

SAF-B01-092
ERDF - Semiannual Leachate Analysis
FINAL VALIDATION PACKAGE

COMPLETE COPY OF VALIDATION PACKAGE TO:

Tom Lazarski H9-03

BLZ 6/18
INITIAL/DATE

Jeanette Duncan

BD
INITIAL/DATE

SDG H2447

SAF-B01-092

RECEIVED
AUG 17 2004
EDMC

Date: 20 April 2004
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: ERDF - Semiannual Leachate Analysis
Subject: Volatiles - Data Package No. H2447-LLI (SDG No. H2447)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H2447-LLI prepared by Lionville Laboratory Inc. (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	Media	Validation	Analysis
J015M7	12/1/03	Water	C	See notes 1
J015M8	12/1/03	Water	C	See notes 1
J015M9	12/1/03	Water	C	See note 1

1 - Volatiles by EPA 8260B (carbon tetrachloride).

Data validation was conducted in accordance with the BHI validation statement of work and the Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Amended Record of Decision, Decision Responsiveness Summary. Appendices 1 through 5 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**

Analytical holding times are assessed to ascertain whether the holding time requirements were met by the laboratory. Preserved water samples must be analyzed within: 14 days of the date of sample collection for VOAs. If holding times are exceeded, but not by greater than twice 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 twice the limit, all

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associated detected sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were met.

- **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 of a given matrix. 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 project quantitation limit (PQL) and is less than five times (or less than ten times for laboratory contaminants) the highest associated blank result, the sample result value is raised to the PQL, qualified as undetected and flagged "U".

All method blank results were acceptable.

Field Blanks

One trip blank (J015M9) was submitted for analysis. No analytes were detected in the equipment blank.

- **Accuracy**

Matrix Spike/Matrix Spike Duplicate & Laboratory Control Sample

Matrix spike/matrix spike duplicate and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike/matrix spike duplicate is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using the target compounds for which percent recoveries must be within established laboratory quality 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.

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All accuracy results were acceptable.

Surrogate Recovery

The analysis of surrogate compounds provides a measure of system performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the laboratory program. When a surrogate compound recovery is out of the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Undetected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Samples with surrogate recoveries less than ten percent are qualified as estimates and flagged "J" for detects, and rejected and flagged "UR" for nondetects. Undetected compounds with surrogate recoveries greater than the upper control limit require no qualification.

All surrogate recovery 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 by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. For samples analyzed using SW-846 protocol, results must be within RPD limits of +/- 20% for water samples and +/- 35% for solid samples. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. 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 pair of field duplicate samples (samples J015M7/J015M8) were submitted to LLI for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All field duplicate results were acceptable.

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- **Analytical Detection Levels**

Reported analytical detection levels are compared against the DOE Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Amended Record of Decision, Decision Responsiveness Summary project quantitation limits (PQLs) to ensure that laboratory detection levels meet the required criteria. All volatile organic results exceeded the PQL. Under the BHI validation SOW, no qualification is required.

- **Completeness**

Data package No. H2447-LLI was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

All volatile organic results exceeded the PQL. Under the BHI validation SOW, no qualification is required.

REFERENCES

FHI, Contract #20266, *Validation Statement of Work*, Bechtel Hanford Incorporated, July 7, 2003.

DOE *Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Amended Record of Decision, Decision Responsiveness Summary*, U.S. Environmental Protection Agency, Region X, Seattle, Washington.

The DOE referenced document was issued prior to the current revision of the validation procedures identified in the FHI validation statement of work. The DOE document referenced validation procedures (WHC-SD-ED-SPP-001, *Data Validation Procedures for Radiological Analysis*, Westinghouse Hanford Company, Richland, WA 1993 and WHC-SD-ED-SPP-002, *Data Validation Procedures for Chemical Analysis*, Westinghouse Hanford Company, Richland, WA 1993) have been superseded by the revisions. This has been accepted by all affected parties and the reference will be changed as the DOE document is revised.

Appendix 1

Glossary of Data Reporting Qualifiers

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Qualifiers which may be applied by data validator 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 sample quantitation limit corrected for 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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VOLATILE ORGANIC DATA QUALIFICATION SUMMARY*

SDG: H2447	REVIEWER: TLI	DATE: 4/20/04	PAGE <u>1</u> OF <u>1</u>
COMMENTS: No qualifiers assigned			

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

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Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

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Lionville Laboratory, Inc.

Volatiles By GC/MS, Special List

Report Date: 12/16/03 10:41

RPW Batch Number: 0312L266

Client: TNUHANFORD B01-092 H2447 Work Order: 11343606001 Page: 1a

Cust ID: J015M7 J015M7 J015M7 J015M7 J015M7 J015M8 J015M9 VBLKRD
 RFW#: 001 001 MS 001 MSD 002 003 03LVX388-MB1
 Matrix: WATER WATER WATER WATER WATER WATER WATER
 D.F.: 1.00 1.00 1.00 1.00 1.00 1.00 1.00
 Units: UG/L UG/L UG/L UG/L UG/L UG/L UG/L

Surrogate	1,2-Dichloroethane-d4	89	%	100	%	97	%	93	%	92	%	85	%
Recovery	Toluene-d8	102	%	102	%	102	%	100	%	102	%	98	%
	Bromofluorobenzene	100	%	104	%	105	%	99	%	102	%	100	%
Carbon Tetrachloride		5	U	85	%	85	%	5	U	5	U	5	U

Cust ID: VBLKRD BS

Sample Information RFW#: 03LVX388-MB1
 Matrix: WATER
 D.F.: 1.00
 Units: UG/L

Surrogate	1,2-Dichloroethane-d4	91	%
Recovery	Toluene-d8	98	%
	Bromofluorobenzene	102	%
Carbon Tetrachloride		89	%

* = Outside of EPA CLP QC limits.

Handwritten: ✓
4/22/04

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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

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Client: TNU-HANFORD B01-092
LVL #: 0312L266
SDG/SAF # H2447/B01-092

W.O. #: 11343-606-001-9999-00
Date Received: 12-03-2003

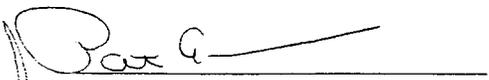
GC/MS VOLATILE

Three (3) water samples were collected on 12-01-2003.

The samples and their associated QC samples were analyzed according to criteria set forth in Lionville Laboratory OPs based on SW 846 Method 8260B for client specified volatile target compounds on 12-04-2003.

The following is a summary of the QC results accompanying these 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 samples were analyzed within holding time.
3. All surrogate recoveries were within EPA QC limits.
4. The matrix spike recoveries were within EPA QC limits.
5. The blank spike recovery was within EPA QC limits.
6. Internal standard area and retention time criteria were met.
7. "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."



