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**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 H9-01

JD 5/13  
INITIAL/DATE

Jeanette Duncan H9-02

JD 5/13  
INITIAL/DATE

SDG: H2131

SAF-B01-054

Waste Site/Sample Location: 1607-B7

**RECEIVED**  
JUL 14 2003

**EDMC**

Date: 25 April 2003  
To: Bechtel Hanford Inc. (technical representative)  
From: TechLaw, Inc.  
Project: 100-BC Area Effluent Pipeline & Proximity Site Remediation Activities - Full Protocol - Waste Site 1607-B7  
Subject: Inorganics - Data Package No. H2131-LLI (SDG No. H2131)

## INTRODUCTION

This memo presents the results of data validation on Data Package No. H2131-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 Level	Analysis
J00KH2	3/27/03	Soil	C	See note 1
J00KF7	3/27/03	Soil	C	See note 1
J00KF8	3/27/03	Soil	C	See note 1
J00KF9	3/27/03	Soil	C	See note 1
J00KH0	3/27/03	Soil	C	See note 1
J00KH1	3/27/03	Soil	C	See note 1

1 - Chromium VI by 7196A; ICP metals by 6010B; mercury by 7471A.

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

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## 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, 6 months for ICP metals and 28 days for mercury.

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.

Due to preparation blank contamination, silver results in samples J00KF8, J00KH0, J00KH2 and J00KH1 were qualified as undetected and flagged "U".

Due to preparation blank contamination, the chromium(total) result in sample J00KH2 was qualified as undetected and flagged "U".

All other preparation blank results were acceptable.

#### Field (Equipment) Blank

One equipment blank (J00KH2) was submitted for analysis. Silver, barium and chromium(total) were detected in the equipment blank. Under the BHI statement

of work, no qualification is required.

## **Accuracy**

### Matrix Spike

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

All matrix spike recovery results were acceptable.

## **Precision**

### Laboratory Duplicate Samples

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

All laboratory duplicate results were acceptable.

### Field Duplicate

One set of field duplicate samples (J00KF9/J00KH0) were submitted for analysis. Field duplicate results are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

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### · **Analytical Detection Levels**

Reported analytical detection levels are compared against the target detection limits (TDLs) to ensure that laboratory detection levels meet the required criteria. All chromium VI results exceeded the TDL. Under the BHI statement of work, no qualification is required. All other reported results met the analyte specific TDL.

### · **Completeness**

Data package No. H2131-LLI was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

### **MAJOR DEFICIENCIES**

None found.

### **MINOR DEFICIENCIES**

Due to preparation blank contamination, silver results in samples J00KF8, J00KH0, J00KH2 and J00KH1 were qualified as undetected and flagged "U". Due to preparation blank contamination, the chromium(total) result in sample J00KH2 was qualified as undetected and flagged "U".

All chromium VI results exceeded the TDL. 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**

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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).

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**Appendix 2**  
**Summary of Data Qualification**

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DATA QUALIFICATION SUMMARY

SDG: H2131	REVIEWER: TLI	DATE: 4/25/03	PAGE <u>1</u> OF <u>1</u>
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Chromium (total)	U	J00KH2	Blank contamination
Silver	U	J00KF8, J00KH0, J00KH1, J00KH2	Blank contamination

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**Appendix 3**

**Qualified Data Summary and Annotated Laboratory Reports**

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 04/08/03

CLIENT: TNUHANFORD B01-054 H2131  
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0304L100

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	J00KH2	Silver, Total	0.09 U	MG/KG	0.08	1.0
		Arsenic, Total	0.35 u	MG/KG	0.35	1.0
		Barium, Total	1.0	MG/KG	0.01	1.0
		Cadmium, Total	0.04 u	MG/KG	0.04	1.0
		Chromium, Total	0.22 U	MG/KG	0.06	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	0.26 u	MG/KG	0.26	1.0
		Selenium, Total	0.36 u	MG/KG	0.36	1.0
-002	J00KF7	Silver, Total	0.08 u	MG/KG	0.08	1.0
		Arsenic, Total	2.9	MG/KG	0.37	1.0
		Barium, Total	65.8	MG/KG	0.01	1.0
		Cadmium, Total	0.21	MG/KG	0.04	1.0
		Chromium, Total	10.0	MG/KG	0.06	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	4.8	MG/KG	0.27	1.0
		Selenium, Total	0.60	MG/KG	0.38	1.0
-003	J00KF8	Silver, Total	0.09 U	MG/KG	0.08	1.0
		Arsenic, Total	3.0	MG/KG	0.36	1.0
		Barium, Total	58.7	MG/KG	0.01	1.0
		Cadmium, Total	0.23	MG/KG	0.04	1.0
		Chromium, Total	8.3	MG/KG	0.06	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	4.2	MG/KG	0.27	1.0
		Selenium, Total	0.40	MG/KG	0.37	1.0

*Handwritten signature*  
 4/2 5/07

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 04/08/03

CLIENT: TNUHANFORD B01-054 H2131  
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0304L100

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING	DILUTION
					LIMIT	FACTOR
-004	J00KF9	Silver, Total	0.08 u	MG/KG	0.08	1.0
		Arsenic, Total	3.1	MG/KG	0.36	1.0
		Barium, Total	73.6	MG/KG	0.01	1.0
		Cadmium, Total	0.23	MG/KG	0.04	1.0
		Chromium, Total	10.3	MG/KG	0.06	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	34.7	MG/KG	0.27	1.0
		Selenium, Total	0.63	MG/KG	0.37	1.0
-005	J00KH0	Silver, Total	0.1 u	MG/KG	0.08	1.0
		Arsenic, Total	3.0	MG/KG	0.36	1.0
		Barium, Total	76.5	MG/KG	0.01	1.0
		Cadmium, Total	0.24	MG/KG	0.04	1.0
		Chromium, Total	10.1	MG/KG	0.06	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	43.0	MG/KG	0.26	1.0
		Selenium, Total	0.70	MG/KG	0.36	1.0
-006	J00KH1	Silver, Total	0.1 u	MG/KG	0.08	1.0
		Arsenic, Total	3.0	MG/KG	0.36	1.0
		Barium, Total	80.8	MG/KG	0.01	1.0
		Cadmium, Total	0.23	MG/KG	0.04	1.0
		Chromium, Total	10.2	MG/KG	0.06	1.0
		Mercury, Total	0.01 u	MG/KG	0.01	1.0
		Lead, Total	5.5	MG/KG	0.27	1.0
		Selenium, Total	0.42	MG/KG	0.37	1.0

*pr*  
 4/25/02

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 04/08/03

CLIENT: TNUHANFORD B01-054 H2131  
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0304L100

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	J00KH2	% Solids Chromium VI	100 0.40 u	% MG/KG	0.01 0.40	1.0 1.0
-002	J00KF7	% Solids Chromium VI	94.6 0.42 u	% MG/KG	0.01 0.42	1.0 1.0
-003	J00KF8	% Solids Chromium VI	95.4 0.42 u	% MG/KG	0.01 0.42	1.0 1.0
-004	J00KF9	% Solids Chromium VI	95.8 0.42 u	% MG/KG	0.01 0.42	1.0 1.0
-005	J00KH0	% Solids Chromium VI	95.0 0.42 u	% MG/KG	0.01 0.42	1.0 1.0
-006	J00KH1	% Solids Chromium VI	95.7 0.42 u	% MG/KG	0.01 0.42	1.0 1.0

*per*  
 4/25/03

**Appendix 4**

**Laboratory Narrative and Chain-of-Custody Documentation**

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Analytical Report

Client: TNU-HANFORD B01-054  
LVL#: 0304L100  
SDG/SAF#: H2131/B01-054

W.O.#: 11343-606-001-9999-00  
Date Received: 04-01-03

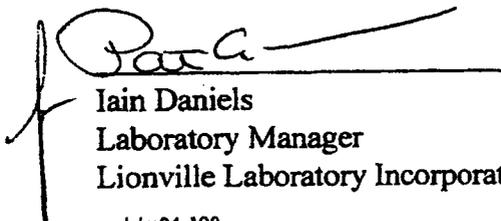
**METALS CASE NARRATIVE**

1. This narrative covers the analyses of 6 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.
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 with the exception of the soil LCS for Mercury (125.1%) which was within manufacturer's performance acceptance 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. The duplicate analysis for 1 analyte was outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

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 15 pages.

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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 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.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated  
gmb/m04-100

04-11-03  
Date



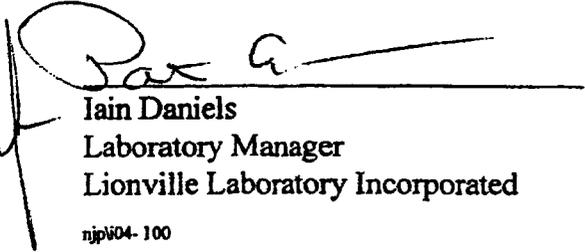
## Analytical Report

**Client:** TNU-HANFORD B01-054 H2131  
**LVL#:** 0304L100

**W.O.#:** 11343-606-001-9999-00  
**Date Received:** 04-01-03

### INORGANIC NARRATIVE

1. This narrative covers the analyses of 6 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 for 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

njl04-100

04-08-03  
Date

The results presented in this report relate to the analytical testing and conditions of the samples upon receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 11 pages.

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Bechtel Hanford Inc. B01-054-017 Page 1 of 3

Collector: D. Shea Project Coordinator: KESSNER, JH

Telephone No. 521-6014 Price Code: 8L

Project Designation: 100 B/C Area Effluent Pipeline & Proximity Site Remediation Data Turnaround: 11 Days

Ice Chest No. ELC 96001 Air Quality:

Shipped To: TMA/KECRA Method of Shipment: FED EX

Field Logbook No. EL-1573 COA: R607B72F00

Offsite Property No. A030174 Bill of Lading/Air Bill No. SREPSL

Sample No.	Matrix *	Sample Date	Sample Time	Preservation	Cool 4C	None	None							
J00KF7	SOIL	3/27/03	1223		G/P	120mL	G/P	120mL	G/P	60mL	G/P	250g	G/P	None
J00KF8	SOIL		1244		G/P	120mL	G/P	120mL	G/P	60mL	G/P	250g	G/P	None
J00KF9	SOIL		1321		G/P	120mL	G/P	120mL	G/P	60mL	G/P	250g	G/P	None
J00KH0	SOIL		1321		G/P	120mL	G/P	120mL	G/P	60mL	G/P	250g	G/P	None
J00KH1	SOIL		1400		G/P	120mL	G/P	120mL	G/P	60mL	G/P	250g	G/P	None

**SAMPLE ANALYSIS**

See item (1) in Special Instructions: ICP Metals - 6010A (Add-on) (Chromium, Lead, Mercury, 7471) - (CV)

See item (2) in Special Instructions: PCBs - 8082 Penicides - 8081

See item (3) in Special Instructions: Semi-VOA - 8270A (TCL)

See item (4) in Special Instructions: Chromium Hex - 7196

See item (5) in Special Instructions: Gross Alpha; Gross Beta

**CHAIN OF POSSESSION**

Received By/Removed From	Date/Time	Received By/Stored In	Date/Time
W. L. Nushen	3/27/03 1809	Fridgen JA	3/27/03 1809
Received By/Removed From	Date/Time	Received By/Stored In	Date/Time
W. L. Nushen	3/31/03 1300	EUGENE J. BLO	3/31/03 1300
Received By/Removed From	Date/Time	Received By/Stored In	Date/Time
W. L. Nushen	3/31/03 1300	FED EX	
Received By/Removed From	Date/Time	Received By/Stored In	Date/Time
W. L. Nushen	4-1-03 10:00	D. J. NASH	4-1-03 10:00
Received By/Removed From	Date/Time	Received By/Stored In	Date/Time
W. L. Nushen		FED EX	

**SPECIAL INSTRUCTIONS**

(1) ICP Metals - 6010TR (Client List) (Arsenic, Barium, Cadmium, Selenium, Silver)  
 (2) 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)

Personnel not available to relinquish samples from the 3728 Ref # SA on 3/11/03

**LABORATORY SECTION** Received By: \_\_\_\_\_ Date/Time: \_\_\_\_\_

**FINAL SAMPLE DISPOSITION** Disposal Method: \_\_\_\_\_ Date/Time: \_\_\_\_\_

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

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**CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST**

Collector: D. Shea  
 Project Designation: 100 B/C Area Effluent Pipeline & Proximity Site Remediation  
 Ice Chest No.: ERC 96 001  
 Company Contact: D. Shea, Telephone No. 521-6014  
 Project Coordinator: KESSNER, JH  
 SAF No.: B01-054  
 Price Code: 8L  
 Data Turnaround: 7 Days  
 Air Quality: [ ]  
 Method of Shipment: FOD EX  
 Bill of Lading/Air Bill No.: 508 05PC

