0070326

# SAF-RC-025
# 100-BC Remaining Pipelines and Sewers - Soil Full Protocol
# FINAL VALIDATION PACKAGE

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**COMPLETE COPY OF VALIDATION PACKAGE TO:**

Jeanette Duncan (2) H9-02 De 7/13/06
INITIAL/DATE

**COMMENTS:**

**SDG K0286 SAF-RC-025**

**Waste Site: 100-B-14:2**

Date: 28 June 2006
To: Washington Closure Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100 BC Remaining Pipelines & Sewers – Soil Full Protocol - Waste Subsite 100-B-14:2
Subject: Semivolatiles - Data Package No. K0286-LLI

## INTRODUCTION

This memo presents the results of data validation on Data Package No. K0286 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 |
|---|---|---|---|---|
| J11KB3 | 4/4/06 | Soil | C | See note 1 |
| J11KB4 | 4/4/06 | Soil | C | See note 1 |
| J11KB5 | 4/4/06 | Soil | C | See note 1 |
| J11KB6 | 4/4/06 | Soil | C | See note 1 |
| J11KB7 | 4/4/06 | Soil | C | See note 1 |
| J11KB8 | 4/4/06 | Soil | C | See note 1 |
| J11KB9 | 4/4/06 | Soil | C | See note 1 |
| J11KC0 | 4/4/06 | Soil | C | See note 1 |
| J11KC1 | 4/4/06 | Soil | C | See note 1 |
| J11KC2 | 4/4/06 | Soil | C | See note 1 |
| J11KC3 | 4/4/06 | Soil | C | See note 1 |
| J11KC4 | 4/4/06 | Soil | C | See note 1 |
| J11KD3 | 4/4/06 | Soil | C | See note 1 |
| J11KD4 | 4/4/06 | Soil | C | See note 1 |
| J11KD5 | 4/4/06 | Soil | C | See note 1 |
| J11KD6 | 4/4/06 | Soil | C | See note 1 |

1– Semivolatiles by 8270C.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, February 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".

All method blank results were acceptable.

Field Blanks

One equipment blank (J11KC4) was submitted for analysis. Di-n-butylphthalate and bis(2-ethylhexyl)phthalate were detected in the equipment blank. Under the WCH statement of work, no qualification is required.

- **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.

Due to a matrix spike (54%) recovery outside QC limits, the 1,2,4-trichlorobenzene result in all samples were qualified as estimates and flagged "J".

All other 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".

All surrogate results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the

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

Due to RPDs outside QC limits, all phenol (31%), 1,2-dichlorobenzene (31%), 2-methylphenol (33%), 2,2'-oxybis(1-chloropropane) (32%), 4-methylphenol (32%), n-nitroso-di-n-propylamine (32%), 2-nitrophenol (36%), 2,4-dimethylphenol (32%), 2,4-dichlorophenol (31%), 2,4-dinitrophenol (52%), 4,6-dinitro-2-methylphenol (37%) and 2,4,6-trichlorophenol (31%) results were qualified as estimates and flagged "J".

All other precision results were acceptable.

Field Duplicate Samples

One set of field duplicates (J11KB6/J11KC3) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the required quantitation limits (RQL's) to ensure that laboratory detection levels meet the required criteria. One hundred-twenty eight analytes exceeded the RQL. Under the WCH statement of work, no qualification is required.

- **Completeness**

Data package No. K0286 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 a matrix spike (54%) recovery outside QC limits, the 1,2,4-trichlorobenzene result in all samples were qualified as estimates and flagged "J".

- Due to RPDs outside QC limits, all phenol (31%), 1,2-dichlorobenzene (31%), 2-methylphenol (33%), 2,2'-oxybis(1-chloropropane) (32%), 4-methylphenol (32%), n-nitroso-di-n-propylamine (32%), 2-nitrophenol (36%), 2,4-dimethylphenol (32%), 2,4-dichlorophenol (31%), 2,4-dinitrophenol (52%), 4,6-dinitro-2-methylphenol (37%) and 2,4,6-trichlorophenol (31%) 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

One hundred-twenty eight analytes exceeded the RQL. Under the WCH statement of work, no qualification is required.

## REFERENCES

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

DOE/RL-96-22, Rev. 4, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, February 2005.

## Appendix 1

## Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the WCH 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 ORGANIC DATA QUALIFICATION SUMMARY*

| SDG: K0286 | REVIEWER: TLI | Project: 100-B-14:2 | PAGE 1 OF 1 |
|---|---|---|---|
| COMMENTS: | | | |
| COMPOUND | QUALIFIER | SAMPLES AFFECTED | REASON |
| 1,2,4-Trichlorobenzene | J | All | MS recovery |
| Phenol<br>1,2-Dichlorobenzene<br>2-Methylphenol<br>2,2'-Oxybis(1-chloropropane)<br>4-Methylphenol<br>n-Nitroso-di-n-propylamine<br>2-Nitrophenol<br>2,4-Dimethylphenol<br>2,4-Dichlorophenol<br>2,4-Dinitrophenol<br>4,6-Dinitro-2-methylphenoL<br>2,4,6-Trichlorophenol | 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

SEMIVOLATILE ANALYSIS, SOIL MATRIX, (UG/KG)



Project: WASHINGTON CLOSURE HANFORD

Laboratory: LLI | SDG: K0286

| Sample Number | | J11KB3 | | J11KB4 | | J11KB5 | | J11KB6 | | J11KB7 | | J11KB8 | | J11KB9 | | J11KC0 | | J11KC1 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Remarks | | | | | | | | Main | | | | | | | | | | | |
| Sample Date | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | |
| Extraction Date | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | |
| Analysis Date | | 4/20/06 | | 4/20/06 | | 4/20/06 | | 4/20/06 | | 4/18/06 | | 4/18/06 | | 4/20/06 | | 4/23/06 | | 4/18/06 | |
| Semivolatile (8270C) | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| Phenol | 660 | 370 | UJ | 360 | UJ | 350 | UJ | 360 | UJ | 350 | UJ | 360 | UJ | 370 | UJ | 350 | UJ | 360 | UJ |
| bis(2-Chloroethyl)ether | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| 2-Chlorophenol | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| 1,3-Dichlorobenzene | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| 1,4-Dichlorobenzene | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| 1,2-Dichlorobenzene | 660 | 370 | UJ | 360 | UJ | 350 | UJ | 360 | UJ | 350 | UJ | 360 | UJ | 370 | UJ | 350 | UJ | 360 | UJ |
| 2-Methylphenol | 660 | 370 | UJ | 360 | UJ | 350 | UJ | 360 | UJ | 350 | UJ | 360 | UJ | 370 | UJ | 350 | UJ | 360 | UJ |
| 2,2'-oxybis(1-chloropropane) | 660 | 370 | UJ | 360 | UJ | 350 | UJ | 360 | UJ | 350 | UJ | 360 | UJ | 370 | UJ | 350 | UJ | 360 | UJ |
| 4-Methylphenol | 660 | 370 | UJ | 360 | UJ | 350 | UJ | 360 | UJ | 350 | UJ | 360 | UJ | 370 | UJ | 350 | UJ | 360 | UJ |
| N-Nitroso-di-n-propylamine | 660 | 370 | UJ | 360 | UJ | 350 | UJ | 360 | UJ | 350 | UJ | 360 | UJ | 370 | UJ | 350 | UJ | 360 | UJ |
| Hexachloroethane | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| Nitrobenzene | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| Isophorone | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| 2-Nitrophenol | 660 | 370 | UJ | 360 | UJ | 350 | UJ | 360 | UJ | 350 | UJ | 360 | UJ | 370 | UJ | 350 | UJ | 360 | UJ |
| 2,4-Dimethylphenol | 660 | 370 | UJ | 360 | UJ | 350 | UJ | 360 | UJ | 350 | UJ | 360 | UJ | 370 | UJ | 350 | UJ | 360 | UJ |
| bis(2-Chloroethoxy)methane | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| 2,4-Dichlorophenol | 660 | 370 | UJ | 360 | UJ | 350 | UJ | 360 | UJ | 350 | UJ | 360 | UJ | 370 | UJ | 350 | UJ | 360 | UJ |
| 1,2,4-Trichlorobenzene | 660 | 370 | UJ | 360 | UJ | 350 | UJ | 360 | UJ | 350 | UJ | 360 | UJ | 370 | UJ | 350 | UJ | 360 | UJ |
| Naphthalene | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| 4-Chloroaniline | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| Hexachlorobutadiene | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| 4-Chloro-3-methylphenol | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| 2-Methylnaphthalene | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| Hexachlorocyclopentadiene | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| 2,4,6-Trichlorophenol | 660 | 370 | UJ | 360 | UJ | 350 | UJ | 360 | UJ | 350 | UJ | 360 | UJ | 370 | UJ | 350 | UJ | 360 | UJ |
| 2,4,5-Trichlorophenol* | 660 | 910 | U | 890 | U | 890 | U | 910 | U | 890 | U | 900 | U | 910 | U | 880 | U | 890 | U |
| 2-Chloronaphthalene | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| 2-Nitroaniline* | 660 | 910 | U | 890 | U | 890 | U | 910 | U | 890 | U | 900 | U | 910 | U | 880 | U | 890 | U |
| Dimethylphthalate | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| Acenaphthylene | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| 2,6-Dinitrotoluene | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | 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.

* - RQL exceeded

SEMIVOLATILE ANALYSIS, SOIL MATRIX, (UG/KG)



Project: WASHINGTON CLOSURE HANFORD

Laboratory: LLI SDG: K0286

| Sample Number | | J11KB3 | | J11KB4 | | J11KB5 | | J11KB6 | | J11KB7 | | J11KB8 | | J11KB9 | | J11KC0 | | J11KC1 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Remarks | | | | | | | | Main | | | | | | | | | | | |
| Sample Date | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | |
| Extraction Date | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | |
| Analysis Date | | 4/20/06 | | 4/20/06 | | 4/20/06 | | 4/20/06 | | 4/18/06 | | 4/18/06 | | 4/20/06 | | 4/23/06 | | 4/18/06 | |
| Semivolatile (8270C) | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| 3-Nitroaniline* | 660 | 910 | U | 890 | U | 890 | U | 910 | U | 890 | U | 900 | U | 910 | U | 880 | U | 890 | U |
| Acenaphthene | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| 2,4-Dinitrophenol* | 660 | 910 | UJ | 890 | UJ | 890 | UJ | 910 | UJ | 890 | UJ | 900 | UJ | 910 | UJ | 880 | UJ | 890 | UJ |
| 4-Nitrophenol* | 660 | 910 | U | 890 | U | 890 | U | 910 | U | 890 | U | 900 | U | 910 | U | 880 | U | 890 | U |
| Dibenzofuran | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| 2,4-Dinitrotoluene | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| Diethylphthalate | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| 4-Chlorophenyl-phenyl ether | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| Fluorene | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| 4-Nitroaniline* | 660 | 910 | U | 890 | U | 890 | U | 910 | U | 890 | U | 900 | U | 910 | U | 880 | U | 890 | U |
| 4,6-Dinitro-2-methylphenol* | 660 | 910 | UJ | 890 | UJ | 890 | UJ | 910 | UJ | 890 | UJ | 900 | UJ | 910 | UJ | 880 | UJ | 890 | UJ |
| N-Nitrosodiphenylamine | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| 4-Bromophenyl-phenyl ether | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| Hexachlorobenzene | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| Pentachlorophenol* | 660 | 910 | U | 890 | U | 890 | U | 910 | U | 890 | U | 900 | U | 910 | U | 880 | U | 890 | U |
| Phenanthrene | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| Anthracene | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| Carbazole | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| Di-n-butylphthalate | 660 | 370 | U | 360 | U | 21 | | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| Fluoranthene | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| Pyrene | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 20 | | 360 | U |
| Butylbenzylphthalate | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| 3,3'-Dichlorobenzidine | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| Benzo(a)anthracene | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| Chrysene | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| bis(2-Ethylhexyl)phthalate | 660 | 370 | U | 36 | | 33 | | 19 | | 350 | U | 360 | U | 370 | U | 22 | | 360 | U |
| Di-n-octylphthalate | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| Benzo(b)fluoranthene | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| Benzo(k)fluoranthene | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| Benzo(a)pyrene | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| Indeno(1,2,3-cd)pyrene | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| Dibenz(a,h)anthracene | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U |
| Benzo(g,h,i)perylene | 660 | 370 | U | 360 | U | 350 | U | 360 | U | 350 | U | 360 | U | 370 | U | 350 | U | 360 | 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.

* - RQL exceeded

000012

SEMIVOLATILE ANALYSIS, SOIL MATRIX, (UG/KG)



Project: WASHINGTON CLOSURE HANFORD

Laboratory: LLI SDG: K0286

| Sample Number | | J11KC2 | | J11KC3 | | J11KC4 | | J11KD3 | | J11KD4 | | J11KD5 | | J11KD6 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Remarks | | | | Duplicate | | | | | | | | | | | | | | | |
| Sample Date | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | | | | |
| Extraction Date | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | | | | | |
| Analysis Date | | 4/20/06 | | 4/23/06 | | 4/18/06 | | 4/20/06 | | 4/23/06 | | 4/18/06 | | 4/23/06 | | | | | |
| Semivolatile (8270C) | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| Phenol | 660 | 410 | UJ | 360 | UJ | 330 | UJ | 350 | UJ | 360 | UJ | 360 | UJ | 350 | UJ | | | | |
| bis(2-Chloroethyl)ether | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| 2-Chlorophenol | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| 1,3-Dichlorobenzene | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| 1,4-Dichlorobenzene | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| 1,2-Dichlorobenzene | 660 | 410 | UJ | 360 | UJ | 330 | UJ | 350 | UJ | 360 | UJ | 360 | UJ | 350 | UJ | | | | |
| 2-Methylphenol | 660 | 410 | UJ | 360 | UJ | 330 | UJ | 350 | UJ | 360 | UJ | 360 | UJ | 350 | UJ | | | | |
| 2,2'-oxybis(1-chloropropane) | 660 | 410 | UJ | 360 | UJ | 330 | UJ | 350 | UJ | 360 | UJ | 360 | UJ | 350 | UJ | | | | |
| 4-Methylphenol | 660 | 410 | UJ | 360 | UJ | 330 | UJ | 350 | UJ | 360 | UJ | 360 | UJ | 350 | UJ | | | | |
| N-Nitroso-di-n-propylamine | 660 | 410 | UJ | 360 | UJ | 330 | UJ | 350 | UJ | 360 | UJ | 360 | UJ | 350 | UJ | | | | |
| Hexachloroethane | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| Nitrobenzene | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| Isophorone | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| 2-Nitrophenol | 660 | 410 | UJ | 360 | UJ | 330 | UJ | 350 | UJ | 360 | UJ | 360 | UJ | 350 | UJ | | | | |
| 2,4-Dimethylphenol | 660 | 410 | UJ | 360 | UJ | 330 | UJ | 350 | UJ | 360 | UJ | 360 | UJ | 350 | UJ | | | | |
| bis(2-Chloroethoxy)methane | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| 2,4-Dichlorophenol | 660 | 410 | UJ | 360 | UJ | 330 | UJ | 350 | UJ | 360 | UJ | 360 | UJ | 350 | UJ | | | | |
| 1,2,4-Trichlorobenzene | 660 | 410 | UJ | 360 | UJ | 330 | UJ | 350 | UJ | 360 | UJ | 360 | UJ | 350 | UJ | | | | |
| Naphthalene | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| 4-Chloroaniline | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| Hexachlorobutadiene | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| 4-Chloro-3-methylphenol | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| 2-Methylnaphthalene | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| Hexachlorocyclopentadiene | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| 2,4,6-Trichlorophenol | 660 | 410 | UJ | 360 | UJ | 330 | UJ | 350 | UJ | 360 | UJ | 360 | UJ | 350 | UJ | | | | |
| 2,4,5-Trichlorophenol* | 660 | 1000 | U | 910 | U | 830 | U | 890 | U | 890 | U | 910 | U | 890 | U | | | | |
| 2-Chloronaphthalene | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| 2-Nitroaniline* | 660 | 1000 | U | 910 | U | 830 | U | 890 | U | 890 | U | 910 | U | 890 | U | | | | |
| Dimethylphthalate | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| Acenaphthylene | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| 2,6-Dinitrotoluene | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | 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.

* - RQL exceeded

SEMIVOLATILE ANALYSIS, SOIL MATRIX, (UG/KG)



| Project: WASHINGTON CLOSURE HANFORD | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Laboratory: LLI | SDG: K0286 | | | | | | | | | | | | | | | | | | |
| Sample Number | | J11KC2 | | J11KC3 | | J11KC4 | | J11KD3 | | J11KD4 | | J11KD5 | | J11KD6 | | | | | |
| Remarks | | | | Duplicate | | | | | | | | | | | | | | | |
| Sample Date | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | | | | |
| Extraction Date | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | | | | | |
| Analysis Date | | 4/20/06 | | 4/23/06 | | 4/18/06 | | 4/20/06 | | 4/23/06 | | 4/18/06 | | 4/23/06 | | | | | |
| Semivolatile (8270C) | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| 3-Nitroaniline* | 660 | 1000 | U | 910 | U | 830 | U | 890 | U | 890 | U | 910 | U | 890 | U | | | | |
| Acenaphthene | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| 2,4-Dinitrophenol* | 660 | 1000 | UJ | 910 | UJ | 830 | UJ | 890 | UJ | 890 | UJ | 910 | UJ | 890 | UJ | | | | |
| 4-Nitrophenol* | 660 | 1000 | U | 910 | U | 830 | U | 890 | U | 890 | U | 910 | U | 890 | U | | | | |
| Dibenzofuran | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| 2,4-Dinitrotoluene | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| Diethylphthalate | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| 4-Chlorophenyl-phenyl ether | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| Fluorene | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| 4-Nitroaniline* | 660 | 1000 | U | 910 | U | 830 | U | 890 | U | 890 | U | 910 | U | 890 | U | | | | |
| 4,6-Dinitro-2-methylphenol* | 660 | 1000 | UJ | 910 | UJ | 830 | UJ | 890 | UJ | 890 | UJ | 910 | UJ | 890 | UJ | | | | |
| N-Nitrosodiphenylamine | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| 4-Bromophenyl-phenyl ether | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| Hexachlorobenzene | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| Pentachlorophenol* | 660 | 1000 | U | 910 | U | 830 | U | 890 | U | 890 | U | 910 | U | 890 | U | | | | |
| Phenanthrene | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| Anthracene | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| Carbazole | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| Di-n-butylphthalate | 660 | 410 | U | 360 | U | 48 | | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| Fluoranthene | 660 | 410 | U | 360 | U | 330 | U | 19 | | 360 | U | 360 | U | 350 | U | | | | |
| Pyrene | 660 | 410 | U | 360 | U | 330 | U | 18 | | 19 | | 360 | U | 350 | U | | | | |
| Butylbenzylphthalate | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| 3,3'-Dichlorobenzidine | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| Benzo(a)anthracene | 660 | 410 | U | 360 | U | 330 | U | 21 | | 360 | U | 360 | U | 350 | U | | | | |
| Chrysene | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| bis(2-Ethylhexyl)phthalate | 660 | 410 | U | 24 | | 19 | | 25 | | 27 | | 360 | U | 27 | | | | | |
| Di-n-octylphthalate | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| Benzo(b)fluoranthene | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| Benzo(k)fluoranthene | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| Benzo(a)pyrene | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| Indeno(1,2,3-cd)pyrene | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| Dibenz(a,h)anthracene | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |
| Benzo(g,h,i)perylene | 660 | 410 | U | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U | | | | |

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

All other qualifiers shown were applied during validation.

* - RQL exceeded

**Lionville Laboratory, Inc.**

Semivolatiles by GC/MS, HSL List

RFW Batch Number: 0604L698 Client: TNUHANFORD RC-025 K0286 Work Order: 11343606001 Report Date: 04/25/06 12:14 Page: 1a

| | Cust ID: | J11KB3 | J11KB3 | J11KB3 | J11KB4 | J11KB5 | J11KB6 |
|---|---|---|---|---|---|---|---|
| Sample Information | RFW#: | 001 | 001 MS | 001 MSD | 002 | 003 | 004 |
| | Matrix: | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL |
| | 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 Recovery | Nitrobenzene-d5 | 63 % | 59 % | 77 % | 75 % | 72 % | 58 % |
| | 2-Fluorobiphenyl | 62 % | 58 % | 77 % | 79 % | 84 % | 60 % |
| | Terphenyl-d14 | 75 % | 67 % | 80 % | 71 % | 97 % | 79 % |
| | Phenol-d5 | 72 % | 65 % | 87 % | 72 % | 71 % | 66 % |
| | 2-Fluorophenol | 64 % | 60 % | 79 % | 70 % | 71 % | 64 % |
| | 2,4,6-Tribromophenol | 60 % | 61 % | 80 % | 65 % | 76 % | 82 % |
| | | fl | fl | fl | fl | fl | fl |
| Phenol | | 370 U J | 72 % | 98 % | 360 U J | 350 U J | 360 U J |
| bis(2-Chloroethyl)ether | | 370 U | 77 % | 98 % | 360 U | 350 U | 360 U |
| 2-Chlorophenol | | 370 U | 71 % | 95 % | 360 U | 350 U | 360 U |
| 1,3-Dichlorobenzene | | 370 U | 58 % | 78 % | 360 U | 350 U | 360 U |
| 1,4-Dichlorobenzene | | 370 U | 58 % | 77 % | 360 U | 350 U | 360 U |
| 1,2-Dichlorobenzene | | 370 U J | 63 % | 86 % | 360 U J | 350 U J | 360 U J |
| 2-Methylphenol | | 370 U J | 73 % | 102 % | 360 U | 350 U | 360 U |
| 2,2'-oxybis(1-Chloropropane) | | 370 U J | 79 % | 104 % | 360 U | 350 U | 360 U |
| 4-Methylphenol | | 370 U J | 74 % | 102 % | 360 U | 350 U | 360 U |
| N-Nitroso-di-n-propylamine | | 370 U J | 81 % | 112 % | 360 U | 350 U | 360 U |
| Hexachloroethane | | 370 U | 60 % | 80 % | 360 U | 350 U | 360 U |
| Nitrobenzene | | 370 U | 67 % | 87 % | 360 U | 350 U | 360 U |
| Isophorone | | 370 U | 79 % | 104 % | 360 U | 350 U | 360 U |
| 2-Nitrophenol | | 370 U J | 63 % | 91 % | 360 U J | 350 U J | 360 U J |
| 2,4-Dimethylphenol | | 370 U J | 64 % | 88 % | 360 U J | 350 U J | 360 U J |
| bis(2-Chloroethoxy)methane | | 370 U | 73 % | 96 % | 360 U | 350 U | 360 U |
| 2,4-Dichlorophenol | | 370 U J | 67 % | 92 % | 360 U J | 350 U J | 360 U J |
| 1,2,4-Trichlorobenzene | | 370 U J | 59 * % | 79 % | 360 U J | 350 U J | 360 U J |
| Naphthalene | | 370 U | 62 % | 81 % | 360 U | 350 U | 360 U |
| 4-Chloroaniline | | 370 U | 80 % | 104 % | 360 U | 350 U | 360 U |
| Hexachlorobutadiene | | 370 U | 63 % | 85 % | 360 U | 350 U | 360 U |
| 4-Chloro-3-methylphenol | | 370 U | 74 % | 100 % | 360 U | 350 U | 360 U |
| 2-Methylnaphthalene | | 370 U | 70 % | 90 % | 360 U | 350 U | 360 U |
| Hexachlorocyclopentadiene | | 370 U | 41 % | 63 % | 360 U | 350 U | 360 U |
| 2,4,6-Trichlorophenol | | 370 U J | 65 % | 89 % | 360 U J | 350 U J | 360 U J |
| 2,4,5-Trichlorophenol | | 910 U | 68 % | 91 % | 890 U | 890 U | 910 U |

*= Outside of EPA CLP QC limits.

K 6/23/06

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RFW Batch Number: 0604L698 Client: TNUHANFORD RC-025 K0286 Work Order: 11343606001 Page: 1b

| Cust ID: | J11KB3 | | J11KB3 | | J11KB3 | | J11KB4 | | J11KB5 | | J11KB6 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RFW#: | 001 | | 001 MS | | 001 MSD | | 002 | | 003 | | 004 | |
| 2-Chloronaphthalene | 370 | U | 64 | % | 86 | % | 360 | U | 350 | U | 360 | U |
| 2-Nitroaniline | 910 | U | 80 | % | 107 | % | 890 | U | 890 | U | 910 | U |
| Dimethylphthalate | 370 | U | 73 | % | 94 | % | 360 | U | 350 | U | 360 | U |
| Acenaphthylene | 370 | U | 66 | % | 87 | % | 360 | U | 350 | U | 360 | U |
| 2,6-Dinitrotoluene | 370 | U | 73 | % | 96 | % | 360 | U | 350 | U | 360 | U |
| 3-Nitroaniline | 910 | U | 86 | % | 110 | % | 890 | U | 890 | U | 910 | U |
| Acenaphthene | 370 | U | 67 | % | 88 | % | 360 | U | 350 | U | 360 | U |
| 2,4-Dinitrophenol | 910 | U J | 30 | % | 51 | % | 890 | U J | 890 | U J | 910 | U J |
| 4-Nitrophenol | 910 | U | 72 | % | 94 | % | 890 | U | 890 | U | 910 | U |
| Dibenzofuran | 370 | U | 69 | % | 90 | % | 360 | U | 350 | U | 360 | U |
| 2,4-Dinitrotoluene | 370 | U | 78 | % | 104 | % | 360 | U | 350 | U | 360 | U |
| Diethylphthalate | 370 | U | 75 | % | 96 | % | 360 | U | 350 | U | 360 | U |
| 4-Chlorophenyl-phenylether | 370 | U | 68 | % | 89 | % | 360 | U | 350 | U | 360 | U |
| Fluorene | 370 | U | 67 | % | 86 | % | 360 | U | 350 | U | 360 | U |
| 4-Nitroaniline | 910 | U | 73 | % | 91 | % | 890 | U | 890 | U | 910 | U |
| 4,6-Dinitro-2-methylphenol | 910 | U J | 62 | % | 90 | % | 890 | U J | 890 | U J | 910 | U J |
| N-Nitrosodiphenylamine (1) | 370 | U | 60 | % | 79 | % | 360 | U | 350 | U | 360 | U |
| 4-Bromophenyl-phenylether | 370 | U | 61 | % | 80 | % | 360 | U | 350 | U | 360 | U |
| Hexachlorobenzene | 370 | U | 69 | % | 92 | % | 360 | U | 350 | U | 360 | U |
| Pentachlorophenol | 910 | U | 66 | % | 82 | % | 890 | U | 890 | U | 910 | U |
| Phenanthrene | 370 | U | 70 | % | 89 | % | 360 | U | 350 | U | 360 | U |
| Anthracene | 370 | U | 71 | % | 92 | % | 360 | U | 350 | U | 360 | U |
| Carbazole | 370 | U | 72 | % | 93 | % | 360 | U | 350 | U | 360 | U |
| Di-n-butylphthalate | 370 | U | 75 | % | 95 | % | 360 | U | 21 | J | 360 | U |
| Fluoranthene | 370 | U | 71 | % | 90 | % | 360 | U | 350 | U | 360 | U |
| Pyrene | 370 | U | 70 | % | 89 | % | 360 | U | 350 | U | 360 | U |
| Butylbenzylphthalate | 370 | U | 80 | % | 102 | % | 360 | U | 350 | U | 360 | U |
| 3,3'-Dichlorobenzidine | 370 | U | 94 | % | 117 | % | 360 | U | 350 | U | 360 | U |
| Benzo(a)anthracene | 370 | U | 71 | % | 91 | % | 360 | U | 350 | U | 360 | U |
| Chrysene | 370 | U | 69 | % | 88 | % | 360 | U | 350 | U | 360 | U |
| bis(2-Ethylhexyl)phthalate | 370 | U | 81 | % | 101 | % | 36 | J | 33 | J | 19 | J |
| Di-n-octyl phthalate | 370 | U | 80 | % | 100 | % | 360 | U | 350 | U | 360 | U |
| Benzo(b)fluoranthene | 370 | U | 70 | % | 88 | % | 360 | U | 350 | U | 360 | U |
| Benzo(k)fluoranthene | 370 | U | 68 | % | 85 | % | 360 | U | 350 | U | 360 | U |
| Benzo(a)pyrene | 370 | U | 67 | % | 85 | % | 360 | U | 350 | U | 360 | U |
| Indeno(1,2,3-cd)pyrene | 370 | U | 70 | % | 89 | % | 360 | U | 350 | U | 360 | U |
| Dibenz(a,h)anthracene | 370 | U | 71 | % | 87 | % | 360 | U | 350 | U | 360 | U |
| Benzo(g,h,i)perylene | 370 | U | 67 | % | 86 | % | 360 | U | 350 | U | 360 | U |

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

K 6/23/06

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**Lionville Laboratory, Inc.**

Semivolatiles by GC/MS, HSL List

Report Date: 04/25/06 12:14

RFW Batch Number: 0604L698 Client: TNUHANFORD RC-025 K0286 Work Order: 11343606001 Page: 2a

| | Cust ID: | J11KB7 | | J11KB8 | | J11KB9 | | J11KC0 | | J11KC1 | | J11KC2 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Information | RFW#: | 005 | | 006 | | 007 | | 008 | | 009 | | 010 | |
| | Matrix: | SOIL | | SOIL | | SOIL | | SOIL | | SOIL | | SOIL | |
| | 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 Recovery | Nitrobenzene-d5 | 59 | % | 69 | % | 56 | % | 64 | % | 53 | % | 68 | % |
| | 2-Fluorobiphenyl | 59 | % | 70 | % | 57 | % | 70 | % | 51 | % | 68 | % |
| | Terphenyl-d14 | 80 | % | 88 | % | 76 | % | 111 | % | 71 | % | 88 | % |
| | Phenol-d5 | 63 | % | 71 | % | 62 | % | 71 | % | 55 | % | 75 | % |
| | 2-Fluorophenol | 64 | % | 76 | % | 61 | % | 59 | % | 58 | % | 78 | % |
| | 2,4,6-Tribromophenol | 65 | % | 85 | % | 75 | % | 65 | % | 68 | % | 97 | % |
| | | fl | | fl | | fl | | fl | | fl | | fl | |
| Phenol | | 350 | U J | 360 | U J | 370 | U J | 350 | U J | 360 | U J | 410 | U J |
| bis(2-Chloroethyl)ether | | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| 2-Chlorophenol | | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| 1,3-Dichlorobenzene | | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| 1,4-Dichlorobenzene | | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| 1,2-Dichlorobenzene | | 350 | U J | 360 | U J | 370 | U J | 350 | U J | 360 | U J | 410 | U J |
| 2-Methylphenol | | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| 2,2'-oxybis(1-Chloropropane) | | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| 4-Methylphenol | | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| N-Nitroso-di-n-propylamine | | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| Hexachloroethane | | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| Nitrobenzene | | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| Isophorone | | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| 2-Nitrophenol | | 350 | U J | 360 | U J | 370 | U J | 350 | U J | 360 | U J | 410 | U J |
| 2,4-Dimethylphenol | | 350 | U J | 360 | U J | 370 | U J | 350 | U J | 360 | U J | 410 | U J |
| bis(2-Chloroethoxy)methane | | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| 2,4-Dichlorophenol | | 350 | U J | 360 | U J | 370 | U J | 350 | U J | 360 | U J | 410 | U J |
| 1,2,4-Trichlorobenzene | | 350 | U J | 360 | U J | 370 | U J | 350 | U J | 360 | U J | 410 | U J |
| Naphthalene | | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| 4-Chloroaniline | | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| Hexachlorobutadiene | | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| 4-Chloro-3-methylphenol | | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| 2-Methylnaphthalene | | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| Hexachlorocyclopentadiene | | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| 2,4,6-Trichlorophenol | | 350 | U J | 360 | U J | 370 | U J | 350 | U J | 360 | U J | 410 | U J |
| 2,4,5-Trichlorophenol | | 890 | U | 900 | U | 910 | U | 880 | U | 890 | U | 1000 | U |

*= Outside of EPA CLP QC limits.

R 6/23/06

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| Cust ID: | J11KB7 | | J11KB8 | | J11KB9 | | J11KC0 | | J11KC1 | | J11KC2 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RFW#: | 005 | | 006 | | 007 | | 008 | | 009 | | 010 | |
| 2-Chloronaphthalene | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| 2-Nitroaniline | 890 | U | 900 | U | 910 | U | 880 | U | 890 | U | 1000 | U |
| Dimethylphthalate | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| Acenaphthylene | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| 2,6-Dinitrotoluene | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| 3-Nitroaniline | 890 | U | 900 | U | 910 | U | 880 | U | 890 | U | 1000 | U |
| Acenaphthene | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| 2,4-Dinitrophenol | 890 | U J | 900 | U J | 910 | U J | 880 | U J | 890 | U J | 1000 | U J |
| 4-Nitrophenol | 890 | U | 900 | U | 910 | U | 880 | U | 890 | U | 1000 | U |
| Dibenzofuran | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| 2,4-Dinitrotoluene | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| Diethylphthalate | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| 4-Chlorophenyl-phenylether | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| Fluorene | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| 4-Nitroaniline | 890 | U | 900 | U | 910 | U | 880 | U | 890 | U | 1000 | U |
| 4,6-Dinitro-2-methylphenol | 890 | U J | 900 | U J | 910 | U J | 880 | U J | 890 | U J | 1000 | U J |
| N-Nitrosodiphenylamine (1) | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| 4-Bromophenyl-phenylether | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| Hexachlorobenzene | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| Pentachlorophenol | 890 | U | 900 | U | 910 | U | 880 | U | 890 | U | 1000 | U |
| Phenanthrene | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| Anthracene | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| Carbazole | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| Di-n-butylphthalate | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| Fluoranthene | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| Pyrene | 350 | U | 360 | U | 370 | U | 20 | J | 360 | U | 410 | U |
| Butylbenzylphthalate | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| 3,3'-Dichlorobenzidine | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| Benzo(a)anthracene | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| Chrysene | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| bis(2-Ethylhexyl)phthalate | 350 | U | 360 | U | 370 | U | 22 | J | 360 | U | 410 | U |
| Di-n-octyl phthalate | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| Benzo(b)fluoranthene | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| Benzo(k)fluoranthene | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| Benzo(a)pyrene | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| Indeno(1,2,3-cd)pyrene | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| Dibenz(a,h)anthracene | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |
| Benzo(g,h,i)perylene | 350 | U | 360 | U | 370 | U | 350 | U | 360 | U | 410 | U |

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

K 6/23/00

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**Lionville Laboratory, Inc.**

Semivolatiles by GC/MS, HSL List

Report Date: 04/25/06 12:14

RFW Batch Number: 0604L698 Client: TNUHANFORD RC-025 K0286 Work Order: 11343606001 Page: 3a

| | Cust ID: | J11KC3 | | J11KC4 | | J11KD3 | | J11KD4 | | J11KD5 | | J11KD6 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Information | RFW#: | 011 | | 012 | | 013 | | 014 | | 015 | | 016 | |
| | Matrix: | SOIL | | SOIL | | SOIL | | SOIL | | SOIL | | SOIL | |
| | 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 Recovery | Nitrobenzene-d5 | 63 | % | 59 | % | 54 | % | 76 | % | 52 | % | 68 | % |
| | 2-Fluorobiphenyl | 67 | % | 59 | % | 63 | % | 77 | % | 50 | % | 68 | % |
| | Terphenyl-d14 | 99 | % | 73 | % | 73 | % | 104 | % | 81 | % | 91 | % |
| | Phenol-d5 | 66 | % | 61 | % | 53 | % | 78 | % | 55 | % | 71 | % |
| | 2-Fluorophenol | 61 | % | 63 | % | 54 | % | 71 | % | 54 | % | 63 | % |
| | 2,4,6-Tribromophenol | 60 | % | 60 | % | 61 | % | 68 | % | 71 | % | 62 | % |
| | | | fl | | fl | | fl | | fl | | fl | | fl |
| Phenol | | 360 | U J | 330 | U J | 350 | U J | 360 | U J | 360 | U J | 350 | U J |
| bis(2-Chloroethyl)ether | | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| 2-Chlorophenol | | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| 1,3-Dichlorobenzene | | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| 1,4-Dichlorobenzene | | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| 1,2-Dichlorobenzene | | 360 | U J | 330 | U J | 350 | U J | 360 | U J | 360 | U J | 350 | U J |
| 2-Methylphenol | | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| 2,2'-oxybis(1-Chloropropane) | | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| 4-Methylphenol | | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| N-Nitroso-di-n-propylamine | | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| Hexachloroethane | | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| Nitrobenzene | | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| Isophorone | | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| 2-Nitrophenol | | 360 | U J | 330 | U J | 350 | U J | 360 | U J | 360 | U J | 350 | U J |
| 2,4-Dimethylphenol | | 360 | U J | 330 | U J | 350 | U J | 360 | U J | 360 | U J | 350 | U J |
| bis(2-Chloroethoxy)methane | | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| 2,4-Dichlorophenol | | 360 | U J | 330 | U J | 350 | U J | 360 | U J | 360 | U J | 350 | U J |
| 1,2,4-Trichlorobenzene | | 360 | U J | 330 | U J | 350 | U J | 360 | U J | 360 | U J | 350 | U J |
| Naphthalene | | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| 4-Chloroaniline | | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| Hexachlorobutadiene | | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| 4-Chloro-3-methylphenol | | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| 2-Methylnaphthalene | | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| Hexachlorocyclopentadiene | | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| 2,4,6-Trichlorophenol | | 360 | U J | 330 | U J | 350 | U J | 360 | U J | 360 | U J | 350 | U J |
| 2,4,5-Trichlorophenol | | 910 | U | 830 | U | 890 | U | 890 | U | 910 | U | 890 | U |

*= Outside of EPA CLP QC limits.

