



**EBERLINE**  
SERVICES

0066561

May 9, 2005

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



Reference: **P.O. #630**  
**Eberline Services R5-03-072-7256, SDG H3071**

Dear Mr. Trent:

Enclosed is the data report for three solid samples designated under SAF No. F03-025 received at Eberline Services on March 10, 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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Analytical Services  
2030 Wright Avenue  
P.O. Box 4040  
Richmond, California 94804-0040  
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## 1.0 GENERAL

Fluor Hanford Inc. (FH) Sample Delivery Group H3071 was composed of three 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

The C-14 samples were analyzed in a preparation batch with QC samples from SDG H3066. No problems were encountered during the course of the analyses.

### 2.3 Nickel-63 Analyses

The Ni-63 samples were analyzed in a preparation batch with QC samples from SDG H3066. No problems were encountered during the course of the analyses.

### 2.4 Total Strontium Analyses

The total strontium samples were analyzed in a preparation batch with QC samples from SDG H3066. No problems were encountered during the course of the analyses.

### 2.5 Technetium-99 Analyses

The Tc-99 samples were analyzed in a preparation batch with QC samples from SDG H3066. 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 Gamma Spectroscopy

No problems were encountered during the course of the analyses.

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**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 Mannion*

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

*5/9/15*

\_\_\_\_\_  
Date

EBERLINE SERVICES / RICHMOND  
SAMPLE DELIVERY GROUP H3071

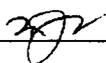
SDG 7256  
Contact Melissa C. Mannion

Client Hanford  
Contract No. 630  
Case no SDG\_H3071

SUMMARY DATA SECTION

TABLE OF CONTENTS				
About this section	.	.	.	1
Sample Summaries	.	.	.	3
Prep Batch Summary	.	.	.	5
Work Summary	.	.	.	6
Method Blanks	.	.	.	8
Lab Control Samples	.	.	.	10
Duplicates	.	.	.	12
Matrix Spikes	.	.	.	13
Data Sheets	.	.	.	14
Method Summaries	.	.	.	17
Report Guides	.	.	.	24
End of Section	.	.	.	38

Prepared by 

Reviewed by 

Lab id EBRLNE  
Protocol Hanford  
Version Ver 1.0  
Form DVD-TOC  
Version 3.06  
Report date 04/27/05

00000004

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H3071

SDG 7256  
Contact Melissa C. Mannion

REPORT GUIDE

Client Hanford  
Contract No. 630  
Case no SDG H3071

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

Page 1

SUMMARY DATA SECTION

Page 1

Lab id EBRLNE  
Protocol Hanford  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 04/27/05

00000005

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H3071

SDG 7256  
Contact Melissa C. Mannion

GUIDE , c o n t .

Client Hanford  
Contract No. 630  
Case no SDG H3071

ABOUT THE DATA SUMMARY SECTION

DUPLICATES

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

MATRIX SPIKES

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

DATA SHEETS

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

METHOD SUMMARIES

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

REPORT GUIDES

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

Lab id EBRLNE  
Protocol Hanford  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 04/27/05

00000006

**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3071

SDG 7256  
 Contact Melissa C. Mannion

**SAMPLE SUMMARY**

Client Hanford  
 Contract No. 630  
 Case no SDG H3071

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB SAMPLE ID	SAF NO	CHAIN OF CUSTODY	COLLECTED
B19429	216-Z-7; 57.5ft-60ft	SOLID		R503072-01	F03-025	F03-025-151	02/22/05 10:30
B19430	216-Z-7; 96'-99.5'	SOLID		R503072-02	F03-025	F03-025-152	03/03/05 07:55
B19431	216-Z-7; 117.5ft-120ft	SOLID		R503072-03	F03-025	F03-025-153	03/04/05 09:50
Method Blank		SOLID		R503033-03	F03-025		
Method Blank		SOLID		R503072-05	F03-025		
Lab Control Sample		SOLID		R503033-02	F03-025		
Lab Control Sample		SOLID		R503072-04	F03-025		
Duplicate (R503072-01)	216-Z-7; 57.5ft-60ft	SOLID		R503072-06	F03-025		02/22/05 10:30
Spike (R503072-02)	216-Z-7; 96'-99.5'	SOLID		R503072-07	F03-025		03/03/05 07:55

SAMPLE SUMMARY

Page 1

SUMMARY DATA SECTION

Page 3

Lab id EBERLINE  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-CS  
 Version 3.06  
 Report date 04/27/05

00000007

**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3071

SDG 7256  
 Contact Melissa C. Mannion

**QC SUMMARY**

Client Hanford  
 Contract No. 630  
 Case no SDG H3071

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	% SOLIDS	SAMPLE AMOUNT	BASIS AMOUNT	DAYS SINCE RECEIVED	LAB COLL SAMPLE ID	DEPARTMENT SAMPLE ID
7254		Method Blank	SOLID					R503033-03	7254-003
		Lab Control Sample	SOLID					R503033-02	7254-002
7256	F03-025-151	B19429	SOLID	97.0	372 g		03/10/05 16	R503072-01	7256-001
	F03-025-152	B19430	SOLID	95.8	290 g		03/10/05 7	R503072-02	7256-002
	F03-025-153	B19431	SOLID	91.9	300 g		03/10/05 6	R503072-03	7256-003
		Method Blank	SOLID					R503072-05	7256-005
		Lab Control Sample	SOLID					R503072-04	7256-004
		Duplicate (R503072-01)	SOLID	97.0	372 g		03/10/05 16	R503072-06	7256-006
		Spike (R503072-02)	SOLID	95.8	290 g		03/10/05 7	R503072-07	7256-007

QC SUMMARY

Page 1

SUMMARY DATA SECTION

Page 4

Lab id EBRLNE  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-QS  
 Version 3.06  
 Report date 04/27/05

00000008

**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3071

SDG 7256  
 Contact Melissa C. Mannion

**PREP BATCH SUMMARY**

Client Hanford  
 Contract No. 630  
 Case no SDG H3071

TEST	MATRIX	METHOD	PREPARATION ERROR			PLANCHETS ANALYZED			QUALI-
			BATCH	2σ %	CLIENT MORE	RE BLANK	LCS	DUP/ORIG MS/ORIG	
<b>Alpha Spectroscopy</b>									
TH	SOLID	Thorium, Isotopic in Solids	7132-050	5.0	3	1	1	1/1	
<b>Beta Counting</b>									
SR	SOLID	Total Strontium in Solids	7132-049	10.0	3	1	1	1/1	
TC	SOLID	Technetium 99 in Solids	7132-049	10.0	3	1	1	1/1	
<b>Gamma Spectroscopy</b>									
GAM	SOLID	Gamma Scan	7132-050	15.0	3	1	1	1/1	
<b>Liquid Scintillation Counting</b>									
C	SOLID	Carbon 14 in Solids	7132-049	10.0	3	1	1	1/1	
H	SOLID	Tritium in Solids	7132-050	10.0	3	1	1	1/1	1/1 X
NI_L	SOLID	Nickel 63 in Solids	7132-049	10.0	3	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.

PREP BATCH SUMMARY

Page 1

SUMMARY DATA SECTION

Page 5

Lab id EBRLNE  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-PBS  
 Version 3.06  
 Report date 04/27/05

00000009

**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3071

SDG 7256  
 Contact Melissa C. Mannion

Client Hanford  
 Contract No. 630  
 Case no SDG H3071

**WORK SUMMARY**

CLIENT SAMPLE ID	LAB SAMPLE ID									
LOCATION	MATRIX	COLLECTED		TEST	SUF-					
CUSTODY	SAF No	RECEIVED	PLANCHET		FIX	ANALYZED	REVIEWED	BY	METHOD	
B19429		R503072-01	7256-001	C		04/02/05	04/07/05	MWT	Carbon 14 in Solids	
216-Z-7; 57.5ft-60ft	SOLID	02/22/05	7256-001	GAM		04/01/05	04/06/05	MWT	Gamma Scan	
F03-025-151	F03-025	03/10/05	7256-001	H		04/20/05	04/25/05	MWT	Tritium in Solids	
			7256-001	NI_L		03/24/05	03/29/05	MWT	Nickel 63 in Solids	
			7256-001	SR		03/29/05	04/27/05	MWT	Total Strontium in Solids	
			7256-001	TC		03/28/05	03/30/05	MWT	Technetium 99 in Solids	
			7256-001	TH		04/02/05	04/04/05	MWT	Thorium, Isotopic in Solids	
B19430		R503072-02	7256-002	C		04/02/05	04/07/05	MWT	Carbon 14 in Solids	
216-Z-7; 96'-99.5'	SOLID	03/03/05	7256-002	GAM		04/01/05	04/06/05	MWT	Gamma Scan	
F03-025-152	F03-025	03/10/05	7256-002	H		04/20/05	04/25/05	MWT	Tritium in Solids	
			7256-002	NI_L		03/24/05	03/29/05	MWT	Nickel 63 in Solids	
			7256-002	SR		03/29/05	04/27/05	MWT	Total Strontium in Solids	
			7256-002	TC		03/28/05	03/30/05	MWT	Technetium 99 in Solids	
			7256-002	TH		04/02/05	04/04/05	MWT	Thorium, Isotopic in Solids	
B19431		R503072-03	7256-003	C		04/02/05	04/07/05	MWT	Carbon 14 in Solids	
216-Z-7; 117.5ft-120ft	SOLID	03/04/05	7256-003	GAM		04/01/05	04/06/05	MWT	Gamma Scan	
F03-025-153	F03-025	03/10/05	7256-003	H		04/20/05	04/25/05	MWT	Tritium in Solids	
			7256-003	NI_L		03/24/05	03/29/05	MWT	Nickel 63 in Solids	
			7256-003	SR		03/29/05	04/27/05	MWT	Total Strontium in Solids	
			7256-003	TC		03/29/05	03/30/05	MWT	Technetium 99 in Solids	
			7256-003	TH		04/02/05	04/04/05	MWT	Thorium, Isotopic in Solids	
Method Blank		R503033-03	7254-003	C		04/02/05	04/17/05	MWT	Carbon 14 in Solids	
	SOLID		7254-003	NI_L		03/24/05	04/17/05	MWT	Nickel 63 in Solids	
	F03-025		7254-003	SR		03/29/05	04/17/05	MWT	Total Strontium in Solids	
			7254-003	TC		03/29/05	04/17/05	MWT	Technetium 99 in Solids	
Method Blank		R503072-05	7256-005	GAM		04/01/05	04/06/05	MWT	Gamma Scan	
	SOLID		7256-005	H		04/20/05	04/25/05	MWT	Tritium in Solids	
	F03-025		7256-005	TH		04/02/05	04/04/05	MWT	Thorium, Isotopic in Solids	
Lab Control Sample		R503033-02	7254-002	C		04/03/05	04/17/05	MWT	Carbon 14 in Solids	
	SOLID		7254-002	NI_L		03/24/05	04/17/05	MWT	Nickel 63 in Solids	
	F03-025		7254-002	SR		03/29/05	04/17/05	MWT	Total Strontium in Solids	
			7254-002	TC		03/28/05	04/17/05	MWT	Technetium 99 in Solids	