COA R607B72F00  
 Offsite Property No.: A030 174

**SAMPLE ANALYSIS**

Sample No.	Matrix *	Sample Date	Sample Time	Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None
00KH2	SOIL	3/27/03	1206		G/P	G/P	G/P	aG	aG	aG	aG	aG	None	None
					1	1	1	1	1	1	1	1	1	1
					120mL	120mL	60mL	250g	60mL	120g	60mL	500mL	60mL	60mL
					See item (1) in Special Instructions.	ICP Metals - 6010A (Add-on) (Chromium, Lead); Mercury - 7471 - (CV)	Chromium Hex - 7196	Sem-VOA - 8270A (TCL)	Pesticides - 8081	PCBs - 8082	See item (2) in Special Instructions.	Gross Alpha, Gross Beta		

**CHAIN OF POSSESSION**

Inquired By/Removed From	Date/Time	Received By/Stored In	Date/Time
W. Sheehan	3/27/03 1007	Friebe SA	3/27/03 1809
REF SA	3/31/03 1300	SALES	3/31/03 1300
W. Sheehan	3/31/03 1300	FOD EX	
W. Sheehan	4-1-03 10:00	D. Minin	4-1-03 10:00

**SPECIAL INSTRUCTIONS**

(1) ICP Metals - 6010TR (Client List) (Arsenic, Barium, Cadmium, Selenium, Silver)  
 (2) 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)

Personnel not available to relinquish samples from the 3728 Ref # SA on 3/27/03

**BORATORY SECTION**

Received By: [Signature]  
 Disposal Method: [ ]  
 Title: [ ]  
 Disposed By: [ ]  
 Date/Time: [ ]

**Appendix 5**

**Data Validation Supporting Documentation**

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**INORGANIC ANALYSIS DATA VALIDATION CHECKLIST**

ALIDATION LEVEL:	A	B	<b>C</b>	D	E
PROJECT:	100BC WS 1607-157		DATA PACKAGE: H2131		
VALIDATOR:	TLI	LAB:	LLI	DATE:	4/25/03
CASE:			SDG:	H2131	
<b>ANALYSES PERFORMED</b>					
SW-846/ICP	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide	CR VI	
<b>SAMPLES/MATRIX</b>					
J00KH2	<del>J00KH3</del>	J00KF7	J00KF8		
J00KF9	J00KH0	J00KH1			
					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: LB H2 FB, HO, HI - ~~4/25/07~~ silver U all 3  
H2 - CR (total) - U  
H2 - EB Barium chromium silver

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**

**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

Results 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 CRTI over

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\_\_\_\_\_  
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**Appendix 6**

**Additional Documentation Requested by Client**

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 04/08/03

CLIENT: TNUHANFORD B01-054 H2131  
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0304L100

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	03L0180-MB1	Silver, Total	0.16	MG/KG	0.08	1.0
		Arsenic, Total	0.35 u	MG/KG	0.35	1.0
		Barium, Total	0.03	MG/KG	0.01	1.0
		Cadmium, Total	0.04 u	MG/KG	0.04	1.0
		Chromium, Total	0.16	MG/KG	0.06	1.0
		Lead, Total	0.26 u	MG/KG	0.26	1.0
		Selenium, Total	0.36 u	MG/KG	0.36	1.0
BLANK1	03C0069-MB1	Mercury, Total	0.02 u	MG/KG	0.02	1.0

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Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 04/08/03

CLIENT: TNUHANFORD B01-054 H2131

LVL LOT #: 0304L100

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-002	J00KF7	Silver, Total	5.1	0.08u	5.2	98.1	1.0
		Arsenic, Total	193	2.9	207	91.9	1.0
		Barium, Total	269	65.8	207	98.0	1.0
		Cadmium, Total	5.0	0.21	5.2	92.2	1.0
		Chromium, Total	30.6	10.0	20.7	99.5	1.0
		Mercury, Total	0.17	0.02u	0.16	105.0	1.0
		Lead, Total	53.3	4.8	51.8	93.6	1.0
		Selenium, Total	187	0.60	207	89.8	1.0

000028

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Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 04/08/03

CLIENT: TNUHANFORD B01-054 H2131  
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0304L100

SAMPLE	SITE ID	ANALYTE	INITIAL	REPLICATE RPD		DILUTION
			RESULT			FACTOR (REP)
-002REP	J00KF7	Silver, Total	0.08u	0.09	NC 20	1.0
		Arsenic, Total	2.9	3.0	3.4	1.0
		Barium, Total	65.8	73.5	11.1	1.0
		Cadmium, Total	0.21	0.22	7.0	1.0
		Chromium, Total	10.0	10.9	8.6	1.0
		Mercury, Total	0.02u	0.02u	NC	1.0
		Lead, Total	4.8	5.2	8.0	1.0
		Selenium, Total	0.60	0.69	13.3	1.0

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Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 04/08/03

CLIENT: TNUHANFORD B01-054 H2131  
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0304L100

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	03LVIA19-MB1	Chromium VI	0.40 u	MG/KG	0.40	1.0

000030

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 04/08/03

CLIENT: TNUHANFORD B01-054 H2131

LVL LOT #: 0304L100

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR (SPK)
-006	J00KH1	Soluble Chromium VI	3.8	0.42u	4.2	89.8	1.0
		Insoluble Chromium VI	1330	0.42u	1150	115.8	100
BLANK10	03LVIA19-MB1	Soluble Chromium VI	4.0	0.40u	4.0	99.0	1.0
		Insoluble Chromium VI	1490	0.40u	1440	103.3	100

000031

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 04/08/03

CLIENT: TNUHANFORD B01-054 H2131  
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 03041100

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE RPD		DILUTION FACTOR (REP)
-002REP	J00KF7	% Solids	94.6	96.0	1.4	1.0
-006REP	J00KH1	Chromium VI	0.42u	0.42u	NC	1.0

000032

Date: 25 April 2003  
 To: Bechtel Hanford Inc. (technical representative)  
 From: TechLaw, Inc.  
 Project: 100-BC Area Effluent Pipeline & Proximity Site Remediation Activities -  
 Full Protocol - Waste Site 1607-B7  
 Subject: PCB/Pesticide - Data Package No. H2131-LLI (SDG No. H2131)

**INTRODUCTION**

This memo presents the results of data validation on Summary Data Package No. H2131-LLI prepared by Lionville Laboratory Incorporated (LLI). A list of the 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
J00KH2	3/27/03	Soil	C	See note 1
J00KF7	3/27/03	Soil	C	See note 1
J00KF8	3/27/03	Soil	C	See note 1
J00KF9	3/27/03	Soil	C	See note 1
J00KH0	3/27/03	Soil	C	See note 1
J00KH1	3/27/03	Soil	C	See note 1

1 - PCBs by 8082; pesticides by 8081A.

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

## DATA QUALITY OBJECTIVES

- **Holding Times**

Sample data were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded by less 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 detected sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were acceptable.

- **Method Blank**

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation or analysis. At least one method blank analysis must be conducted for every 20 samples. Method blanks should not contain target compounds at a concentration greater than required detection limit (RDL). If target compounds are present, sample results less than five times the blank concentration are qualified as undetected and flagged "U". If the sample result is less than five times the blank concentration and less than RDL, the result is qualified as undetected and elevated to the RDL.

All method blank target compound results were acceptable.

### Field Blanks

One equipment blank (J00KH2) was submitted for analysis. No analytes were detected in the field blank.

- **Accuracy**

### Matrix Spike

Matrix spike 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

000002

concentrations. Matrix spike analyses are performed in duplicate and must be within control limits of 70% to 130%. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Non-detected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

All matrix spike results were acceptable.

#### Surrogate Recovery

The analysis of surrogate compounds provides a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the laboratory. When a surrogate compound recovery is outside the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Non-detected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Non-detected compounds with surrogate recoveries above the upper control limit require no qualification.

All surrogate results were acceptable.

- **Precision**

#### Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed as the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. For soil samples, results must be within RPD limits of plus/minus 30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All matrix spike/matrix spike duplicate results were acceptable.

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### Field Duplicate Samples

One set of field duplicate samples (J00KF9/J00KH0) were submitted for analysis. Field duplicate results are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the Required Detection Limits RDLs to ensure that laboratory detection levels meet the required criteria. All PCB, methoxychlor and toxaphene results exceeded the RDL. Under the BHI statement of work, no qualification is required.

- **Completeness**

Data Package No. H2131-LLI was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

### **MAJOR DEFICIENCIES**

None found.

### **MINOR DEFICIENCIES**

Due to a laboratory reported interference with the analysis, the beta-BHC result in sample J00KF9 was qualified as an estimate and flagged "J". Data flagged "J" is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

All PCB, methoxychlor and toxaphene results exceeded the RDL. 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.

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**Appendix 1**  
**Glossary of Data Reporting Qualifiers**

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Qualifiers which may be applied by data validators in compliance with the procedures herein 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 quantitation limit is an estimate.
- 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).

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**Appendix 2**  
**Summary of Data Qualification**

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DATA QUALIFICATION SUMMARY

SDG: H2131	REVIEWER: TLI	DATE: 4/25/03	PAGE <u>1</u> OF <u>1</u>
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Beta-BHC	J	J00KF9	Laboratory reported interference

000009

**Appendix 3**

**Qualified Data Summary and Annotated Laboratory Reports**

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Project: BECHTEL-HANFORD		J00KH2		J00KF7		J00KF8		J00KF9		J00KH0		J00KH1	
Laboratory: Lionville Laboratory Inc.		E. Blank		3/27/03		3/27/03		3/27/03		Duplicate		3/27/03	
Case: SDG: H2131		4/2/03		4/2/03		4/2/03		4/2/03		4/2/03		4/2/03	
Sample Number		4/8/03		4/9/03		4/9/03		4/9/03		4/9/03		4/9/03	
Remarks		RQL		Result		Q		Result		Q		Result	
Sample Date		16.5		33 U		35 U		35 U		35 U		35 U	
Extraction Date		16.5		67 U		70 U		70 U		70 U		70 U	
Analysis Date		16.5		33 U		35 U		35 U		35 U		35 U	
PCB		16.5		33 U		35 U		35 U		35 U		35 U	
Aroclor-1016		16.5		33 U		35 U		35 U		35 U		35 U	
Aroclor-1221		16.5		33 U		35 U		35 U		35 U		35 U	
Aroclor-1232		16.5		33 U		35 U		35 U		35 U		35 U	
Aroclor-1242		16.5		33 U		35 U		35 U		35 U		35 U	
Aroclor-1248		16.5		33 U		35 U		35 U		35 U		35 U	
Aroclor-1254		16.5		33 U		35 U		35 U		35 U		35 U	
Aroclor-1260		16.5		33 U		35 U		35 U		35 U		35 U	
Sample Number		J00KH2		J00KF7		J00KF8		J00KF9		J00KH0		J00KH1	
Remarks		E. Blank		Duplicate									
Sample Date		3/27/03		3/27/03		3/27/03		3/27/03		3/27/03		3/27/03	
Extraction Date		4/2/03		4/2/03		4/2/03		4/2/03		4/2/03		4/2/03	
Analysis Date		4/4/03		4/4/03		4/4/03		4/4/03		4/4/03		4/4/03	
PCB		RQL		Result		Q		Result		Q		Result	
Alpha-BHC		5		1.7 U		1.8 U		1.7 U		1.8 U		1.7 U	
Beta-BHC		5		1.7 U		1.8 U		2.1 J		1.8 U		1.7 U	
Delta-BHC		5		1.7 U		1.8 U		1.7 U		1.8 U		1.7 U	
Gamma-BHC (Lindane)		5		1.7 U		1.8 U		1.7 U		1.8 U		1.7 U	
Heptachlor		5		1.7 U		1.8 U		1.7 U		1.8 U		1.7 U	
Aldrin		5		1.7 U		1.8 U		1.7 U		1.8 U		1.7 U	
Heptachlor Epoxide		5		1.7 U		1.8 U		1.7 U		1.8 U		1.7 U	
Endosulfan I		5		1.7 U		1.8 U		1.7 U		1.8 U		1.7 U	
Dieldrin		5		3.3 U		3.5 U		3.5 U		3.5 U		3.5 U	
4,4'-DDE		5		3.3 U		3.5 U		3.5 U		3.5 U		3.5 U	
Endrin		5		3.3 U		3.5 U		3.5 U		3.5 U		3.5 U	
Endosulfan II		5		3.3 U		3.5 U		3.5 U		3.5 U		3.5 U	
4,4'-DDD		5		3.3 U		3.5 U		3.5 U		3.5 U		3.5 U	
Endosulfan Sulfate		5		3.3 U		3.5 U		3.5 U		3.5 U		3.5 U	
4,4'-DDT		5		3.3 UJ		3.5 UJ		3.5 UJ		3.5 UJ		3.5 UJ	
Methoxychlor		5		17 U		18 U		17 U		18 U		17 U	
Endrin Ketone		5		3.3 U		3.5 U		3.5 U		3.5 U		3.5 U	
Endrin Aldehyde		5		3.3 U		3.5 U		3.5 U		3.5 U		3.5 U	
alpha-Chlordane		16.5		1.7 U		1.8 U		1.7 U		1.8 U		1.7 U	
gamma-Chlordane		16.5		1.7 U		1.8 U		1.7 U		1.8 U		1.7 U	
Toxaphene		5		170 U		180 U		170 U		180 U		170 U	

