



0060740

15 September 2003

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 #	0308L195
SDG #	H2314
SAF #	F03-006
Date Received	8-15-03
# Samples	1
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

RECEIVED
NOV 24 2003
EDMC

Lionville Laboratory, Inc.
 INORGANIC ANALYTICAL DATA PACKAGE FOR
 TNUHANFORD F03-006 H2314

DATE RECEIVED: 08/15/03

LVL LOT # :0308L195

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B173W3						
% SOLIDS	001	S	03L&S108	08/13/03	08/18/03	08/18/03
% SOLIDS	001 REP	S	03L&S108	08/13/03	08/18/03	08/18/03
CHROMIUM VI	001	S	08LVI062	08/13/03	08/19/03	08/19/03
CHROMIUM VI	001 REP	S	08LVI062	08/13/03	08/19/03	08/19/03
CHROMIUM VI	001 MS	S	08LVI062	08/13/03	08/19/03	08/19/03
CHROMIUM VI	001 MSD	S	08LVI062	08/13/03	08/19/03	08/19/03
NITRATE NITRITE	001	S	03LN3A49	08/13/03	09/03/03	09/03/03
NITRATE NITRITE	001 REP	S	03LN3A49	08/13/03	09/03/03	09/03/03
NITRATE NITRITE	001 MS	S	03LN3A49	08/13/03	09/03/03	09/03/03
OIL & GREASE BY GRAV	001	S	03LOG037	08/13/03	08/21/03	08/25/03
OIL AND GREASE BY GR	001 REP	S	03LOG037	08/13/03	08/21/03	08/25/03
OIL AND GREASE BY GR	001 MS	S	03LOG037	08/13/03	08/21/03	08/25/03

LAB QC:

CHROMIUM VI	MB1	S	08LVI062	N/A	08/19/03	08/19/03
CHROMIUM VI	MB1 BS	S	08LVI062	N/A	08/19/03	08/19/03
CHROMIUM VI	MB1 BSD	S	08LVI062	N/A	08/19/03	08/19/03
NITRATE NITRITE	MB1	S	03LN3A49	N/A	09/03/03	09/03/03
NITRATE NITRITE	MB1 BS	S	03LN3A49	N/A	09/03/03	09/03/03
OIL & GREASE BY GRAV	MB1	S	03LOG037	N/A	08/21/03	08/25/03
OIL AND GREASE BY GR	MB1 BS	S	03LOG037	N/A	08/21/03	08/25/03





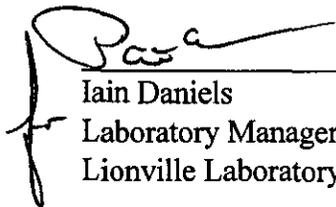
Analytical Report

Client: TNU-HANFORD F03-006 H2314
LVL#: 0308L195

W.O.#: 11343-606-001-9999-00
Date Received: 08-15-03

INORGANIC NARRATIVE

1. This narrative covers the analyses of 1 soil sample.
2. The sample was 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.
4. The results presented in this report are derived from samples that met LvLI's sample acceptance policy.
5. The method blanks were within the method criteria.
6. The Laboratory Control Samples (LCS) were within the laboratory control limits with the exception of 03LOG037-MB1 for Oil and Grease that was below the control limits of 80-120% at 76.2% (an associated matrix spike recovery for Oil and Grease was at 102.0%).
7. The matrix spike recoveries for Nitrate Nitrite and Chromium VI were within the 75-125% control limits, however matrix spike recovery for Oil and Grease was below the control limits at 67.5%.
8. The replicate analyses for Nitrate Nitrite, Oil and Grease, Percent Solids and Chromium VI were within the 20% Relative Percent Difference (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

09-05-03
Date

njpl08-195

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 11 pages.

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.)	✓ 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)	
Specific Gravity	___ D1429-76C/	___ D5057-90	
Sulfur, Total		___ 9056	
Synthetic Preparation Leach		___ 1312	
Paint Filter		___ 9095A	
Other: <i>Nitrate Nitrite</i>		Method: <i>EPA 353.2 (mod.)</i>	
Other:		Method	

Lionville Laboratory Incorporated

METHOD REFERENCES AND DATA QUALIFIERS

DATA QUALIFIERS

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

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

ABBREVIATIONS

MB = Method or Preparation Blank.

MS = Matrix Spike.

MSD = Matrix Spike Duplicate.

REP = Sample Replicate

LC = Laboratory Control Sample.

NC = Not calculated.

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

ANALYTICAL WET CHEMISTRY METHODS

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

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 09/04/03

CLIENT: TNUHANFORD F03-006 H2314
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0308L195

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-----	-----	-----	-----	-----	-----	-----
-001	B173W3	% Solids	96.7	%	0.01	1.0
		Chromium VI	0.41	u MG/KG	0.41	1.0
		Nitrate Nitrite	13.4	MG/KG	0.37	2.0
		Oil & Grease Gravimetri	690	u MG/KG	690	1.0

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 09/04/03

CLIENT: TNUHANFORD F03-006 H2314
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0308L195

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-----	-----	-----	-----	-----	-----	-----
BLANK10	08LVI062-MB1	Chromium VI	0.40	u MG/KG	0.40	1.0
BLANK10	03LN3A49-MB1	Nitrate Nitrite	0.20	u MG/KG	0.20	1.0
BLANK10	03LOG037-MB1	Oil & Grease Gravimetri	667	u MG/KG	667	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 09/04/03

CLIENT: TNUHANFORD F03-006 H2314
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0308L195

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR (SPK)
-001	B173W3	Soluble Chromium VI	4.2	0.41u	4.1	101.5	1.0
		Insoluble Chromium VI	1360	0.41u	1290	105.5	100
		Nitrate Nitrite	19.4	13.4	5.4	110.3	2.0
		Oil & Grease Gravimetr	4410	690 u	6530	67.5	1.0
BLANK10	08LVI062-MB1	Soluble Chromium VI	4.4	0.40u	4.0	109.2	1.0
		Insoluble Chromium VI	1230	0.40u	1170	105.5	100
BLANK10	03LN3A49-MB1	Nitrate Nitrite	5.2	0.20u	5.0	103.6	1.0
BLANK10	03LOG037-MB1	Oil & Grease Gravimetr	4810	667 u	6310	76.2	1.0

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 09/04/03

CLIENT: TNUHANFORD F03-006 H2314
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0308L195

SAMPLE	SITE ID	ANALYTE	INITIAL			DILUTION FACTOR (REP)
			RESULT	REPLICATE RPD		
-001REP	B173W3	% Solids	96.7	96.7	0.052	1.0
		Chromium VI	0.41u	0.41u	NC	1.0
		Nitrate Nitrite	13.4	13.6	1.3	2.0
		Oil & Grease Gravimetri	690 u	690 u	NC	1.0

FH-Central Plateau Project		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-006-203	Page 1 of 1														
Collector Pope/Pfister/Hughes/Johansen		Company Contact LC Hulstrom		Telephone No. 373-3928		Project Coordinator TRENT, SJ	Price Code 8N Data Turnaround 45 Days														
Project Designation 200-PW-2/200-PW-4 OU - Borehole Soil Sampling		Sampling Location ^{7.10.07} 216-A-36B (C3248) - 197.5-200' (24160)			SAF No. F03-006	Air Quality <input type="checkbox"/>	45 Days														
Ice Chest No. SML 452		Field Logbook No. HNF-N-3361		COA 117504ES10		Method of Shipment Federal Express															
Shipped To KELRA MS7-103 EBERLINE SERVICES (Formerly TMA)		Offsite Property No. A030 341			Bill of Lading/Air Bill No. SEK OSL																
POSSIBLE SAMPLE HAZARDS/REMARKS Potentially Radioactive Tie To B17496 Special Handling and/or Storage COOL 4°C				Preservation	Cool 4C	None	None	None													
				Type of Container	aG	aG	aG	aG													
				No. of Container(s)	1	1	1	1													
				Volume	60mL	60mL	60mL	60mL													
SAMPLE ANALYSIS				NO2/NO3 - 353.2; Oil & Grease - 413.1; Chromium Hex - 7196	See item (1) in Special Instructions.	See item (2) in Special Instructions.	Tritium - H3														
Sample No.	Matrix *	Sample Date	Sample Time																		
B173W3	SOIL	8/13/03	0740	X																	
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS				Matrix *									
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		The lab is to achieve a detection limit of 50.0 pCi/g for C-14. FH acknowledges that holding times (less than 14 days) may not be met by the lab due to the radi characteristics. (1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Cesium-134, Radium-226, Radium-228, Thorium-232); Total Uranium; Americium-241; Isotopic Plutonium; Isotopic Uranium (2) Technetium-99, Strontium-90, Total Sr, Isotopic Thorium (Thorium-232); Carbon-14, Iodine-131, Nickel-63, Neptunium-237				8/12/03 ASL									
ISPOPE/ASL		8/13/03 1420		MULLEN		8/13/03 1426															
MO-020		8-14-03 0830		MADISON		8-14-03 0830															
MADISON		8-14-03 0900		FEDEX		8-14-03 0900															
MADISON		8-15-03/0940		MADISON		8-15-03/0940															
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time															
MADISON		8-15-03/0940		MADISON		8-15-03/0940															
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time															
MADISON		8-15-03/0940		MADISON		8-15-03/0940															
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time															
MADISON		8-15-03/0940		MADISON		8-15-03/0940															
LABORATORY SECTION		Received By		Title				Date/Time													
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By				Date/Time													

LIONVILLE LABORATORY INCORPORATED SAMPLE RECEIPT CHECKLIST

CLIENT: TNU Hanford
Purchase Order/Project:

