



**EBERLINE**  
SERVICES

0066557

May 9, 2005

Mr. Steve Trent  
Fluor Hanford Inc.  
825 Jadwin Avenue  
Richland, WA 99352



Reference: P.O. #630  
Eberline Services R5-03-196-7260, SDG H3098

Dear Mr. Trent:

Enclosed is the data report for two solid samples designated under SAF No. F03-025 received at Eberline Services on March 25, 2005. The samples were analyzed according to the accompanying chain-of-custody documents.

Please call if you have any questions concerning this report.

Sincerely,

Melissa C. Mannion  
Senior Program Manager

MCM/

Enclosure: Data Package



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**1.0 GENERAL**

Fluor Hanford Inc. (FH) Sample Delivery Group H3098 was composed of two solid (soil) samples designated under SAF No. F03-025 with a Project Designation of: 200-LW-1/LW-2 Characterization – Soil.

The samples were received as stated on the Chain-of-Custody documents. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist.

**2.0 ANALYSIS NOTES**

**2.1 Tritium Analyses**

No problems were encountered during the course of the analyses.

**2.2 Carbon-14 Analyses**

No problems were encountered during the course of the analyses.

**2.3 Nickel-63 Analyses**

No problems were encountered during the course of the analyses.

**2.4 Total Strontium Analyses**

No problems were encountered during the course of the analyses.

**2.5 Technetium-99 Analyses**

No problems were encountered during the course of the analyses.

**2.6 Isotopic Thorium Analyses**

No problems were encountered during the course of the analyses.

**2.7 Neptunium-237 Analyses**

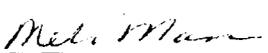
No problems were encountered during the course of the analyses.

**2.8 Gamma Spectroscopy**

No problems were encountered during the course of the analyses.

**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."

  
\_\_\_\_\_  
Melissa C. Mannion  
Senior Program Manager

  
\_\_\_\_\_  
Date

EBERLINE SERVICES / RICHMOND  
SAMPLE DELIVERY GROUP H3098

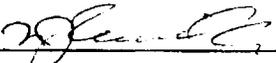
SDG 7260  
Contact Melissa C. Mannion

Client Hanford  
Contract No. 630  
Case no SDG\_H3098

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

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Prepared by 

Reviewed by 

Lab id EBRLNE  
Protocol Hanford  
Version Ver 1.0  
Form DVD-TOC  
Version 3.06  
Report date 05/06/05

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H3098

SDG 7260

Contact Melissa C. Mannion

REPORT GUIDE

Client Hanford

Contract No. 630

Case no SDG H3098

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

Page 1

Lab id EBRLNE

Protocol Hanford

Version Ver 1.0

Form DVD-RG

Version 3.06

Report date 05/06/05

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EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H3098

SDG 7260  
Contact Melissa C. Mannion

GUIDE, cont.

Client Hanford  
Contract No. 630  
Case no SDG H3098

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 Hanford  
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Form DVD-RG  
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**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3098

SDG 7260  
 Contact Melissa C. Mannion

**SAMPLE SUMMARY**

Client Hanford  
 Contract No. 630  
 Case no SDG H3098

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB SAMPLE ID	SAF NO	CHAIN OF CUSTODY	COLLECTED
B19432	216-Z-7; 197.5ft-200ft	SOLID		R503196-01	F03-025	F03-025-154	03/18/05 07:38
B19433	216-Z-7; 215ft-217.5ft	SOLID		R503196-02	F03-025	F03-025-155	03/18/05 08:30
Method Blank		SOLID		R503196-04	F03-025		
Method Blank		SOLID		R503196-08	F03-025		
Lab Control Sample		SOLID		R503196-03	F03-025		
Lab Control Sample		SOLID		R503196-07	F03-025		
Duplicate (R503196-02)	216-Z-7; 215ft-217.5ft	SOLID		R503196-05	F03-025		03/18/05 08:30
Duplicate (R503196-02)	216-Z-7; 215ft-217.5ft	SOLID		R503196-09	F03-025		03/18/05 08:30
Spike (R503196-02)	216-Z-7; 215ft-217.5ft	SOLID		R503196-06	F03-025		03/18/05 08:30

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 Report date 05/06/05

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**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3098

SDG 7260  
 Contact Melissa C. Mannion

**QC SUMMARY**

Client Hanford  
 Contract No. 630  
 Case no SDG H3098

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	SOLIDS	SAMPLE AMOUNT	BASIS AMOUNT	DAYS SINCE RECEIVED	LAB COLL SAMPLE ID	DEPARTMENT SAMPLE ID
7260	F03-025-154	B19432	SOLID	97.5	285.2 g		03/25/05 7	R503196-01	7260-001
	F03-025-155	B19433	SOLID	96.2	308 g		03/25/05 7	R503196-02	7260-002
		Method Blank	SOLID					R503196-04	7260-004
		Method Blank	SOLID					R503196-08	7260-008
		Lab Control Sample	SOLID					R503196-03	7260-003
		Lab Control Sample	SOLID					R503196-07	7260-007
		Duplicate (R503196-02)	SOLID	96.2	308 g		03/25/05 7	R503196-05	7260-005
		Duplicate (R503196-02)	SOLID	96.2	308 g		03/25/05 7	R503196-09	7260-009
		Spike (R503196-02)	SOLID	96.2	308 g		03/25/05 7	R503196-06	7260-006

QC SUMMARY

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**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3098

SDG 7260  
 Contact Melissa C. Mannion

**PREP BATCH SUMMARY**

Client Hanford  
 Contract No. 630  
 Case no SDG H3098

TEST	MATRIX	METHOD	PREPARATION ERROR		PLANCHETS ANALYZED			QUALI-		
			BATCH	2σ %	CLIENT	MORE	RE BLANK		LCS	DUP/ORIG
<b>Alpha Spectroscopy</b>										
NP	SOLID	Neptunium in Solids	7132-076	5.0	1		1	1	1/1	
TH	SOLID	Thorium, Isotopic in Solids	7132-076	5.0	2		1	1	1/1	
<b>Beta Counting</b>										
SR	SOLID	Total Strontium in Solids	7132-076	10.0	2		1	1	1/1	
TC	SOLID	Technetium 99 in Solids	7132-076	10.0	2		1	1	1/1	
<b>Gamma Spectroscopy</b>										
GAM	SOLID	Gamma Scan	7132-076	15.0	2		1	1	1/1	
<b>Liquid Scintillation Counting</b>										
C	SOLID	Carbon 14 in Solids	7132-076	10.0	2		1	1	1/1	
H	SOLID	Tritium in Solids	7132-076	10.0	2		1	1	1/1	1/1 X
NI_L	SOLID	Nickel 63 in Solids	7132-076	10.0	2		1	1	1/1	

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.  
 Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

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 Protocol Hanford  
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**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3098

SDG 7260  
Contact Melissa C. Mannion

Client Hanford  
Contract No. 630  
Case no SDG H3098

**WORK SUMMARY**

CLIENT SAMPLE ID		LAB SAMPLE ID		SOP-					
LOCATION	MATRIX	COLLECTED		TEST	FIX	ANALYZED	REVIEWED	BY	METHOD
CUSTODY	SAF No	RECEIVED	PLANCHET						
B19432		R503196-01	7260-001	C		04/28/05	05/06/05	MWT	Carbon 14 in Solids
216-Z-7; 197.5ft-200ft	SOLID	03/18/05	7260-001	GAM		04/07/05	04/20/05	MWT	Gamma Scan
F03-025-154	F03-025	03/25/05	7260-001	H		05/05/05	05/06/05	MWT	Tritium in Solids
			7260-001	NI_L		04/27/05	05/06/05	MWT	Nickel 63 in Solids
			7260-001	SR		04/18/05	04/21/05	MWT	Total Strontium in Solids
			7260-001	TC		05/03/05	05/06/05	MWT	Technetium 99 in Solids
			7260-001	TH		04/20/05	04/20/05	MWT	Thorium, Isotopic in Solids
B19433		R503196-02	7260-002	C		04/28/05	05/06/05	MWT	Carbon 14 in Solids
216-Z-7; 215ft-217.5ft	SOLID	03/18/05	7260-002	GAM		04/07/05	04/20/05	MWT	Gamma Scan
F03-025-155	F03-025	03/25/05	7260-002	H		05/05/05	05/06/05	MWT	Tritium in Solids
			7260-002	NI_L		04/27/05	05/06/05	MWT	Nickel 63 in Solids
			7260-002	NP		05/02/05	05/03/05	MWT	Neptunium in Solids
			7260-002	SR		04/18/05	04/21/05	MWT	Total Strontium in Solids
			7260-002	TC		05/03/05	05/06/05	MWT	Technetium 99 in Solids
			7260-002	TH		04/20/05	04/20/05	MWT	Thorium, Isotopic in Solids
Method Blank		R503196-04	7260-004	C		04/28/05	05/06/05	MWT	Carbon 14 in Solids
	SOLID		7260-004	GAM		04/07/05	04/20/05	MWT	Gamma Scan
	F03-025		7260-004	H		05/06/05	05/06/05	MWT	Tritium in Solids
			7260-004	NI_L		04/28/05	05/06/05	MWT	Nickel 63 in Solids
			7260-004	SR		04/18/05	04/21/05	MWT	Total Strontium in Solids
			7260-004	TC		05/03/05	05/06/05	MWT	Technetium 99 in Solids
			7260-004	TH		04/20/05	04/20/05	MWT	Thorium, Isotopic in Solids
Method Blank		R503196-08	7260-008	NP		04/30/05	05/03/05	MWT	Neptunium in Solids
	SOLID								
	F03-025								
Lab Control Sample		R503196-03	7260-003	C		04/28/05	05/06/05	MWT	Carbon 14 in Solids
	SOLID		7260-003	GAM		04/16/05	04/20/05	MWT	Gamma Scan
	F03-025		7260-003	H		05/06/05	05/06/05	MWT	Tritium in Solids
			7260-003	NI_L		04/28/05	05/06/05	MWT	Nickel 63 in Solids
			7260-003	SR		04/18/05	04/21/05	MWT	Total Strontium in Solids
			7260-003	TC		05/02/05	05/06/05	MWT	Technetium 99 in Solids
			7260-003	TH		04/20/05	04/20/05	MWT	Thorium, Isotopic in Solids

