Date: 1 July 2002
To: Bechtel Hanford, Inc. (technical representative)
From: TechLaw, Inc.
Project: 100F Area - Full Protocol - Waste Site 116-F-9
Subject: Radiochemistry - Data Package No. H1745-EB (SDG No. H1745)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H1745-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
B14DH7	4/10/02	Soil	C	See note 1
B14DH8	4/10/02	Soil	C	See note 1
B14DH9	4/10/02	Soil	C	See note 1
B14DJ0	4/10/02	Soil	C	See note 1
B14DJ1	4/10/02	Soil	C	See note 1
B14DJ2	4/10/02	Soil	C	See note 1
B14DJ3	4/10/02	Soil	C	See note 1
B14DJ4	4/10/02	Soil	C	See note 1
B14DJ5	4/10/02	Soil	C	See note 1

1-Carbon-14, total strontium 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

No equipment blanks were submitted for analysis.

- **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 (B14DH7/B14DJ5). Field duplicate results are compared using the same criteria as for laboratory duplicates. 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. Twenty analytes were reported above their TDL. All other reported results met the analyte specific TDL.

- **Completeness**

Data package No. H1745 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

None found.

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: H1745	REVIEWER: TLI	DATE: 7/1/02	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: H1745																				
Sample Number		B14DH7		B14DH8		B14DH9		B14DJ0		B14DJ1		B14DJ2		B14DJ3		B14DJ4		B14DJ5			
Location																		Duplicate			
Sample Date		4/10/02		4/10/02		4/10/02		4/10/02		4/10/02		4/10/02		4/10/02		4/10/02		4/10/02			
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	0.057	U	-0.868	U	0.028	U	0.688	U	0.216	U	-1.66	U	0.412	U	0.084	U	0.140	U		
Strontium (total)	1	1.80		0.028	U	0.018	U	0.289		1.87		0.214		2.07		0.828		1.31			
Potassium-40		12.7		13.6		13.6		14.2		14.3		13.0		11.5		12.8		14.1			
Cobalt 60	0.05	U	U	U	U	U	U	U	U	U	U	U	U*	U	U	U	U*	U	U		
Cesium 137	0.1	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U		
Radium-226		0.504		0.543		0.524		0.486		0.520		0.399		0.473		0.512		0.489			
Radium-228		0.746		0.845		0.843		0.865		0.921		0.658		0.913		0.684		0.697			
Europium 152	0.1	U	U	U	U	U	U	U	U	U	U	U	U	U	U*	U	U*	U	U		
Europium 154	0.1	U	U*	U	U*	U	U	U	U	U	U	U	U*	U	U*	U	U*	U	U		
Europium 155	0.1	U	U	U	U*	U	U	U	U	U	U	U	U	U	U*	U	U	U	U		
Thorium-228		0.626		0.728		0.726		0.812		0.803		0.714		0.764		0.772		0.595			
Thorium-232		0.746		0.845		0.843		0.865		0.921		0.658		0.913		0.684		0.697			
Uranium-235(gea)	1	U	U	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*	U	U*		
Americium-241(gea)	1	U	U	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.

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1745

R204079-01 **B14DH7**

DATA SHEET

SDG	7258	Client/Case no	Hanford	SDG H1745	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R204079-01	Client sample id	B14DH7		
Dept sample id	7258-001	Location/Matrix	116-F-9 Shallow Zone	SOLID	
Received	04/16/02	Collected/Weight	04/10/02 08:00	1980 g	
% solids	98.6	Custody/SAF No	B00-030-054	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	0.057	2.3	3.9	50	U	C
Total Strontium	SR-RAD	1.80	0.24	0.21	1.0		SR
Potassium 40	13966-00-2	12.7	0.81	0.36			GAM
Cobalt 60	10198-40-0	U		0.050	0.050	U	GAM
Cesium 137	10045-97-3	U		0.040	0.10	U	GAM
Radium 226	13982-63-3	0.504	0.075	0.069	0.10		GAM
Radium 228	15262-20-1	0.746	0.20	0.20	0.20		GAM
Europium 152	14683-23-9	U		0.087	0.10	U	GAM
Europium 154	15585-10-1	U		0.16	0.10	U	GAM
Europium 155	14391-16-3	U		0.093	0.10	U	GAM
Thorium 228	14274-82-9	0.626	0.042	0.038			GAM
Thorium 232	TH-232	0.746	0.20	0.20			GAM
Uranium 235	15117-96-1	U		0.11		U	GAM
Uranium 238	U-238	U		5.2		U	GAM
Americium 241	14596-10-2	U		0.049		U	GAM

