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SAF-RC-010
ERDF Semiannual Leachate Analysis
FINAL VALIDATION PACKAGE

COMPLETE COPY OF VALIDATION PACKAGE TO:

Jeanette Duncan (2) H9-02

mip 03/29/06
INITIAL/DATE

COMMENTS:

SDG K0150

SAF-RC-010

RECEIVED
JUN 22 2006
EDMC

Waste Site: ERDF

Date: 22 March 2006
To: Washington Closure Hanford (technical representative)
From: TechLaw, Inc.
Project: ERDF - Semiannual Leachate Analysis
Subject: Wet Chemistry - Data Package No. K0150-LLI

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. k0150 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 | Date |
|-----------|-------------|-------|------------|------------|
| J10V58 | 12/21/05 | Water | C | See note 1 |
| J10V59 | 12/21/05 | Water | C | See note 1 |

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

Data validation was conducted in accordance with the WCH validation statement of work and the Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Amended Record of Decision, Decision Responsiveness Summary and DOE/RL-2001-44, Rev. 0, Proposed Plan for an Amendment to the Environmental Restoration Disposal Facility Record of Decision, Hanford Site, Richland, WA. 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 as follows: 28 days for specific conductance and 7 days for TDS, and 2 days for IC anions.

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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 greater than twice the limit, all nitrite results were rejected and flagged "R".

Due to the holding time being exceeded by greater than twice the limit, all IC anion results (except nitrite) were qualified as estimates and flagged "J".

All other holding times were met for all 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.

- **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.

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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 (MDL) or CRQL, all associated sample results are qualified as estimated and flagged "J". If RPD values are plus or minus two times the MDL/CRQL and the sample concentration is less than five times the MDL/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 MDL/CRQL or plus or minus the MDL/CRQL for positive sample results less than five times the MDL/CRQL. Sample results outside the criteria are qualified as estimates and flagged "J/UJ".

Due to the lack of a TDS duplicate analysis, all TDS results were qualified as estimates and flagged "J".

All other laboratory duplicate results were within the required control limits.

Field Duplicate Samples

One pair of field duplicate samples (J10V58/J10V59) 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/RL-2001-44, Rev. 0, Proposed Plan for an Amendment to the Environmental Restoration Disposal Facility Record of Decision minimum detection limits (MDLs) to ensure that laboratory detection levels meet the required criteria. All nitrite results exceeded the MDL. Under the WCH statement of work, no qualification is required.

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- **Completeness**

Data package No. K0150 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 88%.

MAJOR DEFICIENCIES

Due to the holding time being exceeded by greater than twice the limit, all nitrite results were rejected and flagged "R". Rejected data is unusable and should not be recorded.

MINOR DEFICIENCIES

Due to the holding time being exceeded by greater than twice the limit, all IC anion results (except nitrite) were qualified as estimates and flagged "J". Due to the lack of a TDS duplicate analysis, all TDS results were qualified as estimates and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under the WCH 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.

All nitrite results exceeded the MDL. Under the WCH statement of work, no qualification is required.

REFERENCES

WCH, Contract #20266, *Validation Statement of Work*, Washington Closure Hanford, July 7, 2003.

EPA, 1999, *Amended Record of Decision, Decision Summary and Responsiveness Summary for the Environmental Restoration Disposal Facility, Hanford Site - 200 Area, Benton County, Washington, March 1999*, U.S. Environmental Protection Agency, Region 10, Seattle, Washington.

DOE/RL-2001-44, Rev. 0, *Proposed Plan for an Amendment to the Environmental Restoration Disposal Facility Record of Decision, Hanford Site, Richland, WA*.

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*

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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 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).

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Appendix 2

Summary of Data Qualification

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WET CHEMISTRY DATA QUALIFICATION SUMMARY*

| | | | |
|------------------------|-----------|------------------------|-----------------------|
| SDG: KQ130 | | REVIEWER: Project ERDF | PAGE 1 OF 1 |
| COMMENTS: | | | |
| COMPOUND | QUALIFIER | SAMPLES AFFECTED | REASON |
| Nitrite | R | All | Holding time |
| All (except nitrite) | J | All | Holding time |
| Total dissolved solids | J | All | No duplicate analysis |

* - 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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| | | | | | |
|--|-------------|-------------------|----------|---------------|----------|
| Project: WASHINGTON CLOSURE HANFORD | | | | | |
| Laboratory: Lionville Laboratory Inc. | | | | | |
| Case | | SDG: K0150 | | | |
| Sample Number | | J10V58 | | J10V59 | |
| Remarks | | Duplicate | | | |
| Sample Date | | 12/21/05 | | 12/21/05 | |
| General Chemistry | CRDL | Result | Q | Result | Q |
| Bromide | 0.25 | 0.78 | J | 0.80 | J |
| Chloride | 0.1 | 221 | J | 211 | J |
| Fluoride | 0.05 | 0.27 | J | 0.28 | J |
| Nitrite | 0.05 | 5.00 | UR | 5.00 | UR |
| Nitrate | 0.05 | 324 | J | 316 | J |
| Sulfate | 0.25 | 404 | J | 431 | J |
| Specific conductance* | 0.15 | 2750 | | 2770 | |
| Total dissolved solids | 4.70 | 1860 | J | 1920 | J |

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 02/02/06

CLIENT: TNUHANFORD RC-010 K0150
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0512L982

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|--------|---------|------------------------|--------|---------|-----------------|-----------------|
| -001 | J10V58 | Bromide by IC | 0.78 J | MG/L | 0.25 | 1.0 |
| | | Chloride by IC | 221 | MG/L | 12.5 | 50.0 |
| | | Fluoride by IC | 0.27 | MG/L | 0.25 | 1.0 |
| | | Nitrite by IC | 5.00 | uR MG/L | 5.00 | 20.0 |
| | | Nitrate by IC | 324 J | MG/L | 12.5 | 50.0 |
| | | Sulfate by IC | 404 J | MG/L | 25.0 | 100 |
| | | Specific Conductance | 2750 | US/CM | 1.0 | 1.0 |
| | | Total Dissolved Solids | 1860 J | MG/L | 5.00 | 1.0 |
| -002 | J10V59 | Bromide by IC | 0.80 J | MG/L | 0.25 | 1.0 |
| | | Chloride by IC | 211 | MG/L | 25.0 | 100 |
| | | Fluoride by IC | 0.28 | MG/L | 0.25 | 1.0 |
| | | Nitrite by IC | 5.00 | uR MG/L | 5.00 | 20.0 |
| | | Nitrate by IC | 316 J | MG/L | 25.0 | 100 |
| | | Sulfate by IC | 431 J | MG/L | 25.0 | 100 |
| | | Specific Conductance | 2770 | US/CM | 1.0 | 1.0 |
| | | Total Dissolved Solids | 1920 J | MG/L | 5.00 | 1.0 |

Handwritten:
 R
 3/20/06

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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

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Analytical Report

Client: TNU-HANFORD RC-010 K0150
LVL#: 0512L982

W.O.#: 11343-606-001-9999-00
Date Received: 12-23-05

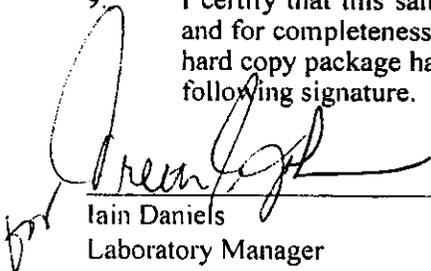
INORGANIC NARRATIVE

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.

Elevated reporting limits for Nitrite are the result of the necessity to dilute the samples to diminish co-elution effects.

LvLI is NELAP accredited by the state of Pennsylvania and holds over 20 additional state accreditations. For a complete list of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager.

3. Sample holding times as required by the method and/or contract were met with the exception of Nitrite and Nitrate (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 LvLI's sample acceptance policy with the exception of Nitrite and Nitrate 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. The duplicate LCS for Total Dissolved Solids (TDS) was within the 20% Relative Percent Difference (RPD) control limit.
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 Specific Conductance were within the 20% Relative Percent Difference (RPD) control limit. Replicate analysis for TDS was not performed due to an analyst's oversight.
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

2/2/06
Date

njpl12-982

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.

