SAF-RC-190
100N Field Remediation – Soil In-Process
FINAL DATA PACKAGE

COMPLETE COPY OF DATA PACKAGE TO:

Kathy Wendt H4-21 KW 1/24/13
INITIAL/DATE

COMMENTS:

SDG KP0178 SAF-RC-190

Rad only ☑ Chem only Rad & Chem

☑ Complete Partial

Sample Location: 120-N-4 Potholing

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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

22 January 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 #	1301019
SDG #	KP0178
SAF #	RC-190
Date Received	01/08/13
# Samples	1
Matrix	SOIL
Volatiles	
Semivolatiles	
Pest/PCB	
Glycols	
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 26 pages.

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

CHAIN OF CUSTODY

Lionville Laboratory Use Only

1301019

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-190 KP0178

Est. Final Proj. Sampling Date:

Project#:

Project Contact/Phone#:

Lionville Laboratory Project Manager: O. Johnson

QC: BW Del: SH TAT: 7

Date Rec'd: 1-8-13 Date Due: 1-15-13

Refrigerator #:

#/Type Container: Liquid / Solid

Volume: Liquid / Solid

Preservatives:

ANALYSES REQUESTED →

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	ORGANIC VOA	BNA	Pest/PCB	Herb				A 2		B 2	1				
														1AG		1AG	1				
														6G		120	1				
														1		1					
														INORG Metal Hg	CN	Tcl met	Tcl Hg				
														METALS		TCL METALS	1				
01	J1R887	✓	✓	Soil	1-4-13	1050								X		X	X				

Lionville Laboratory Use Only

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

Special Instructions:

METALS = HSL + B, Mo, Si (NO TL)

Special Instructions:

1.
2.
3.
4.
5.
6.

Relinquished by	Received by	Date	Time
[illegible]	[illegible]	1-8-13	0740

Relinquished by	Received by	Date	Time

Relinquished by	Received by	Date	Time

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-190-127	Page 1 of 1

Collector Q. Stowe	Company Contact Joan Kessner Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code ~~8L~~ 8J on 1/4/13 Data Turnaround ~~21~~ 7 Days on 1/4/13
Project Designation 100N Field Remediation - Soil In-Process	Sampling Location 120-N-4 Potholing	SAF No. RC-190	
Ice Chest No. RCC-07-005	Field Logbook No. EL-1652-08 COA 0120N42000	Method of Shipment FedEx	
Shipped To ~~EBERLINE SERVICES~~ / LIONVILLE on 1/4/13	Offsite Property No. A120710	Bill of Lading/Air Bill No. See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

~~Potential~~ Rad LDOT Limits AJ 1-7-13

Special Handling and/or Storage

Cool 4C

Preservation	Cool 4C	None	None									
Type of Container	G/P	G/P	G/P									
No. of Container(s)	1	1	1									
Volume	60mL	120mL	60mL									
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.	RCF GEA Shipping Screen 1/4/13		RCF	35135						

Sample No.	Matrix *	Sample Date	Sample Time										
J1R887	SOIL	1-4-13	1050	X	X								

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From Quincy Stowe	Date/Time 1100 1/4/13	Received By/Stored In Dennis Newman	Date/Time 1100 1-4-13
Relinquished By/Removed From Dennis Newman	Date/Time 1620 1-4-13	Received By/Stored In Cindy Bingham	Date/Time 1060#3 1-4-13 1620
Relinquished By/Removed From Cindy Bingham WCH	Date/Time 1060#3 1-7-13 1415	Received By/Stored In Fed. Ex	Date/Time
Relinquished By/Removed From Fed Ex	Date/Time 1-8-13 0940	Received By/Stored In VICTOR HERNANDEZ	Date/Time 1-8-13 0940
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

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 - 7471 - (CV) {Mercury}

(2) Metals by ICP (TCLP) - 1311/6010 {Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver}; Mercury (TCLP) - 1311/7470 {Mercury}

REVIEWED BY AJ DATE 1-7-13

KP0178

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

0000000004

Lionville Laboratory

SAMPLE RECEIPT CHECKLIST (SRC)

CLIENT: WC Hanford
Project/SAF/SOW/Release #: RC-190

Date: 1-8-13

LvL Batch #: 1301019

Sample Custodian: [illegible]

NOTE: EXPLAIN ALL DISCREPANCIES

1. Samples Hand Delivered or Shipped?	Carrier Fed Ex		Airbill # 7944 6127 9299
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 # RCC-07-005
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.	Project: RC-190	
2620 Fermi Avenue	Project Number: KP0178	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	01/17/2013 13:26

Analytical Report for Metals by SW846 6000/7000 series

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1R887	1301019-01	Soil	01/04/2013 10:50	01/08/2013 09:40

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

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Case Narrative

Client: WC-HANFORD RC-190
LVL#: 1301019
SDG/SAF#: KP0178/RC-190

W.O.#: 60049-001-001-0001-00
Date Received: 01-08-13

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 analyses of 1 soil sample and 1 TCLP leachate sample.