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7/1/02

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SAMPLE DELIVERY GROUP H1745

R204079-02 B14DH8

DATA SHEET

SDG	7258	Client/Case no	Hanford	SDG H1745	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R204079-02	Client sample id	B14DH8		
Dept sample id	7258-002	Location/Matrix	116-F-9 Shallow Zone	SOLID	
Received	04/16/02	Collected/Weight	04/10/02 08:20	1534 g	
% solids	96.7	Custody/SAF No	B00-030-054	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	-0.868	2.4	4.1	50	U	C
Total Strontium	SR-RAD	0.028	0.13	0.26	1.0	U	SR
Potassium 40	13966-00-2	13.6	0.73	0.36			GAM
Cobalt 60	10198-40-0	U		0.035	0.050	U	GAM
Cesium 137	10045-97-3	U		0.033	0.10	U	GAM
Radium 226	13982-63-3	0.543	0.064	0.055	0.10		GAM
Radium 228	15262-20-1	0.845	0.13	0.12	0.20		GAM
Europium 152	14683-23-9	U		0.074	0.10	U	GAM
Europium 154	15585-10-1	U		0.12	0.10	U	GAM
Europium 155	14391-16-3	U		0.11	0.10	U	GAM
Thorium 228	14274-82-9	0.728	0.039	0.036			GAM
Thorium 232	TH-232	0.845	0.13	0.12			GAM
Uranium 235	15117-96-1	U		0.13		U	GAM
Uranium 238	U-238	U		3.8		U	GAM
Americium 241	14596-10-2	U		0.23		U	GAM

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SAMPLE DELIVERY GROUP H1745

R204079-03 B14DH9

DATA SHEET

SDG	7258	Client/Case no	Hanford	SDG H1745	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R204079-03	Client sample id	B14DH9		
Dept sample id	7258-003	Location/Matrix	116-F-9 Shallow Zone	SOLID	
Received	04/16/02	Collected/Weight	04/10/02 08:30	1601 g	
% solids	97.6	Custody/SAF No	B00-030-054	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	0.028	2.3	3.8	50	U	C
Total Strontium	SR-RAD	0.018	0.14	0.29	1.0	U	SR
Potassium 40	13966-00-2	13.6	0.89	0.31			GAM
Cobalt 60	10198-40-0	U		0.026	0.050	U	GAM
Cesium 137	10045-97-3	U		0.025	0.10	U	GAM
Radium 226	13982-63-3	0.524	0.056	0.051	0.10		GAM
Radium 228	15262-20-1	0.843	0.14	0.13	0.20		GAM
Europium 152	14683-23-9	U		0.065	0.10	U	GAM
Europium 154	15585-10-1	U		0.093	0.10	U	GAM
Europium 155	14391-16-3	U		0.063	0.10	U	GAM
Thorium 228	14274-82-9	0.726	0.034	0.029			GAM
Thorium 232	TH-232	0.843	0.14	0.13			GAM
Uranium 235	15117-96-1	U		0.092		U	GAM
Uranium 238	U-238	U		2.9		U	GAM
Americium 241	14596-10-2	U		0.037		U	GAM

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SAMPLE DELIVERY GROUP H1745

R204079-04 **B14DJ0**

DATA SHEET

SDG	7258	Client/Case no	Hanford SDG H1745
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R204079-04	Client sample id	B14DJ0
Dept sample id	7258-004	Location/Matrix	116-F-9 Shallow Zone SOLID
Received	04/16/02	Collected/Weight	04/10/02 08:40 1687 g
% solids	96.7	Custody/SAF No	B00-030-054 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	0.688	2.2	3.7	50	U	C
Total Strontium	SR-RAD	0.289	0.13	0.20	1.0	J	SR
Potassium 40	13966-00-2	14.2	0.92	0.28			GAM
Cobalt 60	10198-40-0	U		0.027	0.050	U	GAM
Cesium 137	10045-97-3	U		0.029	0.10	U	GAM
Radium 226	13982-63-3	0.486	0.062	0.060	0.10		GAM
Radium 228	15262-20-1	0.865	0.13	0.13	0.20		GAM
Europium 152	14683-23-9	U		0.073	0.10	U	GAM
Europium 154	15585-10-1	U		0.10	0.10	U	GAM
Europium 155	14391-16-3	U		0.073	0.10	U	GAM
Thorium 228	14274-82-9	0.812	0.039	0.034			GAM
Thorium 232	TH-232	0.865	0.13	0.13			GAM
Uranium 235	15117-96-1	U		0.11		U	GAM
Uranium 238	U-238	U		3.5		U	GAM
Americium 241	14596-10-2	U		0.042		U	GAM