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Lionville Laboratory, Inc.
 INORGANIC ANALYTICAL DATA PACKAGE FOR
 TNUHANFORD RC-010 K0150

DATE RECEIVED: 12/23/05

LVL LOT # :0512L982

| CLIENT ID /ANALYSIS | LVL # | MTX | PREP # | COLLECTION | EXTR/PREP | ANALYSIS | ANALYSIS TIME |
|----------------------|---------|-----|----------|------------|-----------|----------|---------------|
| J10V58 | | | | | | | |
| BROMIDE BY IC | 001 | W | 05LIC106 | 12/21/05 | 12/28/05 | 12/28/05 | |
| BROMIDE BY IC | 001 REP | W | 05LIC106 | 12/21/05 | 12/28/05 | 12/28/05 | |
| BROMIDE BY IC | 001 MS | W | 05LIC106 | 12/21/05 | 12/28/05 | 12/28/05 | |
| CHLORIDE BY IC | 001 | W | 05LIC106 | 12/21/05 | 12/28/05 | 12/29/05 | |
| CHLORIDE BY IC | 001 REP | W | 05LIC106 | 12/21/05 | 12/28/05 | 12/29/05 | |
| CHLORIDE BY IC | 001 MS | W | 05LIC106 | 12/21/05 | 12/28/05 | 12/29/05 | |
| FLUORIDE BY IC | 001 | W | 05LIC106 | 12/21/05 | 12/28/05 | 12/28/05 | |
| FLUORIDE BY IC | 001 REP | W | 05LIC106 | 12/21/05 | 12/28/05 | 12/28/05 | |
| FLUORIDE BY IC | 001 MS | W | 05LIC106 | 12/21/05 | 12/28/05 | 12/28/05 | |
| NITRITE BY IC | 001 | W | 05LIC106 | 12/21/05 | 12/28/05 | 12/29/05 | 1459 |
| NITRITE BY IC | 001 REP | W | 05LIC106 | 12/21/05 | 12/28/05 | 12/29/05 | 1514 |
| NITRITE BY IC | 001 MS | W | 05LIC106 | 12/21/05 | 12/28/05 | 12/29/05 | 1528 |
| NITRATE BY IC | 001 | W | 05LIC106 | 12/21/05 | 12/28/05 | 12/29/05 | 1414 |
| NITRATE BY IC | 001 REP | W | 05LIC106 | 12/21/05 | 12/28/05 | 12/29/05 | 1431 |
| NITRATE BY IC | 001 MS | W | 05LIC106 | 12/21/05 | 12/28/05 | 12/29/05 | 1445 |
| SULFATE BY IC | 001 | W | 05LIC106 | 12/21/05 | 12/28/05 | 12/29/05 | |
| SULFATE BY IC | 001 REP | W | 05LIC106 | 12/21/05 | 12/28/05 | 12/29/05 | |
| SULFATE BY IC | 001 MS | W | 05LIC106 | 12/21/05 | 12/28/05 | 12/29/05 | |
| SPECIFIC CONDUCTANCE | 001 | W | 05LSP025 | 12/21/05 | 12/29/05 | 12/29/05 | |
| SPECIFIC CONDUCTANCE | 001 REP | W | 05LSP025 | 12/21/05 | 12/29/05 | 12/29/05 | |
| TOTAL DISSOLVED SOLI | 001 | W | 05LSSB37 | 12/21/05 | 12/27/05 | 12/27/05 | |

J10V59

| | | | | | | | |
|----------------------|-----|---|----------|----------|----------|----------|------|
| BROMIDE BY IC | 002 | W | 05LIC106 | 12/21/05 | 12/28/05 | 12/28/05 | |
| CHLORIDE BY IC | 002 | W | 05LIC106 | 12/21/05 | 12/28/05 | 12/29/05 | |
| FLUORIDE BY IC | 002 | W | 05LIC106 | 12/21/05 | 12/28/05 | 12/28/05 | |
| NITRITE BY IC | 002 | W | 05LIC106 | 12/21/05 | 12/28/05 | 12/29/05 | 1612 |
| NITRATE BY IC | 002 | W | 05LIC106 | 12/21/05 | 12/28/05 | 12/29/05 | 1543 |
| SULFATE BY IC | 002 | W | 05LIC106 | 12/21/05 | 12/28/05 | 12/29/05 | |
| SPECIFIC CONDUCTANCE | 002 | W | 05LSP025 | 12/21/05 | 12/29/05 | 12/29/05 | |
| TOTAL DISSOLVED SOLI | 002 | W | 05LSSB37 | 12/21/05 | 12/27/05 | 12/27/05 | |

LAB QC:

| | | | | | | | |
|---------------|-----|---|----------|-----|----------|----------|--|
| BROMIDE BY IC | MB1 | W | 05LIC106 | N/A | 12/28/05 | 12/28/05 | |
|---------------|-----|---|----------|-----|----------|----------|--|

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Lionville Laboratory, Inc.
 INORGANIC ANALYTICAL DATA PACKAGE FOR
 TNUHANFORD RC-010 K0150

DATE RECEIVED: 12/23/05

LVL LOT # :0512L982

| CLIENT ID /ANALYSIS | LVL # | MTX | PREP # | COLLECTION | EXTR/PREP | ANALYSIS |
|----------------------|---------|-----|----------|------------|-----------|----------|
| BROMIDE BY IC | MB1 BS | W | 05LIC106 | N/A | 12/28/05 | 12/28/05 |
| CHLORIDE BY IC | MB1 | W | 05LIC106 | N/A | 12/28/05 | 12/28/05 |
| CHLORIDE BY IC | MB1 BS | W | 05LIC106 | N/A | 12/28/05 | 12/28/05 |
| FLUORIDE BY IC | MB1 | W | 05LIC106 | N/A | 12/28/05 | 12/28/05 |
| FLUORIDE BY IC | MB1 BS | W | 05LIC106 | N/A | 12/28/05 | 12/28/05 |
| NITRITE BY IC | MB1 | W | 05LIC106 | N/A | 12/28/05 | 12/28/05 |
| NITRITE BY IC | MB1 BS | W | 05LIC106 | N/A | 12/28/05 | 12/28/05 |
| NITRATE BY IC | MB1 | W | 05LIC106 | N/A | 12/28/05 | 12/28/05 |
| NITRATE BY IC | MB1 BS | W | 05LIC106 | N/A | 12/28/05 | 12/28/05 |
| SULFATE BY IC | MB1 | W | 05LIC106 | N/A | 12/28/05 | 12/28/05 |
| SULFATE BY IC | MB1 BS | W | 05LIC106 | N/A | 12/28/05 | 12/28/05 |
| SPECIFIC CONDUCTANCE | MB1 | W | 05LSP025 | N/A | 12/29/05 | 12/29/05 |
| SPECIFIC CONDUCTANCE | MB1 BS | W | 05LSP025 | N/A | 12/29/05 | 12/29/05 |
| TOTAL DISSOLVED SOLI | MB1 | W | 05LSSB37 | N/A | 12/27/05 | 12/27/05 |
| TOTAL DISSOLVED SOLI | MB1 BS | W | 05LSSB37 | N/A | 12/27/05 | 12/27/05 |
| TOTAL DISSOLVED SOLI | MB1 BSD | W | 05LSSB37 | N/A | 12/27/05 | 12/27/05 |

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-010-1

Page 1 of 1

| | | | | | |
|--|------------------------------------|---|--------------------------------------|------------------|----------------------------|
| Collector GALE, SJ / RZ Steffler | Company Contact JOAN KESSNER | Telephone No. 375-4688 | Project Coordinator KESSNER, JH | Price Code 7N | Data Turnaround 45 Days |
| Project Designation ERDF Semiannual Leachate Analysis | Sampling Location ERDF | SAF No. RC-010 | Air Quality <input type="checkbox"/> | | |
| Ice Chest No. SML-363 | Field Logbook No. EL-1518-2 | COA RERDF22560 | Method of Shipment FED EX | | |
| Shipped To EBERLINE SERVICES <u>LIONVILLE</u> | Offsite Property No. A06018/139 | Bill of Lading/Air Bill No. SEE OSPC | | | |

| | | | | | | | | | | | |
|---|---------------------|----------------------------|----------------|---------|---------|---------|----------------|---------------|--------|--|--|
| POSSIBLE SAMPLE HAZARDS/REMARKS POTENTIALLY RADIOACTIVE <DOT REGULATED AND CORROSIVE Special Handling and/or Storage COOL 4C | Preservation | HCl or H2SO4 to pH < 2 Cor | HNO3 to pH < 2 | Cool 4C | Cool 4C | Cool 4C | HNO3 to pH < 2 | HCl to pH < 2 | None | | |
| | Type of Container | g/Gs* | G/P | G/P | P | P | G/P | G/P | G/P | | |
| | No. of Container(s) | 3 | 1 | 1 | 1 | 1 | 2 | 1 | 4 | | |
| | Volume | 40mL | 500mL | 500mL | 500mL | 500mL | 1000mL | 250mL | 1000mL | | |

| | | | | | | | | | | | |
|--------|-----------------|--|--|--|---------------------------------------|-------------|---------------------|---------------------------------------|--|---------------|------------------------------------|
| 000018 | SAMPLE ANALYSIS | | | VOA - 6260A (TCL) (Carbon tetrachloride) | See item (1) in Special Instructions. | TDS - 160.1 | Conductivity - 9050 | See item (2) in Special Instructions. | Gross Alpha, Gross Beta, Total Uranium, Total Radium | Technetium-99 | Carbon-14 Medium Level, Iodine-129 |
|--------|-----------------|--|--|--|---------------------------------------|-------------|---------------------|---------------------------------------|--|---------------|------------------------------------|

| Sample No. | Matrix * | Sample Date | Sample Time | X | X | X | X | X | X | X | X |
|------------|----------|-------------|-------------|---|---|---|---|---|---|---|---|
| J10V58 | WATER | 12-21-05 | 1044 | X | X | X | X | X | X | X | X |
| J10V59 | WATER | 12-21-05 | 1038 | X | X | X | X | X | X | X | X |
| J10V60 | WATER | 12-12-05 | 1655 | X | | | | | | | X |

| | | | | | | | | |
|---|----------------------------|-----------------------------------|----------------------------|--|--|--|--|--|
| CHAIN OF POSSESSION | | Sign/Print Names | | SPECIAL INSTRUCTIONS | | | | Matrix * |
| Relinquished By/Removed From RZ Steffler RZ Steffler | Date/Time 12-21-05 1245 | Received By/Stored In Fed Ex | Date/Time | (1) ICP Metals - 6010A (TAL) (Barium, Chromium, Vanadium, Zinc); ICP Metals - 6010A (Add-on) (Arsenic, Beryllium, Lead, Selenium, Tin) (2) IC Anions - 300.0 (Bromide, Chloride, Fluoride, Nitrate, Nitrite, Sulfate) | | | | S=Soil SE=Sediment SO=Solid SL=Sludge W=Water O=Oil A=Air DS=Drum Solids TL=Drum Liquids T=Tissue WL=Wipe L=Liquid V=Vegetation X=Other |
| Relinquished By/Removed From Fed Ex | Date/Time 12-23-05/1100 | Received By/Stored In J. Smith | Date/Time 12-23-05/1100 | | | | | |
| 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 | | | | | |

