H1789

0058256

Date: 21 August 2002
To: Bechtel Hanford, Inc. (technical representative)
From: TechLaw, Inc.
Project: 100F Area - Full Protocol - Waste Site 116-F-2 Deep Zone
Subject: Radiochemistry - Data Package No. H1789-EB (SDG No. H1789)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H1789-EB which was prepared by Eberline Services (EB). A list of samples validated along with the analyses reported and the requested analytes is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B14LJ4	5/21/02	Soil	C	See note 1
B14LJ5	5/21/02	Soil	C	See note 1
B14LJ6	5/21/02	Soil	C	See note 1
B14LJ7	5/21/02	Soil	C	See note 1
B14LJ8	5/21/02	Soil	C	See note 1
B14LJ9	5/21/02	Soil	C	See note 1
B14LK0	5/21/02	Soil	C	See note 1
B14LK1	5/21/02	Soil	C	See note 1

1-Carbon-14 and gamma spectroscopy.

Data validation was conducted in accordance with the Bechtel Hanford Incorporated (BHI) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL December 2001). Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Data Requested by Client

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DATA QUALITY PARAMETERS

- **Holding Times**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 6 months.

All holding times were acceptable.

- **Preparation (Method) Blanks**

Laboratory Blanks

Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the minimum detectable activity (MDA), the following qualifiers are applied: All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"; sample results below the MDA are qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the highest blank concentration are not qualified.

All blank results were acceptable.

Field (Equipment) Blank

One equipment blank (B14LK1)was submitted for analysis. Potassium-40, radium-226 and thorium-228 were detected in the equipment blank. Under the BHI statement of work, no qualification is required.

- **Accuracy**

Accuracy is evaluated from laboratory control sample (LCS) or blank spike sample (BSS) batch samples and spiked samples from the analytical batch. Measured activities are compared to the known added amounts. The acceptable LCS or BSS and matrix spike (MS) recovery range is either 70-130% or ±3 sigma. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, or not qualified, depending on the activity of the individual sample. Results are rejected for

LCS/BSS recoveries of less than 30% or ±3 sigma, tracer recoveries of less than 20%, and tracer recoveries of greater than 115% for detected results.

All accuracy results were acceptable.

- **Laboratory Duplicates**

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the contract required detection limit (CRDL) and the RPD is less than 30%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All duplicate results were acceptable.

Field Duplicate

One set of field duplicate samples were submitted for analysis (B14LJ4/B14LK0) were submitted for analysis. Field duplicate results are compared using the same criteria as for laboratory duplicates. The RPDs for potassium-40 (38%), cobalt-60 (66%), cesium-137 (59%), europium-152 (54%) and europium-154 (200%) were outside QC limits. Under the BHI statement of work, no qualification is required. All field duplicate results were acceptable.

- **Detection Levels**

Reported analytical detection levels for undetected analytes are compared against the 100 Area Remedial Action Sampling and Analysis Plan target detection limits (TDLs) to ensure that laboratory detection levels meet the required criteria. Sixteen analytes were reported above their TDL. All other reported results met the analyte specific TDL.

- **Completeness**

Data package No. H1789 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Sixteen analytes were reported above their TDL. All other reported results met the analyte specific TDL.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-96-22, Rev. 3, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, December 2001.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI statement of work are as follows:

U - Indicates the compound or analyte was analyzed for and not detected above the minimum detectable activity (MDA) in the sample. The value reported is the sample result corrected for sample dilution and moisture content by the laboratory. The data is usable for decision making purposes.

UJ - Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate, but is usable for decision making purposes.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H1789	REVIEWER: TLI	DATE: 8/21/02	PAGE 1 OF 1
COMMENTS: No qualifiers assigned			

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

RADIOCHEMISTRY ANALYSIS, SOIL MATRIX, (PCi/G)

Project: BECHTEL-HANFORD																					
Laboratory: EB																					
Case	SDG: H1789																				
Sample Number		B14LJ4		B14LJ5		B14LJ6		B14LJ7		B14LJ8		B14LJ9		B14LK0		B14LK1					
Location														Duplicate		Blank					
Sample Date		5/21/02		5/21/02		5/21/02		5/21/02		5/21/02		5/21/02		5/21/02		5/21/02					
Radiochemistry	TDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Carbon-14	50	1.21	U	6.62	U	1.95	U	2.16	U	1.80	U	1.58	U	0.154	U	0.680	U				
Potassium-40		18.0		15.2		13.0		12.1		16.2		16.3		12.2		6.14					
Cobalt 60	0.05	2.07		0.866		U	U*	1.77		0.346		0.404		1.04		U	U				
Cesium 137	0.1	44.7		11.6		1.32		15.4		3.39		3.44		24.2		U	U				
Radium-226		U	U	U	U	0.434		0.391		0.440		0.429		U	U	0.212					
Radium-228		U	U	U	U	0.635		U	U	0.640		0.548		U	U	U	U				
Europium 152	0.1	85.7		34.1		4.34		31.8		6.00		7.32		48.9		U	U				
Europium 154	0.1	8.90		3.85		0.264		2.89		0.733		0.827		4.51		U	U*				
Europium 155	0.1	U	U*	U	U*	U	U*	U	U*	U	U*	U	U	U	U*	U	U				
Thorium-228		U	U	0.550		0.550		U	U	0.517		0.632		U	U	0.249					
Thorium-232		U	U	U	U	0.635		U	U	0.640		0.548		U	U	U	U				
Uranium-235(gea)	1	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U				
Uranium-238(gea)	1	U	U*	U	U*	U	U*	U	U*	U	U*	U	U*	U	U*	U	U*				
Americium-241(gea)	1	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U				

* - TDL exceeded

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize potential miss-interpretation of results. All other qualifiers shown were applied during validation.