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

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

   The TCLP leachate samples were analyzed and reported with 5-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 (less than the LOQ).

7. All preparation/method blanks (MB) were within method criteria {less than the Limit of Quantitation, MB value less than 5% of the RCRA limit, or samples were greater than 20X MB value}.

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

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9. All Standard Reference Material (SRM) analytes were within the Prediction Interval control limits supplied by the manufacturer. All laboratory control samples (LCS) were within the 80-120% control limits.

10. The soil matrix spike (MS) recoveries for 7 analytes were 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: Aluminum, Antimony, Calcium, Copper, Iron, Manganese, and Silicon.

12. The soil duplicate analyses for 3 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. The sample results for Nickel and Mercury were less than ten times the MDL.

13. The TCLP leachate duplicate analyses were within the 20% Relative Percent Difference (RPD) control limit critieria. The ± 20% RPD control limit applies to sample results greater than ten times the MDL.

14. The TCLP extract from sample J1R887 was selected for the matrix spike (MS) for this analytical batch. All MS recoveries were greater than 50% as per method criteria The matrix spike (MS) concentration for Mercury was equivalent to the regulatory level (200 ppb) as per SW846 method 1311. The required spike concentration is above the linear range of the instrument, resulting in a 50-fold dilution. The MS recovery was greater than 50% as per method criteria.

15. 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.

16. 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.

17. 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.

1/22/13

Iain Daniels
Laboratory Manager
Lionville Laboratory

Date

alm/01-019tcsoil

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Fax: 610-280-3041

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-190 Project Number: KP0178 Project Manager: Joan Kessner	**Reported:** 01/17/2013 13:26

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

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WC-Hanford, Inc.	Project: RC-190	
2620 Fermi Avenue	Project Number: KP0178	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	01/17/2013 13:26

J1R887
1301019-01 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
Metals by SW846 6000/7000 series									
Aluminum	**6850**		15.3	mg/kg dry	3	L301087	01/14/2013	01/15/2013	6010B
Antimony	1.83	U	1.83	mg/kg dry	3	L301087	01/14/2013	01/15/2013	6010B
Arsenic	**2.78**	B	3.05	mg/kg dry	3	L301087	01/14/2013	01/15/2013	6010B
Barium	**64.8**		1.53	mg/kg dry	3	L301087	01/14/2013	01/15/2013	6010B
Beryllium	**0.288**	B	0.611	mg/kg dry	3	L301087	01/14/2013	01/15/2013	6010B
Boron	6.11	U	6.11	mg/kg dry	3	L301087	01/14/2013	01/15/2013	6010B
Cadmium	**0.233**	B	0.611	mg/kg dry	3	L301087	01/14/2013	01/15/2013	6010B
Calcium	**10300**		305	mg/kg dry	3	L301087	01/14/2013	01/15/2013	6010B
Chromium	**11.2**		0.611	mg/kg dry	3	L301087	01/14/2013	01/15/2013	6010B
Cobalt	**7.53**		6.11	mg/kg dry	3	L301087	01/14/2013	01/15/2013	6010B
Copper	**18.2**		3.05	mg/kg dry	3	L301087	01/14/2013	01/15/2013	6010B
Iron	**20700**		61.1	mg/kg dry	3	L301087	01/14/2013	01/15/2013	6010B
Lead	**4.42**		1.53	mg/kg dry	3	L301087	01/14/2013	01/15/2013	6010B
Magnesium	**4340**		229	mg/kg dry	3	L301087	01/14/2013	01/15/2013	6010B
Manganese	**291**		15.3	mg/kg dry	3	L301087	01/14/2013	01/15/2013	6010B
Molybdenum	6.11	U	6.11	mg/kg dry	3	L301087	01/14/2013	01/15/2013	6010B
Nickel	**10.7**	B	12.2	mg/kg dry	3	L301087	01/14/2013	01/15/2013	6010B
Potassium	**945**	B	1220	mg/kg dry	3	L301087	01/14/2013	01/15/2013	6010B
Selenium	0.916	U	0.916	mg/kg dry	3	L301087	01/14/2013	01/15/2013	6010B
Silicon	**461**		6.11	mg/kg dry	3	L301087	01/14/2013	01/15/2013	6010B
Silver	0.611	U	0.611	mg/kg dry	3	L301087	01/14/2013	01/15/2013	6010B
Sodium	**408**		153	mg/kg dry	3	L301087	01/14/2013	01/15/2013	6010B
Vanadium	**55.4**		7.64	mg/kg dry	3	L301087	01/14/2013	01/15/2013	6010B
Zinc	**45.3**		30.5	mg/kg dry	3	L301087	01/14/2013	01/15/2013	6010B
Mercury	**0.0102**	B	0.0283	mg/kg dry	1	L301089	01/15/2013	01/16/2013	7471A