WORK SUMMARY

Page 1

SUMMARY DATA SECTION

Page 6

Lab id EBRLNE  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-CWS  
 Version 3.06  
 Report date 04/27/05

00000010

**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3071

SDG 7256  
Contact Melissa C. Mannion

**WORK SUMMARY, cont.**

Client Hanford  
Contract No. 630  
Case no SDG H3071

CLIENT SAMPLE ID	MATRIX	LAB SAMPLE ID	COLLECTED	TEST	SUF-	ANALYZED	REVIEWED	BY	METHOD
LOCATION	SAF No	RECEIVED	PLANCHET	FIX					
Lab Control Sample		R503072-04	7256-004	GAM		04/01/05	04/06/05	MWT	Gamma Scan
	SOLID		7256-004	H		04/20/05	04/25/05	MWT	Tritium in Solids
	F03-025		7256-004	TH		04/02/05	04/04/05	MWT	Thorium, Isotopic in Solids
Duplicate (R503072-01)		R503072-06	7256-006	C		04/02/05	04/07/05	MWT	Carbon 14 in Solids
216-Z-7; 57.5ft-60ft	SOLID	02/22/05	7256-006	GAM		04/02/05	04/06/05	MWT	Gamma Scan
	F03-025	03/10/05	7256-006	H		04/20/05	04/25/05	MWT	Tritium in Solids
			7256-006	NI_L		03/24/05	03/29/05	MWT	Nickel 63 in Solids
			7256-006	SR		03/29/05	04/27/05	MWT	Total Strontium in Solids
			7256-006	TC		03/28/05	03/30/05	MWT	Technetium 99 in Solids
			7256-006	TH		04/02/05	04/04/05	MWT	Thorium, Isotopic in Solids
Spike (R503072-02)		R503072-07	7256-007	H		04/20/05	04/25/05	MWT	Tritium in Solids
216-Z-7; 96'-99.5'	SOLID	03/03/05							
	F03-025	03/10/05							

**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	3			1	1	1		6
GAM	F03-025	Gamma Scan	GAMMA_GS	3			1	1	1		6
H	F03-025	Tritium in Solids	906.0_H3_LSC	3			1	1	1	1	7
NI_L	F03-025	Nickel 63 in Solids	NI63_LSC	3			1	1	1		6
SR	F03-025	Total Strontium in Solids	SRTOT_SEP_PRECIP_GPC	3			1	1	1		6
TC	F03-025	Technetium 99 in Solids	TC99_TR_SEP_LSC	3			1	1	1		6
TH	F03-025	Thorium, Isotopic in Solids	THISO_IE_PLATE_AEA	3			1	1	1		6
<b>TOTALS</b>				<b>21</b>			<b>7</b>	<b>7</b>	<b>7</b>	<b>1</b>	<b>43</b>

WORK SUMMARY

Page 2

SUMMARY DATA SECTION

Page 7

Lab id EBRLNE  
Protocol Hanford  
Version Ver 1.0  
Form DVD-CWS  
Version 3.06  
Report date 04/27/05

00000011

**EBERLINE SERVICES / RICHMOND**  
**SAMPLE DELIVERY GROUP H3071**

R503033-03

Method Blank

**METHOD BLANK**

SDG <u>7256</u>	Client/Case no <u>Hanford</u>	SDG <u>H3071</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R503033-03</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7254-003</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	N.A.			400		H
Carbon 14	14762-75-5	0.132	2.6	4.4	50	U	C
Nickel 63	13981-37-8	2.30	2.1	3.5	30	U	NI_L
Total Strontium	SR-RAD	-0.002	0.16	0.33	1.0	U	SR
Technetium 99	14133-76-7	-0.072	0.17	0.61	15	U	TC
Thorium 228	14274-82-9	N.A.			1.0		TH
Thorium 230	14269-63-7	N.A.			1.0		TH
Thorium 232	TH-232	N.A.			1.0		TH
Potassium 40	13966-00-2	N.A.					GAM
Cobalt 60	10198-40-0	N.A.			0.050		GAM
Cesium 137	10045-97-3	N.A.			0.10		GAM
Radium 226	13982-63-3	N.A.			0.10		GAM
Radium 228	15262-20-1	N.A.			0.20		GAM
Europium 152	14683-23-9	N.A.			0.10		GAM
Europium 154	15585-10-1	N.A.			0.10		GAM
Europium 155	14391-16-3	N.A.			0.10		GAM
Thorium 228	14274-82-9	N.A.					GAM
Thorium 232	TH-232	N.A.					GAM
Uranium 235	15117-96-1	N.A.					GAM
Uranium 238	U-238	N.A.					GAM
Americium 241	14596-10-2	N.A.					GAM

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

QC-BLANK 52197

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>04/27/05</u>

00000012

**EBERLINE SERVICES / RICHMOND**  
**SAMPLE DELIVERY GROUP H3071**

R503072-05

Method Blank

**METHOD BLANK**

SDG <u>7256</u>	Client/Case no <u>Hanford</u>	SDG <u>H3071</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R503072-05</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7256-005</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	0.062	0.17	0.28	400	U	H
Thorium 228	14274-82-9	0.024	0.030	0.036	1.0	U	TH
Thorium 230	14269-63-7	-0.009	0.089	0.19	1.0	U	TH
Thorium 232	TH-232	-0.015	0.024	0.052	1.0	U	TH
Potassium 40	13966-00-2	U		0.94		U	GAM
Cobalt 60	10198-40-0	U		<u>0.099</u>	0.050	U	GAM
Cesium 137	10045-97-3	U		0.079	0.10	U	GAM
Radium 226	13982-63-3	U		<u>0.16</u>	0.10	U	GAM
Radium 228	15262-20-1	U		<u>0.37</u>	0.20	U	GAM
Europium 152	14683-23-9	U		<u>0.22</u>	0.10	U	GAM
Europium 154	15585-10-1	U		<u>0.28</u>	0.10	U	GAM
Europium 155	14391-16-3	U		<u>0.13</u>	0.10	U	GAM
Thorium 228	14274-82-9	U		0.097		U	GAM
Thorium 232	TH-232	U		0.37		U	GAM
Uranium 235	15117-96-1	U		0.22		U	GAM
Uranium 238	U-238	U		9.6		U	GAM
Americium 241	14596-10-2	U		0.070		U	GAM

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

QC-BLANK #52253

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>04/27/05</u>

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**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3071

R503033-02

Lab Control Sample

**LAB CONTROL SAMPLE**

SDG <u>7256</u> Contact <u>Melissa C. Mannion</u>	Client/Case no <u>Hanford</u> SDG <u>H3071</u> Contract No. <u>630</u>
Lab sample id <u>R503033-02</u> Dept sample id <u>7254-002</u>	Client sample id <u>Lab Control Sample</u> Material/Matrix <u>SOLID</u> SAF No <u>F03-025</u>

ANALYTE	RESULT	2σ ERR	MDA	RDL	QUALI-	ADDED	2σ ERR	REC	3σ LMTS	PROTOCOL
	pCi/g	(COUNT)	pCi/g	pCi/g	FIERS TEST	pCi/g	pCi/g	%	(TOTAL)	LIMITS
Tritium	N.A.			400	H					80-120
Carbon 14	2200	44	10	50	C	2130	85	103	83-117	80-120
Nickel 63	260	8.4	4.6	30	NI_L	270	11	96	84-116	80-120
Total Strontium	10.7	0.62	0.27	1.0	SR	11.1	0.44	96	82-118	80-120
Technetium 99	121	3.2	0.69	15	TC	120	4.8	101	83-117	80-120
Thorium 230	N.A.			1.0	TH					80-120
Cobalt 60	N.A.			0.050	GAM					80-120
Cesium 137	N.A.			0.10	GAM					80-120

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

QC-LCS 52196

Lab id EBRLNE  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-LCS  
 Version 3.06  
 Report date 04/27/05

00000014

**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3071

R503072-04

Lab Control Sample

**LAB CONTROL SAMPLE**

SDG <u>7256</u>	Client/Case no <u>Hanford</u> <span style="float:right">SDG <u>H3071</u></span>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>
Lab sample id <u>R503072-04</u>	Client sample id <u>Lab Control Sample</u>
Dept sample id <u>7256-004</u>	Material/Matrix <u>SOLID</u>
	SAF No <u>F03-025</u>

ANALYTE	RESULT	2σ ERR	MDA	RDL	QUALI-	ADDED	2σ ERR	REC	3σ LMTS	PROTOCOL
	pCi/g	(COUNT)	pCi/g	pCi/g	FIERS TEST	pCi/g	pCi/g	%	(TOTAL)	LIMITS
Tritium	11.9	0.41	0.30	400	H	11.7	0.47	102	83-117	80-120
Thorium 230	40.9	1.2	0.20	1.0	TH	42.0	1.7	97	90-110	80-120
Cobalt 60	1.48	0.19	<u>0.093</u>	0.050	GAM	1.37	0.055	108	67-133	80-120
Cesium 137	1.40	0.16	<u>0.12</u>	0.10	GAM	1.36	0.054	103	70-130	80-120

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

QC-LCS #52252

Lab id EBRLNE  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-LCS  
 Version 3.06  
 Report date 04/27/05