DATE: 8.15.03

SAF# SOW# / Release #: F03-006

Laboratory SDG #: 0308L195

NOTE: ALL ENTRIES MARKED "NO" MUST BE EXPLAINED IN THE COMMENT SECTION

- | | | | | |
|--|---|-----------------------------|---|--|
| 1. Custody seals on coolers or shipping container intact, signed and dated? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> N/A | <input type="checkbox"/> see Comment # |
| 2. Outside of coolers or shipping containers are free from damage? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> N/A | <input type="checkbox"/> see Comment # |
| 3. Airbill # recorded? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> N/A | <input type="checkbox"/> see Comment # |
| 4. All expected paperwork received (coc and other client specific: historical data, alpha/beta or other screening data as applicable)? (paperwork sealed in plastic bag and taped to inside lid) | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> N/A | <input type="checkbox"/> see Comment # |
| 5. Sample containers are intact? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> N/A | <input type="checkbox"/> see Comment # |
| 6. Custody seals on sample containers intact, signed and dated? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> N/A | <input type="checkbox"/> see Comment # |
| 7. All samples on coc received? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> N/A | <input type="checkbox"/> see Comment # |
| 8. All sample label information matches coc? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> N/A | <input type="checkbox"/> see Comment # |
| 9. Laboratory QC samples designated on coc? (QC stickers placed on bottles?) | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> N/A | <input type="checkbox"/> see Comment # |
| 10. Shipment meets LvLI Sample Acceptance Policy? (identify all bottles not within policy. See reverse side for policy) | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> N/A | <input type="checkbox"/> see Comment # |
| 11. Where applicable, bar code labels are affixed to coc? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input checked="" type="checkbox"/> N/A | <input type="checkbox"/> see Comment # |
| 12. coc signed and dated? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> N/A | <input type="checkbox"/> see Comment # |
| 13. coc will be faxed or emailed to client? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> N/A | <input type="checkbox"/> see Comment # |
| 14. Project Manager/Client contacted concerning discrepancies? (name/date) | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input checked="" type="checkbox"/> N/A | <input type="checkbox"/> see Comment # |

Cooler # / temp (°C) and Comments:

SML-452/1.3°

Laboratory Sample Custodian:

D. Smith

Laboratory Project Manager:



EBERLINE SERVICES

September 27, 2003

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



Reference: **P.O. #630**
Eberline Services R3-08-084-7568, SDG H2314

Dear Mr. Trent:

Enclosed is the data report for one solid sample designated under SAF No. F03-006 received at Eberline Services on August 15, 2003. The sample was analyzed according to the accompanying chain-of-custody document.

Please call if you have any questions concerning this report.

Sincerely,

Melissa C. Mannion
Program Manager

MCM

Enclosure: Data Package

Analytical Services
2030 Wright Avenue
P.O. Box 4040
Richmond, California 94804-0040
(510) 235-2633 Fax (510) 235-0438
Toll Free (800) 841-5487
www.eberlineservices.com

1.0 GENERAL

Fluor Hanford Inc. (FH) Sample Delivery Group H2314 was composed of one solid (soil) sample designated under SAF No. F03-006 with a Project Designation of: 200-PW-2/200-PW-4 OU – Borehole Soil Sampling.

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

2.0 ANALYSIS NOTES

2.1 Tritium Analyses

No problems were encountered during the course of the analyses.

2.2 Carbon-14 Analyses

No problems were encountered during the course of the analyses.

2.3 Nickel-63 Analyses

No problems were encountered during the course of the analyses.

2.4 Total Strontium Analyses

No problems were encountered during the course of the analyses.

2.5 Technetium-99 Analyses

There was contamination in the method blank (0.562 pCi/g). The activity was below the RDL (15 pCi/g) for Tc-99. The activity in the method blank was probably from a long-lived isotope in the tracer. No other problems were encountered during the course of the analyses.

2.6 Iodine-129 Analyses

No problems were encountered during the course of the analyses.

2.7 Isotopic Thorium Analyses

No problems were encountered during the course of the analyses.

2.8 Isotopic Uranium Analyses

No problems were encountered during the course of the analyses.

2.9 Total Uranium Analyses

No problems were encountered during the course of the analyses.

2.10 Neptunium-237 Analyses

No problems were encountered during the course of the analyses.

2.11 Isotopic Plutonium Analyses

No problems were encountered during the course of the analyses.

2.12 Americium-241 Analyses

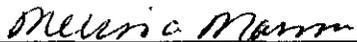
No problems were encountered during the course of the analyses.

2.13 Gamma Spectroscopy Analyses

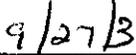
No problems were encountered during the course of the analyses.

Case Narrative Certification Statement

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



Melissa C. Mannion
Program Manager



Date

EBRLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H2314

SDG 7568
Contact Melissa C. Mannion

Client Hanford
Contract No. 630
Case no SDG_H2314

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

T A B L E O F C O N T E N T S				
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Melissa Mannion
Prepared by

Melissa Mannion
Reviewed by

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-TOC
Version 3.06
Report date 09/27/03

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H2314

REPORT GUIDE

SDG 7568
 Contact Melissa C. Mannion

Client Hanford
 Contract No. 630
 Case no SDG_H2314

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 09/27/03

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H2314

SDG 7568
Contact Melissa C. Mannion

GUIDE, cont.

Client Hanford
Contract No. 630
Case no SDG H2314

ABOUT THE DATA SUMMARY SECTION

DUPLICATES

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

MATRIX SPIKES

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

DATA SHEETS

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

METHOD SUMMARIES

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

REPORT GUIDES

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

REPORT GUIDES

Page 2

SUMMARY DATA SECTION

Page 2

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 09/27/03

EBERLINE SERVICES/RICHMOND
 SAMPLE DELIVERY GROUP H2314

SDG 7568
 Contact Melissa C. Mannion

LAB SAMPLE SUMMARY

Client Hanford
 Contract No. 630
 Case no SDG H2314

LAB SAMPLE ID	CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	SAF NO	CHAIN OF CUSTODY	COLLECTED
R308084-01	B173W3	216-A-36B (C4160)	SOLID		F03-006	F03-006-203	08/13/03 07:40
R308084-02	Lab Control Sample		SOLID		F03-006		
R308084-03	Method Blank		SOLID		F03-006		
R308084-04	Duplicate (R308084-01)	216-A-36B (C4160)	SOLID		F03-006		08/13/03 07:40
R308084-05	Spike (R308084-01)	216-A-36B (C4160)	SOLID		F03-006		08/13/03 07:40

Lab id EBRLNE
 Protocol Hanford
 Version Ver 1.0
 Form DVD-LS
 Version 3.06
 Report date 09/27/03

EBERLINE SERVICES/RICHMOND
SAMPLE DELIVERY GROUP H2314

SDG 7568
 Contact Melissa C. Mannion

Client Hanford
 Contract No. 630
 Case no SDG H2314

QC SUMMARY

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	% SOLIDS	SAMPLE AMOUNT	BASIS AMOUNT	DAYS SINCE RECEIVED	LAB COLL SAMPLE ID	DEPARTMENT SAMPLE ID
7568	F03-006-203	B173W3	SOLID	96.6	228.7 g		08/15/03 2	R308084-01	7568-001
		Method Blank	SOLID					R308084-03	7568-003
		Lab Control Sample	SOLID					R308084-02	7568-002
		Duplicate (R308084-01)	SOLID	96.6	228.7 g		08/15/03 2	R308084-04	7568-004
		Spike (R308084-01)	SOLID	96.6	228.7 g		08/15/03 2	R308084-05	7568-005

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2314

SDG 7568
 Contact Melissa C. Mannion

PREP BATCH SUMMARY

Client Hanford
 Contract No. 630
 Case no SDG H2314

TEST	MATRIX	METHOD	PREPARATION ERROR		PLANCHETS ANALYZED				QUALIFIERS	
			BATCH	2σ %	CLIENT	MORE	RE	BLANK		LCS
Alpha Spectroscopy										
AM	SOLID	Americium 241 in Soil	7078-030	5.0	1			1	1	1/1
NP	SOLID	Neptunium in Soil	7078-030	5.0	1			1	1	1/1
PU	SOLID	Plutonium, Isotopic in Solids	7078-030	5.0	1			1	1	1/1
TH	SOLID	Thorium, Isotopic in Soil	7078-030	5.0	1			1	1	1/1
U	SOLID	Uranium, Isotopic in Soil	7078-030	5.0	1			1	1	1/1
Beta Counting										
SR	SOLID	Total Strontium in Soil	7078-030	10.0	1			1	1	1/1
TC	SOLID	Technetium 99 in Soil	7078-030	10.0	1			1	1	1/1
Gamma Spectroscopy										
GAM	SOLID	Gamma Scan	7078-030	15.0	1			1	1	1/1
I	SOLID	Iodine 129 in Soil	7078-030	10.0	1			1	1	1/1
Kinetic Phosphorimetry (KPA)										
U_T	SOLID	Uranium, Total in Soil	7078-030	9.0	1			1	1	1/1
Liquid Scintillation Counting										
C	SOLID	Carbon 14 in Soil	7078-030	10.0	1			1	1	1/1
H	SOLID	Tritium in Soil	7078-030	10.0	1			1	1	1/1 1/1 X
NI_L	SOLID	Nickel 63 in Soil	7078-030	10.0	1			1	1	1/1

