0059877

SAF-B01-054

100 B/C Area Effluent Pipeline & Proximity Site Remediation Activities - Full Protocol

FINAL VALIDATION PACKAGE

COMPLETE COPY OF VALIDATION PACKAGE TO:

Jill Thomson — KB 6.12.03
INITIAL/DATE

Jeanette Duncan — KB 6.12.03
INITIAL/DATE

SDG: H2199 **SAF-B01-054**

Waste Site/Sample Location: 100-B-5

RECEIVED
JUL 28 2003
EDMC

Date: 2 June 2003
To: Bechtel Hanford, Inc. (technical representative)
From: TechLaw, Inc.
Project: 100 B/C Area Effluent Pipeline & Proximity Site Remediation Activities - Full Protocol - Waste Site 100-B-5
Subject: Radiochemistry - Data Package No. H2199-EB (SDG No. H2199)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H2199-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
J00N74	5/7/03	Soil	C	See note 1
J00N75	5/7/03	Soil	C	See note 1
J00N76	5/7/03	Soil	C	See note 1
J00N77	5/7/03	Soil	C	See note 1
J00N78	5/7/03	Soil	C	See note 1
J00N79	5/7/03	Soil	C	See note 1
J00N80	5/7/03	Soil	C	See note 1
J00N81	5/7/03	Soil	C	See note 1
J00N82	5/7/03	Soil	C	See note 1
J00N83	5/7/03	Soil	C	See note 1
J00N84	5/7/03	Soil	C	See note 1
J00N85	5/7/03	Soil	C	See note 1
J00N86	5/7/03	Soil	C	See note 1
J00N87	5/7/03	Soil	C	See note 1
J00N88	5/7/03	Soil	C	See note 1
J00N89	5/7/03	Soil	C	See note 1
J00N90	5/7/03	Soil	C	See note 1
J00N91	5/7/03	Soil	C	See note 1
J00N92	5/7/03	Soil	C	See note 1

1- Gamma spectroscopy, alpha spectroscopy, total strontium.

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) and the Data Quality Objectives Summary Report for 100/300 Area Remaining Sites Analytical Sampling Effort, (BHI-01249, Rev. 3, March 2003). 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

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

  Two equipment blanks (J00N86/J00N91) were submitted for analysis. Potassium-40, radium-226 and thorium-228 as detected in sample J00N86 and uranium-238(aspec), potassium-40 and thorium-228 in sample J00N91. 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 70-130%. 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% and 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.

Due to an RPD outside QC limits (>2XCRDL), the radium-226 results in samples J00N84, J00N85, J00N86, J00N87, J00N88, J00N89, J00N90, J00N91 and J00N92 were qualified as estimates and flagged "J".

All other duplicate results were acceptable.

<u>Field Duplicate</u>

Two sets of field duplicate samples (J00N85/J00N87 & J00N89/J00N92) were submitted for analysis. Duplicates are evaluated based on the same criteria as laboratory duplicates. The europium-152 RPD (42%) in sample duplicate pair J00N89/J00N92 was outside QC limits. Under the BHI statement of work, no qualification is required. All other field duplicate results were acceptable.

- **Detection Levels**

  Reported analytical detection levels for undetected analytes are compared against the remaining waste sites RQLs to ensure that laboratory detection levels meet the required criteria. Seventy-six analytes were reported above their RQL. Under the BHI statement of work, no qualification is required. All other reported results met the analyte specific RQL.

- **Completeness**

  Data package No. H2199 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 an RPD outside QC limits (>2XCRDL), the radium-226 results in samples J00N84, J00N85, J00N86, J00N87, J00N88, J00N89, J00N90, J00N91 and J00N92 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.

Seventy-six analytes were reported above their RQL. Under the BHI statement of work, no qualification is required.

REFERENCES

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

BHI-01249, Rev. 3, *Data Quality Objectives Summary Report for 100/300 Area Remaining Sites Analytical Sampling Effort*, Bechtel Hanford Incorporated, March 2003.

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: H2199	REVIEWER: TLI	DATE: 6/2/03	PAGE_1_OF_1_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Radium-226	J	J00N84, J00N85, J00N86, J00N87, J00N88, J00N89, J00N90, J00N91 J00N92	RPD

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

RADIOCHEMISTRY ANALYSIS, SOIL MATRIX, (PCi/G)

Project: BECHTEL-HANFORD																	
Laboratory: EB																	
Case	SDG: H2199																
Sample Number		J00N74		J00N75		J00N76		J00N77		J00N78		J00N79		J00N80		J00N81	
Remarks																	
Sample Date		5/7/03		5/7/03		5/7/03		5/7/03		5/7/03		5/7/03		5/7/03		5/7/03	
Radiochemistry	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Total Strontium		0.034	U	-0.085	U	0.013	U	0.020	U	-0.024	U	-0.054	U	-0.166	U	0.017	U
Uranium-233/234		0.462		0.348		0.602		0.291		0.464		0.373		0.766		0.637	
Uranium-235		0.155	U	0	U	0	U	0.032	U	0	U	0	U	0	U	0.064	U
Uranium-238		0.513		0.348		0.752		0.502		0.412		0.773		0.560		0.505	
Plutonium-238		0.027	U	0	U	0.042	U	0	U	-0.050	U	0	U	0.032	U	-0.029	U
Plutonium-239/240		0.027	U	0	U	0.083	U	-0.007	U	0	U	0.026	U	0.352		0.029	U
Americium-241		0.030	U	0.045	U	0.111		0.033	U	0.027	U	-0.021	U	0.038	U	-0.016	U
Potassium-40		11.3		7.86		10.7		10.1		11.7		12.0		8.38		11.5	
Cobalt 60	0.05	U	U*	U	U*	U	U*	U	U*	U	U*	U	U*	U	U*	U	U*
Cesium 137	0.05	U	U*	U	U*	U	U*	U	U*	U	U*	U	U*	U	U*	U	U*
Radium-226		0.474		0.305		0.454		0.322		0.392		0.523		0.328		0.456	
Radium-228		0.815		0.562		0.762		0.578		0.622		0.590		0.578		0.627	
Europium 152	0.1	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*
Europium 155	0.1	U	U*	U	U*	U	U*	U	U*	U	U*	U	U*	U	U*	U	U*
Thorium-228		0.602		0.550		0.649		0.481		0.644		0.622		0.636		0.548	
Thorium-232		0.815		0.562		0.762		0.578		0.622		0.590		0.578		0.627	
Uranium-235(gea)		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Uranium-238(gea)		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Americium-241(gea)		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U

NA = Not analyzed

* - RQL 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.

000010

Project: BECHTEL-HANFORD																	
Laboratory: EB																	
Case	SDG: H2199																
Sample Number		J00N82		J00N83		J00N84		J00N85		J00N86		J00N87		J00N88		J00N89	
Remarks										E. Blank		Duplicate					
Sample Date		5/7/03		5/7/03		5/7/03		5/7/03		5/7/03		5/7/03		5/7/03		5/7/03	
Radiochemistry	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Total Strontium		-0.082	U	0.020	U	-0.040	U	-0.021	U	0.005	U	-0.017	U	1.25		0.976	
Uranium-233/234		0.699		0.544		0.667		0.600		0.029	U	0.452		0.786		0.502	
Uranium-235		0.008	U	0.088		0	U	0	U	0	U	0	U	0.073	U	0.032	U
Uranium-238		0.804		0.399		0.567		0.212	U	0.088	U	0.452		0.695		0.264	
Plutonium-238		0.081	U	0.025	U	0.033	U	-0.021	U	0	U	0	U	0.264		0	U
Plutonium-239/240		0	U	0	U	0.033	U	0.043	U	0	U	0.035	U	3.40		0.275	
Americium-241		0.062		-0.024	U	-0.006	U	-0.007	U	0.016	U	-0.018	U	0.968		0.069	
Potassium-40		10.7		9.52		5.83		9.63		3.07		8.47		5.51		8.54	
Cobalt 60	0.05	U	U*	U	U*	U	U*	U	U*	U	U	U	U*	1.46		0.643	
Cesium 137	0.05	U	U*	U	U*	U	U*	U	U*	U	U	U	U*	2.78		6.23	
Radium-226		0.293		0.306		0.287	J	0.303	J	0.130	J	0.361	J	U	UJ	0.328	J
Radium-228		0.688		0.518		0.837		0.575		U	U	0.478		U	U	U	U
Europium 152	0.1	U	U*	U	U*	U	U*	U	U*	U	U	U	U*	15.3		8.69	
Europium 154	0.1	U	U*	U	U*	U	U*	U	U*	U	U*	U	U*	1.44		U	U*
Europium 155	0.1	U	U*	U	U*	U	U*	U	U*	U	U	U	U*	U	U*	U	U*
Thorium-228		0.518		0.473		0.669		0.474		0.168		0.324		0.341		0.462	
Thorium-232		0.688		0.518		0.837		0.575		U	U	0.478		U	U	U	U
Uranium-235(gea)		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Uranium-238(gea)		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Americium-241(gea)		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
NA = Not analyzed																	

* - RQL 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.

RADIOCHEMISTRY ANALYSIS, SOIL MATRIX, (PCi/G)

Project: BECHTEL-HANFORD							
Laboratory: EB							
Case	SDG: H2199						
Sample Number		J00N90		J00N91		J00N92	
Remarks				E. Blank		Duplicate	
Sample Date		5/7/03		5/7/03		5/7/03	
Radiochemistry	RQL	Result	Q	Result	Q	Result	Q
Total Strontium		1.93		0.027	U	0.783	
Uranium-233/234		0.689		0.114	U	0.612	
Uranium-235		0	U	0.035	U	0	U
Uranium-238		0.689		0.285		0.749	
Plutonium-238		0	U	0	U	0	U
Plutonium-239/240		0.814		0	U	0.148	U
Americium-241		0.269		0.012	U	0.074	
Potassium-40		8.17		3.18		9.28	
Cobalt 60	0.05	1.19		U	U*	0.553	
Cesium 137	0.05	22.4		U	U*	4.50	
Radium-226		U	UJ	U	UJ	U	UJ
Radium-228		U	U	U	U	0.656	
Europium 152	0.1	10.1		U	U*	5.65	
Europium 154	0.1	0.864		U	U*	0.613	
Europium 155	0.1	U	U*	U	U*	U	U*
Thorium-228		0.558		0.159		0.470	
Thorium-232		U	U	U	U	0.656	
Uranium-235(gea)		U	U	U	U	U	U
Uranium-238(gea)		U	U	U	U	U	U
Americium-241(gea)		U	U	U	U	U	U
NA = Not analyzed							

* - RQL 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.

000012

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2199

7509-001 J00N74

DATA SHEET

SDG	7509	Client/Case no	Hanford	SDG H2199	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R305058-01	Client sample id	J00N74		
Dept sample id	7509-001	Location/Matrix	100 BC Pipe., 100-B-5	SOLID	
Received	05/09/03	Collected/Weight	05/07/03 08:43	853.0 g	
% solids	95.7	Custody/SAF No	B01-054-031	B01-054	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	0.034	0.15	0.31	1.0	U	SR
Uranium 233/234	U-233/234	0.462	0.26	0.20	1.0		U
Uranium 235	15117-96-1	0.155	0.12	0.24	1.0	U	U
Uranium 238	U-238	0.513	0.26	0.20	1.0		U
Plutonium 238	13981-16-3	0.027	0.055	0.21	1.0	U	PU
Plutonium 239/240	PU-239/240	0.027	0.055	0.21	1.0	U	PU
Americium 241	14596-10-2	0.030	0.060	0.072	1.0	U	AM
Potassium 40	13966-00-2	11.3	3.0	0.94			GAM
Cobalt 60	10198-40-0	U		0.097	0.050	U	GAM
Cesium 137	10045-97-3	U		0.088	0.10	U	GAM
Radium 226	13982-63-3	0.474	0.18	0.18			GAM
Radium 228	15262-20-1	0.815	0.35	0.34			GAM
Europium 152	14683-23-9	U		0.20	0.10	U	GAM
Europium 154	15585-10-1	U		0.27	0.10	U	GAM
Europium 155	14391-16-3	U		0.15	0.10	U	GAM
Thorium 228	14274-82-9	0.602	0.096	0.097			GAM
Thorium 232	TH-232	0.815	0.35	0.34			GAM
Uranium 235	15117-96-1	U		0.25		U	GAM
Uranium 238	U-238	U		9.8		U	GAM
Americium 241	14596-10-2	U		0.080		U	GAM

100 B/C Area Effluent Pipe. & Prox.

R 5/31/03

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	05/16/03

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2199

7509-002 J00N75

DATA SHEET

SDG	7509	Client/Case no	Hanford	SDG H2199	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R305058-02	Client sample id	J00N75		
Dept sample id	7509-002	Location/Matrix	100 BC Pipe., 100-B-5	SOLID	
Received	05/09/03	Collected/Weight	05/07/03 08:50	729.8 g	
% solids	95.3	Custody/SAF No	B01-054-031	B01-054	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	-0.085	0.14	0.31	1.0	U	SR
Uranium 233/234	U-233/234	0.348	0.23	0.22	1.0		U
Uranium 235	15117-96-1	0	0.070	0.27	1.0	U	U
Uranium 238	U-238	0.348	0.18	0.22	1.0		U
Plutonium 238	13981-16-3	0	0.045	0.17	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.045	0.17	1.0	U	PU
Americium 241	14596-10-2	0.045	0.051	0.071	1.0	U	AM
Potassium 40	13966-00-2	7.86	3.0	0.75			GAM
Cobalt 60	10198-40-0	U		0.093	0.050	U	GAM
Cesium 137	10045-97-3	U		0.082	0.10	U	GAM
Radium 226	13982-63-3	0.305	0.15	0.15			GAM
Radium 228	15262-20-1	0.562	0.27	0.26			GAM
Europium 152	14683-23-9	U		0.17	0.10	U	GAM
Europium 154	15585-10-1	U		0.23	0.10	U	GAM
Europium 155	14391-16-3	U		0.14	0.10	U	GAM
Thorium 228	14274-82-9	0.550	0.12	0.13			GAM
Thorium 232	TH-232	0.562	0.27	0.26			GAM
Uranium 235	15117-96-1	U		0.24		U	GAM
Uranium 238	U-238	U		8.0		U	GAM
Americium 241	14596-10-2	U		0.077		U	GAM