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1789

R205128-01 B14LJ4

DATA SHEET

SDG	7285	Client/Case no	Hanford	SDG H1789	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R205128-01	Client sample id	B14LJ4		
Dept sample id	7285-001	Location/Matrix	116-F-2 Deep Zone	SOLID	
Received	05/23/02	Collected/Weight	05/21/02 08:00	1972 g	
% solids	99.4	Custody/SAF No	B00-030-056	B00-030	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Carbon 14	14762-75-5	1.21	2.1	3.4	50	U	C
Potassium 40	13966-00-2	18.0	1.3	0.64			GAM
Cobalt 60	10198-40-0	2.07	0.18	0.15	0.050		GAM
Cesium 137	10045-97-3	44.7	0.49	0.34	0.10		GAM
Radium 226	13982-63-3	U		0.89	0.10	U	GAM
Radium 228	15262-20-1	U		1.0	0.20	U	GAM
Europium 152	14683-23-9	85.7	0.98	0.82	0.10		GAM
Europium 154	15585-10-1	8.90	0.73	0.64	0.10		GAM
Europium 155	14391-16-3	U		0.48	0.10	U	GAM
Thorium 228	14274-82-9	U		0.76		U	GAM
Thorium 232	TH-232	U		1.0		U	GAM
Uranium 235	15117-96-1	U		0.66		U	GAM
Uranium 238	U-238	U		39		U	GAM
Americium 241	14596-10-2	U		0.24		U	GAM

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SAMPLE DELIVERY GROUP H1789

R205128-02 B14LJ5

DATA SHEET

SDG	7285	Client/Case no	Hanford	SDG H1789
Contact	Melissa C. Mannion	Contract	No. 630	
Lab sample id	R205128-02	Client sample id	B14LJ5	
Dept sample id	7285-002	Location/Matrix	116-F-2 Deep Zone	SOLID
Received	05/23/02	Collected/Weight	05/21/02 08:20	1668 g
% solids	99.5	Custody/SAF No	B00-030-056	B00-030

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Carbon 14	14762-75-5	6.62	2.5	3.9	50	J	C
Potassium 40	13966-00-2	15.2	0.95	0.60			GAM
Cobalt 60	10198-40-0	0.866	0.11	0.088	0.050		GAM
Cesium 137	10045-97-3	11.6	0.24	0.19	0.10		GAM
Radium 226	13982-63-3	U		0.50	0.10	U	GAM
Radium 228	15262-20-1	U		0.61	0.20	U	GAM
Europium 152	14683-23-9	34.1	0.53	0.43	0.10		GAM
Europium 154	15585-10-1	3.85	0.40	0.36	0.10		GAM
Europium 155	14391-16-3	U		0.41	0.10	U	GAM
Thorium 228	14274-82-9	0.550	0.11	0.16			GAM
Thorium 232	TH-232	U		0.61		U	GAM
Uranium 235	15117-96-1	U		0.36		U	GAM
Uranium 238	U-238	U		22		U	GAM
Americium 241	14596-10-2	U		0.14		U	GAM

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SAMPLE DELIVERY GROUP H1789

R205128-03 B14LJ6

DATA SHEET

SDG	7285	Client/Case no	Hanford	SDG H1789	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R205128-03	Client sample id	B14LJ6		
Dept sample id	7285-003	Location/Matrix	116-F-2 Deep Zone	SOLID	
Received	05/23/02	Collected/Weight	05/21/02 08:30	1912 g	
% solids	99.4	Custody/SAF No	B00-030-056	B00-030	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Carbon 14	14762-75-5	1.95	2.4	3.9	50	U	C
Potassium 40	13966-00-2	13.0	0.99	0.59			GAM
Cobalt 60	10198-40-0	U		0.075	0.050	U	GAM
Cesium 137	10045-97-3	1.32	0.10	0.099	0.10		GAM
Radium 226	13982-63-3	0.434	0.12	0.14	0.10		GAM
Radium 228	15262-20-1	0.635	0.30	0.33	0.20		GAM
Europium 152	14683-23-9	4.34	0.18	0.15	0.10		GAM
Europium 154	15585-10-1	0.264	0.14	0.18	0.10		GAM
Europium 155	14391-16-3	U		0.18	0.10	U	GAM
Thorium 228	14274-82-9	0.550	0.060	0.081			GAM
Thorium 232	TH-232	0.635	0.30	0.33			GAM
Uranium 235	15117-96-1	U		0.23		U	GAM
Uranium 238	U-238	U		8.3		U	GAM
Americium 241	14596-10-2	U		0.21		U	GAM

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SAMPLE DELIVERY GROUP H1789

R205128-04 B14LJ7

DATA SHEET

SDG	7285	Client/Case no	Hanford SDG H1789
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R205128-04	Client sample id	B14LJ7
Dept sample id	7285-004	Location/Matrix	116-F-2 Deep Zone SOLID
Received	05/23/02	Collected/Weight	05/21/02 08:40 1745 g
% solids	99.3	Custody/SAF No	B00-030-056 B00-030

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Carbon 14	14762-75-5	2.16	2.3	3.8	50	U	C
Potassium 40	13966-00-2	12.1	0.69	0.44			GAM
Cobalt 60	10198-40-0	1.77	0.099	0.076	0.050		GAM
Cesium 137	10045-97-3	15.4	0.21	0.15	0.10		GAM
Radium 226	13982-63-3	0.391	0.15	0.18	0.10		GAM
Radium 228	15262-20-1	U		0.60	0.20	U	GAM
Europium 152	14683-23-9	31.8	0.44	0.38	0.10		GAM
Europium 154	15585-10-1	2.89	0.27	0.25	0.10		GAM
Europium 155	14391-16-3	U		0.39	0.10	U	GAM
Thorium 228	14274-82-9	U		0.54		U	GAM
Thorium 232	TH-232	U		0.60		U	GAM
Uranium 235	15117-96-1	U		0.46		U	GAM
Uranium 238	U-238	U		15		U	GAM
Americium 241	14596-10-2	U		0.42		U	GAM