Lab id EBRLNE  
Protocol Hanford  
Version Ver 1.0  
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Report date 05/06/05

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**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3098

SDG 7260  
Contact Melissa C. Mannion

**WORK SUMMARY, cont.**

Client Hanford  
Contract No. 630  
Case no SDG H3098

CLIENT SAMPLE ID	MATRIX	LAB SAMPLE ID	COLLECTED	SUF-	ANALYZED	REVIEWED	BY	METHOD
LOCATION		RECEIVED	PLANCHET	TEST	FIX			
CUSTODY	SAF No							
Lab Control Sample		R503196-07	7260-007	NP	04/30/05	05/03/05	MWT	Neptunium in Solids
	SOLID							
	F03-025							
Duplicate (R503196-02)		R503196-05	7260-005	C	04/28/05	05/06/05	MWT	Carbon 14 in Solids
216-Z-7; 215ft-217.5ft	SOLID	03/18/05	7260-005	GAM	04/14/05	04/20/05	MWT	Gamma Scan
	F03-025	03/25/05	7260-005	H	05/06/05	05/06/05	MWT	Tritium in Solids
			7260-005	NI_L	04/28/05	05/06/05	MWT	Nickel 63 in Solids
			7260-005	SR	04/18/05	04/21/05	MWT	Total Strontium in Solids
			7260-005	TC	05/03/05	05/06/05	MWT	Technetium 99 in Solids
			7260-005	TH	04/20/05	04/20/05	MWT	Thorium, Isotopic in Solids
Duplicate (R503196-02)		R503196-09	7260-009	NP	05/03/05	05/03/05	MWT	Neptunium in Solids
216-Z-7; 215ft-217.5ft	SOLID	03/18/05						
	F03-025	03/25/05						
Spike (R503196-02)		R503196-06	7260-006	H	05/06/05	05/06/05	MWT	Tritium in Solids
216-Z-7; 215ft-217.5ft	SOLID	03/18/05						
	F03-025	03/25/05						

**COUNTS OF TESTS BY SAMPLE TYPE**

TEST	SAF No	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP	SPIKE	TOTAL
C	F03-025	Carbon 14 in Solids	C14_COX_LSC	2		1	1	1			5
GAM	F03-025	Gamma Scan	GAMMA_GS	2		1	1	1			5
H	F03-025	Tritium in Solids	906.0_H3_LCS	2		1	1	1	1		6
NI_L	F03-025	Nickel 63 in Solids	NI63_LSC	2		1	1	1			5
NP	F03-025	Neptunium in Solids	NP237_LLE_PLATE_AEA	1		1	1	1			4
SR	F03-025	Total Strontium in Solids	SRTOT_SEP_PRECIP_GFC	2		1	1	1			5
TC	F03-025	Technetium 99 in Solids	TC99_TR_SEP_LSC	2		1	1	1			5
TH	F03-025	Thorium, Isotopic in Solids	THISO_IE_PLATE_AEA	2		1	1	1			5
<b>TOTALS</b>				<b>15</b>		<b>8</b>	<b>8</b>	<b>8</b>	<b>1</b>		<b>40</b>

WORK SUMMARY

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Protocol Hanford  
Version Ver 1.0  
Form DVD-CWS  
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**EBERLINE SERVICES / RICHMOND**  
**SAMPLE DELIVERY GROUP H3098**

R503196-04

Method Blank

**METHOD BLANK**

SDG <u>7260</u>	Client/Case no <u>Hanford</u>	SDG <u>H3098</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R503196-04</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7260-004</u>	Material/Matrix <u>SOLID</u>	
	SAF No <u>F03-025</u>	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	-0.628	0.25	0.45	400	U	H
Carbon 14	14762-75-5	-1.84	3.6	6.3	50	U	C
Nickel 63	13981-37-8	-0.713	1.2	2.1	30	U	NI_L
Total Strontium	SR-RAD	-0.042	0.13	0.28	1.0	U	SR
Technetium 99	14133-76-7	0.002	0.14	0.37	15	U	TC
Thorium 228	14274-82-9	-0.038	0.076	0.29	1.0	U	TH
Thorium 230	14269-63-7	-0.038	0.15	0.29	1.0	U	TH
Thorium 232	TH-232	-0.038	0.076	0.29	1.0	U	TH
Potassium 40	13966-00-2	U		1.2		U	GAM
Cobalt 60	10198-40-0	U		0.063	0.050	U	GAM
Cesium 137	10045-97-3	U		0.058	0.10	U	GAM
Radium 226	13982-63-3	U		0.12	0.10	U	GAM
Radium 228	15262-20-1	U		0.24	0.20	U	GAM
Europium 152	14683-23-9	U		0.15	0.10	U	GAM
Europium 154	15585-10-1	U		0.18	0.10	U	GAM
Europium 155	14391-16-3	U		0.14	0.10	U	GAM
Thorium 228	14274-82-9	U		0.081		U	GAM
Thorium 232	TH-232	U		0.24		U	GAM
Uranium 235	15117-96-1	U		0.21		U	GAM
Uranium 238	U-238	U		7.4		U	GAM
Americium 241	14596-10-2	U		0.20		U	GAM

200-LW-1/LW-2 Characterization-Soil

QC-BLANK 52525

Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>05/06/05</u>

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EBERLINE SERVICES / RICHMOND  
SAMPLE DELIVERY GROUP H3098

R503196-08

Method Blank

METHOD BLANK

SDG <u>7260</u>	Client/Case no <u>Hanford</u>	<u>SDG H3098</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R503196-08</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7260-008</u>	Material/Matrix _____	<u>SOLID</u>
	SAF No <u>F03-025</u>	

ANALYTE	CAS NO	RESULT pCi/g	2 $\sigma$ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Neptunium 237	13994-20-2	0	0.20	0.30	1.0	U	NP

200-LW-1/LW-2 Characterization-Soil

QC-BLANK 52653
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Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>05/06/05</u>

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**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3098

R503196-03

Lab Control Sample

**LAB CONTROL SAMPLE**

SDG <u>7260</u>	Client/Case no <u>Hanford</u> <u>SDG H3098</u>
Contact <u>Melissa C. Mannion</u>	Contract <u>No. 630</u>
Lab sample id <u>R503196-03</u>	Client sample id <u>Lab Control Sample</u>
Dept sample id <u>7260-003</u>	Material/Matrix <u>SOLID</u>
	SAF No <u>F03-025</u>

ANALYTE	RESULT	2σ ERR	MDA	RDL	QUALI-	ADDED	2σ ERR	REC	3σ LMITS	PROTOCOL
	pCi/g	(COUNT)	pCi/g	pCi/g	FIERS TEST		pCi/g	pCi/g	%	(TOTAL)
Tritium	16.1	0.56	0.45	400	H	17.1	0.68	94	84-116	80-120
Carbon 14	3000	60	12	50	C	3190	130	94	84-116	80-120
Nickel 63	263	4.6	2.1	30	NI_L	270	11	97	84-116	80-120
Total Strontium	11.2	0.60	0.24	1.0	SR	11.1	0.44	101	82-118	80-120
Technetium 99	118	2.8	0.54	15	TC	120	4.8	98	84-116	80-120
Thorium 230	46.2	4.6	0.27	1.0	TH	46.4	1.9	100	82-118	80-120
Cobalt 60	1.39	0.20	<u>0.098</u>	0.050	GAM	1.30	0.052	107	66-134	80-120
Cesium 137	1.37	0.17	<u>0.14</u>	0.10	GAM	1.34	0.054	102	70-130	80-120

200-LW-1/LW-2 Characterization-Soil

QC-LCS 52524
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Lab id <u>EBRLINE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-LCS</u>
Version <u>3.06</u>
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**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3098

R503196-07

Lab Control Sample

**LAB CONTROL SAMPLE**

SDG <u>7260</u>	Client/Case no <u>Hanford</u> SDG <u>H3098</u>
Contact <u>Melissa C. Mannion</u>	Contract <u>No. 630</u>
Lab sample id <u>R503196-07</u>	Client sample id <u>Lab Control Sample</u>
Dept sample id <u>7260-007</u>	Material/Matrix <u>SOLID</u>
	SAF No <u>F03-025</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
Neptunium 237	19.8	2.7	0.26	1.0	NP	19.8	0.79	100	77-123	80-120

200-LW-1/LW-2 Characterization-Soil

QC-LCS 52652
--------------

Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-LCS</u>
Version <u>3.06</u>
Report date <u>05/06/05</u>

00000014

**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3098

R503196-05

B19433

**DUPLICATE**

SDG <u>7260</u>	Client/Case no <u>Hanford</u>	SDG <u>H3098</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
<b>DUPLICATE</b>	<b>ORIGINAL</b>	
Lab sample id <u>R503196-05</u>	Lab sample id <u>R503196-02</u>	Client sample id <u>B19433</u>
Dept sample id <u>7260-005</u>	Dept sample id <u>7260-002</u>	Location/Matrix <u>216-Z-7; 215ft-217.5ft SOLID</u>
	Received <u>03/25/05</u>	Collected/Weight <u>03/18/05 08:30 308 g</u>
% solids <u>96.2</u>	% solids <u>96.2</u>	Custody/SAF No <u>F03-025-155 F03-025</u>