100 B/C Area Effluent Pipe. & Prox.

pr 5/31/03

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	05/16/03

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2199

7509-003 J00N76

DATA SHEET

SDG	7509	Client/Case no	Hanford SDG H2199
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R305058-03	Client sample id	J00N76
Dept sample id	7509-003	Location/Matrix	100 BC Pipe., 100-B-5 SOLID
Received	05/09/03	Collected/Weight	05/07/03 08:58 802.1 g
% solids	95.4	Custody/SAF No	B01-054-031 B01-054

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	0.013	0.15	0.31	1.0	U	SR
Uranium 233/234	U-233/234	0.602	0.25	0.19	1.0		U
Uranium 235	15117-96-1	0	0.061	0.23	1.0	U	U
Uranium 238	U-238	0.752	0.26	0.19	1.0		U
Plutonium 238	13981-16-3	0.042	0.083	0.32	1.0	U	PU
Plutonium 239/240	PU-239/240	0.083	0.084	0.32	1.0	U	PU
Americium 241	14596-10-2	0.111	0.074	0.071	1.0		AM
Potassium 40	13966-00-2	10.7	1.8	1.1			GAM
Cobalt 60	10198-40-0	U		0.10	0.050	U	GAM
Cesium 137	10045-97-3	U		0.11	0.10	U	GAM
Radium 226	13982-63-3	0.454	0.16	0.17			GAM
Radium 228	15262-20-1	0.762	0.35	0.36			GAM
Europium 152	14683-23-9	U		0.25	0.10	U	GAM
Europium 154	15585-10-1	U		0.37	0.10	U	GAM
Europium 155	14391-16-3	U		0.21	0.10	U	GAM
Thorium 228	14274-82-9	0.649	0.14	0.15			GAM
Thorium 232	TH-232	0.762	0.35	0.36			GAM
Uranium 235	15117-96-1	U		0.35		U	GAM
Uranium 238	U-238	U		9.9		U	GAM
Americium 241	14596-10-2	U		0.23		U	GAM

100 B/C Area Effluent Pipe. & Prox.

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2199

7509-004 J00N77

DATA SHEET

SDG	7509	Client/Case no	Hanford SDG H2199
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R305058-04	Client sample id	J00N77
Dept sample id	7509-004	Location/Matrix	100 BC Pipe., 100-B-5 SOLID
Received	05/09/03	Collected/Weight	05/07/03 09:16 839.5 g
% solids	97.4	Custody/SAF No	B01-054-031 B01-054

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	0.020	0.16	0.33	1.0	U	SR
Uranium 233/234	U-233/234	0.291	0.21	0.20	1.0		U
Uranium 235	15117-96-1	0.032	0.064	0.24	1.0	U	U
Uranium 238	U-238	0.502	0.21	0.20	1.0		U
Plutonium 238	13981-16-3	0	0.014	0.055	1.0	U	PU
Plutonium 239/240	PU-239/240	-0.007	0.029	0.068	1.0	U	PU
Americium 241	14596-10-2	0.033	0.038	0.045	1.0	U	AM
Potassium 40	13966-00-2	10.1	1.0	0.28			GAM
Cobalt 60	10198-40-0	U		0.054	0.050	U	GAM
Cesium 137	10045-97-3	U		0.055	0.10	U	GAM
Radium 226	13982-63-3	0.322	0.093	0.091			GAM
Radium 228	15262-20-1	0.578	0.23	0.23			GAM
Europium 152	14683-23-9	U		0.14	0.10	U	GAM
Europium 154	15585-10-1	U		0.18	0.10	U	GAM
Europium 155	14391-16-3	U		0.13	0.10	U	GAM
Thorium 228	14274-82-9	0.481	0.063	0.057			GAM
Thorium 232	TH-232	0.578	0.23	0.23			GAM
Uranium 235	15117-96-1	U		0.16		U	GAM
Uranium 238	U-238	U		7.0		U	GAM
Americium 241	14596-10-2	U		0.12		U	GAM

100 B/C Area Effluent Pipe. & Prox.

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SAMPLE DELIVERY GROUP H2199

7509-005 J00N78

DATA SHEET

SDG	7509	Client/Case no	Hanford SDG H2199
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R305058-05	Client sample id	J00N78
Dept sample id	7509-005	Location/Matrix	100 BC Pipe., 100-B-5 SOLID
Received	05/09/03	Collected/Weight	05/07/03 09:26 723.7 g
% solids	95.1	Custody/SAF No	B01-054-031 B01-054

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	-0.024	0.14	0.30	1.0	U	SR
Uranium 233/234	U-233/234	0.464	0.21	0.20	1.0		U
Uranium 235	15117-96-1	0	0.062	0.24	1.0	U	U
Uranium 238	U-238	0.412	0.21	0.20	1.0		U
Plutonium 238	13981-16-3	-0.050	0.050	0.24	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.050	0.19	1.0	U	PU
Americium 241	14596-10-2	0.027	0.044	0.053	1.0	U	AM
Potassium 40	13966-00-2	11.7	1.5	0.71			GAM
Cobalt 60	10198-40-0	U		0.089	0.050	U	GAM
Cesium 137	10045-97-3	U		0.084	0.10	U	GAM
Radium 226	13982-63-3	0.392	0.15	0.15			GAM
Radium 228	15262-20-1	0.622	0.32	0.36			GAM
Europium 152	14683-23-9	U		0.20	0.10	U	GAM
Europium 154	15585-10-1	U		0.25	0.10	U	GAM
Europium 155	14391-16-3	U		0.24	0.10	U	GAM
Thorium 228	14274-82-9	0.644	0.085	0.089			GAM
Thorium 232	TH-232	0.622	0.32	0.36			GAM
Uranium 235	15117-96-1	U		0.32		U	GAM
Uranium 238	U-238	U		12		U	GAM
Americium 241	14596-10-2	U		0.41		U	GAM

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SAMPLE DELIVERY GROUP H2199

7509-006 J00N79

DATA SHEET

SDG	7509	Client/Case no	Hanford	SDG H2199	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R305058-06	Client sample id	J00N79		
Dept sample id	7509-006	Location/Matrix	100 BC Pipe., 100-B-5	SOLID	
Received	05/09/03	Collected/Weight	05/07/03 09:32	806.2 g	
% solids	95.7	Custody/SAF No	B01-054-031	B01-054	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	-0.054	0.15	0.33	1.0	U	SR
Uranium 233/234	U-233/234	0.373	0.21	0.20	1.0		U
Uranium 235	15117-96-1	0	0.065	0.25	1.0	U	U
Uranium 238	U-238	0.773	0.27	0.20	1.0		U
Plutonium 238	13981-16-3	0	0.053	0.20	1.0	U	PU
Plutonium 239/240	PU-239/240	0.026	0.053	0.20	1.0	U	PU
Americium 241	14596-10-2	-0.021	0.054	0.10	1.0	U	AM
Potassium 40	13966-00-2	12.0	1.5	0.69			GAM
Cobalt 60	10198-40-0	U		0.087	0.050	U	GAM
Cesium 137	10045-97-3	U		0.078	0.10	U	GAM
Radium 226	13982-63-3	0.523	0.14	0.14			GAM
Radium 228	15262-20-1	0.590	0.33	0.35			GAM
Europium 152	14683-23-9	U		0.22	0.10	U	GAM
Europium 154	15585-10-1	U		0.27	0.10	U	GAM
Europium 155	14391-16-3	U		0.23	0.10	U	GAM
Thorium 228	14274-82-9	0.622	0.082	0.084			GAM
Thorium 232	TH-232	0.590	0.33	0.35			GAM
Uranium 235	15117-96-1	U		0.31		U	GAM
Uranium 238	U-238	U		10		U	GAM
Americium 241	14596-10-2	U		0.40		U	GAM

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SAMPLE DELIVERY GROUP H2199

7509-007 J00N80

DATA SHEET

SDG	7509	Client/Case no	Hanford	SDG H2199	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R305058-07	Client sample id	J00N80		
Dept sample id	7509-007	Location/Matrix	100 BC Pipe., 100-B-5	SOLID	
Received	05/09/03	Collected/Weight	05/07/03 09:40	957.6 g	
% solids	96.8	Custody/SAF No	B01-054-031	B01-054	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	-0.166	0.14	0.32	1.0	U	SR
Uranium 233/234	U-233/234	0.766	0.30	0.23	1.0		U
Uranium 235	15117-96-1	0	0.071	0.27	1.0	U	U
Uranium 238	U-238	0.560	0.24	0.23	1.0		U
Plutonium 238	13981-16-3	0.032	0.064	0.24	1.0	U	PU
Plutonium 239/240	PU-239/240	0.352	0.19	0.24	1.0		PU
Americium 241	14596-10-2	0.038	0.064	0.095	1.0	U	AM
Potassium 40	13966-00-2	8.38	2.8	0.53			GAM
Cobalt 60	10198-40-0	U		0.088	0.050	U	GAM
Cesium 137	10045-97-3	U		0.092	0.10	U	GAM
Radium 226	13982-63-3	0.328	0.15	0.14			GAM
Radium 228	15262-20-1	0.578	0.36	0.37			GAM
Europium 152	14683-23-9	U		0.18	0.10	U	GAM
Europium 154	15585-10-1	U		0.22	0.10	U	GAM
Europium 155	14391-16-3	U		0.14	0.10	U	GAM
Thorium 228	14274-82-9	0.636	0.11	0.11			GAM
Thorium 232	TH-232	0.578	0.36	0.37			GAM
Uranium 235	15117-96-1	U		0.23		U	GAM
Uranium 238	U-238	U		8.1		U	GAM
Americium 241	14596-10-2	U		0.069		U	GAM

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SAMPLE DELIVERY GROUP H2199

7509-008 J00N81

DATA SHEET

SDG	7509	Client/Case no	Hanford SDG H2199
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R305058-08	Client sample id	J00N81
Dept sample id	7509-008	Location/Matrix	100 BC Pipe., 100-B-5 SOLID
Received	05/09/03	Collected/Weight	05/07/03 09:51 842.3 g
% solids	95.2	Custody/SAF No	B01-054-031 B01-054

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	0.017	0.16	0.33	1.0	U	SR
Uranium 233/234	U-233/234	0.637	0.27	0.20	1.0		U
Uranium 235	15117-96-1	0.064	0.064	0.25	1.0	U	U
Uranium 238	U-238	0.505	0.22	0.20	1.0		U
Plutonium 238	13981-16-3	-0.029	0.059	0.23	1.0	U	PU
Plutonium 239/240	PU-239/240	0.029	0.059	0.23	1.0	U	PU
Americium 241	14596-10-2	-0.016	0.032	0.058	1.0	U	AM
Potassium 40	13966-00-2	11.5	1.6	0.85			GAM
Cobalt 60	10198-40-0	U		0.099	0.050	U	GAM
Cesium 137	10045-97-3	U		0.093	0.10	U	GAM
Radium 226	13982-63-3	0.456	0.16	0.17			GAM
Radium 228	15262-20-1	0.627	0.26	0.24			GAM
Europium 152	14683-23-9	U		0.23	0.10	U	GAM
Europium 154	15585-10-1	U		0.30	0.10	U	GAM
Europium 155	14391-16-3	U		0.25	0.10	U	GAM
Thorium 228	14274-82-9	0.548	0.085	0.093			GAM
Thorium 232	TH-232	0.627	0.26	0.24			GAM
Uranium 235	15117-96-1	U		0.32		U	GAM
Uranium 238	U-238	U		11		U	GAM
Americium 241	14596-10-2	U		0.43		U	GAM

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2199

7509-009 J00N82

DATA SHEET

SDG	7509	Client/Case no	Hanford	SDG H2199	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R305058-09	Client sample id	J00N82		
Dept sample id	7509-009	Location/Matrix	100 BC Pipe., 100-B-5	SOLID	
Received	05/09/03	Collected/Weight	05/07/03 10:03	835.1 g	
% solids	94.9	Custody/SAF No	B01-054-031	B01-054	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	-0.082	0.17	0.37	1.0	U	SR
Uranium 233/234	U-233/234	0.699	0.13	0.050	1.0		U
Uranium 235	15117-96-1	0.008	0.032	0.061	1.0	U	U
Uranium 238	U-238	0.804	0.15	0.050	1.0		U
Plutonium 238	13981-16-3	0.081	0.081	0.31	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.081	0.31	1.0	U	PU
Americium 241	14596-10-2	0.062	0.056	0.062	1.0		AM
Potassium 40	13966-00-2	10.7	2.5	0.73			GAM
Cobalt 60	10198-40-0	U		0.091	0.050	U	GAM
Cesium 137	10045-97-3	U		0.096	0.10	U	GAM
Radium 226	13982-63-3	0.293	0.21	0.15			GAM
Radium 228	15262-20-1	0.688	0.28	0.28			GAM
Europium 152	14683-23-9	U		0.17	0.10	U	GAM
Europium 154	15585-10-1	U		0.19	0.10	U	GAM
Europium 155	14391-16-3	U		0.19	0.10	U	GAM
Thorium 228	14274-82-9	0.518	0.089	0.074			GAM
Thorium 232	TH-232	0.688	0.28	0.28			GAM
Uranium 235	15117-96-1	U		0.29		U	GAM
Uranium 238	U-238	U		8.5		U	GAM
Americium 241	14596-10-2	U		0.29		U	GAM

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SAMPLE DELIVERY GROUP H2199

7509-010 J00N83

DATA SHEET

SDG	7509	Client/Case no	Hanford SDG H2199
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R305058-10	Client sample id	J00N83
Dept sample id	7509-010	Location/Matrix	100 BC Pipe., 100-B-5 SOLID
Received	05/09/03	Collected/Weight	05/07/03 10:12 869.0 g
% solids	95.3	Custody/SAF No	B01-054-031 B01-054

