

SAF-RC-041
300 Area D4 Waste Characterization
Sampling - Water
FINAL DATA PACKAGE

COMPLETE COPY OF DATA PACKAGE TO:

No Distribution Required

KW 7/27/11
INITIAL/DATE

COMMENTS:

SDG K3453

SAF-RC-041

Rad only

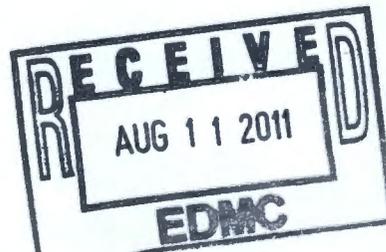
Chem only

Rad & Chem

Complete

Partial

Sample Location/Waste Site: 320 Sumps Poly Tank





EBERLINE SERVICES

EBERLINE ANALYTICAL CORPORATION

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July 22, 2011

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

Reference: **P.O. #S00W235A00**
Eberline Analytical S1-07-027-7733, SDG K3453



Dear Ms. Kessner:

Enclosed is the data report for one water sample designated under SAF No. RC-041. The sample was received at Eberline Analytical on July 8, 2011. The sample was analyzed according to the accompanying chain-of-custody document.

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 K3453 was composed of one water sample designated under SAF No. RC-041 with a Project Designation of: 300 Area D4 Waste Characterization Sampling – Water.

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 July 22, 2011.

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 Isotopic Thorium Analysis

No problems were encountered during the course of the analyses.

2.6 Isotopic Uranium Analysis

No problems were encountered during the course of the analyses.

2.7 Plutonium-241 Analysis

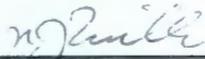
In order to obtain results for Pu-241 initial separation chemistry was performed to purify Pu from the sample. The final solution from the Pu chemistry was split; half the solution was electroplated for alpha counting and yield determination, and the other half was used to prepare the beta Pu-241 planchet. As a consequence of splitting the purified Pu solution, the apparent tracer yields are low and the resultant MDA's are greater than the RDL. No other problems were encountered during the course of the analyses.

2.8 Americium-241 Analysis

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 Manager

7/22/11

Date

EBERLINE ANALYTICAL / RICHMOND
SAMPLE DELIVERY GROUP K3453

SDG 7733
Contact N. Joseph Verville

Client Hanford
Contract No. S00W235A00
Case no SDG_K3453

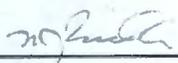
S U M M A R Y D A T A S E C T I O N

T A B L E O F C O N T E N T S

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Prepared by



Reviewed by

Lab id EBRLNE
Protocol RC-041
Version Ver 1.0
Form DVD-TOC
Version 3.06
Report date 07/22/11

EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3453

SDG 7733
Contact N. Joseph Verville

REPORT GUIDE

Client Hanford
Contract No. S00W235A00
Case no SDG_K3453

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-041
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EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3453

SDG 7733
Contact N. Joseph Verville

GUIDE, cont.

Client Hanford
Contract No. S00W235A00
Case no SDG_K3453

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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SUMMARY DATA SECTION

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Lab id EBRLNE
Protocol RC-041
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EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3453

LAB SAMPLE SUMMARY

SDG 7733
 Contact N. Joseph Verville

Client Hanford
 Contract No. S00W235A00
 Case no SDG K3453

LAB SAMPLE ID	CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	SAF NO	CHAIN OF CUSTODY	COLLECTED
S107027-01	J1K420	320 Sumps Poly Tank	WATER		RC-041	RC-041-045	07/05/11 09:50
S107027-02	Lab Control Sample		WATER		RC-041		
S107027-03	Method Blank		WATER		RC-041		
S107027-04	Duplicate (S107027-01)	320 Sumps Poly Tank	WATER		RC-041		07/05/11 09:50
S107027-05	Spike (S107027-01)	320 Sumps Poly Tank	WATER		RC-041		07/05/11 09:50

LAB SUMMARY

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SUMMARY DATA SECTION

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Lab id EBRLNE
 Protocol RC-041
 Version Ver 1.0
 Form DVD-LS
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EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3453

SDG 7733
 Contact N. Joseph Verville

Client Hanford
 Contract No. S00W235A00
 Case no SDG K3453

QC SUMMARY

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
7733	RC-041-045	J1K420	WATER		8.0 L		07/08/11 3	S107027-01		7733-001
		Method Blank	WATER					S107027-03		7733-003
		Lab Control Sample	WATER					S107027-02		7733-002
		Duplicate (S107027-01)	WATER		8.0 L		07/08/11 3	S107027-04		7733-004
		Spike (S107027-01)	WATER		8.0 L		07/08/11 3	S107027-05		7733-005

QC SUMMARY

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SUMMARY DATA SECTION

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Lab id EBRLNE
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EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3453