4/23/06

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| Cust ID: | J11KC3 | | J11KC4 | | J11KD3 | | J11KD4 | | J11KD5 | | J11KD6 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RFW#: | 011 | | 012 | | 013 | | 014 | | 015 | | 016 | |
| 2-Chloronaphthalene | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| 2-Nitroaniline | 910 | U | 830 | U | 890 | U | 890 | U | 910 | U | 890 | U |
| Dimethylphthalate | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| Acenaphthylene | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| 2,6-Dinitrotoluene | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| 3-Nitroaniline | 910 | U | 830 | U | 890 | U | 890 | U | 910 | U | 890 | U |
| Acenaphthene | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| 2,4-Dinitrophenol | 910 | U J | 830 | U J | 890 | U J | 890 | U J | 910 | U J | 890 | U J |
| 4-Nitrophenol | 910 | U | 830 | U | 890 | U | 890 | U | 910 | U | 890 | U |
| Dibenzofuran | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| 2,4-Dinitrotoluene | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| Diethylphthalate | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| 4-Chlorophenyl-phenylether | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| Fluorene | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| 4-Nitroaniline | 910 | U | 830 | U | 890 | U | 890 | U | 910 | U | 890 | U |
| 4,6-Dinitro-2-methylphenol | 910 | U J | 830 | U J | 890 | U J | 890 | U J | 910 | U J | 890 | U J |
| N-Nitrosodiphenylamine (1) | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| 4-Bromophenyl-phenylether | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| Hexachlorobenzene | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| Pentachlorophenol | 910 | U | 830 | U | 890 | U | 890 | U | 910 | U | 890 | U |
| Phenanthrene | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| Anthracene | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| Carbazole | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| Di-n-butylphthalate | 360 | U | 48 | J | 350 | U | 360 | U | 360 | U | 350 | U |
| Fluoranthene | 360 | U | 330 | U | 19 | J | 360 | U | 360 | U | 350 | U |
| Pyrene | 360 | U | 330 | U | 18 | J | 19 | J | 360 | U | 350 | U |
| Butylbenzylphthalate | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| 3,3'-Dichlorobenzidine | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| Benzo(a)anthracene | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| Chrysene | 360 | U | 330 | U | 21 | J | 360 | U | 360 | U | 350 | U |
| bis(2-Ethylhexyl)phthalate | 24 | J | 19 | J | 25 | J | 27 | J | 360 | U | 27 | J |
| Di-n-octyl phthalate | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| Benzo(b)fluoranthene | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| Benzo(k)fluoranthene | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| Benzo(a)pyrene | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| Indeno(1,2,3-cd)pyrene | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| Dibenz(a,h)anthracene | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |
| Benzo(g,h,i)perylene | 360 | U | 330 | U | 350 | U | 360 | U | 360 | U | 350 | U |

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

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**Lionville Laboratory, Inc.**

Semivolatiles by GC/MS, HSL List

RFW Batch Number: **0604L698** Client: **TNUHANFORD RC-025 K0286** Work Order: 11343606001 Report Date: 04/25/06 12:14 Page: 4a

| | | | | | |
|---|---|---|---|---|---|
| | Cust ID: | **SBLKWC** | | **SBLKWC BS** | |
| Sample Information | RFW#: | **06LE0283-MB1** | | **06LE0283-MB1** | |
| | Matrix: | SOIL | | SOIL | |
| | D.F.: | 1.00 | | 1.00 | |
| | Units: | ug/Kg | | ug/Kg | |
| Surrogate Recovery | Nitrobenzene-d5 | 69 | % | 65 | % |
| | 2-Fluorobiphenyl | 67 | % | 73 | % |
| | Terphenyl-d14 | 93 | % | 82 | % |
| | Phenol-d5 | 72 | % | 75 | % |
| | 2-Fluorophenol | 74 | % | 70 | % |
| | 2,4,6-Tribromophenol | 71 | % | 85 | % |
| Phenol | | 330 | U | 85 | % |
| bis(2-Chloroethyl)ether | | 330 | U | 76 | % |
| 2-Chlorophenol | | 330 | U | 81 | % |
| 1,3-Dichlorobenzene | | 330 | U | 71 | % |
| 1,4-Dichlorobenzene | | 330 | U | 69 | % |
| 1,2-Dichlorobenzene | | 330 | U | 76 | % |
| 2-Methylphenol | | 330 | U | 77 | % |
| 2,2'-oxybis(1-Chloropropane) | | 330 | U | 76 | % |
| 4-Methylphenol | | 330 | U | 82 | % |
| N-Nitroso-di-n-propylamine | | 330 | U | 81 | % |
| Hexachloroethane | | 330 | U | 67 | % |
| Nitrobenzene | | 330 | U | 68 | % |
| Isophorone | | 330 | U | 79 | % |
| 2-Nitrophenol | | 330 | U | 74 | % |
| 2,4-Dimethylphenol | | 330 | U | 58 | % |
| bis(2-Chloroethoxy)methane | | 330 | U | 73 | % |
| 2,4-Dichlorophenol | | 330 | U | 77 | % |
| 1,2,4-Trichlorobenzene | | 330 | U | 70 | % |
| Naphthalene | | 330 | U | 71 | % |
| 4-Chloroaniline | | 330 | U | 89 | % |
| Hexachlorobutadiene | | 330 | U | 76 | % |
| 4-Chloro-3-methylphenol | | 330 | U | 79 | % |
| 2-Methylnaphthalene | | 330 | U | 75 | % |
| Hexachlorocyclopentadiene | | 330 | U | 68 | % |
| 2,4,6-Trichlorophenol | | 330 | U | 87 | % |
| 2,4,5-Trichlorophenol | | 830 | U | 80 | % |

*= Outside of EPA CLP QC limits.

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Cust ID: SBLKWC SBLKWC BS

RFW#: 06LE0283-MB1 06LE0283-MB1

| | | | | |
|---|---|---|---|---|
| 2-Chloronaphthalene | 330 | U | 80 | % |
| 2-Nitroaniline | 830 | U | 81 | % |
| Dimethylphthalate | 330 | U | 83 | % |
| Acenaphthylene | 330 | U | 80 | % |
| 2,6-Dinitrotoluene | 330 | U | 81 | % |
| 3-Nitroaniline | 830 | U | 112 | % |
| Acenaphthene | 330 | U | 80 | % |
| 2,4-Dinitrophenol | 830 | U | 30 | % |
| 4-Nitrophenol | 830 | U | 105 | % |
| Dibenzofuran | 330 | U | 82 | % |
| 2,4-Dinitrotoluene | 330 | U | 87 | % |
| Diethylphthalate | 330 | U | 84 | % |
| 4-Chlorophenyl-phenylether | 330 | U | 83 | % |
| Fluorene | 330 | U | 78 | % |
| 4-Nitroaniline | 830 | U | 97 | % |
| 4,6-Dinitro-2-methylphenol | 830 | U | 74 | % |
| N-Nitrosodiphenylamine (1) | 330 | U | 69 | % |
| 4-Bromophenyl-phenylether | 330 | U | 72 | % |
| Hexachlorobenzene | 330 | U | 87 | % |
| Pentachlorophenol | 830 | U | 113 | % |
| Phenanthrene | 330 | U | 84 | % |
| Anthracene | 330 | U | 85 | % |
| Carbazole | 330 | U | 86 | % |
| Di-n-butylphthalate | 330 | U | 87 | % |
| Fluoranthene | 330 | U | 88 | % |
| Pyrene | 330 | U | 88 | % |
| Butylbenzylphthalate | 330 | U | 93 | % |
| 3,3'-Dichlorobenzidine | 330 | U | 125 | % |
| Benzo(a)anthracene | 330 | U | 85 | % |
| Chrysene | 330 | U | 82 | % |
| bis(2-Ethylhexyl)phthalate | 330 | U | 90 | % |
| Di-n-octyl phthalate | 330 | U | 91 | % |
| Benzo(b)fluoranthene | 330 | U | 88 | % |
| Benzo(k)fluoranthene | 330 | U | 82 | % |
| Benzo(a)pyrene | 330 | U | 82 | % |
| Indeno(1,2,3-cd)pyrene | 330 | U | 87 | % |
| Dibenz(a,h)anthracene | 330 | U | 86 | % |
| Benzo(g,h,i)perylene | 330 | U | 83 | % |

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

6/23/06

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## Appendix 4

## Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

**Case Narrative**

**Client:** TNU-HANFORD RC-025
**LVL #:** 0604L698
**SDG/SAF #** K0286/RC-025

**W.O. #:** 11343-606-001-9999-00
**Date Received:** 04-06-2006

**SEMIVOLATILE**

Sixteen (16) soil samples were collected on 04-04-2006.

The samples and their associated QC samples were extracted according to Lionville Laboratory SOPs based on SW 846 method 3540C on 04-13-2006 and analyzed according to criteria set forth in Lionville Laboratory SOPs based on SW 846 Method 8270C for TCL Semivolatile target compounds on 04-18,20,23-2006.

The following is a summary of QC results accompanying the sample results. Lionville Laboratory Inc (LvLI) certifies that all test results meet the requirements of NELAC except as noted below:

1. Samples were extracted and analyzed within required holding time.

2. Non-target compounds were detected in the samples.

3. All surrogate recoveries were within acceptance criteria.

4. One (1) of one hundred twenty-eight (128) matrix spike recoveries was outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.

5. All blank spike recoveries were within acceptance criteria.

6. Internal standard area and retention time criteria were met.

7. The sample results were reported on a dry-weight basis.

8. 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").

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 3 9 pages.



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

LIONVILLE LABORATORY INC.

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

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

5.5.06
Date

som\gorup\data\bna\tnu-hanford\0604-698.doc



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

# Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 06MS138

Initiator: Robert Conder
Date: 4/25/06
Client: TNU Hanford RCORS

Batch: 06GW698
Samples: 01MS
Method: SW846/MCAWW/CLP/

Parameter: 06 25H
Matrix: Soil
Prep Batch: 06GW283

**1. Reason for SDR**

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

**b. General Discrepancy**

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

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

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

1,2,4-Trichlorobenzene spike recovery ~~low~~ above QC limits in 01MS 59% (60-120%) ok in MSD / BS
Reanalyze

**2. Known or Probable Causes(s)** Matrix/extraction problem all other spike/surrogates are equal. Sporadic

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

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

**4. Project Manager Instructions**...signature/date: 4/25/06

✓ 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 5/5/06 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 |
| 1 | X Project Mgr: Stone/Johnson | __ | __ GC/LC: Kiger |
| __ | __ Data Management: Stilwell | 2 | X MS: Rychlak/Daley |
| __ | __ Sample Prep: Beegle/Kiger | __ | __ Log-in: Perry |
| | | __ | __ Admin: _____ |
| | | __ | __ Other: _____ |

QA-105-A-0805

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-025-004 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector<br>C. Martinez/K Singleton/D. Bowers | Company Contact<br>C. Martinez | Telephone No.<br>509-539-2816 | Project Coordinator<br>KESSNER, JH |
| Price Code | Data Turnaround<br>21 days | | |
| Project Designation<br>100-BC Remaining Pipelines and Sewers - Soil Full Protocol | Sampling Location<br>100-B-14:2 (115-B) Area 5 | | SAF No.<br>RC-025 |
| Air Quality ☐ | | | |
| Ice Chest No. GRP-03-009 | Field Logbook No.<br>EL-1585-5 | COA<br>B10B14 2000 | Method of Shipment<br>fed ex |
| Shipped To<br>EBERLINE SERVICES, LIONVILLE | Offsite Property No. A060350 | | Bill of Lading/Air Bill No. SEE OSPC |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*none*

**Special Handling and/or Storage**

*cool 4 degrees centigrade*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | None | Cool 4C | Cool 4C | Cool 4C | None | None | None | Cool 4C | | |
| Type of Container | G/P | G/P | aG | aG | G/P | G/P | G/P | aG | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Volume | 250g | ~~125g~~ 250mL | 120mL | 120mL | 500mL | 120mL | 120mL | 250mL | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Chromium Hex - 7196 | PCBs - 8082 | Semi-VOA - 8270A (TCL) | See item (2) in Special Instructions. | ~~Gamma Rx~~ Tritium - 3H | ~~Nickel-63,~~ Strontium-89,90 -- Total Sr | Pesticides - 8081; ~~Chloro Herbicides - EPA8151~~ 04/04/06 | | |

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| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J11KB3 | SOIL | 04/04/06 | 1015 | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | |
| J11KB4 | SOIL | 04/04/06 | 1020 | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | |
| J11KB5 | SOIL | 04/04/06 | 1045 | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | |
| J11KB6 | SOIL | 04/04/06 | 1050 | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | |
| J11KB7 | SOIL | 04/04/06 | 1230 | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | |

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

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| Brian Singleton | 4-4-06 1600 | 3728 Ref 2 | 4-4-06 1600 |
| 3728 #2A | 4-5-06 0930 | P.R. Gilmanson / JP Blanchard | 4-5-06 0930 |
| P.R. Gilmanson / JP Blanchard | 4-5-06 1500 | FED EX | |
| FED EX | 4/6/06 0910 | J. Hernandez | 4/6/06 0910 |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS**

~~(2) addition to item #2 - Run gross alpha and gross beta off available material.~~ 04/04/06

(1) ICP Metals - 6010TR (Client List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Vanadium); ICP Metals - 6010A (Add-on) (Titanium, Uranium, Zinc, Zirconium); Mercury - 7471 - (CV)

~~(2) Gamma Spectroscopy (TCL List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155)~~ 04/04/06

Personnel not available to relinquish samples from 3728 Ref # 2A on 4/5/06

**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 |

BHI-EE-011 (08/29/2005)

0000035

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-025-004 | Page 2 of 2 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: C. Martinez/K Singleton/D. Bowers | Company Contact: C. Martinez | Telephone No.: 509-539-2816 | Project Coordinator: KESSNER, JH |
| Price Code | Data Turnaround | | |
| Project Designation: 100-BC Remaining Pipelines and Sewers - Soil Full Protocol | Sampling Location: 100-B-14:2 (115-B) Area 5 | | SAF No.: RC-025 |
| Air Quality ☐ 21 days | | | |
| Ice Chest No.: ERC-03-105 | Field Logbook No.: EL-1585-5 | COA: R10B14 2000 | Method of Shipment: fed ex |
| Shipped To: EBERLINE SERVICES / LIONVILLE | Offsite Property No.: A060350 | | Bill of Lading/Air Bill No.: SEE OSPC |

POSSIBLE SAMPLE HAZARDS/REMARKS

*none*

Special Handling and/or Storage

*cool 4 degrees centigrade*

820000

| SAMPLE ANALYSIS | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Preservation | None | Cool 4C | Cool 4C | Cool 4C | None | None | None | Cool 4C |
| | | | | Type of Container | G/P | G/P | aG | aG | G/P | G/P | G/P | aG |
| | | | | No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | | | | Volume | 250g | ~~125g~~ 1 aG 04/04/06 | 120mL | 120mL | 500mL | 120mL | 120mL | 250mL |
| | | | | | See item (1) in Special Instructions. | Chromium Hex - 7196 | PCBs - 8082 | Semi-VOA - 8270A (TCL) | See item (2) in Special Instructions. | ~~Carbon-14~~ Tritium - H3 | ~~Nickel-63~~, Strontium-89,90 -- Total Sr | Pesticides - 8081, ~~Chloro-Herbicides - EPA8151~~ 04/04/06 |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | |
| J11KB8 | SOIL | 04/04/06 | 1235 | | ✓ | ✓ | ✓ | ✓ | | | | ✓ |
| J11KB9 | SOIL | 04/04/06 | 1240 | | ✓ | ✓ | ✓ | ✓ | | | | ✓ |
| J11KC0 | SOIL | 04/04/06 | 1245 | | ✓ | ✓ | ✓ | ✓ | | | | ✓ |
| J11KC1 | SOIL | 04/04/06 | 1345 | | ✓ | ✓ | ✓ | ✓ | | | | ✓ |
| J11KC2 | SOIL | 04/04/06 | 1355 | | ✓ | ✓ | ✓ | ✓ | | | | ✓ |

| CHAIN OF POSSESSION | Date/Time | Sign/Print Names: Received By/Stored In | Date/Time |
|---|---|---|---|
| Relinquished By/Removed From: Kevin Singleton | 4-4-06 1600 | 3728 RefZ | 4-4-06 1600 |
| Relinquished By/Removed From: 3728 #2A | 4-5-06 0930 | T.J. Edmondson / Joe Edmondson | 4-5-06 0930 |
| Relinquished By/Removed From: T.J. Edmondson / Joe Edmondson WCH | 4-5-06 1500 | Received By/Stored In: FED EX | |
| Relinquished By/Removed From: FED EX | 4/6/06 0910 | Received By/Stored In: [illegible] | 4/6/06 0910 |
| Relinquished By/Removed From | | Received By/Stored In | |
| Relinquished By/Removed From | | Received By/Stored In | |

SPECIAL INSTRUCTIONS

~~(2) addition to item # 2. Run gross alpha and gross beta off available material.~~

(1) ICP Metals - 6010TR (Client List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Vanadium); ICP Metals - 6010A (Add-on) (Titanium, Uranium, Zinc, Zirconium); Mercury - 7471 - (CV)

~~(2) Gamma Spectroscopy (TCL List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155)~~

Personnel not available to relinquish samples from 3728 Ref #2A on 4/5/06

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 |

BHI-EE-011 (08/29/2005)

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-025-004 | Page 2 of 2 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: C. Martinez/K Singleton/D. Bowers | Company Contact: C. Martinez | Telephone No.: 509-539-2816 | Project Coordinator: KESSNER, JH |
| Project Designation: 100-BC Remaining Pipelines and Sewers - Soil Full Protocol | Sampling Location: 100-B-14:2 (115-B) Area 5 | | SAF No.: RC-025 |
| Ice Chest No.: ERC-99-063 | Field Logbook No.: EL-1585-5 | COA: R10B14 2000 | Method of Shipment: fed ex |
| Shipped To: EBERLINE SERVICES / LIONVILLE | Offsite Property No.: A060350 | | Bill of Lading/Air Bill No.: SEE OSPC |

Price Code: Data Turnaround: Air Quality ☐ 21 days

POSSIBLE SAMPLE HAZARDS/REMARKS
*none*

Special Handling and/or Storage
*cool 4 degrees centigrade*

620009

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | None | Cool 4C | Cool 4C | Cool 4C | None | None | None | Cool 4C | | |
| Type of Container | G/P | G/P | aG | aG | G/P | G/P | G/P | aG | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Volume | 250g 04/04/06 | ~~125g~~ 120mL | 120mL | 120mL | 500mL | 120mL | 120mL | 250mL | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Chromium Hex - 7196 | PCBs - 8082 | Semi-VOA - 8270A (TCL) | See item (2) in Special Instructions. | ~~Cesium-14;~~ Tritium-3H | ~~Nickel-63;~~ Strontium-89,90 -- Total Sr | Pesticides - 8081; ~~Chlorp Herbicides~~ ~~GRABLST~~ 04/04/06 | | |

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J11KC3 | SOIL | 04/04/06 | 1055 | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | |
| J11KC4 | SOIL | 04/04/06 | 1040 | ✓ | N/A | N/A | ✓ | | | | N/A | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

| CHAIN OF POSSESSION | Date/Time | Sign/Print Names | Date/Time |
|---|---|---|---|
| Relinquished By/Removed From: Kevin Singleton | 4-4-06 1600 | Received By/Stored In: 3278 Ref 2 | 4-4-06 1600 |
| Relinquished By/Removed From: 3728 #2A | 4-5-06 0930 | Received By/Stored In: J.R. Edmondson | 4-5-06 0930 |
| Relinquished By/Removed From: J.R. Edmondson | 4-5-06 1500 | Received By/Stored In: FED EX | |
| Relinquished By/Removed From: | 4/6/06 0910 | Received By/Stored In: | 4/6/06 0910 |
| Relinquished By/Removed From: | | Received By/Stored In: | |
| Relinquished By/Removed From: | | Received By/Stored In: | |

SPECIAL INSTRUCTIONS

~~(2) addition to item # 2. Run gross alpha and gross beta off available material.~~ 04/04/06

(1) ICP Metals - 6010TR (Client List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Vanadium); ICP Metals - 6010A (Add-on) (Titanium, Uranium, Zinc, Zirconium); Mercury - 7471 - (CV)

~~(2) Gamma Spectroscopy (TCL List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155)~~ 04/04/06

Personnel not available to Relinquish samples from 3728 Ref # 2A on 4/5/06

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 |

BHI-EE-011 (08/29/2005)

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-025-006 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| **Collector** C. Martinez/K Singleton/D. Bowers | **Company Contact** C. Martinez | **Telephone No.** 509-539-2816 | **Project Coordinator** KESSNER, JH |
| **Price Code** | **Data Turnaround** | | |
| **Project Designation** 100-BC Remaining Pipelines and Sewers - Soil Full Protocol | **Sampling Location** 100-B-14:2 (115-B) BCL Area 5 | | **SAF No.** RC-025 |
| **Air Quality** ☐ | 21 days | | |
| **Ice Chest No.** GRP-03-009 | **Field Logbook No.** EL-1585-5 | **COA** R10B142000 | **Method of Shipment** fed ex |
| **Shipped To** EBERLINE SERVICES/ LIONVILLE | **Offsite Property No.** A060350 | | **Bill of Lading/Air Bill No.** SEE OSPC |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*none*

**Special Handling and/or Storage**

*cool 4 degrees centigrade*

000030

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Preservation** | None | Cool 4C | Cool 4C | Cool 4C | None | None | Cool 4C | | | | |
| **Type of Container** | G/P | G/P | aG | aG | G/P | G/P | aG | | | | |
| **No. of Container(s)** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | |
| **Volume** | 250g | ~~125g~~ 250mL 04/04/06 | 120mL | 120mL | 500mL | 120mL | 250mL | | | | |
| **SAMPLE ANALYSIS** | See item (1) in Special Instructions. | Chromium Hex - 7196 | PCBs - 8082 | Semi-VOA - 8270A (TCL) | See item (2) in Special Instructions. | ~~Carbon-14~~, Tritium - H3 | Pesticides - 8081; ~~Chlorinated Herbicides - 8151~~ 04/04/06 | | | | |

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J11KD3 | SOIL | 04/04/06 | 0915 | ✓ | ✓ | ✓ | ✓ | | | ✓ | | | |
| J11KD4 | SOIL | 04/04/06 | 0925 | ✓ | ✓ | ✓ | ✓ | | | ✓ | | | |
| J11KD5 | SOIL | 04/04/06 | 0930 | ✓ | ✓ | ✓ | ✓ | | | ✓ | | | |
| J11KD6 | SOIL | 04/04/06 | 0935 | ✓ | ✓ | ✓ | ✓ | | | ✓ | | | |
| | | | | | | | | | | | | | |

04/04/06

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

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| Kevin Singleton | 1600 4-4-06 | 3728 Ref 2A | 1600 4-4-06 |
| 3728 #2A | 4-5-06 0930 | Fred Wilson / LR Edmundson | 4-5-06 0930 |
| Fred Wilson / LR Edmundson | 4-5-06 1500 | FED EX | |
| FED EX | 4/6/06 0910 | | 4/6/06 0910 |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS** 04/04/06

~~(2) addition to item #2 Run gross alpha and gross beta all available material.~~

(1) ICP Metals - 6010TR (Client List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Vanadium); ICP Metals - 6010A (Add-on) (Titanium, Uranium, Zinc, Zirconium); Mercury - 7471 - (CV)

~~(2) Gamma Spectroscopy (TCL List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155)~~ 04/04/06

Personnel not available to relinquish samples from 3728 Ref # 2A on 4/5/06

**Matrix ***

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

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

BHI-EE-011 (08/29/2005)

## Appendix 5

## Data Validation Supporting Documentation

# GC/MS ORGANIC DATA VALIDATION CHECKLIST

| VALIDATION LEVEL: | A | B | C | D | E |
|---|---|---|---|---|---|
| PROJECT: 100-B-14:2 | | | DATA PACKAGE: K0228 | | |
| VALIDATOR: TLI | | LAB: LLI | | DATE: 6/12/02 | |
| | | | SDG: K0228 | | |

| ANALYSES PERFORMED | | | | | |
|---|---|---|---|---|---|
| SW-846 8260 | | SW-846 8260 (TCLP) | SW-846 8270 | | SW-846 8270 (TCLP) |
| | | | | | |

| SAMPLES/MATRIX | | | | | |
|---|---|---|---|---|---|
| J11KB3 | J11KB4 | J11KB5 | J11KB6 | J11KB7 | J11KB8 |
| J11KB9 | J11KC0 | J11KC1 | J11KC2 | J11KC3 | J11KC4 |
| J11KD3 | J11KD4 | J11KD5 | J11KD6 | | |
| | | | | | |
| | | | | | Soil |

## 1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments: _____

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

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

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

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

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

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

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

Comments: _____

# GC/MS ORGANIC DATA VALIDATION CHECKLIST

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

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

Calibration blank results acceptable? (Levels D, E) ..... Yes No N/A

Laboratory blanks analyzed? ..... Yes No N/A

Laboratory blank results acceptable? ..... Yes No N/A

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

Field/trip blank results acceptable? (Levels C, D, E) ..... Yes No N/A

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

Comments: bis(2-ethylhexyl)phthalate + di-n-butylphthalate in the FB

## 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: 1,2,4-trichlorobenzene - US 57% - J all no PQL

# 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:

Phenol (31%) 1,2-dichlorobenzene (31%) 2-methylphenol (33%)
2,2'-oxybis(1-chloropropane) (32%) 4-methylphenol (32%)
n-nitroso-di-n-propylamine (32%) 2-nitrophenol (36%) 2,4 dimethylphenol (32%)
2,4-dichlorophenol (31%) 2,4-dinitrophenol (52%)
4,6-dinitro-2-methylphenol (37%) – J all 2,4,6-trichlorophenol – 31% – J

## 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: 128 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: 28 June 2006
To: Washington Closure Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100 BC Remaining Pipelines & Sewers – Soil Full Protocol - Waste Subsite 100-B-14:2
Subject: Wet Chemistry - Data Package No. K0286-LLI

## INTRODUCTION

This memo presents the results of data validation on Data Package No. K0286 prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

| Sample ID | Sample Date | Media | Validation | Date |
|---|---|---|---|---|
| J11KB3 | 4/4/06 | Soil | C | See note 1 |
| J11KB4 | 4/4/06 | Soil | C | See note 1 |
| J11KB5 | 4/4/06 | Soil | C | See note 1 |
| J11KB6 | 4/4/06 | Soil | C | See note 1 |
| J11KB7 | 4/4/06 | Soil | C | See note 1 |
| J11KB8 | 4/4/06 | Soil | C | See note 1 |
| J11KB9 | 4/4/06 | Soil | C | See note 1 |
| J11KC0 | 4/4/06 | Soil | C | See note 1 |
| J11KC1 | 4/4/06 | Soil | C | See note 1 |
| J11KC2 | 4/4/06 | Soil | C | See note 1 |
| J11KC3 | 4/4/06 | Soil | C | See note 1 |
| J11KD3 | 4/4/06 | Soil | C | See note 1 |
| J11KD4 | 4/4/06 | Soil | C | See note 1 |
| J11KD5 | 4/4/06 | Soil | C | See note 1 |
| J11KD6 | 4/4/06 | Soil | C | See note 1 |

1- Chromium VI by 7196A.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, Rev. 4, February 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 30 days for chromium VI. If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were acceptable.

- **Method Blanks**

Method Blanks

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

All method blank results were acceptable.

Field (Equipment) Blank

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.

All 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.

All laboratory duplicate results were acceptable.

Field Duplicate

One set of field duplicates (J11KB6/J11KC3) were submitted for analysis. Field duplicates are analyzed using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the required quantitation limits (RQLs) to ensure that laboratory detection levels meet the required criteria. All analytes met the RQL.

- **Completeness**

Data package K0286 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

**MAJOR DEFICIENCIES**

None found.

## MINOR DEFICIENCIES

None found.

## REFERENCES

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

DOE/RL-96-22, Rev. 4, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, February 2005.

## Appendix 1

## Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with WCH 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

WET CHEMISTRY DATA QUALIFICATION SUMMARY*

| SDG: K0286 | REVIEWER: TLI | Project: 100-B-14:2 | PAGE 1 OF 1 |
|---|---|---|---|
| COMMENTS: No qualifiers assigned | | | |

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

# Appendix 3

## Qualified Data Summary and Annotated Laboratory Reports

| Project: WASHINGTON CLOSURE HANFORD | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab: LLI | SDG: K0286 | | | | | | | | | | | | | | | | | | |
| Sample Number | | J11KB3 | | J11KB4 | | J11KB5 | | J11KB6 | | J11KB7 | | J11KB8 | | J11KB9 | | J11KC0 | | J11KC1 | |
| Remarks | | | | | | | | Main | | | | | | | | | | | |
| Sample Date | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | |
| Wet Chemistry | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| Chromium VI | 0.5 | 0.22 | U | 0.26 | | 0.21 | U | 0.26 | | 0.21 | U | 0.22 | U | 0.36 | | 0.21 | U | 0.21 | U |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| Sample Number | | J11KC2 | | J11KC3 | | J11KD3 | | J11KD4 | | J11KD5 | | J11KD6 | | | | | | | |
| Remarks | | | | Duplicate | | | | | | | | | | | | | | | |
| Sample Date | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | | | | | | |
| Wet Chemistry | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | | | | | | |
| Chromium VI | 0.5 | 0.37 | | 0.36 | | 0.65 | | 0.22 | | 0.22 | U | 0.22 | | | | | | | |

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

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 04/12/06

CLIENT: TNUHANFORD RC-025 K0286 LVL LOT #: 0604L698
WORK ORDER: 11343-606-001-9999-00

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -001 | J11KB3 | % Solids | 91.3 | % | 0.01 | 1.0 |
| | | Chromium VI | 0.22 u | MG/KG | 0.22 | 1.0 |
| -002 | J11KB4 | % Solids | 93.6 | % | 0.01 | 1.0 |
| | | Chromium VI | 0.26 | MG/KG | 0.21 | 1.0 |
| -003 | J11KB5 | % Solids | 94.1 | % | 0.01 | 1.0 |
| | | Chromium VI | 0.21 u | MG/KG | 0.21 | 1.0 |
| -004 | J11KB6 | % Solids | 91.4 | % | 0.01 | 1.0 |
| | | Chromium VI | 0.26 | MG/KG | 0.22 | 1.0 |
| -005 | J11KB7 | % Solids | 94.1 | % | 0.01 | 1.0 |
| | | Chromium VI | 0.21 u | MG/KG | 0.21 | 1.0 |
| -006 | J11KB8 | % Solids | 92.4 | % | 0.01 | 1.0 |
| | | Chromium VI | 0.22 u | MG/KG | 0.22 | 1.0 |
| -007 | J11KB9 | % Solids | 91.2 | % | 0.01 | 1.0 |
| | | Chromium VI | 0.36 | MG/KG | 0.22 | 1.0 |
| -008 | J11KC0 | % Solids | 94.9 | % | 0.01 | 1.0 |
| | | Chromium VI | 0.21 u | MG/KG | 0.21 | 1.0 |
| -009 | J11KC1 | % Solids | 93.4 | % | 0.01 | 1.0 |
| | | Chromium VI | 0.21 u | MG/KG | 0.21 | 1.0 |
| -010 | J11KC2 | % Solids | 81.5 | % | 0.01 | 1.0 |
| | | Chromium VI | 0.37 | MG/KG | 0.24 | 1.0 |

4/23/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 04/12/06

CLIENT: TNUHANFORD RC-025 K0286 LVL LOT #: 0604L698

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -011 | J11KC3 | % Solids | 91.6 | % | 0.01 | 1.0 |
| | | Chromium VI | 0.36 | MG/KG | 0.22 | 1.0 |
| -012 | J11KC4 | % Solids | 99.9 | % | 0.01 | 1.0 |
| -013 | J11KD3 | % Solids | 94.1 | % | 0.01 | 1.0 |
| | | Chromium VI | 0.65 | MG/KG | 0.21 | 1.0 |
| -014 | J11KD4 | % Solids | 93.4 | % | 0.01 | 1.0 |
| | | Chromium VI | 0.22 | MG/KG | 0.21 | 1.0 |
| -015 | J11KD5 | % Solids | 91.6 | % | 0.01 | 1.0 |
| | | Chromium VI | 0.22 u | MG/KG | 0.22 | 1.0 |
| -016 | J11KD6 | % Solids | 94.0 | % | 0.01 | 1.0 |
| | | Chromium VI | 0.22 | MG/KG | 0.21 | 1.0 |

K
4/23/06

## Appendix 4

## Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

**Analytical Report**

**Client:** TNU-HANFORD RC-025 K0286
**LVL#:** 0604L698

**W.O.#:** 11343-606-001-9999-00
**Date Received:** 04-06-06

**INORGANIC NARRATIVE**

1. This narrative covers the analyses of 16 soil samples.

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

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

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

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

5. The method blank for Chromium VI was within the method criteria.

6. The Laboratory Control Samples (LCS) for Chromium VI were within the laboratory control limits.

7. The matrix spike recoveries for Chromium VI were within the 75-125% control limits.

8. The replicate analysis for Percent Solids was within the 20% Relative Percent Difference (RPD) control limit however replicate analysis for Chromium VI was outside the control limit that may be attributed sample inhomogeneity.

