

SAF-RC-040
300 Area D4 Waste Characterization
Sampling - Other Solid
FINAL DATA PACKAGE

COMPLETE COPY OF DATA PACKAGE TO:

No Distribution Required

KW 5/31/12
INITIAL/DATE

COMMENTS:

SDG K3900

SAF RC-040

Rad only

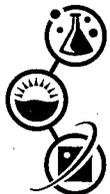
Chem only

Rad & Chem

Complete

Partial

Sample Location/Waste Site: 3730 HEPAs



EBERLINE

SERVICES

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May 30, 2012

Ms. Joan Kessner
Washington Closure Hanford
2620 Fermi Avenue
MSIN H4-21
Richland, WA 99352

Reference: **P.O. #S00W235A01**
Eberline Analytical S2-05-049-7715 SDG K3900

Dear Ms. Kessner:

Enclosed is the data report for one solid (other solid) sample designated under SAF No. RC-040. The sample was received at Eberline Analytical on May 17, 2012. The sample was analyzed according to the accompanying chain-of-custody documents.

Please call if you have any questions concerning this report.

Sincerely,

Joseph Verville
Client Services Manager

NJV/mw

Enclosure: Data Package

1.0 GENERAL

Washington Closure Hanford (WCH) Sample Delivery Group K3900 was composed of one solid (other solid) sample designated under SAF No. RC-040 with a Project Designation of: 300 Area D4 Waste Characterization Sampling – Other Solid.

The sample was received as stated on the Chain-of-Custody document. Any discrepancies are noted on the Eberline Analytical Sample Receipt Checklist. The results were transmitted to WCH via e-mail on May 30, 2012.

The sample consisted of 127.9g of filter material. Results are reported as pCi/g.

2.0 ANALYSIS NOTES

2.1 Tritium Analysis

No problems were encountered during the course of the analyses.

2.2 Carbon-14 Analysis

No problems were encountered during the course of the analyses.

2.3 Nickel-63 Analysis

No problems were encountered during the course of the analyses.

2.4 Total Strontium Analysis

No problems were encountered during the course of the analyses.

2.5 Technetium-99 Analysis

No problems were encountered during the course of the analyses.

2.6 Isotopic Uranium Analysis

The relative percent difference between the original and duplicate U-233 was 36%, the DER was 2.1. No other problems were encountered during the course of the analyses.

2.7 Americium-241/Curium-244 Analysis

No other problems were encountered during the course of the analyses.

2.8 Gamma Spectroscopy

No problems were encountered during the course of the analyses.

3.0 Case Narrative Certification Statement

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



Joseph Verville
Client Services Manager



Date

EBERLINE ANALYTICAL / RICHMOND
SAMPLE DELIVERY GROUP K3900

SDG 7715
Contact N. Joseph Verville

Client Hanford
Contract No. S00W235A01
Case no SDG_K3900

S U M M A R Y D A T A S E C T I O N

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Y. Verville
Prepared by

J. Smith
Reviewed by

Lab id EBRLNE
Protocol RC-040
Version Ver 1.0
Form DVD-TOC
Version 3.06
Report date 05/30/12

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3900

SDG 7715
Contact N.Joseph Verville

REPORT GUIDE

Client Hanford
Contract No. S00W235A01
Case no SDG_K3900

ABOUT THE DATA SUMMARY SECTION

The Data Summary Section of a Data Package has all data, in several useful orders, necessary for first level, routine review of the data package for a Sample Delivery Group (SDG). This section follows the Data Package Narrative, which has an overview of the data package and a discussion of special problems. It is followed by the Raw Data Section, which has full details.

The Data Summary Section has several groups of reports:

SAMPLE SUMMARIES

The Sample and QC Summary Reports show all samples, including QC samples, reported in one SDG. These reports cross-reference client and lab sample identifiers.

PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches (lab groupings reflecting how work was organized) relevant to the reported SDG with information necessary to check the completeness and consistency of the SDG.

WORK SUMMARY

The Work Summary Report shows all samples and work done on them relevant to the reported SDG.

METHOD BLANKS

The Method Blank Reports, one for each Method Blank relevant to the SDG, show all results and primary supporting information for the blanks.

LAB CONTROL SAMPLES

The Lab Control Sample Reports, one for each Lab Control Sample relevant to the SDG, show all results, recoveries and primary supporting information for these QC samples.

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Protocol RC-040
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 05/30/12

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3900

SDG 7715
Contact N. Joseph Verville

GUIDE, cont.

Client Hanford
Contract No. S00W235A01
Case no SDG K3900

ABOUT THE DATA SUMMARY SECTION

DUPLICATES

The Duplicate Reports, one for each Duplicate and Original sample pair relevant to the SDG, show all results, differences and primary supporting information for these QC samples.

MATRIX SPIKES

The Matrix Spike Reports, one for each Spiked and Original sample pair relevant to the SDG, show all results, recoveries and primary supporting information for these QC samples.

DATA SHEETS

The Data Sheet Reports, one for each client sample in the SDG, show all results and primary supporting information for these samples.

METHOD SUMMARIES

The Method Summary Reports, one for each test used in the SDG, show all results, QC and method performance data for one analyte on one or two pages. (A test is a short code for the method used to do certain work to the client's specification.)

REPORT GUIDES

The Report Guides, one for each of the above groups of reports, have documentation on how to read the associated reports.

Lab id EBRLNE
Protocol RC-040
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 05/30/12

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3900

LAB SAMPLE SUMMARY

SDG 7715
 Contact N.Joseph Verville

Client Hanford
 Contract No. S00W235A01
 Case no SDG K3900

LAB	CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	SAF NO	CHAIN OF CUSTODY	COLLECTED
S205049-01	J1P2C5	3730 HEPAs	SOLID		RC-040	RC-040-762	05/15/12 12:25
S205049-02	Lab Control Sample		SOLID		RC-040		
S205049-03	Method Blank		SOLID		RC-040		
S205049-04	Duplicate (S205049-01)	3730 HEPAs	SOLID		RC-040		05/15/12 12:25

LAB SUMMARY

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SUMMARY DATA SECTION

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Lab id EBRLNE
 Protocol RC-040
 Version Ver 1.0
 Form DVD-LS
 Version 3.06
 Report date 05/30/12

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3900

SDG 7715
 Contact N.Joseph Verville

Client Hanford
 Contract No. S00W235A01
 Case no SDG K3900

QC SUMMARY

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	% SOLIDS	SAMPLE AMOUNT	BASIS AMOUNT	DAYS SINCE RECEIVED	LAB COLL	DEPARTMENT SAMPLE ID
7715	RC-040-762	J1P2C5	SOLID	100.0	127.9 g		05/17/12 2	S205049-01	7715-001
		Method Blank	SOLID					S205049-03	7715-003
		Lab Control Sample	SOLID					S205049-02	7715-002
		Duplicate (S205049-01)	SOLID	100.0	127.9 g		05/17/12 2	S205049-04	7715-004

Lab id EBRLNE
 Protocol RC-040
 Version Ver 1.0
 Form DVD-QS
 Version 3.06
 Report date 05/30/12

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3900

SDG 7715
 Contact N. Joseph Verville

PREP BATCH SUMMARY

Client Hanford
 Contract No. S00W235A01
 Case no SDG K3900

TEST	MATRIX	METHOD	PREPARATION ERROR		PLANCHETS ANALYZED				QUALI- FIERS
			BATCH	2σ %	CLIENT	MORE	RE BLANK	LCS	
Alpha Spectroscopy									
TP	SOLID	Americium 241/Curium in Solids	7734-034	8.0	1		1	1	1/1
U	SOLID	Uranium, Isotopic in Solids	7734-034	8.0	1		1	1	1/1
Beta Counting									
SR	SOLID	Total Strontium in Solids	7734-034	10.4	1		1	1	1/1
TC	SOLID	Technetium 99 in Solids	7734-034	13.2	1		1	1	1/1
Gamma Spectroscopy									
GAM	SOLID	Gamma Scan	7734-034	7.0	1		1	1	1/1
Liquid Scintillation Counting									
C	SOLID	Carbon 14 in Solids	7734-034	10.0	1		1	1	1/1
H	SOLID	Tritium in Solids	7734-034	10.0	1		1	1	1/1
NI_L	SOLID	Nickel 63 in Solids	7734-034	11.2	1		1	1	1/1

Duplicates and Spikes are those with original sample in the QC Batch of some Client sample in this SDG.
 Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

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EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3900

SDG 7715
 Contact N.Joseph Verville

LAB WORK SUMMARY

Client Hanford
 Contract No. S00W235A01
 Case no SDG K3900

LAB SAMPLE	CLIENT SAMPLE ID									
COLLECTED	LOCATION		MATRIX		SUF-					
RECEIVED	CUSTODY	SAF No	PLANCHET	TEST	FIX	ANALYZED	REVIEWED	BY	METHOD	
S205049-01	J1P2C5					05/22/12	05/24/12	BW	Carbon 14 in Solids	
05/15/12	3730 HEPAs		SOLID	7715-001	GAM	05/18/12	05/21/12	CSS	Gamma Scan	
05/17/12	RC-040-762	RC-040		7715-001	H	05/23/12	05/24/12	BW	Tritium in Solids	
				7715-001	NI_L	05/24/12	05/29/12	BW	Nickel 63 in Solids	
				7715-001	SR	05/25/12	05/29/12	BW	Total Strontium in Solids	
				7715-001	TC	05/25/12	05/29/12	BW	Technetium 99 in Solids	
				7715-001	TP	05/25/12	05/25/12	MWT	Americium 241/Curium in Solids	
				7715-001	U	05/25/12	05/29/12	BW	Uranium, Isotopic in Solids	
S205049-02	Lab Control Sample					05/22/12	05/24/12	BW	Carbon 14 in Solids	
			SOLID	7715-002	GAM	05/19/12	05/21/12	CSS	Gamma Scan	
		RC-040		7715-002	H	05/23/12	05/24/12	BW	Tritium in Solids	
				7715-002	NI_L	05/24/12	05/29/12	BW	Nickel 63 in Solids	
				7715-002	SR	05/25/12	05/29/12	BW	Total Strontium in Solids	
				7715-002	TC	05/25/12	05/29/12	BW	Technetium 99 in Solids	
				7715-002	TP	05/25/12	05/25/12	MWT	Americium 241/Curium in Solids	
				7715-002	U	05/25/12	05/29/12	BW	Uranium, Isotopic in Solids	
S205049-03	Method Blank					05/22/12	05/24/12	BW	Carbon 14 in Solids	
			SOLID	7715-003	GAM	05/19/12	05/21/12	CSS	Gamma Scan	
		RC-040		7715-003	H	05/23/12	05/24/12	BW	Tritium in Solids	
				7715-003	NI_L	05/24/12	05/29/12	BW	Nickel 63 in Solids	
				7715-003	SR	05/25/12	05/29/12	BW	Total Strontium in Solids	
				7715-003	TC	05/25/12	05/29/12	BW	Technetium 99 in Solids	
				7715-003	TP	05/25/12	05/25/12	MWT	Americium 241/Curium in Solids	
				7715-003	U	05/25/12	05/29/12	BW	Uranium, Isotopic in Solids	
S205049-04	Duplicate (S205049-01)					05/22/12	05/24/12	BW	Carbon 14 in Solids	
05/15/12	3730 HEPAs		SOLID	7715-004	GAM	05/19/12	05/21/12	CSS	Gamma Scan	
05/17/12		RC-040		7715-004	H	05/23/12	05/24/12	BW	Tritium in Solids	
				7715-004	NI_L	05/24/12	05/29/12	BW	Nickel 63 in Solids	
				7715-004	SR	05/25/12	05/29/12	BW	Total Strontium in Solids	
				7715-004	TC	05/25/12	05/29/12	BW	Technetium 99 in Solids	
				7715-004	TP	05/25/12	05/25/12	MWT	Americium 241/Curium in Solids	
				7715-004	U	05/25/12	05/29/12	BW	Uranium, Isotopic in Solids	

WORK SUMMARY

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Lab id EBRLNE
 Protocol RC-040
 Version Ver 1.0
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EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3900

SDG 7715
 Contact N.Joseph Verville

WORK SUMMARY, cont.