SDG 7733
 Contact N.Joseph Verville

PREP BATCH SUMMARY

Client Hanford
 Contract No. S00W235A00
 Case no SDG K3453

TEST	MATRIX	METHOD	PREPARATION ERROR				PLANCHETS ANALYZED				QUALI- FIERS
			BATCH	2σ %	CLIENT	MORE	RE	BLANK	LCS	DUP/ORIG	
Alpha Spectroscopy											
AM	WATER	Americium 241 in Liquid	7296-117	8.0	1			1	1	1/1	
TH	WATER	Thorium, Isotopic in Water	7296-117	8.0	1			1	1	1/1	
U	WATER	Uranium in Liquid	7296-117	8.0	1			1	1	1/1	
Beta Counting											
SR	WATER	Total Strontium in Water	7296-117	10.4	1			1	1	1/1	
Liquid Scintillation Counting											
C	WATER	Carbon 14 in Water	7296-117	10.0	1			1	1	1/1	1/1 X
H	WATER	Tritium in Water	7296-117	10.0	1			1	1	1/1	1/1 X
NI_L	WATER	Nickel-63 in Liquid	7296-117	11.2	1			1	1	1/1	
PU_L	WATER	Plutonium 241 in Water	7296-117	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 K3453

SDG 7733
 Contact N. Joseph Verville

Client Hanford
 Contract No. S00W235A00
 Case no SDG K3453

LAB WORK SUMMARY

LAB SAMPLE	CLIENT SAMPLE ID									
COLLECTED	LOCATION	MATRIX	SUF-							
RECEIVED	CUSTODY	SAF No	PLANCHET	TEST	FIX	ANALYZED	REVIEWED	BY	METHOD	
S107027-01	J1K420		7733-001	AM		07/21/11	07/21/11	BW	Americium 241 in Liquid	
07/05/11	320 Sumps Poly Tank	WATER	7733-001	C		07/14/11	07/18/11	BW	Carbon 14 in Water	
07/08/11	RC-041-045	RC-041	7733-001	H		07/15/11	07/19/11	BW	Tritium in Water	
			7733-001	NI_L		07/18/11	07/20/11	KWP	Nickel-63 in Liquid	
			7733-001	PU_L		07/21/11	07/22/11	KWP	Plutonium 241 in Water	
			7733-001	SR		07/14/11	07/22/11	MWT	Total Strontium in Water	
			7733-001	TH		07/19/11	07/22/11	KWP	Thorium, Isotopic in Water	
			7733-001	U		07/21/11	07/21/11	BW	Uranium in Liquid	
S107027-02	Lab Control Sample		7733-002	AM		07/21/11	07/21/11	BW	Americium 241 in Liquid	
		WATER	7733-002	C		07/14/11	07/18/11	BW	Carbon 14 in Water	
		RC-041	7733-002	H		07/15/11	07/19/11	BW	Tritium in Water	
			7733-002	NI_L		07/18/11	07/20/11	KWP	Nickel-63 in Liquid	
			7733-002	PU_L		07/21/11	07/22/11	KWP	Plutonium 241 in Water	
			7733-002	SR		07/14/11	07/22/11	MWT	Total Strontium in Water	
			7733-002	TH		07/18/11	07/22/11	KWP	Thorium, Isotopic in Water	
			7733-002	U		07/21/11	07/21/11	BW	Uranium in Liquid	
S107027-03	Method Blank		7733-003	AM		07/21/11	07/21/11	BW	Americium 241 in Liquid	
		WATER	7733-003	C		07/14/11	07/18/11	BW	Carbon 14 in Water	
		RC-041	7733-003	H		07/15/11	07/19/11	BW	Tritium in Water	
			7733-003	NI_L		07/18/11	07/20/11	KWP	Nickel-63 in Liquid	
			7733-003	PU_L		07/21/11	07/22/11	KWP	Plutonium 241 in Water	
			7733-003	SR		07/14/11	07/22/11	MWT	Total Strontium in Water	
			7733-003	TH		07/19/11	07/22/11	KWP	Thorium, Isotopic in Water	
			7733-003	U		07/21/11	07/21/11	BW	Uranium in Liquid	
S107027-04	Duplicate (S107027-01)		7733-004	AM		07/21/11	07/21/11	BW	Americium 241 in Liquid	
07/05/11	320 Sumps Poly Tank	WATER	7733-004	C		07/14/11	07/18/11	BW	Carbon 14 in Water	
07/08/11	RC-041		7733-004	H		07/15/11	07/19/11	BW	Tritium in Water	
			7733-004	NI_L		07/18/11	07/20/11	KWP	Nickel-63 in Liquid	
			7733-004	PU_L		07/21/11	07/22/11	KWP	Plutonium 241 in Water	
			7733-004	SR		07/14/11	07/22/11	MWT	Total Strontium in Water	
			7733-004	TH		07/20/11	07/22/11	KWP	Thorium, Isotopic in Water	
			7733-004	U		07/21/11	07/21/11	BW	Uranium in Liquid	
S107027-05	Spike (S107027-01)		7733-005	C		07/14/11	07/18/11	BW	Carbon 14 in Water	
07/05/11	320 Sumps Poly Tank	WATER	7733-005	H		07/15/11	07/19/11	BW	Tritium in Water	
07/08/11	RC-041									

Lab id EBRLNE
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EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3453

WORK SUMMARY, cont.