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

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Lionville Laboratory, Inc.  
Pesticide/PCBs by GC, CLP List

Client: **TNUHANFORD B01-054 H2131** Work Order: **11343606001** Page: **1**  
Report Date: **04/08/03 15:34**

RFW Batch Number: **0304L100**

Sample Information	Surrogate:	J00KH2	J00KH2	J00KH2	J00KH2	J00KF7	J00KF8	J00KF9
RFW#:		001	001 MS	001 MSD	002	003	004	
Matrix:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
D.F.:		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Units:		UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
	Tetrachloro-m-xylene	85 %	90 %	100 %	95 %	100 %	100 %	90 %
	Decachlorobiphenyl	100 %	95 %	105 %	100 %	105 %	100 %	100 %
	Alpha-BHC	1.7 U	1.7 U	1.7 U	1.8 U	1.7 U	1.7 U	1.7 U
	Beta-BHC	1.7 U	1.7 U	1.7 U	1.8 U	1.7 U	1.7 U	2.1 U
	Delta-BHC	1.7 U	1.7 U	1.7 U	1.8 U	1.7 U	1.7 U	1.7 U
	Gamma-BHC (Lindane)	1.7 U	72 %	76 %	1.8 U	1.7 U	1.7 U	1.7 U
	Heptachlor	1.7 U	86 %	94 %	1.8 U	1.7 U	1.7 U	1.7 U
	Aldrin	1.7 U	76 %	82 %	1.8 U	1.7 U	1.7 U	1.7 U
	Heptachlor epoxide	1.7 U	1.7 U	1.7 U	1.8 U	1.7 U	1.7 U	1.7 U
	Endosulfan I	1.7 U	1.7 U	1.7 U	1.8 U	1.7 U	1.7 U	1.7 U
	Dieldrin	3.3 U	92 %	99 %	3.5 U	3.5 U	3.5 U	3.5 U
	4,4'-DDE	3.3 U	3.3 U	3.3 U	3.5 U	3.5 U	3.5 U	3.5 U
	Endrin	3.3 U	104 %	113 %	3.5 U	3.5 U	3.5 U	3.5 U
	Endosulfan II	3.3 U	3.3 U	3.3 U	3.5 U	3.5 U	3.5 U	3.5 U
	4,4'-DDD	3.3 U	3.3 U	3.3 U	3.5 U	3.5 U	3.5 U	3.5 U
	Endosulfan sulfate	3.3 U	3.3 U	3.3 U	3.5 U	3.5 U	3.5 U	3.5 U
	4,4'-DDT	3.3 U	92 %	96 %	3.5 U	3.5 U	3.5 U	3.5 U
	Methoxychlor	17 U	17 U	17 U	18 U	17 U	17 U	17 U
	Endrin ketone	3.3 U	3.3 U	3.3 U	3.5 U	3.5 U	3.5 U	3.5 U
	Endrin aldehyde	3.3 U	3.3 U	3.3 U	3.5 U	3.5 U	3.5 U	3.5 U
	alpha-Chlordane	1.7 U	1.7 U	1.7 U	1.8 U	1.7 U	1.7 U	1.7 U
	gamma-Chlordane	1.7 U	1.7 U	1.7 U	1.8 U	1.7 U	1.7 U	1.7 U
	Toxaphene	170 U	170 U	170 U	180 U	170 U	170 U	170 U

*4/25/03*

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked.  
% = Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. \*= Outside of EPA CLP QC

000012

*4/25/03*

*4/25/03*

Cust ID: J00KH0

J00KH1

PBLKPZ

PBLKPZ BS

Sample Information

RFW#: 005 SOIL 006 03LE0386-MB1 03LE0386-MB1

Matrix: SOIL SOIL SOIL

D.F.: 1.00 1.00 1.00

Units: UG/KG UG/KG UG/KG

Surrogate:	Tetrachloro-m-xylene	95 %	105 %	90 %	90 %	90 %	90 %
Decachlorobiphenyl		105 %	105 %	100 %	95 %	100 %	100 %
Alpha-BHC		1.8 U	1.8 U	1.7 U	1.7 U	1.7 U	1.7 U
Beta-BHC		1.8 U	1.8 U	1.7 U	1.7 U	1.7 U	1.7 U
Delta-BHC		1.8 U	1.8 U	1.7 U	1.7 U	1.7 U	1.7 U
gamma-BHC (Lindane)		1.8 U	1.8 U	1.7 U	1.7 U	74 %	74 %
Heptachlor		1.8 U	1.8 U	1.7 U	1.7 U	88 %	88 %
Aldrin		1.8 U	1.8 U	1.7 U	1.7 U	78 %	78 %
Heptachlor epoxide		1.8 U	1.8 U	1.7 U	1.7 U	1.7 U	1.7 U
Endosulfan I		1.8 U	1.8 U	1.7 U	1.7 U	1.7 U	1.7 U
Dieldrin		3.5 U	3.5 U	3.5 U	3.3 U	94 %	94 %
4,4'-DDE		3.5 U	3.5 U	3.5 U	3.3 U	3.3 U	3.3 U
Endrin		3.5 U	3.5 U	3.5 U	3.3 U	109 %	109 %
Endosulfan II		3.5 U	3.5 U	3.5 U	3.3 U	3.3 U	3.3 U
4,4'-DDD		3.5 U	3.5 U	3.5 U	3.3 U	3.3 U	3.3 U
Endosulfan sulfate		3.5 U	3.5 U	3.5 U	3.3 U	3.3 U	3.3 U
4,4'-DDT		3.5 U	3.5 U	3.5 U	3.3 U	98 %	98 %
Methoxychlor		18 U	18 U	17 U	17 U	17 U	17 U
Endrin ketone		3.5 U	3.5 U	3.5 U	3.3 U	3.3 U	3.3 U
Endrin aldehyde		3.5 U	3.5 U	3.5 U	3.3 U	3.3 U	3.3 U
alpha-Chlordane		1.8 U	1.8 U	1.7 U	1.7 U	1.7 U	1.7 U
gamma-Chlordane		1.8 U	1.8 U	1.7 U	1.7 U	1.7 U	1.7 U
Toxaphene		180 U	180 U	170 U	170 U	170 U	170 U

000013

4/25/03

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. % = Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. \*= Outside of EPA CLP QC

SP4/11/03

Lionville Laboratory, Inc.

PCBs by GC

Report Date: 04/09/03 12:13

RFW Batch Number: 0304L100

Client: TNUHANFORD B01-054 H2131 Work Order: 11343606001 Page: 1

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Sample Information	RFW#:	Matrix:	D.F.:	Units:	J00KH2	J00KF7	J00KF7	J00KF7	J00KF7	J00KF8	J00KF9
					001	002	002 MS	002 MSD	003	004	
		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
		UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate: Tetrachloro-m-xylene	95	%	105	%	100	%	105	%	100	%	95
Decachlorobiphenyl	95	%	100	%	105	%	105	%	105	%	100
Aroclor-1016	33	U	35	U	103	%	109	%	35	U	35
Aroclor-1221	67	U	70	U	70	U	70	U	70	U	70
Aroclor-1232	33	U	35	U	35	U	35	U	35	U	35
Aroclor-1242	33	U	35	U	35	U	35	U	35	U	35
Aroclor-1248	33	U	35	U	35	U	35	U	35	U	35
Aroclor-1254	33	U	35	U	35	U	35	U	35	U	35
Aroclor-1260	33	U	35	U	102	%	109	%	35	U	35

Sample Information	RFW#:	Matrix:	D.F.:	Units:	J00KH0	J00KH1	PBLKPZ	PBLKPZ BS
		SOIL	SOIL	SOIL	005	006	03LE0386-MB1	03LE0386-MB1
		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		1.00	1.00	1.00	1.00	1.00	1.00	1.00
		UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate: Tetrachloro-m-xylene	105	%	90	%	95	%	95	%
Decachlorobiphenyl	115	%	100	%	95	%	100	%
Aroclor-1016	35	U	35	U	33	U	99	%
Aroclor-1221	70	U	70	U	67	U	67	U
Aroclor-1232	35	U	35	U	33	U	33	U
Aroclor-1242	35	U	35	U	33	U	33	U
Aroclor-1248	35	U	35	U	33	U	33	U
Aroclor-1254	35	U	35	U	33	U	33	U
Aroclor-1260	35	U	35	U	33	U	100	%

*Handwritten signature and date: 4/25/03*

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked.  
 %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. \*= Outside of EPA CLP QC

**Appendix 4**

**Laboratory Narrative and Chain-of-Custody Documentation**



**Analytical Report**

Client: TNU-HANFORD B01-054  
LVL #: 0304L100  
SDG/SAF #: H2131/B01-054

W.O. #: 11343-606-001-9999-00  
Date Received: 04-01-03

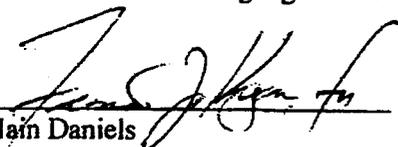
**PCB**

The set of samples consisted of six (6) solid samples collected on 03-27-03.

The samples and their associated QC samples were extracted on 04-02-03 and analyzed according to Lionville Laboratory OPs based on SW846, 3rd Edition procedures on 04-08-03. The extraction procedure was based on method 3540 and the extracts were analyzed based on method 8082.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
2. All required holding times for extraction and analysis have been met.
3. All samples and their associated QC samples received a Sulfuric Acid and a Sulfur cleanup.
4. The method blank was below the reporting limits for all target compounds.
5. All surrogate recoveries were within acceptance criteria.
6. All blank spike recoveries were within acceptance criteria.
7. All matrix spike recoveries were within acceptance criteria.
8. All initial calibrations associated with this data set were within acceptance criteria.
9. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.
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 data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated

  
Date

pcfr:\group\data\pest\tnu hanford\04L-100.pcb

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 7 pages.

000016



**Analytical Report**  
**\*\*REVISION\*\***

**Client:** TNU-HANFORD B01-054  
**LVL #:** 0304L100  
**SDG/SAF #** H2131/B01-054

**W.O. #:** 11343-606-001-9999-00  
**Date Received:** 04-01-2003

**PESTICIDE**

The narrative was revised to clarify the ".I" qualifier for sample J00KF9. See item 10.

Six (6) soil samples were collected on 03-27-2003.

The samples and their associated QC samples were extracted on 04-02-2003 and analyzed according to Lionville Laboratory OPs based on SW846, 3rd Edition procedures on 04-04-2003. The extraction procedure was based on method 3540 and the extracts were analyzed based on method 8081A.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LVL's sample acceptance policy.
2. The required holding time for extraction and analysis has been met.
3. The samples and their associated QC samples received a Florisil and Sulfur cleanup.
4. The method blank was below the reporting limits for all target compounds.
5. All surrogate recoveries were within acceptance criteria.
6. All blank spike recoveries were within acceptance criteria.
7. All matrix spike recoveries were within acceptance criteria.
8. All initial calibrations associated with this data set were within acceptance criteria.
9. All continuing calibration standards analyzed prior to sample extracts and the QC were exceeded on the RTX-CLP2 column; however, it was within acceptance criteria on RTX-35 column. Consequently, the results have been taken from RTX-35 column. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
10. Beta-BHC was reported in sample J00KF9 and flagged with an ".I". This means the compound was detected on the primary column, but could not be confirmed on the secondary column because of a coeluting peak.
11. 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.

  
 Ian Daniels  
 Laboratory Manager  
 Lionville Laboratory Incorporated

  
 Date

pe1&omv:group\data\pe1tnu hanford\0304-100.pes

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 9 pages.