0000015

**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3071

R503072-06

B19429

**DUPLICATE**

SDG <u>7256</u> Contact <u>Melissa C. Mannion</u> DUPLICATE Lab sample id <u>R503072-06</u> Dept sample id <u>7256-006</u> % solids <u>97.0</u>	Client/Case no <u>Hanford</u> SDG <u>H3071</u> Contract No. <u>630</u> ORIGINAL Lab sample id <u>R503072-01</u> Dept sample id <u>7256-001</u> Received <u>03/10/05</u> % solids <u>97.0</u>	Client sample id <u>B19429</u> Location/Matrix <u>216-2-7; 57.5ft-60ft</u> <u>SOLID</u> Collected/Weight <u>02/22/05 10:30</u> <u>372 g</u> Custody/SAF No <u>F03-025-151</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	%
Tritium	1.48	0.20	0.26	400		H	0.631	0.18	0.26	<u>80</u>	45	
Carbon 14	1.37	1.7	2.7	50	U	C	1.14	1.7	2.9	U	-	
Nickel 63	-0.061	3.2	5.4	30	U	NI_L	-0.911	2.3	4.0	U	-	
Total Strontium	0.110	0.14	0.26	1.0	U	SR	-0.036	0.14	0.31	U	-	
Technetium 99	-0.035	0.19	0.66	15	U	TC	-0.030	0.19	0.58	U	-	
Thorium 228	1.15	0.13	0.041	1.0		TH	1.18	0.13	0.045		3	26
Thorium 230	0.782	0.14	0.20	1.0		TH	0.750	0.13	0.19		4	39
Thorium 232	1.16	0.13	0.055	1.0		TH	1.22	0.13	0.052		5	26
Potassium 40	14.8	1.8	0.78			GAM	14.9	1.4	0.58		1	39
Cobalt 60	U		<u>0.091</u>	0.050	U	GAM	U		<u>0.075</u>	U	-	
Cesium 137	U		0.092	0.10	U	GAM	U		0.069	U	-	
Radium 226	0.285	0.12	<u>0.15</u>	0.10		GAM	0.524	0.14	<u>0.14</u>		59	76
Radium 228	0.820	0.33	<u>0.31</u>	0.20		GAM	0.632	0.32	<u>0.33</u>		26	100
Europium 152	U		<u>0.19</u>	0.10	U	GAM	U		<u>0.16</u>	U	-	
Europium 154	U		<u>0.31</u>	0.10	U	GAM	U		<u>0.25</u>	U	-	
Europium 155	U		<u>0.21</u>	0.10	U	GAM	U		<u>0.17</u>	U	-	
Thorium 228	0.704	0.14	0.15			GAM	0.634	0.071	0.073		10	47
Thorium 232	0.820	0.33	0.31			GAM	0.632	0.32	0.33		26	100
Uranium 235	U		0.32		U	GAM	U		0.25	U	-	
Uranium 238	U		12		U	GAM	U		8.8	U	-	
Americium 241	U		0.35		U	GAM	U		0.28	U	-	

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

QC-DUP#1 52254

**DUPLICATES**

Page 1

**SUMMARY DATA SECTION**

Page 12

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>04/27/05</u>

00000016

**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3071

R503072-07

B19430

**MATRIX SPIKE**

SDG <u>7256</u>	Client/Case no <u>Hanford</u>	<u>SDG H3071</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
<b>MATRIX SPIKE</b>	<b>ORIGINAL</b>	
Lab sample id <u>R503072-07</u>	Lab sample id <u>R503072-02</u>	Client sample id <u>B19430</u>
Dept sample id <u>7256-007</u>	Dept sample id <u>7256-002</u>	Location/Matrix <u>216-Z-7; 96'-99.5'</u> <u>SOLID</u>
	Received <u>03/10/05</u>	Collected/Weight <u>03/03/05 07:55</u> <u>290 g</u>
% solids <u>95.8</u>	% solids <u>95.8</u>	Custody/SAP No <u>F03-025-152</u> <u>F03-025</u>

ANALYTE	SPIKE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIBERS TEST	ADDED pCi/g	2σ ERR pCi/g	ORIGINAL pCi/g	2σ ERR (COUNT)	REC 3σ % (TOTAL)	LMTS (TOTAL)	PROTOCOL LIMITS
Tritium	62.6	1.9	0.65	400	X H	58.5	2.3	3.43	0.24	101	82-118	60-140

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

QC-MS#2 52255

MATRIX SPIKES

Page 1

SUMMARY DATA SECTION

Page 13

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>04/27/05</u>

00000017

**EBERLINE SERVICES / RICHMOND**  
**SAMPLE DELIVERY GROUP H3071**

R503072-01

B19429

**DATA SHEET**

SDG <u>7256</u>	Client/Case no <u>Hanford</u>	SDG <u>H3071</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R503072-01</u>	Client sample id <u>B19429</u>	
Dept sample id <u>7256-001</u>	Location/Matrix <u>216-Z-7; 57.5ft-60ft</u>	<u>SOLID</u>
Received <u>03/10/05</u>	Collected/Weight <u>02/22/05 10:30</u>	<u>372 g</u>
% solids <u>97.0</u>	Custody/SAF No <u>F03-025-151</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	0.631	0.18	0.26	400		H
Carbon 14	14762-75-5	1.14	1.7	2.9	50	U	C
Nickel 63	13981-37-8	-0.911	2.3	4.0	30	U	NI_L
Total Strontium	SR-RAD	-0.036	0.14	0.31	1.0	U	SR
Technetium 99	14133-76-7	-0.030	0.19	0.58	15	U	TC
Thorium 228	14274-82-9	1.18	0.13	0.045	1.0		TH
Thorium 230	14269-63-7	0.750	0.13	0.19	1.0		TH
Thorium 232	TH-232	1.22	0.13	0.052	1.0		TH
Potassium 40	13966-00-2	14.9	1.4	0.58			GAM
Cobalt 60	10198-40-0	U		<u>0.075</u>	0.050	U	GAM
Cesium 137	10045-97-3	U		0.069	0.10	U	GAM
Radium 226	13982-63-3	0.524	0.14	<u>0.14</u>	0.10		GAM
Radium 228	15262-20-1	0.632	0.32	<u>0.33</u>	0.20		GAM
Europium 152	14683-23-9	U		<u>0.16</u>	0.10	U	GAM
Europium 154	15585-10-1	U		<u>0.25</u>	0.10	U	GAM
Europium 155	14391-16-3	U		<u>0.17</u>	0.10	U	GAM
Thorium 228	14274-82-9	0.634	0.071	0.073			GAM
Thorium 232	TH-232	0.632	0.32	0.33			GAM
Uranium 235	15117-96-1	U		0.25		U	GAM
Uranium 238	U-238	U		8.8		U	GAM
Americium 241	14596-10-2	U		0.28		U	GAM

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

**DATA SHEETS**  
Page 1  
**SUMMARY DATA SECTION**  
Page 14

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>04/27/05</u>

00000018

**EBERLINE SERVICES / RICHMOND**  
**SAMPLE DELIVERY GROUP H3071**

R503072-02

B19430

**DATA SHEET**

SDG <u>7256</u>	Client/Case no <u>Hanford</u>	SDG <u>H3071</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R503072-02</u>	Client sample id <u>B19430</u>	
Dept sample id <u>7256-002</u>	Location/Matrix <u>216-Z-7; 96'-99.5'</u>	<u>SOLID</u>
Received <u>03/10/05</u>	Collected/Weight <u>03/03/05 07:55</u>	<u>290 g</u>
% solids <u>95.8</u>	Custody/SAF No <u>F03-025-152</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	3.43	0.24	0.27	400		H
Carbon 14	14762-75-5	1.94	1.8	2.9	50	U	C
Nickel 63	13981-37-8	-0.449	1.9	3.3	30	U	NI_L
Total Strontium	SR-RAD	-0.064	0.13	0.29	1.0	U	SR
Technetium 99	14133-76-7	0.019	0.16	0.53	15	U	TC
Thorium 228	14274-82-9	0.577	0.087	0.038	1.0		TH
Thorium 230	14269-63-7	0.497	0.12	0.20	1.0		TH
Thorium 232	TH-232	0.580	0.093	0.061	1.0		TH
Potassium 40	13966-00-2	14.5	1.5	0.49			GAM
Cobalt 60	10198-40-0	0.078	0.066	<u>0.081</u>	0.050	U	GAM
Cesium 137	10045-97-3	U		0.071	0.10	U	GAM
Radium 226	13982-63-3	0.364	0.14	<u>0.16</u>	0.10		GAM
Radium 228	15262-20-1	0.729	0.27	<u>0.29</u>	0.20		GAM
Europium 152	14683-23-9	U		<u>0.20</u>	0.10	U	GAM
Europium 154	15585-10-1	U		<u>0.31</u>	0.10	U	GAM
Europium 155	14391-16-3	U		<u>0.19</u>	0.10	U	GAM
Thorium 228	14274-82-9	0.634	0.12	0.13			GAM
Thorium 232	TH-232	0.729	0.27	0.29			GAM
Uranium 235	15117-96-1	U		0.29		U	GAM
Uranium 238	U-238	U		9.5		U	GAM
Americium 241	14596-10-2	1.77	0.43	0.56			GAM

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

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>04/27/05</u>

00000019

**EBERLINE SERVICES / RICHMOND**  
**SAMPLE DELIVERY GROUP H3071**

R503072-03

B19431

**DATA SHEET**

SDG <u>7256</u>	Client/Case no <u>Hanford</u>	SDG <u>H3071</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R503072-03</u>	Client sample id <u>B19431</u>	
Dept sample id <u>7256-003</u>	Location/Matrix <u>216-Z-7; 117.5ft-120ft</u>	<u>SOLID</u>
Received <u>03/10/05</u>	Collected/Weight <u>03/04/05 09:50</u>	<u>300 g</u>
% solids <u>91.9</u>	Custody/SAF No <u>F03-025-153</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	9.54	0.36	0.28	400		H
Carbon 14	14762-75-5	0.950	1.8	3.0	50	U	C
Nickel 63	13981-37-8	1.47	3.2	5.4	30	U	NI_L
Total Strontium	SR-RAD	-0.027	0.13	0.27	1.0	U	SR
Technetium 99	14133-76-7	-0.060	0.16	0.53	15	U	TC
Thorium 228	14274-82-9	0.900	0.11	0.034	1.0		TH
Thorium 230	14269-63-7	0.998	0.14	0.19	1.0		TH
Thorium 232	TH-232	0.766	0.094	0.048	1.0		TH
Potassium 40	13966-00-2	6.47	1.6	1.3			GAM
Cobalt 60	10198-40-0	U		<u>0.15</u>	0.050	U	GAM
Cesium 137	10045-97-3	U		0.099	0.10	U	GAM
Radium 226	13982-63-3	0.807	0.19	<u>0.20</u>	0.10		GAM
Radium 228	15262-20-1	0.644	0.43	<u>0.47</u>	0.20		GAM
Europium 152	14683-23-9	U		<u>0.26</u>	0.10	U	GAM
Europium 154	15585-10-1	U		<u>0.45</u>	0.10	U	GAM
Europium 155	14391-16-3	U		<u>0.25</u>	0.10	U	GAM
Thorium 228	14274-82-9	0.520	0.096	0.11			GAM
Thorium 232	TH-232	0.644	0.43	0.47			GAM
Uranium 235	15117-96-1	U		0.37		U	GAM
Uranium 238	U-238	U		12		U	GAM
Americium 241	14596-10-2	0.367	0.25	0.33			GAM