SDG 7733
 Contact N. Joseph Verville

Client Hanford
 Contract No. S00W235A00
 Case no SDG K3453

COUNTS OF TESTS BY SAMPLE TYPE

TEST	SAF No	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP	SPIKE	TOTAL
AM	RC-041	Americium 241 in Liquid	AMCMISO_IE_PLATE_AEA	1			1	1	1		4
C	RC-041	Carbon 14 in Water	C14_CHEM_LSC	1			1	1	1	1	5
H	RC-041	Tritium in Water	906.0_H3_LSC	1			1	1	1	1	5
NI_L	RC-041	Nickel-63 in Liquid	NI63_LSC	1			1	1	1		4
PU_L	RC-041	Plutonium 241 in Water	PU241_IE_LSC	1			1	1	1		4
SR	RC-041	Total Strontium in Water	SRTOT_SEP_PRECIP_GPC	1			1	1	1		4
TH	RC-041	Thorium, Isotopic in Water	THISO_IE_PLATE_AEA	1			1	1	1		4
U	RC-041	Uranium in Liquid	UIISO_PLATE_AEA	1			1	1	1		4
TOTALS				8			8	8	8	2	34

WORK SUMMARY

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EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3453

7733-003

Method Blank

METHOD BLANK

SDG <u>7733</u>	Client/Case no <u>Hanford</u>	<u>SDG K3453</u>
Contact <u>N.Joseph Verville</u>	Contract No. <u>S00W235A00</u>	
Lab sample id <u>S107027-03</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7733-003</u>	Material/Matrix <u>WATER</u>	
	SAF No <u>RC-041</u>	

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALIFIERS	TEST
Tritium	10028-17-8	-26.8	94	161	400	U	H
Carbon 14	14762-75-5	-42.4	45	78.2	200	U	C
Nickel 63	13981-37-8	-2.23	2.3	4.04	15.0	U	NI_L
Total Strontium	SR-RAD	0.122	0.37	0.732	1.00	U	SR
Americium 241	14596-10-2	-0.029	0.12	0.318	1.00	U	AM
Thorium 228	14274-82-9	0.117	0.16	0.298	1.00	U	TH
Thorium 230	14269-63-7	0.039	0.23	0.558	1.00	U	TH
Thorium 232	TH-232	0.039	0.078	0.296	1.00	U	TH
Uranium 233/234	U-233/234	-0.033	0.065	0.250	1.00	U	U
Uranium 235	15117-96-1	0.040	0.079	0.302	1.00	U	U
Uranium 238	U-238	0	0.065	0.250	1.00	U	U
Plutonium 241	14119-32-5	6.14	11	<u>18.9</u>	15.0	U	PU_L

QC-BLANK #79059

Lab id <u>EBRLNE</u>
Protocol <u>RC-041</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>07/22/11</u>

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3453

7733-002

Lab Control Sample

LAB CONTROL SAMPLE

SDG <u>7733</u> Contact <u>N.Joseph Verville</u> Lab sample id <u>S107027-02</u> Dept sample id <u>7733-002</u>	Client/Case no <u>Hanford</u> <u>SDG K3453</u> Contract No. <u>S00W235A00</u> Client sample id <u>Lab Control Sample</u> Material/Matrix <u>WATER</u> SAF No <u>RC-041</u>
--	--

ANALYTE	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS TEST	ADDED pCi/L	2σ ERR pCi/L	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Tritium	2440	160	161	400	H	2540	100	96	82-118	80-120
Carbon 14	14600	200	79.4	200	C	14400	580	101	84-116	80-120
Nickel 63	238	7.0	3.86	15.0	NI_L	270	11	88	84-116	80-120
Total Strontium	18.2	1.1	0.510	1.00	SR	17.3	0.69	105	80-120	80-120
Americium 241	15.0	1.6	0.304	1.00	AM	15.2	0.61	99	79-121	80-120
Thorium 230	13.4	0.62	0.148	1.00	TH	14.2	0.57	94	86-114	80-120
Uranium 233/234	14.5	1.8	0.344	1.00	U	13.4	0.54	108	75-125	80-120
Uranium 238	13.7	1.7	0.298	1.00	U	13.4	0.54	102	77-123	80-120
Plutonium 241	327	18	<u>21.2</u>	15.0	PU_L	392	16	83	82-118	80-120