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	0.020	0.14	0.30	1.0	U	SR
Uranium 233/234	U-233/234	0.544	0.12	0.046	1.0		U
Uranium 235	15117-96-1	0.088	0.059	0.056	1.0		U
Uranium 238	U-238	0.399	0.098	0.046	1.0		U
Plutonium 238	13981-16-3	0.025	0.050	0.19	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.050	0.19	1.0	U	PU
Americium 241	14596-10-2	-0.024	0.028	0.058	1.0	U	AM
Potassium 40	13966-00-2	9.52	1.4	0.64			GAM
Cobalt 60	10198-40-0	U		0.073	0.050	U	GAM
Cesium 137	10045-97-3	U		0.081	0.10	U	GAM
Radium 226	13982-63-3	0.306	0.13	0.15			GAM
Radium 228	15262-20-1	0.518	0.35	0.35			GAM
Europium 152	14683-23-9	U		0.17	0.10	U	GAM
Europium 154	15585-10-1	U		0.26	0.10	U	GAM
Europium 155	14391-16-3	U		0.23	0.10	U	GAM
Thorium 228	14274-82-9	0.473	0.074	0.080			GAM
Thorium 232	TH-232	0.518	0.35	0.35			GAM
Uranium 235	15117-96-1	U		0.29		U	GAM
Uranium 238	U-238	U		9.9		U	GAM
Americium 241	14596-10-2	U		0.37		U	GAM

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SAMPLE DELIVERY GROUP H2199

7510-001 J00N84

DATA SHEET

SDG	7510	Client/Case no	Hanford	SDG H2199
Contact	Melissa C. Mannion	Contract	No. 630	
Lab sample id	R305059-01	Client sample id	J00N84	
Dept sample id	7510-001	Location/Matrix	100 BC Pipe., 100-B-5	SOLID
Received	05/09/03	Collected/Weight	05/07/03 10:23	855.7 g
% solids	96.5	Custody/SAF No	B01-054-031	B01-054

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	-0.040	0.15	0.31	1.0	U	SR
Uranium 233/234	U-233/234	0.667	0.34	0.26	1.0		U
Uranium 235	15117-96-1	0	0.081	0.31	1.0	U	U
Uranium 238	U-238	0.567	0.27	0.26	1.0		U
Plutonium 238	13981-16-3	0.033	0.066	0.25	1.0	U	PU
Plutonium 239/240	PU-239/240	0.033	0.066	0.25	1.0	U	PU
Americium 241	14596-10-2	-0.006	0.037	0.059	1.0	U	AM
Potassium 40	13966-00-2	5.83	2.9	0.92			GAM
Cobalt 60	10198-40-0	U		0.081	0.050	U	GAM
Cesium 137	10045-97-3	U		0.15	0.10	U	GAM
Radium 226	13982-63-3	0.287	0.17	0.16		J	GAM
Radium 228	15262-20-1	0.837	0.38	0.36			GAM
Europium 152	14683-23-9	U		0.18	0.10	U	GAM
Europium 154	15585-10-1	U		0.22	0.10	U	GAM
Europium 155	14391-16-3	U		0.15	0.10	U	GAM
Thorium 228	14274-82-9	0.669	0.13	0.13			GAM
Thorium 232	TH-232	0.837	0.38	0.36			GAM
Uranium 235	15117-96-1	U		0.25		U	GAM
Uranium 238	U-238	U		9.7		U	GAM
Americium 241	14596-10-2	U		0.075		U	GAM

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SAMPLE DELIVERY GROUP H2199

7510-002 J00N85

DATA SHEET

SDG	7510	Client/Case no	Hanford SDG H2199
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R305059-02	Client sample id	J00N85
Dept sample id	7510-002	Location/Matrix	100 BC Pipe., 100-B-5 SOLID
Received	05/09/03	Collected/Weight	05/07/03 10:35 932.4 g
% solids	96.3	Custody/SAF No	B01-054-031 B01-054

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	-0.021	0.14	0.30	1.0	U	SR
Uranium 233/234	U-233/234	0.600	0.29	0.27	1.0		U
Uranium 235	15117-96-1	0	0.085	0.33	1.0	U	U
Uranium 238	U-238	0.212	0.14	0.27	1.0	U	U
Plutonium 238	13981-16-3	-0.021	0.043	0.16	1.0	U	PU
Plutonium 239/240	PU-239/240	0.043	0.043	0.16	1.0	U	PU
Americium 241	14596-10-2	-0.007	0.040	0.063	1.0	U	AM
Potassium 40	13966-00-2	9.63	1.1	0.43			GAM
Cobalt 60	10198-40-0	U		0.053	0.050	U	GAM
Cesium 137	10045-97-3	U		0.089	0.10	U	GAM
Radium 226	13982-63-3	0.303	0.081	0.078		J	GAM
Radium 228	15262-20-1	0.575	0.28	0.26			GAM
Europium 152	14683-23-9	U		0.14	0.10	U	GAM
Europium 154	15585-10-1	U		0.18	0.10	U	GAM
Europium 155	14391-16-3	U		0.11	0.10	U	GAM
Thorium 228	14274-82-9	0.474	0.061	0.056			GAM
Thorium 232	TH-232	0.575	0.28	0.26			GAM
Uranium 235	15117-96-1	U		0.17		U	GAM
Uranium 238	U-238	U		6.4		U	GAM
Americium 241	14596-10-2	U		0.11		U	GAM

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SAMPLE DELIVERY GROUP H2199

7510-003 J00N86

DATA SHEET

SDG	7510	Client/Case no	Hanford	SDG H2199	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R305059-03	Client sample id	J00N86		
Dept sample id	7510-003	Location/Matrix	100 BC Pipe., 100-B-5	SOLID	
Received	05/09/03	Collected/Weight	05/07/03 08:25	850.0 g	
% solids	100.0	Custody/SAF No	B01-054-031	B01-054	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	0.005	0.14	0.30	1.0	U	SR
Uranium 233/234	U-233/234	0.029	0.059	0.22	1.0	U	U
Uranium 235	15117-96-1	0	0.071	0.27	1.0	U	U
Uranium 238	U-238	0.088	0.12	0.22	1.0	U	U
Plutonium 238	13981-16-3	0	0.051	0.20	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.051	0.20	1.0	U	PU
Americium 241	14596-10-2	0.016	0.049	0.062	1.0	U	AM
Potassium 40	13966-00-2	3.07	0.62	0.50			GAM
Cobalt 60	10198-40-0	U		0.040	0.050	U	GAM
Cesium 137	10045-97-3	U		0.041	0.10	U	GAM
Radium 226	13982-63-3	0.130	0.058	0.058		J	GAM
Radium 228	15262-20-1	U		0.27		U	GAM
Europium 152	14683-23-9	U		0.085	0.10	U	GAM
Europium 154	15585-10-1	U		0.11	0.10	U	GAM
Europium 155	14391-16-3	U		0.074	0.10	U	GAM
Thorium 228	14274-82-9	0.168	0.049	0.057			GAM
Thorium 232	TH-232	U		0.27		U	GAM
Uranium 235	15117-96-1	U		0.11		U	GAM
Uranium 238	U-238	U		3.9		U	GAM
Americium 241	14596-10-2	U		0.079		U	GAM

100 B/C Area Effluent Pipe. & Prox.

pr 5/31/03

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2199

7510-004 J00N87

DATA SHEET

SDG	7510	Client/Case no	Hanford SDG H2199
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R305059-04	Client sample id	J00N87
Dept sample id	7510-004	Location/Matrix	100 BC Pipe., 100-B-5 SOLID
Received	05/09/03	Collected/Weight	05/07/03 10:25 931.7 g
% solids	96.2	Custody/SAF No	B01-054-031 B01-054

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	-0.017	0.14	0.30	1.0	U	SR
Uranium 233/234	U-233/234	0.452	0.23	0.22	1.0		U
Uranium 235	15117-96-1	0	0.068	0.26	1.0	U	U
Uranium 238	U-238	0.452	0.23	0.22	1.0		U
Plutonium 238	13981-16-3	0	0.070	0.27	1.0	U	PU
Plutonium 239/240	PU-239/240	0.035	0.070	0.27	1.0	U	PU
Americium 241	14596-10-2	-0.018	0.047	0.085	1.0	U	AM
Potassium 40	13966-00-2	8.47	1.2	0.33			GAM
Cobalt 60	10198-40-0	U		0.069	0.050	U	GAM
Cesium 137	10045-97-3	U		0.069	0.10	U	GAM
Radium 226	13982-63-3	0.361	0.13	0.13		J	GAM
Radium 228	15262-20-1	0.478	0.30	0.28			GAM
Europium 152	14683-23-9	U		0.17	0.10	U	GAM
Europium 154	15585-10-1	U		0.22	0.10	U	GAM
Europium 155	14391-16-3	U		0.20	0.10	U	GAM
Thorium 228	14274-82-9	0.324	0.089	0.12			GAM
Thorium 232	TH-232	0.478	0.30	0.28			GAM
Uranium 235	15117-96-1	U		0.28		U	GAM
Uranium 238	U-238	U		9.3		U	GAM
Americium 241	14596-10-2	U		0.34		U	GAM

100 B/C Area Effluent Pipe. & Prox.

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2199

7510-005 J00N88

DATA SHEET

SDG	7510	Client/Case no	Hanford SDG H2199
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R305059-05	Client sample id	J00N88
Dept sample id	7510-005	Location/Matrix	100 BC Pipe., 100-B-5 SOLID
Received	05/09/03	Collected/Weight	05/07/03 12:51 914.4 g
% solids	96.9	Custody/SAF No	B01-054-031 B01-054

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	1.25	0.23	0.24	1.0		SR
Uranium 233/234	U-233/234	0.786	0.31	0.23	1.0		U
Uranium 235	15117-96-1	0.073	0.073	0.28	1.0	U	U
Uranium 238	U-238	0.695	0.31	0.23	1.0		U
Plutonium 238	13981-16-3	0.264	0.18	0.22	1.0		PU
Plutonium 239/240	PU-239/240	3.40	0.70	0.22	1.0		PU
Americium 241	14596-10-2	0.968	0.14	0.044	1.0		AM
Potassium 40	13966-00-2	5.51	2.7	0.88			GAM
Cobalt 60	10198-40-0	1.46	0.16	0.12	0.050		GAM
Cesium 137	10045-97-3	2.78	0.17	0.16	0.10		GAM
Radium 226	13982-63-3	U		0.36		U J	GAM
Radium 228	15262-20-1	U		0.88		U	GAM
Europium 152	14683-23-9	15.3	0.51	0.41	0.10		GAM
Europium 154	15585-10-1	1.44	0.39	0.38	0.10		GAM
Europium 155	14391-16-3	U		0.31	0.10	U	GAM
Thorium 228	14274-82-9	0.341	0.098	0.14			GAM
Thorium 232	TH-232	U		0.88		U	GAM
Uranium 235	15117-96-1	U		0.43		U	GAM
Uranium 238	U-238	U		18		U	GAM
Americium 241	14596-10-2	U		0.12		U	GAM

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2199

7510-006 J00N89

DATA SHEET

SDG	7510	Client/Case no	Hanford	SDG H2199	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R305059-06	Client sample id	J00N89		
Dept sample id	7510-006	Location/Matrix	100 BC Pipe., 100-B-5	SOLID	
Received	05/09/03	Collected/Weight	05/07/03 13:00	892.2 g	
% solids	95.7	Custody/SAF No	B01-054-031	B01-054	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	0.976	0.21	0.25	1.0		SR
Uranium 233/234	U-233/234	0.502	0.27	0.20	1.0		U
Uranium 235	15117-96-1	0.032	0.064	0.24	1.0	U	U
Uranium 238	U-238	0.264	0.16	0.20	1.0		U
Plutonium 238	13981-16-3	0	0.055	0.21	1.0	U	PU
Plutonium 239/240	PU-239/240	0.275	0.17	0.21	1.0		PU
Americium 241	14596-10-2	0.069	0.050	0.047	1.0		AM
Potassium 40	13966-00-2	8.54	1.3	0.76			GAM
Cobalt 60	10198-40-0	0.643	0.12	0.11	0.050		GAM
Cesium 137	10045-97-3	6.23	0.25	0.17	0.10		GAM
Radium 226	13982-63-3	0.328	0.21	0.26		J	GAM
Radium 228	15262-20-1	U		0.73		U	GAM
Europium 152	14683-23-9	8.69	0.40	0.34	0.10		GAM
Europium 154	15585-10-1	U		1.0	0.10	U	GAM
Europium 155	14391-16-3	U		0.44	0.10	U	GAM
Thorium 228	14274-82-9	0.462	0.11	0.16			GAM
Thorium 232	TH-232	U		0.73		U	GAM
Uranium 235	15117-96-1	U		0.49		U	GAM
Uranium 238	U-238	U		17		U	GAM
Americium 241	14596-10-2	U		0.64		U	GAM

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2199

7510-007 J00N90

DATA SHEET

SDG	7510	Client/Case no	Hanford SDG H2199
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R305059-07	Client sample id	J00N90
Dept sample id	7510-007	Location/Matrix	100 BC Pipe., 100-B-5 SOLID
Received	05/09/03	Collected/Weight	05/07/03 13:23 886.1 g
% solids	95.7	Custody/SAF No	B01-054-031 B01-054