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

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SAMPLE DELIVERY GROUP H2314

LAB WORK SUMMARY

SDG 7568
Contact Melissa C. Mannion

Client Hanford
Contract No. 630
Case no SDG H2314

LAB SAMPLE COLLECTED RECEIVED	CLIENT SAMPLE ID LOCATION CUSTODY	SAF No	MATRIX	PLANCHET	TEST	SUF-FIX	ANALYZED	REVIEWED	BY	METHOD
R308084-01	B173W3			7568-001	AM		09/17/03	09/26/03	MWT	Americium 241 in Soil
08/13/03	216-A-36B (C4160)		SOLID	7568-001	C		09/09/03	09/26/03	MWT	Carbon 14 in Soil
08/15/03	F03-006-203	F03-006		7568-001	GAM		09/18/03	09/26/03	MWT	Gamma Scan
				7568-001	H		09/23/03	09/26/03	MWT	Tritium in Soil
				7568-001	I		09/23/03	09/26/03	MWT	Iodine 129 in Soil
				7568-001	NI_L		09/17/03	09/26/03	MWT	Nickel 63 in Soil
				7568-001	NP		09/18/03	09/26/03	MWT	Neptunium in Soil
				7568-001	PU		09/19/03	09/26/03	MWT	Plutonium, Isotopic in Solids
				7568-001	SR		09/12/03	09/26/03	MWT	Total Strontium in Soil
				7568-001	TC		09/23/03	09/26/03	MWT	Technetium 99 in Soil
				7568-001	TH		09/12/03	09/26/03	MWT	Thorium, Isotopic in Soil
				7568-001	U		09/16/03	09/26/03	MWT	Uranium, Isotopic in Soil
				7568-001	U_T		09/09/03	09/26/03	MWT	Uranium, Total in Soil
R308084-02	Lab Control Sample			7568-002	AM		09/17/03	09/26/03	MWT	Americium 241 in Soil
			SOLID	7568-002	C		09/09/03	09/26/03	MWT	Carbon 14 in Soil
		F03-006		7568-002	GAM		09/17/03	09/26/03	MWT	Gamma Scan
				7568-002	H		09/23/03	09/26/03	MWT	Tritium in Soil
				7568-002	I		09/23/03	09/26/03	MWT	Iodine 129 in Soil
				7568-002	NI_L		09/17/03	09/26/03	MWT	Nickel 63 in Soil
				7568-002	NP		09/18/03	09/26/03	MWT	Neptunium in Soil
				7568-002	PU		09/19/03	09/26/03	MWT	Plutonium, Isotopic in Solids
				7568-002	SR		09/12/03	09/26/03	MWT	Total Strontium in Soil
				7568-002	TC		09/19/03	09/26/03	MWT	Technetium 99 in Soil
				7568-002	TH		09/15/03	09/26/03	MWT	Thorium, Isotopic in Soil
				7568-002	U		09/16/03	09/26/03	MWT	Uranium, Isotopic in Soil
				7568-002	U_T		09/09/03	09/26/03	MWT	Uranium, Total in Soil

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SAMPLE DELIVERY GROUP H2314

SDG 7568
 Contact Melissa C. Mannion

WORK SUMMARY, cont.

Client Hanford
 Contract No. 630
 Case no SDG H2314

LAB SAMPLE COLLECTED RECEIVED	CLIENT SAMPLE ID LOCATION CUSTODY	SAF No	MATRIX	PLANCHET	TEST	SUF-FIX	ANALYZED	REVIEWED	BY	METHOD
R308084-03	Method Blank			7568-003	AM		09/17/03	09/26/03	MWT	Americium 241 in Soil
			SOLID	7568-003	C		09/09/03	09/26/03	MWT	Carbon 14 in Soil
		F03-006		7568-003	GAM		09/17/03	09/26/03	MWT	Gamma Scan
				7568-003	H		09/23/03	09/26/03	MWT	Tritium in Soil
				7568-003	I		09/23/03	09/26/03	MWT	Iodine 129 in Soil
				7568-003	NI_L		09/17/03	09/26/03	MWT	Nickel 63 in Soil
				7568-003	NP		09/18/03	09/26/03	MWT	Neptunium in Soil
				7568-003	PU		09/19/03	09/26/03	MWT	Plutonium, Isotopic in Solids
				7568-003	SR		09/12/03	09/26/03	MWT	Total Strontium in Soil
				7568-003	TC		09/25/03	09/26/03	MWT	Technetium 99 in Soil
				7568-003	TH		09/12/03	09/26/03	MWT	Thorium, Isotopic in Soil
				7568-003	U		09/16/03	09/26/03	MWT	Uranium, Isotopic in Soil
				7568-003	U_T		09/09/03	09/26/03	MWT	Uranium, Total in Soil
R308084-04	Duplicate (R308084-01)			7568-004	AM		09/17/03	09/26/03	MWT	Americium 241 in Soil
08/13/03	216-A-36B (C4160)		SOLID	7568-004	C		09/09/03	09/26/03	MWT	Carbon 14 in Soil
08/15/03		F03-006		7568-004	GAM		09/15/03	09/26/03	MWT	Gamma Scan
				7568-004	H		09/23/03	09/26/03	MWT	Tritium in Soil
				7568-004	I		09/24/03	09/26/03	MWT	Iodine 129 in Soil
				7568-004	NI_L		09/17/03	09/26/03	MWT	Nickel 63 in Soil
				7568-004	NP		09/18/03	09/26/03	MWT	Neptunium in Soil
				7568-004	PU		09/19/03	09/26/03	MWT	Plutonium, Isotopic in Solids
				7568-004	SR		09/12/03	09/26/03	MWT	Total Strontium in Soil
				7568-004	TC		09/25/03	09/26/03	MWT	Technetium 99 in Soil
				7568-004	TH		09/16/03	09/26/03	MWT	Thorium, Isotopic in Soil
				7568-004	U		09/16/03	09/26/03	MWT	Uranium, Isotopic in Soil
				7568-004	U_T		09/09/03	09/26/03	MWT	Uranium, Total in Soil
R308084-05	Spike (R308084-01)			7568-005	H		09/23/03	09/26/03	MWT	Tritium in Soil
08/13/03	216-A-36B (C4160)		SOLID							
08/15/03		F03-006								

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SAMPLE DELIVERY GROUP H2314

WORK SUMMARY, cont.

SDG 7568
 Contact Melissa C. Mannion

Client Hanford
 Contract No. 630
 Case no SDG H2314

COUNTS OF TESTS BY SAMPLE TYPE											
TEST	SAF No	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP SPIKE	TOTAL	
AM	F03-006	Americium 241 in Soil	AMCMISO_IE_PLATE_AEA	1			1	1	1	4	
C	F03-006	Carbon 14 in Soil	C14_COX_LSC	1			1	1	1	4	
GAM	F03-006	Gamma Scan	GAMMA_GS	1			1	1	1	4	
H	F03-006	Tritium in Soil	906.0_H3_LSC	1			1	1	1	5	
I	F03-006	Iodine 129 in Soil	I129_SEP_LEPS_GS	1			1	1	1	4	
NI_L	F03-006	Nickel 63 in Soil	NI63_LSC	1			1	1	1	4	
NP	F03-006	Neptunium in Soil	NP237_LLE_PLATE_AEA	1			1	1	1	4	
PU	F03-006	Plutonium, Isotopic in Solids	PUISO_PLATE_AEA	1			1	1	1	4	
SR	F03-006	Total Strontium in Soil	SRTOT_SEP_PRECIP_GPC	1			1	1	1	4	
TC	F03-006	Technetium 99 in Soil	TC99_TR_SEP_LSC	1			1	1	1	4	
TH	F03-006	Thorium, Isotopic in Soil	THISO_IE_PLATE_AEA	1			1	1	1	4	
U	F03-006	Uranium, Isotopic in Soil	UIISO_PLATE_AEA	1			1	1	1	4	
U_T	F03-006	Uranium, Total in Soil	UTOT_KPA	1			1	1	1	4	
TOTALS				13			13	13	13	1	53

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EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H2314

7568-003

Method Blank

METHOD BLANK

SDG <u>7568</u>	Client/Case no <u>Hanford</u>	SDG <u>H2314</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R308084-03</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7568-003</u>	Material/Matrix <u>SOLID</u>	
	SAF No <u>F03-006</u>	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	-0.118	0.15	0.27	400	U	H
Carbon 14	14762-75-5	-1.93	2.0	3.4	50	U	C
Nickel 63	13981-37-8	0.288	1.2	1.9	30	U	NI_L
Total Strontium	SR-RAD	-0.008	0.11	0.23	1.0	U	SR
Technetium 99	14133-76-7	<u>0.562</u>	0.22	0.51	15		TC
Thorium 228	14274-82-9	0.063	0.13	0.24		U	TH
Thorium 230	14269-63-7	0.188	0.19	0.24	1.0	U	TH
Thorium 232	TH-232	0	0.063	0.24	1.0	U	TH
Total Uranium (ug/g)	7440-61-1	0	0.003	0.007	1.0	U	U_T
Uranium 233/234	U-233/234	0	0.067	0.26	1.0	U	U
Uranium 235	15117-96-1	0.041	0.082	0.31	1.0	U	U
Uranium 238	U-238	0	0.067	0.26	1.0	U	U
Neptunium 237	13994-20-2	0	0.096	0.14	1.0	U	NP
Plutonium 238	13981-16-3	0	0.051	0.19	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.051	0.19	1.0	U	PU
Americium 241	14596-10-2	0.036	0.073	0.28	1.0	U	AM
Iodine 129	15046-84-1	-0.168	0.34	0.76	2.0	U	I
Potassium 40	13966-00-2	U		2.1		U	GAM
Cobalt 60	10198-40-0	U		<u>0.077</u>	0.050	U	GAM
Tin 126	15832-50-5	U		0.053		U	GAM
Cesium 134	13967-70-9	U		0.087		U	GAM
Cesium 137	10045-97-3	U		0.069	0.10	U	GAM
Radium 226	13982-63-3	U		0.15		U	GAM
Radium 228	15262-20-1	U		0.31		U	GAM
Europium 152	14683-23-9	U		<u>0.16</u>	0.10	U	GAM
Europium 154	15585-10-1	U		<u>0.23</u>	0.10	U	GAM
Europium 155	14391-16-3	U		<u>0.11</u>	0.10	U	GAM
Thorium 228	14274-82-9	U		0.088		U	GAM
Thorium 232	TH-232	U		0.31		U	GAM

200-PW-2/200-PW-4 OU - Borehole Soil

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SAMPLE DELIVERY GROUP H2314

7568-003

Method Blank

BLANK, cont.