QC-LCS #79058

EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3453

7733-004

J1K420

DUPLICATE

SDG <u>7733</u> Contact <u>N.Joseph Verville</u> Duplicates Lab sample id <u>S107027-04</u> Dept sample id <u>7733-004</u>	Client/Case no <u>Hanford</u> SDG <u>K3453</u> Contract No. <u>S00W235A00</u> ORIGINAL Lab sample id <u>S107027-01</u> Dept sample id <u>7733-001</u> Received <u>07/08/11</u>	Client sample id <u>J1K420</u> Location/Matrix <u>320 Sumps Poly Tank</u> <u>WATER</u> Collected/Volume <u>07/05/11 09:50</u> <u>8.0 L</u> Custody/SAF No <u>RC-041-045</u> <u>RC-041</u>
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ANALYTE	DUPLICATE		MDA		RDL		QUALI-		ORIGINAL		MDA		QUALI-		3σ	DER
	pCi/L	2σ ERR (COUNT)	pCi/L	pCi/L	pCi/L	FIERS	TEST	pCi/L	2σ ERR (COUNT)	pCi/L	FIERS	RPD %	TOT	σ		
Tritium	17.1	94	159	400	U	H	4.62	93	157	U	-	-	0.2			
Carbon 14	-18.2	30	50.7	200	U	C	-3.06	31	52.4	U	-	-	0.7			
Nickel 63	<u>-3.23</u>	2.2	3.90	15.0	U	NI_L	-2.00	2.1	3.78	U	-	-	0.8			
Total Strontium	-0.067	0.37	0.753	1.00	U	SR	-0.113	0.33	0.685	U	-	-	0.2			
Americium 241	0.059	0.12	0.284	1.00	U	AM	0.082	0.17	0.304	U	-	-	0.2			
Thorium 228	0	0.087	0.209	1.00	U	TH	0.158	0.12	0.152		200	282	2.1			
Thorium 230	0.305	0.26	0.401	1.00	U	TH	-0.178	0.16	0.377	U	-	-	<u>3.2</u>			
Thorium 232	0	0.044	0.166	1.00	U	TH	0	0.039	0.151	U	-	-	0			
Uranium 233/234	0.122	0.12	0.233	1.00	U	U	0	0.067	0.258	U	-	-	1.8			
Uranium 235	0	0.074	0.282	1.00	U	U	0	0.082	0.312	U	-	-	0			
Uranium 238	0	0.061	0.233	1.00	U	U	0	0.067	0.258	U	-	-	0			
Plutonium 241	-4.06	14	<u>23.8</u>	15.0	U	PU_L	-8.08	13	<u>22.0</u>	U	-	-	0.4			

QC-DUP#1 79060

300 Area D4 Waste Characterization Sampling - Water

Lab id EBRLNE
 Protocol RC-041
 Version Ver 1.0
 Form DVD-DUP
 Version 3.06
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EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3453

7733-005

J1K420

MATRIX SPIKE

SDG <u>7733</u> Contact <u>N.Joseph Verville</u> Lab sample id <u>S107027-05</u> Dept sample id <u>7733-005</u>	ORIGINAL Lab sample id <u>S107027-01</u> Dept sample id <u>7733-001</u> Received <u>07/08/11</u>	Client/Case no <u>Hanford</u> SDG <u>K3453</u> Contract No. <u>S00W235A00</u> Client sample id <u>J1K420</u> Location/Matrix <u>320 Sumps Poly Tank</u> <u>WATER</u> Collected/Volume <u>07/05/11 09:50</u> <u>8.0 L</u> Custody/SAF No <u>RC-041-045</u> <u>RC-041</u>
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ANALYTE	SPIKE	2σ ERR	MDA	RDL	QUALI-	ADDED	2σ ERR	ORIGINAL	2σ ERR	REC 3σ	LMTS	PROTOCOL
	pCi/L	(COUNT)	pCi/L	pCi/L	FIERS TEST	pCi/L	pCi/L	pCi/L	(COUNT)	% (TOTAL)	LIMITS	
Tritium	25700	420	164	400	X H	26400	1100	4.62	93	97	84-116	80-120
Carbon 14	12000	180	77.5	200	X C	12000	480	-3.06	31	100	84-116	80-120

QC-MS#1 79061

300 Area D4 Waste Characterization Sampling - Water

MATRIX SPIKES

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EBERLINE ANALYTICAL / RICHMOND
SAMPLE DELIVERY GROUP K3453

7733-001

J1K420

DATA SHEET

SDG <u>7733</u>	Client/Case no <u>Hanford</u>	SDG <u>K3453</u>
Contact <u>N. Joseph Verville</u>	Contract No. <u>S00W235A00</u>	
Lab sample id <u>S107027-01</u>	Client sample id <u>J1K420</u>	
Dept sample id <u>7733-001</u>	Location/Matrix <u>320 Sumps Poly Tank</u>	<u>WATER</u>
Received <u>07/08/11</u>	Collected/Volume <u>07/05/11 09:50</u>	<u>8.0 L</u>
	Custody/SAF No <u>RC-041-045</u>	<u>RC-041</u>

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Tritium	10028-17-8	4.62	93	157	400	U	H
Carbon 14	14762-75-5	-3.06	31	52.4	200	U	C
Nickel 63	13981-37-8	-2.00	2.1	3.78	15.0	U	NI_L
Total Strontium	SR-RAD	-0.113	0.33	0.685	1.00	U	SR
Americium 241	14596-10-2	0.082	0.17	0.304	1.00	U	AM
Thorium 228	14274-82-9	0.158	0.12	0.152	1.00		TH
Thorium 230	14269-63-7	<u>-0.178</u>	0.16	0.377	1.00	U	TH
Thorium 232	TH-232	0	0.039	0.151	1.00	U	TH
Uranium 233/234	U-233/234	0	0.067	0.258	1.00	U	U
Uranium 235	15117-96-1	0	0.082	0.312	1.00	U	U
Uranium 238	U-238	0	0.067	0.258	1.00	U	U
Plutonium 241	14119-32-5	-8.08	13	<u>22.0</u>	15.0	U	PU_L