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	1.93	0.28	0.25	1.0		SR
Uranium 233/234	U-233/234	0.689	0.32	0.24	1.0		U
Uranium 235	15117-96-1	0	0.076	0.29	1.0	U	U
Uranium 238	U-238	0.689	0.32	0.24	1.0		U
Plutonium 238	13981-16-3	0	0.047	0.18	1.0	U	PU
Plutonium 239/240	PU-239/240	0.814	0.28	0.18	1.0		PU
Americium 241	14596-10-2	0.269	0.090	0.049	1.0		AM
Potassium 40	13966-00-2	8.17	1.4	0.66			GAM
Cobalt 60	10198-40-0	1.19	0.17	0.11	0.050		GAM
Cesium 137	10045-97-3	22.4	0.47	0.23	0.10		GAM
Radium 226	13982-63-3	U		0.45		U J	GAM
Radium 228	15262-20-1	U		1.0		U	GAM
Europium 152	14683-23-9	10.1	0.63	0.64	0.10		GAM
Europium 154	15585-10-1	0.864	0.42	0.44	0.10		GAM
Europium 155	14391-16-3	U		0.61	0.10	U	GAM
Thorium 228	14274-82-9	0.558	0.17	0.25			GAM
Thorium 232	TH-232	U		1.0		U	GAM
Uranium 235	15117-96-1	U		0.70		U	GAM
Uranium 238	U-238	U		21		U	GAM
Americium 241	14596-10-2	U		0.92		U	GAM

100 B/C Area Effluent Pipe. & Prox.

Rw
5/31/03

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2199

7510-008 **J00N91**

DATA SHEET

SDG	7510	Client/Case no	Hanford	SDG H2199	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R305059-08	Client sample id	J00N91		
Dept sample id	7510-008	Location/Matrix	100 BC Pipe., 100-B-5	SOLID	
Received	05/09/03	Collected/Weight	05/07/03 12:40	882.3 g	
% solids	100.0	Custody/SAF No	B01-054-031	B01-054	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	0.027	0.16	0.33	1.0	U	SR
Uranium 233/234	U-233/234	0.114	0.11	0.22	1.0	U	U
Uranium 235	15117-96-1	0.035	0.069	0.26	1.0	U	U
Uranium 238	U-238	0.285	0.17	0.22	1.0		U
Plutonium 238	13981-16-3	0	0.073	0.28	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.073	0.28	1.0	U	PU
Americium 241	14596-10-2	0.012	0.037	0.059	1.0	U	AM
Potassium 40	13966-00-2	3.18	2.6	0.79			GAM
Cobalt 60	10198-40-0	U		0.079	0.050	U	GAM
Cesium 137	10045-97-3	U		0.070	0.10	U	GAM
Radium 226	13982-63-3	U		0.18		U J	GAM
Radium 228	15262-20-1	U		0.34		U	GAM
Europium 152	14683-23-9	U		0.17	0.10	U	GAM
Europium 154	15585-10-1	U		0.20	0.10	U	GAM
Europium 155	14391-16-3	U		0.12	0.10	U	GAM
Thorium 228	14274-82-9	0.159	0.10	0.11			GAM
Thorium 232	TH-232	U		0.34		U	GAM
Uranium 235	15117-96-1	U		0.21		U	GAM
Uranium 238	U-238	U		8.2		U	GAM
Americium 241	14596-10-2	U		0.064		U	GAM

100 B/C Area Effluent Pipe. & Prox.

5/31/03

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	05/16/03

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2199

7510-009 J00N92

DATA SHEET

SDG	7510	Client/Case no	Hanford	SDG H2199	
Contact	Melissa C. Mannion	Contract	No. 630		
Lab sample id	R305059-09	Client sample id	J00N92		
Dept sample id	7510-009	Location/Matrix	100 BC Pipe., 100-B-5	SOLID	
Received	05/09/03	Collected/Weight	05/07/03 13:00	886.6 g	
% solids	95.9	Custody/SAF No	B01-054-031	B01-054	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	0.783	0.20	0.24	1.0		SR
Uranium 233/234	U-233/234	0.612	0.28	0.26	1.0		U
Uranium 235	15117-96-1	0	0.082	0.32	1.0	U	U
Uranium 238	U-238	0.749	0.35	0.26	1.0		U
Plutonium 238	13981-16-3	0	0.042	0.16	1.0	U	PU
Plutonium 239/240	PU-239/240	0.148	0.13	0.16	1.0	U	PU
Americium 241	14596-10-2	0.074	0.053	0.041	1.0		AM
Potassium 40	13966-00-2	9.28	2.4	0.74			GAM
Cobalt 60	10198-40-0	0.553	0.11	0.083	0.050		GAM
Cesium 137	10045-97-3	4.50	0.18	0.13	0.10		GAM
Radium 226	13982-63-3	U		0.47		U J	GAM
Radium 228	15262-20-1	0.656	0.36	0.40			GAM
Europium 152	14683-23-9	5.65	0.27	0.23	0.10		GAM
Europium 154	15585-10-1	0.613	0.28	0.30	0.10		GAM
Europium 155	14391-16-3	U		0.34	0.10	U	GAM
Thorium 228	14274-82-9	0.470	0.10	0.12			GAM
Thorium 232	TH-232	0.656	0.36	0.40			GAM
Uranium 235	15117-96-1	U		0.40		U	GAM
Uranium 238	U-238	U		12		U	GAM
Americium 241	14596-10-2	U		0.43		U	GAM

100 B/C Area Effluent Pipe. & Prox.

5/31/03

Lab id	EBRLNE
Protocol	Hanford
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Form	DVD-DS
Version	3.06
Report date	05/16/03

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

1.0 GENERAL

Bechtel Hanford Inc. (BHI) Sample Delivery Group H2199 was composed of nineteen solid (soil) samples designated under SAF No. B01-054 with a Project Designation of: 100 B/C Area Effluent Pipeline & Proximity Site Remediation, 100 BC Pipelines, 100-B-5 Verification.

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 May 16, 2003. The electronic data deliverables (EDD) were transmitted to BHI via e-mail on May 16, 2003.

2.0 ANALYSIS NOTES

2.1 Gross Alpha and Gross Beta 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 Isotopic Plutonium Analyses

No problems were encountered during the course of the analyses.

2.4 Americium-241 Analyses

No problems were encountered during the course of the analyses.

2.5 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

5/21/3
Date

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		B01-054-031	Page 1 of 4
Collector D.Shea	Company Contact D.Shea	Telephone No. 521-6014	Project Coordinator KESSNER, JH	Price Code 8L
Project Designation 100 B/C Area Effluent Pipeline & Proximity Site Remediatio	Sampling Location 100 BC pipelines, 100-B-5, Verification H2199 (7509)		SAF No. B01-054	Air Quality ☐ 7 ~~21~~ Days DMS 5-6-03
Ice Chest No. ERC-02-402, ERC-96-014 and ERC-02-005	Field Logbook No. EL-1548-3	COA R100BC2600	Method of Shipment FED EX	
Shipped To ~~TMA/RECRA~~ Eberline DAS 5/8/02	Offsite Property No. A030255		Bill of Lading/Air Bill No. See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

potentially radioactive

Special Handling and/or Storage

Preservation	Cool 4C	Cool 4C	None	None							
Type of Container	G/P	G/P	G/P	G/P							
No. of Container(s)	1	1	1	1							
Volume	250mL	60mL	500mL	60mL							
SAMPLE ANALYSIS	ICP Metals - 6010A (Add-on) (Chromium, Lead); Mercury 7471 - (CV)	Chromium Hex - 7196	See item (1) in Special Instructions.	See item (2) in Special Instructions.							

Sample No.	Matrix *	Sample Date	Sample Time										
J00N74	SOIL	5/7/03	0843	✓	✓	✓	✓						
J00N75	SOIL	↓	0850	✓	✓	✓	✓						
J00N76	SOIL	↓	0858	✓	✓	✓	✓						
J00N77	SOIL	↓	0916	✓	✓	✓	✓						
J00N78	SOIL	↓	0926	✓	✓	✓	✓						

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

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
DWShea DWShea	5/7/03 1705	Fridge 1A	5/7/03 1705
3728 Ref 1A	5/8/03 10:30	David St. John [signature]	5/8/03 1030
David St. John ERC [signature]	5/8/03 1030	FED EX	
FED EX		[signature]	5-9-03 1100

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy (TCL List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, ~~Silver-108 metastable~~, Uranium-238)
(2) Isotopic Plutonium; Isotopic Uranium; Americium-241; Strontium-89,90 – Total Sr; ~~Nickel-63~~ DMS 5-6-03

Personnel not available to relinquish samples from the 3728 Ref # 1A on 5/8/03

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)

000034

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B01-054-031	Page 2 of 4

Collector: D.Shea	Company Contact: D.Shea; Telephone No.: 521-6014	Project Coordinator: KESSNER, JH	Price Code: 8L; Data Turnaround: 7 ~~21~~ Days DMS 5-6-03
Project Designation: 100 B/C Area Effluent Pipeline & Proximity Site Remediatio	Sampling Location: 100 BC pipelines, 100-B-5, Verification H2199 (7509)	SAF No.: B01-054	Air Quality:
Ice Chest No.: ERC-02-402, ERC-96-014 and ERC-02-005	Field Logbook No.: EL-1548-3; COA: R100BC2600	Method of Shipment: FED EX	
Shipped To: DAS 5/8/02 ~~TMA/RECRA~~ Eberline	Offsite Property No.: A030255	Bill of Lading/Air Bill No.: See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

potentially radioactive

Special Handling and/or Storage

Preservation	Cool 4C	Cool 4C	None	None							
Type of Container	G/P	G/P	G/P	G/P							
No. of Container(s)	1		1	1							
Volume	250mL	60mL	500mL	60mL							
SAMPLE ANALYSIS	ICP Metals - 6010A (Add-on) (Chromium Lead); Mercury 7471 - (CV)	Chromium Hex - 7196	See item (1) in Special Instructions.	See item (2) in Special Instructions.							

Sample No.	Matrix *	Sample Date	Sample Time										
J00N79	SOIL	5/7/03	0932	✓	✓	✓	✓						
J00N80	SOIL	↓	0940	✓	✓	✓	✓						
J00N81	SOIL		0951	✓	✓	✓	✓						
J00N82	SOIL		1003	✓	✓	✓	✓						
J00N83	SOIL		1012	✓	✓	✓	✓						

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

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
DWShea DWShea	5/7/03 1705	Fridge 1A	5/7/03 1705
3728 Ref 1A	5/8/03 1030	David St. John David St. John	5/8/03 1030
David St. John ERC David St. John	5/8/03 1020	FED EX	
FED EX		[signature]	5903 100

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy (TCL List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, ~~Silver-108 metastable~~, Uranium-238)
(2) Isotopic Plutonium; Isotopic Uranium; Americium-241; Strontium-89,90 – Total Sr; ~~Nickel-63~~

DMS 5-6-03

Personnel not available to relinquish samples from the 3728 Ref # 1A on 5/8/03

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)

000035

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		B01-054-031 Page 2 of 2
Collector: D.Shea	Company Contact: D.Shea — Telephone No.: 521-6014	Project Coordinator: KESSNER, JH	Price Code: 8L — Data Turnaround: 7 ~~21~~ Days DMS 5-6-03
Project Designation: 100 B/C Area Effluent Pipeline & Proximity Site Remediatio	Sampling Location: 100 BC pipelines, 100-B-5, Verification H2199 (7510)	SAF No.: B01-054	Air Quality ☐
Ice Chest No. ERC-02-402, ERC-96-014 and ERC-02-005	Field Logbook No.: EL-1548-3 — COA: R100BC2600	Method of Shipment: FED EX	
Shipped To: ~~TMA/RECRA~~ Eberline DAS 5/8/02	Offsite Property No.: A030255	Bill of Lading/Air Bill No.: See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

potentially radioactive

Special Handling and/or Storage

Preservation	Cool 4C	Cool 4C	None	None								
Type of Container	G/P	G/P	G/P	G/P								
No. of Container(s)	1	1	1	1								
Volume	250mL	60mL	500mL	60mL								
SAMPLE ANALYSIS	ICP Metals - 6010A (Add-on) (Chromium, Lead); Mercury - 7471 - (CV)	Chromium Hex - 7196	See item (1) in Special Instructions.	See item (2) in Special Instructions.								

Sample No.	Matrix *	Sample Date	Sample Time										
J00N84	SOIL	5/7/03	1023	✓	✓	✓	✓						
J00N85	SOIL	↓	1035	✓	✓	✓	✓						
J00N86	SOIL		0825	✓	✓	✓	✓						
J00N87	SOIL		1025	✓	✓	✓	✓						
J00N88	SOIL		1251	✓	✓	✓	✓						

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

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
DWShea, DWSHEA	5/7/03 1705	Fridge 1A	5/7/03 1705
3728 Ref 1A	5/8/03 1030	David St. John David St. John	5/8/03 1030
David St. John ERC David St. John	5/8/03 1030	FED EX	
FED EX		[signature]	5/9/03 1100

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy (TCL List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, ~~Silver-108 metastable~~, Uranium-238)
(2) Isotopic Plutonium; Isotopic Uranium; Americium-241; Strontium-89,90 – Total Sr; ~~Nickel-63~~

DMS 5-6-03

Personnel not available to relinquish samples from the 3728 Ref # 1A on 5/8/03

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)

000036

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B01-054-031	Page 4 of 9

Collector: D.Shea	Company Contact: D.Shea — Telephone No.: 521-6014	Project Coordinator: KESSNER, JH	Price Code: 8L — Data Turnaround: 7 ~~21~~ Days DMS 5-6-03
Project Designation: 100 B/C Area Effluent Pipeline & Proximity Site Remediatio	Sampling Location: 100 BC pipelines, 100-B-5, Verification H2199 (7510)	SAF No.: B01-054	Air Quality ☐
Ice Chest No.: ERC-02-402, ERC-96-017 and ERC-02-405	Field Logbook No.: EL-1548-3 — COA: R100BC2600	Method of Shipment: FED EX	
Shipped To: ~~TMA/RECRA~~ Ebasline DMS 5/8/03	Offsite Property No.: A030255	Bill of Lading/Air Bill No.: See DSRC	

POSSIBLE SAMPLE HAZARDS/REMARKS

potentially radioactive

Special Handling and/or Storage

Preservation	Cool 4C	Cool 4C	None	None							
Type of Container	G/P	G/P	G/P	G/P							
No. of Container(s)	1	1	1	1							
Volume	250mL	60mL	500mL	60mL							
SAMPLE ANALYSIS	ICP Metals - 6010A (Cd-on) (Chromium, Lead); Mercury - 7471 - (CV)	Chromium Hex - 7196	See item (1) in Special Instructions.	See item (2) in Special Instructions.							

