

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

COMPLETE COPY OF DATA PACKAGE TO:

No Distribution Required

KW 5/20/11
INITIAL/DATE

COMMENTS:

SDG K3339

SAF-RC-040

Rad only

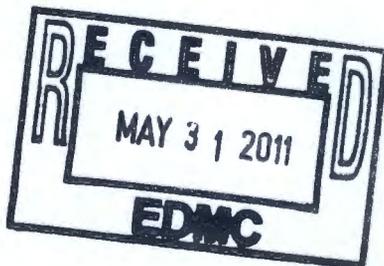
Chem only

Rad & Chem

Complete

Partial

Sample Location/Waste Site: 309 – Calandria





EBERLINE SERVICES

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May 17, 2011

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



Reference: **P.O. #S00W235A00**
Eberline Analytical S1-04-153-7855, SDG K3339

Dear Ms. Kessner:

Enclosed is a data report for one solid (other solid) sample designated under SAF No. RC-040 received at Eberline Analytical on April 27, 2011. The sample was analyzed according to the accompanying chain-of-custody document. Additional analyses for Pu-241, Ni-63 and total strontium were requested by email dated May 4, 2011. (see attached email)

Please call if you have any questions concerning this report.

Sincerely,

N. Joseph Verville
Client Services Manager

NJV/ljb

Enclosure: Data Package

1.0 GENERAL

Washington Closure Hanford (WCH) Sample Delivery Group K3339 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 16, 2011.

2.0 ANALYSIS NOTES

2.1 Tritium Analysis

No problems were encountered during the course of the analyses.

2.2 Carbon-14 Analysis

The results for the initial original and duplicate analyses of sample J1HK82 were not in good agreement therefore the sample was reanalyzed with new QC samples. No problems were encountered with the reanalyses, the original and duplicate results were in good agreement.

2.3 Nickel-63 Analysis

No problems were encountered during the course of the analyses. The Summary Report indicates that the results were obtained from a reanalysis however the A1 prefix indicating a reanalysis was added only to track the added analyses.

2.4 Total Strontium Analysis

No problems were encountered during the course of the analyses. The Summary Report indicates that the results were obtained from a reanalysis however the A1 prefix indicating a reanalysis was added only to track the added analyses

2.5 Isotopic Plutonium Analysis

As a consequence of adding Pu-241 analysis the alpha-Pu analyses was repeated in order to obtain the Pu-241 planchet. No problems were encountered during the course of the analyses.

2.6 Plutonium-241 Analysis

No problems were encountered during the course of the analyses.

2.7 Americium-241 Analysis

No 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."



**N. Joseph Verville
Client Services Managers**

5/17/11

Date

EBERLINE ANALYTICAL / RICHMOND
SAMPLE DELIVERY GROUP K3339

SDG 7855
Contact N. Joseph Verville

Client Hanford
Contract No. S00W235A00
Case no SDG_K3339

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

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Christopher P. Johnson
Prepared by

Reviewed by

Lab id EBRLNE
Protocol RC-040
Version Ver 1.0
Form DVD-TOC
Version 3.06
Report date 05/16/11

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3339

SDG 7855
Contact N. Joseph Verville

REPORT GUIDE

Client Hanford
Contract No. S00W235A00
Case no SDG K3339

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.

REPORT GUIDES

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SUMMARY DATA SECTION

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

SAMPLE DELIVERY GROUP K3339

SDG 7855
Contact N. Joseph Verville

GUIDE, cont.

Client Hanford
Contract No. S00W235A00
Case no SDG K3339

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.

REPORT GUIDES

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

SAMPLE DELIVERY GROUP K3339

LAB SAMPLE SUMMARY

SDG 7855
 Contact N.Joseph Verville

Client Hanford
 Contract No. S00W235A00
 Case no SDG K3339

LAB	SAMPLE ID	CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	SAF NO	CHAIN OF CUSTODY	COLLECTED
	S104153-01	J1HK82	309-Calandria	SOLID		RC-040	RC-040-620	04/21/11 10:51
	S104153-02	Lab Control Sample		SOLID		RC-040		
	S104153-03	Method Blank		SOLID		RC-040		
	S104153-04	Duplicate (S104153-01)	309-Calandria	SOLID		RC-040		04/21/11 10:51
	S104153-05	Lab Control Sample		SOLID		RC-040		
	S104153-06	Method Blank		SOLID		RC-040		
	S104153-07	Duplicate (S104153-01)	309-Calandria	SOLID		RC-040		04/21/11 10:51
	S104153-08	Lab Control Sample		SOLID		RC-040		
	S104153-09	Method Blank		SOLID		RC-040		
	S104153-10	Duplicate (S104153-01)	309-Calandria	SOLID		RC-040		04/21/11 10:51

LAB SUMMARY

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SUMMARY DATA SECTION

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Lab id EBRINE
 Protocol RC-040
 Version Ver 1.0
 Form DVD-LS
 Version 3.06
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EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3339

SDG 7855
 Contact N.Joseph Verville

QC SUMMARY

Client Hanford
 Contract No. S00W235A00
 Case no SDG K3339

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	% SOLIDS	SAMPLE AMOUNT	BASIS AMOUNT	DAYS SINCE RECEIVED	LAB COLL	LAB SAMPLE ID	DEPARTMENT SAMPLE ID
7855	RC-040-620	J1HK82	SOLID	100.0	76.64 g		04/27/11	6	S104153-01	7855-001
		Method Blank	SOLID						S104153-03	7855-003
		Method Blank	SOLID						S104153-06	7855-006
		Method Blank	SOLID						S104153-09	7855-009
		Lab Control Sample	SOLID						S104153-02	7855-002
		Lab Control Sample	SOLID						S104153-05	7855-005
		Lab Control Sample	SOLID						S104153-08	7855-008
		Duplicate (S104153-01)	SOLID	100.0	76.64 g		04/27/11	6	S104153-04	7855-004
		Duplicate (S104153-01)	SOLID	100.0	76.64 g		04/27/11	6	S104153-07	7855-007
		Duplicate (S104153-01)	SOLID	100.0	76.64 g		04/27/11	6	S104153-10	7855-010