Client Hanford
 Contract No. S00W235A01
 Case no SDG K3900

COUNTS OF TESTS BY SAMPLE TYPE

TEST	SAF No	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP SPIKE	TOTAL
C	RC-040	Carbon 14 in Solids	C14_COX_LSC	1			1	1	1	4
GAM	RC-040	Gamma Scan	GAMMA_GS	1			1	1	1	4
H	RC-040	Tritium in Solids	TRITIUM_COX_LSC	1			1	1	1	4
NI_L	RC-040	Nickel 63 in Solids	NI63_LSC	1			1	1	1	4
SR	RC-040	Total Strontium in Solids	SRTOT_SEP_PRECIP_GPC	1			1	1	1	4
TC	RC-040	Technetium 99 in Solids	TC99_TR_SEP_GPC	1			1	1	1	4
TP	RC-040	Americium 241/Curium in Solids	AMCMISO_IE_PLATE_AEA	1			1	1	1	4
U	RC-040	Uranium, Isotopic in Solids	UIISO_PLATE_AEA	1			1	1	1	4
TOTALS				8			8	8	8	32

WORK SUMMARY

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SUMMARY DATA SECTION

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EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3900

7715-003

Method Blank

METHOD BLANK

SDG <u>7715</u>	Client/Case no <u>Hanford</u>	SDG <u>K3900</u>
Contact <u>N.Joseph Verville</u>	Contract <u>No. S00W235A01</u>	
Lab sample id <u>S205049-03</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7715-003</u>	Material/Matrix _____	<u>SOLID</u>
	SAF No <u>RC-040</u>	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	5.26	9.1	15.3	400	U	H
Carbon 14	14762-75-5	0	6.7	11.4	50.0	U	C
Nickel 63	13981-37-8	-0.454	1.7	3.01	30.0	U	NI_L
Total Strontium	SR-RAD	-0.048	0.16	0.322	1.00	U	SR
Americium 241	14596-10-2	-0.047	0.094	0.451	1.00	U	TP
Curium 242	15510-73-3	0	0.094	0.361		U	TP
Curium 243/244	CM-243/244	0	0.19	0.451	1.00	U	TP
Technetium 99	14133-76-7	0.012	0.14	0.303	15.0	U	TC
Uranium 233/234	U-233/234	0.015	0.025	0.044	1.00	U	U
Uranium 235	15117-96-1	-0.015	0.015	0.050	1.00	U	U
Uranium 238	U-238	0	0.012	0.029	1.00	U	U
Potassium 40	13966-00-2	U		0.910		U	GAM
Cobalt 60	10198-40-0	U		<u>0.068</u>	0.050	U	GAM
Cesium 137	10045-97-3	U		0.055	0.100	U	GAM
Radium 226	13982-63-3	U		<u>0.121</u>	0.100	U	GAM
Radium 228	15262-20-1	U		<u>0.253</u>	0.200	U	GAM
Europium 152	14683-23-9	U		<u>0.160</u>	0.100	U	GAM
Europium 154	15585-10-1	U		<u>0.196</u>	0.100	U	GAM
Europium 155	14391-16-3	U		<u>0.143</u>	0.100	U	GAM
Thorium 228	14274-82-9	U		0.083		U	GAM
Thorium 232	TH-232	U		0.253		U	GAM
Uranium 235	15117-96-1	U		0.258	0.300	U	GAM
Uranium 238	U-238	U		7.80	10.0	U	GAM
Americium 241	14596-10-2	U		0.154	0.300	U	GAM
Niobium 94	14681-63-1	U		0.052		U	GAM
Antimony 125	14234-35-6	U		0.128		U	GAM
Barium 133	13981-41-4	U		0.062		U	GAM

METHOD BLANKS

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SUMMARY DATA SECTION

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Protocol <u>RC-040</u>
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Form <u>DVD-DS</u>
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EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3900

7715-003

Method Blank

BLANK, cont.

SDG <u>7715</u>	Client/Case no <u>Hanford</u>	SDG <u>K3900</u>
Contact <u>N. Joseph Verville</u>	Contract No. <u>S00W235A01</u>	
Lab sample id <u>S205049-03</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7715-003</u>	Material/Matrix <u>SOLID</u>	
	SAF No <u>RC-040</u>	

QC-BLANK #81779

Lab id <u>EBRLNE</u>
Protocol <u>RC-040</u>
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EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3900

7715-002

Lab Control Sample

LAB CONTROL SAMPLE

SDG <u>7715</u>	Client/Case no <u>Hanford</u>	<u>SDG K3900</u>
Contact <u>N.Joseph Verville</u>	Contract <u>No. S00W235A01</u>	
Lab sample id <u>S205049-02</u>	Client sample id <u>Lab Control Sample</u>	
Dept sample id <u>7715-002</u>	Material/Matrix <u>SOLID</u>	
	SAF No <u>RC-040</u>	

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Tritium	1880	46	16.4	400	H	1880	75	100	83-117	80-120
Carbon 14	6450	130	27.6	50.0	C	6080	240	106	83-117	80-120
Nickel 63	193	5.7	3.05	30.0	NI_L	214	8.6	90	83-117	80-120
Total Strontium	9.03	0.49	0.204	1.00	SR	9.33	0.37	97	82-118	80-120
Americium 241	10.6	1.6	0.400	1.00	TP	10.1	0.40	105	72-128	80-120
Curium 243/244	7.98	1.4	0.319	1.00	TP	8.80	0.35	91	73-127	80-120
Technetium 99	118	4.5	1.16	15.0	TC	109	4.4	108	77-123	80-120
Uranium 233/234	11.0	0.47	0.079	1.00	U	10.7	0.43	103	85-115	80-120
Uranium 238	10.7	0.46	0.068	1.00	U	10.7	0.43	100	85-115	80-120
Cobalt 60	3.07	0.18	<u>0.091</u>	0.050	GAM	3.25	0.13	94	86-114	80-120
Cesium 137	3.58	0.17	<u>0.105</u>	0.100	GAM	3.71	0.15	96	86-114	80-120

QC-LCS #81778

Lab id <u>EBRLNE</u>
Protocol <u>RC-040</u>
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EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3900

7715-004

J1P2C5

DUPLICATE

SDG <u>7715</u> Contact <u>N.Joseph Verville</u> Duplicates Lab sample id <u>S205049-04</u> Dept sample id <u>7715-004</u> % solids <u>100.0</u>	Client/Case no <u>Hanford</u> <u>SDG K3900</u> Contract <u>No. S00W235A01</u> ORIGINAL Lab sample id <u>S205049-01</u> Dept sample id <u>7715-001</u> Received <u>05/17/12</u> % solids <u>100.0</u>	Client sample id <u>J1P2C5</u> Location/Matrix <u>3730 HEPAs</u> <u>SOLID</u> Collected/Weight <u>05/15/12 12:25</u> <u>127.9 g</u> Custody/SAF No <u>RC-040-762</u> <u>RC-040</u>
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ANALYTE	DUPLICATE	2σ ERR	MDA	RDL	QUALI-	ORIGINAL	2σ ERR	MDA	QUALI-	RPD	3σ	DER
	pCi/g	(COUNT)	pCi/g	pCi/g	FIERS TEST		pCi/g	(COUNT)	pCi/g	FIERS	%	TOT
Tritium	2.07	8.8	15.0	400	U H	12.2	9.4	15.1	U	-		1.6
Carbon 14	1.20	6.6	11.1	50.0	U C	2.91	6.7	11.2	U	-		0.4
Nickel 63	3.65	1.9	2.96	30.0	NI_L	4.08	1.9	2.93		11	107	0.3
Total Strontium	1.51	0.20	0.184	1.00	SR	1.71	0.22	0.186		12	35	1.1
Americium 241	-0.061	0.062	0.294	1.00	U TP	0	0.18	0.422	U	-		0.6
Curium 242	0	0.064	0.245		U TP	0	0.092	0.352	U	-		0
Curium 243/244	0	0.062	0.235	1.00	U TP	0.088	0.18	0.338	U	-		0.9
Technetium 99	0.082	0.14	0.315	15.0	U TC	0.178	0.13	0.290	U	-		1.0
Uranium 233/234	0.249	0.053	0.032	1.00	U	0.173	0.042	0.029		36	51	2.1
Uranium 235	0	0.007	0.027	1.00	U U	0.003	0.006	0.022	U	-		0.6
Uranium 238	0.181	0.047	0.028	1.00	U	0.194	0.042	0.022		7	53	0.4
Potassium 40	17.6	2.2	1.33		GAM	18.6	0.70	0.361		6	24	0.7
Cobalt 60	4.30	0.34	<u>0.221</u>	0.050	GAM	4.81	0.11	<u>0.055</u>		11	19	1.8
Cesium 137	U		<u>0.168</u>	0.100	U GAM	U		0.083	U	-		0.9
Radium 226	U		<u>0.297</u>	0.100	U GAM	U		<u>0.245</u>	U	-		0.3
Radium 228	U		<u>0.882</u>	0.200	U GAM	U		<u>0.221</u>	U	-		1.4
Europium 152	U		<u>0.409</u>	0.100	U GAM	U		0.094	U	-		1.5
Europium 154	U		<u>0.496</u>	0.100	U GAM	U		<u>0.121</u>	U	-		1.5
Europium 155	U		<u>0.421</u>	0.100	U GAM	U		<u>0.101</u>	U	-		1.5
Thorium 228	U		0.376		U GAM	U		0.156	U	-		1.1
Thorium 232	U		0.882		U GAM	U		0.221	U	-		1.4
Uranium 235	U		<u>0.782</u>	0.300	U GAM	U		0.183	U	-		1.5
Uranium 238	U		<u>26.8</u>	10.0	U GAM	U		6.63	U	-		1.5
Americium 241	U		<u>1.04</u>	0.300	U GAM	U		0.195	U	-		1.6
Niobium 94	U		0.192		U GAM	U		0.047	U	-		1.5
Antimony 125	U		0.363		U GAM	U		0.089	U	-		1.5
Barium 133	U		0.156		U GAM	U		0.038	U	-		1.5

DUPLICATES

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SUMMARY DATA SECTION

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Lab id <u>EBRLNE</u>
Protocol <u>RC-040</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DUP</u>
Version <u>3.06</u>
Report date <u>05/30/12</u>

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3900

7715-004

J1P2C5

DUPLICATE, cont.