**Bechtel Hanford Inc.** **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** **B01-054-017** **Page 1 of 2**

Collector: D. Shea **Telephone No. 521-6014** **Project Coordinator KESSNER, JH** **Price Code 8L** **Data Turnaround:**

**Project Designation** 100 BC Area Effluent Pipeline & Proximity Site Remediation **SAF No. B01-054** **Air Quality**  **21 Days**

**Ice Chest No. ERC 96001** **COA R607B72F00** **Method of Shipment FOD EX**

**Shipped To TMA/RECRA** **Offsite Property No. A030174** **Bill of Lading/Air Bill No. SREBSPC**

**POSSIBLE SAMPLE HAZARDS/REMARKS**

**Special Handling and/or Storage**

Sample No.	Matrix *	Sample Date	Sample Time	Preservation	Cool 4C	None	None						
J00KF7	SOIL	3/27/03	1223		G/P	G/P	aG	aG	aG	250g	60mL	500mL	60mL
J00KF8	SOIL		1244		G/P	G/P	aG	aG	aG	250g	60mL	500mL	60mL
J00KF9	SOIL		1221		G/P	G/P	aG	aG	aG	250g	60mL	500mL	60mL
J00KH0	SOIL		1221		G/P	G/P	aG	aG	aG	250g	60mL	500mL	60mL
J00KH1	SOIL		1400		G/P	G/P	aG	aG	aG	250g	60mL	500mL	60mL

**SAMPLE ANALYSIS**

See item (1) in Special Instructions: ICP Metals - 6010A (Add-on) (Chromium, Lead); Mercury - 7471 - (CV)

See item (2) in Special Instructions: PCBs - 8082 Pesticides - 8081

See item (3) in Special Instructions: Gross Alpha; Gross Beta

**CHAIN OF POSSESSION**

Relinquished By/Removed From: **DWS Hanford** **3/27/03** **1809** **Received By/Stored In: Friday 3A 3/27/03 1809**

Relinquished By/Removed From: **KCF 3A 33103** **1200** **Received By/Stored In: SIGNED/SLC 3/27/03 1300**

Relinquished By/Removed From: **3/27/03 1300** **Received By/Stored In: FOD EX**

Relinquished By/Removed From: **3/27/03 1300** **Received By/Stored In: D. JAMES 4:33 10:00**

Relinquished By/Removed From: **4-1-03 10:00** **Received By/Stored In:**

Relinquished By/Removed From: **Received By/Stored In:**

**SPECIAL INSTRUCTIONS**

(1) ICP Metals - 6010TR (Client List) (Arsenic, Barium, Cadmium, Selenium, Silver)

(2) Gamma Spectroscopy (TCL List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Silver-108 instable, Uranium-238)

**Matrix \***

- S-Solid
- SL-Sediment
- SO-Soil
- SI-Sludge
- W - Water
- O-OR
- A-Air
- DC-Dry Solids
- DL-Dry Liquids
- T-Tissue
- W-Water
- L-Liquid
- V-Vegetation
- X-Other

**LABORATORY SECTION** **Received By** **Title**

**FINAL SAMPLE DISPOSITION** **Disposal Method** **Disposed By** **Date/Time**

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

*Personnel not available to relinquish samples from the 3728 Ref # 5A on 2/11/03*

Collector: D. Shea  
 Project Designation: 100 B/C Area Effluent Pipeline & Proximity Site Remediation  
 Project Coordinator: KESSNER, JH  
 Price Code: 8L  
 Data Turnaround: 7-21 Days  
 Date: 3/27/03

Company Contact: D. Shea  
 Telephone No.: 521-6014  
 Project No.: B01-054  
 Air Quality: [ ]  
 Method of Shipment: FOD EX

Field Logbook No.: EL-1573  
 COA: R607B72F00  
 Offsite Property No.: A000 174  
 Bill of Lading/Air Bill No.: 5085 05PK

Special Handling and/or Storage:   
 SAMPLE ANALYSIS

Sample No.	Matrix *	Sample Date	Sample Time	Cool 4C	None	None						
100KH2	SOIL	3/27/03	1206	✓	✓	✓	✓	✓	✓	✓	✓	✓

Received By/Removed From	Date/Time	Received By/Stored In	Date/Time
W. Shea	3/27/03 10:00	Fridge 3A	3/27/03 1809
W. Shea	3/27/03 10:00	W. Shea	3/27/03 1300
W. Shea	3/27/03 10:00	FOD EX	
W. Shea	4-1-03 10:00	D. Shea	4-1-03 10:00

Special Instructions: (1) ICP Metals - 6010TR (Client List) (Arsenic, Barium, Cadmium, Selenium, Silver) (2) 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)

Personnel not available to relinquish samples from the 3728 Ref # SA on 1/27/07

Disposed By: [ ] Date/Time: [ ]

**Bechtel Hanford Inc.**  
 Collector: D. Shea  
 Project Location: 100 BC Area Effluent Pipeline & Proximity Site Remediation  
 Ice Chest No. *ERC 96 001*  
 Shipping To: *TMA/RECR*  
**CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST**  
 Company Contact: D. Shea, Telephone No. 521-6014  
 Project Coordinator: KESSNER, JH  
 Project Code: 8L  
 Date Turnaround: 21 Days  
 Air Quality:    
 Method of Shipment: *FEDEX*  
 COA: R607B72F00  
 Bill of Lading/AFR Bill No. *9805PC*

Offsite Property No. *A030174*  
 Field Notebook No. EL-1573  
 Sampling Location: 100 BC, 1607-B-7 Septic system  
 Field Notebook No. EL-1573  
 Method of Shipment: *FEDEX*

**POSSIBLE SAMPLE HAZARDS/REMARKS**

Special Handling and/or Storage

| Sample No. | Matrix * | Sample Date | Sample Time | Preservation | Cool #C | Notes |
|------------|----------|-------------|-------------|--------------|---------|---------|---------|---------|---------|---------|---------|---------|-------|
| J00KF7     | SOIL     | 32703       | 1223        |              | GP      | None  |
| J00KF8     | SOIL     | 32703       | 1244        |              | GP      | None  |
| J00KF9     | SOIL     | 32703       | 1321        |              | GP      | None  |
| J00KH0     | SOIL     | 92903       | 1321        |              | GP      | None  |
| J00KH1     | SOIL     | 32703       | 1400        |              | GP      | None  |

**SAMPLE ANALYSIS**

| Sample No. | Matrix * | Sample Date | Sample Time | Preservation | Cool #C | Notes |
|------------|----------|-------------|-------------|--------------|---------|---------|---------|---------|---------|---------|---------|---------|-------|
| J00KF7     | SOIL     | 32703       | 1223        |              | GP      | None  |
| J00KF8     | SOIL     | 32703       | 1244        |              | GP      | None  |
| J00KF9     | SOIL     | 32703       | 1321        |              | GP      | None  |
| J00KH0     | SOIL     | 92903       | 1321        |              | GP      | None  |
| J00KH1     | SOIL     | 32703       | 1400        |              | GP      | None  |

**CHAIN OF POSSESSION**

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
<i>Steve</i>	3/10/03 1300	<i>FEDEX</i>	
<i>Steve</i>	4/10/03 10:00	<i>Steve</i>	4/10/03 10:00

**SPECIAL INSTRUCTIONS**

(1) XCP Metals - 6010TR (China List) (Arsenic, Barium, Cadmium, Selenium, Silver)  
 (2) Gamma Spectroscopy (TCL List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Uranium-238)

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

**LABORATORY SECTION**

Received By: \_\_\_\_\_ Title: \_\_\_\_\_

**FINAL SAMPLE DISPOSITION**

Disposal Method: \_\_\_\_\_ Disposed By: \_\_\_\_\_ Date/Time: \_\_\_\_\_

201.1

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				DOI-954-017		Page 3 of 3			
Collector D. Shea		Company Contact D. Shea		Telephone No. 521-6014		Protect Coordinator KESSNER, JH		Price Code 8L		Data Turnaround 21 Days	
Project Designation 100 B/C Area Effluent Pipeline & Proximity Site Remediation		Sampling Location 100 BC, 1607-B-7 Septic system		Field Logbook No. EL-1573		SAF No. B01-054		Air Quality <input type="checkbox"/>			
Ice Chest No. SRC 96001		COA R607B72P00		Method of Shipment FOOD EX		Bill of Lading/Air Bill No. 82503PC					
Shipped To TMO/REGRA		Offsite Property No. A030174									
<p>POSSIBLE SAMPLE HAZARDS/REMARKS</p> <p>Special Handling and/or Storage</p> <p>SAMPLE ANALYSIS</p>											
Sample No.	Matrix *	Sample Date	Sample Time	Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Note
J00K12	SOIL	3/27/03	1206	GP	GP	GP	GP	GP	GP	GP	None
				No. of Containers	1	1	1	1	1	1	1
				Volume	120ml	120ml	120ml	120ml	120ml	120ml	60ml
				See item (1) in Special Instructions.	ICP Metals - 6010A (Add-on) (Chromium, Lead); Mercury - 7471 - (CV)	Chromium Hex - 7106	Semi-VOCs - 8210A (TCL)	Pesticides - 8011	PCBs - 9882	See item (2) in Special Instructions.	Crates Alpha; Orange Beta
<p>CHAIN OF POSSESSION</p> <p>Signature Names</p> <p>Received By/Removed From: <i>Stacy Hall</i> Date/Time: 3/31/03</p> <p>Received By/Removed From: <i>John Doe</i> Date/Time: 4-1-03 10:00</p> <p>Received By/Removed From: <i>J. Arnold</i> Date/Time: 4-1-03 10:00</p> <p>Received By/Removed From: _____ Date/Time: _____</p>											
<p>SPECIAL INSTRUCTIONS</p> <p>(1) ICP Metals - 6010TR (Client List) (Arsenic, Barium, Cadmium, Selenium, Silver)</p> <p>(2) Gamma Spectroscopy (TCL List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-157); Gamma Spec - Add-on (Americium-241, Uranium-238)</p>											
<p>LABORATORY SECTION</p> <p>Received By _____ Date/Time _____</p> <p>Disposal Method _____</p>											
<p>FINAL SAMPLE DISPOSITION</p> <p>Disposal Method _____</p>											
<p>BH-EE-011 (03/01/2002)</p>											

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**Appendix 5**

**Data Validation Supporting Documentation**

000022

**PESTICIDE/PCB DATA VALIDATION CHECKLIST**

VALIDATION LEVEL:	A	B	<b>C</b>	D	E
PROJECT:	1003c	1607-137	DATA PACKAGE: H2131		
VALIDATOR:	TLI	LAB: LLI	DATE: 4/25/03		
CASE:			SDG: H2131		
ANALYSES PERFORMED					
<b>SW-846 8081</b>	SW-846 8081 (TCLP)	<b>SW-846 8082</b>	SW-846 8081 (TCLP)		
SAMPLES/MATRIX					
J00KH2		J00KF7	J00KF8	J00KF9	
J00KH0		J00KH1			
					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 acceptable? ..... Yes No **N/A**  
 Continuing calibrations acceptable? ..... Yes No **N/A**  
 Standards traceable? ..... Yes No **N/A**  
 Standards expired? ..... Yes No **N/A**  
 Calculation check acceptable? ..... Yes No **N/A**  
 DDT and endrin breakdowns acceptable? ..... Yes No **N/A**

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

PESTICIDE/PCB DATA VALIDATION CHECKLIST

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

Calibration blanks analyzed? (Levels D, E) ..... Yes No  N/A  
Calibration blank 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/trip blanks analyzed? (Levels C, D, E) .....  Yes No N/A  
Field/trip 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)

Surrogates analyzed? .....  Yes No N/A  
Surrogate recoveries acceptable? .....  Yes No N/A  
Surrogates traceable? (Levels D, E) ..... Yes No  N/A  
Surrogates expired? (Levels D, E) ..... Yes No  N/A  
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 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

PESTICIDE/PCB 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: NO FS

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

6. SYSTEM PERFORMANCE (Levels D and E)

- Chromatographic performance acceptable? ..... Yes No  N/A
- Positive results resolved acceptably? ..... Yes No  N/A

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

7. HOLDING TIMES (all levels)

- Samples properly preserved? .....  Yes No N/A
- Sample holding times acceptable? .....  Yes No N/A

Comments: \_\_\_\_\_

Lab reported Interference J beta-BHC

FG

\_\_\_\_\_

\_\_\_\_\_

PESTICIDE/PCB DATA VALIDATION CHECKLIST

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

- Compound identification acceptable? (Levels D, E) ..... Yes No N/A
- Compound quantitation acceptable? (Levels D, E) ..... Yes No N/A
- Results reported for all requested analyses? ..... Yes No N/A
- Results 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 PCBs over  
KFZ, KFS, KFS, K140 K141 - pest all one  
H2 all but Dieldrin 44-DDD, Endrin  
methoxychlor, Endosulfan II, 4,4-DDD, Endosulfan  
+ toxaphene are Sulfate, 44-DDT, Endrin ketone, Endrin Hydrolyz,  
alpha + gamma chlorides, methoxychlor

9. SAMPLE CLEANUP (Levels D and E)

- Fluorilicil ® (or other absorbant) cleanup performed? ..... Yes No N/A
- Lot check performed? ..... Yes No N/A
- Check recoveries acceptable? ..... Yes No N/A
- GPC cleanup performed? ..... Yes No N/A
- GPC check performed? ..... Yes No N/A
- GPC check recoveries acceptable? ..... Yes No N/A
- GPC calibration performed? ..... Yes No N/A
- GPC calibration check performed? ..... Yes No N/A
- GPC calibration check retention times acceptable? ..... Yes No N/A
- Check/calibration materials traceable? ..... Yes No N/A
- Check/calibration materials Expired? ..... Yes No N/A
- Analytical batch QC given similar cleanup? ..... Yes No N/A
- Transcription/Calculation Errors? ..... Yes No N/A

