0066134

# SAF-D05-002
# RCBRA Tribal Plant Sampling – Other Solid
# FINAL VALIDATION PACKAGE

**MAIL VALIDATION PACKAGE TO:**

Jeanette Duncan – 1 copy  mjp 8-4-05 INITIAL/DATE

Steve Weiss  H0-23  mjp 8-4-05 INITIAL/DATE

**SDG H3139**  **SAF-D05-002**

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EDMC

Date: 8 June 2005
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: RCBRA Tribal Plant Sampling - Other Solid
Subject: Pesticides/PCB - Data Package No. H3139-LLI (SDG No. H3139)

## INTRODUCTION

This memo presents the results of data validation on Data Package No. H3139-LLI prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

| Sample ID | Sample Date | Media | Validation | Analysis |
|---|---|---|---|---|
| J03128 | 4/19/05 | Solid | C | See note 1 |
| J03129 | 4/19/05 | Solid | C | See note 1 |
| J03130 | 4/19/05 | Solid | C | See note 1 |
| J03132 | 4/19/05 | Solid | C | See note 1 |
| J03138 | 4/20/05 | Solid | C | See note 1 |
| J03139 | 4/20/05 | Solid | C | See note 1 |
| J03136 | 4/20/05 | Solid | C | See note 1 |
| J03140 | 4/20/05 | Solid | C | See note 1 |
| J03142 | 4/20/05 | Solid | C | See note 1 |
| J03144 | 4/20/05 | Solid | C | See note 1 |

1 - Pesticides by 8081A and PCBs by 8082.

Data validation was conducted in accordance with the Bechtel Hanford Incorporated (BHI) validation statement of work and the Sampling Analysis Instruction for Tribal Plant Sampling in Support of the 100 Area and 300 Area Component of the RCBRA (BHI-01754, March 2005). 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**

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

If holding times are exceeded by less than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detected sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were acceptable.

- **Method Blank**

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

All method blank target compound results were acceptable.

Field Blanks

No field blanks were submitted for analysis.

- **Accuracy**

Matrix Spike & 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 70% to 130%. If spike recoveries are

outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Non-detected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

Due to the matrix spike and matrix spike duplicate being diluted out, all pesticide results (except toxaphene) were qualified as estimates and flagged "J".

Due to the lack of an LCS, matrix spike and matrix spike duplicate analysis, all toxaphene results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

Surrogate Recovery

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

Due to a surrogate recovery outside QC limits (8%), all PCB results in sample J03136 were rejected and flagged "R".

Due to the surrogate being diluted out, all pesticide results in samples J03130 and J03132 were qualified as estimates and flagged "J".

Due to a surrogate recovery outside QC limits (23%), all pesticide results in sample J03136 were qualified as estimates and flagged "J".

Due to a surrogate recovery outside QC limits (165% and 148%), all detected pesticide results in samples J03140 and J03144 were qualified as estimates and flagged "J".

All other surrogate results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

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

Due to the matrix spike and matrix spike duplicate being diluted out, all pesticide results (except toxaphene) were qualified as estimates and flagged "J".

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

Field Duplicate Samples

No field blanks were submitted for analysis.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the Remaining Waste Sites RQLs to ensure that laboratory detection levels meet the required criteria. All undetected analytes exceeded the RQL. Under the BHI statement of work, no qualification is required.

- **Completeness**

Data Package No. H3139-LLI was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 97%.

## MAJOR DEFICIENCIES

Due to a surrogate recovery outside QC limits (8%), all PCB results in sample J03136 were rejected and flagged "R". Rejected data is unusable and should not be reported.

## MINOR DEFICIENCIES

The following minor deficiencies were noted:

- Due to the matrix spike and matrix spike duplicate being diluted out, all pesticide results (except toxaphene) were qualified as estimates and flagged "J".
- Due to the lack of an LCS, matrix spike and matrix spike duplicate analysis, all toxaphene results were qualified as estimates and flagged "J".
- Due to the surrogate being diluted out, all pesticide results in samples J03130 and J03132 were qualified as estimates and flagged "J".
- Due to a surrogate recovery outside QC limits (23%), all pesticide results in sample J03136 were qualified as estimates and flagged "J".
- Due to a surrogate recovery outside QC limits (165% and 148%), all detected pesticide results in samples J03140 and J03144 were qualified as estimates and flagged "J".

Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

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

## REFERENCES

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

BHI-01754, *Sampling Analysis Instruction for Tribal Plant Sampling in Support of the 100 Area and 300 Area Component of the River Corridor Baseline Risk Assessment*, March 2005.

## Appendix 1

## Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the procedures herein are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

# Appendix 2

## Summary of Data Qualification

PESTICIDE/PCB DATA QUALIFICATION SUMMARY*

| SDG: H3139 | REVIEWER: TLI | PROJECT: RCBRA | PAGE_1_OF_1_ |
|---|---|---|---|
| COMMENTS: | | | |
| COMPOUND | QUALIFIER | SAMPLES AFFECTED | REASON |
| PCBs | R | J03136 | Surrogate recovery |
| All but toxaphene | J | All | MS/MSD diluted out |
| Toxaphene | J | All | No MS, MSD or LCS analysis |
| All | J | J03130, J03132 | Surrogate diluted out |
| All | J | J03136 | Surrogate recovery |
| All detected analytes | J | J03140, J03144 | Surrogate 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.

# Appendix 3

## Qualified Data Summary and Annotated Laboratory Reports

PESTICIDE/PCB ANALYSIS, SOLID MATRIX, (UG/KG)



| | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Project: BECHTEL-HANFORD | | | | | | | | | | | | | | | | | | | | | |
| Laboratory: Lionville Laboratory Inc. | | | | | | | | | | | | | | | | | | | | | |
| Case: | SDG: H3139 | | | | | | | | | | | | | | | | | | | | |
| Sample Number | | J03128 | | J03129 | | J03130 | | J03132 | | J03138 | | J03139 | | J03136 | | J03140 | | J03142 | | J03144 | |
| Remarks | | | | | | | | | | | | | | | | | | | | | |
| Sample Date | | 4/19/05 | | 4/19/05 | | 4/19/05 | | 4/19/05 | | 4/20/05 | | 4/20/05 | | 4/20/05 | | 4/20/05 | | 4/20/05 | | 4/20/05 | |
| Extraction Date | | 4/30/05 | | 4/30/05 | | 4/30/05 | | 4/30/05 | | 4/30/05 | | 4/30/05 | | 4/30/05 | | 4/30/05 | | 4/30/05 | | 4/30/05 | |
| Analysis Date | | 5/3/05 | | 5/3/05 | | 5/3/05 | | 5/4/05 | | 5/4/05 | | 5/4/05 | | 5/5/05 | | 5/4/05 | | 5/4/05 | | 5/4/05 | |
| PCB/Pesticide | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| Aroclor-1016 | 20 | 440 | U | 270 | U | 540 | U | 380 | U | 320 | U | 230 | U | 430 | UR | 310 | U | 380 | U | 400 | U |
| Aroclor-1221 | 20 | 440 | U | 270 | U | 540 | U | 380 | U | 320 | U | 230 | U | 430 | UR | 310 | U | 380 | U | 400 | U |
| Aroclor-1232 | 20 | 440 | U | 270 | U | 540 | U | 380 | U | 320 | U | 230 | U | 430 | UR | 310 | U | 380 | U | 400 | U |
| Aroclor-1242 | 20 | 440 | U | 270 | U | 540 | U | 380 | U | 320 | U | 230 | U | 430 | UR | 310 | U | 380 | U | 400 | U |
| Aroclor-1248 | 20 | 440 | U | 270 | U | 540 | U | 380 | U | 320 | U | 230 | U | 430 | UR | 310 | U | 380 | U | 400 | U |
| Aroclor-1254 | 20 | 440 | U | 270 | U | 540 | U | 380 | U | 320 | U | 230 | U | 430 | UR | 310 | U | 380 | U | 400 | U |
| Aroclor-1260 | 20 | 440 | U | 270 | U | 540 | U | 380 | U | 320 | U | 230 | U | 430 | UR | 310 | U | 380 | U | 400 | U |
| | | | | | | | | | | | | | | | | | | | | | |
| Sample Date | | 4/19/05 | | 4/19/05 | | 4/19/05 | | 4/19/05 | | 4/19/05 | | 4/20/05 | | 4/20/05 | | 4/20/05 | | 4/20/05 | | 4/20/05 | |
| Extraction Date | | 4/29/05 | | 4/29/05 | | 4/29/05 | | 4/29/05 | | 4/29/05 | | 4/29/05 | | 4/29/05 | | 4/29/05 | | 4/29/05 | | 4/29/05 | |
| Analysis Date | | 5/4/05 | | 5/4/05 | | 5/4/05 | | 5/4/05 | | 5/4/05 | | 5/4/05 | | 5/4/05 | | 5/4/05 | | 5/4/05 | | 5/4/05 | |
| Alpha-BHC | 5 | 220 | UJ | 140 | UJ | 290 | J | 150 | J | 160 | UJ | 110 | UJ | 220 | UJ | 150 | J | 290 | J | 200 | UJ |
| Beta-BHC | 5 | 220 | UJ | 140 | UJ | 1700 | J | 380 | UJ | 160 | UJ | 110 | UJ | 220 | UJ | 150 | UJ | 190 | UJ | 200 | UJ |
| Delta-BHC | 5 | 220 | UJ | 150 | J | 610 | J | 430 | J | 160 | UJ | 110 | UJ | 220 | UJ | 150 | UJ | 190 | UJ | 200 | UJ |
| Gamma-BHC (Lindane) | 5 | 220 | UJ | 140 | UJ | 540 | UJ | 380 | UJ | 160 | UJ | 110 | UJ | 220 | UJ | 150 | UJ | 190 | UJ | 200 | UJ |
| Heptachlor | 5 | 220 | UJ | 140 | UJ | 460 | J | 480 | J | 160 | UJ | 110 | UJ | 220 | UJ | 240 | J | 480 | J | 200 | UJ |
| Aldrin | 5 | 220 | UJ | 140 | UJ | 760 | J | 380 | J | 160 | UJ | 110 | UJ | 220 | UJ | 180 | J | 590 | J | 200 | UJ |
| Heptachlor Epoxide | 5 | 220 | UJ | 140 | UJ | 540 | UJ | 380 | UJ | 160 | UJ | 110 | UJ | 220 | UJ | 150 | UJ | 290 | J | 200 | UJ |
| Endosulfan I | 5 | 220 | UJ | 310 | J | 540 | UJ | 780 | J | 190 | J | 460 | J | 240 | J | 930 | J | 1300 | J | 200 | UJ |
| Dieldrin | 5 | 440 | UJ | 2100 | J | 400 | J | 380 | UJ | 1100 | J | 1300 | J | 220 | UJ | 300 | J | 400 | J | 200 | UJ |
| 4,4'-DDE | 5 | 440 | UJ | 12000 | J | 600 | J | 250 | J | 1100 | J | 6900 | J | 310 | J | 280 | J | 360 | J | 400 | UJ |
| Endrin | 5 | 440 | UJ | 270 | UJ | 1100 | UJ | 750 | UJ | 320 | UJ | 230 | UJ | 280 | J | 310 | UJ | 380 | UJ | 400 | UJ |
| Endosulfan II | 5 | 440 | UJ | 5700 | J | 1100 | UJ | 750 | UJ | 2000 | J | 11000 | J | 330 | J | 310 | UJ | 190 | J | 400 | UJ |
| 4,4'-DDD | 5 | 440 | UJ | 270 | UJ | 1100 | UJ | 750 | UJ | 320 | UJ | 230 | UJ | 430 | UJ | 200 | J | 370 | J | 200 | J |
| Endosulfan Sulfate | 5 | 490 | J | 370 | J | 390 | J | 260 | J | 320 | UJ | 1200 | J | 430 | UJ | 310 | UJ | 380 | UJ | 410 | J |
| 4,4'-DDT | 5 | 440 | UJ | 270 | UJ | 1100 | UJ | 750 | UJ | 320 | UJ | 5200 | J | 430 | UJ | 310 | UJ | 380 | UJ | 400 | UJ |
| Methoxychlor | 5 | 270 | J | 410 | J | 5400 | UJ | 230 | J | 190 | J | 1100 | UJ | 2200 | UJ | 1500 | UJ | 1900 | UJ | 320 | J |
| Endrin Ketone | 5 | 310 | J | 130 | J | 300 | J | 750 | UJ | 320 | UJ | 200 | J | 430 | UJ | 310 | UJ | 380 | UJ | 330 | J |
| Endrin Aldehyde | 5 | 700 | J | 270 | UJ | 500 | J | 750 | UJ | 320 | UJ | 230 | UJ | 430 | UJ | 310 | UJ | 200 | J | 400 | UJ |
| alpha-Chlordane | 5 | 220 | UJ | 140 | UJ | 540 | UJ | 380 | UJ | 160 | UJ | 110 | UJ | 220 | UJ | 150 | UJ | 260 | J | 200 | UJ |
| gamma-Chlordane | 5 | 220 | UJ | 140 | UJ | 560 | J | 380 | UJ | 160 | UJ | 110 | UJ | 220 | UJ | 220 | J | 310 | J | 200 | UJ |
| Toxaphene | 5 | 22000 | UJ | 14000 | UJ | 54000 | UJ | 38000 | UJ | 16000 | UJ | 11000 | UJ | 22000 | UJ | 15000 | UJ | 19000 | UJ | 20000 | UJ |

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

Lionville Laboratory, Inc.

PCBs by GC

Report Date: 05/06/05 14:24

RFW Batch Number: 0504L309 Client: TNU-HANFORD D05-002 Work Order: 11343606001 Page: 1

| | Cust ID: | J03128 | J03129 | J03130 | J03130 | J03130 | J03132 |
|---|---|---|---|---|---|---|---|
| Sample Information | RFW#: | 001 | 002 | 003 | 003 MS | 003 MSD | 004 |
| | Matrix: | SOLID | SOLID | SOLID | SOLID | SOLID | SOLID |
| | D.F.: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | Units: | UG/KG | UG/KG | UG/KG | UG/KG | UG/KG | UG/KG |
| Surrogate: | Tetrachloro-m-xylene | 79 % | 82 % | 90 % | 113 % | 92 % | 76 % |
| | Decachlorobiphenyl | 90 % | 91 % | 87 % | 98 % | 92 % | 85 % |
| | | fl | fl | fl | fl | fl | fl |
| Aroclor-1016 | | 440 U | 270 U | 540 U | 71 % | 67 % | 380 U |
| Aroclor-1221 | | 440 U | 270 U | 540 U | 540 U | 540 U | 380 U |
| Aroclor-1232 | | 440 U | 270 U | 540 U | 540 U | 540 U | 380 U |
| Aroclor-1242 | | 440 U | 270 U | 540 U | 540 U | 540 U | 380 U |
| Aroclor-1248 | | 440 U | 270 U | 540 U | 540 U | 540 U | 380 U |
| Aroclor-1254 | | 440 U | 270 U | 540 U | 540 U | 540 U | 380 U |
| Aroclor-1260 | | 440 U | 270 U | 540 U | 82 % | 76 % | 380 U |

| | Cust ID: | J03138 | J03139 | J03136 | J03140 | J03142 | J03144 |
|---|---|---|---|---|---|---|---|
| Sample Information | RFW#: | 006 | 007 | 008 | 009 | 010 | 011 |
| | Matrix: | SOLID | SOLID | SOLID | SOLID | SOLID | SOLID |
| | D.F.: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | Units: | UG/KG | UG/KG | UG/KG | UG/KG | UG/KG | UG/KG |
| Surrogate: | Tetrachloro-m-xylene | 76 % | 83 % | 8 * % | 93 % | 87 % | 79 % |
| | Decachlorobiphenyl | 83 % | 90 % | 11 * % | 84 % | 88 % | 85 % |
| | | fl | fl | fl | fl | fl | fl |
| Aroclor-1016 | | 320 U | 230 U | 430 U R | 310 U | 380 U | 400 U |
| Aroclor-1221 | | 320 U | 230 U | 430 U | 310 U | 380 U | 400 U |
| Aroclor-1232 | | 320 U | 230 U | 430 U | 310 U | 380 U | 400 U |
| Aroclor-1242 | | 320 U | 230 U | 430 U | 310 U | 380 U | 400 U |
| Aroclor-1248 | | 320 U | 230 U | 430 U | 310 U | 380 U | 400 U |
| Aroclor-1254 | | 320 U | 230 U | 430 U | 310 U | 380 U | 400 U |
| Aroclor-1260 | | 320 U | 230 U | 430 U | 310 U | 380 U | 400 U |

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

K 6/14/05

000011A

Lionville Laboratory, Inc.