SDG <u>7568</u>	Client/Case no <u>Hanford</u>	SDG <u>H2314</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R308084-03</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7568-003</u>	Material/Matrix <u>SOLID</u>	
	SAF No <u>F03-006</u>	

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Uranium 235	15117-96-1	U		0.21		U	GAM
Uranium 238	U-238	U		8.2		U	GAM
Americium 241	14596-10-2	U		0.054		U	GAM

200-PW-2/200-PW-4 OU - Borehole Soil

QC-BLANK 45550

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2314

7568-002

Lab Control Sample

LAB CONTROL SAMPLE

SDG <u>7568</u>	Client/Case no <u>Hanford</u> SDG <u>H2314</u>
Contact <u>Melissa C. Mannion</u>	Contract <u>No. 630</u>
Lab sample id <u>R308084-02</u>	Client sample id <u>Lab Control Sample</u>
Dept sample id <u>7568-002</u>	Material/Matrix <u>SOLID</u>
	SAF No <u>F03-006</u>

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Tritium	11.9	0.40	0.26	400		H	12.8	0.51	93	84-116	80-120
Carbon 14	1890	38	10	50		C	1960	78	96	84-116	80-120
Nickel 63	219	4.7	2.3	30		NI_L	228	9.1	96	84-116	80-120
Total Strontium	20.5	0.82	0.25	1.0		SR	20.9	0.84	98	83-117	80-120
Technetium 99	113	2.0	0.51	15	B	TC	109	4.4	104	83-117	80-120
Thorium 230	41.5	1.8	0.23	1.0		TH	40.8	1.6	102	88-112	80-120
Total Uranium (ug/g)	17.4	2.2	0.073	1.0		U_T	16.5	0.66	106	75-125	80-120
Uranium 233/234	20.1	2.8	1.0	1.0		U	18.6	0.74	108	75-125	80-120
Uranium 235	16.2	2.4	0.26	1.0		U	15.1	0.60	107	74-126	80-120
Uranium 238	21.1	2.9	0.99	1.0		U	20.2	0.81	104	76-124	80-120
Neptunium 237	18.8	1.9	0.14	1.0		NP	19.8	0.79	95	83-117	80-120
Plutonium 238	22.2	2.6	0.28	1.0		PU	24.4	0.98	91	82-118	80-120
Plutonium 239/240	26.2	2.9	0.28	1.0		PU	26.4	1.1	99	81-119	80-120
Americium 241	18.1	2.1	0.28	1.0		AM	19.0	0.76	95	81-119	80-120
Iodine 129	115	2.0	<u>3.3</u>	2.0		I	116	4.6	99	84-116	80-120
Cobalt 60	2.93	0.12	<u>0.056</u>	0.050		GAM	2.54	0.10	115	72-128	80-120
Cesium 137	2.99	0.10	0.061	0.10		GAM	2.56	0.10	117	72-128	80-120

200-PW-2/200-PW-4 OU - Borehole Soil

QC-LCS 45549

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2314

7568-004

B173W3

DUPLICATE

SDG <u>7568</u>	Client/Case no <u>Hanford</u>	SDG <u>H2314</u>
Contact <u>Melissa C. Mannion</u>	Contract <u>No. 630</u>	
DUPLICATE	ORIGINAL	
Lab sample id <u>R308084-04</u>	Lab sample id <u>R308084-01</u>	Client sample id <u>B173W3</u>
Dept sample id <u>7568-004</u>	Dept sample id <u>7568-001</u>	Location/Matrix <u>216-A-36B (C4160)</u> <u>SOLID</u>
	Received <u>08/15/03</u>	Collected/Weight <u>08/13/03 07:40</u> <u>228.7 g</u>
% solids <u>96.6</u>	% solids <u>96.6</u>	Custody/SAF No <u>F03-006-203</u> <u>F03-006</u>

ANALYTE	DUPLICATE		MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL		MDA pCi/g	QUALI- FIERS	RPD %	3σ TOT	PROT LIMIT
	pCi/g	2σ ERR (COUNT)					pCi/g	2σ ERR (COUNT)					
Tritium	31.1	0.62	0.26	400		H	31.8	0.63	0.26		2	22	
Carbon 14	<u>-4.46</u>	2.0	3.4	50	U	C	-2.78	1.7	3.0	U	-	-	
Nickel 63	-0.559	1.3	2.2	30	U	NI_L	-0.862	1.3	2.3	U	-	-	
Total Strontium	0.012	0.094	0.19	1.0	U	SR	-0.096	0.084	0.20	U	-	-	
Technetium 99	0.450	0.23	0.59	15	U	TC	0.330	0.21	0.54	U	-	-	
Thorium 228	0.605	0.29	0.27			TH	0.614	0.29	0.28		1	102	
Thorium 230	0.708	0.36	0.27	1.0		TH	0.685	0.36	0.28		3	110	
Thorium 232	0.602	0.29	0.27	1.0		TH	0.361	0.22	0.28		50	114	
Total Uranium (ug/g)	0.382	0.047	0.007	1.0		U_T	0.395	0.049	0.007		3	32	
Uranium 233/234	0.428	0.23	0.22	1.0		U	0.581	0.26	0.19		30	104	
Uranium 235	0.035	0.069	0.26	1.0	U	U	0.031	0.061	0.23	U	-	-	
Uranium 238	0.571	0.24	0.22	1.0		U	0.429	0.21	0.19		28	96	
Neptunium 237	0.044	0.089	0.13	1.0	U	NP	0	<u>9.9</u>	0.15	U	-	-	
Plutonium 238	-0.032	0.063	0.24	1.0	U	PU	0.078	0.078	0.30	U	-	-	
Plutonium 239/240	0	0.063	0.24	1.0	U	PU	0	0.077	0.30	U	-	-	
Americium 241	-0.029	0.059	0.22	1.0	U	AM	-0.037	0.074	0.28	U	-	-	
Iodine 129	-0.284	0.60	1.4	2.0	U	I	-0.277	0.68	1.5	U	-	-	
Potassium 40	10.7	6.3	0.77			GAM	8.29	1.3	1.1		25	107	
Cobalt 60	U		<u>0.084</u>	0.050	U	GAM	U		<u>0.061</u>	U	-	-	
Tin 126	U		0.063		U	GAM	U		0.080	U	-	-	
Cesium 134	U		0.095		U	GAM	U		0.073	U	-	-	
Cesium 137	U		0.070	0.10	U	GAM	U		0.053	U	-	-	
Radium 226	0.456	0.23	0.14			GAM	0.215	0.15	0.15		72	127	
Radium 228	0.510	0.40	0.30			GAM	U		0.28	U	58	188	
Europium 152	U		<u>0.17</u>	0.10	U	GAM	U		<u>0.15</u>	U	-	-	
Europium 154	U		<u>0.24</u>	0.10	U	GAM	U		<u>0.21</u>	U	-	-	
Europium 155	U		<u>0.12</u>	0.10	U	GAM	U		<u>0.12</u>	U	-	-	
Thorium 228	0.585	0.17	0.081			GAM	0.554	0.082	0.080		5	59	

200-PW-2/200-PW-4 OU - Borehole Soil

DUPLICATES

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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>09/27/03</u>

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2314

7568-004

B173W3

DUPLICATE, cont.

SDG <u>7568</u>	Client/Case no <u>Hanford</u>	SDG <u>H2314</u>
Contact <u>Melissa C. Mannion</u>	Contract <u>No. 630</u>	
DUPLICATE	ORIGINAL	
Lab sample id <u>R308084-04</u>	Lab sample id <u>R308084-01</u>	Client sample id <u>B173W3</u>
Dept sample id <u>7568-004</u>	Dept sample id <u>7568-001</u>	Location/Matrix <u>216-A-36B (C4160)</u> <u>SOLID</u>
	Received <u>08/15/03</u>	Collected/Weight <u>08/13/03 07:40</u> <u>228.7 g</u>
% solids <u>96.6</u>	% solids <u>96.6</u>	Custody/SAF No <u>F03-006-203</u> <u>F03-006</u>

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI- FIERS	RPD %	3σ TOT	PROT LIMIT
Thorium 232	0.510	0.40	0.30			GAM	U		0.28	U	58	188	
Uranium 235	U		0.21		U	GAM	U		0.20	U	-		
Uranium 238	U		8.3		U	GAM	U		6.8	U	-		
Americium 241	U		0.063		U	GAM	U		0.14	U	-		

200-PW-2/200-PW-4 OU - Borehole Soil

QC-DUP#1 45551

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>09/27/03</u>

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2314

7568-005

B173W3

MATRIX SPIKE

SDG <u>7568</u>	Client/Case no <u>Hanford</u>	<u>SDG H2314</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
MATRIX SPIKE	ORIGINAL	
Lab sample id <u>R308084-05</u>	Lab sample id <u>R308084-01</u>	Client sample id <u>B173W3</u>
Dept sample id <u>7568-005</u>	Dept sample id <u>7568-001</u>	Location/Matrix <u>216-A-36B (C4160)</u> <u>SOLID</u>
	Received <u>08/15/03</u>	Collected/Weight <u>08/13/03 07:40</u> <u>228.7 g</u>
% solids <u>96.6</u>	% solids <u>96.6</u>	Custody/SAF No <u>F03-006-203</u> <u>F03-006</u>

ANALYTE	SPIKE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	ORIGINAL pCi/g	2σ ERR (COUNT)	REC 3σ % (TOTAL)	LMTS LIMITS	PROTOCOL
Tritium	71.4	0.90	0.25	400	X	H	47.8	1.9	31.8	0.63	83	75-125	60-140

200-PW-2/200-PW-4 OU - Borehole Soil

QC-MS#1 45552

MATRIX SPIKES

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Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
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EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H2314