300 Area D4 Waste Characterization Sampling - Water

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EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3453

Test AM Matrix WATER
 SDG 7733
 Contact N.Joseph Verville

Client Hanford
 Contract No. S00W235A00
 Contract SDG K3453

LAB METHOD SUMMARY

AMERICIUM 241 IN LIQUID
 ALPHA SPECTROSCOPY

RESULTS

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

Preparation batch 7296-117

S107027-01	7733-001	J1K420	U
S107027-02	7733-002	Lab Control Sample	ok
S107027-03	7733-003	Method Blank	U
S107027-04	7733-004	Duplicate (S107027-01)	- U

Nominal values and limits from method RDLs (pCi/L) 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/L	L	FAC	TION	%	%	min	keV	KeV	HELD PREPARED	YZED	DETECTOR

Preparation batch 7296-117 2σ prep error 8.0 % Reference Lab Notebook 7296 pg. 117

S107027-01	J1K420	0.304	0.400	90	137	16	07/21/11	07/21	SS-051
S107027-02	Lab Control Sample	0.304	0.400	86	137	07/21/11	07/21	SS-052	
S107027-03	Method Blank	0.318	0.400	88	137	07/21/11	07/21	SS-053	
S107027-04	Duplicate (S107027-01)	0.284	0.400	87	138	16	07/21/11	07/21	SS-054

Nominal values and limits from method 1.00 0.400 30-110 50 100 180

PROCEDURES	REFERENCE	AMCMISO_IE_PLATE_AEA
SPP-040	Environmental Water Dissolution, rev 2	
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>0.302</u> ± <u>0.028</u>
FOR 4 SAMPLES	YIELD <u>88</u> ± <u>3</u>

METHOD SUMMARIES

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EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3453

LAB METHOD SUMMARY

THORIUM, ISOTOPIC IN WATER

ALPHA SPECTROSCOPY

Test TH Matrix WATER
 SDG 7733
 Contact N. Joseph Verville

Client Hanford
 Contract No. S00W235A00
 Contract SDG K3453

RESULTS

LAB	RAW	SUF-								
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID	Thorium 228	Thorium 230	Thorium 232				
Preparation batch 7296-117										
S107027-01		7733-001	J1K420	0.158	U	U				
S107027-02		7733-002	Lab Control Sample		ok					
S107027-03		7733-003	Method Blank	U	U	U				
S107027-04		7733-004	Duplicate (S107027-01)	ok	U	<u>OUT</u>	U	-	U	
Nominal values and limits from method				RDLs (pCi/L)	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/L	L	FAC	TION	%	%	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR
Preparation batch 7296-117 2σ prep error 8.0 % Reference Lab Notebook 7296 pg. 117																
S107027-01		J1K420		0.377	0.400			97		151			14	07/18/11	07/19	SS-002
S107027-02		Lab Control Sample		0.148	0.400			78		1057				07/18/11	07/18	SS-061
S107027-03		Method Blank		0.558	0.400			52		152				07/18/11	07/19	SS-013
S107027-04		Duplicate (S107027-01)		0.401	0.400			90		188			15	07/18/11	07/20	SS-033
Nominal values and limits from method				1.00	0.400			30-110		150	100		180			

PROCEDURES REFERENCE THISO_IE_PLATE_AEA
 SPP-062 Sample Aliquoting, rev 1
 SPP-040 Environmental Water Dissolution, rev 2
 CP-900 Thorium in Water and Dissolved Solid Samples by
 Extraction Chromatography, rev 5
 CP-008 Heavy Element Electroplating, rev 13

AVERAGES ± 2 SD MDA 0.371 ± 0.338
 FOR 4 SAMPLES YIELD 79 ± 40

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EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3453

Test U Matrix WATER
 SDG 7733
 Contact N.Joseph Verville

Client Hanford
 Contract No. S00W235A00
 Contract SDG K3453

LAB METHOD SUMMARY

URANIUM IN LIQUID
 ALPHA SPECTROSCOPY

RESULTS

LAB SAMPLE ID	RAW TEST	SUF- FIX	PLANCHET	CLIENT SAMPLE ID	1: Uranium	2: Uranium	3: Uranium	RESULT RATIOS (%)					
					233/234	235	238	1+3	2σ	2+3	2σ		
Preparation batch 7296-117													
S107027-01			7733-001	J1K420	U	U	U						
S107027-02			7733-002	Lab Control Sample	ok		ok						
S107027-03			7733-003	Method Blank	U	U	U						
S107027-04			7733-004	Duplicate (S107027-01)	- U	- U	- U						
Nominal values and limits from method				RDLs (pCi/L)	1.00	1.00	1.00	Averages					