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

Appendix 5
Data Validation Supporting Documentation

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GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

| | | | | | |
|--------------------|------------|----------|---------------------|----------------|----------------------------------|
| VALIDATION LEVEL: | A | B | C | D | E |
| PROJECT: | ERDF | | DATA PACKAGE: K0150 | | |
| VALIDATOR: | TLI | LAB: | LLI | DATE: 3/20/08 | |
| | | | SDG: K0150 | | |
| 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 | S | |
| SAMPLES/MATRIX | | | | | |
| J10V58 J10V59 | | | | | |
| Water | | | | | |

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 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 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 PS

GENERAL CHEMISTRY 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: no TDS duplicate - J all

6. HOLDING TIMES (all levels)

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

Comments: all outside Held the 72x R nitrate
J all other

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

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: all nitrate over

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Appendix 6

Additional Documentation Requested by Client

000024

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 02/02/06

CLIENT: TNUHANFORD RC-010 K0150
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0512L982

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---------|--------------|------------------------|--------|-------|--------------------|--------------------|
| BLANK10 | 05LIC106-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 |
| | | Phosphate by IC | 0.25 u | MG/L | 0.25 | 1.0 |
| | | Sulfate by IC | 0.25 u | MG/L | 0.25 | 1.0 |
| BLANK10 | 05LSP025-MB1 | Specific Conductance | 1.0 u | US/CM | 1.0 | 1.0 |
| BLANK10 | 05LSSB37-MB1 | Total Dissolved Solids | 5.00 u | MG/L | 5.00 | 1.0 |

000025

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 02/02/06

CLIENT: TNUHANFORD RC-010 K0150
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0512L982

| SAMPLE | SITE ID | ANALYTE | SPIKED SAMPLE | INITIAL RESULT | SPIKED AMOUNT | %RECOV | DILUTION FACTOR (SPK) |
|---------|--------------|------------------------|------------------|-------------------|------------------|--------|--------------------------|
| -001 | J10V58 | Bromide by IC | 10.1 | 0.78 | 10.0 | 93.1 | 2.0 |
| | | Chloride by IC | 724 | 221 | 500 | 100.7 | 100 |
| | | Fluoride by IC | 9.6 | 0.27 | 10.0 | 93.0 | 2.0 |
| | | Nitrite by IC | 240 | 5.00u | 250 | 96.2 | 50.0 |
| | | Nitrate by IC | 794 | 324 | 500 | 94.0 | 100 |
| | | Sulfate by IC | 1390 | 404 | 1000 | 98.1 | 200 |
| BLANK10 | 05LIC106-MB1 | Bromide by IC | 5.0 | 0.25u | 5.0 | 101.0 | 1.0 |
| | | Chloride by IC | 4.8 | 0.25u | 5.0 | 95.3 | 1.0 |
| | | Fluoride by IC | 4.9 | 0.25u | 5.0 | 97.9 | 1.0 |
| | | Nitrite by IC | 5.14 | 0.25u | 5.00 | 102.8 | 1.0 |
| | | Nitrate by IC | 5.14 | 0.25u | 5.00 | 102.9 | 1.0 |
| | | Phosphate by IC | 5.2 | 0.25u | 5.0 | 103.6 | 1.0 |
| | | Sulfate by IC | 4.9 | 0.25u | 5.0 | 98.0 | 1.0 |
| BLANK10 | 05LSP025-MB1 | Specific Conductance | 720 | 1.0 u | 718 | 100.3 | 1.0 |
| BLANK10 | 05LSSB37-MB1 | Total Dissolved Solids | 103 | 5.00u | 100 | 103.0 | 1.0 |
| | | Total Dissolved Solids | 101 | 5.00u | 100 | 101.0 | 1.0 |

000026

Lionville Laboratory, Inc.

INORGANICS DUPLICATE SPIKE REPORT 02/02/06

CLIENT: TNUHANFORD RC-010 K0150
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0512L982

| SAMPLE | SITE ID | ANALYTE | SPIKE#1 %RECOV | SPIKE#2 %RECOV | %DIFF |
|---------|--------------|------------------------|-------------------|-------------------|-------|
| BLANK10 | 05LSSB37-MB1 | Total Dissolved Solids | 103.0 | 101.0 | 2.0 |

000027

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 02/02/06

CLIENT: TNUHANFORD RC-010 K0150
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0512L982

| SAMPLE | SITE ID | ANALYTE | INITIAL RESULT | REPLICATE | RPD | DILUTION FACTOR (REP) |
|---------|---------|----------------------|-------------------|-----------|------|--------------------------|
| -001REP | J10V58 | Bromide by IC | 0.78 | 0.90 | 13.7 | 1.0 |
| | | Chloride by IC | 221 | 222 | 0.30 | 50.0 |
| | | Fluoride by IC | 0.27 | 0.28 | 3.9 | 1.0 |
| | | Nitrite by IC | 5.00u | 5.00u | NC | 20.0 |
| | | Nitrate by IC | 324 | 290 | 11.0 | 50.0 |
| | | Sulfate by IC | 404 | 410 | 1.4 | 100 |
| | | Specific Conductance | 2750 | 2730 | 0.66 | 1.0 |

000028

Date: 22 March 2006
To: Washington Closure Hanford (technical representative)
From: TechLaw, Inc.
Project: ERDF - Semiannual Leachate Analysis
Subject: Radiochemistry - Data Package No. K0150-EB

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. K0150, 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 | Date |
|-----------|-------------|-------|------------|------------|
| J10V58 | 12/21/05 | Water | C | See note 1 |
| J10V59 | 12/21/05 | 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 WCH validation statement of work and the Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Amended Record of Decision, Decision Responsiveness Summary and DOE/RL-2001-44, Rev. 0, Proposed Plan for an Amendment to the Environmental Restoration Disposal Facility Record of Decision, Hanford Site, Richland, WA. 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.

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- **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.

- **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.

Due to an LCS recovery outside QC limits (66%), all gross alpha results were qualified as estimates and flagged "J".

All other 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

000002

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 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 (J10V58/J10V59) was submitted to EB for analysis. The duplicate sample results were compared using the same validation guidelines as for laboratory duplicates. All field duplicate results were acceptable.

• **Detection Levels**

Reported analytical detection levels are compared against the DOE/RL-2001-44, Rev. 0, Proposed Plan for an Amendment to the Environmental Restoration Disposal Facility Record of Decision minimum detection limits (MDLs) to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels met the analyte specific MDL.

• **Completeness**

Data package SDG No. K0150 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to an LCS recovery outside QC limits (66%), all gross alpha results were qualified as estimates and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under the WCH statement of work, the

CC0003

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*, Washington Closure Hanford, July 7, 2003.

EPA, 1999, *Amended Record of Decision, Decision Summary and Responsiveness Summary for the Environmental Restoration Disposal Facility*, Hanford Site - 200 Area, Benton County, Washington, March 1999, U.S. Environmental Protection Agency, Region 10, Seattle, Washington.

DOE/RL-2001-44, Rev. 0, *Proposed Plan for an Amendment to the Environmental Restoration Disposal Facility Record of Decision, Hanford Site, Richland, WA.*

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 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.

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Appendix 2

Summary of Data Qualification

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RADIOCHEMISTRY DATA QUALIFICATION SUMMARY*

| | | | | |
|-------------|-----------|-------------------------|------------------|-------------|
| SDG: K0150 | | REVIEWED BY: [REDACTED] | ERDF: [REDACTED] | PAGE 1 OF 1 |
| COMMENTS: | | | | |
| COMPOUND | QUALIFIER | SAMPLES AFFECTED | REASON | |
| Gross alpha | J | All | LCS recovery | |

* - 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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| | | | | | | | | | |
|--|-------------------|---------------|-----------|---------------|----------|---------------|----------|---------------|----------|
| Project: WASHINGTON CLOSURE HANFORD | | | | | | | | | |
| Laboratory: EB | | | | | | | | | |
| Case | SDG: K0150 | | | | | | | | |
| Sample Number | J10V58 | | J10V59 | | | | | | |
| Remarks | | | Duplicate | | | | | | |
| Sample Date | 12/21/05 | | 12/21/05 | | | | | | |
| Radiochemistry | CRDL | Result | Q | Result | Q | Result | Q | Result | Q |
| Gross Alpha | 3 | 340 | J | 444 | J | | | | |
| Gross Beta | 4 | 471 | | 530 | | | | | |
| Carbon-14 | | 25.3 | U | 12.8 | U | | | | |
| Technetium-99 | | 612 | | 631 | | | | | |
| Total Uranium (ug/L) | | 754 | | 941 | | | | | |
| Total Radium | | 0.135 | U | -0.020 | U | | | | |
| Iodine-129 | | 0.844 | U | 0.951 | U | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
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Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP K0150