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Initiator: Boya Santoro  
Date: 4/17/03  
Client: TUV

Batch: 0304100  
Samples: 91  
Method: SWB45MCAWW/CLPI

Parameter: 0605H  
Matrix: Soil  
Prep Batch: RLE0386

**1. Reason for SDR**

a. COC Discrepancy  Tech Profile Error  Client Request  Sampler Error on C-O-C  
 Transcription Error  Wrong Test Code  Other \_\_\_\_\_

**b. General Discrepancy**

Missing Sample/Extract  Container Broken  Wrong Sample Pulled  Label ID's Illegible  
 Hold Time Exceeded  Insufficient Sample  Preservation Wrong  Received Past Hold  
 Improper Bottle Type  Not Amenable to Analysis

Note: Verified by [Log-In] or [Prep Group] (circle) signature/date: \_\_\_\_\_

**c. Problem (Include all relevant specific results; attach data if necessary)**

① CCR'S prior to samples and AC were increased on the RTX-CLP2 column, OK on RTX-35. Results taken from RTX-35 column

**2. Known or Probable Causes(s)**

**3. Discussion and Proposed Action**

Other Description: Narrative

- Re-log
- Entire Batch
- Following Samples: \_\_\_\_\_
- Re-leach
- Re-extract
- Re-digest
- Revise EDD
- Change Test Code to \_\_\_\_\_
- Place On/Take Off Hold (circle)

*[Handwritten signature]* 4/17/03

**4. Project Manager Instructions...signature/date:**

- Concur with Proposed Action
- Disagree with Proposed Action; See Instruction
- Include in Case Narrative
- Client Contacted:
- Date/Person \_\_\_\_\_
- Add
- Cancel

**5. Final Action...signature/date:**

Other Explanation:

- Verified re-[log][leach][extract][digest][analysis] (circle)
- Included in Case Narrative
- Hard Copy COC Revised
- Electronic COC Revised
- EDD Corrections Completed

When Final Action has been recorded, forward original to QA Specialist for distribution and filing.

Route Distribution of Completed SDR

- X Initiator
- X Lab General Manager: M. Taylor
- X Project Mgr. Stone/Johnson/Haslett
- X Technical Mgr. Wesson/Daniels
- X QA (file)
- Data Management: Feldman
- Sample Prep: Beegle/Kiger

Route Distribution of Completed SDR

- Metals: Beegle
- Inorganic: Perrone
- GC/LC: Kiger
- MS: Rychlak/Layman
- Log-in: Melnic
- Admin: Soos
- Other: \_\_\_\_\_

Date: 25 April 2003  
To: Bechtel Hanford Inc. (technical representative)  
From: TechLaw, Inc.  
Project: 100-BC Area Effluent Pipeline & Proximity Site Remediation Activities -  
Full Protocol - Waste Site 1607-B7  
Subject: Semivolatile - Data Package No. H2131-LLI (SDG No. H2131)

## **INTRODUCTION**

This memo presents the results of data validation on Data Package No. H2131-LLI prepared by Lionville Laboratory Incorporated (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
J00KH2	3/27/03	Soil	C	See note 1
J00KF7	3/27/03	Soil	C	See note 1
J00KF8	3/27/03	Soil	C	See note 1
J00KF9	3/27/03	Soil	C	See note 1
J00KH0	3/27/03	Soil	C	See note 1
J00KH1	3/27/03	Soil	C	See note 1

1-Semivolatiles by 8270C.

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

000001

## DATA QUALITY OBJECTIVES

- **Holding Times**

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Water samples must be extracted within 7 days of the date of sample collection and analyzed within 40 days from the date of extraction.

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 met.

- **Method Blanks**

Method blank analyses are conducted 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. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".

Due to laboratory blank contamination, the bis(2-ethylhexyl)phthalate result in samples J00KH0 and J00KF7 were raised to the RDL, qualified as undetected and flagged "U".

All other method blank results were acceptable.

### Field Blanks

One equipment blank (J00KH2) was submitted for analysis. All field blank results were acceptable.

000002

- **Accuracy**

Matrix Spike/Matrix Spike Duplicate Recoveries

Matrix spike/matrix spike duplicate 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/matrix spike duplicate analyses are performed in duplicate using five compounds for which percent recoveries must be within a range of 50-150% or within laboratory control limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

All matrix spike/matrix spike duplicate results were acceptable.

Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the contract required quantitation limit (CRQL) are qualified as estimates and flagged "J". Sample results less than the CRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the CRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

All surrogate results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of +/-30%. If RPD values are out of specification and the sample concentration is less than five times the spike

concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All MS/MSD RPD results were acceptable.

#### Field Duplicate Samples

One set of field duplicate samples (J00KF9/J00KH0) were submitted for analysis. Field duplicate results are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the required detection limits (RDL's) to ensure that laboratory detection levels meet the required criteria. Seven analytes exceeded the RDL in all samples (2-nitroaniline, 2,4-dinitrophenol, 3-nitroaniline, 4-nitrophenol, 4-nitroaniline, 4,6-dinitro-2-methylphenol, pentachlorophenol and 2,4,5-trichlorophenol). Under the BHI statement of work, no qualification is required.

- **Completeness**

Data package No. H2131-LLI was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

#### **MAJOR DEFICIENCIES**

None found.

#### **MINOR DEFICIENCIES**

Due to laboratory blank contamination, the bis(2-ethylhexyl)phthalate result in samples J00KH0 and J00KF7 were raised to the RDL, qualified as undetected and flagged "U".

Seven analytes exceeded the RDL in all samples (2-nitroaniline, 2,4-dinitrophenol, 3-nitroaniline, 4-nitrophenol, 4-nitroaniline, 4,6-dinitro-2-methylphenol,

pentachlorophenol and 2,4,5-trichlorophenol). 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**

000006

Qualifiers which may be applied by data validators in compliance with the 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 same 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 quantitation limit is an estimate.
- 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 usable for decision-making purposes).

**Appendix 2**  
**Summary of Data Qualification**

000008

DATA QUALIFICATION SUMMARY

SDG: H2131	REVIEWER: TLI	DATE: 4/25/03	PAGE <u>1</u> OF <u>1</u>
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
bis(2-ethylhexyl)phthalate	U	J00KH0, J00KF7	Blank contamination

000009

**Appendix 3**

**Qualified Data Summary and Annotated Laboratory Reports**

000010





Sample Information	Surrogate	J00KH2	J00KH2	J00KH2	J00KF7	J00KF8	J00KF9
Matrix:	001 MS	001 MSD	002	003	004		
D.F.:	SOIL	SOIL	SOIL	SOIL	SOIL		
Units:	1.00 ug/Kg						
Nitrobenzene-d5	68 %	70 %	60 %	66 %	55 %	48 %	
2-Fluorobiphenyl	75 %	79 %	65 %	78 %	62 %	58 %	
Terphenyl-d14	105 %	108 %	90 %	113 %	80 %	85 %	
Phenol-d5	76 %	78 %	68 %	78 %	62 %	54 %	
2-Fluorophenol	81 %	81 %	70 %	82 %	65 %	56 %	
2,4,6-Tribromophenol	84 %	93 %	78 %	101 %	70 %	72 %	
Phenol	330 U	73 %	62 %	350 U	350 U	350 U	
bis(2-Chloroethyl)ether	330 U	330 U	330 U	350 U	350 U	350 U	
2-Chlorophenol	330 U	84 %	73 %	350 U	350 U	350 U	
1,3-Dichlorobenzene	330 U	330 U	330 U	350 U	350 U	350 U	
1,4-Dichlorobenzene	330 U	72 %	63 %	350 U	350 U	350 U	
1,2-Dichlorobenzene	330 U	330 U	330 U	350 U	350 U	350 U	
2-Methylphenol	330 U	330 U	330 U	350 U	350 U	350 U	
2,2'-oxybis(1-Chloropropane)	330 U	330 U	330 U	350 U	350 U	350 U	
3- and/or 4-Methylphenol	330 U	330 U	330 U	350 U	350 U	350 U	
N-Nitroso-di-n-propylamine	330 U	67 %	60 %	350 U	350 U	350 U	
Hexachloroethane	330 U	330 U	330 U	350 U	350 U	350 U	
Nitrobenzene	330 U	330 U	330 U	350 U	350 U	350 U	
Isophorone	330 U	330 U	330 U	350 U	350 U	350 U	
2-Nitrophenol	330 U	330 U	330 U	350 U	350 U	350 U	
2,4-Dimethylphenol	330 U	330 U	330 U	350 U	350 U	350 U	
bis(2-Chloroethoxy)methane	330 U	330 U	330 U	350 U	350 U	350 U	
2,4-Dichlorophenol	330 U	330 U	330 U	350 U	350 U	350 U	
1,2,4-Trichlorobenzene	330 U	70 %	57 %	350 U	350 U	350 U	
Naphthalene	330 U	330 U	330 U	350 U	350 U	350 U	
4-Chloroaniline	330 U	330 U	330 U	350 U	350 U	350 U	
Hexachlorobutadiene	330 U	330 U	330 U	350 U	350 U	350 U	
4-Chloro-3-methylphenol	330 U	84 %	70 %	350 U	350 U	350 U	
2-Methylnaphthalene	330 U	330 U	330 U	350 U	350 U	350 U	
Hexachlorocyclopentadiene	330 U	330 U	330 U	350 U	350 U	350 U	
2,4,6-Trichlorophenol	330 U	330 U	330 U	350 U	350 U	350 U	
2,4,5-Trichlorophenol	840 U	840 U	840 U	880 U	880 U	870 U	

*Handwritten signature and date:*  
 [Signature]  
 5/25/03

\* = Outside of EPA CLP QC limits.

RFW#:	001	001 MS	001 MSD	002	003	004
2-Chloronaphthalene	330 U	330 U	330 U	350 U	350 U	350 U
2-Nitroaniline	840 U	840 U	840 U	880 U	880 U	870 U
Dimethylphthalate	330 U	330 U	330 U	350 U	350 U	350 U
Acenaphthylene	330 U	330 U	330 U	350 U	350 U	350 U
2,6-Dinitrotoluene	330 U	330 U	330 U	350 U	350 U	350 U
3-Nitroaniline	840 U	840 U	840 U	880 U	880 U	870 U
Acenaphthene	330 U	82 %	65 %	350 U	350 U	350 U
2,4-Dinitrophenol	840 U	840 U	840 U	880 U	880 U	870 U
4-Nitrophenol	840 U	120 *	99 %	880 U	880 U	870 U
Dibenzofuran	330 U	330 U	330 U	350 U	350 U	350 U
2,4-Dinitrotoluene	330 U	89 %	73 %	350 U	350 U	350 U
Diethylphthalate	330 U	330 U	330 U	350 U	350 U	350 U
4-Chlorophenyl-phenylether	330 U	330 U	330 U	350 U	350 U	350 U
Fluorene	330 U	330 U	330 U	350 U	350 U	350 U
4-Nitroaniline	840 U	840 U	840 U	880 U	880 U	870 U
4,6-Dinitro-2-methylphenol	840 U	840 U	840 U	880 U	880 U	870 U
N-Nitrosodiphenylamine (1)	330 U	330 U	330 U	350 U	350 U	350 U
4-Bromophenyl-phenylether	330 U	330 U	330 U	350 U	350 U	350 U
Hexachlorobenzene	330 U	330 U	330 U	350 U	350 U	350 U
Pentachlorophenol	840 U	91 %	74 %	880 U	880 U	870 U
Phenanthrene	330 U	330 U	330 U	350 U	350 U	350 U
Anthracene	330 U	330 U	330 U	350 U	350 U	350 U
Carbazole	330 U	330 U	330 U	350 U	350 U	350 U
Di-n-butylphthalate	330 U	330 U	330 U	350 U	350 U	350 U
Fluoranthene	330 U	330 U	330 U	350 U	350 U	350 U
Pyrene	330 U	98 %	78 %	350 U	350 U	350 U
Butylbenzylphthalate	330 U	330 U	330 U	350 U	350 U	350 U
3,3'-Dichlorobenzidine	330 U	330 U	330 U	350 U	350 U	350 U
Benzo(a)anthracene	330 U	330 U	330 U	350 U	350 U	350 U
Chrysene	330 U	330 U	330 U	350 U	350 U	350 U
bis(2-Ethylhexyl)phthalate	330 U	450 B	330 U	350 U	350 U	350 U
Di-n-octyl phthalate	330 U	330 U	330 U	350 U	350 U	350 U
Benzo(b)fluoranthene	330 U	330 U	330 U	350 U	350 U	350 U
Benzo(k)fluoranthene	330 U	330 U	330 U	350 U	350 U	350 U
Benzo(a)pyrene	330 U	330 U	330 U	350 U	350 U	350 U
Indeno(1,2,3-cd)pyrene	330 U	330 U	330 U	350 U	350 U	350 U
Dibenz(a,h)anthracene	330 U	330 U	330 U	350 U	350 U	350 U
Benzo(g,h,i)perylene	330 U	330 U	330 U	350 U	350 U	350 U

330 U ~~330 U~~ <sup>4/24/82</sup> JB/A

(1) - Cannot be separated from Diphenylamine. \* = Outside of EPA CLP QC limits.