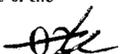
J. Michael Taylor
President
Lionville Laboratory Incorporated

12-18-03
Date

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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 10 pages.

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Appendix 5

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	ERDF SAL		DATA PACKAGE: H2447		
VALIDATOR:	TLP	LAB: LLI	DATE: 4/2/04		
CASE:			SDG:	H2447	
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)
SAMPLES/MATRIX					
JO15M7		JO15M8		JO15M9	
Sci					

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: NO BS

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

Comments: all over

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: 20 April 2004
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: ERDF - Semiannual Leachate Analysis
Subject: Inorganics - Data Package No. H2447-LLI (SDG No. H2447)

INTRODUCTION

This memo presents the results of data validation on Data Package No. H2447-LLI prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
J015M7	12/1/03	Water	C	See note 1
J015M8	12/1/03	Water	C	See note 1

1- ICP metals by 6010B.

Data validation was conducted in accordance with the BHI validation statement of work and the Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Ammended Record of Decision, Decision Responsiveness Summary. Appendices 1 through 5 provide the following information as indicated below:

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

DATA QUALITY OBJECTIVES

- **Holding Times**

Analytical holding times for mercury and ICP metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Samples must be analyzed within six (6) months for ICP metals.

All holding times were met.

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- **Blanks**

Preparation (Method) 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 (in ug/L) 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 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 laboratory blank contamination, the zinc result in sample J015M8 was qualified as estimated and flagged "J".

All other preparation blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis, therefore, no field blank data was available for review.

- **Accuracy**

Matrix Spike and Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 75% to 125%. Samples with a recovery of less than 25% and a sample result below the instrument detection limit (IDL) are rejected and flagged "UR". Samples with a recovery of 30% to 74% and a sample result less than the IDL are qualified "UJ". Samples with a recovery of greater than 125% or less than 75% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a spike recovery greater than 125% and a sample result less than the IDL, no qualification is required.

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All accuracy results were acceptable.

- **Precision**

Laboratory Duplicate Samples

Laboratory duplicate sample analyses are used to measure laboratory precision and sample homogeneity. Results must be within relative percent difference (RPD) limits of plus or minus 20% for water samples. If RPD values are out of specification and the sample concentration is greater than five times the CRDL, all associated sample results are qualified as estimated and flagged "J". If RPD values are plus or minus two times the CRDL and the sample concentration is less than five times the CRDL, all associated sample results are qualified as estimated and flagged "J/UJ". The performance criteria for aqueous laboratory duplicates are an RPD less than 20% for positive sample results greater than five times the CRDL or plus or minus the CRDL for positive sample results less than five times the CRDL. Sample results outside the criteria are qualified as estimates and flagged "J/UJ".

Due to an RPD outside QC limits (151.5%), all zinc results were qualified as estimates and flagged "J".

All other laboratory duplicate results were acceptable.

Field Duplicate Samples

One pair of field duplicate samples (samples J015M7/J015M8) were submitted to LLI for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. The RPD for zinc was outside QC limits (90%). Under the BHI statement of work, no qualification is required. All other field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against DOE Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Amended Record of Decision, Decision Responsiveness Summary project quantitation limits (PQLs) to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels met the analyte specific PQL.

- **Completeness**

Data package SDG No. H2447 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%.

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MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to laboratory blank contamination, the zinc result in sample J015M8 was qualified as estimated and flagged "J". Due to an RPD outside QC limits (151.5%), all zinc results were qualified as estimates and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

FHI, Contract #20266, *Validation Statement of Work*, Bechtel Hanford Incorporated, July 7, 2003.

DOE *Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Ammended Record of Decision, Decision Responsiveness Summary*, U.S. Environmental Protection Agency, Region X, Seattle, Washington.

The DOE referenced document was issued prior to the current revision of the validation procedures identified in the FHI validation statement of work. The DOE document referenced validation procedures (WHC-SD-ED-SPP-001, *Data Validation Procedures for Radiological Analysis*, Westinghouse Hanford Company, Richland, WA 1993 and WHC-SD-ED-SPP-002, *Data Validation Procedures for Chemical Analysis*, Westinghouse Hanford Company, Richland, WA 1993) have been superceded by the revisions. This has been accepted by all affected parties and the reference will be changed as the DOE document is revised.

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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 BHI validation SOW are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

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INORGANIC DATA QUALIFICATION SUMMARY*

SDG: H2447	REVIEWER: TLI	DATE: 4/20/04	PAGE <u>1</u> OF <u>1</u>
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Zinc	J	J015M8	Blank contamination
Zinc	J	All	RPD

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

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Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 01/05/04

CLIENT: TNUHANFORD B01-092 H2447
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0312L266

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
=====	=====	=====	=====	=====	=====	=====
-001	J015M7	Arsenic, Total	6.3	UG/L	4.2	1.0
		Barium, Total	97.1	UG/L	0.20	1.0
		Chromium, Total	27.1	UG/L	1.0	1.0
		Lead, Total	1.9 u	UG/L	1.9	1.0
		Selenium, Total	9.3	UG/L	2.9	1.0
		Tin, Total	5.6 u	UG/L	5.6	1.0
		Vanadium, Total	20.8	UG/L	0.90	1.0
		Zinc, Total	35.5 J	UG/L	2.6	1.0
-002	J015M8	Arsenic, Total	10.0	UG/L	4.2	1.0
		Barium, Total	100	UG/L	0.20	1.0
		Chromium, Total	27.6	UG/L	1.0	1.0
		Lead, Total	1.9 u	UG/L	1.9	1.0
		Selenium, Total	8.2	UG/L	2.9	1.0
		Tin, Total	5.6 u	UG/L	5.6	1.0
		Vanadium, Total	21.4	UG/L	0.90	1.0
		Zinc, Total	13.4 J	UG/L	2.6	1.0

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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation



Analytical Report

Client: TNU-HANFORD B01-092
LVL#: 0312L266
SDG/SAF#: H2447/B01-092

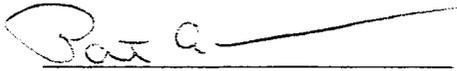
W.O.#: 11343-606-001-9999-00
Date Received: 12-03-03

METALS CASE NARRATIVE

1. This narrative covers the analyses of 2 water 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. 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 analyses for 3 analytes were 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.