SDG <u>7715</u>		Client/Case no <u>Hanford</u>	<u>SDG K3900</u>
Contact <u>N.Joseph Verville</u>		Contract <u>No. S00W235A01</u>	
<u>DUPLICATE</u>	<u>ORIGINAL</u>		
Lab sample id <u>S205049-04</u>	Lab sample id <u>S205049-01</u>	Client sample id <u>J1P2C5</u>	
Dept sample id <u>7715-004</u>	Dept sample id <u>7715-001</u>	Location/Matrix <u>3730 HEPAs</u>	<u>SOLID</u>
	Received <u>05/17/12</u>	Collected/Weight <u>05/15/12 12:25</u>	<u>127.9 g</u>
% solids <u>100.0</u>	% solids <u>100.0</u>	Custody/SAF No <u>RC-040-762</u>	<u>RC-040</u>

QC-DUP#1 81780

300 Area D4 Waste Characterization Sampling - Other Solid

DUPLICATES

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SUMMARY DATA SECTION

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Lab id <u>EBRLNE</u>
Protocol <u>RC-040</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DUP</u>
Version <u>3.06</u>
Report date <u>05/30/12</u>

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3900

7715-001

J1P2C5

DATA SHEET

SDG <u>7715</u>	Client/Case no <u>Hanford</u>	SDG <u>K3900</u>
Contact <u>N. Joseph Verville</u>	Contract No. <u>S00W235A01</u>	
Lab sample id <u>S205049-01</u>	Client sample id <u>J1P2C5</u>	
Dept sample id <u>7715-001</u>	Location/Matrix <u>3730 HEPAS</u>	<u>SOLID</u>
Received <u>05/17/12</u>	Collected/Weight <u>05/15/12 12:25</u>	<u>127.9 g</u>
% solids <u>100.0</u>	Custody/SAF No <u>RC-040-762</u>	<u>RC-040</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	12.2	9.4	15.1	400	U	H
Carbon 14	14762-75-5	2.91	6.7	11.2	50.0	U	C
Nickel 63	13981-37-8	4.08	1.9	2.93	30.0		NI_L
Total Strontium	SR-RAD	1.71	0.22	0.186	1.00		SR
Americium 241	14596-10-2	0	0.18	0.422	1.00	U	TP
Curium 242	15510-73-3	0	0.092	0.352		U	TP
Curium 243/244	CM-243/244	0.088	0.18	0.338	1.00	U	TP
Technetium 99	14133-76-7	0.178	0.13	0.290	15.0	U	TC
Uranium 233/234	U-233/234	0.173	0.042	0.029	1.00		U
Uranium 235	15117-96-1	0.003	0.006	0.022	1.00	U	U
Uranium 238	U-238	0.194	0.042	0.022	1.00		U
Potassium 40	13966-00-2	18.6	0.70	0.361			GAM
Cobalt 60	10198-40-0	4.81	0.11	0.055	0.050		GAM
Cesium 137	10045-97-3	U		0.083	0.100	U	GAM
Radium 226	13982-63-3	U		0.245	0.100	U	GAM
Radium 228	15262-20-1	U		0.221	0.200	U	GAM
Europium 152	14683-23-9	U		0.094	0.100	U	GAM
Europium 154	15585-10-1	U		0.121	0.100	U	GAM
Europium 155	14391-16-3	U		0.101	0.100	U	GAM
Thorium 228	14274-82-9	U		0.156		U	GAM
Thorium 232	TH-232	U		0.221		U	GAM
Uranium 235	15117-96-1	U		0.183	0.300	U	GAM
Uranium 238	U-238	U		6.63	10.0	U	GAM
Americium 241	14596-10-2	U		0.195	0.300	U	GAM
Niobium 94	14681-63-1	U		0.047		U	GAM
Antimony 125	14234-35-6	U		0.089		U	GAM
Barium 133	13981-41-4	U		0.038		U	GAM

Lab id <u>EBERLINE</u>
Protocol <u>RC-040</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>05/30/12</u>

EBERLINE ANALYTICAL/RICHMOND
SAMPLE DELIVERY GROUP K3900

7715-001

J1P2C5

DATA SHEET, cont

SDG <u>7715</u>	Client/Case no <u>Hanford</u>	SDG <u>K3900</u>
Contact <u>N.Joseph Verville</u>	Contract No. <u>S00W235A01</u>	
Lab sample id <u>S205049-01</u>	Client sample id <u>J1P2C5</u>	
Dept sample id <u>7715-001</u>	Location/Matrix <u>3730 HEPAs</u>	<u>SOLID</u>
Received <u>05/17/12</u>	Collected/Weight <u>05/15/12 12:25</u>	<u>127.9 g</u>
% solids <u>100.0</u>	Custody/SAF No <u>RC-040-762</u>	<u>RC-040</u>

300 Area D4 Waste Characterization Sampling - Other
Solid

DATA SHEETS

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Lab id <u>EBRLNE</u>
Protocol <u>RC-040</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>05/30/12</u>

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3900

Test TP Matrix SOLID
 SDG 7715
 Contact N.Joseph Verville

Client Hanford
 Contract No. S00W235A01
 Contract SDG K3900

LAB METHOD SUMMARY

AMERICIUM 241/CURIUM IN SOLIDS

ALPHA SPECTROSCOPY

RESULTS

LAB	RAW	SUF-		Americium		Curium
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID	241	Curium 242	243/244
Preparation batch 7734-034						
S205049-01		7715-001	J1P2C5	U	U	U
S205049-02		7715-002	Lab Control Sample	ok		ok
S205049-03		7715-003	Method Blank	U	U	U
S205049-04		7715-004	Duplicate (S205049-01)	- U	- U	- U
Nominal values and limits from method			RDLs (pCi/g)	1.00		1.00

METHOD PERFORMANCE

LAB	RAW	SUF-	MAX MDA	ALIQ	PREP	DILU-	YIELD	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-
SAMPLE ID	TEST FIX	CLIENT SAMPLE ID	pCi/g	g	FAC	TION	%	%	min	keV	KeV	HELD PREPARED	YZED DETECTOR
Preparation batch 7734-034			2σ prep error 8.0 %		Reference Lab Notebook 7323 pg. 142								
S205049-01		J1P2C5	0.422	0.500			51		102			10 05/25/12	05/25 SS-030
S205049-02		Lab Control Sample	0.400	0.500			66		102			05/25/12	05/25 SS-031
S205049-03		Method Blank	0.451	0.500			59		102			05/25/12	05/25 SS-034
S205049-04		Duplicate (S205049-01)	0.294	0.500			71		104			10 05/25/12	05/25 SS-040
Nominal values and limits from method			1.00	0.500			30-110		100			180	

PROCEDURES	REFERENCE	AMCMISO_IE_PLATE_AEA
SPP-070	Soil Dissolution, < 1.0g Aliquot, rev 1	
CP-963	Americium and Curium in Water and Dissolved Samples by Extraction Chromatography, rev 6	
CP-008	Heavy Element Electroplating, rev 13	

AVERAGES ± 2 SD	MDA <u>0.392</u> ± <u>0.137</u>
FOR 4 SAMPLES	YIELD <u>62</u> ± <u>17</u>

METHOD SUMMARIES

Page 1

SUMMARY DATA SECTION

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Lab id EBRLNE
 Protocol RC-040
 Version Ver 1.0
 Form DVD-LMS
 Version 3.06
 Report date 05/30/12

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3900

Test U Matrix SOLID
 SDG 7715
 Contact N.Joseph Verville

LAB METHOD SUMMARY

URANIUM, ISOTOPIC IN SOLIDS
 ALPHA SPECTROSCOPY

Client Hanford
 Contract No. S00W235A01
 Contract SDG K3900

RESULTS

LAB	RAW	SUF-		Uranium			
SAMPLE ID	TEST	FIX	PLANCHET	CLIENT SAMPLE ID	233/234	Uranium 235	Uranium 238
Preparation batch 7734-034							
S205049-01			7715-001	J1P2C5	0.173	U	0.194
S205049-02			7715-002	Lab Control Sample	ok		ok
S205049-03			7715-003	Method Blank	U	U	U
S205049-04			7715-004	Duplicate (S205049-01)	ok	- U	ok
Nominal values and limits from method				RDLs (pCi/g)	1.00	1.00	1.00

METHOD PERFORMANCE

LAB	RAW	SUF-		MAX MDA	ALIQ	PREP	DILU-	YIELD	EFF	COUNT	FWHM	DRIFT	DAYS		ANAL-	
SAMPLE ID	TEST	FIX	CLIENT SAMPLE ID	pCi/g	g	FAC	TION	%	%	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR
Preparation batch 7734-034 2σ prep error 8.0 % Reference Lab Notebook 7323 pg. 142																
S205049-01			J1P2C5	0.029	0.500			92		1066			10	05/25/12	05/25	SS-030
S205049-02			Lab Control Sample	0.079	0.500			90		1067				05/25/12	05/25	SS-031
S205049-03			Method Blank	0.050	0.500			87		1067				05/25/12	05/25	SS-034
S205049-04			Duplicate (S205049-01)	0.032	0.500			86		1067			10	05/25/12	05/25	SS-036
Nominal values and limits from method				1.00	0.500			30-110		100						180

PROCEDURES REFERENCE UIISO_PLATE_AEA
 SPP-070 Soil Dissolution, < 1.0g Aliquot, rev 1
 CP-921 Uranium in Water and Dissolved Samples by
 Extraction Chromatography, rev 5
 CP-008 Heavy Element Electroplating, rev 13

AVERAGES ± 2 SD MDA 0.048 ± 0.046
 FOR 4 SAMPLES YIELD 89 ± 6

Lab id EBRLNE
 Protocol RC-040
 Version Ver 1.0
 Form DVD-LMS
 Version 3.06
 Report date 05/30/12

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3900

Test SR Matrix SOLID
 SDG 7715
 Contact N.Joseph Verville

LAB METHOD SUMMARY

TOTAL STRONTIUM IN SOLIDS
 BETA COUNTING

Client Hanford
 Contract No. S00W235A01
 Contract SDG K3900

RESULTS

LAB	RAW	SUF-		Total	
SAMPLE ID	TEST	FIX	PLANCHET	CLIENT SAMPLE ID	Strontium
Preparation batch 7734-034					
S205049-01			7715-001	J1P2C5	1.71
S205049-02			7715-002	Lab Control Sample	ok
S205049-03			7715-003	Method Blank	U
S205049-04			7715-004	Duplicate (S205049-01)	ok