ANALYTE	DUPLICATE		MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL		MDA pCi/g	QUALI- FIERS	RPD %	3σ TOT	PROT LIMIT
	pCi/g	2σ ERR (COUNT)					pCi/g	2σ ERR (COUNT)					
Tritium	-0.399	0.25	0.43	400	U	H	-0.386	0.25	0.44	U	-		
Carbon 14	-1.16	2.1	3.7	50	U	C	-0.215	2.8	4.8	U	-		
Nickel 63	-0.526	1.4	2.4	30	U	NI_L	-0.142	1.4	2.4	U	-		
Total Strontium	0.020	0.14	0.27	1.0	U	SR	0.017	0.14	0.29	U	-		
Technetium 99	0.072	0.15	0.38	15	U	TC	-0.022	0.14	0.37	U	-		
Thorium 228	0.113	0.15	0.29	1.0	U	TH	0.272	0.21	0.26		83	201	
Thorium 230	0.302	0.30	0.29	1.0		TH	-0.068	0.14	0.26	U	200	269	
Thorium 232	0.302	0.23	0.29	1.0		TH	0.510	0.28	0.26		51	134	
Potassium 40	9.02	1.4	0.57			GAM	8.71	1.3	0.82		3	45	
Cobalt 60	U		0.070	0.050	U	GAM	U		0.078	U	-		
Cesium 137	U		0.076	0.10	U	GAM	U		0.069	U	-		
Radium 226	0.225	0.12	0.15	0.10		GAM	0.219	0.12	0.12		3	119	
Radium 228	0.559	0.30	0.30	0.20		GAM	0.227	0.21	0.27	U	84	144	
Europium 152	U		0.20	0.10	U	GAM	U		0.15	U	-		
Europium 154	U		0.26	0.10	U	GAM	U		0.26	U	-		
Europium 155	U		0.21	0.10	U	GAM	U		0.16	U	-		
Thorium 228	0.337	0.063	0.073			GAM	0.472	0.085	0.090		33	51	
Thorium 232	0.559	0.30	0.30			GAM	0.227	0.21	0.27	U	84	144	
Uranium 235	U		0.27		U	GAM	U		0.26	U	-		
Uranium 238	U		10		U	GAM	U		9.1	U	-		
Americium 241	U		0.33		U	GAM	U		0.28	U	-		

200-LW-1/LW-2 Characterization-Soil

QC-DUP#2 52526

Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DUP</u>
Version <u>3.06</u>
Report date <u>05/06/05</u>

00000015

**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3098

R503196-09

B19433

**DUPLICATE**

SDG <u>7260</u>	Client/Case no <u>Hanford</u>	SDG <u>H3098</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
<b>DUPLICATE</b>	<b>ORIGINAL</b>	
Lab sample id <u>R503196-09</u>	Lab sample id <u>R503196-02</u>	Client sample id <u>B19433</u>
Dept sample id <u>7260-009</u>	Dept sample id <u>7260-002</u>	Location/Matrix <u>216-Z-7; 215ft-217.5ft</u> <u>SOLID</u>
	Received <u>03/25/05</u>	Collected/Weight <u>03/18/05 08:30</u> <u>308 g</u>
% solids <u>96.2</u>	% solids <u>96.2</u>	Custody/SAF No <u>F03-025-155</u> <u>F03-025</u>

ANALYTE	DUPLICATE	2σ ERR	MDA	RDL	QUALI-	ORIGINAL	2σ ERR	MDA	QUALI-	RPD	3σ	PROT
	pCi/g	(COUNT)	pCi/g	pCi/g	FIERS		TEST	pCi/g	(COUNT)	pCi/g	FIERS	%
Neptunium 237	0	0.074	0.11	1.0	U	NP	0.043	0.086	0.13	U	-	

200-LW-1/LW-2 Characterization-Soil

QC-DUP#2 52654

Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DUP</u>
Version <u>3.06</u>
Report date <u>05/06/05</u>

00000016

**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3098

R503196-06

B19433

**MATRIX SPIKE**

SDG <u>7260</u>	Client/Case no <u>Hanford</u>	<u>SDG H3098</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
<b>MATRIX SPIKE</b>	<b>ORIGINAL</b>	
Lab sample id <u>R503196-06</u>	Lab sample id <u>R503196-02</u>	Client sample id <u>B19433</u>
Dept sample id <u>7260-006</u>	Dept sample id <u>7260-002</u>	Location/Matrix <u>216-Z-7; 215ft-217.5ft SOLID</u>
	Received <u>03/25/05</u>	Collected/Weight <u>03/18/05 08:30 308 g</u>
% solids <u>96.2</u>	% solids <u>96.2</u>	Custody/SAF No <u>F03-025-155 F03-025</u>

ANALYTE	SPIKE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS TEST	ADDED pCi/g	2σ ERR pCi/g	ORIGINAL pCi/g	2σ ERR (COUNT)	REC 3σ % (TOTAL)	LMTS LIMITS	PROTOCOL
Tritium	81.2	1.1	0.44	400	X H	85.8	3.4	-0.386	0.25	95	84-116	60-140

200-LW-1/LW-2 Characterization-Soil

QC-MS#2 52527

Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-MS</u>
Version <u>3.06</u>
Report date <u>05/06/05</u>

00000017

**EBERLINE SERVICES / RICHMOND**  
**SAMPLE DELIVERY GROUP H3098**

R503196-01

B19432

**DATA SHEET**

SDG <u>7260</u>	Client/Case no <u>Hanford</u>	SDG <u>H3098</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R503196-01</u>	Client sample id <u>B19432</u>	
Dept sample id <u>7260-001</u>	Location/Matrix <u>216-Z-7; 197.5ft-200ft</u>	<u>SOLID</u>
Received <u>03/25/05</u>	Collected/Weight <u>03/18/05 07:38</u>	<u>285.2 g</u>
% solids <u>97.5</u>	Custody/SAF No <u>F03-025-154</u>	<u>F03-025</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	0.668	0.21	0.32	400		H
Carbon 14	14762-75-5	-1.90	3.1	5.4	50	U	C
Nickel 63	13981-37-8	0.311	1.4	2.4	30	U	NI_L
Total Strontium	SR-RAD	0.068	0.14	0.27	1.0	U	SR
Technetium 99	14133-76-7	-0.092	0.17	0.59	15	U	TC
Thorium 228	14274-82-9	0.459	0.25	0.23	1.0		TH
Thorium 230	14269-63-7	0.306	0.25	0.23	1.0		TH
Thorium 232	TH-232	0.489	0.25	0.23	1.0		TH
Potassium 40	13966-00-2	11.1	1.7	1.0			GAM
Cobalt 60	10198-40-0	U		<u>0.12</u>	0.050	U	GAM
Cesium 137	10045-97-3	U		<u>0.084</u>	0.10	U	GAM
Radium 226	13982-63-3	0.299	0.12	<u>0.14</u>	0.10		GAM
Radium 228	15262-20-1	0.589	0.28	<u>0.34</u>	0.20		GAM
Europium 152	14683-23-9	U		<u>0.23</u>	0.10	U	GAM
Europium 154	15585-10-1	U		<u>0.30</u>	0.10	U	GAM
Europium 155	14391-16-3	U		<u>0.21</u>	0.10	U	GAM
Thorium 228	14274-82-9	0.539	0.12	0.14			GAM
Thorium 232	TH-232	0.589	0.28	0.34			GAM
Uranium 235	15117-96-1	U		0.30		U	GAM
Uranium 238	U-238	U		12		U	GAM
Americium 241	14596-10-2	U		0.23		U	GAM

200-LW-1/LW-2 Characterization-Soil

**DATA SHEETS**

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**SUMMARY DATA SECTION**

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Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>05/06/05</u>

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**EBERLINE SERVICES / RICHMOND**

**SAMPLE DELIVERY GROUP H3098**

R503196-02

B19433

**DATA SHEET**

SDG <u>7260</u>	Client/Case no <u>Hanford</u>	SDG <u>H3098</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R503196-02</u>	Client sample id <u>B19433</u>	
Dept sample id <u>7260-002</u>	Location/Matrix <u>216-Z-7; 215ft-217.5ft</u>	<u>SOLID</u>
Received <u>03/25/05</u>	Collected/Weight <u>03/18/05 08:30</u>	<u>308 g</u>
% solids <u>96.2</u>	Custody/SAF No <u>F03-025-155</u>	<u>F03-025</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	-0.386	0.25	0.44	400	U	H
Carbon 14	14762-75-5	-0.215	2.8	4.8	50	U	C
Nickel 63	13981-37-8	-0.142	1.4	2.4	30	U	NI_L
Total Strontium	SR-RAD	0.017	0.14	0.29	1.0	U	SR
Technetium 99	14133-76-7	-0.022	0.14	0.37	15	U	TC
Thorium 228	14274-82-9	0.272	0.21	0.26	1.0		TH
Thorium 230	14269-63-7	-0.068	0.14	0.26	1.0	U	TH
Thorium 232	TH-232	0.510	0.28	0.26	1.0		TH
Neptunium 237	13994-20-2	0.043	0.086	0.13	1.0	U	NP
Potassium 40	13966-00-2	8.71	1.3	0.82			GAM
Cobalt 60	10198-40-0	U		0.078	0.050	U	GAM
Cesium 137	10045-97-3	U		0.069	0.10	U	GAM
Radium 226	13982-63-3	0.219	0.12	0.12	0.10		GAM
Radium 228	15262-20-1	0.227	0.21	0.27	0.20	U	GAM
Europium 152	14683-23-9	U		0.15	0.10	U	GAM
Europium 154	15585-10-1	U		0.26	0.10	U	GAM
Europium 155	14391-16-3	U		0.16	0.10	U	GAM
Thorium 228	14274-82-9	0.472	0.085	0.090			GAM
Thorium 232	TH-232	0.227	0.21	0.27		U	GAM
Uranium 235	15117-96-1	U		0.26		U	GAM
Uranium 238	U-238	U		9.1		U	GAM
Americium 241	14596-10-2	U		0.28		U	GAM