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/m12-266

01-05-03

Date



000014



Appendix 5

Data Validation Supporting Documentation Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

ALIDATION LEVEL:	A	B	C	D	E
PROJECT:	ERDF - Samiennud		DATA PACKAGE: H2447		
VALIDATOR:	TLI	LAB: LLI	DATE: 4/2/04		
CASE:			SDG: H2447		
ANALYSES PERFORMED					
SW-846/ICP	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide		
SAMPLES/MATRIX					
JO15M7 JO15M8					
with					

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: NO PB

Zinc in LB - ~~5.18~~ 5.18

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 PD

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

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

- Duplicate RPD values acceptable? Yes No N/A
- Duplicate results acceptable? Yes No N/A
- MS/MSD standards NIST traceable? (Levels D, E) Yes No N/A
- MS/MSD standards expired? (Levels D, E) Yes No N/A
- Field duplicate RPD values acceptable? Yes No N/A
- Field split RPD values acceptable? Yes No N/A
- Transcription/calculation errors? (Levels D, E) Yes No N/A

Comments: Zinc 15% Iell
FD Zinc 90%

6. ICP QUALITY CONTROL (Levels D and E)

- ICP serial dilution samples analyzed? Yes No N/A
- ICP serial dilution %D values acceptable? Yes No N/A
- ICP post digestion spike required? Yes No N/A
- ICP post digestion spike values acceptable? Yes No N/A
- Standards traceable? Yes No N/A
- Standards expired? Yes No N/A
- Transcription/calculation errors? Yes No N/A

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

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

Duplicate injections performed as required? Yes No N/A
Duplicate injection %RSD values acceptable? Yes No N/A
Analytical spikes performed as required? Yes No N/A
Analytical spike recoveries acceptable? Yes No N/A
Standards traceable? Yes No N/A
Standards expired? Yes No N/A
MSA performed as required? Yes No N/A
MSA results acceptable? Yes No N/A
Transcription/calculation errors? Yes No N/A

Comments: _____

8. HOLDING TIMES (all levels)

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

Comments: _____

Appendix 6

Additional Documentation Requested by Client

000021

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 01/05/04

CLIENT: TNUHANFORD B01-092 H2447
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0312L266

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
=====	=====	=====	=====	=====	=====	=====
BLANK1	03L0767-MB1	Arsenic, Total	4.2	u UG/L	4.2	1.0
		Barium, Total	0.42	UG/L	0.20	1.0
		Chromium, Total	1.0	u UG/L	1.0	1.0
		Lead, Total	1.9	u UG/L	1.9	1.0
		Selenium, Total	2.9	u UG/L	2.9	1.0
		Tin, Total	5.6	u UG/L	5.6	1.0
		Vanadium, Total	0.90	u UG/L	0.90	1.0
		Zinc, Total	5.2	UG/L	2.6	1.0



Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 01/05/04

CLIENT: TNUHANFORD B01-092 H2447
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0312L266

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR (SPK)
-002	JO15M8	Arsenic, Total	2040	10.0	2000	101.5	1.0
		Barium, Total	2130	100	2000	101.3	1.0
		Chromium, Total	222	27.6	200	97.0	1.0
		Lead, Total	495	1.9 u	500	98.9	1.0
		Selenium, Total	2090	8.2	2000	104.1	1.0
		Tin, Total	1020	5.6 u	1000	102.5	1.0
		Vanadium, Total	517	21.4	500	99.1	1.0
		Zinc, Total	513	13.4	500	99.9	1.0

000023

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 01/05/04

CLIENT: TNUHANFORD B01-092 H2447

LVL LOT #: 0312L266

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

SAMPLE	SITE ID	ANALYTE	INITIAL			DILUTION FACTOR (REP)
			RESULT	REPLICATE RPD		
-001REP	J015M7	Arsenic, Total	6.3	7.9	22.5	1.0
		Barium, Total	97.1	96.2	0.93	1.0
		Chromium, Total	27.1	27.0	0.37	1.0
		Lead, Total	1.9 u	1.9 u	NC	1.0
		Selenium, Total	9.3	6.0	43.1	1.0
		Tin, Total	5.6 u	5.6 u	NC	1.0
		Vanadium, Total	20.8	20.9	0.48	1.0
		Zinc, Total	35.5	4.9	151.5	1.0

000024

Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 01/05/04

CLIENT: TNUHANFORD B01-092 H2447
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0312L266

SAMPLE	SITE ID	ANALYTE	SPIKED		UNITS	%RECOV
			SAMPLE	AMOUNT		
LCS1	03L0767-LC1	Arsenic, LCS	9710	10000	UG/L	97.1
		Barium, LCS	5020	5000	UG/L	100.4
		Chromium, LCS	491	500	UG/L	98.1
		Lead, LCS	2450	2500	UG/L	97.9
		Selenium, LCS	10000	10000	UG/L	100.3
		Tin, LCS	4940	5000	UG/L	98.7
		Vanadium, LCS	2450	2500	UG/L	98.1
		Zinc, LCS	994	1000	UG/L	99.4

000025

Date: 20 April 2004
To: Bechtel Hanford, Inc. (technical representative)
From: TechLaw, Inc.
Project: ERDF - Semiannual Leachate Analysis
Subject: Radiochemistry - Data Package No. H2447-EB (SDG No. H2447)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H2447-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
J015M7	12/01/03	Water	C	See note 1
J015M8	12/01/03	Water	C	See note 1

1 - Gross alpha and beta; carbon-14; technetium-99; iodine-129; total radium and total uranium.

Data validation was conducted in accordance with the BHI validation statement of work and the Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Amended Record of Decision, Decision Responsiveness Summary. Appendices 1 through 6 provide the following information as indicated below:

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

DATA QUALITY OBJECTIVES

- **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.

000001

- **Laboratory (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 required detection limit (RDL), 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 minimum detectable activity (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 laboratory blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis, therefore, no field blank data was available for review.

- **Accuracy**

Accuracy is evaluated by analyzing distilled water or field samples spiked with known amounts of radionuclides. The sample activity as determined by analysis is compared to the known activity to assess accuracy. The acceptable laboratory control sample (LCS) and matrix spike (MS) recovery range is 70-130%. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, rejected, or not qualified, depending on the activity of the individual sample.

All accuracy results were acceptable.

- **Precision**

Analytical precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Precision may also be assessed using unspiked duplicate sample analyses. If both sample and replicate activities are greater than five times the contract required detection limit (CRDL) and the RPD is less than 20 percent, the results are acceptable. If either activities are less than five times the CRDL, a control limit of less than or equal to two times the CRDL is used for soil samples and less than or equal to the

000002

CRDL for water samples. If either the original or replicate value is below the CRDL, the applicable control limits are less than or equal to the CRDL for water samples and less than or equal to two times the CRDL for soil samples. 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 Samples

One pair of field duplicate samples (samples J015M7/J015M8) were submitted to EB for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All field duplicate results were acceptable.

- **Detection Levels**

Reported analytical detection levels are compared against the DOE Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Amended Record of Decision, Decision Responsiveness Summary project quantitation limits (PQLs) to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels met the analyte specific PQL.

- **Completeness**

Data package SDG No. H2447 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found

REFERENCES

FHI, Contract #20266, *Validation Statement of Work*, Bechtel Hanford Incorporated, July 7, 2003.