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SAMPLE DELIVERY GROUP H1745

R204079-05 B14DJ1

DATA SHEET

SDG	7258	Client/Case no	Hanford	SDG H1745	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R204079-05	Client sample id	B14DJ1		
Dept sample id	7258-005	Location/Matrix	116-F-9 Shallow Zone	SOLID	
Received	04/16/02	Collected/Weight	04/10/02 08:50	1462 g	
% solids	96.3	Custody/SAF No	B00-030-054	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	0.216	2.2	3.7	50	U	C
Total Strontium	SR-RAD	1.87	0.24	0.21	1.0		SR
Potassium 40	13966-00-2	14.3	0.31	0.13			GAM
Cobalt 60	10198-40-0	U		0.013	0.050	U	GAM
Cesium 137	10045-97-3	U		0.013	0.10	U	GAM
Radium 226	13982-63-3	0.520	0.026	0.026	0.10		GAM
Radium 228	15262-20-1	0.921	0.058	0.055	0.20		GAM
Europium 152	14683-23-9	U		0.030	0.10	U	GAM
Europium 154	15585-10-1	U		0.046	0.10	U	GAM
Europium 155	14391-16-3	U		0.066	0.10	U	GAM
Thorium 228	14274-82-9	0.803	0.017	0.015			GAM
Thorium 232	TH-232	0.921	0.058	0.055			GAM
Uranium 235	15117-96-1	U		0.071		U	GAM
Uranium 238	U-238	U		1.5		U	GAM
Americium 241	14596-10-2	U		0.095		U	GAM

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SAMPLE DELIVERY GROUP H1745

R204079-06 B14DJ2

DATA SHEET

SDG	7258	Client/Case no	Hanford	SDG H1745	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R204079-06	Client sample id	B14DJ2		
Dept sample id	7258-006	Location/Matrix	116-F-9 Shallow Zone	SOLID	
Received	04/16/02	Collected/Weight	04/10/02 09:00	1628 g	
% solids	96.6	Custody/SAF No	B00-030-054	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	-1.66	2.4	4.1	50	U	C
Total Strontium	SR-RAD	0.214	0.13	0.21	1.0	J	SR
Potassium 40	13966-00-2	13.0	0.95	0.34			GAM
Cobalt 60	10198-40-0	U		0.051	0.050	U	GAM
Cesium 137	10045-97-3	U		0.049	0.10	U	GAM
Radium 226	13982-63-3	0.399	0.096	0.094	0.10		GAM
Radium 228	15262-20-1	0.658	0.23	0.21	0.20		GAM
Europium 152	14683-23-9	U		0.10	0.10	U	GAM
Europium 154	15585-10-1	U		0.18	0.10	U	GAM
Europium 155	14391-16-3	U		0.075	0.10	U	GAM
Thorium 228	14274-82-9	0.714	0.066	0.063			GAM
Thorium 232	TH-232	0.658	0.23	0.21			GAM
Uranium 235	15117-96-1	U		0.13		U	GAM
Uranium 238	U-238	U		6.2		U	GAM
Americium 241	14596-10-2	U		0.054		U	GAM

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SAMPLE DELIVERY GROUP H1745

R204079-07 B14DJ3

DATA SHEET

SDG	7258	Client/Case no	Hanford		SDG H1745
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R204079-07	Client sample id	B14DJ3		
Dept sample id	7258-007	Location/Matrix	116-F-9 Shallow Zone		SOLID
Received	04/16/02	Collected/Weight	04/10/02 09:10	1677 g	
% solids	97.8	Custody/SAF No	B00-030-054	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	0.412	2.1	3.5	50	U	C
Total Strontium	SR-RAD	2.07	0.27	0.23	1.0		SR
Potassium 40	13966-00-2	11.5	0.97	0.61			GAM
Cobalt 60	10198-40-0	U		0.049	0.050	U	GAM
Cesium 137	10045-97-3	U		0.048	0.10	U	GAM
Radium 226	13982-63-3	0.473	0.078	0.075	0.10		GAM
Radium 228	15262-20-1	0.913	0.24	0.20	0.20		GAM
Europium 152	14683-23-9	U		0.12	0.10	U	GAM
Europium 154	15585-10-1	U		0.17	0.10	U	GAM
Europium 155	14391-16-3	U		0.11	0.10	U	GAM
Thorium 228	14274-82-9	0.764	0.080	0.081			GAM
Thorium 232	TH-232	0.913	0.24	0.20			GAM
Uranium 235	15117-96-1	U		0.16		U	GAM
Uranium 238	U-238	U		5.3		U	GAM
Americium 241	14596-10-2	U		0.16		U	GAM

