SAF-RC-042
300 Area D4 Waste Characterization Sampling - Other Liquid
FINAL DATA PACKAGE

COMPLETE COPY OF DATA PACKAGE TO:

No Distribution Required KW 3/19/13
INITIAL/DATE

COMMENTS:

SDG K4046 **SAF-RC-042**

Rad only ☑ Chem only Rad & Chem

☑ Complete Partial

Sample Location/Waste Site: 3718F Waste Pad Glycol Drum

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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 #	1301034
SDG #	K4046
SAF #	RC-042
Date Received	01/17/13
# Samples	1
Matrix	OTHER
Volatiles	
Semivolatiles	
Pest/PCB	
Glycols	X
DRO/KRO/GRO	
PAHs	
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 24 pages.

29 05; 3/19/13

000000001

CHAIN OF CUSTODY

Lionville Laboratory Use Only

1301034

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 SAF# RC-042

Est. Final Proj. Sampling Date

Project#

Project Contact/Phone#

Lionville Laboratory Project Manager O. Johnson

QC SW Del SH TAT 15 Days

Date Rec'd 1-17-13 Date Due 2-1-13

Refrigerator #

#/Type Container	Liquid	Solid
Volume	Liquid	Solid
Preservatives		

ANALYSES REQUESTED →

		ORGANIC						INORG												
		VOA	BNA	Pest/ PCB	Herb		A Non-Halo Glycol Ketones		B		Metal HSL	CN								
							VOA		2											
							1AG		1P											
							40		120											
							—		—											

Lionville Laboratory Use Only

MATRIX CODES:	Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected						8015 NONHALO		METALS							
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	01	J1R9T4	✓	✓	WST	1-16-13	1306						X		X							

Special Instructions:

OTHER LIQUID = WASTE PAD GLYCOL DRUM

METALS = HSL + B, Mo, Si

Special Instructions:

1/17/13 1. NONHALO VOA = propylene + ethylene glycol

2.

3.

4.

5.

6.

Relinquished by	Received by	Date	Time
Ed Ec	V Hernandez	1-17-13	0935

Relinquished by	Received by	Date	Time

Relinquished by	Received by	Date	Time

1301034

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-042-188	Page 1 of 1

Collector R STRICKLAND	**Company Contact** Tom Edmundson	**Telephone No.** 509.947.5192	**Project Coordinator** KESSNER, JH	**Price Code** 9K	**Data Turnaround** 15 Days
Project Designation 300 Area D4 Waste Characterization Sampling - Other Liqui	**Sampling Location** 3718F Waste Pad Glycol Drum		**SAF No.** RC-042		
Ice Chest No. WCH-12-034	**Field Logbook No.** EL-1518-26	**COA** RD4MXX2F00	**Method of Shipment** Fed Ex		
Shipped To EBERLINE SERVICES (LIONVILLE)	**Offsite Property No.** A11D 418		**Bill of Lading/Air Bill No.** See OSPC		

POSSIBLE SAMPLE HAZARDS/REMARKS

N/A

Special Handling and/or Storage

Cool 4 Degree C

Preservation	Cool 4C	Cool 4C									
Type of Container	G/P	aG									
No. of Container(s)	1 120mL	1									
Volume	~~60mL~~ SMS 1/15/13	60mL									
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.									
Sample No.	Matrix *	Sample Date	Sample Time								
J1R9T4	OTHER LIQUID	01/16/13	1306	✓	✓						

CHAIN OF POSSESSION

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
R Strickland WCH	01/16/13 1400	FEDEX	
Ed Eo	1-17-13 0935	Victor Hernandez	1-17-13 0935

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010TR (Client 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 - 7470 - (CV)
(2) Alcohols, Glycols, & Ketones - 8015M (Add-on) {1,2-Propanediol (Propylene glycol), Ethylene glycol}

REVIEWED BY SMS DATE 1/16/2013

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	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

WCH-EE-011

000000004

Lionville Laboratory

SAMPLE RECEIPT CHECKLIST (SRC)