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

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

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

4/26/06
Date

njp\i04-698

The results presented in this report relate to the analytical testing and conditions of the samples upon receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 18 pages.



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

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-025-004 | Page 1 of 3 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: C. Martinez/K Singleton/D. Bowers | Company Contact: C. Martinez | Telephone No.: 509-539-2816 | Project Coordinator: KESSNER, JH | Price Code | Data Turnaround: 21 days |
| Project Designation: 100-BC Remaining Pipelines and Sewers - Soil Full Protocol | Sampling Location: 100-B-14:2 (115-B) Area 5 | | SAF No.: RC-025 | Air Quality ☐ | |
| Ice Chest No.: GRP-03-009 | Field Logbook No.: EL-1585-5 | COA: B10B14 2000 | Method of Shipment: fed ex | | |
| Shipped To: EBERLINE SERVICES LIONVILLE | Offsite Property No.: A060350 | | Bill of Lading/Air Bill No.: SEE OSPC | | |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*none*

**Special Handling and/or Storage**

*cool 4 degrees centigrade*

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | None | Cool 4C | Cool 4C | Cool 4C | None | None | None | Cool 4C | | |
| Type of Container | G/P | G/P | aG | aG | G/P | G/P | G/P | aG | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Volume | 250g | ~~125g~~ 250mL 04/04/06 | 120mL | 120mL | 500mL | 120mL | 120mL | 250mL | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Chromium Hex - 7196 | PCBs - 8082 | Semi-VOA - 8270A (TCL) | See item (2) in Special Instructions. | ~~Gamma Spec~~ Tritium - 3H3 | ~~Nickel-63,~~ Strontium-89,90 -- Total Sr | Pesticides - 8081; ~~Chloro-Herbicides - EPA8151~~ 04/04/06 | | |

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| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J11KB3 | SOIL | 04/04/06 | 1015 | ✓ | ✓ | ✓ | ✓ | | | | ✓ | |
| J11KB4 | SOIL | 04/04/06 | 1020 | ✓ | ✓ | ✓ | ✓ | | | | ✓ | |
| J11KB5 | SOIL | 04/04/06 | 1045 | ✓ | ✓ | ✓ | ✓ | | | | ✓ | |
| J11KB6 | SOIL | 04/04/06 | 1050 | ✓ | ✓ | ✓ | ✓ | | | | ✓ | |
| J11KB7 | SOIL | 04/04/06 | 1230 | ✓ | ✓ | ✓ | ✓ | | | | ✓ | |

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

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| Kevin Singleton | 4-4-06 1600 | 3728 Ref 2 | 4-4-06 1600 |
| 3728 #2A | 4-5-06 0930 | T.R. Gunderson / Jo Blanchard | 4-5-06 0930 |
| T.R. Gunderson / Jo Blanchard | 4-5-06 1500 | FED EX | |
| FED EX | 4/6/06 0910 | [illegible] | 4/6/06 0910 |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS**

~~(2) addition to item # 2 - Run gross alpha and gross beta off available material.~~ 04/04/06

(1) ICP Metals - 6010TR (Client List) {Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Vanadium}; ICP Metals - 6010A (Add-on) {Titanium, Uranium, Zinc, Zirconium}; Mercury - 7471 - (CV)

~~(2) Gamma Spectroscopy (TCL List) {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}~~ 04/04/06

Personnel not available to relinquish samples from 3728 Ref # 2A on 4/5/06

**Matrix ***

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

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

BHI-EE-011 (08/29/2005)

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-025-004 | Page 2 of 3 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| **Collector** C. Martinez/K Singleton/D. Bowers | **Company Contact** C. Martinez **Telephone No.** 509-539-2816 | **Project Coordinator** KESSNER, JH | **Price Code** **Data Turnaround** |
| **Project Designation** 100-BC Remaining Pipelines and Sewers - Soil Full Protocol | **Sampling Location** 100-B-14:2 (115-B) Area 5 | **SAF No.** RC-025 | Air Quality ☐ 21 days |
| **Ice Chest No.** ERC-03-105 | **Field Logbook No.** EL-1585-5 **COA** B10B14 2000 | **Method of Shipment** fed ex | |
| **Shipped To** EBERLINE SERVICES / LIONVILLE | **Offsite Property No.** A060350 | **Bill of Lading/Air Bill No.** SEE OSPC | |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*none*

**Special Handling and/or Storage**

*cool 4 degrees centigrade*

000016

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Preservation** | None | Cool 4C | Cool 4C | Cool 4C | None | None | None | Cool 4C |
| | | | **Type of Container** | G/P | G/P | aG | aG | G/P | G/P | G/P | aG |
| | | | **No. of Container(s)** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | | | **Volume** | 250g | ~~125g~~ 125mL | 120mL | 120mL | 500mL | 120mL | 120mL | 250mL |
| | | | **SAMPLE ANALYSIS** | See item (1) in Special Instructions. | Chromium Hex - 7196 | PCBs - 8082 | Semi-VOA - 8270A (TCL) | See item (2) in Special Instructions. | ~~Carbon-14~~, Tritium - 3H3 | ~~Nickel-63~~, Strontium-89,90 -- Total Sr | Pesticides - 8081, ~~Chloro-Herbicides - EPA815L~~ |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | |
| J11KB8 | SOIL | 04/04/06 | 1235 | ✓ | ✓ | ✓ | ✓ | | | | ✓ |
| J11KB9 | SOIL | 04/04/06 | 1240 | ✓ | ✓ | ✓ | ✓ | | | | ✓ |
| J11KC0 | SOIL | 04/04/06 | 1245 | ✓ | ✓ | ✓ | ✓ | | | | ✓ |
| J11KC1 | SOIL | 04/04/06 | 1345 | ✓ | ✓ | ✓ | ✓ | | | | ✓ |
| J11KC2 | SOIL | 04/04/06 | 1355 | ✓ | ✓ | ✓ | ✓ | | | | ✓ |

04/04/06

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By/Removed From: Kevin Singleton | Date/Time 1600 4-4-06 | Received By/Stored In: 3728 RefZ | Date/Time 1600 4-4-06 |
| Relinquished By/Removed From: 3728 #2A | Date/Time 4-5-06 0930 | Received By/Stored In: L.R. Edmundson | Date/Time 4-5-06 0930 |
| Relinquished By/Removed From: L.R. Edmundson | Date/Time 4-5-06 1500 | Received By/Stored In: FED EX | Date/Time |
| Relinquished By/Removed From: Fed Ex | Date/Time 4/6/06 0910 | Received By/Stored In: [illegible] | Date/Time 4/6/06 0910 |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |

**SPECIAL INSTRUCTIONS**

~~(2) addition to item # 2. Run gross alpha and gross beta off available material.~~

(1) ICP Metals - 6010TR (Client List) {Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Vanadium}; ICP Metals - 6010A (Add-on) {Titanium, Uranium, Zinc, Zirconium}; Mercury - 7471 - (CV)

~~(2) Gamma Spectroscopy (TCL List) {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}~~

Personnel not available to relinquish samples from 3728 Ref #2A on 4/5/06

**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 |

BHI-EE-011 (08/29/2005)

Washington Closure Hanford

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-025-004



| | | | |
|---|---|---|---|
| **Collector** C. Martinez/K Singleton/D. Bowers | **Company Contact** C. Martinez | **Telephone No.** 509-539-2816 | **Project Coordinator** KESSNER, JH |
| **Price Code** | **Data Turnaround** | | |
| **Project Designation** 100-BC Remaining Pipelines and Sewers - Soil Full Protocol | **Sampling Location** 100-B-14;2 (115-B) Area 5 | | **SAF No.** RC-025 |
| **Air Quality** ☐ 21 days | | | |
| **Ice Chest No.** ERC-99-063 | **Field Logbook No.** EL-1585-5 | **COA** R10B14 2000 | **Method of Shipment** fed ex |
| **Shipped To** EBERLINE SERVICES / LIONVILLE | **Offsite Property No.** A060350 | | **Bill of Lading/Air Bill No.** SEE OSPC |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*none*

**Special Handling and/or Storage**

*cool 4 degrees centigrade*

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Preservation** | None | Cool 4C | Cool 4C | Cool 4C | None | None | None | Cool 4C | | |
| **Type of Container** | G/P | G/P | aG | aG | G/P | G/P | G/P | aG | | |
| **No. of Container(s)** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| **Volume** | 250g 04/04/06 | ~~125g~~ 120mL | 120mL | 120mL | 500mL | 120mL | 120mL | 250mL | | |
| **SAMPLE ANALYSIS** | See item (1) in Special Instructions. | Chromium Hex - 7196 | PCBs - 8082 | Semi-VOA - 8270A (TCL) | See item (2) in Special Instructions. | ~~Gamma-14~~; Tritium - 3H3 | ~~Nickel-63~~, Strontium-89,90 -- Total Sr | Pesticides - 8081; ~~Chloro-Herbicides - 8151~~ 04/04/06 | | |

000017

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J11KC3 | SOIL | 04/04/06 | 1055 | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | |
| J11KC4 | SOIL | 04/04/06 | 1040 | ✓ | N/A | N/A | ✓ | | | | N/A | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

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

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| Kevin Singleton | 4-4-06 1600 | 3278 Rm 2 | 4-4-06 1600 |
| 3728 #2A | 4-5-06 0930 | T.R. Edmundson / J.R. Edmundson | 4-5-06 0930 |
| T.R. Edmundson / J.R. Edmundson | 4-5-06 1500 | FED EX | |
| FED EX | 4/6/06 0910 | P. Kessendy | 4/6/06 0910 |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS**

~~(2) addition to item # 2. Run gross alpha and gross beta off available material.~~ 04/04/06

(1) ICP Metals - 6010TR (Client List) {Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Vanadium}; ICP Metals - 6010A (Add-on) {Titanium, Uranium, Zinc, Zirconium}; Mercury - 7471 - (CV)

~~(3) Gamma Spectroscopy (TCL List) {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}~~ 04/04/06

Personnel not available to Relinquish samples from 3728 Ref # 2A on 4/5/06

**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 |

BHI-EE-011 (08/29/2005)

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-025-006 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| **Collector** C. Martinez/K Singleton/D. Bowers | **Company Contact** C. Martinez | **Telephone No.** 509-539-2816 | **Project Coordinator** KESSNER, JH |
| **Price Code** | **Data Turnaround** | | |
| **Project Designation** 100-BC Remaining Pipelines and Sewers - Soil Full Protocol | **Sampling Location** 100-B-14:2 (115-B) BCL Area 5 | | **SAF No.** RC-025 |
| **Air Quality** ☐ 21 days | | | |
| **Ice Chest No.** GRP-03-009 | **Field Logbook No.** EL-1585-5 | **COA** R10B142000 | **Method of Shipment** fed ex |
| **Shipped To** EBERLINE SERVICES LIONVILLE | **Offsite Property No.** A060350 | | **Bill of Lading/Air Bill No.** SEE OSPC |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*none*

**Special Handling and/or Storage**

*cool 4 degrees centigrade*

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Preservation** | None | Cool 4C | Cool 4C | Cool 4C | None | None | Cool 4C | | | |
| **Type of Container** | G/P | G/P | aG | aG | G/P | G/P | aG | | | |
| **No. of Container(s)** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | |
| **Volume** | 250g | ~~125g~~ 250mL | 120mL | 120mL | 500mL | 120mL | 250mL | | | |
| **SAMPLE ANALYSIS** | See item (1) in Special Instructions. | Chromium Hex - 7196 | PCBs - 8082 | Semi-VOA - 8270A (TCL) | See item (2) in Special Instructions. | ~~Gamma-HA~~ Tritium - H3 | Pesticides - 8081; ~~Chlorinated Herbicides 8151~~ | | | |

04/04/06

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J11KD3 | SOIL | 04/04/06 | 0915 | ✓ | ✓ | ✓ | ✓ | | | ✓ | | |
| J11KD4 | SOIL | 04/04/06 | 0925 | ✓ | ✓ | ✓ | ✓ | | | ✓ | | |
| J11KD5 | SOIL | 04/04/06 | 0930 | ✓ | ✓ | ✓ | ✓ | | | ✓ | | |
| J11KD6 | SOIL | 04/04/06 | 0935 | ✓ | ✓ | ✓ | ✓ | | | ✓ | | |
| | | | | | | | | | | | | |

04/04/06

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

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| Kevin Singleton | 4-4-06 1600 | 3728 Ref 2A | 4-4-06 1600 |
| 3728 #2A | 4-5-06 0930 | TR Edmundson | 4-5-06 0930 |
| TR Edmundson | 4-5-06 1500 | FED EX | |
| FED EX | 4/6/06 0910 | | 4/6/06 0910 |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS** 04/04/06

~~(2) addition to item # 2. Run gross alpha and gross beta on all available material.~~

(1) ICP Metals - 6010TR (Client List) {Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Vanadium}; ICP Metals - 6010A (Add-on) {Titanium, Uranium, Zinc, Zirconium}; Mercury - 7471 - (CV)

~~(2) Gamma Spectroscopy (TCL List) {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}~~

04/04/06

Personnel not available to relinquish samples from 3728 Ref # 2A on 4/5/06

**Matrix ***

S=Soil
Sd=Sediment
SO=Solid
Sl=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
Wi=Wipe
L=Liquid
V=Vegetation
X=Other

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

BHI-EE-011 (08/29/2005)

## Appendix 5

## Data Validation Supporting Documentation

# GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

| VALIDATION LEVEL: | A | B | C | D | E |
|---|---|---|---|---|---|
| PROJECT: 100-B-14:2 | | | DATA PACKAGE: K0286 | | |
| VALIDATOR: TLI | | LAB: LLI | | DATE: 6/12/06 | |
| | | | SDG: K0286 | | |

| ANALYSES PERFORMED | | | | | |
|---|---|---|---|---|---|
| Anions/IC | TOC | TOX | TPH-418.1 | Oil and Grease | Alkalinity |
| Ammonia | BOD/COD | Chloride | Chromium-VI | pH | $NO_3/NO_2$ |
| Sulfate | TDS | TKN | Phosphate | | |
| | | | | | |

| SAMPLES/MATRIX | | | | | |
|---|---|---|---|---|---|
| J11KB3 | J11KB4 | J11KB5 | J11KB6 | J11KB7 | J11KB8 |
| J11KB9 | J11KC0 | J11KC1 | J11KC2 | J11KC3 | J11KD3 |
| J11KD4 | J11KD5 | J11KD6 | | | |
| | | | | | |
| | | | | | Soil |

## 1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments: _____

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

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

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

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

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

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

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

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

Comments: _____

# GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

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

ICB and CCB checks performed for all applicable analyses? (Levels D, E) ..... Yes No N/A

ICB and CCB results acceptable? (Levels D, E) ..... Yes No N/A

Laboratory blanks analyzed? ..... Yes No N/A

Laboratory blank results acceptable? ..... Yes No N/A

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

Field blank results acceptable? (Levels C, D, E) ..... Yes No N/A

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

Comments: no FB

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

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

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

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

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

LCS/BSS samples analyzed? ..... Yes No N/A

LCS/BSS results acceptable? ..... Yes No N/A

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

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

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

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

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

Comments: no PAS

# GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments:

## 6. HOLDING TIMES (all levels)

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

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

Comments:

# GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

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

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

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

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

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

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

Comments:

## Appendix 6

## Additional Documentation Requested by Client

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 04/12/06

CLIENT: TNUHANFORD RC-025 K0286

LVL LOT #: 0604L698

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| BLANK10 | 06LVI023-MB1 | Chromium VI | 0.20 u | MG/KG | 0.20 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 04/12/06

CLIENT: TNUHANFORD RC-025 K0286

LVL LOT #: 0604L698

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

| SAMPLE | SITE ID | ANALYTE | SPIKED SAMPLE | INITIAL RESULT | SPIKED AMOUNT | %RECOV | DILUTION FACTOR(SPK) |
|---|---|---|---|---|---|---|---|
| -001 | J11KB3 | Soluble Chromium VI | 4.2 | 0.22u | 4.4 | 92.7 | 1.0 |
| | | Insoluble Chromium VI | 1320 | 0.22u | 1240 | 106.3 | 100 |
| BLANK10 | 06LVI023-MB1 | Soluble Chromium VI | 4.0 | 0.20u | 4.0 | 98.9 | 1.0 |
| | | Insoluble Chromium VI | 1270 | 0.20u | 1170 | 109.1 | 100 |

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 04/12/06

CLIENT: TNUHANFORD RC-025 K0286

LVL LOT #: 0604L698

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

| SAMPLE | SITE ID | ANALYTE | INITIAL RESULT | REPLICATE | RPD | DILUTION FACTOR (REP) |
|---|---|---|---|---|---|---|
| -001REP | J11KB3 | Chromium VI | 0.22u | 0.26 | ~~NC~~ 60.3 | 1.0 |
| -016REP | J11KD6 | % Solids | 94.0 | 93.7 | 0.34 | 1.0 |

Date: 28 June 2006
To: Washington Closure Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100 BC Remaining Pipelines & Sewers – Soil Full Protocol - Waste Subsite 100-B-14:2
Subject: Radiochemistry - Data Package No. K0286-EB

## INTRODUCTION

This memo presents the results of data validation on Data Package No. K0286 prepared by Eberline Services (EB). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

| Sample ID | Sample Date | Media | Validation | Date |
|---|---|---|---|---|
| J11KB3 | 4/4/06 | Soil | C | See note 1 |
| J11KB4 | 4/4/06 | Soil | C | See note 1 |
| J11KB5 | 4/4/06 | Soil | C | See note 1 |
| J11KB6 | 4/4/06 | Soil | C | See note 1 |
| J11KB7 | 4/4/06 | Soil | C | See note 1 |
| J11KB8 | 4/4/06 | Soil | C | See note 1 |
| J11KB9 | 4/4/06 | Soil | C | See note 1 |
| J11KC0 | 4/4/06 | Soil | C | See note 1 |
| J11KC1 | 4/4/06 | Soil | C | See note 1 |
| J11KC2 | 4/4/06 | Soil | C | See note 1 |
| J11KC3 | 4/4/06 | Soil | C | See note 1 |
| J11KD3 | 4/4/06 | Soil | C | See note 1 |
| J11KD4 | 4/4/06 | Soil | C | See note 1 |
| J11KD5 | 4/4/06 | Soil | C | See note 1 |
| J11KD6 | 4/4/06 | Soil | C | See note 1 |

1 – Gamma spectroscopy, gross alpha, gross beta, tritium and total strontium.

Data validation was conducted in accordance with the Washington Closure Hanford Incorporated (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, February 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 Data Requested by Client

## DATA QUALITY PARAMETERS

- **Holding Times**

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

All holding times were acceptable.

- **Preparation (Method) Blanks**

Laboratory Blanks

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

All blank results were acceptable.

Field (Equipment) Blank

No equipment blanks were submitted for analysis.

- **Accuracy**

Accuracy is evaluated from laboratory control sample (LCS) or blank spike sample (BSS) batch samples and spiked samples from the analytical batch. Measured activities are compared to the known added amounts. The acceptable LCS or BSS and matrix spike (MS) recovery range is 70-130%. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, or not qualified, depending on the activity of the individual sample. Results are rejected for LCS/BSS recoveries of less than 30% and tracer recoveries of less than 20%, and tracer recoveries of greater than 115% for detected results.

All accuracy results were acceptable.

- **Laboratory Duplicates**

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

Due to an RPD outside QC limits (39%), all thorium-232 results were qualified as estimates and flagged "J".

All other duplicate results were acceptable.

Field Duplicates

One set of field duplicates (J11KB6/J11KC3) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. The RPD for thorium-232 was outside QC limits (55%). Under the WCH statement of work, no qualification is required. All other field duplicate results were acceptable.

- **Detection Levels**

Reported analytical detection levels for undetected analytes are compared against the remaining waste sites RQLs to ensure that laboratory detection levels meet the required criteria. Seventy-four analytes exceeded the RQL. Under the WCH statement of work, no qualification is required.

- **Completeness**

Data package No. K0286 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 an RPD outside QC limits (39%), all thorium-232 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.

Seventy-four analytes exceeded the RQL. Under the WCH statement of work, no qualification is required.

## REFERENCES

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

DOE/RL-96-22, Rev. 4, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, February 2005.

## Appendix 1

## Glossary of Data Reporting Qualifiers

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

U - Indicates the compound or analyte was analyzed for and not detected above the minimum detectable activity (MDA) in the sample. The value reported is the sample result corrected for sample dilution and moisture content by the laboratory. The data is usable for decision making purposes.

UJ - Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate, but is usable for decision making purposes.

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

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

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

## Appendix 2

## Summary of Data Qualification

RADIOCHEMISTRY DATA QUALIFICATION SUMMARY*

| SDG: K0286 | REVIEWER: TLI | Project: 100-B-14:2 | PAGE 1 OF 1 |
|---|---|---|---|
| COMMENTS: | | | |
| COMPOUND | QUALIFIER | SAMPLES AFFECTED | REASON |
| Thorium-232 | 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: WASHINGTON CLOSURE HANFORD | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Laboratory: EB | | | | | | | | | | | | | | | | | | | |
| Case | SDG: K0286 | | | | | | | | | | | | | | | | | | |
| Sample Number | | J11KB3 | | J11KB4 | | J11KB5 | | J11KB6 | | J11KB7 | | J11KB8 | | J11KB9 | | J11KC0 | | J11KC1 | |
| Remarks | | | | | | | | Main | | | | | | | | | | | |
| Sample Date | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | |
| Radiochemistry | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| Gross alpha | | 4.82 | U | 1.86 | U | 4.35 | | 6.75 | | 4.34 | U | 9.17 | | 5.90 | | 0.948 | U | 0.581 | U |
| Gross beta | | 22.3 | | 13.8 | | 8.32 | U | 19.1 | | 10.2 | | 15.3 | | 17.6 | | 15.1 | | 18.4 | |
| Tritium | 10 | -0.076 | U | -0.130 | U | -0.140 | U | -0.028 | U | -0.024 | U | -0.085 | U | 0.110 | U | 0.094 | U | -0.005 | U |
| Total strontium | 1 | -0.051 | U | -0.052 | U | -0.135 | U | -0.039 | U | 0.090 | U | 0.085 | U | 0.018 | U | -0.033 | U | -0.041 | U |
| Potassium-40 | | 8.39 | | 8.83 | | 6.75 | | 10.3 | | 7.29 | | 7.68 | | 8.45 | | 11.0 | | 6.16 | |
| Cobalt 60 | 0.05 | U | U* | U | U* | U | U* | U | U* | U | U* | U | U* | U | U* | U | U* | U | U* |
| Cesium 137 | 0.05 | U | U* | U | U* | U | U* | U | U* | U | U* | U | U* | U | U* | 0.077 | | U | U* |
| Radium-226 | | 0.294 | | 0.419 | | 0.280 | | 0.292 | | 0.185 | | 0.248 | | 0.404 | | 0.346 | | 0.314 | |
| Radium-228 | | 0.489 | | 0.551 | | 0.302 | | 0.479 | | 0.404 | | 0.546 | | 0.648 | | 0.574 | | 0.464 | |
| Europium 152 | 0.1 | U | U* | U | U* | U | U* | U | U* | U | U* | U | U* | U | U* | U | U* | U | U* |
| Europium 154 | 0.1 | U | U* | U | U* | U | U* | U | U* | U | U* | U | U* | U | U* | U | U* | U | U* |
| Europium 155 | 0.1 | U | U* | U | U* | U | U* | U | U* | U | U* | U | U* | U | U* | U | U* | U | U* |
| Thorium-228 | | 0.354 | | 0.516 | | 0.460 | | 0.696 | | 0.265 | | 0.341 | | 0.498 | | 0.408 | | 0.463 | |
| Thorium-232 | | 0.489 | J | 0.551 | J | 0.302 | UJ | 0.479 | J | 0.404 | J | 0.546 | J | 0.680 | J | 0.574 | J | 0.464 | J |
| Uranium-235(gea) | | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| Uranium-238(gea) | | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| Americium-241(gea) | | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |

000010

* - RQL exceeded

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

| Project: WASHINGTON CLOSURE HANFORD | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Laboratory: EB | | | | | | | | | | | | | |
| Case | SDG: K0286 | | | | | | | | | | | | |
| Sample Number | | J11KC2 | | J11KC3 | | J11KD3 | | J11KD4 | | J11KD5 | | J11KD6 | |
| Remarks | | | | Duplicate | | | | | | | | | |
| Sample Date | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | |
| Radiochemistry | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| Gross alpha | | 7.72 | | 8.50 | | 6.32 | U | 4.20 | | 4.37 | U | 6.36 | |
| Gross beta | | 14.6 | | 19.8 | | 15.6 | | 11.9 | | 20.1 | | 19.8 | |
| Tritium | 10 | 0.239 | U | 0.151 | U | -0.105 | U | 0.296 | U | 0.045 | U | -0.114 | U |
| Total strontium | 1 | 0.114 | U | -0.045 | U | NA | | NA | | NA | | NA | |
| Potassium-40 | | 12.2 | | 8.82 | | 9.81 | | 11.6 | | 9.15 | | 9.42 | |
| Cobalt 60 | 0.05 | U | U* | U | U* | U | U* | U | U* | U | U* | U | U* |
| Cesium 137 | 0.05 | U | U* | U | U* | U | U* | U | U* | U | U* | U | U* |
| Radium-226 | | 0.431 | | 0.377 | | 0.324 | | 0.455 | | 0.258 | | 0.349 | |
| Radium-228 | | 0.909 | | 0.835 | | 0.546 | | U | U | 0.575 | | 0.501 | |
| Europium 152 | 0.1 | U | U* | U | U* | U | U* | U | U* | U | U* | U | U* |
| Europium 154 | 0.1 | U | U* | U | U* | U | U* | U | U* | U | U* | U | U* |
| Europium 155 | 0.1 | U | U* | U | U* | U | U* | U | U* | U | U* | U | U* |
| Thorium-228 | | 0.742 | | 0.589 | | 0.490 | | 0.450 | | 0.566 | | 0.509 | |
| Thorium-232 | | 0.909 | J | 0.835 | J | 0.546 | J | U | UJ | 0.575 | J | 0.501 | J |
| Uranium-235(gea) | | U | U | U | U | U | U | U | U | U | U | U | U |
| Uranium-238(gea) | | U | U | U | U | U | U | U | U | U | U | U | U |
| Americium-241(gea) | | U | U | U | U | U | U | U | U | U | U | U | U |

000011

* - RQL exceeded

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

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0286

R604022-01 J11KB3

## DATA SHEET

| | | | | | |
|---|---|---|---|---|---|
| SDG | 7413 | Client/Case no | Hanford | SDG K0286 | |
| Contact | Melissa C. Mannion | Contract | No. 630 | | |
| Lab sample id | R604022-01 | Client sample id | J11KB3 | | |
| Dept sample id | 7413-001 | Location/Matrix | 100-B-14:2(115-B) Area 5 | SOLID | |
| Received | 04/06/06 | Collected/Weight | 04/04/06 10:15 | 1107 g | |
| % solids | 93.7 | Custody/SAF No | RC-025-004 | RC-025 | |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Gross Alpha | 12587-46-1 | 4.82 | 3.9 | 5.4 | 10 | U | 93A |
| Gross Beta | 12587-47-2 | 22.3 | 4.7 | 5.9 | 15 | | 93B |
| Tritium | 10028-17-8 | -0.076 | 0.22 | 0.37 | 400 | U | H |
| Total Strontium | SR-RAD | -0.051 | 0.15 | 0.32 | 1.0 | U | SR |
| Potassium 40 | 13966-00-2 | 8.39 | 2.0 | 0.84 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.093 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.077 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | 0.294 | 0.11 | 0.12 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.489 | 0.33 | 0.34 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.18 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.21 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.18 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.354 | 0.074 | 0.080 | | | GAM |
| Thorium 232 | TH-232 | 0.489 | 0.33 | 0.34 | | J | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.23 | | U | GAM |
| Uranium 238 | U-238 | U | | 9.4 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.24 | | U | GAM |

100BC Remain.Piplns&Sewers-SoilFullP

K
6/23/06

| | |
|---|---|
| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 05/11/06 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0286

R604022-02 J11KB4

## DATA SHEET

| | | | | | |
|---|---|---|---|---|---|
| SDG | 7413 | Client/Case no | Hanford | SDG K0286 | |
| Contact | Melissa C. Mannion | Contract | No. 630 | | |
| Lab sample id | R604022-02 | Client sample id | J11KB4 | | |
| Dept sample id | 7413-002 | Location/Matrix | 100-B-14:2(115-B) Area 5 | SOLID | |
| Received | 04/06/06 | Collected/Weight | 04/04/06 10:20 | 1161 g | |
| % solids | 94.8 | Custody/SAF No | RC-025-004 | RC-025 | |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Gross Alpha | 12587-46-1 | 1.86 | 2.8 | 4.4 | 10 | U | 93A |
| Gross Beta | 12587-47-2 | 13.8 | 6.7 | 10 | 15 | | 93B |
| Tritium | 10028-17-8 | -0.130 | 0.21 | 0.36 | 400 | U | H |
| Total Strontium | SR-RAD | -0.052 | 0.14 | 0.31 | 1.0 | U | SR |
| Potassium 40 | 13966-00-2 | 8.83 | 1.3 | 0.53 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.068 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.067 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | 0.419 | 0.13 | 0.14 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.551 | 0.28 | 0.32 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.16 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.25 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.18 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.516 | 0.079 | 0.087 | | | GAM |
| Thorium 232 | TH-232 | 0.551 | 0.28 | 0.32 | | J | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.26 | | U | GAM |
| Uranium 238 | U-238 | U | | 10 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.19 | | U | GAM |

100BC Remain.Piplns&Sewers-SoilFullP

K 6/23/06

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| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 05/11/06 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0286

R604022-03 J11KB5

## DATA SHEET

| | | | |
|---|---|---|---|
| SDG | 7413 | Client/Case no | Hanford SDG K0286 |
| Contact | Melissa C. Mannion | Contract | No. 630 |
| Lab sample id | R604022-03 | Client sample id | J11KB5 |
| Dept sample id | 7413-003 | Location/Matrix | 100-B-14:2(115-B) Area 5 SOLID |
| Received | 04/06/06 | Collected/Weight | 04/04/06 10:45 1240 g |
| % solids | 95.1 | Custody/SAF No | RC-025-004 RC-025 |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Gross Alpha | 12587-46-1 | 4.35 | 3.3 | 4.3 | 10 | | 93A |
| Gross Beta | 12587-47-2 | 8.32 | 6.8 | 11 | 15 | U | 93B |
| Tritium | 10028-17-8 | -0.140 | 0.21 | 0.36 | 400 | U | H |
| Total Strontium | SR-RAD | -0.135 | 0.16 | 0.37 | 1.0 | U | SR |
| Potassium 40 | 13966-00-2 | 6.75 | 1.8 | 0.82 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.090 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.071 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | 0.280 | 0.14 | 0.13 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.302 | 0.27 | 0.31 | 0.20 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.15 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.22 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.17 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.460 | 0.093 | 0.099 | | | GAM |
| Thorium 232 | TH-232 | 0.302 | 0.27 | 0.31 | | U J | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.22 | | U | GAM |
| Uranium 238 | U-238 | U | | 8.2 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.23 | | U | GAM |

100BC Remain.Piplns&Sewers-SoilFullP

6/23/06

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| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 05/11/06 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0286

R604022-04 J11KB6

## DATA SHEET

| | | | | |
|---|---|---|---|---|
| SDG | 7413 | Client/Case no | Hanford | SDG_K0286 |
| Contact | Melissa C. Mannion | Contract | No. 630 | |
| Lab sample id | R604022-04 | Client sample id | J11KB6 | |
| Dept sample id | 7413-004 | Location/Matrix | 100-B-14:2(115-B) Area 5 | SOLID |
| Received | 04/06/06 | Collected/Weight | 04/04/06 10:50 | 1020 g |
| % solids | 93.4 | Custody/SAF No | RC-025-004 | RC-025 |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Gross Alpha | 12587-46-1 | 6.75 | 4.0 | 4.7 | 10 | | 93A |
| Gross Beta | 12587-47-2 | 19.1 | 4.3 | 5.5 | 15 | | 93B |
| Tritium | 10028-17-8 | -0.028 | 0.21 | 0.36 | 400 | U | H |
| Total Strontium | SR-RAD | -0.039 | 0.13 | 0.28 | 1.0 | U | SR |
| Potassium 40 | 13966-00-2 | 10.3 | 1.2 | 0.54 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.065 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.071 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | 0.292 | 0.13 | 0.14 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.479 | 0.29 | 0.32 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.16 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.25 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.16 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.696 | 0.11 | 0.12 | | | GAM |
| Thorium 232 | TH-232 | 0.479 | 0.29 | 0.32 | | J | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.26 | | U | GAM |
| Uranium 238 | U-238 | U | | 7.9 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.26 | | U | GAM |

100BC Remain.Piplns&Sewers-SoilFullP

6/23/06

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| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 05/11/06 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0286

R604022-05 J11KB7

## DATA SHEET

| | | | | | |
|---|---|---|---|---|---|
| SDG | 7413 | Client/Case no | Hanford | SDG K0286 | |
| Contact | Melissa C. Mannion | Contract | No. 630 | | |
| Lab sample id | R604022-05 | Client sample id | J11KB7 | | |
| Dept sample id | 7413-005 | Location/Matrix | 100-B-14:2(115-B) Area 5 | SOLID | |
| Received | 04/06/06 | Collected/Weight | 04/04/06 12:30 | 1076 g | |
| % solids | 94.1 | Custody/SAF No | RC-025-004 | RC-025 | |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Gross Alpha | 12587-46-1 | 4.34 | 3.6 | 4.9 | 10 | U | 93A |
| Gross Beta | 12587-47-2 | 10.2 | 4.3 | 6.5 | 15 | | 93B |
| Tritium | 10028-17-8 | -0.024 | 0.21 | 0.37 | 400 | U | H |
| Total Strontium | SR-RAD | 0.090 | 0.15 | 0.29 | 1.0 | U | SR |
| Potassium 40 | 13966-00-2 | 7.29 | 1.8 | 0.60 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.082 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.062 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | 0.185 | 0.11 | 0.11 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.404 | 0.25 | 0.25 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.14 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.22 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.16 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.265 | 0.066 | 0.070 | | | GAM |
| Thorium 232 | TH-232 | 0.404 | 0.25 | 0.25 | | J | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.21 | | U | GAM |
| Uranium 238 | U-238 | U | | 7.1 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.22 | | U | GAM |

100BC Remain.Piplns&Sewers-SoilFullP

K 6/23/06

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| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 05/11/06 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0286

R604022-06 J11KB8

## DATA SHEET

| | | | | | |
|---|---|---|---|---|---|
| SDG | 7413 | Client/Case no | Hanford | SDG K0286 | |
| Contact | Melissa C. Mannion | Contract | No. 630 | | |
| Lab sample id | R604022-06 | Client sample id | J11KB8 | | |
| Dept sample id | 7413-006 | Location/Matrix | 100-B-14:2(115-B) Area 5 | SOLID | |
| Received | 04/06/06 | Collected/Weight | 04/04/06 12:35 | 1034 g | |
| % solids | 93.3 | Custody/SAF No | RC-025-004 | RC-025 | |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Gross Alpha | 12587-46-1 | 9.17 | 4.1 | 3.9 | 10 | | 93A |
| Gross Beta | 12587-47-2 | 15.3 | 4.0 | 5.4 | 15 | | 93B |
| Tritium | 10028-17-8 | -0.085 | 0.21 | 0.37 | 400 | U | H |
| Total Strontium | SR-RAD | 0.085 | 0.15 | 0.29 | 1.0 | U | SR |
| Potassium 40 | 13966-00-2 | 7.68 | 1.7 | 0.62 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.077 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.067 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | 0.248 | 0.14 | 0.14 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.546 | 0.28 | 0.27 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.15 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.20 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.17 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.341 | 0.067 | 0.071 | | | GAM |
| Thorium 232 | TH-232 | 0.546 | 0.28 | 0.27 | | J | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.22 | | U | GAM |
| Uranium 238 | U-238 | U | | 7.8 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.21 | | U | GAM |