7358-001

J10V58

DATA SHEET

| | | |
|-----------------------------------|--|------------------|
| SDG <u>7358</u> | Client/Case no <u>Hanford</u> | SDG <u>K0150</u> |
| Contact <u>Melissa C. Mannion</u> | Contract No. <u>630</u> | |
| Lab sample id <u>R512142-01</u> | Client sample id <u>J10V58</u> | |
| Dept sample id <u>7358-001</u> | Location/Matrix <u>ERDF</u> | <u>WATER</u> |
| Received <u>12/23/05</u> | Collected/Volume <u>12/21/05 10:44</u> | <u>6.5 L</u> |
| | Custody/SAF No <u>RC-010-1</u> | <u>RC-010</u> |

| ANALYTE | CAS NO | RESULT pCi/L | 2σ ERR (COUNT) | MDA pCi/L | RDL pCi/L | QUALIFIERS | TEST |
|----------------------|------------|-----------------|-------------------|--------------|--------------|------------|------|
| Gross Alpha | 12587-46-1 | 340 | 32 | <u>8.1</u> | 3.0 | <u>J</u> | 93A |
| Gross Beta | 12587-47-2 | 471 | 15 | <u>6.2</u> | 4.0 | | 93B |
| Carbon 14 | 14762-75-5 | 25.3 | 47 | 79 | 200 | U | C |
| Technetium 99 | 14133-76-7 | 612 | 13 | 4.2 | 15 | | TC |
| Total Uranium (ug/L) | 7440-61-1 | 754 | 90 | <u>4.1</u> | 0.10 | | U_T |
| Total Radium | ALPHA-RA | 0.135 | 0.17 | 0.57 | 1.0 | U | RAT |
| Iodine 129 | 15046-84-1 | 0.844 | 3.7 | <u>8.5</u> | 5.0 | U | I |

ERDF Semiannual Leachate Analysis

K
3/20/06

| |
|-----------------------------|
| 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>02/13/06</u> |

000011

EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP K0150

7358-002

J10V59

D A T A S H E E T

| | | |
|-----------------------------------|--|------------------|
| SDG <u>7358</u> | Client/Case no <u>Hanford</u> | SDG <u>K0150</u> |
| Contact <u>Melissa C. Mannion</u> | Contract No. <u>630</u> | |
| Lab sample id <u>R512142-02</u> | Client sample id <u>J10V59</u> | |
| Dept sample id <u>7358-002</u> | Location/Matrix <u>ERDF</u> | <u>WATER</u> |
| Received <u>12/23/05</u> | Collected/Volume <u>12/21/05 10:38</u> | <u>6.5 L</u> |
| | Custody/SAF No <u>RC-010-1</u> | <u>RC-010</u> |

| ANALYTE | CAS NO | RESULT pCi/L | 2σ ERR (COUNT) | MDA pCi/L | RDL pCi/L | QUALIFIERS | TEST |
|----------------------|------------|-----------------|-------------------|--------------|--------------|------------|------|
| Gross Alpha | 12587-46-1 | 444 | 37 | <u>8.8</u> | 3.0 | J | 93A |
| Gross Beta | 12587-47-2 | 530 | 15 | <u>4.7</u> | 4.0 | | 93B |
| Carbon 14 | 14762-75-5 | 12.8 | 45 | 76 | 200 | U | C |
| Technetium 99 | 14133-76-7 | 631 | 13 | 4.3 | 15 | | TC |
| Total Uranium (ug/L) | 7440-61-1 | 941 | 110 | <u>4.1</u> | 0.10 | | U_T |
| Total Radium | ALPHA-RA | -0.020 | 0.097 | 0.44 | 1.0 | U | RAT |
| Iodine 129 | 15046-84-1 | 0.951 | 3.2 | <u>7.2</u> | 5.0 | U | I |

ERDF Semiannual Leachate Analysis

R
3/20/06

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| |
|-----------------------------|
| 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>02/13/06</u> |

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

000013

1.0 GENERAL

Washington Closure Hanford (WCH) Sample Delivery Group K0150 was composed of two water samples designated under SAF No. RC-010 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 WCH via e-mail on February 13, 2006.

2.0 ANALYSIS NOTES

2.1 Gross Alpha and Gross Beta Analysis

The gross alpha LCS (68%) was below the contract lower limit of 70%. No other problems were encountered during the course of the analyses.

2.2 Carbon-14 Analysis

No problems were encountered during the course of the analyses.

2.3 Iodine-129 Analysis

No problems were encountered during the course of the analyses.

2.4 Technetium-99 Analysis

No problems were encountered during the course of the analyses.

2.5 Total Radium Analysis

No problems were encountered during the course of the analyses.

2.6 Total Uranium Analysis

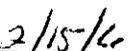
No problems were encountered during the course of the analyses.

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



Date

000014

| Washington Closure Hanford | | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | | | | | RC-010-1 | | Page 1 of 1 | | | |
|--|-------|--|---------------------------------------|---|---------------------|---------------------------------------|--|--|------------------------------------|----------------------------|--|---|
| Collector GALE, SJ / RZ Steffler | | Company Contact JOAN KESSNER | | Telephone No. 375-4688 | | Project Coordinator KESSNER, JH | | Price Code 7N | | Data Turnaround 45 Days | | |
| Project Designation ERDF Semiannual Leachate Analysis | | Sampling Location ERDF | | K0150 (7358) | | SAF No. RC-010 | | Air Quality | | | | |
| Ice Chest No. ERC-99-046 | | Field Logbook No. EL-1518-2 | | COA RERDF22560 | | Method of Shipment FED EX | | | | | | |
| Shipped To EBERLINE SERVICES LIONVILLE | | Offsite Property No. A 060181 | | Bill of Lading/Air Bill No. SEE OSPC | | | | | | | | |
| POSSIBLE SAMPLE HAZARDS/REMARKS POTENTIALLY RADIOACTIVE <DOT REGULATED AND CORROSIVE Special Handling and/or Storage None | | Preservation | HCl or H2SO4 to pH <2 Cool | HNO3 to pH <2 | Cool 4C | Cool 4C | Cool 4C | HNO3 to pH <2 | HCl to pH <2 | None | | |
| | | Type of Container | aGs* | G/P | G/P | P | P | G/P | G/P | G/P | | |
| | | No. of Container(s) | 3 | 1 | 1 | 1 | 1 | 2 | 1 | 4 | | |
| | | Volume | 40mL | 500mL | 500mL | 500mL | 500mL | 1000mL | 250mL | 1000mL | | |
| SAMPLE ANALYSIS | | VOA - 8260A (TCL) [Carbon tetrachloride] | See item (1) in Special Instructions. | TDS - 160.1 | Conductivity - 9050 | See item (2) in Special Instructions. | Gross Alpha, Gross Beta, Total Uranium, Total Radium | Technetium-99 | Carbon-14 Medium Level, Iodine-129 | | | |
| | | Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | |
| J10V58 | WATER | 12-21-05 | 10491048 | | | | X | X | X | | | |
| J10V59 | WATER | 12-21-05 | 10491038 | | | | X | X | X | | | |
| J10V60 | WATER | | | | | | | | | | | |
| CHAIN OF POSSESSION | | | | Sign/Print Names | | | | SPECIAL INSTRUCTIONS | | | | Matrix * |
| Relinquished By/Removed From | | Date/Time | | Received By/Stored In | | Date/Time | | (1) ICP Metals - 6010A (TAL) ; Barium, Chromium, Vanadium, Zinc; ; ICP Metals - 6010A (Add-on) ; Arsenic, Beryllium, Lead, Selenium, Tin) (2) IC Anions - 300.0 ; Bromide, Chloride, Fluoride, Nitrate, Nitrite, Sulfate) | | | | S= Soil SE= Sediment SO= Solid SL= Sludge W = Water O= Oil A= Air DS= Dross Solids DL= Dross Liquids T= Tissue WI= Wipe L= Liquid V= Vegetation X= Other |
| RZ Steffler | | 12/25/05 | | Fed Ex | | 12/23/05 11:50 | | | | | | |
| FED EX | | | | MFW | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| LABORATORY SECTION | | Received By | | Title | | | | Date/Time | | | | |
| FINAL SAMPLE DISPOSITION | | Disposal Method | | Disposed By | | | | Date/Time | | | | |

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Appendix 5
Data Validation Supporting Documentation

000016

**APPENDIX A
RADIOCHEMICAL DATA VALIDATION CHECKLIST**

| | | | | | |
|---------------------------|--------------|----------------------|--------------------|---------------------|--------------|
| VALIDATION LEVEL: | A | B | <u>C</u> | D | E |
| PROJECT: | ERDF | | DATA PACKAGE: | K0150 | |
| VALIDATOR: | TLI | LAB: | LLI | DATE: | 3/20/00 |
| | | SDG: | K0150 | | |
| ANALYSES PERFORMED | | | | | |
| <u>Gross Alpha/Beta</u> | Strontium-90 | <u>Technetium-99</u> | Alpha Spectroscopy | Gamma Spectroscopy | |
| <u>Total Uranium</u> | Radium-22 | <u>Thium</u> | <u>C-14</u> | <u>total radium</u> | <u>1-129</u> |
| SAMPLES/MATRIX | | | | | |
| | J10V58 | J10V59 | | | |
| | | | | | |
| | | | | | |
| | | | | | water |

