indeno[1,2,3-cd]pyrene	3050	U	3050	ug/kg dry	191.01	3010 U *	31-156		40
Pyrene	859	J, D	3050	ug/kg dry	191.01	3010 U 450*	33-152		40
Benz[a]anthracene	911	J, D	3050	ug/kg dry	191.01	3010 U 477*	32-157	13	40
Chrysene	3050	U	3050	ug/kg dry	191.01	3010 U *	31-159		40
Benzo[b] fluoranthene	1030	J, D	3050	ug/kg dry	191.01	3010 U 538*	33-164		40
Benzo[k] fluoranthene	3050	U	3050	ug/kg dry	191.01	3010 U *	28-161		40
Benzo[a] pyrene	3050	U	3050	ug/kg dry	191.01	3010 U *	29-149		40
Dibenz[a,h]anthracene	3050	U	3050	ug/kg dry	191.01	3010 U *	27-153		40
Benzo[g,h,i] perylene	3050	U	3050	ug/kg dry	191.01	3010 U *	32-157		40
<i>Surrogate: Triphenylene</i>	123			ug/kg dry	191.01	64*	68-129		

PREPARATION BENCH SHEET

L302092

Lionville Laboratory

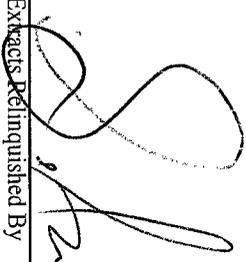
Printed: 2/14/2013 10:15:04AM

Matrix: Solid

Prepared using: HPLC - SW 3540C

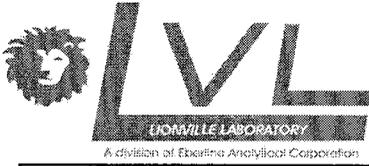
Surrogate used: 1200612

Lab Number	Analysis	Prepared	Initial (g)	Final (ml)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
L302003-01	8310 PAH	02/11/2013 13:31	30.81	40			50	50	WC-Hanford, Inc.	
L302004-01	8310 PAH	02/11/2013 13:31	30.51	20			50	50	WC-Hanford, Inc.	
L302005-01	8310 PAH	02/11/2013 13:31	30.15	20			50	50	WC-Hanford, Inc.	
L302005-02	8310 PAH	02/11/2013 13:31	30.4	40			50	50	WC-Hanford, Inc.	
L302014-01	8310 PAH	02/11/2013 13:31	30.58	40			50	50	WC-Hanford, Inc.	
L302092-BLK1	QC	02/11/2013 13:31	30	5			50	50		
L302092-BS1	QC	02/11/2013 13:31	30	5	1300078		50	50		
L302092-MS1	QC	02/11/2013 13:31	30.13	40	1300078	1302003-01	50	50		
L302092-MS2	QC	02/11/2013 13:31	30.04	20	1300078	1302004-01	50	50		
L302092-MS3	QC	02/11/2013 13:31	30.17	20	1300078	1302005-01	50	50		
L302092-MS4	QC	02/11/2013 13:31	30.35	40	1300078	1302014-01	50	50		
L302092-MSD1	QC	02/11/2013 13:31	30.54	40	1300078	1302003-01	50	50		
L302092-MSD2	QC	02/11/2013 13:31	30.62	20	1300078	1302004-01	50	50		
L302092-MSD3	QC	02/11/2013 13:31	30.07	20	1300078	1302005-01	50	50		
L302092-MSD4	QC	02/11/2013 13:31	30.15	40	1300078	1302014-01	50	50		

Extracts Relinquished By  Date 2/14/13 10:15

Extracts Received By  Date 02.14.13 10:15

METALS



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

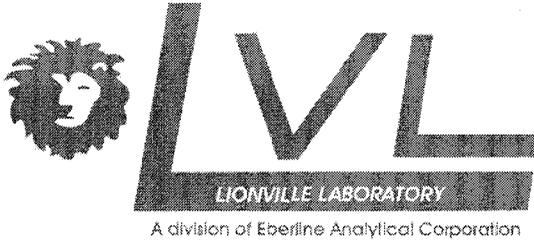
WC-Hanford, Inc.
2620 Fermi Avenue
Richland WA, 99354