METHOD PERFORMANCE

LAB SAMPLE ID	RAW TEST	SUF- FIX	CLIENT SAMPLE ID	MAX MDA	ALIQ	PREP	DILU-	YIELD	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-		
				pCi/L	L	FAC	TION	%	%	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR
Preparation batch 7296-117				2σ prep error 8.0 %		Reference Lab Notebook 7296 pg. 117										
S107027-01			J1K420	0.312	0.400			83		100		16	07/21/11	07/21	SS-047	
S107027-02			Lab Control Sample	0.344	0.400			90		100			07/21/11	07/21	SS-048	
S107027-03			Method Blank	0.302	0.400			88		101			07/21/11	07/21	SS-049	
S107027-04			Duplicate (S107027-01)	0.282	0.400			95		101		16	07/21/11	07/21	SS-050	
Nominal values and limits from method				1.00	0.400			30-110		100		180				

PROCEDURES	REFERENCE	UIISO_PLATE_AEA
SPP-040	Environmental Water Dissolution, rev 2	
CP-921	Uranium in Water and Dissolved Samples by Extraction Chromatography, rev 5	
CP-008	Heavy Element Electroplating, rev 13	

AVERAGES ± 2 SD	MDA <u>0.310</u> ± <u>0.052</u>
FOR 4 SAMPLES	YIELD <u>89</u> ± <u>10</u>

METHOD SUMMARIES

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EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3453

LAB METHOD SUMMARY

TOTAL STRONTIUM IN WATER

BETA COUNTING

Test SR Matrix WATER
 SDG 7733
 Contact N. Joseph Verville

Client Hanford
 Contract No. S00W235A00
 Contract SDG K3453

RESULTS

LAB	RAW	SUF-		Total
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID	Strontium
Preparation batch 7296-117				
S107027-01		7733-001	J1K420	U
S107027-02		7733-002	Lab Control Sample	ok
S107027-03		7733-003	Method Blank	U
S107027-04		7733-004	Duplicate (S107027-01)	- U

Nominal values and limits from method RDLs (pCi/L) 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/L	L	FAC	TION	%	%	min	keV	KeV	HELD PREPARED	YZED DETECTOR
Preparation batch 7296-117 2σ prep error 10.4 % Reference Lab Notebook 7296 pg. 117													
S107027-01		J1K420	0.685	0.500			88		100			9 07/14/11 07/14	GRB-227
S107027-02		Lab Control Sample	0.510	0.500			92		100			07/14/11 07/14	GRB-202
S107027-03		Method Blank	0.732	0.500			81		100			07/14/11 07/14	GRB-230
S107027-04		Duplicate (S107027-01)	0.753	0.500			84		100			9 07/14/11 07/14	GRB-231

Nominal values and limits from method 1.00 0.500 40-110 100 180

PROCEDURES REFERENCE SRTOT_SEP_PRECIP_GPC
 SPP-062 Sample Aliquoting, rev 1
 CP-380 Strontium in Water Samples, rev 5

AVERAGES ± 2 SD MDA 0.670 ± 0.221
 FOR 4 SAMPLES YIELD 86 ± 10

METHOD SUMMARIES

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EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3453

LAB METHOD SUMMARY

CARBON 14 IN WATER

LIQUID SCINTILLATION COUNTING

Test C Matrix WATER
 SDG 7733
 Contact N. Joseph Verville

Client Hanford
 Contract No. S00W235A00
 Contract SDG K3453

RESULTS

LAB	RAW	SUF-		
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID	Carbon 14
Preparation batch 7296-117				
S107027-01		7733-001	J1K420	U
S107027-02		7733-002	Lab Control Sample	ok
S107027-03		7733-003	Method Blank	U
S107027-04		7733-004	Duplicate (S107027-01)	- U
S107027-05		7733-005	Spike (S107027-01)	ok X

Nominal values and limits from method RDLs (pCi/L) 200

METHOD PERFORMANCE

LAB	RAW	SUF-	MDA	ALIQ	PREP	DILU-	YIELD	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-		
SAMPLE ID	TEST FIX	CLIENT SAMPLE ID	pCi/L	L	FAC	TION	%	%	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR
Preparation batch 7296-117			2σ prep error 10.0 %		Reference Lab Notebook 7296 pg. 117										
S107027-01		J1K420	52.4	0.0300			100		50			9	07/14/11	07/14	LSC-004
S107027-02		Lab Control Sample	79.4	0.0200			100		50				07/14/11	07/14	LSC-004
S107027-03		Method Blank	78.2	0.0200			100		50				07/14/11	07/14	LSC-004
S107027-04		Duplicate (S107027-01)	50.7	0.0300			100		50			9	07/14/11	07/14	LSC-004
S107027-05		Spike (S107027-01)	77.5	0.0200			100		50			9	07/14/11	07/14	LSC-004