DOE *Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Amended Record of Decision, Decision Responsiveness Summary*, U.S. Environmental Protection Agency, Region X, Seattle, Washington.

The DOE referenced document was issued prior to the current revision of the validation procedures identified in the FHI validation statement of work. The DOE document referenced validation procedures (WHC-SD-ED-SPP-001, *Data Validation Procedures for Radiological Analysis*, Westinghouse Hanford Company, Richland, WA 1993 and WHC-SD-ED-SPP-002, *Data Validation Procedures for Chemical Analysis*, Westinghouse Hanford Company, Richland, WA 1993) have been superseded by the revisions. This has been accepted by all affected parties and the reference will be changed as the DOE document is revised.

Appendix 1

Glossary of Data Reporting Qualifiers

000005

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

- U - Indicates the compound or analyte was analyzed for and not detected above the minimum detectable activity (MDA) in the sample. The value reported is the sample result corrected for sample dilution and moisture content by the laboratory. The data is usable for decision making purposes.
- UJ - Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate, but is usable for decision making purposes.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

Appendix 2

Summary of Data Qualification

000007

RADIOCHEMISTRY DATA QUALIFICATION SUMMARY*

SDG: H2447	REVIEWER: TLI	DATE: 4/20/04	PAGE <u>1</u> OF <u>1</u>
COMMENTS: No qualifiers assigned			

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

000008

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

000009

EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H2447

7656-001

J015M7

DATA SHEET

SDG <u>7656</u>	Client/Case no <u>Hanford</u>	SDG <u>H2447</u>
Contact <u>Melissa C. Mannion</u>	Contract <u>No. 630</u>	
Lab sample id <u>R312017-01</u>	Client sample id <u>J015M7</u>	
Dept sample id <u>7656-001</u>	Location/Matrix <u>ERDF 200 West</u>	<u>WATER</u>
Received <u>12/03/03</u>	Collected/Volume <u>12/01/03 09:45</u>	<u>9.0 L</u>
	Custody/SAF No <u>B01-092-13</u>	<u>B01-092</u>

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Gross Alpha	12587-46-1	730	48	<u>8.0</u>	3.0		93A
Gross Beta	12587-47-2	697	20	<u>8.0</u>	4.0		93B
Carbon 14	14762-75-5	79.4	77	130	200	U	C
Technetium 99	14133-76-7	1000	20	5.7	15		TC
Total Uranium (ug/L)	7440-61-1	1310	180	<u>14</u>	0.10		U_T
Total Radium	ALPHA-RA	0.056	0.23	0.78	1.0	U	RAT
Iodine 129	15046-84-1	-1.01	1.6	3.7	5.0	U	I

ERDF - Semiannual Leachate Analysis

Handwritten:
✓
4/20/04

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>01/21/04</u>

000011

EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H2447

7656-002

J015M8

DATA SHEET

SDG <u>7656</u>	Client/Case no <u>Hanford</u>	SDG <u>H2447</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R312017-02</u>	Client sample id <u>J015M8</u>	
Dept sample id <u>7656-002</u>	Location/Matrix <u>ERDF 200 West</u>	<u>WATER</u>
Received <u>12/03/03</u>	Collected/Volume <u>12/01/03 09:45</u>	<u>9.0 L</u>
	Custody/SAF No <u>B01-092-13</u>	<u>B01-092</u>

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Gross Alpha	12587-46-1	821	51	<u>9.2</u>	3.0		93A
Gross Beta	12587-47-2	718	20	<u>6.9</u>	4.0		93B
Carbon 14	14762-75-5	87.4	75	120	200	U	C
Technetium 99	14133-76-7	997	27	5.6	15		TC
Total Uranium (ug/L)	7440-61-1	1390	190	<u>14</u>	0.10		U_T
Total Radium	ALPHA-RA	<u>-0.318</u>	0.081	0.82	1.0	U	RAT
Iodine 129	15046-84-1	-1.23	4.4	<u>10</u>	5.0	U	I

ERDF - Semiannual Leachate Analysis

Handwritten signature
4/22/04

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>01/21/04</u>

000012

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

1.0 GENERAL

Bechtel Hanford Inc. (BHI) Sample Delivery Group H2447 was composed of two water samples designated under SAF No. B01-092 with a Project Designation of: ERDF – Semiannual Leachate Analysis.

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 January 21, 2004.

2.0 ANALYSIS NOTES

2.1 Gross Alpha and Gross Beta Analyses

No problems were encountered during the course of the analyses.

2.2 Carbon-14 Analyses

The LCS and method blank were not scaled to the nominal aliquot. No problems were encountered during the course of the analyses.

2.3 Iodine-129 Analyses

No problems were encountered during the course of the analyses.

2.4 Technetium-99 Analyses

No problems were encountered during the course of the analyses.

2.5 Total Radium Analyses

No problems were encountered during the course of the analyses.

2.6 Total Uranium 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
Senior Program Manager

1/21/4

Date

Appendix 5

Data Validation Supporting Documentation

000016

APPENDIX A

RADIOCHEMICAL DATA VALIDATION CHECKLIST

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	ERDF - SA		DATA PACKAGE: H2447		
VALIDATOR:	TL	LAB:	ERB	DATE: 4/2/04	
CASE:			SDG:	A2447	
ANALYSES PERFORMED					
Gross Alpha/Beta	Strontium-90	Technetium-99	Alpha Spectroscopy	Gamma Spectroscopy	tot U Rgn
Total Uranium	Radium-22	Trinium	(614)	(128)	(107 Packed)
SAMPLES/MATRIX					
J015M7 J015M8					
Soil					

1. Completeness ~~N/A~~

Technical verification forms present? Yes No N/A

Comments: _____

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

Instruments/detectors calibrated? Yes No N/A

Initial calibration acceptable? Yes No N/A

Standards NIST traceable? Yes No N/A

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: No 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

BHI-01433

Rev. 0

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 Pts

12. Holding Times (All levels)

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

Comments: _____

Appendix A – Radiochemical Data Validation Checklist

BHI-01433

Rev. 0

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: _____

Appendix 6

Additional Documentation Requested by Client

000023

EBERLINE SERVICES / RICHMOND
 SAMPLE DELIVERY GROUP H2447

7656-004

Method Blank

METHOD BLANK

SDG <u>7656</u>	Client/Case no <u>Hanford</u>	SDG <u>H2447</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R312017-04</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7656-004</u>	Material/Matrix <u>WATER</u>	
	SAF No <u>B01-092</u>	

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Gross Alpha	12587-46-1	-0.043	1.4	2.7	3.0	U	93A
Gross Beta	12587-47-2	0.971	3.0	<u>5.1</u>	4.0	U	93B
Carbon 14	14762-75-5	0.035	0.76	1.3	200	U	C
Technetium 99	14133-76-7	0.628	2.1	5.7	15	U	TC
Total Uranium (ug/L)	7440-61-1	0.011	0.006	0.014	0.10	U	U_T
Total Radium	ALPHA-RA	0.023	0.18	0.71	1.0	U	RAT
Iodine 129	15046-84-1	-2.39	4.5	<u>10</u>	5.0	U	I