Nominal values and limits from method RDLs (pCi/g) 1.00

METHOD PERFORMANCE

LAB	RAW	SUF-	MDA	ALIQ	PREP	DILU-	YIELD	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-			
SAMPLE ID	TEST	FIX	CLIENT SAMPLE ID	pCi/g	g	FAC	TION	%	%	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR
Preparation batch 7734-034 2σ prep error 10.4 % Reference Lab Notebook 7323 pg. 142																
S205049-01			J1P2C5	0.186	1.00			99	100			10	05/25/12	05/25	GRB-221	
S205049-02			Lab Control Sample	0.204	1.00			86	100				05/25/12	05/25	GRB-222	
S205049-03			Method Blank	0.322	1.00			88	100				05/25/12	05/25	GRB-224	
S205049-04			Duplicate (S205049-01)	0.184	1.00			98	100			10	05/25/12	05/25	GRB-223	

Nominal values and limits from method 1.00 1.00 40-110 100 180

PROCEDURES REFERENCE SRTOT_SEP_PRECIP_GPC
 SPP-070 Soil Dissolution, < 1.0g Aliquot, rev 1
 CP-383 Strontium in Dissolved Solid of < 5.0g Aliquot,
 rev 4

AVERAGES ± 2 SD MDA 0.224 ± 0.132
 FOR 4 SAMPLES YIELD 93 ± 13

Lab id EBRLNE
 Protocol RC-040
 Version Ver 1.0
 Form DVD-LMS
 Version 3.06
 Report date 05/30/12

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3900

Test TC Matrix SOLID
 SDG 7715
 Contact N.Joseph Verville

LAB METHOD SUMMARY

TECHNETIUM 99 IN SOLIDS

BETA COUNTING

Client Hanford
 Contract No. S00W235A01
 Contract SDG K3900

RESULTS

LAB	RAW	SUF-	Technetium	
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID	99
Preparation batch 7734-034				
S205049-01		7715-001	J1P2C5	U
S205049-02		7715-002	Lab Control Sample	ok
S205049-03		7715-003	Method Blank	U
S205049-04		7715-004	Duplicate (S205049-01)	- U

Nominal values and limits from method RDLs (pCi/g) 15.0

METHOD PERFORMANCE

LAB	RAW	SUF-	MDA	ALIQ	PREP	DILU-	YIELD	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-		
SAMPLE ID	TEST FIX	CLIENT SAMPLE ID	pCi/g	g	FAC	TION	%	%	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR
Preparation batch 7734-034			2σ prep error 13.2 % Reference Lab Notebook 7323 pg. 142												
S205049-01		J1P2C5	0.290	1.00			82		200		10	05/22/12	05/25	GRB-222	
S205049-02		Lab Control Sample	1.16	1.00			78		<u>20</u>			05/22/12	05/25	GRB-230	
S205049-03		Method Blank	0.303	1.00			83		200			05/22/12	05/25	GRB-221	
S205049-04		Duplicate (S205049-01)	0.315	1.00			79		200		10	05/22/12	05/25	GRB-223	
Nominal values and limits from method			15.0	1.00			30-110		50		180				

PROCEDURES REFERENCE TC99_TR_SEP_GPC
 CP-021 Preparation of Tc-99m Tracer, rev 6
 CP-431 Technetium-99 Purification of Soil or Resin by
 Extraction Chromatography, rev 8

AVERAGES ± 2 SD MDA 0.517 ± 0.858
 FOR 4 SAMPLES YIELD 80 ± 5

Lab id EBRLNE
 Protocol RC-040
 Version Ver 1.0
 Form DVD-LMS
 Version 3.06
 Report date 05/30/12

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3900

Test GAM Matrix SOLID
 SDG 7715
 Contact N.Joseph Verville

LAB METHOD SUMMARY

GAMMA SCAN
 GAMMA SPECTROSCOPY

Client Hanford
 Contract No. S00W235A01
 Contract SDG K3900

RESULTS

LAB	RAW	SUF-			
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID	Cobalt 60	Cesium 137
Preparation batch 7734-034					
S205049-01		7715-001	J1P2C5	4.81	U
S205049-02		7715-002	Lab Control Sample	ok	ok
S205049-03		7715-003	Method Blank	U	U
S205049-04		7715-004	Duplicate (S205049-01)	ok	- U

Nominal values and limits from method RDLs (pCi/g) 0.050 0.100

METHOD PERFORMANCE

LAB	RAW	SUF-	MDA	ALIQ	PREP	DILU-	YIELD	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-		
SAMPLE ID	TEST FIX	CLIENT SAMPLE ID	pCi/g	g	FAC	TION	%	%	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR
Preparation batch 7734-034 2σ prep error 7.0 % Reference Lab Notebook 7323 pg. 142															
S205049-01		J1P2C5	<u>0.112</u>	79.0					1035			3	05/18/12	05/18	MB,08,00
S205049-02		Lab Control Sample	<u>0.091</u>	79.0					257				05/18/12	05/19	01,03,00
S205049-03		Method Blank	<u>0.110</u>	79.0					257				05/18/12	05/19	01,04,00
S205049-04		Duplicate (S205049-01)	<u>0.471</u>	79.0					257			4	05/18/12	05/19	MB,05,00

Nominal values and limits from method 0.050 79.0 100 180

PROCEDURES REFERENCE GAMMA_GS
 SPP-060 Soil Preparation, rev 0
 SPP-100 Preparation of Sample for Gamma Spectroscopy,
 rev 0

AVERAGES ± 2 SD MDA 0.196 ± 0.367
 FOR 4 SAMPLES YIELD _____ ± _____

Lab id EBRLNE
 Protocol RC-040
 Version Ver 1.0
 Form DVD-LMS
 Version 3.06
 Report date 05/30/12

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3900

Test C Matrix SOLID
 SDG 7715
 Contact N. Joseph Verville

Client Hanford
 Contract No. S00W235A01
 Contract SDG K3900

LAB METHOD SUMMARY

CARBON 14 IN SOLIDS

LIQUID SCINTILLATION COUNTING

RESULTS

LAB	RAW	SUF-		
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID	Carbon 14
Preparation batch 7734-034				
S205049-01		7715-001	J1P2C5	U
S205049-02		7715-002	Lab Control Sample	ok
S205049-03		7715-003	Method Blank	U
S205049-04		7715-004	Duplicate (S205049-01)	- U

Nominal values and limits from method RDLs (pCi/g) 50.0

METHOD PERFORMANCE

LAB	RAW	SUF-	MDA	ALIQ	PREP	DILU-	YIELD	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-		
SAMPLE ID	TEST FIX	CLIENT SAMPLE ID	pCi/g	g	FAC	TION	%	%	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR
Preparation batch 7734-034			2σ prep error 10.0 %		Reference Lab Notebook 7323 pg. 142										
S205049-01		J1P2C5	11.2	0.105			100		50		7	05/22/12	05/22	LSC-007	
S205049-02		Lab Control Sample	27.6	0.105			100		<u>9</u>			05/22/12	05/22	LSC-007	
S205049-03		Method Blank	11.4	0.105			100		50			05/22/12	05/22	LSC-007	
S205049-04		Duplicate (S205049-01)	11.1	0.107			100		50		7	05/22/12	05/22	LSC-007	

Nominal values and limits from method 50.0 0.105 50 180

PROCEDURES	REFERENCE	C14_COX_LSC
SPP-060	Soil Preparation, rev 0	
SPP-070	Soil Dissolution, < 1.0g Aliquot, rev 1	
CP-251	Tritium/Carbon-14 Oxidation, rev 11	

AVERAGES ± 2 SD	MDA <u>15.3</u> ± <u>16.4</u>
FOR 4 SAMPLES	YIELD <u>100</u> ± <u>0</u>

Lab id EBRLNE
 Protocol RC-040
 Version Ver 1.0
 Form DVD-LMS
 Version 3.06
 Report date 05/30/12

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3900

Test H Matrix SOLID
 SDG 7715
 Contact N.Joseph Verville

LAB METHOD SUMMARY

TRITIUM IN SOLIDS

LIQUID SCINTILLATION COUNTING

Client Hanford
 Contract No. S00W235A01
 Contract SDG K3900

RESULTS

LAB	RAW	SUF-		
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID	Tritium
Preparation batch 7734-034				
S205049-01		7715-001	J1P2C5	U
S205049-02		7715-002	Lab Control Sample	ok
S205049-03		7715-003	Method Blank	U
S205049-04		7715-004	Duplicate (S205049-01)	- U

Nominal values and limits from method RDLs (pCi/g) 400

METHOD PERFORMANCE

LAB	RAW	SUF-	MDA	ALIQ	PREP	DILU-	YIELD	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-		
SAMPLE ID	TEST FIX	CLIENT SAMPLE ID	pCi/g	g	FAC	TION	%	%	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR
Preparation batch 7734-034			2σ prep error 10.0 %			Reference Lab Notebook 7323 pg. 142									
S205049-01		J1P2C5	15.1	0.105			100		50		8	05/22/12	05/23	LSC-007	
S205049-02		Lab Control Sample	16.4	0.105			100		50			05/22/12	05/23	LSC-007	
S205049-03		Method Blank	15.3	0.105			100		50			05/22/12	05/23	LSC-007	
S205049-04		Duplicate (S205049-01)	15.0	0.107			100		50		8	05/22/12	05/23	LSC-007	

Nominal values and limits from method 400 0.105 50 180

PROCEDURES	REFERENCE	TRITIUM_COX_LSC
SPP-060	Soil Preparation, rev 0	
SPP-070	Soil Dissolution, < 1.0g Aliquot, rev 1	
CP-251	Tritium/Carbon-14 Oxidation, rev 11	

AVERAGES ± 2 SD	MDA <u>15.4</u> ± <u>1.29</u>
FOR 4 SAMPLES	YIELD <u>100</u> ± <u>0</u>

Lab id EBRINE
 Protocol RC-040
 Version Ver 1.0
 Form DVD-LMS
 Version 3.06
 Report date 05/30/12

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3900

Test NI L Matrix SOLID
 SDG 7715
 Contact N.Joseph Verville

LAB METHOD SUMMARY

NICKEL 63 IN SOLIDS

LIQUID SCINTILLATION COUNTING

Client Hanford
 Contract No. S00W235A01
 Contract SDG K3900

RESULTS

LAB RAW SUP-
 SAMPLE ID TEST FIX PLANCHET CLIENT SAMPLE ID Nickel 63

Preparation batch 7734-034

S205049-01	7715-001	J1P2C5	4.08
S205049-02	7715-002	Lab Control Sample	ok
S205049-03	7715-003	Method Blank	U
S205049-04	7715-004	Duplicate (S205049-01)	ok