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-190 Project Number: KP0178 Project Manager: Joan Kessner	**Reported:** 01/17/2013 13:26

J1R887

1301019-01 (Soil)

Analyte	Result and Qualifier		Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Lionville Laboratory									
TCLP Metals by SW846 1311 6000/7000 series									
Arsenic	0.0750	U	0.0750	mg/L	5	L301104	01/15/2013	01/17/2013	6010
Barium	**0.141**		0.00500	mg/L	5	L301104	01/15/2013	01/17/2013	6010
Cadmium	0.0150	U	0.0150	mg/L	5	L301104	01/15/2013	01/17/2013	6010
Chromium	**0.00315**	B	0.0250	mg/L	5	L301104	01/15/2013	01/17/2013	6010
Lead	0.0500	U	0.0500	mg/L	5	L301104	01/15/2013	01/17/2013	6010
Selenium	0.100	U	0.100	mg/L	5	L301104	01/15/2013	01/17/2013	6010
Silver	0.0300	U	0.0300	mg/L	5	L301104	01/15/2013	01/17/2013	6010
Mercury	0.000200	U	0.000200	mg/L	1	L301108	01/15/2013	01/16/2013	7470

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-190 Project Number: KP0178 Project Manager: Joan Kessner	**Reported:** 01/17/2013 13:26

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 L301087 - SW 3050B										
Blank (L301087-BLK1)				Prepared: 01/14/2013 Analyzed: 01/15/2013						
Aluminum	4.72	U	4.72	mg/kg wet						
Antimony	0.566	U	0.566	mg/kg wet						
Arsenic	0.943	U	0.943	mg/kg wet						
Barium	0.472	U	0.472	mg/kg wet						
Beryllium	0.189	U	0.189	mg/kg wet						
Boron	1.89	U	1.89	mg/kg wet						
Cadmium	0.189	U	0.189	mg/kg wet						
Calcium	6.52	B	94.3	mg/kg wet						
Chromium	0.189	U	0.189	mg/kg wet						
Cobalt	1.89	U	1.89	mg/kg wet						
Copper	0.943	U	0.943	mg/kg wet						
Iron	18.9	U	18.9	mg/kg wet						
Lead	0.472	U	0.472	mg/kg wet						
Magnesium	2.28	B	70.8	mg/kg wet						
Manganese	4.72	U	4.72	mg/kg wet						
Molybdenum	1.89	U	1.89	mg/kg wet						
Nickel	3.77	U	3.77	mg/kg wet						
Potassium	377	U	377	mg/kg wet						
Selenium	0.283	U	0.283	mg/kg wet						
Silicon	1.89	U	1.89	mg/kg wet						
Silver	0.189	U	0.189	mg/kg wet						
Sodium	14.2	B	47.2	mg/kg wet						
Vanadium	2.36	U	2.36	mg/kg wet						
Zinc	9.43	U	9.43	mg/kg wet						
Duplicate (L301087-DUP1)			**Source: 1301019-01**	Prepared: 01/14/2013 Analyzed: 01/15/2013						
Aluminum	7180		15.0	mg/kg dry		6850			4.68	20
Antimony	1.80	U	1.80	mg/kg dry		1.83 U				20
Arsenic	3.31		3.00	mg/kg dry		2.78			17.4	20
Barium	47.4		1.50	mg/kg dry		64.8			30.9*	20
Beryllium	0.275	B	0.600	mg/kg dry		0.288			4.73	20
Boron	1.62	B	6.00	mg/kg dry		6.11 U				20
Cadmium	0.600	U	0.600	mg/kg dry		0.233				20
Calcium	11200		300	mg/kg dry		10300			8.10	20
Chromium	14.5		0.600	mg/kg dry		11.2			25.1*	20
Cobalt	7.65		6.00	mg/kg dry		7.53			1.60	20
Copper	22.3		3.00	mg/kg dry		18.2			20.2*	20

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-190 Project Number: KP0178 Project Manager: Joan Kessner	**Reported:** 01/17/2013 13:26