ERDF - Semiannual Leachate Analysis

QC-BLANK 46316

000024

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>01/21/04</u>

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2447

7656-003

Lab Control Sample

LAB CONTROL SAMPLE

SDG <u>7656</u>	Client/Case no <u>Hanford</u>	<u>SDG H2447</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R312017-03</u>	Client sample id <u>Lab Control Sample</u>	
Dept sample id <u>7656-003</u>	Material/Matrix <u>WATER</u>	
	SAF No <u>B01-092</u>	

ANALYTE	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS TEST	ADDED pCi/L	2σ ERR pCi/L	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Gross Alpha	180	14	2.6	3.0	93A	200	8.0	90	70-130	70-130
Gross Beta	200	11	<u>7.1</u>	4.0	93B	208	8.3	96	76-124	70-130
Carbon 14	232	2.7	1.3	200	C	239	9.6	97	84-116	80-120
Technetium 99	1100	22	5.6	15	TC	1090	44	101	83-117	80-120
Total Uranium (ug/L)	97.0	12	<u>0.14</u>	0.10	U_T	82.5	3.3	118	72-128	80-120
Total Radium	50.6	2.4	0.71	1.0	RAT	56.0	2.2	90	89-111	80-120
Iodine 129	438	6.5	<u>12</u>	5.0	I	464	19	94	90-110	80-120

ERDF - Semiannual Leachate Analysis

QC-LCS 46315

000025

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>01/21/04</u>

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2447

7656-005

J015M7

DUPLICATE

SDG <u>7656</u>	Client/Case no <u>Hanford</u>	SDG <u>H2447</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
DUPLICATE	ORIGINAL	
Lab sample id <u>R312017-05</u>	Lab sample id <u>R312017-01</u>	Client sample id <u>J015M7</u>
Dept sample id <u>7656-005</u>	Dept sample id <u>7656-001</u>	Location/Matrix <u>ERDF 200 West</u> <u>WATER</u>
	Received <u>12/03/03</u>	Collected/Volume <u>12/01/03 09:45</u> <u>9.0 L</u>
		Custody/SAF No <u>B01-092-13</u> <u>B01-092</u>

ANALYTE	DUPLICATE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST	ORIGINAL pCi/L	2σ ERR (COUNT)	MDA pCi/L	QUALI- FIERS	RPD %	3σ TOT	PROT LIMIT
Gross Alpha	671	46	<u>9.1</u>	3.0		93A	730	48	<u>8.0</u>		8	45	
Gross Beta	724	20	<u>6.9</u>	4.0		93B	697	20	<u>8.0</u>		4	32	
Carbon 14	32.6	73	120	200	U	C	79.4	77	130	U	-	-	
Technetium 99	1020	21	<u>6.1</u>	15		TC	1000	20	<u>5.7</u>		2	22	
Total Uranium (ug/L)	1350	190	<u>14</u>	0.10		U_T	1310	180	<u>14</u>		3	35	
Total Radium	-0.097	0.14	<u>0.77</u>	1.0	U	RAT	0.056	0.23	0.78	U	-	-	
Iodine 129	-2.18	5.6	<u>13</u>	5.0	U	I	-1.01	1.6	3.7	U	-	-	

ERDF - Semiannual Leachate Analysis

QC-DUP#1 46317

DUPLICATES

Page 1

SUMMARY DATA SECTION

Page 10

000026

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>01/21/04</u>

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2447

7656-006

J015M7

MATRIX SPIKE

SDG <u>7656</u>	Client/Case no <u>Hanford</u>	SDG <u>H2447</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
MATRIX SPIKE	ORIGINAL	
Lab sample id <u>R312017-06</u>	Lab sample id <u>R312017-01</u>	Client sample id <u>J015M7</u>
Dept sample id <u>7656-006</u>	Dept sample id <u>7656-001</u>	Location/Matrix <u>ERDF 200 West</u> <u>WATER</u>
	Received <u>12/03/03</u>	Collected/Volume <u>12/01/03 09:45</u> <u>9.0 L</u>
		Custody/SAF No <u>B01-092-13</u> <u>B01-092</u>

ANALYTE	SPIKE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS TEST	ADDED pCi/L	2σ ERR pCi/L	ORIGINAL pCi/L	2σ ERR (COUNT)	REC 3σ % (TOTAL)	LMTS LIMITS	PROTOCOL
Carbon 14	84200	850	<u>220</u>	200	X C	95700	3800	79.4	77	88	85-115 60-140	

ERDF - Semiannual Leachate Analysis

QC-MS#1 46318

MATRIX SPIKES

Page 1

SUMMARY DATA SECTION

Page 11

Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-MS</u>
Version <u>3.06</u>
Report date <u>01/21/04</u>

000027

Date: 20 April 2004
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: ERDF - Semiannual Leachate Analysis
Subject: Wet Chemistry - Data Package No. H2447-LLI (SDG No. H2447)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H2447-LLI prepared by Lionville Laboratory Inc.(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
J015M7	12/1/03	Water	C	See note 1
J015M8	12/1/03	Water	C	See note 1
J015N0	12/1/03	Water	C	See note 2

1 - Specific conductance - 9050A, total dissolved solids - 160.1, IC anions - 300.0.

2 - pH

Data validation was conducted in accordance with the BHI validation statement of work and the Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Amended Record of Decision, Decision Responsiveness Summary. Appendices 1 through 6 provide the following information as indicated below:

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

DATA QUALITY OBJECTIVES

- **Holding Times**

Analytical holding times are assessed to ascertain whether the holding time requirements have been met by the laboratory. The holding time requirements are

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as follows: 28 days for specific conductance and 7 days for TDS, 2 days for IC anions and immediate (24 hours) for pH.

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".

Due to the holding time being exceeded by less than twice the limit, all pH results were qualified as estimates and flagged "J".

Holding times were met for all other parameters and samples.

- **Method Blanks**

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

All method blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis, therefore, no field blank data was available for review.

- **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 concentrations. Matrix spike recoveries must fall within the range of 75% to 125%. Samples with a spike recovery of less than 30% and a sample value below the instrument detection limit (IDL) are rejected and flagged "UR". Samples with a spike recovery of 30% to 74% and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 125% or less than 75% and a sample result greater than the IDL are qualified "J". Finally, for samples with a spike recovery greater than 125% and a sample result less than the IDL, no qualification is required.

All matrix spike recovery results were acceptable.