Project: RC-233
Project Number: K4062
Project Manager: Joan Kessner

Reported:
02/22/2013 14:34

Analytical Report for Metals by SW846 6000/7000 series

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
JIRD81	1302014-01	Soil	01/29/2013 12:30	02/01/2013 09:50



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

Case Narrative

Client: WC-HANFORD RC-233
LVL#: 1302014
SDG/SAF#: K4062/RC-233

W.O.#: 60049-001-001-0001-00
Date Received: 02-01-13

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.

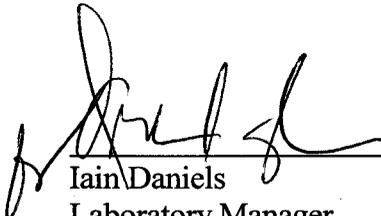
All soil samples are reported on a dry weight basis unless requested by the client, required by the method, or noted otherwise.

1. This narrative covers the analysis of 1 soil sample.
2. The sample was prepared and analyzed in accordance with methods listed on the data report forms.

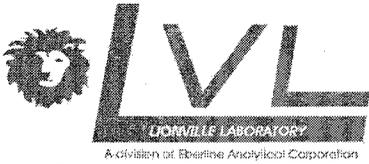
The sample was analyzed with a 3-fold dilution for ICP metals due to sample matrix.

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 control limits.
6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within method criteria.
7. All preparation/method blanks (MB) were within method criteria {less than the Limit of Quantitation (3-10X the LOD or samples 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) recovery for 9 analytes was outside the 75-125% control limits.

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: Antimony, Barium, Boron, Calcium, Copper, Iron, Lead, Silicon, and Zinc.
12. The duplicate analyses for 3 analytes were outside the 20% Relative Percent Difference (RPD) control limit criteria. The $\pm 20\%$ RPD control limit applies to sample results greater than ten times the MDL. The sample results for Cadmium and Molybdenum were less 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 hardcopy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.


Iain Daniels
Laboratory Manager
Lionville Laboratory
m1302014hg%ijw.doc

3/12/13
Date



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

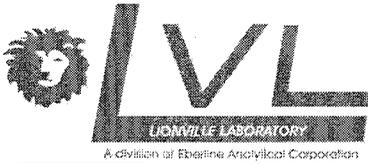
WC-Hanford, Inc.
2620 Fermi Avenue
Richland WA, 99354

Project: RC-233
Project Number: K4062
Project Manager: Joan Kessner

Reported:
02/22/2013 14:34

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
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 Fax: 610-280-3041

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-233 Project Number: K4062 Project Manager: Joan Kessner	Reported: 02/22/2013 14:34
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JIRD81
1302014-01 (Soil)

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
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Lionville Laboratory