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 Form DVD-QS
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EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3339

SDG 7855
 Contact N.Joseph Verville

PREP BATCH SUMMARY

Client Hanford
 Contract No. S00W235A00
 Case no SDG K3339

TEST	MATRIX	METHOD	PREPARATION ERROR		PLANCHETS ANALYZED				QUALI- FIERS
			BATCH	2σ %	CLIENT	MORE	RE BLANK	LCS	
Alpha Spectroscopy									
AM	SOLID	Americium 241 in Solids	7299-115	8.0	1		1	1	1/1
PU	SOLID	Plutonium, Isotopic in Solids	7299-115	8.0	1		1	1	1/1
Beta Counting									
SR	SOLID	Total Strontium in Solids	7299-115	10.4	1		1	1	1/1
Gamma Spectroscopy									
GAM	SOLID	Gamma Scan	7299-115	7.0	1		1	1	1/1
Liquid Scintillation Counting									
C	SOLID	Carbon 14 in Solids	7299-115	10.0	1		1	1	1/1
H	SOLID	Tritium in Solids	7299-115	10.0	1		1	1	1/1
NI_L	SOLID	Nickel 63 in Solids	7299-115	11.2	1		1	1	1/1
PU_L	SOLID	Plutonium 241 in Solids	7299-115	12.4	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 K3339

SDG 7855
 Contact N.Joseph Verville

LAB WORK SUMMARY

Client Hanford
 Contract No. S00W235A00
 Case no SDG K3339

LAB SAMPLE	CLIENT SAMPLE ID				SUP-					
COLLECTED	LOCATION		MATRIX		FIX	ANALYZED	REVIEWED	BY	METHOD	
RECEIVED	CUSTODY	SAF No	PLANCHET	TEST						
S104153-01	J1HK82			7855-001	AM	05/06/11	05/09/11	BW	Americium 241 in Solids	
04/21/11	309-Calandria		SOLID	7855-001	C	A1 05/05/11	05/06/11	BW	Carbon 14 in Solids	
04/27/11	RC-040-620	RC-040		7855-001	GAM	04/29/11	05/02/11	BW	Gamma Scan	
				7855-001	H	05/02/11	05/04/11	KWP	Tritium in Solids	
				7855-001	NI_L	A1 05/10/11	05/12/11	BW	Nickel 63 in Solids	
				7855-001	PU	A1 05/11/11	05/12/11	BW	Plutonium, Isotopic in Solids	
				7855-001	PU_L	A1 05/11/11	05/12/11	BW	Plutonium 241 in Solids	
				7855-001	SR	A1 05/09/11	05/12/11	BW	Total Strontium in Solids	
S104153-02	Lab Control Sample			7855-002	AM	05/05/11	05/09/11	BW	Americium 241 in Solids	
			SOLID	7855-002	GAM	04/29/11	05/02/11	BW	Gamma Scan	
		RC-040		7855-002	H	05/02/11	05/04/11	KWP	Tritium in Solids	
S104153-03	Method Blank			7855-003	AM	05/05/11	05/09/11	BW	Americium 241 in Solids	
			SOLID	7855-003	GAM	04/29/11	05/02/11	BW	Gamma Scan	
		RC-040		7855-003	H	05/02/11	05/04/11	KWP	Tritium in Solids	
S104153-04	Duplicate (S104153-01)			7855-004	AM	05/06/11	05/09/11	BW	Americium 241 in Solids	
04/21/11	309-Calandria		SOLID	7855-004	GAM	04/28/11	05/02/11	BW	Gamma Scan	
04/27/11		RC-040		7855-004	H	05/02/11	05/04/11	KWP	Tritium in Solids	
S104153-05	Lab Control Sample			7855-005	C	05/05/11	05/06/11	BW	Carbon 14 in Solids	
			SOLID							
		RC-040								
S104153-06	Method Blank			7855-006	C	05/05/11	05/06/11	BW	Carbon 14 in Solids	
			SOLID							
		RC-040								
S104153-07	Duplicate (S104153-01)			7855-007	C	05/05/11	05/06/11	BW	Carbon 14 in Solids	
04/21/11	309-Calandria		SOLID							
04/27/11		RC-040								
S104153-08	Lab Control Sample			7855-008	NI_L	05/10/11	05/12/11	BW	Nickel 63 in Solids	
			SOLID	7855-008	PU	05/11/11	05/12/11	BW	Plutonium, Isotopic in Solids	
		RC-040		7855-008	PU_L	05/11/11	05/12/11	BW	Plutonium 241 in Solids	
				7855-008	SR	05/09/11	05/12/11	BW	Total Strontium in Solids	

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EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3339

SDG 7855
 Contact N.Joseph Verville

Client Hanford
 Contract No. S00W235A00
 Case no SDG K3339

WORK SUMMARY, cont.