Nominal values and limits from method RDLs (pCi/g) 30.0

METHOD PERFORMANCE

LAB RAW SUP- MDA ALIQ PREP DILU- YIELD EFF COUNT FWHM DRIFT DAYS ANAL-
 SAMPLE ID TEST FIX CLIENT SAMPLE ID pCi/g g FAC TION % % min keV KeV HELD PREPARED YZED DETECTOR

Preparation batch 7734-034 2σ prep error 11.2 % Reference Lab Notebook 7323 pg. 142

S205049-01	J1P2C5	2.93	0.500	99	50	9	05/24/12	05/24	LSC-007
S205049-02	Lab Control Sample	3.05	0.500	97	50		05/24/12	05/24	LSC-007
S205049-03	Method Blank	3.01	0.500	99	50		05/24/12	05/24	LSC-007
S205049-04	Duplicate (S205049-01)	2.96	0.500	100	50	9	05/24/12	05/24	LSC-007

Nominal values and limits from method 30.0 0.500 40-110 50 180

PROCEDURES REFERENCE NI63_LSC
 SPP-060 Soil Preparation, rev 0
 SPP-070 Soil Dissolution, < 1.0g Aliquot, rev 1
 CP-281 Nickel-63 Purification By Extraction
 Chromatography, rev 5

AVERAGES ± 2 SD MDA 2.99 ± 0.106
 FOR 4 SAMPLES YIELD 99 ± 3

METHOD SUMMARIES

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Contact N. Joseph Verville

REPORT GUIDE

Client Hanford
Contract No. S00W235A01
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SAMPLE SUMMARY

The Sample and QC Summary Reports show all samples, including QC samples, reported in one Sample Delivery Group (SDG).

The Sample Summary Report fully identifies client samples and gives the corresponding lab sample identification. The QC Summary Report shows at the sample level how the lab organized the samples into batches and generated QC samples. The Preparation Batch and Method Summary Reports show this at the analysis level.

The following notes apply to these reports:

- * LAB SAMPLE ID is the lab's primary identification for a sample.
- * DEPARTMENT SAMPLE ID is an alternate lab id, for example one assigned by a radiochemistry department in a lab.
- * CLIENT SAMPLE ID is the client's primary identification for a sample. It includes any sample preparation done by the client that is necessary to identify the sample.
- * QC BATCH is a lab assigned code that groups samples to be processed and QCed together. These samples should have similar matrices.

QC BATCH is not necessarily the same as SDG, which reflects samples received and reported together.

- * All Lab Control Samples, Method Blanks, Duplicates and Matrix Spikes are shown that QC any of the samples. Due to possible reanalyses, not all results for all these QC samples may be relevant to the SDG. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.

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PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches in one Sample Delivery Group (SDG) with information necessary to check the completeness and consistency of the SDG.

The following notes apply to this report:

- * The preparation batches are shown in the same order as the Method Summary Reports are printed.
- * Only analyses of planchets relevant to the SDG are included.
- * Each preparation batch should have at least one Method Blank and LCS in it to validate client sample results.
- * The QUALIFIERS shown are all qualifiers other than U, J, B, L and H that occur on any analysis in the preparation batch. The Method Summary Report has these qualifiers on a per sample basis.

These qualifiers should be reviewed as follows:

- X Some data has been manually entered or modified. Transcription errors are possible.
- P One or more results are 'preliminary'. The data is not ready for final reporting.
- 2 There were two or more results for one analyte on one planchet imported at one time. The results in DVD may not be the same as on the raw data sheets.

Other lab defined qualifiers may occur. In general, these should be addressed in the SDG narrative.

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3900

SDG 7715
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REPORT GUIDE

WORK SUMMARY

The Work Summary Report shows all samples, including QC samples, and all relevant analyses in one Sample Delivery Group (SDG). This report is often useful as supporting documentation for an invoice.

The following notes apply to this report:

- * TEST is a code for the method used to measure associated analytes. Results and related information for each analyte are on the Data Sheet Report. In special cases, a test code used in the summary data section is not the same as in associated raw data. In this case, both codes are shown on the Work Summary.
- * SUFFIX is the lab's code to distinguish multiple analyses (recounts, reworks, reanalyses) of a fraction of the sample. The suffix indicates which result is being reported. An empty suffix normally identifies the first attempt to analyze the sample.
- * The LAB SAMPLE ID, TEST and SUFFIX uniquely identify all supporting data for a result. The Method Summary Report for each TEST has method performance data, such as yield, for each lab sample id and suffix and procedures used in the method.
- * PLANCHET is an alternate lab identifier for work done for one test. It, combined with the TEST and SUFFIX, may be the best link to raw data.
- * For QC samples, only analyses that directly QC some regular sample are shown. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.
- * The SAS (Special Analytical Services) Number is a client or lab assigned code that reflects special processing for samples, such as rapid turn around. Counts of tests done are lists by SAS number since it is likely to affect prices.

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DATA SHEET

The Data Sheet Report shows all results and primary supporting information for one client sample or Method Blank. This report corresponds to both the CLP Inorganics and Organics Data Sheet.

The following notes apply to this report:

- * TEST is a code for the method used to measure an analyte. If the TEST is empty, no data is available; the analyte was not analyzed for.
- * The LAB SAMPLE ID and TEST uniquely identify work within the Summary Data Section of a Data Package. The Work Summary and Method Summary Reports further identify raw data that underlies this work.

The Method Summary Report for each TEST has method performance data, such as yield, for each Lab Sample ID and a list of procedures used in the method.

- * ERRORS can be labeled TOTAL or COUNT. TOTAL implies a preparation (non-counting method) error has been added, as square root of sum of squares, to the counting error denoted by COUNT. The preparation errors, which may vary by preparation batch, are shown on the Method Summary Report.
- * A RESULT can be 'N.R.' (Not Reported). This means the lab did this work but chooses not to report it now, possibly because it was reported at another time.
- * When reporting a Method Blank, a RESULT can be 'N.A.' (Not Applicable). This means there is no reported client sample work in the same preparation batch as the Blank's result. This is likely to occur when the Method Blank is associated with reanalyses of selected work for a few samples in the SDG.

The following qualifiers are defined by the DVD system:

- U The RESULT is less than the MDA (Minimum Detectable Activity).

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DATA SHEET

If the MDA is blank, the ERROR is used as the limit.

- J The RESULT is less than the RDL (Required Detection Limit) and no U qualifier is assigned.
 - B A Method Blank associated with this sample had a result without a U flag and, after correcting for possibly different aliquots, that result is greater than or equal to the MDA for this sample.
- Normally, B is not assigned if U is. When method blank subtraction is shown on this report, B flags are assigned based on the unsubtracted values while U's are assigned based on the subtracted ones. Both flags can be assigned in this case.
- For each sample result, all Method Blank results in the same preparation batch are compared. The Method Summary Report documents this and other QC relationships.
- L Some Lab Control Sample that QC's this sample had a low recovery. The lab can disable assignment of this qualifier.
 - H Similar to 'L' except the recovery was high.
 - P The RESULT is 'preliminary'.
 - X Some data necessary to compute the RESULT, ERROR or MDA was manually entered or modified.
 - 2 There were two or more results available for this analyte. The reported result may not be the same as in the raw data.

Other qualifiers are lab defined. Definitions should be in the SDG narrative.

The following values are underlined to indicate possible problems:

- * An MDA is underlined if it is bigger than its RDL.

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GUIDE, cont.

DATA SHEET

- * An ERROR is underlined if the 1.645 sigma counting error is bigger than both the MDA and the RESULT, implying that the MDA may not be a good estimate of the 'real' minimum detectable activity.
- * A negative RESULT is underlined if it is less than the negative of its 2 sigma counting ERROR.
- * When reporting a Method Blank, a RESULT is underlined if greater than its MDA. If the MDA is blank, the 2 sigma counting error is used in the comparison.

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LAB CONTROL SAMPLE

The Lab Control Sample Report shows all results, recoveries and primary supporting information for one Lab Control Sample.

The following notes apply to this report:

- * All fields in common with the Data Sheet Report have similar usage. Refer to its Report Guide for details.
- * An amount ADDED is the lab's value ~~for~~ the actual amount spiked into this sample with its ERROR an estimate of the error of this amount.

An amount added is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

- * REC (Recovery) is RESULT divided by ADDED expressed as a percent.
- * The first, computed limits for the recovery reflect:
 1. The error of RESULT, including that introduced by rounding the result prior to printing.

If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.
 2. The error of ADDED.
 3. A lab specified, per analyte bias. The bias changes the center of the computed limits.
- * The second limits are protocol defined upper and lower QC limits for the recovery.
- * The recovery is underlined if it is outside either of these ranges.

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DUPLICATE

The Duplicate Report shows all results, differences and primary supporting information for one Duplicate and associated Original sample.

The following notes apply to this report:

- * All fields in common with the Data Sheet Report have similar usage. This applies both to the Duplicate and Original sample data. Refer to the Data Sheet Report Guide for details.

If the Duplicate has data for a TEST and the lab did not do this test to the Original, the Original's RESULTS are underlined.

- * The RPD (Relative Percent Difference) is the absolute value of the difference of the RESULTS divided by their average expressed as a percent.

If both RESULTS are less than their MDAs, no RPD is computed and a '-' is printed.

For an analyte, if the lab did work for both samples but has data for only one, the MDA from the sample with data is used as the other's result in the RPD.

- * The first, computed limit is the sum, as square root of sum of squares, of the errors of the results divided by the average result as a percent, hence the relative error of the difference rather than the error of the relative difference. The errors include those introduced by rounding the RESULTS prior to printing.

If this limit is labeled TOT, it includes the preparation error in the RESULTS. If labeled CNT, it does not.

This value reported for this limit is at most 999.

- * The second limit for the RPD is the larger of:

1. A fixed percentage specified in the protocol.

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DUPLICATE

2. A protocol factor (typically 2) times the average MDA as a percent of the average result. This limit applies when the results are close to the MDAs.

- * The RPD is underlined if it is greater than either limit.
- * If specified by the lab, the second limit column is replaced by the Difference Error Ratio (DER), which is the absolute value of the difference of the results divided by the quadratic sum of their one sigma errors, the same errors as used in the first limit.

Except for differences due to rounding, the DER is the same as the RPD divided by the first RPD limit with the limit scaled to 1 sigma.

- * The DER is underlined if it is greater than the sigma factor, typically 2 or 3, shown in the header for the first RPD limit.

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MATRIX SPIKE

The Matrix Spike Report shows all results, recoveries and primary supporting information for one Matrix Spike and associated Original sample.

The following notes apply to this report:

- * All fields in common with the Data Sheet Report have similar usage. This applies both to the Spiked and Original sample data. Refer to the Data Sheet Report Guide for details.

If the Spike has data for a TEST and the lab did not do this test to the Original, the Original's RESULTS are underlined.