200-LW-1/LW-2 Characterization-Soil

DATA SHEETS  
Page 2  
SUMMARY DATA SECTION  
Page 16

Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>05/06/05</u>

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**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3098

Test NP Matrix SOLID  
 SDG 7260  
 Contact Melissa C. Mannion

Client Hanford  
 Contract No. 630  
 Contract SDG H3098

**METHOD SUMMARY**

NEPTUNIUM IN SOLIDS  
 ALPHA SPECTROSCOPY

**RESULTS**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Neptunium
Preparation batch 7132-076				
B19433	R503196-02	7260-002		U
BLK (QC ID=52653)	R503196-08	7260-008		U
LCS (QC ID=52652)	R503196-07	7260-007		ok
Duplicate (R503196-02)	R503196-09	7260-009		- U
Nominal values and limits from method				
200-LW-1/LW-2 Characterization-Soil			RDLs (pCi/g)	1.0

**METHOD PERFORMANCE**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/g	MDA	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT keV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 7132-076 2σ prep error 5.0 % Reference Lab Notebook 7132 pg. 61																
B19433	R503196-02			0.13	0.500			55		107			45	04/29/05	05/02	SS-028
BLK (QC ID=52653)	R503196-08			0.30	0.500			20		125				04/29/05	04/30	SS-040
LCS (QC ID=52652)	R503196-07			0.26	0.500			25		125				04/29/05	04/30	SS-036
Duplicate (R503196-02)	R503196-09			0.11	0.500			58		126			46	04/29/05	05/03	SS-042
(QC ID=52654)																
Nominal values and limits from method				1.0	0.500			20-105		100			180			

PROCEDURES	REFERENCE	NP237_LLE_PLATE_AEA
CP-060	Soil Preparation, rev 7	
CP-071	Soil Dissolution, > 1.0g Aliquot, rev 5	
CP-930	Neptunium from Solids and Water by Extraction Chromatography, rev 1	
CP-008	Heavy Element Electroplating, rev 9	

AVERAGES ± 2 SD	MDA	0.20 ± 0.19
FOR 4 SAMPLES	YIELD	40 ± 40

Lab id EBRINE  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-CMS  
 Version 3.06  
 Report date 05/06/05

00000020

**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3098

Test TH Matrix SOLID  
 SDG 7260  
 Contact Melissa C. Mannion

**METHOD SUMMARY**

THORIUM, ISOTOPIC IN SOLIDS  
 ALPHA SPECTROSCOPY

Client Hanford  
 Contract No. 630  
 Contract SDG H3098

**RESULTS**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Thorium 230
Preparation batch 7132-076				
B19432	R503196-01	7260-001		0.306
B19433	R503196-02	7260-002		U
BLK (QC ID=52525)	R503196-04	7260-004		U
LCS (QC ID=52524)	R503196-03	7260-003		ok
Duplicate (R503196-02)	R503196-05	7260-005		ok
Nominal values and limits from method RDLs (pCi/g) 1.0				
200-LW-1/LW-2 Characterization-Soil				

**METHOD PERFORMANCE**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/g	MAX MDA	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 7132-076 20 prep error 5.0 % Reference Lab Notebook 7132 pg. 61																
B19432	R503196-01		0.23	0.250				98		167			33	04/20/05	04/20	SS-028
B19433	R503196-02		0.26	0.250				91		168			33	04/20/05	04/20	SS-031
BLK (QC ID=52525)	R503196-04		0.29	0.250				86		168				04/20/05	04/20	SS-034
LCS (QC ID=52524)	R503196-03		0.27	0.250				88		168				04/20/05	04/20	SS-032
Duplicate (R503196-02)	R503196-05		0.29	0.250				85		168			33	04/20/05	04/20	SS-036
(QC ID=52526)																
Nominal values and limits from method 1.0 0.250 20-105 150 180																

PROCEDURES	REFERENCE	THISO_IE_PLATE_AEA
CP-060		Soil Preparation, rev 7
CP-071		Soil Dissolution, > 1.0g Aliquot, rev 5
CP-900		Thorium in Water and Dissolved Solid Samples by Extraction Chromatography, rev 1
CP-008		Heavy Element Electroplating, rev 9

AVERAGES ± 2 SD	MDA	0.27 ± 0.050
FOR 5 SAMPLES	YIELD	90 ± 10

Lab id EBERLINE  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-CMS  
 Version 3.06  
 Report date 05/06/05

00000021

**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3098

Test SR Matrix SOLID  
 SDG 7260  
 Contact Melissa C. Mannion

**METHOD SUMMARY**

TOTAL STRONTIUM IN SOLIDS  
 BETA COUNTING

Client Hanford  
 Contract No. 630  
 Contract SDG H3098

**RESULTS**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	PLANCHET	Total Strontium
Preparation batch 7132-076					
B19432	R503196-01			7260-001	U
B19433	R503196-02			7260-002	U
BLK (QC ID=52525)	R503196-04			7260-004	U
LCS (QC ID=52524)	R503196-03			7260-003	ok
Duplicate (R503196-02)	R503196-05			7260-005	- U

Nominal values and limits from method RDLs (pCi/g) 1.0  
 200-LW-1/LW-2 Characterization-Soil

**METHOD PERFORMANCE**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	MDA pCi/g	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 7132-076 2σ prep error 10.0 % Reference Lab Notebook 7132 pg. 61																
B19432	R503196-01			0.27	1.00			87	100				31	04/18/05	04/18	GRB-221
B19433	R503196-02			0.29	1.00			78	100				31	04/18/05	04/18	GRB-222
BLK (QC ID=52525)	R503196-04			0.28	1.00			84	100					04/18/05	04/18	GRB-224
LCS (QC ID=52524)	R503196-03			0.24	1.00			86	100					04/18/05	04/18	GRB-217
Duplicate (R503196-02) (QC ID=52526)	R503196-05			0.27	1.00			87	120				31	04/18/05	04/18	GRB-225

Nominal values and limits from method 1.0 1.00 30-105 100 180

PROCEDURES REFERENCE SRTOT\_SEP\_PRECIP\_GPC  
 CP-071 Soil Dissolution, > 1.0g Aliquot, rev 5  
 CP-383 Strontium in Dissolved Solid of < 5.0g Aliquot,  
 rev 1

AVERAGES ± 2 SD MDA 0.27 ± 0.037  
 FOR 5 SAMPLES YIELD 84 ± 8

Lab id EBERLINE  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-CMS  
 Version 3.06  
 Report date 05/06/05

00000022

**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3098

Test TC Matrix SOLID  
 SDG 7260  
 Contact Melissa C. Mannion

**METHOD SUMMARY**

TECHNETIUM 99 IN SOLIDS

BETA COUNTING

Client Hanford  
 Contract No. 630  
 Contract SDG H3098

**RESULTS**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	Technetium PLANCHET	99
Preparation batch 7132-076					
B19432	R503196-01			7260-001	U
B19433	R503196-02			7260-002	U
BLK (QC ID=52525)	R503196-04			7260-004	U
LCS (QC ID=52524)	R503196-03			7260-003	ok
Duplicate (R503196-02)	R503196-05			7260-005	- U

Nominal values and limits from method RDLs (pCi/g) 15  
 200-LW-1/LW-2 Characterization-Soil

**METHOD PERFORMANCE**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	MDA pCi/g	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 7132-076 2σ prep error 10.0 % Reference Lab Notebook 7132 pg. 61																
B19432	R503196-01			0.59	1.00			86		50			46	04/28/05	05/03	GRB-228
B19433	R503196-02			0.37	1.00			91		100			46	04/28/05	05/03	GRB-222
BLK (QC ID=52525)	R503196-04			0.37	1.00			98		100				04/28/05	05/03	GRB-223
LCS (QC ID=52524)	R503196-03			0.54	1.00			97		50				04/28/05	05/02	GRB-221
Duplicate (R503196-02)	R503196-05			0.38	1.00			91		100			46	04/28/05	05/03	GRB-224
	(QC ID=52526)															

Nominal values and limits from method 15 1.00 20-105 50 180

PROCEDURES	REFERENCE	TC99_TR_SEP_LSC
	CP-431	Technetium-99 Purification of Soil or Resin by Extraction Chromatography, rev 2
	CP-008	Heavy Element Electroplating, rev 9

AVERAGES ± 2 SD	MDA	0.45 ± 0.21
FOR 5 SAMPLES	YIELD	93 ± 10

Lab id EBRLNE  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-CMS  
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 Report date 05/06/05

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**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3098

**METHOD SUMMARY**

GAMMA SCAN  
GAMMA SPECTROSCOPY

Test GAM Matrix SOLID  
SDG 7260  
Contact Melissa C. Mannion

Client Hanford  
Contract No. 630  
Contract SDG H3098

**RESULTS**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Cobalt 60	Cesium 137
Preparation batch 7132-076					
B19432	R503196-01		7260-001	U	U
B19433	R503196-02		7260-002	U	U
BLK (QC ID=52525)	R503196-04		7260-004	U	U
LCS (QC ID=52524)	R503196-03		7260-003	ok	ok
Duplicate (R503196-02)	R503196-05		7260-005	- U	- U
Nominal values and limits from method		RDLs (pCi/g)		0.050	0.10
200-LW-1/LW-2 Characterization-Soil					

**METHOD PERFORMANCE**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/g	MDA	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 7132-076 2σ prep error 15.0 % Reference Lab Notebook 7132 pg. 61																
B19432	R503196-01		<u>0.82</u>	204						121			20	04/07/05	04/07	JR.03.00
B19433	R503196-02		<u>0.58</u>	200						120			20	04/07/05	04/07	JR.05.00
BLK (QC ID=52525)	R503196-04		<u>0.42</u>	200						103				04/07/05	04/07	JR.05.00
LCS (QC ID=52524)	R503196-03		<u>0.098</u>	200						102				04/07/05	04/16	JR.03.00
Duplicate (R503196-02)	R503196-05		<u>0.59</u>	200						101			27	04/07/05	04/14	JR.05.00
(QC ID=52526)																
Nominal values and limits from method		0.050		200						100			180			