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

**DATA SHEETS**

Page 3

**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>04/27/05</u>

00000020

**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3071

Test TH Matrix SOLID  
SDG 7256  
Contact Melissa C. Mannion

**METHOD SUMMARY**

THORIUM, ISOTOPIC IN SOLIDS  
ALPHA SPECTROSCOPY

Client Hanford  
Contract No. 630  
Contract SDG H3071

**RESULTS**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Thorium 230
Preparation batch 7132-050				
B19429	R503072-01		7256-001	0.750
B19430	R503072-02		7256-002	0.497
B19431	R503072-03		7256-003	0.998
BLK (QC ID=52253)	R503072-05		7256-005	U
LCS (QC ID=52252)	R503072-04		7256-004	ok
Duplicate (R503072-01)	R503072-06		7256-006	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 7132-050 2σ prep error 5.0 % Reference Lab Notebook 7132 pg. 49																
B19429	R503072-01		0.19	0.250				87		2182			39	04/02/05	04/02	SS-066
B19430	R503072-02		0.20	0.250				78		2181			30	04/02/05	04/02	SS-061
B19431	R503072-03		0.19	0.250				86		2164			29	04/02/05	04/02	SS-028
BLK (QC ID=52253)	R503072-05		0.19	0.250				87		2162				04/02/05	04/02	SS-036
LCS (QC ID=52252)	R503072-04		0.20	0.250				83		2161				04/02/05	04/02	SS-035
Duplicate (R503072-01)	R503072-06		0.20	0.250				79		2163			39	04/02/05	04/02	SS-042
	(QC ID=52254)															

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 0.20 ± 0.011
FOR 6 SAMPLES	YIELD 83 ± 8

METHOD SUMMARIES

Page 1

SUMMARY DATA SECTION

Page 17

Lab id EBRLINE  
Protocol Hanford  
Version Ver 1.0  
Form DVD-CMS  
Version 3.06  
Report date 04/27/05

00000021

**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3071

Test SR Matrix SOLID  
 SDG 7256  
 Contact Melissa C. Mannion

**METHOD SUMMARY**

TOTAL STRONTIUM IN SOLIDS  
 BETA COUNTING

Client Hanford  
 Contract No. 630  
 Contract SDG H3071

**RESULTS**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	PLANCHET	Total Strontium
Preparation batch 7132-049					
B19429	R503072-01			7256-001	U
B19430	R503072-02			7256-002	U
B19431	R503072-03			7256-003	U
BLK (QC ID=52197)	R503033-03			7254-003	U
LCS (QC ID=52196)	R503033-02			7254-002	ok
Duplicate (R503072-01)	R503072-06			7256-006	- 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 %	BFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- YZED	DETECTOR
Preparation batch 7132-049 2σ prep error 10.0 % Reference Lab Notebook 7132 pg. 49															
B19429	R503072-01			0.31	1.00			85		100			35	03/29/05	GRB-222
B19430	R503072-02			0.29	1.00			83		100			26	03/29/05	GRB-227
B19431	R503072-03			0.27	1.00			85		100			25	03/29/05	GRB-228
BLK (QC ID=52197)	R503033-03			0.33	1.00			77		100				03/29/05	GRB-225
LCS (QC ID=52196)	R503033-02			0.27	1.00			77		<u>99</u>				03/29/05	GRB-217
Duplicate (R503072-01)	R503072-06			0.26	1.00			86		120			35	03/29/05	GRB-201
															(QC ID=52254)

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

PROCEDURES	REFERENCE	SRTOT_SEP_PRECIP_GPC
CP-061	Determination of Moisture Content in Solid Samples rev 3	
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 <u>0.29</u> ± <u>0.054</u>
FOR 6 SAMPLES	YIELD <u>82</u> ± <u>8</u>

METHOD SUMMARIES

Page 2

SUMMARY DATA SECTION

Page 18

Lab id EBRLNE  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-CMS  
 Version 3.06  
 Report date 04/27/05

00000022

**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3071

Test TC Matrix SOLID  
 SDG 7256  
 Contact Melissa C. Mannion

**METHOD SUMMARY**

TECHNETIUM 99 IN SOLIDS  
 BETA COUNTING

Client Hanford  
 Contract No. 630  
 Contract SDG H3071

**RESULTS**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	Technetium PLANCHET	99
Preparation batch 7132-049					
B19429	R503072-01			7256-001	U
B19430	R503072-02			7256-002	U
B19431	R503072-03			7256-003	U
BLK (QC ID=52197)	R503033-03			7254-003	U
LCS (QC ID=52196)	R503033-02			7254-002	ok
Duplicate (R503072-01)	R503072-06			7256-006	- 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 7132-049 2σ prep error 10.0 % Reference Lab Notebook 7132 pg. 49																
B19429	R503072-01			0.58	1.00			94		50			34	03/24/05	03/28	GRB-201
B19430	R503072-02			0.53	1.00			97		50			25	03/24/05	03/28	GRB-203
B19431	R503072-03			0.53	1.00			96		50			25	03/24/05	03/29	GRB-228
BLK (QC ID=52197)	R503033-03			0.61	1.00			83		50				03/24/05	03/29	GRB-224
LCS (QC ID=52196)	R503033-02			0.69	1.00			93		50				03/24/05	03/28	GRB-226
Duplicate (R503072-01)	R503072-06			0.66	1.00			79		50			34	03/24/05	03/28	GRB-221
	(QC ID=52254)															

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 0.60 ± 0.13  
 FOR 6 SAMPLES YIELD 90 ± 15

METHOD SUMMARIES  
 Page 3  
 SUMMARY DATA SECTION  
 Page 19

Lab id EBRLNE  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-CMS  
 Version 3.06  
 Report date 04/27/05

00000023

**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3071

Test GAM Matrix SOLID  
 SDG 7256  
 Contact Melissa C. Mannion

**METHOD SUMMARY**

GAMMA SCAN  
 GAMMA SPECTROSCOPY

Client Hanford  
 Contract No. 630  
 Contract SDG H3071

**RESULTS**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Cobalt 60	Cesium 137
Preparation batch 7132-050					
B19429	R503072-01		7256-001	U	U
B19430	R503072-02		7256-002	0.078 U	U
B19431	R503072-03		7256-003	U	U
BLK (QC ID=52253)	R503072-05		7256-005	U	U
LCS (QC ID=52252)	R503072-04		7256-004	ok	ok
Duplicate (R503072-01)	R503072-06		7256-006	- U	- U
Nominal values and limits from method 200-LW-1/LW-2 Characterization-Soil					
			RDLs (pCi/g)	0.050	0.10

**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 7132-050 2σ prep error 15.0 % Reference Lab Notebook 7132 pg. 49																
B19429	R503072-01		<u>0.59</u>	188						171			38	03/14/05	04/01	JR,05,00
B19430	R503072-02		<u>0.70</u>	168						147			29	03/14/05	04/01	JR,05,00
B19431	R503072-03		<u>0.90</u>	184						110			28	03/14/05	04/01	JR,03,00
BLK (QC ID=52253)	R503072-05		<u>0.70</u>	163						109				03/14/05	04/01	JR,07,00
LCS (QC ID=52252)	R503072-04		<u>0.093</u>	163						110				03/14/05	04/01	JR,05,00
Duplicate (R503072-01)	R503072-06		<u>0.76</u>	188						107			39	03/14/05	04/02	JR,05,00
																(QC ID=52254)
Nominal values and limits from method																
			0.050	163						100						180

PROCEDURES REFERENCE GAMMA\_GS  
 CP-061 Determination of Moisture Content in Solid Samples rev 3  
 CP-100 Ge(Li) Preparation for Commercial Samples, rev 7

AVERAGES ± 2 SD MDA 0.62 ± 0.56  
 FOR 6 SAMPLES YIELD \_\_\_\_\_ ± \_\_\_\_\_

Lab id EBRLNE  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-CMS  
 Version 3.06  
 Report date 04/27/05

00000024

**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3071

Test C Matrix SOLID  
 SDG 7256  
 Contact Melissa C. Mannion

**METHOD SUMMARY**  
 CARBON 14 IN SOLIDS  
 LIQUID SCINTILLATION COUNTING

Client Hanford  
 Contract No. 630  
 Contract SDG H3071

**RESULTS**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	PLANCHET	Carbon 14
Preparation batch 7132-049					
B19429	R503072-01			7256-001	U
B19430	R503072-02			7256-002	U
B19431	R503072-03			7256-003	U
BLK (QC ID=52197)	R503033-03			7254-003	U
LCS (QC ID=52196)	R503033-02			7254-002	ok
Duplicate (R503072-01)	R503072-06			7256-006	- 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	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 7132-049 2σ prep error 10.0 % Reference Lab Notebook 7132 pg. 49																
B19429	R503072-01			2.9	0.447			100		50			39	04/01/05	04/02	LSC-004
B19430	R503072-02			2.9	0.450			100		50			30	04/01/05	04/02	LSC-004
B19431	R503072-03			3.0	0.430			100		50			29	04/01/05	04/02	LSC-004
BLK (QC ID=52197)	R503033-03			4.4	0.300			100		50				04/01/05	04/02	LSC-004
LCS (QC ID=52196)	R503033-02			10	0.300			100		<u>9</u>				04/01/05	04/03	LSC-004
Duplicate (R503072-01)	R503072-06			2.7	0.472			100		50			39	04/01/05	04/02	LSC-004
																(QC ID=52254)