PCBs by GC

Report Date: 05/06/05 14:24

RFW Batch Number: 0504L309 Client: TNU-HANFORD D05-002 Work Order: 11343606001 Page: 2

| | | | |
|---|---|---|---|
| | Cust ID: | PBLKKG | PBLKKG BS |
| Sample Information | RFW#: | 05LE0338-MB1 | 05LE0338-MB1 |
| | Matrix: | SOIL | SOIL |
| | D.F.: | 1.00 | 1.00 |
| | Units: | UG/KG | UG/KG |

| | | | | | |
|---|---|---|---|---|---|
| Surrogate: | Tetrachloro-m-xylene | 89 | % | 82 | % |
| | Decachlorobiphenyl | 94 | % | 87 | % |
| Aroclor-1016 | | 33 | U | 65 | % |
| Aroclor-1221 | | 33 | U | 33 | U |
| Aroclor-1232 | | 33 | U | 33 | U |
| Aroclor-1242 | | 33 | U | 33 | U |
| Aroclor-1248 | | 33 | U | 33 | U |
| Aroclor-1254 | | 33 | U | 33 | U |
| Aroclor-1260 | | 33 | U | 71 | % |

6/14/05

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

000011B

**Lionville Laboratory, Inc.**

Pesticide/PCBs by GC, CLP List

Report Date: 05/09/05 15:14

RFW Batch Number: **0504L309** Client: **TNU-HANFORD D05-002** Work Order: 11343606001 Page: 1

| | Cust ID: | J03128 | J03129 | J03130 | J03130 | J03130 | J03132 |
|---|---|---|---|---|---|---|---|
| Sample Information | RFW#: | 001 | 002 | 003 | 003 MS | 003 MSD | 004 |
| | Matrix: | SOLID | SOLID | SOLID | SOLID | SOLID | SOLID |
| | D.F.: | 10.0 | 10.0 | 20.0 | 20.0 | 20.0 | 20.0 |
| | Units: | UG/KG | UG/KG | UG/KG | UG/KG | UG/KG | UG/KG |
| Surrogate: | Decachlorobiphenyl | 104 % | 109 % | D % | D % | D % | D % |
| | Tetrachloro-m-xylene | 68 % | 99 % | D % | D % | D % | D % |
| | | fl | fl | fl | fl | fl | fl |
| Alpha-BHC | | 220 U J | 140 U J | 290 J | D % | D % | 150 J |
| Beta-BHC | | 220 U | 140 U | 1700 | D % | D % | 380 U |
| Delta-BHC | | 220 U | 150 | 610 | D % | D % | 430 |
| gamma-BHC (Lindane) | | 220 U | 140 U | 540 U | D % | D % | 380 U |
| Heptachlor | | 220 U | 140 U | 460 | D % | D % | 480 |
| Aldrin | | 220 U | 140 U | 760 | D % | D % | 380 |
| Heptachlor epoxide | | 220 U | 140 U | 540 U | D % | D % | 380 U |
| Endosulfan I | | 220 U | 310 | 540 U | D % | D % | 780 |
| Dieldrin | | 220 U | 2100 | 400 | D % | D % | 380 U |
| 4,4'-DDE | | 440 U | 12000 | 600 | D % | D % | 250 |
| Endrin | | 440 U | 270 U | 1100 U | D % | D % | 750 U |
| Endosulfan II | | 440 U | 5700 | 1100 U | D % | D % | 750 U |
| 4,4'-DDD | | 440 U | 270 U | 1100 U | D % | D % | 750 U |
| Endosulfan sulfate | | 490 | 370 | 390 | D % | D % | 260 |
| 4,4'-DDT | | 440 U | 270 U | 1100 U | D % | D % | 750 U |
| Methoxychlor | | 270 | 410 | 5400 U | D % | D % | 230 |
| Endrin ketone | | 310 | 130 | 300 | D % | D % | 750 U |
| Endrin aldehyde | | 700 | 270 U | 500 | D % | D % | 750 U |
| alpha-Chlordane | | 220 U | 140 U | 540 U | D % | D % | 380 U |
| gamma-Chlordane | | 220 U | 140 U | 560 | D % | D % | 380 U |
| Toxaphene | | 22000 U | 14000 U | 54000 U | 53000 U | 53000 U | 38000 U |

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

000012

K 6/6/05

5/13/05

**Lionville Laboratory, Inc.**

Pesticide/PCBs by GC, CLP List

Report Date: 05/09/05 15:14

RFW Batch Number: **0504L309** Client: **TNU-HANFORD D05-002** Work Order: 11343606001 Page: 2

| | Cust ID: | J03138 | J03139 | J03136 | J03140 | J03142 | J03144 |
|---|---|---|---|---|---|---|---|
| Sample Information | RFW#: | 006 | 007 | 008 | 009 | 010 | 011 |
| | Matrix: | SOLID | SOLID | SOLID | SOLID | SOLID | SOLID |
| | D.F.: | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| | Units: | UG/KG | UG/KG | UG/KG | UG/KG | UG/KG | UG/KG |
| Surrogate: | Decachlorobiphenyl | 106 % | 120 % | 23 * % | 111 % | 119 % | 148 * % |
| | Tetrachloro-m-xylene | 78 % | 96 % | 72 % | 165 * % | 94 % | 112 % |
| | | fl | fl | fl | fl | fl | fl |
| Alpha-BHC | | 160 U J | 110 U J | 220 U J | 150 J | 290 J | 200 U J |
| Beta-BHC | | 160 U | 110 U | 220 U | 150 U | 190 U | 200 U |
| Delta-BHC | | 160 U | 110 U | 220 U | 150 U | 190 U | 200 U |
| gamma-BHC (Lindane) | | 160 U | 110 U | 220 U | 150 U | 190 U | 200 U |
| Heptachlor | | 160 U | 110 U | 220 U | 240 | 480 | 200 U |
| Aldrin | | 160 U | 110 U | 220 U | 180 | 590 | 200 U |
| Heptachlor epoxide | | 160 U | 110 U | 220 U | 150 U | 290 | 200 U |
| Endosulfan I | | 190 | 460 | 240 | 930 | 1300 | 200 U |
| Dieldrin | | 1100 | 1300 | 220 U | 300 | 400 | 200 U |
| 4,4'-DDE | | 1100 | 6900 | 310 | 280 | 360 | 400 U |
| Endrin | | 320 U | 230 U | 280 | 310 U | 380 U | 400 U |
| Endosulfan II | | 2000 | 11000 | 330 | 310 U | 190 | 400 U |
| 4,4'-DDD | | 320 U | 230 U | 430 U | 200 | 370 | 200 |
| Endosulfan sulfate | | 320 U | 1200 | 430 U | 310 U | 380 U | 410 |
| 4,4'-DDT | | 320 U | 5200 | 430 U | 310 U | 380 U | 400 U |
| Methoxychlor | | 190 | 1100 U | 2200 U | 1500 U | 1900 U | 320 |
| Endrin ketone | | 320 U | 200 | 430 U | 310 U | 380 U | 330 |
| Endrin aldehyde | | 320 U | 230 U | 430 U | 310 U | 200 | 400 U |
| alpha-Chlordane | | 160 U | 110 U | 220 U | 150 U | 260 | 200 U |
| gamma-Chlordane | | 160 U | 110 U | 220 U | 220 | 310 | 200 U |
| Toxaphene | | 16000 U | 11000 U | 22000 U | 15000 U | 19000 U | 20000 U |

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

K 6/6/06

5/13/06

000013

**Lionville Laboratory, Inc.**

Pesticide/PCBs by GC, CLP List

Report Date: 05/09/05 15:14

RFW Batch Number: **0504L309** Client: **TNU-HANFORD D05-002** Work Order: 11343606001 Page: 3

| | | | |
|---|---|---|---|
| | Cust ID: | **PBLKKG** | **PBLKKG BS** |
| Sample Information | RFW#: | **05LE0338-MB1** | **05LE0338-MB1** |
| | Matrix: | SOIL | SOIL |
| | D.F.: | 1.00 | 1.00 |
| | Units: | UG/KG | UG/KG |

| | | | | | |
|---|---|---|---|---|---|
| Surrogate: | Decachlorobiphenyl | 100 | % | 94 | % |
| | Tetrachloro-m-xylene | 83 | % | 92 | % |
| Alpha-BHC | | 1.7 | U | 102 | % |
| Beta-BHC | | 1.7 | U | 92 | % |
| Delta-BHC | | 1.7 | U | 106 | % |
| gamma-BHC (Lindane) | | 1.7 | U | 101 | % |
| Heptachlor | | 1.7 | U | 95 | % |
| Aldrin | | 1.7 | U | 102 | % |
| Heptachlor epoxide | | 1.7 | U | 99 | % |
| Endosulfan I | | 1.7 | U | 99 | % |
| Dieldrin | | 1.7 | U | 104 | % |
| 4,4'-DDE | | 3.3 | U | 104 | % |
| Endrin | | 3.3 | U | 103 | % |
| Endosulfan II | | 3.3 | U | 101 | % |
| 4,4'-DDD | | 3.3 | U | 103 | % |
| Endosulfan sulfate | | 3.3 | U | 102 | % |
| 4,4'-DDT | | 3.3 | U | 102 | % |
| Methoxychlor | | 17 | U | 95 | % |
| Endrin ketone | | 3.3 | U | 105 | % |
| Endrin aldehyde | | 3.3 | U | 96 | % |
| alpha-Chlordane | | 1.7 | U | 99 | % |
| gamma-Chlordane | | 1.7 | U | 100 | % |
| Toxaphene | | 170 | U | 170 | U |

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

00014

6/6/05

6/7/05

# Appendix 4

## Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

**Case Narrative**

**Client:** TNU-HANFORD B05-004
**LVL #:** 0504L309
**SDG/SAF #** H3124/D05-002
H3139 05 5/26/05

**W.O. #:** 11343-606-001-9999-00
**Date Received:** 04-26-2005

**CHLORINATED PESTICIDES**

Ten (10) solid samples were collected on 04-19-2005 and 04-20-05.

The samples and there associated QC samples were extracted on 04-30-2005 and analyzed according to Lionville Laboratory SOPs based on SW846, 3rd Edition procedures on 05-06-2005 and 05-07-2005. The extraction procedure was based on method 3540C and the extracts were analyzed based on method 8081A.

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

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

2. The samples were extracted and analyzed within required holding time.

3. The samples and their associated QC samples received Copper-Sulfur cleanups according to Lionville Laboratory SOP's based on SW846 method 3660A.

4. The Method Blank was below the reporting limits for all target compounds.

5. Three (3) of twenty-eight (28) surrogate recoveries were outside acceptance criteria. However, the surrogate recovery acceptance criteria were met (i.e. no more than one outlier per sample).

6. All matrix spike recoveries were within acceptance criteria.

7. All samples required instrument dilutions due to high concentrations of target analytes.

8. The initial calibrations associated with this data set were within acceptance criteria.

9. The continuing calibration standards analyzed prior to sample extracts were within acceptance criteria with the exception that a matrix interference caused continuing CCV's to fluctuate in and out of acceptance criteria. A copy of our Sample Discrepancy Report (SDR #05GC175) has been enclosed.

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

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

5/23/05
Date

jak\r:\group\data\pest\tnu hanford\0504-309.pes

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 13 pages.



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

# Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 056C175

Initiator: M. McAnally
Date: 5/9/05
Client: INU Harrisburg

Batch: ~~ACC~~ 5/9/05 0504L309
Samples: ACC
Method: SW846/MCAWW/CLP/

Parameter: 06084
Matrix: Solid
Prep Batch: 056C0338

**1. Reason for SDR**

**a. COC Discrepancy** __ Tech Profile Error __ Client Request __ Sampler Error on C-O-C __ Transcription Error __ Wrong Test Code __ Other _____

**b. General Discrepancy**

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

Note*: Verified by [Log-In] or [Prep Group] (circle)...signature/date: _____

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

- Matrix interference caused continuing CCVs to fluctuate in and out of acceptance criteria.
- Both columns were used for quantitation of results, but the lowest result was reported.
- BS was OK, Blank was Clean.

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

**3. Discussion and Proposed Action** Other Description:

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

report 1.na

**4. Project Manager Instructions**...signature/date: 5/10/05

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

**5. Final Action**...signature/date: 5/13/05 Other Explanation:

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

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

| Route | Distribution of Completed SDR | Route | Distribution of Completed SDR |
|---|---|---|---|
| __ | X Initiator | __ | __ Metals: Beegle |
| __ | X Lab General Manager: M. Taylor | __ | __ Inorganic: Perrone |
| / | X Project Mgr: Stone/Johnson/Haslett | __ | __ GC/LC: Kiger |
| __ | X Technical Mgr: Wesson/Daniels | __ | __ MS: Rychlak/Layman |
| __ | X QA (file): Alberts | __ | __ Log-in: Melnic |
| __ | __ Data Management: Feldman | __ | __ Admin: Soos |
| __ | __ Sample Prep: Beegle/Kiger | __ | __ Other: _____ |

QA-105-A-0801

LIONVILLE LABORATORY INC.

**Case Narrative**

**Client:** TNU-HANFORD B05-015
**LVL #:** 0504L309
**SDG/SAF #** ~~H3~~124/D05-002
H3139 JD
**PCB** 6/10/05

**W.O. #:** 11343-606-001-9999-00
**Date Received:** 04-26-2005

Ten (10) solid samples were collected on 04-19-2005 and 04-20-2005.

The samples and their associated QC samples were extracted on 04-30-2005 and analyzed according to Lionville Laboratory SOPs based on SW846, 3rd Edition procedures on 05-03-2005, 05-04-2005 and 05-05-2005. The extraction procedure was based on method 3540C and the extracts were analyzed based on method 8082.

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

1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
2. Samples were extracted and analyzed within required holding time.
3. The samples and their associated QC samples received Copper-Sulfur, Sulfuric Acid and Silica Gel cleanups according to Lionville Laboratory SOPs based on SW846 methods 3660A, 3665A, and 3630C respectively.
4. The method blank was below the reporting limits for all target compounds.
5. Two (2) of twenty-eight (28) surrogate recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR# 05GC173) has been enclosed.
6. All blank spike recoveries were within acceptance criteria.
7. All matrix spike recoveries were within acceptance criteria.
8. The initial calibrations associated with this data set were within acceptance criteria.
9. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.
10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

5/23/05
Date

kds\c:\group\data\pest\tnu hanford\0504-309.pcb

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 12 pages.