Metals by SW846 6000/7000 series

Aluminum	13400		16.0	mg/kg dry	3	L302109	02/14/2013	02/15/2013	6010B
Antimony	3.51		1.92	mg/kg dry	3	L302109	02/14/2013	02/15/2013	6010B
Arsenic	3.77		3.20	mg/kg dry	3	L302109	02/14/2013	02/15/2013	6010B
Barium	487		1.60	mg/kg dry	3	L302109	02/14/2013	02/15/2013	6010B
Beryllium	0.821		0.640	mg/kg dry	3	L302109	02/14/2013	02/15/2013	6010B
Boron	84.5		6.40	mg/kg dry	3	L302109	02/14/2013	02/15/2013	6010B
Cadmium	0.387	B	0.640	mg/kg dry	3	L302109	02/14/2013	02/15/2013	6010B
Calcium	18500		320	mg/kg dry	3	L302109	02/14/2013	02/15/2013	6010B
Chromium	11.5		0.640	mg/kg dry	3	L302109	02/14/2013	02/15/2013	6010B
Cobalt	7.32		6.40	mg/kg dry	3	L302109	02/14/2013	02/15/2013	6010B
Copper	174		3.20	mg/kg dry	3	L302109	02/14/2013	02/15/2013	6010B
Iron	21100		64.0	mg/kg dry	3	L302109	02/14/2013	02/15/2013	6010B
Lead	62.4		1.60	mg/kg dry	3	L302109	02/14/2013	02/15/2013	6010B
Magnesium	3120		240	mg/kg dry	3	L302109	02/14/2013	02/15/2013	6010B
Manganese	275		16.0	mg/kg dry	3	L302109	02/14/2013	02/15/2013	6010B
Molybdenum	0.999	B	6.40	mg/kg dry	3	L302109	02/14/2013	02/15/2013	6010B
Nickel	13.0		12.8	mg/kg dry	3	L302109	02/14/2013	02/15/2013	6010B
Potassium	1440		1280	mg/kg dry	3	L302109	02/14/2013	02/15/2013	6010B
Selenium	0.960	U	0.960	mg/kg dry	3	L302109	02/14/2013	02/15/2013	6010B
Silicon	282		6.40	mg/kg dry	3	L302109	02/14/2013	02/15/2013	6010B
Silver	0.640	U	0.640	mg/kg dry	3	L302109	02/14/2013	02/15/2013	6010B
Sodium	622		160	mg/kg dry	3	L302109	02/14/2013	02/15/2013	6010B
Vanadium	79.9		8.00	mg/kg dry	3	L302109	02/14/2013	02/15/2013	6010B
Zinc	125		32.0	mg/kg dry	3	L302109	02/14/2013	02/15/2013	6010B
Mercury	0.0164	B	0.0305	mg/kg dry	1	L302108	02/14/2013	02/15/2013	7471A



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

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-233 Project Number: K4062 Project Manager: Joan Kessner	Reported: 02/22/2013 14:34
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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 L302108 - SW 7471A Prep										
Blank (L302108-BLK1)					Prepared: 02/14/2013 Analyzed: 02/15/2013					
Mercury	0.0281	U	0.0281	mg/kg wet						
Duplicate (L302108-DUP2)					Source: 1302014-01 Prepared: 02/14/2013 Analyzed: 02/15/2013					
Mercury	0.0280	U	0.0280	mg/kg dry		0.0164				20
Matrix Spike (L302108-MS2)					Source: 1302014-01 Prepared: 02/14/2013 Analyzed: 02/15/2013					
Mercury	0.201		0.0280	mg/kg dry	0.15565	0.0164	118	75-125		20
Reference (L302108-SRM1)					Prepared: 02/14/2013 Analyzed: 02/15/2013					
Mercury	1.30		0.0290	mg/kg wet	1.2900		101	62.6-138		
Batch L302109 - SW 3050B										
Blank (L302109-BLK1)					Prepared: 02/14/2013 Analyzed: 02/15/2013					
Aluminum	4.81	U	4.81	mg/kg wet						
Antimony	0.577	U	0.577	mg/kg wet						
Arsenic	0.962	U	0.962	mg/kg wet						
Barium	0.481	U	0.481	mg/kg wet						
Beryllium	0.192	U	0.192	mg/kg wet						
Boron	1.92	U	1.92	mg/kg wet						
Cadmium	0.192	U	0.192	mg/kg wet						
Calcium	7.70	B	96.2	mg/kg wet						
Chromium	0.192	U	0.192	mg/kg wet						
Cobalt	1.92	U	1.92	mg/kg wet						
Copper	0.962	U	0.962	mg/kg wet						
Iron	19.2	U	19.2	mg/kg wet						
Lead	0.481	U	0.481	mg/kg wet						
Magnesium	4.32	B	72.1	mg/kg wet						
Manganese	4.81	U	4.81	mg/kg wet						
Molybdenum	1.92	U	1.92	mg/kg wet						
Nickel	3.85	U	3.85	mg/kg wet						
Potassium	385	U	385	mg/kg wet						
Selenium	0.288	U	0.288	mg/kg wet						
Silicon	1.92	U	1.92	mg/kg wet						
Silver	0.192	U	0.192	mg/kg wet						
Sodium	48.1	U	48.1	mg/kg wet						
Vanadium	2.40	U	2.40	mg/kg wet						
Zinc	9.62	U	9.62	mg/kg wet						