Sample No.	Matrix *	Sample Date	Sample Time										
J00N89	SOIL	5/7/03	1300	✓	✓	✓	✓						
J00N90	SOIL	↓	1323	✓	✓	✓	✓						
J00N91	SOIL		1240	✓	✓	✓	✓						
J00N92	SOIL		1300	✓	✓	✓	✓						

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
D.Shea D.Shea	5/7/03 1705	Erica IA	5/7/03 1705
3728 Ref IA	5/8/03 1030	David St. John	5/8/03 1030
David St. John ERC	5/8/03 1030	FED EX	
FED EX			5-9-03 1100

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy (TCL List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, ~~Silver-108-metastable~~, Uranium-238)
(2) Isotopic Plutonium; Isotopic Uranium; Americium-241; Strontium-89,90 – Total Sr; ~~Nickel-63~~

DMS 5-6-03

Personnel not available to relinquish samples from the 3728 Ref # 1A on 5/8/03

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)

000037

Appendix 5

Data Validation Supporting Documentation

APPENDIX A

RADIOCHEMICAL DATA VALIDATION CHECKLIST

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 100 B/C		100-B-5	DATA PACKAGE: H2199		
VALIDATOR: TCI		LAB: ED		DATE: 5/31/03	
CASE:			SDG: H2199		
ANALYSES PERFORMED					
Gross Alpha/Beta	Strontium-90	Technetium-99	Alpha Spectroscopy	Gamma Spectroscopy	
Total Uranium	Radium-22	Tritium			
SAMPLES/MATRIX					
J00N74	J00N75	J00N76	J00N77	J00N78	J00N79
J00N80	J00N81	J00N82	J00N83	J00N84	J00N85
J00N86	J00N87	J00N88	J00N89	J00N90	~~J00N91~~ SB1L
J00N91	J00N92				

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: 86 - K-40 RA-226 Th 228
91 - U238(aspec) K-40 Th 228 } EBS

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: RA 224 84-92 J all
(over 2x CRDL)

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: EU-152 in 87/92 (42%)

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: 76 over

Appendix 6

Additional Documentation Requested by Client

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2199

7509-012 Method Blank

METHOD BLANK

SDG	7509	Client/Case no	Hanford SDG H2199
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R305058-12	Client sample id	Method Blank
Dept sample id	7509-012	Material/Matrix	SOLID
		SAF No	B01-054

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	-0.085	0.15	0.34	1.0	U	SR
Uranium 233/234	U-233/234	-0.018	0.024	0.057	1.0	U	U
Uranium 235	15117-96-1	-0.007	0.015	0.055	1.0	U	U
Uranium 238	U-238	-0.006	0.012	0.046	1.0	U	U
Plutonium 238	13981-16-3	0.031	0.063	0.24	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.063	0.24	1.0	U	PU
Americium 241	14596-10-2	-0.019	0.029	0.053	1.0	U	AM
Potassium 40	13966-00-2	U		1.5		U	GAM
Cobalt 60	10198-40-0	U		0.089	0.050	U	GAM
Cesium 137	10045-97-3	U		0.054	0.10	U	GAM
Radium 226	13982-63-3	U		0.11		U	GAM
Radium 228	15262-20-1	U		0.27		U	GAM
Europium 152	14683-23-9	U		0.15	0.10	U	GAM
Europium 154	15585-10-1	U		0.18	0.10	U	GAM
Europium 155	14391-16-3	U		0.14	0.10	U	GAM
Thorium 228	14274-82-9	U		0.074		U	GAM
Thorium 232	TH-232	U		0.27		U	GAM
Uranium 235	15117-96-1	U		0.21		U	GAM
Uranium 238	U-238	U		6.9		U	GAM
Americium 241	14596-10-2	U		0.20		U	GAM

100 B/C Area Effluent Pipe. & Prox.

QC-BLANK #44650

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	05/16/03

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2199

7509-011

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7509
Contact Melissa C. Mannion

Client/Case no Hanford SDG H2199
Contract No. 630

Lab sample id R305058-11
Dept sample id 7509-011

Client sample id Lab Control Sample
Material/Matrix SOLID
SAF No B01-054

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
Total Strontium	21.2	0.90	0.30	1.0		SR	21.0	0.84	101	82-118	80-120
Uranium 233/234	17.0	0.90	0.42	1.0		U	16.7	0.67	102	87-113	80-120
Uranium 235	12.8	0.76	0.058	1.0		U	13.6	0.54	94	88-112	80-120
Uranium 238	18.4	0.95	0.40	1.0		U	18.1	0.72	102	88-112	80-120
Plutonium 238	24.3	2.3	0.19	1.0		PU	24.4	0.98	100	83-117	80-120
Plutonium 239/240	26.5	2.5	0.19	1.0		PU	26.4	1.1	100	83-117	80-120
Americium 241	19.3	0.83	0.046	1.0		AM	19.0	0.76	102	88-112	80-120
Cobalt 60	4.66	0.24	0.11	0.050		GAM	4.78	0.19	97	76-124	80-120
Cesium 137	4.70	0.21	0.13	0.10		GAM	4.64	0.19	101	75-125	80-120

100 B/C Area Effluent Pipe. & Prox.

QC-LCS #44649

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 05/16/03

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2199

7509-013 J00N76

DUPLICATE

SDG	7509			Client/Case no	Hanford SDG H2199
Contact	Melissa C. Mannion			Contract	No. 630
DUPLICATE		ORIGINAL			
Lab sample id	R305058-13	Lab sample id	R305058-03	Client sample id	J00N76
Dept sample id	7509-013	Dept sample id	7509-003	Location/Matrix	100 BC Pipe., 100-B-5 SOLID
		Received	05/09/03	Collected/Weight	05/07/03 08:58 802.1 g
% solids	95.4	% solids	95.4	Custody/SAF No	B01-054-031 B01-054

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
Total Strontium	-0.026	0.15	0.31	1.0	U	SR	0.013	0.15	0.31	U	-	
Uranium 233/234	0.454	0.11	0.060	1.0		U	0.602	0.25	0.19		28	78
Uranium 235	0.038	0.031	0.058	1.0	U	U	0	0.061	0.23	U	-	
Uranium 238	0.404	0.10	0.060	1.0		U	0.752	0.26	0.19		60	73
Plutonium 238	0	0.069	0.26	1.0	U	PU	0.042	0.083	0.32	U	-	
Plutonium 239/240	0.138	0.14	0.26	1.0	U	PU	0.083	0.084	0.32	U	-	
Americium 241	0.052	0.052	0.050	1.0		AM	0.111	0.074	0.071		72	167
Potassium 40	9.81	1.4	0.59			GAM	10.7	1.8	1.1		9	46
Cobalt 60	U		0.088	0.050	U	GAM	U		0.10	U	-	
Cesium 137	U		0.11	0.10	U	GAM	U		0.11	U	-	
Radium 226	0.538	0.15	0.15			GAM	0.454	0.16	0.17		17	74
Radium 228	0.600	0.23	0.23			GAM	0.762	0.35	0.36		24	98
Europium 152	U		0.20	0.10	U	GAM	U		0.25	U	-	
Europium 154	U		0.23	0.10	U	GAM	U		0.37	U	-	
Europium 155	U		0.23	0.10	U	GAM	U		0.21	U	-	
Thorium 228	0.609	0.12	0.13			GAM	0.649	0.14	0.15		6	54
Thorium 232	0.600	0.23	0.23			GAM	0.762	0.35	0.36		24	98
Uranium 235	U		0.31		U	GAM	U		0.35	U	-	
Uranium 238	U		9.1		U	GAM	U		9.9	U	-	
Americium 241	U		0.38		U	GAM	U		0.23	U	-	

100 B/C Area Effluent Pipe. & Prox.

QC-DUP#3 44651

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DUP
Version	3.06
Report date	05/16/03

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2199

7510-011 **Method Blank**

METHOD BLANK

SDG	7510	Client/Case no	Hanford SDG H2199
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R305059-11	Client sample id	Method Blank
Dept sample id	7510-011	Material/Matrix	SOLID
		SAF No	B01-054

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Total Strontium	SR-RAD	-0.035	0.15	0.32	1.0	U	SR
Uranium 233/234	U-233/234	-0.033	0.066	0.25	1.0	U	U
Uranium 235	15117-96-1	0.040	0.080	0.31	1.0	U	U
Uranium 238	U-238	0.066	0.067	0.25	1.0	U	U
Plutonium 238	13981-16-3	0	0.052	0.20	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.052	0.20	1.0	U	PU
Americium 241	14596-10-2	0.057	0.069	0.088	1.0	U	AM
Potassium 40	13966-00-2	U		0.95		U	GAM
Cobalt 60	10198-40-0	U		0.066	0.050	U	GAM
Cesium 137	10045-97-3	U		0.058	0.10	U	GAM
Radium 226	13982-63-3	U		0.077		U	GAM
Radium 228	15262-20-1	U		0.21		U	GAM
Europium 152	14683-23-9	U		0.13	0.10	U	GAM
Europium 154	15585-10-1	U		0.10	0.10	U	GAM
Europium 155	14391-16-3	U		0.14	0.10	U	GAM
Thorium 228	14274-82-9	U		0.067		U	GAM
Thorium 232	TH-232	U		0.21		U	GAM
Uranium 235	15117-96-1	U		0.18		U	GAM
Uranium 238	U-238	U		5.8		U	GAM
Americium 241	14596-10-2	U		0.24		U	GAM

100 B/C Area Effluent Pipe. & Prox.

QC-BLANK #44653

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	05/16/03

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2199

7510-010 Lab Control Sample

LAB CONTROL SAMPLE

SDG 7510
Contact Melissa C. Mannion

Client/Case no Hanford SDG H2199
Contract No. 630

Lab sample id R305059-10
Dept sample id 7510-010

Client sample id Lab Control Sample
Material/Matrix SOLID
SAF No B01-054

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
Total Strontium	23.4	0.96	0.30	1.0		SR	23.2	0.93	101	83-117	80-120
Uranium 233/234	19.0	2.3	1.2	1.0		U	18.6	0.74	102	79-121	80-120
Uranium 235	16.3	2.1	0.32	1.0		U	15.1	0.60	108	77-123	80-120
Uranium 238	19.8	2.4	1.1	1.0		U	20.2	0.81	98	80-120	80-120
Plutonium 238	24.3	2.2	0.17	1.0		PU	26.8	1.1	91	85-115	80-120
Plutonium 239/240	27.6	2.5	0.17	1.0		PU	29.0	1.2	95	84-116	80-120
Americium 241	22.7	0.98	0.050	1.0		AM	23.8	0.95	95	89-111	80-120
Cobalt 60	4.81	0.20	0.065	0.050		GAM	5.00	0.20	96	77-123	80-120
Cesium 137	4.82	0.17	0.091	0.10		GAM	4.86	0.19	99	76-124	80-120

100 B/C Area Effluent Pipe. & Prox.

QC-LCS #44652

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 05/16/03

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2199

7510-012 J00N89

DUPLICATE

SDG	7510			Client/Case no	Hanford SDG H2199
Contact	Melissa C. Mannion			Contract	No. 630
DUPLICATE		ORIGINAL			
Lab sample id	R305059-12	Lab sample id	R305059-06	Client sample id	J00N89
Dept sample id	7510-012	Dept sample id	7510-006	Location/Matrix	100 BC Pipe., 100-B-5 SOLID
		Received	05/09/03	Collected/Weight	05/07/03 13:00 892.2 g
% solids	95.7	% solids	95.7	Custody/SAF No	B01-054-031 B01-054

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
Total Strontium	1.05	0.22	0.25	1.0		SR	0.976	0.21	0.25		7	50
Uranium 233/234	0.640	0.27	0.20	1.0		U	0.502	0.27	0.20		24	101
Uranium 235	0	0.065	0.25	1.0	U	U	0.032	0.064	0.24	U	-	
Uranium 238	0.534	0.22	0.20	1.0		U	0.264	0.16	0.20		68	103
Plutonium 238	0.045	0.090	0.34	1.0	U	PU	0	0.055	0.21	U	-	
Plutonium 239/240	0.269	0.18	0.34	1.0	U	PU	0.275	0.17	0.21		2	137
Americium 241	0.059	0.043	0.041	1.0		AM	0.069	0.050	0.047		16	155
Potassium 40	10.5	1.1	0.56			GAM	8.54	1.3	0.76		21	42
Cobalt 60	0.709	0.098	0.067	0.050		GAM	0.643	0.12	0.11		10	47
Cesium 137	6.94	0.22	0.14	0.10		GAM	6.23	0.25	0.17		11	33
Radium 226	0.660	0.20	0.21			GAM	0.328	0.21	0.26		67	94
Radium 228	U		0.46		U	GAM	U		0.73	U	-	
Europium 152	9.82	0.42	0.36	0.10		GAM	8.69	0.40	0.34		12	33
Europium 154	U		1.1	0.10	U	GAM	U		1.0	U	-	
Europium 155	U		0.26	0.10	U	GAM	U		0.44	U	-	
Thorium 228	0.506	0.096	0.14			GAM	0.462	0.11	0.16		9	55
Thorium 232	U		0.46		U	GAM	U		0.73	U	-	
Uranium 235	U		0.34		U	GAM	U		0.49	U	-	
Uranium 238	U		14		U	GAM	U		17	U	-	
Americium 241	U		0.23		U	GAM	U		0.64	U	-	

100 B/C Area Effluent Pipe. & Prox.

QC-DUP#6 44654

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DUP
Version	3.06
Report date	05/16/03

Date: 2 June 2003
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100 B/C Area Effluent Pipeline & Proximity Site Remediation Activities - Full Protocol - Waste Site 100-B-5
Subject: Wet Chemistry - Data Package No. H2199-LLI (SDG No. H2199)

INTRODUCTION

This memo presents the results of data validation on Data Package No. H2199-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
J00N74	5/7/03	Soil	C	Chromium VI by 7196A
J00N75	5/7/03	Soil	C	Chromium VI by 7196A
J00N76	5/7/03	Soil	C	Chromium VI by 7196A
J00N77	5/7/03	Soil	C	Chromium VI by 7196A
J00N78	5/7/03	Soil	C	Chromium VI by 7196A
J00N79	5/7/03	Soil	C	Chromium VI by 7196A
J00N80	5/7/03	Soil	C	Chromium VI by 7196A
J00N81	5/7/03	Soil	C	Chromium VI by 7196A
J00N82	5/7/03	Soil	C	Chromium VI by 7196A
J00N83	5/7/03	Soil	C	Chromium VI by 7196A
J00N84	5/7/03	Soil	C	Chromium VI by 7196A
J00N85	5/7/03	Soil	C	Chromium VI by 7196A
J00N86	5/7/03	Soil	C	Chromium VI by 7196A
J00N87	5/7/03	Soil	C	Chromium VI by 7196A
J00N88	5/7/03	Soil	C	Chromium VI by 7196A
J00N89	5/7/03	Soil	C	Chromium VI by 7196A
J00N90	5/7/03	Soil	C	Chromium VI by 7196A
J00N91	5/7/03	Soil	C	Chromium VI by 7196A
J00N92	5/7/03	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) and the Data Quality Objectives Summary Report for 100/300 Area Remaining Sites Analytical Sampling Effort, (BHI-01249, Rev. 3, March 2003). 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.