LAB SAMPLE	CLIENT SAMPLE ID									
COLLECTED	LOCATION	MATRIX			SUP-					
RECEIVED	CUSTODY	SAF No	PLANCHET	TEST	FIX	ANALYZED	REVIEWED	BY	METHOD	
S104153-09	Method Blank		7855-009	NI_L		05/10/11	05/12/11	BW	Nickel 63 in Solids	
		SOLID	7855-009	PU		05/11/11	05/12/11	BW	Plutonium, Isotopic in Solids	
		RC-040	7855-009	PU_L		05/12/11	05/12/11	BW	Plutonium 241 in Solids	
			7855-009	SR		05/09/11	05/12/11	BW	Total Strontium in Solids	
S104153-10	Duplicate (S104153-01)		7855-010	NI_L		05/10/11	05/12/11	BW	Nickel 63 in Solids	
04/21/11	309-Calandria	SOLID	7855-010	PU		05/11/11	05/12/11	BW	Plutonium, Isotopic in Solids	
04/27/11		RC-040	7855-010	PU_L		05/12/11	05/12/11	BW	Plutonium 241 in Solids	
			7855-010	SR		05/09/11	05/12/11	BW	Total Strontium in Solids	

COUNTS OF TESTS BY SAMPLE TYPE

TEST	SAF No	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP SPIKE	TOTAL
AM	RC-040	Americium 241 in Solids	AMCMISO_IE_PLATE_AEA	1			1	1	1	4
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
PU	RC-040	Plutonium, Isotopic in Solids	PUISO_PLATE_AEA	1			1	1	1	4
PU_L	RC-040	Plutonium 241 in Solids	PU241_IE_LSC	1			1	1	1	4
SR	RC-040	Total Strontium in Solids	SRTOT_SEP_PRECIP_GPC	1			1	1	1	4
TOTALS				8			8	8	8	32

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EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3339

7855-003

Method Blank

METHOD BLANK

SDG <u>7855</u>	Client/Case no <u>Hanford</u>	<u>SDG K3339</u>
Contact <u>N.Joseph Verville</u>	Contract No. <u>S00W235A00</u>	
Lab sample id <u>S104153-03</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7855-003</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	4.45	52	90.4	400	U	H
Americium 241	14596-10-2	2.06	2.1	<u>3.29</u>	1.00	U	AM
Potassium 40	13966-00-2	U		0.442		U	GAM
Cobalt 60	10198-40-0	U		0.031	0.050	U	GAM
Cesium 137	10045-97-3	U		0.030	0.100	U	GAM
Radium 226	13982-63-3	U		0.060	0.100	U	GAM
Radium 228	15262-20-1	U		0.113	0.200	U	GAM
Europium 152	14683-23-9	U		0.080	0.100	U	GAM
Europium 154	15585-10-1	U		0.089	0.100	U	GAM
Europium 155	14391-16-3	U		0.061	0.100	U	GAM
Thorium 228	14274-82-9	U		0.048		U	GAM
Thorium 232	TH-232	U		0.113		U	GAM
Uranium 235	15117-96-1	U		0.144		U	GAM
Uranium-238	U-238	U		3.61		U	GAM
Americium 241	14596-10-2	U		0.071		U	GAM
Antimony 125	14234-35-6	U		0.071		U	GAM
Barium-133	13981-41-4	U		0.037		U	GAM
Niobium 94	14681-63-1	U		0.025		U	GAM

QC-BLANK #78330

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SAMPLE DELIVERY GROUP K3339

7855-006

Method Blank

METHOD BLANK

SDG <u>7855</u>	Client/Case no <u>Hanford</u>	SDG <u>K3339</u>
Contact <u>N. Joseph Verville</u>	Contract No. <u>S00W235A00</u>	
Lab sample id <u>S104153-06</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7855-006</u>	Material/Matrix _____	<u>SOLID</u>
	SAF No <u>RC-040</u>	

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Carbon 14	14762-75-5	-13.6	79	<u>135</u>	50.0	U	C

QC-BLANK #78376

METHOD BLANKS

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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-DS</u>
Version <u>3.06</u>
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EBERLINE ANALYTICAL / RICHMOND
SAMPLE DELIVERY GROUP K3339

7855-009

Method Blank

METHOD BLANK

SDG <u>7855</u>	Client/Case no <u>Hanford</u>	SDG <u>K3339</u>
Contact <u>N.Joseph Verville</u>	Contract No. <u>S00W235A00</u>	
Lab sample id <u>S104153-09</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7855-009</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
Nickel 63	13981-37-8	-6.66	17	29.6	30.0	U	NI_L
Total Strontium	SR-RAD	0.655	2.9	<u>5.82</u>	1.00	U	SR
Plutonium 238	13981-16-3	0.180	0.90	<u>1.66</u>	1.00	U	PU
Plutonium 239/240	PU-239/240	0.270	0.54	<u>1.11</u>	1.00	U	PU
Plutonium 241	14119-32-5	-27.1	78	<u>131</u>	15.0	U	PU_L

QC-BLANK #78385

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3339

7855-005

Lab Control Sample

LAB CONTROL SAMPLE

SDG <u>7855</u> Contact <u>N.Joseph Verville</u> Lab sample id <u>S104153-05</u> Dept sample id <u>7855-005</u>	Client/Case no <u>Hanford</u> <u>SDG K3339</u> Contract <u>No. S00W235A00</u> Client sample id <u>Lab Control Sample</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
Carbon 14	65700	620	<u>136</u>	50.0	C		63800	2600	103	83-117	80-120

QC-LCS #78375

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3339

7855-008

Lab Control Sample

LAB CONTROL SAMPLE

SDG <u>7855</u> Contact <u>N. Joseph Verville</u> Lab sample id <u>S104153-08</u> Dept sample id <u>7855-008</u>	Client/Case no <u>Hanford</u> <u>SDG K3339</u> Contract No. <u>S00W235A00</u> Client sample id <u>Lab Control Sample</u> Material/Matrix _____ <u>SOLID</u> SAF No <u>RC-040</u>
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ANALYTE	RESULT	2σ ERR	MDA	RDL	QUALI-	ADDED	2σ ERR	REC	3σ LMTS	PROTOCOL
	pCi/g	(COUNT)	pCi/g	pCi/g	FIERS TEST	pCi/g	pCi/g	%	(TOTAL)	LIMITS
Nickel 63	2240	60	29.7	30.0	NI_L	2600	100	86	84-116	80-120
Total Strontium	206	11	<u>4.80</u>	1.00	SR	191	7.6	108	80-120	80-120
Plutonium 238	127	27	<u>8.02</u>	1.00	PU	114	4.6	111	62-138	80-120
Plutonium 239/240	128	27	<u>8.02</u>	1.00	PU	132	5.3	97	67-133	80-120
Plutonium 241	3190	150	<u>161</u>	15.0	PU_L	3160	130	101	79-121	80-120