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Project: RC-233
 Project Number: K4062
 Project Manager: Joan Kessner

Reported:
 02/22/2013 14:34

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
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Batch L302109 - SW 3050B

Duplicate (L302109-DUP2)		Source: 1302014-01		Prepared: 02/14/2013 Analyzed: 02/15/2013		
Aluminum	10900	14.6	mg/kg dry	13400	20.8*	20
Antimony	2.89	1.76	mg/kg dry	3.51	19.4	20
Arsenic	3.71	2.93	mg/kg dry	3.77	1.57	20
Barium	406	1.46	mg/kg dry	487	18.2	20
Beryllium	0.753	0.586	mg/kg dry	0.821	8.54	20
Boron	80.6	5.86	mg/kg dry	84.5	4.63	20
Cadmium	0.304 B	0.586	mg/kg dry	0.387	24.1*	20
Calcium	21500	293	mg/kg dry	18500	15.1	20
Chromium	9.80	0.586	mg/kg dry	11.5	15.9	20
Cobalt	7.59	5.86	mg/kg dry	7.32	3.58	20
Copper	46.5	2.93	mg/kg dry	174	116*	20
Iron	19400	58.6	mg/kg dry	21100	8.61	20
Lead	68.5	1.46	mg/kg dry	62.4	9.42	20
Magnesium	3260	220	mg/kg dry	3120	4.24	20
Manganese	254	14.6	mg/kg dry	275	7.73	20
Molybdenum	1.30 B	5.86	mg/kg dry	0.999	26.2*	20
Nickel	12.2	11.7	mg/kg dry	13.0	6.26	20
Potassium	1330	1170	mg/kg dry	1440	8.19	20
Selenium	0.878 U	0.878	mg/kg dry	0.960 U		20
Silicon	216	5.86	mg/kg dry	282	26.3*	20
Silver	0.586 U	0.586	mg/kg dry	0.640 U		20
Sodium	669	146	mg/kg dry	622	7.22	20
Vanadium	73.5	7.32	mg/kg dry	79.9	8.37	20
Zinc	105	29.3	mg/kg dry	125	17.4	20

Matrix Spike (L302109-MS2)		Source: 1302014-01		Prepared: 02/14/2013 Analyzed: 02/15/2013	
Aluminum	13600	14.6	mg/kg dry	195.22	13400 120 75-125
Antimony	18.8	1.76	mg/kg dry	48.804	3.51 31.2* 75-125
Arsenic	168	2.93	mg/kg dry	195.22	3.77 84.2 75-125
Barium	602	1.46	mg/kg dry	195.22	487 58.6* 75-125
Beryllium	4.97	0.586	mg/kg dry	4.8804	0.821 85.0 75-125
Boron	275	5.86	mg/kg dry	97.608	84.5 195* 75-125
Cadmium	4.42	0.586	mg/kg dry	4.8804	0.387 82.7 75-125
Calcium	19800	293	mg/kg dry	2440.2	18500 55.7* 75-125
Chromium	26.8	0.586	mg/kg dry	19.522	11.5 78.4 75-125
Cobalt	48.2	5.86	mg/kg dry	48.804	7.32 83.8 75-125
Copper	77.4	2.93	mg/kg dry	24.402	174 -396* 75-125