PROCEDURES REFERENCE GAMMA\_GS  
CP-100 Ge(Li) Preparation for Commercial Samples, rev 7

AVERAGES ± 2 SD MDA 0.50 ± 0.53  
FOR 5 SAMPLES YIELD \_\_\_\_\_ ± \_\_\_\_\_

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**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3098

Test C Matrix SOLID  
 SDG 7260  
 Contact Melissa C. Mannion

**METHOD SUMMARY**

CARBON 14 IN SOLIDS  
 LIQUID SCINTILLATION COUNTING

Client Hanford  
 Contract No. 630  
 Contract SDG H3098

**RESULTS**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Carbon 14
Preparation batch 7132-076				
B19432	R503196-01		7260-001	U
B19433	R503196-02		7260-002	U
BLK (QC ID=52525)	R503196-04		7260-004	U
LCS (QC ID=52524)	R503196-03		7260-003	ok
Duplicate (R503196-02)	R503196-05		7260-005	- U

Nominal values and limits from method RDLs (pCi/g) 50  
 200-LW-1/LW-2 Characterization-Soil

**METHOD PERFORMANCE**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/g	MDA	ALIQ g	PREP FAC	DILU TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL- YZED	DETECTOR
Preparation batch 7132-076 2σ prep error 10.0 % Reference Lab Notebook 7132 pg. 61																
B19432	R503196-01		5.4	0.237				100		50			41	04/28/05	04/28	LSC-005
B19433	R503196-02		4.8	0.268				100		50			41	04/28/05	04/28	LSC-005
BLK (QC ID=52525)	R503196-04		6.3	0.200				100		50				04/28/05	04/28	LSC-005
LCS (QC ID=52524)	R503196-03		12	0.200				100		<u>11</u>				04/28/05	04/28	LSC-005
Duplicate (R503196-02) (QC ID=52526)	R503196-05		3.7	0.334				100		50			41	04/28/05	04/28	LSC-005

Nominal values and limits from method 50 0.200 25 180

PROCEDURES REFERENCE C14\_COX\_LSC  
 CP-251 Tritium/Carbon-14 Oxidation, rev 8

AVERAGES ± 2 SD MDA 6.4 ± 6.5  
 FOR 5 SAMPLES YIELD 100 ± 0

METHOD SUMMARIES

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**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3098

Test H Matrix SOLID  
SDG 7260  
Contact Melissa C. Mannion

**METHOD SUMMARY**

TRITIUM IN SOLIDS  
LIQUID SCINTILLATION COUNTING

Client Hanford  
Contract No. 630  
Contract SDG H3098

**RESULTS**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	PLANCHET	Tritium
Preparation batch 7132-076					
B19432	R503196-01			7260-001	0.668
B19433	R503196-02			7260-002	U
BLK (QC ID=52525)	R503196-04			7260-004	U
LCS (QC ID=52524)	R503196-03			7260-003	ok
Duplicate (R503196-02)	R503196-05			7260-005	- U
Spike (R503196-02)	R503196-06			7260-006	ok X

Nominal values and limits from method RDLs (pCi/g) 400  
200-LW-1/LW-2 Characterization-Soil

**METHOD PERFORMANCE**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	MDA pCi/g	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL- YZED	DETECTOR
Preparation batch 7132-076 2σ prep error 10.0 % Reference Lab Notebook 7132 pg. 61																
B19432	R503196-01			0.32	20.4			34		120			48	05/05/05	05/05	LSC-006
B19433	R503196-02			0.44	15.1			34		120			48	05/05/05	05/05	LSC-006
BLK (QC ID=52525)	R503196-04			0.45	15.0			33		120				05/05/05	05/06	LSC-006
LCS (QC ID=52524)	R503196-03			0.45	15.0			33		120				05/05/05	05/06	LSC-006
Duplicate (R503196-02)	R503196-05			0.43	15.2			35		120			49	05/05/05	05/06	LSC-006
	(QC ID=52526)															
Spike (R503196-02)	R503196-06			0.44	15.4			34		120			49	05/05/05	05/06	LSC-006
	(QC ID=52527)															

Nominal values and limits from method MDA 400 ALIQ 15.0 YIELD 25 DRIFT 180

PROCEDURES REFERENCE 906.0\_H3\_LCS  
CP-218 Tritium in Soil Samples by Azeotropic Distillation, rev 3

AVERAGES ± 2 SD MDA 0.42 ± 0.10  
FOR 6 SAMPLES YIELD 34 ± 2

Lab id EBRLNE  
Protocol Hanford  
Version Ver 1.0  
Form DVD-CMS  
Version 3.06  
Report date 05/06/05

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**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3098

Test NI L Matrix SOLID  
 SDG 7260  
 Contact Melissa C. Mannion

**METHOD SUMMARY**

NICKEL 63 IN SOLIDS  
 LIQUID SCINTILLATION COUNTING

Client Hanford  
 Contract No. 630  
 Contract SDG H3098

**RESULTS**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Nickel 63
Preparation batch 7132-076				
B19432	R503196-01		7260-001	U
B19433	R503196-02		7260-002	U
BLK (QC ID=52525)	R503196-04		7260-004	U
LCS (QC ID=52524)	R503196-03		7260-003	ok
Duplicate (R503196-02)	R503196-05		7260-005	U
Nominal values and limits from method				
200-LW-1/LW-2 Characterization-Soil			RDLs (pCi/g)	30

**METHOD PERFORMANCE**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/g	MDA	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- YZED	DETECTOR
Preparation batch 7132-076    2σ prep error 10.0 %    Reference Lab Notebook 7132 pg. 61															
B19432	R503196-01		2.4	0.500				82	100				40	04/26/05	04/27 LSC-007
B19433	R503196-02		2.4	0.500				85	100				40	04/26/05	04/27 LSC-007
BLK (QC ID=52525)	R503196-04		2.1	0.500				93	100					04/26/05	04/28 LSC-007
LCS (QC ID=52524)	R503196-03		2.1	0.500				93	100					04/26/05	04/28 LSC-007
Duplicate (R503196-02)	R503196-05		2.4	0.500				85	100				41	04/26/05	04/28 LSC-007
(QC ID=52526)															
Nominal values and limits from method			30	0.500				30-105	25				180		

PROCEDURES	REFERENCE	NI63_LSC
CP-061	Determination of Moisture Content in Solid Samples rev 3	
CP-071	Soil Dissolution, > 1.0g Aliquot, rev 5	
CP-280	Nickel-63 Purification, rev 3	

AVERAGES ± 2 SD	MDA	2.3 ± 0.33
FOR 5 SAMPLES	YIELD	88 ± 10

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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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SDG 7260  
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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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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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SDG 7260  
Contact Melissa C. Mannion

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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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SAMPLE DELIVERY GROUP H3098

SDG 7260  
Contact Melissa C. Mannion

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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'

REPORT GUIDES

Page 12

SUMMARY DATA SECTION

Page 36

Lab id EBRLNE  
Protocol Hanford  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 05/06/05

00000039

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H3098

SDG 7260  
 Contact Melissa C. Mannion

GUIDE, cont.

Client Hanford  
 Contract No. 630  
 Case no SDG H3098

METHOD SUMMARY

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

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

MDAs are underlined if greater than the printed RDL.

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

Lab id EBRLNE  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-RG  
 Version 3.06  
 Report date 05/06/05

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EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H3098

SDG 7260  
 Contact Melissa C. Mannion

GUIDE, cont.

Client Hanford  
 Contract No. 630  
 Case no SDG H3098

METHOD SUMMARY

- \* 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

Lab id EBRLNE  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-RG  
 Version 3.06  
 Report date 05/06/05

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EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H3098

SDG 7260

Contact Melissa C. Mannion

Client Hanford

Contract No. 630

Case no SDG H3098

GUIDE, cont.

METHOD SUMMARY

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

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

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

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

REPORT GUIDES

Page 15

SUMMARY DATA SECTION

Page 39

Lab id EBERLINE

Protocol Hanford

Version Ver 1.0

Form DVD-RG

Version 3.06

Report date 05/06/05

00000042

FLUOR Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F03-025-154

PAGE 1

OF 1

COLLECTOR: Pope/Pfister/Tyra/Wiberg

COMPANY CONTACT: TRENT, STEVE

TELEPHONE NO.: 373-5689

PROJECT COORDINATOR: TRENT, SJ

PRICE CODE: BN

DATA TURNAROUND: 45 Days / 45 Days

SAMPLING LOCATION: 216-Z-7; 197-5R-200R

PROJECT DESIGNATION: 200-LW-1/LW-2 Characterization - Soil

SAF NO.: F03-025

AIR QUALITY:

ICE CREST NO.: 61K-05-014

FIELD LOGBOOK NO.: HNF-N-356 1

COA: 119143ES10

METHOD OF SHIPMENT: Federal Express

BILL OF LADING / AIR BIL. NO.: 24 PTK 15076

OFFSITE PROPERTY NO.: 24 PTK 15076

PRESERVATION: None

TYPE OF CONTAINER: 4C

NO. OF CONTAINER(S): 1

VOLUME: 250ml

SAMPLE ANALYSIS: SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SPECIAL HANDLING AND/OR STORAGE: NONE

SAMPLE NO.: B19432

MATRIX\*: SOIL

RELINQUISHED BY / REMOVED FROM	DATE/TIME	RECEIVED BY / STORED IN	DATE/TIME
C. Pfister	3/18/05 1200	M.D. DUNN	3/18/05 1200
M.D. DUNN	3/18/05 0738	M.D. DUNN	3/18/05 10:00
FEP EX	3/25/05		