- **Precision**

Laboratory Duplicate Samples

Laboratory duplicate sample analyses are used to measure laboratory precision and sample homogeneity. Results must be within relative percent difference (RPD) limits of plus or minus 20% for water samples. If RPD values are out of specification and the sample concentration is greater than five times the project quantitation limit (PQL) or CRQL, all associated sample results are qualified as estimated and flagged "J". If RPD values are plus or minus two times the PQL/CRQL and the sample concentration is less than five times the PQL/CRQL, all associated sample results are qualified as estimated and flagged "J/UJ". The performance criteria for aqueous laboratory duplicates are an RPD less than 20% for positive sample results greater than five times the PQL/CRQL or plus or minus the PQL/CRQL for positive sample results less than five times the PQL/CRQL. Sample results outside the criteria are qualified as estimates and flagged "J/UJ".

All laboratory duplicate results were within the required control limits.

Field Duplicate Samples

One pair of field duplicate samples (samples J015M7/J015M8) were submitted to LLI for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the DOE Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Amended Record of Decision, Decision Responsiveness Summary project quantitation limits (PQLs) to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels met the analyte specific PQL.

- **Completeness**

Data package No. H2447 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 the holding time being exceeded by less than twice the limit, all pH results were qualified as estimates and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

FHI, Contract #20266, *Validation Statement of Work*, Bechtel Hanford Incorporated, July 7, 2003.

DOE *Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Amended Record of Decision, Decision Responsiveness Summary*, U.S. Environmental Protection Agency, Region X, Seattle, Washington.

The DOE referenced document was issued prior to the current revision of the validation procedures identified in the FHI validation statement of work. The DOE document referenced validation procedures (WHC-SD-ED-SPP-001, *Data Validation Procedures for Radiological Analysis*, Westinghouse Hanford Company, Richland, WA 1993 and WHC-SD-ED-SPP-002, *Data Validation Procedures for Chemical Analysis*, Westinghouse Hanford Company, Richland, WA 1993) have been superceded by the revisions. This has been accepted by all affected parties and the reference will be changed as the DOE document is revised.

Appendix 1

Glossary of Data Reporting Qualifiers

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Qualifiers which may be applied by data validators in compliance with BHI procedures 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 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. 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 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 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).

000006

Appendix 2
Summary of Data Qualification

000007

WET CHEMISTRY DATA QUALIFICATION SUMMARY*

SDG: H2447	REVIEWER: TLI	DATE: 4/20/04	PAGE <u>1</u> OF <u>1</u>
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
pH	J	All	Holding time

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

000008

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 12/11/03

CLIENT: TNUHANFORD B01-092 H2447
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0312L266

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	J015M7	Specific Conductance	2500	US/CM	1.0	1.0
		Total Dissolved Solids	1940	MG/L	5.00	1.0
-002	J015M8	Specific Conductance	2430	US/CM	1.0	1.0
		Total Dissolved Solids	1970	MG/L	5.00	1.0

jr
4/20/04

000011

05

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 12/05/03

CLIENT: TNU-HANFORD B01-092
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0312L256

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING	DILUTION
					LIMIT	FACTOR
-001	J015M7	Bromide by IC	1.2	u MG/L	1.2	5.0
		Chloride by IC	221	MG/L	12.5	50.0
		Fluoride by IC	1.2	u MG/L	1.2	5.0
		Nitrite by IC	1.25	u MG/L	1.25	5.0
		Nitrate by IC	450	MG/L	12.5	50.0
		Sulfate by IC	458	MG/L	12.5	50.0
-002	J015M8	Bromide by IC	1.2	u MG/L	1.2	5.0
		Chloride by IC	230	MG/L	12.5	50.0
		Fluoride by IC	1.2	u MG/L	1.2	5.0
		Nitrite by IC	1.25	u MG/L	1.25	5.0
		Nitrate by IC	448	MG/L	12.5	50.0
		Sulfate by IC	458	MG/L	12.5	50.0
-003	J015N0	pH	7.6	J PH UNIT	0.01	1.0

JL
4/20/04

000012

DB

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation



Analytical Report

Client: TNU-HANFORD B01-092 12247
LVL#: 0312L256

W.O.#: 11343-606-001-9999-00
Date Received: 12-02-03

INORGANIC NARRATIVE

1. This narrative covers the analyses of 3 water samples.
2. The samples were prepared and analyzed in accordance with the methods checked on the attached glossary.

Elevated reporting limits for Bromide, Fluoride and Nitrite are the result of the necessity to dilute the samples to diminish co-elution effects.
3. Sample holding times as required by the method and/or contract were met with the exception of pH that were received past hold (see the sample chronology summary for analyses times for short hold samples).
4. The results presented in this report are derived from samples that met LVL's sample acceptance policy with the exception of pH as noted on the Sample Receipt Checklist.
5. The method blanks were within the method criteria.
6. The Laboratory Control Samples (LCS) were within the laboratory control limits.
7. The matrix spike recoveries for Bromide, Chloride, Fluoride, Nitrite, Nitrate and Sulfate were within the 75-125% control limits.
8. The replicate analyses for Bromide, Chloride, Fluoride, Nitrite, Nitrate, Sulfate and pH were within the 20% Relative Percent Difference (RPD) control limit.
9. 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
npj012-256

12-11-03
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 13 pages.

000014



Analytical Report

Client: TNU-HANFORD B01-092 H2447
LVL#: 0312L266

W.O.#: 11343-606-001-9999-00
Date Received: 12-03-03

INORGANIC NARRATIVE

1. This narrative covers the analyses of 2 water 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 blanks were within the method criteria.
6. The Laboratory Control Samples (LCS) were within the laboratory control limits. The duplicate LCS for Total Dissolved Solids (TDS) was within the 20% Relative Percent Difference (RPD) control limit.
7. The replicate analyses for Specific Conductance and TDS were within the 20% RPD control limit.
8. 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

njp\12-266

12-17-03
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 13 pages.