  If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

  All holding times were acceptable.

- **Method Blanks**

  Method Blanks

  Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. All blank results must fall below the contract required detection limit (CRQL) to be acceptable.

  All method blank results were acceptable.

Field (Equipment) Blank

Two equipment blanks (J00N86/J00N91) were 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.

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

Two sets of field duplicate samples (J00N85/J00N87 & J00N89/J00N92) were submitted for analysis. Field duplicate results are compared using the same criteria as for laboratory duplicates. All other duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the required quantitation limits (RQLs) to ensure that laboratory detection levels meet the required criteria. All undetected chromium VI results exceeded the RQL. Under the BHI statement of work, no qualification is required.

- **Completeness**

Data package No. H2199-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

All undetected chromium VI results exceeded the RQL. Under the BHI statement of work, no qualification is required.

REFERENCES

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

BHI-01249, Rev. 3, *Data Quality Objectives Summary Report for 100/300 Area Remaining Sites Analytical Sampling Effort*, Bechtel Hanford Incorporated, March 2003.

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: H2199	REVIEWER: TLI	DATE: 6/2/03	PAGE 1 OF 1
COMMENTS: No qualifiers assigned.			

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

WET CHEMISTRY ANALYSIS, SOIL MATRIX, MG/KG

Project: BECHTEL-HANFORD																	
Laboratory: LLI																	
Case	SDG: H2199																
Sample Number		J00N74		J00N75		J00N76		J00N77		J00N78		J00N79		J00N80		J00N81	
Remarks																	
Sample Date		05/07/03		05/07/03		05/07/03		05/07/03		05/07/03		05/07/03		05/07/03		05/07/03	
Wet Chemistry	RDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chromium VI	0.1	0.42	U	0.42	U	0.42	U	0.41	U	0.42	U	0.42	U	0.41	U	0.43	U
Sample Number		J00N82		J00N83		J00N84		J00N85		J00N86		J00N87		J00N88		J00N89	
Remarks										E. Blank		Duplicate					
Sample Date		05/07/03		05/07/03		05/07/03		05/07/03		05/07/03		05/07/03		05/07/03		05/07/03	
Wet Chemistry	RDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chromium VI	0.1	0.42	U	0.42	U	0.41	U	0.41	U	0.40	U	0.41	U	1.9		1.7	
Sample Number		J00N90		J00N91		J00N92											
Remarks				E. Blank		Duplicate											
Sample Date		05/07/03		05/07/03		05/07/03											
Wet Chemistry	RDL	Result	Q	Result	Q	Result	Q										
Chromium VI	0.1	0.42	U	0.40	U	0.42	U										
NA = Not analyzed																	

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.

000040

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/15/03

CLIENT: TNU-HANFORD B01-054 LVL LOT #: 0305L377

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	J00N74	% Solids	96.3	%	0.01	1.0
		Chromium VI	0.42 u	MG/KG	0.42	1.0
-002	J00N75	% Solids	95.8	%	0.01	1.0
		Chromium VI	0.42 u	MG/KG	0.42	1.0
-003	J00N76	% Solids	96.2	%	0.01	1.0
		Chromium VI	0.42 u	MG/KG	0.42	1.0
-004	J00N77	% Solids	98.0	%	0.01	1.0
		Chromium VI	0.41 u	MG/KG	0.41	1.0
-005	J00N78	% Solids	95.0	%	0.01	1.0
		Chromium VI	0.42 u	MG/KG	0.42	1.0
-006	J00N79	% Solids	96.0	%	0.01	1.0
		Chromium VI	0.42 u	MG/KG	0.42	1.0
-007	J00N80	% Solids	97.1	%	0.01	1.0
		Chromium VI	0.41 u	MG/KG	0.41	1.0
-008	J00N81	% Solids	93.8	%	0.01	1.0
		Chromium VI	0.43 u	MG/KG	0.43	1.0
-009	J00N82	% Solids	94.5	%	0.01	1.0
		Chromium VI	0.42 u	MG/KG	0.42	1.0
-010	J00N83	% Solids	95.3	%	0.01	1.0
		Chromium VI	0.42 u	MG/KG	0.42	1.0

5/31/03

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/15/03

CLIENT: TNU-HANFORD B01-054 H2199
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0305L377

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-011	J00N84	% Solids	96.9	%	0.01	1.0
		Chromium VI	0.41 u	MG/KG	0.41	1.0
-012	J00N85	% Solids	97.0	%	0.01	1.0
		Chromium VI	0.41 u	MG/KG	0.41	1.0
-013	J00N86	% Solids	99.8	%	0.01	1.0
		Chromium VI	0.40 u	MG/KG	0.40	1.0
-014	J00N87	% Solids	97.0	%	0.01	1.0
		Chromium VI	0.41 u	MG/KG	0.41	1.0
-015	J00N88	% Solids	97.2	%	0.01	1.0
		Chromium VI	1.9	MG/KG	0.41	1.0
-016	J00N89	% Solids	96.2	%	0.01	1.0
		Chromium VI	1.7	MG/KG	0.42	1.0
-017	J00N90	% Solids	95.5	%	0.01	1.0
		Chromium VI	0.42 u	MG/KG	0.42	1.0
-018	J00N91	% Solids	99.9	%	0.01	1.0
		Chromium VI	0.40 u	MG/KG	0.40	1.0
-019	J00N92	% Solids	95.9	%	0.01	1.0
		Chromium VI	0.42 u	MG/KG	0.42	1.0

5/31/03

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD B01-054 H2199
LVL#: 0305L377

W.O.#: 11343-606-001-9999-00
Date Received: 05-09-03

INORGANIC NARRATIVE

1. This narrative covers the analyses of 19 soil samples.

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

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

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

5. The method 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 recoveries for Chromium VI were within the 75-125% control limits.

8. The replicate analyses Percent Solids and Chromium VI were within the 20% Relative Percent Difference (RPD) control limit.

9. Results for solid samples are reported on a dry weight basis.

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

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

05-15-03
Date

njp\i05-377

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 18 pages.

208 Welsh Pool Road • Exton, PA 19341-1313 • (610) 280-3000 • Fax (610) 280-3041

14

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		B01-054-031	Page 1 of 4
Collector: D.Shea	Company Contact: D.Shea	Telephone No.: 521-6014	Project Coordinator: KESSNER, JH	Price Code: 8L; Data Turnaround: Air Quality 7 ~~21~~ Days DNS 5-6-03
Project Designation: 100 B/C Area Effluent Pipeline & Proximity Site Remediatio	Sampling Location: 100 BC pipelines, 100-B-5, Verification		SAF No.: B01-054	
Ice Chest No.: ERC-96-002 and ERC-96-061	Field Logbook No.: EL-1548-3	COA: R100BC2600	Method of Shipment: FED EX	
Shipped To: TMA/RECRA	Offsite Property No.: A030226		Bill of Lading/Air Bill No.: See OSRC	

POSSIBLE SAMPLE HAZARDS/REMARKS

potentially radioactive

Special Handling and/or Storage

000015

Preservation				Cool 4C	Cool 4C	None	None						
Type of Container				G/P	G/P	G/P	G/P						
No. of Container(s)				1	1	1	1						
Volume				250mL	60mL	500mL	60mL						
SAMPLE ANALYSIS				ICP Metals - 6010A (Add-on) [Chromium, Lead]; Mercury - 7471 - (CV)	Chromium Hex - 7196	See item (1) in Special Instructions	See item (2) in Special Instructions						
Sample No.	Matrix *	Sample Date	Sample Time										
J00N74	SOIL	5/7/03	0843	✓	✓	✓	✓						
J00N75	SOIL	↓	0850	✓	✓	✓	✓						
J00N76	SOIL	↓	0858	✓	✓	✓	✓						
J00N77	SOIL	↓	0916	✓	✓	✓	✓						
J00N78	SOIL	↓	0926	✓	✓	✓	✓						

DAS 5/8/03

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From: DWShea DWShea	Date/Time: 5/7/03 1705	Received By/Stored In: Fridge 1A	Date/Time: 5/7/03 1705
Relinquished By/Removed From: 3728 Ref 1A	Date/Time: 5/8/03 10:30	Received By/Stored In: David St. John [signature]	Date/Time: 5/8/03 1030
Relinquished By/Removed From: David St. John ERC [signature]	Date/Time: 5/8/03 1030	Received By/Stored In: FED EX	Date/Time:
Relinquished By/Removed From: FEDEX	Date/Time: 5-9-03 0930	Received By/Stored In: [signature]	Date/Time: 5-9-03 0930
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy (TCL List) [Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155]; Gamma Spec - Add-on [Americium-241, ~~Silver-108 metastable~~, Uranium-238]
(2) Isotopic Plutonium; Isotopic Uranium; Americium-241; Strontium-89,90 -- Total Sr; ~~Nickel-63~~

DNS 5-6-03

Personnel not available to relinquish samples from the 3728 Ref # 1A on 5/8/03

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	Disposal Method	Disposed By	Date/Time

15

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		B01-054-031	Page 2 of 4
Collector: D.Shea	Company Contact: D.Shea	Telephone No.: 521-6014	Project Coordinator: KESSNER, JH	Price Code: 8L
Project Designation: 100 B C Area Effluent Pipeline & Proximity Site Remediatio	Sampling Location: 100 BC pipelines, 100-B-5, Verification		SAF No.: B01-054	Air Quality
Ice Chest No.: ERC-96-002 and ERC-96-061	Field Logbook No.: EL-1548-3	COA: R100BC2600	Method of Shipment: FED EX	Data Turnaround: 7 ~~21~~ Days DMS 5-6-03
Shipped To: TMA/Ex/CRA	Offsite Property No.: A030226		Bill of Lading/Air Bill No.: See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

potentially radioactive

Special Handling and/or Storage

000016

Preservation				Cool 4C	Cool 4C	None	None						
Type of Container				G/P	G/P	G/P	G/P						
No. of Container(s)				1	1	1	1						
Volume				250mL	60mL	500mL	1000mL						
SAMPLE ANALYSIS				ICP Metals - 6010A (Add-on) {Chromium, Lead}; Mercury - 7471 - (CV)	Chromium Hex - 7196	See item (1) in Special Instructions	See item (2) in Special Instructions						
Sample No.	Matrix *	Sample Date	Sample Time										
J00N79	SOIL	5/7/03	0932	✓	✓	✓	✓						
J00N80	SOIL	↓	0940	✓	✓	✓	✓						
J00N81	SOIL		0951	✓	✓	✓	✓						
J00N82	SOIL		1003	✓	✓	✓	✓						
J00N83	SOIL	↓	1012	✓	✓	✓	✓						

DAT 5/7/03

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From: DWShea DWShea	Date/Time: 5/7/03 1705	Received By/Stored In: Fridge 1A	Date/Time: 5/7/03 1705
Relinquished By/Removed From: 3729 Ref 1A	Date/Time: 5/8/03 1030	Received By/Stored In: David St. John David St. John	Date/Time: 5/8/03 1030
Relinquished By/Removed From: David St. John ERC David St. John	Date/Time: 5/8/03 1020	Received By/Stored In: FED EX	Date/Time:
Relinquished By/Removed From: FEDEX	Date/Time: 5-9-03 0930	Received By/Stored In: [signature]	Date/Time: 5-9-03 0930
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy (TCL List) {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Americium-241, ~~Silver-108 metastable~~, Uranium-238}
(2) Isotopic Plutonium; Isotopic Uranium; Americium-241; Strontium-89,90 -- Total Sr; ~~Nickel-63~~

DMS 5-6-03

Personnel not available to relinquish samples from the 3728 Ref # 1.1 on 5/8/03

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

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B01-054-031	Page 3 of 4

Collector: D.Shea	Company Contact: D.Shea	Telephone No.: 521-6014	Project Coordinator: KESSNER, JH
Project Designation: 100 B/C Area Effluent Pipeline & Proximity Site Remediatio	Sampling Location: 100 BC pipelines, 100-B-5, Verification		SAF No.: B01-054
Ice Chest No. ERC-96-002 and ERC-96-061	Field Logbook No.: EL-1548-3	COA: R100BC2600	Method of Shipment: FED EX
Shipped To: TMA/RECRA	Offsite Property No.: 4030226		Bill of Lading/Air Bill No.: See OSPC