CLIENT: WC Hanford **Date:** 1-17-13

Project/SAF/SOW/Release #: RC-042

LvL Batch #: 1301034 **Sample Custodian:** Vicki Hinandez

NOTE: EXPLAIN ALL DISCREPANCIES

1. Samples Hand Delivered or Shipped?	Carrier FedEx		Airbill # 794535443803
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** 2.1°	°C	Cooler # WCH-12-034
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 _____

NON-HALOGENATED VOLATILES

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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

WC-Hanford, Inc.	Project: RC-042	
2620 Fermi Avenue	Project Number: K4046	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/14/2013 22:36

Analytical Report for Non-Halogenated Volatiles by SW846 8015

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1R9T4	1301034-01	Other Liquid	01/16/2013 13:06	01/17/2013 09:35

LIONVILLE LABORATORY
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Exton, Pennsylvania 19341
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Fax (610) 280-3041

Case Narrative

Client: WC-HANFORD RC-042 K4046 **Date Received:** 01-17-2013
LVL #: 1301034

NON-HALOGENATED VOLATILES

One (1) other liquid sample was collected on 01-16-2013.

The sample and associated QC samples were prepared and analyzed 01-27-2013 and 02-14-2013 according to criteria set forth in Lionville Laboratory SOPs. The preparation and analysis procedure was based on SW846 Method 8015B.

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 with exceptions noted on the Sample Receipt Checklist.

2. The samples were originally extracted with their required holding time. Due to high concentrations of target compounds and instrument malfunction, the samples were re-analyzed at dilution outside of the recommended holding time.

3. All obtainable surrogate recoveries were within acceptance criteria.

4. The method blank was below the reporting limits for all target compounds.

5. All blank spike recoveries were within acceptance criteria.

6. All matrix spike recoveries were within acceptance criteria.

7. All initial calibrations associated with this data set were within acceptance criteria.

8. 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.

9. 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

r:\group\data\2013\8015 non halogenated volatiles\wc hanford\1301034oj.doc

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.

8015B/C Alcohols/Glycols
Analytes with %Difference or %Drift >15%, Where Mean is Used for Continuing Calibration

Analyte	2/13/13 8:17:27 PM CCV1	2/14/13 12:53:51 AM CCV2	2/14/13 5:06:46 AM CCV3	CCV4	CCV5	CCV6	CCV7	CCV8
1,2-Butanediol (surrogate)		-17.2	-34.9					
Methanol	21.4							
Ethanol								
Ethylene Glycol								
Diethylene Glycol								
Propylene Glycol								
Mean %D or %Drift	1.0	74.0	-16.3					

Sample results reported from affected CCV:

CCV1: _____

CCV2: L301181-BLK, BS1, 1301034-01 L301181-MS1

CCV3: _____

CCV4: _____

CCV5: _____

CCV6: _____

CCV7: _____

CCV8: _____

8015B/C Alcohols/Glycols
Analytes with %Difference or %Drift >15%, Where Mean is Used for Continuing Calibration

Analyte	2/14/13 9:21:29 PM CCV1	2/14/13 10:30:09 CCV2	CCV3	CCV4	CCV5	CCV6	CCV7	CCV8
1,2-Butanediol (surrogate)	-18.4	-17.0						
Methanol								
Ethanol								
Ethylene Glycol								
Diethylene Glycol								
Propylene Glycol								
Mean %D or %Drift	-14.5	-13.2						

Sample results reported from affected CCV:

CCV1: L301181-MSD1

CCV2: _____

CCV3: _____

CCV4: _____

CCV5: _____

CCV6: _____

CCV7: _____

CCV8: _____

LIONVILLE LABORATORY INC.

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.

LIONVILLE LABORATORY
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WC-Hanford, Inc.	Project: RC-042	
2620 Fermi Avenue	Project Number: K4046	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/14/2013 22:36

J1R9T4

1301034-01 (Other Liquid)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Non-Halogenated Volatiles by SW846 8015									
Ethylene Glycol	**283000**		50000	mg/L	1	L301181	01/27/2013	02/14/2013	SW846 8015C
Propylene Glycol	50000	U	50000	mg/L	1	L301181	01/27/2013	02/14/2013	SW846 8015C
Surrogate: 1,2-Butanediol	*77 %*		*50-120*			*L301181*	*01/27/2013*	*02/14/2013*	*SW846 8015C*