SPECIAL INSTRUCTIONS: (1) Chromium Hex - 7196; NO2/NO3 - 353.2; Sulphides - 9030; Oil & Grease - 413.1; (2) Nickel-63; Gamma Spec - Radium (Radon-222, Radium-226, Radium-228) Technetium-99; Isotopic Thorium (Thorium-232) Tritium - H3; Carbon-14; Strontium-89,90 -- Total Sr;

LABORATORY SECTION: RECEIVED BY

FINAL SAMPLE DISPOSITION: DISPOSED BY

TITLE: \_\_\_\_\_

DATE/TIME: \_\_\_\_\_

*Handwritten notes:*  
 10:00  
 M.D. DUNN





RICHMOND, CA LABORATORY

SAMPLE RECEIPT CHECKLIST

Client FLUOR HANFORD City RICHMOND State WA  
 Date/Time received 3/25/05 10:00 CoC No. F03-025-154, 155, 159  
 Container I.D. No. GRP-06-014 Requested TAT (Days) 45 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 [ ] N/A [  ]
6. Number of samples in shipping container: 3 Sample Matrix SOIL
7. Number of containers per sample: \_\_\_\_\_ Or see CoC F03-025-154, 155, 159
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 AK Date: 3/25/05 Time: 10:00

Customer Sample No.	cpm	mR/hr	wipe	Customer Sample No.	cpm	mR/hr	wipe

Ion Chamber Ser. No. \_\_\_\_\_ Calibration date AK 3/25/05 10:00  
 Alpha Meter Ser. No. \_\_\_\_\_ Calibration date \_\_\_\_\_  
 Beta/Gamma Meter Ser. No. \_\_\_\_\_ Calibration date \_\_\_\_\_



5



Mr. Steve Trent  
Fluor Hanford Inc.  
825 Jadwin Ave.  
Richland, WA 99352

**Subject: Contract No. 630  
Analytical Data Package**

Dear Mr. Trent:

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

LvLI Batch #	0503L078
SDG #	H3098
SAF #	F03-025
Date Received	3-25-05
# Samples	2
Matrix	Soil
Volatiles	
Semivolatiles	
Pest/PCB	
DRO/GRO/KRO	
Herbicides	
GC Alcohol	
Metals	
Inorganics	X

The electronic data deliverable (EDD) will be emailed shortly. If you have any questions, please don't hesitate to contact me at (610) 280-3012.

Sincerely,  
Lionville Laboratory Incorporated

Orlette S. Johnson  
Project Manager

r:\group\pm\orlette\tnu-hanford\data\fc\_ltrs.doc



Lionville Laboratory, Inc.  
 INORGANIC ANALYTICAL DATA PACKAGE FOR  
 TNUHANFORD F03-025 H3098

DATE RECEIVED: 03/25/05

LVL LOT # :0503L078

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
---------------------	-------	-----	--------	------------	-----------	----------

B19432

% SOLIDS	001	S	05L%S044	03/18/05	03/30/05	03/30/05
% SOLIDS	001 REP	S	05L%S044	03/18/05	03/30/05	03/30/05
CHROMIUM VI	001	S	05LVI027	03/18/05	03/30/05	03/30/05
NITRATE NITRITE	001	S	05LN3B25	03/18/05	04/22/05	04/22/05
OIL & GREASE BY GRAV	001	S	05LOG014	03/18/05	04/03/05	04/03/05
SULFIDE	001	S	05LSD015	03/18/05	03/30/05	03/30/05

B19433

% SOLIDS	002	S	05L%S044	03/23/05	03/30/05	03/30/05
CHROMIUM VI	002	S	05LVI027	03/23/05	03/30/05	03/30/05
CHROMIUM VI	002 REP	S	05LVI027	03/23/05	03/30/05	03/30/05
CHROMIUM VI	002 MS	S	05LVI027	03/23/05	03/30/05	03/30/05
CHROMIUM VI	002 MSD	S	05LVI027	03/23/05	03/30/05	03/30/05
NITRATE NITRITE	002	S	05LN3B25	03/23/05	04/22/05	04/22/05
NITRATE NITRITE	002 REP	S	05LN3B25	03/23/05	04/22/05	04/22/05
NITRATE NITRITE	002 MS	S	05LN3B25	03/23/05	04/22/05	04/22/05
OIL & GREASE BY GRAV	002	S	05LOG014	03/23/05	04/03/05	04/03/05
OIL AND GREASE BY GR	002 REP	S	05LOG014	03/23/05	04/03/05	04/03/05
OIL AND GREASE BY GR	002 MS	S	05LOG014	03/23/05	04/03/05	04/03/05
SULFIDE	002	S	05LSD015	03/23/05	03/30/05	03/30/05
SULFIDE	002 REP	S	05LSD015	03/23/05	03/30/05	03/30/05
SULFIDE	002 MS	S	05LSD015	03/23/05	03/30/05	03/30/05

LAB QC:

CHROMIUM VI	MB1	S	05LVI027	N/A	03/30/05	03/30/05
CHROMIUM VI	MB1 BS	S	05LVI027	N/A	03/30/05	03/30/05
CHROMIUM VI	MB1 BSD	S	05LVI027	N/A	03/30/05	03/30/05
NITRATE NITRITE	MB1	S	05LN3B25	N/A	04/22/05	04/22/05
NITRATE NITRITE	MB1 BS	S	05LN3B25	N/A	04/22/05	04/22/05
OIL & GREASE BY GRAV	MB1	S	05LOG014	N/A	04/03/05	04/03/05
OIL AND GREASE BY GR	MB1 BS	S	05LOG014	N/A	04/03/05	04/03/05
OIL AND GREASE BY GR	MB1 BSD	S	05LOG014	N/A	04/03/05	04/03/05
SULFIDE	MB1	S	05LSD015	N/A	03/30/05	03/30/05

Lionville Laboratory, Inc.  
INORGANIC ANALYTICAL DATA PACKAGE FOR  
TNUHANFORD F03-025 H3098

DATE RECEIVED: 03/25/05

LVL LOT # :0503L078

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
SULFIDE	MB1 BS	S	05LSD015	N/A	03/30/05	03/30/05
SULFIDE	MB1 BSD	S	05LSD015	N/A	03/30/05	03/30/05



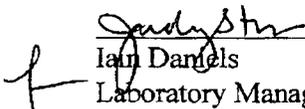
## Analytical Report

Client: TNU-HANFORD F03-025 H3098  
LVL#: 0503L078

W.O.#: 11343-606-001-9999-00  
Date Received: 03-25-05

### INORGANIC NARRATIVE

1. This narrative covers the analyses of 2 soil samples.
2. The samples were prepared and analyzed in accordance with the methods checked on the attached glossary.
3. Sample holding times as required by the method and/or contract were met.
4. The results presented in this report are derived from samples that met LvLI's sample acceptance policy.
5. The method blanks were within the method criteria.
6. The Laboratory Control Samples (LCS) were within the laboratory control limits. The duplicate LCS for Sulfide was within the 20% Relative Percent Difference (RDP) control limit.
7. The matrix spike recoveries for Chromium VI, Nitrate Nitrite, Oil and Grease and Sulfide were within the 75-125% control limits.
8. The replicate analyses for Percent Solids, Chromium VI, Nitrate Nitrite, Oil and Grease and Sulfide were within the 20% RPD control limit.
9. Results for solid samples are reported on a dry weight basis.
10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard copy package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

  
Ian Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated

5/4/05  
Date

njpl03-078

The results presented in this report relate to the analytical testing and conditions of the samples upon receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 14 pages.

03

**Lionville Laboratory Incorporated**

**WET CHEMISTRY**

**METHODS GLOSSARY FOR SOIL/SOLIDS SAMPLE ANALYSIS**

	<u>ASTM</u>	<u>SW846</u>	<u>OTHER</u>
% Ash	___ D2216-80		
% Moisture	___ D2216-80		___ ILMO4.0 (e)
% Solids	✓ D2216-80		___ ILMO4.0 (e)
% Volatile Solids	___ D2216-80		
ASTM Extraction in Water	___ D3987-81/85		
BTU	___ D240-87		
CEC		___ 9081	___ c
Chromium VI		✓ 3060A/7196A	
Corrosivity ___ by coupon ___ by pH		___ 1110(mod) ___ 9045C	
Cyanide, Total		___ 9010B	___ ILMO4.0 (e)
Cyanide, Reactive		___ Section 7.3/9014	
Halides, Extractable Organic		___ 9020B	___ EPA 600/4/84-008
Halides, Total		___ 9020B	___ EPA 600/4/84-008
EP Toxicity		___ 1310A	
Flash Point		___ 1010	
Ignitability		___ 1010	
Oil & Grease		✓ 9071A(mod)	✓ EPA 413.1(mod.)
Carbon, Total Organic		___ 9060	___ Lloyd Kahn (mod)
Oxygen Bomb Prep for Anions	___ D240-87(mod)	___ 5050	
Petroleum Hydrocarbons, Total Recoverable		___ 9071	___ EPA 418.1
pH, Soil		___ 9045C	
Sulfide, Reactive		___ Section 7.3/9030B	
Sulfide		✓ 9030B(mod) / 9034	
Specific Gravity	___ D1429-76C/	___ D5057-90	
Sulfur, Total		___ 9056	
Synthetic Preparation Leach		___ 1312	
Paint Filter		___ 9095A	
Other: <i>Nitrate Nitrite</i>		Method: <i>EPA 353.2(mod.)</i>	
Other:		Method	

## Lionville Laboratory Incorporated

### METHOD REFERENCES AND DATA QUALIFIERS

#### DATA QUALIFIERS

U = Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.

\* = Indicates that the original sample result is greater than 4x the spike amount added.

#### ABBREVIATIONS

MB = Method or Preparation Blank.

MS = Matrix Spike.

MSD = Matrix Spike Duplicate.

REP = Sample Replicate

LC = Laboratory Control Sample.

NC = Not calculated.

A suffix of -R, -S, or -T following these codes indicate a replicate, spike or sample duplicate analysis respectively.