100BC Remain.Piplns&Sewers-SoilFullP

6/23/06

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| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 05/11/06 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0286

R604022-07 J11KB9

## DATA SHEET

| | | | | | |
|---|---|---|---|---|---|
| SDG | 7413 | Client/Case no | Hanford | SDG K0286 | |
| Contact | Melissa C. Mannion | Contract | No. 630 | | |
| Lab sample id | R604022-07 | Client sample id | J11KB9 | | |
| Dept sample id | 7413-007 | Location/Matrix | 100-B-14:2(115-B) Area 5 | SOLID | |
| Received | 04/06/06 | Collected/Weight | 04/04/06 12:40 | 1125 g | |
| % solids | 93.2 | Custody/SAF No | RC-025-004 | RC-025 | |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Gross Alpha | 12587-46-1 | 5.90 | 3.7 | 4.4 | 10 | | 93A |
| Gross Beta | 12587-47-2 | 17.6 | 4.3 | 5.6 | 15 | | 93B |
| Tritium | 10028-17-8 | 0.110 | 0.22 | 0.36 | 400 | U | H |
| Total Strontium | SR-RAD | 0.018 | 0.16 | 0.31 | 1.0 | U | SR |
| Potassium 40 | 13966-00-2 | 8.45 | 1.3 | 0.76 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.078 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.065 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | 0.404 | 0.11 | 0.10 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.648 | 0.31 | 0.33 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.19 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.19 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.18 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.498 | 0.081 | 0.089 | | | GAM |
| Thorium 232 | TH-232 | 0.648 | 0.31 | 0.33 | | J | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.29 | | U | GAM |
| Uranium 238 | U-238 | U | | 8.2 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.37 | | U | GAM |

100BC Remain.Piplns&Sewers-SoilFullP

6/23/06

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| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 05/11/06 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0286

R604022-08 J11KC0

## DATA SHEET

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|---|---|---|---|---|---|
| SDG | 7413 | Client/Case no | Hanford | SDG K0286 | |
| Contact | Melissa C. Mannion | Contract | No. 630 | | |
| Lab sample id | R604022-08 | Client sample id | J11KC0 | | |
| Dept sample id | 7413-008 | Location/Matrix | 100-B-14:2(115-B) Area 5 | SOLID | |
| Received | 04/06/06 | Collected/Weight | 04/04/06 10:45 | 1162 g | |
| % solids | 94.7 | Custody/SAF No | RC-025-004 | RC-025 | |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Gross Alpha | 12587-46-1 | 0.948 | 3.8 | 5.9 | 10 | U | 93A |
| Gross Beta | 12587-47-2 | 15.1 | 4.1 | 5.7 | 15 | | 93B |
| Tritium | 10028-17-8 | 0.094 | 0.21 | 0.35 | 400 | U | H |
| Total Strontium | SR-RAD | -0.033 | 0.15 | 0.31 | 1.0 | U | SR |
| Potassium 40 | 13966-00-2 | 11.0 | 2.5 | 0.69 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.068 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | 0.077 | 0.055 | 0.063 | 0.10 | | GAM |
| Radium 226 | 13982-63-3 | 0.346 | 0.14 | 0.13 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.574 | 0.27 | 0.26 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.15 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.19 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.18 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.408 | 0.075 | 0.072 | | | GAM |
| Thorium 232 | TH-232 | 0.574 | 0.27 | 0.26 | | J | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.22 | | U | GAM |
| Uranium 238 | U-238 | U | | 6.7 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.21 | | U | GAM |

100BC Remain.Piplns&Sewers-SoilFullP

6/23/06

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| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 05/11/06 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0286

R604022-09 J11KC1

## DATA SHEET

| | | | |
|---|---|---|---|
| SDG | 7413 | Client/Case no | Hanford SDG K0286 |
| Contact | Melissa C. Mannion | Contract | No. 630 |
| Lab sample id | R604022-09 | Client sample id | J11KC1 |
| Dept sample id | 7413-009 | Location/Matrix | 100-B-14:2(115-B) Area 5 SOLID |
| Received | 04/06/06 | Collected/Weight | 04/04/06 13:45 1158 g |
| % solids | 94.8 | Custody/SAF No | RC-025-004 RC-025 |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Gross Alpha | 12587-46-1 | 0.581 | 2.6 | 4.9 | 10 | U | 93A |
| Gross Beta | 12587-47-2 | 18.4 | 4.2 | 5.6 | 15 | | 93B |
| Tritium | 10028-17-8 | -0.005 | 0.22 | 0.38 | 400 | U | H |
| Total Strontium | SR-RAD | -0.041 | 0.13 | 0.26 | 1.0 | U | SR |
| Potassium 40 | 13966-00-2 | 6.16 | 1.7 | 0.67 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.083 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.059 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | 0.314 | 0.12 | 0.11 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.464 | 0.20 | 0.20 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.14 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.20 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.16 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.463 | 0.094 | 0.096 | | | GAM |
| Thorium 232 | TH-232 | 0.464 | 0.20 | 0.20 | | J | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.19 | | U | GAM |
| Uranium 238 | U-238 | U | | 7.8 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.19 | | U | GAM |

100BC Remain.Piplns&Sewers-SoilFullP

12/27/06

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| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 05/11/06 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0286

R604022-10 J11KC2

## DATA SHEET

| | | | |
|---|---|---|---|
| SDG | 7413 | Client/Case no | Hanford SDG K0286 |
| Contact | Melissa C. Mannion | Contract | No. 630 |
| Lab sample id | R604022-10 | Client sample id | J11KC2 |
| Dept sample id | 7413-010 | Location/Matrix | 100-B-14:2(115-B) Area 5 SOLID |
| Received | 04/06/06 | Collected/Weight | 04/04/06 13:55 892 g |
| % solids | 85.1 | Custody/SAF No | RC-025-004 RC-025 |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Gross Alpha | 12587-46-1 | 7.72 | 4.4 | 5.8 | 10 | | 93A |
| Gross Beta | 12587-47-2 | 14.6 | 4.0 | 5.7 | 15 | | 93B |
| Tritium | 10028-17-8 | 0.239 | 0.24 | 0.40 | 400 | U | H |
| Total Strontium | SR-RAD | 0.114 | 0.18 | 0.33 | 1.0 | U | SR |
| Potassium 40 | 13966-00-2 | 12.2 | 1.6 | 0.62 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.094 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.098 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | 0.431 | 0.15 | 0.17 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.909 | 0.33 | 0.33 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.20 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.31 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.22 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.742 | 0.096 | 0.083 | | | GAM |
| Thorium 232 | TH-232 | 0.909 | 0.33 | 0.33 | | J | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.33 | | U | GAM |
| Uranium 238 | U-238 | U | | 12 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.23 | | U | GAM |

100BC Remain.Piplns&Sewers-SoilFullP

6/23/06

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| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 05/11/06 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0286

R604022-11 J11KC3

## DATA SHEET

| | | | | | |
|---|---|---|---|---|---|
| SDG | 7413 | Client/Case no | Hanford | SDG_K0286 | |
| Contact | Melissa C. Mannion | Contract | No. 630 | | |
| Lab sample id | R604022-11 | Client sample id | J11KC3 | | |
| Dept sample id | 7413-011 | Location/Matrix | 100-B-14:2(115-B) Area 5 | SOLID | |
| Received | 04/06/06 | Collected/Weight | 04/04/06 10:55 | 1088 g | |
| % solids | 93.0 | Custody/SAF No | RC-025-004 | RC-025 | |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Gross Alpha | 12587-46-1 | 8.50 | 4.6 | 5.8 | 10 | | 93A |
| Gross Beta | 12587-47-2 | 19.8 | 5.8 | 8.9 | 15 | | 93B |
| Tritium | 10028-17-8 | 0.151 | 0.16 | 0.27 | 400 | U | H |
| Total Strontium | SR-RAD | -0.045 | 0.12 | 0.25 | 1.0 | U | SR |
| Potassium 40 | 13966-00-2 | 8.82 | 1.6 | 1.1 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.082 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.097 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | 0.377 | 0.17 | 0.19 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.835 | 0.37 | 0.35 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.19 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.26 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.21 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.589 | 0.13 | 0.14 | | | GAM |
| Thorium 232 | TH-232 | 0.835 | 0.37 | 0.35 | | J | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.31 | | U | GAM |
| Uranium 238 | U-238 | U | | 11 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.22 | | U | GAM |

100BC Remain.Piplns&Sewers-SoilFullP

6/23/06

| | |
|---|---|
| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 05/11/06 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0286

R604022-12 J11KD3

## DATA SHEET

| | | | |
|---|---|---|---|
| SDG | 7413 | Client/Case no | Hanford SDG K0286 |
| Contact | Melissa C. Mannion | Contract | No. 630 |
| Lab sample id | R604022-12 | Client sample id | J11KD3 |
| Dept sample id | 7413-012 | Location/Matrix | 100-B-14:2(115-B)BCL Ar5 SOLID |
| Received | 04/06/06 | Collected/Weight | 04/04/06 09:15 974 g |
| % solids | 95.6 | Custody/SAF No | RC-025-006 RC-025 |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Gross Alpha | 12587-46-1 | 6.32 | 4.7 | 6.7 | 10 | U | 93A |
| Gross Beta | 12587-47-2 | 15.6 | 5.6 | 8.6 | 15 | | 93B |
| Tritium | 10028-17-8 | -0.105 | 0.17 | 0.25 | 400 | U | H |
| Potassium 40 | 13966-00-2 | 9.81 | 1.3 | 0.096 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.070 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.074 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | 0.324 | 0.11 | 0.12 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.546 | 0.32 | 0.32 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.19 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.23 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.18 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.490 | 0.074 | 0.080 | | | GAM |
| Thorium 232 | TH-232 | 0.546 | 0.32 | 0.32 | | J | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.27 | | U | GAM |
| Uranium 238 | U-238 | U | | 9.4 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.27 | | U | GAM |

100BC Remain.Piplns&Sewers-SoilFullP

6/23/06

| | |
|---|---|
| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 05/11/06 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0286

R604022-13 J11KD4

## DATA SHEET

| | | | | | |
|---|---|---|---|---|---|
| SDG | 7413 | Client/Case no | Hanford | SDG K0286 | |
| Contact | Melissa C. Mannion | Contract | No. 630 | | |
| Lab sample id | R604022-13 | Client sample id | J11KD4 | | |
| Dept sample id | 7413-013 | Location/Matrix | 100-B-14:2(115-B)BCL Ar5 | SOLID | |
| Received | 04/06/06 | Collected/Weight | 04/04/06 09:25 | 933 g | |
| % solids | 94.5 | Custody/SAF No | RC-025-006 | RC-025 | |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Gross Alpha | 12587-46-1 | 4.20 | 3.5 | 5.1 | 10 | U | 93A |
| Gross Beta | 12587-47-2 | 11.9 | 3.8 | 5.4 | 15 | | 93B |
| Tritium | 10028-17-8 | 0.296 | 0.20 | 0.27 | 400 | | H |
| Potassium 40 | 13966-00-2 | 11.6 | 2.8 | 0.66 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.092 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.17 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | 0.455 | 0.14 | 0.12 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | U | | 0.64 | 0.20 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.19 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.26 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.24 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.450 | 0.092 | 0.097 | | | GAM |
| Thorium 232 | TH-232 | U | | 0.64 | | U J | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.34 | | U | GAM |
| Uranium 238 | U-238 | U | | 9.0 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.30 | | U | GAM |

100BC Remain.Piplns&Sewers-SoilFullP

VC
6/23/06

| | |
|---|---|
| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 05/11/06 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0286

R604022-14 J11KD5

## DATA SHEET

| | | | |
|---|---|---|---|
| SDG | 7413 | Client/Case no | Hanford SDG K0286 |
| Contact | Melissa C. Mannion | Contract | No. 630 |
| Lab sample id | R604022-14 | Client sample id | J11KD5 |
| Dept sample id | 7413-014 | Location/Matrix | 100-B-14:2(115-B)BCL Ar5 SOLID |
| Received | 04/06/06 | Collected/Weight | 04/04/06 09:30 870 g |
| % solids | 93.6 | Custody/SAF No | RC-025-006 RC-025 |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Gross Alpha | 12587-46-1 | 4.37 | 3.7 | 5.3 | 10 | U | 93A |
| Gross Beta | 12587-47-2 | 20.1 | 4.6 | 5.9 | 15 | | 93B |
| Tritium | 10028-17-8 | 0.045 | 0.16 | 0.26 | 400 | U | H |
| Potassium 40 | 13966-00-2 | 9.15 | 2.0 | 0.87 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.082 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.079 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | 0.258 | 0.16 | 0.15 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.575 | 0.31 | 0.33 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.18 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.23 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.20 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.566 | 0.11 | 0.12 | | | GAM |
| Thorium 232 | TH-232 | 0.575 | 0.31 | 0.33 | | J | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.24 | | U | GAM |
| Uranium 238 | U-238 | U | | 9.0 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.26 | | U | GAM |

100BC Remain.Piplns&Sewers-SoilFullP

K
6/23/06

| | |
|---|---|
| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 05/11/06 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0286

R604022-15 J11KD6

## DATA SHEET

| | | | | | |
|---|---|---|---|---|---|
| SDG | 7413 | Client/Case no | Hanford | SDG K0286 | |
| Contact | Melissa C. Mannion | Contract | No. 630 | | |
| Lab sample id | R604022-15 | Client sample id | J11KD6 | | |
| Dept sample id | 7413-015 | Location/Matrix | 100-B-14:2(115-B)BCL Ar5 | SOLID | |
| Received | 04/06/06 | Collected/Weight | 04/04/06 09:35 | 1015 g | |
| % solids | 94.4 | Custody/SAF No | RC-025-006 | RC-025 | |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Gross Alpha | 12587-46-1 | 6.36 | 3.8 | 4.5 | 10 | | 93A |
| Gross Beta | 12587-47-2 | 19.8 | 6.9 | 10 | 15 | | 93B |
| Tritium | 10028-17-8 | -0.114 | 0.15 | 0.25 | 400 | U | H |
| Potassium 40 | 13966-00-2 | 9.42 | 2.6 | 0.81 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.081 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.066 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | 0.349 | 0.15 | 0.14 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.501 | 0.31 | 0.31 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.17 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.21 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.19 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.509 | 0.12 | 0.12 | | | GAM |
| Thorium 232 | TH-232 | 0.501 | 0.31 | 0.31 | | J | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.28 | | U | GAM |
| Uranium 238 | U-238 | U | | 8.3 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.26 | | U | GAM |

100BC Remain.Piplns&Sewers-SoilFullP

K
6/23/06

| | |
|---|---|
| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 05/11/06 |

## Appendix 4

## Laboratory Narrative and Chain-of-Custody Documentation

## 1.0 GENERAL

Washington Closure Hanford (WCH) Sample Delivery Group K0286 was composed of fifteen solid (soil) samples designated under SAF No. RC-025 with a Project Designation of: 100-BC Remaining Pipelines and Sewers-Soil Full Protocol.

The samples were received as stated on the Chain-of-Custody documents. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist. The results were transmitted to WCH via e-mail on May 11, 2006.

## 2.0 ANALYSIS NOTES

### 2.1 Gross Alpha/Gross Beta Analysis

No problems were encountered during the course of the analyses.

### 2.2 Tritium Analysis

No problems were encountered during the course of the analyses.

### 2.3 Total Strontium Analysis

No problems were encountered during the course of the analyses.

### 2.4 Gamma Spectroscopy

No problems were encountered during the course of the analyses.

**Case Narrative Certification Statement**

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

Melissa Mannion

**Melissa C. Mannion**
**Senior Program Manager**

5/17/6

**Date**

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-025-004 | Page 1 of 3 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| **Collector** C. Martinez/K Singleton/D. Bowers | **Company Contact** C. Martinez | **Telephone No.** 509-539-2816 | **Project Coordinator** KESSNER, JH | **Price Code** | **Data Turnaround** |
| **Project Designation** 100-BC Remaining Pipelines and Sewers - Soil Full Protocol | **Sampling Location** 100-B-14:2 (115-B) Area 5 K0286 (7413) | | **SAF No.** RC-025 | **Air Quality** ☐ | 21 days |
| **Ice Chest No.** ERC-02-504 | **Field Logbook No.** EL-1585-5 | **COA** RIDB14 2000 | **Method of Shipment** fed ex | | |
| **Shipped To** EBERLINE SERVICES LIONVILLE | **Offsite Property No.** A060327 | | **Bill of Lading/Air Bill No.** SEE OSPC | | |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*none*

**Special Handling and/or Storage**

~~cool 4 degrees centigrade~~

none TRE 4-5-06

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Preservation** | None | Cool 4C | Cool 4C | Cool 4C | None | None | None | Cool 4C | | |
| **Type of Container** | G/P | G/P | aG | aG | G/P | G/P | G/P | aG | | |
| **No. of Container(s)** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| **Volume** | 250g | ~~125g~~ 120mL | 120mL | 120mL | 500mL | 120mL | 120mL | 250mL | | |
| **SAMPLE ANALYSIS** | See item (1) in Special Instructions. | Chromium Hex - 7196 | PCBs - 8082 | Semi-VOA - 8270A (TCL) | See item (2) in Special Instructions. | ~~Carbon-14~~; Tritium - H3 | ~~Nickel-63~~; Strontium-89,90 -- Total Sr | Pesticides - 8081; ~~Chloro-Herbicides - EPA 8151~~ | | |

00000029

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J11KB3 | SOIL | 04/04/06 | 1015 | | | | | ✓ | ✓ | ✓ | | | |
| J11KB4 | SOIL | 04/04/06 | 1020 | | | | | ✓ | ✓ | ✓ | | | |
| J11KB5 | SOIL | 04/04/06 | 1045 | | | | | ✓ | ✓ | ✓ | | | |
| J11KB6 | SOIL | 04/04/06 | 1050 | | | | | ✓ | ✓ | ✓ | | | |
| J11KB7 | SOIL | 04/04/06 | 1330 | | | | | ✓ | ✓ | ✓ | | | |

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

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| Kevin Singleton | 4-4-06 1600 | 3728 Ref 2A | 4-4-06 1600 |
| 3728 #2A | 4-5-06 1030 | T R Edmundson / TR Edmundson | 4-5-06 1030 |
| T R Edmundson / TR Edmundson | 4-5-06 1500 | FED EX | |
| FED EX | | FEDEX | 04/06/06 9:30 |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS**

(2) addition to item # 2. Run gross alpha and gross beta off available material.

(1) ICP Metals - 6010TR (Client List) {Aluminum, Antimony, Arsenic, Barium, ~~Beryllium, Boron~~, Cadmium, ~~Calcium, Chromium~~, Cobalt, Copper, Iron, Lead, ~~Lithium~~, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, ~~Potassium, Selenium~~, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Vanadium}; ICP ~~Metals - 6010A~~ (Add-on) {Titanium, ~~Uranium, Zinc, Zirconium~~}; Mercury - 7471 ~~(CV)~~

(2) Gamma Spectroscopy (TCL List) {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}

Personnel not available to relinquish samples from 3728 Ref # 2A on 4/5/06

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 |

BHI-EE-011 (08/29/2005)

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-025-004 | Page 2 of 3 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| **Collector** C. Martinez/K Singleton/D. Bowers | **Company Contact** C. Martinez | **Telephone No.** 509-539-2816 | **Project Coordinator** KESSNER, JH | **Price Code** | **Data Turnaround** |
| **Project Designation** 100-BC Remaining Pipelines and Sewers - Soil Full Protocol | **Sampling Location** 100-B-14:2 (115-B) Area 5 K0286 (7413) | | **SAF No.** RC-025 | **Air Quality** ☐ | 21 days |
| **Ice Chest No.** ERC-02-504 | **Field Logbook No.** EL-1585-5 | **COA** R10B14 2000 | **Method of Shipment** fed ex | | |
| **Shipped To** EBERLINE SERVICES / LIONVILLE | **Offsite Property No.** A060327 | | **Bill of Lading/Air Bill No.** SEE OSPC | | |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*none*

**Special Handling and/or Storage**

~~cool 4 degrees centigrade~~

None TRE 4-5-06

00030

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Preservation** | None | Cool 4C | Cool 4C | Cool 4C | None | None | None | Cool 4C | | |
| **Type of Container** | G/P | G/P | aG | aG | G/P | G/P | G/P | aG | | |
| **No. of Container(s)** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| **Volume** | 250g | ~~125g~~ 120mL | 120mL | 120mL | 500mL | 120mL | 120mL | 250mL | | |
| **SAMPLE ANALYSIS** | See item (1) in Special Instructions. | Chromium Hex - 7196 | PCBs - 8082 | Semi-VOA - 8270A (TCL) | See item (2) in Special Instructions. | ~~Carbon-14~~; Tritium - H3 | ~~Nickel-63~~; Strontium-89,90 -- Total Sr | Pesticides - 808 ~~Chloro-Herbicides - EPA 8151~~ | | |

04/04/06

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J11KB8 | SOIL | 04/04/06 | 1235 | | | | | ✓ | ✓ | ✓ | | | |
| J11KB9 | SOIL | 04/04/06 | 1240 | | | | | ✓ | ✓ | ✓ | | | |
| J11KC0 | SOIL | 04/04/06 | 1245 | | | | | ✓ | ✓ | ✓ | | | |
| J11KC1 | SOIL | 04/04/06 | 1345 | | | | | ✓ | ✓ | ✓ | | | |
| J11KC2 | SOIL | 04/04/06 | 1355 | | | | | ✓ | ✓ | ✓ | | | |

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

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| Kevin Singleton | 4-4-06 1600 | 3728 Ref 2A | 4-4-06 1600 |
| 3728 #2A | 4-5-06 1030 | T.R. Edmundson | 4-5-06 1030 |
| T.R. Edmundson | 4-5-06 1500 | FED EX | |
| FED EX | | [illegible] | 04/06/06 930 |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS**

(2) addition to item # 2. Run gross alpha and gross beta off available material.

(1) ~~ICP Metals~~ - 6010TR (Client List) {Aluminum, Antimony, Arsenic, Barium, ~~Beryllium, Boron~~, Cadmium, Calcium, ~~Chromium~~, Cobalt, Copper, Iron, Lead, ~~Lithium~~, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, ~~Potassium, Selenium~~, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Vanadium}; ~~ICP Metals - 6010A~~ (Add-on) {Titanium, ~~Uranium, Zinc, Zirconium~~}; Mercury - ~~7471 (CV)~~

(2) Gamma Spectroscopy (TCL List) {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}

Personnel not available to relinquish samples from 3728 Ref #2A on 5/4/06

**Matrix ***

S=Soil
SB=Sediment
SO=Solid
Sl=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
Wi=Wipe
L=Liquid
V=Vegetation
X=Other

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

BHI-EE-011 (08/29/2005)

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-025-004 | Page 3 of 3 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: C. Martinez/K Singleton/D. Bowers | Company Contact: C. Martinez | Telephone No.: 509-539-2816 | Project Coordinator: KESSNER, JH | Price Code | Data Turnaround |
| Project Designation: 100-BC Remaining Pipelines and Sewers - Soil Full Protocol | Sampling Location: 100-B-14:2 (115-B) Area 5 K0286 (7413) | | SAF No.: RC-025 | Air Quality ☐ | 21 days |
| Ice Chest No.: ERC-02-504 | Field Logbook No.: EL-1585-5 | COA: R10R14 2000 | Method of Shipment: fed ex | | |
| Shipped To: EBERLINE SERVICES/ LIONVILLE | Offsite Property No.: A060327 | | Bill of Lading/Air Bill No.: SEE OSPC | | |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*none*

**Special Handling and/or Storage**

~~cool 4 degrees centigrade~~

None TRE 4-5-06

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | None | Cool 4C | Cool 4C | Cool 4C | None | None | None | Cool 4C | | |
| Type of Container | G/P | G/P | aG | aG | G/P | G/P | G/P | aG | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Volume | 250g | ~~125g~~ 120mL | 120mL | 120mL | 500mL | 120mL | 120mL | 250mL | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Chromium Hex - 7196 | PCBs - 8082 | Semi-VOA - 8270A (TCL) | See item (2) in Special Instructions. | ~~Carbon-14~~; Tritium - H3 | ~~Nickel-63~~; Strontium-89,90 -- Total Sr | Pesticides - 8081; ~~Chloro Herbicides - EPA 515.1~~ | | |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | |
| J11KC3 | SOIL | 04/04/06 | 1055 | | | | ✓ | ✓ | ✓ | |
| J11KC4 | SOIL | n/a | n/a | | | | n/a | n/a | n/a | |

000031

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By/Removed From: Kevin Singleton | Date/Time: 4-4-06 1600 | Received By/Stored In: 3728 Ref 2A | Date/Time: 4-4-06 1600 |
| Relinquished By/Removed From: 3728 #2A | Date/Time: 4-5-06 1030 | Received By/Stored In: T.R. Edmundson | Date/Time: 4-5-06 1030 |
| Relinquished By/Removed From: T.R. Edmundson WCH | Date/Time: 4-5-06 1500 | Received By/Stored In: FED EX | Date/Time: |
| Relinquished By/Removed From: FED EX | Date/Time: | Received By/Stored In: | Date/Time: 04/06/06 9:30 |
| Relinquished By/Removed From: | Date/Time: | Received By/Stored In: | Date/Time: |
| Relinquished By/Removed From: | Date/Time: | Received By/Stored In: | Date/Time: |

**SPECIAL INSTRUCTIONS**

(2) addition to item # 2. Run gross alpha and gross beta off available material.

(1) ~~ICP Metals - 6010TR~~ (Client List) {Aluminum, Antimony, Arsenic, Barium, Beryllium, ~~Boron~~, Cadmium, Calcium, ~~Chromium~~, Cobalt, Copper, Iron, Lead, Lithium, ~~Magnesium~~, Manganese, Molybdenum, Nickel, Phosphorus, ~~Potassium~~, ~~Selenium~~, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Vanadium}; ~~ICP Metals - 6010A~~ (Add-on) {Titanium, ~~Uranium~~, ~~Zinc~~, Zirconium}; Mercury - 7471 (CV)

(2) Gamma Spectroscopy (TCL List) {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}

Personnel not available to Relinquish samples from 3728 Ref # 2A on 4/5/06

**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 |

BHI-EE-011 (08/29/2005)

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-025-006 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| **Collector** C. Martinez/K Singleton/D. Bowers | **Company Contact** C. Martinez | **Telephone No.** 509-539-2816 | **Project Coordinator** KESSNER, JH |
| **Project Designation** 100-BC Remaining Pipelines and Sewers - Soil Full Protocol | **Sampling Location** 100-B-14:2 (115-B) BCL Area 5 K0286 (7413) | | **SAF No.** RC-025 |
| **Ice Chest No.** ERC-02-504 | **Field Logbook No.** EL-1585-5 | **COA** R10B142000 | **Method of Shipment** fed ex |
| **Shipped To** EBERLINE SERVICES / LIONVILLE | **Offsite Property No.** A060327 | | **Bill of Lading/Air Bill No.** SEE OSPC |

**Price Code** / **Data Turnaround**: Air Quality ☐ 21 days

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*none*

**Special Handling and/or Storage**

~~cool 4 degrees centigrade~~ TRE 4-5-06

none

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Preservation** | None | Cool 4C | Cool 4C | Cool 4C | None | None | Cool 4C | | | |
| **Type of Container** | G/P | G/P | aG | aG | G/P | G/P | aG | | | |
| **No. of Container(s)** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | |
| **Volume** | 250g | ~~125g~~ 120mL | 120mL | 120mL | 500mL | 120mL | 250mL | | | |
| **SAMPLE ANALYSIS** | See item (1) in Special Instructions. | Chromium Hex - 7196 | PCBs - 8082 | Semi-VOA - 8270A (TCL) | See item (2) in Special Instructions. | ~~Carbon 14~~; Tritium - H3 04/04/06 | Pesticides - 8081; ~~Chlor. Herbicides - 8151A~~ | | | |

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J11KD3 | SOIL | 04/04/06 | 0915 | | | | | ✓ | ✓ | | | | |
| J11KD4 | SOIL | 04/04/06 | 0925 | | | | | ✓ | ✓ | | | | |
| J11KD5 | SOIL | 04/04/06 | 0930 | | | | | ✓ | ✓ | | | | |
| J11KD6 | SOIL | 04/04/06 | 0935 | | | | | ✓ | ✓ | | | | |
| | | | | | | | | | | | | | |

0000032

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

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| Kevin Singleton | 4-4-06 1600 | 3728 Ref 2A | 4-4-06 1600 |
| 3728 #2A | 4-5-06 1030 | T.R. Edmundson / J.R. Edmundson | 4-5-06 1030 |
| T.R. Edmundson / J.R. Edmundson WCH | 4-5-06 1500 | FED EX | |
| FED EX | | | 04/06/06 6:30 |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS**

(2) addition to item # 2. Run gross alpha and gross beta off available material.

~~(1) ICP Metals - 6010TR (Client List) {Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Vanadium}; ICP Metals - 6010A (Add-on) {Titanium, Uranium, Zinc, Zirconium}; Mercury - 7471L (CV)~~

(2) Gamma Spectroscopy (TCL List) {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}

Personnel not available to Relinquish samples from 3728 Ref # 2A on 4/5/06

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

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

BHI-EE-011 (08/29/2005)

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0286

Test H Matrix SOLID
SDG 7413
Contact Melissa C. Mannion

## METHOD SUMMARY

TRITIUM IN SOLIDS

LIQUID SCINTILLATION COUNTING

Client Hanford
Contract No. 630
Contract SDG K0286

## ıETHOD PERFORMANCE

| LIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | MDA pCi/g | ALIQ g | PREP FAC | DILU-TION | YIELD % | EFF % | COUNT min | FWHM keV | DRIFT KeV | DAYS HELD | PREPARED | ANAL-YZED | DETECTOR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| reparation batch 7131-132 | 2σ prep error 10.0 % | Reference Lab Notebook 7131 pg. 135 | | | | | | | | | | | | | | |
| 11KB3 | R604022-01 | | | 0.37 | 20.3 | | | 33 | | 75 | | | 26 | 04/20/06 | 04/30 | LSC-006 |
| 11KB4 | R604022-02 | | | 0.36 | 20.4 | | | 33 | | 75 | | | 26 | 04/20/06 | 04/30 | LSC-006 |
| 11KB5 | R604022-03 | | | 0.36 | 20.6 | | | 33 | | 75 | | | 26 | 04/20/06 | 04/30 | LSC-006 |
| 11KB6 | R604022-04 | | | 0.36 | 20.8 | | | 33 | | 75 | | | 26 | 04/20/06 | 04/30 | LSC-006 |
| 11KB7 | R604022-05 | | | 0.37 | 20.2 | | | 33 | | 75 | | | 26 | 04/20/06 | 04/30 | LSC-006 |
| 11KB8 | R604022-06 | | | 0.37 | 20.1 | | | 32 | | 75 | | | 21 | 04/20/06 | 04/25 | LSC-006 |
| 11KB9 | R604022-07 | | | 0.36 | 20.8 | | | 33 | | 75 | | | 21 | 04/20/06 | 04/25 | LSC-006 |
| 11KC0 | R604022-08 | | | 0.35 | 20.7 | | | 33 | | 75 | | | 21 | 04/20/06 | 04/25 | LSC-006 |
| 11KC1 | R604022-09 | | | 0.38 | 20.2 | | | 33 | | 75 | | | 21 | 04/20/06 | 04/25 | LSC-006 |
| 11KC2 | R604022-10 | | | 0.40 | 20.1 | | | 31 | | 75 | | | 21 | 04/20/06 | 04/25 | LSC-006 |
| 11KC3 | R604022-11 | | | 0.27 | 20.0 | | | 33 | | 150 | | | 20 | 04/20/06 | 04/24 | LSC-007 |
| 11KD3 | R604022-12 | | | 0.25 | 20.6 | | | 34 | | 150 | | | 20 | 04/20/06 | 04/24 | LSC-007 |
| 11KD4 | R604022-13 | | | 0.27 | 20.0 | | | 33 | | 150 | | | 20 | 04/20/06 | 04/24 | LSC-007 |
| 11KD5 | R604022-14 | | | 0.26 | 20.5 | | | 32 | | 150 | | | 20 | 04/20/06 | 04/24 | LSC-007 |
| 11KD6 | R604022-15 | | | 0.25 | 20.1 | | | 34 | | 150 | | | 20 | 04/20/06 | 04/24 | LSC-007 |
| ethod Blank | R604022-17 | | | 17 | 0.300 | | | 34 | | 150 | | | | 04/20/06 | 04/24 | LSC-007 |
| ab Control Sample | R604022-16 | | | 17 | 0.300 | | | 35 | | 150 | | | | 04/20/06 | 04/24 | LSC-007 |
| uplicate (R604022-07) | R604022-18 | | | 0.27 | 20.1 | | | 33 | | 150 | | | 20 | 04/20/06 | 04/24 | LSC-007 |
| pike (R604022-07) | R604022-19 | | | 0.44 | 20.6 | | | 33 | | 51 | | | 20 | 04/20/06 | 04/24 | LSC-007 |
| ominal values and limits from method | | | | 400 | 0.300 | | | | | 25 | | | 180 | | | |

PROCEDURES REFERENCE TRITIUM_COX_LSC
CP-251 Tritium/Carbon-14 Oxidation, rev 8

AVERAGES ± 2 SD FOR 19 SAMPLES
MDA 2.1 ± 11
YIELD 33 ± 2

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 05/11/06

## Appendix 5

## Data Validation Supporting Documentation

## APPENDIX A

## RADIOCHEMICAL DATA VALIDATION CHECKLIST

| VALIDATION LEVEL: | A | B | C | D | E |
|---|---|---|---|---|---|
| PROJECT: | 100-B-14:2 | | DATA PACKAGE: | K0286 | |
| VALIDATOR: | TLR | LAB: EB | | DATE: 6/12/06 | |
| | | | SDG: | K0286 | |

| ANALYSES PERFORMED | | | | | |
|---|---|---|---|---|---|
| Gross Alpha/Beta | Strontium-90 | Technetium-99 | Alpha Spectroscopy | Gamma Spectroscopy | |
| Total Uranium | Radium-22 | Tritium | | | |

| SAMPLES/MATRIX | | | | | |
|---|---|---|---|---|---|
| J11KB3 | J11KB4 | J11KB5 | J11KB6 | J11KB7 | J11KB8 |
| J11KB9 | J11KC0 | J11KC1 | J11KC2 | J11KC3 | J11KD3 |
| J11KD4 | J11KD5 | J11KD6 | | | |
| | | | | | |
| | | | | | Soil |