7568-001

B173W3

DATA SHEET

SDG <u>7568</u>	Client/Case no <u>Hanford</u>	SDG <u>H2314</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R308084-01</u>	Client sample id <u>B173W3</u>	
Dept sample id <u>7568-001</u>	Location/Matrix <u>216-A-36B (C4160)</u>	<u>SOLID</u>
Received <u>08/15/03</u>	Collected/Weight <u>08/13/03 07:40</u>	<u>228.7 g</u>
% solids <u>96.6</u>	Custody/SAF No <u>F03-006-203</u>	<u>F03-006</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	31.8	0.63	0.26	400		H
Carbon 14	14762-75-5	-2.78	1.7	3.0	50	U	C
Nickel 63	13981-37-8	-0.862	1.3	2.3	30	U	NI_L
Total Strontium	SR-RAD	-0.096	0.084	0.20	1.0	U	SR
Technetium 99	14133-76-7	0.330	0.21	0.54	15	U	TC
Thorium 228	14274-82-9	0.614	0.29	0.28			TH
Thorium 230	14269-63-7	0.685	0.36	0.28	1.0		TH
Thorium 232	TH-232	0.361	0.22	0.28	1.0		TH
Total Uranium (ug/g)	7440-61-1	0.395	0.049	0.007	1.0		U_T
Uranium 233/234	U-233/234	0.581	0.26	0.19	1.0		U
Uranium 235	15117-96-1	0.031	0.061	0.23	1.0	U	U
Uranium 238	U-238	0.429	0.21	0.19	1.0		U
Neptunium 237	13994-20-2	0	9.9	0.15	1.0	U	NP
Plutonium 238	13981-16-3	0.078	0.078	0.30	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.077	0.30	1.0	U	PU
Americium 241	14596-10-2	-0.037	0.074	0.28	1.0	U	AM
Iodine 129	15046-84-1	-0.277	0.68	1.5	2.0	U	I
Potassium 40	13966-00-2	8.29	1.3	1.1			GAM
Cobalt 60	10198-40-0	U		0.061	0.050	U	GAM
Tin 126	15832-50-5	U		0.080		U	GAM
Cesium 134	13967-70-9	U		0.073		U	GAM
Cesium 137	10045-97-3	U		0.053	0.10	U	GAM
Radium 226	13982-63-3	0.215	0.15	0.15			GAM
Radium 228	15262-20-1	U		0.28		U	GAM
Europium 152	14683-23-9	U		0.15	0.10	U	GAM
Europium 154	15585-10-1	U		0.21	0.10	U	GAM
Europium 155	14391-16-3	U		0.12	0.10	U	GAM
Thorium 228	14274-82-9	0.554	0.082	0.080			GAM

200-PW-2/200-PW-4 OU - Borehole 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>09/27/03</u>

EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H2314

7568-001

B173W3

DATA SHEET, cont

SDG <u>7568</u>	Client/Case no <u>Hanford</u>	SDG <u>H2314</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R308084-01</u>	Client sample id <u>B173W3</u>	
Dept sample id <u>7568-001</u>	Location/Matrix <u>216-A-36B (C4160)</u>	<u>SOLID</u>
Received <u>08/15/03</u>	Collected/Weight <u>08/13/03 07:40</u>	<u>228.7 g</u>
% solids <u>96.6</u>	Custody/SAF No <u>F03-006-203</u>	<u>F03-006</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Thorium 232	TH-232	U		0.28		U	GAM
Uranium 235	15117-96-1	U		0.20		U	GAM
Uranium 238	U-238	U		6.8		U	GAM
Americium 241	14596-10-2	U		0.14		U	GAM

200-PW-2/200-PW-4 OU - Borehole 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>09/27/03</u>

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2314

Test AM Matrix SOLID
 SDG 7568
 Contact Melissa C. Mannion

LAB METHOD SUMMARY

AMERICIUM 241 IN SOIL
 ALPHA SPECTROSCOPY

Client Hanford
 Contract No. 630
 Contract SDG H2314

RESULTS

LAB	RAW	SUF-		Americium
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID	241
Preparation batch 7078-030				
R308084-01		7568-001	B173W3	U
R308084-02		7568-002	LCS (QC ID=45549)	ok
R308084-03		7568-003	BLK (QC ID=45550)	U
R308084-04		7568-004	Duplicate (R308084-01)	- U

Nominal values and limits from method RDLs (pCi/g) 1.0
 200-PW-2/200-PW-4 OU - Borehole Soil

METHOD PERFORMANCE

LAB	RAW	SUF-	MDA	ALIQ	PREP	DILU-	YIELD	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-		
SAMPLE ID	TEST FIX	CLIENT SAMPLE ID	pCi/g	g	FAC	TION	%	%	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR
Preparation batch 7078-030			2σ prep error 5.0 %			Reference Lab Notebook 7078 pg. 030									
R308084-01		B173W3	0.28	0.500			66	110				35	09/17/03	09/17	SS-035
R308084-02		LCS (QC ID=45549)	0.28	0.500			70	111					09/17/03	09/17	SS-036
R308084-03		BLK (QC ID=45550)	0.28	0.500			65	111					09/17/03	09/17	SS-042
R308084-04		Duplicate (R308084-01) (QC ID=45551)	0.22	0.500			76	110				35	09/17/03	09/17	SS-028

Nominal values and limits from method 1.0 0.500 20-105 100 100 180

PROCEDURES	REFERENCE	AMCMISO_IE_PLATE_AEA
CP-061		Determination of Moisture Content in Solid Samples, rev 1
CP-071		Soil Dissolution, > 1.0g Aliquot, rev 2
CP-963		Americium and Curium in Water and Dissolved Samples by Extraction Chromatography, rev 3
CP-008		Heavy Element Electroplating, rev 7

AVERAGES ± 2 SD	MDA	<u>0.26</u> ± <u>0.060</u>
FOR 4 SAMPLES	YIELD	<u>69</u> ± <u>10</u>

METHOD SUMMARIES

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2314

LAB METHOD SUMMARY

NEPTUNIUM IN SOIL
ALPHA SPECTROSCOPY

Test NP Matrix SOLID
SDG 7568
Contact Melissa C. Mannion

Client Hanford
Contract No. 630
Contract SDG H2314

RESULTS

LAB	RAW	SUF-		Neptunium
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID	237
Preparation batch 7078-030				
R308084-01		7568-001	B173W3	U
R308084-02		7568-002	LCS (QC ID=45549)	ok
R308084-03		7568-003	BLK (QC ID=45550)	U
R308084-04		7568-004	Duplicate (R308084-01)	- U

Nominal values and limits from method RDLs (pCi/g) 1.0
200-PW-2/200-PW-4 OU - Borehole Soil

METHOD PERFORMANCE

LAB	RAW	SUF-	MDA	ALIQ	PREP	DILU-	YIELD	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-		
SAMPLE ID	TEST FIX	CLIENT SAMPLE ID	pCi/g	g	FAC	TION	%	%	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR
Preparation batch 7078-030			2σ prep error 5.0 %			Reference Lab Notebook 7078 pg. 030									
R308084-01		B173W3	0.15	0.500			54	103				36	09/17/03	09/18	SS-057
R308084-02		LCS (QC ID=45549)	0.14	0.500			56	103					09/17/03	09/18	SS-058
R308084-03		BLK (QC ID=45550)	0.14	0.500			53	102					09/17/03	09/18	SS-059
R308084-04		Duplicate (R308084-01) (QC ID=45551)	0.13	0.500			58	103				36	09/17/03	09/18	SS-060

Nominal values and limits from method 1.0 0.500 20-105 100 180

PROCEDURES	REFERENCE	NP237_LLE_PLATE_AEA
CP-061		Determinatioin of Moisture Content in Solid Samples, rev 1
CP-071		Soil Dissolution, > 1.0g Aliquot, rev 2
CP-930		Neptunium from Solids and Water by Extraction Chromatography, rev 0
CP-008		Heavy Element Electroplating, rev 7

AVERAGES ± 2 SD	MDA	0.14 ± 0.016
FOR 4 SAMPLES	YIELD	55 ± 4

Lab id EBRLNE
Protocol Hanford
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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2314

LAB METHOD SUMMARY

PLUTONIUM, ISOTOPIC IN SOLIDS
ALPHA SPECTROSCOPY

Test PU Matrix SOLID
SDG 7568
Contact Melissa C. Mannion

Client Hanford
Contract No. 630
Contract SDG H2314

RESULTS

LAB	RAW	SUF-		Plutonium	Plutonium	
SAMPLE ID	TEST	FIX	PLANCHET	CLIENT SAMPLE ID	238	239/240
Preparation batch 7078-030						
R308084-01			7568-001	B173W3	U	U
R308084-02			7568-002	LCS (QC ID=45549)	ok	ok
R308084-03			7568-003	BLK (QC ID=45550)	U	U
R308084-04			7568-004	Duplicate (R308084-01)	- U	- U

Nominal values and limits from method RDLs (pCi/g) 1.0 1.0
200-PW-2/200-PW-4 OU - Borehole Soil

METHOD PERFORMANCE

LAB	RAW	SUF-		MAX MDA	ALIQ	PREP	DILU-	YIELD	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-		
SAMPLE ID	TEST	FIX	CLIENT SAMPLE ID	pCi/g	g	FAC	TION	%	%	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR
Preparation batch 7078-030 2σ prep error 5.0 % Reference Lab Notebook 7078 pg. 030																
R308084-01			B173W3	0.30	0.500			51	135				37	09/19/03	09/19	SS-035
R308084-02			LCS (QC ID=45549)	0.28	0.500			57	135					09/19/03	09/19	SS-036
R308084-03			BLK (QC ID=45550)	0.19	0.500			77	136					09/19/03	09/19	SS-042
R308084-04			Duplicate (R308084-01) (QC ID=45551)	0.24	0.500			60	136				37	09/19/03	09/19	SS-055