- * An amount ADDED is the lab's value for the actual amount spiked into the Spike sample with its ERROR an estimate of the error of this amount.

An amount is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

- * REC (Recovery) is the Spike RESULT minus the Original RESULT divided by ADDED expressed as a percent.
- * The first, computed limits for the recovery reflect:
 1. The errors of the two RESULTS, including those introduced by rounding them prior to printing.

If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.

 2. The error of ADDED.
 3. A lab specified, per analyte bias. The bias changes the center of the computed limits.
- * The second limits are protocol defined upper and lower QC limits

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GUIDE, cont.

MATRIX SPIKE

for the recovery.

These limits are left blank if the Original RESULT is more than a protocol defined factor (typically 4) times ADDED. This is a way of accounting for that when the spike is small compared to the amount in the original sample, the recovery is unreliable.

- * The recovery is underlined (out of spec) if it is outside either of these ranges.

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METHOD SUMMARY

The Method Summary Report has two tables. One shows up to five results measured using one method. The other has performance data for the method. There is one report for each TEST, as used on the Data Sheet Report.

The following notes apply to this report:

- * Each table is subdivided into sections, one for each preparation batch. A preparation batch is a group of aliquots prepared at roughly the same time in one work area of the lab using the same method.

There should be Lab Control Sample and Method Blank results in each preparation batch since this close correspondence makes the QC meaningful. Depending on lab policy, Duplicates need not occur in each batch since they QC sample dependencies such as matrix effects.

- * The RAW TEST column shows the test code used in the raw data to identify a particular analysis if it is different than the test code in the header of the report. This occurs in special cases due to method specific details about how the lab labels work.

The Lab Sample or Planchet ID combined with the (Raw) Test Code and Suffix uniquely identify the raw data for each analysis.

- * If a result is less than both its MDA and RDL, it is replaced by just 'U' on this report. If it is greater than or equal to the RDL but less than the MDA, the result is shown with a 'U' flag.

The J and X flags are as on the data sheet.

- * Non-U results for Method Blanks are underlined to indicate possible contamination of other samples in the preparation batch. The Method Blank Report has supporting data.
- * Lab Control Sample and Matrix Spike results are shown as: ok, No data, LOW or HIGH, with the last two underlined. 'No data'

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METHOD SUMMARY

means no amount ADDED was specified. 'LOW' and 'HIGH' correspond to when the recovery is underlined on the Lab Control Sample or Matrix Spike Report. See these reports for supporting data.

- * Duplicate sample results are shown as: ok, No data, or OUT, with the last two underlined. 'No data' means there was no original sample data found for this duplicate. 'OUT' corresponds to when the RPD is underlined on the Duplicate Report. See this report for supporting data.
- * If the MDA column is labeled 'MAX MDA', there was more than one result measured by the reported method and the MDA shown is the largest MDA. If not all these results have the same RDL, the MAX MDA reflects only those results with RDL equal to the smallest one.

MDAs are underlined if greater than the printed RDL.

- * Aliquots are underlined if less than the nominal value specified for the method.
- * Preparation factors are underlined if greater than the nominal value specified for the method.
- * Dilution factors are underlined if greater than the nominal value specified for the method.
- * Residues are underlined if outside the range specified for the method. Residues are not printed if yields are.
- * Yields, which may be gravimetric, radiometric or some type of recovery depending on the method, are underlined if outside the range specified for the method.
- * Efficiencies are underlined if outside the range specified for the method. Efficiencies are detector and geometry dependent so this test is only approximate.

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- * Count times are underlined if less than the nominal value specified for the method.
- * Resolutions (as FWHM; Full Width at Half Max) are underlined if greater than the method specified limit.
- * Tracer drifts are underlined if their absolute values are greater than the method specified limit. Tracer drifts are not printed if percent moistures are.
- * Days Held are underlined if greater than the holding time specified in the protocol.
- * Analysis dates are underlined if before their planchet's preparation date or, if a limit is specified, too far after it.

For some methods, ratios as percentages and error estimates for them are computed for pairs of results. A ratio column header like '1+3' means the ratio of the first result column and the third result column.

Ratios are not computed for Lab Control Sample, Method Blank or Matrix Spike results since their matrices are not necessarily similar to client samples'.

The error estimate for a ratio of results from one planchet reflects only counting errors since other errors should be correlated. For a ratio involving different planchets, if QC limits are computed based on total errors, the error for the ratio allows for the preparation errors for the planchets.

The ratio is underlined (out of spec) if the absolute value of its difference from the nominal value is greater than its error estimate. If no nominal value is specified, this test is not done.

For Gross Alpha or Gross Beta results, there may be a column showing the sum of other Alpha or Beta emitters. This sum includes all relevant

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GUIDE, cont.

METHOD SUMMARY

results in the DVD database, whether reported or not. Results in the sum are weighted by a particles/decay value specified by the lab for each relevant analyte. Results less than their MDA are not included. No sums are computed for Lab Control, Method Blank or Matrix Spike samples since their various planchets may not be physically related.

If a ratio of total isotopic to Gross Alpha or Beta is shown, the error for the ratio reflects both the error in the Gross result and the sum, as square root of sum of squares, of the errors in the isotopic results.

For total elemental uranium or thorium results, there may be a column showing the total weight computed from associated isotopic results. Ignoring results less than their MDAs, this is a weighted sum of the isotopic results. The weights depend on the molecular weight and half-life of each isotope so as to convert activities (decays) to weight (atoms).

If a ratio of total computed to measured elemental uranium or thorium is shown, the error for the ratio reflects the errors in all the measurements.

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Collector: R. STRICKLAND RC-040-762

Project Designation: 300 Area D4 Waste Characterization Sampling - Other Solid Price Code **9K**

Ice Chest No. WCH-11-084 Data Turnaround **15 Days**

Company Contact: Tom Edmundson Telephone No. 509.947.5192 Project Coordinator: KESSNER, JH

Sampling Location: K3900 (7715) SAF No. RC-040

Field Logbook No. EL-1518-25 COA RD4MXX2F00 Method of Shipment: FEDEX

Offsite Property No. A110297 Bill of Lading/Air Bill No. See OSPC

Sample No.	Matrix *	Sample Date	Sample Time	Preservation	Cool 4C	None	None	None	None	None	None
J1P2C5	OTHER SOLID	5/15/2012	1205	Type of Container	G/P	G/P	G/P	G/P	G/P	G/P	None
				No. of Container(s)	1	0	0	0	0	0	1
				Volume	1000mL	60mL	60mL	60mL	60mL	60mL	1000mL

SAMPLE ANALYSIS

Sample No.	Matrix *	Sample Date	Sample Time	Preservation	Cool 4C	None	None	None	None	None	None
				Type of Container	G/P	G/P	G/P	G/P	G/P	G/P	None
				No. of Container(s)	1	0	0	0	0	0	1
				Volume	1000mL	60mL	60mL	60mL	60mL	60mL	1000mL

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)

(2) Gamma Spec (Client List) (Americium-241, Antimony-125, Barium-133, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Niobium-94, Radium-226, Radium-228)

** Run all selected analytes from material received.*

REVIEWED BY
Sms
DATE
5/16/12

CHAIN OF POSSESSION

Received By/Removed From	Date/Time	Received By/Stored In	Date/Time
<u>R. Strickland</u>	<u>05/15/12 1300</u>	<u>M. Keck</u>	<u>5-15-12</u>
<u>R. Strickland</u>	<u>05/15/12 1005</u>	<u>R. Strickland</u>	<u>05/16/12</u>
<u>R. Strickland</u>	<u>05/16/12 1400</u>	<u>FED EX</u>	<u>05/17/12 0900</u>

LABORATORY SECTION Received By: _____ Date/Time: _____

FINAL SAMPLE DISPOSITION Disposal Method: _____ Date/Time: _____

Disposed By: _____ Title: _____



RICHMOND, CA LABORATORY

SAMPLE RECEIPT CHECKLIST

Client: W.C. HANFORD City RICHMOND State WA

Date/Time received 05/17/12 0920 CoC No. RC-040-762

Container I.D. No. WCH-11-084 Requested TAT (Days) 15 P.O. Received Yes [] No []

INSPECTION

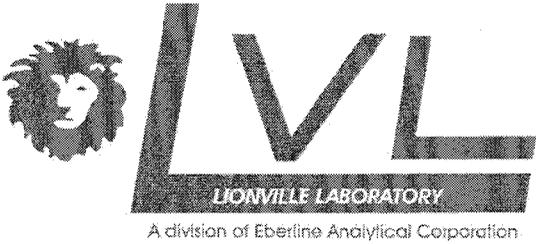
1. Custody seals on shipping container intact? Yes [] No [] N/A []
2. Custody seals on shipping container dated & signed? Yes [] No [] N/A []
3. Custody seals on sample containers intact? Yes [] No [] N/A []
4. Custody seals on sample containers dated & signed? Yes [] No [] N/A []
5. Packing material is: Wet [] Dry []
6. Number of samples in shipping container: 1 Sample Matrix X Solid
7. Number of containers per sample: 1 (Or see CoC _____)
8. Samples are in correct container Yes [] No []
9. Paperwork agrees with samples? Yes [] No []
10. Samples have: Tape [] Hazard labels [] Rad labels [] Appropriate sample labels []
11. Samples are: In good condition [] Leaking [] Broken Container [] Missing []
12. Samples are: Preserved [] Not preserved [] pH N/A Preservative _____
13. Describe any anomalies:

14. Was P.M. notified of any anomalies? Yes [] No [] Date _____
15. Inspected by [Signature] Date: 05/17/12 Time: 10:00

Customer Sample No.	Beta/Gamma cpm	Ion Chamber mR/hr	Wipe	Customer Sample No.	Beta/Gamma cpm	Ion Chamber mR/hr	wipe
<u>11P2CS</u>	<u>280</u>						

Ion Chamber Ser. No. _____
 Alpha Meter Ser. No. _____
 Beta/Gamma Meter Ser. No. 100482

Calibration date _____
 Calibration date _____
 Calibration date 06 DEC 11



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

25 May 2012

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

Subject: Analytical Data Package

Dear Ms. Kessner:

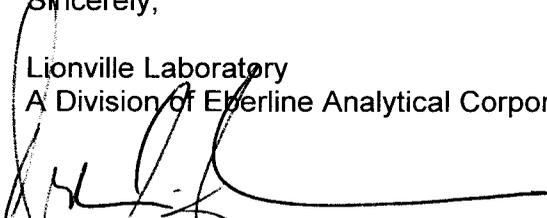
Enclosed are the hard copy analytical reports for the batch number/fraction indicated (marked X) in the following table:

LvLI Batch #	1205044
SDG #	K3900
SAF #	RC-040
Date Received	05/17/12
# Samples	1
Matrix	OTHER SOLID
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 18 pages.