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WC-Hanford, Inc.	Project: RC-042	
2620 Fermi Avenue	Project Number: K4046	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/14/2013 22:36

Non-Halogenated Volatiles 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 L301181 - 8015B DIrect Inject										
Blank (L301181-BLK1)				Prepared: 01/27/2013 Analyzed: 02/14/2013						
Ethylene Glycol	20.0	U	20.0	mg/L						
Propylene Glycol	20.0	U	20.0	mg/L						
Surrogate: 1,2-Butanediol	*94.1*			*mg/L*	*100.00*		*94*	*50-120*		
LCS (L301181-BS1)				Prepared: 01/27/2013 Analyzed: 02/14/2013						
Ethylene Glycol	100		20.0	mg/L	100.00		100	50-150		
Propylene Glycol	96.4		20.0	mg/L	100.00		96	60-130		
Surrogate: 1,2-Butanediol	*92.6*			*mg/L*	*100.00*		*93*	*50-120*		
Matrix Spike (L301181-MS1)		**Source: 1301034-01**		Prepared: 01/27/2013 Analyzed: 02/14/2013						
Ethylene Glycol	577000		50000	mg/L	250000	283000	118	50-150		
Propylene Glycol	233000		50000	mg/L	250000	50000 U	93	60-130		
Surrogate: 1,2-Butanediol	*169000*			*mg/L*	*250000*		*68*	*50-120*		
Matrix Spike Dup (L301181-MSD1)		**Source: 1301034-01**		Prepared: 01/27/2013 Analyzed: 02/14/2013						
Ethylene Glycol	642000		50000	mg/L	250000	283000	144	50-150	20	40
Propylene Glycol	258000		50000	mg/L	250000	50000 U	103	60-130	10	40
Surrogate: 1,2-Butanediol	*223000*			*mg/L*	*250000*		*89*	*50-120*		

PREPARATION BENCH SHEET

L301181

Lionville Laboratory

Printed: 1/27/2013 1:16:38PM

00000014

Matrix: Non Aqueous Liquic **Prepared using: GC - 8015B DIrect Inject** **Surrogate used: 1201693**

Lab Number	Analysis	Prepared	Initial (mL)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
1301034-01	8015C Non-Halogenated Volatiles	01/27/2013 07:04	0.0008	2				20	WC-Hanford, Inc.	propylene, ethylene glycol
L301181-BLK1	QC	01/27/2013 07:04	2	2				20		
L301181-BS1	QC	01/27/2013 07:04	2	2	1200700		20	20		
L301181-MS1	QC	01/27/2013 07:04	0.0008	2	1200700	1301034-01	20	20		
L301181-MSD1	QC	01/27/2013 07:04	0.0008	2	1200700	1301034-01	20	20		

Spike #2 ID - 1200701 20

Catherine Lacy 01/27/13

Extracts Relinquished By Date

Extracts Received By Date

METALS

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

WC-Hanford, Inc.	Project: RC-042	
2620 Fermi Avenue	Project Number: K4046	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/06/2013 13:46

Analytical Report for Metals by SW846 6000/7000 series

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1R9T4	1301034-01	Other Liquid	01/16/2013 13:06	01/17/2013 09:35

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-042
LVL#: 1301034
SDG/SAF#: K4046/RC-042

W.O.#: 60049-001-001-0001-00
Date Received: 01-17-13

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.

1. This narrative covers the analysis of 1 liquid sample.

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

   Due to sample matrix, the sample was digested using soil digestion methods, utilizing an initial sample volume, as opposed to weight.

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 (less than the LOQ).

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. The laboratory control sample (LCS) was outside the 80-120% control limits for Silicon at 10%. Please refer to SDR #13MR003A.

10. The matrix spike (MS) recovery for 1 analyte 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 level for the following analyte: Silicon.

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12. All duplicate analyses were within the 20% Relative Percent Difference (RPD) control limits. The ± 20% RPD control limit applies to sample results greater than ten times the MDL. The duplicate results for Calcium, Magnesium, and Manganese 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 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

3/12/13
Date

alm/11-064

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 131MR003A

Initiator: [illegible]
Date: 1/31/13
Client: WC Hanford

Batch: 1301034
Samples: 01
Method: SW846/MCAWW/CLP/

Parameter: Si
Matrix: other liquid
Prep Batch: L301190

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)
L301190-BS1 out of control for Si at 107. Rec. The sample value to be reported is 30,800 ug/L, the MS1 recovered at 74%, the PDS recovered at 102%.