QC-LCS #78384

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3339

7855-004

J1HK82

DUPLICATE

SDG <u>7855</u>	Client/Case no <u>Hanford</u>	SDG <u>K3339</u>
Contact <u>N.Joseph Verville</u>	Contract <u>No. S00W235A00</u>	
DUPLICATE	ORIGINAL	
Lab sample id <u>S104153-04</u>	Lab sample id <u>S104153-01</u>	Client sample id <u>J1HK82</u>
Dept sample id <u>7855-004</u>	Dept sample id <u>7855-001</u>	Location/Matrix <u>309-Calandria</u> <u>SOLID</u>
	Received <u>04/27/11</u>	Collected/Weight <u>04/21/11 10:51</u> <u>76.64 g</u>
% solids <u>100.0</u>	% solids <u>100.0</u>	Custody/SAF No <u>RC-040-620</u> <u>RC-040</u>

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	794000	9000	<u>435</u>	400		H	766000	8700	<u>429</u>		4	21	0.5
Americium 241	1890	150	<u>6.53</u>	1.00		AM	1840	160	<u>9.04</u>		3	24	0.3
Potassium 40	U		9.82		U	GAM	U		31.1	U	-		1.3
Cobalt 60	10400	10	<u>2.11</u>	0.050		GAM	10000	20	<u>6.31</u>		4	15	0.8
Cesium 137	1810	3.0	<u>2.23</u>	0.100		GAM	1690	8.0	<u>6.80</u>		7	15	1.4
Radium 226	U		<u>2.67</u>	0.100	U	GAM	U		<u>8.16</u>	U	-		1.3
Radium 228	U		<u>9.68</u>	0.200	U	GAM	U		<u>29.6</u>	U	-		1.3
Europium 152	321	3.9	<u>4.80</u>	0.100		GAM	305	9.6	<u>12.8</u>		5	16	1.0
Europium 154	59.4	3.5	<u>4.41</u>	0.100		GAM	46.9	8.6	<u>11.8</u>		24	30	2.3
Europium 155	U		<u>4.95</u>	0.100	U	GAM	U		<u>8.72</u>	U	-		0.8
Thorium 228	U		1.84		U	GAM	U		6.11	U	-		1.3
Thorium 232	U		9.68		U	GAM	U		29.6	U	-		1.3
Uranium 235	U		6.07		U	GAM	U		20.0	U	-		1.3
Uranium-238	U		291		U	GAM	U		886	U	-		1.3
Americium 241	1270	3.0	3.20			GAM	1110	13	14.3		13	15	2.7
Antimony 125	U		3.60		U	GAM	U		10.9	U	-		1.3
Barium-133	U		1.57		U	GAM	U		4.75	U	-		1.3
Niobium 94	U		2.07		U	GAM	U		7.58	U	-		1.4

QC-DUP#1 78331

300 Area D4 Waste Characterization Sampling
- Other Solid

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3339

7855-007

J1HK82

DUPLICATE

SDG <u>7855</u>		Client/Case no <u>Hanford</u> SDG <u>K3339</u>
Contact <u>N.Joseph Verville</u>		Contract No. <u>S00W235A00</u>
DUPLICATE	ORIGINAL	
Lab sample id <u>S104153-07</u>	Lab sample id <u>S104153-01</u>	Client sample id <u>J1HK82</u>
Dept sample id <u>7855-007</u>	Dept sample id <u>7855-001</u>	Location/Matrix <u>309-Calandria</u> <u>SOLID</u>
	Received <u>04/27/11</u>	Collected/Weight <u>04/21/11 10:51</u> <u>76.64 g</u>
% solids <u>100.0</u>	% solids <u>100.0</u>	Custody/SAF No <u>RC-040-620</u> <u>RC-040</u>

ANALYTE	DUPLICATE	2σ ERR	MDA	RDL	QUALI- FIERS	TEST	ORIGINAL	2σ ERR	MDA	QUALI- FIERS	RPD	3σ	DER
	pCi/g	(COUNT)	pCi/g	pCi/g			pCi/g	(COUNT)	pCi/g		%	TOT	σ
Carbon 14	1000	96	<u>115</u>	50.0		C	970	94	<u>113</u>		3	29	0.3

QC-DUP#1 78377

300 Area D4 Waste Characterization Sampling
- Other Solid

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3339

7855-010

J1HK82

DUPLICATE

SDG <u>7855</u>		Client/Case no <u>Hanford</u>	SDG <u>K3339</u>
Contact <u>N.Joseph Verville</u>		Contract No. <u>S00W235A00</u>	
DUPLICATE	ORIGINAL		
Lab sample id <u>S104153-10</u>	Lab sample id <u>S104153-01</u>	Client sample id <u>J1HK82</u>	
Dept sample id <u>7855-010</u>	Dept sample id <u>7855-001</u>	Location/Matrix <u>309-Calandria</u>	<u>SOLID</u>
	Received <u>04/27/11</u>	Collected/Weight <u>04/21/11 10:51</u>	<u>76.64 g</u>
% solids <u>100.0</u>	% solids <u>100.0</u>	Custody/SAF No <u>RC-040-620</u>	<u>RC-040</u>