1. Completeness N/A

Technical verification forms present? Yes No N/A

Comments: _____

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

Instruments/detectors calibrated? Yes No N/A

Initial calibration acceptable? Yes No N/A

Standards NIST traceable? Yes No N/A

Standards Expired? Yes No N/A

Calculation check acceptable? Yes No N/A

Comments: _____

3. Continuing Calibration (Levels D, E)

N/A

Calibration checked within required frequency? Yes No N/A

Calibration check acceptable? Yes No N/A

Calibration check standards traceable? Yes No N/A

Calibration check standards expired? Yes No N/A

Calculation check acceptable? Yes No N/A

Comments: _____

4. Background Counts (Levels D, E)

N/A

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

Background Counts acceptable? Yes No N/A

Calculation check acceptable? Yes No N/A

Comments: _____

5. Blanks (Levels B, C, D, E) N/A
Method blank analyzed within required frequency? Yes No N/A
Method blank results acceptable? Yes No N/A
Analytes detected in method blank? Yes No N/A
Field blank(s) analyzed? Yes No N/A
Field blank results acceptable? Yes No N/A
Analytes detected in field blank(s)? Yes No N/A
Transcription/Calculation Errors? (Levels D, E) Yes No N/A
Comments: 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: gross alpha 6870

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

000019

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: NO MS - JALC-14

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 PAS or FS

12. Holding Times (All levels)

Are sample holding times acceptable? Yes No N/A

Comments: _____

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

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

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

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

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

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

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

Comments: _____

Appendix 6

Additional Documentation Requested by Client

000023

EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP K0150

7358-004

Method Blank

METHOD BLANK

| | | |
|-----------------------------------|--------------------------------------|------------------|
| SDG <u>7358</u> | Client/Case no <u>Hanford</u> | SDG <u>K0150</u> |
| Contact <u>Melissa C. Mannion</u> | Contract No. <u>630</u> | |
| Lab sample id <u>R512142-04</u> | Client sample id <u>Method Blank</u> | |
| Dept sample id <u>7358-004</u> | Material/Matrix <u>WATER</u> | |
| | SAF No <u>RC-010</u> | |

| ANALYTE | CAS NO | RESULT pCi/L | 2σ ERR (COUNT) | MDA pCi/L | RDL pCi/L | QUALI- FIERS | TEST |
|----------------------|------------|-----------------|-------------------|--------------|--------------|-----------------|------|
| Gross Alpha | 12587-46-1 | 0.350 | 1.6 | <u>3.3</u> | 3.0 | U | 93A |
| Gross Beta | 12587-47-2 | 0.442 | 4.8 | <u>8.0</u> | 4.0 | U | 93B |
| Carbon 14 | 14762-75-5 | -24.7 | 45 | 77 | 200 | U | C |
| Technetium 99 | 14133-76-7 | 0.042 | 1.8 | 5.0 | 15 | U | TC |
| Total Uranium (ug/L) | 7440-61-1 | -0.005 | 0.017 | 0.041 | 0.10 | U | U_T |
| Total Radium | ALPHA-RA | -0.002 | 0.15 | 0.60 | 1.0 | U | RAT |
| Iodine 129 | 15046-84-1 | -3.44 | 8.9 | <u>20</u> | 5.0 | U | I |

ERDF Semiannual Leachate Analysis

QC-BLANK #55712

| |
|-----------------------------|
| 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>02/13/06</u> |

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0150

7358-003

Lab Control Sample

LAB CONTROL SAMPLE

| | |
|-----------------------------------|---|
| SDG <u>7358</u> | Client/Case no <u>Hanford</u> SDG <u>K0150</u> |
| Contact <u>Melissa C. Mannion</u> | Contract No. <u>630</u> |
| Lab sample id <u>R512142-03</u> | Client sample id <u>Lab Control Sample</u> |
| Dept sample id <u>7358-003</u> | Material/Matrix <u>WATER</u> |
| | SAF No <u>RC-010</u> |

| ANALYTE | RESULT | 2σ ERR | MDA | RDL | QUALI- | ADDED | 2σ ERR | REC | 3σ | LMTS | PROTOCOL |
|----------------------|--------|---------|-------------|-------|------------|-------|--------|-----------|--------|---------|----------|
| | pCi/L | (COUNT) | pCi/L | pCi/L | FIERS TEST | | pCi/L | pCi/L | % | (TOTAL) | LIMITS |
| Gross Alpha | 145 | 15 | <u>4.6</u> | 3.0 | 93A | 214 | 8.6 | <u>68</u> | 76-124 | 70-130 | |
| Gross Beta | 203 | 10 | <u>5.6</u> | 4.0 | 93B | 197 | 7.9 | 103 | 75-125 | 80-120 | |
| Carbon 14 | 15800 | 210 | 75 | 200 | C | 15900 | 640 | 99 | 84-116 | 80-120 | |
| Technetium 99 | 1080 | 19 | 3.5 | 15 | TC | 1090 | 44 | 99 | 84-116 | 80-120 | |
| Total Uranium (ug/L) | 85.0 | 9.7 | <u>0.41</u> | 0.10 | U_T | 82.5 | 3.3 | 103 | 77-123 | 80-120 | |
| Total Radium | 46.2 | 4.4 | <u>0.64</u> | 1.0 | RAT | 56.0 | 2.2 | <u>82</u> | 85-115 | 80-120 | |
| Iodine 129 | 462 | 19 | <u>39</u> | 5.0 | I | 464 | 19 | 100 | 89-111 | 80-120 | |

ERDF Semiannual Leachate Analysis

QC-LCS #55711

| |
|-----------------------------|
| 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>02/13/06</u> |

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0150

7358-005

J10V58

DUPLICATE

| | | |
|-----------------------------------|---------------------------------|---|
| SDG <u>7358</u> | Client/Case no <u>Hanford</u> | SDG <u>K0150</u> |
| Contact <u>Melissa C. Mannion</u> | Contract No. <u>630</u> | |
| DUPLICATE | ORIGINAL | |
| Lab sample id <u>R512142-05</u> | Lab sample id <u>R512142-01</u> | Client sample id <u>J10V58</u> |
| Dept sample id <u>7358-005</u> | Dept sample id <u>7358-001</u> | Location/Matrix <u>ERDF</u> <u>WATER</u> |
| | Received <u>12/23/05</u> | Collected/Volume <u>12/21/05 10:44</u> <u>6.5 L</u> |
| | | Custody/SAF No <u>RC-010-1</u> <u>RC-010</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 | DER σ |
|----------------------|--------------------|-------------------|--------------|--------------|-----------------|------|-------------------|-------------------|--------------|-----------------|----------|-----------|----------|
| Gross Alpha | 306 | 30 | <u>8.3</u> | 3.0 | | 93A | 340 | 32 | <u>8.1</u> | | 11 | 47 | 0.7 |
| Gross Beta | 459 | 15 | <u>6.5</u> | 4.0 | | 93B | 471 | 15 | <u>6.2</u> | | 3 | 33 | 0.2 |
| Carbon 14 | 14.0 | 45 | 75 | 200 | U | C | 25.3 | 47 | 79 | U | - | | 0.3 |
| Technetium 99 | 527 | 14 | 5.2 | 15 | | TC | 612 | 13 | 4.2 | | 15 | 22 | 2.0 |
| Total Uranium (ug/L) | 760 | 91 | <u>4.1</u> | 0.10 | | U_T | 754 | 90 | <u>4.1</u> | | 1 | 32 | 0.1 |
| Total Radium | 0.020 | 0.14 | 0.57 | 1.0 | U | RAT | 0.135 | 0.17 | 0.57 | U | - | | 1.0 |
| Iodine 129 | 3.37 | 6.5 | <u>15</u> | 5.0 | U | I | 0.844 | 3.7 | <u>8.5</u> | U | - | | 0.7 |

ERDF Semiannual Leachate Analysis

QC-DUP#1 55713

DUPLICATES

Page 1

SUMMARY DATA SECTION

Page 10

| |
|-----------------------------|
| 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>02/13/06</u> |

000026

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0150

7358-006

J10V59

MATRIX SPIKE

| | | |
|-----------------------------------|---------------------------------|---|
| SDG <u>7358</u> | Client/Case no <u>Hanford</u> | <u>SDG K0150</u> |
| Contact <u>Melissa C. Mannion</u> | Contract No. <u>630</u> | |
| MATRIX SPIKE | ORIGINAL | |
| Lab sample id <u>R512142-06</u> | Lab sample id <u>R512142-02</u> | Client sample id <u>J10V59</u> |
| Dept sample id <u>7358-006</u> | Dept sample id <u>7358-002</u> | Location/Matrix <u>ERDF</u> <u>WATER</u> |
| | Received <u>12/23/05</u> | Collected/Volume <u>12/21/05 10:38</u> <u>6.5 L</u> |
| | | Custody/SAF No <u>RC-010-1</u> <u>RC-010</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 (TOTAL) | PROTOCOL LIMITS |
|-----------|----------------|-------------------|--------------|--------------|----------------------|----------------|-----------------|-------------------|-------------------|---------------------|-----------------|--------------------|
| Carbon 14 | 30100 | 310 | 83 | 200 | C | 31900 | 1300 | 12.8 | 45 | 94 | 85-115 | 60-140 |

ERDF Semiannual Leachate Analysis

QC-MS#2 55714

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>02/13/06</u> |

000027

Date: 22 March 2006
To: Washington Closure Hanford (technical representative)
From: TechLaw, Inc.
Project: ERDF - Semiannual Leachate Analysis
Subject: Volatiles - Data Package No. K0150-LLI

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. K0150 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 | Date |
|-----------|-------------|-------|------------|------------|
| J10V58 | 12/21/05 | Water | C | See note 1 |
| J10V59 | 12/21/05 | Water | C | See note 1 |
| J10V60 | 12/12/05 | Water | C | See note 1 |

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

Data validation was conducted in accordance with the WCH validation statement of work and the Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Amended Record of Decision, Decision Responsiveness Summary and DOE/RL-2001-44, Rev. 0, Proposed Plan for an Amendment to the Environmental Restoration Disposal Facility Record of Decision, Hanford Site, Richland, WA. 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 preserved VOA samples and 7 days for unpreserved samples. 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

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are exceeded by greater than twice the limit, all associated detected 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 greater than twice the limit, all carbon tetrachloride results in sample J10V60 were qualified as estimates and flagged "J".