2. Known or Probable Causes(s)
Si has the potential to be problematic in 3050 preparation, H_2O_2 could cause SiO_4 to precipitate out.

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)

report + narrative

4. Project Manager Instructions...signature/date: [signature] 1/31/13
✓ Concur with Proposed Action
__ Disagree with Proposed Action; See Instruction
✓ Include in Case Narrative
__ Client Contacted:
Date/Person _____
__ Add
__ Cancel

5. Final Action...signature/date: [signature] 2/11/13
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 diposition.

Route
X Lab Manager: Daniels
X 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: _____

QA-139-A-0208

264 Welsh Pool Road
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WC-Hanford, Inc.	Project: RC-042	
2620 Fermi Avenue	Project Number: K4046	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/06/2013 13:46

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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WC-Hanford, Inc.	Project: RC-042	
2620 Fermi Avenue	Project Number: K4046	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/06/2013 13:46

J1R9T4

1301034-01 (Other Liquid)

Lionville Laboratory

Metals by SW846 6000/7000 series

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Aluminum	**3370**	B	10000	ug/L	1	L301190	01/28/2013	01/30/2013	6010B
Antimony	500	U	500	ug/L	1	L301190	01/28/2013	01/30/2013	6010B
Arsenic	**185**	B	500	ug/L	1	L301190	01/28/2013	01/30/2013	6010B
Barium	250	U	250	ug/L	1	L301190	01/28/2013	01/30/2013	6010B
Beryllium	100	U	100	ug/L	1	L301190	01/28/2013	01/30/2013	6010B
Boron	**303000**		1000	ug/L	1	L301190	01/28/2013	01/30/2013	6010B
Cadmium	125	U	125	ug/L	1	L301190	01/28/2013	01/30/2013	6010B
Calcium	**7650**	B	10000	ug/L	1	L301190	01/28/2013	01/30/2013	6010B
Chromium	500	U	500	ug/L	1	L301190	01/28/2013	01/30/2013	6010B
Cobalt	1500	U	1500	ug/L	1	L301190	01/28/2013	01/30/2013	6010B
Copper	**338**	B	1000	ug/L	1	L301190	01/28/2013	01/30/2013	6010B
Iron	**10300**		10000	ug/L	1	L301190	01/28/2013	01/30/2013	6010B
Lead	500	U	500	ug/L	1	L301190	01/28/2013	01/30/2013	6010B
Magnesium	**2070**	B	2500	ug/L	1	L301190	01/28/2013	01/30/2013	6010B
Manganese	**158**	B	500	ug/L	1	L301190	01/28/2013	01/30/2013	6010B
Molybdenum	**59400**		500	ug/L	1	L301190	01/28/2013	01/30/2013	6010B
Nickel	1250	U	1250	ug/L	1	L301190	01/28/2013	01/30/2013	6010B
Potassium	**2730000**		50000	ug/L	1	L301190	01/28/2013	01/30/2013	6010B
Selenium	**359**	B	500	ug/L	1	L301190	01/28/2013	01/30/2013	6010B
Silicon	**30800**		3000	ug/L	1	L301190	01/28/2013	01/30/2013	6010B
Silver	500	U	500	ug/L	1	L301190	01/28/2013	01/30/2013	6010B
Sodium	**3120000**		25000	ug/L	1	L301190	01/28/2013	01/30/2013	6010B
Vanadium	**133**	B	500	ug/L	1	L301190	01/28/2013	01/30/2013	6010B
Zinc	**920**	B	1500	ug/L	1	L301190	01/28/2013	01/30/2013	6010B
Mercury	20.0	U	20.0	ug/L	1	L301194	01/28/2013	01/29/2013	7471A

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WC-Hanford, Inc.	Project: RC-042	
2620 Fermi Avenue	Project Number: K4046	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/06/2013 13:46