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 4.3 ± 5.7  
 FOR 6 SAMPLES YIELD 100 ± 0

METHOD SUMMARIES

Page 5

SUMMARY DATA SECTION

Page 21

Lab id EBRLNE  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-CMS  
 Version 3.06  
 Report date 04/27/05

00000025

**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3071

**METHOD SUMMARY**

TRITIUM IN SOLIDS  
LIQUID SCINTILLATION COUNTING

Test H Matrix SOLID  
SDG 7256  
Contact Melissa C. Mannion

Client Hanford  
Contract No. 630  
Contract SDG H3071

**RESULTS**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	PLANCHET	Tritium
Preparation batch 7132-050					
B19429	R503072-01	7256-001			0.631
B19430	R503072-02	7256-002			3.43
B19431	R503072-03	7256-003			9.54
BLK (QC ID=52253)	R503072-05	7256-005			U
LCS (QC ID=52252)	R503072-04	7256-004			ok
Duplicate (R503072-01)	R503072-06	7256-006			<u>OUT</u>
Spike (R503072-02)	R503072-07	7256-007			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 7132-050 2σ prep error 10.0 % Reference Lab Notebook 7132 pg. 50																
B19429	R503072-01			0.26	20.4			35		120			57	04/19/05	04/20	LSC-007
B19430	R503072-02			0.27	20.3			35		120			48	04/19/05	04/20	LSC-007
B19431	R503072-03			0.28	20.1			33		120			47	04/19/05	04/20	LSC-007
BLK (QC ID=52253)	R503072-05			0.28	20.0			33		120				04/19/05	04/20	LSC-007
LCS (QC ID=52252)	R503072-04			0.30	20.0			33		105				04/19/05	04/20	LSC-007
Duplicate (R503072-01)	R503072-06			0.26	20.2			35		120			57	04/19/05	04/20	LSC-007
(QC ID=52254)																
Spike (R503072-02)	R503072-07			0.65	20.1			34		<u>22</u>			48	04/19/05	04/20	LSC-007
(QC ID=52255)																

Nominal values and limits from method 400 20.0 25 180

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

AVERAGES ± 2 SD MDA 0.33 ± 0.28  
FOR 7 SAMPLES YIELD 34 ± 2

METHOD SUMMARIES

Page 6

SUMMARY DATA SECTION

Page 22

Lab id EBRLNE  
Protocol Hanford  
Version Ver 1.0  
Form DVD-CMS  
Version 3.06  
Report date 04/27/05

00000026

**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H3071

Test NI L Matrix SOLID  
 SDG 7256  
 Contact Melissa C. Mannion

**METHOD SUMMARY**

NICKEL 63 IN SOLIDS  
 LIQUID SCINTILLATION COUNTING

Client Hanford  
 Contract No. 630  
 Contract SDG H3071

**RESULTS**

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	PLANCHET	Nickel 63
Preparation batch 7132-049					
B19429	R503072-01			7256-001	U
B19430	R503072-02			7256-002	U
B19431	R503072-03			7256-003	U
BLK (QC ID=52197)	R503033-03			7254-003	U
LCS (QC ID=52196)	R503033-02			7254-002	ok
Duplicate (R503072-01)	R503072-06			7256-006	- U

Nominal values and limits from method RDLs (pCi/g) 30  
 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 7132-049 2σ prep error 10.0 % Reference Lab Notebook 7132 pg. 49																
B19429	R503072-01			4.0	0.500			70		50			30	03/23/05	03/24	LSC-004
B19430	R503072-02			3.3	0.500			85		50			21	03/23/05	03/24	LSC-004
B19431	R503072-03			5.4	0.500			52		50			20	03/23/05	03/24	LSC-004
BLK (QC ID=52197)	R503033-03			3.5	0.500			79		50				03/23/05	03/24	LSC-004
LCS (QC ID=52196)	R503033-02			4.6	0.500			74		35				03/23/05	03/24	LSC-004
Duplicate (R503072-01)	R503072-06			5.4	0.500			52		50			30	03/23/05	03/24	LSC-004
	(QC ID=52254)															

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	4.4 ± 1.8
FOR 6 SAMPLES	YIELD	69 ± 28

Lab id EBRLNE  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-CMS  
 Version 3.06  
 Report date 04/27/05

00000027

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H3071

SDG 7256  
Contact Melissa C. Mannion

REPORT GUIDE

Client Hanford  
Contract No. 630  
Case no SDG H3071

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.

REPORT GUIDES

Page 1

SUMMARY DATA SECTION

Page 24

Lab id EBRLNE  
Protocol Hanford  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 04/27/05

00000028

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H3071

SDG 7256  
 Contact Melissa C. Mannion

REPORT GUIDE

Client Hanford  
 Contract No. 630  
 Case no SDG H3071

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.

Lab id EBRLNE  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-RG  
 Version 3.06  
 Report date 04/27/05

00000029

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H3071

SDG 7256  
 Contact Melissa C. Mannion

REPORT GUIDE

Client Hanford  
 Contract No. 630  
 Case no SDG H3071

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.

Lab id EBRLNE  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-RG  
 Version 3.06  
 Report date 04/27/05

00000030

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H3071

SDG 7256  
 Contact Melissa C. Mannion

REPORT GUIDE

Client Hanford  
 Contract No. 630  
 Case no SDG H3071

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).

Lab id EBRLNE  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-RG  
 Version 3.06  
 Report date 04/27/05

00000031

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H3071

SDG 7256  
 Contact Melissa C. Mannion

GUIDE , c o n t .

Client Hanford  
 Contract No. 630  
 Case no SDG\_H3071

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.

Lab id EBRLNE  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-RG  
 Version 3.06  
 Report date 04/27/05

00000032

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H3071

SDG 7256  
Contact Melissa C. Mannion

GUIDE , cont .

Client Hanford  
Contract No. 630  
Case no SDG H3071

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.

Lab id EBRLNE  
Protocol Hanford  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 04/27/05

00000033

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H3071

SDG 7256  
 Contact Melissa C. Mannion

REPORT GUIDE

Client Hanford  
 Contract No. 630  
 Case no SDG H3071

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.

REPORT GUIDES

Page 7

SUMMARY DATA SECTION

Page 30

Lab id EBRLNE  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-RG  
 Version 3.06  
 Report date 04/27/05

00000034

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H3071

SDG 7256  
Contact Melissa C. Mannion

REPORT GUIDE

Client Hanford  
Contract No. 630  
Case no SDG H3071

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.

REPORT GUIDES

Page 8

SUMMARY DATA SECTION

Page 31

Lab id EBRLNE  
Protocol Hanford  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 04/27/05

00000035

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H3071

SDG 7256  
Contact Melissa C. Mannion

GUIDE, cont.

Client Hanford  
Contract No. 630  
Case no SDG H3071

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.

REPORT GUIDES

Page 9

SUMMARY DATA SECTION

Page 32

Lab id EBRLNE  
Protocol Hanford  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 04/27/05

00000036

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H3071

SDG 7256  
Contact Melissa C. Mannion

REPORT GUIDE

Client Hanford  
Contract No. 630  
Case no SDG H3071

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

REPORT GUIDES

Page 10

SUMMARY DATA SECTION

Page 33

Lab id EBRLNE  
Protocol Hanford  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 04/27/05

00000037

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H3071

SDG 7256  
Contact Melissa C. Mannion

GUIDE , c o n t .

Client Hanford  
Contract No. 630  
Case no SDG H3071

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.

Lab id EBRLNE  
Protocol Hanford  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 04/27/05

00000038

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H3071

SDG 7256  
 Contact Melissa C. Mannion

REPORT GUIDE

Client Hanford  
 Contract No. 630  
 Case no SDG H3071

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'

Lab id EBRLNE  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-RG  
 Version 3.06  
 Report date 04/27/05

00000039

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H3071

SDG 7256  
 Contact Melissa C. Mannion

GUIDE, cont.

Client Hanford  
 Contract No. 630  
 Case no SDG H3071

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 04/27/05

REPORT GUIDES

Page 13

SUMMARY DATA SECTION

Page 36

00000040

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H3071

SDG 7256  
 Contact Melissa C. Mannion

GUIDE, cont.

Client Hanford  
 Contract No. 630  
 Case no SDG H3071

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 04/27/05

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H3071

SDG 7256

Contact Melissa C. Mannion

GUIDE, cont.

Client Hanford

Contract No. 630

Case no SDG H3071

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 38

Lab id EBRLNE

Protocol Hanford

Version Ver 1.0

Form DVD-RG

Version 3.06

Report date 04/27/05

00000042

**FLUOR Hanford Inc.**

**COLLECTOR**  
Pope/Pfister/Tyra/Wiberg

**SAMPLING LOCATION**  
216-Z-7; 57.5R-60T

**ICE CHEST NO.**  
GRP-03-025

**COMPANY CONTACT**  
TRENT, STEVE

**TELEPHONE NO.**  
373-5689

**PROJECT COORDINATOR**  
TRENT, SJ

**SAF NO.**  
F03-025

**METHOD OF SHIPMENT**  
Federal Express

**PRICE CODE**  
8N

**AIR QUALITY**

**DATA TURNAROUND**  
45 Days / 45 Days

**F03-025-151**

**PAGE 1 OF 1**

**CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST**

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

**FIELD LOGBOOK NO.**  
11NF-N-356 1

**COA**  
119143E510

**PROJECT COORDINATOR**  
TRENT, SJ

**SAF NO.**  
F03-025

**METHOD OF SHIPMENT**  
Federal Express

**BILL OF LADING/AIR BILL NO.**  
See PTR 15019

**SHIPPED TO**  
Eberline Services

**OFFSITE PROPERTY NO.**  
See PTR 15019

PRECONSERVATION	COOL AC	PRESERVATION
None	None	None
pg	pg	pg
1	1	1
250ml	250ml	250ml

**TYPE OF CONTAINER**  
pg

**NO. OF CONTAINER(S)**  
1

**VOLUME**  
250ml

**SAMPLE ANALYSIS**  
SEE ITEM (1) IN SPECIAL INSTRUCTIONS  
SEE ITEM (2) IN SPECIAL INSTRUCTIONS

**SPECIAL HANDLING AND/OR STORAGE**  
Radonachou Tie ID: D9418

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME
B19429	SOIL	2-22-05	10:30