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
Nickel 63	70800	230	20.8	30.0	NI_L	78200	340	30.0		10	24	1.3
Total Strontium	1490	31	<u>5.48</u>	1.00	SR	1520	31	<u>5.60</u>		2	22	0.3
Plutonium 238	71.9	19	<u>7.54</u>	1.00	PU	62.5	19	<u>8.69</u>		14	62	0.7
Plutonium 239/240	1940	210	<u>7.53</u>	1.00	PU	1950	230	<u>8.68</u>		1	29	0.1
Plutonium 241	4010	190	<u>196</u>	15.0	PU_L	4140	200	<u>213</u>		3	28	0.3

QC-DUP#1 78386

300 Area D4 Waste Characterization Sampling
- Other Solid

Lab id EBRLNE
Protocol RC-040
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 05/16/11

EBERLINE ANALYTICAL / RICHMOND
SAMPLE DELIVERY GROUP K3339

7855-001

J1HK82

DATA SHEET

SDG <u>7855</u>	Client/Case no <u>Hanford</u>	SDG <u>K3339</u>
Contact <u>N. Joseph Verville</u>	Contract No. <u>S00W235A00</u>	
Lab sample id <u>S104153-01</u>	Client sample id <u>J1HK82</u>	
Dept sample id <u>7855-001</u>	Location/Matrix <u>309-Calandria</u>	<u>SOLID</u>
Received <u>04/27/11</u>	Collected/Weight <u>04/21/11 10:51</u>	<u>76.64 g</u>
% solids <u>100.0</u>	Custody/SAF No <u>RC-040-620</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	766000	8700	<u>429</u>	400		H
Carbon 14	14762-75-5	970	94	<u>113</u>	50.0		C
Nickel 63	13981-37-8	78200	340	30.0	30.0		NI_L
Total Strontium	SR-RAD	1520	31	<u>5.60</u>	1.00		SR
Americium 241	14596-10-2	1840	160	<u>9.04</u>	1.00		AM
Plutonium 238	13981-16-3	62.5	19	<u>8.69</u>	1.00		PU
Plutonium 239/240	PU-239/240	1950	230	<u>8.68</u>	1.00		PU
Plutonium 241	14119-32-5	4140	200	<u>213</u>	15.0		PU_L
Potassium 40	13966-00-2	U		31.1		U	GAM
Cobalt 60	10198-40-0	10000	20	<u>6.31</u>	0.050		GAM
Cesium 137	10045-97-3	1690	8.0	<u>6.80</u>	0.100		GAM
Radium 226	13982-63-3	U		<u>8.16</u>	0.100	U	GAM
Radium 228	15262-20-1	U		<u>29.6</u>	0.200	U	GAM
Europium 152	14683-23-9	305	9.6	<u>12.8</u>	0.100		GAM
Europium 154	15585-10-1	46.9	8.6	<u>11.8</u>	0.100		GAM
Europium 155	14391-16-3	U		<u>8.72</u>	0.100	U	GAM
Thorium 228	14274-82-9	U		6.11		U	GAM
Thorium 232	TH-232	U		29.6		U	GAM
Uranium 235	15117-96-1	U		20.0		U	GAM
Uranium-238	U-238	U		886		U	GAM
Americium 241	14596-10-2	1110	13	14.3			GAM
Antimony 125	14234-35-6	U		10.9		U	GAM
Barium-133	13981-41-4	U		4.75		U	GAM
Niobium 94	14681-63-1	U		7.58		U	GAM

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>05/16/11</u>

EBERLINE ANALYTICAL/RICHMOND
SAMPLE DELIVERY GROUP K3339

7855-001

J1HK82

DATA SHEET, cont

SDG <u>7855</u>	Client/Case no <u>Hanford</u>	<u>SDG_K3339</u>
Contact <u>N.Joseph Verville</u>	Contract <u>No. S00W235A00</u>	
Lab sample id <u>S104153-01</u>	Client sample id <u>J1HK82</u>	
Dept sample id <u>7855-001</u>	Location/Matrix <u>309-Calandria</u>	<u>SOLID</u>
Received <u>04/27/11</u>	Collected/Weight <u>04/21/11 10:51</u>	<u>76.64 g</u>
% solids <u>100.0</u>	Custody/SAF No <u>RC-040-620</u>	<u>RC-040</u>

300 Area D4 Waste Characterization Sampling
- Other Solid

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>05/16/11</u>

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3339

Test AM Matrix SOLID
 SDG 7855
 Contact N.Joseph Verville

LAB METHOD SUMMARY

AMERICIUM 241 IN SOLIDS
 ALPHA SPECTROSCOPY

Client Hanford
 Contract No. S00W235A00
 Contract SDG K3339

RESULTS

LAB RAW SUF- Americium
 SAMPLE ID TEST FIX PLANCHET CLIENT SAMPLE ID 241

Preparation batch 7299-115

S104153-01	7855-001	J1HK82	1840
S104153-02	7855-002	Lab Control Sample	ok
S104153-03	7855-003	Method Blank	<u>2.06</u> U
S104153-04	7855-004	Duplicate (S104153-01)	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 7299-115 2σ prep error 8.0 % Reference Lab Notebook 7299 pg. 115

S104153-01	J1HK82	<u>9.04</u>	0.0500	62	1119	15	05/05/11	05/06	SS-039
S104153-02	Lab Control Sample	<u>3.63</u>	0.0500	68	102		05/05/11	05/05	SS-048
S104153-03	Method Blank	<u>3.29</u>	0.0500	67	102		05/05/11	05/05	SS-049
S104153-04	Duplicate (S104153-01)	<u>6.53</u>	0.0500	69	1120	15	05/05/11	05/06	SS-040

Nominal values and limits from method 1.00 0.0500 30-110 100 100 180

PROCEDURES REFERENCE AMCMISO_IE_PLATE_AEA
 SPP-060 Soil Preparation, rev 0
 SPP-070 Soil Dissolution, < 1.0g Aliquot, rev 1
 CP-965 Americium & Curium in Water & Dissolved Samples
 by Extraction Chromatography & Microprecipitation,
 rev 3
 CP-008 Heavy Element Electroplating, rev 13