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 L301087 - SW 3050B										
Duplicate (L301087-DUP1)		**Source: 1301019-01**		Prepared: 01/14/2013 Analyzed: 01/15/2013						
Iron	23000		60.0	mg/kg dry		20700			11.0	20
Lead	4.77		1.50	mg/kg dry		4.42			7.52	20
Magnesium	4990		225	mg/kg dry		4340			13.9	20
Manganese	308		15.0	mg/kg dry		291			5.48	20
Molybdenum	6.00	U	6.00	mg/kg dry		6.11 U				20
Nickel	14.8		12.0	mg/kg dry		10.7			31.8*	20
Potassium	878	B	1200	mg/kg dry		945			7.32	20
Selenium	0.900	U	0.900	mg/kg dry		0.916 U				20
Silicon	515		6.00	mg/kg dry		461			11.0	20
Silver	0.600	U	0.600	mg/kg dry		0.611 U				20
Sodium	366		150	mg/kg dry		408			10.9	20
Vanadium	55.6		7.50	mg/kg dry		55.4			0.457	20
Zinc	50.9		30.0	mg/kg dry		45.3			11.6	20
Matrix Spike (L301087-MS1)		**Source: 1301019-01**		Prepared: 01/14/2013 Analyzed: 01/15/2013						
Aluminum	8170		13.5	mg/kg dry	180.28	6850	732*	75-125		
Antimony	16.8		1.62	mg/kg dry	45.071	1.83 U	37.2*	75-125		
Arsenic	162		2.70	mg/kg dry	180.28	2.78	88.4	75-125		
Barium	210		1.35	mg/kg dry	180.28	64.8	80.5	75-125		
Beryllium	4.38		0.541	mg/kg dry	4.5071	0.288	90.7	75-125		
Boron	80.7		5.41	mg/kg dry	90.142	6.11 U	89.6	75-125		
Cadmium	3.76		0.541	mg/kg dry	4.5071	0.233	78.3	75-125		
Calcium	13200		270	mg/kg dry	2253.5	10300	126*	75-125		
Chromium	29.9		0.541	mg/kg dry	18.028	11.2	103	75-125		
Cobalt	48.2		5.41	mg/kg dry	45.071	7.53	90.2	75-125		
Copper	51.7		2.70	mg/kg dry	22.535	18.2	149*	75-125		
Iron	28600		54.1	mg/kg dry	90.142	20700	8860*	75-125		
Lead	44.8		1.35	mg/kg dry	45.071	4.42	89.5	75-125		
Magnesium	6730		203	mg/kg dry	2253.5	4340	106	75-125		
Manganese	353		13.5	mg/kg dry	45.071	291	138*	75-125		
Molybdenum	79.2		5.41	mg/kg dry	90.142	6.11 U	87.9	75-125		
Nickel	54.2		10.8	mg/kg dry	45.071	10.7	96.5	75-125		
Potassium	2920		1080	mg/kg dry	2253.5	945	87.6	75-125		
Selenium	160		0.811	mg/kg dry	180.28	0.916 U	88.9	75-125		
Silicon	577		5.41	mg/kg dry	90.142	461	129*	75-125		
Silver	3.86		0.541	mg/kg dry	4.5071	0.611 U	85.7	75-125		
Sodium	2670		135	mg/kg dry	2253.5	408	100	75-125		

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Fax: 610-280-3041

WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-190 Project Number: KP0178 Project Manager: Joan Kessner	**Reported:** 01/17/2013 13:26