**CHAIN OF POSSESSION**

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
David Tyra	2/22/05 1300	Z-7 site fridge	2/22/05 1300
David Tyra	3/3/05 1020	David Tyra	3/3/05 1020
David Tyra	3/3/05 1400	MO-026, Fridge #3	3/3/05 1400
MO-026 Fridge #3	3/19/05 0930	Greg Thomas	3/19/05 0930
Greg Thomas	3/19/05 0930	Ref Ex	
Ref Ex	3/19/05 0930	RECEIVED BY/STORED IN	DATE/TIME
Ref Ex	3/19/05	RECEIVED BY/STORED IN	DATE/TIME
Ref Ex	3/19/05	RECEIVED BY/STORED IN	DATE/TIME

**SPECIAL INSTRUCTIONS**

(1) Chromium Hex - 7196; NO2/NO3 - 3592; Solids - 9030; Oil & Grease - 413.1;  
(2) Nickel-63; Gamma Spec - Radium-226, Radium-228, Thorium-230, Thorium-232; Tritium - H3; Carbon-14; Strontium-89,90 -- Total Isotopic Thorium (Thorium-232)

**LABORATORY SECTION**

**RECEIVED BY**

**DISPOSAL METHOD**

**FINAL SAMPLE DISPOSITION**

**DATE/TIME**

**DISPOSED BY**

**DATE/TIME**



FLUOR Hanford Inc.		CHAIN OF CUSTODY / SAMPLE ANALYSIS REQUEST		F03-025-153	PAGE 1	OF 1
COLLECTOR Pope/Pfister/Tyra/Wiberg	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; 117.5R-120ft	PROJECT DESIGNATION 200-LW-1/LW-2 Characterization - Soil	H3071 (7256)	SAF NO. F03-025	AIR QUALITY		
ICE CHEST NO. GRP-03-025	FIELD LOGBOOK NO. HNF-N-356 1	COA 119143E510	METHOD OF SHIPMENT Federal Express	BILL OF LADING/AIR BILL NO. PTR 15019		
SHIPPED TO Eberline Services	OFFSITE PROPERTY NO. See PTR 15019	Preservation Cool 4C				
MATRIX* A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WF=Water X=Other	POSSIBLE SAMPLE HAZARDS/REMARKS N/A	Type of Container aG	NO. OF CONTAINER(S) 1	VOLUME 250ml	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS
SPECIAL HANDLING AND/OR STORAGE Radioactive TRTD: B19420						
SAMPLE NO. B19431	MATRIX* SOIL	SAMPLE DATE 3/4/05	SAMPLE TIME 0950	SIGN / PRINT NAMES		
CHAIN OF POSSESSION		RECEIVED BY/STORED IN		DATE/TIME		
RELINQUISHED BY/REMOVED FROM		David Tyra / Pope		3-4-05	1230	
RELINQUISHED BY/REMOVED FROM		Mo-026 Fridge #1		3/9/05	0930	
RELINQUISHED BY/REMOVED FROM		Greg Thomas / Wiberg		3/9/05	0920	
RELINQUISHED BY/REMOVED FROM		Fed Ex		3/10/05		
RELINQUISHED BY/REMOVED FROM		SON TARA		3/10/05		
RELINQUISHED BY/REMOVED FROM						
RELINQUISHED BY/REMOVED FROM						
RELINQUISHED BY/REMOVED FROM						
RELINQUISHED BY/REMOVED FROM						
RELINQUISHED BY/REMOVED FROM						
RELINQUISHED BY/REMOVED FROM						
LABORATORY SECTION		RECEIVED BY		TITLE		
FINAL SAMPLE DISPOSITION		DISPOSAL METHOD		DATE/TIME		

SPECIAL INSTRUCTIONS  
 (1) Chromium-Hex-7196; NO2/NO3-3532; Sulphides-9030; Oil & Grease-4131;  
 (2) Nickel-63; Gamma Spec - Radium-226; Radium-228; Technetium-99;  
 Isotopic Thorium (Thorium-232) Tritium - H3; Carbon-14; Strontium-89,90 -- Total Sr;



RICHMOND, CA LABORATORY

SAMPLE RECEIPT CHECKLIST

206 H 5071  
CA + 7256

Client Hanford City Richland State CA  
Date/Time received 3/10/05 CoC No. FO3-025-157

Container I.D. No. 512P-03-025 Requested TAT (Days) 45 P.D. 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: 5 Sample Matrix Soil
- 7. Number of containers per sample: \_\_\_\_\_ (Or see CoC FO3-025)
- 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 TS Date: 03/10/05 Time: 10:50 AM

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

Ion Chamber Ser. No. \_\_\_\_\_ Calibration date \_\_\_\_\_  
Alpha Meter Ser. No. \_\_\_\_\_ Calibration date \_\_\_\_\_  
Beta/Gamma Meter Ser. No. \_\_\_\_\_ Calibration date \_\_\_\_\_



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



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

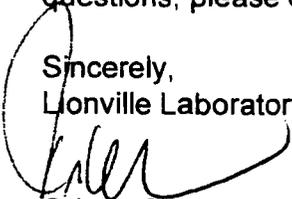
Dear Mr. Trent:

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

LvLI Batch #	0503L967
SDG #	H3071
SAF #	F03-025
Date Received	3-10-05
# Samples	3
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\_itr.doc



Lionville Laboratory, Inc.  
 INORGANIC ANALYTICAL DATA PACKAGE FOR  
 TNUHANFORD F03-025 H3071

DATE RECEIVED: 03/10/05

LVL LOT # :0503L967

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B19429						
% SOLIDS	001	S	05L*S035	02/22/05	03/11/05	03/11/05
CHROMIUM VI	001	S	05LVI021	02/22/05	03/14/05	03/14/05
NITRATE NITRITE	001	S	05LN3017	02/22/05	03/23/05	03/24/05
OIL & GREASE BY GRAV	001	S	05LOG013	02/22/05	03/17/05	03/18/05
SULFIDE	001	S	05LSDA12	02/22/05	03/14/05	03/14/05
B19430						
% SOLIDS	002	S	05L*S035	03/03/05	03/11/05	03/11/05
CHROMIUM VI	002	S	05LVI021	03/03/05	03/14/05	03/14/05
NITRATE NITRITE	002	S	05LN3017	03/03/05	03/23/05	03/24/05
NITRATE NITRITE	002 REP	S	05LN3017	03/03/05	03/23/05	03/24/05
NITRATE NITRITE	002 MS	S	05LN3017	03/03/05	03/23/05	03/24/05
OIL & GREASE BY GRAV	002	S	05LOG013	03/03/05	03/17/05	03/18/05
SULFIDE	002	S	05LSDA12	03/03/05	03/14/05	03/14/05
SULFIDE	002 REP	S	05LSDA12	03/03/05	03/14/05	03/14/05
SULFIDE	002 MS	S	05LSDA12	03/03/05	03/14/05	03/14/05
B19431						
% SOLIDS	003	S	05L*S035	03/04/05	03/11/05	03/11/05
CHROMIUM VI	003	S	05LVI021	03/04/05	03/14/05	03/14/05
CHROMIUM VI	003 REP	S	05LVI021	03/04/05	03/14/05	03/14/05
CHROMIUM VI	003 MS	S	05LVI021	03/04/05	03/14/05	03/14/05
CHROMIUM VI	003 MSD	S	05LVI021	03/04/05	03/14/05	03/14/05
NITRATE NITRITE	003	S	05LN3017	03/04/05	03/23/05	03/24/05
OIL & GREASE BY GRAV	003	S	05LOG013	03/04/05	03/17/05	03/18/05
OIL AND GREASE BY GR	003 REP	S	05LOG013	03/04/05	03/17/05	03/18/05
OIL AND GREASE BY GR	003 MS	S	05LOG013	03/04/05	03/17/05	03/18/05
SULFIDE	003	S	05LSDA12	03/04/05	03/14/05	03/14/05

LAB QC:

CHROMIUM VI	MB1	S	05LVI021	N/A	03/14/05	03/14/05
CHROMIUM VI	MB1 BS	S	05LVI021	N/A	03/14/05	03/14/05

Lionville Laboratory, Inc.  
INORGANIC ANALYTICAL DATA PACKAGE FOR  
TNUHANFORD F03-025 H3071

DATE RECEIVED: 03/10/05

LVL LOT # :0503L967

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
CHROMIUM VI	MB1 BSD	S	05LVI021	N/A	03/14/05	03/14/05
NITRATE NITRITE	MB1	S	05LN3017	N/A	03/23/05	03/24/05
NITRATE NITRITE	MB1 BS	S	05LN3017	N/A	03/23/05	03/24/05
OIL & GREASE BY GRAV	MB1	S	05LOG013	N/A	03/17/05	03/18/05
OIL AND GREASE BY GR	MB1 BS	S	05LOG013	N/A	03/17/05	03/18/05
SULFIDE	MB1	S	05LSDA12	N/A	03/14/05	03/14/05
SULFIDE	MB1 BS	S	05LSDA12	N/A	03/14/05	03/14/05
SULFIDE	MB1 BSD	S	05LSDA12	N/A	03/14/05	03/14/05



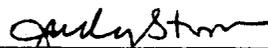
## Analytical Report

Client: TNU-HANFORD F03-025 H3071  
LVL#: 0503L967

W.O.#: 11343-606-001-9999-00  
Date Received: 03-10-05

### INORGANIC NARRATIVE

1. This narrative covers the analyses of 3 soil samples.
2. The samples were prepared and analyzed in accordance with the methods indicated on the attached glossary.
3. Sample holding times as required by the method and/or contract were met with the exception of Sulfide that were received past hold.
4. The results presented in this report are derived from samples that met LvLI's sample acceptance policy with the exception of Sulfide as noted on the Sample Receipt Checklist.
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 (RPD) control limit.
7. The matrix spike recoveries for Nitrate Nitrite, Sulfide, Chromium VI and Oil and Grease were within the 75-125% control limits.
8. The replicate analyses for Nitrate Nitrite, Sulfide, Chromium VI and Oil and Grease 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.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated

4/7/05  
Date

njp\03-967

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 15 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.)	✓ <sup>EPA</sup> 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: Nitrate Nitrite		Method: EPA 353.2(mod.)	
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 04/05/05

CLIENT: TNUHANFORD P03-025 H3071  
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0503L967