Sample Information: RFW#: 005 SOIL 1.00 ug/Kg  
 Matrix: SOIL 1.00 ug/Kg  
 D.F.: 1.00  
 Units: ug/Kg

Surrogate	59 %	68 %	96 %	68 %	73 %	85 %	58 %	68 %	98 %	66 %	70 %	85 %	75 %	83 %	113 %	84 %	88 %	94 %	59 %	67 %	97 %	67 %	68 %	90 %
Nitrobenzene-d5	350 U																							
2-Fluorobiphenyl	350 U																							
Terphenyl-d14	350 U																							
Phenol-d5	350 U																							
2-Fluorophenol	350 U																							
2,4,6-Tribromophenol	350 U																							
Phenol	350 U																							
bis(2-Chloroethyl) ether	350 U																							
2-Chlorophenol	350 U																							
1,3-Dichlorobenzene	350 U																							
1,4-Dichlorobenzene	350 U																							
1,2-Dichlorobenzene	350 U																							
2-Methylphenol	350 U																							
2,2'-oxybis(1-Chloropropane)	350 U																							
3- and/or 4-Methylphenol	350 U																							
N-Nitroso-di-n-propylamine	350 U																							
Hexachloroethane	350 U																							
Nitrobenzene	350 U																							
Isophorone	350 U																							
2-Nitrophenol	350 U																							
2,4-Dimethylphenol	350 U																							
bis(2-Chloroethoxy) methane	350 U																							
2,4-Dichlorophenol	350 U																							
1,2,4-Trichlorobenzene	350 U																							
Naphthalene	350 U																							
4-Chloroaniline	350 U																							
Hexachlorobutadiene	350 U																							
4-Chloro-3-methylphenol	350 U																							
2-Methylnaphthalene	350 U																							
Hexachlorocyclopentadiene	350 U																							
2,4,6-Trichlorophenol	350 U																							
2,4,5-Trichlorophenol	880 U																							

\* = Outside of EPA CLP QC limits.

*R*  
 4/25/04

6

*Handwritten:* 4/25/03

Chemical Name	005	006	03LE0388-MB1	03LE0388-MB1
2-Chloronaphthalene	350 U	350 U	330 U	330 U
2-Nitroaniline	880 U	870 U	840 U	840 U
Dimethylphthalate	350 U	350 U	330 U	330 U
Acenaphthylene	350 U	350 U	330 U	330 U
2,6-Dinitrotoluene	350 U	350 U	330 U	330 U
3-Nitroaniline	880 U	870 U	840 U	840 U
Acenaphthene	350 U	350 U	330 U	68 %
2,4-Dinitrophenol	880 U	870 U	840 U	840 U
4-Nitrophenol	880 U	870 U	840 U	101 %
Dibenzofuran	350 U	350 U	330 U	330 U
2,4-Dinitrotoluene	350 U	350 U	330 U	79 %
Diethylphthalate	350 U	350 U	330 U	330 U
4-Chlorophenyl-phenylether	350 U	350 U	330 U	330 U
Fluorene	350 U	350 U	330 U	330 U
4-Nitroaniline	880 U	870 U	840 U	840 U
4,6-Dinitro-2-methylphenol	880 U	870 U	840 U	840 U
N-Nitrosodiphenylamine (1)	350 U	350 U	330 U	330 U
4-Bromophenyl-phenylether	350 U	350 U	330 U	330 U
Hexachlorobenzene	350 U	350 U	330 U	330 U
Pentachlorophenol	880 U	870 U	840 U	86 %
Phenanthrene	350 U	350 U	330 U	330 U
Anthracene	350 U	350 U	330 U	330 U
Carbazole	350 U	350 U	330 U	330 U
Di-n-butylphthalate	350 U	350 U	330 U	330 U
Fluoranthene	350 U	350 U	330 U	330 U
Pyrene	350 U	350 U	330 U	87 %
Butylbenzylphthalate	350 U	350 U	330 U	330 U
3,3'-Dichlorobenzidine	350 U	350 U	330 U	330 U
Benzo(a)anthracene	350 U	350 U	330 U	330 U
Chrysene	350 U	350 U	330 U	330 U
bis(2-Ethylhexyl)phthalate	330 U	350 U	350 U	220 JB
Di-n-octyl phthalate	350 U	350 U	330 U	330 U
Benzo(b)fluoranthene	350 U	350 U	330 U	330 U
Benzo(k)fluoranthene	350 U	350 U	330 U	330 U
Benzo(a)pyrene	350 U	350 U	330 U	330 U
Indeno(1,2,3-cd)pyrene	350 U	350 U	330 U	330 U
Dibenz(a,h)anthracene	350 U	350 U	330 U	330 U
Benzo(g,h,i)perylene	350 U	350 U	330 U	330 U

(1) - Cannot be separated from Diphenylamine. \* = Outside of EPA CLP QC limits.

000000

**Appendix 4**

**Laboratory Narrative and Chain-of-Custody Documentation**

000017



Client: TNU-HANFORD B01-054  
LVL #: 0304L100  
SDG/SAF # H2131/B01-054

W.O. #: 11343-606-001-9999-00  
Date Received: 04-01-2003

### SEMIVOLATILE

Six (6) soil samples were collected on 03-27-2003.

The samples and their associated QC samples were extracted according to Lionville Laboratory OPs based on method 3550 on 04-02-2003 and analyzed according to criteria set forth in Lionville Laboratory OPs based on SW 846 Method 8270C for TCL Semivolatile target compounds on 04-08,09-2003.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
2. Samples were extracted and analyzed within required holding time.
3. Non-target compounds were detected in the samples.
4. All surrogate recoveries were within EPA QC limits.
5. One (1) of twenty-two (22) matrix spike recoveries was outside EPA QC limits.
6. All blank spike recoveries were within EPA QC limits.
7. The method blank contained the common laboratory contaminant Bis (2-Ethylhexyl) phthalate at a level less than 2x the CRQL.
8. Internal standard area and retention time criteria were met.
9. Manual integrations are performed according to OP 21-06A-125 to produce quality data with the utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in the Glossary ("Technical Flags For Manual Integration").
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 data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

J. Michael Taylor  
President  
Lionville Laboratory Incorporated

04-11-03  
Date

som\group\data\bna\tnu-hanford-0304-100.doc

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 1-8 pages.

23 05/11/03 000018

02



Collector: D. Shea  
 Project Designation: 100 B/C Area Effluent Pipeline & Proximity Site Remediation  
 Project Coordinator: KESSNER, JH  
 Price Code: 8L  
 Data Turnaround: 7 M Days plus 3/27/03  
 Telephone No.: 521-6014  
 SAF No.: B01-054  
 Air Quality: [ ]  
 Method of Shipment: FOD EX  
 COA: R607B72F00  
 Field Logbook No.: EL-1573  
 Bill of Lading/Air Bill No.: 5085 05PC

Offsite Property No.: A070 174  
 POSSIBLE SAMPLE HAZARDS/REMARKS  
 Special Handling and/or Storage

Sample No.	Matrix *	Sample Date	Sample Time	Preservation	Cool 4C	None	None						
100KH2	SOIL	3/27/03	1206		G/P	G/P	G/P	120mL	60mL	250g	120g	300mL	60mL

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010TR (Client List) (Arsenic, Barium, Cadmium, Selenium, Silver)  
 (2) 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)

Matrix \*

- S=Soil
- SE=Soil/Element
- SO=Soil
- SL=Sludge
- W=Water
- O=Oil
- A=Air
- DE=Drum Solids
- DL=Drum Liquids
- T=Trash
- W=Wipe
- L=Liquid
- V=Vegetation
- X=Other

CHAIN OF POSSESSION

Received By/Removed From	Date/Time	Received By/Stored In	Date/Time
W. Shea	3/27/03 1207	F. Price	3/27/03 1809
REF 3A	33103 000	W. Shea	3/27/03 1300
W. Shea	33103 1300	FOD EX	
W. Shea	4-03-10:00	D. Price	4-03-10:00
W. Shea			
W. Shea			

Personnel not available to relinquish samples from the 3728 Ref # 3A on 3/27/07

Disposed By: \_\_\_\_\_ Date/Time: \_\_\_\_\_

**Appendix 5**

**Data Validation Supporting Documentation**

000021

**GC/MS ORGANIC DATA VALIDATION CHECKLIST**

VALIDATION LEVEL:	A	B	<b>C</b>	D	E
PROJECT:	100BC	1607-B7	DATA PACKAGE: H2131		
VALIDATOR:	FLI	LAB: LLI	DATE: 4/25/03		
CASE:			SDG: H2131		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	<b>SW-846 8270</b>		SW-846 8270 (TCLP)
SAMPLES/MATRIX					
J00KH2 J00KF7 J00KF8 J00KF9					
J00KH0 J00KH1					
soil					

**1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE**

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

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)**

GC/MS tuning/performance check acceptable? ..... Yes No **N/A**  
 Initial calibrations acceptable? ..... Yes No **N/A**  
 Continuing calibrations 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: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

GC/MS ORGANIC DATA VALIDATION CHECKLIST

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

Calibration blanks analyzed? (Levels D, E) ..... Yes No  N/A  
Calibration blank 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/trip blanks analyzed? (Levels C, D, E) .....  Yes No N/A  
Field/trip blank results acceptable? (Levels C, D, E) .....  Yes No N/A  
Transcription/calculation errors? (Levels D, E) ..... Yes No  N/A  
Comments: bis(2-ethylhexyl) phthalate - He/F7 - to PDL + U

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

Surrogates/system monitoring compounds analyzed? .....  Yes No N/A  
Surrogate/system monitoring compound recoveries acceptable? .....  Yes No N/A  
Surrogates traceable? (Levels D, E) ..... Yes No  N/A  
Surrogates expired? (Levels D, E) ..... Yes No  N/A  
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? (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

GC/MS ORGANIC DATA VALIDATION CHECKLIST

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

- MS/MSD samples analyzed? .....  Yes No N/A
- MS/MSD RPD values 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. SYSTEM PERFORMANCE (Levels D and E)

- Internal standards analyzed? ..... Yes No  N/A
- Internal standard areas acceptable? ..... Yes No  N/A
- Internal standard retention times 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: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

7. HOLDING TIMES (all levels)

- Samples properly preserved? .....  Yes No N/A
- Sample holding times acceptable? .....  Yes No N/A

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

GC/MS ORGANIC DATA VALIDATION CHECKLIST

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E) ..... Yes No N/A  
Compound quantitation acceptable? (Levels D, E) ..... Yes No N/A  
Results reported for all requested analyses? ..... Yes No N/A  
Results supported in the raw data? (Levels D, E) ..... Yes No N/A  
Samples properly prepared? (Levels D, E) ..... Yes No N/A  
Laboratory properly identified and coded all TIC? (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 *4/29/02*  
Comments: all are high <sup>1110</sup>H<sub>2</sub> - 2-nitrophenol, 2-nitroaniline  
2,4-dinitrophenol, 4-nitrophenol, 4-nitroaniline, 4,6-dinitro-2-  
methylphenol, pentachlorophenol, 2,4,5-trichlorophenol are  
in all  
all 2-nitrophenol ok

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed? ..... Yes No N/A  
GPC check performed? ..... Yes No N/A  
GPC check recoveries acceptable? ..... Yes No N/A  
GPC calibration performed? ..... Yes No N/A  
GPC calibration check performed? ..... Yes No N/A  
GPC calibration check retention times acceptable? ..... Yes No N/A  
Check/calibration materials traceable? ..... Yes No N/A  
Check/calibration materials Expired? ..... Yes No N/A  
Analytical batch QC given similar cleanup? ..... Yes No N/A  
Transcription/Calculation Errors? ..... Yes No N/A  
Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Date: 25 April 2003  
To: Bechtel Hanford, Inc. (technical representative)  
From: TechLaw, Inc.  
Project: 100-BC Area Effluent Pipeline & Proximity Site Remediation Activities - Full Protocol - Waste Site 1607-B7  
Subject: Radiochemistry - Data Package No. H2131-EB (SDG No. H2131)

## INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H2131-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
J00KH2	3/27/03	Soil	C	See note 1
J00KF7	3/27/03	Soil	C	See note 1
J00KF8	3/27/03	Soil	C	See note 1
J00KF9	3/27/03	Soil	C	See note 1
J00KH0	3/27/03	Soil	C	See note 1
J00KH1	3/27/03	Soil	C	See note 1

1- Gamma spectroscopy, gross alpha & beta.