# Laboratory Sample Discrepancy Report (SDR)

SDR #: 0060173

Initiator: M. Mcnally
Date: 5/6/05
Client: TNU Hanford

Batch: 0504L309
Samples: -008
Method: SW846/MCAWW/CLP/

Parameter: OPCS
Matrix: Solid
Prep Batch: 0502C338

**Reason for SDR**

**a. COC Discrepancy** __ Tech Profile Error __ Client Request __ Sampler Error on C-O-C __ Transcription Error __ Wrong Test Code __ Other _____

**b. General Discrepancy**

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

Note*: Verified by [Log-In] or [Prep Group] (circle)...signature/date: _____

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

- Surrogates were low for sample -008. TCX @ 8% (limit: 20-118). DCB @ 11% (limit: 38-122).
- All other surrs and spikes were ok.
- no hits in any samples

**Known or Probable Causes(s)**

**Discussion and Proposed Action**

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

Other Description: report + manual

**Project Manager Instructions**...signature/date: 5/6/05

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

**Final Action**...signature/date: 5/6/05

Other Explanation:

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

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

| Distribution of Completed SDR | Route | Distribution of Completed SDR |
|---|---|---|
| Initiator | __ | __ Metals: Beegle |
| Lab General Manager: M. Taylor | __ | __ Inorganic: Perrone |
| Project Mgr: Stone/Johnson/Haslett | __ | __ GC/LC: Kiger |
| Technical Mgr: Wesson/Daniels | __ | __ MS: Rychlak/Layman |
| QA (file): Alberts | __ | __ Log-in: Melnic |
| Data Management: Feldman | __ | __ Admin: Soos |
| Sample Prep: Beegle/Kiger | __ | __ Other: _____ |

| Bechtel Hanford Inc. | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | D05-002-1 | Page 1 of 1 |
|---|---|---|---|
| Collector: Stankowich/Gale/Singleton | Company Contact: Steve Weiss; Telephone No.: (509) 372-9495 | Project Coordinator: WEISS, RL | Price Code: 9L; Data Turnaround: 21 Days |
| Project Designation: RCBRA Tribal Plant Sampling - Other Solid | Sampling Location: 100-H Area | SAF No.: D05-002; Air Quality | |
| Ice Chest No.: ERC-02-006, AFS-04-052 & ERC-96-009 | Field Logbook No.: EFL-1133-11; COA: BRASCC0520 | Method of Shipment: FedEx | |
| Shipped To: EBERLINE SERVICES/LIONVILLE | Offsite Property No.: A050184 | Bill of Lading/Air Bill No.: See DSPC | |

POSSIBLE SAMPLE HAZARDS/REMARKS: None

Special Handling and/or Storage: Cool 4°C

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | None D | Cool 4C β | Cool 4C C | Cool 4C | | | | | | | |
| Type of Container | GP | aG | aG | aG A | | | | | | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | | | | | | | |
| Volume | 60g | 120g | 120g | 1000 ~~250ml~~ | ms 4/21/05 | | | | | | |
| SAMPLE ANALYSIS | RCP Metals - 6010 (Client List), Mercury - 7471 - (CV), Percent Solids | PCBs - 8082 | Pesticides - 8081 | Semi-VOA - 8270A (TCL) | | | | | | | |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | |
| 1 ✓ J03128 | OTHER SOLID | 4-19-05 | 1300 | | X | X | X | - one container | | | |
| 2 ✓ J03129 | other solid | 4-19-05 | 1300 | X | (X | XO | XO) | - ~~2 containers~~ | ms 4/21/05 | | |
| 3 ✓ J03130 | other solid | 4-19-05 | 1100 ~~1300~~ | X | X | X | X | | | | |
| 4 ✓ J03132 | other solid | 4-19-05 | 1400 | X | X | X | X | | | | |
| 5 ✓ J03134 | other solid | 4-19-05 | 1410 | X | | | | | | | |

000017

CHAIN OF POSSESSION — Sign/Print Names: ms 4-21-05

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| MT ms stankowich | 1600 4/21/05 | 3728/3C | 1600 4/21/05 |
| 3728 RCE 3C | 4/25/05 1100 | DST John Rice Dwd Stafford | 4/25/05 1100 |
| DST John Rice Dwd Stafford | 4/25/05 1100 | FedEx | |
| FedEx | 4/26/05 0915 | [illegible] | 4/26/05 0915 |
| | | | |
| | | | |

SPECIAL INSTRUCTIONS

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

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

Lionville Laboratory Use Only

0504L309

# Custody Transfer Record/Lab Work Request



LVLI

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Client TNU-HANFORD D05-002

Est. Final Proj. Sampling Date

Project #

Project Contact/Phone #

Lionville Laboratory Project Manager

QC Del TAT

Date Rec'd Date Due

| | | A | B | C | D | |
|---|---|---|---|---|---|---|
| Refrigerator # | | 6 | 6 | 6 | 6 | |
| #/Type Container | Liquid | | | | | 4y |
| | Solid | C | B4 | B4 | B4 | 4 |
| Volume | Liquid | | | | | 4y |
| | Solid | C | – | – | – | 4 |
| Preservatives | | – | – | – | – | 4 |
| ANALYSES REQUESTED → | | ORGANIC | | | INORG | |
| | | VOA | BNA | Pest/PCB | Herb | Metal | CN | Percent solids |

Lionville Laboratory Use Only

MATRIX CODES:
S - Soil
SE - Sediment
SO - Solid
SL - Sludge
W - Water
O - Oil
A - Air
DS - Drum Solids
DL - Drum Liquids
L - EP/TCLP Leachate
WI - Wipe
X - Other
F - Fish

| Lab ID | Client ID/Description | Matrix QC Chosen (✓) MS | MSD | Matrix | Date Collected | Time Collected | 0625H | 0008H | 0PCB | METALS(1) | | EQ SOL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 011 | T03144 | | | X | 4-2005 | 1315 | 1 | 1 | 1 | 1 | | ✓ |

020000

Special Instructions:

METALS(1) = As, Ba, Cr, Pb, Se, Sn, V, Zn, Hg

DATE/REVISIONS:

1.
2.
3.
4.
5.
6.

| Relinquished by | Received by | Date | Time |
|---|---|---|---|
| [illegible] | [illegible] | 1/26/05 | 0915 |

| Relinquished by | Received by | Date | Time |
|---|---|---|---|
| | | | |

| Relinquished by | Received by | Date | Time |
|---|---|---|---|
| | | | |

# Appendix 5

## Data Validation Supporting Documentation

# PCB DATA VALIDATION CHECKLIST

| VALIDATION LEVEL: | A | B | C | D | E |
|---|---|---|---|---|---|
| PROJECT: RCBRA | | | DATA PACKAGE: H3139 | | |
| VALIDATOR: TCI | | LAB: LLI | | DATE: 6/4/03 | |
| | | | SDG: H3139 | | |
| ANALYSES PERFORMED | | | | | |
| SW-846 8081 | SW-846 8081 (TCLP) | SW-846 8082 | SW-846 8081 (TCLP) | | |
| SAMPLES/MATRIX | | | | | |
| J03128 | J03129 | J03130 | J03132 | J03138 | |
| J03139 | J03136 | J03140 | J03142 | J03144 | |
| | | | | | |
| | | | | | |
| | | | | | solid |

## 1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments:

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

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

Continuing calibrations acceptable? ..... Yes No N/A

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

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

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

DDT and endrin breakdowns acceptable? ..... Yes No N/A

Comments:

# PCB DATA VALIDATION CHECKLIST

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

Calibration blanks analyzed? (Levels D, E) ..... Yes No N/A
Calibration blank results acceptable? (Levels D, E) ..... Yes No N/A
Laboratory blanks analyzed? ..... Yes No N/A
Laboratory blank results acceptable? ..... Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E) ..... Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E) ..... Yes No N/A
Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: No FB

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

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

Comments: Surr diluted out 30/32 - J all
Surr - 136 - J all Surr 40 - J all detects
Surr - 44 - J all detects
MS/MSD diluted out - J all (except toxaphene)
NO MS/MSD - J all toxaphene
NO toxaphene LCS - J all

SOTR - PCB - R 36
87c

# PCB DATA VALIDATION CHECKLIST

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

Duplicate RPD values acceptable? ..... Yes (No) N/A

Duplicate results acceptable? ..... Yes (No) N/A

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

MS/MSD standards expired? (Levels D, E) ..... Yes No (N/A)

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

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

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

Comments: MS/MSD diluted out – J all
no surrogate dup – J all

## 6. SYSTEM PERFORMANCE (Levels D and E)

Chromatographic performance acceptable? ..... Yes No (N/A)

Positive results resolved acceptably? ..... Yes No (N/A)

Comments:

## 7. HOLDING TIMES (all levels)

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

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

Comments:

# PCB DATA VALIDATION CHECKLIST

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

Compound identification acceptable? (Levels D, E) ..... Yes No N/A

Compound quantitation acceptable? (Levels D, E) ..... Yes No N/A

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

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

Samples properly prepared? (Levels D, E) ..... Yes No N/A

Detection limits meet RDL? ..... Yes No N/A

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

Comments: all undetected ones

## 9. SAMPLE CLEANUP (Levels D and E)

Fluoricil ® (or other absorbent) cleanup performed? ..... Yes No N/A

Lot check performed? ..... Yes No N/A

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

GPC cleanup performed? ..... Yes No N/A

GPC check performed? ..... Yes No N/A

GPC check recoveries acceptable? ..... Yes No N/A

GPC calibration performed? ..... Yes No N/A

GPC calibration check performed? ..... Yes No N/A

GPC calibration check retention times acceptable? ..... Yes No N/A

Check/calibration materials traceable? ..... Yes No N/A

Check/calibration materials Expired? ..... Yes No N/A

Analytical batch QC given similar cleanup? ..... Yes No N/A

Transcription/Calculation Errors? ..... Yes No N/A

Comments:

Date: 8 June 2005
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: RCBRA Tribal Plant Sampling - Other Solid
Subject: Semivolatile - Data Package No. H3139-LLI (SDG No. H3139)

## INTRODUCTION

This memo presents the results of data validation on Data Package No. H3139-LLI prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

| Sample ID | Sample Date | Media | Validation | Analysis |
|---|---|---|---|---|
| J03128 | 4/19/05 | Solid | C | Semivolatiles by 8270C |
| J03129 | 4/19/05 | Solid | C | Semivolatiles by 8270C |
| J03130 | 4/19/05 | Solid | C | Semivolatiles by 8270C |
| J03132 | 4/19/05 | Solid | C | Semivolatiles by 8270C |
| J03138 | 4/20/05 | Solid | C | Semivolatiles by 8270C |
| J03139 | 4/20/05 | Solid | C | Semivolatiles by 8270C |
| J03136 | 4/20/05 | Solid | C | Semivolatiles by 8270C |
| J03140 | 4/20/05 | Solid | C | Semivolatiles by 8270C |
| J03142 | 4/20/05 | Solid | C | Semivolatiles by 8270C |
| J03144 | 4/20/05 | Solid | C | Semivolatiles by 8270C |

Data validation was conducted in accordance with the Bechtel Hanford Incorporated (BHI) validation statement of work and the Sampling Analysis Instruction for Tribal Plant Sampling in Support of the 100 Area and 300 Area Component of the RCBRA (BHI-01754, March 2005). 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 were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

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

All holding times were met.

- **Method Blanks**

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".

Due to method blank contamination, the bis(2-ethylhexyl)phthalate result in sample J03140 was qualified as undetected and flagged "U".

All other method blank results were acceptable.

<u>Field Blanks</u>

No field blanks were submitted for analysis.

- **Accuracy**

Matrix Spike/Matrix Spike Duplicate & Blank Spike Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using five compounds for which percent recoveries must be within a range of 50-150% or within laboratory control limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries below control limits are qualified as estimates and flagged "UJ". Undetected sample results are not qualified if the spike recovery is above control limits. Sample results greater than five times the spike concentration require no qualification.

All accuracy results were acceptable.

Surrogate Recovery

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

Due to a surrogate recovery outside QC limits (114%), the phenol, 4-methylphenol and bis(2-ethylhexyl)phthalate result in sample J03128 was qualified as an estimate and flagged "J".

All other surrogate results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes.

Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of +/-30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All precision results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for analysis.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the required quantitation limits (RQL's) to ensure that laboratory detection levels meet the required criteria. All undetected analytes were reported above the RQL. Under the BHI statement of work, no qualification is required.

- **Completeness**

Data package No. H3139-LLI was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

**MAJOR DEFICIENCIES**

None found.

**MINOR DEFICIENCIES**

Due to method blank contamination, the bis(2-ethylhexyl)phthalate result in sample J03140 was qualified as undetected and flagged "U". Due to a surrogate recovery outside QC limits (114%), the phenol, 4-methylphenol and bis(2-ethylhexyl)phthalate result in sample J03128 was qualified as an estimate and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for

decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

All undetected analytes were reported above the RQL. Under the BHI statement of work, no qualification is required.

## REFERENCES

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

BHI-01754, *Sampling Analysis Instruction for Tribal Plant Sampling in Support of the 100 Area and 300 Area Component of the River Corridor Baseline Risk Assessment*, March 2005.

## Appendix 1

## Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the same quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications usable for decision-making purposes).

## Appendix 2

## Summary of Data Qualification

SEMIVOLATILE DATA QUALIFICATION SUMMARY*

| SDG: H3139 | REVIEWER: TLI | PROJECT: RCBRA | PAGE_1_OF_1_ |
|---|---|---|---|
| COMMENTS: | | | |
| COMPOUND | QUALIFIER | SAMPLES AFFECTED | REASON |
| bis(2-Ethylhexyl)phthalate | U | J03140 | Method blank contamination |
| Phenol<br>4-Methylphenol<br>bis(2-Ethylhexyl)phthalate | J | J03128 | Surrogate 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.

# Appendix 3

## Qualified Data Summary and Annotated Laboratory Reports

SEMIVOLATILE ANALYSIS, SOLID MATRIX, (UG/KG)



| Project: BECHTEL-HANFORD | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Laboratory: LLI | SDG: H3139 | | | | | | | | | | | | | | | | | | | | |
| Sample Number | | J03128 | | J03129 | | J03130 | | J03132 | | J03138 | | J03139 | | J03136 | | J03140 | | J03142 | | J03144 | |
| Remarks | | | | | | | | | | | | | | | | | | | | | |
| Sample Date | | 4/19/05 | | 4/19/05 | | 4/19/05 | | 4/19/05 | | 4/19/05 | | 4/20/05 | | 4/20/05 | | 4/20/05 | | 4/20/05 | | 4/20/05 | |
| Extraction Date | | 5/3/05 | | 5/3/05 | | 5/3/05 | | 5/3/05 | | 5/3/05 | | 5/3/05 | | 5/3/05 | | 5/3/05 | | 5/3/05 | | 5/3/05 | |
| Analysis Date | | 5/6/05 | | 5/6/05 | | 5/6/05 | | 5/6/05 | | 5/6/05 | | 5/6/05 | | 5/6/05 | | 5/6/05 | | 5/6/05 | | 5/6/05 | |
| Semivolatile (8270C) | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| Phenol | 330 | 6300 | J | 2600 | U | 21000 | U | 36000 | U | 6300 | | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 6900 | |
| bis(2-Chloroethyl)ether | 330 | 19000 | | 2600 | U | 21000 | U | 36000 | U | 13000 | | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 2-Chlorophenol | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 1,3-Dichlorobenzene | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 1,4-Dichlorobenzene | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 1,2-Dichlorobenzene | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 2-Methylphenol | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 2,2'-oxybis(1-chloropropane) | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 3 and/or 4-Methylphenol | 330 | 4100 | J | 2600 | U | 21000 | U | 36000 | U | 2700 | | 8500 | U | 840 | | 6000 | U | 13000 | U | 20000 | U |
| N-Nitroso-di-n-propylamine | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Hexachloroethane | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Nitrobenzene | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Isophorone | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 2-Nitrophenol | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 2,4-Dimethylphenol | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| bis(2-Chloroethoxy)methane | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 2,4-Dichlorophenol | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 1,2,4-Trichlorobenzene | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Naphthalene | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 4-Chloroaniline | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Hexachlorobutadiene | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 4-Chloro-3-methylphenol | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 2-Methylnaphthalene | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Hexachlorocyclopentadiene | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 2,4,6-Trichlorophenol | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 2,4,5-Trichlorophenol | 330 | 99000 | U | 6400 | U | 53000 | U | 91000 | U | 78000 | U | 21000 | U | 41000 | U | 15000 | U | 33000 | U | 51000 | U |
| 2-Chloronaphthalene | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 2-Nitroaniline | 330 | 99000 | U | 6400 | U | 53000 | U | 91000 | U | 78000 | U | 21000 | U | 41000 | U | 15000 | U | 33000 | U | 51000 | U |
| Dimethylphthalate | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Acenaphthylene | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 2,6-Dinitrotoluene | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results.

All other qualifiers shown were applied during validation.