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B19429	% Solids	96.9	%	0.01	1.0
		Chromium VI	0.21	u MG/KG	0.21	1.0
		Nitrate Nitrite	0.71	MG/KG	0.21	1.0
		Oil & Grease Gravimetri	688	u MG/KG	688	1.0
		Sulfide	41.7	u MG/KG	41.7	1.0
-002	B19430	% Solids	96.0	%	0.01	1.0
		Chromium VI	0.21	u MG/KG	0.21	1.0
		Nitrate Nitrite	0.44	MG/KG	0.21	1.0
		Oil & Grease Gravimetri	695	u MG/KG	695	1.0
		Sulfide	43.1	u MG/KG	43.1	1.0
-003	B19431	% Solids	92.2	%	0.01	1.0
		Chromium VI	0.22	u MG/KG	0.22	1.0
		Nitrate Nitrite	0.36	MG/KG	0.22	1.0
		Oil & Grease Gravimetri	723	u MG/KG	723	1.0
		Sulfide	42.2	u MG/KG	42.2	1.0

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 04/05/05

CLIENT: TNUHANFORD P03-025 H3071  
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0503L967

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-----	-----	-----	-----	-----	-----	-----
BLANK10	05LVI021-MB1	Chromium VI	0.20	u MG/KG	0.20	1.0
BLANK10	05LN3017-MB1	Nitrate Nitrite	0.20	u MG/KG	0.20	1.0
BLANK10	05LOG013-MB1	Oil & Grease Gravimetri	667	u MG/KG	667	1.0
BLANK10	05LSDA12-MB1	Sulfide	40.0	u MG/KG	40.0	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 04/05/05

CLIENT: TNUHANFORD F03-025 H3071  
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0503L967

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR (SPK)
-002	B19430	Nitrate Nitrite	6.1	0.44	5.2	109.6	1.0
		Sulfide	347	1.1	377	91.7	1.0
-003	B19431	Soluble Chromium VI	4.7	021u	4.3	103.4	1.0
		Insoluble Chromium VI	1420	021u	1140	124.8	100
		Oil & Grease Gravimetr	6030	723 u	7420	81.4	1.0
BLANK10	05LVI021-MB1	Soluble Chromium VI	4.1	0.20u	4.0	101.3	1.0
		Insoluble Chromium VI	1240	0.20u	1100	112.4	100
BLANK10	05LN3017-MB1	Nitrate Nitrite	5.1	0.20u	5.0	102.4	1.0
BLANK10	05LOG013-MB1	Oil & Grease Gravimetr	6470	667 u	6840	94.5	1.0
BLANK10	05LSDA12-MB1	Sulfide	320	40.0 u	365	87.6	1.0
		Sulfide MSD	312	40.0 u	365	85.4	1.0

Lionville Laboratory, Inc.

INORGANICS DUPLICATE SPIKE REPORT 04/05/05

CLIENT: TNUHANFORD F03-025 H3071

LVL LOT #: 0503L967

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKE#1 %RECOV	SPIKE#2 %RECOV	%DIFF
BLANK10	05LSDA12-MB1	Sulfide	87.6	85.4	2.5

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 04/05/05

CLIENT: INUHANFORD F03-025 H3071

LVL LOT #: 0503L967

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL			DILUTION FACTOR (REP)
			RESULT	REPLICATE RPD		
-002REP	B19430	Nitrate Nitrite	0.44	0.36	19.0	1.0
		Sulfide	43.1 u	40.6 u	NC	1.0
-003REP	B19431	Chromium VI	0.22u	0.22u	NC	1.0
		Oil & Grease Gravimetri	723 u	723 u	NC	1.0



FLUOR Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			PAGE 1 OF 1	
COLLECTOR Pope/Mister/Tyra/Wiberg	COMPANY CONTACT TRENT, STEVE	TELEPHONE NO. 373-5689	PROJECT COORDINATOR TRENT, SJ	PRICE CODE 8N	DATA TURNAROUND 45 Days / 45 Days	
SAMPLING LOCATION 216-2-7; 57.5R-60T	PROJECT DESIGNATION 200-LW-1/LW-2 Characterization - Soil	FIELD LOGBOOK NO. HNF-N-356 1	SAF NO. F03-025	AIR QUALITY <input type="checkbox"/>		
ICE CHEST NO. GPP-05-001	COA 119143ES10	OFFSITE PROPERTY NO. See PFR 15021	METHOD OF SHIPMENT Federal Express	BILL OF LADING/AIR BILL NO. See PFR 15021		
SHIPPED BY Electroline Services	Precra					
MATRIX* A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	POSSIBLE SAMPLE HAZARDS/REMARKS N/A	PRESERVATION Cool 4C	None			
SPECIAL HANDLING AND/OR STORAGE N/A	TYPE OF CONTAINER #6	NO. OF CONTAINER(S) 1	VOLUME 250mL			
SPECIAL HANDLING AND/OR STORAGE N/A	SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS			
SAMPLE NO. B19429	MATRIX* SOIL	SAMPLE DATE 2-22-05	SAMPLE TIME 10:30			
CHAIN OF POSSESSION						
RELINQUISHED BY/REMOVED FROM Z-7 Fridge, 3/3/05	RECEIVED BY/STORED IN David Tyra	DATE/TIME 3/3/05 10:20	DATE/TIME 3/3/05 1400			
RELINQUISHED BY/REMOVED FROM M-026 Fridge #3	RECEIVED BY/STORED IN Greg Thomas	DATE/TIME 3/1/05 1000	DATE/TIME 3/1/05 1400			
RELINQUISHED BY/REMOVED FROM FedEx	RECEIVED BY/STORED IN FedEx	DATE/TIME 3/1/05 1000	DATE/TIME 3/1/05 1400			
RELINQUISHED BY/REMOVED FROM FedEx	RECEIVED BY/STORED IN J.J. Smith	DATE/TIME 3-10-05 10:55	DATE/TIME 3-10-05 10:55			
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	DATE/TIME	DATE/TIME			
SIGN/PRINT NAMES				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, Thorium-232, Tritium - H3; Carbon-14; Strontium-89, 90 - Total		
LABORATORY SECTION	RECEIVED BY	TITLE		DATE/TIME		
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY		DATE/TIME		



PAGE 1 OF 1

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

<b>FLUOR Hanford Inc.</b> COLLECTOR Pope/Plister/Tyra/Wiberg	<b>COMPANY CONTACT</b> TRENT, STEVE TELEPHONE NO. 373-5689	<b>PROJECT COORDINATOR</b> TRENT, SJ SAF NO. F03-025	<b>PRICE CODE</b> 8N <b>AIR QUALITY</b> <input type="checkbox"/> <b>DATA TURNAROUND</b> 45 Days / 45 Days
<b>SAMPLING LOCATION</b> 216-Z-7; 117.5R-120R	<b>PROJECT DESIGNATION</b> 200-LW-1/LW-2 Characterization - Soil	<b>METHOD OF SHIPMENT</b> Federal Express	<b>SAF NO.</b> F03-025
<b>ICE CHEST NO.</b> GP-05-001	<b>FIELD LOGBOOK NO.</b> HNF-N-356 1	<b>COA</b> 119143E510	<b>BILL OF LADING/AIR BILL NO.</b> See PTR 15021
<b>SHIPPED TO</b> Sierra Nevada	<b>OFFSITE PROPERTY NO.</b> See PTR 15021	<b>PRESEVATION</b> None	<b>DATE/TIME</b> 3/4/05 0950
<b>Possible Sample Hazards/Remarks</b> N/A	<b>TYPE OF CONTAINER</b> #G	<b>NO. OF CONTAINER(S)</b> 1	<b>SPECIAL INSTRUCTIONS</b> SEE ITEM (1) IN SPECIAL INSTRUCTIONS SEE ITEM (2) IN SPECIAL INSTRUCTIONS
<b>SPECIAL HANDLING AND/OR STORAGE</b> Radioactive Tracer: Bi9420	<b>VOLUME</b> 250mL	<b>SAMPLE ANALYSIS</b>	<b>SIGN/PRINT NAMES</b>
<b>SAMPLE NO.</b> B19431	<b>MATRIX*</b> SOIL	<b>SAMPLE DATE</b> 3/4/05	<b>SAMPLE TIME</b> 0950

CHAIN OF POSSESSION		SIGN/PRINT NAMES	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
David Tyra/Da.../3-4-05	1230	M0-026 Frid... #1	3-4-05 1230
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
M0-026 Frid... #1	3/4/05 1000	Greg.../3/4/05	1000
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Greg.../3/4/05	1000	Fidel...	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
DALEX	3.10.05/0955	JD.../Smith	3.10.05/0955
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

**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;  
 Isotope: Thorium-232, Tritium - H3, Carbon-14, Strontium-89, 90 - Total 67.

<b>LABORATORY SECTION</b>	<b>RECEIVED BY</b>	<b>TITLE</b>	<b>DATE/TIME</b>
<b>FINAL SAMPLE DISPOSITION</b>	<b>DISPOSAL METHOD</b>	<b>DISPOSED BY</b>	<b>DATE/TIME</b>

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

CLIENT: TNU Hamford

Date: 3-10-05

Purchase Order / Project# /  
SAF# / SOW# / Release #: F03-025

LvLI Batch #: 0503L967

Sample Custodian: *D. Smith*

NOTE: EXPLAIN ALL DISCREPANCIES

- |   |  |  |
|---|--|--|
| 1. Samples Hand Delivered or <u>Shipped</u>   | Carrier <i>DeDEx</i>   | Airbill# 7915 6885 2297                              |
| 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 <u>cooled</u> or ambient?   | Temp <i>43 °C</i>  | Cooler # <i>GRP-05-001</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 checked="" type="checkbox"/> No | <i>Sulfide past hold</i>                             |
| 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 checked="" type="checkbox"/> No | <i>All # 12</i>                                      |
| 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 27, 2005

This is the Certificate of Analysis for the following samples:

Shaw Project ID:	<b>Eberline - Hanford</b>
Shaw Project Number:	<b>100846.57000000</b>
Client Sample Data Group:	H3071
Date Received by Lab:	March 16, 2005
Number of Samples:	Two (2)
Sample Type:	Soil



### I. Introduction/Case Narrative

Two soil samples were received by the Shaw Geotechnical Laboratory on March 16, 2005. The samples were submitted for determination of moisture content, bulk density, and sieve analysis. The sample numbers received was B19435 and B19436.