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Project: RC-233
Project Number: K4062
Project Manager: Joan Kessner

Reported:
02/22/2013 14:34

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
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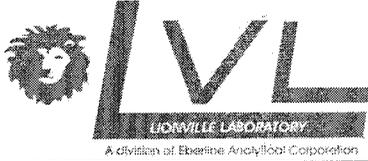
Batch L302109 - SW 3050B

Matrix Spike (L302109-MS2)		Source: 1302014-01		Prepared: 02/14/2013		Analyzed: 02/15/2013	
Iron	24400	58.6	mg/kg dry	97.608	21100	3400*	75-125
Lead	90.6	1.46	mg/kg dry	48.804	62.4	57.9*	75-125
Magnesium	5520	220	mg/kg dry	2440.2	3120	98.1	75-125
Manganese	321	14.6	mg/kg dry	48.804	275	95.2	75-125
Molybdenum	81.1	5.86	mg/kg dry	97.608	0.999	82.0	75-125
Nickel	52.9	11.7	mg/kg dry	48.804	13.0	81.7	75-125
Potassium	3600	1170	mg/kg dry	2440.2	1440	88.3	75-125
Selenium	163	0.878	mg/kg dry	195.22	0.960 U	83.7	75-125
Silicon	316	5.86	mg/kg dry	97.608	282	35.4*	75-125
Silver	4.14	0.586	mg/kg dry	4.8804	0.640 U	84.8	75-125
Sodium	3420	146	mg/kg dry	2440.2	622	115	75-125
Vanadium	125	7.32	mg/kg dry	48.804	79.9	92.0	75-125
Zinc	146	29.3	mg/kg dry	48.804	125	43.6*	75-125

Post Spike (L302109-PS2)		Source: 1302014-01		Prepared: 02/14/2013		Analyzed: 02/15/2013	
Antimony	325		ug/L	300.00	32.9	97.2	75-125
Barium	4800		ug/L	300.00	4570	78.0	75-125
Boron	1060		ug/L	300.00	792	88.0	75-125
Calcium	224000		ug/L	62400	173000	81.3	75-125
Copper	1890		ug/L	300.00	1630	85.2	75-125
Iron	302000		ug/L	126000	198000	82.1	75-125
Lead	845		ug/L	300.00	585	86.7	75-125
Silicon	8660		ug/L	6300.0	2640	95.5	75-125
Zinc	1450		ug/L	300.00	1170	92.1	75-125

Reference (L302109-SRM1)				Prepared: 02/14/2013		Analyzed: 02/15/2013	
Aluminum	10600	14.2	mg/kg wet	6670.0		159	0-200.89
Antimony	44.3	1.70	mg/kg wet	53.000		83.6	0-235.8
Arsenic	112	2.83	mg/kg wet	114.00		97.9	82.8-117.54
Barium	300	1.42	mg/kg wet	307.00		97.6	79.8-120.2
Beryllium	104	0.566	mg/kg wet	108.00		96.0	82.8-117.6
Boron	76.9	5.66	mg/kg wet	85.100		90.4	67.5-132.8
Cadmium	217	0.566	mg/kg wet	225.00		96.3	83.6-116.4
Calcium	3260	283	mg/kg wet	3360.0		97.0	83.3-116.9
Chromium	83.1	0.566	mg/kg wet	77.200		108	73.3-126.4
Cobalt	158	5.66	mg/kg wet	166.00		95.1	80.7-118.7
Copper	255	2.83	mg/kg wet	271.00		94.0	80.8-119.2
Iron	8570	56.6	mg/kg wet	8420.0		102	78.6-121.1

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Project: RC-233
 Project Number: K4062
 Project Manager: Joan Kessner

Reported:
 02/22/2013 14:34

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 L302109 - SW 3050B									
Reference (L302109-SRM1)				Prepared: 02/14/2013 Analyzed: 02/15/2013					
Lead	181	1.42	mg/kg wet	190.00		95.1	81.6-118.4		
Magnesium	8340	212	mg/kg wet	8570.0		97.3	83.2-116.7		
Manganese	943	14.2	mg/kg wet	965.00		97.7	69.3-130.5		
Molybdenum	228	5.66	mg/kg wet	235.00		97.0	76.2-123.8		
Nickel	218	11.3	mg/kg wet	221.00		98.7	79.6-120.8		
Potassium	14200	1130	mg/kg wet	14400		98.9	81.9-118.1		
Selenium	181	0.849	mg/kg wet	187.00		96.9	75.9-124.6		
Silicon	647	5.66	mg/kg wet	807.00		80.2	0-219.3		
Silver	80.6	0.566	mg/kg wet	83.500		96.5	82.7-117.1		
Sodium	9490	142	mg/kg wet	9730.0		97.5	82.5-117.2		
Vanadium	107	7.08	mg/kg wet	98.700		109	75.9-123.6		
Zinc	194	28.3	mg/kg wet	199.00		97.3	78.4-121.6		

SAMPLE DIGESTION RECORD

Digestion Batch #: L302109
 Date/Time Initiated: 2/14/13 1050 *weighed out 2/15 pm 2/13/13*
 Date/Time Completed: 2/14/13 1750
 Analyst: PM
 Matrix (circle one): Soil Water Other
 Method (circle one): 3005A 3010A 3050 200.7 (1994)
 pH/Turbidity: N/A for Solids.

Digested / Undigested (circle one)
 Balance #: B14
 Balance Cal Verification: (Y) NA
 Temp: 94°
 BLOCK 1 (2) 2 (circle one)

NOTE: All temperatures are recorded as corrected temperatures

Work Order #	Spike Vol (mL)	Initial Wt/Vol (g/mL)	Final Vol (mL)	pH <2	Type: To/Sol/TC	Texture	Color / Appearance	Artifact	Turb
L302013-01		0.52	50		TD	fine	brown soil	N/A	
L302109-00P1		0.56	50						
MS1	0.5	0.58	50						
L302013-02		0.59	50			fine	dark brown soil	rocks, veg	
03		0.55	50			coarse	dark tan soil	rocks, clay, rocks	
04		0.62	50			coarse	brown soil with brown lumps, vegetation	rocks	
L302014-01		0.54	50			not fine	brown soil	small tan lumps	
L302109-00P2		0.59	50						
MS2	0.5	0.59	50						
HH		0.52	50			coarse	biting chips		
SPM1	<u>(A)</u>	0.53	50			fine	pink, sandy		

PM 2/13/13

Spiking IDs / Expiration Date:
 MS#: 1300144

 LCS#: 1201014 (A)

Reagent IDs:
 HNO₃ 000003390
 HCl 0000018301
 H₂O₂ 111A03
 1:1 HNO₃ 637-076-07
 1:1 HCl _____

File ID#: _____
 Data Review By/Date: _____
PM 2/13/13

Lionville Laboratory

MERCURY PREPARATION

Analyst: M. Leleh
 Date: 2/13/13 - 2/14/13
 Start Time/Temp: 1315/94°
 End Time/Temp: 1515/94°