000011

SEMIVOLATILE ANALYSIS, SOLID MATRIX, (UG/KG)



| Project: BECHTEL-HANFORD | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Laboratory: LLI | SDG: H3139 | | | | | | | | | | | | | | | | | | | | |
| Sample Number | | J03128 | | J03129 | | J03130 | | J03132 | | J03138 | | J03139 | | J03136 | | J03140 | | J03142 | | J03144 | |
| Remarks | | | | | | | | | | | | | | | | | | | | | |
| Sample Date | | 4/19/05 | | 4/19/05 | | 4/19/05 | | 4/19/05 | | 4/20/05 | | 4/20/05 | | 4/20/05 | | 4/20/05 | | 4/20/05 | | 4/20/05 | |
| Extraction Date | | 5/3/05 | | 5/3/05 | | 5/3/05 | | 5/3/05 | | 5/3/05 | | 5/3/05 | | 5/3/05 | | 5/3/05 | | 5/3/05 | | 5/3/05 | |
| Analysis Date | | 5/6/05 | | 5/6/05 | | 5/6/05 | | 5/6/05 | | 5/6/05 | | 5/6/05 | | 5/6/05 | | 5/6/05 | | 5/6/05 | | 5/6/05 | |
| Semivolatile (8270C) | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| 3-Nitroaniline | 330 | 99000 | U | 6400 | U | 53000 | U | 91000 | U | 78000 | U | 21000 | U | 41000 | U | 15000 | U | 33000 | U | 51000 | U |
| Acenaphthene | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 2,4-Dinitrophenol | 330 | 99000 | U | 6400 | U | 53000 | U | 91000 | U | 78000 | U | 21000 | U | 41000 | U | 15000 | U | 33000 | U | 51000 | U |
| 4-Nitrophenol | 330 | 99000 | U | 6400 | U | 53000 | U | 91000 | U | 78000 | U | 21000 | U | 41000 | U | 15000 | U | 33000 | U | 51000 | U |
| Dibenzofuran | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 2,4-Dinitrotoluene | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Diethylphthalate | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 4-Chlorophenyl-phenyl ether | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Fluorene | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 4-Nitroaniline | 330 | 99000 | U | 6400 | U | 53000 | U | 91000 | U | 78000 | U | 21000 | U | 41000 | U | 15000 | U | 33000 | U | 51000 | U |
| 4,6-Dinitro-2-methylphenol | 330 | 99000 | U | 6400 | U | 53000 | U | 91000 | U | 78000 | U | 21000 | U | 41000 | U | 15000 | U | 33000 | U | 51000 | U |
| N-Nitrosodiphenylamine | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 4-Bromophenyl-phenyl ether | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Hexachlorobenzene | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Pentachlorophenol | 330 | 99000 | U | 6400 | U | 53000 | U | 91000 | U | 78000 | U | 21000 | U | 41000 | U | 15000 | U | 33000 | U | 51000 | U |
| Phenanthrene | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Anthracene | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Carbazole | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Di-n-butylphthalate | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Fluoranthene | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Pyrene | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Butylbenzylphthalate | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 1500 | |
| 3,3'-Dichlorobenzidine | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Benzo(a)anthracene | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Chrysene | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| bis(2-Ethylhexyl)phthalate | 330 | 5200 | J | 540 | | 21000 | U | 2000 | | 1800 | | 8500 | U | 4600 | | 330 | U | 860 | | 1100 | |
| Di-n-octylphthalate | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Benzo(b)fluoranthene | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Benzo(k)fluoranthene | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Benzo(a)pyrene | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Indeno(1,2,3-cd)pyrene | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Dibenz(a,h)anthracene | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Benzo(g,h,i)perylene | 330 | 39000 | U | 2600 | U | 21000 | U | 36000 | U | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results.

All other qualifiers shown were applied during validation.

**Lionville Laboratory, Inc.**

Semivolatiles by GC/MS, HSL List

Report Date: 05/12/05 09:44

RFW Batch Number: 0504L309 Client: TNUHANFORD D05-002 H3139 Work Order: 11343606001 Page: 1a

| | Cust ID: | J03128 | | J03129 | | J03130 | | J03130 | | J03130 | | J03132 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Information | RFW#: | 001 | | 002 | | 003 | | 003 MS | | 003 MSD | | 004 | |
| | Matrix: | SOLID | | SOLID | | SOLID | | SOLID | | SOLID | | SOLID | |
| | D.F.: | 10.0 | | 1.00 | | 4.00 | | 4.00 | | 4.00 | | 10.0 | |
| | Units: | UG/KG | | UG/KG | | UG/KG | | UG/KG | | UG/KG | | UG/KG | |
| Surrogate Recovery | Nitrobenzene-d5 | 93 | % | 73 | % | 97 | % | 74 | % | 93 | % | 102 | % |
| | 2-Fluorobiphenyl | 101 | % | 83 | % | 99 | % | 75 | % | 89 | % | 108 | % |
| | Terphenyl-d14 | 118 | % | 56 | % | 118 | % | 83 | % | 100 | % | 129 | % |
| | Phenol-d5 | 114 * | % | 86 | % | 101 | % | 80 | % | 99 | % | 110 | % |
| | 2-Fluorophenol | 106 | % | 73 | % | 92 | % | 78 | % | 92 | % | 116 | % |
| | 2,4,6-Tribromophenol | 120 | % | 102 | % | 124 * | % | 87 | % | 103 | % | 123 * | % |
| | | | fl | | fl | | fl | | fl | | fl | | fl |
| Phenol | | 6300 | J | 2600 | U | 21000 | U | 69 | % | 84 | % | 36000 | U |
| bis(2-Chloroethyl)ether | | 19000 | J | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| 2-Chlorophenol | | 39000 | U | 2600 | U | 21000 | U | 69 | % | 83 | % | 36000 | U |
| 1,3-Dichlorobenzene | | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| 1,4-Dichlorobenzene | | 39000 | U | 2600 | U | 21000 | U | 68 | % | 80 | % | 36000 | U |
| 1,2-Dichlorobenzene | | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| 2-Methylphenol | | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| 2,2'-oxybis(1-Chloropropane) | | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| 3/4-Methylphenol | | 4100 | J | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| N-Nitroso-di-n-propylamine | | 39000 | U | 2600 | U | 21000 | U | 84 | % | 105 | % | 36000 | U |
| Hexachloroethane | | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| Nitrobenzene | | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| Isophorone | | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| 2-Nitrophenol | | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| 2,4-Dimethylphenol | | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| bis(2-Chloroethoxy)methane | | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| 2,4-Dichlorophenol | | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| 1,2,4-Trichlorobenzene | | 39000 | U | 2600 | U | 21000 | U | 71 | % | 83 | % | 36000 | U |
| Naphthalene | | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| 4-Chloroaniline | | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| Hexachlorobutadiene | | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| 4-Chloro-3-methylphenol | | 39000 | U | 2600 | U | 21000 | U | 72 | % | 90 | % | 36000 | U |
| 2-Methylnaphthalene | | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| Hexachlorocyclopentadiene | | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| 2,4,6-Trichlorophenol | | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| 2,4,5-Trichlorophenol | | 99000 | U | 6400 | U | 53000 | U | 48000 | U | 53000 | U | 91000 | U |

*= Outside of EPA CLP QC limits.

6/6/05

000013

RFW Batch Number: 0504L309 Client: TNUHANFORD D05-002 H3139 Work Order: 11343606001 Page: 1b

| Cust ID: | J03128 | | J03129 | | J03130 | | J03130 | | J03130 | | J03132 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RFW#: | 001 | | 002 | | 003 | | 003 MS | | 003 MSD | | 004 | |
| 2-Chloronaphthalene | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| 2-Nitroaniline | 99000 | U | 6400 | U | 53000 | U | 48000 | U | 53000 | U | 91000 | U |
| Dimethylphthalate | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| Acenaphthylene | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| 2,6-Dinitrotoluene | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| 3-Nitroaniline | 99000 | U | 6400 | U | 53000 | U | 48000 | U | 53000 | U | 91000 | U |
| Acenaphthene | 39000 | U | 2600 | U | 21000 | U | 73 | % | 85 | % | 36000 | U |
| 2,4-Dinitrophenol | 99000 | U | 6400 | U | 53000 | U | 48000 | U | 53000 | U | 91000 | U |
| 4-Nitrophenol | 99000 | U | 6400 | U | 53000 | U | 61 | % | 82 | % | 91000 | U |
| Dibenzofuran | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| 2,4-Dinitrotoluene | 39000 | U | 2600 | U | 21000 | U | 59 | % | 70 | % | 36000 | U |
| Diethylphthalate | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| 4-Chlorophenyl-phenylether | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| Fluorene | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| 4-Nitroaniline | 99000 | U | 6400 | U | 53000 | U | 48000 | U | 53000 | U | 91000 | U |
| 4,6-Dinitro-2-methylphenol | 99000 | U | 6400 | U | 53000 | U | 48000 | U | 53000 | U | 91000 | U |
| N-Nitrosodiphenylamine (1) | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| 4-Bromophenyl-phenylether | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| Hexachlorobenzene | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| Pentachlorophenol | 99000 | U | 6400 | U | 53000 | U | 65 | % | 78 | % | 91000 | U |
| Phenanthrene | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| Anthracene | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| Carbazole | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| Di-n-butylphthalate | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| Fluoranthene | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| Pyrene | 39000 | U | 2600 | U | 21000 | U | 74 | % | 87 | % | 36000 | U |
| Butylbenzylphthalate | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| 3,3'-Dichlorobenzidine | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| Benzo(a)anthracene | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| Chrysene | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| bis(2-Ethylhexyl)phthalate | 5200 | ~~JB~~ J | 540 | JB | 21000 | U | 19000 | U | 21000 | U | 2000 | JB |
| Di-n-octyl phthalate | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| Benzo(b)fluoranthene | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| Benzo(k)fluoranthene | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| Benzo(a)pyrene | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| Indeno(1,2,3-cd)pyrene | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| Dibenz(a,h)anthracene | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |
| Benzo(g,h,i)perylene | 39000 | U | 2600 | U | 21000 | U | 19000 | U | 21000 | U | 36000 | U |

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

6/6/05

000074

**Lionville Laboratory, Inc.**

Semivolatiles by GC/MS, HSL List

Report Date: 05/12/05 09:44

RFW Batch Number: **0504L309** Client: **TNUHANFORD D05-002 H3139** Work Order: 11343606001 Page: 2a

| | Cust ID: | J03138 | | J03139 | | J03136 | | J03140 | | J03142 | | J03144 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Information | RFW#: | 006 | | 007 | | 008 | | 009 | | 010 | | 011 | |
| | Matrix: | SOLID | | SOLID | | SOLID | | SOLID | | SOLID | | SOLID | |
| | D.F.: | 10.0 | | 4.00 | | 4.00 | | 2.00 | | 4.00 | | 5.00 | |
| | Units: | UG/KG | | UG/KG | | UG/KG | | UG/KG | | UG/KG | | UG/KG | |
| Surrogate Recovery | Nitrobenzene-d5 | 100 | % | 82 | % | 99 | % | 76 | % | 85 | % | 94 | % |
| | 2-Fluorobiphenyl | 110 | % | 85 | % | 105 | % | 73 | % | 91 | % | 95 | % |
| | Terphenyl-d14 | 124 | % | 63 | % | 125 | % | 81 | % | 109 | % | 99 | % |
| | Phenol-d5 | 111 | % | 91 | % | 106 | % | 75 | % | 89 | % | 102 | % |
| | 2-Fluorophenol | 108 | % | 85 | % | 99 | % | 67 | % | 86 | % | 87 | % |
| | 2,4,6-Tribromophenol | 123 * | % | 103 | % | 128 * | % | 88 | % | 108 | % | 116 | % |
| | | | fl | | fl | | fl | | fl | | fl | | fl |
| Phenol | | 6300 | J | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 6900 | J |
| bis(2-Chloroethyl)ether | | 13000 | J | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 2-Chlorophenol | | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 1,3-Dichlorobenzene | | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 1,4-Dichlorobenzene | | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 1,2-Dichlorobenzene | | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 2-Methylphenol | | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 2,2'-oxybis(1-Chloropropane) | | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 3/4-Methylphenol | | 2700 | J | 8500 | U | 840 | J | 6000 | U | 13000 | U | 20000 | U |
| N-Nitroso-di-n-propylamine | | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Hexachloroethane | | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Nitrobenzene | | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Isophorone | | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 2-Nitrophenol | | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 2,4-Dimethylphenol | | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| bis(2-Chloroethoxy)methane | | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 2,4-Dichlorophenol | | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 1,2,4-Trichlorobenzene | | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Naphthalene | | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 4-Chloroaniline | | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Hexachlorobutadiene | | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 4-Chloro-3-methylphenol | | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 2-Methylnaphthalene | | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Hexachlorocyclopentadiene | | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 2,4,6-Trichlorophenol | | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 2,4,5-Trichlorophenol | | 78000 | U | 21000 | U | 41000 | U | 15000 | U | 33000 | U | 51000 | U |

*= Outside of EPA CLP QC limits.

6/6/05

000015

RFW Batch Number: 0504L309 Client: TNUHANFORD D05-002 H3139 Work Order: 11343606001 Page: 2b

| Cust ID: | J03138 | | J03139 | | J03136 | | J03140 | | J03142 | | J03144 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RFW#: | 006 | | 007 | | 008 | | 009 | | 010 | | 011 | |
| 2-Chloronaphthalene | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 2-Nitroaniline | 78000 | U | 21000 | U | 41000 | U | 15000 | U | 33000 | U | 51000 | U |
| Dimethylphthalate | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Acenaphthylene | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 2,6-Dinitrotoluene | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 3-Nitroaniline | 78000 | U | 21000 | U | 41000 | U | 15000 | U | 33000 | U | 51000 | U |
| Acenaphthene | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 2,4-Dinitrophenol | 78000 | U | 21000 | U | 41000 | U | 15000 | U | 33000 | U | 51000 | U |
| 4-Nitrophenol | 78000 | U | 21000 | U | 41000 | U | 15000 | U | 33000 | U | 51000 | U |
| Dibenzofuran | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 2,4-Dinitrotoluene | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Diethylphthalate | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 4-Chlorophenyl-phenylether | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Fluorene | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 4-Nitroaniline | 78000 | U | 21000 | U | 41000 | U | 15000 | U | 33000 | U | 51000 | U |
| 4,6-Dinitro-2-methylphenol | 78000 | U | 21000 | U | 41000 | U | 15000 | U | 33000 | U | 51000 | U |
| N-Nitrosodiphenylamine (1) | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| 4-Bromophenyl-phenylether | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Hexachlorobenzene | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Pentachlorophenol | 78000 | U | 21000 | U | 41000 | U | 15000 | U | 33000 | U | 51000 | U |
| Phenanthrene | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Anthracene | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Carbazole | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Di-n-butylphthalate | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Fluoranthene | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Pyrene | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Butylbenzylphthalate | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 1500 | J |
| 3,3'-Dichlorobenzidine | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Benzo(a)anthracene | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Chrysene | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| bis(2-Ethylhexyl)phthalate | 1800 | JB | 8500 | U | 4600 | JB | 330 | ~~JB~~ U | 860 | JB | 1100 | JB |
| Di-n-octyl phthalate | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Benzo(b)fluoranthene | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Benzo(k)fluoranthene | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Benzo(a)pyrene | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Indeno(1,2,3-cd)pyrene | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Dibenz(a,h)anthracene | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |
| Benzo(g,h,i)perylene | 31000 | U | 8500 | U | 16000 | U | 6000 | U | 13000 | U | 20000 | U |

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

6/6/05

000016

**Lionville Laboratory, Inc.**

Semivolatiles by GC/MS, HSL List

Report Date: 05/12/05 09:44

RFW Batch Number: **0504L309** Client: **TNUHANFORD D05-002 H3139** Work Order: 11343606001 Page: 3a

| | | | | | |
|---|---|---|---|---|---|
| | Cust ID: | **SBLKIW** | | **SBLKIW BS** | |
| Sample Information | RFW#: | **05LE0343-MB1** | | **05LE0343-MB1** | |
| | Matrix: | SOIL | | SOIL | |
| | D.F.: | 1.00 | | 1.00 | |
| | Units: | UG/KG | | UG/KG | |
| Surrogate Recovery | Nitrobenzene-d5 | 76 | % | 69 | % |
| | 2-Fluorobiphenyl | 82 | % | 74 | % |
| | Terphenyl-d14 | 103 | % | 97 | % |
| | Phenol-d5 | 84 | % | 76 | % |
| | 2-Fluorophenol | 76 | % | 73 | % |
| | 2,4,6-Tribromophenol | 80 | % | 82 | % |

| | | | | |
|---|---|---|---|---|
| Phenol | 330 | U | 69 | % |
| bis(2-Chloroethyl)ether | 330 | U | 330 | U |
| 2-Chlorophenol | 330 | U | 70 | % |
| 1,3-Dichlorobenzene | 330 | U | 330 | U |
| 1,4-Dichlorobenzene | 330 | U | 68 | % |
| 1,2-Dichlorobenzene | 330 | U | 330 | U |
| 2-Methylphenol | 330 | U | 330 | U |
| 2,2'-oxybis(1-Chloropropane) | 330 | U | 330 | U |
| 3/4-Methylphenol | 330 | U | 330 | U |
| N-Nitroso-di-n-propylamine | 330 | U | 68 | % |
| Hexachloroethane | 330 | U | 330 | U |
| Nitrobenzene | 330 | U | 330 | U |
| Isophorone | 330 | U | 330 | U |
| 2-Nitrophenol | 330 | U | 330 | U |
| 2,4-Dimethylphenol | 330 | U | 330 | U |
| bis(2-Chloroethoxy)methane | 330 | U | 330 | U |
| 2,4-Dichlorophenol | 330 | U | 330 | U |
| 1,2,4-Trichlorobenzene | 330 | U | 66 | % |
| Naphthalene | 330 | U | 330 | U |
| 4-Chloroaniline | 330 | U | 330 | U |
| Hexachlorobutadiene | 330 | U | 330 | U |
| 4-Chloro-3-methylphenol | 330 | U | 65 | % |
| 2-Methylnaphthalene | 330 | U | 330 | U |
| Hexachlorocyclopentadiene | 330 | U | 330 | U |
| 2,4,6-Trichlorophenol | 330 | U | 330 | U |
| 2,4,5-Trichlorophenol | 830 | U | 830 | U |

*= Outside of EPA CLP QC limits.