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

00000001

## 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**  
Bulk Density of Soils..... **EM 1110-2-1906**  
Particle-size Analysis of Soils ..... **ASTM D 422**

## 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.
- 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).

#### IV. Data Qualification

None.

00000003

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

00000004

Page 4 of 11  
April 27, 2005  
Stephen Trent  
Fluor Hanford, Inc.  
Shaw Project Name: Eberline Hanford  
Shaw Project No. 100846.57000000  
SDG No. H3071

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

---

**SAMPLE NUMBER CROSS-REFERENCE LIST**

---

<b>LAB SAMPLE NO.</b>	<b>CLIENT SAMPLE NO.</b>	<b>MATRIX</b>
BC0544 .....	B19435 .....	Soil
BC0545 .....	B19436 .....	Soil

00000005

**Appendix B**  
**Sample Test Results**

00000006





**PARTICLE-SIZE DISTRIBUTION  
 ASTM D 422**

Project Name Eberline Hanford

Field Sample No. B19435

Project No. 100846.57000000

Lab Sample No. BC0544

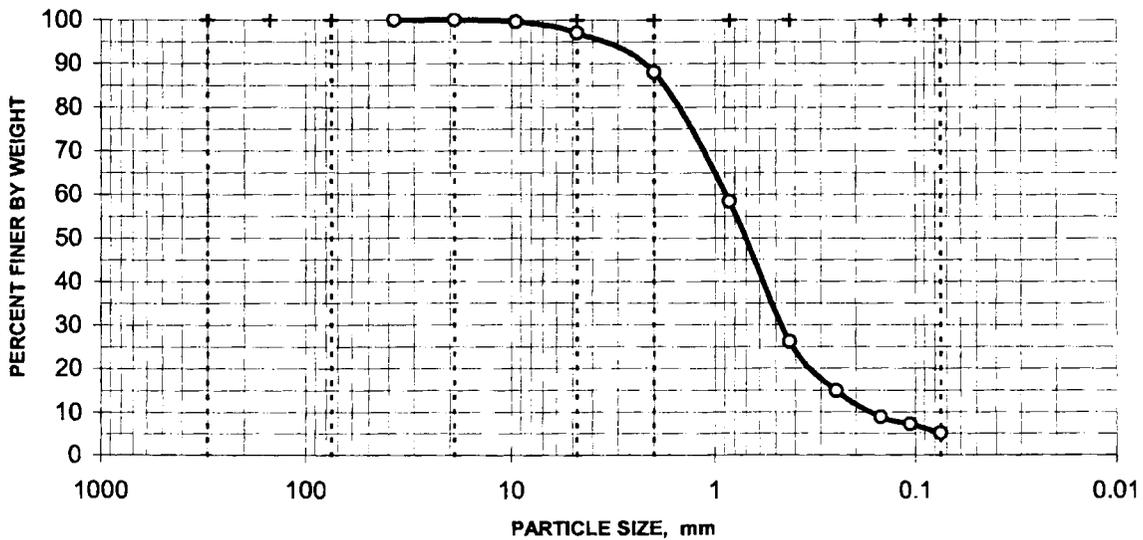
Moisture Content = 4.4%  
 based on dry sample weight

**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	99.6%
	#4	4.750	97.1%
	#10	2.000	88.0%

F I N E	Sieve No.	Diameter mm	Percent Finer
	#20	0.850	58.5%
	#40	0.425	26.2%
	#60	0.250	14.9%
	#100	0.149	8.8%
	#140	0.106	7.2%
	#200	0.075	5.1%

**DISTRIBUTION CURVE**



2.9% Gravel

92.0% Sand

5.1% Silt/Clay

00000009

**PARTICLE-SIZE DISTRIBUTION  
 ASTM D 422**

Project Name Eberline Hanford

Field Sample No. B19436

Project No. 100846.57000000

Lab Sample No. BC0545

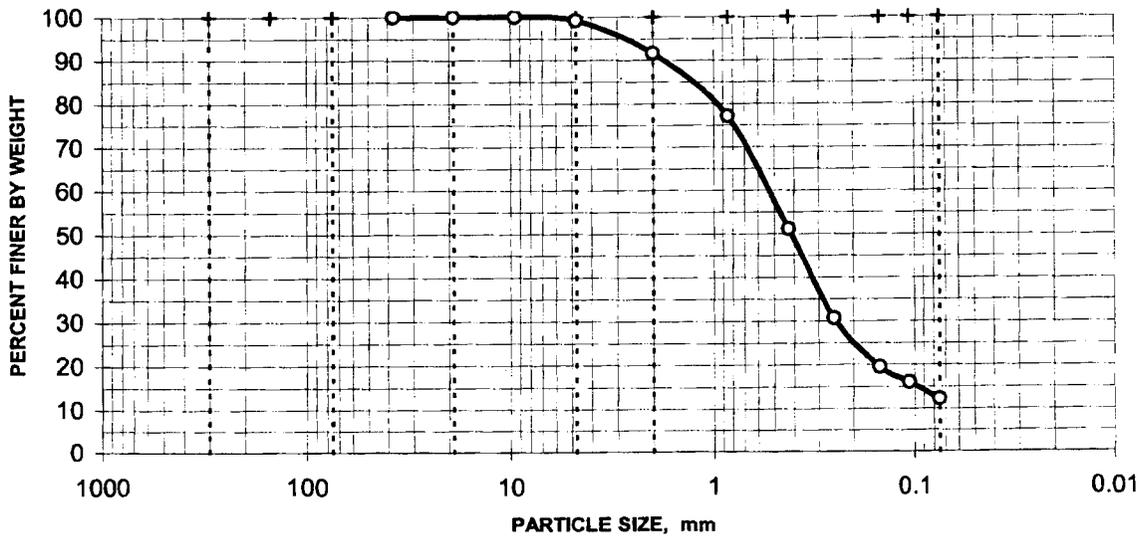
Moisture Content = 5.0%  
 based on dry sample weight

**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	100.0%
	#4	4.750	99.2%
	#10	2.000	91.6%

F I N E	Sieve No.	Diameter mm	Percent Finer
	#20	0.850	77.1%
	#40	0.425	51.1%
	#60	0.250	30.7%
	#100	0.149	19.5%
	#140	0.106	16.0%
	#200	0.075	12.3%

**DISTRIBUTION CURVE**



0.8% Gravel

86.9% Sand

12.3% Silt/Clay

00000010

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

00000011

FLUOR Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F03-025-157	PAGE 1 OF 1
COLLECTOR Pope/Pfister/Tyra/Wiberg	COMPANY CONTACT TRENT, STEVE	TELEPHONE NO. 373-5689	PROJECT COORDINATOR TRENT, SJ	PRICE CODE 8N	AIR QUALITY	DATA TURNAROUND 45 Days / 45 Days
SAMPLING LOCATION 216-Z-7; 57.5ft-60ft	PROJECT DESIGNATION 200-LW-1/LW-2 Characterization - Soil	FIELD LOGBOOK NO. HNF-N-356 1	SAF NO. F03-025	AIR QUALITY		
ICE CHEST NO. GPR-03-025	FIELD LOGBOOK NO. HNF-N-356 1	COA 119143ES10	METHOD OF SHIPMENT Federal Express			
SHIPPED TO Shaw Group	OFFSITE PROPERTY NO. Sec PTR 15019	BILL OF LADING/AIR BILL NO. Sec PTR-15019				
MATRIX* A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	POSSIBLE SAMPLE HAZARDS/REMARKS N/A	PRESERVATION None	TYPE OF CONTAINER Moisture Resistant Cont	NO. OF CONTAINER(S) 1	VOLUME 200ml	1000ml
	SDG# H3071					
	SPECIAL HANDLING AND/OR STORAGE Radioactive Tracer ID: B9418	SAMPLE ANALYSIS Moisture Content - D216;	SEE ITEM (1) IN SPECIAL INSTRUCTIONS			
SAMPLE NO. B19435	MATRIX* SOIL	SAMPLE DATE 2-22-05	SAMPLE TIME 10:30		BC 0544	
CHAIN OF POSSESSION						
RELINQUISHED BY/REMOVED FROM David Isaca	DATE/TIME 3/3/05 1400	SIGN/PRINT NAMES	RECEIVED BY/STORED IN David Isaca	DATE/TIME 3/3/05 1020	SPECIAL INSTRUCTIONS (1) Particle Size (Dry Sieve) - D422; Bulk Density - D2937;	
RELINQUISHED BY/REMOVED FROM Z-7 Friday	DATE/TIME 3/3/05 1020		RECEIVED BY/STORED IN MO-024, Fridge #3	DATE/TIME 3/3/05 1400		
RELINQUISHED BY/REMOVED FROM Mo. 024 Fridge #3	DATE/TIME 3/19/05 0930		RECEIVED BY/STORED IN Gry Thomas	DATE/TIME 3/19/05 0930		
RELINQUISHED BY/REMOVED FROM Gry Thomas	DATE/TIME 3/19/05 0930		RECEIVED BY/STORED IN Fed Ex	DATE/TIME 3/16/05		
RELINQUISHED BY/REMOVED FROM Fed Ex	DATE/TIME 3/16/05		RECEIVED BY/STORED IN SON THAI	DATE/TIME 3/16/05		
RELINQUISHED BY/REMOVED FROM Alex Kelly	DATE/TIME 3/14/05		RECEIVED BY/STORED IN DAN HUBLEY	DATE/TIME 3/16/05 0930		
LABORATORY SECTION	RECEIVED BY D. Hubley	TITLE SMW E T I	DISPOSAL METHOD SR LAB TELH	DATE/TIME 3-16-05/0930		
FINAL SAMPLE DISPOSITION				DATE/TIME		



DASH	SAMPLE IDENTIFICATION	STORED	TESTS	
01A-S	B19435	SHAW	DISPOS E331S E333S E335S	BC 0544
*****				***
02A-S	B19436	SHAW	DISPOS E331S E333S E335S	BC 0545
=====				===

RELEASED BY	DATE	TRANSFERRED TO	DATE	RECEIVED BY	DATE
<i>file kelley</i>	<i>3/14/05</i>	<i>SHAW LAB</i>	<i>3/14/05</i>	<i>D. Huskey, SNAWEI</i>	<i>3/16/05</i>
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____