Nominal values and limits from method 1.0 0.500 20-105 100 100 180

PROCEDURES	REFERENCE	PUISO_PLATE_AEA
CP-061		Determination of Moisture Content in Solid Samples, rev 1
CP-071		Soil Dissolution, > 1.0g Aliquot, rev 2
CP-941		Plutonium in Water and Dissolved Samples by Extraction Chromatography, rev 1
CP-008		Heavy Element Electroplating, rev 7

AVERAGES ± 2 SD	MDA	0.25 ± 0.097
FOR 4 SAMPLES	YIELD	61 ± 22

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2314

Test TH Matrix SOLID
 SDG 7568
 Contact Melissa C. Mannion

LAB METHOD SUMMARY

THORIUM, ISOTOPIC IN SOIL
 ALPHA SPECTROSCOPY

Client Hanford
 Contract No. 630
 Contract SDG H2314

RESULTS

LAB RAW SUF-
 SAMPLE ID TEST FIX PLANCHET CLIENT SAMPLE ID Thorium 230

Preparation batch 7078-030			
R308084-01	7568-001	B173W3	0.685
R308084-02	7568-002	LCS (QC ID=45549)	ok
R308084-03	7568-003	BLK (QC ID=45550)	U
R308084-04	7568-004	Duplicate (R308084-01)	ok

Nominal values and limits from method RDLs (pCi/g) 1.0
 200-PW-2/200-PW-4 OU - Borehole Soil

METHOD PERFORMANCE

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

Preparation batch 7078-030		2σ prep error 5.0 %	Reference Lab Notebook 7078 pg. 030							
R308084-01	B173W3	0.28	0.250	87	168	30	09/12/03	09/12	SS-051	
R308084-02	LCS (QC ID=45549)	0.23	0.250	91	939		09/12/03	09/15	SS-057	
R308084-03	BLK (QC ID=45550)	0.24	0.250	99	169		09/12/03	09/12	SS-055	
R308084-04	Duplicate (R308084-01) (QC ID=45551)	0.27	0.250	90	154	34	09/12/03	09/16	SS-052	

Nominal values and limits from method 1.0 0.250 20-105 150 180

PROCEDURES	REFERENCE	THISO_IE_PLATE_AEA
CP-061		Determination of Moisture Content in Solid Samples, rev 1
CP-071		Soil Dissolution, > 1.0g Aliquot, rev 2
CP-900		Thorium in Water and Dissolved Solid Samples by Extraction Chromatography, rev 1
CP-008		Heavy Element Electroplating, rev 7

AVERAGES ± 2 SD	MDA	<u>0.26</u> ± <u>0.048</u>
FOR 4 SAMPLES	YIELD	<u>92</u> ± <u>10</u>

METHOD SUMMARIES

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SUMMARY DATA SECTION

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2314

LAB METHOD SUMMARY

URANIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

Test U Matrix SOLID
 SDG 7568
 Contact Melissa C. Mannion

Client Hanford
 Contract No. 630
 Contract SDG H2314

RESULTS

LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	CLIENT SAMPLE ID	1: Uranium	2: Uranium	3: Uranium	RESULT RATIOS (%)				
				233/234	235	238	1÷3	2σ	2÷3	2σ	
Preparation batch 7078-030											
R308084-01		7568-001	B173W3	0.581	U	0.429	135	90	7	15	
R308084-02		7568-002	LCS (QC ID=45549)	ok	ok	ok					
R308084-03		7568-003	BLK (QC ID=45550)	U	U	U					
R308084-04		7568-004	Duplicate (R308084-01)	ok	- U	ok	75	51	6	12	
Nominal values and limits from method				RDIs (pCi/g)	1.0	1.0	1.0	100		4	
200-PW-2/200-PW-4 OU - Borehole Soil							Averages 105			7	

METHOD PERFORMANCE

LAB SAMPLE ID	RAW TEST FIX	SUF- CLIENT SAMPLE ID	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL-	
													PREPARED	YZED
Preparation batch 7078-030 2σ prep error 5.0 % Reference Lab Notebook 7078 pg. 030														
R308084-01		B173W3	0.23	0.500			92	106			34	09/16/03	09/16	SS-028
R308084-02		LCS (QC ID=45549)	1.0	0.500			89	106				09/16/03	09/16	SS-035
R308084-03		BLK (QC ID=45550)	0.31	0.500			78	106				09/16/03	09/16	SS-036
R308084-04		Duplicate (R308084-01) (QC ID=45551)	0.26	0.500			87	107			34	09/16/03	09/16	SS-042
Nominal values and limits from method			1.0	0.500			20-105	100	100		180			

PROCEDURES	REFERENCE	UIISO_PLATE_AEA
CP-061		Determination of Moisture Content in Solid Samples, rev 1
CP-071		Soil Dissolution, > 1.0g Aliquot, rev 2
CP-921		Uranium in Water and Dissolved Samples by Extraction Chromatography, rev 0
CP-008		Heavy Element Electroplating, rev 7

AVERAGES ± 2 SD	MDA <u>0.45</u> ± <u>0.74</u>
FOR 4 SAMPLES	YIELD <u>86</u> ± <u>12</u>

Lab id EBRLNE
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 Form DVD-LMS
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 Report date 09/27/03

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2314

Test SR Matrix SOLID
 SDG 7568
 Contact Melissa C. Mannion

LAB METHOD SUMMARY

TOTAL STRONTIUM IN SOIL
 BETA COUNTING

Client Hanford
 Contract No. 630
 Contract SDG H2314

RESULTS

LAB	RAW	SUF-		Total
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID	Strontium
Preparation batch 7078-030				
R308084-01		7568-001	B173W3	U
R308084-02		7568-002	LCS (QC ID=45549)	ok
R308084-03		7568-003	BLK (QC ID=45550)	U
R308084-04		7568-004	Duplicate (R308084-01)	- U
Nominal values and limits from method			RDLs (pCi/g)	1.0
200-PW-2/200-PW-4 OU - Borehole Soil				

METHOD PERFORMANCE

LAB	RAW	SUF-	MDA	ALIQ	PREP	DILU-	YIELD	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-		
SAMPLE ID	TEST FIX	CLIENT SAMPLE ID	pCi/g	g	FAC	TION	%	%	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR
Preparation batch 7078-030			2σ prep error 10.0 % Reference Lab Notebook 7078 pg. 030												
R308084-01		B173W3	0.20	1.00			97	100			30	09/12/03	09/12	GRB-230	
R308084-02		LCS (QC ID=45549)	0.25	1.00			85	100				09/12/03	09/12	GRB-230	
R308084-03		BLK (QC ID=45550)	0.23	1.00			86	100				09/12/03	09/12	GRB-232	
R308084-04		Duplicate (R308084-01)	0.19	1.00			100	100			30	09/12/03	09/12	GRB-217	
			(QC ID=45551)												
Nominal values and limits from method			1.0	1.00			30-105	100			180				

PROCEDURES	REFERENCE	SRTOT_SEP_PRECIP_GPC
CP-061		Determinatioin of Moisture Content in Solid Samples, rev 1
CP-071		Soil Dissolution, > 1.0g Aliquot, rev 2
CP-381		Strontium in Solids, rev 1

AVERAGES ± 2 SD	MDA	<u>0.22</u> ± <u>0.055</u>
FOR 4 SAMPLES	YIELD	<u>92</u> ± <u>15</u>

METHOD SUMMARIES

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SUMMARY DATA SECTION

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2314

Test TC Matrix SOLID
 SDG 7568
 Contact Melissa C. Mannion

LAB METHOD SUMMARY
 TECHNETIUM 99 IN SOIL
 BETA COUNTING

Client Hanford
 Contract No. 630
 Contract SDG H2314

RESULTS

LAB	RAW	SUF-		Technetium
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID	99
Preparation batch 7078-030				
R308084-01		7568-001	B173W3	U
R308084-02		7568-002	LCS (QC ID=45549)	ok
R308084-03		7568-003	BLK (QC ID=45550)	<u>0.562</u>
R308084-04		7568-004	Duplicate (R308084-01)	- U

Nominal values and limits from method RDLs (pCi/g) 15
 200-PW-2/200-PW-4 OU - Borehole Soil

METHOD PERFORMANCE

LAB	RAW	SUF-	MDA	ALIQ	PREP	DILU-	YIELD	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-		
SAMPLE ID	TEST FIX	CLIENT SAMPLE ID	pCi/g	g	FAC	TION	%	%	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR
Preparation batch 7078-030 2σ prep error 10.0 % Reference Lab Notebook 7078 pg. 030															
R308084-01		B173W3	0.54	1.02			96					41	09/16/03	09/23	GRB-221
R308084-02		LCS (QC ID=45549)	0.51	1.00			100						09/16/03	09/19	GRB-218
R308084-03		BLK (QC ID=45550)	0.51	1.00			100						09/16/03	09/25	GRB-203
R308084-04		Duplicate (R308084-01) (QC ID=45551)	0.59	1.02			90					43	09/16/03	09/25	GRB-204

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

PROCEDURES	REFERENCE	TC99_TR_SEP_LSC
CP-071	Soil Dissolution, > 1.0g Aliquot, rev 2	
CP-021	Preparation of Tc-99m Tracer, rev 2	
CP-002	Q.C. Preparation, rev 4	
CP-003	Addition of Carriers and Tracers, rev 5	
CP-542	Technetium-99 Purification (Soil) by Extraction Chromatography, rev 2	
CP-008	Heavy Element Electroplating, rev 7	

AVERAGES ± 2 SD	MDA	<u>0.54</u> ± <u>0.075</u>
FOR 4 SAMPLES	YIELD	<u>96</u> ± <u>9</u>