#### ANALYTICAL WET CHEMISTRY METHODS

1. ASTM Standard Methods.
2. USEPA Methods for Chemical Analysis of Water and Wastes (USEPA 600/4-79-020).
3. Test Methods for Evaluating Solid Waste (USEPA SW-846).
  - a. Standard Methods for the Examination of Water and Waste, 16 ed, (1983).
  - b. Standard Methods for the Examination of Water and Waste, 17 ed, (1989)/18ed (1992).
  - c. Method of Soil Analysis, Part 1, Physical and Mineralogical Methods, 2nd ed, (1986).
  - d. Method of Soil Analysis, Part 2, Chemical and Microbiological Properties, Am. Soc. Agron., Madison, WI (1965).
  - e. USEPA Contract Laboratory Program, Statement of Work for Inorganic Analysis.
  - f. Code of Federal Regulations.

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 04/27/05

CLIENT: TNUHANFORD F03-025 H3098  
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0503L078

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B19432	% Solids	97.4	%	0.01	1.0
		Chromium VI	2.0	MG/KG	0.20	1.0
		Nitrate Nitrite	0.20	u MG/KG	0.20	1.0
		Oil & Grease Gravimetri	684	u MG/KG	684	1.0
		Sulfide	38.6	u MG/KG	38.6	1.0
-002	B19433	% Solids	95.3	%	0.01	1.0
		Chromium VI	1.3	MG/KG	0.21	1.0
		Nitrate Nitrite	0.21	u MG/KG	0.21	1.0
		Oil & Grease Gravimetri	727	MG/KG	699	1.0
		Sulfide	37.4	u MG/KG	37.4	1.0

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 04/27/05

CLIENT: TNUHANFORD F03-025 H3098  
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0503L078

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	05LVI027-MB1	Chromium VI	0.20	u MG/KG	0.20	1.0
BLANK10	05LN3B25-MB1	Nitrate Nitrite	0.20	u MG/KG	0.20	1.0
BLANK10	05LOG014-MB1	Oil & Grease Gravimetri	667	u MG/KG	667	1.0
BLANK10	05LSD015-MB1	Sulfide	40.0	u MG/KG	40.0	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 04/27/05

CLIENT: TNUHANFORD F03-025 H3098  
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0503L078

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-002	B19433	Soluble Chromium VI	5.5	1.3	4.2	99.4	1.0
		Insoluble Chromium VI	1320	1.3	1170	112.5	100
		Nitrate Nitrite	5.8	0.21u	5.2	112.0	1.0
		Oil & Grease Gravimetr	8030	727	8840	82.6	1.0
		Sulfide	556	16.9	609	88.4	1.0
BLANK10	05LVI027-MB1	Soluble Chromium VI	4.1	0.20u	4.0	101.8	1.0
		Insoluble Chromium VI	1310	0.20u	1200	108.4	100
BLANK10	05LN3B25-MB1	Nitrate Nitrite	5.3	0.20u	5.0	105.4	1.0
BLANK10	05LOG014-MB1	Oil & Grease Gravimetr	9120	667 u	8430	108.2	1.0
BLANK10	05LSD015-MB1	Sulfide	560	40.0 u	607	92.3	1.0
		Sulfide MSD	525	40.0 u	607	86.6	1.0

Lionville Laboratory, Inc.

INORGANICS DUPLICATE SPIKE REPORT 04/27/05

CLIENT: TNUHANFORD P03-025 H3098  
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0503L078

SAMPLE	SITE ID	ANALYTE	SPIKE#1		SPIKE#2	
			%RECOV	%RECOV	%RECOV	%DIFF
BLANK10	05LSD015-MB1	Sulfide	92.3	86.6	6.4	

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 04/27/05

CLIENT: TNUHANFORD P03-025 H3098  
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0503L078

SAMPLE	SITE ID	ANALYTE	INITIAL			DILUTION FACTOR (REP)
			RESULT	REPLICATE	RPD	
-001REP	B19432	% Solids	97.4	97.7	0.27	1.0
-002REP	B19433	Chromium VI	1.3	1.5	10.1	1.0
		Nitrate Nitrite	0.21u	0.21u	NC	1.0
		Oil & Grease Gravimetri	727	699 u	NC	1.0
		Sulfide	37.4 u	41.5 u	NC	1.0



FLUOR Hanford Inc.		CHAIN OF CUSTODY / SAMPLE ANALYSIS REQUEST				PAGE 1 OF 12	
COLLECTOR Pope/Pfister/Tyra/Wilberg	COMPANY CONTACT TRENT, STEVE	TELEPHONE NO. 373-5689	PROJECT COORDINATOR TRENT, SJ	PRICE CODE 8N	DATA TURNAROUND 45 Days / 45 Days		
SAMPLING LOCATION 216-Z-7; 197-Sfr-200R	PROJECT DESIGNATION 200-LW-1/LW-2 Characterization - Soil	SAF NO. F03-025		AIR QUALITY			
ICE CHEST NO. 578P-05-017	FIELD LOGBOOK NO. HMF-N-356 1	COA 119143E510	METHOD OF SHIPMENT Federal Express				
SHIPPED TO Becca	OFFSITE PROPERTY NO. 200-022-11-11	BILL OF LADING / AIRBILL NO. 200 PTK 15077					
MATRIX* A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wide X=Other	POSSIBLE SAMPLE HAZARDS / REMARKS N/A	PRESERVATION Cool 4C	None				
		TYPE OF CONTAINER 8G	8G				
		NO. OF CONTAINER(S) 1	1				
		VOLUME 250mL	250mL				
		SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS				
		SPECIAL HANDLING AND/OR STORAGE See Special Handling In ID: 019421	SEE ITEM (2) IN SPECIAL INSTRUCTIONS				
SAMPLE NO. E19432	MATRIX* SOIL	SAMPLE DATE 3/18/05	SAMPLE TIME 0738				
CHAIN OF POSSESSION				SIGN / PRINT NAMES			
RELINQUISHED BY / REMOVED FROM R. Pfister	DATE/TIME 3/18/05 1200	RECEIVED BY / STORED IN M. J. Baulch	DATE/TIME 3/18/05 1200	SPECIAL INSTRUCTIONS (1) Chromium Hex - 7196; NO2/NO3 - 353.2; Sulfides - 9030; Oil & Grease - 413.1; (2) Nickel-63; Gamma Spec - Radium-226, Radium-228; Technetium-99; Total Isotopic Thorium (Thorium-232) - Thallium-201; Carbon-14; Strontium-89, 90 - Total 8-11			
RELINQUISHED BY / REMOVED FROM M. J. Baulch	DATE/TIME 3-25-05	RECEIVED BY / STORED IN M. J. Baulch	DATE/TIME 3-25-05 0930				
RELINQUISHED BY / REMOVED FROM M. J. Baulch	DATE/TIME 3-25-05	RECEIVED BY / STORED IN M. J. Baulch	DATE/TIME 3-25-05 0930				
RELINQUISHED BY / REMOVED FROM	DATE/TIME	RECEIVED BY / STORED IN	DATE/TIME				
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			



**Lionville Laboratory Incorporated**  
**SAMPLE RECEIPT CHECKLIST (SRC)**

CLIENT: *TNU - HANFORD*

Date: *3-25-05*

Purchase Order / Project# /

SAF# / SOW# / Release #: *F03-025*

LvLI Batch #:

Sample Custodian: *Victor Hernandez*

NOTE: EXPLAIN ALL DISCREPANCIES

- |   |   |  |
|---|---|--|
| 1. Samples Hand Delivered or <u>Shipped</u>   | Carrier <i>FedEx</i>  | Airbill# <i>7904 6674 9149</i>                       |
| 2. Custody seals on coolers or shipping container intact, signed and dated?   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> No Seals      Comments      |
| 3. Outside of coolers or shipping containers are free from damage?  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |  |
| 4. All expected paperwork received (coc and other client specific information) sealed in plastic bag and easily accessible? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |  |
| 5. Samples received cooled or ambient?  | Temp <i>2.2</i> °C  | Cooler # <i>GRP-05-017</i>                           |
| 6. Custody seals on sample containers intact, signed and dated?   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> No Seals                    |
| 7. coc signed and dated?  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |  |
| 8. Sample containers are intact?  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |  |
| 9. All samples on coc received? All samples received on coc?  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |  |
| 10. All sample label information matches coc?   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |  |
| 11. Samples properly preserved?   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |  |
| 12. Samples received within hold times? Short holds taken to wet lab?   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |  |
| 13. VOA, TOC, TOX free of headspace?  | <input type="checkbox"/> Yes <input type="checkbox"/> No            | <input checked="" type="checkbox"/> N/A              |
| 14. QC stickers placed on bottles designated by client?   | <input type="checkbox"/> Yes <input type="checkbox"/> No            | <input checked="" type="checkbox"/> N/A              |
| 15. Shipment meets LvLI Sample Acceptance Policy? (Identify all bottles not within policy. See reverse side for policy)     | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |  |
| 16. Project Manager contacted concerning discrepancies? name/date (or samples outside criteria)                             | <input type="checkbox"/> Yes <input type="checkbox"/> No            | <input checked="" type="checkbox"/> No Discrepancies |



Geotechnical Laboratory  
PO Box 4339  
1570 Bear Creek Road  
Oak Ridge TN 37830  
(865) 482-6497

## CERTIFICATE OF ANALYSIS

Stephen Trent  
Fluor Hanford, Inc.  
825 Jadwin Avenue  
Richland, Washington 99352

April 28, 2005

This is the Certificate of Analysis for the following samples:

Shaw Project ID:	<b>Eberline - Hanford</b>
Shaw Project Number:	<b>100846.58000000</b>
Client Sample Data Group:	H3098
Date Received by Lab:	March 29, 2005
Number of Samples:	One (1)
Sample Type:	Soil



### I. Introduction/Case Narrative

One soil sample was received by the Shaw Geotechnical Laboratory on March 29, 2005. The sample was submitted for determination of moisture content, bulk density, and sieve analysis. The sample number received was B19437.