JR 6/6/05

000017

Cust ID: SBLKIW SBLKIW BS

RFW#: 05LE0343-MB1 05LE0343-MB1

| | | | | |
|---|---|---|---|---|
| 2-Chloronaphthalene | 330 | U | 330 | U |
| 2-Nitroaniline | 830 | U | 830 | U |
| Dimethylphthalate | 330 | U | 330 | U |
| Acenaphthylene | 330 | U | 330 | U |
| 2,6-Dinitrotoluene | 330 | U | 330 | U |
| 3-Nitroaniline | 830 | U | 830 | U |
| Acenaphthene | 330 | U | 70 | % |
| 2,4-Dinitrophenol | 830 | U | 830 | U |
| 4-Nitrophenol | 830 | U | 65 | % |
| Dibenzofuran | 330 | U | 330 | U |
| 2,4-Dinitrotoluene | 330 | U | 67 | % |
| Diethylphthalate | 330 | U | 330 | U |
| 4-Chlorophenyl-phenylether | 330 | U | 330 | U |
| Fluorene | 330 | U | 330 | U |
| 4-Nitroaniline | 830 | U | 830 | U |
| 4,6-Dinitro-2-methylphenol | 830 | U | 830 | U |
| N-Nitrosodiphenylamine (1) | 330 | U | 330 | U |
| 4-Bromophenyl-phenylether | 330 | U | 330 | U |
| Hexachlorobenzene | 330 | U | 330 | U |
| Pentachlorophenol | 830 | U | 46 | % |
| Phenanthrene | 330 | U | 330 | U |
| Anthracene | 330 | U | 330 | U |
| Carbazole | 330 | U | 330 | U |
| Di-n-butylphthalate | 330 | U | 330 | U |
| Fluoranthene | 330 | U | 330 | U |
| Pyrene | 330 | U | 81 | % |
| Butylbenzylphthalate | 330 | U | 330 | U |
| 3,3'-Dichlorobenzidine | 330 | U | 330 | U |
| Benzo(a)anthracene | 330 | U | 330 | U |
| Chrysene | 330 | U | 330 | U |
| bis(2-Ethylhexyl)phthalate | 40 | J | 43 | JB |
| Di-n-octyl phthalate | 330 | U | 330 | U |
| Benzo(b)fluoranthene | 330 | U | 330 | U |
| Benzo(k)fluoranthene | 330 | U | 330 | U |
| Benzo(a)pyrene | 330 | U | 330 | U |
| Indeno(1,2,3-cd)pyrene | 330 | U | 330 | U |
| Dibenz(a,h)anthracene | 330 | U | 330 | U |
| Benzo(g,h,i)perylene | 330 | U | 330 | U |

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

6/6/05

000018

## Appendix 4

## Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

**Case Narrative**

**Client:** TNU-HANFORD D05-003
**LVL #:** 0504L309
**SDG/SAF #** H3139/D05-003

**W.O. #:** 11343-606-001-9999-00
**Date Received:** 04-26-2005

## SEMIVOLATILE

Ten (10) solid samples were collected on 04-19-2005 and 04-20-2005.

The samples and their associated QC samples were extracted according to Lionville Laboratory SOPs based on SW 846 method 3540C on 05-03-2005 and analyzed according to criteria set forth in Lionville Laboratory SOPs based on SW 846 Method 8270C for TCL Semivolatile target compounds on 05-04-2005, 05-05-2005, 05-06-2005, 05-09-2005.

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

1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
2. Samples were extracted and analyzed within required holding time.
3. Non-target compounds were detected in the samples.
4. Due to matrix the following samples had adjusted final volumes: J03128, J03132, J03138 – 10 mls, J03144 – 5 mls, J03130, J03139, J03136, J03142 – 4 mls, J03140 – 2 mls. These samples require no instrument dilutions. Due to programming limitations this dilution factor is reflected on the Form 1 summary.
5. Five (5) of eighty-four (84) surrogate recoveries were outside EPA QC limits. However, EPA CLP surrogate recovery criteria were not met. (i.e, no more than one outlier per fraction {acid and base neutral} and no recoveries less than 10%)
6. All matrix spike recoveries were within acceptance criteria.
7. All blank spike recoveries were within acceptance criteria.
8. The method blank contained the common laboratory contaminant Bis (2-Ethylhexyl) phthalate at a level less than the CRQL.
9. Internal standard area and retention time criteria were met.
10. 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").
11. I certify, that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data, contained in this hard-copy data package, has been authorized, by the Laboratory Manager or a designee, as verified by the following signature.

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

5/23/05
Date



kds\gorup\data\bna\tnu-hanford\0504-309.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 28 pages.

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# Appendix 5

## Data Validation Supporting Documentation

# GC/MS ORGANIC DATA VALIDATION CHECKLIST

| VALIDATION LEVEL: | A | B | C | D | E |
|---|---|---|---|---|---|
| PROJECT: RCBRA | | | DATA PACKAGE: H3139 | | |
| VALIDATOR: TLI | | LAB: LCI | | DATE: 4 June 05 | |
| | | | SDG: H3139 | | |
| ANALYSES PERFORMED | | | | | |
| SW-846 8260 | | SW-846 8260 (TCLP) | SW-846 8270 | | SW-846 8270 (TCLP) |
| | | | | | |
| SAMPLES/MATRIX | | | | | |
| J03128 | J03129 | J03130 | J03132 | J03138 | J03139 |
| J03136 | J03140 | J03142 | J03144 | | |
| | | | | | |
| | | | | | |
| | | | | | Solid |

## 1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments:

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

GC/MS tuning/performance check acceptable? ..... Yes No N/A

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

Continuing calibrations acceptable? ..... Yes No N/A

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

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

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

Comments:

# GC/MS ORGANIC DATA VALIDATION CHECKLIST

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

Calibration blanks analyzed? (Levels D, E) ..... Yes No N/A
Calibration blank results acceptable? (Levels D, E) ..... Yes No N/A
Laboratory blanks analyzed? ..... Yes No N/A
Laboratory blank results acceptable? ..... Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E) ..... Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E) ..... Yes No N/A
Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: NO FB

bis(2-ethylhexyl) phthalate - U at 1/RQL 4/4L - 40

## 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: 128 - phenol, 3/4 methyl phenol + bis(2ethylhexyl) phthalate - - surr over J

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
Iinternal standard areas acceptable? ..... Yes No N/A
Internal standard retention times acceptable? ..... Yes No N/A
Standards traceable? ..... Yes No N/A
Standards expired? ..... Yes No N/A
Transcription/calculation errors? ..... Yes No N/A

Comments: _____

## 7. HOLDING TIMES (all levels )

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

Comments: _____

# GC/MS ORGANIC DATA VALIDATION CHECKLIST

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

Compound identification acceptable? (Levels D, E) ..... Yes No N/A
Compound quantitation acceptable? (Levels D, E) ..... Yes No N/A
Results reported for all requested analyses? ..... Yes No N/A
Results supported in the raw data? (Levels D, E) ..... Yes No N/A
Samples properly prepared? (Levels D, E) ..... Yes No N/A
Laboratory properly identified and coded all TIC? (Levels D, E) ..... Yes No N/A
Detection limits meet RDL? ..... Yes No N/A
Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: all undetects over

## 9. SAMPLE CLEANUP (Levels D and E)

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

Comments:

Date: 8 June 2005
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: RCBRA Tribal Plant Sampling - Other Solid
Subject: Inorganics - Data Package No. H3139-LLI (SDG No. H3139)

## INTRODUCTION

This memo presents the results of data validation on Data Package No. H3139-LLI prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

| Sample ID | Sample Date | Media | Validation | Analysis |
|---|---|---|---|---|
| J03129 | 4/19/05 | Solid | C | See note 1 |
| J03130 | 4/19/05 | Solid | C | See note 1 |
| J03132 | 4/19/05 | Solid | C | See note 1 |
| J03134 | 4/19/05 | Solid | C | See note 1 |
| J03139 | 4/20/05 | Solid | C | See note 1 |
| J03136 | 4/20/05 | Solid | C | See note 1 |
| J03140 | 4/20/05 | Solid | C | See note 1 |
| J03142 | 4/20/05 | Solid | C | See note 1 |
| J03144 | 4/20/05 | Solid | C | See note 1 |

1 - ICP metals (6010B) and mercury (7471A).

Data validation was conducted in accordance with the Bechtel Hanford Incorporated (BHI) validation statement of work and the Sampling Analysis Instruction for Tribal Plant Sampling in Support of the 100 Area and 300 Area Component of the RCBRA (BHI-01754, March 2005). Appendices 1 through 6 provide the following information as indicated below:

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

## DATA QUALITY PARAMETERS

- **Holding Times**

Analytical holding times for metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within 28 days for mercury and 6 months for ICP metals.

All holding times were acceptable.

- **Preparation (Method) Blanks**

Preparation Blanks

At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "U". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

In the case of negative blank results, if the absolute value exceeds the contract required detection limit (CRDL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the instrument detection limit (IDL) and less than or equal to the CRDL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

Due to method blank contamination, the molybdenum result in samples J03139 and J03140 were qualified as estimates and flagged "UJ".

Due to method blank contamination, the lead result in samples J03129 and J03144 were qualified as estimates and flagged "UJ".

Due to method blank contamination, the tin result in samples J03130, J03132 and J03139 were qualified as estimates and flagged "UJ".

All other preparation blank results were acceptable.

Field (Equipment) Blank

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 70% to 130%. Samples with a recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a recovery of 30% to 69% and a sample result less than the IDL are qualified "UJ". Samples with a recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 130% and a sample result less than the IDL, no qualification is required.

Due to a MS recovery outside QC limits (178%), all iron results were qualified as estimates and flagged "J".

Due to a MS recovery outside QC limits (41%), all phosphorous results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

- **Precision**

Laboratory Duplicate Samples

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

Due to an RPD outside QC limits (36%), all iron results were qualified as estimates and flagged "J".

All other laboratory duplicate results were acceptable.

Field Duplicate

No field duplicates were submitted for analysis.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the remaining waste sites RQLs to ensure that laboratory detection levels meet the required criteria. All undetected silver, arsenic, chromium, lead, antimony, uranium and selenium, reported results exceeded the analyte specific RQL. Under the BHI statement of work, no qualification is required.

- **Completeness**

Data package No. H3139-LLI was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

## MAJOR DEFICIENCIES

None found.

## MINOR DEFICIENCIES

The following minor deficiencies were noted:

- Due to method blank contamination, the molybdenum result in samples J03139 and J03140 were qualified as estimates and flagged "UJ".
- Due to method blank contamination, the lead result in samples J03129 and J03144 were qualified as estimates and flagged "UJ".
- Due to method blank contamination, the tin result in samples J03130, J03132 and J03139 were qualified as estimates and flagged "UJ".
- Due to a MS recovery outside QC limits (178%), all iron results were qualified as estimates and flagged "J".
- Due to a MS recovery outside QC limits (41%), all phosphorous results were qualified as estimates and flagged "J".

- Due to an RPD outside QC limits (36%), all iron results were qualified as estimates and flagged "J".

Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

All undetected silver, arsenic, chromium, lead, antimony, uranium and selenium, reported results exceeded the analyte specific RQL. Under the BHI statement of work, no qualification is required.

## REFERENCES

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

BHI-01754, *Sampling Analysis Instruction for Tribal Plant Sampling in Support of the 100 Area and 300 Area Component of the River Corridor Baseline Risk Assessment*, March 2005.

## Appendix 1

## Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with BHI validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.

BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

# Appendix 2

## Summary of Data Qualification

INORGANIC DATA QUALIFICATION SUMMARY*

| SDG: H3139 | REVIEWER: TLI | Project: RCBRA | PAGE 1 OF 1 |
|---|---|---|---|
| COMMENTS: | | | |
| COMPOUND | QUALIFIER | SAMPLES AFFECTED | REASON |
| Molybdenum | UJ | J03139, J03140 | Method Blank |
| Lead | UJ | J03129, J03144 | Method Blank |
| Tin | UJ | J03130, J03132, J03139 | Method Blank |
| Iron<br>Phosphorous | J | All | MS recovery |
| Iron | 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.

# Appendix 3

## Qualified Data Summary and Annotated Laboratory Reports

| Project: BECHTEL-HANFORD | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Laboratory: LLI | | | | | | | | | | | | | | | | | | | |
| Case | SDG: H3139 | | | | | | | | | | | | | | | | | | |
| Sample Number | | J03129 | | J03130 | | J03132 | | J03134 | | J03139 | | J03136 | | J03140 | | J03142 | | J03144 | |
| Remarks | | | | | | | | | | | | | | | | | | | |
| Sample Date | | 4/19/05 | | 4/19/05 | | 4/19/05 | | 4/19/05 | | 4/20/05 | | 4/20/05 | | 4/20/05 | | 4/20/05 | | 4/20/05 | |
| Inorganics | RDL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| Silver | 0.2 | 0.33 | U | 0.61 | U | 0.51 | U | 0.43 | U | 0.23 | U | 0.42 | U | 0.39 | U | 0.48 | U | 0.45 | U |
| Aluminum | | 135 | | 16.1 | U | 13.5 | U | 72.2 | | 114 | | 28.2 | | 10.3 | U | 91.6 | | 45.5 | |
| Arsenic | 1 | 1.7 | U | 3.0 | U | 2.6 | U | 2.2 | U | 1.1 | U | 2.1 | U | 1.9 | U | 2.4 | U | 2.3 | U |
| Boron | 2 | 26.5 | | 16.0 | | 10.3 | | 22.1 | | 27.7 | | 7.9 | | 15.7 | | 15.1 | | 14.3 | |
| Barium | 0.5 | 51.9 | | 23.7 | | 9.3 | | 18.8 | | 49.1 | | 11.6 | | 12.5 | | 9.7 | | 14.8 | |
| Beryllium | 0.2 | 0.04 | U | 0.07 | U | 0.06 | U | 0.05 | U | 0.03 | U | 0.05 | U | 0.04 | U | 0.05 | U | 0.05 | U |
| Bismuth | | 1.2 | U | 2.2 | U | 1.8 | U | 1.6 | U | 0.82 | U | 1.5 | U | 1.4 | U | 2.7 | | 1.6 | U |
| Calcium | | 9270 | | 8780 | | 4810 | | 8890 | | 14100 | | 4390 | | 4570 | | 5500 | | 6620 | |
| Cadmium | 0.2 | 1.1 | | 0.67 | | 0.17 | U | 4.7 | | 1.4 | | 0.43 | | 0.35 | | 0.54 | | 7.2 | |
| Cobalt | 2 | 0.33 | U | 0.61 | U | 0.51 | U | 0.43 | U | 0.24 | | 0.42 | U | 0.39 | U | 0.48 | U | 0.45 | U |
| Chromium | 0.2 | 0.73 | | 0.49 | | 0.40 | U | 0.70 | | 2.7 | | 0.74 | | 0.69 | | 0.43 | | 0.35 | U |
| Copper | 1 | 5.8 | | 4.7 | | 5.1 | | 8.2 | | 4.8 | | 3.8 | | 4.2 | | 3.3 | | 8.4 | |
| Iron | | 250 | J | 59.0 | J | 32.6 | J | 205 | J | 306 | J | 98.0 | J | 55.5 | J | 240 | J | 147 | J |
| Mercury | | 0.06 | U | 0.13 | U | 0.07 | U | 0.12 | U | 0.05 | U | 0.11 | U | 0.07 | U | 0.09 | U | 0.09 | U |
| Potassium | | 16300 | | 15900 | | 15100 | | 49500 | | 6780 | | 12200 | | 13400 | | 11100 | | 34700 | |
| Lithium | | 0.21 | | 0.23 | | 0.13 | | 0.18 | | 0.18 | | 0.11 | | 0.30 | | 0.29 | | 0.31 | |
| Magnesium | | 3070 | | 1250 | | 931 | | 2830 | | 1790 | | 808 | | 1080 | | 1020 | | 2040 | |
| Manganese | 5 | 25.0 | | 16.0 | | 19.5 | | 32.1 | | 26.2 | | 10.0 | | 15.0 | | 15.7 | | 30.2 | |
| Molybdenum | 2 | 0.59 | U | 1.1 | U | 0.91 | U | 0.77 | U | 1.2 | UJ | 0.74 | U | 0.75 | UJ | 0.85 | U | 0.80 | U |
| Sodium | | 234 | | 213 | | 152 | | 60.0 | | 269 | | 167 | | 126 | | 82.9 | | 55.3 | |
| Nickel | 4 | 1.9 | | 1.6 | | 1.2 | U | 1.1 | U | 1.1 | | 1.2 | | 1.7 | | 1.2 | U | 1.1 | U |
| Phosphorus | | 2990 | J | 2450 | J | 3050 | J | 2110 | J | 1500 | J | 2600 | J | 2720 | J | 1820 | J | 1820 | J |
| Lead | 0.5 | 1.6 | UJ | 1.7 | U | 1.4 | U | 1.2 | U | 1.9 | | 1.2 | U | 1.1 | U | 2.1 | | 1.6 | UJ |
| Antimony | 0.6 | 1.5 | U | 2.7 | U | 2.3 | U | 1.9 | U | 1.0 | U | 1.9 | U | 1.7 | U | 2.1 | U | 2.0 | U |
| Selenium | 1 | 1.8 | U | 3.3 | U | 2.8 | U | 2.4 | U | 1.2 | U | 2.3 | U | 2.1 | U | 2.6 | U | 2.5 | U |
| Silicon | | 159 | | 47.9 | | 17.2 | | 384 | | 148 | | 29.9 | | 34.3 | | 61.1 | | 447 | |
| Tin | | 2.1 | U | 5.2 | UJ | 5.0 | UJ | 2.7 | U | 2.3 | UJ | 2.6 | U | 2.4 | U | 3.0 | U | 2.8 | U |
| Strontium | | 64.5 | | 59.9 | | 35.4 | | 36.0 | | 99.3 | | 31.3 | | 35.3 | | 23.2 | | 30.4 | |
| Thallium | | 2.9 | U | 5.4 | U | 4.5 | U | 3.8 | U | 2.0 | U | 3.7 | U | 3.4 | U | 4.2 | U | 4.0 | U |
| Uranium | 5 | 7.3 | U | 13.4 | U | 11.2 | U | 9.6 | U | 5.0 | U | 9.2 | U | 8.6 | U | 45.3 | | 9.9 | U |
| Vanadium | 2.5 | 0.84 | | 0.41 | U | 0.34 | U | 0.43 | | 0.82 | | 0.28 | U | 0.26 | U | 0.51 | | 0.30 | U |
| Zinc | 1 | 167 | | 34.2 | | 21.6 | | 79.7 | | 103 | | 21.5 | | 28.0 | | 34.2 | | 110 | |