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2314

Test GAM Matrix SOLID
 SDG 7568
 Contact Melissa C. Mannion

Client Hanford
 Contract No. 630
 Contract SDG H2314

LAB METHOD SUMMARY

GAMMA SCAN
 GAMMA SPECTROSCOPY

RESULTS

LAB	RAW	SUF-				
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID		Cobalt 60	Cesium 137
Preparation batch 7078-030						
R308084-01		7568-001	B173W3		U	U
R308084-02		7568-002	LCS (QC ID=45549)		ok	ok
R308084-03		7568-003	BLK (QC ID=45550)		U	U
R308084-04		7568-004	Duplicate (R308084-01)		- U	- U
Nominal values and limits from method						
200-PW-2/200-PW-4 OU - Borehole Soil			RDLs (pCi/g)		0.050	0.10

METHOD PERFORMANCE

LAB	RAW	SUF-	MDA	ALIQ	PREP	DILU-	YIELD	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-		
SAMPLE ID	TEST FIX	CLIENT SAMPLE ID	pCi/g	g	FAC	TION	%	%	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR
Preparation batch 7078-030 2σ prep error 15.0 % Reference Lab Notebook 7078 pg. 030															
R308084-01		B173W3	<u>0.50</u>	89.8								36	09/03/03	09/18	PD,03,00
R308084-02		LCS (QC ID=45549)	<u>0.056</u>	89.8									09/03/03	09/17	PD,04,00
R308084-03		BLK (QC ID=45550)	<u>0.53</u>	89.8									09/03/03	09/17	PD,07,00
R308084-04		Duplicate (R308084-01) (QC ID=45551)	<u>0.58</u>	89.8								33	09/03/03	09/15	PD,07,00
Nominal values and limits from method															
			0.050	89.8								100		180	

PROCEDURES	REFERENCE	GAMMA_GS
	CP-061	Determination of Moisture Content in Solid Samples, rev 1
	CP-100	Ge(Li) Preparation for Commercial Samples, rev 5

AVERAGES ± 2 SD	MDA	<u>0.42</u> ± <u>0.49</u>
FOR 4 SAMPLES	YIELD	_____ ± _____

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2314

LAB METHOD SUMMARY

IODINE 129 IN SOIL
GAMMA SPECTROSCOPY

Test I Matrix SOLID
SDG 7568
Contact Melissa C. Mannion

Client Hanford
Contract No. 630
Contract SDG H2314

RESULTS

LAB	RAW	SUF-	SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID	Iodine 129
Preparation batch 7078-030							
R308084-01				7568-001		B173W3	U
R308084-02				7568-002		LCS (QC ID=45549)	ok
R308084-03				7568-003		BLK (QC ID=45550)	U
R308084-04				7568-004		Duplicate (R308084-01)	- U
Nominal values and limits from method							
200-PW-2/200-PW-4 OU - Borehole Soil						RDLs (pCi/g)	2.0

METHOD PERFORMANCE

LAB	RAW	SUF-	MDA	ALIQ	PREP	DILU-	YIELD	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-		
SAMPLE ID	TEST FIX	CLIENT SAMPLE ID	pCi/g	g	FAC	TION	%	%	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR
Preparation batch 7078-030 2σ prep error 10.0 % Reference Lab Notebook 7078 pg. 030															
R308084-01		B173W3	1.5	1.02			53	609				41	09/18/03	09/23	XSPEC-004
R308084-02		LCS (QC ID=45549)	<u>3.3</u>	1.00			87	610					09/18/03	09/23	XSPEC-016
R308084-03		BLK (QC ID=45550)	0.76	1.00			92	917					09/18/03	09/23	XSPEC-004
R308084-04		Duplicate (R308084-01) (QC ID=45551)	1.4	1.02			54	702				42	09/18/03	09/24	XSPEC-004
Nominal values and limits from method															
			2.0	1.00			20-105	300			180				

PROCEDURES REFERENCE I129_SEP_LEPS_GS
CP-024 Iodine-129, Sample Dissolution, rev 3
CP-530 Iodine-129 Purification, rev 0

AVERAGES ± 2 SD MDA 1.7 ± 2.2
FOR 4 SAMPLES YIELD 72 ± 42

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2314

LAB METHOD SUMMARY

URANIUM, TOTAL IN SOIL
KINETIC PHOSPHORIMETRY (KPA)

Test U T Matrix SOLID
SDG 7568
Contact Melissa C. Mannion

Client Hanford
Contract No. 630
Contract SDG H2314

RESULTS

LAB	RAW	SUF-		Total
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID	Uranium
Preparation batch 7078-030				
R308084-01		7568-001	B173W3	0.395
R308084-02		7568-002	LCS (QC ID=45549)	ok
R308084-03		7568-003	BLK (QC ID=45550)	U
R308084-04		7568-004	Duplicate (R308084-01)	ok

Nominal values and limits from method RDLs (ug/g) 1.0
200-PW-2/200-PW-4 OU - Borehole Soil

METHOD PERFORMANCE

LAB	RAW	SUF-	MDA	ALIQ	PREP	DILU-	YIELD	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-
SAMPLE ID	TEST FIX	CLIENT SAMPLE ID	ug/g	g	FAC	TION	%	%	min	keV	KeV	HELD PREPARED	YZED DETECTOR
Preparation batch 7078-030			2σ prep error 9.0 %		Reference Lab Notebook 7078 pg. 030								
R308084-01		B173W3	0.007	0.100								27 09/09/03	09/09 KPA-001
R308084-02		LCS (QC ID=45549)	0.073	0.100								09/09/03	09/09 KPA-001
R308084-03		BLK (QC ID=45550)	0.007	0.100								09/09/03	09/09 KPA-001
R308084-04		Duplicate (R308084-01)	0.007	0.100								27 09/09/03	09/09 KPA-001
		(QC ID=45551)											

Nominal values and limits from method 1.0 0.100 180

PROCEDURES	REFERENCE	UTOT_KPA
CP-061		Determinatioin of Moisture Content in Solid Samples, rev 1
CP-071		Soil Dissolution, > 1.0g Aliquot, rev 2
CP-044		Sample Preparation for Total Uranium by Kinetic Phosphorimetry, rev 4
CP-928		Total Uranium by Kinetic Phosphorimetry, rev 5

AVERAGES ± 2 SD	MDA <u>0.024 ± 0.066</u>
FOR 4 SAMPLES	YIELD _____ ± _____

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2314

Test C Matrix SOLID
 SDG 7568
 Contact Melissa C. Mannion

LAB METHOD SUMMARY

CARBON 14 IN SOIL

LIQUID SCINTILLATION COUNTING

Client Hanford
 Contract No. 630
 Contract SDG H2314

RESULTS

LAB	RAW	SUF-		
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID	Carbon 14
Preparation batch 7078-030				
R308084-01		7568-001	B173W3	U
R308084-02		7568-002	LCS (QC ID=45549)	ok
R308084-03		7568-003	BLK (QC ID=45550)	U
R308084-04		7568-004	Duplicate (R308084-01)	- U

Nominal values and limits from method RDLs (pCi/g) 50
 200-PW-2/200-PW-4 OU - Borehole Soil

METHOD PERFORMANCE

LAB	RAW	SUF-	MDA	ALIQ	PREP	DILU-	YIELD	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-
SAMPLE ID	TEST FIX	CLIENT SAMPLE ID	pCi/g	g	FAC	TION	%	%	min	keV	KeV	HELD PREPARED	YZED DETECTOR
Preparation batch 7078-030 2σ prep error 10.0 % Reference Lab Notebook 7078 pg. 030													
R308084-01		B173W3	3.0	0.369			100		100			27 09/04/03 09/09	LSC-004
R308084-02		LCS (QC ID=45549)	10	0.326			100		10			09/04/03 09/09	LSC-004
R308084-03		BLK (QC ID=45550)	3.4	0.326			100		100			09/04/03 09/09	LSC-004
R308084-04		Duplicate (R308084-01) (QC ID=45551)	3.4	0.326			100		100			27 09/04/03 09/09	LSC-004

Nominal values and limits from method 50 0.326 50 180

PROCEDURES REFERENCE C14_COX_LSC
 CP-251 Tritium/Carbon-14 Oxidation, rev 5

AVERAGES ± 2 SD MDA 5.0 ± 6.7
 FOR 4 SAMPLES YIELD 100 ± 0

METHOD SUMMARIES

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SAMPLE DELIVERY GROUP H2314

Test H Matrix SOLID
 SDG 7568
 Contact Melissa C. Mannion

LAB METHOD SUMMARY

TRITIUM IN SOIL

LIQUID SCINTILLATION COUNTING

Client Hanford
 Contract No. 630
 Contract SDG H2314

RESULTS

LAB	RAW	SUF-			
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID	Tritium	
Preparation batch 7078-030					
R308084-01		7568-001	B173W3	31.8	
R308084-02		7568-002	LCS (QC ID=45549)	ok	
R308084-03		7568-003	BLK (QC ID=45550)	U	
R308084-04		7568-004	Duplicate (R308084-01)	ok	
R308084-05		7568-005	Spike (R308084-01)	ok	X
Nominal values and limits from method			RDLs (pCi/g)	400	
200-PW-2/200-PW-4 OU - Borehole Soil					

METHOD PERFORMANCE

LAB	RAW	SUF-	MDA	ALIQ	PREP	DILU-	YIELD	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-
SAMPLE ID	TEST FIX	CLIENT SAMPLE ID	pCi/g	g	FAC	TION	%	%	min	keV	KeV	HELD PREPARED	YZED DETECTOR
Preparation batch 7078-030 2σ prep error 10.0 % Reference Lab Notebook 7078 pg. 030													
R308084-01		B173W3	0.26	20.8			34		120		41	09/18/03 09/23	LSC-005
R308084-02		LCS (QC ID=45549)	0.26	20.0			33		120			09/18/03 09/23	LSC-005
R308084-03		BLK (QC ID=45550)	0.27	20.0			33		120			09/18/03 09/23	LSC-005
R308084-04		Duplicate (R308084-01) (QC ID=45551)	0.26	20.7			33		120		41	09/18/03 09/23	LSC-005
R308084-05		Spike (R308084-01) (QC ID=45552)	0.25	21.5			33		120		41	09/18/03 09/23	LSC-005
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 1