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SAMPLE DELIVERY GROUP H1789

R205128-05 B14LJ8

DATA SHEET

SDG	7285	Client/Case no	Hanford		SDG H1789
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R205128-05	Client sample id	B14LJ8		
Dept sample id	7285-005	Location/Matrix	116-F-2 Deep Zone		SOLID
Received	05/23/02	Collected/Weight	05/21/02 08:50	1597 g	
% solids	99.2	Custody/SAF No	B00-030-056	B00-030	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Carbon 14	14762-75-5	1.80	2.3	3.7	50	U	C
Potassium 40	13966-00-2	16.2	0.81	0.33			GAM
Cobalt 60	10198-40-0	0.346	0.057	0.048	0.050		GAM
Cesium 137	10045-97-3	3.39	0.11	0.077	0.10		GAM
Radium 226	13982-63-3	0.440	0.10	0.12	0.10		GAM
Radium 228	15262-20-1	0.640	0.22	0.26	0.20		GAM
Europium 152	14683-23-9	6.00	0.18	0.13	0.10		GAM
Europium 154	15585-10-1	0.733	0.18	0.19	0.10		GAM
Europium 155	14391-16-3	U		0.20	0.10	U	GAM
Thorium 228	14274-82-9	0.517	0.046	0.062			GAM
Thorium 232	TH-232	0.640	0.22	0.26			GAM
Uranium 235	15117-96-1	U		0.25		U	GAM
Uranium 238	U-238	U		8.2		U	GAM
Americium 241	14596-10-2	U		0.40		U	GAM

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SAMPLE DELIVERY GROUP H1789

R205128-06 B14LJ9

DATA SHEET

SDG	7285	Client/Case no	Hanford	SDG H1789	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R205128-06	Client sample id	B14LJ9		
Dept sample id	7285-006	Location/Matrix	116-F-2 Deep Zone	SOLID	
Received	05/23/02	Collected/Weight	05/21/02 09:00	1540 g	
% solids	99.4	Custody/SAF No	B00-030-056	B00-030	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Carbon 14	14762-75-5	1.58	2.3	3.8	50	U	C
Potassium 40	13966-00-2	16.3	0.90	0.19			GAM
Cobalt 60	10198-40-0	0.404	0.044	0.039	0.050		GAM
Cesium 137	10045-97-3	3.44	0.076	0.052	0.10		GAM
Radium 226	13982-63-3	0.429	0.065	0.077	0.10		GAM
Radium 228	15262-20-1	0.548	0.14	0.17	0.20		GAM
Europium 152	14683-23-9	7.32	0.14	0.097	0.10		GAM
Europium 154	15585-10-1	0.827	0.13	0.13	0.10		GAM
Europium 155	14391-16-3	U		0.10	0.10	U	GAM
Thorium 228	14274-82-9	0.632	0.041	0.051			GAM
Thorium 232	TH-232	0.548	0.14	0.17			GAM
Uranium 235	15117-96-1	U		0.15		U	GAM
Uranium 238	U-238	U		6.0		U	GAM
Americium 241	14596-10-2	U		0.050		U	GAM

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SAMPLE DELIVERY GROUP H1789

R205128-07 B14LK0

DATA SHEET

SDG	7285	Client/Case no	Hanford	SDG H1789
Contact	Melissa C. Mannion	Contract	No. 630	
Lab sample id	R205128-07	Client sample id	B14LK0	
Dept sample id	7285-007	Location/Matrix	116-F-2 Deep Zone	SOLID
Received	05/23/02	Collected/Weight	05/21/02 08:00	2052 g
% solids	99.4	Custody/SAF No	B00-030-056	B00-030

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Carbon 14	14762-75-5	0.154	2.2	3.7	50	U	C
Potassium 40	13966-00-2	12.2	0.85	0.53			GAM
Cobalt 60	10198-40-0	1.04	0.11	0.088	0.050		GAM
Cesium 137	10045-97-3	24.2	0.31	0.22	0.10		GAM
Radium 226	13982-63-3	U		0.43	0.10	U	GAM
Radium 228	15262-20-1	U		0.58	0.20	U	GAM
Europium 152	14683-23-9	48.9	0.64	0.55	0.10		GAM
Europium 154	15585-10-1	4.51	0.40	0.35	0.10		GAM
Europium 155	14391-16-3	U		0.58	0.10	U	GAM
Thorium 228	14274-82-9	U		0.25		U	GAM
Thorium 232	TH-232	U		0.58		U	GAM
Uranium 235	15117-96-1	U		0.64		U	GAM
Uranium 238	U-238	U		20		U	GAM
Americium 241	14596-10-2	U		0.59		U	GAM

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SAMPLE DELIVERY GROUP H1789

R205128-08 B14LK1

DATA SHEET

SDG	7285	Client/Case no	Hanford	SDG H1789	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R205128-08	Client sample id	B14LK1		
Dept sample id	7285-008	Location/Matrix	116-F-2 Deep Zone	SOLID	
Received	05/23/02	Collected/Weight	05/21/02 07:45	1630 g	
% solids	100.0	Custody/SAF No	B00-030-056	B00-030	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Carbon 14	14762-75-5	0.680	2.3	3.8	50	U	C
Potassium 40	13966-00-2	6.14	0.66	0.28			GAM
Cobalt 60	10198-40-0	U		0.041	0.050	U	GAM
Cesium 137	10045-97-3	U		0.028	0.10	U	GAM
Radium 226	13982-63-3	0.212	0.062	0.052	0.10		GAM
Radium 228	15262-20-1	U		0.20	0.20	U	GAM
Europium 152	14683-23-9	U		0.067	0.10	U	GAM
Europium 154	15585-10-1	U		0.12	0.10	U	GAM
Europium 155	14391-16-3	U		0.052	0.10	U	GAM
Thorium 228	14274-82-9	0.249	0.039	0.039			GAM
Thorium 232	TH-232	U		0.20		U	GAM
Uranium 235	15117-96-1	U		0.077		U	GAM
Uranium 238	U-238	U		4.0		U	GAM
Americium 241	14596-10-2	U		0.038		U	GAM

100 F Area - Full Protocol

8/21/02

K

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	06/11/02

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

1.0 GENERAL

Bechtel Hanford Inc. (BHI) Sample Delivery Group H1789 was composed of eight solid (soil) samples designated under SAF No. B00-030 with a Project Designation of: 100 F Area – Full Protocol.

The samples were received as stated on the Chain-of-Custody documents. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist. The results were transmitted to BHI via e-Fax on June 11, 2002.

2.0 ANALYSIS NOTES

2.1 Carbon-14 Analyses

No problems were encountered during the course of the analyses.