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SAMPLE DELIVERY GROUP H1745

R204079-08 **B14DJ4**

DATA SHEET

SDG	7258	Client/Case no	Hanford	SDG H1745	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R204079-08	Client sample id	B14DJ4		
Dept sample id	7258-008	Location/Matrix	116-F-9 Shallow Zone	SOLID	
Received	04/16/02	Collected/Weight	04/10/02 09:20	1850 g	
% solids	98.1	Custody/SAF No	B00-030-054	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	0.084	2.3	3.8	50	U	C
Total Strontium	SR-RAD	0.828	0.17	0.19	1.0	J	SR
Potassium 40	13966-00-2	12.8	0.96	0.44			GAM
Cobalt 60	10198-40-0	U		0.051	0.050	U	GAM
Cesium 137	10045-97-3	U		0.050	0.10	U	GAM
Radium 226	13982-63-3	0.512	0.091	0.085	0.10		GAM
Radium 228	15262-20-1	0.684	0.18	0.17	0.20		GAM
Europium 152	14683-23-9	U		0.11	0.10	U	GAM
Europium 154	15585-10-1	U		0.18	0.10	U	GAM
Europium 155	14391-16-3	U		0.077	0.10	U	GAM
Thorium 228	14274-82-9	0.772	0.071	0.070			GAM
Thorium 232	TH-232	0.684	0.18	0.17			GAM
Uranium 235	15117-96-1	U		0.14		U	GAM
Uranium 238	U-238	U		6.6		U	GAM
Americium 241	14596-10-2	U		0.054		U	GAM

100 F Area - Full Protocol

7/1/02

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	05/07/02

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1745

R204079-09 B14DJ5

DATA SHEET

SDG	7258	Client/Case no	Hanford SDG H1745
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R204079-09	Client sample id	B14DJ5
Dept sample id	7258-009	Location/Matrix	116-F-9 Shallow Zone SOLID
Received	04/16/02	Collected/Weight	04/10/02 08:00 1908 g
% solids	98.5	Custody/SAF No	B00-030-054 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	0.140	2.3	3.8	50	U	C
Total Strontium	SR-RAD	1.31	0.21	0.22	1.0		SR
Potassium 40	13966-00-2	14.1	0.60	0.22			GAM
Cobalt 60	10198-40-0	U		0.025	0.050	U	GAM
Cesium 137	10045-97-3	U		0.026	0.10	U	GAM
Radium 226	13982-63-3	0.489	0.051	0.045	0.10		GAM
Radium 228	15262-20-1	0.697	0.12	0.11	0.20		GAM
Europium 152	14683-23-9	U		0.064	0.10	U	GAM
Europium 154	15585-10-1	U		0.085	0.10	U	GAM
Europium 155	14391-16-3	U		0.070	0.10	U	GAM
Thorium 228	14274-82-9	0.595	0.033	0.031			GAM
Thorium 232	TH-232	0.697	0.12	0.11			GAM
Uranium 235	15117-96-1	U		0.11		U	GAM
Uranium 238	U-238	U		3.3		U	GAM
Americium 241	14596-10-2	U		0.096		U	GAM

100 F Area - Full Protocol

7/1/02

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	05/07/02

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

1.0 GENERAL

Bechtel Hanford Inc. (BHI) Sample Delivery Group H1745 was composed of nine 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 document. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist. The results were transmitted to BHI via e-Fax on May 7, 2002.

2.0 ANALYSIS NOTES

2.1 Carbon-14 Analyses

No problems were encountered during the course of the analyses.

2.2 Total Strontium Analyses

No problems were encountered during the course of the analyses.

2.3 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

May 16, 2002
Date

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B00-030-054	Page 2 of 2

Collector: M T Stankovich	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-9 Shallow Zone H1754 (7258)	SAF No.: B00-030	
Ice Chest No.: ERC96-026	Field Logbook No.: EL-1535-4	COA: R116P92000	Method of Shipment: FED EX
Shipped To: TMA/RECRA	Offsite Property No.: A020623		Bill of Lading/Air Bill No.: 7903 8272 3451

POSSIBLE SAMPLE HAZARDS/REMARKS

Radioactive TIE TO B11YW6 (Sr-90) & 1313599

Special Handling and/or Storage

None

Preservation	Cool 4C	None	None	
Type of Container	G	P	sG	
No. of Container(s)	1	1	1	
Volume	40mL	1000mL	60mL	
SAMPLE ANALYSIS	Chromium Hex - 7196	See Item (1) in Special Instructions.	Strontium-89,90 – Total Sr: [redacted] Cesium-14	MO 4-9-02

Sample No.	Matrix *	Sample Date	Sample Time			
B14DJ2	SOIL	4-10-02	0900		✓	✓
B14DJ3	SOIL	4-10-02	0910		✓	✓
B14DJ4	SOIL	4-10-02	0920		✓	✓
B14DJ5	SOIL	4-10-02	0800		✓	✓

CHAIN OF POSSESSION	Sign/Print Names	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	M Stankovich	4-10-02 1320	Fed Ex 3B	4-10-02 1330
Relinquished By/Removed From	R.J. SB 3728	4-15-02 0900	R. P. Thorell	4-15-02 0900
Relinquished By/Removed From	R P Thorell ERC	4-15-02 0900	FED EX	4-15-02
Relinquished By/Removed From	FED EXPRESS	4-16-02 10:50	Received By/Stored In: SCA-2 E Maxlas E. MASTAS	Date/Time 4-16-02 10:50
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 # 3B on 4/15/02 FT