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

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/18/05

CLIENT: TNUHANFORD D05-002 H3139 LVL LOT #: 0504L309

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -002 | J03129 | Silver, Total | 0.33 u | MG/KG | 0.33 | 1.0 |
| | | Aluminum, Total | 135 | MG/KG | 8.8 | 1.0 |
| | | Arsenic, Total | 1.7 u | MG/KG | 1.7 | 1.0 |
| | | Boron, Total | 26.5 | MG/KG | 0.85 | 1.0 |
| | | Barium, Total | 51.9 | MG/KG | 0.07 | 1.0 |
| | | Beryllium, Total | 0.04 u | MG/KG | 0.04 | 1.0 |
| | | Bismuth, Total | 1.2 u | MG/KG | 1.2 | 1.0 |
| | | Calcium, Total | 9270 | MG/KG | 6.9 | 1.0 |
| | | Cadmium, Total | 1.1 | MG/KG | 0.11 | 1.0 |
| | | Cobalt, Total | 0.33 u | MG/KG | 0.33 | 1.0 |
| | | Chromium, Total | 0.73 | MG/KG | 0.26 | 1.0 |
| | | Copper, Total | 5.8 | MG/KG | 0.30 | 1.0 |
| | | Iron, Total | 250 J | MG/KG | 10.9 | 1.0 |
| | | Mercury, Total | 0.06 u | MG/KG | 0.06 | 1.0 |
| | | Potassium, Total | 16300 | MG/KG | 202 | 1.0 |
| | | Lithium, Total | 0.21 | MG/KG | 0.07 | 1.0 |
| | | Magnesium, Total | 3070 | MG/KG | 2.5 | 1.0 |
| | | Manganese, Total | 25.0 | MG/KG | 0.07 | 1.0 |
| | | Molybdenum, Total | 0.59 u | MG/KG | 0.59 | 1.0 |
| | | Sodium, Total | 234 | MG/KG | 8.6 | 1.0 |
| | | Nickel, Total | 1.9 | MG/KG | 0.82 | 1.0 |
| | | Phosphorus, Total | 2990 J | MG/KG | 4.3 | 1.0 |
| | | Lead, Total | 1.6 UJ | MG/KG | 0.93 | 1.0 |
| | | Antimony, Total | 1.5 u | MG/KG | 1.5 | 1.0 |
| | | Selenium, Total | 1.8 u | MG/KG | 1.8 | 1.0 |
| | | Silicon, Total | 159 | MG/KG | 2.5 | 1.0 |
| | | Tin, Total | 2.1 u | MG/KG | 2.1 | 1.0 |
| | | Strontium, Total | 64.5 | MG/KG | 0.04 | 1.0 |
| | | Thallium, Total | 2.9 u | MG/KG | 2.9 | 1.0 |
| | | Uranium, Total | 7.3 u | MG/KG | 7.3 | 1.0 |
| | | Vanadium, Total | 0.84 | MG/KG | 0.22 | 1.0 |
| | | Zinc, Total | 167 | MG/KG | 0.19 | 1.0 |

6/6/05

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/18/05

CLIENT: TNUHANFORD D05-002 H3139 LVL LOT #: 0504L309

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -003 | J03130 | Silver, Total | 0.61 u | MG/KG | 0.61 | 1.0 |
| | | Aluminum, Total | 16.1 u | MG/KG | 16.1 | 1.0 |
| | | Arsenic, Total | 3.0 u | MG/KG | 3.0 | 1.0 |
| | | Boron, Total | 16.0 | MG/KG | 1.6 | 1.0 |
| | | Barium, Total | 23.7 | MG/KG | 0.14 | 1.0 |
| | | Beryllium, Total | 0.07 u | MG/KG | 0.07 | 1.0 |
| | | Bismuth, Total | 2.2 u | MG/KG | 2.2 | 1.0 |
| | | Calcium, Total | 8780 | MG/KG | 12.5 | 1.0 |
| | | Cadmium, Total | 0.67 | MG/KG | 0.20 | 1.0 |
| | | Cobalt, Total | 0.61 u | MG/KG | 0.61 | 1.0 |
| | | Chromium, Total | 0.49 | MG/KG | 0.47 | 1.0 |
| | | Copper, Total | 4.7 | MG/KG | 0.54 | 1.0 |
| | | Iron, Total | 59.0 J | MG/KG | 19.9 | 1.0 |
| | | Mercury, Total | 0.13 u | MG/KG | 0.13 | 1.0 |
| | | Potassium, Total | 15900 | MG/KG | 369 | 1.0 |
| | | Lithium, Total | 0.23 | MG/KG | 0.14 | 1.0 |
| | | Magnesium, Total | 1250 | MG/KG | 4.5 | 1.0 |
| | | Manganese, Total | 16.0 | MG/KG | 0.14 | 1.0 |
| | | Molybdenum, Total | 1.1 u | MG/KG | 1.1 | 1.0 |
| | | Sodium, Total | 213 | MG/KG | 15.7 | 1.0 |
| | | Nickel, Total | 1.6 | MG/KG | 1.5 | 1.0 |
| | | Phosphorus, Total | 2450 J | MG/KG | 7.8 | 1.0 |
| | | Lead, Total | 1.7 u | MG/KG | 1.7 | 1.0 |
| | | Antimony, Total | 2.7 u | MG/KG | 2.7 | 1.0 |
| | | Selenium, Total | 3.3 u | MG/KG | 3.3 | 1.0 |
| | | Silicon, Total | 47.9 | MG/KG | 4.6 | 1.0 |
| | | Tin, Total | 5.2 UJ | MG/KG | 3.8 | 1.0 |
| | | Strontium, Total | 59.9 | MG/KG | 0.07 | 1.0 |
| | | Thallium, Total | 5.4 u | MG/KG | 5.4 | 1.0 |
| | | Uranium, Total | 13.4 u | MG/KG | 13.4 | 1.0 |
| | | Vanadium, Total | 0.41 u | MG/KG | 0.41 | 1.0 |
| | | Zinc, Total | 34.2 | MG/KG | 0.34 | 1.0 |

6/6/05

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/18/05

CLIENT: TNUHANFORD D05-002 H3139

LVL LOT #: 0504L309

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -004 | J03132 | Silver, Total | 0.51 u | MG/KG | 0.51 | 1.0 |
| | | Aluminum, Total | 13.5 u | MG/KG | 13.5 | 1.0 |
| | | Arsenic, Total | 2.6 u | MG/KG | 2.6 | 1.0 |
| | | Boron, Total | 10.3 | MG/KG | 1.3 | 1.0 |
| | | Barium, Total | 9.3 | MG/KG | 0.11 | 1.0 |
| | | Beryllium, Total | 0.06 u | MG/KG | 0.06 | 1.0 |
| | | Bismuth, Total | 1.8 u | MG/KG | 1.8 | 1.0 |
| | | Calcium, Total | 4810 | MG/KG | 10.5 | 1.0 |
| | | Cadmium, Total | 0.17 u | MG/KG | 0.17 | 1.0 |
| | | Cobalt, Total | 0.51 u | MG/KG | 0.51 | 1.0 |
| | | Chromium, Total | 0.40 u | MG/KG | 0.40 | 1.0 |
| | | Copper, Total | 5.1 | MG/KG | 0.45 | 1.0 |
| | | Iron, Total | 32.6 J | MG/KG | 16.6 | 1.0 |
| | | Mercury, Total | 0.07 u | MG/KG | 0.07 | 1.0 |
| | | Potassium, Total | 15100 | MG/KG | 309 | 1.0 |
| | | Lithium, Total | 0.13 | MG/KG | 0.11 | 1.0 |
| | | Magnesium, Total | 931 | MG/KG | 3.8 | 1.0 |
| | | Manganese, Total | 19.5 | MG/KG | 0.11 | 1.0 |
| | | Molybdenum, Total | 0.91 u | MG/KG | 0.91 | 1.0 |
| | | Sodium, Total | 152 | MG/KG | 13.1 | 1.0 |
| | | Nickel, Total | 1.2 u | MG/KG | 1.2 | 1.0 |
| | | Phosphorus, Total | 3050 J | MG/KG | 6.5 | 1.0 |
| | | Lead, Total | 1.4 u | MG/KG | 1.4 | 1.0 |
| | | Antimony, Total | 2.3 u | MG/KG | 2.3 | 1.0 |
| | | Selenium, Total | 2.8 u | MG/KG | 2.8 | 1.0 |
| | | Silicon, Total | 17.2 | MG/KG | 3.9 | 1.0 |
| | | Tin, Total | 5.0 UJ | MG/KG | 3.2 | 1.0 |
| | | Strontium, Total | 35.4 | MG/KG | 0.06 | 1.0 |
| | | Thallium, Total | 4.5 u | MG/KG | 4.5 | 1.0 |
| | | Uranium, Total | 11.2 u | MG/KG | 11.2 | 1.0 |
| | | Vanadium, Total | 0.34 u | MG/KG | 0.34 | 1.0 |
| | | Zinc, Total | 21.6 | MG/KG | 0.28 | 1.0 |

6/6/05

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/18/05

CLIENT: TNUHANFORD D05-002 H3139 LVL LOT #: 0504L309

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

| SAMPLE | SITE ID | ANALYTE | RESULT | | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|---|
| -005 | J03134 | Silver, Total | 0.43 | u | MG/KG | 0.43 | 1.0 |
| | | Aluminum, Total | 72.2 | | MG/KG | 11.4 | 1.0 |
| | | Arsenic, Total | 2.2 | u | MG/KG | 2.2 | 1.0 |
| | | Boron, Total | 22.1 | | MG/KG | 1.1 | 1.0 |
| | | Barium, Total | 18.8 | | MG/KG | 0.1 | 1.0 |
| | | Beryllium, Total | 0.05 | u | MG/KG | 0.05 | 1.0 |
| | | Bismuth, Total | 1.6 | u | MG/KG | 1.6 | 1.0 |
| | | Calcium, Total | 8890 | | MG/KG | 8.9 | 1.0 |
| | | Cadmium, Total | 4.7 | | MG/KG | 0.14 | 1.0 |
| | | Cobalt, Total | 0.43 | u | MG/KG | 0.43 | 1.0 |
| | | Chromium, Total | 0.70 | | MG/KG | 0.34 | 1.0 |
| | | Copper, Total | 8.2 | | MG/KG | 0.39 | 1.0 |
| | | Iron, Total | 205 | J | MG/KG | 14.2 | 1.0 |
| | | Mercury, Total | 0.12 | u | MG/KG | 0.12 | 1.0 |
| | | Potassium, Total | 49500 | | MG/KG | 263 | 1.0 |
| | | Lithium, Total | 0.18 | | MG/KG | 0.1 | 1.0 |
| | | Magnesium, Total | 2830 | | MG/KG | 3.2 | 1.0 |
| | | Manganese, Total | 32.1 | | MG/KG | 0.1 | 1.0 |
| | | Molybdenum, Total | 0.77 | u | MG/KG | 0.77 | 1.0 |
| | | Sodium, Total | 60.0 | | MG/KG | 11.2 | 1.0 |
| | | Nickel, Total | 1.1 | u | MG/KG | 1.1 | 1.0 |
| | | Phosphorus, Total | 2110 | J | MG/KG | 5.6 | 1.0 |
| | | Lead, Total | 1.2 | u | MG/KG | 1.2 | 1.0 |
| | | Antimony, Total | 1.9 | u | MG/KG | 1.9 | 1.0 |
| | | Selenium, Total | 2.4 | u | MG/KG | 2.4 | 1.0 |
| | | Silicon, Total | 384 | | MG/KG | 3.3 | 1.0 |
| | | Tin, Total | 2.7 | u | MG/KG | 2.7 | 1.0 |
| | | Strontium, Total | 36.0 | | MG/KG | 0.05 | 1.0 |
| | | Thallium, Total | 3.8 | u | MG/KG | 3.8 | 1.0 |
| | | Uranium, Total | 9.6 | u | MG/KG | 9.6 | 1.0 |
| | | Vanadium, Total | 0.43 | | MG/KG | 0.29 | 1.0 |
| | | Zinc, Total | 79.7 | | MG/KG | 0.24 | 1.0 |

6/6/05

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/18/05

CLIENT: TNUHANFORD D05-002 H3139

LVL LOT #: 0504L309

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -008 | J03136 | Silver, Total | 0.42 u | MG/KG | 0.42 | 1.0 |
| | | Aluminum, Total | 28.2 | MG/KG | 11.0 | 1.0 |
| | | Arsenic, Total | 2.1 u | MG/KG | 2.1 | 1.0 |
| | | Boron, Total | 7.9 | MG/KG | 1.1 | 1.0 |
| | | Barium, Total | 11.6 | MG/KG | 0.09 | 1.0 |
| | | Beryllium, Total | 0.05 u | MG/KG | 0.05 | 1.0 |
| | | Bismuth, Total | 1.5 u | MG/KG | 1.5 | 1.0 |
| | | Calcium, Total | 4390 | MG/KG | 8.6 | 1.0 |
| | | Cadmium, Total | 0.43 | MG/KG | 0.14 | 1.0 |
| | | Cobalt, Total | 0.42 u | MG/KG | 0.42 | 1.0 |
| | | Chromium, Total | 0.74 | MG/KG | 0.32 | 1.0 |
| | | Copper, Total | 3.8 | MG/KG | 0.37 | 1.0 |
| | | Iron, Total | 98.0 J | MG/KG | 13.6 | 1.0 |
| | | Mercury, Total | 0.11 u | MG/KG | 0.11 | 1.0 |
| | | Potassium, Total | 12200 | MG/KG | 252 | 1.0 |
| | | Lithium, Total | 0.11 | MG/KG | 0.09 | 1.0 |
| | | Magnesium, Total | 808 | MG/KG | 3.1 | 1.0 |
| | | Manganese, Total | 10.0 | MG/KG | 0.09 | 1.0 |
| | | Molybdenum, Total | 0.74 u | MG/KG | 0.74 | 1.0 |
| | | Sodium, Total | 167 | MG/KG | 10.7 | 1.0 |
| | | Nickel, Total | 1.2 | MG/KG | 1.0 | 1.0 |
| | | Phosphorus, Total | 2600 J | MG/KG | 5.3 | 1.0 |
| | | Lead, Total | 1.2 u | MG/KG | 1.2 | 1.0 |
| | | Antimony, Total | 1.9 u | MG/KG | 1.9 | 1.0 |
| | | Selenium, Total | 2.3 u | MG/KG | 2.3 | 1.0 |
| | | Silicon, Total | 29.9 | MG/KG | 3.1 | 1.0 |
| | | Tin, Total | 2.6 u | MG/KG | 2.6 | 1.0 |
| | | Strontium, Total | 31.3 | MG/KG | 0.05 | 1.0 |
| | | Thallium, Total | 3.7 u | MG/KG | 3.7 | 1.0 |
| | | Uranium, Total | 9.2 u | MG/KG | 9.2 | 1.0 |
| | | Vanadium, Total | 0.28 u | MG/KG | 0.28 | 1.0 |
| | | Zinc, Total | 21.5 | MG/KG | 0.23 | 1.0 |