2.2 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 Mannion
Melissa C. Mannion
Program Manager

6/25/02
Date

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B00-030-056	Page 1 of 2

Collector: M T Stankovilch	Company Contact: Mike Stankovich; Telephone No.: 531-7620	Project Coordinator: TRENT, SJ	Price Code: 8L; Data Turnaround: 21 Days
Project Designation: 100 F Area - Full Protocol	Sampling Location: 116-F-2 Deep Zone H1789 (7285)	SAF No.: B00-030	Air Quality ☐
Ice Chest No.: SEE OSPC	Field Logbook No.: EL-1535-5; COA: R116F22000	Method of Shipment: FedEx	
Shipped To: TMA/RECRA	Offsite Property No.: AQ20127	Bill of Lading/Air Bill No.: SEE OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

Radioactive

Special Handling and/or Storage

Tie to B117PZ

Preservation	Cool 4C	None	None								
Type of Container	aG	P	aG								
No. of Container(s)	1	2	1								
Volume	125mL	500mL	60mL								
SAMPLE ANALYSIS	Chromium Hex - 7196	See item (1) in Special Instructions.	[redacted] Carbon-14								

Sample No.	Matrix *	Sample Date	Sample Time										
B14LJ4	SOIL	5-21-02	0800		✓	✓							
B14LJ5	SOIL	5-21-02	0820		✓	✓							
B14LJ6	SOIL	5-21-02	0830		✓	✓							
B14LJ7	SOIL	5-21-02	0840		✓	✓							
B14LJ8	SOIL	5-21-02	0850		✓	✓							

CHAIN OF POSSESSION — **Sign/Print Names**

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
M T Stankovich	5-21-02 1500	1A/3728	5-21-02 1500
Left 1-A 3728	5-22-02 0900	R. Fehlberg / R. Fehlberg	5-22-02 0900
R. Fehlberg / R. Fehlberg	5-22-02 0900	Fed Ex	5-22-02
FED EXPRESS	5-23-02 10:30	E. Meerstar / E. HARSTAD BCA-2	5-23-02 10:30

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}

Personnel not available to relinquish samples from the 3728 Ref # 1-A on 5/22/02

Matrix *

S=Soil
SE=Sediment
SO=Solid
SI=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (03/01/2002)

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B00-030-056	Page 2 of 2

Collector: M T Stankoviich	Company Contact: Mike Stankovich	Telephone No.: 531-7620	Project Coordinator: TRENT, SJ
Price Code: 8L	Data Turnaround: 21 Days	Air Quality ☐	
Project Designation: 100 F Area - Full Protocol	Sampling Location: 116-F-2 Deep Zone H1789 (7285)	SAF No.: B00-030	
Ice Chest No.: SEE OSPC	Field Logbook No.: EL-1535-5	COA: R116F22000	Method of Shipment: FedEx
Shipped To: TMA/RECRA	Offsite Property No.: A 20127	Bill of Lading/Air Bill No.: SEE OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

Radioactive

Special Handling and/or Storage

Tie To B117P2

Preservation	Cool 4C	None	None								
Type of Container	aG	P	aG								
No. of Container(s)	1	2	1								
Volume	125mL	500mL	60mL								
SAMPLE ANALYSIS	Chromium Hex - 7196 RC 5.22.02	See item (1) in Special Instructions.	[redacted] Carbon-14	no 5-10-02							

Sample No.	Matrix *	Sample Date	Sample Time										
114LJ9	SOIL	5-21-02	0900		—	—							
114LK0	SOIL	5-21-02	0800		—	—							
114LK1	SOIL	5-21-02	0745		✓	✓							

CHAIN OF POSSESSION	Sign/Print Names	
Relinquished By/Removed From: MTStankovich	Date/Time: 5-21-02 1500	Received By/Stored In: 1A/3728
Date/Time: 5-21-02 1506		
Relinquished By/Removed From: 1-A 3728	Date/Time: 5-22-02 0900	Received By/Stored In: FRC R.Fehlberg/R.Fehlberg
Date/Time: 5-22-02 0900		
Relinquished By/Removed From: FRC R.Fehlberg/R.Fehlberg	Date/Time: 5-22-02 0900	Received By/Stored In: FedEx
Date/Time: 5-22-02		
Relinquished By/Removed From: FED EXPRESS	Date/Time: 5-23-02 10:30	Received By/Stored In: SCA-2 E.Maestas E.MAESTAS
Date/Time: 5-23-02 10:30		
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) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}

Personnel not available to relinquish samples from the 3728 Ref # 1-A on 5/22/02

Matrix *

B=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

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

I-EE-011 (03/01/2002)

Appendix 5

Data Validation Supporting Documentation

APPENDIX A

RADIOCHEMICAL DATA VALIDATION CHECKLIST

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 100F 116-F-2			DATA PACKAGE: H1789		
VALIDATOR: TLI		LAB: EB		DATE: 8/21/02	
CASE:			SDG: H1789		
ANALYSES PERFORMED					
Gross Alpha/Beta	Strontium-90	Technetium-99	Alpha Spectroscopy	Gamma Spectroscopy	
Total Uranium	Radium-22	Tritium	C14		
SAMPLES/MATRIX					
B14LJ4	B14LJ5	B14LJ6	B14LJ7		
B14LJ8	B14LJ9	B14LK0	B14LK1		

1. Completeness ..... ☒ N/A

Technical verification forms present? ..... Yes No N/A

Comments: _____

2. Initial Calibration (Levels D, E) ..... ☒ N/A

Instruments/detectors calibrated? ..... Yes No N/A

Initial calibration acceptable? ..... Yes No N/A

Standards NIST traceable? ..... Yes No N/A

Standards Expired? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments: _____

3. Continuing Calibration (Levels D, E) ..... ☐ N/A

Calibration checked within required frequency? ..... Yes No N/A

Calibration check acceptable? ..... Yes No N/A

Calibration check standards traceable? ..... Yes No N/A

Calibration check standards expired? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments: _____

4. Background Counts (Levels D, E) ..... ☒ N/A

Background Counts checked within required frequency? ..... Yes No N/A

Background Counts acceptable? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments: _____