Matrix *: S-Soil, SD-Sediment, SG-Solid, SL-Sludge, W-Water, O-Oil, A-Air, DS-Drum Solids, DL-Drum Liquid, T-Tissue, WI-Wipe, L-Liquid, V-Vegetation, X-Other

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	B00-030-054	Page 1 of 2

Collector: M T Stankovitch	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-9 Shallow Zone H1745 (7258)	SAF No.: B00-030	Air Quality ☐
Ice Chest No.: ERC 96-026	Field Logbook No.: EL-1535-4 — COA: R116F92000	Method of Shipment: FED EXP	
Shipped To: TMA/RECRA	Offsite Property No.: A020123	Bill of Lading/Air Bill No.: 7463827 2-3451	

POSSIBLE SAMPLE HAZARDS/REMARKS

Radioactive Tie TO B11YN6 (Sr 90) & B1354 B13549

Special Handling and/or Storage 4.15.02

None

Preservation	Cool 4C	None	None								
Type of Container	G	P	aG								
No. of Container(s)	1	1	1								
Volume	125mL	1000mL	60mL								
SAMPLE ANALYSIS	Chromium Hex - 7196	See Item (1) in Special Instructions.	Strontium-89,90 -- Total Sr: [redacted] Carbon-14	no 4-9-02							

Sample No.	Matrix *	Sample Date	Sample Time										
B14DH7	SOIL	4-10-02	0800		—	—							
B14DH8	SOIL	4-10-02	0820		—	—							
B14DH9	SOIL	4-10-02	0830		—	—							
B14DJ0	SOIL	4-10-02	0850		—	—							
B14DJ1	SOIL	4-10-02	0900		—	—							

CHAIN OF POSSESSION	Sign/Print Names	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	MStankovich	4-10-02 1550	Fig 3B	4-10-02 1330
Relinquished By/Removed From	Rok 3B 3728	4.15.02 0800	R Thorar	4-15.02 0900
Relinquished By/Removed From	RThorar ERC	4.15.02 0900	FED EXP	4-15-02
Relinquished By/Removed From	PBA EXPDITOR	4-16-02 10	SCA-2 E. Maestas	4-16-02 1010
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 # 3B on 4/16/02 RT

Matrix *: S=Soil; SD=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

BHI-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: 116-F-9			DATA PACKAGE: H1745		
VALIDATOR: TCI		LAB: EB		DATE: 7/1/02	
CASE:			SDG: H1745		
ANALYSES PERFORMED					
Gross Alpha/Beta	Strontium-90	Technetium-99	Alpha Spectroscopy	Gamma Spectroscopy	
Total Uranium	Radium-22	Tritium	CTD		
SAMPLES/MATRIX					
B14DH7	B14DH8	B14DH9	B14DJ0	B14DJ1	
B14DJ2	B14DJ3	B14DJ4	B14DJ5		
				soil	

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: _____

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:

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: _____

12. Holding Times (All levels)

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

Comments: _____

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: 29 over

000020

Appendix 6

Additional Documentation Requested by Client

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1745

R204079-12 B14DJ5

DUPLICATE

SDG	7258			Client/Case no	Hanford SDG H1745
Contact	Melissa C. Mannion			Case no	No. 630
DUPLICATE		ORIGINAL			
Lab sample id	R204079-12	Lab sample id	R204079-09	Client sample id	B14DJ5
Dept sample id	7258-012	Dept sample id	7258-009	Location/Matrix	116-F-9 Shallow Zone SOLID
		Received	04/16/02	Collected/Weight	04/10/02 08:00 1908 g
		% solids	98.5	Custody/SAF No	B00-030-054 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	0	2.2	3.7	50	U	C	0.140	2.3	3.8	U	-	
Total Strontium	1.35	0.16	0.14	1.0		SR	1.31	0.21	0.22		3	37
Potassium 40	12.6	0.88	0.51			GAM	14.1	0.60	0.22		11	34
Cobalt 60	U		0.039	0.050	U	GAM	U		0.025	U	-	
Cesium 137	U		0.039	0.10	U	GAM	U		0.026	U	-	
Radium 226	0.464	0.079	0.079	0.10		GAM	0.489	0.051	0.045		5	43
Radium 228	0.729	0.16	0.18	0.20		GAM	0.697	0.12	0.11		4	53
Europium 152	U		0.099	0.10	U	GAM	U		0.064	U	-	
Europium 154	U		0.13	0.10	U	GAM	U		0.085	U	-	
Europium 155	U		0.092	0.10	U	GAM	U		0.070	U	-	
Thorium 228	0.789	0.063	0.063			GAM	0.595	0.033	0.031		28	36
Thorium 232	0.729	0.16	0.18			GAM	0.697	0.12	0.11		4	53
Uranium 235	U		0.13		U	GAM	U		0.11	U	-	
Uranium 238	U		4.6		U	GAM	U		3.3	U	-	
Americium 241	U		0.13		U	GAM	U		0.096	U	-	