6/6/05

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/18/05

CLIENT: TNUHANFORD D05-002 H3139 LVL LOT #: 0504L309

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -007 | J03139 | Silver, Total | 0.23 u | MG/KG | 0.23 | 1.0 |
| | | Aluminum, Total | 114 | MG/KG | 6.0 | 1.0 |
| | | Arsenic, Total | 1.1 u | MG/KG | 1.1 | 1.0 |
| | | Boron, Total | 27.7 | MG/KG | 0.58 | 1.0 |
| | | Barium, Total | 49.1 | MG/KG | 0.05 | 1.0 |
| | | Beryllium, Total | 0.03 u | MG/KG | 0.03 | 1.0 |
| | | Bismuth, Total | 0.82 u | MG/KG | 0.82 | 1.0 |
| | | Calcium, Total | 14100 | MG/KG | 4.7 | 1.0 |
| | | Cadmium, Total | 1.4 | MG/KG | 0.08 | 1.0 |
| | | Cobalt, Total | 0.24 | MG/KG | 0.23 | 1.0 |
| | | Chromium, Total | 2.7 | MG/KG | 0.18 | 1.0 |
| | | Copper, Total | 4.8 | MG/KG | 0.20 | 1.0 |
| | | Iron, Total | 306 J | MG/KG | 7.4 | 1.0 |
| | | Mercury, Total | 0.05 u | MG/KG | 0.05 | 1.0 |
| | | Potassium, Total | 6780 | MG/KG | 137 | 1.0 |
| | | Lithium, Total | 0.18 | MG/KG | 0.05 | 1.0 |
| | | Magnesium, Total | 1790 | MG/KG | 1.7 | 1.0 |
| | | Manganese, Total | 26.2 | MG/KG | 0.05 | 1.0 |
| | | Molybdenum, Total | 1.2 UJ | MG/KG | 0.40 | 1.0 |
| | | Sodium, Total | 269 | MG/KG | 5.8 | 1.0 |
| | | Nickel, Total | 1.1 | MG/KG | 0.56 | 1.0 |
| | | Phosphorus, Total | 1500 J | MG/KG | 2.9 | 1.0 |
| | | Lead, Total | 1.9 | MG/KG | 0.63 | 1.0 |
| | | Antimony, Total | 1.0 u | MG/KG | 1.0 | 1.0 |
| | | Selenium, Total | 1.2 u | MG/KG | 1.2 | 1.0 |
| | | Silicon, Total | 148 | MG/KG | 1.7 | 1.0 |
| | | Tin, Total | 2.3 UJ | MG/KG | 1.4 | 1.0 |
| | | Strontium, Total | 99.3 | MG/KG | 0.03 | 1.0 |
| | | Thallium, Total | 2.0 u | MG/KG | 2.0 | 1.0 |
| | | Uranium, Total | 5.0 u | MG/KG | 5.0 | 1.0 |
| | | Vanadium, Total | 0.82 | MG/KG | 0.15 | 1.0 |
| | | Zinc, Total | 103 | MG/KG | 0.13 | 1.0 |

6/6/05

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/18/05

CLIENT: TNUHANFORD D05-002 H3139 LVL LOT #: 0504L309

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

| SAMPLE | SITE ID | ANALYTE | RESULT | | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|---|
| -009 | J03140 | Silver, Total | 0.39 | u | MG/KG | 0.39 | 1.0 |
| | | Aluminum, Total | 10.3 | u | MG/KG | 10.3 | 1.0 |
| | | Arsenic, Total | 1.9 | u | MG/KG | 1.9 | 1.0 |
| | | Boron, Total | 15.7 | | MG/KG | 1.0 | 1.0 |
| | | Barium, Total | 12.5 | | MG/KG | 0.09 | 1.0 |
| | | Beryllium, Total | 0.04 | u | MG/KG | 0.04 | 1.0 |
| | | Bismuth, Total | 1.4 | u | MG/KG | 1.4 | 1.0 |
| | | Calcium, Total | 4570 | | MG/KG | 8.0 | 1.0 |
| | | Cadmium, Total | 0.35 | | MG/KG | 0.13 | 1.0 |
| | | Cobalt, Total | 0.39 | u | MG/KG | 0.39 | 1.0 |
| | | Chromium, Total | 0.69 | | MG/KG | 0.30 | 1.0 |
| | | Copper, Total | 4.2 | | MG/KG | 0.35 | 1.0 |
| | | Iron, Total | 55.5 | J | MG/KG | 12.7 | 1.0 |
| | | Mercury, Total | 0.07 | u | MG/KG | 0.07 | 1.0 |
| | | Potassium, Total | 13400 | | MG/KG | 236 | 1.0 |
| | | Lithium, Total | 0.30 | | MG/KG | 0.09 | 1.0 |
| | | Magnesium, Total | 1080 | | MG/KG | 2.9 | 1.0 |
| | | Manganese, Total | 15.0 | | MG/KG | 0.09 | 1.0 |
| | | Molybdenum, Total | 0.75 | UJ | MG/KG | 0.69 | 1.0 |
| | | Sodium, Total | 126 | | MG/KG | 10.0 | 1.0 |
| | | Nickel, Total | 1.7 | | MG/KG | 0.95 | 1.0 |
| | | Phosphorus, Total | 2720 | J | MG/KG | 5.0 | 1.0 |
| | | Lead, Total | 1.1 | u | MG/KG | 1.1 | 1.0 |
| | | Antimony, Total | 1.7 | u | MG/KG | 1.7 | 1.0 |
| | | Selenium, Total | 2.1 | u | MG/KG | 2.1 | 1.0 |
| | | Silicon, Total | 34.3 | | MG/KG | 2.9 | 1.0 |
| | | Tin, Total | 2.4 | u | MG/KG | 2.4 | 1.0 |
| | | Strontium, Total | 35.3 | | MG/KG | 0.04 | 1.0 |
| | | Thallium, Total | 3.4 | u | MG/KG | 3.4 | 1.0 |
| | | Uranium, Total | 8.6 | u | MG/KG | 8.6 | 1.0 |
| | | Vanadium, Total | 0.26 | u | MG/KG | 0.26 | 1.0 |
| | | Zinc, Total | 28.0 | | MG/KG | 0.22 | 1.0 |

6/6/05



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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/18/05

CLIENT: TNUHANFORD D05-002 H3139 LVL LOT #: 0504L309

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

| SAMPLE | SITE ID | ANALYTE | RESULT | | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|---|
| -010 | J03142 | Silver, Total | 0.48 | u | MG/KG | 0.48 | 1.0 |
| | | Aluminum, Total | 91.6 | | MG/KG | 12.6 | 1.0 |
| | | Arsenic, Total | 2.4 | u | MG/KG | 2.4 | 1.0 |
| | | Boron, Total | 15.1 | | MG/KG | 1.2 | 1.0 |
| | | Barium, Total | 9.7 | | MG/KG | 0.11 | 1.0 |
| | | Beryllium, Total | 0.05 | u | MG/KG | 0.05 | 1.0 |
| | | Bismuth, Total | 2.7 | | MG/KG | 1.7 | 1.0 |
| | | Calcium, Total | 5500 | | MG/KG | 9.8 | 1.0 |
| | | Cadmium, Total | 0.54 | | MG/KG | 0.16 | 1.0 |
| | | Cobalt, Total | 0.48 | u | MG/KG | 0.48 | 1.0 |
| | | Chromium, Total | 0.43 | | MG/KG | 0.37 | 1.0 |
| | | Copper, Total | 3.3 | | MG/KG | 0.42 | 1.0 |
| | | Iron, Total | 240 | J | MG/KG | 15.5 | 1.0 |
| | | Mercury, Total | 0.09 | u | MG/KG | 0.09 | 1.0 |
| | | Potassium, Total | 11100 | | MG/KG | 288 | 1.0 |
| | | Lithium, Total | 0.29 | | MG/KG | 0.11 | 1.0 |
| | | Magnesium, Total | 1020 | | MG/KG | 3.6 | 1.0 |
| | | Manganese, Total | 15.7 | | MG/KG | 0.11 | 1.0 |
| | | Molybdenum, Total | 0.85 | u | MG/KG | 0.85 | 1.0 |
| | | Sodium, Total | 82.9 | | MG/KG | 12.2 | 1.0 |
| | | Nickel, Total | 1.2 | u | MG/KG | 1.2 | 1.0 |
| | | Phosphorus, Total | 1820 | J | MG/KG | 6.1 | 1.0 |
| | | Lead, Total | 2.1 | | MG/KG | 1.3 | 1.0 |
| | | Antimony, Total | 2.1 | u | MG/KG | 2.1 | 1.0 |
| | | Selenium, Total | 2.6 | u | MG/KG | 2.6 | 1.0 |
| | | Silicon, Total | 61.1 | | MG/KG | 3.6 | 1.0 |
| | | Tin, Total | 3.0 | u | MG/KG | 3.0 | 1.0 |
| | | Strontium, Total | 23.2 | | MG/KG | 0.05 | 1.0 |
| | | Thallium, Total | 4.2 | u | MG/KG | 4.2 | 1.0 |
| | | Uranium, Total | 45.3 | | MG/KG | 10.5 | 1.0 |
| | | Vanadium, Total | 0.51 | | MG/KG | 0.32 | 1.0 |
| | | Zinc, Total | 34.2 | | MG/KG | 0.26 | 1.0 |

6/6/05

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/18/05

CLIENT: TNUHANFORD D05-002 H3139 LVL LOT #: 0504L309

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -011 | J03144 | Silver, Total | 0.45 u | MG/KG | 0.45 | 1.0 |
| | | Aluminum, Total | 45.5 | MG/KG | 11.9 | 1.0 |
| | | Arsenic, Total | 2.3 u | MG/KG | 2.3 | 1.0 |
| | | Boron, Total | 14.3 | MG/KG | 1.2 | 1.0 |
| | | Barium, Total | 14.8 | MG/KG | 0.10 | 1.0 |
| | | Beryllium, Total | 0.05 u | MG/KG | 0.05 | 1.0 |
| | | Bismuth, Total | 1.6 u | MG/KG | 1.6 | 1.0 |
| | | Calcium, Total | 6620 | MG/KG | 9.3 | 1.0 |
| | | Cadmium, Total | 7.2 | MG/KG | 0.15 | 1.0 |
| | | Cobalt, Total | 0.45 u | MG/KG | 0.45 | 1.0 |
| | | Chromium, Total | 0.35 u | MG/KG | 0.35 | 1.0 |
| | | Copper, Total | 8.4 | MG/KG | 0.40 | 1.0 |
| | | Iron, Total | 147 J | MG/KG | 14.7 | 1.0 |
| | | Mercury, Total | 0.09 u | MG/KG | 0.09 | 1.0 |
| | | Potassium, Total | 34700 | MG/KG | 273 | 1.0 |
| | | Lithium, Total | 0.31 | MG/KG | 0.10 | 1.0 |
| | | Magnesium, Total | 2040 | MG/KG | 3.4 | 1.0 |
| | | Manganese, Total | 30.2 | MG/KG | 0.10 | 1.0 |
| | | Molybdenum, Total | 0.80 u | MG/KG | 0.80 | 1.0 |
| | | Sodium, Total | 55.3 | MG/KG | 11.6 | 1.0 |
| | | Nickel, Total | 1.1 u | MG/KG | 1.1 | 1.0 |
| | | Phosphorus, Total | 1820 J | MG/KG | 5.8 | 1.0 |
| | | Lead, Total | 1.6 UJ | MG/KG | 1.3 | 1.0 |
| | | Antimony, Total | 2.0 u | MG/KG | 2.0 | 1.0 |
| | | Selenium, Total | 2.5 u | MG/KG | 2.5 | 1.0 |
| | | Silicon, Total | 447 | MG/KG | 3.4 | 1.0 |
| | | Tin, Total | 2.8 u | MG/KG | 2.8 | 1.0 |
| | | Strontium, Total | 30.4 | MG/KG | 0.05 | 1.0 |
| | | Thallium, Total | 4.0 u | MG/KG | 4.0 | 1.0 |
| | | Uranium, Total | 9.9 u | MG/KG | 9.9 | 1.0 |
| | | Vanadium, Total | 0.30 u | MG/KG | 0.30 | 1.0 |
| | | Zinc, Total | 110 | MG/KG | 0.25 | 1.0 |

6/6/05

## Appendix 4

## Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

**Client:** TNU-HANFORD D05-002
**LVL#:** 0504L309
**SDG/SAF#:** H3139/D05-002

**W.O.#:** 11343-606-001-9999-00
**Date Received:** 04-26-05

**METALS CASE NARRATIVE**

1. This narrative covers the analyses of 9 solid samples.

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

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

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

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

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

7. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL), 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. The matrix spike (MS) recoveries for 2 analytes were outside the 75-125% control limits. Refer to the Inorganics Accuracy Report.

11. For analytes where the ICP MS is out-of-control, a post-digestion MS (PDS) and serial dilution are performed. A PDS was prepared at meaningful concentration level for the following analytes:

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 35 pages.



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

| Sample ID | Element | PDS Concentration (ppb) | PDS % Recovery |
|---|---|---|---|
| J03129 | Iron | 2,000 | 97.6 |
| | Phosphorous | 2,000 | 100.6 |

12. The duplicate analyses for 13 analytes were outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

13. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.