Appendix A – Radiochemical Data Validation Checklist

5. Blanks (Levels B, C, D, E) ..... ☐ N/A

Method blank analyzed within required frequency? ..... Yes No N/A
Method blank results acceptable? ..... Yes No N/A
Analytes detected in method blank? ..... Yes No N/A
Field blank(s) analyzed? ..... Yes No N/A
Field blank results acceptable? ..... Yes No N/A
Analytes detected in field blank(s)? ..... Yes No N/A
Transcription/Calculation Errors? (Levels D, E) ..... Yes No N/A

Comments: K1 – Ra226 th 228

6. Laboratory Control Samples or Blank Spike Samples (Levels C, D, E) ..... ☐ N/A

LCS /BSS analyzed within required frequency? ..... Yes No N/A
LCS/BSS recoveries acceptable? ..... Yes No N/A
LCS/BSS traceable? (Levels D,E) ..... Yes No N/A
LCS/BSS expired? (Levels D,E) ..... Yes No N/A
LCS/BSS levels correct? (Levels D,E) ..... Yes No N/A
Transcription/Calculation Errors? (Levels D, E) ..... Yes No N/A

Comments:

7. Chemical Carrier Recovery (Levels C, D, E) ..... ☐ N/A

Chemical carrier added? ..... Yes No N/A
Chemical recovery acceptable? ..... Yes No N/A
Chemical carrier traceable? (Levels D, E) ..... Yes No N/A

Chemical carrier expired? (Levels D, E) ..... Yes No N/A

Transcription/Calculation errors? (Levels D, E) ..... Yes No N/A

Comments: _____

8. Tracer Recovery (Levels C, D, E) ..... ☐ N/A

Tracer added? ..... Yes No N/A

Tracer recovery acceptable? ..... Yes No N/A

Tracer traceable? (Levels D, E) ..... Yes No N/A

Tracer expired? (Levels D, E) ..... Yes No N/A

Transcription/Calculation errors? (Levels D, E) ..... Yes No N/A

Comments: _____

9. Matrix Spikes (Levels C, D, E) ..... ☐ N/A

Matrix spike analyzed? ..... Yes No N/A

Spike recoveries acceptable? ..... Yes No N/A

Spike source traceable? (Levels D, E) ..... Yes No N/A

Spike source expired? Levels D, E) ..... Yes No N/A

Transcription/Calculation Errors? (Levels D, E) ..... Yes No N/A

Comments: _____

Appendix A – Radiochemical Data Validation Checklist

10. Duplicates (Levels C, D, E) ..... ☐ N/A

Duplicates Analyzed at required frequency? ..... Yes No N/A

RPD Values Acceptable? ..... Yes No N/A

Transcription/Calculation Errors? (Levels D, E) ..... Yes No N/A

Comments:

11. Field QC Samples (Levels C, D E) ..... ☐ N/A

Field duplicate sample(s) analyzed? ..... Yes No N/A

Field duplicate RPD values acceptable? ..... Yes No N/A

Field split sample(s) analyzed? ..... Yes No N/A

Field split RPD values acceptable? ..... Yes No N/A

Performance audit sample(s) analyzed? ..... Yes No N/A

Performance audit sample results acceptable? ..... Yes No N/A

Comments: K40 38%
Co60 66%
Cs137 59%
Eu152 54%
Eu154 200%

12. Holding Times (All levels)

Are sample holding times acceptable? ..... Yes No N/A

Comments:

Appendix A – Radiochemical Data Validation Checklist

13. Results and Detection Limits (All Levels) ☐ N/A

Results reported for all required sample analyses? Yes No N/A

Results supported in raw data?(Levels D, E) Yes No N/A

Results Acceptable? (Levels D, E) Yes No N/A

Transcription/Calculation errors? (Levels D, E) Yes No N/A

MDA's meet required detection limits? Yes No N/A

Transcription/calculation errors? (Levels D, E) Yes No N/A

Comments: 16 one TDL

Appendix 6

Additional Documentation Requested by Client

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1789

R205128-10 Method Blank

METHOD BLANK

SDG	7285	Client/Case no	Hanford SDG H1789
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R205128-10	Client sample id	Method Blank
Dept sample id	7285-010	Material/Matrix	SOLID
		SAF No	B00-030

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Carbon 14	14762-75-5	0.532	2.4	3.9	50	U	C
Potassium 40	13966-00-2	U		0.45		U	GAM
Cobalt 60	10198-40-0	U		0.016	0.050	U	GAM
Cesium 137	10045-97-3	U		0.015	0.10	U	GAM
Radium 226	13982-63-3	U		0.033	0.10	U	GAM
Radium 228	15262-20-1	U		0.071	0.20	U	GAM
Europium 152	14683-23-9	U		0.037	0.10	U	GAM
Europium 154	15585-10-1	U		0.051	0.10	U	GAM
Europium 155	14391-16-3	U		0.028	0.10	U	GAM
Thorium 228	14274-82-9	U		0.021		U	GAM
Thorium 232	TH-232	U		0.071		U	GAM
Uranium 235	15117-96-1	U		0.063		U	GAM
Uranium 238	U-238	U		2.0		U	GAM
Americium 241	14596-10-2	U		0.016		U	GAM

100 F Area - Full Protocol

QC-BLANK 42007

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	06/11/02

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1789

R205128-09

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7285

Contact Melissa C. Mannion

Client/Case no Hanford SDG H1789

Case no No. 630

Lab sample id R205128-09

Dept sample id 7285-009

Client sample id Lab Control Sample

Material/Matrix SOLID

SAF No B00-030

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Carbon 14	10300	210	23	50		C	11300	450	91	85-115	80-120
Cobalt 60	0.913	0.084	0.055	0.050		GAM	0.953	0.038	96	74-126	80-120
Cesium 137	1.23	0.081	0.055	0.10		GAM	1.17	0.047	105	73-127	80-120