100 F Area - Full Protocol

QC-DUP#9 41769

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 05/07/02

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1745

R204079-10

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7258
Contact Melissa C. Mannion

Client/Case no Hanford SDG H1745
Case no No. 630

Lab sample id R204079-10
Dept sample id 7258-010

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	10600	110	13	50		C	11300	450	94	85-115	80-120
Total Strontium	22.7	0.77	0.20	1.0		SR	21.6	0.86	105	82-118	80-120
Cobalt 60	0.962	0.051	0.014	0.050		GAM	0.986	0.039	98	76-124	80-120
Cesium 137	1.31	0.052	0.031	0.10		GAM	1.20	0.048	109	74-126	80-120

100 F Area - Full Protocol

QC-LCS 41767

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 05/07/02

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1745

R204079-11 Method Blank

METHOD BLANK

SDG	7258	Client/Case no	Hanford	SDG H1745	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R204079-11	Client sample id	Method Blank		
Dept sample id	7258-011	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	0.682	2.8	4.6	50	U	C
Total Strontium	SR-RAD	-0.060	0.092	0.16	1.0	U	SR
Potassium 40	13966-00-2	U		0.32		U	GAM
Cobalt 60	10198-40-0	U		0.021	0.050	U	GAM
Cesium 137	10045-97-3	U		0.019	0.10	U	GAM
Radium 226	13982-63-3	U		0.034	0.10	U	GAM
Radium 228	15262-20-1	U		0.076	0.20	U	GAM
Europium 152	14683-23-9	U		0.047	0.10	U	GAM
Europium 154	15585-10-1	U		0.070	0.10	U	GAM
Europium 155	14391-16-3	U		0.043	0.10	U	GAM
Thorium 228	14274-82-9	U		0.026		U	GAM
Thorium 232	TH-232	U		0.076		U	GAM
Uranium 235	15117-96-1	U		0.069		U	GAM
Uranium 238	U-238	U		1.8		U	GAM
Americium 241	14596-10-2	U		0.064		U	GAM

100 F Area - Full Protocol

QC-BLANK 41768

000071

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	05/07/02

Date: 1 July 2002
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100F Area - Full Protocol - Waste Site 116-F-9
Subject: Inorganics - Data Package No. H1745-LLI (SDG No. H1745)

INTRODUCTION

This memo presents the results of data validation on Data Package No. H1745-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
B14DH7	4/10/02	Soil	C	Chromium VI by 7196A
B14DH8	4/10/02	Soil	C	Chromium VI by 7196A
B14DH9	4/10/02	Soil	C	Chromium VI by 7196A
B14DJ0	4/10/02	Soil	C	Chromium VI by 7196A
B14DJ1	4/10/02	Soil	C	Chromium VI by 7196A
B14DJ2	4/10/02	Soil	C	Chromium VI by 7196A
B14DJ3	4/10/02	Soil	C	Chromium VI by 7196A
B14DJ4	4/10/02	Soil	C	Chromium VI by 7196A
B14DJ5	4/10/02	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

No field blanks were submitted for analysis.

- **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.

All 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 were submitted for analysis (B14DH7/B14DJ5). Field duplicate results are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **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. H1745-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

None found.

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: H1745	REVIEWER: TLI	DATE: 7/1/02	PAGE_1_OF_1_
COMMENTS: No qualifiers assigned.			

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

INORGANIC ANALYSIS, SOIL MATRIX, MG/KG

Project: BECHTEL-HANFORD																					
Laboratory: LLI																					
Case	SDG: H1745																				
Sample Number		B14DH7		B14DH8		B14DH9		B14DJ0		B14DJ1		B14DJ2		B14DJ3		B14DJ4		B14DJ5			
Location																		Duplicate			
Sample Date		4/10/02		4/10/02		4/10/02		4/10/02		4/10/02		4/10/02		4/10/02		4/10/02		4/10/02			
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	0.41	U	0.42	U	0.41	U	0.41	U	0.41	U	0.41	U	0.41	U	0.41	U	0.41	U		

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.

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 04/24/02

CLIENT: TNUHANFORD B00-030 H1745 LVL LOT #: 0204L400

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B14DJ2	% Solids	96.9	%	0.01	1.0
		Chromium VI	0.41 u	MG/KG	0.41	1.0
-002	B14DJ3	% Solids	97.8	%	0.01	1.0
		Chromium VI	0.41 u	MG/KG	0.41	1.0
-003	B14DJ4	% Solids	98.5	%	0.01	1.0
		Chromium VI	0.41 u	MG/KG	0.41	1.0
-004	B14DJ5	% Solids	98.4	%	0.01	1.0
		Chromium VI	0.41 u	MG/KG	0.41	1.0
-005	B14DH7	% Solids	98.6	%	0.01	1.0
		Chromium VI	0.41 u	MG/KG	0.41	1.0
-006	B14DH8	% Solids	95.4	%	0.01	1.0
		Chromium VI	0.42 u	MG/KG	0.42	1.0
-007	B14DH9	% Solids	98.3	%	0.01	1.0
		Chromium VI	0.41 u	MG/KG	0.41	1.0
-008	B14DJ0	% Solids	98.3	%	0.01	1.0
		Chromium VI	0.41 u	MG/KG	0.41	1.0
-009	B14DJ1	% Solids	97.6	%	0.01	1.0
		Chromium VI	0.41 u	MG/KG	0.41	1.0

7/1/02

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD B00-030 H1745
LVL#: 0104L400

W.O.#: 11343-606-001-9999-00
Date Received: 04-16-02

INORGANIC NARRATIVE

1. This narrative covers the analyses of 9 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 Insoluble Chromium VI was within the 75-125% control limits, however MS recovery for Soluble Chromium VI was below 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.

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

04-24-02
Date

njp\i04-400

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.

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B00-030-054	Page 2 of 2

Collector: M T Stankovich	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-9 Shallow Zone	SAF No.: B00-030	
Ice Chest No.: ERC96-043	Field Logbook No.: EL-1535-4	COA: R116F92000	Method of Shipment: FEDEX
Shipped To: TMA/RECRA	Offsite Property No.: A#20199		Bill of Lading/Air Bill No.: 7926170 0 1734

POSSIBLE SAMPLE HAZARDS/REMARKS

Radioactive TICTO B11YN6 (Sr-90) & B13599

Special Handling and/or Storage

Cool 4C

Preservation	Cool 4C	None	None								
Type of Container	nG	P	P								
No. of Container(s)	1	1	1								
Volume	125mL	1000mL	60mL								
SAMPLE ANALYSIS	Chromium Hex - 7196	See item (1) in Special Instructions.	Strontium-89,90 -- Total Sr; [redacted] Carbon-14	MO 4-9-02							

Sample No.	Matrix *	Sample Date	Sample Time	[redacted]									
B14DJ2	SOIL	4-10-02	0900	—									
B14DJ3	SOIL	4-10-02	0910	—									
B14DJ4	SOIL	4-10-02	0920	—									
B14DJ5	SOIL	4-10-02	0800	—									

CHAIN OF POSSESSION	Date/Time	Sign/Print Names: Received By/Stored In	Date/Time
Relinquished By/Removed From: M Stankovich 4-10-02	1320	Received By/Stored In: Fed Ex SB 4-10-02	1330
Relinquished By/Removed From: BB 3728 4-15-02	0900	Received By/Stored In: R Thorsen	0905 4-15-02
Relinquished By/Removed From: R Thorsen EDC 4.15.02	0900	Received By/Stored In: FED EX	
Relinquished By/Removed From: FEDEX 4-16-02	0940	Received By/Stored In: Carl Hanf 4-16-02	0940
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)~~ RT 4-15-02

Personnel not available to relinquish samples from the 3728 Ref # 3B on 4-15-02 RT

Matrix *
S=Soil
SD=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

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

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B00-030-054	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 — Air Quality ☐
Project Designation: 100 F Area - Full Protocol	Sampling Location: 116-F-9 Shallow Zone	SAF No.: B00-030	
Ice Chest No.: ERC96-043	Field Logbook No.: EL-1535-4 — COA: R116F92000	Method of Shipment: FEDEX	
Shipped To: TMA/RECRA	Offsite Property No.: A020099	Bill of Lading/Air Bill No.: 7920170 0-1734	

POSSIBLE SAMPLE HAZARDS/REMARKS

Radioactive Tie to B11YN6 (3-90) & B13599

Special Handling and/or Storage

Cool 4C

Preservation	Cool 4C	None	None
Type of Container	aG	P	aG
No. of Container(s)	1	1	4
Volume	125mL	1000mL	40mL

SAMPLE ANALYSIS

	Chromium Hex - 7196	Sea Ium (1) Special Instructions.	Strontium-89,90 -- Total Sr; [redacted] Carbon-14
B14DH7	✓		
B14DH8	✓		
B14DH9	✓		
B14DJ0	✓		
B14DJ1	✓		

Sample No.	Matrix *	Sample Date	Sample Time
B14DH7	SOIL	4-10-02	0800
B14DH8	SOIL	4-10-02	0820
B14DH9	SOIL	4-10-02	0850
B14DJ0	SOIL	4-10-02	0880
B14DJ1	SOIL	4-10-02	0900

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
MT Stankovich	4-10-02 1320	Frig 3B	4-10-02 1330
R 3B 3728	4-15-02 0900	R Thorsen	4-15-02 0900
R Thorsen 2B	4-15-02 0900	FEDEX	
FEDEX	4-16-02 0940	Cal Hanf	4-16-02 0940

SPECIAL INSTRUCTIONS

(1) ~~Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155)~~ RT 4-15-02

Personnel not available to relinquish samples from the 3728 Ref # 30 on 4/15/02 RT

Matrix *: 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

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: 116-F-9			DATA PACKAGE: H1745		
VALIDATOR: TCI		LAB: LLI		DATE: 7/1/02	
CASE:			SDG: H1745		
ANALYSES PERFORMED					
SW-846/ICP	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide	CR-VI	
SAMPLES/MATRIX					
B14DH7	B14DH8	B14DH9	B14DJ0	B14DJ1	
B14DJ2	B14DJ3	B14DJ4	B14DJ5		
					Sand

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:

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: _____

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:

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:

Appendix 6

Additional Documentation Requested by Client

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 04/24/02

CLIENT: TNUHANFORD B00-030 H1745 LVL LOT #: 0204L400

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	02LVI012-MB1	Chromium VI	0.40 u	MG/KG	0.40	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 04/24/02

CLIENT: TNUHANFORD B00-030 H1745

LVL LOT #: 0204L400

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-007	B14DH9	Soluble Chromium VI	3.1	0.41u	4.1	72.6	1.0
		Insoluble Chromium VI	1280	0.41u	1240	102.9	100
BLANK10	02LVI012-MB1	Soluble Chromium VI	3.6	0.40u	4.0	90.3	1.0
		Insoluble Chromium VI	1050	0.40u	1090	96.1	100

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 04/24/02

CLIENT: TNUHANFORD B00-030 H1745 LVL LOT #: 0204L400

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

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	B14DJ2	% Solids	96.9	97.1	0.20	1.0
-007REP	B14DH9	Chromium VI	0.41u	0.41u	NC	1.0

From: Duncan, Jeanette M [SMTP:JMDuncan@mail.bhi-erc.com]
To: 'bchristian@techlawinc.com'
Cc:
Subject: FW: Review of Validation Package for SDG H1745
Sent: 7/22/02 4:30 PM **Importance:** Normal

Bruce,

Please incorporate Rich's comments below. Claude had no comments.

Jeanette

> -----Original Message-----
> From: Weiss, Richard L
> Sent: Wednesday, July 17, 2002 1:21 PM
> To: Duncan, Jeanette M
> Subject: Review of Validation Package for SDG H1745
>
> Jeanette,
>
> Here are my comments on the SDG H1745 Validation packages.
>
> Inorganic - No comments.
>
> Radiochemistry - Page 3;There is a "typo" in the last sentence of the
> Detection Levels paragraph. "specific" is spelled "speciiec".
>
> Pagers 3 & 10; If the "TDL" column on page 10 is
> correct, missed TDL flags are incorrect for Eu-152 for sample B14DH7,
> U-235 for all samples except
> B14DJ0 & B12DJ1, and Am-241 for samples B14DH8 & B14DJ3. The
> missed TDL "count" on page 3 will need to be revised to reflect any
> changes
> made on page 10.
>
>
>
> Let me know if you have any questions.
>
> Rich
>
>

Review Comment Record (RCR)

1. Date	2. Review No.
7/15/02	BHI/QA2013
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.: H1745	100F Area Full Protocol – Waste Sites 116-F-9	Claude Stacey	BHI/QA	H0-16/372-9208

17. Comment Submittal Approval:

10. Agreement with indicated comment disposition(s)

11. CLOSED

Organization Manager (Optional)

Date

Reviewer/Point of Contact

Author/Originator

Date

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				

Duncan, Jeanette M

From: Weiss, Richard L
Sent: Wednesday, July 17, 2002 1:21 PM
To: Duncan, Jeanette M
Subject: Review of Validation Package for SDG H1745

Jeanette,

Here are my comments on the SDG H1745 Validation packages.

Inorganic - No comments.

Radiochemistry - Page 3;There is a "typo" in the last sentence of the Detection Levels paragraph. "specific" is spelled "speciiec".

Pagers 3 & 10; If the "TDL" column on page 10 is correct, missed TDL flags are incorrect for Eu-152 for sample B14DH7, U-235 for all samples except B14DJ0 & B12DJ1, and Am-241 for samples B14DH8 & B14DJ3. The missed TDL "count" on page 3 will need to be revised to reflect any changes made on page 10.

Let me know if you have any questions.

Rich