Price Code: 8L — Data Turnaround: 7 ~~21~~ Days — Air Quality: DNS 5-6-03

POSSIBLE SAMPLE HAZARDS/REMARKS

potentially radioactive

Special Handling and/or Storage

000017

Preservation				Cool 4C	Cool 4C	None	None						
Type of Container				G/P	G/P	G/P	G/P						
No. of Container(s)				1	1	1	1						
Volume				250mL	60mL	500mL	60mL						
SAMPLE ANALYSIS				ICP Metals - 6010A (Add-on) (Chromium, Lead); Mercury - 7471 - (CV)	Chromium Hex - 7196	See item (1) in Special Instructions.	See item (2) in Special Instructions.						
Sample No.	Matrix *	Sample Date	Sample Time										
J00N84	SOIL	5/7/03	1023	✓	✓	✓	✓						
J00N85	SOIL	↓	1035	✓	✓	✓	✓						
J00N86	SOIL	↓	0825	✓	✓	✓	✓						
J00N87	SOIL	↓	1025	✓	✓	✓	✓						
J00N88	SOIL	↓	1251	✓	✓	✓	✓						

DAS 5/8/03

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From: DWShea, DWSHEA	Date/Time: 5/7/03 1705	Received By/Stored In: Fridge 1A	Date/Time: 5/7/03 1705
Relinquished By/Removed From: 3728 Ref 1A	Date/Time: 5/8/03 1030	Received By/Stored In: David St. John David St. John	Date/Time: 5/8/03 1030
Relinquished By/Removed From: David St. John ERC David St. John	Date/Time: 5/8/03 1030	Received By/Stored In: FED EX	Date/Time:
Relinquished By/Removed From: FEDEX	Date/Time: 5-9-03 0930	Received By/Stored In: Carl [illegible]	Date/Time: 5-9-03 0930
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy (TCL List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, ~~Silver-108 metastable~~, Uranium-238)
(2) Isotopic Plutonium; Isotopic Uranium; Americium-241; Strontium-89,90 -- Total Sr; ~~Nickel-63~~

DNS 5-6-03

Personnel not available to relinquish samples from the 3728 Ref # 1A on 5/8/03

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

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B01-054-031	Page 4 of 4

Collector D.Shea	Company Contact D.Shea / Telephone No. 521-6014	Project Coordinator KESSNER, JH	Price Code 8L / Data Turnaround ~~21~~ 7 Days DMS 5-6-03
Project Designation 100 B/C Area Effluent Pipeline & Proximity Site Remediatio	Sampling Location 100 BC pipelines, 100-B-5, Verification	SAF No. B01-054	Air Quality
Ice Chest No. ERC-96-002 and ERC-96-061	Field Logbook No. EL-1548-3 / COA R100BC2600	Method of Shipment FED EX	
Shipped To TMA/RECRA	Offsite Property No. 4030226	Bill of Lading/Air Bill No. See OSAC	

POSSIBLE SAMPLE HAZARDS/REMARKS

potentially radioactive

Special Handling and/or Storage

Preservation	Cool 4C	Cool 4C	None	None							
Type of Container	G/P	G/P	G/P	G/P							
No. of Container(s)	1	1	1	1							
Volume	250mL	60mL	500mL	60mL							
SAMPLE ANALYSIS	ICP Metals - 6010A (Add-on) (Chromium, Lead); Mercury - 7471 - (CV)	Chromium Hex - 7196	See item (1) in Special Instructions.	See item (2) in Special Instructions							
Sample No. / Matrix * / Sample Date / Sample Time											
J00N89 / SOIL / 5/7/03 / 1300	✓	✓	✓	✓							
J00N90 / SOIL / ↓ / 1323	✓	✓	✓	✓							
J00N91 / SOIL / 1240	✓	✓	✓	✓							
J00N92 / SOIL / 1300	✓	✓	✓	✓							

000018

CHAIN OF POSSESSION	Date/Time	Sign/Print Names: Received By/Stored In	Date/Time
Relinquished By/Removed From: DWShea DWSHEA	5/7/03 1705	Received By/Stored In: Frida 1A	5/7/03 1705
Relinquished By/Removed From: 3728 Ref 1A	5/8/03 1030	Received By/Stored In: David St. John	5/8/03 1030
Relinquished By/Removed From: David St. John for ERC	5/8/03 1030	Received By/Stored In: FED EX	
Relinquished By/Removed From: FEDEX	5-9-03 0930	Received By/Stored In: [signature]	5-9-03 0930
Relinquished By/Removed From		Received By/Stored In	
Relinquished By/Removed From		Received By/Stored In	

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy (TCL List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, ~~Silver-108 metastable~~, Uranium-238)
(2) Isotopic Plutonium; Isotopic Uranium; Americium-241; Strontium-89,90 -- Total Sr; ~~Nickel-63~~

DMS 5-6-03

Personnel not available to relinquish samples from the 3728 Ref # 1A on 5/8/03

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

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

Appendix 5

Data Validation Supporting Documentation

GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 100 B/C 100-B-5			DATA PACKAGE: H2199		
VALIDATOR: TCT		LAB: LLI		DATE: 5/31/03	
CASE:			SDG: H2199		
ANALYSES PERFORMED					
Anions/IC	TOC	TOX	TPH-418.1	Oil and Grease	Alkalinity
Ammonia	BOD/COD	Chloride	Chromium-VI	pH	NO_3/NO_2
Sulfate	TDS	TKN	Phosphate		
SAMPLES/MATRIX					
J00N74	J00N75	J00N76	J00N77	J00N78	J00N79
J00N80	J00N81	J00N82	J00N83	J00N84	J00N85
J00N86	J00N87	J00N88	J00N89	J00N90	J00N91
J00N92					

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

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: _____

GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

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)

Spike samples analyzed? ..... Yes No N/A

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

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

Spike 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: No PAS

GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

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. HOLDING TIMES (all levels)

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

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

Comments: _____

GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

7. 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: all CRQL on (undetects)

Appendix 6

Additional Documentation Requested by Client

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 05/15/03

CLIENT: TNU-HANFORD B01-054 H2199

LVL LOT #: 0305L377

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	03LVI043-MB1	Chromium VI	0.40 u	MG/KG	0.40	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 05/15/03

CLIENT: TNU-HANFORD B01-054 H2199 LVL LOT #: 0305L377

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	J00N74	Soluble Chromium VI	3.7	0.42u	4.2	88.8	1.0
		Insoluble Chromium VI	941	0.42u	1030	91.1	100
BLANK10	03LVI043-MB1	Soluble Chromium VI	4.0	0.40u	4.0	98.9	1.0
		Insoluble Chromium VI	970	0.40u	1050	92.3	100

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 05/15/03

CLIENT: TNU-HANFORD B01-054 H2199 LVL LOT #: 0305L377

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

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	J00N74	% Solids	96.3	96.3	0.010	1.0
		Chromium VI	0.42u	0.42u	NC	1.0

Date: 2 June 2003
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100 B/C Area Effluent Pipeline & Proximity Site Remediation Activities - Full Protocol - Waste Site 100-B-5
Subject: Inorganics - Data Package No. H2199-LLI (SDG No. H2199)

INTRODUCTION

This memo presents the results of data validation on Data Package No. H2199-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
J00N74	5/7/03	Soil	C	See note 1
J00N75	5/7/03	Soil	C	See note 1
J00N76	5/7/03	Soil	C	See note 1
J00N77	5/7/03	Soil	C	See note 1
J00N78	5/7/03	Soil	C	See note 1
J00N79	5/7/03	Soil	C	See note 1
J00N80	5/7/03	Soil	C	See note 1
J00N81	5/7/03	Soil	C	See note 1
J00N82	5/7/03	Soil	C	See note 1
J00N83	5/7/03	Soil	C	See note 1
J00N84	5/7/03	Soil	C	See note 1
J00N85	5/7/03	Soil	C	See note 1
J00N86	5/7/03	Soil	C	See note 1
J00N87	5/7/03	Soil	C	See note 1
J00N88	5/7/03	Soil	C	See note 1
J00N89	5/7/03	Soil	C	See note 1
J00N90	5/7/03	Soil	C	See note 1
J00N91	5/7/03	Soil	C	See note 1
J00N92	5/7/03	Soil	C	See note 1

1 - ICP metals; mercury.

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) and the Data Quality Objectives Summary Report for 100/300 Area Remaining Sites Analytical Sampling Effort, (BHI-01249, Rev. 3, March 2003). 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 28 days for mercury and 6 months for ICP metals.

  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

Two equipment blanks (J00N86/J00N91) were 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.

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

Two sets of field duplicate samples (J00N85/J00N87 & J00N89/J00N92) were submitted for analysis. Field duplicate results are compared using the same criteria as for laboratory duplicates. All other duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the remaining waste sites RQLs to ensure that laboratory detection levels meet the required criteria. All reported results met the analyte specific RQL.

- **Completeness**

Data package No. H2199-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.

BHI-01249, Rev. 3, *Data Quality Objectives Summary Report for 100/300 Area Remaining Sites Analytical Sampling Effort*, Bechtel Hanford Incorporated, March 2003.

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: H2199	REVIEWER: TLI	DATE: 6/2/03	PAGE_1_OF_1_
COMMENTS: No qualifiers assigned.			

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: BECHTEL-HANFORD																	
Laboratory: LLI																	
Case	SDG: H2199																
Sample Number		J00N74		J00N75		J00N76		J00N77		J00N78		J00N79		J00N80		J00N81	
Remarks																	
Sample Date		5/7/03		5/7/03		5/7/03		5/7/03		5/7/03		5/7/03		5/7/03		5/7/03	
Inorganics	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chromium (total)	1	14.5		11.1		11.9		10.6		11.6		14.1		10.1		13.0	
Mercury	0.2	0.01	U	0.02	U	0.02	U	0.01	U	0.02	U	0.02		0.02	U	0.02	U
Lead	5	8.2		4.5		6.2		4.7		9.4		8.7		7.2		7.6	
Sample Number		J00N82		J00N83		J00N84		J00N85		J00N86		J00N87		J00N88		J00N89	
Remarks										E. Blank		Duplicate					
Sample Date		5/7/03		5/7/03		5/7/03		5/7/03		5/7/03		5/7/03		5/7/03		5/7/03	
Inorganics	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chromium (total)	1	13.4		12.0		12.0		9.3		0.52	U	10.4		297		176	
Mercury	0.2	0.02	U	0.02		0.01	U	0.02	U	0.02	U	0.01	U	5.0		0.59	
Lead	5	9.10		7.0		7.0		6.0		3.4	U	4.8		3.2	U	8.2	
Sample Number		J00N90		J00N91		J00N92											
Remarks				E. Blank		Duplicate											
Sample Date		5/7/03		5/7/03		5/7/03											
Inorganics	RQL	Result	Q	Result	Q	Result	Q										
Chromium (total)	1	98.2		0.53	U	166											
Mercury	0.2	0.49		0.02	U	0.66											
Lead	5	6.4		3.5	U	7.6											

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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 05/16/03

CLIENT: TNUHANFORD B01-054 H2199 LVL LOT #: 0305L377

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	J00N74	Chromium, Total	14.5	MG/KG	0.51	1.0
		Mercury, Total	0.01 u	MG/KG	0.01	1.0
		Lead, Total	8.2	MG/KG	3.4	1.0
-002	J00N75	Chromium, Total	11.1	MG/KG	0.54	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	4.5	MG/KG	3.5	1.0
-003	J00N76	Chromium, Total	11.9	MG/KG	0.55	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	6.2	MG/KG	3.6	1.0
-004	J00N77	Chromium, Total	10.6	MG/KG	0.45	1.0
		Mercury, Total	0.01 u	MG/KG	0.01	1.0
		Lead, Total	4.7	MG/KG	2.9	1.0
-005	J00N78	Chromium, Total	11.6	MG/KG	0.55	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	9.4	MG/KG	3.6	1.0
-006	J00N79	Chromium, Total	14.1	MG/KG	0.52	1.0
		Mercury, Total	0.02	MG/KG	0.02	1.0
		Lead, Total	8.7	MG/KG	3.4	1.0
-007	J00N80	Chromium, Total	10.1	MG/KG	0.50	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	7.2	MG/KG	3.3	1.0
-008	J00N81	Chromium, Total	13.0	MG/KG	0.54	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	7.6	MG/KG	3.6	1.0
-009	J00N82	Chromium, Total	13.4	MG/KG	0.54	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	9.1	MG/KG	3.6	1.0
-010	J00N83	Chromium, Total	12.0	MG/KG	0.53	1.0
		Mercury, Total	0.02	MG/KG	0.01	1.0
		Lead, Total	7.0	MG/KG	3.5	1.0

PR 5/31/03

~~09~~

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/16/03

CLIENT: TNUHANFORD B01-054 H2199 LVL LOT #: 0305L377

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-011	J00N84	Chromium, Total	12.0	MG/KG	0.48	1.0
		Mercury, Total	0.01 u	MG/KG	0.01	1.0
		Lead, Total	7.0	MG/KG	3.1	1.0
-012	J00N85	Chromium, Total	9.3	MG/KG	0.54	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	6.0	MG/KG	3.5	1.0
-013	J00N86	Chromium, Total	0.52 u	MG/KG	0.52	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	3.4 u	MG/KG	3.4	1.0
-014	J00N87	Chromium, Total	10.4	MG/KG	0.53	1.0
		Mercury, Total	0.01 u	MG/KG	0.01	1.0
		Lead, Total	4.8	MG/KG	3.5	1.0
-015	J00N88	Chromium, Total	297	MG/KG	0.49	1.0
		Mercury, Total	5.0	MG/KG	0.08	5.0
		Lead, Total	3.2 u	MG/KG	3.2	1.0
-016	J00N89	Chromium, Total	176	MG/KG	0.53	1.0
		Mercury, Total	0.59	MG/KG	0.02	1.0
		Lead, Total	8.2	MG/KG	3.5	1.0
-017	J00N90	Chromium, Total	98.2	MG/KG	0.53	1.0
		Mercury, Total	0.49	MG/KG	0.02	1.0
		Lead, Total	6.4	MG/KG	3.5	1.0
-018	J00N91	Chromium, Total	0.53 u	MG/KG	0.53	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	3.5 u	MG/KG	3.5	1.0
-019	J00N92	Chromium, Total	166	MG/KG	0.39	1.0
		Mercury, Total	0.66	MG/KG	0.02	1.0
		Lead, Total	7.6	MG/KG	2.6	1.0

5/31/03

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD B01-054
LVL#: 0305L377
SDG/SAF#: H2199/B01-054

W.O.#: 11343-606-001-9999-00
Date Received: 05-09-03

METALS CASE NARRATIVE

1. This narrative covers the analyses of 19 soil samples.

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

3. All analyses were performed within the required holding times.

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

5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits (80-120% for Mercury).