100 F Area - Full Protocol

QC-LCS 42006

Lab id TMANC

Protocol Hanford

Version Ver 1.0

Form DVD-LCS

Version 3.06

Report date 06/11/02

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1789

R205128-11 B14LK0

DUPLICATE

SDG	7285			Client/Case no	Hanford SDG H1789
Contact	Melissa C. Mannion			Case no	No. 630
	DUPLICATE		ORIGINAL		
Lab sample id	R205128-11	Lab sample id	R205128-07	Client sample id	B14LK0
Dept sample id	7285-011	Dept sample id	7285-007	Location/Matrix	116-F-2 Deep Zone SOLID
		Received	05/23/02	Collected/Weight	05/21/02 08:00 2052 g
% solids	99.4	% solids	99.4	Custody/SAF No	B00-030-056 B00-030

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 PROT TOT LIMIT
Carbon 14	1.47	2.3	3.9	50	U	C	0.154	2.2	3.7	U	-	
Potassium 40	15.3	1.2	0.90			GAM	12.2	0.85	0.53		23	36
Cobalt 60	1.38	0.14	0.13	0.050		GAM	1.04	0.11	0.088		28	39
Cesium 137	28.5	0.38	0.30	0.10		GAM	24.2	0.31	0.22		16	32
Radium 226	U		0.58	0.10	U	GAM	U		0.43	U	-	
Radium 228	U		0.76	0.20	U	GAM	U		0.58	U	-	
Europium 152	58.0	0.76	0.68	0.10		GAM	48.9	0.64	0.55		17	32
Europium 154	5.49	0.59	0.57	0.10		GAM	4.51	0.40	0.35		20	38
Europium 155	U		0.53	0.10	U	GAM	U		0.58	U	-	
Thorium 228	U		0.86		U	GAM	U		0.25	U	-	
Thorium 232	U		0.76		U	GAM	U		0.58	U	-	
Uranium 235	U		0.64		U	GAM	U		0.64	U	-	
Uranium 238	U		24		U	GAM	U		20	U	-	
Americium 241	U		0.58		U	GAM	U		0.59	U	-	

100 F Area - Full Protocol

QC-DUP#7 42008

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 06/11/02

Date: 21 August 2002
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100F Area - Full Protocol - Waste Site 116-F-2 Deep Zone
Subject: Inorganics - Data Package No. H1789-LLI (SDG No. H1789)

INTRODUCTION

This memo presents the results of data validation on Data Package No. H1789-LLI prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B14LJ4	5/21/02	Soil	C	Chromium VI by 7196A
B14LJ5	5/21/02	Soil	C	Chromium VI by 7196A
B14LJ6	5/21/02	Soil	C	Chromium VI by 7196A
B14LJ7	5/21/02	Soil	C	Chromium VI by 7196A
B14LJ8	5/21/02	Soil	C	Chromium VI by 7196A
B14LJ9	5/21/02	Soil	C	Chromium VI by 7196A
B14LK0	5/21/02	Soil	C	Chromium VI by 7196A
B14LK1	5/21/02	Soil	C	Chromium VI by 7196A

Data validation was conducted in accordance with the Bechtel Hanford Incorporated (BHI) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL December 2001). Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested by Client

DATA QUALITY PARAMETERS

- **Holding Times**

Analytical holding times for metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within 30 days for chromium VI.

All holding times were acceptable.

- **Preparation (Method) Blanks**

Preparation Blanks

At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "U". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

In the case of negative blank results, if the absolute value exceeds the contract required detection limit (CRDL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the instrument detection limit (IDL) and less than or equal to the CRDL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

All preparation blank results were acceptable.

Field (Equipment) Blank

One equipment blank (B14LK1) was submitted for analysis. No analytes were detected in the equipment blank.

- **Accuracy**

Matrix Spike

Matrix spike (MS) analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike recoveries must fall within the range of 70% to 130%. Samples with a spike recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a spike recovery of 30% to 69% and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a spike recovery greater than 130% and a sample result less than the IDL, no qualification is required.

Due to a matrix spike recovery of 133% (insoluble chromium VI), all chromium VI results were qualified as estimates and flagged "J".

All other matrix spike recovery results were acceptable.

- **Precision**

Laboratory Duplicate Samples

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of matrix spike duplicate (MSD) analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the CRDL and the RPD is less than 30%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All laboratory duplicate results were acceptable.

Field Duplicate

One set of field duplicate samples (B14LJ4/B14LK0) was submitted for analysis. Field duplicate results are compared using the same criteria as for laboratory duplicates. All field duplicate results were within QC limits.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the 100 Area Remedial Action Sampling and Analysis Plan TDLs to ensure that laboratory detection levels meet the required criteria. All reported results met the analyte specific TDL.

- **Completeness**

Data package No. H1789-LLI was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to a matrix spike recovery of 133% (insoluble chromium VI), all chromium VI results were qualified as estimates and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-96-22, Rev. 3, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, December 2001.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with BHI validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.

BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H1789	REVIEWER: TLI	DATE: 8/21/02	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Chromium VI	J	All	MS recovery

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: BECHTEL-HANFORD																					
Laboratory: LLI																					
Case	SDG: H1789																				
Sample Number		B14LJ4		B14LJ5		B14LJ6		B14LJ7		B14LJ8		B14LJ9		B14LK0		B14LK1					
Location														Duplicate		Blank					
Sample Date		5/21/02		5/21/02		5/21/02		5/21/02		5/21/02		5/21/02		5/21/02		5/21/02					
Inorganics	TDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chromium VI	0.5	0.40	UJ	0.40	UJ	0.40	UJ	1.4	J	0.40	UJ	0.91	J	0.90	J	0.40	UJ				

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

000000

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 06/12/02

CLIENT: TNUHANFORD B00-030 H1789 LVL LOT #: 0205L749

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B14LJ4	% Solids	99.6		0.19	1.0
		Chromium VI	0.40 u J	MG/KG	0.40	1.0
-002	B14LJ5	% Solids	99.6		0.18	1.0
		Chromium VI	0.40 u J	MG/KG	0.40	1.0
-003	B14LJ6	% Solids	99.6		0.19	1.0
		Chromium VI	0.40 u J	MG/KG	0.40	1.0
-004	B14LJ7	% Solids	99.5		0.19	1.0
		Chromium VI	1.4 J	MG/KG	0.40	1.0
-005	B14LJ8	% Solids	99.5		0.19	1.0
		Chromium VI	0.40 u J	MG/KG	0.40	1.0
-006	B14LJ9	% Solids	99.7		0.19	1.0
		Chromium VI	0.91 J	MG/KG	0.40	1.0
-007	B14LK0	% Solids	99.7		0.18	1.0
		Chromium VI	0.90 J	MG/KG	0.40	1.0
-008	B14LK1	% Solids	99.9		0.19	1.0
		Chromium VI	0.40 u J	MG/KG	0.40	1.0