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 L301087 - SW 3050B									
Matrix Spike (L301087-MS1)		**Source: 1301019-01**	Prepared: 01/14/2013 Analyzed: 01/15/2013						
Vanadium	98.3	6.76	mg/kg dry	45.071	55.4	95.2	75-125		
Zinc	92.0	27.0	mg/kg dry	45.071	45.3	104	75-125		
Post Spike (L301087-PS1)		**Source: 1301019-01**	Prepared: 01/14/2013 Analyzed: 01/15/2013						
Aluminum	128000		ug/L	66000	67300	91.4	75-125		
Antimony	306		ug/L	300.00	1.85	101	75-125		
Calcium	156000		ug/L	62400	102000	87.4	75-125		
Copper	489		ug/L	300.00	179	103	75-125		
Iron	310000		ug/L	126000	203000	85.2	75-125		
Manganese	5580		ug/L	3000.0	2860	90.6	75-125		
Silicon	11500		ug/L	6300.0	4530	110	75-125		
Reference (L301087-SRM1)			Prepared: 01/14/2013 Analyzed: 01/15/2013						
Aluminum	10800	14.2	mg/kg wet	6670.0		162	0-200.89		
Antimony	46.6	1.70	mg/kg wet	53.000		87.9	0-235.8		
Arsenic	115	2.83	mg/kg wet	114.00		101	82.8-117.54		
Barium	318	1.42	mg/kg wet	307.00		104	79.8-120.2		
Beryllium	108	0.566	mg/kg wet	108.00		99.8	82.8-117.6		
Boron	79.7	5.66	mg/kg wet	85.100		93.6	67.5-132.8		
Cadmium	229	0.566	mg/kg wet	225.00		102	83.6-116.4		
Calcium	3390	283	mg/kg wet	3360.0		101	83.3-116.9		
Chromium	81.9	0.566	mg/kg wet	77.200		106	73.3-126.4		
Cobalt	168	5.66	mg/kg wet	166.00		101	80.7-118.7		
Copper	271	2.83	mg/kg wet	271.00		100	80.8-119.2		
Iron	8680	56.6	mg/kg wet	8420.0		103	78.6-121.1		
Lead	188	1.42	mg/kg wet	190.00		99.1	81.6-118.4		
Magnesium	8730	212	mg/kg wet	8570.0		102	83.2-116.7		
Manganese	902	14.2	mg/kg wet	965.00		93.4	69.3-130.5		
Molybdenum	232	5.66	mg/kg wet	235.00		98.7	76.2-123.8		
Nickel	225	11.3	mg/kg wet	221.00		102	79.6-120.8		
Potassium	14500	1130	mg/kg wet	14400		100	81.9-118.1		
Selenium	192	0.849	mg/kg wet	187.00		103	75.9-124.6		
Silicon	494	5.66	mg/kg wet	807.00		61.2	0-219.3		
Silver	81.4	0.566	mg/kg wet	83.500		97.5	82.7-117.1		
Sodium	9550	142	mg/kg wet	9730.0		98.2	82.5-117.2		
Vanadium	103	7.08	mg/kg wet	98.700		105	75.9-123.6		
Zinc	205	28.3	mg/kg wet	199.00		103	78.4-121.6		

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WC-Hanford, Inc.	Project: RC-190	
2620 Fermi Avenue	Project Number: KP0178	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	01/17/2013 13:26

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 L301089 - SW 7471A Prep										
Blank (L301089-BLK1)				Prepared: 01/15/2013 Analyzed: 01/16/2013						
Mercury	0.0290	U	0.0290	mg/kg wet						
Duplicate (L301089-DUP2)		**Source: 1301019-01**		Prepared: 01/15/2013 Analyzed: 01/16/2013						
Mercury	0.0245	B	0.0283	mg/kg dry		0.0102			82.4*	20
Matrix Spike (L301089-MS2)		**Source: 1301019-01**		Prepared: 01/15/2013 Analyzed: 01/16/2013						
Mercury	0.183		0.0275	mg/kg dry	0.15274	0.0102	113	75-125		20
Reference (L301089-SRM1)				Prepared: 01/15/2013 Analyzed: 01/16/2013						
Mercury	1.20		0.0281	mg/kg wet	1.2900		93.0	62.6-138		

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WC-Hanford, Inc. 2620 Fermi Avenue Richland WA, 99354	Project: RC-190 Project Number: KP0178 Project Manager: Joan Kessner	**Reported:** 01/17/2013 13:26

TCLP Metals by SW846 1311 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 L301104 - SW 3010A										
Blank (L301104-BLK1)				Prepared: 01/15/2013 Analyzed: 01/17/2013						
Arsenic	0.0150	U	0.0150	mg/L						
Barium	0.00100	U	0.00100	mg/L						
Cadmium	0.00300	U	0.00300	mg/L						
Chromium	0.00500	U	0.00500	mg/L						
Lead	0.0100	U	0.0100	mg/L						
Selenium	0.0200	U	0.0200	mg/L						
Silver	0.00600	U	0.00600	mg/L						
Blank (L301104-BLK2)				Prepared: 01/15/2013 Analyzed: 01/17/2013						
Arsenic	0.0750	U	0.0750	mg/L						
Barium	0.00500	U	0.00500	mg/L						
Cadmium	0.0150	U	0.0150	mg/L						
Chromium	0.0250	U	0.0250	mg/L						
Lead	0.0500	U	0.0500	mg/L						
Selenium	0.100	U	0.100	mg/L						
Silver	0.0300	U	0.0300	mg/L						
LCS (L301104-BS1)				Prepared: 01/15/2013 Analyzed: 01/17/2013						
Arsenic	9.90		0.0150	mg/L	10.000		99.0	80-120		
Barium	5.10		0.00100	mg/L	5.0000		102	80-120		
Cadmium	0.247		0.00300	mg/L	0.25000		99.0	80-120		
Chromium	0.499		0.00500	mg/L	0.50000		99.8	80-120		
Lead	2.45		0.0100	mg/L	2.5000		98.0	80-120		
Selenium	9.61		0.0200	mg/L	10.000		96.1	80-120		
Silver	0.495		0.00600	mg/L	0.50000		99.0	80-120		
Duplicate (L301104-DUP1)		**Source: 1301019-01**		Prepared: 01/15/2013 Analyzed: 01/17/2013						
Arsenic	0.0750	U	0.0750	mg/L		0.0750 U				20
Barium	0.141		0.00500	mg/L		0.141			0.248	20
Cadmium	0.0150	U	0.0150	mg/L		0.0150 U				20
Chromium	0.00313	B	0.0250	mg/L		0.00315			0.876	20
Lead	0.0500	U	0.0500	mg/L		0.0500 U				20
Selenium	0.100	U	0.100	mg/L		0.100 U				20
Silver	0.0300	U	0.0300	mg/L		0.0300 U				20