All other holding times were acceptable.

- **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 (J10V60) was submitted for analysis. No analytes were detected in the trip blank. It should be noted that the trip blank was taken 9 days prior to the sampling event and kept in storage.

- **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

000002

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 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.

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Field Duplicate Samples

One pair of field duplicate samples (J10V58/J10V59) was 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/RL-2001-44, Rev. 0, Proposed Plan for an Amendment to the Environmental Restoration Disposal Facility Record of Decision minimum detection limits (MDLs) to ensure that laboratory detection levels meet the required criteria. All volatile organic results exceeded the MDL. Under the WCH validation SOW, no qualification is required.

Completeness

Data package No. K0150 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 greater than twice the limit, all carbon tetrachloride results in sample J10V60 were qualified as estimates and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under the WCH 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.

All volatile organic results exceeded the MDL. Under the WCH validation SOW, no qualification is required.

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REFERENCES

WCH, Contract #20266, *Validation Statement of Work*, Washington Closure Hanford, July 7, 2003.

EPA, 1999, *Amended Record of Decision, Decision Summary and Responsiveness Summary for the Environmental Restoration Disposal Facility*, Hanford Site - 200 Area, Benton County, Washington, March 1999, U.S. Environmental Protection Agency, Region 10, Seattle, Washington.

DOE/RL-2001-44, Rev. 0, *Proposed Plan for an Amendment to the Environmental Restoration Disposal Facility Record of Decision, Hanford Site, Richland, WA.*

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.

000005

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).

000007

Appendix 2

Summary of Data Qualification

000008

VOLATILE ORGANIC DATA QUALIFICATION SUMMARY*

| SDG: K0150 | | REVIEWER: ERDF | PAGE 1 OF 1 |
|----------------------|-----------|------------------|--------------|
| COMMENTS: | | | |
| COMPOUND | QUALIFIER | SAMPLES AFFECTED | REASON |
| Carbon tetrachloride | J | J10V60 | 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.

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Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

000010

| | | | | | | | | |
|--|--|-------------|---------------|-------------------|---------------|----------|---------------|----------|
| Project: WASHINGTON CLOSURE HANFORD | | | | | | | | |
| Laboratory: LLI | | | | | | | | |
| Case: | | | | SDG: K0150 | | | | |
| Sample Number | | J10V58 | | J10V59 | | J10V60 | | |
| Remarks | | | | Duplicate | | T. Blank | | |
| Sample Date | | 12/21/05 | | 12/21/05 | | 12/12/05 | | |
| Analysis Date | | 12/29/05 | | 12/29/05 | | 12/29/05 | | |
| VOA | | MDL | Result | Q | Result | Q | Result | Q |
| Carbon Tetrachloride | | 0.71 | 5 | U | 5 | U | 5 | UJ |
| | | | | | | | | |
| | | | | | | | | |

000011

RFW Batch Number: 0512L982

Client: ~~TNUHANFORD~~ RC-010 K0150 Work Order: 11343606001 Page: 1a

| | Cust ID: | J10V58 | J10V58 | J10V58 | J10V59 | J10V60 | VBLKOM |
|--------------------|-----------------------|---------------|--------|---------|-----------------|--------------|--------------|
| Sample Information | RFW#: | 001 | 001 MS | 001 MSD | 002 | 003 | 05LVG370-MB1 |
| | Matrix: | WATER | WATER | WATER | WATER | WATER | WATER |
| | D.F.: | 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 |
| Surrogate | 1,2-Dichloroethane-d4 | 95 % | 92 % | 99 % | 97 % | 99 % | 96 % |
| Recovery | Toluene-d8 | 97 % | 95 % | 94 % | 91 % | 97 % | 95 % |
| | Bromofluorobenzene | 99 % | 94 % | 98 % | 96 % | 100 % | 97 % |
| | Carbon Tetrachloride | 5 U <i>By</i> | 120 % | 119 % | 5 U <i>File</i> | 5 U <i>J</i> | 5 U |

Cust ID: VBLKOM BS

Sample Information RFW#: 05LVG370-MB1
 Matrix: WATER
 D.F.: 1.00
 Units: UG/L

| | | |
|-----------|-----------------------|-------|
| Surrogate | 1,2-Dichloroethane-d4 | 92 % |
| Recovery | Toluene-d8 | 92 % |
| | Bromofluorobenzene | 92 % |
| | Carbon Tetrachloride | 113 % |

*= Outside of EPA CLP QC limits.

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✓
3/20/06

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

000013



Case Narrative

Client: TNU-HANFORD RC-010
LVL #: 0512L982
SDG/SAF # K0150/RC-010

W.O. #: 11343-606-001-9999-00
Date Received: 12-23-2005

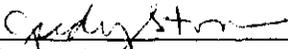
GC/MS VOLATILE

Three (3) water samples were collected on 12-12,21-2005.

The samples and their associated QC samples were analyzed according to criteria set forth in Lionville Laboratory SOPs based on SW 846 Method 8260B for client specified volatile target compound Carbon Tetrachloride on 12-29-2005.

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. Samples were analyzed within required holding time with the exception of sample J10V60, which was received outside the holding time.
3. All surrogate recoveries were within acceptance criteria.
4. The matrix spike recoveries were within acceptance criteria.
5. The blank spike recovery was within acceptance criteria.
6. Internal standard area and retention time criteria were met.
7. Manual integrations are performed according to SOP QA-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").
8. LvLI is NELAP accredited by the state of Pennsylvania and holds over 20 additional state accreditations. For a complete listing of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager.
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 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

\\srm\group\data\voa\tnu-hanford\0512-982.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 9 pages.

000014

Lionville Laboratory, Inc.
 VOA ANALYTICAL DATA PACKAGE FOR
 TNUHANFORD RC-010 K0150



DATE RECEIVED: 12/23/05

LVL LOT # :0512L982

| CLIENT ID | LVL # | MTX | PREP # | COLLECTION | EXTR/PREP | ANALYSIS |
|-----------|---------|-----|----------|------------|-----------|----------|
| J10V58 | 001 | W | 05LVG370 | 12/21/05 | N/A | 12/29/05 |
| J10V58 | 001 MS | W | 05LVG370 | 12/21/05 | N/A | 12/29/05 |
| J10V58 | 001 MSD | W | 05LVG370 | 12/21/05 | N/A | 12/29/05 |
| J10V59 | 002 | W | 05LVG370 | 12/21/05 | N/A | 12/29/05 |
| J10V60 | 003 | W | 05LVG370 | 12/12/05 | N/A | 12/29/05 |

LAB QC:

| | | | | | | |
|--------|--------|---|----------|-----|-----|----------|
| VBLKOM | MB1 | W | 05LVG370 | N/A | N/A | 12/29/05 |
| VBLKOM | MB1 BS | W | 05LVG370 | N/A | N/A | 12/29/05 |

000015

000000001

| | | | | | | | |
|--|------------------------------------|--|------------------------------------|--------------------------------------|---------------|----------------------------|-------------|
| Washington Closure Hanford | | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | | | | RC-010-1 | Page 1 of 1 |
| Collector GALE, SJ / RZ Steffler | Company Contact JOAN KESSNER | Telephone No. 375-4688 | Project Coordinator KESSNER, JH | | Price Code 7N | Data Turnaround 45 Days | |
| Project Designation ERDF Semiannual Leachate Analysis | Sampling Location ERDF | SAF No. RC-010 | | Air Quality <input type="checkbox"/> | | | |
| Ice Chest No. SML-363 | Field Logbook No. EL-1518-2 | COA RERDF22560 | Method of Shipment FED EX | | | | |
| Shipped To EBERLINE SERVICES (LIONVILLE) | Offsite Property No. A060181139 | Bill of Lading/Air Bill No. SEE OSCP | | | | | |

| | | | | | | | | | | | |
|--|---------------------|------------------------|-----------------|---------|---------|---------|----------------|---------------|--------|--|--|
| POSSIBLE SAMPLE HAZARDS/REMARKS POTENTIALLY RADIOACTIVE <DOT REGULATED AND CORROSIVE Special Handling and/or Storage COOL 4C | Preservation | HCl or H2SO4 to pH < 2 | ERNO3 to pH < 2 | Cool 4C | Cool 4C | Cool 4C | HNO3 to pH < 2 | HCl to pH < 2 | None | | |
| | Type of Container | gGs* | G/P | G/P | P | P | G/P | G/P | G/P | | |
| | No. of Container(s) | 3 | 1 | 1 | 1 | 1 | 2 | 1 | 4 | | |
| | Volume | 40mL | 500mL | 500mL | 500mL | 500mL | 1000mL | 250mL | 1000mL | | |

| | | | | | | | | | | |
|------------------------------|--|---------------------------------------|-------------|---------------------|---------------------------------------|--|---------------|------------------------------------|--|--|
| SAMPLE ANALYSIS 00016 | VOA - 6010A (TCL) (Carbon tetrachloride) | See Item (1) in Special Instructions. | TDS - 160.1 | Conductivity - 9050 | See Item (2) in Special Instructions. | Gross Alpha; Gross Beta; Total Uranium; Total Radium | Technetium-99 | Carbon-14 Median Level; Iodine-129 | | |
|------------------------------|--|---------------------------------------|-------------|---------------------|---------------------------------------|--|---------------|------------------------------------|--|--|