Instrument ID: HG3.1
 Balance #: B14 /NA
 Pipette Calibration (Daily) Y

Logbook # 1198
 Prep Batch: L302108 w.e. prep 2/13/13
 Worksheet: HG021901 HG021501
 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.
<u>Blank</u>				<u>10ml</u>	<u>50</u>	
<u>0.2 µg/L</u>		<u>0.100</u>	<u>w.e. µg/L</u>	<u>10ml</u>	<u>50</u>	
<u>1.0 µg/L</u>		<u>0.500</u>		<u>10ml</u>	<u>50</u>	
<u>2.0 µg/L</u>		<u>1.000</u>		<u>10ml</u>	<u>50</u>	
<u>5.0 µg/L</u>		<u>2.500</u>		<u>10ml</u>	<u>50</u>	
<u>10.0 µg/L</u>		<u>5.000</u>		<u>10ml</u>	<u>50</u>	
<u>ICV</u>		<u>0.125</u>	<u>2.5</u>	<u>10ml</u>	<u>50</u>	
<u>CCV</u>		<u>0.250</u>	<u>5.0</u>	<u>10ml</u>	<u>50</u>	
<u>ICB/CCB</u>				<u>10ml</u>	<u>50</u>	
<u>L302108-BLK1</u>				<u>0.32</u>	<u>50</u>	
<u>SAM1</u>		<u>(#)</u>	<u>(#)</u>	<u>0.31</u>	<u>50</u>	
<u>1302013-01</u>				<u>0.36</u>	<u>50</u>	
<u>L302108-DUP1</u>				<u>0.34</u>	<u>50</u>	
<u>MS1</u>		<u>0.500</u>	<u>1.0</u>	<u>0.34</u>	<u>50</u>	
<u>1302013-02</u>				<u>0.35</u>	<u>50</u>	
<u>03</u>				<u>0.37</u>	<u>50</u>	
<u>04</u>				<u>0.39</u>	<u>50</u>	
<u>1302014-01</u>				<u>0.34</u>	<u>50</u>	
<u>L302108-DUP2</u>				<u>0.37</u>	<u>50</u>	
<u>MS2</u>		<u>0.500</u>	<u>1.0</u>	<u>0.37</u>	<u>50</u>	
<u>1302015-01</u>				<u>0.36</u>	<u>50</u>	
<u>L302108-DUP3</u>				<u>0.37</u>	<u>50</u>	
<u>MS3</u>		<u>0.500</u>	<u>1.0</u>	<u>0.36</u>	<u>50</u>	<u>digestates lost</u>
<u>1302015-02</u>				<u>0.34</u>	<u>50</u>	
<u>1302030-01</u>				<u>0.34</u>	<u>50</u>	
<u>L302108-DUP4</u>				<u>0.35</u>	<u>50</u>	
<u>MS4</u>		<u>0.500</u>	<u>1.0</u>	<u>0.34</u>	<u>50</u>	

Standard:	ID	Prep Date/Time
ICAL/MS	<u>RI 1201235</u>	<u>2/14/1010</u>
ICV/CCV/LCS	<u>(I.V. 1201411)</u>	

Reviewed By/Date: R. Huff

Soil LCS True Value = 1.27 mg/Kg
 Standard # 1201019

see book # 1198 for std traceability information
 Water Matrix Spiking Solution Concentration = 0.1 µg/ml
 after LCS Spiking Concentration: 1.0 µg/ml



Lionville Laboratory

MERCURY PREPARATION

Analyst: Miller
 Date: 2/13/13
 Start Time/Temp: 1:27 PM 024
 End Time/Temp: 1:27 PM 024

Instrument ID: HG3.1
 Balance #: B19 /NA
 Pipette Calibration (Daily) (Y)

Logbook # 1198
 Prep Batch: L302108
 Worksheet: HG021507
 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.
1302030-02				0.36	50	
03				0.38	50	
1302031-01				0.38	50	
L302108-BUPS				0.36	50	
MSS		0.500	1.0	0.34	50	
1302031-02				0.38	50	
03				0.33	50	
1198 2/13/13						

Standard:	ID	Prep Date/Time	Reviewed By/Date:
ICAL/MS			<u>Miller</u>
ICV/CCV/LCS			

Soil LCS True Value = Average 0.44 mg/Kg
 Standard # _____

see book # 1198 for std traceability information
 Water Matrix Spiking Solution Concentration = 0.1 µg/ml
 after LCS Spiking Concentration: 1.0 µg/ml