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WC-Hanford, Inc.	Project: RC-190	
2620 Fermi Avenue	Project Number: KP0178	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	01/17/2013 13:26

TCLP Metals by SW846 1311 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 L301104 - SW 3010A										
Matrix Spike (L301104-MS1)		**Source: 1301019-01**		Prepared: 01/15/2013 Analyzed: 01/17/2013						
Arsenic	5.04		0.0750	mg/L	5.0000	0.0750 U	101	50-1000		
Barium	96.8		0.00500	mg/L	100.00	0.141	96.7	50-1000		
Cadmium	0.992		0.0150	mg/L	1.0000	0.0150 U	99.2	50-1000		
Chromium	4.94		0.0250	mg/L	5.0000	0.00315	98.8	50-1000		
Lead	4.69		0.0500	mg/L	5.0000	0.0500 U	93.8	50-1000		
Selenium	0.978		0.100	mg/L	1.0000	0.100 U	97.8	50-1000		
Silver	4.30		0.0300	mg/L	5.0000	0.0300 U	86.0	50-1000		
Batch L301108 - SW 7470A Prep										
Blank (L301108-BLK1)				Prepared: 01/15/2013 Analyzed: 01/16/2013						
Mercury	0.000200	U	0.000200	mg/L						
Blank (L301108-BLK2)				Prepared: 01/15/2013 Analyzed: 01/16/2013						
Mercury	0.000200	U	0.000200	mg/L						
LCS (L301108-BS1)				Prepared: 01/15/2013 Analyzed: 01/16/2013						
Mercury	0.00538		0.000200	mg/L	0.0050000		108	80-120		
Duplicate (L301108-DUP1)		**Source: 1301019-01**		Prepared: 01/15/2013 Analyzed: 01/16/2013						
Mercury	0.000200	U	0.000200	mg/L		0.000200 U				20
Matrix Spike (L301108-MS1)		**Source: 1301019-01**		Prepared: 01/15/2013 Analyzed: 01/16/2013						
Mercury	0.204		0.0100	mg/L	0.20000	0.000200 U	102	50-1000		

Lionville Laboratory

Logbook #: 1194

SAMPLE DIGESTION RECORD

Digestion Batch #: L301087
Date/Time Initiated: 1/14/13 1200
Date/Time Completed: 1/14/13 1945
Analyst: NW
Matrix (circle): 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: 95°
BLOCK 1 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
1301019-01		0.54	50		TO	fine	brown sol	rocks	
L301087-DUP1		0.55	50						
MS1	0.5	0.61	50						
BLK1		0.53	50			coarse	boiling chips		
SRM1		0.53	50			fine	pink, sandy		

NW 1/14/13

Spiking IDs / Expiration Date:
MS#: 1201581

LCS#: 1201014

Reagent IDs:
HNO_3 0000003390
HCl 0000018301
H_2O_2 L11A03
1:1 HNO_3 637-076-07
1:1 HCl

File ID#:

Data Review By/Date: 1/16/13

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Page #:

PREPARATION BENCH SHEET

L301087

Lionville Laboratory

Printed: 1/14/2013 8:31:33PM

Matrix: Solid **Prepared using: METALS - SW 3050B** **(No Surrogate)**

Lab Number	Analysis	Prepared	Initial (g)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
1301019-01	6010B HSL Metals	01/14/2013 12:00	0.54	50					WC-Hanford, Inc.	HSL + B, Mo, Si (No TL)
L301087-BLK1	QC	01/14/2013 12:00	0.53	50						
L301087-DUP1	QC	01/14/2013 12:00	0.55	50		1301019-01				
L301087-MS1	QC	01/14/2013 12:00	0.61	50	1201581	1301019-01	500			
L301087-PS1	QC	01/14/2013 12:00	0.54	50	1201582	1301019-01	100			
L301087-SRM1	QC	01/14/2013 12:00	0.53	50	1201014		530			