CHAIN OF CUSTODY

Lionville Laboratory
SAMPLE RECEIPT CHECKLIST (SRC)

CLIENT: Wc Hanford
 Project/SAR/SOW/Release #: RC-040

Date: 5/17/12

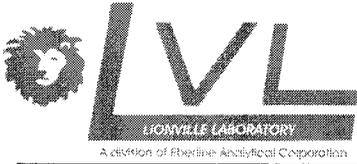
LvL Batch #: 1205044

Sample Custodian: Victor Hernandez

NOTE: EXPLAIN ALL DISCREPANCIES

- | | | |
|--|---|---|
| 1. Samples Hand Delivered or Shipped? | Carrier <u>FedEx</u> | Airbill # <u>7984 0491 2779</u> |
| 2. Custody Seals on coolers or shipping containers intact, signed & dated? | <input checked="" 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>12.9</u> °C | Cooler # <u>WCH-11-082</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 checked="" 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 checked="" type="checkbox"/> Yes <input type="checkbox"/> No | <input checked="" type="checkbox"/> N/A |
| Short holds taken to wet lab? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | |
| 13. VOA, TOC, TOX free of headspace? | <input checked="" 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 checked="" 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 _____ | |

METALS



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

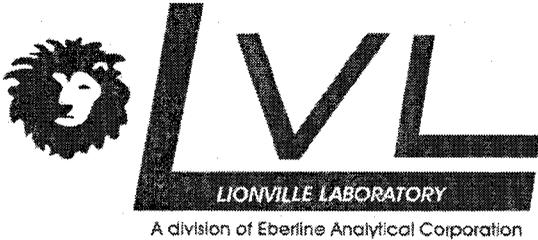
WC-Hanford, Inc.
2620 Fermi Avenue
Richland WA, 99354

Project: RC-040
Project Number: K3900
Project Manager: Joan Kessner

Reported:
05/25/2012 12:32

Analytical Report for Metals by SW846 6000/7000 series

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
J1P2C5	1205044-01	Other Solid	05/15/2012 12:25	05/17/2012 09:45



264 Welsh Pool Road
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Case Narrative

Client: WC-HANFORD RC-040
LVL#: 1205044
SDG/SAF#: K3900/RC-040

W.O.#: 60049-001-001-0001-00
Date Received: 05-17-12

METALS

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

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

1. This narrative covers the analysis of 1 solid sample.
2. The sample was prepared and analyzed in accordance with methods listed on the data report forms. The sample was reported on a wet weight, 'as-received' basis.
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. All Standard Reference Material (SRM) analytes were within the Prediction Interval control limits supplied by the manufacturer.
10. The matrix spike (MS) recoveries for 16 analytes were outside the 75-125% control limits.

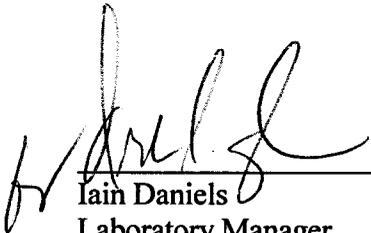
The matrix spike result for Zinc exceeded the linear range of the instrument, and therefore was not quantified for this report
11. For analytes where the ICP MS is out-of-control, a post-digestion MS (PDS) and serial dilution are performed. A PDS was prepared at meaningful concentration level for the following

analytes:

<u>Sample ID</u>	<u>Element</u>	<u>PDS</u> <u>Concentration (ppb)</u>	<u>PDS</u> <u>% Recovery</u>
J1P2C5	Aluminum	12,000	-18*
	Antimony	100	103.3
	Barium	100	-3530*
	Boron	100	-3800*
	Chromium	100	68.7
	Cobalt	100	105.5
	Copper	100	-3*
	Iron	4,000	82.0
	Lead	100	60.7
	Magnesium	21,600	82.9
	Manganese	1,000	83.6
	Nickel	100	94.6
	Potassium	5,000	78.4
	Silicon	1,100	-195*
	Sodium	12,000	-292*
	Zinc	1,000	-186*

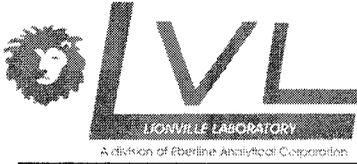
*PDS values were too low compared to indigenous concentrations.

- The duplicate analyses for 14 analytes were outside the 20% Relative Percent Difference (RPD) control limits. The $\pm 20\%$ RPD control limit applies to sample results greater than ten times the MDL. Results for Antimony, Arsenic, Cadmium, Molybdenum, Nickel, Selenium, and Vanadium were below ten times the MDL.
- 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.
- 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.
- 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

alm/05-044


Date



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Fax: 610-280-3041

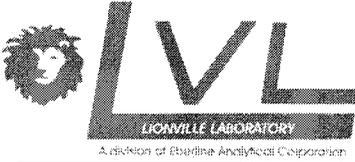
WC-Hanford, Inc.
2620 Fermi Avenue
Richland WA, 99354

Project: RC-040
Project Number: K3900
Project Manager: Joan Kessner

Reported:
05/25/2012 12:32

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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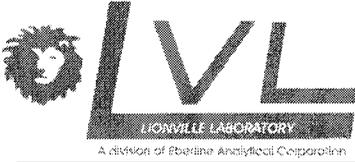
J1P2C5
1205044-01 (Other Solid)

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	2040		16.9	mg/kg wet	1	L205182	05/22/2012	05/24/2012	6010B
Antimony	0.849		0.847	mg/kg wet	1	L205182	05/22/2012	05/24/2012	6010B
Arsenic	1.81		0.847	mg/kg wet	1	L205182	05/22/2012	05/24/2012	6010B
Barium	847		0.424	mg/kg wet	1	L205182	05/22/2012	05/24/2012	6010B
Beryllium	0.169	U	0.169	mg/kg wet	1	L205182	05/22/2012	05/24/2012	6010B
Boron	908		1.69	mg/kg wet	1	L205182	05/22/2012	05/24/2012	6010B
Cadmium	0.525		0.212	mg/kg wet	1	L205182	05/22/2012	05/24/2012	6010B
Calcium	4020		16.9	mg/kg wet	1	L205182	05/22/2012	05/24/2012	6010B
Chromium	6.40		0.847	mg/kg wet	1	L205182	05/22/2012	05/24/2012	6010B
Cobalt	2.54	U	2.54	mg/kg wet	1	L205182	05/22/2012	05/24/2012	6010B
Copper	21.0		1.69	mg/kg wet	1	L205182	05/22/2012	05/24/2012	6010B
Iron	1500		16.9	mg/kg wet	1	L205182	05/22/2012	05/24/2012	6010B
Lead	9.91		0.847	mg/kg wet	1	L205182	05/22/2012	05/24/2012	6010B
Magnesium	300		4.24	mg/kg wet	1	L205182	05/22/2012	05/24/2012	6010B
Manganese	21.3		0.847	mg/kg wet	1	L205182	05/22/2012	05/24/2012	6010B
Molybdenum	0.675	B	0.847	mg/kg wet	1	L205182	05/22/2012	05/24/2012	6010B
Nickel	2.39		2.12	mg/kg wet	1	L205182	05/22/2012	05/24/2012	6010B
Potassium	1370		84.7	mg/kg wet	1	L205182	05/22/2012	05/24/2012	6010B
Selenium	0.634	B	0.847	mg/kg wet	1	L205182	05/22/2012	05/24/2012	6010B
Silicon	636		5.08	mg/kg wet	1	L205182	05/22/2012	05/24/2012	6010B
Silver	0.847	U	0.847	mg/kg wet	1	L205182	05/22/2012	05/24/2012	6010B
Sodium	8580		42.4	mg/kg wet	1	L205182	05/22/2012	05/24/2012	6010B
Vanadium	4.14		0.847	mg/kg wet	1	L205182	05/22/2012	05/24/2012	6010B
Zinc	702		2.54	mg/kg wet	1	L205182	05/22/2012	05/24/2012	6010B
Mercury	0.0268	B	0.0300	mg/kg	1	L205172	05/21/2012	05/22/2012	7471A

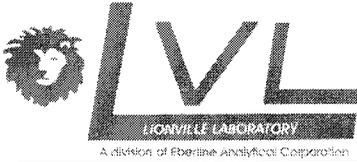


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Metals by SW846 6000/7000 series - Quality Control
Lionville Laboratory

Analyte	Result and Qualifiers		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L205172 - SW 7471A Prep										
Blank (L205172-BLK1)					Prepared: 05/21/2012 Analyzed: 05/22/2012					
Mercury	0.0281	U	0.0281	mg/kg						
Duplicate (L205172-DUP1)					Source: 1205044-01 Prepared: 05/21/2012 Analyzed: 05/22/2012					
Mercury	0.0247	B	0.0300	mg/kg		0.0268			8.41	20
Matrix Spike (L205172-MS1)					Source: 1205044-01 Prepared: 05/21/2012 Analyzed: 05/22/2012					
Mercury	0.206		0.0290	mg/kg	0.16129	0.0268	111	75-125		20
Reference (L205172-SRM1)					Prepared: 05/21/2012 Analyzed: 05/22/2012					
Mercury	1.27		0.0281	mg/kg	1.2900		98.7	62.6-138		
Batch L205182 - SW 3050B										
Blank (L205182-BLK1)					Prepared: 05/22/2012 Analyzed: 05/24/2012					
Aluminum	13.7	U	13.7	mg/kg wet						
Antimony	0.685	U	0.685	mg/kg wet						
Arsenic	0.685	U	0.685	mg/kg wet						
Barium	0.342	U	0.342	mg/kg wet						
Beryllium	0.137	U	0.137	mg/kg wet						
Boron	1.37	U	1.37	mg/kg wet						
Cadmium	0.171	U	0.171	mg/kg wet						
Calcium	5.87	B	13.7	mg/kg wet						
Chromium	0.685	U	0.685	mg/kg wet						
Cobalt	2.05	U	2.05	mg/kg wet						
Copper	1.37	U	1.37	mg/kg wet						
Iron	13.7	U	13.7	mg/kg wet						
Lead	0.685	U	0.685	mg/kg wet						
Magnesium	3.42	U	3.42	mg/kg wet						
Manganese	0.685	U	0.685	mg/kg wet						
Molybdenum	0.685	U	0.685	mg/kg wet						
Nickel	1.71	U	1.71	mg/kg wet						
Potassium	68.5	U	68.5	mg/kg wet						
Selenium	0.685	U	0.685	mg/kg wet						
Silicon	4.11	U	4.11	mg/kg wet						
Silver	0.685	U	0.685	mg/kg wet						
Sodium	34.2	U	34.2	mg/kg wet						
Vanadium	0.685	U	0.685	mg/kg wet						
Zinc	2.05	U	2.05	mg/kg wet						



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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
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Batch L205182 - SW 3050B