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 L301190 - SW 3050B										
Blank (L301190-BLK1)				Prepared: 01/28/2013 Analyzed: 01/30/2013						
Aluminum	10000	U	10000	ug/L						
Antimony	500	U	500	ug/L						
Arsenic	500	U	500	ug/L						
Barium	250	U	250	ug/L						
Beryllium	100	U	100	ug/L						
Boron	1000	U	1000	ug/L						
Cadmium	125	U	125	ug/L						
Calcium	10000	U	10000	ug/L						
Chromium	500	U	500	ug/L						
Cobalt	1500	U	1500	ug/L						
Copper	1000	U	1000	ug/L						
Iron	10000	U	10000	ug/L						
Lead	500	U	500	ug/L						
Magnesium	2500	U	2500	ug/L						
Manganese	500	U	500	ug/L						
Molybdenum	500	U	500	ug/L						
Nickel	1250	U	1250	ug/L						
Potassium	50000	U	50000	ug/L						
Selenium	500	U	500	ug/L						
Silicon	1120	B	3000	ug/L						
Silver	500	U	500	ug/L						
Sodium	25000	U	25000	ug/L						
Vanadium	500	U	500	ug/L						
Zinc	1500	U	1500	ug/L						
LCS (L301190-BS1)				Prepared: 01/28/2013 Analyzed: 01/30/2013						
Aluminum	258000		10000	ug/L	250000		103	80-120		
Antimony	152000		500	ug/L	150000		101	80-120		
Arsenic	498000		500	ug/L	500000		100	80-120		
Barium	268000		250	ug/L	250000		107	80-120		
Beryllium	12600		100	ug/L	12500		101	80-120		
Boron	228000		1000	ug/L	250000		91	80-120		
Cadmium	12400		125	ug/L	12500		99	80-120		
Calcium	1290000		10000	ug/L	1250000		103	80-120		
Chromium	25500		500	ug/L	25000		102	80-120		
Cobalt	127000		1500	ug/L	125000		101	80-120		
Copper	62400		1000	ug/L	62500		100	80-120		

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WC-Hanford, Inc.	Project: RC-042	
2620 Fermi Avenue	Project Number: K4046	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/06/2013 13:46

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 L301190 - SW 3050B										
LCS (L301190-BS1)					Prepared: 01/28/2013 Analyzed: 01/30/2013					
Iron	258000		10000	ug/L	250000		103	80-120		
Lead	117000		500	ug/L	125000		94	80-120		
Magnesium	1280000		2500	ug/L	1250000		103	80-120		
Manganese	38900		500	ug/L	37500		104	80-120		
Molybdenum	256000		500	ug/L	250000		102	80-120		
Nickel	97900		1250	ug/L	100000		98	80-120		
Potassium	1290000		50000	ug/L	1250000		103	80-120		
Selenium	466000		500	ug/L	500000		93	80-120		
Silicon	25500		3000	ug/L	250000		10*	80-120		
Silver	24800		500	ug/L	25000		99	80-120		
Sodium	1340000		25000	ug/L	1250000		107	80-120		
Vanadium	129000		500	ug/L	125000		103	80-120		
Zinc	50400		1500	ug/L	50000		101	80-120		
Duplicate (L301190-DUP1)		**Source: 1301034-01**			Prepared: 01/28/2013 Analyzed: 01/30/2013					
Aluminum	10000	U	10000	ug/L		3370				20
Antimony	500	U	500	ug/L		500 U				20
Arsenic	500	U	500	ug/L		185				20
Barium	250	U	250	ug/L		250 U				20
Beryllium	100	U	100	ug/L		100 U				20
Boron	298000		1000	ug/L		303000			2	20
Cadmium	125	U	125	ug/L		125 U				20
Calcium	5320	B	10000	ug/L		7650			36*	20
Chromium	500	U	500	ug/L		500 U				20
Cobalt	1500	U	1500	ug/L		1500 U				20
Copper	316	B	1000	ug/L		338			7	20
Iron	10000		10000	ug/L		10300			3	20
Lead	500	U	500	ug/L		500 U				20
Magnesium	1120	B	2500	ug/L		2070			60*	20
Manganese	111	B	500	ug/L		158			35*	20
Molybdenum	58200		500	ug/L		59400			2	20
Nickel	1250	U	1250	ug/L		1250 U				20
Potassium	2730000		50000	ug/L		2730000			0.2	20
Selenium	299	B	500	ug/L		359			18	20
Silicon	30600		3000	ug/L		30800			0.8	20
Silver	500	U	500	ug/L		500 U				20
Sodium	3090000		25000	ug/L		3120000			0.8	20