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

000001

## DATA QUALITY PARAMETERS

- **Holding Times**

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

All holding times were acceptable.

- **Preparation (Method) Blanks**

### Laboratory Blanks

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

All blank results were acceptable.

### Field (Equipment) Blank

One equipment blank (J00KH2) was submitted for analysis. Potassium-40 and thorium-228 were detected in the equipment blank. Under the BHI statement of work, no qualification is required.

- **Accuracy**

Accuracy is evaluated from laboratory control sample (LCS) or blank spike sample (BSS) batch samples and spiked samples from the analytical batch. Measured activities are compared to the known added amounts. The acceptable LCS or BSS and matrix spike (MS) recovery range is either 70-130% or  $\pm 3$  sigma (gamma spectroscopy). 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. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, or not qualified, depending on the activity of the

individual sample. Results are rejected for LCS/BSS recoveries of less than 30% or  $\pm 3$  sigma.

All accuracy results were acceptable.

- **Laboratory Duplicates**

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

All duplicate results were acceptable.

Field Duplicate

One set of field duplicate samples (JOOKF9/JOOKH0) were submitted for analysis. Field duplicate results are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **Detection Levels**

Reported analytical detection levels for undetected analytes are compared against the target detection limits (TDLs) to ensure that laboratory detection levels meet the required criteria. Thirty-two analytes were reported above their TDL. Under the BHI statement of work, no qualification is required. All other reported results met the analyte specific TDL.

- **Completeness**

Data package No. H2131 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%.

000003

## MAJOR DEFICIENCIES

None found.

## MINOR DEFICIENCIES

Thirty-eight analytes were reported above their TDL. 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.

000004

**Appendix 1**

**Glossary of Data Reporting Qualifiers**

000005 *for*  
3/1/02

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.

000006

**Appendix 2**  
**Summary of Data Qualification**

000007

DATA QUALIFICATION SUMMARY

SDG: H2131	REVIEWER: TLI	DATE: 4/25/03	PAGE <u>1</u> OF <u>1</u>
COMMENTS: No qualifiers assigned			

**Appendix 3**

**Qualified Data Summary and Annotated Laboratory Reports**

Project: BECHTEL-HANFORD		J00KH2		J00KH1	
Laboratory: EB		SDG: H2131		Duplicate	
Sample Number	Remarks	1607-B7	1607-B7	1607-B7	1607-B7
Location	Sample Date	3/27/03	3/27/03	3/27/03	3/27/03
Radiochemistry	TDL	Result	Q	Result	Q
Gross alpha		3.15	U	5.34	U
Gross beta		5.03	U	17.8	U
Potassium-40		2.52	U	8.24	U
Cobalt 60	0.05	U	U*	U	U*
Cesium 137	0.05	U	U*	U	U*
Radium-226		0.083	U	0.317	U
Radium-228		U	U	0.516	U
Europium 152	0.1	U	U*	U	U*
Europium 154	0.1	U	U*	U	U*
Europium 155	0.1	U	U*	U	U*
Thorium-228		0.181	U	0.423	U
Thorium-232		U	U	0.516	U
Uranium-235	1	U	U	U	U
Uranium-238	1	U	U*	U	U*
Americium-241	1	U	U	U	U

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

000010

**EBERLINE SERVICES / RICHMOND**  
**SAMPLE DELIVERY GROUP H2131**

7471-001

J00KF7

**DATA SHEET**

SDG <u>7471</u>	Client/Case no <u>Hanford</u>	SDG <u>H2131</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R304008-01</u>	Client sample id <u>J00KF7</u>	
Dept sample id <u>7471-001</u>	Location/Matrix <u>100 BC, 1607-B-7 Septic SOLID</u>	
Received <u>04/01/03</u>	Collected/Weight <u>03/27/03 12:23 902.5 g</u>	
% solids <u>95.4</u>	Custody/SAF No <u>B01-054-017 B01-054</u>	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Gross Alpha	12587-46-1	5.34	4.2	4.7	10		93A
Gross Beta	12587-47-2	17.8	4.3	5.5	15		93B
Potassium 40	13966-00-2	8.24	0.93	0.59			GAM
Cobalt 60	10198-40-0	U		0.050	0.050	U	GAM
Cesium 137	10045-97-3	U		0.053	0.10	U	GAM
Radium 226	13982-63-3	0.317	0.087	0.090			GAM
Radium 228	15262-20-1	0.516	0.20	0.19			GAM
Europium 152	14683-23-9	U		<u>0.12</u>	0.10	U	GAM
Europium 154	15585-10-1	U		<u>0.17</u>	0.10	U	GAM
Europium 155	14391-16-3	U		<u>0.12</u>	0.10	U	GAM
Thorium 228	14274-82-9	0.423	0.057	0.053			GAM
Thorium 232	TH-232	0.516	0.20	0.19			GAM
Uranium 235	15117-96-1	U		0.16		U	GAM
Uranium 238	U-238	U		7.5		U	GAM
Americium 241	14596-10-2	U		0.12		U	GAM

100 B/C Area Effluent Pipe. & Prox.

*Handwritten:*  
 4/25/03

000011

Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>04/08/03</u>

EBERLINE SERVICES / RICHMOND  
SAMPLE DELIVERY GROUP H2131

7471-002

J00KF8

DATA SHEET

SDG <u>7471</u>	Client/Case no <u>Hanford</u>	SDG <u>H2131</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R304008-02</u>	Client sample id <u>J00KF8</u>	
Dept sample id <u>7471-002</u>	Location/Matrix <u>100 BC, 1607-B-7 Septic</u>	<u>SOLID</u>
Received <u>04/01/03</u>	Collected/Weight <u>03/27/03 12:44</u>	<u>929.6 g</u>
% solids <u>95.3</u>	Custody/SAF No <u>B01-054-017</u>	<u>B01-054</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Gross Alpha	12587-46-1	5.26	4.3	4.9	10		93A
Gross Beta	12587-47-2	13.0	4.2	5.8	15		93B
Potassium 40	13966-00-2	7.85	1.6	1.0			GAM
Cobalt 60	10198-40-0	U		<u>0.11</u>	0.050	U	GAM
Cesium 137	10045-97-3	U		0.097	0.10	U	GAM
Radium 226	13982-63-3	0.366	0.13	0.14			GAM
Radium 228	15262-20-1	0.761	0.34	0.31			GAM
Europium 152	14683-23-9	U		<u>0.24</u>	0.10	U	GAM
Europium 154	15585-10-1	U		<u>0.28</u>	0.10	U	GAM
Europium 155	14391-16-3	U		<u>0.20</u>	0.10	U	GAM
Thorium 228	14274-82-9	0.501	0.13	0.15			GAM
Thorium 232	TH-232	0.761	0.34	0.31			GAM
Uranium 235	15117-96-1	U		0.33		U	GAM
Uranium 238	U-238	U		13		U	GAM
Americium 241	14596-10-2	U		0.22		U	GAM

100 B/C Area Effluent Pipe. & Prox.

*Handwritten:*  
4/25/03

000012

Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>04/08/03</u>

**EBERLINE SERVICES / RICHMOND**  
**SAMPLE DELIVERY GROUP H2131**

7471-003

J00KF9

**DATA SHEET**

SDG <u>7471</u>	Client/Case no <u>Hanford</u>	SDG <u>H2131</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R304008-03</u>	Client sample id <u>J00KF9</u>	
Dept sample id <u>7471-003</u>	Location/Matrix <u>100 BC, 1607-B-7 Septic SOLID</u>	
Received <u>04/01/03</u>	Collected/Weight <u>03/27/03 13:21 875.5 g</u>	
% solids <u>95.8</u>	Custody/SAF No <u>B01-054-017 B01-054</u>	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Gross Alpha	12587-46-1	4.43	4.3	5.5	10	U	93A
Gross Beta	12587-47-2	17.6	5.0	6.9	15		93B
Potassium 40	13966-00-2	9.52	1.5	0.80			GAM
Cobalt 60	10198-40-0	U		<u>0.085</u>	0.050	U	GAM
Cesium 137	10045-97-3	U		0.096	0.10	U	GAM
Radium 226	13982-63-3	0.401	0.13	0.13			GAM
Radium 228	15262-20-1	0.785	0.37	0.32			GAM
Europium 152	14683-23-9	U		<u>0.21</u>	0.10	U	GAM
Europium 154	15585-10-1	U		<u>0.30</u>	0.10	U	GAM
Europium 155	14391-16-3	U		<u>0.20</u>	0.10	U	GAM
Thorium 228	14274-82-9	0.440	0.079	0.085			GAM
Thorium 232	TH-232	0.785	0.37	0.32			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		0.21		U	GAM

100 B/C Area Effluent Pipe. & Prox.

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4/25/07

000013

Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>04/08/03</u>

**EBERLINE SERVICES / RICHMOND**  
**SAMPLE DELIVERY GROUP H2131**

7471-004

J00KH0

**DATA SHEET**

SDG <u>7471</u>	Client/Case no <u>Hanford</u>	<u>SDG H2131</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R304008-04</u>	Client sample id <u>J00KH0</u>	
Dept sample id <u>7471-004</u>	Location/Matrix <u>100 BC, 1607-B-7 Septic</u>	<u>SOLID</u>
Received <u>04/01/03</u>	Collected/Weight <u>03/27/03 13:21</u>	<u>949.7 g</u>
% solids <u>95.9</u>	Custody/SAF No <u>B01-054-017</u>	<u>B01-054</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Gross Alpha	12587-46-1	6.59	4.7	5.3	10		93A
Gross Beta	12587-47-2	16.6	4.4	5.8	15		93B
Potassium 40	13966-00-2	9.08	0.81	0.36			GAM
Cobalt 60	10198-40-0	U		0.048	0.050	U	GAM
Cesium 137	10045-97-3	U		0.044	0.10	U	GAM
Radium 226	13982-63-3	0.328	0.094	0.089			GAM
Radium 228	15262-20-1	0.629	0.20	0.19			GAM
Europium 152	14683-23-9	U		<u>0.11</u>	0.10	U	GAM
Europium 154	15585-10-1	U		<u>0.16</u>	0.10	U	GAM
Europium 155	14391-16-3	U		<u>0.11</u>	0.10	U	GAM
Thorium 228	14274-82-9	0.502	0.053	0.048			GAM
Thorium 232	TH-232	0.629	0.20	0.19			GAM
Uranium 235	15117-96-1	U		0.14		U	GAM
Uranium 238	U-238	U		5.6		U	GAM
Americium 241	14596-10-2	U		0.10		U	GAM

100 B/C Area Effluent Pipe. & Prox.

*4/25/03*  
*pe*

000014

Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>04/08/03</u>

**EBERLINE SERVICES / RICHMOND**  
**SAMPLE DELIVERY GROUP H2131**

7471-005

J00KH1

**DATA SHEET**

SDG <u>7471</u>	Client/Case no <u>Hanford</u>	SDG <u>H2131</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R304008-05</u>	Client sample id <u>J00KH1</u>	
Dept sample id <u>7471-005</u>	Location/Matrix <u>100 BC, 1607-B-7 Septic SOLID</u>	
Received <u>04/01/03</u>	Collected/Weight <u>03/27/03 14:00 962.8 g</u>	
% solids <u>95.5</u>	Custody/SAF No <u>B01-054-017 B01-054</u>	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Gross Alpha	12587-46-1	3.67	4.6	6.1	10	U	93A
Gross Beta	12587-47-2	18.3	5.1	7.2	15		93B
Potassium 40	13966-00-2	9.49	1.1	0.63			GAM
Cobalt 60	10198-40-0	U		<u>0.055</u>	0.050	U	GAM
Cesium 137	10045-97-3	U		0.057	0.10	U	GAM
Radium 226	13982-63-3	0.321	0.087	0.089			GAM
Radium 228	15262-20-1	0.608	0.22	0.19			GAM
Europium 152	14683-23-9	U		<u>0.12</u>	0.10	U	GAM
Europium 154	15585-10-1	U		<u>0.20</u>	0.10	U	GAM
Europium 155	14391-16-3	U		<u>0.13</u>	0.10	U	GAM
Thorium 228	14274-82-9	0.494	0.060	0.056			GAM
Thorium 232	TH-232	0.608	0.22	0.19			GAM
Uranium 235	15117-96-1	U		0.17		U	GAM
Uranium 238	U-238	U		7.3		U	GAM
Americium 241	14596-10-2	U		0.12		U	GAM