Please see Appendix A, Sample Number Cross Reference List; Appendix B, Analysis Results; and Appendix C, Chain-of-Custody/Sample Receipt Records.

"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 contained in this hardcopy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

Reviewed and Approved:

Ralph Cole  
Laboratory Manager, Geotechnical Services

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## II. Analytical Results/Methodology

REFERENCES: United States Army Corps of Engineers (USACE), Engineer Manual 1110-2-1906, *Laboratory Soils Testing*, appendix II, 1970; United States Environmental Protection Agency, SW846, *Test Methods for Examining Solid Waste, Physical/Chemical Methods*, 3rd ed., Nov 1986 (EPA SW-846). Annual Book of ASTM Standards, Section 4, Construction, Volume 04.08, *Soil and Rock (I)*, and Volume 04.09, *Soil and Rock (II)*, 2004. Shaw Environmental and infrastructure, Standard Operating Procedures.

Moisture Content of Soil and Rock.....	ASTM D 2216
Particle-size Analysis of Soils .....	ASTM D 422
Bulk Density of Soils .....	EM 1110-2-1906

## III. Quality Control

Quality control checks such as duplicates and spikes (QC samples), are not normally applicable to geotechnical testing. This is due largely to the inability of obtaining samples with known characteristics, the heterogenous nature of the samples, and quality control procedures built-in to the analytical method.

QC measures to ensure accuracy and precision of test results include the following:

- 100% verification of all numerical results - raw data entries, transcriptions and calculations entered by lab technicians are checked, recalculated and verified. Most data calculations are performed by computer programs.
- Data validation through test reasonableness - summaries of all test results for individual reports are reviewed to determine the overall reasonableness of data and to determine the presence of any data that may be considered outliers.
- Quality control procedures are built into most standardized geotechnical procedures. For example, liquid limit and plastic limit analyses call for re-analyses and specify acceptance criteria.
- Routine instrument calibration - instruments, gauges and equipment used in testing are calibrated on a routine basis. All instrument calibration follows ASTM or manufacturer guidelines.
- Maintenance of all past calibration records - calibration records and certification documents of all instruments, gauges and equipment are updated routinely and maintained in the Quality Control Coordinators Quality/Operations files.

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- Certified and trained personnel - all technicians are certified by the National Institute for Certification of Engineering Technicians (NICET) in geotechnical soil testing, and are trained in the application of standard laboratory procedures for geotechnical analyses as well as the quality assurance measures implemented by Shaw.
- Quantitative analyses frequently used in geotechnical/physical testing programs do not use QC tools common to wet chemistry or radiochemistry laboratories. Measures not employed in the analysis of samples reported in this report include: laboratory control samples (LCS), blanks, matrix spikes (MS), duplicate analyses, dilutions, digestions, correction factors, surrogate sample analyses, detection limit determinations, control charts, and/or tentatively identified compounds (TICs).<sup>7</sup>

#### IV. Data Qualification

None.

**Appendix A**  
**Sample Cross-Reference List**

00000004

Page 4 of 9  
April 28, 2005  
Stephen Trent  
Fluor Hanford, Inc.  
Shaw Project Name: Eberline Hanford  
Shaw Project No. 100846.58000000  
SDG No. H3098

**Shaw Geotechnical  
Laboratory  
Oak Ridge TN  
(865) 482-6497**

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**SAMPLE NUMBER CROSS-REFERENCE LIST**

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<b>LAB SAMPLE NO.</b>	<b>CLIENT SAMPLE NO.</b>	<b>MATRIX</b>
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BC0546 .....	B19437 .....	Soil
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**Appendix B**  
**Sample Test Results**

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**PARTICLE-SIZE DISTRIBUTION  
 ASTM D 422**

Project Name Eberline Hanford

Field Sample No. B19437

Project No. 100846.58000000

Lab Sample No. BC0546

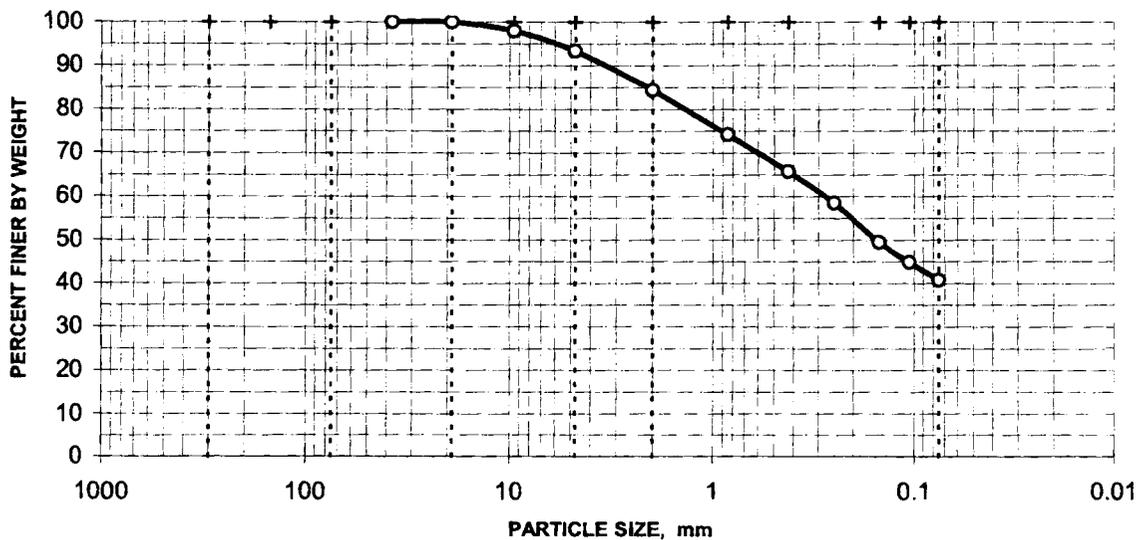
Moisture Content = 2.6%  
 based on dry sample weight

**SIEVE ANALYSIS**

C O A R S E	Sieve No.	Diameter mm	Percent Finer
	3"	75.000	100.0%
	1.5"	37.500	100.0%
	0.75"	19.000	100.0%
	0.375"	9.500	97.9%
	#4	4.750	93.3%
	#10	2.000	84.4%

F I N E	Sieve No.	Diameter mm	Percent Finer
	#20	0.850	74.2%
	#40	0.425	65.8%
	#60	0.250	58.5%
	#100	0.149	49.5%
	#140	0.106	44.9%
	#200	0.075	40.7%

**DISTRIBUTION CURVE**



6.7% Gravel

52.6% Sand

40.7% Silt/Clay

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**Appendix C**  
**Chain-of-Custody and Request-for-Analysis Records**

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FLUOR Hanford Inc. CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

COLLECTOR: Pope/Pfister/Tyar/Wiberg COMPANY CONTACT: TRENT, STEVE TELEPHONE NO.: 373-5689 PROJECT COORDINATOR: TRENT, SJ

SAMPLING LOCATION: 216-Z-7; 197.5R-200ft PROJECT DESIGNATION: 200-LW-1/LW-2 Characterization - Soil

ICE CHEST NO.: GPR-05-074 FIELD LOGBOOK NO.: HNF-N-356 1 COA: 119143ES10

SHIPPED TO: Shaw Group OFFSITE PROPERTY NO.: 200 MK 5076

MATRIX\*: A=Air, DL=Drum, Liquids, DS=Drum, Solids, L=Liquid, O=Oil, S=Soil, SE=Sediment, T=Tissue, V=Vegetation, W=Water, WP=Wipe, X=Other

POSSIBLE SAMPLE HAZARDS/REMARKS: N/A

SDG # H3098

SPECIAL HANDLING AND/OR STORAGE: Radioactive TEL: B19491

SAMPLE NO.: B19437 MATRIX\*: SOIL

BC 0546

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
R. Pfister	3/18/05 1200	M. O. 026 FRIG #1	3/18/05 1200
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RELINQUISHED BY/STORED IN	DATE/TIME
M. O. 026	3/18/05 0740	M. O. 026	3/18/05 0740
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RELINQUISHED BY/STORED IN	DATE/TIME
M. O. 026	3/18/05 0740	M. O. 026	3/18/05 0740
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RELINQUISHED BY/STORED IN	DATE/TIME
F. O. EX	2/25/05	AK	3/29/05 10:00
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RELINQUISHED BY/STORED IN	DATE/TIME
Alex	2/25/05 17:00	AK	3/29/05 10:00
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RELINQUISHED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RELINQUISHED BY/STORED IN	DATE/TIME

SIGN/PRINT NAMES

SPECIAL INSTRUCTIONS: (1) Particle Size (Dry Sieve) - D422; Bulk Density - D2937;

TO SHAW LAB

DATE/TIME: 3/29/05 @ 0945

DISPOSED BY: Shaw, OAK RIDGE

LABORATORY SECTION: Shaw, OAK RIDGE

FINAL SAMPLE DISPOSITION: Shaw, OAK RIDGE

00000011

SDG# 43098

Eberline Srvces

CHAIN OF CUSTODY

ORD # R5-03-197

03/28/05 09:09:05

WORK ID: SAP# F03-025 SDG H3098

RCVD: 03/25/05 DUE: 05/09/05

KRRP: 05/09/06 DISP: S

<u>DASH</u>	<u>SAMPLE IDENTIFICATION</u>	<u>STORED</u>	<u>TESTS</u>		
01A-S	B19437	SHAW	DISPOS	E331S	E333S E335S

<u>RELEASED BY</u>	<u>DATE</u>	<u>TRANSFERRED TO</u>	<u>DATE</u>	<u>RECEIVED BY</u>	<u>DATE</u>
<i>Alex Kelmich</i>	3/28/05	SHAW	3/28/05	<i>[Signature]</i>	3/29/05
BC 0546					