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WC-Hanford, Inc.	Project: RC-042	
2620 Fermi Avenue	Project Number: K4046	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/06/2013 13:46

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 L301190 - SW 3050B										
Duplicate (L301190-DUP1)		**Source: 1301034-01**		Prepared: 01/28/2013 Analyzed: 01/30/2013						
Vanadium	500	U	500	ug/L		133				20
Zinc	824	B	1500	ug/L		920			11	20
Matrix Spike (L301190-MS1)		**Source: 1301034-01**		Prepared: 01/28/2013 Analyzed: 01/30/2013						
Aluminum	99600		10000	ug/L	100000	3370	96	75-125		
Antimony	25400		500	ug/L	25000	500 U	102	75-125		
Arsenic	101000		500	ug/L	100000	185	101	75-125		
Barium	102000		250	ug/L	100000	250 U	102	75-125		
Beryllium	2480		100	ug/L	2500.0	100 U	99	75-125		
Boron	350000		1000	ug/L	50000	303000	94	75-125		
Cadmium	2560		125	ug/L	2500.0	125 U	102	75-125		
Calcium	1260000		10000	ug/L	1250000	7650	100	75-125		
Chromium	10200		500	ug/L	10000	500 U	102	75-125		
Cobalt	25000		1500	ug/L	25000	1500 U	100	75-125		
Copper	12800		1000	ug/L	12500	338	100	75-125		
Iron	60500		10000	ug/L	50000	10300	100	75-125		
Lead	23700		500	ug/L	25000	500 U	95	75-125		
Magnesium	1250000		2500	ug/L	1250000	2070	100	75-125		
Manganese	25100		500	ug/L	25000	158	100	75-125		
Molybdenum	110000		500	ug/L	50000	59400	101	75-125		
Nickel	24500		1250	ug/L	25000	1250 U	98	75-125		
Potassium	4040000		50000	ug/L	1250000	2730000	105	75-125		
Selenium	101000		500	ug/L	100000	359	101	75-125		
Silicon	67800		3000	ug/L	50000	30800	74*	75-125		
Silver	2540		500	ug/L	2500.0	500 U	102	75-125		
Sodium	4440000		25000	ug/L	1250000	3120000	106	75-125		
Vanadium	26500		500	ug/L	25000	133	105	75-125		
Zinc	24600		1500	ug/L	25000	920	95	75-125		

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WC-Hanford, Inc.	Project: RC-042	
2620 Fermi Avenue	Project Number: K4046	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	02/06/2013 13:46

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 L301190 - SW 3050B										
Post Spike (L301190-PS1)		**Source: 1301034-01**		Prepared: 01/28/2013 Analyzed: 01/30/2013						
Silicon	1740			ug/L	1100.0	616	102	75-125		
Batch L301194 - SW 7471A Prep										
Blank (L301194-BLK1)				Prepared: 01/28/2013 Analyzed: 01/29/2013						
Mercury	20.0	U	20.0	ug/L						
LCS (L301194-BS1)				Prepared: 01/28/2013 Analyzed: 01/29/2013						
Mercury	520		20.0	ug/L	500.00		104	80-120		
Duplicate (L301194-DUP1)		**Source: 1301034-01**		Prepared: 01/28/2013 Analyzed: 01/29/2013						
Mercury	20.0	U	20.0	ug/L		20.0 U				20
Matrix Spike (L301194-MS1)		**Source: 1301034-01**		Prepared: 01/28/2013 Analyzed: 01/29/2013						
Mercury	92.0		20.0	ug/L	100.00	20.0 U	92.0	75-125		

Lionville Laboratory

Logbook #: 1194

SAMPLE DIGESTION RECORD

Digestion Batch #: L301190
Date/Time Initiated: 1/28/13 1040
Date/Time Completed: 1/29/13 1115
Analyst: MW
Matrix (circle): Soil Water Other Non-aqueous liq.
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 #:
Balance Cal Verification: (Y) NA
Temp: 94°
BLOCK 1 2 (circle one)
(1)