Nominal values and limits from method MDA 200 0.0200 50 180

PROCEDURES REFERENCE C14_CHEM_LSC
 CP-241 Carbon-14 in Aqueous Samples, rev 8

AVERAGES ± 2 SD MDA 67.6 ± 29.4
 FOR 5 SAMPLES YIELD 100 ± 0

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EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3453

LAB METHOD SUMMARY

TRITIUM IN WATER

LIQUID SCINTILLATION COUNTING

Test H Matrix WATER
 SDG 7733
 Contact N. Joseph Verville

Client Hanford
 Contract No. S00W235A00
 Contract SDG K3453

RESULTS

LAB	RAW	SUF-		
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID	Tritium
Preparation batch 7296-117				
S107027-01		7733-001	J1K420	U
S107027-02		7733-002	Lab Control Sample	ok
S107027-03		7733-003	Method Blank	U
S107027-04		7733-004	Duplicate (S107027-01)	- U
S107027-05		7733-005	Spike (S107027-01)	ok X

Nominal values and limits from method RDLs (pCi/L) 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/L	L	FAC	TION	%	%	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR
Preparation batch 7296-117			2σ prep error 10.0 %		Reference Lab Notebook 7296 pg. 117										
S107027-01		J1K420	157	0.0100			100		150			10	07/14/11	07/15	LSC-004
S107027-02		Lab Control Sample	161	0.100			10		150				07/14/11	07/15	LSC-004
S107027-03		Method Blank	161	0.100			10		150				07/14/11	07/15	LSC-004
S107027-04		Duplicate (S107027-01)	159	0.0100			100		150			10	07/14/11	07/15	LSC-004
S107027-05		Spike (S107027-01)	164	0.0250			40		150			10	07/14/11	07/15	LSC-004

Nominal values and limits from method 400 0.0100 25 180

PROCEDURES REFERENCE 906.0_H3_LSC
 CP-210 Tritium in Water Samples by Distillation, rev 11

AVERAGES ± 2 SD MDA 160 ± 5.22
 FOR 5 SAMPLES YIELD 52 ± 91

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EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3453

LAB METHOD SUMMARY

NICKEL-63 IN LIQUID

LIQUID SCINTILLATION COUNTING

Test NI L Matrix WATER
 SDG 7733
 Contact N.Joseph Verville

Client Hanford
 Contract No. S00W235A00
 Contract SDG K3453

RESULTS

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

Preparation batch 7296-117

S107027-01	7733-001	J1K420	U
S107027-02	7733-002	Lab Control Sample	ok
S107027-03	7733-003	Method Blank	U
S107027-04	7733-004	Duplicate (S107027-01)	- U

Nominal values and limits from method RDLs (pCi/L) 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/L	L	FAC	TION	%	%	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR

Preparation batch 7296-117 2σ prep error 11.2 % Reference Lab Notebook 7296 pg. 117

S107027-01	J1K420	3.78	0.400	103	50	13	07/18/11	07/18	LSC-005
S107027-02	Lab Control Sample	3.86	0.400	101	50	07/18/11	07/18	LSC-005	
S107027-03	Method Blank	4.04	0.400	96	50	07/18/11	07/18	LSC-005	
S107027-04	Duplicate (S107027-01)	3.90	0.400	99	50	13	07/18/11	07/18	LSC-005

Nominal values and limits from method 15.0 0.400 40-110 50 180

PROCEDURES	REFERENCE	NI63_LSC
	SPP-040	Environmental Water Dissolution, rev 2
	CP-281	Nickel-63 Purification By Extraction Chromatography, rev 5

AVERAGES ± 2 SD	MDA	<u>3.90</u> ± <u>0.218</u>
FOR 4 SAMPLES	YIELD	<u>100</u> ± <u>6</u>

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EBERLINE ANALYTICAL/RICHMOND

SAMPLE DELIVERY GROUP K3453

LAB METHOD SUMMARY

PLUTONIUM 241 IN WATER

LIQUID SCINTILLATION COUNTING

Test PU L Matrix WATER
SDG 7733
Contact N.Joseph Verville

Client Hanford
Contract No. S00W235A00
Contract SDG K3453

RESULTS

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

Preparation batch 7296-117

S107027-01		7733-001	J1K420	U
S107027-02		7733-002	Lab Control Sample	ok
S107027-03		7733-003	Method Blank	U
S107027-04		7733-004	Duplicate (S107027-01)	- U

Nominal values and limits from method RDLs (pCi/L) 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/L	L	FAC	TION	%	%	min	keV	KeV	HELD PREPARED	YZED DETECTOR

Preparation batch 7296-117 2σ prep error 12.4 % Reference Lab Notebook 7296 pg. 117

S107027-01		J1K420	<u>22.0</u>	0.400			30	100				16	07/20/11 07/21 LSC-004
S107027-02		Lab Control Sample	<u>21.2</u>	0.400			31	100				07/20/11 07/21 LSC-004	
S107027-03		Method Blank	<u>18.9</u>	0.400			34	100				07/20/11 07/21 LSC-004	
S107027-04		Duplicate (S107027-01)	<u>23.8</u>	0.400			<u>28</u>	100				16 07/20/11 07/21 LSC-004	