6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).

7. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL), MB value less than 5% of the RCRA limit, or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.

8. All ICP Interference Check Standards were within control limits.

9. All laboratory control samples (LCS) were within the 80-120% control limits. Refer to the Inorganics Laboratory Control Standards Report.

10. All matrix spike (MS) recoveries were within the 75-125% control limits. Refer to the Inorganics Accuracy Report.

11. All duplicate analyses were within the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

12. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in

The results presented in this report relate only to the analytical testing and conditions of the samples at 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 21 pages.

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a region of less-certain quantification.

13. 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 data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Pat G

for Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

05-16-03
Date

jjw/m03-377

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		B01-054-031	Page 1 of 4
Collector: D.Shea	Company Contact: D.Shea	Telephone No.: 521-6014	Project Coordinator: KESSNER, JH	Price Code: 8L; Data Turnaround: 7 ~~21~~ Days DNS 5-6-03
Project Designation: 100 B/C Area Effluent Pipeline & Proximity Site Remediatio	Sampling Location: 100 BC pipelines, 100-B-5, Verification		SAF No.: B01-054	Air Quality
Ice Chest No.: ERC-96-002 and ERC-96-061	Field Logbook No.: EL-1548-3	COA: R100BC2600	Method of Shipment: FED EX	
Shipped To: TMA/RECRA	Offsite Property No.: A030226		Bill of Lading/Air Bill No.: See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

potentially radioactive

Special Handling and/or Storage

Preservation	Cool 4C	Cool 4C	None	None								
Type of Container	G/P	G/P	G/P	G/P								
No. of Container(s)	1	1	1	1								
Volume	250mL	60mL	500mL	60mL								
SAMPLE ANALYSIS	ICP Metals - 6010A (Add-on) [Chromium, Lead]; Mercury - 7471 - (CV)	Chromium Hex - 7196	See item (1) in Special Instructions	See item (2) in Special Instructions								

000016

Sample No.	Matrix *	Sample Date	Sample Time										
J00N74	SOIL	5/7/03	0843	✓	✓	✓	✓						
J00N75	SOIL	↓	0850	✓	✓	✓	✓						
J00N76	SOIL	↓	0858	✓	✓	✓	✓						
J00N77	SOIL	↓	0916	✓	✓	✓	✓						
J00N78	SOIL	↓	0926	✓	✓	✓	✓						

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From: DWShea DWShea	Date/Time: 5/7/03 1705	Received By/Stored In: Fridge 1A	Date/Time: 5/7/03 1705
Relinquished By/Removed From: 3728 Ref 1A	Date/Time: 5/8/03 10:30	Received By/Stored In: Daniel St. John	Date/Time: 5/8/03 1030
Relinquished By/Removed From: Daniel St. John ERC	Date/Time: 5/8/03 1030	Received By/Stored In: FED EX	Date/Time:
Relinquished By/Removed From: FEDEX	Date/Time: 5-9-03 0930	Received By/Stored In: [signature]	Date/Time: 5-9-03 0930
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy (TCL List) [Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155]; Gamma Spec - Add-on [Americium-241, ~~Silver-108 metastable~~, Uranium-238]
(2) Isotopic Plutonium; Isotopic Uranium; Americium-241; Strontium-89,90 -- Total Sr; ~~Nickel-63~~

DNS 5-6-03

Personnel not available to relinquish samples from the 3728 Ref # 1A on 5/8/03

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

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		B01-054-031	Page 2 of 4
Collector: D.Shea	Company Contact: D.Shea	Telephone No.: 521-6014	Project Coordinator: KESSNER, JH	Price Code: 8L
Project Designation: 100 B C Area Effluent Pipeline & Proximity Site Remediatio	Sampling Location: 100 BC pipelines, 100-B-5, Verification		SAF No.: B01-054	Data Turnaround: Air Quality 7 ~~21~~ Days DMS 5-6-03
Ice Chest No.: ERC-96-002 and ERC-96-061	Field Logbook No.: EL-1548-3	COA: R100BC2600	Method of Shipment: FED EX	
Shipped To: TM/ERCRA	Offsite Property No.: 4030226		Bill of Lading/Air Bill No.: See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

potentially radioactive

Special Handling and/or Storage

Preservation	Cool 4C	Cool 4C	None	None							
Type of Container	G/P	G/P	G/P	G/P							
No. of Container(s)	1	1	1	1							
Volume	250mL	60mL	500mL	250mL							
SAMPLE ANALYSIS	ICP Metals - 6010A (Add-on) (Chromium, Lead); Mercury - 7471 - (CV)	Chromium Hex - 7196	See item (1) in Special Instructions	See item (2) in Special Instructions							
Sample No. / Matrix * / Sample Date / Sample Time											
J00N79 / SOIL / 5/7/03 / 0932	✓	✓	✓	✓							
J00N80 / SOIL / ↓ / 0940	✓	✓	✓	✓							
J00N81 / SOIL / ↓ / 0951	✓	✓	✓	✓							
J00N82 / SOIL / ↓ / 1003	✓	✓	✓	✓							
J00N83 / SOIL / ↓ / 1012	✓	✓	✓	✓							

DA 5/7/03

000017

CHAIN OF POSSESSION	Sign/Print Names	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Dwshea Dwshea	5/7/03 1705	Fridge 14	5/7/03 1705
Relinquished By/Removed From	3729 Ref 14	5/8/03 1030	David St. John	5/8/03 1030
Relinquished By/Removed From	David St. John ERC	5/8/03 1020	FED EX	
Relinquished By/Removed From	FEDEx	5-9-03 0930	Carl	5-9-03 0930
Relinquished By/Removed From			Received By/Stored In	
Relinquished By/Removed From			Received By/Stored In	

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy (TCL List) [Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155]; Gamma Spec - Add-on [Americium-241, ~~Silver-108 metastable~~, Uranium-238]
(2) Isotopic Plutonium; Isotopic Uranium; Americium-241; Strontium-89,90 -- Total Sr; ~~Nickel-63~~

DMS 5-6-03

Personnel not available to relinquish samples from the 3728 Ref # 1.1 on 5/8/03

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

00

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B01-054-031	Page 3 of 4

llector D.Shea	Company Contact D.Shea / Telephone No. 521-6014	Project Coordinator KESSNER, JH	Price Code 8L / Data Turnaround ~~21~~ 7 Days DNS 5-6-03
niect Designation 100 B/C Area Effluent Pipeline & Proximity Site Remediatio	Sampling Location 100 BC pipelines, 100-B-5, Verification	SAF No. B01-054	Air Quality
e Chest No. ERC-96-002 and ERC-96-061	Field Logbook No. EL-1548-3 / COA R100BC2600	Method of Shipment FED EX	
hipped To TMA/RECRA	Offsite Property No. 4030226	Bill of Lading/Air Bill No. See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

potentially radioactive

Special Handling and/or Storage

000018

SAMPLE ANALYSIS													
Preservation				Cool 4C	Cool 4C	None	None						
Type of Container				G/P	G/P	G/P	G/P						
No. of Container(s)				1	1	1	1						
Volume				250mL	60mL	500mL	60mL						
				ICP Metals - 6010A (Add-on) (Chromium, Lead); Mercury - 7471 - (CV)	Chromium Hex - 7196	See item (1) in Special Instructions.	See item (2) in Special Instructions.						
Sample No.	Matrix *	Sample Date	Sample Time										
J00N84	SOIL	5/7/03	1023	✓	✓	✓	✓						
J00N85	SOIL	↓	1035	✓	✓	✓	✓						
J00N86	SOIL		0825	✓	✓	✓	✓						
J00N87	SOIL		1025	✓	✓	✓	✓						
J00N88	SOIL	↓	1251	✓	✓	✓	✓						

CHAIN OF POSSESSION	Sign/Print Names	Date/Time	Received By/Stored In	Sign/Print Names	Date/Time
Relinquished By/Removed From	DW Shea DW SHEA	5/7/03 1705	Received By/Stored In	Fridge 1A	5/7/03 1705
Relinquished By/Removed From 3728 Ref 1A		5/8/03 1030	Received By/Stored In	David St. John David St. John	5/8/03 1030
Relinquished By/Removed From David St. John ERC	David St. John	5/8/03 1030	Received By/Stored In	FED EX	
Relinquished By/Removed From FEDEX		5-9-03 0930	Received By/Stored In	Carl Hanna	5-9-03 0930
Relinquished By/Removed From			Received By/Stored In		
Relinquished By/Removed From			Received By/Stored In		

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy (TCL List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, ~~Silver-108 metastable~~, Uranium-238)
(2) Isotopic Plutonium; Isotopic Uranium; Americium-241; Strontium-89,90 -- Total Sr; ~~Nickel-63~~

DNS 5-6-03

Personnel not available to relinquish samples from the 3728 Ref # 1A on 5/8/03

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

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		B01-054-031	Page 1 of 1
Collector: D.Shea	Company Contact: D.Shea	Telephone No.: 521-6014	Project Coordinator: KESSNER, JH	Price Code: 8L
Project Designation: 100 B/C Area Effluent Pipeline & Proximity Site Remediatio	Sampling Location: 100 BC pipelines, 100-B-5, Verification		SAF No.: B01-054	Data Turnaround: Air Quality 7 ~~21~~ Days DMS 5-6-03
Ice Chest No.: ERC-96-062 and ERC-96-061	Field Logbook No.: EL-1548-3	COA: R100BC2600	Method of Shipment: FED EX	
Shipped To: TMA/RECRA	Offsite Property No.: A030226		Bill of Lading/Air Bill No.: See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

potentially radioactive

Special Handling and/or Storage

Preservation	Cool 4C	Cool 4C	None	None							
Type of Container	G/P	G/P	G/P	G/P							
No. of Container(s)	1	1	1	1							
Volume	250mL	60mL	500mL	60mL							
SAMPLE ANALYSIS	ICP Metals - 6010A (Add-on) [Chromium, Lead]; Mercury - 7471 - (CV)	Chromium Hex - 7196	See item (1) in Special Instructions.	See item (2) in Special Instructions							
Sample No. / Matrix * / Sample Date / Sample Time											
J00N89 / SOIL / 5/7/03 / 1300	✓	✓	✓	✓							
J00N90 / SOIL / ↓ / 1323	✓	✓	✓	✓							
J00N91 / SOIL / ↓ / 1240	✓	✓	✓	✓							
J00N92 / SOIL / ↓ / 1300	✓	✓	✓	✓							

000019

CHAIN OF POSSESSION	Sign/Print Names	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From: DJ Shea	DJ Shea	5/7/03 1705	Received By/Stored In: Erica 1A	5/7/03 1705
Relinquished By/Removed From: 3728 Ref 1A		5/8/03 1030	Received By/Stored In: David St. John	5/8/03 1030
Relinquished By/Removed From: David St. John ERC	David St. John	5/8/03 1030	Received By/Stored In: FEDEX	
Relinquished By/Removed From: FEDEX		5-9-03 0930	Received By/Stored In:	5-9-03 0930
Relinquished By/Removed From:			Received By/Stored In:	
Relinquished By/Removed From:			Received By/Stored In:	

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy (TCL List) [Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155]; Gamma Spec - Add-on [Americium-241, ~~Silver-108 metastable~~, Uranium-238]
(2) Isotopic Plutonium; Isotopic Uranium; Americium-241; Strontium-89,90 -- Total Sr; ~~Nickel-63~~

DMS 5-6-03

Personnel not available to relinquish samples from the 3728 Ref # 1A on 5/8/03

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

Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

ALIDATION LEVEL:	A	B	C	D	E

PROJECT: 100BC 100-B-5		DATA PACKAGE: #2199	
VALIDATOR: TLT	LAB: LLI		DATE: 5/31/03
CASE:		SDG: #2199	

ANALYSES PERFORMED					
SW-846/ICP	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide		

SAMPLES/MATRIX						
J00N74	J00N75	J00N76	J00N77	J00N78	J00N79	J00N80
J00N81	J00N82	J00N83	J00N84	J00N85	J00N86	J00N87
J00N88	J00N89	J00N90	J00N91	J00N92		
						Soil

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: ~~CR 86+91 0~~ 5/1/4

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: NO PAS

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 05/16/03

CLIENT: TNUHANFORD B01-054 H2199 LVL LOT #: 0305L377

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	03L0260-MB1	Chromium, Total	0.69	MG/KG	0.53	1.0
		Lead, Total	3.5 u	MG/KG	3.5	1.0
BLANK1	03C0111-MB1	Mercury, Total	0.02 u	MG/KG	0.02	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 05/16/03

CLIENT: TNUHANFORD B01-054 H2199

LVL LOT #: 0305L377

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	J00N74	Chromium, Total	31.9	14.5	19.6	88.8	1.0
		Mercury, Total	0.14	0.01u	0.14	97.9	1.0
		Lead, Total	51.3	8.2	49.0	88.0	1.0

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 05/16/03

CLIENT: TNUHANFORD B01-054 H2199 LVL LOT #: 0305L377

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

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	J00N74	Chromium, Total	14.5	14.4	0.69	1.0
		Mercury, Total	0.01u	0.01u	NC	1.0
		Lead, Total	8.2	9.2	11.5	1.0