Duplicate (L205182-DUP1)	Source: 1205044-01		Prepared: 05/22/2012 Analyzed: 05/24/2012						
Aluminum	532		14.5	mg/kg wet	2040			117*	20
Antimony	0.332	B	0.725	mg/kg wet	0.849			87.6*	20
Arsenic	0.633	B	0.725	mg/kg wet	1.81			96.5*	20
Barium	323		0.362	mg/kg wet	847			89.6*	20
Beryllium	0.145	U	0.145	mg/kg wet	0.169 U				20
Boron	405		1.45	mg/kg wet	908			76.6*	20
Cadmium	0.239		0.181	mg/kg wet	0.525			74.8*	20
Calcium	1190		14.5	mg/kg wet	4020			109*	20
Chromium	1.67		0.725	mg/kg wet	6.40			117*	20
Cobalt	2.17	U	2.17	mg/kg wet	2.54 U				20
Copper	7.37		1.45	mg/kg wet	21.0			96.2*	20
Iron	474		14.5	mg/kg wet	1500			104*	20
Lead	4.61		0.725	mg/kg wet	9.91			72.9*	20
Magnesium	90.1		3.62	mg/kg wet	300			108*	20
Manganese	6.86		0.725	mg/kg wet	21.3			102*	20
Molybdenum	0.187	B	0.725	mg/kg wet	0.675			113*	20
Nickel	0.746	B	1.81	mg/kg wet	2.39			105*	20
Potassium	479		72.5	mg/kg wet	1370			96.1*	20
Selenium	0.219	B	0.725	mg/kg wet	0.634			97.4*	20
Silicon	230		4.35	mg/kg wet	636			93.6*	20
Silver	0.725	U	0.725	mg/kg wet	0.847 U				20
Sodium	3220		36.2	mg/kg wet	8580			90.9*	20
Vanadium	1.20		0.725	mg/kg wet	4.14			110*	20
Zinc	323		2.17	mg/kg wet	702			74.0*	20

Matrix Spike (L205182-MS1)	Source: 1205044-01		Prepared: 05/22/2012 Analyzed: 05/24/2012						
Aluminum	2830		16.9	mg/kg wet	169.49	2040	467*	75-125	20
Antimony	28.3		0.847	mg/kg wet	42.373	0.849	64.8*	75-125	20
Arsenic	133		0.847	mg/kg wet	169.49	1.81	77.3	75-125	20
Barium	1750		0.424	mg/kg wet	169.49	847	534*	75-125	20
Beryllium	3.19		0.169	mg/kg wet	4.2373	0.169 U	75.3	75-125	20
Boron	1660		1.69	mg/kg wet	84.746	908	884*	75-125	20
Cadmium	4.27		0.212	mg/kg wet	4.2373	0.525	88.3	75-125	20
Calcium	6190		16.9	mg/kg wet	2118.6	4020	102	75-125	20
Chromium	17.8		0.847	mg/kg wet	16.949	6.40	67.4*	75-125	20
Cobalt	30.9		2.54	mg/kg wet	42.373	2.54 U	72.9*	75-125	20
Copper	29.8		1.69	mg/kg wet	21.186	21.0	41.5*	75-125	20



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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 L205182 - SW 3050B									
Matrix Spike (L205182-MS1)		Source: 1205044-01		Prepared: 05/22/2012		Analyzed: 05/24/2012			
Iron	904	16.9	mg/kg wet	84.746	1500	-699*	75-125		20
Lead	38.3	0.847	mg/kg wet	42.373	9.91	67.1*	75-125		20
Magnesium	1740	4.24	mg/kg wet	2118.6	300	68.2*	75-125		20
Manganese	42.9	0.847	mg/kg wet	42.373	21.3	51.1*	75-125		20
Molybdenum	65.8	0.847	mg/kg wet	84.746	0.675	76.8	75-125		20
Nickel	31.1	2.12	mg/kg wet	42.373	2.39	67.7*	75-125		20
Potassium	2940	84.7	mg/kg wet	2118.6	1370	74.4*	75-125		20
Selenium	128	0.847	mg/kg wet	169.49	0.634	75.1	75-125		20
Silicon	408	5.08	mg/kg wet	84.746	636	-268*	75-125		20
Silver	3.97	0.847	mg/kg wet	4.2373	0.847 U	93.7	75-125		20
Sodium	7660	42.4	mg/kg wet	2118.6	8580	-43.9*	75-125		20
Vanadium	36.5	0.847	mg/kg wet	42.373	4.14	76.4	75-125		20
Zinc	84700000 *	2.54	mg/kg wet	42.373	702	00000000 *	75-125		20
Reference (L205182-SRM1)				Prepared: 05/22/2012		Analyzed: 05/24/2012			
Aluminum	9410	42.3	mg/kg wet	6670.0		141	0-200.89		
Antimony	36.8	2.11	mg/kg wet	53.000		69.4	0-235.8		
Arsenic	111	2.11	mg/kg wet	114.00		97.1	82.8-117.54		
Barium	307	1.06	mg/kg wet	307.00		100	79.8-120.2		
Beryllium	103	0.423	mg/kg wet	108.00		95.7	82.8-117.6		
Boron	74.6	4.23	mg/kg wet	85.100		87.7	67.5-132.8		
Cadmium	216	0.528	mg/kg wet	225.00		96.2	83.6-116.4		
Calcium	3190	42.3	mg/kg wet	3360.0		94.9	83.3-116.9		
Chromium	78.3	2.11	mg/kg wet	77.200		101	73.3-126.4		
Cobalt	156	6.34	mg/kg wet	166.00		94.2	80.7-118.7		
Copper	255	4.23	mg/kg wet	271.00		94.0	80.8-119.2		
Iron	8200	42.3	mg/kg wet	8420.0		97.4	78.6-121.1		
Lead	180	2.11	mg/kg wet	190.00		94.6	81.6-118.4		
Magnesium	8170	10.6	mg/kg wet	8570.0		95.4	83.2-116.7		
Manganese	953	2.11	mg/kg wet	965.00		98.7	69.3-130.5		
Molybdenum	223	2.11	mg/kg wet	235.00		94.8	76.2-123.8		
Nickel	211	5.28	mg/kg wet	221.00		95.4	79.6-120.8		
Potassium	14100	211	mg/kg wet	14400		97.6	81.9-118.1		
Selenium	179	2.11	mg/kg wet	187.00		96.0	75.9-124.6		
Silicon	370	12.7	mg/kg wet	807.00		45.9	0-219.3		
Silver	81.4	2.11	mg/kg wet	83.500		97.5	82.7-117.1		
Sodium	9040	106	mg/kg wet	9730.0		92.9	82.5-117.2		



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-040 Project Number: K3900 Project Manager: Joan Kessner	Reported: 05/25/2012 12:32
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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 L205182 - SW 3050B									
Reference (L205182-SRM1)				Prepared: 05/22/2012 Analyzed: 05/24/2012					
Vanadium	103	2.11	mg/kg wet	98.700	104	75.9-123.6			
Zinc	189	6.34	mg/kg wet	199.00	95.2	78.4-121.6			

SAMPLE DIGESTION RECORD

Digestion Batch #: L205182
 Date/Time Initiated: 5/22/12 12:15
 Date/Time Completed: 5/22/12 17:00
 Analyst: JJS
 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 #: 1314
 Balance Cal Verification: (Y) NA
 Temp: 93
 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	Type: To/Sol/TC	Texture	Color / Appearance	Artifact	Turb				
1205094-01		0.59	50		TO	coarse	white	N/A	N/A				
L205182 Rp1		0.69	50		↓	↓	↓	↓	↓				
-ms1	0.5	0.59	50							fine	white		
1205060-01		0.59	50										
L205182 -Rp2		0.62	50										
-ms2	0.5	0.52	50										
-M41		0.77	50							coarse	Boring clay		
-sum		0.71	50							fine	pink sand		

JJS
5/22/12

Spiking IDs / Expiration Date:
 MS#: 1205457

 LCS#: 1101357

Reagent IDs:
 HNO₃ 1591023
 HCl 101031
 H₂O₂ 1009103
 1:1 HNO₃ 637-066-02
 1:1 HCl _____

File ID#: _____
 Data Review By/Date:
Alan 5/23/12

PREPARATION BENCH SHEET

L205182

Lionville Laboratory

Printed: 5/22/2012 1:18:25PM

Matrix: Solid

Prepared using: METALS - SW 3050B

(No Surrogate)

Lab Number	Analysis	Prepared	Initial (g)	Final (mL)	Spike ID	Source ID	Spike μ l	Surrogate μ l	Client	Extraction Comments
L205044-01	6010B HSL Metals	05/22/2012 11:49	0.59	50					WC-Hanford, Inc.	HSL + B, Mo, Si (no TL)
L205060-01	6010B HSL Metals	05/22/2012 11:49	0.54	50					WC-Hanford, Inc.	HSL + B, Mo, Si (no TL)
L205182-BLK1	QC	05/22/2012 11:49	0.73	50						
L205182-DUP1	QC	05/22/2012 11:49	0.69	50		L205044-01				
L205182-DUP2	QC	05/22/2012 11:49	0.62	50		L205060-01				
L205182-MS1	QC	05/22/2012 11:49	0.59	50	1200457	L205044-01	500			
L205182-MS2	QC	05/22/2012 11:49	0.52	50	1200457	L205060-01	500			
L205182-SRM1	QC	05/22/2012 11:49	0.71	50	1101357		710			

Extracts Relinquished By JS Date 5/23/12 Extracts Received By Procter Date 05/23/12

MERCURY PREPARATION

Analyst: MLL
 Date: 5/21/12
 Start Time/Temp: 2030/95°
 End Time/Temp: 2110/97°

Instrument ID: HG3.4
 Balance #: B29 /NA
 Pipette Calibration (Daily) (Y)

Logbook # 1123
 Prep Batch: L205172
 Worksheet: HG052204
 SOP No. ME-HgCVAA
 BLOCK 1 (3) 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	
0.2 µg/L		0.100		10ml	50	
1.0 µg/L		0.500		10ml	50	
2.0 µg/L		1.000		10ml	50	
5.0 µg/L		2.500		10ml	50	
10.0 µg/L		5.000		10ml	50	
ICV		0.125	2.5	10ml	50	
CCV		0.250	5.0	10ml	50	
ICV/CCV				10ml	50	
L205172-BLK1				0.32	50	
SPM1				0.32	50	
1205037-02				0.30	50	
05				0.30	50	
1205044-01				0.30	50	
L205172-DUP1				0.30	50	
MS1		0.500	1.0	0.31	50	
1205060-01				0.31	50	
L205172-DUP2				0.31	50	
MS2		0.500	1.0	0.31	50	
NW 5/21/12						

Standard: _____ ID: _____ Prep Date/Time: _____
 ICAL/MS: RI 120588 5/21/12 1100
 ICV/CCV/LCS: IX 1101427 1

Reviewed By/Date: QJM 5/23/12

Soil LCS True Value = 1.25 mg/Kg
 Standard # 1101357 (circled)

see book # 9368 for std traceability information
 Water Matrix Spiking Solution Concentration = 0.1 µg/ml
 after LCS Spiking Concentration: 1.0 µg/ml

A