AVERAGES ± 2 SD MDA 5.62 ± 5.41
 FOR 4 SAMPLES YIELD 66 ± 6

METHOD SUMMARIES

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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 05/16/11

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3339

LAB METHOD SUMMARY

PLUTONIUM, ISOTOPIC IN SOLIDS

ALPHA SPECTROSCOPY

Test PU Matrix SOLID
 SDG 7855
 Contact N.Joseph Verville

Client Hanford
 Contract No. S00W235A00
 Contract SDG K3339

RESULTS

LAB	RAW	SUF-		Plutonium	Plutonium
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID	238	239/240

Preparation batch 7299-115

S104153-01	A1	7855-001	J1HK82	62.5	1950
S104153-08		7855-008	Lab Control Sample	ok	ok
S104153-09		7855-009	Method Blank	U	U
S104153-10		7855-010	Duplicate (S104153-01)	ok	ok

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 7299-115 2σ prep error 8.0 % Reference Lab Notebook 7299 pg. 115

S104153-01	A1	J1HK82	<u>8.69</u>	0.0500			<u>18</u>		107			20	05/11/11	05/11	SS-049
S104153-08		Lab Control Sample	<u>8.02</u>	0.0500			<u>26</u>		103				05/11/11	05/11	SS-033
S104153-09		Method Blank	<u>1.66</u>	0.0500			<u>38</u>		833				05/11/11	05/11	SS-033
S104153-10		Duplicate (S104153-01)	<u>7.54</u>	0.0500			<u>28</u>		103			20	05/11/11	05/11	SS-034

Nominal values and limits from method 1.00 0.0500 30-110 100 100 180

PROCEDURES	REFERENCE	PUISO_PLATE_AEA
SPP-060		Soil Preparation, rev 0
SPP-070		Soil Dissolution, < 1.0g Aliquot, rev 1
CP-941		Plutonium in Water and Dissolved Samples by Extraction Chromatography, rev 12
CP-008		Heavy Element Electroplating, rev 13

AVERAGES ± 2 SD	MDA	<u>6.48</u>	±	<u>6.49</u>
FOR 4 SAMPLES	YIELD	<u>28</u>	±	<u>16</u>

METHOD SUMMARIES

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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 05/16/11

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3339

LAB METHOD SUMMARY

TOTAL STRONTIUM IN SOLIDS
BETA COUNTING

Test SR Matrix SOLID
SDG 7855
Contact N. Joseph Verville

Client Hanford
Contract No. S00W235A00
Contract SDG K3339

RESULTS

LAB	RAW	SUF-		Total
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID	Strontium

Preparation batch 7299-115

S104153-01	Al	7855-001	J1HK82	1520
S104153-08		7855-008	Lab Control Sample	ok
S104153-09		7855-009	Method Blank	U
S104153-10		7855-010	Duplicate (S104153-01)	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 7299-115 2σ prep error 10.4 % Reference Lab Notebook 7299 pg. 115

S104153-01	Al	J1HK82	<u>5.60</u>	0.0500			86		100			18 05/09/11 05/09	GRB-225
S104153-08		Lab Control Sample	<u>4.80</u>	0.0500			89		100			05/09/11 05/09	GRB-228
S104153-09		Method Blank	<u>5.82</u>	0.0500			84		100			05/09/11 05/09	GRB-202
S104153-10		Duplicate (S104153-01)	<u>5.48</u>	0.0500			84		100			18 05/09/11 05/09	GRB-227

Nominal values and limits from method 1.00 0.0500 40-110 100 180

PROCEDURES	REFERENCE	SRTOT_SEP_PRECIP_GPC
SPP-060	Soil Preparation, rev 0	
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 <u>5.42</u> ± <u>0.880</u>
FOR 4 SAMPLES	YIELD <u>86</u> ± <u>5</u>

METHOD SUMMARIES

Page 3

SUMMARY DATA SECTION

Page 21

Lab id <u>EBRLNE</u>
Protocol <u>RC-040</u>
Version <u>Ver 1.0</u>
Form <u>DVD-LMS</u>
Version <u>3.06</u>
Report date <u>05/16/11</u>

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3339

LAB METHOD SUMMARY

GAMMA SCAN
GAMMA SPECTROSCOPY

Test GAM Matrix SOLID
SDG 7855
Contact N.Joseph Verville

Client Hanford
Contract No. S00W235A00
Contract SDG K3339

RESULTS

LAB RAW SUP-
SAMPLE ID TEST FIX PLANCHET CLIENT SAMPLE ID Cobalt 60 Cesium 137

Preparation batch 7299-115

S104153-01	7855-001	J1HK82	10000	1690
S104153-02	7855-002	Lab Control Sample	ok	ok
S104153-03	7855-003	Method Blank	U	U
S104153-04	7855-004	Duplicate (S104153-01)	ok	ok

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

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 7299-115 2σ prep error 7.0 % Reference Lab Notebook 7299 pg. 115

S104153-01	J1HK82	<u>15.6</u>	76.6	<u>64</u>	8	04/28/11	04/29	PD,02,00
S104153-02	Lab Control Sample	<u>0.065</u>	70.0	1184		04/28/11	04/29	JR,03,00
S104153-03	Method Blank	<u>0.061</u>	70.0	1184		04/28/11	04/29	JR,04,00
S104153-04	Duplicate (S104153-01)	<u>5.11</u>	76.6	619	7	04/28/11	04/28	PD,02,00

Nominal values and limits from method 0.050 70.0 100 180

PROCEDURES	REFERENCE	GAMMA_GS
SPP-060	Soil Preparation, rev 0	
SPP-100	Preparation of Sample for Gamma Spectroscopy, rev 0	
SPP-070	Soil Dissolution, < 1.0g Aliquot, rev 1	

AVERAGES ± 2 SD	MDA <u>5.21 ± 14.6</u>
FOR 4 SAMPLES	YIELD _____ ± _____

METHOD SUMMARIES

Page 4

SUMMARY DATA SECTION

Page 22

Lab id	<u>EBRLNE</u>
Protocol	<u>RC-040</u>
Version	<u>Ver 1.0</u>
Form	<u>DVD-LMS</u>
Version	<u>3.06</u>
Report date	<u>05/16/11</u>

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3339

LAB METHOD SUMMARY

CARBON 14 IN SOLIDS

LIQUID SCINTILLATION COUNTING

Test C Matrix SOLID
 SDG 7855
 Contact N.Joseph Verville

Client Hanford
 Contract No. S00W235A00
 Contract SDG K3339

RESULTS

LAB RAW SUF-
 SAMPLE ID TEST FIX PLANCHET CLIENT SAMPLE ID Carbon 14

Preparation batch 7299-115

S104153-01	A1	7855-001	J1HK82	970
S104153-05		7855-005	Lab Control Sample	ok
S104153-06		7855-006	Method Blank	U
S104153-07		7855-007	Duplicate (S104153-01)	ok

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 7299-115 2σ prep error 10.0 % Reference Lab Notebook 7299 pg. 115

S104153-01	A1	J1HK82	<u>113</u>	0.0117			100	50		14	05/04/11	05/05	LSC-004
S104153-05		Lab Control Sample	<u>136</u>	0.0100			100	50			05/04/11	05/05	LSC-004
S104153-06		Method Blank	<u>135</u>	0.0100			100	50			05/04/11	05/05	LSC-004
S104153-07		Duplicate (S104153-01)	<u>115</u>	0.0116			100	50		14	05/04/11	05/05	LSC-004

Nominal values and limits from method 50.0 0.0100 10 180

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 125 ± 24.9
 FOR 4 SAMPLES YIELD 100 ± 0

METHOD SUMMARIES

Page 5

SUMMARY DATA SECTION

Page 23

Lab id EBRLNE
 Protocol RC-040
 Version Ver 1.0
 Form DVD-LMS
 Version 3.06
 Report date 05/16/11

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3339

Test H Matrix SOLID
 SDG 7855
 Contact N. Joseph Verville

LAB METHOD SUMMARY

TRITIUM IN SOLIDS

LIQUID SCINTILLATION COUNTING

Client Hanford
 Contract No. S00W235A00
 Contract SDG K3339

RESULTS

LAB RAW SUF-
 SAMPLE ID TEST FIX PLANCHET CLIENT SAMPLE ID Tritium

Preparation batch 7299-115

S104153-01	7855-001	J1HK82	766000
S104153-02	7855-002	Lab Control Sample	ok
S104153-03	7855-003	Method Blank	U
S104153-04	7855-004	Duplicate (S104153-01)	ok

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 7299-115 2σ prep error 10.0 % Reference Lab Notebook 7299 pg. 115

S104153-01	J1HK82	429	0.0213	100	3	11	05/02/11	05/02	LSC-006
S104153-02	Lab Control Sample	138	0.0200	100	50		05/02/11	05/02	LSC-006
S104153-03	Method Blank	90.4	0.0200	100	50		05/02/11	05/02	LSC-006
S104153-04	Duplicate (S104153-01)	435	0.0212	100	2	11	05/02/11	05/02	LSC-006

Nominal values and limits from method 400 0.0200 25 180

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>273</u> ± <u>369</u>
FOR 4 SAMPLES	YIELD <u>100</u> ± <u>0</u>

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3339

LAB METHOD SUMMARY

NICKEL 63 IN SOLIDS

LIQUID SCINTILLATION COUNTING

Test NI L Matrix SOLID

SDG 7855

Contact N. Joseph Verville

Client Hanford

Contract No. S00W235A00

Contract SDG K3339

RESULTS

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

Preparation batch 7299-115

S104153-01	A1	7855-001	J1HK82	78200
S104153-08		7855-008	Lab Control Sample	ok
S104153-09		7855-009	Method Blank	U
S104153-10		7855-010	Duplicate (S104153-01)	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 7299-115 2σ prep error 11.2 % Reference Lab Notebook 7299 pg. 115

S104153-01	A1	J1HK82	30.0	0.0500			98	50			19	05/10/11	05/10	LSC-004
S104153-08		Lab Control Sample	29.7	0.0500			99	50				05/10/11	05/10	LSC-004
S104153-09		Method Blank	29.6	0.0500			98	50				05/10/11	05/10	LSC-004
S104153-10		Duplicate (S104153-01)	20.8	0.0500			96	100			19	05/10/11	05/10	LSC-004

Nominal values and limits from method 30.0 0.0500 40-110 25 180

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	<u>27.5</u> ± <u>8.97</u>
FOR 4 SAMPLES	YIELD	<u>98</u> ± <u>3</u>

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Protocol RC-040

Version Ver 1.0

Form DVD-LMS

Version 3.06

Report date 05/16/11

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SAMPLE DELIVERY GROUP K3339

LAB METHOD SUMMARY

PLUTONIUM 241 IN SOLIDS

LIQUID SCINTILLATION COUNTING

Test PU L Matrix SOLID
 SDG 7855
 Contact N. Joseph Verville

Client Hanford
 Contract No. S00W235A00
 Contract SDG K3339

RESULTS

LAB	RAW	SUF-		Plutonium
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID	241

Preparation batch 7299-115

S104153-01	A1	7855-001	J1HK82	4140
S104153-08		7855-008	Lab Control Sample	ok
S104153-09		7855-009	Method Blank	U
S104153-10		7855-010	Duplicate (S104153-01)	ok

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 7299-115 2σ prep error 12.4 % Reference Lab Notebook 7299 pg. 115

S104153-01	A1	J1HK82	<u>213</u>	0.0500			<u>27</u>		100		20	05/11/11	05/11	LSC-006
S104153-08		Lab Control Sample	<u>161</u>	0.0500			36		100			05/11/11	05/11	LSC-006
S104153-09		Method Blank	<u>131</u>	0.0500			44		100			05/11/11	05/12	LSC-006
S104153-10		Duplicate (S104153-01)	<u>196</u>	0.0500			<u>29</u>		100		21	05/11/11	05/12	LSC-006

Nominal values and limits from method 15.0 0.0500 30-110 50 180

PROCEDURES	REFERENCE	PU241_IE_LSC
SPP-060	Soil Preparation, rev 0	
SPP-070	Soil Dissolution, < 1.0g Aliquot, rev 1	
CP-941	Plutonium in Water and Dissolved Samples by Extraction Chromatography, rev 12	
RP-948	Plutonium-241 by Liquid Scintillation Counting, rev 4	

AVERAGES ± 2 SD	MDA <u>175</u> ± <u>73.2</u>
FOR 4 SAMPLES	YIELD <u>34</u> ± <u>15</u>

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Form <u>DVD-LMS</u>
Version <u>3.06</u>
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SAMPLE DELIVERY GROUP K3339

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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.

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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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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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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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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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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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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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Report date 05/16/11

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST					RC-040-620		Page 1 of 1					
Collector Seals Mahony, LE 4/21/11		Company Contact Mike Stankovich		Telephone No. 509.430.7142		Project Coordinator KESSNER, JH		Price Code 9K		Data Turnaround 15 Days				
Project Designation 300 Area D4 Waste Characterization Sampling - Other Solid		Sampling Location 309-Calandria		K3339 (7855)		SAF No. RC-040								
Ice Chest No. GWS-197		Field Logbook No. EL-1518-19		COA RD4MXX2F00		Method of Shipment FedEx								
Shipped To EBERLINE SERVICES ALIONVILLE		Offsite Property No. N/A		Bill of Lading/Air Bill No. See OSPE N/A TRR 4-25-11 SEE RSR										
POSSIBLE SAMPLE HAZARDS/REMARKS Rad			Preservation	None	None	None	None	None						
Special Handling and/or Storage N/A			Type of Container	G/P	G/P	G/P	aG	G/P						
			No. of Container(s)	1	0	0	0	1						
			Volume	500ml 1000ml	60ml	60ml	60ml	60ml	60ml 1800ml					
SAMPLE ANALYSIS			See item (1) in Special Instructions.	Isotopic Plutonium	Americium-241/Cesium-244 Americium-241, Cesium-244 4/21/11	Tritium - H3; Carbon-14	RCF GEA Shipping Screen							
Sample No.	Matrix *	Sample Date	Sample Time											
J1HK82	OTHER SOLID	4-21-11	1051	X	X	X	X	X	27909	82g				
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS				Matrix *		
Relinquished By/Removed From Lindsay Mahony		Date/Time 4/21/11 11:00 AM		Received By/Stored In J. Scales		Date/Time 4/21/11 1100		(1) 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)				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		
Relinquished By/Removed From J. Scales		Date/Time 4-21-11 1115		Received By/Stored In P.L. Wallace		Date/Time 4-21-11 1115								
Relinquished By/Removed From M. K. Ror		Date/Time 4-25-11/1200		Received By/Stored In L.D. Wall & D. Wall		Date/Time 4/25/11 1200								
Relinquished By/Removed From L.D. Wall & D. Wall		Date/Time 4/25/11 1400		Received By/Stored In FEDEX		Date/Time								
Relinquished By/Removed From FEDEX		Date/Time		Received By/Stored In Sam Hosi		Date/Time 4/27/11 11:57								
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time								
LABORATORY SECTION		Received By		Title				Date/Time						
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By				Date/Time						

FW: 309 Core Samples add-ons

Kessner, Joan H [jhkessne@wch-rcc.com]

Sent: Wednesday, May 04, 2011 11:10 AM

To: Joe Verville; Laura Bralts; Joshua Gutierrez

Importance: High

Hi--

We need to add some stuff per Mike's note below.

Thanks,
Joan

PS Total Rad Sr has already been added to J1HH93 on 5/2) - good luck!!

From: Stankovich, Michael T
Sent: Wednesday, May 04, 2011 8:37 AM
To: Kessner, Joan H
Subject: 309 Core Samples
Importance: High

Joan,

Waste management has asked that three analyses be added to these samples, Pu-241, Ni-63 and Total Strontium.

The samples numbers are J1HKF9 (**being shipped today**), J1HH93 (**K3305**), & J1HK82 (**K3339**).

Michael T. Stankovich

300/400 Area D4 Project Analytical Lead

300/3760/101B

300 Area D4 Characterization

509.430.7142

mtstanko@wch-rcc.com



RICHMOND, CA LABORATORY

SAMPLE RECEIPT CHECKLIST

Client: W.C Hanford City Richland State WA

Date/Time received 04/27/11 CoC No. RC-040-620

Container I.D. No. GWS-197 Requested TAT (Days) _____ 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 other 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 _____ Preservative _____
13. Describe any anomalies:

14. Was P.M. notified of any anomalies? Yes [] No [] Date _____
15. Inspected by Santana Date: 04/27/11 Time: 11:40

Customer Sample No.	Beta/Gamma cpm	Ion Chamber mR/hr	Wipe	Customer Sample No.	Beta/Gamma cpm	Ion Chamber mR/hr	wipe
<u>all sample</u>	<u>15 K</u>						

Ion Chamber Ser. No. _____ Calibration date _____
 Alpha Meter Ser. No. _____ Calibration date _____
 Beta/Gamma Meter Ser. No. 100482 Calibration date 24 Sep 2010