000015



03/26256

Bechtel Hanford Inc.		B01-092-13		Page 1 of 1	
Collector GALE/STANKOVICH		Company Contact JEFF JAMES		Project Coordinator KESSNER, JH	
Project Designation ERDF - Semiannual Leachate Analysis		Telephone No. 373-6262		Price Code 7N	
Ice Chest No. SEI: OSPC		Field Logbook No. EL-1518-2		Air Quality []	
Shipped To TMA/RECRA		COA RERDF22560		45 Days	
POSSIBLE SAMPLE HAZARDS/REMARKS L 2,000 pc/gm cool 40C		Offsite Property No. A040052		Method of Shipment FED EX	
Bill of Lading/Air Bill No. SEE OSPC		HNO3 to pH <2		HNO3 to pH <2	
Preservation		HNO3 to pH <2		HNO3 to pH <2	
Type of Container		HNO3 to pH <2		HNO3 to pH <2	
No. of Container(s)		HNO3 to pH <2		HNO3 to pH <2	
Volume		HNO3 to pH <2		HNO3 to pH <2	
HCl or H2SO4 to pH <2 Coe		HNO3 to pH <2		HNO3 to pH <2	
VOA - 8260A (TCL) (Carbon tetrachloride)		HNO3 to pH <2		HNO3 to pH <2	
See item (1) in Special Instructions		HNO3 to pH <2		HNO3 to pH <2	
Conductivity - 9050		HNO3 to pH <2		HNO3 to pH <2	
TDS - 160.1		HNO3 to pH <2		HNO3 to pH <2	
Gross Alpha; Gross Beta; Total Uranium; Total Radium		HNO3 to pH <2		HNO3 to pH <2	
Carbon-14; Iovline-129		HNO3 to pH <2		HNO3 to pH <2	

SAMPLE ANALYSIS

Sample No.	Matrix *	Sample Date	Sample Time	Sign/Print Names	Date/Time
J015M7	WATER	12-1-03	0945	FER EX	12/1/03 1130
J015M8	WATER	12-1-03	0945	W. J. Stankovich	12-2-03 0950
Relinquished By/Removed From				Received By/Stored In	Date/Time
Relinquished By/Removed From				Received By/Stored In	Date/Time
Relinquished By/Removed From				Received By/Stored In	Date/Time
Relinquished By/Removed From				Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

- (1) ICP Metals - 6010A (TAL) (Barium, Chromium, Vanadium, Zinc); ICP Metals - 6010A (Add-on) (Arsenic, Lead, Selenium, Tin)
- (2) IC Anions - 300.0 (Bromide, Chloride, Fluoride, Nitrate, Nitrite, Sulfate)

Matrix *

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

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

65/AL 256

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				B01-092-15		Page 1 of 1	
Collector GALE/STANKOVICH	Company Contact JEFF JAMES	Telephone No. 373-6262	Project Coordinator KESSNER, JH		Price Code 7N	Data Turnaround 45 Days			
Project Designation ERDF - Semiannual Leachate Analysis		Sampling Location ERDF 200 WEST	SAF No. B01-092		Air Quality <input type="checkbox"/>				
Ice Chest No. SEE OSPC	Field Logbook No. EL-1518-2	COA REFRDF2256D	Method of Shipment FED EX						
Shipped To Field Analysis Activities REGRA		Offsite Property No. A040052		Bill of Lading/Air Bill No. SEE OSPC					
POSSIBLE SAMPLE HAZARDS/REMARKS <p>< 2,000 pCi/gm cool 4°C</p>									
SPECIAL ANALYSIS									
Sample No.	Matrix *	Sample Date	Sample Time	Preservation	Type of Container	No. of Container(s)	Volume	pH ANALYSIS	
J015N0	WATER	12-1-03	0945	NONE	P	1	125mL		
CHAIN OF POSSESSION									
Relinquished By/Removed From	Date/Time	1130	Received By/Stored In	Date/Time					
M. J. Stankovich	12/1/03	1130	FED EX	12/1/03					
Relinquished By/Removed From	Date/Time	0950	Received By/Stored In	Date/Time					
FED EX	12-2-03	0950	Jeff James	12-2-03					
Relinquished By/Removed From	Date/Time	0950	Received By/Stored In	Date/Time					
Relinquished By/Removed From	Date/Time		Received By/Stored In	Date/Time					
Relinquished By/Removed From	Date/Time		Received By/Stored In	Date/Time					
Relinquished By/Removed From	Date/Time		Received By/Stored In	Date/Time					
SPECIAL INSTRUCTIONS									
Matrix *									
S=Soil SF=Sludges SO=Solid SI=Sludge W=Water O=Oil A=Air DS=Drum Solids DL=Drum Liquids T=Tissue W=Wipe L=Liquid V=Vegetation X=Other									
LABORATORY SECTION		Received By		Title		Date/Time			
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time			

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

000019

SAMPLE ANALYSIS

Sample No.	Matrix *	Sample Date	Sample Time	Preservation	HCl or H2SO4 to pH <2 Cool	Type of Container	No. of Container(s)	Volume	VOA - 8260A (TCL) (Carbon tetrachloride)
J015M9	WATER	12-1-03	0710				3	40mL	

SPECIAL INSTRUCTIONS

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
J. Galle	12-03-03 1500	RET SA	12-03-03 1300
RET SA	12-2-03 1000	Received By/Stored In	Date/Time 1000
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
J. Galle	12-2-03 1000	S. Galle	12-2-03 12-2-03
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
J. Galle	12-3-03 0945	RET EX	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
J. Galle	12-3-03 0945	V. Henry	12-3-03 0945
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
J. Galle	12-3-03 0945	Received By/Stored In	Date/Time

Appendix 5

Data Validation Supporting Documentation

000020

GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	ERDF SAL		DATA PACKAGE:		
VALIDATOR:	TLT	LAB:	LLI	DATE:	H2447
CASE:	SDG: H2447				
ANALYSES PERFORMED					
Anions/IC	TOC	TOX	TPH-418.1	Oil and Grease	Alkalinity
Ammonia	BOD/COD	Chloride	Chromium-VI	pH	NO ₃ /NO ₂
Sulfate	TDS	TKN	Phosphate	Si Cond	
SAMPLES/MATRIX					
JO1M57 JO1M58 JO1500					
Wash					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments: _____

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

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

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

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

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

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

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

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

Comments: _____

GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

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

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

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

Spike samples analyzed? Yes No N/A
Spike recoveries acceptable? Yes No N/A
Spike standards NIST traceable? (Levels D, E) Yes No N/A
Spike standards expired? (Levels D, E)..... Yes No N/A
LCS/BSS samples analyzed? Yes No N/A
LCS/BSS results acceptable?..... Yes No N/A
Standards traceable? (Levels D, E)..... Yes No N/A
Standards expired? (Levels D, E) Yes No N/A
Transcription/calculation errors? (Levels D, E) Yes No N/A
Performance audit sample(s) analyzed? Yes No N/A
Performance audit sample results acceptable?..... Yes No N/A
Comments: NO PAS

GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

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

- Duplicate RPD values acceptable? Yes No N/A
- Duplicate results acceptable? Yes No N/A
- MS/MSD standards NIST traceable? (Levels D, E) Yes No N/A
- MS/MSD standards expired? (Levels D, E) Yes No N/A
- Field duplicate RPD values acceptable? Yes No N/A
- Field split RPD values acceptable? Yes No N/A
- Transcription/calculation errors? (Levels D, E) Yes No N/A

Comments: _____

6. HOLDING TIMES (all levels)

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

Comments: pt over the hold time > 24 hrs _____

GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

7. 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: _____

Appendix 6

Additional Documentation Requested by Client

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Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 12/05/03

CLIENT: TNU-HANFORD B01-092

LVL LOT #: 0312L256

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	03LIC081-MB1	Bromide by IC	0.25 u	MG/L	0.25	1.0
		Chloride by IC	0.25 u	MG/L	0.25	1.0
		Fluoride by IC	0.25 u	MG/L	0.25	1.0
		Nitrite by IC	0.25 u	MG/L	0.25	1.0
		Nitrate by IC	0.25 u	MG/L	0.25	1.0
		Sulfate by IC	0.25 u	MG/L	0.25	1.0

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Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 12/05/03

CLIENT: TNU-HANFORD B01-092

LVL LOT #: 0312L256

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR (SPK)
=====	=====	=====	=====	=====	=====	=====	=====
-001	J015M7	Bromide by IC	28.2	0.88	25.0	109.4	5.0
		Chloride by IC	738	221	500	103.5	100
		Fluoride by IC	26.6	0.25	25.0	105.5	5.0
		Nitrite by IC	28.1	1.25u	25.0	112.4	5.0
		Nitrate by IC	966	450	500	103.2	100
		Sulfate by IC	981	458	500	104.6	100
BLANK10	03LIC081-MB1	Bromide by IC	5.0	0.25u	5.0	100.3	1.0
		Chloride by IC	4.8	0.25u	5.0	96.2	1.0
		Fluoride by IC	4.8	0.25u	5.0	96.8	1.0
		Nitrite by IC	4.88	0.25u	5.00	97.6	1.0
		Nitrate by IC	5.16	0.25u	5.00	103.3	1.0
		Sulfate by IC	4.9	0.25u	5.0	98.8	1.0

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Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 12/05/03

CLIENT: TNU-HANFORD B01-092

LVL LOT #: 0312L256

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

SAMPLE	SITE ID	ANALYTE	INITIAL			DILUTION
			RESULT	REPLICATE	RPD	FACTOR (REP)
-001REP	J015M7	Bromide by IC	1.2 u	1.2 u	NC	5.0
		Chloride by IC	221	216	2.4	50.0
		Fluoride by IC	1.2 u	1.2 u	NC	5.0
		Nitrite by IC	1.25u	1.25u	NC	5.0
		Nitrate by IC	450	437	3.0	50.0
		Sulfate by IC	458	452	1.4	50.0
-003REP	J015N0	pH	7.6	7.6	0.0	1.0

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Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 12/11/03

CLIENT: TNUHANFORD B01-092 H2447
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0312L266

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	03LSP046-MB1	Specific Conductance	1.0	u US/CM	1.0	1.0
BLANK10	03LSS172-MB1	Total Dissolved Solids	5.00	u MG/L	5.00	1.0

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Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 12/11/03

CLIENT: TNUHANFORD B01-092 H2447
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0312L266

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR (SPK)
BLANK10	03LSP046-MB1	Specific Conductance	706	1.0 u	718	98.4	1.0
BLANK10	03LSS172-MB1	Total Dissolved Solids	100	5.00u	100	100	1.0
		Total Dissolved Solids	96.0	5.00u	100	96.0	1.0

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Lionville Laboratory, Inc.

INORGANICS DUPLICATE SPIKE REPORT 12/11/03

CLIENT: TNUHANFORD B01-092 H2447
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0312L266

SAMPLE	SITE ID	ANALYTE	SPIKE#1 %RECOV	SPIKE#2 %RECOV	%DIFF
BLANK10	03LSS172-ME1	Total Dissolved Solids	100	96.0	4.1

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Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 12/11/03

CLIENT: TNUHANFORD B01-092 H2447
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0312L266

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR (REP)
-001REP	J015M7	Specific Conductance	2500	2500	0.040	1.0
-002REP	J015M8	Total Dissolved Solids	1970	2140	8.4	1.0

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Lionville Laboratory, Inc.
 INORGANIC ANALYTICAL DATA PACKAGE FOR
 TNU-HANFORD B01-092 **H2447**



LVL LOT # :0312L256

DATE RECEIVED: 12/02/03

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS	ANALYSIS TIME
J015M7							
BROMIDE BY IC	001	W	03LIC081	12/01/03	12/02/03	12/02/03	
BROMIDE BY IC	001 REP	W	03LIC081	12/01/03	12/02/03	12/02/03	
BROMIDE BY IC	001 MS	W	03LIC081	12/01/03	12/02/03	12/02/03	
CHLORIDE BY IC	001	W	03LIC081	12/01/03	12/02/03	12/02/03	
CHLORIDE BY IC	001 REP	W	03LIC081	12/01/03	12/02/03	12/02/03	
CHLORIDE BY IC	001 MS	W	03LIC081	12/01/03	12/02/03	12/02/03	
FLUORIDE BY IC	001	W	03LIC081	12/01/03	12/02/03	12/02/03	
FLUORIDE BY IC	001 REP	W	03LIC081	12/01/03	12/02/03	12/02/03	
FLUORIDE BY IC	001 MS	W	03LIC081	12/01/03	12/02/03	12/02/03	
NITRITE BY IC	001	W	03LIC081	12/01/03	12/02/03	12/02/03	1517
NITRITE BY IC	001 REP	W	03LIC081	12/01/03	12/02/03	12/02/03	1532
NITRITE BY IC	001 MS	W	03LIC081	12/01/03	12/02/03	12/02/03	1546
NITRATE BY IC	001	W	03LIC081	12/01/03	12/02/03	12/02/03	1601
NITRATE BY IC	001 REP	W	03LIC081	12/01/03	12/02/03	12/02/03	1616
NITRATE BY IC	001 MS	W	03LIC081	12/01/03	12/02/03	12/02/03	1631
SULFATE BY IC	001	W	03LIC081	12/01/03	12/02/03	12/02/03	
SULFATE BY IC	001 REP	W	03LIC081	12/01/03	12/02/03	12/02/03	
SULFATE BY IC	001 MS	W	03LIC081	12/01/03	12/02/03	12/02/03	

J015M8

BROMIDE BY IC	002	W	03LIC081	12/01/03	12/02/03	12/02/03	
CHLORIDE BY IC	002	W	03LIC081	12/01/03	12/02/03	12/02/03	
FLUORIDE BY IC	002	W	03LIC081	12/01/03	12/02/03	12/02/03	
NITRITE BY IC	002	W	03LIC081	12/01/03	12/02/03	12/02/03	1646
NITRATE BY IC	002	W	03LIC081	12/01/03	12/02/03	12/02/03	1701
SULFATE BY IC	002	W	03LIC081	12/01/03	12/02/03	12/02/03	

J015N0

PH	003	W	03LPH108	12/01/03	12/02/03	12/02/03	1715
PH	003 REP	W	03LPH108	12/01/03	12/02/03	12/02/03	1712

LAB QC:

BROMIDE BY IC	MB1	W	03LIC081	N/A	12/02/03	12/02/03	
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