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | |
|------------|----------|-------------|-------------|---|---|---|---|---|--|---|--------------|
| J10V58 | WATER | 12-21-05 | 1044 | X | X | X | X | X | | | |
| J10V59 | WATER | 12-21-05 | 1038 | X | X | X | X | X | | X | 125 12-21-05 |
| J10V60 | WATER | 12-12-05 | 0655 | X | | | | | | | |

| | | | | | | | | |
|---|----------------------------|-----------------------------------|----------------------------|--|--|--|--|--|
| CHAIN OF POSSESSION | | | | SPECIAL INSTRUCTIONS | | | | Matrix * S-Soil SE-Sediment SD-Solid SL-Sludge W-Water O-Oil A-Air DS-Drum, Bottle DL-Drum, Liquid T-Thin W-Wipe L-Liquid V-Vegetation X-Other |
| Relinquished By/Removed From RZ Steffler RZ Steffler | Date/Time 11-21-05 1215 | Received By/Stored In Fed Ex | Date/Time | (1) ICP Metals - 6010A (TAL) (Barium, Chromium, Vanadium, Zinc); ICP Metals - 6010A (Add-on) (Arsenic, Beryllium, Lead, Selenium, Tin) (2) IC Anions - 300.0 (Bromide, Chloride, Fluoride, Nitrate, Nitrite, Sulfate) | | | | |
| Relinquished By/Removed From Fed Ex | Date/Time 12-23-05/1100 | Received By/Stored In J. Smith | Date/Time 12-23-05/1100 | | | | | |
| 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 | | | | | |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time | | | | | |

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

Appendix 5
Data Validation Supporting Documentation

000017

GC/MS ORGANIC DATA VALIDATION CHECKLIST

| | | | | | |
|--------------------|------|--------------------|---------------------|---|--------------------|
| VALIDATION LEVEL: | A | B | <u>C</u> | D | E |
| PROJECT: | ERDF | | DATA PACKAGE: K0150 | | |
| VALIDATOR: | TLI | LAB: LLI | DATE: 3/20/06 | | |
| | | | SDG: K0150 | | |
| ANALYSES PERFORMED | | | | | |
| <u>SW-846 8260</u> | | SW-846 8260 (TCLP) | SW-846 8270 | | SW-846 8270 (TCLP) |
| SAMPLES/MATRIX | | | | | |
| J10V58 | | J10V59 | J10V60 | | |
| water | | | | | |

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:

- Trip blank taken 9 days prior to sample
+ stored

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: _____

J10UGO - 52K lb hold time - J

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: _____

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: 22 March 2006
To: Washington Closure Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: ERDF - Semiannual Leachate Analysis
Subject: Inorganics - Data Package No. K0150-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0150-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 | Date |
|-----------|-------------|-------|------------|------------|
| J10V59 | 12/21/05 | Water | C | See note 1 |
| J10V58 | 12/21/05 | Water | C | See note 1 |

1- ICP metals by 6010B.

Data validation was conducted in accordance with the WCH validation statement of work and the Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Amended Record of Decision, Decision Responsiveness Summary and DOE/RL-2001-44, Rev. 0, Proposed Plan for an Amendment to the Environmental Restoration Disposal Facility Record of Decision, Hanford Site, Richland, WA. 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 for 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.

000001

· **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.

All preparation blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis.

· **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.

All accuracy results were acceptable.

000002

- **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 (90.7%), 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 J10V58/J10V59) 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 (35%). Under the WCH statement of work, no qualification is required. All other field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the DOE/RL-2001-44, Rev. 0, Proposed Plan for an Amendment to the Environmental Restoration Disposal Facility Record of Decision minimum detection limits (MDLs) to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels met the analyte specific MDL.

- **Completeness**

Data package SDG No. K0150 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

Due to an RPD outside QC limits (90.7%), all zinc results were qualified as estimates and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under the WCH 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

WCH, Contract #20266, *Validation Statement of Work*, Washington Closure Hanford, July 7, 2003.

EPA, 1999, *Amended Record of Decision, Decision Summary and Responsiveness Summary for the Environmental Restoration Disposal Facility*, Hanford Site - 200 Area, Benton County, Washington, March 1999, U.S. Environmental Protection Agency, Region 10, Seattle, Washington.

DOE/RL-2001-44, Rev. 0, *Proposed Plan for an Amendment to the Environmental Restoration Disposal Facility Record of Decision, Hanford Site, Richland, WA*.

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.

000004

Appendix 1

Glossary of Data Reporting Qualifiers

000005

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).

000006

Appendix 2
Summary of Data Qualification

000007

METALS DATA QUALIFICATION SUMMARY*

| | | | |
|------------|----------------------|------------------|-------------|
| SDG: K0150 | REVIEWER: [REDACTED] | PROJECT: ERDE | PAGE 1 OF 1 |
| COMMENTS: | | | |
| COMPOUND | QUALIFIER | SAMPLES AFFECTED | REASON |
| 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.

000008

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

000009

| | | | | | | | | | | | |
|--|-------------|-------------------|----------|---------------|----------|---------------|----------|---------------|----------|---------------|----------|
| Project: WASHINGTON CLOSURE HANFORD | | | | | | | | | | | |
| Laboratory: LLI | | | | | | | | | | | |
| Case | | SDG: K0150 | | | | | | | | | |
| Sample Number | | J10V58 | | J10V59 | | | | | | | |
| Remarks | | Duplicate | | | | | | | | | |
| Sample Date | | 12/21/05 | | 12/21/05 | | | | | | | |
| Inorganics | CRDL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| Arsenic | 82 | 8.3 | | 7.2 | | | | | | | |
| Barium | 0.4 | 108 | | 108 | | | | | | | |
| Beryllium | 0.4 | 0.10 | U | 0.10 | U | | | | | | |
| Chromium | 2.7 | 36.1 | | 37.8 | | | | | | | |
| Lead | 30 | 3.1 | U | 3.1 | U | | | | | | |
| Selenium | 61 | 4.7 | | 3.9 | | | | | | | |
| Tin | 35 | 5.2 | U | 5.2 | U | | | | | | |
| Vanadium | 2.9 | 18.1 | | 18.7 | | | | | | | |
| Zinc | 2.3 | 11.7 | J | 16.6 | J | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

000010

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 01/25/06

CLIENT: TNUHANFORD RC-010 K0150

LVL LOT #: 0512L982

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|--------|---------|------------------|--------|-------|--------------------|--------------------|
| -001 | J10V58 | Arsenic, Total | 8.3 | UG/L | 3.4 | 1.0 |
| | | Barium, Total | 108 | UG/L | 0.20 | 1.0 |
| | | Beryllium, Total | 0.10 u | UG/L | 0.10 | 1.0 |
| | | Chromium, Total | 36.1 | UG/L | 1.6 | 1.0 |
| | | Lead, Total | 3.1 u | UG/L | 3.1 | 1.0 |
| | | Selenium, Total | 4.7 | UG/L | 3.6 | 1.0 |
| | | Tin, Total | 5.2 u | UG/L | 5.2 | 1.0 |
| | | Vanadium, Total | 18.1 | UG/L | 0.90 | 1.0 |
| | | Zinc, Total | 11.7 J | UG/L | 0.50 | 1.0 |
| -002 | J10V59 | Arsenic, Total | 7.2 | UG/L | 3.4 | 1.0 |
| | | Barium, Total | 108 | UG/L | 0.20 | 1.0 |
| | | Beryllium, Total | 0.10 u | UG/L | 0.10 | 1.0 |
| | | Chromium, Total | 37.8 | UG/L | 1.6 | 1.0 |
| | | Lead, Total | 3.1 u | UG/L | 3.1 | 1.0 |
| | | Selenium, Total | 3.9 | UG/L | 3.6 | 1.0 |
| | | Tin, Total | 5.2 u | UG/L | 5.2 | 1.0 |
| | | Vanadium, Total | 18.7 | UG/L | 0.90 | 1.0 |
| | | Zinc, Total | 16.6 J | UG/L | 0.50 | 1.0 |

Handwritten:
12
3/29/06

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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

000012



Analytical Report

Client: TNU-HANFORD RC-010
LVL#: 0512L982
SDG/SAF#: K0150/RC-010

W.O.#: 11343-606-001-9999-00
Date Received: 12-23-05

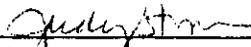
METALS CASE NARRATIVE

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), 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 2 analytes were outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.
12. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a

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 **1000013** pages.

region of less-certain quantification.