Work Order #	Spike Vol (mL)	Initial Wt/Vol (g/mL)	Final Vol (mL)	pH <2	Type: To/Sol/ TC	Texture	Color / Appearance	Artifact	Turb
1301034-01		1	50		TO		clear green liquid		(1.06 gm)
L301190-DUP1		1	50		"		"		(1.05 gm)
MS1	0.5	1	50		"		"		(1.07 gm)
BLK1		1	50		"		clear, colorless		
BS1	0.5	1	50				"		

MW 1/28/13

Spiking IDs / Expiration Date:
MS# : 1201581
LCS#: 1201583

Reagent IDs:
HNO_3 0000003390
HCl 0000018301
H_2O_2 LI1A03
1:1 HNO_3 637-076-07
1:1 HCl

File ID#:

Data Review By/Date:
PMP 01/30/13

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

Page #: 26 of 50 3/19/13

00000021

PREPARATION BENCH SHEET

L301190

Lionville Laboratory

Printed: 2/7/2013 8:13:16AM

Matrix: Non Aqueous Liquic **Prepared using: METALS - SW 3050B** **(No Surrogate)**

Lab Number	Analysis	Prepared	Initial (mL)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
1301034-01	6010B ICP Trace	01/28/2013 10:40	1	50					WC-Hanford, Inc.	HSL (B-, Mo, Si) no TL
L301190-BLK1	QC	01/28/2013 10:40	1	50						
L301190-BS1	QC	01/28/2013 10:40	1	50	1201583		500			
L301190-DUP1	QC	01/28/2013 10:40	1	50		1301034-01				
L301190-MS1	QC	01/28/2013 10:40	1	50	1201581	1301034-01	500			
L301190-PS1	QC	01/28/2013 10:40	1	50	1201582	1301034-01	100			

Reason for time prepared RKi 2/7/13

Extracts Relinquished By Date Extracts Received By Date

PREPARATION BENCH SHEET

L301190

Lionville Laboratory

Printed: 2/7/2013 8:09:30AM

Matrix: Non Aqueous Liquic **Prepared using: METALS - SW 3050B** **(No Surrogate)**

Lab Number	Analysis	Prepared	Initial (mL)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
1301034-01	6010B ICP Trace	01/28/2013 10:26	1	50					WC-Hanford, Inc.	HSL (B-, Mo, Si) no TL
L301190-BLK1	QC	01/28/2013 10:26	1	50						
L301190-BS1	QC	01/28/2013 10:26	1	50	1201583		500			
L301190-DUP1	QC	01/28/2013 10:26	1	50		1301034-01				
L301190-MS1	QC	01/28/2013 10:26	1	50	1201581	1301034-01	500			
L301190-PS1	QC	01/28/2013 10:26	1	50	1201582	1301034-01	100			

Extracts Relinquished By Date

Extracts Received By Date

Lionville Laboratory

MERCURY PREPARATION

Logbook # 1198

Analyst: MM
Date 1/28/13
Start Time/Temp: 2010/94°
End Time/Temp: 2040/96°

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

Prep Batch: L301194
Worksheet: HG012901
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	50	
0.2 µg/L		0.100		10	50	
1.0 µg/L		0.500		10	50	
2.0 µg/L		1.000		10	50	
5.0 µg/L		2.500		10	50	
10.0 µg/L		5.000		10	50	
ICV		0.125	2.5	10	50	
CCV		0.250	5.0	10	50	
ICB/CCB				10	50	
L301194-BLK1				0.5	50	
BS1		0.250	5.0	0.5	50	
1301034-01				0.5	50	(0.54gm)
L301194-DUP1				0.5	50	(0.54gm)
MS1		0.500	1.0	0.5	50	(0.53gm)

PMP 1/28/13

Standard:	ID	Prep Date/Time
ICAL/MS	RI 120123S	1/28/13 1330
ICV/CCV/LCS	(I.V. 120141I)	N/A

Reviewed By/Date: PMP, 01/30/13

see book # 1198 for std traceability information

Soil LCS True Value = N/A mg/Kg
Standard # ____

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