AVERAGES ± 2 SD MDA 0.26 ± 0.014
 FOR 5 SAMPLES YIELD 33 ± 1

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SAMPLE DELIVERY GROUP H2314

LAB METHOD SUMMARY

NICKEL 63 IN SOIL

LIQUID SCINTILLATION COUNTING

Test NI L Matrix SOLID
 SDG 7568
 Contact Melissa C. Mannion

Client Hanford
 Contract No. 630
 Contract SDG H2314

RESULTS

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

Preparation batch 7078-030

R308084-01	7568-001	B173W3	U
R308084-02	7568-002	LCS (QC ID=45549)	ok
R308084-03	7568-003	BLK (QC ID=45550)	U
R308084-04	7568-004	Duplicate (R308084-01)	- U

Nominal values and limits from method RDLs (pCi/g) 30
 200-PW-2/200-PW-4 OU - Borehole Soil

METHOD PERFORMANCE

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

Preparation batch 7078-030 2σ prep error 10.0 % Reference Lab Notebook 7078 pg. 030

R308084-01	B173W3	2.3	0.500	86	100	35	09/16/03	09/17	LSC-004
R308084-02	LCS (QC ID=45549)	2.3	0.500	96	78		09/16/03	09/17	LSC-004
R308084-03	BLK (QC ID=45550)	1.9	0.500	97	100		09/16/03	09/17	LSC-004
R308084-04	Duplicate (R308084-01) (QC ID=45551)	2.2	0.500	89	100	35	09/16/03	09/17	LSC-004

Nominal values and limits from method 30 0.500 30-105 50 180

PROCEDURES	REFERENCE	NI63_LSC
CP-061	Determinatioin of Moisture Content in Solid Samples, rev 1	
CP-071	Soil Dissolution, > 1.0g Aliquot, rev 2	
CP-280	Nickel-63 Purification, rev 0	

AVERAGES ± 2 SD	MDA	2.2 ± 0.38
FOR 4 SAMPLES	YIELD	92 ± 11

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SAMPLE DELIVERY GROUP H2314

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 Contact Melissa C. Mannion

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SAMPLE SUMMARY

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

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

The following notes apply to these reports:

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

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

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

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SAMPLE DELIVERY GROUP H2314

SDG 7568

Contact Melissa C. Mannion

REPORT GUIDE

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PREPARATION BATCH SUMMARY

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

The following notes apply to this report:

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

These qualifiers should be reviewed as follows:

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

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

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WORK SUMMARY

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

The following notes apply to this report:

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

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SAMPLE DELIVERY GROUP H2314

SDG 7568
 Contact Melissa C. Mannion

REPORT GUIDE

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DATA SHEET

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

The following notes apply to this report:

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

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

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

The following qualifiers are defined by the DVD system:

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

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 Contact Melissa C. Mannion

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DATA SHEET

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

- J The RESULT is less than the RDL (Required Detection Limit) and no U qualifier is assigned.
- B A Method Blank associated with this sample had a result without a U flag and, after correcting for possibly different aliquots, that result is greater than or equal to the MDA for this sample.

Normally, B is not assigned if U is. When method blank subtraction is shown on this report, B flags are assigned based on the unsubtracted values while U's are assigned based on the subtracted ones. Both flags can be assigned in this case.

For each sample result, all Method Blank results in the same preparation batch are compared. The Method Summary Report documents this and other QC relationships.

- L Some Lab Control Sample that QC's this sample had a low recovery. The lab can disable assignment of this qualifier.
- H Similar to 'L' except the recovery was high.
- P The RESULT is 'preliminary'.
- X Some data necessary to compute the RESULT, ERROR or MDA was manually entered or modified.
- 2 There were two or more results available for this analyte. The reported result may not be the same as in the raw data.

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

The following values are underlined to indicate possible problems:

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

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 Report date 09/27/03

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H2314

SDG 7568

Contact Melissa C. Mannion

Client Hanford

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DATA SHEET

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

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LAB CONTROL SAMPLE

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

The following notes apply to this report:

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

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

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

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

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DUPLICATE

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

The following notes apply to this report:

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

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

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

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

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

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

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

This value reported for this limit is at most 999.

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

1. A fixed percentage specified in the protocol.

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DUPLICATE

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

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

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

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

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MATRIX SPIKE

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

The following notes apply to this report:

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

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

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

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

- * REC (Recovery) is the Spike RESULT minus the Original RESULT divided by ADDED expressed as a percent.

- * The first, computed limits for the recovery reflect:

1. The errors of the two RESULTS, including those introduced by rounding them prior to printing.

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

2. The error of ADDED.

3. A lab specified, per analyte bias. The bias changes the center of the computed limits.

- * The second limits are protocol defined upper and lower QC limits

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MATRIX SPIKE

for the recovery.

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

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

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METHOD SUMMARY

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

The following notes apply to this report:

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

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

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

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

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

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

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

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

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

MDAs are underlined if greater than the printed RDL.

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

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

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

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

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

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

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

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METHOD SUMMARY

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

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

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

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

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FH-Central Plateau Project		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-006-203		Page 1 of 1		
Collector Pope/Pfister/Hughes/Johansen		Company Contact LC Hulstrom		Telephone No. 373-3928		Project Coordinator TRENT, SJ		Price Code 8N Data Turnaround 45 Days		
Project Designation 200-PW-2/200-PW-4 OU - Borehole Soil Sampling		Sampling Location 216-A-36B (C3248) - 197.5-200'		7-11-03 (4160) (7568)		SAF No. F03-006		Air Quality <input type="checkbox"/>		
Ice Chest No. ERC 99.022		Field Logbook No. HNF-N-3361		COA 117504ES10		H2314		Method of Shipment Federal Express		
Shipped To EBERLINE SERVICES (Formerly TMA)		Offsite Property No. R030 328		Bill of Lading/Air Bill No. SEE OSLC						
POSSIBLE SAMPLE HAZARDS/REMARKS Potential Radioactive Tie to B17496 Special Handling and/or Storage None				Preservation	Cool 4C	None	None	None		
				Type of Container	aG	aG	aG	aG		
				No. of Container(s)	1	1	1	1		
				Volume	60mL	60mL	60mL	60mL		
SAMPLE ANALYSIS				NO2/NO3 - 353.2; O3 & Gross - 413.1; Chromium - 71.0	See item (1) in Special Instructions.	See item (2) in Special Instructions.	Tritium - HB			
Sample No.	Matrix *	Sample Date	Sample Time							
B173W3	SOIL	8/13/03	0740		X	X	X			
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS		Matrix *
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		<p>The lab is to achieve a detection limit of 50.0 pCi/g for C-14. FH acknowledges that holding times (less than 14 days) may not be met by the lab due to the rad characteristics.</p> <p>(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Cesium-134, Radium-226, Radium-228, Tin-126); Total Uranium; Americium-241; Isotopic Plutonium; Isotopic Uranium</p> <p>(2) Technetium-99; Strontium-89,90 - Total Sr; Isotopic Thorium (Thorium-232); Carbon-14; Iodine-129; Nickel-63; Neptunium-237</p>		<p>S=Soil SE=Sediment SO=Solid SL=Sludge W=Water O=Oil A=Air DS=Drum Solids DL=Drum Liquids T=Tissue WI=Wipe L=Liquid V=Vegetation X=Other</p>
JSAK/AS/la		8/13/03 1420		ma-424. Fridge #2		8/13/03 1420				
110-020 Fridge #2		8/14/03 0830		[Signature]		0830				
[Signature]		8/14/03 0900		FEDEx		8-14-03 0900				
FED Ex		[Signature]		[Signature]		8-15-03 1000				
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time				
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time				
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time				
LABORATORY SECTION	Received By	Title				Date/Time				
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By				Date/Time				



RICHMOND, CA LABORATORY
SAMPLE RECEIPT CHECKLIST

Client: FLR Date/Time received 1000 8-15-03
CoC No. F03-006-203
Container I.D. No. ERC-99-022 Requested TAT (Days) 45 P.O. Received Yes [] No []

INSPECTION

1. Custody seals on shipping container intact? Yes [] No [] N/A []
2. Custody seals on shipping container dated & signed? Yes [] No [] N/A []
3. Custody seals on sample containers intact? Yes [] No [] N/A []
4. Custody seals on sample containers dated & signed? Yes [] No [] N/A []
5. Packing material is: Wet [] Dry []
6. Number of samples in shipping container: _____
7. Number of containers per sample: 3 (Or see CoC _____)
8. Samples are in correct container Yes [] No []
9. Paperwork agrees with samples? Yes [] No []
10. Samples have: Tape [] Hazard labels [] Rad labels [] Appropriate sample labels []
11. Samples are: In good condition [] Leaking [] Broken Container [] Missing []
12. Samples are: Preserved [] Not preserved [] Preservative _____
13. Describe any anomalies: SAMPLE TIME ON ONE CONTAINER IS 0730, TIME ON OTHER TWO CONTAINERS + COC IS 0740
14. Was P.M. notified of any anomalies? Yes [] No [] Date 8-15-03
15. Received by [Signature] Date: 8-15-03 Time: 1000

Customer Sample No.	cpm	mR/hr	wipe	Customer Sample No.	cpm	mR/hr	wipe
<u>B173W3</u>	<u>400</u>						

Ion Chamber Ser. No. _____ Calibration date _____
Alpha Meter Ser. No. _____ Calibration date _____
Beta/Gamma Meter Ser. No. 100482 Calibration date 6-21-03