Extracts Relinquished By — Date: 1/14/13

Extracts Received By — Date: 01/15/13

Ironville Laboratory

Logbook #: 1194

SAMPLE DIGESTION RECORD

Digestion Batch #: L301104
Date/Time Initiated: 1/15/13 1400
Date/Time Completed: 1/16/13 1115
Analyst: MW
Matrix (circle): Soil Water Other TCP
Method (circle one): 3005A 3010A 3050 200.7 (1994)
pH/Turbidity: N/A for Solids.

Digested / Undigested (circle one)
Balance #:
Balance Cal Verification: Y NA
Temp: 95°
BLOCK 1 2 3 (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
1301019-01		50	50	<	TC		clear/colorless		
L301104-DUP1		50	50	<					
MS1	0.5	50	50						
1301024-19		10	50	<			dark brown/opaque		
L301104-DUP2		10	50	<					
MS2	0.1	10	50						
BLK1		50	50				clear/colorless		
BS1	0.5	50	50						
BLK2		50	50	<					

MW 1/15/13

Spiking IDs / Expiration Date:
MS#: 1201195
1200388
LCS#: 1201583

Reagent IDs:
HNO_3 0000003390
HCl
H_2O_2
1:1 HNO_3
1:1 HCl 631-069-01

File ID#:

Data Review By/Date: 1/17/13

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PREPARATION BENCH SHEET

L301104

Lionville Laboratory

Printed: 1/16/2013 12:02:41P

Matrix: Waste **Prepared using: METALS - SW 3010A** **(No Surrogate)**

Lab Number	Analysis	Prepared	Initial (mL)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	Client	Extraction Comments
1301019-01	1311/6010B TCLP RCRA ICP MET	01/15/2013 14:00	50	50					WC-Hanford, Inc.	
1301024-19	1311/6010B TCLP RCRA ICP MET	01/15/2013 14:00	10	50					PA DEP	
L301104-BLK1	QC	01/15/2013 14:00	50	50						
L301104-BLK2	QC	01/15/2013 14:00	50	50						
L301104-BS1	QC	01/15/2013 14:00	50	50	1201583		500			
L301104-DUP1	QC	01/15/2013 14:00	50	50		1301019-01				
L301104-DUP2	QC	01/15/2013 14:00	10	50		1301024-19				
L301104-MS1	QC	01/15/2013 14:00	50	50	1201195	1301019-01	500			
L301104-MS2	QC	01/15/2013 14:00	10	50	1201195	1301024-19	100			

Extracts Relinquished By — Date: 1/16/13

Extracts Received By — Date: 01/16/13

Lionville Laboratory

MERCURY PREPARATION

Logbook # 1198

Analyst: [illegible]
Date 1/14/13 - 1/15/13
Start Time/Temp: 1755/95°
End Time/Temp: 1825/95°

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

Prep Batch: L301089
Worksheet: HG011601
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				10ml	50	
0.2µg/l		0.100		10ml	50	
1.0µg/l		0.500		10ml	50	
2.0µg/l		1.000		10ml	50	
5.0µg/l		2.500		10ml	50	
10.0µg/l		5.000		10ml	50	
ICV		0.125	2.5	10ml	50	
CCV		0.250	5.0	10ml	50	
ICB/CCB				10ml	50	
L301089-BLK1				0.31	50	
SPM1		(*)	(*)	0.32	50	
1301006-01			use MM 1/17/13	~~0.35~~ 0.37	50	
L301089-DUP1				~~0.35~~ 0.35	50	
MS1		0.500	1.0	~~0.34~~ 0.36	50	
1301006-02				0.37	50	
03				0.35	50	
04				0.38	50	
05				0.35	50	
06				0.38	50	
07				0.34	50	
08				0.36	50	
09				0.35	50	
10				0.33	50	
11				0.33	50	
12				0.38	50	
13				0.35	50	
14				0.32	50	

Standard:	ID	Prep Date/Time
ICAL/MS	RI 1201235	1/15/13 1136
ICV/CCV/LCS	(I.V. 1201411)	N/A

Reviewed By/Date: [illegible] 1/17/13

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
Water LCS Spiking Concentration: 1.0 µg/ml

4

ME-HgCVAA-Prep0910

Page #:

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Lionville Laboratory

MERCURY PREPARATION

Analyst: [illegible]
Date 1/14/13 – 1/15/13
Start Time/Temp: See pg 014
End Time/Temp:

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

Logbook # 1198
Prep Batch: L301089
Worksheet: HG011601
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.
1301006-15				0.35	50	
16				0.35	50	
17				0.38	50	
1301019-01				0.35	50	
L301089-DUP2				0.35	50	
MS2		0.500	1.0	0.36	50	

MW 1/14/13

Standard:	ID	Prep Date/Time
ICAL/MS		
ICV/CCV/LCS		

See page 014

Reviewed By/Date: [illegible] 1/17/13

se book # 1198 for std traceability information

Soil LCS True Value = See page 014 mg/Kg
Standard #

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

ME-HgCVAA-Prep0910

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Lionville Laboratory

MERCURY PREPARATION

Analyst: [illegible]
Date 1/15/13
Start Time/Temp: 2100/95
End Time/Temp: 2300/96

Instrument ID: HG3.2
Balance # (NA)
Pipette Calibration (Daily) (Y)

Logbook # 1198
Prep Batch: L301108
Worksheet: HG011602
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				35	35	
0.2 µg/L		0.070		35	35	
1.0 µg/L		0.350		35	35	
2.0 µg/L		0.700		35	35	
5.0 µg/L		1.750		35	35	
10.0 µg/L		3.500		35	35	
ICV		0.0875	2.5	35	35	
CCV		0.175	5.0	35	35	
ICB/CCB				35	35	
L301108-BLK1				35	35	
BS1		0.175	5.0	35	35	
BLK2	<			35	35	
1301019-01	<			35	35	
L301108-DUP1	<			35	35	
MS1		0.700	200	35	35	
1301024-19	<			0.7	35	
L301108-DUP2	<			0.7	35	
MS2 *		0.140	40	~~0.7~~ 35	35	
				W.G. MW 1/15/13		

MW 1/15/13

Standard:	ID	Prep Date/Time
ICAL/MS	RI 1201235	1/15/13, 1130
ICV/CCV/LCS	(I.V. 1201411)	N/A

Reviewed By/Date: [illegible] 1/17/13

se book # 1198 for std traceability information

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

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

* MS prepped 10 ml diluted to 50 ml (5x) and spiked to read ~~20~~ 40 ug/L. Then 3.5 ml digested to 35 ml (10x) for a total 50x dilution.

ME-HgCVAA-Prep0910

Page #:

Lionville Laboratory

TCLP EXTRACTION RECORD
(NON-VOLATILES)

LOGBOOK # 1252

Start Date: 1-14-13 Start Time: 12:05 Analyst: RH SOP: SPI-1311.1	End Date: 1-15-13 End Time: 6:00 Analyst: RH Method: 1311.1	Tumbler Speed: 31 RPM Leachate Batch #: L301081 Leachate Page: 1 of 1 Room Temp. (°C): Start 21 /Finish 21 **Room Temp. Acceptance Criteria:** **23°C ± 2°**

LvL #: 1301019-01 Client ID#: JIR887 pH After 5 Min: 8.56 pH After Acid/Heat: 1.82 Extraction Fluid/pH: #1 4.90 Sample Wt.(g): 25 Extract Fluid Vol.(mL): 500 pH After Extraction: 5.09	Initial Filtration Data and Comments: Solids: _____% / NA Initial Filtrate Added: _____
LvL #: 1301024-19 Client ID#: RC-01092013-K112 pH After 5 Min: N/A pH After Acid/Heat: N/A Extraction Fluid/pH: #1 4.90 Sample Wt.(g): 25 Extract Fluid Vol.(mL): 500 pH After Extraction: _____	Initial Filtration Data and Comments: Solids: _____% / NA Initial Filtrate Added: _____
LvL # L301081 Client ID#: N/A pH After 5 Min: N/A pH After Acid/Heat: N/A Extraction Fluid/pH: N/A Sample Wt.(g): N/A Extract Fluid Vol.(mL): N/A pH After Extraction: _____	Initial Filtration Data and Comments: Solids: _____% / NA Initial Filtrate Added: Blank
LvL #: _____ Client ID#: _____ pH After 5 Min: _____ pH After Acid/Heat: _____ Extraction Fluid/pH: _____ Sample Wt.(g): _____ Extract Fluid Vol.(mL): _____ pH After Extraction: _____	Initial Filtration Data and Comments: Solids: _____% / NA 1-15-13 RH Initial Filtrate Added: _____

Standard	ID	Prep Date	Expir Date	pH Acceptance Criteria
Fluid #1	1201586	12-3-12	6-3-13	4.93 ± 0.05
Fluid # 2				2.88 ± 0.05

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