13. LvLI is NELAP accredited by the state of Pennsylvania and holds over 20 additional state accreditations. For a complete listing of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager.
14. 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

2/2/04
Date

jjw.m12-982



000014

25588004

| | | | | | | |
|--|---------------------------------|--|------------------------------------|--|--------------------------------------|----------------------------|
| Washington Closure Hanford | | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | | | RC-010-1 | Page 1 of 1 |
| Collector GALE, SJ / RZ Steffler | Company Contact JOAN KESSNER | Telephone No. 375-4688 | Project Coordinator KESSNER, JH | | Price Code 7N | Data Turnaround 45 Days |
| Project Designation ERDF Semiannual Leachate Analysis | | Sampling Location ERDF | SAF No. RC-010 | | Air Quality <input type="checkbox"/> | |

| | | | | | |
|---|--------------------------------|------------------------------------|---|--|--|
| Ice Chest No. SML-363 | Field Logbook No. EL-1518-2 | COA RERDF22560 | Method of Shipment FED EX | | |
| Shipped To EBERLINE SERVICES (LIONVILLE) | | Offsite Property No. A06018T139 | Bill of Lading/Air Bill No. SEE OSPC | | |

POSSIBLE SAMPLE HAZARDS/REMARKS
 POTENTIALLY RADIOACTIVE <DOT REGULATED AND CORROSIVE

Special Handling and/or Storage
 COOL 4C

| Preservation | HCl or H2SO4 to pH < 2 | HNO3 to pH < 2 | Cool 4C | Cool 4C | Cool 4C | HNO3 to pH < 2 | HCl to pH < 2 | None |
|---------------------|------------------------|----------------|---------|---------|---------|----------------|---------------|--------|
| Type of Container | aGs* | G/P | G/P | P | P | G/P | G/P | G/P |
| No. of Container(s) | 3 | 1 | 1 | 1 | 1 | 2 | 1 | 4 |
| Volume | 40mL | 500mL | 500mL | 500mL | 500mL | 1000mL | 250mL | 1000mL |

| | | | | | | | | | | |
|--------|-----------------|--|--|---------------------------------------|-------------|---------------------|---------------------------------------|--|---------------|------------------------------------|
| 000015 | SAMPLE ANALYSIS | | VOA - 8260A (TCL) (Carbon tetrachloride) | See item (1) in Special Instructions. | TDS - 160.1 | Conductivity - 9050 | See item (2) in Special Instructions. | Gross Alpha; Gross Beta; Total Uranium; Total Radium | Technetium-99 | Carbon-14 Medium Level; Iodine-129 |
|--------|-----------------|--|--|---------------------------------------|-------------|---------------------|---------------------------------------|--|---------------|------------------------------------|

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | |
|------------|----------|-------------|-------------|---|---|---|---|---|--|----------------|
| J10V58 | WATER | 12-21-05 | 1044 | X | X | X | X | X | | |
| J10V59 | WATER | 12-21-05 | 1038 | X | X | X | X | X | | X RES 12-21-05 |
| J10V60 | WATER | 12-12-05 | 0655 | X | | | | | | |

| CHAIN OF POSSESSION | | Sign/Print Names | |
|------------------------------|---------------|-----------------------|---------------|
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| RZ Steffler RZ Steffler | 12-21-05 1245 | Fed Ex | |
| Dea Ex | 12-23-05/1100 | W. Smith | 12-23-05/1100 |
| | | | |
| | | | |
| | | | |
| | | | |

| SPECIAL INSTRUCTIONS | Matrix * |
|--|---|
| (1) ICP Metals - 6010A (TAL) (Barium, Chromium, Vanadium, Zinc); ICP Metals - 6010A (Add-on) (Arsenic, Beryllium, Lead, Selenium, Tin) (2) IC Anions - 300.0 (Bromide, Chloride, Fluoride, Nitrate, Nitrite, Sulfate) | S-Soil SE-Sediment SO-Solids SI-Sludge W-Water O-Oil A-Air DS-Drum Solids DL-Drum Liquids T-Tissue Wp-Wipe L-Liquid V-Vegetation X-Other |

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

Appendix 5

Data Validation Supporting Documentation Documentation

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INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

| | | | | | |
|--------------------|-------------|-----------|---------------------|---|---|
| VALIDATION LEVEL: | A | B | C | D | E |
| PROJECT: | ERDF | | DATA PACKAGE: K0150 | | |
| VALIDATOR: | TLI | LAB: LLI | DATE: 3/20/00 | | |
| | | SDG: | K0150 | | |
| ANALYSES PERFORMED | | | | | |
| SW-846/ICP | SW-846/GFAA | SW-846/Hg | SW-846 Cyanide | | |
| | | | | | |
| SAMPLES/MATRIX | | | | | |
| J10V58 J10V6059 | | | | | |
| | | | | | |
| | | | | | |
| water | | | | | |

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 FB

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

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

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

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

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

Comments: Zinc 3570 - FD LD - 90% - J all

6. ICP QUALITY CONTROL (Levels D and E)

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

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

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

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

Comments: _____

8. HOLDING TIMES (all levels)

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

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

9. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

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

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Appendix 6

Additional Documentation Requested by Client

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Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 01/25/06

CLIENT: TNUHANFORD RC-010 K0150

LVL LOT #: 0512L982

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|--------|-------------|------------------|--------|--------|--------------------|--------------------|
| BLANK1 | 06L0032-MB1 | Arsenic, Total | 3.4 | u UG/L | 3.4 | 1.0 |
| | | Barium, Total | 0.20 | u UG/L | 0.20 | 1.0 |
| | | Beryllium, Total | 0.10 | u UG/L | 0.10 | 1.0 |
| | | Chromium, Total | 1.6 | u UG/L | 1.6 | 1.0 |
| | | Lead, Total | 3.1 | u UG/L | 3.1 | 1.0 |
| | | Selenium, Total | 3.6 | u UG/L | 3.6 | 1.0 |
| | | Tin, Total | 5.2 | u UG/L | 5.2 | 1.0 |
| | | Vanadium, Total | 0.90 | u UG/L | 0.90 | 1.0 |
| | | Zinc, Total | 0.50 | u UG/L | 0.50 | 1.0 |

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Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 01/25/06

CLIENT: TNUHANFORD RC-010 K0150
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0512L982

| SAMPLE | SITE ID | ANALYTE | SPIKED SAMPLE | INITIAL RESULT | SPIKED AMOUNT | %RECOV | DILUTION FACTOR (SPK) |
|--------|---------|------------------|---------------|----------------|---------------|--------|-----------------------|
| -002 | J10V59 | Arsenic, Total | 1950 | 7.2 | 2000 | 97.4 | 1.0 |
| | | Barium, Total | 2030 | 108 | 2000 | 96.3 | 1.0 |
| | | Beryllium, Total | 48.3 | 0.10u | 50.0 | 96.6 | 1.0 |
| | | Chromium, Total | 230 | 37.8 | 200 | 96.2 | 1.0 |
| | | Lead, Total | 473 | 3.1 u | 500 | 94.6 | 1.0 |
| | | Selenium, Total | 1940 | 3.9 | 2000 | 96.7 | 1.0 |
| | | Tin, Total | 969 | 5.2 u | 1000 | 96.9 | 1.0 |
| | | Vanadium, Total | 503 | 18.7 | 500 | 96.9 | 1.0 |
| | | Zinc, Total | 489 | 16.6 | 500 | 94.5 | 1.0 |

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Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 01/25/06

CLIENT: TNUHANFORD RC-010 K0150
 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0512L982

| SAMPLE | SITE ID | ANALYTE | INITIAL | | | DILUTION FACTOR (REP) |
|---------|---------|------------------|---------|---------------|------|--------------------------|
| | | | RESULT | REPLICATE RPD | | |
| -001REP | J10V58 | Arsenic, Total | 8.3 | 9.8 | 16.6 | 1.0 |
| | | Barium, Total | 108 | 105 | 3.1 | 1.0 |
| | | Beryllium, Total | 0.10u | 0.10u | NC | 1.0 |
| | | Chromium, Total | 36.1 | 34.5 | 4.5 | 1.0 |
| | | Lead, Total | 3.1 u | 3.1 u | NC | 1.0 |
| | | Selenium, Total | 4.7 | 3.6 u | NC | 1.0 |
| | | Tin, Total | 5.2 u | 5.2 u | NC | 1.0 |
| | | Vanadium, Total | 18.1 | 17.9 | 1.1 | 1.0 |
| | | Zinc, Total | 11.7 | 31.1 | 90.7 | 1.0 |

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 2/4/02*

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Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 01/25/06

CLIENT: TNUHANFORD RC-010 K0150

LVL LOT #: 0512L982

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

| SAMPLE | SITE ID | ANALYTE | SPIKED | SPIKED | UNITS | %RECOV |
|--------|-------------|----------------|--------|--------|-------|--------|
| | | | SAMPLE | AMOUNT | | |
| LCS1 | 06L0032-LC1 | Arsenic, LCS | 9610 | 10000 | UG/L | 96.1 |
| | | Barium, LCS | 4890 | 5000 | UG/L | 97.7 |
| | | Beryllium, LCS | 247 | 250 | UG/L | 98.7 |
| | | Chromium, LCS | 500 | 500 | UG/L | 100.1 |
| | | Lead, LCS | 2470 | 2500 | UG/L | 98.7 |
| | | Selenium, LCS | 9670 | 10000 | UG/L | 96.7 |
| | | Tin, LCS | 4900 | 5000 | UG/L | 98.0 |
| | | Vanadium, LCS | 2470 | 2500 | UG/L | 99.0 |
| | | Zinc, LCS | 989 | 1000 | UG/L | 98.9 |

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