100 B/C Area Effluent Pipe. & Prox.

*4/25/03*  
*K*

Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>04/08/03</u>

000015

**EBERLINE SERVICES / RICHMOND**  
**SAMPLE DELIVERY GROUP H2131**

7471-006

J00KH2

**DATA SHEET**

SDG <u>7471</u>	Client/Case no <u>Hanford</u>	<u>SDG H2131</u>
Contact <u>Melissa C. Mannion</u>	Contract <u>No. 630</u>	
Lab sample id <u>R304008-06</u>	Client sample id <u>J00KH2</u>	
Dept sample id <u>7471-006</u>	Location/Matrix <u>100 BC, 1607-B-7 Septic</u>	<u>SOLID</u>
Received <u>04/01/03</u>	Collected/Weight <u>03/27/03 12:06</u>	<u>1027 g</u>
% solids <u>99.9</u>	Custody/SAF No <u>B01-054-017</u>	<u>B01-054</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Gross Alpha	12587-46-1	3.15	2.9	3.8	10	U	93A
Gross Beta	12587-47-2	5.03	3.7	5.9	15	U	93B
Potassium 40	13966-00-2	2.52	0.72	0.44			GAM
Cobalt 60	10198-40-0	U		<u>0.065</u>	0.050	U	GAM
Cesium 137	10045-97-3	U		0.050	0.10	U	GAM
Radium 226	13982-63-3	0.083	0.071	0.092		U	GAM
Radium 228	15262-20-1	U		0.31		U	GAM
Europium 152	14683-23-9	U		<u>0.14</u>	0.10	U	GAM
Europium 154	15585-10-1	U		<u>0.19</u>	0.10	U	GAM
Europium 155	14391-16-3	U		<u>0.13</u>	0.10	U	GAM
Thorium 228	14274-82-9	0.181	0.076	0.081			GAM
Thorium 232	TH-232	U		0.31		U	GAM
Uranium 235	15117-96-1	U		0.21		U	GAM
Uranium 238	U-238	U		6.8		U	GAM
Americium 241	14596-10-2	U		0.13		U	GAM

100 B/C Area Effluent Pipe. & Prox.

*4/25/03*  
*✓*

000016

Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>04/08/03</u>

**Appendix 4**

**Laboratory Narrative and Chain-of-Custody Documentation**

000017

**1.0 GENERAL**

Bechtel Hanford Inc. (BHI) Sample Delivery Group H2131 was composed of six solid (soil) samples designated under SAF No. B01-054 with a Project Designation of: 100 B/C Area Effluent Pipeline & Proximity Site Remediation, 1607-B-7 Septic System.

The samples were received as stated on the Chain-of-Custody document. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist. The results were transmitted to BHI via e-Fax on April 8, 2003. The electronic data deliverable (EDD) was transmitted to BHI via e-mail on April 8, 2003.

**2.0 ANALYSIS NOTES**

**2.1 Gross Alpha and Gross Beta Analyses**

No problems were encountered during the course of the analyses.

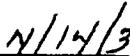
**2.2 Gamma Spectroscopy Analyses**

No problems were encountered during the course of the analyses.

**Case Narrative Certification Statement**

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

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

  
\_\_\_\_\_  
Date

**Bechtel Hanford Inc.**  
 Collector: D. Shea  
 Project Designation: 100 B/C Area Effluent Pipeline & Proximity Site Remediation  
 Ice Chest No.: *ERC 02 00 2*  
 Shipper To: *TMA/ECRA*  
 POSSIBLE SAMPLE HAZARDS/REMARKS

**CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST**  
 Company Contact: D. Shea, Telephone No. 521-6014  
 Project Coordinator: KESSNER, JH  
 Price Code: 8L  
 Data Turnaround: 7 Days  
 Air Quality:  *MS 3/22/03*  
 Method of Shipment: *FED EX*  
 Bill of Lading/Air Bill No.: *200 05PC*  
 Sampling Location: 100 BC, 1607-B-7 Septic system  
 Field Logbook No.: EL-1573  
 COA: R607B72F00  
 Onsite Property No.: *A030789*

**SAMPLE ANALYSIS**

Sample No.	Matrix *	Sample Date	Sample Time	Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None
J00KF7	SOIL	<i>3/27/03</i>	<i>1223</i>		G/P	120ml	Chromium Hex - 196	60ml	G/P	1	1	500mL	None
J00KF8	SOIL		<i>1244</i>		G/P	120ml	ICP Metals - 6010A Add-on (Chromium, Lead, Mercury - 747) - (CV)	60ml	G/P	1	1	500mL	G/P
J00KF9	SOIL		<i>1321</i>		G/P	120ml	Chromium Hex - 196	60ml	G/P	1	1	500mL	G/P
J00KH0	SOIL		<i>1321</i>		G/P	120ml	Chromium Hex - 196	60ml	G/P	1	1	500mL	G/P
J00KH1	SOIL		<i>1400</i>		G/P	120ml	Chromium Hex - 196	60ml	G/P	1	1	500mL	G/P

**CHAIN OF POSSESSION**

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
<i>Dwight Ruster</i>	<i>3/27/03 0807</i>	<i>Fridge</i>	<i>3/27/03 1809</i>
<i>REST 38</i>	<i>3/30/03 1300</i>	<i>Stone</i>	<i>3/30/03 1300</i>
<i>Stone</i>	<i>3/30/03 1300</i>	<i>FED EX</i>	<i>3/30/03 1300</i>
<i>FED EX</i>	<i>3/30/03 1300</i>	<i>Stone</i>	<i>3/30/03 1300</i>

**SPECIAL INSTRUCTIONS**  
 (1) ICP Metals - 6010TR (Client List) (Arsenic, Barium, Cadmium, Selenium, Silver)  
 (2) Gamma Spectroscopy (TCL List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155), Gamma Spec - Add-on (Americium-241, Silver-108, Uranium-238)  
*DWS 3/27/03*

Personnel not available to repackage samples from the 3728 Ref # *3728 on 3/21/03*

**LABORATORY SECTION**  
 Received By: \_\_\_\_\_ Date/Time: \_\_\_\_\_  
 Disposal Method: \_\_\_\_\_ Date/Time: \_\_\_\_\_

**FINAL SAMPLE DISPOSITION**  
 Disposed By: \_\_\_\_\_ Date/Time: \_\_\_\_\_



**Appendix 5**

**Data Validation Supporting Documentation**

**000021**

## APPENDIX A

### RADIOCHEMICAL DATA VALIDATION CHECKLIST

#### RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	<u>C</u>	D	E
PROJECT:	100-BC	1607-57	DATA PACKAGE: H 2131		
VALIDATOR:	TLI	LAB: LLI	DATE: 4/25/03		
CASE:			SDG: H2131		
ANALYSES PERFORMED					
<input checked="" type="checkbox"/> Gross Alpha/Beta	<input type="checkbox"/> Strontium-90	<input type="checkbox"/> Technetium-99	<input type="checkbox"/> Alpha Spectroscopy	<input checked="" type="checkbox"/> Gamma Spectroscopy	
<input type="checkbox"/> Total Uranium	<input type="checkbox"/> Radium-22	<input type="checkbox"/> Tritium			
SAMPLES/MATRIX					
J00KH2    J00KF7    J00KF8    J00KF9					
J00KH0    J00KH1					
Jail					

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

**Appendix A – Radiochemical Data Validation Checklist**

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: \_\_\_\_\_  
\_\_\_\_\_ k-40 Ph 228 - FB \_\_\_\_\_  
\_\_\_\_\_

- 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

**Appendix A – Radiochemical Data Validation Checklist**

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

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

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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

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

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

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

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

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

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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

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

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

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

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

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

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Appendix A – Radiochemical Data Validation Checklist**

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

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

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

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

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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

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

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

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

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

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

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

Comments: NO FS or PAS  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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: 32. 28 over  
5/11

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

000027

**Appendix 6**

**Additional Documentation Requested by Client**

**EBERLINE SERVICES / RICHMOND**  
**SAMPLE DELIVERY GROUP H2131**

7471-008

Method Blank

**METHOD BLANK**

SDG <u>7471</u>	Client/Case no <u>Hanford</u>	SDG <u>H2131</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R304008-08</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7471-008</u>	Material/Matrix _____	<u>SOLID</u>
	SAF No <u>B01-054</u>	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Gross Alpha	12587-46-1	-0.185	1.2	2.6	10	U	93A
Gross Beta	12587-47-2	-0.816	3.0	5.2	15	U	93B
Potassium 40	13966-00-2	U		0.29		U	GAM
Cobalt 60	10198-40-0	U		0.033	0.050	U	GAM
Cesium 137	10045-97-3	U		0.027	0.10	U	GAM
Radium 226	13982-63-3	U		0.050		U	GAM
Radium 228	15262-20-1	U		0.12		U	GAM
Europium 152	14683-23-9	U		0.067	0.10	U	GAM
Europium 154	15585-10-1	U		0.089	0.10	U	GAM
Europium 155	14391-16-3	U		0.055	0.10	U	GAM
Thorium 228	14274-82-9	U		0.035		U	GAM
Thorium 232	TH-232	U		0.12		U	GAM
Uranium 235	15117-96-1	U		0.072		U	GAM
Uranium 238	U-238	U		3.5		U	GAM
Americium 241	14596-10-2	U		0.051		U	GAM

100 B/C Area Effluent Pipe. & Prox.

QC-BLANK 44241

000029

**EBERLINE SERVICES/RICHMOND**  
**SAMPLE DELIVERY GROUP H2131**

7471-007

Lab Control Sample

**LAB CONTROL SAMPLE**

SDG <u>7471</u>	Client/Case no <u>Hanford</u>	SDG <u>H2131</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R304008-07</u>	Client sample id <u>Lab Control Sample</u>	
Dept sample id <u>7471-007</u>	Material/Matrix <u>SOLID</u>	
	SAF No <u>801-054</u>	

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LNTS (TOTAL)	PROTOCOL LIMITS
Gross Alpha	204	15	3.2	10	93A	200	8.0	102	67-133	70-130
Gross Beta	198	11	7.9	15	93B	211	8.4	94	77-123	70-130
Cobalt 60	4.80	0.26	<u>0.083</u>	0.050	GAM	4.80	0.19	100	75-125	80-120
Cesium 137	4.66	0.23	<u>0.15</u>	0.10	GAM	4.61	0.18	101	75-125	80-120

100 B/C Area Effluent Pipe. & Prox.

QC-LCS 44240

000030

Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-LCS</u>
Version <u>3.06</u>
Report date <u>04/08/03</u>

**EBERLINE SERVICES/RICHMOND**

SAMPLE DELIVERY GROUP H2131

7471-009

J00KF8

**DUPLICATE**

SDG <u>7471</u>	Client/Case no <u>Hanford</u>	SDG <u>H2131</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
<b>DUPLICATE</b>	<b>ORIGINAL</b>	
Lab sample id <u>R304008-09</u>	Lab sample id <u>R304008-02</u>	Client sample id <u>J00KF8</u>
Dept sample id <u>7471-009</u>	Dept sample id <u>7471-002</u>	Location/Matrix <u>100 BC, 1607-B-7 Septic SOLID</u>
	Received <u>04/01/03</u>	Collected/Weight <u>03/27/03 12:44 929.6 g</u>
% solids <u>95.3</u>	% solids <u>95.3</u>	Custody/SAF No <u>B01-054-017 B01-054</u>

ANALYTE	DUPLICATE		MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL		MDA pCi/g	QUALI- FIERS	RPD %	3σ TOT	PROT LIMIT
	pCi/g	2σ ERR (COUNT)					pCi/g	2σ ERR (COUNT)					
Gross Alpha	5.23	4.4	5.0	10		93A	5.26	4.3	4.9		1	181	
Gross Beta	17.6	4.5	5.8	15		93B	13.0	4.2	5.8		30	68	
Potassium 40	8.87	1.0	0.45			GAM	7.85	1.6	1.0		12	47	
Cobalt 60	U		<u>0.064</u>	0.050	U	GAM	U		<u>0.11</u>	U	-		
Cesium 137	U		0.061	0.10	U	GAM	U		0.097	U	-		
Radium 226	0.399	0.12	0.12			GAM	0.366	0.13	0.14		9	76	
Radium 228	0.609	0.21	0.21			GAM	0.761	0.34	0.31		22	93	
Europium 152	U		<u>0.15</u>	0.10	U	GAM	U		<u>0.24</u>	U	-		
Europium 154	U		<u>0.19</u>	0.10	U	GAM	U		<u>0.28</u>	U	-		
Europium 155	U		<u>0.15</u>	0.10	U	GAM	U		<u>0.20</u>	U	-		
Thorium 228	0.434	0.062	0.067			GAM	0.501	0.13	0.15		14	56	
Thorium 232	0.609	0.21	0.21			GAM	0.761	0.34	0.31		22	93	
Uranium 235	U		0.21		U	GAM	U		0.33	U	-		
Uranium 238	U		6.7		U	GAM	U		13	U	-		
Americium 241	U		0.30		U	GAM	U		0.22	U	-		

100 B/C Area Effluent Pipe. & Prox.

QC-DUP#2 44242

000031

Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DUP</u>
Version <u>3.06</u>
Report date <u>04/08/03</u>