Nominal values and limits from method 15.0 0.400 30-110 100 180

PROCEDURES	REFERENCE	PU241_IE_LSC
	CP-941	Plutonium in Water and Dissolved Samples by Extraction Chromatography, rev 12
	CP-008	Heavy Element Electroplating, rev 13
	RP-948	Plutonium-241 by Liquid Scintillation Counting, rev 4

AVERAGES ± 2 SD	MDA <u>21.5</u> ± <u>4.06</u>
FOR 4 SAMPLES	YIELD <u>31</u> ± <u>5</u>

METHOD SUMMARIES

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EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3453

SDG 7733
Contact N. Joseph Verville

REPORT GUIDE

Client Hanford
Contract No. S00W235A00
Case no SDG K3453

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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EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3453

SDG 7733
Contact N.Joseph Verville

REPORT GUIDE

Client Hanford
Contract No. S00W235A00
Case no SDG K3453

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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EBERLINE ANALYTICAL / RICHMOND

SAMPLE DELIVERY GROUP K3453

SDG 7733
 Contact N. Joseph Verville

Client Hanford
 Contract No. S00W235A00
 Case no SDG K3453

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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 Protocol RC-041
 Version Ver 1.0
 Form DVD-RG
 Version 3.06
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REPORT GUIDE

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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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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- * 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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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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Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-041-045		Page 1 of 1	
Collector K Hulse		Company Contact Mike Stankovich		Telephone No. 509.430.7142		Project Coordinator KESSNER, JH		Price Code 7K	
Project Designation 300 Area D4 Waste Characterization Sampling - Water		Sampling Location 320 Sumps Poly Tank		K3453 (7733)		SAF No. RC-041		Data Turnaround <i>Sample 30-0</i> 7 15 Days	
Ice Chest No. 6WS-189-02		Field Logbook No. EL-1518-21		COA RD4MXX2F00		Method of Shipment Fedex			
Shipped To <u>EBERLINE SERVICES</u> / LIONVILLE		Offsite Property No. 2814		Bill of Lading/Air Bill No. 7949 4322 1931					

POSSIBLE SAMPLE HAZARDS/REMARKS <i>Lead, Chromium, Low Rad</i> Special Handling and/or Storage <i>Rad tie to SJVR6</i>	Preservation	HNO3 to pH ≤	None	HNO3 to pH ≤							
	Type of Container	G/P	<i>125 P</i>	G/P	G/P	G/P	G/P	G/P			
	No. of Container(s)	1	<i>125</i>	1	1	2	2	1			
	Volume	1000mL	<i>120mL</i>	1000mL	1000mL	1000mL	1000mL	1000mL	1000mL		

SAMPLE ANALYSIS											
Sample No.	Matrix *	Sample Date	Sample Time								
J1K420	WATER	7-5-11	0950	✓	✓	✓	✓	✓	✓	✓	

CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS				Matrix *
Relinquished By/Removed From <i>K. Hulse</i>		Date/Time 7/5/11 1100		Received By/Stored In <i>SSU-1</i>		Date/Time 7-5-11 1100		LOT # 1000 P - 035482 125 kg - 027722 <i>047474</i> <i>75# 7511</i>				S=Soil SE=Sediment SO=Solid SL=Sludge W = Water O=Oil A=Air DS=Drum Solids DL=Drum Liquid T=Tissue WI=Wipe L=Liquid V=Vegetation X=Other
Relinquished By/Removed From <i>SSU-1</i>		Date/Time JUL 06 2011 0730		Received By/Stored In <i>L.D. Wall</i>		Date/Time JUL 06 2011 0730						
Relinquished By/Removed From <i>L.D. Wall</i>		Date/Time JUL 06 2011 1400		Received By/Stored In <i>FEDEX</i>		Date/Time						
Relinquished By/Removed From <i>FEDEX</i>		Date/Time		Received By/Stored In <i>M. Le... [Signature]</i>		Date/Time 07/08/11 0915						
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time						
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



RICHMOND, CA LABORATORY

SAMPLE RECEIPT CHECKLIST

Client: W.C. HANFORD City MCHLAND State WA

Date/Time received 07/08/11 1000 CoC No. PC-041-045

Container I.D. No. GWS-189-02 Requested TAT (Days) 7 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 W
7. Number of containers per sample: 9 (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 < 7 / N/A Preservative #N03
13. Describe any anomalies:

14. Was P.M. notified of any anomalies? Yes [] No [] Date _____

15. Inspected by [Signature] Date: 07/08/11 Time: 1045

Customer Sample No.	Beta/Gamma com	Ion Chamber mR/hr	Wide	Customer Sample No.	Beta/Gamma com	Ion Chamber mR/hr	Wide
<u>111420</u>	<u>280</u>						

Ion Chamber Ser. No. _____ Calibration date _____
 Alpha Meter Ser. No. _____ Calibration date _____
 Beta/Gamma Meter Ser. No. 100482 Calibration date 24 SEP 10