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

5/24/05
Date

jjw/m04-309

LVLI LIONVILLE LABORATORY INC.

| Bechtel Hanford Inc. | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | D05-002-1 | Page 1 of 1 |
|---|---|---|---|
| Collector: Stankovich/Gale/Singleton | Company Contact: Steve Weiss — Telephone No.: (509) 372-9495 | Project Coordinator: WEISS, RL | Price Code: 9L — Data Turnaround: 21 Days |
| Project Designation: RCBRA Tribal Plant Sampling - Other Solid | Sampling Location: 100-H Area | SAF No.: D05-002 | Air Quality |
| Ice Chest No.: ERC-02-006, AFS-04-052 & ERC-96-009 | Field Logbook No.: EFL-1133-11 — COA: BRASCC6520 | Method of Shipment: FedEx | |
| Shipped To: EBERLINE SERVICES / LIONVILLE | Offsite Property No.: A050184 | Bill of Lading/Air Bill No.: See OSPC | |

POSSIBLE SAMPLE HAZARDS/REMARKS

None

Special Handling and/or Storage

Cool 4°C

| SAMPLE ANALYSIS | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | | | | None D | Cool 4C B | Cool 4C C | Cool 4C | | | | | |
| Type of Container | | | | G P | aG | aG | aG A | | | | | |
| No. of Container(s) | | | | 1 | 1 | 1 | 1 | | | | | |
| Volume | | | | 60g | 120g | 120g | 1000 ~~250~~ mL | ms 4/21/05 | | | | |
| | | | | ICP Metals - 6010 (Client List), Mercury - 7471 - (CVP), Percent Solids | PCBs - 8082 | Pesticides - 8081 | Semi-VOA - 8270A (TCL) | | | | | |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | |
| ✓ J03128 | OTHER SOLID | 4-19-05 | 1300 | | x | x | x | - one container | | | | |
| ✓ J03129 | other solid | 4-19-05 | 1300 | x | (x | X0 | X0) | - ~~2 containers~~ | | ms 4/21/05 | | |
| ✓ J03130 | other solid | 4-19-05 | 1100 ~~1300~~ | x | x | x | x | | | | | |
| ✓ J03132 | other solid | 4-19-05 | 1400 | x | x | x | x | | | | | |
| ✓ J03134 | other solid | 4-19-05 | 1410 | X | | | | | | | | |

| CHAIN OF POSSESSION | Sign/Print Names ms 4-19-05 | SPECIAL INSTRUCTIONS | Matrix * |
|---|---|---|---|
| Relinquished By/Removed From: MTH ms stankovich — Date/Time: 1600 4/21/05 | Received By/Stored In: 3728 /SC — Date/Time: 1600 4/21/05 | | S=Soil, SE=Sediment, SO=Solid, SL=Sludge, W=Water, O=Oil, A=Air, DS=Drum Solids, DL=Drum Liquids, T=Tissue, WI=Wipe, L=Liquid, V=Vegetation, X=Other |
| Relinquished By/Removed From: 3728 Lab 3C — Date/Time: 4/25/05 1100 | Received By/Stored In: D St John Dundee — Date/Time: 4/25/05 1100 | | |
| Relinquished By/Removed From: D St John Dundee — Date/Time: 4/25/05 1100 | Received By/Stored In: FedEx — Date/Time: | | |
| Relinquished By/Removed From: FedEx — Date/Time: 4/26/05 0915 | Received By/Stored In: [signature] — Date/Time: 4/26/05 0915 | | |
| 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 |

BHI-EE-01 (10/94)

# Appendix 5

## Data Validation Supporting Documentation

# INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

| VALIDATION LEVEL: | A | B | C | D | E |
|---|---|---|---|---|---|
| PROJECT: RCBRA | | | DATA PACKAGE: H3139 | | |
| VALIDATOR: TLI | | LAB: LLI | | DATE: 6/4/05 | |
| | | | SDG: H3139 | | |

ANALYSES PERFORMED

| SW-846/ICP | SW-846/GFAA | SW-846/Hg | SW-846 Cyanide | | |
|---|---|---|---|---|---|
| | | | | | |

SAMPLES/MATRIX

| | | | | |
|---|---|---|---|---|
| J03129 | J03130 | J03132 | J03134 | J03139 |
| J03136 | J03140 | J03142 | J03144 | |
| | | | | |
| | | | | |
| | | | | |

## 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: moly - 39/40 } UJ all — no FR
lead - 29/44
tin - 30/32/39

## 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: MS iron - 178 J all — no PAS
P phosphorus - 41.9 J all

# 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: Iron 36.4 - J all
~~Lithium - 45.~~ 76/4/67

## 6. ICP QUALITY CONTROL (Levels D and E)

ICP serial dilution samples analyzed? ..... Yes No N/A

ICP serial dilution %D values acceptable? ..... Yes No N/A

ICP post digestion spike required? ..... Yes No N/A

ICP post digestion spike values acceptable? ..... Yes No N/A

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

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

Transcription/calculation errors? ..... Yes No N/A

Comments:

# INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

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

Duplicate injections performed as required? ..... Yes No N/A

Duplicate injection %RSD values acceptable? ..... Yes No N/A

Analytical spikes performed as required? ..... Yes No N/A

Analytical spike recoveries acceptable? ..... Yes No N/A

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

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

MSA performed as required? ..... Yes No N/A

MSA results acceptable? ..... Yes No N/A

Transcription/calculation errors? ..... Yes No N/A

Comments: _____

## 8. HOLDING TIMES (all levels)

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

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

Comments: _____

# INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

## 9. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

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

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

Samples properly prepared? (Levels D, E) ..... Yes No N/A

Detection limits meet RDL? ..... Yes No N/A

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

Comments: Silver - all
arsenic - all
chromium - all
lead - all
antimony - all
selenium - all
uranium - all

## Appendix 6

## Additional Documentation Requested by Client

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 05/18/05

CLIENT: TNUHANFORD D05-002 H3139 LVL LOT #: 0504L309

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| BLANK1 | 05L0253-MB1 | Silver, Total | 0.09 u | MG/KG | 0.09 | 1.0 |
| | | Aluminum, Total | 2.4 u | MG/KG | 2.4 | 1.0 |
| | | Arsenic, Total | 0.45 u | MG/KG | 0.45 | 1.0 |
| | | Boron, Total | 0.23 u | MG/KG | 0.23 | 1.0 |
| | | Barium, Total | 0.03 | MG/KG | 0.02 | 1.0 |
| | | Beryllium, Total | 0.01 u | MG/KG | 0.01 | 1.0 |
| | | Bismuth, Total | 0.32 u | MG/KG | 0.32 | 1.0 |
| | | Calcium, Total | 2.3 | MG/KG | 1.8 | 1.0 |
| | | Cadmium, Total | 0.03 u | MG/KG | 0.03 | 1.0 |
| | | Cobalt, Total | 0.09 u | MG/KG | 0.09 | 1.0 |
| | | Chromium, Total | 0.07 u | MG/KG | 0.07 | 1.0 |
| | | Copper, Total | 0.08 u | MG/KG | 0.08 | 1.0 |
| | | Iron, Total | 2.9 u | MG/KG | 2.9 | 1.0 |
| | | Potassium, Total | 73.8 | MG/KG | 54.4 | 1.0 |
| | | Lithium, Total | 0.02 | MG/KG | 0.02 | 1.0 |
| | | Magnesium, Total | 1.0 | MG/KG | 0.67 | 1.0 |
| | | Manganese, Total | 0.03 | MG/KG | 0.02 | 1.0 |
| | | Molybdenum, Total | 0.27 | MG/KG | 0.16 | 1.0 |
| | | Sodium, Total | 2.9 | MG/KG | 2.3 | 1.0 |
| | | Nickel, Total | 0.22 u | MG/KG | 0.22 | 1.0 |
| | | Phosphorus, Total | 1.2 u | MG/KG | 1.2 | 1.0 |
| | | Lead, Total | 0.36 | MG/KG | 0.25 | 1.0 |
| | | Antimony, Total | 0.40 u | MG/KG | 0.40 | 1.0 |
| | | Selenium, Total | 0.49 u | MG/KG | 0.49 | 1.0 |
| | | Silicon, Total | 1.4 | MG/KG | 0.68 | 1.0 |
| | | Tin, Total | 1.1 | MG/KG | 0.56 | 1.0 |
| | | Strontium, Total | 0.02 | MG/KG | 0.01 | 1.0 |
| | | Thallium, Total | 0.79 u | MG/KG | 0.79 | 1.0 |
| | | Uranium, Total | 2.0 u | MG/KG | 2.0 | 1.0 |
| | | Vanadium, Total | 0.06 u | MG/KG | 0.06 | 1.0 |
| | | Zinc, Total | 0.60 | MG/KG | 0.05 | 1.0 |
| BLANK1 | 05C0103-MB1 | Mercury, Total | 0.02 u | MG/KG | 0.02 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 05/18/05

CLIENT: TNUHANFORD D05-002 H3139 LVL LOT #: 0504L309

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

| SAMPLE | SITE ID | ANALYTE | SPIKED SAMPLE | INITIAL RESULT | SPIKED AMOUNT | %RECOV | DILUTION FACTOR(SPK) |
|---|---|---|---|---|---|---|---|
| -002 | J03129 | Silver, Total | 17.9 | 0.33u | 20.0 | 89.5 | 1.0 |
| | | Aluminum, Total | 1020 | 135 | 800 | 110.0 | 1.0 |
| | | Arsenic, Total | 697 | 1.7 u | 800 | 87.1 | 1.0 |
| | | Boron, Total | 380 | 26.5 | 400 | 88.3 | 1.0 |
| | | Barium, Total | 787 | 51.9 | 800 | 91.8 | 1.0 |
| | | Beryllium, Total | 17.9 | 0.04u | 20.0 | 89.5 | 1.0 |
| | | Bismuth, Total | 1810 | 1.2 u | 2000 | 90.7 | 1.0 |
| | | Calcium, Total | 17800 | 9270 | 10000 | 84.9 | 1.0 |
| | | Cadmium, Total | 19.3 | 1.1 | 20.0 | 91.0 | 1.0 |
| | | Cobalt, Total | 180 | 0.33u | 200 | 90.0 | 1.0 |
| | | Chromium, Total | 73.5 | 0.73 | 80.0 | 91.0 | 1.0 |
| | | Copper, Total | 103 | 5.8 | 100 | 97.1 | 1.0 |
| | | Iron, Total | 966 | 250 | 400 | 178.8 | 1.0 |
| | | Mercury, Total | 0.62 | 0.06u | 0.58 | 106.0 | 1.0 |
| | | Potassium, Total | 25200 | 16300 | 10000 | 89.5 | 1.0 |
| | | Lithium, Total | 410 | 0.21 | 400 | 102.4 | 1.0 |
| | | Magnesium, Total | 11400 | 3070 | 10000 | 83.7 | 1.0 |
| | | Manganese, Total | 224 | 25.0 | 200 | 99.6 | 1.0 |
| | | Molybdenum, Total | 362 | 0.59u | 400 | 90.6 | 1.0 |
| | | Sodium, Total | 9340 | 234 | 10000 | 91.0 | 1.0 |
| | | Nickel, Total | 182 | 1.9 | 200 | 89.9 | 1.0 |
| | | Phosphorus, Total | 3820 | 2990 | 2000 | 41.9 | 1.0 |
| | | Lead, Total | 182 | 1.6 | 200 | 90.4 | 1.0 |
| | | Antimony, Total | 170 | 1.5 u | 200 | 84.8 | 1.0 |
| | | Selenium, Total | 689 | 1.8 u | 800 | 86.0 | 1.0 |
| | | Silicon, Total | 609 | 159 | 400 | 112.6 | 1.0 |
| | | Tin, Total | 358 | 2.1 u | 400 | 89.5 | 1.0 |
| | | Strontium, Total | 434 | 64.5 | 400 | 92.5 | 1.0 |
| | | Thallium, Total | 702 | 2.9 u | 800 | 87.8 | 1.0 |
| | | Uranium, Total | 1830 | 7.3 u | 2000 | 91.3 | 1.0 |
| | | Vanadium, Total | 178 | 0.84 | 200 | 88.8 | 1.0 |
| | | Zinc, Total | 365 | 167 | 200 | 99.1 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 05/18/05

CLIENT: TNUHANFORD D05-002 H3139 LVL LOT #: 0504L309

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

| SAMPLE | SITE ID | ANALYTE | INITIAL RESULT | REPLICATE | RPD | DILUTION FACTOR(REP) |
|---|---|---|---|---|---|---|
| -002REP | J03129 | Silver, Total | 0.33u | 0.35u | NC | 1.0 |
| | | Aluminum, Total | 135 | 172 | 24.1 | 1.0 |
| | | Arsenic, Total | 1.7 u | 1.7 u | NC | 1.0 |
| | | Boron, Total | 26.5 | 25.5 | 3.8 | 1.0 |
| | | Barium, Total | 51.9 | 49.1 | 5.5 | 1.0 |
| | | Beryllium, Total | 0.04u | 0.04u | NC | 1.0 |
| | | Bismuth, Total | 1.2 u | 2.9 | ~~NC~~ 200 | 1.0 |
| | | Calcium, Total | 9270 | 7540 | 20.6 MW 5/23/05 | 1.0 |
| | | Cadmium, Total | 1.1 | 1.3 | 16.7 | 1.0 |
| | | Cobalt, Total | 0.33u | 0.44 | ~~NC~~ 200 MW 5/23/05 | 1.0 |
| | | Chromium, Total | 0.73 | 0.85 | 16.1 | 1.0 |
| | | Copper, Total | 5.8 | 5.9 | 1.7 | 1.0 |
| | | Iron, Total | 250 | 361 | 36.4 | 1.0 |
| | | Mercury, Total | 0.06u | 0.07u | NC | 1.0 |
| | | Potassium, Total | 16300 | 17100 | 4.9 | 1.0 |
| | | Lithium, Total | 0.21 | 0.59 | 95.7 | 1.0 |
| | | Magnesium, Total | 3070 | 2110 | 36.8 | 1.0 |
| | | Manganese, Total | 25.0 | 29.8 | 17.5 | 1.0 |
| | | Molybdenum, Total | 0.59u | 0.62u | NC | 1.0 |
| | | Sodium, Total | 234 | 162 | 36.1 | 1.0 |
| | | Nickel, Total | 1.9 | 2.5 | 27.3 | 1.0 |
| | | Phosphorus, Total | 2990 | 2990 | 0.28 | 1.0 |
| | | Lead, Total | 1.6 | 2.6 | 47.6 | 1.0 |
| | | Antimony, Total | 1.5 u | 1.5 u | NC | 1.0 |
| | | Selenium, Total | 1.8 u | 2.5 | ~~NC~~ 200 MW 5/23/05 | 1.0 |
| | | Silicon, Total | 159 | 190 | 17.8 | 1.0 |
| | | Tin, Total | 2.1 u | 4.0 | ~~NC~~ 200 MW 5/23/05 | 1.0 |
| | | Strontium, Total | 64.5 | 54.4 | 17.0 | 1.0 |
| | | Thallium, Total | 2.9 u | 3.0 u | NC | 1.0 |
| | | Uranium, Total | 7.3 u | 7.6 u | NC | 1.0 |
| | | Vanadium, Total | 0.84 | 1.3 | 43.6 | 1.0 |
| | | Zinc, Total | 167 | 175 | 4.9 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 05/18/05

CLIENT: TNUHANFORD D05-002 H3139 LVL LOT #: 0504L309

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

| SAMPLE | SITE ID | ANALYTE | SPIKED SAMPLE | SPIKED AMOUNT | UNITS | %RECOV |
|---|---|---|---|---|---|---|
| LCS1 | 05L0253-LC1 | Silver, LCS | 49.2 | 50.0 | MG/KG | 98.4 |
| | | Aluminum, LCS | 445 | 500 | MG/KG | 89.0 |
| | | Arsenic, LCS | 934 | 1000 | MG/KG | 93.4 |
| | | Boron, LCS | 480 | 500 | MG/KG | 95.9 |
| | | Barium, LCS | 495 | 500 | MG/KG | 99.0 |
| | | Beryllium, LCS | 24.3 | 25.0 | MG/KG | 97.2 |
| | | Bismuth, LCS | 484 | 500 | MG/KG | 96.8 |
| | | Calcium, LCS | 2140 | 2500 | MG/KG | 85.5 |
| | | Cadmium, LCS | 24.3 | 25.0 | MG/KG | 97.2 |
| | | Cobalt, LCS | 249 | 250 | MG/KG | 99.4 |
| | | Chromium, LCS | 50.0 | 50.0 | MG/KG | 100 |
| | | Copper, LCS | 127 | 125 | MG/KG | 101.3 |
| | | Iron, LCS | 499 | 500 | MG/KG | 99.8 |
| | | Potassium, LCS | 2260 | 2500 | MG/KG | 90.5 |
| | | Lithium, LCS | 515 | 500 | MG/KG | 103.0 |
| | | Magnesium, LCS | 2440 | 2500 | MG/KG | 97.7 |
| | | Manganese, LCS | 75.8 | 75.0 | MG/KG | 101.1 |
| | | Molybdenum, LCS | 502 | 500 | MG/KG | 100.4 |
| | | Sodium, LCS | 2300 | 2500 | MG/KG | 92.2 |
| | | Nickel, LCS | 199 | 200 | MG/KG | 99.6 |
| | | Phosphorus, LCS | 466 | 500 | MG/KG | 93.2 |
| | | Lead, LCS | 245 | 250 | MG/KG | 98.2 |
| | | Antimony, LCS | 289 | 300 | MG/KG | 96.3 |
| | | Selenium, LCS | 900 | 1000 | MG/KG | 90.0 |
| | | Silicon, LCS | 407 | 500 | MG/KG | 81.4 |
| | | Tin, LCS | 495 | 500 | MG/KG | 98.9 |
| | | Strontium, LCS | 498 | 500 | MG/KG | 99.5 |
| | | Thallium, LCS | 978 | 1000 | MG/KG | 97.8 |
| | | Uranium, LCS | 493 | 500 | MG/KG | 98.5 |
| | | Vanadium, LCS | 243 | 250 | MG/KG | 97.1 |
| | | Zinc, LCS | 97.7 | 100 | MG/KG | 97.7 |
| LCS1 | 05C0103-LC1 | Mercury, LCS | 6.7 | 6.2 | MG/KG | 108.7 |