1. Completeness ..... ☐ N/A

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

Comments: _____

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

Instruments/detectors calibrated? ..... Yes No N/A

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

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

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

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

Comments: _____

3. Continuing Calibration (Levels D, E) ☒ N/A

Calibration checked within required frequency? ..... Yes No N/A

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

Calibration check standards traceable? ..... Yes No N/A

Calibration check standards expired? ..... Yes No N/A

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

Comments: _____

_____

_____

_____

_____

4. Background Counts (Levels D, E) ..... ☒ N/A

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

Background Counts acceptable? ..... Yes No N/A

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

Comments: _____

_____

_____

_____

_____

5. Blanks (Levels B, C, D, E) ..... ☐ N/A

Method blank analyzed within required frequency? ..... Yes No N/A

Method blank results acceptable? ..... Yes No N/A

Analytes detected in method blank? ..... Yes No N/A

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

Field blank results acceptable? ..... Yes No N/A

Analytes detected in field blank(s)? ..... Yes No N/A

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

Comments: no FB

6. Laboratory Control Samples or Blank Spike Samples (Levels C, D, E) ..... ☐ N/A

LCS /BSS analyzed within required frequency? ..... Yes No N/A

LCS/BSS recoveries acceptable? ..... Yes No N/A

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

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

LCS/BSS levels correct? (Levels D,E) ..... Yes No N/A

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

Comments:

7. Chemical Carrier Recovery (Levels C, D, E) ..... ☒ N/A

Chemical carrier added? ..... Yes No N/A

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

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

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

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

Comments: _____

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

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

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

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

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

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

Comments: _____

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

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

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

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

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

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

Comments: _____

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

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

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

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

Comments: thorium 232 - 397% - J all

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

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

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

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

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

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

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

Comments: th 232 - 555% RPD no FS or PAs

12. Holding Times (All levels)

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

Comments: B3 - B7 10 days ~~prep to analy~~ 7/5/02 - J

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

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

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

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

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

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

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

Comments: 74 over

## Appendix 6

## Additional Documentation Requested by Client

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0286

R604022-17 Method Blank

## METHOD BLANK

| | | | |
|---|---|---|---|
| SDG | 7413 | Client/Case no | Hanford SDG K0286 |
| Contact | Melissa C. Mannion | Contract | No. 630 |
| Lab sample id | R604022-17 | Client sample id | Method Blank |
| Dept sample id | 7413-017 | Material/Matrix | SOLID |
| | | SAF No | RC-025 |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Gross Alpha | 12587-46-1 | -1.60 | 2.3 | 5.5 | 10 | U | 93A |
| Gross Beta | 12587-47-2 | 2.82 | 3.4 | 5.5 | 15 | U | 93B |
| Tritium | 10028-17-8 | -5.12 | 10 | 17 | 400 | U | H |
| Total Strontium | SR-RAD | 0.003 | 0.14 | 0.30 | 1.0 | U | SR |
| Potassium 40 | 13966-00-2 | U | | 1.6 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.074 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.064 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | U | | 0.13 | 0.10 | U | GAM |
| Radium 228 | 15262-20-1 | U | | 0.31 | 0.20 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.15 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.20 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.16 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.083 | | U | GAM |
| Thorium 232 | TH-232 | U | | 0.31 | | U | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.21 | | U | GAM |
| Uranium 238 | U-238 | U | | 7.6 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.20 | | U | GAM |

100BC Remain.Piplns&Sewers-SoilFullP

QC-BLANK #56699

| | |
|---|---|
| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 05/11/06 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0286

R604022-16

Lab Control Sample

## LAB CONTROL SAMPLE

SDG 7413

Contact Melissa C. Mannion

Client/Case no Hanford SDG K0286

Contract No. 630

Lab sample id R604022-16

Dept sample id 7413-016

Client sample id Lab Control Sample

Material/Matrix SOLID

SAF No RC-025

| ANALYTE | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST | ADDED pCi/g | 2σ ERR pCi/g | REC % | 3σ LMTS (TOTAL) | PROTOCOL LIMITS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Gross Alpha | 110 | 14 | 4.9 | 10 | | 93A | 102 | 4.1 | 108 | 61-139 | 70-130 |
| Gross Beta | 116 | 9.9 | 11 | 15 | | 93B | 98.1 | 3.9 | 118 | 69-131 | 70-130 |
| Tritium | 709 | 22 | 17 | 400 | | H | 737 | 29 | 96 | 84-116 | 80-120 |
| Total Strontium | 10.4 | 0.55 | 0.23 | 1.0 | | SR | 9.81 | 0.39 | 106 | 81-119 | 80-120 |
| Cobalt 60 | 2.12 | 0.24 | 0.15 | 0.050 | | GAM | 2.42 | 0.097 | 88 | 75-125 | 80-120 |
| Cesium 137 | 2.46 | 0.22 | 0.15 | 0.10 | | GAM | 2.51 | 0.10 | 98 | 74-126 | 80-120 |

100BC Remain.Piplns&Sewers-SoilFullP

QC-LCS #56698

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 05/11/06

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0286

R604022-18 J11KB9

## DUPLICATE

| | | | | | |
|---|---|---|---|---|---|
| SDG | 7413 | | | Client/Case no | Hanford SDG K0286 |
| Contact | Melissa C. Mannion | | | Contract | No. 630 |
| | DUPLICATE | | ORIGINAL | | |
| Lab sample id | R604022-18 | Lab sample id | R604022-07 | Client sample id | J11KB9 |
| Dept sample id | 7413-018 | Dept sample id | 7413-007 | Location/Matrix | 100-B-14:2(115-B) Area 5 SOLID |
| | | Received | 04/06/06 | Collected/Weight | 04/04/06 12:40 1125 g |
| % solids | 93.2 | % solids | 93.2 | Custody/SAF No | RC-025-004 RC-025 |

| ANALYTE | DUPLICATE pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST | ORIGINAL pCi/g | 2σ ERR (COUNT) | MDA pCi/g | QUALI-FIERS | RPD % | 3σ TOT | DER σ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gross Alpha | 5.75 | 3.6 | 4.6 | 10 | | 93A | 5.90 | 3.7 | 4.4 | | 3 | 140 | 0.1 |
| Gross Beta | 9.89 | 4.3 | 6.4 | 15 | | 93B | 17.6 | 4.3 | 5.6 | | 56 | 74 | 2.3 |
| Tritium | -0.126 | 0.15 | 0.27 | 400 | U | H | 0.110 | 0.22 | 0.36 | U | - | | 1.8 |
| Total Strontium | 0.034 | 0.13 | 0.25 | 1.0 | U | SR | 0.018 | 0.16 | 0.31 | U | - | | 0.2 |
| Potassium 40 | 8.12 | 1.2 | 0.83 | | | GAM | 8.45 | 1.3 | 0.76 | | 4 | 45 | 0.3 |
| Cobalt 60 | U | | 0.077 | 0.050 | U | GAM | U | | 0.078 | U | - | | 0 |
| Cesium 137 | U | | 0.079 | 0.10 | U | GAM | U | | 0.065 | U | - | | 0.3 |
| Radium 226 | 0.452 | 0.14 | 0.13 | 0.10 | | GAM | 0.404 | 0.11 | 0.10 | | 11 | 70 | 0.5 |
| Radium 228 | 0.435 | 0.30 | 0.28 | 0.20 | | GAM | 0.648 | 0.31 | 0.33 | | 39 | 124 | 1.0 |
| Europium 152 | U | | 0.14 | 0.10 | U | GAM | U | | 0.19 | U | - | | 0.4 |
| Europium 154 | U | | 0.24 | 0.10 | U | GAM | U | | 0.19 | U | - | | 0.3 |
| Europium 155 | U | | 0.18 | 0.10 | U | GAM | U | | 0.18 | U | - | | 0 |
| Thorium 228 | 0.489 | 0.079 | 0.089 | | | GAM | 0.498 | 0.081 | 0.089 | | 2 | 47 | 0.1 |
| Thorium 232 | 0.435 | 0.30 | 0.28 | | | GAM | 0.648 | 0.31 | 0.33 | | 39 | 124 | 1.0 |
| Uranium 235 | U | | 0.28 | | U | GAM | U | | 0.29 | U | - | | 0 |
| Uranium 238 | U | | 9.2 | | U | GAM | U | | 8.2 | U | - | | 0.2 |
| Americium 241 | U | | 0.32 | | U | GAM | U | | 0.37 | U | - | | 0.2 |

100BC Remain.Piplns&Sewers-SoilFullP

QC-DUP#7 56700

| | |
|---|---|
| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DUP |
| Version | 3.06 |
| Report date | 05/11/06 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0286

R604022-19 J11KB9

## MATRIX SPIKE

| | | | | | |
|---|---|---|---|---|---|
| SDG | 7413 | | | Client/Case no | Hanford SDG K0286 |
| Contact | Melissa C. Mannion | | | Contract | No. 630 |
| | MATRIX SPIKE | | ORIGINAL | | |
| Lab sample id | R604022-19 | Lab sample id | R604022-07 | Client sample id | J11KB9 |
| Dept sample id | 7413-019 | Dept sample id | 7413-007 | Location/Matrix | 100-B-14:2(115-B) Area 5 SOLID |
| | | Received | 04/06/06 | Collected/Weight | 04/04/06 12:40 1125 g |
| % solids | 93.2 | % solids | 93.2 | Custody/SAF No | RC-025-004 RC-025 |

| ANALYTE | SPIKE pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST | ADDED pCi/g | 2σ ERR pCi/g | ORIGINAL pCi/g | 2σ ERR (COUNT) | REC % | 3σ LMTS (TOTAL) | PROTOCOL LIMITS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tritium | 49.5 | 1.1 | 0.44 | 400 | X | H | 53.6 | 2.1 | 0.110 | 0.22 | 92 | 85-115 | 60-140 |

100BC Remain.Piplns&Sewers-SoilFullP

QC-MS#7 56701

| | |
|---|---|
| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-MS |
| Version | 3.06 |
| Report date | 05/11/06 |

Date: 28 June 2006
To: Washington Closure Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100 BC Remaining Pipelines & Sewers – Soil Full Protocol - Waste Subsite 100-B-14:2
Subject: Inorganics - Data Package No. K0286-LLI

## INTRODUCTION

This memo presents the results of data validation on Data Package No. K0286 prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

| Sample ID | Sample Date | Media | Validation | Date |
|---|---|---|---|---|
| J11KB3 | 4/4/06 | Soil | C | See note 1 |
| J11KB4 | 4/4/06 | Soil | C | See note 1 |
| J11KB5 | 4/4/06 | Soil | C | See note 1 |
| J11KB6 | 4/4/06 | Soil | C | See note 1 |
| J11KB7 | 4/4/06 | Soil | C | See note 1 |
| J11KB8 | 4/4/06 | Soil | C | See note 1 |
| J11KB9 | 4/4/06 | Soil | C | See note 1 |
| J11KC0 | 4/4/06 | Soil | C | See note 1 |
| J11KC1 | 4/4/06 | Soil | C | See note 1 |
| J11KC2 | 4/4/06 | Soil | C | See note 1 |
| J11KC3 | 4/4/06 | Soil | C | See note 1 |
| J11KC4 | 4/4/06 | Soil | C | See note 1 |
| J11KD3 | 4/4/06 | Soil | C | See note 1 |
| J11KD4 | 4/4/06 | Soil | C | See note 1 |
| J11KD5 | 4/4/06 | Soil | C | See note 1 |
| J11KD6 | 4/4/06 | Soil | C | See note 1 |

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

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, February 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, all detected uranium results were qualified as estimates and flagged "UJ".

Due to method blank contamination, lithium, sodium and phosphorous results in sample J11KC4 were qualified as estimates and flagged "UJ".

All other preparation blank results were acceptable.

Field (Equipment) Blank

One field blank (J11KC4) was submitted for analysis. Aluminum, boron, barium, calcium, iron, magnesium, manganese, silicon, strontium, titanium, vanadium and

zinc were detected in the equipment blank. Under the WCH statement of work, no qualification is required.

- **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 an LCS recovery outside QC limits (50.3%), all silicon results were qualified as estimates and flagged "J".

Due to a matrix spike recovery outside QC limits (59.2%), all antimony results were qualified as estimates and flagged "J".

Due to a matrix spike recovery outside QC limits (68.6%), all calcium 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.

All laboratory duplicate results were acceptable.

Field Duplicate

One set of field duplicates (J11KB6/J11KC3) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the 100 Area RQLs to ensure that laboratory detection levels meet the required criteria. All results met the RQL.

- **Completeness**

Data package No. K0286 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, all detected uranium results were qualified as estimates and flagged "UJ".
- Due to method blank contamination, lithium, sodium and phosphorous results in sample J11KC4 were qualified as estimates and flagged "UJ".
- Due to an LCS recovery outside QC limits (50.3%), all silicon results were qualified as estimates and flagged "J".
- Due to a matrix spike recovery outside QC limits (59.2%), all antimony results were qualified as estimates and flagged "J".
- Due to a matrix spike recovery outside QC limits (68.6%), all calcium results were qualified as estimates and flagged "J".

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

## REFERENCES

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

DOE/RL-96-22, Rev. 4, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, February 2005.

## Appendix 1

## Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with WCH 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

METALS DATA QUALIFICATION SUMMARY*

| SDG: K0286 | REVIEWER: TLI | Project: 100-B-14:2 | PAGE 1 OF 1 |
|---|---|---|---|
| COMMENTS: | | | |
| COMPOUND | QUALIFIER | SAMPLES AFFECTED | REASON |
| Uranium | UJ | J11KB8, J11KB9<br>J11KC1, J11KC2<br>J11KC3, J11KD3<br>J11KD4, J11KD5<br>J111KD6 | Blank contamination |
| Lithium<br>Sodium<br>Phosphorous | UJ | J11KC4 | Blank contamination |
| Silicon | J | All | LCS recovery |
| Antimony<br>Calcium | J | All | MS 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

| Project: WASHINGTON CLOSURE HANFORD | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab: LLI | SDG: K0286 | | | | | | | | | | | | | | | | | | |
| Sample Number | | J11KB3 | | J11KB4 | | J11KB5 | | J11KB6 | | J11KB7 | | J11KB8 | | J11KB9 | | J11KC0 | | J11KC1 | |
| Remarks | | | | | | | | Main | | | | | | | | | | | |
| Sample Date | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | |
| Inorganics | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| Silver | 0.2 | 0.07 | U | 0.07 | U | 0.07 | U | 0.07 | U | 0.07 | U | 0.07 | U | 0.07 | U | 0.07 | U | 0.07 | U |
| Aluminum | | 4250 | | 4720 | | 4020 | | 5390 | | 4310 | | 4560 | | 4530 | | 3420 | | 5780 | |
| Arsenic | 10 | 2.6 | | 2.4 | | 2.9 | | 2.7 | | 2.3 | | 2.3 | | 2.0 | | 1.7 | | 2.8 | |
| Boron | | 0.88 | | 1.5 | | 0.70 | | 0.98 | | 0.37 | | 0.76 | | 1.0 | | 0.68 | | 1.8 | |
| Barium | 2 | 44.2 | | 51.2 | | 43.6 | | 56.2 | | 46.8 | | 56.2 | | 60.1 | | 48.1 | | 67.2 | |
| Beryllium | | 0.24 | | 0.31 | | 0.22 | | 0.31 | | 0.30 | | 0.29 | | 0.26 | | 0.24 | | 0.34 | |
| Calcium | | 6860 | J | 5680 | J | 6840 | J | 5670 | J | 7710 | J | 4370 | J | 5910 | J | 4310 | J | 4820 | J |
| Cadmium | 0.2 | 0.09 | | 0.15 | | 0.14 | | 0.14 | | 0.12 | | 0.13 | | 0.13 | | 0.09 | | 0.15 | |
| Cobalt | | 7.1 | | 7.4 | | 6.5 | | 7.5 | | 8.3 | | 7.2 | | 6.2 | | 6.2 | | 8.4 | |
| Chromium | 1 | 5.8 | | 6.5 | | 5.8 | | 7.6 | | 5.9 | | 6.4 | | 6.7 | | 5.2 | | 7.8 | |
| Copper | | 14.8 | | 16.3 | | 16.0 | | 16.4 | | 17.5 | | 15.0 | | 15.4 | | 14.8 | | 18.4 | |
| Iron | | 17300 | | 18200 | | 16500 | | 18400 | | 18800 | | 15900 | | 14500 | | 13200 | | 19800 | |
| Mercury | 0.2 | 0.02 | U | 0.04 | | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.03 | | 0.02 | U | 0.02 | |
| Potassium | | 951 | | 925 | | 685 | | 1050 | | 757 | | 866 | | 825 | | 660 | | 1150 | |
| Lithium | | 5.6 | | 8.4 | | 5.2 | | 6.4 | | 5.7 | | 5.5 | | 5.4 | | 3.9 | | 5.9 | |
| Magnesium | | 3680 | | 3690 | | 3650 | | 4030 | | 4100 | | 3550 | | 3360 | | 2930 | | 4090 | |
| Manganese | | 289 | | 306 | | 259 | | 315 | | 312 | | 308 | | 302 | | 232 | | 362 | |
| Molybdenum | | 0.49 | | 0.53 | | 0.41 | | 0.43 | | 0.50 | | 0.49 | | 0.49 | | 0.40 | | 0.53 | |
| Sodium | | 119 | | 135 | | 98.4 | | 111 | | 105 | | 89.8 | | 110 | | 101 | | 129 | |
| Nickel | | 8.7 | | 9.8 | | 8.7 | | 10.0 | | 10.6 | | 9.7 | | 8.6 | | 8.3 | | 11.7 | |
| Phosohorous | | 939 | | 887 | | 874 | | 829 | | 1030 | | 808 | | 717 | | 801 | | 944 | |
| Lead | 5 | 5.1 | | 4.8 | | 6.5 | | 5.8 | | 3.9 | | 5.7 | | 5.0 | | 3.2 | | 5.6 | |
| Antimony | | 0.44 | UJ | 0.43 | UJ | 0.43 | UJ | 0.43 | UJ | 0.43 | UJ | 0.43 | UJ | 0.43 | UJ | 0.42 | UJ | 0.42 | UJ |
| Selenium | 1 | 0.47 | U | 0.46 | U | 0.45 | U | 0.46 | U | 0.45 | U | 0.46 | U | 0.46 | U | 0.45 | U | 0.45 | U |
| Silicon | | 522 | J | 441 | J | 416 | J | 478 | J | 466 | J | 587 | J | 491 | J | 387 | J | 483 | J |
| Tin | | 1.1 | | 1.4 | | 1.2 | | 1.4 | | 1.5 | | 1.2 | | 1.3 | | 1.2 | | 1.3 | |
| Strontium | | 21.6 | | 21.6 | | 24.2 | | 24.3 | | 25.7 | | 19.8 | | 25.6 | | 20.2 | | 27.5 | |
| Titanium | | 1330 | | 1560 | | 1360 | | 1450 | | 1730 | | 1270 | | 1100 | | 1010 | | 1460 | |
| Thallium | | 0.70 | U | 0.68 | U | 0.68 | U | 0.69 | U | 0.68 | U | 0.69 | U | 0.69 | U | 0.67 | U | 0.67 | U |
| Uranium | | 0.88 | U | 0.85 | U | 0.85 | U | 0.87 | U | 0.85 | U | 1.1 | UJ | 1.3 | UJ | 0.84 | U | 1.6 | UJ |
| Vanadium | | 40.8 | | 46.9 | | 41.1 | | 46.2 | | 49.1 | | 39.1 | | 35.2 | | 31.2 | | 43.7 | |
| Zinc | 1 | 38.8 | | 38.5 | | 35.5 | | 40.2 | | 38.4 | | 35.5 | | 34.4 | | 29.2 | | 39.4 | |
| Zirconium | | 16.1 | | 19.8 | | 17.0 | | 19.6 | | 18.3 | | 17.9 | | 14.5 | | 14.4 | | 23.1 | |

000011

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.

| Project: WASHINGTON CLOSURE HANFORD | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab: LLI | SDG: K0286 | | | | | | | | | | | | | | | | | | |
| Sample Number | | J11KC2 | | J11KC3 | | J11KC4 | | J11KD3 | | J11KD4 | | J11KD5 | | J11KD6 | | | | | |
| Remarks | | | | Duplicate | | E. Blank | | | | | | | | | | | | | |
| Sample Date | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | | | | |
| Inorganics | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| Silver | 0.2 | 0.08 | U | 0.07 | U | 0.06 | U | 0.07 | U | 0.07 | U | 0.07 | U | 0.07 | U | | | | |
| Aluminum | | 7870 | | 5380 | | 40.8 | | 3810 | | 5170 | | 4790 | | 4090 | | | | | |
| Arsenic | 10 | 7.5 | | 3.0 | | 0.54 | U | 2.0 | | 2.4 | | 2.3 | | 2.6 | | | | | |
| Boron | | 2.6 | | 0.82 | | 0.80 | | 0.59 | | 0.95 | | 0.97 | | 3.3 | | | | | |
| Barium | 2 | 70.5 | | 55.7 | | 1.3 | | 50.6 | | 58.2 | | 65.5 | | 75.0 | | | | | |
| Beryllium | | 0.42 | | 0.35 | | 0.02 | U | 0.24 | | 0.32 | | 0.32 | | 0.26 | | | | | |
| Calcium | | 32500 | J | 6580 | J | 18.1 | J | 4720 | J | 4830 | J | 4010 | J | 6970 | J | | | | |
| Cadmium | 0.2 | 0.21 | | 0.12 | | 0.06 | U | 0.14 | | 0.09 | | 0.1 | | 0.1 | | | | | |
| Cobalt | | 8.6 | | 7.8 | | 0.12 | U | 6.8 | | 7.0 | | 7.4 | | 6.6 | | | | | |
| Chromium | 1 | 10.9 | | 7.4 | | 0.12 | U | 5.4 | | 8.7 | | 6.3 | | 12.7 | | | | | |
| Copper | | 21.2 | | 15.7 | | 0.11 | U | 14.2 | | 15.5 | | 14.6 | | 15.8 | | | | | |
| Iron | | 21000 | | 18200 | | 359 | | 15200 | | 16700 | | 15700 | | 14000 | | | | | |
| Mercury | 0.2 | 0.02 | U | 0.02 | U | 0.02 | U | 0.04 | | 0.02 | U | 0.02 | U | 0.1 | | | | | |
| Potassium | | 1290 | | 1100 | | 68.3 | U | 772 | | 1050 | | 1130 | | 742 | | | | | |
| Lithium | | 11.9 | | 6.4 | | 0.07 | UJ | 4.9 | | 5.9 | | 5.0 | | 4.9 | | | | | |
| Magnesium | | 6020 | | 4170 | | 6.7 | | 3060 | | 3630 | | 3470 | | 3120 | | | | | |
| Manganese | | 388 | | 333 | | 5.4 | | 276 | | 306 | | 324 | | 264 | | | | | |
| Molybdenum | | 0.56 | | 0.52 | | 0.26 | U | 0.45 | | 0.50 | | 0.39 | | 0.46 | | | | | |
| Sodium | | 218 | | 108 | | 6.9 | UJ | 101 | | 103 | | 91.6 | | 154 | | | | | |
| Nickel | | 14.1 | | 10.0 | | 0.21 | U | 8.0 | | 9.7 | | 9.0 | | 8.1 | | | | | |
| Phosohorous | | 802 | | 886 | | 3.3 | UJ | 889 | | 801 | | 859 | | 896 | | | | | |
| Lead | 5 | 10.6 | | 5.8 | | 0.34 | | 26.1 | | 7.2 | | 4.8 | | 7.4 | | | | | |
| Antimony | | 0.50 | UJ | 0.43 | UJ | 0.39 | UJ | 0.43 | UJ | 0.42 | UJ | 0.44 | UJ | 0.42 | UJ | | | | |
| Selenium | 1 | 0.53 | U | 0.46 | U | 0.42 | U | 0.45 | U | 0.45 | U | 0.47 | U | 0.45 | U | | | | |
| Silicon | | 526 | J | 522 | J | 42.2 | J | 482 | J | 486 | J | 519 | J | 517 | J | | | | |
| Tin | | 1.2 | U | 1.3 | | 0.95 | U | 1.1 | | 1.1 | | 1.3 | | 1.3 | | | | | |
| Strontium | | 59.2 | | 23.7 | | 0.22 | | 23.9 | | 21.6 | | 20.0 | | 33.1 | | | | | |
| Titanium | | 1020 | | 1460 | | 1.9 | | 1020 | | 1250 | | 1140 | | 1090 | | | | | |
| Thallium | | 0.79 | U | 0.69 | U | 0.62 | U | 0.68 | U | 0.68 | U | 0.70 | U | 0.66 | U | | | | |
| Uranium | | 3.1 | UJ | 2.2 | UJ | 0.78 | U | 1.9 | UJ | 1.8 | UJ | 1.8 | UJ | 2.2 | UJ | | | | |
| Vanadium | | 36.7 | | 44.6 | | 0.12 | | 33.6 | | 42.0 | | 35.7 | | 33.9 | | | | | |
| Zinc | 1 | 44.8 | | 38.5 | | 1.2 | | 33.2 | | 38.2 | | 41.3 | | 39.0 | | | | | |
| Zirconium | | 11.2 | | 19.8 | | 0.94 | U | 14.6 | | 17.4 | | 19.4 | | 14.5 | | | | | |

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 05/11/06

CLIENT: TNUHANFORD RC-025 K0286 LVL LOT #: 0604L698

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -001 | J11KB3 | Silver, Total | 0.07 u | MG/KG | 0.07 | 1.0 |
| | | Aluminum, Total | 4250 | MG/KG | 2.4 | 1.0 |
| | | Arsenic, Total | 2.6 | MG/KG | 0.61 | 1.0 |
| | | Boron, Total | 0.88 | MG/KG | 0.24 | 1.0 |
| | | Barium, Total | 44.2 | MG/KG | 0.02 | 1.0 |
| | | Beryllium, Total | 0.24 | MG/KG | 0.02 | 1.0 |
| | | Calcium, Total | 6860 J | MG/KG | 2.2 | 1.0 |
| | | Cadmium, Total | 0.09 | MG/KG | 0.07 | 1.0 |
| | | Cobalt, Total | 7.1 | MG/KG | 0.14 | 1.0 |
| | | Chromium, Total | 5.8 | MG/KG | 0.13 | 1.0 |
| | | Copper, Total | 14.8 | MG/KG | 0.12 | 1.0 |
| | | Iron, Total | 17300 | MG/KG | 0.54 | 1.0 |
| | | Mercury, Total | 0.02 u | MG/KG | 0.02 | 1.0 |
| | | Potassium, Total | 951 | MG/KG | 77.5 | 1.0 |
| | | Lithium, Total | 5.6 | MG/KG | 0.03 | 1.0 |
| | | Magnesium, Total | 3680 | MG/KG | 3.9 | 1.0 |
| | | Manganese, Total | 289 | MG/KG | 0.03 | 1.0 |
| | | Molybdenum, Total | 0.49 | MG/KG | 0.29 | 1.0 |
| | | Sodium, Total | 119 | MG/KG | 2.5 | 1.0 |
| | | Nickel, Total | 8.7 | MG/KG | 0.24 | 1.0 |
| | | Phosphorus, Total | 939 | MG/KG | 0.90 | 1.0 |
| | | Lead, Total | 5.1 | MG/KG | 0.31 | 1.0 |
| | | Antimony, Total | 0.44 uJ | MG/KG | 0.44 | 1.0 |
| | | Selenium, Total | 0.47 u | MG/KG | 0.47 | 1.0 |
| | | Silicon, Total | 522 J | MG/KG | 2.3 | 1.0 |
| | | Tin, Total | 1.1 | MG/KG | 1.1 | 1.0 |
| | | Strontium, Total | 21.6 | MG/KG | 0.01 | 1.0 |
| | | Titanium, Total | 1330 | MG/KG | 0.03 | 1.0 |
| | | Thallium, Total | 0.70 u | MG/KG | 0.70 | 1.0 |
| | | Uranium, Total | 0.88 u | MG/KG | 0.88 | 1.0 |
| | | Vanadium, Total | 40.8 | MG/KG | 0.09 | 1.0 |
| | | Zinc, Total | 38.8 | MG/KG | 0.16 | 1.0 |
| | | Zirconium, Total | 16.1 | MG/KG | 1.1 | 1.0 |

PL 6/23/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/11/06

CLIENT: TNUHANFORD RC-025 K0286 LVL LOT #: 0604L698

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -002 | J11KB4 | Silver, Total | 0.07 u | MG/KG | 0.07 | 1.0 |
| | | Aluminum, Total | 4720 | MG/KG | 2.3 | 1.0 |
| | | Arsenic, Total | 2.4 | MG/KG | 0.59 | 1.0 |
| | | Boron, Total | 1.5 | MG/KG | 0.23 | 1.0 |
| | | Barium, Total | 51.2 | MG/KG | 0.02 | 1.0 |
| | | Beryllium, Total | 0.31 | MG/KG | 0.02 | 1.0 |
| | | Calcium, Total | 5680 J | MG/KG | 2.1 | 1.0 |
| | | Cadmium, Total | 0.15 | MG/KG | 0.07 | 1.0 |
| | | Cobalt, Total | 7.4 | MG/KG | 0.14 | 1.0 |
| | | Chromium, Total | 6.5 | MG/KG | 0.13 | 1.0 |
| | | Copper, Total | 16.3 | MG/KG | 0.12 | 1.0 |
| | | Iron, Total | 18200 | MG/KG | 0.52 | 1.0 |
| | | Mercury, Total | 0.04 | MG/KG | 0.02 | 1.0 |
| | | Potassium, Total | 925 | MG/KG | 74.9 | 1.0 |
| | | Lithium, Total | 8.4 | MG/KG | 0.03 | 1.0 |
| | | Magnesium, Total | 3690 | MG/KG | 3.8 | 1.0 |
| | | Manganese, Total | 306 | MG/KG | 0.03 | 1.0 |
| | | Molybdenum, Total | 0.53 | MG/KG | 0.28 | 1.0 |
| | | Sodium, Total | 135 | MG/KG | 2.4 | 1.0 |
| | | Nickel, Total | 9.8 | MG/KG | 0.23 | 1.0 |
| | | Phosphorus, Total | 887 | MG/KG | 0.87 | 1.0 |
| | | Lead, Total | 4.8 | MG/KG | 0.30 | 1.0 |
| | | Antimony, Total | 0.43 u J | MG/KG | 0.43 | 1.0 |
| | | Selenium, Total | 0.46 u | MG/KG | 0.46 | 1.0 |
| | | Silicon, Total | 441 J | MG/KG | 2.2 | 1.0 |
| | | Tin, Total | 1.4 | MG/KG | 1.0 | 1.0 |
| | | Strontium, Total | 21.6 | MG/KG | 0.01 | 1.0 |
| | | Titanium, Total | 1560 | MG/KG | 0.03 | 1.0 |
| | | Thallium, Total | 0.68 u | MG/KG | 0.68 | 1.0 |
| | | Uranium, Total | 0.85 u | MG/KG | 0.85 | 1.0 |
| | | Vanadium, Total | 46.9 | MG/KG | 0.09 | 1.0 |
| | | Zinc, Total | 38.5 | MG/KG | 0.16 | 1.0 |
| | | Zirconium, Total | 19.8 | MG/KG | 1.0 | 1.0 |

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/11/06

CLIENT: TNUHANFORD RC-025 K0286 LVL LOT #: 0604L698

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -003 | J11KB5 | Silver, Total | 0.07 u | MG/KG | 0.07 | 1.0 |
| | | Aluminum, Total | 4020 | MG/KG | 2.3 | 1.0 |
| | | Arsenic, Total | 2.9 | MG/KG | 0.59 | 1.0 |
| | | Boron, Total | 0.70 | MG/KG | 0.23 | 1.0 |
| | | Barium, Total | 43.6 | MG/KG | 0.02 | 1.0 |
| | | Beryllium, Total | 0.22 | MG/KG | 0.02 | 1.0 |
| | | Calcium, Total | 6840 J | MG/KG | 2.1 | 1.0 |
| | | Cadmium, Total | 0.14 | MG/KG | 0.07 | 1.0 |
| | | Cobalt, Total | 6.5 | MG/KG | 0.14 | 1.0 |
| | | Chromium, Total | 5.8 | MG/KG | 0.13 | 1.0 |
| | | Copper, Total | 16.0 | MG/KG | 0.12 | 1.0 |
| | | Iron, Total | 16500 | MG/KG | 0.52 | 1.0 |
| | | Mercury, Total | 0.02 u | MG/KG | 0.02 | 1.0 |
| | | Potassium, Total | 685 | MG/KG | 74.5 | 1.0 |
| | | Lithium, Total | 5.2 | MG/KG | 0.03 | 1.0 |
| | | Magnesium, Total | 3650 | MG/KG | 3.8 | 1.0 |
| | | Manganese, Total | 259 | MG/KG | 0.03 | 1.0 |
| | | Molybdenum, Total | 0.41 | MG/KG | 0.28 | 1.0 |
| | | Sodium, Total | 98.4 | MG/KG | 2.4 | 1.0 |
| | | Nickel, Total | 8.7 | MG/KG | 0.23 | 1.0 |
| | | Phosphorus, Total | 874 | MG/KG | 0.87 | 1.0 |
| | | Lead, Total | 6.5 | MG/KG | 0.30 | 1.0 |
| | | Antimony, Total | 0.43 uJ | MG/KG | 0.43 | 1.0 |
| | | Selenium, Total | 0.45 u | MG/KG | 0.45 | 1.0 |
| | | Silicon, Total | 416 J | MG/KG | 2.2 | 1.0 |
| | | Tin, Total | 1.2 | MG/KG | 1.0 | 1.0 |
| | | Strontium, Total | 24.2 | MG/KG | 0.01 | 1.0 |
| | | Titanium, Total | 1360 | MG/KG | 0.03 | 1.0 |
| | | Thallium, Total | 0.68 u | MG/KG | 0.68 | 1.0 |
| | | Uranium, Total | 0.85 u | MG/KG | 0.85 | 1.0 |
| | | Vanadium, Total | 41.1 | MG/KG | 0.09 | 1.0 |
| | | Zinc, Total | 35.5 | MG/KG | 0.15 | 1.0 |
| | | Zirconium, Total | 17.0 | MG/KG | 1.0 | 1.0 |

6/23/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/11/06

CLIENT: TNUHANFORD RC-025 K0286 LVL LOT #: 0604L698

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -004 | J11KB6 | Silver, Total | 0.07 u | MG/KG | 0.07 | 1.0 |
| | | Aluminum, Total | 5390 | MG/KG | 2.3 | 1.0 |
| | | Arsenic, Total | 2.7 | MG/KG | 0.60 | 1.0 |
| | | Boron, Total | 0.98 | MG/KG | 0.24 | 1.0 |
| | | Barium, Total | 56.2 | MG/KG | 0.02 | 1.0 |
| | | Beryllium, Total | 0.31 | MG/KG | 0.02 | 1.0 |
| | | Calcium, Total | 5670 J | MG/KG | 2.2 | 1.0 |
| | | Cadmium, Total | 0.14 | MG/KG | 0.07 | 1.0 |
| | | Cobalt, Total | 7.5 | MG/KG | 0.14 | 1.0 |
| | | Chromium, Total | 7.6 | MG/KG | 0.13 | 1.0 |
| | | Copper, Total | 16.4 | MG/KG | 0.12 | 1.0 |
| | | Iron, Total | 18400 | MG/KG | 0.53 | 1.0 |
| | | Mercury, Total | 0.02 u | MG/KG | 0.02 | 1.0 |
| | | Potassium, Total | 1050 | MG/KG | 76.0 | 1.0 |
| | | Lithium, Total | 6.4 | MG/KG | 0.03 | 1.0 |
| | | Magnesium, Total | 4030 | MG/KG | 3.9 | 1.0 |
| | | Manganese, Total | 315 | MG/KG | 0.03 | 1.0 |
| | | Molybdenum, Total | 0.43 | MG/KG | 0.29 | 1.0 |
| | | Sodium, Total | 111 | MG/KG | 2.5 | 1.0 |
| | | Nickel, Total | 10.0 | MG/KG | 0.24 | 1.0 |
| | | Phosphorus, Total | 829 | MG/KG | 0.89 | 1.0 |
| | | Lead, Total | 5.8 | MG/KG | 0.31 | 1.0 |
| | | Antimony, Total | 0.43 u J | MG/KG | 0.43 | 1.0 |
| | | Selenium, Total | 0.46 u | MG/KG | 0.46 | 1.0 |
| | | Silicon, Total | 478 J | MG/KG | 2.2 | 1.0 |
| | | Tin, Total | 1.4 | MG/KG | 1.1 | 1.0 |
| | | Strontium, Total | 24.3 | MG/KG | 0.01 | 1.0 |
| | | Titanium, Total | 1450 | MG/KG | 0.03 | 1.0 |
| | | Thallium, Total | 0.69 u | MG/KG | 0.69 | 1.0 |
| | | Uranium, Total | 0.87 u | MG/KG | 0.87 | 1.0 |
| | | Vanadium, Total | 46.2 | MG/KG | 0.09 | 1.0 |
| | | Zinc, Total | 40.2 | MG/KG | 0.16 | 1.0 |
| | | Zirconium, Total | 19.6 | MG/KG | 1.0 | 1.0 |