8/21/02

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD B00-030 H1789
LVL#: 0205L749

W.O.#: 11343-606-001-9999-00
Date Received: 05-23-02

INORGANIC NARRATIVE

1. This narrative covers the analyses of 8 soil samples.

2. The samples were prepared and analyzed in accordance with the methods checked on the attached glossary.

3. Sample holding times as required by the method and/or contract were met.

4. All results presented in this report are derived form samples that met LvLI's sample acceptance policy.

5. The method blank for Chromium VI was within the method criteria.

6. The Laboratory Control Samples (LCS) for Chromium VI were within the laboratory control limits.

7. The matrix spike (MS) recovery for Soluble Chromium VI was within the 75-125% control limits, however MS recovery for Insoluble Chromium VI was above the control limits that may be attributed to sample inhomogeneity.

8. The replicate analyses 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.

By _____ 06-14-02

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

Date

njp\i05-749

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 13 pages.

02050749

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B00-030-056	Page 1 of 2

Collector: M T Stankoviich	Company Contact: Mike Stankovich	Telephone No.: 531-7620	Project Coordinator: TRENT, SJ
Price Code: 8L	Data Turnaround: 21 Days	Air Quality ☐	
Project Designation: 100 F Area - Full Protocol	Sampling Location: 116-F-2 Deep Zone	SAF No.: B00-030	
Ice Chest No.: ERC-02-007	Field Logbook No.: EL-1535-5	COA: R116F22000	Method of Shipment: FedEx
Shipped To: TMA RECRA	Offsite Property No.: AØ 20141		Bill of Lading/Air Bill No.: SEE OSPC

POSSIBLE SAMPLE HAZARDS/REMARKS

Radioactive TIE TO B117P2

Special Handling and/or Storage

COOL

Preservation	Cool 4C	None	None								
Type of Container	aG	P	aG								
No. of Container(s)	1	2	1								
Volume	125mL	500mL	60mL								
SAMPLE ANALYSIS	Chromium Hex - 7196	See item (1) in Special Instructions.	[redacted] Carbon-14 5.22.02	5-10-02							

	Sample No.	Matrix *	Sample Date	Sample Time										
1	B14LJ4	SOIL	5-21-02	0800	✓									
2	B14LJ5	SOIL	5-21-02	0820	✓									
3	B14LJ6	SOIL	5-21-02	0830	✓									
4	B14LJ7	SOIL	5-21-02	0840	✓									
5	B14LJ8	SOIL	5-21-02	0850	✓									

CHAIN OF POSSESSION — **Sign/Print Names**

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
MT Stankovich	1500 5-21-02	1A/3728	5-21-02 1500
Ref 1-A 3728	5-22-02 0900	R. Fahlberg / R Fahlberg	0900 5-22-02
ERC R. Fahlberg / R. Fahlberg	0900 5-22-02	FedEx	
FedEx	5-23-02 0945	V. Hernandez	5-23-02 0945

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}

Personnel not available to relinquish samples from the 3728 Ref # 1-A on 5/22/02

Matrix *

S=Soil
SB=Sediment
SO=Solid
SL=Sludge
W = Water
O=Oil
A=Air
DS=Drum So
DL=Drum Li
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-SF-011 (03/01/2002)

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B00-030-056	Page 2 of 2

Collector M T Stankovich	Company Contact Mike Stankovich	Telephone No. 531-7620	Project Coordinator TRENT, SJ
Project Designation 100 F Area - Full Protocol	Sampling Location 116-F-2 Deep Zone		SAF No. B00-030
Ice Chest No. ERC 02-007	Field Logbook No. EL-1535-5	COA R116F22000	Method of Shipment FedEx
Shipped To TMA/RECRA	Offsite Property No. AØ2-0141		Bill of Lading/Air Bill No. SEE OSPC

Price Code 8L

Air Quality ☐

Data Turnaround 21 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

Radioactive TICTOB117P2

Special Handling and/or Storage

Cool

Preservation	Cool 4C	None	None	
Type of Container	aG	P	aG	
No. of Container(s)	1	2	1	
Volume	125mL	500mL	60mL	
SAMPLE ANALYSIS	Chromium Hex - 7196	See item (1) in Special Instructions. RF 5.22.02	[redacted] Carbon-14	NG 5-10-02

	Sample No.	Matrix *	Sample Date	Sample Time	Chromium Hex - 7196	See item (1) in Special Instructions.	[redacted] Carbon-14	NG 5-10-02
6	B14LJ9	SOIL	5-21-02	0900	✓			
7	B14LK0	SOIL	5-21-02	0800	✓			
8	B14LK1	SOIL	5-21-02	0745	✓			

CHAIN OF POSSESSION	Sign/Print Names	Date/Time
Relinquished By/Removed From: M T Stankovich	Received By/Stored In: 1A/3728	5-21-02 1500
Relinquished By/Removed From: Ref 1-A 3728	Received By/Stored In: R Fahlberg / R Fahlberg	5-22-02 0900
Relinquished By/Removed From: ERC / R Fahlberg / R Fahlberg	Received By/Stored In: Fed Ex	5-22-02 0900
Relinquished By/Removed From: Fed Ex	Received By/Stored In: V. Hernandez	5-23-02 0945
Relinquished By/Removed From:	Received By/Stored In:	
Relinquished By/Removed From:	Received By/Stored In:	

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155)

Personnel not available to relinquish samples from the 3728 Ref # 117 on 5/22/02

Matrix

S=Soil
SE=Sediment
SO=Solid
SL=Sludge
W = Water
O=Oil
A=Air
DS=Drum S
DL=Drum L
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (03/01/2002)

Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

ALIDATION LEVEL:	A	B	C	D	E
PROJECT: 100F 116-F-2			DATA PACKAGE: H1784		
VALIDATOR: TCI		LAB: LLI		DATE: 8/21/02	
CASE:			SDG: H1784		
ANALYSES PERFORMED					
SW-846/ICP	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide	CR(VI)	
SAMPLES/MATRIX					
B14LJ4	B14LJ5	B14LJ6	B14LJ7		
B14LJ8	B14LJ9	B14LK0	B14LK1		

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes No N/A

Comments:

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations performed on all instruments? ..... Yes No N/A

Initial calibrations acceptable? ..... Yes No N/A

ICP interference checks acceptable? ..... Yes No N/A

ICV and CCV checks performed on all instruments? ..... Yes No N/A

ICV and CCV checks acceptable? ..... Yes No N/A

Standards traceable? ..... Yes No N/A

Standards expired? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments:

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

ICB and CCB checks performed for all applicable analyses? (Levels D, E) ..... Yes No N/A
ICB and CCB results acceptable? (Levels D, E) ..... Yes No N/A
Laboratory blanks analyzed? ..... Yes No N/A
Laboratory blank results acceptable? ..... Yes No N/A
Field blanks analyzed? (Levels C, D, E) ..... Yes No N/A
Field blank results acceptable? (Levels C, D, E) ..... Yes No N/A
Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments:

4. ACCURACY (Levels C, D, and E)

MS/MSD samples analyzed? ..... Yes No N/A
MS/MSD results acceptable? ..... Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A
MS/MSD standards expired? (Levels D, E) ..... Yes No N/A
LCS/BSS samples analyzed? ..... Yes No N/A
LCS/BSS results acceptable? ..... Yes No N/A
Standards traceable? (Levels D, E) ..... Yes No N/A
Standards expired? (Levels D, E) ..... Yes No N/A
Transcription/calculation errors? (Levels D, E) ..... Yes No N/A
Performance audit sample(s) analyzed? ..... Yes No N/A
Performance audit sample results acceptable? ..... Yes No N/A

Comments:
In Sol CRUT 133.1

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable? ..... Yes No N/A

Duplicate results acceptable? ..... Yes No N/A

MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A

MS/MSD standards expired? (Levels D, E) ..... Yes No N/A

Field duplicate RPD values acceptable? ..... Yes No N/A

Field split RPD values acceptable? ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: f. dup 7790 – ok

6. ICP QUALITY CONTROL (Levels D and E)

ICP serial dilution samples analyzed? ..... Yes No N/A

ICP serial dilution %D values acceptable? ..... Yes No N/A

ICP post digestion spike required? ..... Yes No N/A

ICP post digestion spike values acceptable? ..... Yes No N/A

Standards traceable? ..... Yes No N/A

Standards expired? ..... Yes No N/A

Transcription/calculation errors? ..... Yes No N/A

Comments:

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

7. FURNACE AA QUALITY CONTROL (Levels D and E)

Duplicate injections performed as required? ..... Yes No N/A

Duplicate injection %RSD values acceptable? ..... Yes No N/A

Analytical spikes performed as required? ..... Yes No N/A

Analytical spike recoveries acceptable? ..... Yes No N/A

Standards traceable? ..... Yes No N/A

Standards expired? ..... Yes No N/A

MSA performed as required? ..... Yes No N/A

MSA results acceptable? ..... Yes No N/A

Transcription/calculation errors? ..... Yes No N/A

Comments:

8. HOLDING TIMES (all levels)

Samples properly preserved? ..... Yes No N/A

Sample holding times acceptable? ..... Yes No N/A

Comments:

000030

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

9. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

Results reported for all requested analyses? ..... Yes No N/A

Rresults supported in the raw data? (Levels D, E) ..... Yes No N/A

Samples properly prepared? (Levels D, E) ..... Yes No N/A

Detection limits meet RDL? ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: _____

000021

Appendix 6

Additional Documentation Requested by Client

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 06/12/02

CLIENT: TNUHANFORD B00-030 H1789 LVL LOT #: 0205L749

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	02LVI017-MB1	Chromium VI	0.40 u	MG/KG	0.40	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 06/12/02

CLIENT: TNUHANFORD B00-030 H1789 LVL LOT #: 0205L749

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-008	B14LK1	Soluble Chromium VI	3.7	0.040u	4.0	91.2	1.0
		Insoluble Chromium VI	1370	0.040u	1030	133.1	100
BLANK10	02LVI017-MB1	Soluble Chromium VI	4.1	0.40u	4.0	101.9	1.0
		Insoluble Chromium VI	1090	0.40u	966	113.3	100

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 06/12/02

CLIENT: TNUHANFORD B00-030 H1789 LVL LOT #: 0205L749

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

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	B14LJ4	% Solids	99.6	99.6	0.030	1.0
-008REP	B14LK1	Chromium VI	0.40u	0.40u	NC	1.0

Duncan, Jeanette M

From: Weiss, Richard L
Sent: Tuesday, August 27, 2002 4:23 PM
To: Duncan, Jeanette M
Subject: Review of Validation Package for SDG H1789

Jeanete,

Revisions Incorporated RLW

Here are my comment on the validation packages for SDG H1789:

Radiochemistry - No comments.

Inorganics - pg. 3, Field Duplicate; Both the sample and field duplicate results are less than 5X the CRDL. The difference between the two values are less than 2X the CRDL. The meets applicable criteria. Revise 3rd sentence.

pg. 10, The first two result columns are labeled "B14LJ5". One (probably the 1st) should be "B14LJ4".

Let me know if you have any questions.

Rich

Review Comment Record (RCR)

1. Date	2. Review No.
8/28/02	BHI/QA2014
3. Project	4. Page
100F Area	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
SDG No.: H1789	100F Area Full Protocol – Waste Sites 116-F-2 Deep Zone	Claude Stacey	BHI/QA	H0-16/372-9208

17. Comment Submittal Approval:

Organization Manager (Optional) _____ Date _____

10. Agreement with indicated comment disposition(s)

Reviewer/Point of Contact _____ Date _____

Author/Originator _____

11. CLOSED

Reviewer/Point of Contact _____

Author/Originator _____

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
1	Radiochemistry: OK, No Comments			
2	Inorganic: OK No comments.			
3	.			
4				
5				
6				