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/11/06

CLIENT: TNUHANFORD RC-025 K0286 LVL LOT #: 0604L698

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -005 | J11KB7 | Silver, Total | 0.07 u | MG/KG | 0.07 | 1.0 |
| | | Aluminum, Total | 4310 | MG/KG | 2.3 | 1.0 |
| | | Arsenic, Total | 2.3 | MG/KG | 0.59 | 1.0 |
| | | Boron, Total | 0.37 | MG/KG | 0.23 | 1.0 |
| | | Barium, Total | 46.8 | MG/KG | 0.02 | 1.0 |
| | | Beryllium, Total | 0.30 | MG/KG | 0.02 | 1.0 |
| | | Calcium, Total | 7710 J | MG/KG | 2.1 | 1.0 |
| | | Cadmium, Total | 0.12 | MG/KG | 0.07 | 1.0 |
| | | Cobalt, Total | 8.3 | MG/KG | 0.14 | 1.0 |
| | | Chromium, Total | 5.9 | MG/KG | 0.13 | 1.0 |
| | | Copper, Total | 17.5 | MG/KG | 0.12 | 1.0 |
| | | Iron, Total | 18800 | MG/KG | 0.52 | 1.0 |
| | | Mercury, Total | 0.02 u | MG/KG | 0.02 | 1.0 |
| | | Potassium, Total | 757 | MG/KG | 74.5 | 1.0 |
| | | Lithium, Total | 5.7 | MG/KG | 0.03 | 1.0 |
| | | Magnesium, Total | 4100 | MG/KG | 3.8 | 1.0 |
| | | Manganese, Total | 312 | MG/KG | 0.03 | 1.0 |
| | | Molybdenum, Total | 0.50 | MG/KG | 0.28 | 1.0 |
| | | Sodium, Total | 105 | MG/KG | 2.4 | 1.0 |
| | | Nickel, Total | 10.6 | MG/KG | 0.23 | 1.0 |
| | | Phosphorus, Total | 1030 | MG/KG | 0.87 | 1.0 |
| | | Lead, Total | 3.9 | MG/KG | 0.30 | 1.0 |
| | | Antimony, Total | 0.43 uJ | MG/KG | 0.43 | 1.0 |
| | | Selenium, Total | 0.45 u | MG/KG | 0.45 | 1.0 |
| | | Silicon, Total | 466 J | MG/KG | 2.2 | 1.0 |
| | | Tin, Total | 1.5 | MG/KG | 1.0 | 1.0 |
| | | Strontium, Total | 25.7 | MG/KG | 0.01 | 1.0 |
| | | Titanium, Total | 1730 | MG/KG | 0.03 | 1.0 |
| | | Thallium, Total | 0.68 u | MG/KG | 0.68 | 1.0 |
| | | Uranium, Total | 0.85 u | MG/KG | 0.85 | 1.0 |
| | | Vanadium, Total | 49.1 | MG/KG | 0.09 | 1.0 |
| | | Zinc, Total | 38.4 | MG/KG | 0.15 | 1.0 |
| | | Zirconium, Total | 18.3 | MG/KG | 1.0 | 1.0 |

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/11/06

CLIENT: TNUHANFORD RC-025 K0286 LVL LOT #: 0604L698

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -006 | J11KB8 | Silver, Total | 0.07 u | MG/KG | 0.07 | 1.0 |
| | | Aluminum, Total | 4560 | MG/KG | 2.3 | 1.0 |
| | | Arsenic, Total | 2.3 | MG/KG | 0.60 | 1.0 |
| | | Boron, Total | 0.76 | MG/KG | 0.24 | 1.0 |
| | | Barium, Total | 56.2 | MG/KG | 0.02 | 1.0 |
| | | Beryllium, Total | 0.79 | MG/KG | 0.02 | 1.0 |
| | | Calcium, Total | 4370 J | MG/KG | 2.2 | 1.0 |
| | | Cadmium, Total | 0.13 | MG/KG | 0.07 | 1.0 |
| | | Cobalt, Total | 7.2 | MG/KG | 0.14 | 1.0 |
| | | Chromium, Total | 6.4 | MG/KG | 0.13 | 1.0 |
| | | Copper, Total | 15.0 | MG/KG | 0.12 | 1.0 |
| | | Iron, Total | 15900 | MG/KG | 0.53 | 1.0 |
| | | Mercury, Total | 0.02 u | MG/KG | 0.02 | 1.0 |
| | | Potassium, Total | 866 | MG/KG | 75.9 | 1.0 |
| | | Lithium, Total | 5.5 | MG/KG | 0.03 | 1.0 |
| | | Magnesium, Total | 3550 | MG/KG | 3.8 | 1.0 |
| | | Manganese, Total | 308 | MG/KG | 0.03 | 1.0 |
| | | Molybdenum, Total | 0.49 | MG/KG | 0.29 | 1.0 |
| | | Sodium, Total | 89.8 | MG/KG | 2.5 | 1.0 |
| | | Nickel, Total | 9.7 | MG/KG | 0.24 | 1.0 |
| | | Phosphorus, Total | 808 | MG/KG | 0.89 | 1.0 |
| | | Lead, Total | 5.7 | MG/KG | 0.31 | 1.0 |
| | | Antimony, Total | 0.43 uJ | MG/KG | 0.43 | 1.0 |
| | | Selenium, Total | 0.46 u | MG/KG | 0.46 | 1.0 |
| | | Silicon, Total | 587 J | MG/KG | 2.2 | 1.0 |
| | | Tin, Total | 1.2 | MG/KG | 1.1 | 1.0 |
| | | Strontium, Total | 19.8 | MG/KG | 0.01 | 1.0 |
| | | Titanium, Total | 1270 | MG/KG | 0.03 | 1.0 |
| | | Thallium, Total | 0.69 u | MG/KG | 0.69 | 1.0 |
| | | Uranium, Total | 1.1 UJ | MG/KG | 0.87 | 1.0 |
| | | Vanadium, Total | 39.1 | MG/KG | 0.09 | 1.0 |
| | | Zinc, Total | 35.5 | MG/KG | 0.16 | 1.0 |
| | | Zirconium, Total | 17.9 | MG/KG | 1.0 | 1.0 |

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/11/06

CLIENT: TNUHANPORD RC-025 K0286 LVL LOT #: 0604L698

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -007 | J11KB9 | Silver, Total | 0.07 u | MG/KG | 0.07 | 1.0 |
| | | Aluminum, Total | 4530 | MG/KG | 2.3 | 1.0 |
| | | Arsenic, Total | 2.0 | MG/KG | 0.60 | 1.0 |
| | | Boron, Total | 1.0 | MG/KG | 0.24 | 1.0 |
| | | Barium, Total | 60.1 | MG/KG | 0.02 | 1.0 |
| | | Beryllium, Total | 0.26 | MG/KG | 0.02 | 1.0 |
| | | Calcium, Total | 5910 J | MG/KG | 2.2 | 1.0 |
| | | Cadmium, Total | 0.13 | MG/KG | 0.07 | 1.0 |
| | | Cobalt, Total | 6.2 | MG/KG | 0.14 | 1.0 |
| | | Chromium, Total | 6.7 | MG/KG | 0.13 | 1.0 |
| | | Copper, Total | 15.4 | MG/KG | 0.12 | 1.0 |
| | | Iron, Total | 14500 | MG/KG | 0.53 | 1.0 |
| | | Mercury, Total | 0.03 | MG/KG | 0.02 | 1.0 |
| | | Potassium, Total | 825 | MG/KG | 76.2 | 1.0 |
| | | Lithium, Total | 5.4 | MG/KG | 0.03 | 1.0 |
| | | Magnesium, Total | 3360 | MG/KG | 3.9 | 1.0 |
| | | Manganese, Total | 302 | MG/KG | 0.03 | 1.0 |
| | | Molybdenum, Total | 0.49 | MG/KG | 0.29 | 1.0 |
| | | Sodium, Total | 110 | MG/KG | 2.5 | 1.0 |
| | | Nickel, Total | 8.6 | MG/KG | 0.24 | 1.0 |
| | | Phosphorus, Total | 717 | MG/KG | 0.89 | 1.0 |
| | | Lead, Total | 5.0 | MG/KG | 0.31 | 1.0 |
| | | Antimony, Total | 0.42 uJ | MG/KG | 0.43 | 1.0 |
| | | Selenium, Total | 0.46 u | MG/KG | 0.46 | 1.0 |
| | | Silicon, Total | 491 J | MG/KG | 2.2 | 1.0 |
| | | Tin, Total | 1.3 | MG/KG | 1.1 | 1.0 |
| | | Strontium, Total | 25.6 | MG/KG | 0.01 | 1.0 |
| | | Titanium, Total | 1100 | MG/KG | 0.03 | 1.0 |
| | | Thallium, Total | 0.69 u | MG/KG | 0.69 | 1.0 |
| | | Uranium, Total | 1.3 UJ | MG/KG | 0.87 | 1.0 |
| | | Vanadium, Total | 35.2 | MG/KG | 0.09 | 1.0 |
| | | Zinc, Total | 34.4 | MG/KG | 0.16 | 1.0 |
| | | Zirconium, Total | 14.5 | MG/KG | 1.0 | 1.0 |

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/11/06

CLIENT: TNUHANFORD RC-025 K0286 LVL LOT #: 0604L698

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -008 | J11KC0 | Silver, Total | 0.07 u | MG/KG | 0.07 | 1.0 |
| | | Aluminum, Total | 3420 | MG/KG | 2.3 | 1.0 |
| | | Arsenic, Total | 1.7 | MG/KG | 0.58 | 1.0 |
| | | Boron, Total | 0.68 | MG/KG | 0.23 | 1.0 |
| | | Barium, Total | 48.1 | MG/KG | 0.02 | 1.0 |
| | | Beryllium, Total | 0.24 | MG/KG | 0.02 | 1.0 |
| | | Calcium, Total | 4310 J | MG/KG | 2.1 | 1.0 |
| | | Cadmium, Total | 0.09 | MG/KG | 0.07 | 1.0 |
| | | Cobalt, Total | 6.2 | MG/KG | 0.13 | 1.0 |
| | | Chromium, Total | 5.2 | MG/KG | 0.12 | 1.0 |
| | | Copper, Total | 14.8 | MG/KG | 0.11 | 1.0 |
| | | Iron, Total | 13200 | MG/KG | 0.52 | 1.0 |
| | | Mercury, Total | 0.02 u | MG/KG | 0.02 | 1.0 |
| | | Potassium, Total | 660 | MG/KG | 73.9 | 1.0 |
| | | Lithium, Total | 3.9 | MG/KG | 0.03 | 1.0 |
| | | Magnesium, Total | 2930 | MG/KG | 3.7 | 1.0 |
| | | Manganese, Total | 232 | MG/KG | 0.03 | 1.0 |
| | | Molybdenum, Total | 0.40 | MG/KG | 0.28 | 1.0 |
| | | Sodium, Total | 101 | MG/KG | 2.4 | 1.0 |
| | | Nickel, Total | 8.3 | MG/KG | 0.23 | 1.0 |
| | | Phosphorus, Total | 801 | MG/KG | 0.86 | 1.0 |
| | | Lead, Total | 3.2 | MG/KG | 0.30 | 1.0 |
| | | Antimony, Total | 0.42 u J | MG/KG | 0.42 | 1.0 |
| | | Selenium, Total | 0.45 u | MG/KG | 0.45 | 1.0 |
| | | Silicon, Total | 387 J | MG/KG | 2.2 | 1.0 |
| | | Tin, Total | 1.2 | MG/KG | 1.0 | 1.0 |
| | | Strontium, Total | 20.2 | MG/KG | 0.01 | 1.0 |
| | | Titanium, Total | 1010 | MG/KG | 0.03 | 1.0 |
| | | Thallium, Total | 0.67 u | MG/KG | 0.67 | 1.0 |
| | | Uranium, Total | 0.84 u | MG/KG | 0.84 | 1.0 |
| | | Vanadium, Total | 31.2 | MG/KG | 0.09 | 1.0 |
| | | Zinc, Total | 29.2 | MG/KG | 0.15 | 1.0 |
| | | Zirconium, Total | 14.4 | MG/KG | 1.0 | 1.0 |

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/11/06

CLIENT: TNUHANFORD RC-025 K0286 LVL LOT #: 0604L698

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -009 | J11KC1 | Silver, Total | 0.07 u | MG/KG | 0.07 | 1.0 |
| | | Aluminum, Total | 5780 | MG/KG | 2.3 | 1.0 |
| | | Arsenic, Total | 2.8 | MG/KG | 0.58 | 1.0 |
| | | Boron, Total | 1.8 | MG/KG | 0.23 | 1.0 |
| | | Barium, Total | 67.2 | MG/KG | 0.02 | 1.0 |
| | | Beryllium, Total | 0.34 | MG/KG | 0.02 | 1.0 |
| | | Calcium, Total | 4820 J | MG/KG | 2.1 | 1.0 |
| | | Cadmium, Total | 0.15 | MG/KG | 0.07 | 1.0 |
| | | Cobalt, Total | 8.4 | MG/KG | 0.13 | 1.0 |
| | | Chromium, Total | 7.8 | MG/KG | 0.12 | 1.0 |
| | | Copper, Total | 18.4 | MG/KG | 0.11 | 1.0 |
| | | Iron, Total | 19800 | MG/KG | 0.52 | 1.0 |
| | | Mercury, Total | 0.02 | MG/KG | 0.01 | 1.0 |
| | | Potassium, Total | 1150 | MG/KG | 73.7 | 1.0 |
| | | Lithium, Total | 5.9 | MG/KG | 0.03 | 1.0 |
| | | Magnesium, Total | 4090 | MG/KG | 3.7 | 1.0 |
| | | Manganese, Total | 362 | MG/KG | 0.03 | 1.0 |
| | | Molybdenum, Total | 0.53 | MG/KG | 0.28 | 1.0 |
| | | Sodium, Total | 129 | MG/KG | 2.4 | 1.0 |
| | | Nickel, Total | 11.7 | MG/KG | 0.23 | 1.0 |
| | | Phosphorus, Total | 944 | MG/KG | 0.86 | 1.0 |
| | | Lead, Total | 5.6 | MG/KG | 0.30 | 1.0 |
| | | Antimony, Total | 0.42 u J | MG/KG | 0.42 | 1.0 |
| | | Selenium, Total | 0.45 u | MG/KG | 0.45 | 1.0 |
| | | Silicon, Total | 483 J | MG/KG | 2.2 | 1.0 |
| | | Tin, Total | 1.3 | MG/KG | 1.0 | 1.0 |
| | | Strontium, Total | 27.5 | MG/KG | 0.01 | 1.0 |
| | | Titanium, Total | 1460 | MG/KG | 0.03 | 1.0 |
| | | Thallium, Total | 0.67 u | MG/KG | 0.67 | 1.0 |
| | | Uranium, Total | 1.6 UJ | MG/KG | 0.84 | 1.0 |
| | | Vanadium, Total | 43.7 | MG/KG | 0.09 | 1.0 |
| | | Zinc, Total | 39.4 | MG/KG | 0.15 | 1.0 |
| | | Zirconium, Total | 23.1 | MG/KG | 1.0 | 1.0 |

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/11/06

CLIENT: TNUHANFORD RC-025 K0286 LVL LOT #: 0604L698

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -010 | J11KC2 | Silver, Total | 0.08 u | MG/KG | 0.08 | 1.0 |
| | | Aluminum, Total | 7870 | MG/KG | 2.7 | 1.0 |
| | | Arsenic, Total | 7.5 | MG/KG | 0.69 | 1.0 |
| | | Boron, Total | 2.6 | MG/KG | 0.27 | 1.0 |
| | | Barium, Total | 70.5 | MG/KG | 0.02 | 1.0 |
| | | Beryllium, Total | 0.42 | MG/KG | 0.02 | 1.0 |
| | | Calcium, Total | 32500 J | MG/KG | 2.5 | 1.0 |
| | | Cadmium, Total | 0.21 | MG/KG | 0.08 | 1.0 |
| | | Cobalt, Total | 8.6 | MG/KG | 0.16 | 1.0 |
| | | Chromium, Total | 10.9 | MG/KG | 0.15 | 1.0 |
| | | Copper, Total | 21.2 | MG/KG | 0.14 | 1.0 |
| | | Iron, Total | 21000 | MG/KG | 0.61 | 1.0 |
| | | Mercury, Total | 0.02 u | MG/KG | 0.02 | 1.0 |
| | | Potassium, Total | 1290 | MG/KG | 86.8 | 1.0 |
| | | Lithium, Total | 11.9 | MG/KG | 0.03 | 1.0 |
| | | Magnesium, Total | 6020 | MG/KG | 4.4 | 1.0 |
| | | Manganese, Total | 388 | MG/KG | 0.03 | 1.0 |
| | | Molybdenum, Total | 0.56 | MG/KG | 0.33 | 1.0 |
| | | Sodium, Total | 218 | MG/KG | 2.8 | 1.0 |
| | | Nickel, Total | 14.1 | MG/KG | 0.27 | 1.0 |
| | | Phosphorus, Total | 802 | MG/KG | 1.0 | 1.0 |
| | | Lead, Total | 10.6 | MG/KG | 0.35 | 1.0 |
| | | Antimony, Total | 0.50 u J | MG/KG | 0.50 | 1.0 |
| | | Selenium, Total | 0.53 u | MG/KG | 0.53 | 1.0 |
| | | Silicon, Total | 526 J | MG/KG | 2.6 | 1.0 |
| | | Tin, Total | 1.2 u | MG/KG | 1.2 | 1.0 |
| | | Strontium, Total | 59.2 | MG/KG | 0.01 | 1.0 |
| | | Titanium, Total | 1020 | MG/KG | 0.03 | 1.0 |
| | | Thallium, Total | 0.79 u | MG/KG | 0.79 | 1.0 |
| | | Uranium, Total | 3.1 UJ | MG/KG | 0.99 | 1.0 |
| | | Vanadium, Total | 36.7 | MG/KG | 0.10 | 1.0 |
| | | Zinc, Total | 44.8 | MG/KG | 0.18 | 1.0 |
| | | Zirconium, Total | 11.2 | MG/KG | 1.2 | 1.0 |

6/23/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/11/06

CLIENT: TNUHANFORD RC-025 K0286 LVL LOT #: 0604L698

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -011 | J11KC3 | Silver, Total | 0.07 u | MG/KG | 0.07 | 1.0 |
| | | Aluminum, Total | 5380 | MG/KG | 2.3 | 1.0 |
| | | Arsenic, Total | 3.0 | MG/KG | 0.60 | 1.0 |
| | | Boron, Total | 0.82 | MG/KG | 0.24 | 1.0 |
| | | Barium, Total | 55.7 | MG/KG | 0.02 | 1.0 |
| | | Beryllium, Total | 0.35 | MG/KG | 0.02 | 1.0 |
| | | Calcium, Total | 6580 J | MG/KG | 2.2 | 1.0 |
| | | Cadmium, Total | 0.12 | MG/KG | 0.07 | 1.0 |
| | | Cobalt, Total | 7.8 | MG/KG | 0.14 | 1.0 |
| | | Chromium, Total | 7.4 | MG/KG | 0.13 | 1.0 |
| | | Copper, Total | 15.7 | MG/KG | 0.12 | 1.0 |
| | | Iron, Total | 18200 | MG/KG | 0.53 | 1.0 |
| | | Mercury, Total | 0.02 u | MG/KG | 0.02 | 1.0 |
| | | Potassium, Total | 1100 | MG/KG | 75.8 | 1.0 |
| | | Lithium, Total | 6.4 | MG/KG | 0.03 | 1.0 |
| | | Magnesium, Total | 4170 | MG/KG | 3.8 | 1.0 |
| | | Manganese, Total | 333 | MG/KG | 0.03 | 1.0 |
| | | Molybdenum, Total | 0.52 | MG/KG | 0.29 | 1.0 |
| | | Sodium, Total | 108 | MG/KG | 2.5 | 1.0 |
| | | Nickel, Total | 10.0 | MG/KG | 0.24 | 1.0 |
| | | Phosphorus, Total | 886 | MG/KG | 0.88 | 1.0 |
| | | Lead, Total | 5.8 | MG/KG | 0.30 | 1.0 |
| | | Antimony, Total | 0.43 uJ | MG/KG | 0.43 | 1.0 |
| | | Selenium, Total | 0.46 u | MG/KG | 0.46 | 1.0 |
| | | Silicon, Total | 522 J | MG/KG | 2.2 | 1.0 |
| | | Tin, Total | 1.3 | MG/KG | 1.1 | 1.0 |
| | | Strontium, Total | 23.7 | MG/KG | 0.01 | 1.0 |
| | | Titanium, Total | 1460 | MG/KG | 0.03 | 1.0 |
| | | Thallium, Total | 0.69 u | MG/KG | 0.69 | 1.0 |
| | | Uranium, Total | 2.2 UJ | MG/KG | 0.87 | 1.0 |
| | | Vanadium, Total | 44.6 | MG/KG | 0.09 | 1.0 |
| | | Zinc, Total | 38.5 | MG/KG | 0.16 | 1.0 |
| | | Zirconium, Total | 19.8 | MG/KG | 1.0 | 1.0 |

6/23/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/11/06

CLIENT: TNUHANFORD RC-025 K0286 LVL LOT #: 0604L698

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -012 | J11KC4 | Silver, Total | 0.06 u | MG/KG | 0.06 | 1.0 |
| | | Aluminum, Total | 40.8 | MG/KG | 2.1 | 1.0 |
| | | Arsenic, Total | 0.54 u | MG/KG | 0.54 | 1.0 |
| | | Boron, Total | 0.80 | MG/KG | 0.21 | 1.0 |
| | | Barium, Total | 1.3 | MG/KG | 0.02 | 1.0 |
| | | Beryllium, Total | 0.02 u | MG/KG | 0.02 | 1.0 |
| | | Calcium, Total | 18.1 J | MG/KG | 1.9 | 1.0 |
| | | Cadmium, Total | 0.06 u | MG/KG | 0.06 | 1.0 |
| | | Cobalt, Total | 0.12 u | MG/KG | 0.12 | 1.0 |
| | | Chromium, Total | 0.12 u | MG/KG | 0.12 | 1.0 |
| | | Copper, Total | 0.11 u | MG/KG | 0.11 | 1.0 |
| | | Iron, Total | 359 | MG/KG | 0.48 | 1.0 |
| | | Mercury, Total | 0.02 u | MG/KG | 0.02 | 1.0 |
| | | Potassium, Total | 68.3 u | MG/KG | 68.3 | 1.0 |
| | | Lithium, Total | 0.07 UJ | MG/KG | 0.03 | 1.0 |
| | | Magnesium, Total | 6.7 | MG/KG | 3.5 | 1.0 |
| | | Manganese, Total | 5.4 | MG/KG | 0.03 | 1.0 |
| | | Molybdenum, Total | 0.26 u | MG/KG | 0.26 | 1.0 |
| | | Sodium, Total | 6.9 UJ | MG/KG | 2.2 | 1.0 |
| | | Nickel, Total | 0.21 u | MG/KG | 0.21 | 1.0 |
| | | Phosphorus, Total | 3.3 UJ | MG/KG | 0.80 | 1.0 |
| | | Lead, Total | 0.34 | MG/KG | 0.27 | 1.0 |
| | | Antimony, Total | 0.39 u J | MG/KG | 0.39 | 1.0 |
| | | Selenium, Total | 0.42 u | MG/KG | 0.42 | 1.0 |
| | | Silicon, Total | 42.2 J | MG/KG | 2.0 | 1.0 |
| | | Tin, Total | 0.95 u | MG/KG | 0.95 | 1.0 |
| | | Strontium, Total | 0.22 | MG/KG | 0.009 | 1.0 |
| | | Titanium, Total | 1.9 | MG/KG | 0.03 | 1.0 |
| | | Thallium, Total | 0.62 u | MG/KG | 0.62 | 1.0 |
| | | Uranium, Total | 0.78 u | MG/KG | 0.78 | 1.0 |
| | | Vanadium, Total | 0.12 | MG/KG | 0.08 | 1.0 |
| | | Zinc, Total | 1.2 | MG/KG | 0.14 | 1.0 |
| | | Zirconium, Total | 0.94 u | MG/KG | 0.94 | 1.0 |

6/23/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/11/06

CLIENT: TNUHANFORD RC-025 K0286 LVL LOT #: 0604L698

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -013 | J11KD3 | Silver, Total | 0.07 u | MG/KG | 0.07 | 1.0 |
| | | Aluminum, Total | 3910 | MG/KG | 2.3 | 1.0 |
| | | Arsenic, Total | 2.0 | MG/KG | 0.59 | 1.0 |
| | | Boron, Total | 0.59 | MG/KG | 0.23 | 1.0 |
| | | Barium, Total | 50.6 | MG/KG | 0.02 | 1.0 |
| | | Beryllium, Total | 0.24 | MG/KG | 0.02 | 1.0 |
| | | Calcium, Total | 4720 J | MG/KG | 2.1 | 1.0 |
| | | Cadmium, Total | 0.14 | MG/KG | 0.07 | 1.0 |
| | | Cobalt, Total | 6.8 | MG/KG | 0.14 | 1.0 |
| | | Chromium, Total | 5.4 | MG/KG | 0.13 | 1.0 |
| | | Copper, Total | 14.2 | MG/KG | 0.12 | 1.0 |
| | | Iron, Total | 15200 | MG/KG | 0.52 | 1.0 |
| | | Mercury, Total | 0.04 | MG/KG | 0.02 | 1.0 |
| | | Potassium, Total | 772 | MG/KG | 74.5 | 1.0 |
| | | Lithium, Total | 4.9 | MG/KG | 0.03 | 1.0 |
| | | Magnesium, Total | 3060 | MG/KG | 3.8 | 1.0 |
| | | Manganese, Total | 276 | MG/KG | 0.03 | 1.0 |
| | | Molybdenum, Total | 0.45 | MG/KG | 0.28 | 1.0 |
| | | Sodium, Total | 101 | MG/KG | 2.4 | 1.0 |
| | | Nickel, Total | 8.0 | MG/KG | 0.23 | 1.0 |
| | | Phosphorus, Total | 889 | MG/KG | 0.87 | 1.0 |
| | | Lead, Total | 26.1 | MG/KG | 0.30 | 1.0 |
| | | Antimony, Total | 0.43 uJ | MG/KG | 0.43 | 1.0 |
| | | Selenium, Total | 0.45 u | MG/KG | 0.45 | 1.0 |
| | | Silicon, Total | 482 J | MG/KG | 2.2 | 1.0 |
| | | Tin, Total | 1.1 | MG/KG | 1.0 | 1.0 |
| | | Strontium, Total | 23.9 | MG/KG | 0.01 | 1.0 |
| | | Titanium, Total | 1020 | MG/KG | 0.03 | 1.0 |
| | | Thallium, Total | 0.68 u | MG/KG | 0.68 | 1.0 |
| | | Uranium, Total | 1.9 UJ | MG/KG | 0.85 | 1.0 |
| | | Vanadium, Total | 33.6 | MG/KG | 0.09 | 1.0 |
| | | Zinc, Total | 33.2 | MG/KG | 0.15 | 1.0 |
| | | Zirconium, Total | 14.6 | MG/KG | 1.0 | 1.0 |

6/23/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/11/06

CLIENT: TNUHANFORD RC-025 K0286 LVL LOT #: 0604L698

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -014 | J11KD4 | Silver, Total | 0.07 u | MG/KG | 0.07 | 1.0 |
| | | Aluminum, Total | 5170 | MG/KG | 2.3 | 1.0 |
| | | Arsenic, Total | 2.4 | MG/KG | 0.59 | 1.0 |
| | | Boron, Total | 0.95 | MG/KG | 0.23 | 1.0 |
| | | Barium, Total | 58.2 | MG/KG | 0.02 | 1.0 |
| | | Beryllium, Total | 0.32 | MG/KG | 0.02 | 1.0 |
| | | Calcium, Total | 4830 J | MG/KG | 2.1 | 1.0 |
| | | Cadmium, Total | 0.09 | MG/KG | 0.07 | 1.0 |
| | | Cobalt, Total | 7.0 | MG/KG | 0.14 | 1.0 |
| | | Chromium, Total | 8.7 | MG/KG | 0.13 | 1.0 |
| | | Copper, Total | 15.5 | MG/KG | 0.12 | 1.0 |
| | | Iron, Total | 16700 | MG/KG | 0.52 | 1.0 |
| | | Mercury, Total | 0.02 u | MG/KG | 0.02 | 1.0 |
| | | Potassium, Total | 1050 | MG/KG | 74.4 | 1.0 |
| | | Lithium, Total | 5.9 | MG/KG | 0.03 | 1.0 |
| | | Magnesium, Total | 3630 | MG/KG | 3.8 | 1.0 |
| | | Manganese, Total | 306 | MG/KG | 0.03 | 1.0 |
| | | Molybdenum, Total | 0.50 | MG/KG | 0.28 | 1.0 |
| | | Sodium, Total | 103 | MG/KG | 2.4 | 1.0 |
| | | Nickel, Total | 9.7 | MG/KG | 0.23 | 1.0 |
| | | Phosphorus, Total | 801 | MG/KG | 0.87 | 1.0 |
| | | Lead, Total | 7.2 | MG/KG | 0.20 | 1.0 |
| | | Antimony, Total | 0.42 u J | MG/KG | 0.42 | 1.0 |
| | | Selenium, Total | 0.45 u | MG/KG | 0.45 | 1.0 |
| | | Silicon, Total | 486 J | MG/KG | 2.2 | 1.0 |
| | | Tin, Total | 1.1 | MG/KG | 1.0 | 1.0 |
| | | Strontium, Total | 21.6 | MG/KG | 0.01 | 1.0 |
| | | Titanium, Total | 1250 | MG/KG | 0.03 | 1.0 |
| | | Thallium, Total | 0.68 u | MG/KG | 0.68 | 1.0 |
| | | Uranium, Total | 1.8 UJ | MG/KG | 0.85 | 1.0 |
| | | Vanadium, Total | 42.0 | MG/KG | 0.09 | 1.0 |
| | | Zinc, Total | 38.2 | MG/KG | 0.15 | 1.0 |
| | | Zirconium, Total | 17.4 | MG/KG | 1.0 | 1.0 |

6/23/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/11/06

CLIENT: TNUHANFORD RC-025 K0286 LVL LOT #: 0604L698

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -015 | J11KD5 | Silver, Total | 0.07 u | MG/KG | 0.07 | 1.0 |
| | | Aluminum, Total | 4790 | MG/KG | 2.4 | 1.0 |
| | | Arsenic, Total | 2.3 | MG/KG | 0.61 | 1.0 |
| | | Boron, Total | 0.97 | MG/KG | 0.24 | 1.0 |
| | | Barium, Total | 65.5 | MG/KG | 0.02 | 1.0 |
| | | Beryllium, Total | 0.32 | MG/KG | 0.02 | 1.0 |
| | | Calcium, Total | 4010 J | MG/KG | 2.2 | 1.0 |
| | | Cadmium, Total | 0.1 | MG/KG | 0.07 | 1.0 |
| | | Cobalt, Total | 7.4 | MG/KG | 0.14 | 1.0 |
| | | Chromium, Total | 6.3 | MG/KG | 0.13 | 1.0 |
| | | Copper, Total | 14.6 | MG/KG | 0.12 | 1.0 |
| | | Iron, Total | 15700 | MG/KG | 0.54 | 1.0 |
| | | Mercury, Total | 0.02 u | MG/KG | 0.02 | 1.0 |
| | | Potassium, Total | 1130 | MG/KG | 77.3 | 1.0 |
| | | Lithium, Total | 5.0 | MG/KG | 0.03 | 1.0 |
| | | Magnesium, Total | 3470 | MG/KG | 3.9 | 1.0 |
| | | Manganese, Total | 324 | MG/KG | 0.03 | 1.0 |
| | | Molybdenum, Total | 0.39 | MG/KG | 0.29 | 1.0 |
| | | Sodium, Total | 91.6 | MG/KG | 2.5 | 1.0 |
| | | Nickel, Total | 9.0 | MG/KG | 0.24 | 1.0 |
| | | Phosphorus, Total | 859 | MG/KG | 0.90 | 1.0 |
| | | Lead, Total | 4.8 | MG/KG | 0.31 | 1.0 |
| | | Antimony, Total | 0.44 u J | MG/KG | 0.44 | 1.0 |
| | | Selenium, Total | 0.47 u | MG/KG | 0.47 | 1.0 |
| | | Silicon, Total | 519 J | MG/KG | 2.3 | 1.0 |
| | | Tin, Total | 1.3 | MG/KG | 1.1 | 1.0 |
| | | Strontium, Total | 20.0 | MG/KG | 0.01 | 1.0 |
| | | Titanium, Total | 1140 | MG/KG | 0.03 | 1.0 |
| | | Thallium, Total | 0.70 u | MG/KG | 0.70 | 1.0 |
| | | Uranium, Total | 1.8 UJ | MG/KG | 0.88 | 1.0 |
| | | Vanadium, Total | 35.7 | MG/KG | 0.09 | 1.0 |
| | | Zinc, Total | 41.3 | MG/KG | 0.16 | 1.0 |
| | | Zirconium, Total | 19.4 | MG/KG | 1.1 | 1.0 |

6/23/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/11/06

CLIENT: TNUHANFORD RC-025 K0286 LVL LOT #: 0604L698

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -016 | J11KD6 | Silver, Total | 0.07 u | MG/KG | 0.07 | 1.0 |
| | | Aluminum, Total | 4090 | MG/KG | 2.2 | 1.0 |
| | | Arsenic, Total | 2.6 | MG/KG | 0.58 | 1.0 |
| | | Boron, Total | 3.3 | MG/KG | 0.23 | 1.0 |
| | | Barium, Total | 75.0 | MG/KG | 0.02 | 1.0 |
| | | Beryllium, Total | 0.26 | MG/KG | 0.02 | 1.0 |
| | | Calcium, Total | 6970 J | MG/KG | 2.1 | 1.0 |
| | | Cadmium, Total | 0.1 | MG/KG | 0.07 | 1.0 |
| | | Cobalt, Total | 6.6 | MG/KG | 0.13 | 1.0 |
| | | Chromium, Total | 12.7 | MG/KG | 0.12 | 1.0 |
| | | Copper, Total | 15.8 | MG/KG | 0.11 | 1.0 |
| | | Iron, Total | 14000 | MG/KG | 0.51 | 1.0 |
| | | Mercury, Total | 0.1 | MG/KG | 0.02 | 1.0 |
| | | Potassium, Total | 742 | MG/KG | 73.2 | 1.0 |
| | | Lithium, Total | 4.9 | MG/KG | 0.03 | 1.0 |
| | | Magnesium, Total | 3120 | MG/KG | 3.7 | 1.0 |
| | | Manganese, Total | 264 | MG/KG | 0.03 | 1.0 |
| | | Molybdenum, Total | 0.46 | MG/KG | 0.28 | 1.0 |
| | | Sodium, Total | 154 | MG/KG | 2.4 | 1.0 |
| | | Nickel, Total | 8.1 | MG/KG | 0.23 | 1.0 |
| | | Phosphorus, Total | 896 | MG/KG | 0.86 | 1.0 |
| | | Lead, Total | 7.4 | MG/KG | 0.29 | 1.0 |
| | | Antimony, Total | 0.42 u J | MG/KG | 0.42 | 1.0 |
| | | Selenium, Total | 0.45 u | MG/KG | 0.45 | 1.0 |
| | | Silicon, Total | 517 J | MG/KG | 2.2 | 1.0 |
| | | Tin, Total | 1.3 | MG/KG | 1.0 | 1.0 |
| | | Strontium, Total | 33.1 | MG/KG | 0.01 | 1.0 |
| | | Titanium, Total | 1090 | MG/KG | 0.03 | 1.0 |
| | | Thallium, Total | 0.66 u | MG/KG | 0.66 | 1.0 |
| | | Uranium, Total | 2.2 UJ | MG/KG | 0.84 | 1.0 |
| | | Vanadium, Total | 33.9 | MG/KG | 0.09 | 1.0 |
| | | Zinc, Total | 39.0 | MG/KG | 0.15 | 1.0 |
| | | Zirconium, Total | 14.5 | MG/KG | 1.0 | 1.0 |

6/23/06

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-025-004 | Page 2 of 3 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector<br>C. Martinez/K Singleton/D. Bowers | Company Contact<br>C. Martinez | Telephone No.<br>509-539-2816 | Project Coordinator<br>KESSNER, JH |
| Project Designation<br>100-BC Remaining Pipelines and Sewers - Soil Full Protocol | Sampling Location<br>100-B-14:2 (115-B) Area 5 | | SAF No.<br>RC-025 |
| Ice Chest No. ERC-03-105 | Field Logbook No.<br>EL-1585-5 | COA<br>R10B14 2000 | Method of Shipment<br>fed ex |
| Shipped To<br>EBERLINE SERVICES/ LIONVILLE | Offsite Property No. A060350 | | Bill of Lading/Air Bill No. SEE OSPC |

Price Code: Air Quality ☐ 21 days

Data Turnaround

POSSIBLE SAMPLE HAZARDS/REMARKS

*none*

Special Handling and/or Storage

*cool 4 degrees centigrade*

000032

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | None | Cool 4C | Cool 4C | Cool 4C | None | None | None | Cool 4C | | |
| Type of Container | G/P | G/P | aG | aG | G/P | G/P | G/P | aG | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Volume | 250g | ~~125g~~ 120mL | 120mL | 120mL | 500mL | 120mL | 120mL | 250mL | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Chromium Hex - 7196 | PCBs - 8082 | Semi-VOA - 8270A (TCL) | See item (2) in Special Instructions. | ~~Carbon-14~~, Tritium - 3H | ~~Nickel-63~~, Strontium-89,90 -- Total Sr | Pesticides - 8081, ~~Chloro-Herbicides - 8041A/8151~~ 04/04/06 | | |

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J11KB8 | SOIL | 04/04/06 | 1235 | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | |
| J11KB9 | SOIL | 04/04/06 | 1240 | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | |
| J11KC0 | SOIL | 04/04/06 | 1245 | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | |
| J11KC1 | SOIL | 04/04/06 | 1345 | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | |
| J11KC2 | SOIL | 04/04/06 | 1355 | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | |

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By/Removed From<br>Kevin Singleton | Date/Time 1600 4-4-06 | Received By/Stored In<br>3728 RefZ | Date/Time 1600 4-4-06 |
| Relinquished By/Removed From<br>3728 #2A | Date/Time 4-5-06 0930 | Received By/Stored In<br>T.E. Edmondson | Date/Time 4-5-06 0930 |
| Relinquished By/Removed From<br>T.E. Edmondson | Date/Time 4-5-06 1500 | Received By/Stored In<br>FED EX | Date/Time |
| Relinquished By/Removed From<br>FED EX | Date/Time 4/6/06 0910 | Received By/Stored In | Date/Time 4/6/06 0910 |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |

SPECIAL INSTRUCTIONS

~~(2) addition to item # 2. Run gross alpha and gross beta off available material.~~

(1) ICP Metals - 6010TR (Client List) {Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Vanadium}; ICP Metals - 6010A (Add-on) {Titanium, Uranium, Zinc, Zirconium}; Mercury - 7471 - (CV)

~~(2) Gamma Spectroscopy (TCL List) {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}~~

Personnel not available to relinquish samples from 3728 Ref #2A on 4/5/06

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 |

BHI-EE-011 (08/29/2005)

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-025-004 | Page 2 of 2 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| **Collector** C. Martinez/K Singleton/D. Bowers | **Company Contact** C. Martinez **Telephone No.** 509-539-2816 | **Project Coordinator** KESSNER, JH | **Price Code** **Data Turnaround** |
| **Project Designation** 100-BC Remaining Pipelines and Sewers - Soil Full Protocol | **Sampling Location** 100-B-14:2 (115-B) Area 5 | **SAF No.** RC-025 | **Air Quality** ☐ 21 days |
| **Ice Chest No.** ERC-99-063 | **Field Logbook No.** EL-1585-5 **COA** R10314 2000 | **Method of Shipment** fed ex | |
| **Shipped To** EBERLINE SERVICES / LIONVILLE | **Offsite Property No.** A060350 | **Bill of Lading/Air Bill No.** SEE OSPC | |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*none*

**Special Handling and/or Storage**

*cool 4 degrees centigrade*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **Preservation** | None | Cool 4C | Cool 4C | Cool 4C | None | None | None | Cool 4C | | |
| | | | | **Type of Container** | G/P | G/P | aG | aG | G/P | G/P | G/P | aG | | |
| | | | | **No. of Container(s)** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | | | **Volume** | 250g 04/04/06 | ~~125g~~ 120mL | 120mL | 120mL | 500mL | 120mL | 120mL | 250mL | | |
| | | | | **SAMPLE ANALYSIS** | See item (1) in Special Instructions. | Chromium Hex - 7196 | PCBs - 8082 | Semi-VOA - 8270A (TCL) | See item (2) in Special Instructions. | ~~Carbon 14,~~ Tritium - 3H3 | ~~Nickel 63,~~ Strontium-89,90 -- Total Sr | Pesticides - 8081; ~~Chlorophenoxy Herbicides, 8151~~ 04/04/06 | | |
| **Sample No.** | **Matrix *** | **Sample Date** | **Sample Time** | | | | | | | | | | | |
| J11KC3 | SOIL | 04/04/06 | 1055 | | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | |
| J11KC4 | SOIL | 04/04/06 | 1040 | | ✓ | N/A | N/A | ✓ | | | | N/A | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

0000033

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By/Removed From | Date/Time 1600 | Received By/Stored In | Date/Time 1600 |
| Kevin Singleton 4-4-06 | | 3278 Ref 2 4-4-06 | |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| 3728 #2A 4-5-06 | 0930 | JR Edmundson 4-5-06 | 0930 |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| WCH JR Edmundson 4-5-06 | 1500 | FED EX | |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| FED EX 4/6/06 | 0910 | Hernandez 4/6/06 | 0910 |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |

**SPECIAL INSTRUCTIONS** 04/04/06

~~(2) addition to item # 2. Run gross alpha and gross beta off available material.~~

(1) ICP Metals - 6010TR (Client List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Vanadium); ICP Metals - 6010A (Add-on) (Titanium, Uranium, Zinc, Zirconium); Mercury - 7471 - (CV)

~~(2) Gamma Spectroscopy (TCL List) (Cesium 137, Cobalt 60, Europium 152, Europium 154, Europium 155)~~ 04/04/06

Personnel not available to Relinquish samples from 3728 Ref # 2A on 4/5/06

**Matrix ***

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

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

BHI-EE-011 (08/29/2005)

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-025-006 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: C. Martinez/K Singleton/D. Bowers | Company Contact: C. Martinez | Telephone No.: 509-539-2816 | Project Coordinator: KESSNER, JH |
| Price Code | Data Turnaround: Air Quality ☐ 21 days | | |
| Project Designation: 100-BC Remaining Pipelines and Sewers - Soil Full Protocol | Sampling Location: 100-B-14:2 (115-B) BCL Area 5 | | SAF No.: RC-025 |
| Ice Chest No.: GRP-03-009 | Field Logbook No.: EL-1585-5 | COA: R10B142000 | Method of Shipment: fed ex |
| Shipped To: EBERLINE SERVICES/ LIONVILLE | Offsite Property No.: A060350 | | Bill of Lading/Air Bill No.: SEE OSPC |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*none*

**Special Handling and/or Storage**

*cool 4 degrees centigrade*

000034

| SAMPLE ANALYSIS | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | None | Cool 4C | Cool 4C | Cool 4C | None | None | Cool 4C | | | |
| Type of Container | G/P | G/P | aG | aG | G/P | G/P | aG | | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | |
| Volume | 250g | ~~125g~~ 20mL 04/04/06 | 120mL | 120mL | 500mL | 120mL | 250mL | | | |
| | See item (1) in Special Instructions. | Chromium Hex - 7196 | PCBs - 8082 | Semi-VOA - 8270A (TCL) | See item (2) in Special Instructions. | ~~Gamma-14,~~ Tritium - H3 | Pesticides - 8081; ~~Chlorinated Herbicides - 8151~~ 04/04/06 | | | |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | |
| J11KD3 | SOIL | 04/04/06 | 0915 | ✓ | ✓ | ✓ | ✓ | | | ✓ | |
| J11KD4 | SOIL | 04/04/06 | 0925 | ✓ | ✓ | ✓ | ✓ | | | ✓ | |
| J11KD5 | SOIL | 04/04/06 | 0930 | ✓ | ✓ | ✓ | ✓ | | | ✓ | |
| J11KD6 | SOIL | 04/04/06 | 0935 | ✓ | ✓ | ✓ | ✓ | | | ✓ | |
| | | | | | | | | | | | |

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

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| Kevin Singleton | 1600 4-4-06 | 3728 Ref 2A | 1600 4-4-06 |
| 3728 #2A | 4-5-06 0930 | TR Edmundson / TR Edmundson | 4-5-06 0930 |
| TR Edmundson / TR Edmundson | WCH 4-5-06 1500 | FED EX | |
| Fed Ex | 4/6/06 0910 | | 4/6/06 0910 |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |

**SPECIAL INSTRUCTIONS** 04/04/06

~~(2) addition to item # 2. Run gross alpha and gross beta off available material.~~

(1) ICP Metals - 6010TR (Client List) {Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Vanadium}; ICP Metals - 6010A (Add-on) {Titanium, Uranium, Zinc, Zirconium}; Mercury - 7471 - (CV)

~~(2) Gamma Spectroscopy (TCL List) {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}~~ 04/04/06

Personnel not available to relinquish samples from 3728 Ref # 2A on 4/5/06

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 |

BHI-EE-011 (08/29/2005)

## Appendix 5

## Data Validation Supporting Documentation

# INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

| VALIDATION LEVEL: | A | B | C | D | E |
|---|---|---|---|---|---|

| | | | |
|---|---|---|---|
| PROJECT: 100-B-14:2 | | DATA PACKAGE: K0286 | |
| VALIDATOR: TLI | LAB: LLR | | DATE: 6/12/06 |
| | | SDG: K0286 | |

ANALYSES PERFORMED

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

SAMPLES/MATRIX

J11KB3 J11KB4 J11KB5 J11KB6 J11KB7 J11KB8
J11KB9 J11KC0 J11KC1 J11KC2 J11KC3 J11KD3
J11KD4 J11KD5 J11KD6 J11KC4

Soil

## 1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments:

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

Initial calibrations performed on all instruments? ..... Yes No (N/A)

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

ICP interference checks acceptable? ..... Yes No (N/A)

ICV and CCV checks performed on all instruments? ..... Yes No (N/A)

ICV and CCV checks acceptable? ..... Yes No (N/A)

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

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

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

Comments:

# INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

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

ICB and CCB checks performed for all applicable analyses? (Levels D, E) ..... Yes No N/A

ICB and CCB results acceptable? (Levels D, E) ..... Yes No N/A

Laboratory blanks analyzed? ..... Yes No N/A

Laboratory blank results acceptable? ..... Yes No N/A

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

Field blank results acceptable? (Levels C, D, E) ..... Yes No N/A

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

Comments: Lithium - UJ C4
Sodium - " "
phosphorous - " "

ED - al, boron, barium, calcium, iron, magnesium, manganese, silicon, strontium, titanium, vanadium, zinc

Uranium - UJ - B8, B9, C1, C2, C3, D3, D4, D5, D6

## 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 - Calcium 68.6 - J all no PAS
MS - Antimony - 59.2 - J all

LCS - Silicon - 50.3 - 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: _____

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

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

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

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

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

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

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

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

Comments: _____

# INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

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

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

Comments: _____

## 8. HOLDING TIMES (all levels)

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

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

Comments: _____

# INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

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

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

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

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

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

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

Comments:

## Appendix 6

## Additional Documentation Requested by Client

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 05/11/06

CLIENT: TNUHANFORD RC-025 K0286 LVL LOT #: 0604L698

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

| SAMPLE | SITE ID | ANALYTE | RESULT | | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|---|
| BLANK1 | 06L0233-MB1 | Silver, Total | 0.07 | u | MG/KG | 0.07 | 1.0 |
| | | Aluminum, Total | 2.4 | u | MG/KG | 2.4 | 1.0 |
| | | Arsenic, Total | 0.61 | u | MG/KG | 0.61 | 1.0 |
| | | Boron, Total | 0.24 | u | MG/KG | 0.24 | 1.0 |
| | | Barium, Total | 0.02 | u | MG/KG | 0.02 | 1.0 |
| | | Beryllium, Total | 0.02 | u | MG/KG | 0.02 | 1.0 |
| | | Calcium, Total | 2.2 | u | MG/KG | 2.2 | 1.0 |
| | | Cadmium, Total | 0.07 | u | MG/KG | 0.07 | 1.0 |
| | | Cobalt, Total | 0.14 | u | MG/KG | 0.14 | 1.0 |
| | | Chromium, Total | 0.13 | u | MG/KG | 0.13 | 1.0 |
| | | Copper, Total | 0.12 | u | MG/KG | 0.12 | 1.0 |
| | | Iron, Total | 0.54 | u | MG/KG | 0.54 | 1.0 |
| | | Potassium, Total | 77.1 | u | MG/KG | 77.1 | 1.0 |
| | | Lithium, Total | 0.05 | | MG/KG | 0.03 | 1.0 |
| | | Magnesium, Total | 3.9 | u | MG/KG | 3.9 | 1.0 |
| | | Manganese, Total | 0.03 | u | MG/KG | 0.03 | 1.0 |
| | | Molybdenum, Total | 0.29 | u | MG/KG | 0.29 | 1.0 |
| | | Sodium, Total | 3.1 | | MG/KG | 2.5 | 1.0 |
| | | Nickel, Total | 0.24 | u | MG/KG | 0.24 | 1.0 |
| | | Phosphorus, Total | 1.0 | | MG/KG | 0.90 | 1.0 |
| | | Lead, Total | 0.31 | u | MG/KG | 0.31 | 1.0 |
| | | Antimony, Total | 0.44 | u | MG/KG | 0.44 | 1.0 |
| | | Selenium, Total | 0.47 | u | MG/KG | 0.47 | 1.0 |
| | | Silicon, Total | 2.3 | u | MG/KG | 2.3 | 1.0 |
| | | Tin, Total | 1.1 | u | MG/KG | 1.1 | 1.0 |
| | | Strontium, Total | 0.01 | | MG/KG | 0.01 | 1.0 |
| | | Titanium, Total | 0.03 | u | MG/KG | 0.03 | 1.0 |
| | | Thallium, Total | 0.70 | u | MG/KG | 0.70 | 1.0 |
| | | Uranium, Total | 1.0 | | MG/KG | 0.88 | 1.0 |
| | | Vanadium, Total | 0.09 | u | MG/KG | 0.09 | 1.0 |
| | | Zinc, Total | 0.16 | u | MG/KG | 0.16 | 1.0 |
| | | Zirconium, Total | 1.1 | u | MG/KG | 1.1 | 1.0 |
| BLANK1 | 06C0072-MB1 | Mercury, Total | 0.02 | u | MG/KG | 0.02 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 05/11/06

CLIENT: TNUHANFORD RC-025 K0286 LVL LOT #: 0604L698

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

| SAMPLE | SITE ID | ANALYTE | SPIKED SAMPLE | INITIAL RESULT | SPIKED AMOUNT | %RECOV | DILUTION FACTOR(SPK) |
|---|---|---|---|---|---|---|---|
| -001 | J11KB3 | Silver, Total | 4.6 | 0.07u | 5.0 | 92.0 | 1.0 |
| | | Aluminum, Total | 5700 | 4250 | 201 | 717.3* | 1.0 |
| | | Arsenic, Total | 184 | 2.6 | 201 | 90.3 | 1.0 |
| | | Boron, Total | 91.4 | 0.88 | 100 | 90.1 | 1.0 |
| | | Barium, Total | 236 | 44.2 | 201 | 95.6 | 1.0 |
| | | Beryllium, Total | 4.8 | 0.24 | 5.0 | 91.3 | 1.0 |
| | | Calcium, Total | 8580 | 6860 | 2510 | 68.6 | 1.0 |
| | | Cadmium, Total | 4.6 | 0.09 | 5.0 | 90.2 | 1.0 |
| | | Cobalt, Total | 52.4 | 7.1 | 50.2 | 90.2 | 1.0 |
| | | Chromium, Total | 25.7 | 5.8 | 20.1 | 99.0 | 1.0 |
| | | Copper, Total | 40.0 | 14.8 | 25.1 | 100.4 | 1.0 |
| | | Iron, Total | 17200 | 17300 | 100 | -97. * | 1.0 |
| | | Potassium, Total | 3190 | 951 | 2510 | 89.1 | 1.0 |
| | | Lithium, Total | 114 | 5.6 | 100 | 107.7 | 1.0 |
| | | Magnesium, Total | 5940 | 3680 | 2510 | 90.0 | 1.0 |
| | | Manganese, Total | 334 | 289 | 50.2 | 90.0* | 1.0 |
| | | Molybdenum, Total | 92.3 | 0.49 | 100 | 91.4 | 1.0 |
| | | Sodium, Total | 2340 | 119 | 2510 | 88.3 | 1.0 |
| | | Nickel, Total | 54.4 | 8.7 | 50.2 | 91.0 | 1.0 |
| | | Phosphorus, Total | 1300 | 939 | 502 | 71.5 | 1.0 |
| | | Lead, Total | 51.4 | 5.1 | 50.2 | 92.2 | 1.0 |
| | | Antimony, Total | 29.7 | 0.44u | 50.2 | 59.2 | 1.0 |
| | | Selenium, Total | 175 | 0.47u | 201 | 86.9 | 1.0 |
| | | Silicon, Total | 791 | 522 | 100 | 267.7* | 1.0 |
| | | Tin, Total | 92.9 | 1.1 | 100 | 91.3 | 1.0 |
| | | Strontium, Total | 118 | 21.6 | 100 | 95.9 | 1.0 |
| | | Titanium, Total | 1500 | 1330 | 100 | 169.7* | 1.0 |
| | | Thallium, Total | 184 | 0.70u | 201 | 91.8 | 1.0 |
| | | Uranium, Total | 231 | 0.88u | 251 | 91.8 | 1.0 |
| | | Vanadium, Total | 90.5 | 40.8 | 50.2 | 99.0 | 1.0 |
| | | Zinc, Total | 83.5 | 38.8 | 50.2 | 89.0 | 1.0 |
| | | Zirconium, Total | 438 | 16.1 | 502 | 84.0 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 05/11/06

CLIENT: TNUHANFORD RC-025 K0286 LVL LOT #: 0604L698

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

| SAMPLE | SITE ID | ANALYTE | SPIKED SAMPLE | INITIAL RESULT | SPIKED AMOUNT | %RECOV | DILUTION FACTOR(SPK) |
|---|---|---|---|---|---|---|---|
| -008 | J11KC0 | Mercury, Total | 0.17 | 0.02u | 0.16 | 107.7 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 05/11/06

CLIENT: TNUHANFORD RC-025 K0286 LVL LOT #: 0604L698

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

| SAMPLE | SITE ID | ANALYTE | INITIAL RESULT | REPLICATE | RPD | DILUTION FACTOR(REP) |
|---|---|---|---|---|---|---|
| -001REP | J11KB3 | Silver, Total | 0.07u | 0.07u | NC | 1.0 |
| | | Aluminum, Total | 4250 | 5120 | 18.5 | 1.0 |
| | | Arsenic, Total | 2.6 | 2.8 | 7.4 | 1.0 |
| | | Boron, Total | 0.88 | 0.74 | 17.7 | 1.0 |
| | | Barium, Total | 44.2 | 49.7 | 11.7 | 1.0 |
| | | Beryllium, Total | 0.24 | 0.27 | 10.9 | 1.0 |
| | | Calcium, Total | 6860 | 7070 | 3.0 | 1.0 |
| | | Cadmium, Total | 0.09 | 0.13 | 31.2 | 1.0 |
| | | Cobalt, Total | 7.1 | 8.0 | 11.9 | 1.0 |
| | | Chromium, Total | 5.8 | 7.6 | 26.9 | 1.0 |
| | | Copper, Total | 14.8 | 16.5 | 10.9 | 1.0 |
| | | Iron, Total | 17300 | 18400 | 6.2 | 1.0 |
| | | Potassium, Total | 951 | 1130 | 17.4 | 1.0 |
| | | Lithium, Total | 5.6 | 6.7 | 17.9 | 1.0 |
| | | Magnesium, Total | 3680 | 4210 | 13.4 | 1.0 |
| | | Manganese, Total | 289 | 309 | 6.9 | 1.0 |
| | | Molybdenum, Total | 0.49 | 0.48 | 2.1 | 1.0 |
| | | Sodium, Total | 119 | 144 | 19.4 | 1.0 |
| | | Nickel, Total | 8.7 | 11.2 | 25.1 | 1.0 |
| | | Phosphorus, Total | 939 | 931 | 0.86 | 1.0 |
| | | Lead, Total | 5.1 | 5.2 | 1.9 | 1.0 |
| | | Antimony, Total | 0.44u | 0.44u | NC | 1.0 |
| | | Selenium, Total | 0.47u | 0.47u | NC | 1.0 |
| | | Silicon, Total | 522 | 446 | 15.7 | 1.0 |
| | | Tin, Total | 1.1 | 1.3 | 16.7 | 1.0 |
| | | Strontium, Total | 21.6 | 23.7 | 9.3 | 1.0 |
| | | Titanium, Total | 1330 | 1520 | 13.4 | 1.0 |
| | | Thallium, Total | 0.70u | 0.70u | NC | 1.0 |
| | | Uranium, Total | 0.88u | 0.88u | NC | 1.0 |
| | | Vanadium, Total | 40.8 | 48.5 | 17.2 | 1.0 |
| | | Zinc, Total | 38.8 | 41.6 | 7.0 | 1.0 |
| | | Zirconium, Total | 16.1 | 18.5 | 13.9 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 05/11/06

CLIENT: TNUHANFORD RC-025 K0286 LVL LOT #: 0604L698

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

| SAMPLE | SITE ID | ANALYTE | INITIAL RESULT | REPLICATE | RPD | DILUTION FACTOR(REP) |
|---|---|---|---|---|---|---|
| -008REP | J11KC0 | Mercury, Total | 0.02u | 0.02u | NC | 1.0 |

Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 05/11/06

CLIENT: TNUHANFORD RC-025 K0286 LVL LOT #: 0604L698

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

| SAMPLE | SITE ID | ANALYTE | SPIKED SAMPLE | SPIKED AMOUNT | UNITS | %RECOV |
|---|---|---|---|---|---|---|
| LCS1 | 06L0233-LC1 | Silver, LCS | 48.7 | 50.0 | MG/KG | 97.4 |
| | | Aluminum, LCS | 456 | 500 | MG/KG | 91.2 |
| | | Arsenic, LCS | 936 | 1000 | MG/KG | 93.6 |
| | | Boron, LCS | 474 | 500 | MG/KG | 94.9 |
| | | Barium, LCS | 486 | 500 | MG/KG | 97.3 |
| | | Beryllium, LCS | 23.5 | 25.0 | MG/KG | 94.0 |
| | | Calcium, LCS | 2180 | 2500 | MG/KG | 87.1 |
| | | Cadmium, LCS | 24.2 | 25.0 | MG/KG | 96.8 |
| | | Cobalt, LCS | 243 | 250 | MG/KG | 97.4 |
| | | Chromium, LCS | 49.2 | 50.0 | MG/KG | 98.4 |
| | | Copper, LCS | 124 | 125 | MG/KG | 99.3 |
| | | Iron, LCS | 449 | 500 | MG/KG | 89.8 |
| | | Potassium, LCS | 2250 | 2500 | MG/KG | 89.8 |
| | | Lithium, LCS | 505 | 500 | MG/KG | 100.9 |
| | | Magnesium, LCS | 2220 | 2500 | MG/KG | 88.8 |
| | | Manganese, LCS | 75.0 | 75.0 | MG/KG | 100 |
| | | Molybdenum, LCS | 498 | 500 | MG/KG | 99.5 |
| | | Sodium, LCS | 2280 | 2500 | MG/KG | 91.3 |
| | | Nickel, LCS | 195 | 200 | MG/KG | 97.7 |
| | | Phosphorus, LCS | 445 | 500 | MG/KG | 89.0 |
| | | Lead, LCS | 242 | 250 | MG/KG | 96.8 |
| | | Antimony, LCS | 286 | 300 | MG/KG | 95.3 |
| | | Selenium, LCS | 899 | 1000 | MG/KG | 89.9 |
| | | Silicon, LCS | 252 | 500 | MG/KG | 50.3 |
| | | Tin, LCS | 497 | 500 | MG/KG | 99.4 |
| | | Strontium, LCS | 488 | 500 | MG/KG | 97.5 |
| | | Titanium, LCS | 489 | 500 | MG/KG | 97.8 |
| | | Thallium, LCS | 975 | 1000 | MG/KG | 97.5 |
| | | Uranium, LCS | 242 | 250 | MG/KG | 96.7 |
| | | Vanadium, LCS | 244 | 250 | MG/KG | 97.6 |
| | | Zinc, LCS | 96.3 | 100 | MG/KG | 96.3 |
| | | Zirconium, LCS | 457 | 500 | MG/KG | 91.4 |
| LCS1 | 06C0072-LC1 | Mercury, LCS | 6.4 | 6.2 | MG/KG | 102.8 |

Date: 28 June 2006
To: Washington Closure Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100 BC Remaining Pipelines & Sewers – Soil Full Protocol - Waste Subsite 100-B-14:2
Subject: PCB/Pesticide - Data Package No. K0286-LLI

## INTRODUCTION

This memo presents the results of data validation on Data Package No. K0286 prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

| Sample ID | Sample Date | Media | Validation | Date |
|---|---|---|---|---|
| J11KB3 | 4/4/06 | Soil | C | See note 1 |
| J11KB4 | 4/4/06 | Soil | C | See note 1 |
| J11KB5 | 4/4/06 | Soil | C | See note 1 |
| J11KB6 | 4/4/06 | Soil | C | See note 1 |
| J11KB7 | 4/4/06 | Soil | C | See note 1 |
| J11KB8 | 4/4/06 | Soil | C | See note 1 |
| J11KB9 | 4/4/06 | Soil | C | See note 1 |
| J11KC0 | 4/4/06 | Soil | C | See note 1 |
| J11KC1 | 4/4/06 | Soil | C | See note 1 |
| J11KC2 | 4/4/06 | Soil | C | See note 1 |
| J11KC3 | 4/4/06 | Soil | C | See note 1 |
| J11KD3 | 4/4/06 | Soil | C | See note 1 |
| J11KD4 | 4/4/06 | Soil | C | See note 1 |
| J11KD5 | 4/4/06 | Soil | C | See note 1 |
| J11KD6 | 4/4/06 | Soil | C | See note 1 |

1– PCBs by 8082 & pesticides by 8081.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, February 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 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 LCS recoveries outside QC limits, all pesticide results (except toxaphene) were qualified as estimates and flagged "J".

Due to the lack of a matrix spike, matrix spike duplicate or LCS 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 surrogate recoveries outside QC limits, the beta-BHC result in samples J11KB3 and J11KC3 and the methoxyclor result in sample J11KB4 were qualified as estimates and flagged "J".

Due to surrogate recoveries outside QC limits, the aroclor-1254 result in samples J11KB6, J11KB9, J11KC0 and J11KC3 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 lack of a matrix spike and matrix spike duplicate analysis, all toxaphene results were qualified as estimates and flagged "J".

All other precision results were acceptable.

Field Duplicate

One set of field duplicates (J11KB6/J11KC3) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the 100 Area RQLs to ensure that laboratory detection levels meet the required criteria. All toxaphene results exceeded the RQL. Under the WCH statement of work, no qualification is required. All other analytes met the RQL.

- **Completeness**

Data Package No. K0286 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 deficiency was noted:

- Due to LCS recoveries outside QC limits, all pesticide results (except toxaphene) were qualified as estimates and flagged "J".

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

- Due to surrogate recoveries outside QC limits, the beta-BHC result in samples J11KB3 and J11KC3 and the methoxyclor result in sample J11KB4 were qualified as estimates and flagged "J".

- Due to surrogate recoveries outside QC limits, the aroclor-1254 result in samples J11KB6, J11KB9, J11KC0 and J11KC3 were qualified as estimates and flagged "J".

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

All toxaphene results exceeded the RQL. Under the WCH statement of work, no qualification is required.

## REFERENCES

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

DOE/RL-96-22, Rev. 4, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, February 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: K0286 | REVIEWER: TLI | Project: 100-B-14:2 | PAGE 1 OF 1 |
|---|---|---|---|
| COMMENTS: | | | |
| COMPOUND | QUALIFIER | SAMPLES AFFECTED | REASON |
| Toxaphene | J | All | No MS/MSD/LCS analysis |
| All pesticide analytes (except toxahene) | J | All | LCS recovery |
| Beta-BHC | J | J11KB3, K11KC3 | Surrogate recovery |
| Methoxyclor | J | J11KB4 | Surrogate recovery |
| Aroclor-1254 | J | J11KB6, J11KB9 J11KC0, J11KC3 | 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

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



Project: WASHINGTON CLOSURE HANFORD

Laboratory: LLI | SDG: K0286

| Sample Number | | J11KB3 | | J11KB4 | | J11KB5 | | J11KB6 | | J11KB7 | | J11KB8 | | J11KB9 | | J11KC0 | | J11KC1 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Remarks | | | | | | | | Main | | | | | | | | | | | |
| Sample Date | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | |
| Extraction Date | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | |
| Analysis Date | | 4/19/06 | | 4/19/06 | | 4/19/06 | | 4/19/06 | | 4/19/06 | | 4/19/06 | | 4/19/06 | | 4/19/06 | | 4/19/06 | |
| PCB | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| Aroclor-1016 | 100 | 15 | U | 14 | U | 14 | U | 15 | U | 14 | U | 14 | U | 15 | U | 14 | U | 14 | U |
| Aroclor-1221 | 100 | 15 | U | 14 | U | 14 | U | 15 | U | 14 | U | 14 | U | 15 | U | 14 | U | 14 | U |
| Aroclor-1232 | 100 | 15 | U | 14 | U | 14 | U | 15 | U | 14 | U | 14 | U | 15 | U | 14 | U | 14 | U |
| Aroclor-1242 | 100 | 15 | U | 14 | U | 14 | U | 15 | U | 14 | U | 14 | U | 15 | U | 14 | U | 14 | U |
| Aroclor-1248 | 100 | 15 | U | 14 | U | 14 | U | 15 | U | 14 | U | 14 | U | 15 | U | 14 | U | 14 | U |
| Aroclor-1254 | 100 | 15 | U | 14 | U | 3.5 | | 3.9 | J | 14 | U | 14 | U | 2.9 | J | 4.2 | J | 14 | U |
| Aroclor-1260 | 100 | 15 | U | 14 | U | 14 | U | 15 | U | 14 | U | 14 | U | 15 | U | 14 | U | 14 | U |

| Sample Number | | J11KB3 | | J11KB4 | | J11KB5 | | J11KB6 | | J11KB7 | | J11KB8 | | J11KB9 | | J11KC0 | | J11KC1 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Remarks | | | | | | | | Main | | | | | | | | | | | |
| Sample Date | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | |
| Extraction Date | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | |
| Analysis Date | | 4/19/06 | | 4/19/06 | | 4/19/06 | | 4/19/06 | | 4/19/06 | | 4/19/06 | | 4/19/06 | | 4/19/06 | | 4/19/06 | |
| Pesticide | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| Alpha-BHC | 5 | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ |
| Gamma-BHC (Lindane) | 5 | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ |
| Beta-BHC | 5 | 0.62 | J | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ |
| Heptachlor | 5 | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ |
| Delta-BHC | 5 | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ |
| Aldrin | 5 | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ |
| Heptachlor Epoxide | 5 | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ |
| gamma-Chlordane | 5 | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ |
| Endosulfan I | 5 | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ |
| alpha-Chlordane | 5 | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ |
| 4,4'-DDE | 5 | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ |
| Dieldrin | 5 | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ |
| Endrin | 5 | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ |
| 4,4'-DDD | 5 | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ |
| Endosulfan II | 5 | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ |
| 4,4'-DDT | 5 | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ |
| Endrin Aldehyde | 5 | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ |
| Endosulfan sulfate | 5 | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ |
| Methoxyclor | 5 | 1.5 | UJ | 49 | J | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ |
| Endrin Ketone | 5 | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ |
| Toxaphene | 5 | 15 | UJ | 14 | UJ | 14 | UJ | 15 | UJ | 14 | UJ | 14 | UJ | 15 | UJ | 14 | UJ | 14 | 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.

000011

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



| Project: WASHINGTON CLOSURE HANFORD | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Laboratory: LLI | SDG: K0286 | | | | | | | | | | | |
| Sample Number | | J11KC2 | | J11KC3 | | J11KD3 | | J11KD4 | | J11KD5 | | J11KD6 |
| Remarks | | | | Duplicate | | | | | | | | |
| Sample Date | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 |
| Extraction Date | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 |
| Analysis Date | | 4/19/06 | | 4/19/06 | | 4/19/06 | | 4/19/06 | | 4/19/06 | | 4/19/06 |
| PCB | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| Aroclor-1016 | 100 | 16 | U | 15 | U | 14 | U | 14 | U | 15 | U | 14 | U |
| Aroclor-1221 | 100 | 16 | U | 15 | U | 14 | U | 14 | U | 15 | U | 14 | U |
| Aroclor-1232 | 100 | 16 | U | 15 | U | 14 | U | 14 | U | 15 | U | 14 | U |
| Aroclor-1242 | 100 | 16 | U | 15 | U | 14 | U | 14 | U | 15 | U | 14 | U |
| Aroclor-1248 | 100 | 16 | U | 15 | U | 14 | U | 14 | U | 15 | U | 14 | U |
| Aroclor-1254 | 100 | 16 | U | 11 | J | 14 | U | 14 | U | 15 | U | 14 | U |
| Aroclor-1260 | 100 | 16 | U | 15 | U | 14 | U | 14 | U | 15 | U | 14 | U |

| Sample Number | | J11KC2 | | J11KC3 | | J11KD3 | | J11KD4 | | J11KD5 | | J11KD6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Remarks | | | | Duplicate | | | | | | | | |
| Sample Date | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 | | 4/4/06 |
| Extraction Date | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 | | 4/13/06 |
| Analysis Date | | 4/19/06 | | 4/19/06 | | 4/19/06 | | 4/19/06 | | 4/19/06 | | 4/19/06 |
| Pesticide | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| Alpha-BHC | 5 | 1.6 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ |
| Gamma-BHC (Lindane) | 5 | 1.6 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ |
| Beta-BHC | 5 | 1.6 | UJ | 0.62 | J | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ |
| Heptachlor | 5 | 1.6 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ |
| Delta-BHC | 5 | 1.6 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ |
| Aldrin | 5 | 1.6 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ |
| Heptachlor Epoxide | 5 | 1.6 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ |
| gamma-Chlordane | 5 | 1.6 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ |
| Endosulfan I | 5 | 1.6 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ |
| alpha-Chlordane | 5 | 1.6 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ |
| 4,4'-DDE | 5 | 1.6 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ |
| Dieldrin | 5 | 1.6 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ |
| Endrin | 5 | 1.6 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ |
| 4,4'-DDD | 5 | 1.6 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ |
| Endosulfan II | 5 | 1.6 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ |
| 4,4'-DDT | 5 | 1.6 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ |
| Endrin Aldehyde | 5 | 1.6 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ |
| Endosulfan sulfate | 5 | 1.6 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ |
| Methoxyclor | 5 | 1.6 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ |
| Endrin Ketone | 5 | 1.6 | UJ | 1.5 | UJ | 1.4 | UJ | 1.4 | UJ | 1.5 | UJ | 1.4 | UJ |
| Toxaphene | 5 | 16 | UJ | 15 | UJ | 14 | UJ | 14 | UJ | 14 | UJ | 14 | 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.

000012

PCBs by GC

Report Date: 05/02/06 12:13

RFW Batch Number: 0604L698 Client: TNUHANFORD RC-025 K0286 Work Order: 11343606001 Page: 1

| | Cust ID: | J11KB3 | J11KB3 | J11KB3 | J11KB4 | J11KB5 | J11KB6 |
|---|---|---|---|---|---|---|---|
| Sample Information | RFW#: | 001 | 001 MS | 001 MSD | 002 | 003 | 004 |
| | Matrix: | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL |
| | 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 | 95 % | 96 % | 93 % | 128 * % | 117 % | 129 * % |
| | Decachlorobiphenyl | 101 % | 103 % | 99 % | 130 * % | 120 % | 128 * % |
| | | fl | fl | fl | fl | fl | fl |
| Aroclor-1016 | | 15 U | 82 % | 83 % | 14 U | 14 U | 15 U |
| Aroclor-1221 | | 15 U | 15 U | 15 U | 14 U | 14 U | 15 U |
| Aroclor-1232 | | 15 U | 15 U | 15 U | 14 U | 14 U | 15 U |
| Aroclor-1242 | | 15 U | 15 U | 15 U | 14 U | 14 U | 15 U |
| Aroclor-1248 | | 15 U | 15 U | 15 U | 14 U | 14 U | 15 U |
| Aroclor-1254 | | 15 U | 15 U | 15 U | 14 U | 3.5 J | 3.9 J |
| Aroclor-1260 | | 15 U | 96 % | 96 % | 14 U | 14 U | 15 U |

| | Cust ID: | J11KB7 | J11KB8 | J11KB9 | J11KC0 | J11KC1 | J11KC2 |
|---|---|---|---|---|---|---|---|
| Sample Information | RFW#: | 005 | 006 | 007 | 008 | 009 | 010 |
| | Matrix: | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL |
| | 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 | 122 * % | 120 * % | 124 * % | 126 * % | 129 * % | 110 % |
| | Decachlorobiphenyl | 118 % | 119 % | 122 % | 134 * % | 128 * % | 108 % |
| | | fl | fl | fl | fl | fl | fl |
| Aroclor-1016 | | 14 U | 14 U | 15 U | 14 U | 14 U | 16 U |
| Aroclor-1221 | | 14 U | 14 U | 15 U | 14 U | 14 U | 16 U |
| Aroclor-1232 | | 14 U | 14 U | 15 U | 14 U | 14 U | 16 U |
| Aroclor-1242 | | 14 U | 14 U | 15 U | 14 U | 14 U | 16 U |
| Aroclor-1248 | | 14 U | 14 U | 15 U | 14 U | 14 U | 16 U |
| Aroclor-1254 | | 14 U | 14 U | 2.9 J | 4.2 J | 14 U | 16 U |
| Aroclor-1260 | | 14 U | 14 U | 15 U | 14 U | 14 U | 16 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

6/23/06

0000013

| | Cust ID: | J11KC3 | J11KD3 | J11KD4 | J11KD5 | J11KD6 | PBLKFM |
|---|---|---|---|---|---|---|---|
| Sample Information | RFW#: | 011 | 013 | 014 | 015 | 016 | 06LE0282-MB1 |
| | Matrix: | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL |
| | 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 | 130 * % | 133 * % | 137 * % | 128 * % | 124 * % | 97 % |
| | Decachlorobiphenyl | 128 * % | 136 * % | 138 * % | 128 * % | 130 * % | 100 % |
| Aroclor-1016 | | 15 U | 14 U | 14 U | 15 U | 14 U | 13 U |
| Aroclor-1221 | | 15 U | 14 U | 14 U | 15 U | 14 U | 13 U |
| Aroclor-1232 | | 15 U | 14 U | 14 U | 15 U | 14 U | 13 U |
| Aroclor-1242 | | 15 U | 14 U | 14 U | 15 U | 14 U | 13 U |
| Aroclor-1248 | | 15 U | 14 U | 14 U | 15 U | 14 U | 13 U |
| Aroclor-1254 | | 11 ~~U~~ J | 14 U | 14 U | 15 U | 14 U | 13 U |
| Aroclor-1260 | | 15 U | 14 U | 14 U | 15 U | 14 U | 13 U |

| | Cust ID: | PBLKFM BS |
|---|---|---|
| Sample Information | RFW#: | 06LE0282-MB1 |
| | Matrix: | SOIL |
| | D.F.: | 1.00 |
| | Units: | UG/KG |
| Surrogate: | Tetrachloro-m-xylene | 92 % |
| | Decachlorobiphenyl | 97 % |
| Aroclor-1016 | | 82 % |
| Aroclor-1221 | | 13 U |
| Aroclor-1232 | | 13 U |
| Aroclor-1242 | | 13 U |
| Aroclor-1248 | | 13 U |
| Aroclor-1254 | | 13 U |
| Aroclor-1260 | | 89 % |

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

6/23/06

5/2/6

000014

Pesticide/PCBs by GC, CLP List

Report Date: 05/01/06 14:19

RFW Batch Number: 0604L698 Client: TNUHANFORD RC-025 K0286 Work Order: 11343606001 Page: 1

| | Cust ID: | J11KB3 | J11KB3 | J11KB3 | J11KB4 | J11KB5 | J11KB6 |
|---|---|---|---|---|---|---|---|
| Sample Information | RFW#: | 001 | 001 MS | 001 MSD | 002 | 003 | 004 |
| | Matrix: | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL |
| | D.F.: | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| | Units: | UG/KG | UG/KG | UG/KG | UG/KG | UG/KG | UG/KG |
| Surrogate: | Tetrachloro-m-xylene | 128 * % | 146 * % | 125 * % | 134 * % | 129 * % | 144 * % |
| | Decachlorobiphenyl | 136 * % | 148 * % | 128 * % | 139 * % | 127 * % | 138 * % |
| | | fl | fl | fl | fl | fl | fl |
| Alpha-BHC | | 1.5 U J | 116 % | 109 % | 1.4 U J | 1.4 U J | 1.5 U J |
| gamma-BHC (Lindane) | | 1.5 U | 118 % | 112 % | 1.4 U | 1.4 U | 1.5 U |
| Beta-BHC | | 0.62 ~~U~~ | 117 % | 109 % | 1.4 U | 1.4 U | 1.5 U |
| Heptachlor | | 1.5 U | 113 % | 107 % | 1.4 U | 1.4 U | 1.5 U |
| Delta-BHC | | 1.5 U | 96 % | 89 % | 1.4 U | 1.4 U | 1.5 U |
| Aldrin | | 1.5 U | 109 % | 102 % | 1.4 U | 1.4 U | 1.5 U |
| Heptachlor epoxide | | 1.5 U | 117 % | 118 % | 1.4 U | 1.4 U | 1.5 U |
| gamma-Chlordane | | 1.5 U | 110 % | 104 % | 1.4 U | 1.4 U | 1.5 U |
| Endosulfan I | | 1.5 U | 110 % | 104 % | 1.4 U | 1.4 U | 1.5 U |
| alpha-Chlordane | | 1.5 U | 113 % | 107 % | 1.4 U | 1.4 U | 1.5 U |
| 4,4'-DDE | | 1.5 U | 103 % | 97 % | 1.4 U | 1.4 U | 1.5 U |
| Dieldrin | | 1.5 U | 106 % | 98 % | 1.4 U | 1.4 U | 1.5 U |
| Endrin | | 1.5 U | 111 % | 106 % | 1.4 U | 1.3 J | 1.5 U |
| 4,4'-DDD | | 1.5 U | 109 % | 102 % | 1.4 U | 1.4 U | 1.5 U |
| Endosulfan II | | 1.5 U | 110 % | 103 % | 1.4 U | 1.4 U | 1.5 U |
| 4,4'-DDT | | 1.5 U | 94 % | 92 % | 1.4 U | 1.4 U | 1.5 U |
| Endrin aldehyde | | 1.5 U | 109 % | 101 % | 1.4 U | 1.4 U | 1.5 U |
| Endosulfan sulfate | | 1.5 U | 108 % | 103 % | 1.4 U | 1.4 U | 1.5 U |
| Methoxychlor | | 1.5 U | 112 % | 108 % | 49 | 1.4 U | 1.5 U |
| Endrin ketone | | 1.5 U | 117 % | 111 % | 1.4 U | 1.4 U | 1.5 U |
| Toxaphene | | 15 U | 15 U | 15 U | 14 U | 14 U | 15 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

000015

6/23/06 6/23/06

Pesticide/PCBs by GC, CLP List

Report Date: 05/01/06 14:19

RFW Batch Number: 0604L698 Client: TNUHANFORD RC-025 K0286 Work Order: 11343606001 Page: 2

| | Cust ID: | J11KB7 | J11KB8 | J11KB9 | J11KC0 | J11KC1 | J11KC2 |
|---|---|---|---|---|---|---|---|
| Sample Information | RFW#: | 005 | 006 | 007 | 008 | 009 | 010 |
| | Matrix: | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL |
| | D.F.: | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| | Units: | UG/KG | UG/KG | UG/KG | UG/KG | UG/KG | UG/KG |
| Surrogate: | Tetrachloro-m-xylene | 130 * % | 126 * % | 126 * % | 123 * % | 122 * % | 104 % |
| | Decachlorobiphenyl | 130 * % | 128 * % | 133 * % | 141 * % | 137 * % | 112 % |
| | | fl | fl | fl | fl | fl | fl |
| Alpha-BHC | | 1.4 U J | 1.4 U J | 1.5 U J | 1.4 U J | 1.4 U J | 1.6 U J |
| gamma-BHC (Lindane) | | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 1.4 U | 1.6 U |
| Beta-BHC | | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 1.4 U | 1.6 U |
| Heptachlor | | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 1.4 U | 1.6 U |
| Delta-BHC | | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 1.4 U | 1.6 U |
| Aldrin | | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 1.4 U | 1.6 U |
| Heptachlor epoxide | | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 1.4 U | 1.6 U |
| gamma-Chlordane | | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 1.4 U | 1.6 U |
| Endosulfan I | | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 1.4 U | 1.6 U |
| alpha-Chlordane | | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 1.4 U | 1.6 U |
| 4,4'-DDE | | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 1.4 U | 1.6 U |
| Dieldrin | | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 1.4 U | 1.6 U |
| Endrin | | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 1.4 U | 1.6 U |
| 4,4'-DDD | | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 1.4 U | 1.6 U |
| Endosulfan II | | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 1.4 U | 1.6 U |
| 4,4'-DDT | | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 1.4 U | 1.6 U |
| Endrin aldehyde | | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 1.4 U | 1.6 U |
| Endosulfan sulfate | | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 1.4 U | 1.6 U |
| Methoxychlor | | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 1.4 U | 1.6 U |
| Endrin ketone | | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 1.4 U | 1.6 U |
| Toxaphene | | 14 U | 14 U | 15 U | 14 U | 14 U | 16 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

0000016

6/23/06

| | Cust ID: | J11KC3 | J11KD3 | J11KD4 | J11KD5 | J11KD6 | PBLKFM |
|---|---|---|---|---|---|---|---|
| Sample Information | RFW#: | 011 | 013 | 014 | 015 | 016 | 06LE0282-MB1 |
| | Matrix: | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL |
| | D.F.: | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 1.00 |
| | Units: | UG/KG | UG/KG | UG/KG | UG/KG | UG/KG | UG/KG |
| Surrogate: | Tetrachloro-m-xylene | 128 * % | 130 * % | 141 * % | 128 * % | 129 * % | 111 % |
| | Decachlorobiphenyl | 136 * % | 147 * % | 145 * % | 133 * % | 141 * % | 113 % |
| | | fl | fl | fl | fl | fl | fl |
| Alpha-BHC | | 1.5 U J | 1.4 U J | 1.4 U J | 1.5 U J | 1.4 U J | 0.33 U |
| gamma-BHC (Lindane) | | 1.5 U | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 0.33 U |
| Beta-BHC | | 0.62 J | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 0.33 U |
| Heptachlor | | 1.5 U | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 0.33 U |
| Delta-BHC | | 1.5 U | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 0.33 U |
| Aldrin | | 1.5 U | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 0.33 U |
| Heptachlor epoxide | | 1.5 U | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 0.33 U |
| gamma-Chlordane | | 1.5 U | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 0.33 U |
| Endosulfan I | | 1.5 U | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 0.33 U |
| alpha-Chlordane | | 1.5 U | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 0.33 U |
| 4,4'-DDE | | 1.5 U | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 0.33 U |
| Dieldrin | | 1.5 U | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 0.33 U |
| Endrin | | 1.5 U | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 0.33 U |
| 4,4'-DDD | | 1.5 U | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 0.33 U |
| Endosulfan II | | 1.5 U | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 0.33 U |
| 4,4'-DDT | | 1.5 U | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 0.33 U |
| Endrin aldehyde | | 1.5 U | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 0.33 U |
| Endosulfan sulfate | | 1.5 U | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 0.33 U |
| Methoxychlor | | 1.5 U | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 0.33 U |
| Endrin ketone | | 1.5 U | 1.4 U | 1.4 U | 1.5 U | 1.4 U | 0.33 U |
| Toxaphene | | 15 U | 14 U | 14 U | 15 U | 14 U | 3.3 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

6/23/06

000017

| | | | |
|---|---|---|---|
| | Cust ID: | PBLKFM BS | PBLKFM BS |
| Sample Information | RFW#: | 06LE0282-MB1 | 06LE0282-MB1 |
| | Matrix: | SOIL | SOIL |
| | D.F.: | 1.00 | 1.00 |
| | Units: | UG/KG | UG/KG |
| Surrogate: | Tetrachloro-m-xylene | 15 * % | 16 * % |
| | Decachlorobiphenyl | 18 * % | 17 * % |
| Alpha-BHC | | 11 * % | 11 * % |
| gamma-BHC (Lindane) | | 12 * % | 12 * % |
| Beta-BHC | | 15 * % | 15 * % |
| Heptachlor | | 13 * % | 13 * % |
| Delta-BHC | | 10 * % | 9 * % |
| Aldrin | | 11 * % | 12 * % |
| Heptachlor epoxide | | 13 * % | 13 * % |
| gamma-Chlordane | | 13 * % | 12 * % |
| Endosulfan I | | 12 * % | 12 * % |
| alpha-Chlordane | | 13 * % | 13 * % |
| 4,4'-DDE | | 12 * % | 10 * % |
| Dieldrin | | 12 * % | 12 * % |
| Endrin | | 12 * % | 12 * % |
| 4,4'-DDD | | 12 * % | 10 * % |
| Endosulfan II | | 13 * % | 13 * % |
| 4,4'-DDT | | 10 * % | 10 * % |
| Endrin aldehyde | | 14 * % | 13 * % |
| Endosulfan sulfate | | 13 * % | 12 * % |
| Methoxychlor | | 12 * % | 11 * % |
| Endrin ketone | | 14 * % | 13 * % |
| Toxaphene | | 3.3 U | 3.3 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

6/23/06

## Appendix 4

## Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

**Case Narrative**

**Client:** TNU-HANFORD RC-025
**LVL #:** 0604L698
**SDG/SAF #** K0286/RC-025

**W.O. #:** 11343-606-001-9999-00
**Date Received:** 04-06-2006

## CHLORINATED PESTICIDES

Fifteen (15) soil samples were collected on 04-04-2006.

The samples and their associated QC samples were extracted on 04-13-2006 and analyzed according to Lionville Laboratory SOPs based on SW846, 3rd Edition procedures on 04-17, 18, 19-2006. The extraction procedure was based on method 3540C and the extracts were analyzed based on method 8081A.

The following is a summary of QC results accompanying the sample results. Lionville Laboratory Inc (LvLI) certifies that all test results meet the requirements of NELAC except as noted below:

1. Samples were extracted and analyzed within required holding time.

2. The samples and their associated QC samples received a Copper-Sulfur cleanup according to Lionville Laboratory SOPs based on SW846 method 3660A.

3. The method blank was below the reporting limits for all target compounds.

4. Twenty-six (36) of forty (40) surrogate recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.

5. All blank spike recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.

6. All matrix spike recoveries were within acceptance criteria.

7. All samples required a 4-fold dilution due to the nature of the sample matrix. The reporting limits were adjusted to reflect the necessary dilution.

8. The results for soil samples were reported on a dry weight basis.

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

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 1 6 pages.



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LIONVILLE LABORATORY INC.

10. The continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

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

12. 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

5/2/6
Date

som\r:\group\data\pest\mu hanford\0604-698.pst



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# Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 066-138

Initiator: KAW
Date: 5/1/06
Client: TW

Batch: 0604L698
Samples: ALL
Method: SW846/MCAWW/CLP/ SOM1

Parameter: PEST
Matrix: SOIL
Prep Batch: 06LR0292

**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)

Surrogate recoveries high for most samples.
Surrogate recoveries low for Blank Spike and Blank Spike Replicate.
Blank Spike recoveries low.

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

**3. 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: ~~Narrative~~
Narrative - high surrogate recoveries exceed MRL criteria by 10-25%. marginal impact on final results.
MS/MSD spike recoveries are all w/in control - low LCS recoveries do not impact data quantitation. 5.1.06

**4. Project Manager Instructions**...signature/date: _____
__ Concur with Proposed Action
__ Disagree with Proposed Action; See Instruction
__ Include in Case Narrative
__ Client Contacted:
Date/Person _____
__ Add
__ Cancel

**5. Final Action**...signature/date: 5.5.06
__ Verified re-[log][leach][extract][digest][analysis] (circle)
__ Included in Case Narrative
__ Hard Copy COC Revised
__ Electronic COC Revised
__ EDD Corrections Completed

Other Explanation:

**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 | __ | __ GC/LC: Kiger |
| __ | __ Data Management: Stilwell | __ | __ MS: Rychlak/Daley |
| __ | __ Sample Prep: Beegle/Kiger | __ | __ Log-in: Perry |
| | | __ | __ Admin: _____ |
| | | __ | __ Other: _____ |

QA-105-A-0805

LIONVILLE LABORATORY INC.

**Case Narrative**

**Client:** TNU-HANFORD RC-025
**LVL #:** 0604L698
**SDG/SAF #** K0286/RC-025

**W.O. #:** 11343-606-001-9999-00
**Date Received:** 04-06-2006

**PCB**

Fifteen (15) soil samples were collected on 04-04-2006.

The samples and their associated QC samples were extracted on 04-13-2006 and analyzed according to Lionville Laboratory SOPs based on SW846, 3rd Edition procedures on 04-19-2006. The extraction procedure was based on method 3540C and the extracts were analyzed based on method 8082.

The following is a summary of QC results accompanying the sample results. Lionville Laboratory Inc (LvLI) certifies that all test results meet the requirements of NELAC except as noted below:

1. Samples were extracted and analyzed within required holding time.

2. The samples and their associated QC samples received Copper-Sulfur and Sulfuric Acid cleanups according to Lionville Laboratory SOPs based on SW846 methods 3660A and 3665A respectively.

3. The method blank was below the reporting limits for all target compounds.

4. Twenty-one (21) of thirty-eight (38) surrogate recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.

5. The blank spike recoveries were within acceptance criteria.

6. All matrix spike recoveries were within acceptance criteria.

7. The results for soil samples were reported on a dry-weight basis.

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.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 1 4 pages.



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

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

5/2/16
Date

som\r:\group\data\pest\tnu hanford\0604-698.pcbs



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# Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 0606139

Initiator: MBW
Date: 6/2/06
Client: TN

Batch: 06042698
Samples:
Method: SW846/MCAWW/CLP/

Parameter: OPCB
Matrix: SOIL
Prep Batch: 06LR0282

**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)

Surrogate recoveries high for most samples.

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

**3. 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:

Nonetc - ~~[illegible]~~ exceedances outside acceptance criteria by 10-20%; marginal impact on reported data.

[illegible] 6/2/06

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

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

**5. Final Action**...signature/date: [illegible] 6/2/06

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 | __ | __ GC/LC: Kiger |
| __ | __ Data Management: Stilwell | __ | __ MS: Rychlak/Daley |
| __ | __ Sample Prep: Beegle/Kiger | __ | __ Log-in: Perry |
| | | __ | __ Admin: _____ |
| | | __ | __ Other: _____ |

QA-105-A-0805

**Washington Closure Hanford**

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-025-004 | Page 1 of 3

| | | | |
|---|---|---|---|
| **Collector** C. Martinez/K Singleton/D. Bowers | **Company Contact** C. Martinez | **Telephone No.** 509-539-2816 | **Project Coordinator** KESSNER, JH |
| **Price Code** | **Data Turnaround** | | |
| **Project Designation** 100-BC Remaining Pipelines and Sewers - Soil Full Protocol | **Sampling Location** 100-B-14:2 (115-B) Area 5 | | **SAF No.** RC-025 |
| **Air Quality** ☐ | 21 days | | |
| **Ice Chest No.** GRP-03-009 | **Field Logbook No.** EL-1585-5 | **COA** B10B14 2000 | **Method of Shipment** fed ex |
| **Shipped To** EBERLINE SERVICES / LIONVILLE | **Offsite Property No.** A060350 | | **Bill of Lading/Air Bill No.** SEE OSPC |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*none*

**Special Handling and/or Storage**

*cool 4 degrees centigrade*

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Preservation** | None | Cool 4C | Cool 4C | Cool 4C | None | None | None | Cool 4C | | |
| **Type of Container** | G/P | G/P | aG | aG | G/P | G/P | G/P | aG | | |
| **No. of Container(s)** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| **Volume** | 250g | ~~125g~~ 500mL | 120mL | 120mL | 500mL | 120mL | 120mL | 250mL | | |
| **SAMPLE ANALYSIS** | See item (1) in Special Instructions. | Chromium Hex - 7196 | PCBs - 8082 | Semi-VOA - 8270A (TCL) | See item (2) in Special Instructions. | ~~Gamma~~ Tritium - 3H3 | ~~Nickel-63,~~ Strontium-89,90 -- Total Sr | Pesticides - 8081; ~~Chloro Herbicides - EPA8151~~ | | |

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J11KB3 | SOIL | 04/04/06 | 1015 | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | |
| J11KB4 | SOIL | 04/04/06 | 1020 | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | |
| J11KB5 | SOIL | 04/04/06 | 1045 | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | |
| J11KB6 | SOIL | 04/04/06 | 1050 | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | |
| J11KB7 | SOIL | 04/04/06 | 1230 | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | |

**CHAIN OF POSSESSION**

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| Brain Singleton | 1600 4-4-06 | 3728 Ref 2 | 1600 4-4-06 |
| 3728 #2A | 4-5-06 0930 | R. Edmundson / JR Edmundson | 4-5-06 0930 |
| JR Edmundson | 4-5-06 1500 | FED EX | |
| FED EX | 4/6/06 0910 | V. Hernandez | 4/6/06 0910 |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS**

~~(2) addition to item # 2. Run gross alpha and gross beta off available material.~~ 04/04/06

(1) ICP Metals - 6010TR (Client List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Vanadium); ICP Metals - 6010A (Add-on) (Titanium, Uranium, Zinc, Zirconium); Mercury - 7471 - (CV)

~~(2) Gamma Spectroscopy (TCL List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155)~~ 04/04/06

Personnel not available to relinquish samples from 3728 Ref # 2A on 4/5/06

**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 |

BHI-EE-011 (08/29/2005)

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-025-004 | Page 2 of 3 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector<br>C. Martinez/K Singleton/D. Bowers | Company Contact<br>C. Martinez | Telephone No.<br>509-539-2816 | Project Coordinator<br>KESSNER, JH | Price Code | Data Turnaround |
| Project Designation<br>100-BC Remaining Pipelines and Sewers - Soil Full Protocol | Sampling Location<br>100-B-14:2 (115-B) Area 5 | | SAF No.<br>RC-025 | Air Quality ☐ | 21 days |
| Ice Chest No. ERC-03-105 | Field Logbook No.<br>EL-1585-5 | COA<br>B10B14 2000 | Method of Shipment<br>fed ex | | |
| Shipped To<br>EBERLINE SERVICES / LIONVILLE | Offsite Property No. A060350 | | Bill of Lading/Air Bill No. SEE OSPC | | |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*none*

**Special Handling and/or Storage**

*cool 4 degrees centigrade*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | None | Cool 4C | Cool 4C | Cool 4C | None | None | None | Cool 4C | | |
| Type of Container | G/P | G/P | aG | aG | G/P | G/P | G/P | aG | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Volume | 250g | ~~125g~~ 125mL | 120mL | 120mL | 500mL | 120mL | 120mL | 250mL | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Chromium Hex - 7196 | PCBs - 8082 | Semi-VOA - 8270A (TCL) | See item (2) in Special Instructions. | ~~Carbon-14~~, Tritium - 3H | ~~Nickel-63~~, Strontium-89,90 -- Total Sr | Pesticides - 8081, ~~Chloro-Herbicides - EPA8151~~ | | |

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J11KB8 | SOIL | 04/04/06 | 1235 | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | |
| J11KB9 | SOIL | 04/04/06 | 1240 | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | |
| J11KC0 | SOIL | 04/04/06 | 1245 | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | |
| J11KC1 | SOIL | 04/04/06 | 1345 | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | |
| J11KC2 | SOIL | 04/04/06 | 1355 | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | |

04/04/06

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

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| Kevin Singleton | 4-4-06 1600 | 3728 RefZ | 4-4-06 1600 |
| 3728 #2A | 4-5-06 0930 | T.E. Edmondson | 4-5-06 0930 |
| T.E. Edmondson WCH | 4-5-06 1500 | FED EX | |
| FED EX | 4/6/06 0910 | C. Nelson | 4/6/06 0910 |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS**

~~(3) addition to item # 2. Run gross alpha and gross beta off available material.~~

(1) ICP Metals - 6010TR (Client List) {Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Vanadium}; ICP Metals - 6010A (Add-on) {Titanium, Uranium, Zinc, Zirconium}; Mercury - 7471 - (CV)

~~(2) Gamma Spectroscopy (TCL List) {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}~~

Personnel not available to relinquish samples from 3728 Ref 2A on 4/5/06

**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 |

BHI-EE-011 (08/29/2005)

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-025-004 | Page 2 of 2 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: C. Martinez/K Singleton/D. Bowers | Company Contact: C. Martinez | Telephone No.: 509-539-2816 | Project Coordinator: KESSNER, JH |
| Price Code | Data Turnaround | | |
| Project Designation: 100-BC Remaining Pipelines and Sewers - Soil Full Protocol | Sampling Location: 100-B-14:2 (115-B) Area 5 | SAF No.: RC-025 | Air Quality ☐ 21 days |
| Ice Chest No. ERC-99-063 | Field Logbook No.: EL-1585-5 | COA: R10B14 2000 | Method of Shipment: fed ex |
| Shipped To: EBERLINE SERVICES / LIONVILLE | Offsite Property No. A060350 | Bill of Lading/Air Bill No. SEE OSPC | |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*none*

**Special Handling and/or Storage**

*cool 4 degrees centigrade*

000028

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | None | Cool 4C | Cool 4C | Cool 4C | None | None | None | Cool 4C | | |
| Type of Container | G/P | G/P | aG | aG | G/P G | G/P | G/P | aG | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Volume | 250g 04/04/06 | ~~125g~~ 250mL | 120mL | 120mL | 500mL | 120mL | 120mL | 250mL | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Chromium Hex - 7196 | PCBs - 8082 | Semi-VOA - 8270A (TCL) | See item (2) in Special Instructions. | ~~Beta-14;~~ Tritium - H3 | ~~Nickel-63;~~ Stronium-89,90 -- Total Sr | Pesticides - 8081; ~~Chlor Herbicides - 8151B~~ 04/04/06 | | |

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J11KC3 | SOIL | 04/04/06 | 1055 | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | |
| J11KC4 | SOIL | 04/04/06 | 1040 | ✓ | N/A | N/A | ✓ | | | | N/A | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

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

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| Kevin Singleton | 4-4-06 1600 | 3278 Ref 2 | 4-4-06 1600 |
| 3278 #2A | 4-5-06 0930 | JR Edmundson | 4-5-06 0930 |
| JR Edmundson | 4-5-06 1500 | FED EX | |
| FED EX | 4/6/06 0910 | V. Hernandez | 4/6/06 0910 |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS**

~~(2) addition to item # 2. Run gross alpha and gross beta on all available material.~~ 04/04/06

(1) ICP Metals - 6010TR (Client List) {Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Vanadium}; ICP Metals - 6010A (Add-on) {Titanium, Uranium, Zinc, Zirconium}; Mercury - 7471 - (CV)

~~(2) Gamma Spectroscopy (TCL List) {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}~~ 04/04/06

Personnel not available to Relinquish samples from 3728 Ref # 2A on 4/5/06

**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 |

BHI-EE-011 (08/29/2005)

Washington Closure Hanford

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-025-006 Page 1 of 1

| | | | |
|---|---|---|---|
| Collector: C. Martinez/K Singleton/D. Bowers | Company Contact: C. Martinez | Telephone No.: 509-539-2816 | Project Coordinator: KESSNER, JH |
| Price Code | Data Turnaround | | |
| Project Designation: 100-BC Remaining Pipelines and Sewers - Soil Full Protocol | Sampling Location: 100-B-14:2 (115-B) BCL Area 5 | | SAF No.: RC-025 |
| Air Quality ☐ | 21 days | | |
| Ice Chest No.: GRP-03-009 | Field Logbook No.: EL-1585-5 | COA: R10B142000 | Method of Shipment: fed ex |
| Shipped To: EBERLINE SERVICES LIONVILLE | Offsite Property No.: A060350 | | Bill of Lading/Air Bill No.: SEE OSPC |

POSSIBLE SAMPLE HAZARDS/REMARKS

*none*

Special Handling and/or Storage

*cool 4 degrees centigrade*

6200029

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | None | Cool 4C | Cool 4C | Cool 4C | None | None | Cool 4C | | | |
| Type of Container | G/P | G/P | aG | aG | G/P | G/P | aG | | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | |
| Volume | 250g | ~~125g~~ 250mL 04/04/06 | 120mL | 120mL | 500mL | 120mL | 250mL | | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Chromium Hex - 7196 | PCBs - 8082 | Semi-VOA - 8270A (TCL) | See item (2) in Special Instructions. | ~~Gamma-14,~~ Tritium - H3 | Pesticides - 8081; ~~Chlorp. Herbicides~~ ~~8151A~~ 04/04/06 | | | |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | |
| J11KD3 | SOIL | 04/04/06 | 0915 | ✓ | ✓ | ✓ | ✓ | | | ✓ | |
| J11KD4 | SOIL | 04/04/06 | 0925 | ✓ | ✓ | ✓ | ✓ | | | ✓ | |
| J11KD5 | SOIL | 04/04/06 | 0930 | ✓ | ✓ | ✓ | ✓ | | | ✓ | |
| J11KD6 | SOIL | 04/04/06 | 0935 | ✓ | ✓ | ✓ | ✓ | | | ✓ | |

04/04/06

| CHAIN OF POSSESSION | Date/Time | Sign/Print Names: Received By/Stored In | Date/Time |
|---|---|---|---|
| Relinquished By/Removed From: Kevin Singleton | 1600 4-4-06 | 3728 Ref 2A | 1600 4-4-06 |
| Relinquished By/Removed From: 3728 #2A | 4-5-06 0930 | Received By/Stored In: [illegible] | 4-5-06 0930 |
| Relinquished By/Removed From: WCH [illegible] | 4-5-06 1500 | Received By/Stored In: FED EX | |
| Relinquished By/Removed From: Fed Ex | 4/6/06 0910 | Received By/Stored In: [illegible] | 4/6/06 0910 |
| Relinquished By/Removed From | | Received By/Stored In | |
| Relinquished By/Removed From | | Received By/Stored In | |

SPECIAL INSTRUCTIONS 04/04/06

~~(2) addition to item # 2. Run gross alpha and gross beta all available material.~~

(1) ICP Metals - 6010TR (Client List) {Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Vanadium}; ICP Metals - 6010A (Add-on) {Titanium, Uranium, Zinc, Zirconium}; Mercury - 7471 - (CV)

~~(2) Gamma Spectroscopy (TCL List) {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}~~ 04/04/06

Personnel not available to relinquish samples from 3728 Ref # 2A on 4/5/06

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 |

BHI-EE-011 (08/29/2005)

## Appendix 5

## Data Validation Supporting Documentation

# PCB DATA VALIDATION CHECKLIST

| VALIDATION LEVEL: | A | B | C | D | E |
|---|---|---|---|---|---|
| PROJECT: 100-B-14:2 | | | DATA PACKAGE: K0286 | | |
| VALIDATOR: TLT | | LAB: LLI | | DATE: 6/12/06 | |
| | | | SDG: K0286 | | |
| ANALYSES PERFORMED | | | | | |
| SW-846 8081 | SW-846 8081 (TCLP) | SW-846 8082 | SW-846 8081 (TCLP) | | |
| SAMPLES/MATRIX | | | | | |
| J11KB3 | J11KB4 | J11KB5 | J11KB6 | J11KB7 | J11KB8 |
| J11KB9 | J11KC0 | J11KC1 | J11KC2 | J11KC3 | J11KD3 |
| J11KD4 | J11KD5 | J11KD6 | | | |
| | | | | | |
| | | | | | Soil |

## 1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

Comments:

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

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

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

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

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

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

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

Comments:

# 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 PCB 54 in B6, B9, C0, C3 – J no RA

surr Pest – Beta-BHC – B3, C3 + methoxychlor in B4 – J

LCS pesticide – J all but toxaphene

toxaphene – no MS/MSD/LCS – J all

# PCB DATA VALIDATION CHECKLIST

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

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

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

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

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

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

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

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

Comments: no toxaphen ms/msd – 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: