0071094

# SAF-RC-072
# 100 & 300 Area Component of the RCBRA - Discrete Soil Sampling
# FINAL VALIDATION PACKAGE

**COMPLETE COPY OF VALIDATION PACKAGE TO:**

Jeanette Duncan (2) H9-02 DR 09/19/06
INITIAL/DATE

**COMMENTS:**

**SDG K0445 SAF-RC-072**

**Waste Site:** **1607-D2:1**
**116-DR-1 & 2**
**600-139**
**600-171**
**600-181**
**618-4**

RECEIVED
SEP 25 2006
EDMC

Date: 11 September 2006
To: Washington Closure Hanford (technical representative)
From: TechLaw, Inc.
Project: 100 Area and 300 Area Component of the RCBRA – Discrete Soil Sampling
Subject: Radiochemistry - Data Package No. K0445-EB

## INTRODUCTION

This memo presents the results of data validation on Data Package No. K0445 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 |
|---|---|---|---|---|
| J12N79 | 6/19/06 | Soil | C | See note 1 |
| J12N80 | 6/19/06 | Soil | C | See note 1 |
| J12N81 | 6/19/06 | Soil | C | See note 1 |
| J12N82 | 6/19/06 | Soil | C | See note 1 |
| J12N83 | 6/20/06 | Soil | C | See note 1 |
| J12N84 | 6/20/06 | Soil | C | See note 1 |
| J12N85 | 6/20/06 | Soil | C | See note 1 |
| J12N86 | 6/20/06 | Soil | C | See note 1 |
| J12N87 | 6/20/06 | Soil | C | See note 1 |
| J12N88 | 6/20/06 | Soil | C | See note 1 |
| J12N89 | 6/19/06 | Soil | C | See note 1 |
| J12N90 | 6/19/06 | Soil | C | See note 1 |
| J12N91 | 6/19/06 | Soil | C | See note 1 |
| J12N92 | 6/19/06 | Soil | C | See note 1 |

1 – Total strontium, alpha spectroscopy and gamma spectroscopy.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area and 300 Area Component of the RCBRA Sampling & Analysis Plan (DOE/RL-2005-42, Rev. 0, October 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 field 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 80-120%. 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.

Due to the lack of an LCS analysis, all thorium-228 and thorium-232 results were qualified as estimates and flagged "J".

All other 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 20%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All duplicate results were acceptable.

Field Duplicates

No field duplicates were submitted for analysis.

- **Detection Levels**

Reported analytical detection levels for undetected analytes are compared against the 100 & 300 Area RQLs to ensure that laboratory detection levels meet the required criteria. Twelve analytes exceeded the RQL. Under the WCH statement of work, no qualification is required.

- **Completeness**

Data package No. K0445 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 the lack of an LCS analysis, all thorium-228 and thorium-232 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.

Twelve 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-2005-42, Rev. 0, October 2005, *100 Area and 300 Area Component of the RCBRA Sampling & Analysis Plan*.

## Appendix 1

## Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the WCH 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: K0445 | REVIEWER: [illegible] | Project: RCBRA | PAGE 1 OF 1 |
|---|---|---|---|
| COMMENTS: | | | |
| COMPOUND | QUALIFIER | SAMPLES AFFECTED | REASON |
| Thorium-228<br>Thorium-232 | J | All | No LCS |

* - 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

RADIOCHEMISTRY ANALYSIS, SOLID MATRIX, (pCi/g)



| Project: WASHINGTON CLOSURE HANFORD | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Laboratory: EB | | | | | | | | | | | | | | | | | | | | | |
| Case | SDG: K0445 | | | | | | | | | | | | | | | | | | | | |
| Sample Number | | J12N79 | | J12N80 | | J12N81 | | J12N82 | | J12N83 | | J12N84 | | J12N85 | | J12N86 | | J12N87 | | J12N88 | |
| Remarks | | | | | | | | | | | | | | | | | | | | | |
| Sample Date | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | |
| Radiochemistry | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| Total Strontium | 1 | 0.135 | U | -0.006 | U | -0.077 | U | -0.019 | U | -0.012 | U | 0.034 | U | 0.047 | U | 0.104 | U | 0.022 | U | 0.093 | U |
| Thorium-228 | | 0.544 | J | 0.778 | J | 0.744 | J | 0.509 | J | 0.659 | J | 0.606 | J | 0.592 | J | 0.550 | J | 0.488 | J | 0.623 | J |
| Thorium-230 | | 0.530 | | 0.556 | | 0.878 | | 0.606 | | 0.278 | | 0.421 | | 0.526 | | 0.465 | | 0.253 | | 0.616 | |
| Thorium-232 | | 0.570 | J | 0.774 | J | 0.508 | J | 0.565 | J | 0.519 | J | 0.650 | J | 0.591 | J | 0.528 | J | 0.500 | J | 0.628 | J |
| Uranium-233/234 | 1 | 0.603 | | 0.501 | | 0.480 | | 0.352 | | 0.404 | | 0.369 | | 0.412 | | 0.310 | | 0.257 | | 0.371 | |
| Uranium-235 | 1 | 0.036 | U | 0.038 | U | 0.034 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.016 | U | 0.017 | U | 0.047 | U | 0.060 | U |
| Uranium-238 | 1 | 0.529 | | 0.469 | | 0.466 | | 0.528 | | 0.494 | | 0.369 | | 0.425 | | 0.422 | | 0.449 | | 0.346 | |
| Plutonium-238 | 1 | 0.055 | U | 0 | U | 0 | U | 0.051 | U | -0.049 | U | 0.050 | U | 0 | U | 0.031 | U | -0.045 | U | 0.011 | U |
| Plutonium-239/240 | 1 | 0 | U | 0 | U | 0 | U | 0 | U | 0 | U | 0.025 | U | 0.040 | U | 0 | U | 0.008 | U | 0.007 | U |
| Potassium-40 | | 12.8 | | 10.9 | | 12.2 | | 33.0 | | 11.6 | | 13.9 | | 10.4 | | 24.5 | | 13.3 | | 24.5 | |
| Cobalt 60 | 0.05 | U | U* | U | U* | U | U* | U | U* | U | U* | U | U* | U | U* | U | U* | U | U | U | U* |
| Cesium 137 | 0.1 | U | U | U | U* | U | U | U | U | U | U* | 0.362 | | U | U | U | U | 0.077 | | 0.096 | |
| Radium-226 | | 0.432 | | 0.584 | | 0.425 | | 1.10 | | 0.530 | | 0.219 | | 0.327 | | 0.850 | | 0.461 | | 0.800 | |
| Radium-228 | | 0.598 | | 0.536 | | 0.710 | | 1.41 | | 0.785 | | 0.561 | | 0.854 | | 1.46 | | 0.704 | | 1.31 | |
| Europium 152 | | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| Europium 154 | | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| Europium 155 | | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| Thorium-228 | | 0.555 | | 0.428 | | 0.585 | | 1.66 | | 0.345 | | 0.336 | | 0.419 | | 1.34 | | 0.554 | | 1.49 | |
| Thorium-232 | | 0.598 | | 0.536 | | 0.710 | | 1.41 | | 0.785 | | 0.561 | | 0.854 | | 1.46 | | 0.704 | | 1.31 | |
| Uranium-235(gea) | | U | U | 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 | U | U |
| Americium-241(gea) | | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| Beryllium-7 | | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| Ruthenium-106 | | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| Antimony-125 | | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| Cesium-134 | | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |

* - 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: K0445 | | | | | | | | | | | | | | | | | | | | |
| Sample Number | | J12N89 | | J12N90 | | J12N91 | | J12N92 | | | | | | | | | | | | | |
| Remarks | | | | | | | | | | | | | | | | | | | | | |
| Sample Date | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/19/06 | | | | | | | | | | | | | |
| Radiochemistry | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| Total Strontium | 1 | 0.072 | U | -0.025 | U | 0.032 | U | -0.011 | U | | | | | | | | | | | | |
| Thorium-228 | | 0.538 | J | 0.534 | J | 0.226 | J | 0.470 | J | | | | | | | | | | | | |
| Thorium-230 | | 0.458 | | 0.493 | | 0.260 | | 0.698 | | | | | | | | | | | | | |
| Thorium-232 | | 0.599 | J | 0.428 | J | 0.347 | J | 0.355 | J | | | | | | | | | | | | |
| Uranium-233/234 | 1 | 0.572 | | 0.372 | | 0.319 | | 0.379 | | | | | | | | | | | | | |
| Uranium-235 | 1 | 0.048 | U | 0.013 | U | 0 | U | 0.017 | U | | | | | | | | | | | | |
| Uranium-238 | 1 | 0.585 | | 0.382 | | 0.367 | | 0.435 | | | | | | | | | | | | | |
| Plutonium-238 | | 0 | U | 0 | U | 0 | U | -0.025 | U | | | | | | | | | | | | |
| Plutonium-239/240 | | 0 | U | 0 | U | 0.067 | U | 0 | U | | | | | | | | | | | | |
| Potassium-40 | | 7.65 | | 9.12 | | 29.4 | | 16.1 | | | | | | | | | | | | | |
| Cobalt 60 | 0.05 | U | U | U | U* | U | U | U | U | | | | | | | | | | | | |
| Cesium 137 | 0.1 | U | U | U | U | U | U | U | U | | | | | | | | | | | | |
| Radium-226 | | 0.352 | | 0.301 | | 0.786 | | 0.489 | | | | | | | | | | | | | |
| Radium-228 | | 0.365 | | U | U | 1.10 | | 0.734 | | | | | | | | | | | | | |
| Europium 152 | | U | U | U | U | U | U | U | U | | | | | | | | | | | | |
| Europium 154 | | U | U | U | U | U | U | U | U | | | | | | | | | | | | |
| Europium 155 | | U | U | U | U | U | U | U | U | | | | | | | | | | | | |
| Thorium-228 | | 0.375 | | 0.234 | | 1.05 | | 0.672 | | | | | | | | | | | | | |
| Thorium-232 | | 0.365 | | U | U | 1.10 | | 0.734 | | | | | | | | | | | | | |
| Uranium-235(gea) | | U | U | U | U | U | U | U | U | | | | | | | | | | | | |
| Uranium-238(gea) | | U | U | U | U | U | U | U | U | | | | | | | | | | | | |
| Americium-241(gea) | | U | U | U | U | U | U | U | U | | | | | | | | | | | | |
| Ruthenium-106 | | U | U | U | U | U | U | U | U | | | | | | | | | | | | |
| Antimony-125 | | U | U | U | U | U | U | U | U | | | | | | | | | | | | |
| Beryllium-7 | | U | U | U | U | U | U | U | U | | | | | | | | | | | | |
| Cesium-134 | | U | U | U | U | U | U | U | U | | | | | | | | | | | | |

* - 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 K0445

7487-001

J12N79

## DATA SHEET

| | | | | | |
|---|---|---|---|---|---|
| SDG | 7487 | Client/Case no | Hanford | SDG K0445 | |
| Contact | Melissa C. Mannion | Contract | No. 630 | | |
| Lab sample id | R606184-01 | Client sample id | J12N79 | | |
| Dept sample id | 7487-001 | Location/Matrix | 1607-D2;1 | SOLID | |
| Received | 06/22/06 | Collected/Weight | 06/19/06 12:10 | 584 g | |
| % solids | 97.6 | Custody/SAF No | RC-072-2 | RC-072 | |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALIFIERS | TEST |
|---|---|---|---|---|---|---|---|
| Total Strontium | SR-RAD | 0.135 | 0.27 | 0.47 | 1.0 | U | SR |
| Thorium 228 | 14274-82-9 | 0.544 | 0.19 | 0.18 | 1.0 | J | TH |
| Thorium 230 | 14269-63-7 | 0.530 | 0.21 | 0.25 | 1.0 | | TH |
| Thorium 232 | TH-232 | 0.570 | 0.19 | 0.10 | 1.0 | J | TH |
| Uranium 233/234 | U-233/234 | 0.603 | 0.18 | 0.11 | 1.0 | | U |
| Uranium 235 | 15117-96-1 | 0.036 | 0.036 | 0.14 | 1.0 | U | U |
| Uranium 238 | U-238 | 0.529 | 0.18 | 0.11 | 1.0 | | U |
| Plutonium 238 | 13981-16-3 | 0.055 | 0.22 | 0.42 | 1.0 | U | PU |
| Plutonium 239/240 | PU-239/240 | 0 | 0.11 | 0.42 | 1.0 | U | PU |
| Potassium 40 | 13966-00-2 | 12.8 | 1.2 | 0.54 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.059 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.061 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | 0.432 | 0.11 | 0.12 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.598 | 0.25 | 0.26 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.14 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.18 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.14 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.555 | 0.067 | 0.068 | | | GAM |
| Thorium 232 | TH-232 | 0.598 | 0.25 | 0.26 | | | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.22 | | U | GAM |
| Uranium 238 | U-238 | U | | 6.6 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.23 | | U | GAM |
| Cesium 134 | 13967-70-9 | U | | 0.068 | | U | GAM |

100&300AreaCompntRCBRA-DiscreteSoilS

✓ 9/9/d

| | |
|---|---|
| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 08/09/06 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0445

7487-002 J12N80

## DATA SHEET

| | | | |
|---|---|---|---|
| SDG 7487 | Client/Case no Hanford | SDG K0445 | |
| Contact Melissa C. Mannion | Contract No. 630 | | |
| Lab sample id R606184-02 | Client sample id J12N80 | | |
| Dept sample id 7487-002 | Location/Matrix 1607-D2:1 | SOLID | |
| Received 06/22/06 | Collected/Weight 06/19/06 12:40 | 631 g | |
| % solids 98.3 | Custody/SAF No RC-072-2 | RC-072 | |

| ANALYTE | CAS-NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALIFIERS | TEST |
|---|---|---|---|---|---|---|---|
| Total Strontium | SR-RAD | -0.006 | 0.14 | 0.29 | 1.0 | U | SR |
| Thorium 228 | 14274-82-9 | 0.778 | 0.22 | 0.18 | 1.0 | J | TH |
| Thorium 230 | 14269-63-7 | 0.556 | 0.20 | 0.21 | 1.0 | | TH |
| Thorium 232 | TH-232 | 0.774 | 0.20 | 0.093 | 1.0 | J | TH |
| Uranium 233/234 | U-233/234 | 0.501 | 0.19 | 0.12 | 1.0 | | U |
| Uranium 235 | 15117-96-1 | 0.038 | 0.038 | 0.14 | 1.0 | U | U |
| Uranium 238 | U-238 | 0.469 | 0.16 | 0.12 | 1.0 | | U |
| Plutonium 238 | 13981-16-3 | 0 | 0.074 | 0.28 | 1.0 | U | PU |
| Plutonium 239/240 | PU-239/240 | 0 | 0.074 | 0.28 | 1.0 | U | PU |
| Potassium 40 | 13966-00-2 | 10.9 | 2.1 | 2.0 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.15 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.11 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | 0.584 | 0.23 | 0.21 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.536 | 0.38 | 0.46 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.17 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.46 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.11 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.428 | 0.11 | 0.098 | | | GAM |
| Thorium 232 | TH-232 | 0.536 | 0.38 | 0.46 | | | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.17 | | U | GAM |
| Uranium 238 | U-238 | U | | 15 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.11 | | U | GAM |
| Cesium 134 | 13967-70-9 | U | | 0.15 | | U | GAM |

100&300AreaCompntRCBRA-DiscreteSoilS

9/12/06

| | |
|---|---|
| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 08/09/06 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0445

7487-003 J12N81

## DATA SHEET

| | | | | | |
|---|---|---|---|---|---|
| SDG | 7487 | Client/Case no | Hanford | SDG K0445 | |
| Contact | Melissa C. Mannion | Contract | No. 630 | | |
| Lab sample id | R606184-03 | Client sample id | J12N81 | | |
| Dept sample id | 7487-003 | Location/Matrix | 116-DR-1&2 | SOLID | |
| Received | 06/22/06 | Collected/Weight | 06/19/06 13:10 | 715 g | |
| % solids | 99.6 | Custody/SAF No | RC-072-3 | RC-072 | |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALIFIERS | TEST |
|---|---|---|---|---|---|---|---|
| Total Strontium | SR-RAD | -0.077 | 0.11 | 0.26 | 1.0 | U | SR |
| Thorium 228 | 14274-82-9 | 0.744 | 0.38 | 0.36 | 1.0 | J | TH |
| Thorium 230 | 14269-63-7 | 0.878 | 0.47 | 0.35 | 1.0 | | TH |
| Thorium 232 | TH-232 | 0.508 | 0.28 | 0.35 | 1.0 | J | TH |
| Uranium 233/234 | U-233/234 | 0.480 | 0.17 | 0.11 | 1.0 | | U |
| Uranium 235 | 15117-96-1 | 0.034 | 0.034 | 0.13 | 1.0 | U | U |
| Uranium 238 | U-238 | 0.466 | 0.17 | 0.11 | 1.0 | | U |
| Plutonium 238 | 13981-16-3 | 0 | 0.068 | 0.26 | 1.0 | U | PU |
| Plutonium 239/240 | PU-239/240 | 0 | 0.068 | 0.26 | 1.0 | U | PU |
| Potassium 40 | 13966-00-2 | 12.2 | 2.2 | 0.60 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.086 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.055 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | 0.425 | 0.11 | 0.096 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.710 | 0.29 | 0.24 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.14 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.17 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.15 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.585 | 0.096 | 0.099 | | | GAM |
| Thorium 232 | TH-232 | 0.710 | 0.29 | 0.24 | | | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.21 | | U | GAM |
| Uranium 238 | U-238 | U | | 6.6 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.19 | | U | GAM |
| Cesium 134 | 13967-70-9 | U | | 0.072 | | U | GAM |

100&300AreaCompntRCBRA-DiscreteSoilS

✓ 9/9/06

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| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 08/09/06 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0445

7487-004 J12N82

## DATA SHEET

| | | | |
|---|---|---|---|
| SDG | 7487 | Client/Case no | Hanford SDG K0445 |
| Contact | Melissa C. Mannion | Contract | No. 630 |
| Lab sample id | R606184-04 | Client sample id | J12N82 |
| Dept sample id | 7487-004 | Location/Matrix | 600-139 SOLID |
| Received | 06/22/06 | Collected/Weight | 06/19/06 13:50 885 g |
| % solids | 99.1 | Custody/SAF No | RC-072-4 RC-072 |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALIFIERS | TEST |
|---|---|---|---|---|---|---|---|
| Total Strontium | SR-RAD | -0.019 | 0.16 | 0.34 | 1.0 | U | SR |
| Thorium 228 | 14274-82-9 | 0.509 | 0.15 | 0.099 | 1.0 | J | TH |
| Thorium 230 | 14269-63-7 | 0.606 | 0.18 | 0.21 | 1.0 | | TH |
| Thorium 232 | TH-232 | 0.565 | 0.13 | 0.062 | 1.0 | J | TH |
| Uranium 233/234 | U-233/234 | 0.352 | 0.15 | 0.11 | 1.0 | | U |
| Uranium 235 | 15117-96-1 | 0.018 | 0.036 | 0.14 | 1.0 | U | U |
| Uranium 238 | U-238 | 0.528 | 0.18 | 0.11 | 1.0 | | U |
| Plutonium 238 | 13981-16-3 | 0.051 | 0.10 | 0.25 | 1.0 | U | PU |
| Plutonium 239/240 | PU-239/240 | 0 | 0.051 | 0.20 | 1.0 | U | PU |
| Potassium 40 | 13966-00-2 | 33.0 | 1.9 | 0.62 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.065 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.064 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | 1.10 | 0.14 | 0.12 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 1.41 | 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 | | 0.22 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.17 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 1.66 | 0.12 | 0.11 | | | GAM |
| Thorium 232 | TH-232 | 1.41 | 0.28 | 0.27 | | | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.24 | | U | GAM |
| Uranium 238 | U-238 | U | | 8.0 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.26 | | U | GAM |
| Cesium 134 | 13967-70-9 | U | | 0.079 | | U | GAM |

100&300AreaCompntRCBRA-DiscreteSoilS

9/9/06

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| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 08/09/06 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0445

7487-005 J12N83

## DATA SHEET

| | | | |
|---|---|---|---|
| SDG 7487 | Client/Case no Hanford | SDG K0445 | |
| Contact Melissa C. Mannion | Contract No. 630 | | |
| Lab sample id R606184-05 | Client sample id J12N83 | | |
| Dept sample id 7487-005 | Location/Matrix 600-171 | SOLID | |
| Received 06/22/06 | Collected/Weight 06/20/06 09:10 | 704 g | |
| % solids 98.8 | Custody/SAF No RC-072-5 | RC-072 | |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Total Strontium | SR-RAD | -0.012 | 0.13 | 0.28 | 1.0 | U | SR |
| Thorium 228 | 14274-82-9 | 0.659 | 0.13 | 0.048 | 1.0 | J | TH |
| Thorium 230 | 14269-63-7 | 0.278 | 0.14 | 0.20 | 1.0 | | TH |
| Thorium 232 | TH-232 | 0.519 | 0.12 | 0.061 | 1.0 | J | TH |
| Uranium 233/234 | U-233/234 | 0.404 | 0.15 | 0.11 | 1.0 | | U |
| Uranium 235 | 15117-96-1 | 0.018 | 0.036 | 0.14 | 1.0 | U | U |
| Uranium 238 | U-238 | 0.494 | 0.18 | 0.11 | 1.0 | | U |
| Plutonium 238 | 13981-16-3 | -0.049 | 0.098 | 0.27 | 1.0 | U | PU |
| Plutonium 239/240 | PU-239/240 | 0 | 0.049 | 0.19 | 1.0 | U | PU |
| Potassium 40 | 13966-00-2 | 11.6 | 2.4 | 1.6 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.15 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.12 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | 0.530 | 0.19 | 0.18 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.785 | 0.54 | 0.52 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.17 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.42 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.11 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.345 | 0.10 | 0.093 | | | GAM |
| Thorium 232 | TH-232 | 0.785 | 0.54 | 0.52 | | | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.17 | | U | GAM |
| Uranium 238 | U-238 | U | | 17 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.10 | | U | GAM |
| Cesium 134 | 13967-70-9 | U | | 0.15 | | U | GAM |

100&300AreaCompntRCBRA-DiscreteSoilS

9/9/06

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| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 08/09/06 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0445

7487-006 J12N84

## DATA SHEET

| | | | |
|---|---|---|---|
| SDG | 7487 | Client/Case no | Hanford SDG K0445 |
| Contact | Melissa C. Mannion | Contract | No. 630 |
| Lab sample id | R606184-06 | Client sample id | J12N84 |
| Dept sample id | 7487-006 | Location/Matrix | 600-171 SOLID |
| Received | 06/22/06 | Collected/Weight | 06/20/06 09:30 672 g |
| % solids | 99.3 | Custody/SAF No | RC-072-5 RC-072 |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALIFIERS | TEST |
|---|---|---|---|---|---|---|---|
| Total Strontium | SR-RAD | 0.034 | 0.17 | 0.35 | 1.0 | U | SR |
| Thorium 228 | 14274-82-9 | 0.606 | 0.13 | 0.079 | 1.0 | J | TH |
| Thorium 230 | 14269-63-7 | 0.421 | 0.15 | 0.20 | 1.0 | | TH |
| Thorium 232 | TH-232 | 0.650 | 0.13 | 0.049 | 1.0 | J | TH |
| Uranium 233/234 | U-233/234 | 0.369 | 0.15 | 0.11 | 1.0 | | U |
| Uranium 235 | 15117-96-1 | 0.018 | 0.036 | 0.14 | 1.0 | U | U |
| Uranium 238 | U-238 | 0.369 | 0.15 | 0.11 | 1.0 | | U |
| Plutonium 238 | 13981-16-3 | 0.050 | 0.10 | 0.19 | 1.0 | U | PU |
| Plutonium 239/240 | PU-239/240 | 0.025 | 0.050 | 0.19 | 1.0 | U | PU |
| Potassium 40 | 13966-00-2 | 13.9 | 2.2 | 1.2 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.14 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | 0.362 | 0.14 | 0.14 | 0.10 | | GAM |
| Radium 226 | 13982-63-3 | 0.219 | 0.14 | 0.17 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.561 | 0.55 | 0.62 | 0.20 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.17 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.47 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.11 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.336 | 0.091 | 0.087 | | | GAM |
| Thorium 232 | TH-232 | 0.561 | 0.55 | 0.62 | | U | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.16 | | U | GAM |
| Uranium 238 | U-238 | U | | 17 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.094 | | U | GAM |
| Cesium 134 | 13967-70-9 | U | | 0.13 | | U | GAM |

100&300AreaCompntRCBRA-DiscreteSoilS

K 9/2/06

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| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 08/09/06 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0445

7487-007 J12N85

## DATA SHEET

| | | | | | |
|---|---|---|---|---|---|
| SDG | 7487 | Client/Case no | Hanford | SDG | K0445 |
| Contact | Melissa C. Mannion | Contract | No. 630 | | |
| Lab sample id | R606184-07 | Client sample id | J12N85 | | |
| Dept sample id | 7487-007 | Location/Matrix | 600-171 | SOLID | |
| Received | 06/22/06 | Collected/Weight | 06/20/06 10:00 | 740 g | |
| % solids | 99.3 | Custody/SAF No | RC-072-5 | RC-072 | |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALIFIERS | TEST |
|---|---|---|---|---|---|---|---|
| Total Strontium | SR-RAD | 0.047 | 0.16 | 0.33 | 1.0 | U | SR |
| Thorium 228 | 14274-82-9 | 0.592 | 0.17 | 0.13 | 1.0 | J | TH |
| Thorium 230 | 14269-63-7 | 0.526 | 0.19 | 0.21 | 1.0 | | TH |
| Thorium 232 | TH-232 | 0.591 | 0.15 | 0.090 | 1.0 | J | TH |
| Uranium 233/234 | U-233/234 | 0.412 | 0.16 | 0.10 | 1.0 | | U |
| Uranium 235 | 15117-96-1 | 0.016 | 0.032 | 0.12 | 1.0 | U | U |
| Uranium 238 | U-238 | 0.425 | 0.16 | 0.10 | 1.0 | | U |
| Plutonium 238 | 13981-16-3 | 0 | 0.080 | 0.30 | 1.0 | U | PU |
| Plutonium 239/240 | PU-239/240 | 0.040 | 0.080 | 0.30 | 1.0 | U | PU |
| Potassium 40 | 13966-00-2 | 10.4 | 1.3 | 0.60 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.060 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.067 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | 0.327 | 0.14 | 0.15 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.854 | 0.32 | 0.27 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.16 | 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 | 0.419 | 0.074 | 0.081 | | | GAM |
| Thorium 232 | TH-232 | 0.854 | 0.32 | 0.27 | | | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.25 | | U | GAM |
| Uranium 238 | U-238 | U | | 8.9 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.27 | | U | GAM |
| Cesium 134 | 13967-70-9 | U | | 0.078 | | U | GAM |

100&300AreaCompntRCBRA-DiscreteSoilS

9/9/06

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| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 08/09/06 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0445

7487-008 J12N86

## DATA SHEET

| | | | |
|---|---|---|---|
| SDG | 7487 | Client/Case no | Hanford SDG K0445 |
| Contact | Melissa C. Mannion | Contract | No. 630 |
| Lab sample id | R606184-08 | Client sample id | J12N86 |
| Dept sample id | 7487-008 | Location/Matrix | 600-181 SOLID |
| Received | 06/22/06 | Collected/Weight | 06/20/06 10:45 796 g |
| % solids | 99.2 | Custody/SAF No | RC-072-6 RC-072 |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALIFIERS | TEST |
|---|---|---|---|---|---|---|---|
| Total Strontium | SR-RAD | 0.104 | 0.17 | 0.32 | 1.0 | U | SR |
| Thorium 228 | 14274-82-9 | 0.550 | 0.13 | 0.078 | 1.0 | J | TH |
| Thorium 230 | 14269-63-7 | 0.465 | 0.17 | 0.23 | 1.0 | | TH |
| Thorium 232 | TH-232 | 0.528 | 0.13 | 0.087 | 1.0 | J | TH |
| Uranium 233/234 | U-233/234 | 0.310 | 0.14 | 0.11 | 1.0 | | U |
| Uranium 235 | 15117-96-1 | 0.017 | 0.034 | 0.13 | 1.0 | U | U |
| Uranium 238 | U-238 | 0.422 | 0.14 | 0.11 | 1.0 | | U |
| Plutonium 238 | 13981-16-3 | 0.031 | 0.12 | 0.24 | 1.0 | U | PU |
| Plutonium 239/240 | PU-239/240 | 0 | 0.062 | 0.24 | 1.0 | U | PU |
| Potassium 40 | 13966-00-2 | 24.5 | 1.3 | 0.46 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.051 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.051 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | 0.850 | 0.10 | 0.095 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 1.46 | 0.27 | 0.23 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.12 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.17 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.18 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 1.34 | 0.075 | 0.069 | | | GAM |
| Thorium 232 | TH-232 | 1.46 | 0.27 | 0.23 | | | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.20 | | U | GAM |
| Uranium 238 | U-238 | U | | 6.0 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.46 | | U | GAM |
| Cesium 134 | 13967-70-9 | U | | 0.062 | | U | GAM |

100&300AreaCompntRCBRA-DiscreteSoilS

9/9/06

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| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 08/09/06 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0445

7487-009

J12N87

## DATA SHEET

| | | | |
|---|---|---|---|
| SDG | 7487 | Client/Case no | Hanford SDG K0445 |
| Contact | Melissa C. Mannion | Contract | No. 630 |
| Lab sample id | R606184-09 | Client sample id | J12N87 |
| Dept sample id | 7487-009 | Location/Matrix | 600-181 SOLID |
| Received | 06/22/06 | Collected/Weight | 06/20/06 11:30 814 g |
| % solids | 99.1 | Custody/SAF No | RC-072-6 RC-072 |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALIFIERS | TEST |
|---|---|---|---|---|---|---|---|
| Total Strontium | SR-RAD | 0.022 | 0.16 | 0.32 | 1.0 | U | SR |
| Thorium 228 | 14274-82-9 | 0.488 | 0.12 | 0.095 | 1.0 | J | TH |
| Thorium 230 | 14269-63-7 | 0.253 | 0.12 | 0.20 | 1.0 | | TH |
| Thorium 232 | TH-232 | 0.500 | 0.11 | 0.047 | 1.0 | J | TH |
| Uranium 233/234 | U-233/234 | 0.257 | 0.13 | 0.098 | 1.0 | | U |
| Uranium 235 | 15117-96-1 | 0.047 | 0.062 | 0.12 | 1.0 | U | U |
| Uranium 238 | U-238 | 0.449 | 0.16 | 0.098 | 1.0 | | U |
| Plutonium 238 | 13981-16-3 | -0.045 | 0.038 | 0.088 | 1.0 | U | PU |
| Plutonium 239/240 | PU-239/240 | 0.008 | 0.015 | 0.029 | 1.0 | U | PU |
| Potassium 40 | 13966-00-2 | 13.3 | 0.77 | 0.23 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.030 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | 0.077 | 0.033 | 0.034 | 0.10 | | GAM |
| Radium 226 | 13982-63-3 | 0.461 | 0.054 | 0.047 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.704 | 0.13 | 0.12 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.063 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.086 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.090 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.554 | 0.034 | 0.032 | | | GAM |
| Thorium 232 | TH-232 | 0.704 | 0.13 | 0.12 | | | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.11 | | U | GAM |
| Uranium 238 | U-238 | U | | 3.3 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.15 | | U | GAM |
| Cesium 134 | 13967-70-9 | U | | 0.038 | | U | GAM |

100&300AreaCompntRCBRA-DiscreteSoilS

9/9/06

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| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 08/09/06 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0445

7487-010 J12N88

## DATA SHEET

| | | | | | |
|---|---|---|---|---|---|
| SDG | 7487 | Client/Case no | Hanford | SDG K0445 | |
| Contact | Melissa C. Mannion | Contract | No. 630 | | |
| Lab sample id | R606184-10 | Client sample id | J12N88 | | |
| Dept sample id | 7487-010 | Location/Matrix | 600-181 | SOLID | |
| Received | 06/22/06 | Collected/Weight | 06/20/06 12:00 | 898 g | |
| % solids | 99.4 | Custody/SAF No | RC-072-6 | RC-072 | |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALIFIERS | TEST |
|---|---|---|---|---|---|---|---|
| Total Strontium | SR-RAD | 0.093 | 0.15 | 0.29 | 1.0 | U | SR |
| Thorium 228 | 14274-82-9 | 0.623 | 0.13 | 0.11 | 1.0 | J | TH |
| Thorium 230 | 14269-63-7 | 0.616 | 0.17 | 0.22 | 1.0 | | TH |
| Thorium 232 | TH-232 | 0.628 | 0.12 | 0.057 | 1.0 | J | TH |
| Uranium 233/234 | U-233/234 | 0.371 | 0.15 | 0.094 | 1.0 | | U |
| Uranium 235 | 15117-96-1 | 0.060 | 0.060 | 0.11 | 1.0 | U | U |
| Uranium 238 | U-238 | 0.346 | 0.12 | 0.094 | 1.0 | | U |
| Plutonium 238 | 13981-16-3 | 0.011 | 0.036 | 0.064 | 1.0 | U | PU |
| Plutonium 239/240 | PU-239/240 | 0.007 | 0.014 | 0.027 | 1.0 | U | PU |
| Potassium 40 | 13966-00-2 | 24.5 | 2.2 | 0.99 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.081 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | 0.096 | 0.067 | 0.080 | 0.10 | | GAM |
| Radium 226 | 13982-63-3 | 0.800 | 0.17 | 0.16 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 1.31 | 0.34 | 0.33 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.19 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.27 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.20 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 1.49 | 0.14 | 0.13 | | | GAM |
| Thorium 232 | TH-232 | 1.31 | 0.34 | 0.33 | | | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.29 | | U | GAM |
| Uranium 238 | U-238 | U | | 10 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.33 | | U | GAM |
| Cesium 134 | 13967-70-9 | U | | 0.099 | | U | GAM |

100&300AreaCompntRCBRA-DiscreteSoilS

VV 9/9/06

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| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 08/09/06 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0445

7487-011

J12N89

## DATA SHEET

| | | | |
|---|---|---|---|
| SDG 7487 | | Client/Case no Hanford | SDG K0445 |
| Contact Melissa C. Mannion | | Contract No. 630 | |
| Lab sample id R606184-11 | | Client sample id J12N89 | |
| Dept sample id 7487-011 | | Location/Matrix 600-181 | SOLID |
| Received 06/22/06 | | Collected/Weight 06/20/06 10:55 | 849 g |
| % solids 99.3 | | Custody/SAF No RC-072-6 | RC-072 |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Total Strontium | SR-RAD | 0.072 | 0.16 | 0.32 | 1.0 | U | SR |
| Thorium 228 | 14274-82-9 | 0.538 | 0.13 | 0.10 | 1.0 | J | TH |
| Thorium 230 | 14269-63-7 | 0.458 | 0.15 | 0.20 | 1.0 | | TH |
| Thorium 232 | TH-232 | 0.599 | 0.11 | 0.043 | 1.0 | J | TH |
| Uranium 233/234 | U-233/234 | 0.572 | 0.19 | 0.10 | 1.0 | | U |
| Uranium 235 | 15117-96-1 | 0.048 | 0.064 | 0.12 | 1.0 | U | U |
| Uranium 238 | U-238 | 0.585 | 0.19 | 0.10 | 1.0 | | U |
| Plutonium 238 | 13981-16-3 | 0 | 0.058 | 0.22 | 1.0 | U | PU |
| Plutonium 239/240 | PU-239/240 | 0 | 0.058 | 0.22 | 1.0 | U | PU |
| Potassium 40 | 13966-00-2 | 7.65 | 0.36 | 0.18 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.015 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.040 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | 0.352 | 0.034 | 0.032 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.365 | 0.076 | 0.076 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.038 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.054 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.031 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.375 | 0.020 | 0.019 | | | GAM |
| Thorium 232 | TH-232 | 0.365 | 0.076 | 0.076 | | | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.057 | | U | GAM |
| Uranium 238 | U-238 | U | | 1.7 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.020 | | U | GAM |
| Cesium 134 | 13967-70-9 | U | | 0.023 | | U | GAM |

100&300AreaCompntRCBRA-DiscreteSoilS

9/2/06

| | |
|---|---|
| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 08/09/06 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0445

7487-012 J12N90

## DATA SHEET

| | | | |
|---|---|---|---|
| SDG | 7487 | Client/Case no | Hanford SDG K0445 |
| Contact | Melissa C. Mannion | Contract No. | 630 |
| Lab sample id | R606184-12 | Client sample id | J12N90 |
| Dept sample id | 7487-012 | Location/Matrix | 618-4 SOLID |
| Received | 06/22/06 | Collected/Weight | 06/19/06 15:00 733 g |
| % solids | 99.6 | Custody/SAF No | RC-072-7 RC-072 |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALIFIERS | TEST |
|---|---|---|---|---|---|---|---|
| Total Strontium | SR-RAD | -0.025 | 0.15 | 0.32 | 1.0 | U | SR |
| Thorium 228 | 14274-82-9 | 0.534 | 0.13 | 0.10 | 1.0 | J | TH |
| Thorium 230 | 14269-63-7 | 0.493 | 0.16 | 0.21 | 1.0 | | TH |
| Thorium 232 | TH-232 | 0.428 | 0.11 | 0.050 | 1.0 | J | TH |
| Uranium 233/234 | U-233/234 | 0.372 | 0.13 | 0.081 | 1.0 | | U |
| Uranium 235 | 15117-96-1 | 0.013 | 0.026 | 0.098 | 1.0 | U | U |
| Uranium 238 | U-238 | 0.382 | 0.13 | 0.081 | 1.0 | | U |
| Plutonium 238 | 13981-16-3 | 0 | 0.12 | 0.45 | 1.0 | U | PU |
| Plutonium 239/240 | PU-239/240 | 0 | 0.12 | 0.45 | 1.0 | U | PU |
| Potassium 40 | 13966-00-2 | 9.12 | 1.9 | 0.67 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.068 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.064 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | 0.301 | 0.15 | 0.13 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | U | | 0.36 | 0.20 | U | 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 | | 0.17 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.234 | 0.073 | 0.074 | | | GAM |
| Thorium 232 | TH-232 | U | | 0.36 | | U | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.22 | | U | GAM |
| Uranium 238 | U-238 | U | | 8.3 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.23 | | U | GAM |
| Cesium 134 | 13967-70-9 | U | | 0.087 | | U | GAM |

100&300AreaCompntRCBRA-DiscreteSoilS

9/2/06

| | |
|---|---|
| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 08/09/06 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0445

7487-013 J12N91

## DATA SHEET

| | | | |
|---|---|---|---|
| SDG | 7487 | Client/Case no | Hanford SDG K0445 |
| Contact | Melissa C. Mannion | Contract No. | 630 |
| Lab sample id | R606184-13 | Client sample id | J12N91 |
| Dept sample id | 7487-013 | Location/Matrix | 618-4 SOLID |
| Received | 06/22/06 | Collected/Weight | 06/19/06 15:30 869 g |
| % solids | 99.2 | Custody/SAF No | RC-072-7 RC-072 |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALIFIERS | TEST |
|---|---|---|---|---|---|---|---|
| Total Strontium | SR-RAD | 0.032 | 0.16 | 0.31 | 1.0 | U | SR |
| Thorium 228 | 14274-82-9 | 0.226 | 0.093 | 0.11 | 1.0 | J | TH |
| Thorium 230 | 14269-63-7 | 0.260 | 0.13 | 0.21 | 1.0 | | TH |
| Thorium 232 | TH-232 | 0.347 | 0.093 | 0.064 | 1.0 | J | TH |
| Uranium 233/234 | U-233/234 | 0.319 | 0.12 | 0.090 | 1.0 | | U |
| Uranium 235 | 15117-96-1 | 0 | 0.029 | 0.11 | 1.0 | U | U |
| Uranium 238 | U-238 | 0.367 | 0.14 | 0.090 | 1.0 | | U |
| Plutonium 238 | 13981-16-3 | 0 | 0.067 | 0.26 | 1.0 | U | PU |
| Plutonium 239/240 | PU-239/240 | 0.067 | 0.067 | 0.26 | 1.0 | U | PU |
| Potassium 40 | 13966-00-2 | 29.4 | 1.2 | 0.46 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.048 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.045 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | 0.786 | 0.092 | 0.086 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 1.10 | 0.18 | 0.17 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.11 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.16 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.17 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 1.05 | 0.064 | 0.062 | | | GAM |
| Thorium 232 | TH-232 | 1.10 | 0.18 | 0.17 | | | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.19 | | U | GAM |
| Uranium 238 | U-238 | U | | 6.2 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.41 | | U | GAM |
| Cesium 134 | 13967-70-9 | U | | 0.054 | | U | GAM |

100&300AreaCompntRCBRA-DiscreteSoilS

9/9/06

| | |
|---|---|
| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 08/09/06 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0445

7487-014 J12N92

## DATA SHEET

| | | | |
|---|---|---|---|
| SDG | 7487 | Client/Case no | Hanford SDG K0445 |
| Contact | Melissa C. Mannion | Contract No. | 630 |
| Lab sample id | R606184-14 | Client sample id | J12N92 |
| Dept sample id | 7487-014 | Location/Matrix | 618-4 SOLID |
| Received | 06/22/06 | Collected/Weight | 06/19/06 16:00 796 g |
| % solids | 99.1 | Custody/SAF No | RC-072-7 RC-072 |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALIFIERS | TEST |
|---|---|---|---|---|---|---|---|
| Total Strontium | SR-RAD | -0.011 | 0.16 | 0.33 | 1.0 | U | SR |
| Thorium 228 | 14274-82-9 | 0.470 | 0.13 | 0.11 | 1.0 | J | TH |
| Thorium 230 | 14269-63-7 | 0.698 | 0.17 | 0.20 | 1.0 | | TH |
| Thorium 232 | TH-232 | 0.355 | 0.10 | 0.070 | 1.0 | J | TH |
| Uranium 233/234 | U-233/234 | 0.379 | 0.14 | 0.11 | 1.0 | | U |
| Uranium 235 | 15117-96-1 | 0.017 | 0.034 | 0.13 | 1.0 | U | U |
| Uranium 238 | U-238 | 0.435 | 0.17 | 0.11 | 1.0 | | U |
| Plutonium 238 | 13981-16-3 | -0.025 | 0.10 | 0.24 | 1.0 | U | PU |
| Plutonium 239/240 | PU-239/240 | 0 | 0.051 | 0.19 | 1.0 | U | PU |
| Potassium 40 | 13966-00-2 | 16.1 | 0.84 | 0.32 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.030 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.028 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | 0.489 | 0.065 | 0.061 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.734 | 0.13 | 0.12 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.071 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.090 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.099 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.672 | 0.037 | 0.036 | | | GAM |
| Thorium 232 | TH-232 | 0.734 | 0.13 | 0.12 | | | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.12 | | U | GAM |
| Uranium 238 | U-238 | U | | 3.2 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.16 | | U | GAM |
| Cesium 134 | 13967-70-9 | U | | 0.039 | | U | GAM |

100&300AreaCompntRCBRA-DiscreteSoilS

9/9/06

| | |
|---|---|
| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 08/09/06 |

## Appendix 4

## Laboratory Narrative and Chain-of-Custody Documentation

## 1.0 GENERAL

Washington Closure Hanford (WCH) Sample Delivery Group K0445 was composed of fourteen solid (soil) samples designated under SAF No. RC-072 with a Project Designation of: 100 & 300 Area Component of the RCBRA-Discrete Soil S.

The samples were received as stated on the Chain-of-Custody documents. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist. All results were transmitted to WCH via e-mail on August 9, 2006.

## 2.0 ANALYSIS NOTES

### 2.1 Total Strontium Analysis

No problems were encountered during the course of the analyses.

### 2.2 Isotopic Thorium Analysis

No problems were encountered during the course of the analyses.

### 2.3 Isotopic Uranium Analysis

No problems were encountered during the course of the analyses.

### 2.4 Isotopic Plutonium Analysis

No problems were encountered during the course of the analyses

### 2.5 Gamma Spectroscopy

No problems were encountered during the course of the analyses.

## 3.0 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**

MCM
8/11/06
**Date**

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-072-2 | Page 1 of 2 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: Tiller, B. | Company Contact: JOAN KESSNER — Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH | Price Code: 8N — Data Turnaround: 45 Days |
| Project Designation: 100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location: 1607-D2:1 K0445 (7487) | SAF No.: RC-072 | Air Quality ☐ |
| Ice Chest No.: ERC-99-046 | Field Logbook No.: EL-1597-X2 A-7-06-19-06 — COA: BESRAS6520 | Method of Shipment: FED EX | |
| Shipped To: EBERLINE SERVICES / LIONVILLE | Offsite Property No.: A060552 | Bill of Lading/Air Bill No.: SEE OSPC | |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*NONE*

**Special Handling and/or Storage**

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

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| SAMPLE ANALYSIS | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | | | | None | None | None | None | None | None | None | None | None | None |
| Type of Container | | | | G/P | G/P | * | * | * | ^ | ^ | ^ | ^ | ^ |
| No. of Container(s) | | | | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume | | | | 500g | 30g | 1* | 1* | 1* | 1^ | 1^ | 1^ | 1^ | 1^ |
| | | | | See item (1) in Special Instructions. | Strontium-89,90 – Total Sr | Isotopic Thorium (Thorium-228, Thorium-232) | Isotopic Uranium (Uranium-233/234, Uranium-235, Uranium-238) | Isotopic Plutonium (Plutonium-238, Plutonium-239/240) | ^ | ^^ | ^^^ | ^^^^ | ^^^^^ |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
| J12N79 | SOIL | 06-19-06 | 1210 | X* | X* | X | X | X | | | | | |
| J12N80 | SOIL | 6-19-06 | 1240 | X* | X* | X | X | X | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

| CHAIN OF POSSESSION | | Sign/Print Names | |
|---|---|---|---|
| Relinquished By/Removed From: BRETT TILLER | Date/Time: 6-19-06 1700 | Received By/Stored In: EAS LOCKED STORAGE | Date/Time: 6-19-06 1700 |
| Relinquished By/Removed From: EAS LOCKED STORAGE | Date/Time: 6-21-06 0900 | Received By/Stored In: [signature] | Date/Time: 6-21-06 0900 |
| Relinquished By/Removed From: [signature] WCH | Date/Time: 6/21/06 1500 | Received By/Stored In: Fed Ex | Date/Time: |
| Relinquished By/Removed From: FED EX | Date/Time: | Received By/Stored In: [signature] | Date/Time: 06/22/06 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**

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 – Total Sr analysis fraction.

^ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions.

(1) Gamma Spec - (Full List) [Cesium-134, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226, Radium-228]

**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-072-3 | Page 1 of 2 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector<br>Tiller, B. | Company Contact<br>JOAN KESSNER | Telephone No.<br>375-4688 | Project Coordinator<br>KESSNER, JH |
| Project Designation<br>100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location<br>116-DR-1&2 K0445 (7487) | | SAF No.<br>RC-072 |
| Ice Chest No. ERC-99-046 | Field Logbook No.<br>EL-1597-1 | COA<br>BESRAS6520 | Method of Shipment<br>FED EX |
| Shipped To<br>EBERLINE SERVICES LIONVILLE | Offsite Property No. A060552 | | Bill of Lading/Air Bill No.<br>SEE OSPC |

Price Code 8N

Data Turnaround 45 Days

Air Quality ☐

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*NONE*

**Special Handling and/or Storage**

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | None | None | None | None | None | None | None | None | None | None |
| Type of Container | G/P | G/P | ^ | ^ | ^ | ^ | ^ | ^ | ^ | ^ |
| No. of Container(s) | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume | 500g | 30g | 1^ | 1^ | 1^ | 1^ | 1^ | 1^ | 1^ | 1^ |

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| SAMPLE ANALYSIS | | | | See item (1) in Special Instructions. | Strontium-89,90 -- Total Sr | Isotopic Thorium (Thorium-228, Thorium-232) | Isotopic Uranium (Uranium-233/234, Uranium-235, Uranium-238) | Isotopic Plutonium (Plutonium-238, Plutonium-239/240) | ^ | ^^ | ^^^ | ^^^^ | ^^^^^ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
| J12N81 | SOIL | 06-19-06 | 1310 | X* | X* | X | X | X | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

| CHAIN OF POSSESSION | Date/Time | Sign/Print Names: Received By/Stored In | Date/Time |
|---|---|---|---|
| Relinquished By/Removed From BRETT TILLER | 6-19-06 1200 | EAS LOCKED STORAGE | 6-19-06 1200 |
| Relinquished By/Removed From EAS LOCKED STORAGE | 6-21-06 0900 | Received By/Stored In | 6-21-06 0900 |
| Relinquished By/Removed From | 6/21/06 1500 | Received By/Stored In Fed Ex | |
| Relinquished By/Removed From FED EX | | Received By/Stored In MFW | 06/22/06 9:30 |
| Relinquished By/Removed From | | Received By/Stored In | |
| Relinquished By/Removed From | | Received By/Stored In | |

**SPECIAL INSTRUCTIONS**

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

^ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions.

(1) Gamma Spec - (Full List) [Cesium-134, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226, Radium-228]

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-072-4 | Page 1 of 2 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector<br>Tiller, B. | Company Contact<br>JOAN KESSNER | Telephone No.<br>375-4688 | Project Coordinator<br>KESSNER, JH | Price Code 8N<br>Air Quality ☐ | Data Turnaround<br>45 Days |
| Project Designation<br>100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location<br>600-139 K0445 (7487) | | SAF No.<br>RC-072 | | |
| Ice Chest No.<br>RC-99-046 | Field Logbook No.<br>EL-1597-1 | COA<br>BESRAS6520 | Method of Shipment<br>FED EX | | |
| Shipped To<br>EBERLINE SERVICES LIONVILLE | Offsite Property No.<br>A060562 | | Bill of Lading/Air Bill No.<br>SEE OSPC | | |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*NONE*

**Special Handling and/or Storage**

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

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| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | None | None | None | None | None | None | None | None | None | None |
| Type of Container | G/P | G/P | ^ | ^ | ^ | ^ | ^ | ^ | ^ | ^ |
| No. of Container(s) | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume | 500g | 30g | 1^ | 1^ | 1^ | 1^ | 1^ | 1^ | 1^ | 1^ |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Strontium-89,90 – Total Sr | Isotopic Thorium (Thorium-228, Thorium-232) | Isotopic Uranium (Uranium-233/234, Uranium-235, Uranium-238) | Isotopic Plutonium (Plutonium-238, Plutonium-239/240) | ^ | ^^ | ^^^ | ^^^^ | ^^^^^ |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | |
| J12N82 | SOIL | 6-19-06 | 1350 | X * | X * | X | X | X | | | |

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By/Removed From<br>BRETT TILLER | Date/Time 1700<br>6-19-06 | Received By/Stored In<br>EAS LOCKED STORAGE | Date/Time 1700<br>6-19-06 |
| Relinquished By/Removed From<br>EAS LOCKED STORAGE | Date/Time 0900<br>6-21-06 | Received By/Stored In<br>JR Sanders | Date/Time<br>6-21-06 0900 |
| Relinquished By/Removed From<br>WCH | Date/Time<br>6/21/06 1500 | Received By/Stored In<br>Fed Ex | Date/Time |
| Relinquished By/Removed From<br>FED EX | Date/Time | Received By/Stored In<br>MM | Date/Time<br>06/22/06 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**

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 – Total Sr analysis fraction.

~ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions.

(1) Gamma Spec - (Full List) (Cesium-134, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226, Radium-228)

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
Ve=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-072-5 | Page 1 of 2 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: Tiller, B. | Company Contact: JOAN KESSNER | Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH |
| Price Code: 8N | Data Turnaround: 45 Days | Air Quality ☐ | |
| Project Designation: 100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location: 600-171 K0445 (7487) | SAF No.: RC-072 | |
| Ice Chest No.: ERC-99-046 | Field Logbook No.: EL-1597-R-2 BT 06-20-06 | COA: BESRAS6520 | Method of Shipment: FED EX |
| Shipped To: EBERLINE SERVICES / LIONVILLE | Offsite Property No.: A060552 | | Bill of Lading/Air Bill No.: SEE OSPC |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*NONE*

**Special Handling and/or Storage**

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

000031

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | None | None | None | None | None | None | None | None | None | None | None |
| Type of Container | G/P | G/P | ` | ` | ` | ^ | ^ | ^ | ^ | ^ |
| No. of Container(s) | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume | 500g | 30g | 1` | 1` | 1` | 1^ | 1^ | 1^ | 1^ | 1^ |

| SAMPLE ANALYSIS | | | | See item (1) in Special Instructions. | Strontium-89,90 -- Total Sr | Isotopic Thorium (Thorium-228, Thorium-232) | Isotopic Uranium (Uranium-233/234, Uranium-235, Uranium-238) | Isotopic Plutonium (Plutonium-238, Plutonium-239/240) | ^ | ^^ | ^^^ | ^^^^ | ^^^^^ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
| J12N83 | SOIL | 06-20-06 | 0910 | X` | X` | X | X | X | | | | | |
| J12N84 | SOIL | 06-20-06 | 0930 | X` | X` | X | X | X | | | | | |
| J12N85 | SOIL | 06-20-06 | 1000 | X` | X` | X | X | X | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By/Removed From: BRETT TILLER | Date/Time: 1330 6-20-06 | Received By/Stored In: EAS LOCKED STORAGE | Date/Time: 1330 6-20-06 |
| Relinquished By/Removed From: EAS LOCKED STORAGE | Date/Time: 0900 6-21-06 | Received By/Stored In: [illegible] | Date/Time: 6-21-06 0900 |
| Relinquished By/Removed From: [illegible] UXH | Date/Time: 6/21/06 1500 | Received By/Stored In: Fed EX | Date/Time: |
| Relinquished By/Removed From: FED EX | Date/Time: | Received By/Stored In: [illegible] | Date/Time: 06/22/06 9:20 |
| 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**

` These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

^ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions.

(1) Gamma Spec - (Full List) (Cesium-134, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226, Radium-228)

**Matrix ***

S=Soil
SE=Sediment
SO=Solid
Sl=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
To=Tissue
Wi=Wipe
L=Liquid
Ve=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-072-6 | Page 1 of 2 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: Tiller, B. | Company Contact: JOAN KESSNER; Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH | Price Code: 8N; Data Turnaround: 45 Days |
| Project Designation: 100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location: 600-181 K0445 (7487) | SAF No.: RC-072 | Air Quality ☐ |
| Ice Chest No.: ERC-99-046 | Field Logbook No.: EL-1597-12 BT 06-20-06; COA: BESRAS6520 | Method of Shipment: FED EX | |
| Shipped To: EBERLINE SERVICES / LIONVILLE | Offsite Property No.: A060552 | Bill of Lading/Air Bill No.: SEE OSPC | |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*NONE*

**Special Handling and/or Storage**

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

000032

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | | | | None | None | None | None | None | None | None | None | None | None |
| Type of Container | | | | G/P | G/P | * | * | * | ^ | ^ | ^ | ^ | ^ |
| No. of Container(s) | | | | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume | | | | 500g | 30g | 1* | 1* | 1* | 1^ | 1^ | 1^ | 1^ | 1^ |
| SAMPLE ANALYSIS | | | | See item (1) in Special Instructions. | Strontium-89,90 -- Total Sr | Isotopic Thorium (Thorium-228, Thorium-232) | Isotopic Uranium (Uranium-233/234, Uranium-235, Uranium-238) | Isotopic Plutonium (Plutonium-238, Plutonium-239/240) | ^ | ^^ | ^^^ | ^^^^ | ^^^^^ |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
| J12N86 | SOIL | 06-20-06 | 1045 | X* | X* | X | X | X | | | | | |
| J12N87 | SOIL | 06-20-06 | ~~1030~~ 1130 BT 06-20-06 | X* | X* | X | X | X | | | | | |
| J12N88 | SOIL | 06-20-06 | 1200 | X* | X* | X | X | X | | | | | |
| J12N89 | SOIL | 06-20-06 | 1055 | X* | X* | X | X | X | | | | | |

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By/Removed From: BRETT TILLER | Date/Time: 1330 6-20-06 | Received By/Stored In: EAS LOCKED STORAGE | Date/Time: 1330 6-20-06 |
| Relinquished By/Removed From: EAS LOCKED STORAGE | Date/Time: 0900 6-21-06 | Received By/Stored In: [signature] | Date/Time: 6-21-06 0900 |
| Relinquished By/Removed From: [signature] WEH | Date/Time: 6/21/06 1500 | Received By/Stored In: Fed Ex | Date/Time: |
| Relinquished By/Removed From: FED EX | Date/Time: | Received By/Stored In: [signature] | Date/Time: 06/22/06 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**

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

^ These marks indicate that this is a non-analysis used to properly format COC form.

Contact Joan Kessner for any questions.

(1) Gamma Spec - (Full List) [Cesium-134, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226, Radium-228]

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-072-7 | Page 1 of 2 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector<br>Tiller, B. | Company Contact<br>JOAN KESSNER<br>Telephone No.<br>375-4688 | Project Coordinator<br>KESSNER, JH | Price Code 8N<br>Data Turnaround<br>Air Quality ☐ 45 Days |
| Project Designation<br>100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location<br>618-4 K0445 (7487) | SAF No.<br>RC-072 | |
| Ice Chest No. ERC-99-046 | Field Logbook No.<br>EL-1597-Y2 BS 06-19-06<br>COA<br>BESRAS6520 | Method of Shipment<br>FED EX | |
| Shipped To<br>EBERLINE SERVICES LIONVILLE | Offsite Property No. A060552 | Bill of Lading/Air Bill No.<br>SEE OSPC | |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*NONE*

**Special Handling and/or Storage**

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

000033

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | None | None | None | None | None | None | None | None | None | None |
| Type of Container | G/P | G/P | * | * | * | ^ | ^ | ^ | ^ | ^ |
| No. of Container(s) | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume | 500g | 30g | 1* | 1* | 1* | 1^ | 1^ | 1^ | 1^ | 1^ |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Strontium-89,90 – Total Sr | Isotopic Thorium (Thorium-228, Thorium-232) | Isotopic Uranium (Uranium-233/234, Uranium-235, Uranium-238) | Isotopic Plutonium (Plutonium-238, Plutonium-239/240) | ^ | ^^ | ^^^ | ^^^^ | ^^^^^ |

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J12N90 | SOIL | 06-19-06 | 1500 | X* | X* | X | X | X | | | | | |
| J12N91 | SOIL | 06-19-06 | 1530 | X* | X* | X | X | X | | | | | |
| J12N92 | SOIL | 06-19-06 | 1600 | X* | X* | X | X | X | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By/Removed From<br>BRETT TILLER [signature] | Date/Time 1700<br>6-19-06 | Received By/Stored In<br>EAS LOCKED STORAGE | Date/Time 1700<br>6-19-06 |
| Relinquished By/Removed From<br>EAS LOCKED STORAGE | Date/Time 0900<br>6-21-06 | Received By/Stored In<br>[signature] | Date/Time<br>6-21-06 0900 |
| Relinquished By/Removed From<br>[signature] WCH | Date/Time<br>6/21/06 1500 | Received By/Stored In<br>Fed Ex | Date/Time |
| Relinquished By/Removed From<br>FED EX | Date/Time | Received By/Stored In<br>[signature] | Date/Time<br>06/22/06 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**

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 – Total Sr analysis fraction.

^– These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions.

(1) Gamma Spec - (Full List) [Cesium-134, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226, Radium-228]

**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

## APPENDIX A

## RADIOCHEMICAL DATA VALIDATION CHECKLIST

| VALIDATION LEVEL: | A | B | C | D | E |
|---|---|---|---|---|---|
| PROJECT: | RCBRA | | DATA PACKAGE: | K0445 | |
| VALIDATOR: | TLI | LAB: EB | | DATE: 9/7/06 | |
| | | | SDG: | K0445 | |
| ANALYSES PERFORMED | | | | | |
| Gross Alpha/Beta | Strontium-90 | Technetium-99 | Alpha Spectroscopy | Gamma Spectroscopy | |
| Total Uranium | Radium-22 | Tritium | | | |
| SAMPLES/MATRIX | | | | | |
| J12N79 | J12N80 | J12N81 | J12N82 | J12N83 | J12N84 |
| J12N85 | J12N86 | J12N87 | J12N88 | J12N89 | J12N90 |
| J12N92 | J12N93 | | | | |
| | | | | | |
| | | | | | 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: no th228 or 232 LCS - J all

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: _____

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

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

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

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

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

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

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

Comments: no Field QC

12. Holding Times (All levels)

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

Comments: _____

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

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

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

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

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

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

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

Comments: 4 over

12

## Appendix 6

## Additional Documentation Requested by Client

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0445

7487-016

Method Blank

## METHOD BLANK

SDG 7487 Client/Case no Hanford SDG K0445
Contact Melissa C. Mannion Contract No. 630

Lab sample id R606184-16 Client sample id Method Blank
Dept sample id 7487-016 Material/Matrix SOLID
SAF No RC-072

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Total Strontium | SR-RAD | -0.021 | 0.15 | 0.32 | 1.0 | U | SR |
| Thorium 228 | 14274-82-9 | -0.014 | 0.084 | 0.17 | 1.0 | U | TH |
| Thorium 230 | 14269-63-7 | 0.168 | 0.13 | 0.22 | 1.0 | U | TH |
| Thorium 232 | TH-232 | 0 | 0.028 | 0.067 | 1.0 | U | TH |
| Uranium 233/234 | U-233/234 | 0.076 | 0.076 | 0.29 | 1.0 | U | U |
| Uranium 235 | 15117-96-1 | 0 | 0.092 | 0.35 | 1.0 | U | U |
| Uranium 238 | U-238 | 0 | 0.076 | 0.29 | 1.0 | U | U |
| Plutonium 238 | 13981-16-3 | -0.025 | 0.050 | 0.19 | 1.0 | U | PU |
| Plutonium 239/240 | PU-239/240 | 0 | 0.050 | 0.19 | 1.0 | U | PU |
| Potassium 40 | 13966-00-2 | U | | 4.5 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.18 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.17 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | U | | 0.36 | 0.10 | U | GAM |
| Radium 228 | 15262-20-1 | U | | 0.75 | 0.20 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.45 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.52 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.44 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.23 | | U | GAM |
| Thorium 232 | TH-232 | U | | 0.75 | | U | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.67 | | U | GAM |
| Uranium 238 | U-238 | U | | 22 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.66 | | U | GAM |
| Cesium 134 | 13967-70-9 | U | | 0.21 | | U | GAM |

100&300AreaCompntRCBRA-DiscreteSoilS

QC-BLANK #57766

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 08/09/06

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0445

7487-015

Lab Control Sample

## LAB CONTROL SAMPLE

SDG 7487 | Client/Case no Hanford | SDG K0445

Contact Melissa C. Mannion | Contract No. 630

Lab sample id R606184-15 | Client sample id Lab Control Sample

Dept sample id 7487-015 | Material/Matrix SOLID

SAF No RC-072

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Strontium | 10.1 | 0.62 | 0.29 | 1.0 | | SR | 9.75 | 0.39 | 104 | 81-119 | 80-120 |
| Thorium 230 | 36.7 | 1.6 | 0.20 | 1.0 | | TH | 36.4 | 1.5 | 101 | 88-112 | 80-120 |
| Uranium 233/234 | 19.1 | 1.6 | 0.70 | 1.0 | | U | 18.6 | 0.74 | 103 | 84-116 | 80-120 |
| Uranium 235 | 15.8 | 1.4 | 0.13 | 1.0 | | U | 15.1 | 0.60 | 105 | 83-117 | 80-120 |
| Uranium 238 | 20.6 | 1.7 | 0.67 | 1.0 | | U | 20.2 | 0.81 | 102 | 84-116 | 80-120 |
| Plutonium 238 | 20.6 | 1.9 | 0.24 | 1.0 | | PU | 23.8 | 0.95 | 87 | 85-115 | 80-120 |
| Plutonium 239/240 | 23.0 | 2.1 | 0.16 | 1.0 | | PU | 26.4 | 1.1 | 87 | 85-115 | 80-120 |
| Cobalt 60 | 1.99 | 0.18 | 0.057 | 0.050 | | GAM | 2.11 | 0.084 | 94 | 75-125 | 80-120 |
| Cesium 137 | 2.09 | 0.17 | 0.11 | 0.10 | | GAM | 2.24 | 0.090 | 93 | 75-125 | 80-120 |

100&300AreaCompntRCBRA-DiscreteSoilS

QC-LCS #57765

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 08/09/06

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0445

7487-017 J12N79

## DUPLICATE

SDG 7487 Client/Case no Hanford SDG K0445

Contact Melissa C. Mannion Contract No. 630

| DUPLICATE | ORIGINAL | |
|---|---|---|
| Lab sample id R606184-17 | Lab sample id R606184-01 | Client sample id J12N79 |
| Dept sample id 7487-017 | Dept sample id 7487-001 | Location/Matrix 1607-D2:1 SOLID |
| | Received 06/22/06 | Collected/Weight 06/19/06 12:10 584 g |
| % solids 97.6 | % solids 97.6 | Custody/SAF No RC-072-2 RC-072 |

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Strontium | 0.148 | 0.17 | 0.32 | 1.0 | U | SR | 0.135 | 0.27 | 0.47 | U | - | | 0.1 |
| Thorium 228 | 0.761 | 0.14 | 0.12 | 1.0 | | TH | 0.544 | 0.19 | 0.18 | | 33 | 55 | 1.8 |
| Thorium 230 | 0.476 | 0.14 | 0.19 | 1.0 | | TH | 0.530 | 0.21 | 0.25 | | 11 | 76 | 0.4 |
| Thorium 232 | 0.693 | 0.12 | 0.037 | 1.0 | | TH | 0.570 | 0.19 | 0.10 | | 19 | 54 | 1.1 |
| Uranium 233/234 | 0.495 | 0.17 | 0.11 | 1.0 | | U | 0.603 | 0.18 | 0.11 | | 20 | 68 | 0.9 |
| Uranium 235 | 0.034 | 0.034 | 0.13 | 1.0 | U | U | 0.036 | 0.036 | 0.14 | U | - | | 0.1 |
| Uranium 238 | 0.396 | 0.14 | 0.11 | 1.0 | | U | 0.529 | 0.18 | 0.11 | | 29 | 75 | 1.2 |
| Plutonium 238 | 0.021 | 0.084 | 0.16 | 1.0 | U | PU | 0.055 | 0.22 | 0.42 | U | - | | 0.3 |
| Plutonium 239/240 | 0 | 0.042 | 0.16 | 1.0 | U | PU | 0 | 0.11 | 0.42 | U | - | | 0 |
| Potassium 40 | 10.8 | 1.4 | 0.77 | | | GAM | 12.8 | 1.2 | 0.54 | | 17 | 40 | 1.3 |
| Cobalt 60 | U | | 0.079 | 0.050 | U | GAM | U | | 0.059 | U | - | | 0.4 |
| Cesium 137 | U | | 0.076 | 0.10 | U | GAM | U | | 0.061 | U | - | | 0.3 |
| Radium 226 | 0.444 | 0.12 | 0.12 | 0.10 | | GAM | 0.432 | 0.11 | 0.12 | | 3 | 64 | 0.1 |
| Radium 228 | 0.502 | 0.25 | 0.30 | 0.20 | | GAM | 0.598 | 0.25 | 0.26 | | 17 | 102 | 0.5 |
| Europium 152 | U | | 0.18 | 0.10 | U | GAM | U | | 0.14 | U | - | | 0.3 |
| Europium 154 | U | | 0.28 | 0.10 | U | GAM | U | | 0.18 | U | - | | 0.6 |
| Europium 155 | U | | 0.19 | 0.10 | U | GAM | U | | 0.14 | U | - | | 0.4 |
| Thorium 228 | 0.740 | 0.14 | 0.14 | | | GAM | 0.555 | 0.067 | 0.068 | | 29 | 48 | 1.8 |
| Thorium 232 | 0.502 | 0.25 | 0.30 | | | GAM | 0.598 | 0.25 | 0.26 | | 17 | 102 | 0.5 |
| Uranium 235 | U | | 0.29 | | U | GAM | U | | 0.22 | U | - | | 0.4 |
| Uranium 238 | U | | 9.9 | | U | GAM | U | | 6.6 | U | - | | 0.5 |
| Americium 241 | U | | 0.30 | | U | GAM | U | | 0.23 | U | - | | 0.4 |
| Cesium 134 | U | | 0.12 | | U | GAM | U | | 0.068 | U | - | | 0.7 |

100&300AreaCompntRCBRA-DiscreteSoilS

QC-DUP#1 57767

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 08/09/06

Date: 11 September 2006
To: Washington Closure Hanford (technical representative)
From: TechLaw, Inc.
Project: 100 Area and 300 Area Component of the RCBRA – Discrete Soil Sampling
Subject: Pesticide/PCB/Herbicide - Data Package No. K0445-LLI

## INTRODUCTION

This memo presents the results of data validation on Data Package No. K0445 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 |
|---|---|---|---|---|
| J12N79 | 6/19/06 | Soil | C | See note 1 |
| J12N80 | 6/19/06 | Soil | C | See note 1 |
| J12N81 | 6/19/06 | Soil | C | See note 1 |
| J12N82 | 6/19/06 | Soil | C | See note 1 |
| J12N83 | 6/20/06 | Soil | C | See note 1 |
| J12N84 | 6/20/06 | Soil | C | See note 1 |
| J12N85 | 6/20/06 | Soil | C | See note 1 |
| J12N86 | 6/20/06 | Soil | C | See note 1 |
| J12N87 | 6/20/06 | Soil | C | See note 1 |
| J12N88 | 6/20/06 | Soil | C | See note 1 |
| J12N89 | 6/19/06 | Soil | C | See note 1 |
| J12N90 | 6/19/06 | Soil | C | See note 1 |
| J12N91 | 6/19/06 | Soil | C | See note 1 |
| J12N92 | 6/19/06 | Soil | C | See note 1 |
| J12N93 | 6/19/06 | Soil | C | See note 1 |

1 – Pesticides by 8081A, PCBs by 8082 and chlorinated herbicides by 8151A.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area and 300 Area Component of the RCBRA Sampling & Analysis Plan (DOE/RL-2005-42, Rev. 0, October 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 Preservation**

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.

Due to method blank contamination, all detected dalapon results (J12N79, J12N80, J12N81, J12N87, J12N88, J12N91 and J12N92) were qualified as estimates and flagged "UJ".

Due to method blank contamination, the dicamba results in samples J12N79, J12N82, J12N84, J12N83, J12N85, J12N87, J12N88, J12N89, J12N90, J12N91, J12N92 and J12N93 were qualified as estimates and flagged "UJ".

Due to method blank contamination, the 2,4-DB result in sample J12N88 was qualified as an estimate and flagged "UJ".

All other 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 80% to 120%. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Non-detected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

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

Due to the lack of an LCS analysis, all chlorinated herbicide results were qualified as estimates and flagged "J".

Due to an LCS recovery outside QC limits (48%), all methoxychlor 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 recovery interference, all chlorinated herbicide results in sample J12N83 were qualified as estimates and flagged "J".

Due to surrogate recoveries outside QC limits, all detected chlorinated herbicide results in samples J12N82 (179%), J12N91 (160%) and J12N92 (154%) were qualified as estimates and flagged "J".

Due to a surrogate recovery outside QC limits (30%), all PCB results in sample J12N88 were qualified as estimates and flagged "J".

Due to a surrogate recovery outside QC limits (28%), all pesticide results in sample J12N88 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 20%. 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, matrix spike duplicate and LCS analysis, all toxaphene results were qualified as estimates and flagged "J".

Due to RPDs outside QC limits, all dalapon (59%), dichlroprop (61%), 2,4-D (70%), 2,4,5-TP (61%), 2,4,5-T (41%) and pentachlorophenol (50%) results were qualified as estimates and flagged "J".

All other precision results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for analysis.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the project specific RQLs to ensure that laboratory detection levels meet the required criteria. All toxaphene, dichloroprop and dinoseb results exceeded the RQL. Under the WCH statement of work, no qualification is required.

- **Completeness**

Data Package No. K0445 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 dalapon results (J12N79, J12N80, J12N81, J12N87, J12N88, J12N91 and J12N92) were qualified as estimates and flagged "UJ".

- Due to method blank contamination, the dicamba results in samples J12N79, J12N82, J12N84, J12N83, J12N85, J12N87, J12N88, J12N89, J12N90, J12N91, J12N92 and J12N93 were qualified as estimates and flagged "UJ".

- Due to method blank contamination, the 2,4-DB result in sample J12N88 was qualified as an estimate and flagged "UJ".

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

- Due to the lack of an LCS analysis, all chlorinated herbicide results were qualified as estimates and flagged "J".

- Due to an LCS recovery outside QC limits (48%), all methoxyclor results were qualified as estimates and flagged "J".

- Due to surrogate recovery interference, all chlorinated herbicide results in sample J12N83 were qualified as estimates and flagged "J".

- Due to surrogate recoveries outside QC limits, all detected chlorinated herbicide results in samples J12N82 (179%), J12N91 (160%) and J12N92 (154%) were qualified as estimates and flagged "J".

- Due to a surrogate recovery outside QC limits (30%), all PCB results in sample J12N88 were qualified as estimates and flagged "J".

- Due to a surrogate recovery outside QC limits (28%), all pesticide results in sample J12N88 were qualified as estimates and flagged "J".

- Due to RPDs outside QC limits, all dalapon (59%), dichlroprop (61%), 2,4-D (70%), 2,4,5-TP (61%), 2,4,5-T (41%) and pentachlorophenol (50%) results were qualified as estimates and flagged "J".

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

All toxaphene, dichloroprop and dinoseb 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-2005-42, Rev. 0, October 2005, *100 Area and 300 Area Component of the RCBRA Sampling & Analysis Plan*.

## 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/HERBICIDE DATA QUALIFICATION SUMMARY*

| SDG: K0445 | REVIEWER: TLI | Project: RCBRA | PAGE 1 OF 1 |
|---|---|---|---|
| COMMENTS: | | | |
| COMPOUND | QUALIFIER | SAMPLES AFFECTED | REASON |
| Dalapon | UJ | J12N79, J12N80 J12N81, J12N87 J12N88, J12N91 J12N92 | Blank contamination |
| Dicamba | UJ | J12N79, J12N82 J12N84, J12N83 J12N85, J12N87 J12N88, J12N89 J12N90, J12N91 J12N92, J12N93 | Blank contamination |
| 2,4-DB | UJ | J12N88 | Blank contamination |
| Toxaphene | J | All | No MS/MSD/LCS analysis |
| Chlorinated Herbicides | J | All | No LCS analysis |
| Methoxychlor | J | All | LCS recovery |
| Chlorinated Herbicides | J | J12N83 | Surrogate interference |
| All detected chlorinated herbicides | J | J12N82, J12N91 J12N92 | Surrogate recovery |
| All PCBs All pesticides | J | J12N88 | Surrogate recovery |
| Dalapon Dichlroprop 2,4-D 2,4,5-TP 2,4,5-T Pentachlorophenol | 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

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



Project: WASHINGTON CLOSURE HANFORD
Laboratory: LLI SDG: K0445

| Sample Number | | J12N79 | | J12N80 | | J12N81 | | J12N82 | | J12N83 | | J12N84 | | J12N85 | | J12N86 | | J12N87 | | J12N88 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Remarks | | | | | | | | | | | | | | | | | | | | | |
| Sample Date | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | |
| Extraction Date | | 6/26/06 | | 6/26/06 | | 6/26/06 | | 6/26/06 | | 6/26/06 | | 6/26/06 | | 6/26/06 | | 6/26/06 | | 6/26/06 | | 6/26/06 | |
| Analysis Date | | 7/28/06 | | 7/28/06 | | 7/28/06 | | 7/28/06 | | 7/28/06 | | 7/28/06 | | 7/28/06 | | 7/28/06 | | 7/28/06 | | 7/28/06 | |
| PCB | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| Aroclor-1016 | | 14 | U | 14 | U | 13 | U | 13 | U | 13 | U | 13 | U | 13 | U | 13 | U | 13 | U | 13 | UJ |
| Aroclor-1221 | | 14 | U | 14 | U | 13 | U | 13 | U | 13 | U | 13 | U | 13 | U | 13 | U | 13 | U | 13 | UJ |
| Aroclor-1232 | 16.5 | 14 | U | 14 | U | 13 | U | 13 | U | 13 | U | 13 | U | 13 | U | 13 | U | 13 | U | 13 | UJ |
| Aroclor-1242 | 16.5 | 14 | U | 14 | U | 13 | U | 13 | U | 13 | U | 13 | U | 13 | U | 13 | U | 13 | U | 13 | UJ |
| Aroclor-1248 | | 14 | U | 14 | U | 13 | U | 13 | U | 13 | U | 13 | U | 13 | U | 13 | U | 13 | U | 13 | UJ |
| Aroclor-1254 | 16.5 | 14 | U | 14 | U | 13 | U | 13 | U | 13 | U | 170 | | 13 | U | 13 | U | 13 | U | 13 | UJ |
| Aroclor-1260 | 16.5 | 14 | U | 14 | U | 6.9 | | 13 | U | 13 | U | 13 | U | 13 | U | 13 | U | 13 | U | 13 | UJ |

| Sample Number | | J12N79 | | J12N80 | | J12N81 | | J12N82 | | J12N83 | | J12N84 | | J12N85 | | J12N86 | | J12N87 | | J12N88 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Remarks | | | | | | | | | | | | | | | | | | | | | |
| Sample Date | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | |
| Extraction Date | | 6/26/06 | | 6/26/06 | | 6/26/06 | | 6/26/06 | | 6/26/06 | | 6/26/06 | | 6/26/06 | | 6/26/06 | | 6/26/06 | | 6/26/06 | |
| Analysis Date | | 7/4/06 | | 7/5/06 | | 7/5/06 | | 7/5/06 | | 7/5/06 | | 7/5/06 | | 7/5/06 | | 7/5/06 | | 7/5/06 | | 7/5/06 | |
| Pesticide | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| Alpha-BHC | 5 | 0.34 | U | 0.34 | U | 0.33 | U | 0.34 | U | 0.34 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | UJ |
| Gamma-BHC (Lindane) | 5 | 0.34 | U | 0.34 | U | 0.33 | U | 0.34 | U | 0.34 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | UJ |
| Beta-BHC | 5 | 0.34 | U | 0.34 | U | 0.33 | U | 0.34 | U | 1.3 | | 1.3 | | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | UJ |
| Heptachlor | 5 | 0.34 | U | 0.34 | U | 0.33 | U | 0.34 | U | 0.34 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | UJ |
| Delta-BHC | 5 | 0.34 | U | 0.34 | U | 0.33 | U | 0.34 | U | 0.34 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | UJ |
| Aldrin | 5 | 0.34 | U | 0.34 | U | 0.33 | U | 0.34 | U | 0.34 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | UJ |
| Heptachlor Epoxide | 5 | 0.34 | U | 0.34 | U | 0.33 | U | 0.34 | U | 0.34 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | UJ |
| Endosulfan I | 5 | 0.34 | U | 0.34 | U | 0.33 | U | 0.34 | U | 0.34 | U | 0.34 | | 0.33 | U | 0.33 | U | 0.33 | U | 0.67 | J |
| Dieldrin | 5 | 0.34 | U | 0.34 | U | 0.33 | U | 0.34 | U | 0.34 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | UJ |
| 4,4'-DDE | 5 | 0.34 | U | 0.34 | U | 0.33 | U | 0.34 | U | 1.7 | | 6.5 | | 0.97 | | 0.33 | U | 0.33 | U | 0.33 | UJ |
| Endrin | 5 | 0.34 | U | 0.34 | U | 0.33 | U | 0.34 | U | 0.34 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | UJ |
| Endosulfan II | 5 | 0.34 | U | 0.34 | U | 0.33 | U | 0.34 | U | 0.34 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | UJ |
| 4,4'-DDD | 5 | 0.34 | U | 0.34 | U | 0.33 | U | 0.34 | U | 0.34 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | UJ |
| Endosulfan Sulfate | 5 | 0.34 | U | 0.34 | U | 0.33 | U | 0.34 | U | 0.34 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | UJ |
| 4,4'-DDT | 5 | 0.34 | U | 0.34 | U | 0.33 | U | 0.34 | U | 0.34 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | UJ |
| Methoxychlor | 5 | 0.34 | UJ | 0.34 | UJ | 0.33 | UJ | 0.34 | UJ | 0.34 | UJ | 0.33 | UJ | 0.33 | UJ | 0.33 | UJ | 0.33 | UJ | 0.33 | UJ |
| Endrin Ketone | 5 | 0.34 | U | 0.34 | U | 0.33 | U | 0.34 | U | 0.34 | U | 0.67 | | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | UJ |
| Endrin Aldehyde | 5 | 0.34 | U | 0.34 | U | 0.33 | U | 0.34 | U | 0.34 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | UJ |
| alpha-Chlordane | 5 | 0.34 | U | 0.34 | U | 0.33 | U | 0.34 | U | 0.34 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.54 | | 0.33 | UJ |
| gamma-Chlordane | 5 | 0.34 | U | 0.34 | U | 0.33 | U | 0.34 | U | 0.34 | U | 1.7 | | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | UJ |
| Toxaphene | 5 | 3.4 | UJ | 3.4 | UJ | 3.3 | UJ | 3.4 | UJ | 3.4 | UJ | 3.3 | UJ | 3.3 | UJ | 3.3 | UJ | 3.3 | UJ | 3.3 | 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.

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



Project: WASHINGTON CLOSURE HANFORD

Laboratory: LLI SDG: K0445

| Sample Number | | J12N89 | | J12N90 | | J12N91 | | J12N92 | | J12N93 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Remarks | | | | | | | | | | | | | | | | | | | | | |
| Sample Date | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/19/06 | | | | | | | | | | | |
| Extraction Date | | 6/26/06 | | 6/26/06 | | 6/26/06 | | 6/26/06 | | 6/26/06 | | | | | | | | | | | |
| Analysis Date | | 7/28/06 | | 7/28/06 | | 7/28/06 | | 7/28/06 | | 7/28/06 | | | | | | | | | | | |
| PCB | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| Aroclor-1016 | | 13 | U | 13 | U | 13 | U | 13 | U | 13 | U | | | | | | | | | | |
| Aroclor-1221 | | 13 | U | 13 | U | 13 | U | 13 | U | 13 | U | | | | | | | | | | |
| Aroclor-1232 | 16.5 | 13 | U | 13 | U | 13 | U | 13 | U | 13 | U | | | | | | | | | | |
| Aroclor-1242 | 16.5 | 13 | U | 13 | U | 13 | U | 13 | U | 13 | U | | | | | | | | | | |
| Aroclor-1248 | | 13 | U | 13 | U | 13 | U | 13 | U | 13 | U | | | | | | | | | | |
| Aroclor-1254 | 16.5 | 13 | U | 13 | U | 13 | U | 13 | U | 13 | U | | | | | | | | | | |
| Aroclor-1260 | 16.5 | 13 | U | 13 | U | 13 | U | 13 | U | 13 | U | | | | | | | | | | |

| Sample Number | | J12N89 | | J12N90 | | J12N91 | | J12N92 | | J12N93 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Remarks | | | | | | | | | | | | | | | | | | | | | |
| Sample Date | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/19/06 | | | | | | | | | | | |
| Extraction Date | | 6/26/06 | | 6/26/06 | | 6/26/06 | | 6/26/06 | | 6/26/06 | | | | | | | | | | | |
| Analysis Date | | 7/5/06 | | 7/5/06 | | 7/5/06 | | 7/5/06 | | 7/5/06 | | | | | | | | | | | |
| Pesticide | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| Alpha-BHC | 5 | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | | | | | | | | | | |
| Gamma-BHC (Lindane) | 5 | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | | | | | | | | | | |
| Beta-BHC | 5 | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | | | | | | | | | | |
| Heptachlor | 5 | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | | | | | | | | | | |
| Delta-BHC | 5 | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | | | | | | | | | | |
| Aldrin | 5 | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | | | | | | | | | | |
| Heptachlor Epoxide | 5 | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | | | | | | | | | | |
| Endosulfan I | 5 | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | | | | | | | | | | |
| Dieldrin | 5 | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | | | | | | | | | | |
| 4,4'-DDE | 5 | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | | | | | | | | | | |
| Endrin | 5 | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | | | | | | | | | | |
| Endosulfan II | 5 | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | | | | | | | | | | |
| 4,4'-DDD | 5 | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | | | | | | | | | | |
| Endosulfan Sulfate | 5 | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | | | | | | | | | | |
| 4,4'-DDT | 5 | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | | | | | | | | | | |
| Methoxychlor | 5 | 0.33 | UJ | 0.33 | UJ | 0.33 | UJ | 0.60 | J | 0.33 | UJ | | | | | | | | | | |
| Endrin Ketone | 5 | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | | | | | | | | | | |
| Endrin Aldehyde | 5 | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | | | | | | | | | | |
| alpha-Chlordane | 5 | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | | | | | | | | | | |
| gamma-Chlordane | 5 | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | | | | | | | | | | |
| Toxaphene | 5 | 3.3 | UJ | 3.3 | UJ | 3.3 | UJ | 3.3 | UJ | 3.3 | 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.

000013

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



Project: WASHINGTON CLOSURE HANFORD
Laboratory: Lionville Laboratory Inc.
Case: SDG: K0445

| Sample Number | | J12N79 | | J12N80 | | J12N81 | | J12N82 | | J12N83 | | J12N84 | | J12N85 | | J12N86 | | J12N87 | | J12N88 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Remarks | | | | | | | | | | | | | | | | | | | | | |
| Sample Date | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | |
| Extraction Date | | 6/28/06 | | 6/28/06 | | 6/28/06 | | 6/28/06 | | 6/28/06 | | 6/28/06 | | 6/28/06 | | 6/28/06 | | 6/28/06 | | 6/28/06 | |
| Analysis Date | | 7/10/06 | | 7/10/06 | | 7/10/06 | | 7/10/06 | | 7/10/06 | | 7/10/06 | | 7/10/06 | | 7/10/06 | | 7/10/06 | | 7/10/06 | |
| Chlorinated Herbicides | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| Dalapon | 100 | 28 | UJ | 24 | UJ | 18 | UJ | 170 | UJ | 170 | UJ | 170 | UJ | 170 | UJ | 170 | UJ | 28 | UJ | 11 | UJ |
| Dicamba | 100 | 10 | UJ | 68 | UJ | 67 | UJ | 91 | UJ | 12 | UJ | 88 | UJ | 30 | UJ | 67 | UJ | 45 | UJ | 21 | UJ |
| Dichloroprop | 100 | 170 | UJ | 170 | UJ | 170 | UJ | 170 | UJ | 170 | UJ | 36 | J | 170 | UJ | 170 | UJ | 170 | UJ | 170 | UJ |
| 2,4-D | 100 | 71 | J | 34 | UJ | 39 | J | 62 | J | 24 | J | 230 | J | 33 | UJ | 33 | UJ | 37 | J | 35 | J |
| 2,4,5-TP (Silvex) | 100 | 17 | UJ | 17 | UJ | 10 | J | 17 | UJ | 17 | UJ | 17 | UJ | 17 | UJ | 17 | UJ | 17 | UJ | 17 | UJ |
| 2,4,5-T | 100 | 17 | UJ | 17 | UJ | 17 | UJ | 17 | UJ | 17 | UJ | 17 | UJ | 17 | UJ | 17 | UJ | 17 | UJ | 17 | UJ |
| Dinoseb | 100 | 170 | UJ | 170 | UJ | 170 | UJ | 170 | UJ | 170 | UJ | 170 | UJ | 170 | UJ | 170 | UJ | 170 | UJ | 9.9 | UJ |
| 2,4-DB | 100 | 17 | UJ | 17 | UJ | 17 | UJ | 17 | UJ | 30 | J | 15 | J | 26 | J | 31 | J | 18 | J | 80 | J |
| Pentachlorophenol | 100 | 14 | UJ | 14 | UJ | 13 | UJ | 13 | UJ | 13 | UJ | 13 | UJ | 13 | UJ | 13 | UJ | 13 | UJ | 13 | UJ |

| Sample Number | | J12N89 | | J12N90 | | J12N91 | | J12N92 | | J12N93 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Remarks | | | | | | | | | | | |
| Sample Date | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/19/06 | |
| Extraction Date | | 6/28/06 | | 6/28/06 | | 6/28/06 | | 6/28/06 | | 6/28/06 | |
| Analysis Date | | 7/10/06 | | 7/10/06 | | 7/10/06 | | 7/10/06 | | 7/10/06 | |
| Chlorinated Herbicides | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| Dalapon | 100 | 170 | UJ | 170 | UJ | 24 | UJ | 22 | UJ | 170 | UJ |
| Dicamba | 100 | 15 | UJ | 36 | UJ | 87 | UJ | 58 | UJ | 19 | UJ |
| Dichloroprop | 100 | 170 | UJ | 170 | UJ | 170 | UJ | 170 | UJ | 170 | UJ |
| 2,4-D | 100 | 33 | UJ | 33 | UJ | 21 | J | 16 | J | 33 | UJ |
| 2,4,5-TP (Silvex) | 100 | 17 | UJ | 17 | UJ | 17 | UJ | 17 | UJ | 17 | UJ |
| 2,4,5-T | 100 | 17 | UJ | 17 | UJ | 17 | UJ | 17 | UJ | 17 | UJ |
| Dinoseb | 100 | 170 | UJ | 170 | UJ | 170 | UJ | 170 | UJ | 170 | UJ |
| 2,4-DB | 100 | 20 | J | 18 | J | 9.8 | J | 10 | J | 17 | UJ |
| Pentachlorophenol | 100 | 13 | UJ | 13 | UJ | 13 | UJ | 13 | UJ | 13 | UJ |

000014

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.

PCBs by GC

Report Date: 07/31/06 16:16

RFW Batch Number: 0606L337 Client: TNUHANFORD RC-072 K0445 Work Order: 11343606001 Page: 1

| Sample Information | Cust ID: | J12N79 | J12N80 | J12N80 | J12N80 | J12N81 | J12N82 |
|---|---|---|---|---|---|---|---|
| | RFW#: | 001 | 002 | 002 MS | 002 MSD | 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 | 98 % | 92 % | 91 % | 95 % | 99 % | 96 % |
| | Decachlorobiphenyl | 92 % | 88 % | 88 % | 92 % | 95 % | 94 % |
| | | fl | fl | fl | fl | fl | fl |
| Aroclor-1016 | | 14 U | 14 U | 80 % | 86 % | 13 U | 13 U |
| Aroclor-1221 | | 14 U | 14 U | 14 U | 14 U | 13 U | 13 U |
| Aroclor-1232 | | 14 U | 14 U | 14 U | 14 U | 13 U | 13 U |
| Aroclor-1242 | | 14 U | 14 U | 14 U | 14 U | 13 U | 13 U |
| Aroclor-1248 | | 14 U | 14 U | 14 U | 14 U | 13 U | 13 U |
| Aroclor-1254 | | 14 U | 14 U | 14 U | 14 U | 13 U | 13 U |
| Aroclor-1260 | | 14 U | 14 U | 82 % | 90 % | 6.9 J | 13 U |

| Sample Information | Cust ID: | J12N83 | J12N84 | J12N85 | J12N86 | J12N87 | J12N88 |
|---|---|---|---|---|---|---|---|
| | 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 | 92 % | 94 % | 98 % | 94 % | 90 % | 56 % |
| | Decachlorobiphenyl | 91 % | 91 % | 93 % | 92 % | 93 % | 30 * % |
| | | fl | fl | fl | fl | fl | fl |
| Aroclor-1016 | | 13 U | 13 U | 13 U | 13 U | 13 U | 13 U J |
| Aroclor-1221 | | 13 U | 13 U | 13 U | 13 U | 13 U | 13 U |
| Aroclor-1232 | | 13 U | 13 U | 13 U | 13 U | 13 U | 13 U |
| Aroclor-1242 | | 13 U | 13 U | 13 U | 13 U | 13 U | 13 U |
| Aroclor-1248 | | 13 U | 13 U | 13 U | 13 U | 13 U | 13 U |
| Aroclor-1254 | | 13 U | 170 | 13 U | 13 U | 13 U | 13 U |
| Aroclor-1260 | | 13 U | 13 U | 13 U | 13 U | 13 U | 13 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

9/8/06

000015

000000015

| Sample Information | Cust ID: | J12N89 | J12N90 | J12N91 | J12N92 | J12N93 | PBLKKC |
|---|---|---|---|---|---|---|---|
| | RFW#: | 011 | 012 | 013 | 014 | 015 | 06LE0525-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 | 92 % | 93 % | 98 % | 94 % | 59 % | 96 % |
| | Decachlorobiphenyl | 95 % | 101 % | 95 % | 93 % | 54 % | 90 % |
| | | fl | fl | fl | fl | fl | fl |
| Aroclor-1016 | | 13 U | 13 U | 13 U | 13 U | 13 U | 13 U |
| Aroclor-1221 | | 13 U | 13 U | 13 U | 13 U | 13 U | 13 U |
| Aroclor-1232 | | 13 U | 13 U | 13 U | 13 U | 13 U | 13 U |
| Aroclor-1242 | | 13 U | 13 U | 13 U | 13 U | 13 U | 13 U |
| Aroclor-1248 | | 13 U | 13 U | 13 U | 13 U | 13 U | 13 U |
| Aroclor-1254 | | 13 U | 13 U | 13 U | 13 U | 13 U | 13 U |
| Aroclor-1260 | | 13 U | 13 U | 13 U | 13 U | 13 U | 13 U |

| Sample Information | Cust ID: | PBLKKC BS |
|---|---|---|
| | RFW#: | 06LE0525-MB1 |
| | Matrix: | SOIL |
| | D.F.: | 1.00 |
| | Units: | UG/KG |
| Surrogate: | Tetrachloro-m-xylene | 93 % |
| | Decachlorobiphenyl | 88 % |
| | | fl |
| Aroclor-1016 | | 84 % |
| Aroclor-1221 | | 13 U |
| Aroclor-1232 | | 13 U |
| Aroclor-1242 | | 13 U |
| Aroclor-1248 | | 13 U |
| Aroclor-1254 | | 13 U |
| Aroclor-1260 | | 87 % |

9/9/06

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

000016

000000016

Pesticide/PCBs by GC, CLP List

RFW Batch Number: 0606L337 Client: TNUHANFORD RC-072 K0445 Work Order: 11343606001 Page: 1

Report Date: 07/10/06 09:24

| | Cust ID: | J12N79 | | J12N79 | | J12N79 | | J12N80 | | J12N81 | | J12N82 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | 97 | % | 94 | % | 89 | % | 87 | % | 102 | % | 99 | % |
| | Decachlorobiphenyl | 100 | % | 97 | % | 98 | % | 93 | % | 108 | % | 100 | % |
| | | | fl | | fl | | fl | | fl | | fl | | fl |
| Alpha-BHC | | 0.34 | U | 83 | % | 79 | % | 0.34 | U | 0.33 | U | 0.34 | U |
| gamma-BHC (Lindane) | | 0.34 | U | 87 | % | 81 | % | 0.34 | U | 0.33 | U | 0.34 | U |
| Beta-BHC | | 0.34 | U | 83 | % | 78 | % | 0.34 | U | 0.33 | U | 0.34 | U |
| Heptachlor | | 0.34 | U | 88 | % | 84 | % | 0.34 | U | 0.33 | U | 0.34 | U |
| Delta-BHC | | 0.34 | U | 73 | % | 69 | % | 0.34 | U | 0.33 | U | 0.34 | U |
| Aldrin | | 0.34 | U | 84 | % | 79 | % | 0.34 | U | 0.33 | U | 0.34 | U |
| Heptachlor epoxide | | 0.34 | U | 95 | % | 92 | % | 0.34 | U | 0.33 | U | 0.34 | U |
| gamma-Chlordane | | 0.34 | U | 93 | % | 91 | % | 0.34 | U | 0.33 | U | 0.34 | U |
| Endosulfan I | | 0.34 | U | 98 | % | 95 | % | 0.34 | U | 0.33 | U | 0.34 | U |
| alpha-Chlordane | | 0.34 | U | 93 | % | 91 | % | 0.34 | U | 0.33 | U | 0.34 | U |
| 4,4'-DDE | | 0.34 | U | 78 | % | 74 | % | 0.34 | U | 0.33 | U | 0.34 | U |
| Dieldrin | | 0.34 | U | 100 | % | 97 | % | 0.34 | U | 0.33 | U | 0.34 | U |
| Endrin | | 0.34 | U | 99 | % | 94 | % | 0.34 | U | 0.33 | U | 0.34 | U |
| 4,4'-DDD | | 0.34 | U | 73 | % | 65 | % | 0.34 | U | 0.33 | U | 0.34 | U |
| Endosulfan II | | 0.34 | U | 90 | % | 87 | % | 0.34 | U | 0.33 | U | 0.34 | U |
| 4,4'-DDT | | 0.34 | U | 67 | % | 63 | % | 0.34 | U | 0.33 | U | 0.34 | U |
| Endrin aldehyde | | 0.34 | U | 79 | % | 77 | % | 0.34 | U | 0.33 | U | 0.34 | U |
| Endosulfan sulfate | | 0.34 | U | 93 | % | 91 | % | 0.34 | U | 0.33 | U | 0.34 | U |
| Methoxychlor | | 0.34 | UJ | 75 | % | 73 | % | 0.34 | UJ | 0.33 | UJ | 0.34 | UJ |
| Endrin ketone | | 0.34 | U | 94 | % | 92 | % | 0.34 | U | 0.33 | U | 0.34 | U |
| Toxaphene | | 3.4 | UJ | 3.4 | U | 3.4 | U | 3.4 | UJ | 3.3 | UJ | 3.4 | UJ |

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

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JR 9/9/06

Pesticide/PCBs by GC, CLP List

RFW Batch Number: 0606L337 Client: TNUHANFORD RC-072 K0445 Work Order: 11343606001 Page: 2

Report Date: 07/10/06 09:24

| Cust ID: | J12N83 | J12N84 | J12N85 | J12N86 | J12N87 | J12N88 |
|---|---|---|---|---|---|---|
| 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 | 94 % | 91 % | 105 % | 100 % | 102 % | 55 % |
| Decachlorobiphenyl | 102 % | 102 % | 103 % | 99 % | 103 % | 28 * % |
| | fl | fl | fl | fl | fl | fl |
| Alpha-BHC | 0.34 U | 0.33 U | 0.33 U | 0.33 U | 0.33 U | 0.33 U J |
| gamma-BHC (Lindane) | 0.34 U | 0.33 U | 0.33 U | 0.33 U | 0.33 U | 0.33 U |
| Beta-BHC | 1.3 J | 1.3 J | 0.33 U | 0.33 U | 0.33 U | 0.33 U |
| Heptachlor | 0.34 U | 0.33 U | 0.33 U | 0.33 U | 0.33 U | 0.33 U |
| Delta-BHC | 0.34 U | 0.33 U | 0.33 U | 0.33 U | 0.33 U | 0.33 U |
| Aldrin | 0.34 U | 0.33 U | 0.33 U | 0.33 U | 0.33 U | 0.33 U |
| Heptachlor epoxide | 0.34 U | 0.33 U | 0.33 U | 0.33 U | 0.33 U | 0.33 U |
| gamma-Chlordane | 0.34 U | 1.7 J | 0.33 U | 0.33 U | 0.33 U | 0.33 U |
| Endosulfan I | 0.34 U | 0.34 J | 0.33 U | 0.33 U | 0.33 U | 0.67 |
| alpha-Chlordane | 0.34 U | 0.33 U | 0.33 U | 0.33 U | 0.33 U | 0.33 U |
| 4,4'-DDE | 1.7 J | 6.5 | 0.97 J | 0.33 U | 0.33 U | 0.33 U |
| Dieldrin | 0.34 U | 0.33 U | 0.33 U | 0.33 U | 0.33 U | 0.33 U |
| Endrin | 0.34 U | 0.33 U | 0.33 U | 0.33 U | 0.33 U | 0.33 U |
| 4,4'-DDD | 0.34 U | 0.33 U | 0.33 U | 0.33 U | 0.33 U | 0.33 U |
| Endosulfan II | 0.34 U | 0.33 U | 0.33 U | 0.33 U | 0.33 U | 0.33 U |
| 4,4'-DDT | 0.34 U | 0.33 U | 0.33 U | 0.33 U | 0.33 U | 0.33 U |
| Endrin aldehyde | 0.34 U | 0.33 U | 0.33 U | 0.33 U | 0.33 U | 0.33 U |
| Endosulfan sulfate | 0.34 U | 0.33 U | 0.33 U | 0.33 U | 0.33 U | 0.33 U |
| Methoxychlor | 0.34 UJ | 0.33 UJ | 0.33 UJ | 0.33 UJ | 0.54 J | 0.33 UJ |
| Endrin ketone | 0.34 U | 0.67 J | 0.33 U | 0.33 U | 0.33 U | 0.33 UJ |
| Toxaphene | 3.4 UJ | 3.3 UJ | 3.3 UJ | 3.3 UJ | 3.3 UJ | 3.3 UJ |

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

9/8/06

9/27/06

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Pesticide/PCBs by GC, CLP List

Report Date: 07/10/06 09:24

RFW Batch Number: 0606L337 Client: TNUHANFORD RC-072 K0445 Work Order: 11343606001 Page: 3

| | Cust ID: | J12N89 | | J12N90 | | J12N91 | | J12N92 | | J12N93 | | PBLKKC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Information | RFW#: | 011 | | 012 | | 013 | | 014 | | 015 | | 06LE0525-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 | | 100 | % | 92 | % | 93 | % | 98 | % | 67 | % | 92 | % |
| Decachlorobiphenyl | | 106 | % | 102 | % | 100 | % | 99 | % | 56 | % | 94 | % |
| | | | fl | | fl | | fl | | fl | | fl | | fl |
| Alpha-BHC | | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U |
| gamma-BHC (Lindane) | | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U |
| Beta-BHC | | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U |
| Heptachlor | | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U |
| Delta-BHC | | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U |
| Aldrin | | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U |
| Heptachlor epoxide | | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U |
| gamma-Chlordane | | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U |
| Endosulfan I | | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U |
| alpha-Chlordane | | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U |
| 4,4'-DDE | | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U |
| Dieldrin | | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U |
| Endrin | | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U |
| 4,4'-DDD | | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U |
| Endosulfan II | | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U |
| 4,4'-DDT | | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U |
| Endrin aldehyde | | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U |
| Endosulfan sulfate | | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U |
| Methoxychlor | | 0.33 | U J | 0.33 | U J | 0.33 | U J | 0.60 | J J | 0.33 | U J | 0.33 | U |
| Endrin ketone | | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.33 | U |
| Toxaphene | | 3.3 | U J | 3.3 | U J | 3.3 | U J | 3.3 | U J | 3.3 | U J | 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

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9/9/06

9/27/06

Cust ID: PBLKKC BS

Sample Information
RFW#: 06LE0525-MB1
Matrix: SOIL
D.F.: 1.00
Units: UG/KG

| | | |
|---|---|---|
| Surrogate: Tetrachloro-m-xylene | 94 | % |
| Decachlorobiphenyl | 94 | % |

| | | |
|---|---|---|
| Alpha-BHC | 82 | % |
| gamma-BHC (Lindane) | 85 | % |
| Beta-BHC | 80 | % |
| Heptachlor | 87 | % |
| Delta-BHC | 81 | % |
| Aldrin | 83 | % |
| Heptachlor epoxide | 94 | % |
| gamma-Chlordane | 93 | % |
| Endosulfan I | 98 | % |
| alpha-Chlordane | 92 | % |
| 4,4'-DDE | 70 | % |
| Dieldrin | 98 | % |
| Endrin | 94 | % |
| 4,4'-DDD | 63 | % |
| Endosulfan II | 97 | % |
| 4,4'-DDT | 49 | % |
| Endrin aldehyde | 76 | % |
| Endosulfan sulfate | 86 | % |
| Methoxychlor | 48 * | % |
| Endrin ketone | 87 | % |
| Toxaphene | 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

R 9/9/06

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Herbicides, Special List

Report Date: 07/17/06 13:10

RFW Batch Number: 0606L337 Client: TNUHANFORD RC-072 K0445 Work Order: 11343606001 Page: 1

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| Cust ID: | J12N79 | J12N80 | J12N81 | J12N81 | J12N81 | J12N82 |
|---|---|---|---|---|---|---|
| Sample Information RFW#: | 001 | 002 | 003 | 003 MS | 003 MSD | 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: DCAA | 127 % | 85 % | 109 % | 79 % | 97 % | 179 * % |
| | fl | fl | fl | fl | fl | fl |
| Dalapon | 28 JB | 24 JB | 18 JB | 44 % | 81 % | 170 U |
| Dicamba | 10 JB | 68 U | 67 U | 54 % | 61 % | 91 JB |
| Dichloroprop | 170 U | 170 U | 170 U | 53 % | 100 % | 170 U |
| 2,4-D | 71 I | 34 U | 39 | 52 % | 109 % | 62 I |
| 2,4,5-TP (Silvex) | 17 U | 17 U | 10 I | 56 % | 106 % | 17 U |
| 2,4,5-T | 17 U | 17 U | 17 U | 60 % | 91 % | 17 U |
| 2,4-DB | 170 U | 170 U | 170 U | 38 % | 51 % | 170 U |
| Dinoseb | 17 U | 17 U | 17 U | 56 % | 69 % | 17 U |
| Pentachlorophenol | 14 U | 14 U | 13 U | 67 % | 112 % | 13 U |

| Cust ID: | J12N83 | J12N84 | J12N85 | J12N86 | J12N87 | J12N88 |
|---|---|---|---|---|---|---|
| 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: DCAA | .I % | 145 % | 97 % | 89 % | 109 % | 92 % |
| | fl | fl | fl | fl | fl | fl |
| Dalapon | 170 U | 170 U | 170 U | 170 U | 28 JB | 11 JB |
| Dicamba | 12 JB | 88 B | 30 JB | 67 U | 45 JB | 21 JB |
| Dichloroprop | 170 U | 36 | 170 U | 170 U | 170 U | 170 U |
| 2,4-D | 24 I | 230 | 33 U | 33 U | 37 | 35 |
| 2,4,5-TP (Silvex) | 17 U | 17 U | 17 U | 17 U | 17 U | 17 U |
| 2,4,5-T | 17 U | 17 U | 17 U | 17 U | 17 U | 17 U |
| 2,4-DB | 170 U | 170 U | 170 U | 170 U | 170 U | 9.9 I |
| Dinoseb | 30 | 15 I | 26 | 31 | 18 | 80 |
| Pentachlorophenol | 13 U | 13 U | 13 U | 13 U | 13 U | 13 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

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Herbicides, Special List

RFW Batch Number: 0606L337 Client: TNUHANFORD RC-072 K0445 Work Order: 11343606001 Page: 2

Report Date: 07/17/06 13:10

| | Cust ID: | J12N89 | J12N90 | J12N91 | J12N92 | J12N93 | PBLKKX |
|---|---|---|---|---|---|---|---|
| Sample Information | RFW#: | 011 | 012 | 013 | 014 | 015 | 06LE0530-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: | DCAA | 79 % | 122 % | 160 * % | 154 * % | 48 % | 108 % |
| | | fl | fl | fl | fl | fl | fl |
| Dalapon | | 170 U J | 170 U J | 24 JB UJ | 22 JB J | UJ 170 U J | 32 J |
| Dicamba | | 15 JB UJ | 36 JB U | 87 JB U | 58 JB I | UJ 19 JB U | 15 J |
| Dichloroprop | | 170 U | 170 U | 170 U | 170 U | J 170 U | 170 U |
| 2,4-D | | 33 U | 33 U | 21 J | 16 J | 33 U | 33 U |
| 2,4,5-TP (Silvex) | | 17 U | 17 U | 17 U | 17 U | 17 U | 17 U |
| 2,4,5-T | | 17 U | 17 U | 17 U | 17 U | 17 U | 17 U |
| 2,4-DB | | 170 U | 170 U | 170 U | 170 U | 170 U | 15 J |
| Dinoseb | | 20 | 18 JI | 9.8 J | 10 J | 17 U | 17 U |
| Pentachlorophenol | | 13 U | 13 U | 13 U | 13 U | 13 U | 13 U |

| | Cust ID: | PBLKKX BS | PBLKKX BS |
|---|---|---|---|
| Sample Information | RFW#: | 06LE0530-MB1 | 06LE0530-MB1 |
| | Matrix: | SOIL | SOIL |
| | D.F.: | 1.00 | 1.00 |
| | Units: | ug/kg | ug/kg |
| Surrogate: | DCAA | 41 % | 68 % |
| | | fl | fl |
| Dalapon | | NS % | NS % |
| Dicamba | | NS % | NS % |
| Dichloroprop | | NS % | NS % |
| 2,4-D | | NS % | NS % |
| 2,4,5-TP (Silvex) | | NS % | NS % |
| 2,4,5-T | | NS % | NS % |
| 2,4-DB | | NS % | NS % |
| Dinoseb | | NS % | NS % |
| Pentachlorophenol | | NS % | NS % |

9/19/06

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

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## Appendix 4

## Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

**Case Narrative**

**Client:** TNU-HANFORD RC-072
**LVL #:** 0606L337
**SDG/SAF #** K0445/RC-072

**W.O. #:** 11343-606-001-9999-00
**Date Received:** 06-22-2006

**PCB**

Fifteen (15) soil samples were collected on 06-19,20-2006.

The samples and their associated QC samples were extracted on 06-26-2006 and analyzed according to Lionville Laboratory SOPs based on SW846, 3rd Edition procedures on 07-05,06,28-2006. 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. The samples were extracted and analyzed within required holding time.
2. The sample results were reported on a dry-weight basis.
3. 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.
4. The method blank was below the reporting limits for all target compounds.
5. One (1) of thirty-eight (38) surrogate recoveries was outside acceptance criteria. However, the surrogate recovery acceptance criteria were met (i.e., no more than one outlier per sample).
6. The blank spike recoveries were within acceptance criteria.
7. All matrix spike recoveries were within acceptance criteria.
8. The initial calibrations associated with this data set were within acceptance criteria.
9. 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 6 pages. Beginning with Page 11



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LIONVILLE LABORATORY INC.

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

8/4/6
Date

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LIONVILLE LABORATORY INC.

Case Narrative

Client: TNU-HANFORD RC-072
LVL #: 0606L337
SDG/SAF # K0445/RC-072

W.O. #: 11343-606-001-9999-00
Date Received: 06-22-2006

## CHLORINATED PESTICIDES

Fifteen (15) soil samples were collected on 06-19,20-2006.

The samples and their associated QC samples were extracted on 06-26-2006 and analyzed according to Lionville Laboratory SOPs based on SW846, 3rd Edition procedures on 07-04,05-2006. The extraction procedure was based on method 3540C and the extracts were analyzed based on method 8081A.

The following is a summary of the QC results accompanying the sample results. 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. All sample results were reported on a dry-weight basis.
3. The samples and their associated QC samples received a Copper-Sulfur cleanup according to Lionville Laboratory SOPs based on SW846 method 3660A.
4. The method blanks were below the reporting limits for all target compounds.
5. One (1) of thirty-eight (38) surrogate recoveries was outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
6. One (1) of twenty (20) blank spike recoveries was outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
7. All matrix spike recoveries were within acceptance criteria.
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



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LvLI
LIONVILLE LABORATORY INC.

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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

8/3/6
Date

som\r:\group\data\pest\tnu hanford\0606-337.pst



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# Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 06GC250

Initiator: Vanessa Boschi
Date: 7/17/06
Client: TNU

Batch: 06061337
Samples: 06LE0525-MBS
Method: SW846/MCAWW/CLP/

Parameter: Pesticides
Matrix: soil
Prep Batch: 06LE0525

**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)

method blank spike for methoxychlor is below control criteria
@ 48% Limit 50%

**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:

narrate
there is minimal impact to the data as the matrix spikes are within control limits. 7/17/06

**4. Project Manager Instructions**...signature/date: 7/17/06

✓ 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: _____

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

LIONVILLE LABORATORY INC.

**Case Narrative**

**Client:** TNU-HANFORD RC-072
**LVL #:** 0606L337
**SDG/SAF #** K0445/RC-072

**W.O. #:** 11343-606-001-9999-00
**Date Received:** 06-22-2006

**HERBICIDE**

Fifteen (15) soil samples were collected on 06-19,20-2006.

The samples and their associated QC samples were extracted on 06-28-2006 and analyzed according to Lionville Laboratory SOPs based on SW846, 3rd Edition procedure on 07-10,14-2006. The extraction and analysis procedures were based on method 8151A.

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. All samples were extracted and analyzed within required holding time.
2. All soil sample results were reported on a dry-weight basis.
3. The method blank was below the reporting limits for all target compounds.
4. Three (3) of nineteen (19) obtainable surrogate recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
5. The blank spike sample was inadvertently not spiked. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
6. All matrix spike recoveries were within acceptance criteria.
7. The initial calibrations associated with this data set were within acceptance criteria.
8. 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 5 pages.



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LvLI
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

8/9/6
Date

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# Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 06GC292

Initiator: Vanessa Boschi
Date: 7/17/06
Client: TNU

Batch: 06061337
Samples: 4, 13, 14, 06LE0530
Method: SW846/MCAWW/CLP/ MB

Parameter: OHBG
Matrix: Soil
Prep Batch: 06LE0530

**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 surrogate recoveries elevated due to possible matrix interference
② ~~some recovery for target compounds in sample 06LE0530~~ (dalapon, dicamba, 2,4-DB) 7/27/06
③ BS/~~[illegible]~~ not spiked.

**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:

Narrate:
① matrix interference in sample 005 prevents quantitation of surrogates 004, 013, 014 are except acceptance criteria and appear to be impacted/interfered w/ by the same interferant peak.
② All MS/MSD spikes are w/in acceptance criteria

**4. Project Manager Instructions**...signature/date: [signature] 8/3/06

__ 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: [signature] 7/27/06

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-072-2 | Page 2 of 2

| | | | |
|---|---|---|---|
| Collector: Tiller, B. | Company Contact: JOAN KESSNER | Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH |
| Project Designation: 100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location: 1607-D2:1 | | SAF No.: RC-072 |
| Ice Chest No.: ERC-02-406 | Field Logbook No.: EL-1597-2 BT 06-19-06 | COA: BESRAS6520 | Method of Shipment: FED EX |
| Shipped To: EBERLINE SERVICES (LIONVILLE) | Offsite Property No.: A060510 | | Bill of Lading/Air Bill No.: SEE OSPC |

Price Code: 8N

Air Quality: ☐

Data Turnaround: 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage: COOL 4C

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

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| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | COOL 4C → ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | AJD 61406 | |
| Type of Container | G/P | G/P | aG | aG | aG | aG | aG | G/P | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Volume | 30g | 30g | 250g | 125g | 125g | 125g | 125g | 125g | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Chromium Hex - 7196 | Semi-VOA - 8270A (TCL) | PAHs - 8310 | Pesticides - 8081 | PCBs - 8082 | See item (2) in Special Instructions. | See item (3) in Special Instructions. | | |

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J12N79 | SOIL | 06-19-06 | 1210 | X | X | X | X | X | X | X | X | | |
| J12N80 | SOIL | 6-19-06 | 1240 | X | X | X | X | X | X | X | X | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By/Removed From: BRETT TILLER | Date/Time: 6-19-06 1700 | Received By/Stored In: EAS LOCKED STORAGE | Date/Time: 6-19-06 1700 |
| Relinquished By/Removed From: EAS LOCKED STORAGE | Date/Time: 6-21-06 0900 | Received By/Stored In: TR Edmonton | Date/Time: 6-21-06 0900 |
| Relinquished By/Removed From: TR Edmonton | Date/Time: 6-21-06 1500 | Received By/Stored In: Fed Ex | Date/Time: 2 |
| Relinquished By/Removed From: Fed Ex | Date/Time: 6.22.06 1095 | Received By/Stored In: [illegible] | Date/Time: 6.22.06 1095 |
| 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

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

~ These marks indicate that this is a non-analysis used to properly format COC form.

Contact Joan Kessner for any questions.

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

(2) Chloro-Herbicides - EPA8151+ {2,4,5-Trichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid, 2-(2,4,5-Trichlorophenoxy)propionic acid, 2-secButyl-4,6-dinitrophenol(DNBP), 4-(2,4-Dichlorophenoxy)butanoic acid, Dalapon, Dicamba, Dichloroprop}

(3) IC Anions - 300.0 {Nitrate}; NO2/NO3 - 353.2 {Nitrogen in Nitrite and Nitrate}

2,4,5-T
2,4-D
Silvex
2,4-DB
Dalapon
Dicamba
Dichloroprop
Dinoseb

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

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

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

Washington Closure Hanford

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-072-3 | Page 2 of 2

| | | | |
|---|---|---|---|
| Collector: Tiller, B. | Company Contact: JOAN KESSNER | Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH |
| Price Code: 8N | Data Turnaround: 45 Days | | |
| Project Designation: 100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location: 116-DR-1&2 | | SAF No.: RC-072 |
| Air Quality ☐ | | | |
| Ice Chest No.: ERC-02-406 | Field Logbook No.: EL-1597-1 | COA: BESRAS6520 | Method of Shipment: FED EX |
| Shipped To: EBERLINE SERVICES, LIONVILLE | Offsite Property No.: A060510 | | Bill of Lading/Air Bill No.: SEE OSPC |

POSSIBLE SAMPLE HAZARDS/REMARKS

*NONE*

Special Handling and/or Storage COOL 4C

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | COOL 4C | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ 4/AGH06 | |
| Type of Container | G/P | G/P | aG | aG | aG | aG | aG | G/P | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Volume | 30g | 30g | 250g | 125g | 125g | 125g | 125g | 125g | | |

000033

SAMPLE ANALYSIS

| Sample No. | Matrix * | Sample Date | Sample Time | See item (1) in Special Instructions | Chromium Hex - 7196 | Semi-VOA - 8270A (TCL) | PAHs - 8310 | Pesticides - 8081 | PCBs - 8082 | See item (2) in Special Instructions | See item (3) in Special Instructions | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J12N81 | SOIL | 06-19-06 | 1310 | X | X | X | X | X | X | X | X | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

CHAIN OF POSSESSION — Sign/Print Names

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| BRETT TILLER | 6-19-06 1700 | EAS LOCKED STORAGE | 6-19-06 1700 |
| EAS LOCKED STORAGE | 6-21-06 0900 | [illegible] | 6-21-06 0900 |
| [illegible] | 6/21/06 0800 | Fed. Ex | |
| Fed Ex | 6-22-06 0925 | [illegible] | 6-22-06 0925 |
| | | | |
| | | | |

SPECIAL INSTRUCTIONS

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

^ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions.

2(/) ICP Metals - 6010 (Full List) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Uranium, Vanadium, Zinc]; Mercury - 7471 - (CV)

3(/) Chloro-Herbicides - EPA8151+ [2,4,5-Trichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid, 2-(2,4,5-Trichlorophenoxy)propionic acid, 2-secButyl-4,6-dinitrophenol(DNBP), 4-(2,4-Dichlorophenoxy)butanoic acid, Dalapon, Dicamba, Dichloroprop]

4(/) IC Anions - 300.0 [Nitrate]; NO2/NO3 - 353.2 [Nitrogen in Nitrite and Nitrate]

Matrix *

S=Soil
SE=Sediment
SO=Solid
Sl=Sludge
W = Water
Un=Oil
A=Air
DS=Drum Solids
DL=Drum Liquid
T=Tissue
Wi=Wipe
L=Liquid
Va=Vapor
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-072-4 | Page 2 of 2

| | | | |
|---|---|---|---|
| Collector: Tiller, B. | Company Contact: JOAN KESSNER | Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH |
| Project Designation: 100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location: 600-139 | | SAF No.: RC-072 |
| Ice Chest No.: ERC-02-406 | Field Logbook No.: EL-1597-Y2 BT 06-19-06 | COA: BESRAS6520 | Method of Shipment: FED EX |
| Shipped To: EBERLINE SERVICES (LIONVILLE) | Offsite Property No.: A060510 | | Bill of Lading/Air Bill No.: SEE OSPC |

Price Code: 8N | Data Turnaround: 45 Days | Air Quality ☐

00000012

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*NONE*

**Special Handling and/or Storage** COOL 4C

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| COOL 4C Preservation | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | 1/S 61406 | | |
| Type of Container | G/P | G/P | aG | aG | aG | aG | aG | G/P | | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | |
| Volume | 30g | 30g | 250g | 125g | 125g | 125g | 125g | 125g | | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Chromium Hex - 7196 | Semi-VOA - 8270A (TCL) | PAHs - 8310 | Pesticides - 8081 | PCBs - 8082 | See item (2) in Special Instructions. | See item (3) in Special Instructions. | | | |

000034

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J12N82 | SOIL | 06-19-06 | 1350 | X* | X* | X* | X* | X* | X* | X* | X* | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

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

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| BRETT TILLER | 1700 6-19-06 | EAS LOCKED STORAGE | 1700 6-19-06 |
| EAS LOCKED STORAGE | 0900 6-21-06 | [signature] | 6-21-06 0900 |
| [signature] WCH | 6/21/06 1500 | Fed Ex | |
| [signature] | 6-22-06 0925 | [signature] | 6-22-06 0925 |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS**

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

^ These marks indicate that this is a non-analysis used to properly format COC form.

Contact Joan Kessner for any questions.

2(1) ICP Metals - 6010 (Full List) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Uranium, Vanadium, Zinc]; Mercury - 7471 - (CV)

3(2) Chloro-Herbicides - EPA8151+ [2,4,5-Trichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid, 2-(2,4,5-Trichlorophenoxy)propionic acid, 2-secButyl-4,6-dinitrophenol(DNBP), 4-(2,4-Dichlorophenoxy)butanoic acid, Dalapon, Dicamba, Dichloroprop]

4(3) IC Anions - 300.0 [Nitrate]; NO2/NO3 - 353.2 [Nitrogen in Nitrite and Nitrate]

Matrix *: S=Soil, SE=Sediment, SO=Solid, SL=Sludge, W=Water, O=Oil, A=Air, DS=Drum Solids, DL=Drum Liquid, 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-072-3 | Page 2 of 2

| | | | |
|---|---|---|---|
| Collector: Tiller, B. | Company Contact: JOAN KESSNER | Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH |
| Price Code | Data Turnaround: 45 Days | | |
| Project Designation: 100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location: 600-171 | | SAF No.: RC-072 |
| Air Quality ☐ | | | |
| Ice Chest No.: ERC-02-406 | Field Logbook No.: EL-1597 | COA: BES RAS6520 | Method of Shipment: FED EX |
| Shipped To: EBERLINE SERVICES / LIONVILLE | Offsite Property No.: A060510 | | Bill of Lading/Air Bill No.: SEE OSPC |

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage COOL 4C

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

000035

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | COOL 4C → | None | None | None | None | None | None | None | None | | |
| Type of Container | | G/P | G/P | aG | aG | aG | aG | aG | G/P | | |
| No. of Container(s) | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Volume | | 30g | 30g | 250g | 125g | 125g | 125g | 125g | 125g | | |
| SAMPLE ANALYSIS | | See item (1) in Special Instructions. | Chromium Hex - 7196 | Semi-VOA - 8270A (TCL) | PAHs - 8310 | Pesticides - 8081 | PCBs - 8082 | See item (2) in Special Instructions. | See item (3) in Special Instructions. | | |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | |
| J12N83 | SOIL | 06-20-06 | 0910 | X* | X* | X* | X* | X* | X* | X* | X* |
| J12N84 | SOIL | 06-20-06 | 0930 | X* | X* | X* | X* | X* | X* | X* | X* |
| J12N85 | SOIL | 06-20-06 | 1000 | X* | X* | X* | X* | X* | X* | X* | X* |

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By/Removed From: BRETT TILLER | Date/Time: 1330 6-20-06 | Received By/Stored In: EAS LOCKED STORAGE | Date/Time: 1330 6-20-06 |
| Relinquished By/Removed From: EAS LOCKED STORAGE | Date/Time: 6-21-06 0900 | Received By/Stored In: [illegible] | Date/Time: 6-21-06 0900 |
| Relinquished By/Removed From: [illegible] | Date/Time: 6/21/06 1500 | Received By/Stored In: Fed Ex | Date/Time: |
| Relinquished By/Removed From: Fed Ex | Date/Time: 6-22-06 10925 | Received By/Stored In: [illegible] | Date/Time: 6-22-06 10925 |
| 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

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

^ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions.

1(*) ICP Metals - 6010 (Full List) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Uranium, Vanadium, Zinc]; Mercury - 7471 - (CV)

3(*) Chloro-Herbicides - EPA8151+ [2,4,5-Trichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid, 2-(2,4,5-Trichlorophenoxy)propionic acid, 3-sec-butyl-4,6-dinitrophenol(DNBP), 4-(2,4-Dichlorophenoxy)butanoic acid, Dalapon, Dicamba, Dichloroprop]

4(*) IC Anions - 300.0 [Nitrate]; NO2/NO3 - 353.2 [Nitrogen in Nitrite and Nitrate]

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
Ve=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-072-6 | Page 2 of 2

| | | | |
|---|---|---|---|
| Collector: Tiller, B. | Company Contact: JOAN KESSNER | Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH |
| Project Designation: 100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location: 600-181 | | SAF No.: RC-072 |
| Ice Chest No.: ERC-02-406 | Field Logbook No.: EL-1597-~~1~~ 2 | COA: BESRAS6520 | Method of Shipment: FED EX |
| Shipped To: EBERLINE SERVICES / LIONVILLE | Offsite Property No.: A060510 | | Bill of Lading/Air Bill No.: SEE OSPC |

Price Code: 8N

Air Quality: ☐

Data Turnaround: 45 Days

0000014

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*NONE*

**Special Handling and/or Storage** COOL 4C

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| COOL 4C → Preservation | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | S/S 6/1/06 | | |
| Type of Container | G/P | G/P | aG | aG | aG | aG | aG | G/P | | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | |
| Volume | 30g | 30g | 250g | 125g | 125g | 125g | 125g | 125g | | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Chromium Hex - 7196 | Semi-VOA - 8270A (TCL) | PAHs - 8310 | Pesticides - 8081 | PCBs - 8082 | See item (2) in Special Instructions. | See item (3) in Special Instructions. | | | |

000036

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J12N86 | SOIL | 06-20-06 | 1045 | X* | X* | X* | X* | X* | X* | X* | X* | | |
| J12N87 | SOIL | 06-20-06 | 1130 | X* | X* | X* | X* | X* | X* | X* | X* | | |
| J12N88 | SOIL | 06-20-06 | 1200 | X* | X* | X* | X* | X* | X* | X* | X* | | |
| J12N89 | SOIL | 06-20-06 | 1055 | X* | X* | X* | X* | X* | X* | X* | X* | | |

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

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| BRETT TILLER | 1330 6-20-06 | EAS LOCKED STORAGE | 1330 6-20-06 |
| EAS LOCKED STORAGE | 1700 6-21-06 | [illegible] | 6-21-06 0900 |
| [illegible] | 1500 6/21/06 | Fed Ex | |
| [illegible] | 6-22-06 0925 | [illegible] | 6-22-06 1092 |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS**

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

^ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions.

2(1) ICP Metals - 6010 (Full List) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Uranium, Vanadium, Zinc]; Mercury - 7471 - (CV)

3(2) Chloro-Herbicides - EPA8151+ [2,4,5-Trichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid, 2-(2,4,5-Trichlorophenoxy)propionic acid, 2-secButyl-4,6-dinitrophenol(DNBP), 4-(2,4-Dichlorophenoxy)butanoic acid, Dalapon, Dicamba, Dichloroprop]

4(3) IC Anions - 300.0 [Nitrate]; NO2/NO3 - 353.2 [Nitrogen in Nitrite and Nitrate]

Matrix *: S=Soil, SE=Sediment, SO=Solid, SI=Sludge, W=Water, O=Oil, A=Air, DS=Drum Solids, DL=Drum Liquid, 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-072-7 | Page 2 of 2 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: Tiller, B. | Company Contact: JOAN KESSNER — Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH | Price Code: 8N — Data Turnaround: 45 Day |
| Project Designation: 100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location: 618-4 | SAF No.: RC-072 | Air Quality ☐ |
| Ice Chest No.: ERC-02-406 | Field Logbook No.: EL-1597, 2 BT 06-19-06 — COA: BESRAS6520 | Method of Shipment: FED EX | |
| Shipped To: EBERLINE SERVICES (LIONVILLE) | Offsite Property No.: A060510 | Bill of Lading/Air Bill No.: SEE OSPC | |

000000015

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*NONE*

**Special Handling and/or Storage** COOL 4C

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| COOL 4C → Preservation | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | 61406 |
| Type of Container | G/P | G/P | aG | aG | aG | aG | aG | G/P | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| Volume | 30g | 30g | 250g | 125g | 125g | 125g | 125g | 125g | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Chromium Hex - 7196 | Semi-VOA - 8270A (TCL) | PAHs - 8310 | Pesticides - 8081 | PCBs - 8082 | See item (2) in Special Instructions. | See item (3) in Special Instructions. | |

000037

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J12N90 | SOIL | 06-19-06 | 1500 | X | X | X | X | X | X | X | X | | |
| J12N91 | SOIL | 06-19-06 | 1530 | X | X | X | X | X | X | X | X | | |
| J12N92 | SOIL | 06-19-06 | 1600 | X | X | X | X | X | X | X | X | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

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

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| BRETT TILLER | 1700 6-19-06 | EAS LOCKED STORAGE | 1700 6-19-06 |
| EAS LOCKED STORAGE | 0900 6-21-06 | [illegible] | 6-21-06 0900 |
| [illegible] | 6/21/06 1500 | Fed Ex | |
| [illegible] | 6-22-06 0925 | [illegible] | 6-22-06 0925 |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS**

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

~ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions.

2(1) ICP Metals - 6010 (Full List) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Uranium, Vanadium, Zinc]; Mercury - 7471 - (CV)

3(2) Chloro-Herbicides - EPA8151+ [2,4,5-Trichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid, 2-(2,4,5-Trichlorophenoxy)propionic acid, 2-secButyl-4,6-dinitrophenol(DNBP), 4-(2,4-Dichlorophenoxy)butanoic acid, Dalupon, Dicamba, Dichloroprop]

4(3) IC Anions - 300.0 [Nitrate]; NO2/NO3 - 353.2 [Nitrogen in Nitrite and Nitrate].

Matrix *: S=Soil, SE=Sediment, SO=Solid, SL=Sludge, W=Water, O=Oil, A=Air, DS=Drum Solid, DL=Drum Liquid, 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-072-8 | Page 1 of 1

| | | | |
|---|---|---|---|
| Collector: Tiller, B. | Company Contact: JOAN KESSNER | Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH |
| Project Designation: 100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location: EQUIPMENT BLANK | | SAF No.: RC-072 |
| Ice Chest No.: ERC-02-406 | Field Logbook No.: EL-1597-1 | COA: BESRAS6520 | Method of Shipment: FED EX |
| Shipped To: EBERLINE SERVICES / LIONVILLE | Offsite Property No.: A060510 | | Bill of Lading/Air Bill No.: SEE OSPC |

Price Code: 8N | Data Turnaround: 45 Days | Air Quality ☐

0000000016

POSSIBLE SAMPLE HAZARDS/REMARKS

*NONE*

Special Handling and/or Storage: COOL 4C

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| COOL 4C → Preservation | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | S/S 61406 | |
| Type of Container | G/P | G/P | aG | aG | aG | aG | aG | G/P | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Volume | 30g | 30g | 250g | 125g | 125g | 125g | 125g | 125g | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Chromium Hex - 7196 | Semi-VOA - 8270A (TCL) | PAHs - 8310 | Pesticides - 8081 | PCBs - 8082 | See item (2) in Special Instructions. | See item (3) in Special Instructions. | | |

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| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J12N93 | SOIL | 6-19-06 | 1140 | X | X | X | X | X | X | X | X | | |

| CHAIN OF POSSESSION | | Sign/Print Names | |
|---|---|---|---|
| Relinquished By/Removed From: BRETT TILLER | Date/Time: 1700 6-19-06 | Received By/Stored In: EAS LOCKED STORAGE | Date/Time: 1700 6-19-06 |
| Relinquished By/Removed From: EAS LOCKED STORAGE | Date/Time: 0900 6-21-06 | Received By/Stored In: [signature] | Date/Time: 6-21-06 0900 |
| Relinquished By/Removed From: [signature] | Date/Time: 1500 6/21/06 | Received By/Stored In: Fed Ex | Date/Time: |
| Relinquished By/Removed From: Fed Ex | Date/Time: 6 22 06 0925 | Received By/Stored In: [signature] | Date/Time: 6 22 06 0925 |
| 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

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

^ These marks indicate that this is a non-analysis used to properly format COC form.

Contact Joan Kessner for any questions.

2(1) ICP Metals - 6010 (Full List) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Uranium, Vanadium, Zinc]; Mercury - 7471 - (CV)

3(2) Chloro-Herbicides - EPA8151+ [2,4,5-Trichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid, 2-(2,4,5-Trichlorophenoxy)propionic acid, 2-secButyl-4,6-dinitrophenol(DNBP), 4-(2,4-Dichlorophenoxy)butanoic acid, Dalapon, Dicamba, Dichloroprop]

4(3) IC Anions - 300.0 (Nitrate); NO2/NO3 - 353.2 [Nitrogen in Nitrite and Nitrate]

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

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

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

## Appendix 5

## Data Validation Supporting Documentation

# PCB DATA VALIDATION CHECKLIST

| VALIDATION LEVEL: | A | B | C | D | E |
|---|---|---|---|---|---|
| PROJECT: RCBRA | | | DATA PACKAGE: K0445 | | |
| VALIDATOR: JLI | | LAB: LLI | | DATE: 9/5/06 | |
| | | | SDG: K0445 | | |
| ANALYSES PERFORMED | | | | | |
| SW-846 8081 | SW-846 8081 (TCLP) | SW-846 8082 | SW-846 8081 (TCLP) | 8151A | |
| SAMPLES/MATRIX | | | | | |
| J12N79 | J12N80 | J12N81 | J12N82 | J12N83 | |
| J12N84 | J12N85 | J12N86 | J12N87 | J12N88 | |
| J12N89 | J12N90 | J12N91 | J12N92 | J12N93 | |
| | | | | | |
| | | | | | 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: MB – all detected dalapon, dicamba +2,4DD – UJ

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 → CP- 82 - J all detect CP 83 - J all CP- 91+92 J all detect

Surr → PCB- 88 - J all Pest 88 - J all no tox MS/MSD/LCS - J all

no CP LCS LCS - methoxychlor 48% - J all

no RPD

# 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 target MS/MSD - J all
RPD - dalapon - (59%) dichloroprop - (61%) 2,4-D (70%) 2,4,5-TP - (61%)
2,4,5-T - (41%) pentachlorophenol (50%) - J all

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

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

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

Comments:

## 7. HOLDING TIMES (all levels)

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

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

Comments:

# PCB DATA VALIDATION CHECKLIST

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

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

Comments: all toxaphene over all dichloroprop + dinoseb over

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

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

Comments:

Date: 11 September 2006
To: Washington Closure Hanford (technical representative)
From: TechLaw, Inc.
Project: 100 Area and 300 Area Component of the RCBRA – Discrete Soil Sampling
Subject: Wet Chemistry - Data Package No. K0445-LLI

## INTRODUCTION

This memo presents the results of data validation on Data Package No. K0445 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 |
|---|---|---|---|---|
| J12N79 | 6/19/06 | Soil | C | See note 1 |
| J12N80 | 6/19/06 | Soil | C | See note 1 |
| J12N81 | 6/19/06 | Soil | C | See note 1 |
| J12N82 | 6/19/06 | Soil | C | See note 1 |
| J12N83 | 6/20/06 | Soil | C | See note 1 |
| J12N84 | 6/20/06 | Soil | C | See note 1 |
| J12N85 | 6/20/06 | Soil | C | See note 1 |
| J12N86 | 6/20/06 | Soil | C | See note 1 |
| J12N87 | 6/20/06 | Soil | C | See note 1 |
| J12N88 | 6/20/06 | Soil | C | See note 1 |
| J12N89 | 6/19/06 | Soil | C | See note 1 |
| J12N90 | 6/19/06 | Soil | C | See note 1 |
| J12N91 | 6/19/06 | Soil | C | See note 1 |
| J12N92 | 6/19/06 | Soil | C | See note 1 |
| J12N93 | 6/19/06 | Soil | C | See note 1 |

1 – IC anions by 300.0 (nitrate), chromium VI by 7196A and nitrate/nitrite by 353.2.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area and 300 Area Component of the RCBRA Sampling & Analysis Plan (DOE/RL-2005-42, Rev. 0, October 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; 28 days for nitrate/nitrite; and 48 hours for nitrate.

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

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

Due to the holding time being exceeded by greater than twice the limit, all undetected nitrate results were rejected and flagged "UR".

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

All other 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 80% to 120%. 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 79% 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 120% 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 20%, 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

No field duplicates were submitted for analysis.

- **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. The nitrate result in samples J12N87, J12N91 and J1293 and the chromium VI result in samples J12N83 and J12N84 exceeded the RQL. Under the WCH

statement of work, no qualification is required. All other analytes met the RQL.

- **Completeness**

Data package No. K0445 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 87%.

## MAJOR DEFICIENCIES

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

## MINOR DEFICIENCIES

The following minor deficiency was noted:

- Due to the holding time being exceeded by less than twice the limit, all nitrate/nitrite results were qualified as estimates and flagged "J".
- Due to the holding time being exceeded by greater than twice the limit, all detected nitrate 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-2005-42, Rev. 0, October 2005, *100 Area and 300 Area Component of the RCBRA Sampling & Analysis Plan*.

## 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: K0445 | REVIEWER: TLP | Project: RCBRA | PAGE 1 OF 1 |
|---|---|---|---|
| COMMENTS: | | | |
| COMPOUND | QUALIFIER | SAMPLES AFFECTED | REASON |
| Nitrate | UR | J11N79, J11N87<br>J11N90, J12N91<br>J12N92, J12N93 | Holding time |
| Nitrate | J | J11N80, J11N81<br>J11N82, J11N83<br>J11N84, J11N85<br>J11N86, J11N88<br>J11N89 | Holding time |
| Nitrate/nitrite | J | All | Holding time |

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

## Appendix 3

## Qualified Data Summary and Annotated Laboratory Reports

Project: WASHINGTON CLOSURE HANFORD
Lab: LLI SDG: K0445

| Sample Number | | J12N79 | | J12N80 | | J12N81 | | J12N82 | | J12N83 | | J12N84 | | J12N85 | | J12N86 | | J12N87 | | J12N88 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Remarks | | | | | | | | | | | | | | | | | | | | | |
| Sample Date | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | |
| Wet Chemistry | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| Nitrate | 2.5 | 2.40 | UR | 3.47 | J | 3.82 | J | 5.56 | J | 24.1 | J | 6.18 | J | 3.39 | J | 3.02 | J | 2.53 | UR | 5.08 | U |
| Chromium VI | 0.5 | 0.39 | | 0.35 | | 0.32 | | 0.25 | | 20.1 | U | 20.1 | U | 0.25 | | 0.28 | | 0.35 | | 0.26 | |
| Nitrate/nitrite | | 0.49 | J | 0.94 | J | 1.1 | J | 1.4 | J | 5.9 | J | 1.7 | J | 0.93 | J | 0.82 | J | 2.6 | J | 1.3 | J |

| Sample Number | | J12N89 | | J12N90 | | J12N91 | | J12N92 | | J12N93 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Remarks | | | | | | | | | | | |
| Sample Date | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/19/06 | |
| Wet Chemistry | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| Nitrate | 2.5 | 3.10 | J | 2.47 | UR | 2.59 | UR | 2.50 | UR | 2.57 | UR |
| Chromium VI | 0.5 | 0.20 | U | 0.20 | U | 0.28 | | 0.25 | | 0.20 | U |
| Nitrate/nitrite | | 0.23 | J | 0.23 | J | 0.21 | UJ | 0.40 | J | 0.21 | 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.

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 08/09/06

CLIENT: TNUHANFORD RC-072 K0445 LVL LOT #: 0606L337
WORK ORDER: 11343-606-001-9999-00

| SAMPLE | SITE ID | ANALYTE | RESULT | | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|---|
| -001 | J12N79 | % Solids | 98.1 | | % | 0.01 | 1.0 |
| | | Nitrate by IC | 2.40 | u R | MG/KG | 2.40 | 1.0 |
| | | Chromium VI | 0.39 | | MG/KG | 0.20 | 1.0 |
| | | Nitrate Nitrite | 0.49 | J | MG/KG | 0.19 | 1.0 |
| -002 | J12N80 | % Solids | 98.6 | | % | 0.01 | 1.0 |
| | | Nitrate by IC | 3.47 | J | MG/KG | 2.54 | 1.0 |
| | | Chromium VI | 0.35 | | MG/KG | 0.20 | 1.0 |
| | | Nitrate Nitrite | 0.94 | J | MG/KG | 0.20 | 1.0 |
| -003 | J12N81 | % Solids | 99.9 | | % | 0.01 | 1.0 |
| | | Nitrate by IC | 3.82 | J | MG/KG | 2.38 | 1.0 |
| | | Chromium VI | 0.32 | | MG/KG | 0.20 | 1.0 |
| | | Nitrate Nitrite | 1.1 | J | MG/KG | 0.19 | 1.0 |
| -004 | J12N82 | % Solids | 99.1 | | % | 0.01 | 1.0 |
| | | Nitrate by IC | 5.56 | J | MG/KG | 2.61 | 1.0 |
| | | Chromium VI | 0.25 | | MG/KG | 0.20 | 1.0 |
| | | Nitrate Nitrite | 1.4 | J | MG/KG | 0.21 | 1.0 |
| -005 | J12N83 | % Solids | 99.3 | | % | 0.01 | 1.0 |
| | | Nitrate by IC | 24.1 | J | MG/KG | 2.50 | 1.0 |
| | | Chromium VI | 20.1 | u | MG/KG | 20.1 | 100 |
| | | Nitrate Nitrite | 5.9 | J | MG/KG | 0.20 | 1.0 |

9/9/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 08/09/06

CLIENT: TNUHANFORD RC-072 K0445

LVL LOT #: 0606L337

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

| SAMPLE | SITE ID | ANALYTE | RESULT | | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|---|
| -006 | J12N84 | % Solids | 99.6 | | % | 0.01 | 1.0 |
| | | Nitrate by IC | 6.18 | J | MG/KG | 2.48 | 1.0 |
| | | Chromium VI | 20.1 | u | MG/KG | 20.1 | 100 |
| | | Nitrate Nitrite | 1.7 | J | MG/KG | 0.20 | 1.0 |
| -007 | J12N85 | % Solids | 99.8 | | % | 0.01 | 1.0 |
| | | Nitrate by IC | 3.39 | J | MG/KG | 2.46 | 1.0 |
| | | Chromium VI | 0.25 | | MG/KG | 0.20 | 1.0 |
| | | Nitrate Nitrite | 0.93 | J | MG/KG | 0.20 | 1.0 |
| -008 | J12N86 | % Solids | 99.7 | | % | 0.01 | 1.0 |
| | | Nitrate by IC | 3.02 | J | MG/KG | 2.35 | 1.0 |
| | | Chromium VI | 0.28 | | MG/KG | 0.20 | 1.0 |
| | | Nitrate Nitrite | 0.82 | J | MG/KG | 0.19 | 1.0 |
| -009 | J12N87 | % Solids | 99.7 | | % | 0.01 | 1.0 |
| | | Nitrate by IC | 2.53 | uR | MG/KG | 2.53 | 1.0 |
| | | Chromium VI | 0.35 | | MG/KG | 0.20 | 1.0 |
| | | Nitrate Nitrite | 2.6 | J | MG/KG | 0.20 | 1.0 |
| -010 | J12N88 | % Solids | 99.8 | | % | 0.01 | 1.0 |
| | | Nitrate by IC | 5.08 | J | MG/KG | 2.49 | 1.0 |
| | | Chromium VI | 0.26 | | MG/KG | 0.20 | 1.0 |
| | | Nitrate Nitrite | 1.3 | J | MG/KG | 0.20 | 1.0 |

R 9/9/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 08/09/06

CLIENT: TNUHANFORD RC-072 K0445

LVL LOT #: 0606L337

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -011 | J12N89 | % Solids | 99.8 | % | 0.01 | 1.0 |
| | | Nitrate by IC | 3.10 J | MG/KG | 2.44 | 1.0 |
| | | Chromium VI | 0.20 u | MG/KG | 0.20 | 1.0 |
| | | Nitrate Nitrite | 0.86 J | MG/KG | 0.20 | 1.0 |
| -012 | J12N90 | % Solids | 100 | % | 0.01 | 1.0 |
| | | Nitrate by IC | 2.47 uR | MG/KG | 2.47 | 1.0 |
| | | Chromium VI | 0.20 u | MG/KG | 0.20 | 1.0 |
| | | Nitrate Nitrite | 0.23 J | MG/KG | 0.20 | 1.0 |
| -013 | J12N91 | % Solids | 99.7 | % | 0.01 | 1.0 |
| | | Nitrate by IC | 2.59 uR | MG/KG | 2.59 | 1.0 |
| | | Chromium VI | 0.28 | MG/KG | 0.20 | 1.0 |
| | | Nitrate Nitrite | 0.21 uJ | MG/KG | 0.21 | 1.0 |
| -014 | J12N92 | % Solids | 99.7 | % | 0.01 | 1.0 |
| | | Nitrate by IC | 2.50 uR | MG/KG | 2.50 | 1.0 |
| | | Chromium VI | 0.25 | MG/KG | 0.20 | 1.0 |
| | | Nitrate Nitrite | 0.40 J | MG/KG | 0.20 | 1.0 |
| -015 | J12N93 | % Solids | 100 | % | 0.01 | 1.0 |
| | | Nitrate by IC | 2.57 uR | MG/KG | 2.57 | 1.0 |
| | | Chromium VI | 0.20 u | MG/KG | 0.20 | 1.0 |
| | | Nitrate Nitrite | 0.21 uJ | MG/KG | 0.21 | 1.0 |

9/9/06

## Appendix 4

## Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD RC-072 K0445
LVL#: 0606L337

W.O.#: 11343-606-001-9999-00
Date Received: 06-22-06

## INORGANIC NARRATIVE

1. This narrative covers the analyses of 15 soil samples.

2. The samples were prepared and analyzed in accordance with the methods indicated 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. LvLI certifies that all test results meet the requirements of NELAC with any exception noted in the following statements.

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

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

5. The method blanks were within the method criteria.

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

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

8. The replicate analyses for Nitrate, Nitrate Nitrite, Percent Solids and Chromium VI were within the 20% Relative Percent Difference (RPD) control limit.

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

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

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

8/14/06
Date

njp\i06-337

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 23 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-072-2 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: Tiller, B. | Company Contact: JOAN KESSNER | Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH |
| Price Code: 8N | Data Turnaround: 45 Days | Air Quality ☐ | |
| Project Designation: 100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location: 1607-D2:1 | SAF No.: RC-072 | |
| Ice Chest No.: ERC-02-406 | Field Logbook No.: EL-1597-2 BT00-19-06 | COA: BESRAS6520 | Method of Shipment: FED EX |
| Shipped To: EBERLINE SERVICES (LIONVILLE) | Offsite Property No.: A060510 | Bill of Lading/Air Bill No.: SEE OSPC | |

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage: COOL 4C

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | COOL 4C → | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ AD04406 | |
| Type of Container | G/P | G/P | aG | aG | aG | aG | aG | G/P | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Volume | 30g | 30g | 250g | 125g | 125g | 125g | 125g | 125g | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Chromium Hex - 7196 | Semi-VOA - 8270A (TCL) | PAHs - 8310 | Pesticides - 8081 | PCBs - 8082 | See item (2) in Special Instructions. | See item (3) in Special Instructions. | | |

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J12N79 | SOIL | 06-19-06 | 1210 | X | X | X | X | X | X | X | X | |
| J12N80 | SOIL | 6-19-06 | 1240 | X | X | X | X | X | X | X | X | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

| CHAIN OF POSSESSION | Date/Time | Sign/Print Names | Date/Time |
|---|---|---|---|
| Relinquished By/Removed From: BRETT TILLER | 6-19-06 1700 | Received By/Stored In: EAS LOCKED STORAGE | 6-19-06 1700 |
| Relinquished By/Removed From: EAS LOCKED STORAGE | 6-21-06 0700 | Received By/Stored In: TR Blackburn | 6-21-06 0900 |
| Relinquished By/Removed From: TR Blackburn | 6-21-06 1500 | Received By/Stored In: Fed Ex | |
| Relinquished By/Removed From: Fed Ex | 6-22-06 1025 | Received By/Stored In: [illegible] | 6-22-06 1025 |
| Relinquished By/Removed From: | | Received By/Stored In: | |
| Relinquished By/Removed From: | | Received By/Stored In: | |

SPECIAL INSTRUCTIONS

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

~ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions.

(1) ICP Metals - 6010 (Full List) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Uranium, Vanadium, Zinc]; Mercury - 7471 - (CV)

(2) Chloro-Herbicides - EPA8151+ [2,4,5-Trichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid, 2-(2,4,5-Trichlorophenoxy)propionic acid, 2-sec.butyl-4,6-dinitrophenol(DNBP), 4-(2,4-Dichlorophenoxy)butanoic acid, Dalapon, Dicamba, Dichloroprop]

(3) IC Anions - 300.0 [Nitrate]; NO2/NO3 - 353.2 [Nitrogen in Nitrite and Nitrate]

Matrix *

SoSoil
SESediment
SOSolid
SlSludge
W = Water
OiOil
AirAir
DSDrummed Solids
DLDrummed Liquids
TsTissue
WipWipe
LaLaqueid
VaVegetation
XOther

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

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

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000016

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-072-3 | Page 2 of 2 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: Tiller, B. | Company Contact: JOAN KESSNER | Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH |
| Project Designation: 100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location: 116-DR-1&2 | | SAF No.: RC-072 |
| Ice Chest No.: ERC-02-406 | Field Logbook No.: EL-1597-1 | COA: BESRAS6520 | Method of Shipment: FED EX |
| Shipped To: EBERLINE SERVICES / LIONVILLE | Offsite Property No.: A060510 | | Bill of Lading/Air Bill No.: SEE OSPC |

Price Code: 8N

Air Quality: ☐

Data Turnaround: 45 Days

000000017

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*NONE*

**Special Handling and/or Storage** COOL 4C

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| COOL 4C Preservation | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | 4/AG406 | |
| Type of Container | G/P | G/P | aG | aG | aG | aG | aG | G/P | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Volume | 30g | 30g | 250g | 125g | 125g | 125g | 125g | 125g | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Chromium Hex - 7196 | Semi-VOA - 8270A (TCL) | PAHs - 8310 | Pesticides - 8081 | PCBs - 8082 | See item (2) in Special Instructions. | See item (3) in Special Instructions. | | |

000017

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J12N81 | SOIL | 06-19-06 | 1310 | X * | X * | X * | X * | X * | X * | X * | X * | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

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

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| BRETT TILLER | 6-19-06 1700 | EAS LOCKED STORAGE | 6-19-06 1700 |
| EAS LOCKED STORAGE | 6-21-06 0900 | [signature] | 6-21-06 0900 |
| [signature] | 6/21/06 1500 | Fed. Ex | |
| [signature] | 6-22-06 0925 | [signature] | 6-22-06 0925 |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS**

* These marks indicate that unless lined out, analytes to be included with Strontium-89.90 -- Total Sr analysis fraction.

^ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions.

2(1) ICP Metals - 6010 (Full List) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Uranium, Vanadium, Zinc]; Mercury - 7471 - (CV)

3(2) Chloro-Herbicides - EPA8151+ [2,4,5-Trichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid, 2-(2,4,5-Trichlorophenoxy)propionic acid, 2-secButyl-4,6-dinitrophenol(DNBP), 4-(2,4-Dichlorophenoxy)butanoic acid, Dalapon, Dicamba, Dichloroprop]

4(3) IC Anions - 300.0 [Nitrate]; NO2/NO3 - 353.2 [Nitrogen in Nitrite and Nitrate]

Matrix *: P=Soil, SE=Sediment, SO=Solid, SL=Sludge, W=Water, D=Oil, A=Air, OS=Drum Solids, OL=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-072-4 | Page 2 of 2 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: Tiller, B. | Company Contact: JOAN KESSNER — Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH | Price Code: 8N — Data Turnaround: 45 Days |
| Project Designation: 100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location: 600-139 | SAF No.: RC-072 | Air Quality ☐ |
| Ice Chest No.: ERC-02-406 | Field Logbook No.: EL-1597-Y2 BT 06-19-06 — COA: BESRAS6520 | Method of Shipment: FED EX | |
| Shipped To: EBERLINE SERVICES / LIONVILLE | Offsite Property No.: A060S10 | Bill of Lading/Air Bill No.: SEE OSPC | |

POSSIBLE SAMPLE HAZARDS/REMARKS

*NONE*

Special Handling and/or Storage COOL 4C

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| COOL 4C Preservation | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ J/A61406 | | |
| Type of Container | G/P | G/P | aG | aG | aG | aG | aG | G/P | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Volume | 30g | 30g | 250g | 125g | 125g | 125g | 125g | 125g | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Chromium Hex - 7196 | Semi-VOA - 8270A (TCL) | PAHs - 8310 | Pesticides - 8081 | PCBs - 8082 | See item (2) in Special Instructions. | See item (3) in Special Instructions. | | |

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J12N82 | SOIL | 06-19-06 | 1350 | X* | X* | X* | X* | X* | X* | X* | X* | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

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| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By/Removed From: BRETT TILLER | Date/Time: 6-19-06 1700 | Received By/Stored In: EAS LOCKED STORAGE | Date/Time: 6-19-06 1700 |
| Relinquished By/Removed From: EAS LOCKED STORAGE | Date/Time: 6-21-06 0900 | Received By/Stored In: [signature] | Date/Time: 6-21-06 0900 |
| Relinquished By/Removed From: [signature] WCH | Date/Time: 6/21/06 1500 | Received By/Stored In: FED EX | Date/Time: |
| Relinquished By/Removed From: FED EX | Date/Time: 6-22-06 0925 | Received By/Stored In: [signature] | Date/Time: 6-22-06 0925 |
| 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

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

^ These marks indicate that this is a non-analysis used to properly format COC form.

Contact Joan Kessner for any questions.

2(1) ICP Metals - 6010 (Full List) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Uranium, Vanadium, Zinc]; Mercury - 7471 - (CV)

3(2) Chloro-Herbicides - EPA8151+ [2,4,5-Trichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid, 2-(2,4,5-Trichlorophenoxy)propionic acid, 2-secButyl-4,6-dinitrophenol(DNBP), 4-(2,4-Dichlorophenoxy)butanoic acid, Dalapon, Dicamba, Dichloroprop]

4(3) IC Anions - 300.0 [Nitrate]; NO2/NO3 - 353.2 [Nitrogen in Nitrite and Nitrate]

Matrix *: S=Soil, SE=Sediment, SO=Solid, Sl=Sludge, W=Water, O=Oil, A=Air, DS=Drum Solids, DL=Drum Liquids, T=Tissue, W(=W)pe, 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-072-5 | Page 2 of 2 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: Tiller, B. | Company Contact: JOAN KESSNER | Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH |
| Price Code | Data Turnaround: 45 Days | Air Quality ☐ | |
| Project Designation: 100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location: 600-171 | | SAF No.: RC-072 |
| Ice Chest No.: ERC-02-406 | Field Logbook No.: EL-1597 | COA: BESRAS6520 | Method of Shipment: FED EX |
| Shipped To: EBERLINE SERVICES / LIONVILLE | Offsite Property No.: A060510 | | Bill of Lading/Air Bill No.: SEE OSPC |

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage: COOL 4C

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | COOL 4C→ | None | None | None | None | None | None | None | None A/A 6406 | |
| Type of Container | G/P | G/P | aG | aG | aG | aG | aG | G/P | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Volume | 30g Item 2 | 30g | 250g | 125g | 125g | 125g | 125g 3 | 125g 4 | | |
| SAMPLE ANALYSIS | See item (*) in Special Instructions. | Chromium Hex - 7196 | Semi-VOA - 8270A (TCL) | PAHs - 8310 | Pesticides - 8081 | PCBs - 8082 | See item (*) in Special Instructions. | See item (*) in Special Instructions. | | |

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J12N83 | SOIL | 06-20-06 | 0910 | X* | X* | X* | X* | X* | X* | X* | X* | |
| J12N84 | SOIL | 06-20-06 | 0930 | X* | X* | X* | X* | X* | X* | X* | X* | |
| J12N85 | SOIL | 06-20-06 | ~~0940~~ 1000 | X* | X* | X* | X* | X* | X* | X* | X* | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

CHAIN OF POSSESSION — Sign/Print Names

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| BRETT TILLER | 6-20-06 1330 | EAS LOCKED STORAGE | 6-20-06 1330 |
| EAS LOCKED STORAGE | 6-21-06 0900 | [illegible] | 6-21-06 0900 |
| [illegible] | 6/21/06 1500 | Fed Ex | |
| Fed Ex | 6-22-06 1025 | [illegible] | 6-22-06 1025 |
| | | | |
| | | | |

SPECIAL INSTRUCTIONS

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

~ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions.

1(*) ICP Metals - 6010 (Full List) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Uranium, Vanadium, Zinc]; Mercury - 7471 - (CV)

2(*) Chloro-Herbicides - EPA8151+ [2,4,5-Trichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid, 2-(2,4,5-Trichlorophenoxy)propionic acid, 2-secButyl-4,6-dinitrophenol(DNBP), 4-(2,4-Dichlorophenoxy)butanoic acid, Dalapon, Dicamba, Dichloroprop]

3(*) IC Anions - 300.0 [Nitrate]; NO2/NO3 - 353.2 [Nitrogen in Nitrite and Nitrate]

Matrix *

Se=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
Ve=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)

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| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-072-6 | Page 2 of 2 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: Tiller, B. | Company Contact: JOAN KESSNER — Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH | Price Code: 8N — Data Turnaround: 45 Days |
| Project Designation: 100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location: 600-181 | SAF No.: RC-072 | Air Quality ☐ |
| Ice Chest No.: ERC-02-406 | Field Logbook No.: EL-1597-X 2 [illegible] — COA: BESRAS6520 | Method of Shipment: FED EX | |
| Shipped To: EBERLINE SERVICES (LIONVILLE) | Offsite Property No.: A060510 | Bill of Lading/Air Bill No.: SEE OSPC | |

000000020

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*NONE*

**Special Handling and/or Storage** COOL 4C

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

000020

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| COOL 4C → Preservation | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ 3/8 61406 | | |
| Type of Container | G/P | G/P | aG | aG | aG | aG | aG | G/P | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Volume | 30g | 30g | 250g | 125g | 125g | 125g | 125g | 125g | | |
| | Item 2 | | | | | | 3 | Item 4 | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Chromium Hex - 7196 | Semi-VOA - 8270A (TCL) | PAHs - 8310 | Pesticides - 8081 | PCBs - 8082 | See item (2) in Special Instructions. | See item (3) in Special Instructions. | | |

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J12N86 | SOIL | 06-20-06 | 1045 | X* | X* | X* | X* | X* | X* | X* | X* | | |
| J12N87 | SOIL | 06-20-06 | 1130 | X* | X* | X* | X* | X* | X* | X* | X* | | |
| J12N88 | SOIL | 06-20-06 | 1200 | X* | X* | X* | X* | X* | X* | X* | X* | | |
| J12N89 | SOIL | 06-20-06 | 1055 | X* | X* | X* | X* | X* | X* | X* | X* | | |

| CHAIN OF POSSESSION | | Sign/Print Names | |
|---|---|---|---|
| Relinquished By/Removed From: BRETT TILLER | Date/Time: 1330 6-20-06 | Received By/Stored In: EAS LOCKED STORAGE | Date/Time: 1330 6-20-06 |
| Relinquished By/Removed From: EAS LOCKED STORAGE | Date/Time: 1700 6-21-06 | Received By/Stored In: [signature] | Date/Time: 6-21-06 0900 |
| Relinquished By/Removed From: [signature] | Date/Time: 1500 6/21/06 | Received By/Stored In: Fed Ex | Date/Time: |
| Relinquished By/Removed From: Fed Ex | Date/Time: 6-22-06 0925 | Received By/Stored In: [signature] | Date/Time: 6-22-06 1092[illegible] |
| 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**

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

^ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions.

2 (1) ICP Metals - 6010 (Full List) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Uranium, Vanadium, Zinc]; Mercury - 7471 - (CV)

3 (2) Chloro-Herbicides - EPA8151+ [2,4,5-Trichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid, 2-(2,4,5-Trichlorophenoxy)propionic acid, 2-secButyl-4,6-dinitrophenol(DNBP), 4-(2,4-Dichlorophenoxy)butanoic acid, Dalapon, Dicamba, Dichloroprop]

4 (3) IC Anions - 300.0 [Nitrate]; NO2/NO3 - 353.2 [Nitrogen in Nitrite and Nitrate]

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-072-7 | Page 2 of 2 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: Tiller, B. | Company Contact: JOAN KESSNER — Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH | Price Code: 8N — Data Turnaround: 45 Days |
| Project Designation: 100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location: 618-4 | SAF No.: RC-072 | Air Quality ☐ |
| Ice Chest No.: ERC-02-406 | Field Logbook No.: EL-1597 [illegible] — COA: BESRAS6520 | Method of Shipment: FED EX | |
| Shipped To: EBERLINE SERVICES (LIONVILLE) | Offsite Property No.: A060510 | Bill of Lading/Air Bill No.: SEE OSPC | |

000000021

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*NONE*

**Special Handling and/or Storage** COOL 4C

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| COOL 4C → Preservation | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | [illegible] 61406 |
| Type of Container | G/P | G/P | aG | aG | aG | aG | aG | G/P | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| Volume | 30g | 30g | 250g | 125g | 125g | 125g | 125g | 125g | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Chromium Hex - 7196 | Semi-VOA - 8270A (TCL) | PAHs - 8310 | Pesticides - 8081 | PCBs - 8082 | See item (2) in Special Instructions. | See item (3) in Special Instructions. | |

000021

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J12N90 | SOIL | 06-19-06 | 1500 | X | X | X | X | X | X | X | X | | |
| J12N91 | SOIL | 06-19-06 | 1530 | X | X | X | X | X | X | X | X | | |
| J12N92 | SOIL | 06-19-06 | 1600 | X | X | X | X | X | X | X | X | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

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

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| BRETT TILLER [signature] | 1700 6-19-06 | EAS LOCKED STORAGE | 1700 6-19-06 |
| EAS LOCKED STORAGE | 0900 6-21-06 | [signature] | 6-21-06 0900 |
| [signature] | 6/21/06 1500 | Fed Ex | |
| [signature] | 6-22-06 0925 | [signature] | 6-22-06 0925 |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS**

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

^- These marks indicate that this is a non-analysis used to properly format COC form.

Contact Joan Kessner for any questions.

2(1) ICP Metals - 6010 (Full List) {Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Uranium, Vanadium, Zinc}; Mercury - 7471 - (CV)

3(2) Chloro-Herbicides - EPA8151+ {2,4,5-Trichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid, 2-(2,4,5-Trichlorophenoxy)propionic acid, 2-secButyl-4,6-dinitrophenol(DNBP), 4-(2,4-Dichlorophenoxy)butanoic acid, Dalapon, Dicamba, Dichloroprop}

4(3) IC Anions - 300.0 {Nitrate}; NO2/NO3 - 353.2 {Nitrogen in Nitrite and Nitrate}

**Matrix ***

R=Soil
SE=Sediment
SO=Solid
Sl=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
Wt=Wipe
Lo=Liquid
Ve=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-072-8 | Page 1 of 1 8/8/2006

| | | | |
|---|---|---|---|
| Collector: Tiller, B. | Company Contact: JOAN KESSNER | Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH |
| Price Code: 8N | Data Turnaround: 45 Days | | |
| Project Designation: 100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location: EQUIPMENT BLANK | | SAF No.: RC-072 |
| Air Quality: ☐ | | | |
| Ice Chest No.: EKC-02-406 | Field Logbook No.: EL-1597-1 | COA: BESRAS6520 | Method of Shipment: FED EX |
| Shipped To: EBERLINE SERVICES LIONVILLE | Offsite Property No.: A060510 | | Bill of Lading/Air Bill No.: SEE OSPC |

000000022

POSSIBLE SAMPLE HAZARDS/REMARKS

*NONE*

Special Handling and/or Storage: Cool 4C

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

000022

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | COOL 4C → Preservation | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ 8/8/06 1406 |
| | | | | Type of Container | G/P | G/P | aG | aG | aG | aG | aG | G/P |
| | | | | No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | | | | Volume | 30g | 30g | 250g | 125g | 125g | 125g | 125g | 125g |
| | | | | SAMPLE ANALYSIS | See item (1) in Special Instructions. | Chromium Hex - 7196 | Semi-VOA - 8270A (TCL) | PAHs - 8310 | Pesticides - 8081 | PCBs - 8082 | See item (2) in Special Instructions. | See item (3) in Special Instructions. |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | |
| J12N93 | SOIL | 6-19-06 | 1140 | | X | X | X | X | X | X | X | X |

CHAIN OF POSSESSION — Sign/Print Names

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| ~~BRETT TILLER~~ BRETT TILLER | 1700 6-19-06 | EAS LOCKED STORAGE | 1700 6-19-06 |
| EAS LOCKED STORAGE | 0900 6-21-06 | [illegible] | 6-21-06 0900 |
| [illegible] | 1500 6/21/06 | Fed Ex | |
| Fed Ex | 6-22-06 0925 | [illegible] | 6-22-06 0925 |
| | | | |
| | | | |

SPECIAL INSTRUCTIONS

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

~ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions.

(1) ICP Metals - 6010 (Full List) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Uranium, Vanadium, Zinc]; Mercury - 7471 - (CV)

(2) Chloro-Herbicides - EPA8151+ [2,4,5-Trichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid, 2-(2,4,5-Trichlorophenoxy)propionic acid, 2-secButyl-4,6-dinitrophenol(DNBP), 4-(2,4-Dichlorophenoxy)butanoic acid, Dalapon, Dicamba, Dichloroprop]

(3) IC Anions - 300.0 [Nitrate]; NO2/NO3 - 353.2 [Nitrogen in Nitrite and Nitrate]

Matrix *
Solid
SE=Sediment
SO=Soil
Sl=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
Wt=Wipe
Lq=Liquid
Vg=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)

RECEIVED
AUG 2006

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD RC-072 K0445

DATE RECEIVED: 06/22/06 LVL LOT # :0606L337

| CLIENT ID /ANALYSIS | LVL # | MTX | PREP # | COLLECTION | EXTR/PREP | ANALYSIS |
|---|---|---|---|---|---|---|
| J12N79 | | | | | | |
| % SOLIDS | 001 | S | 06L%S070 | 06/19/06 | 06/26/06 | 06/27/06 |
| NITRATE BY IC | 001 | S | 06LIC070 | 06/19/06 | 07/24/06 | 07/25/06 |
| NITRATE BY IC | 001 REP | S | 06LIC070 | 06/19/06 | 07/24/06 | 07/25/06 |
| NITRATE BY IC | 001 MS | S | 06LIC070 | 06/19/06 | 07/24/06 | 07/25/06 |
| CHROMIUM VI | 001 | S | 06LVI066 | 06/19/06 | 07/05/06 | 07/05/06 |
| NITRATE NITRITE | 001 | S | 06LN3058 | 06/19/06 | 07/24/06 | 07/25/06 |
| NITRATE NITRITE | 001 REP | S | 06LN3058 | 06/19/06 | 07/24/06 | 07/25/06 |
| NITRATE NITRITE | 001 MS | S | 06LN3058 | 06/19/06 | 07/24/06 | 07/25/06 |
| J12N80 | | | | | | |
| % SOLIDS | 002 | S | 06L%S070 | 06/19/06 | 06/26/06 | 06/27/06 |
| NITRATE BY IC | 002 | S | 06LIC070 | 06/19/06 | 07/24/06 | 07/25/06 |
| CHROMIUM VI | 002 | S | 06LVI066 | 06/19/06 | 07/05/06 | 07/05/06 |
| NITRATE NITRITE | 002 | S | 06LN3058 | 06/19/06 | 07/24/06 | 07/25/06 |
| J12N81 | | | | | | |
| % SOLIDS | 003 | S | 06L%S070 | 06/19/06 | 06/26/06 | 06/27/06 |
| NITRATE BY IC | 003 | S | 06LIC070 | 06/19/06 | 07/24/06 | 07/25/06 |
| CHROMIUM VI | 003 | S | 06LVI066 | 06/19/06 | 07/05/06 | 07/05/06 |
| NITRATE NITRITE | 003 | S | 06LN3058 | 06/19/06 | 07/24/06 | 07/25/06 |
| J12N82 | | | | | | |
| % SOLIDS | 004 | S | 06L%S070 | 06/19/06 | 06/26/06 | 06/27/06 |
| NITRATE BY IC | 004 | S | 06LIC070 | 06/19/06 | 07/24/06 | 07/25/06 |
| CHROMIUM VI | 004 | S | 06LVI066 | 06/19/06 | 07/05/06 | 07/05/06 |
| NITRATE NITRITE | 004 | S | 06LN3058 | 06/19/06 | 07/24/06 | 07/25/06 |
| J12N83 | | | | | | |
| % SOLIDS | 005 | S | 06L%S070 | 06/20/06 | 06/26/06 | 06/27/06 |
| NITRATE BY IC | 005 | S | 06LIC070 | 06/20/06 | 07/24/06 | 07/25/06 |
| CHROMIUM VI | 005 | S | 06LVI066 | 06/20/06 | 07/05/06 | 07/05/06 |

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD RC-072 K0445

DATE RECEIVED: 06/22/06 LVL LOT # :0606L337

| CLIENT ID /ANALYSIS | LVL # | MTX | PREP # | COLLECTION | EXTR/PREP | ANALYSIS |
|---|---|---|---|---|---|---|
| NITRATE NITRITE | 005 | S | 06LN3058 | 06/20/06 | 07/24/06 | 07/25/06 |
| J12N84 | | | | | | |
| % SOLIDS | 006 | S | 06L%S070 | 06/20/06 | 06/26/06 | 06/27/06 |
| NITRATE BY IC | 006 | S | 06LIC070 | 06/20/06 | 07/24/06 | 07/25/06 |
| CHROMIUM VI | 006 | S | 06LVI066 | 06/20/06 | 07/05/06 | 07/05/06 |
| NITRATE NITRITE | 006 | S | 06LN3058 | 06/20/06 | 07/24/06 | 07/25/06 |
| J12N85 | | | | | | |
| % SOLIDS | 007 | S | 06L%S070 | 06/20/06 | 06/26/06 | 06/27/06 |
| NITRATE BY IC | 007 | S | 06LIC070 | 06/20/06 | 07/24/06 | 07/25/06 |
| CHROMIUM VI | 007 | S | 06LVI066 | 06/20/06 | 07/05/06 | 07/05/06 |
| NITRATE NITRITE | 007 | S | 06LN3058 | 06/20/06 | 07/24/06 | 07/25/06 |
| J12N86 | | | | | | |
| % SOLIDS | 008 | S | 06L%S070 | 06/20/06 | 06/26/06 | 06/27/06 |
| NITRATE BY IC | 008 | S | 06LIC070 | 06/20/06 | 07/24/06 | 07/25/06 |
| CHROMIUM VI | 008 | S | 06LVI066 | 06/20/06 | 07/05/06 | 07/05/06 |
| NITRATE NITRITE | 008 | S | 06LN3058 | 06/20/06 | 07/24/06 | 07/25/06 |
| J12N87 | | | | | | |
| % SOLIDS | 009 | S | 06L%S070 | 06/20/06 | 06/26/06 | 06/27/06 |
| NITRATE BY IC | 009 | S | 06LIC070 | 06/20/06 | 07/24/06 | 07/25/06 |
| CHROMIUM VI | 009 | S | 06LVI066 | 06/20/06 | 07/05/06 | 07/05/06 |
| NITRATE NITRITE | 009 | S | 06LN3058 | 06/20/06 | 07/24/06 | 07/25/06 |
| J12N88 | | | | | | |
| % SOLIDS | 010 | S | 06L%S070 | 06/20/06 | 06/26/06 | 06/27/06 |
| NITRATE BY IC | 010 | S | 06LIC070 | 06/20/06 | 07/24/06 | 07/25/06 |
| CHROMIUM VI | 010 | S | 06LVI066 | 06/20/06 | 07/05/06 | 07/05/06 |
| NITRATE NITRITE | 010 | S | 06LN3058 | 06/20/06 | 07/24/06 | 07/25/06 |
| J12N89 | | | | | | |
| % SOLIDS | 011 | S | 06L%S070 | 06/20/06 | 06/26/06 | 06/27/06 |

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD RC-072 K0445

DATE RECEIVED: 06/22/06 LVL LOT # :0606L337

| CLIENT ID /ANALYSIS | LVL # | MTX | PREP # | COLLECTION | EXTR/PREP | ANALYSIS |
|---|---|---|---|---|---|---|
| NITRATE BY IC | 011 | S | 06LIC070 | 06/20/06 | 07/24/06 | 07/25/06 |
| CHROMIUM VI | 011 | S | 06LVI066 | 06/20/06 | 07/05/06 | 07/05/06 |
| NITRATE NITRITE | 011 | S | 06LN3058 | 06/20/06 | 07/24/06 | 07/25/06 |
| J12N90 | | | | | | |
| % SOLIDS | 012 | S | 06L%S070 | 06/19/06 | 06/26/06 | 06/27/06 |
| NITRATE BY IC | 012 | S | 06LIC070 | 06/19/06 | 07/24/06 | 07/25/06 |
| CHROMIUM VI | 012 | S | 06LVI066 | 06/19/06 | 07/05/06 | 07/05/06 |
| NITRATE NITRITE | 012 | S | 06LN3058 | 06/19/06 | 07/24/06 | 07/25/06 |
| J12N91 | | | | | | |
| % SOLIDS | 013 | S | 06L%S070 | 06/19/06 | 06/26/06 | 06/27/06 |
| NITRATE BY IC | 013 | S | 06LIC070 | 06/19/06 | 07/24/06 | 07/25/06 |
| CHROMIUM VI | 013 | S | 06LVI066 | 06/19/06 | 07/05/06 | 07/05/06 |
| NITRATE NITRITE | 013 | S | 06LN3058 | 06/19/06 | 07/24/06 | 07/25/06 |
| J12N92 | | | | | | |
| % SOLIDS | 014 | S | 06L%S070 | 06/19/06 | 06/26/06 | 06/27/06 |
| NITRATE BY IC | 014 | S | 06LIC070 | 06/19/06 | 07/24/06 | 07/25/06 |
| CHROMIUM VI | 014 | S | 06LVI066 | 06/19/06 | 07/05/06 | 07/05/06 |
| NITRATE NITRITE | 014 | S | 06LN3058 | 06/19/06 | 07/24/06 | 07/25/06 |
| J12N93 | | | | | | |
| % SOLIDS | 015 | S | 06L%S070 | 06/19/06 | 06/26/06 | 06/27/06 |
| % SOLIDS | 015 REP | S | 06L%S070 | 06/19/06 | 06/26/06 | 06/27/06 |
| NITRATE BY IC | 015 | S | 06LIC070 | 06/19/06 | 07/24/06 | 07/25/06 |
| CHROMIUM VI | 015 | S | 06LVI066 | 06/19/06 | 07/05/06 | 07/05/06 |
| CHROMIUM VI | 015 REP | S | 06LVI066 | 06/19/06 | 07/05/06 | 07/05/06 |
| CHROMIUM VI | 015 MS | S | 06LVI066 | 06/19/06 | 07/05/06 | 07/05/06 |
| CHROMIUM VI | 015 MSD | S | 06LVI066 | 06/19/06 | 07/05/06 | 07/05/06 |
| NITRATE NITRITE | 015 | S | 06LN3058 | 06/19/06 | 07/24/06 | 07/25/06 |

AB QC:

| | | | | | | |
|---|---|---|---|---|---|---|
| NITRATE BY IC | MB1 | S | 06LIC070 | N/A | 07/24/06 | 07/24/06 |

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD RC-072 K0445

DATE RECEIVED: 06/22/06 LVL LOT #:0606L337

| CLIENT ID /ANALYSIS | LVL # | MTX | PREP # | COLLECTION | EXTR/PREP | ANALYSIS |
|---|---|---|---|---|---|---|
| NITRATE BY IC | MB1 BS | S | 06LIC070 | N/A | 07/24/06 | 07/24/06 |
| CHROMIUM VI | MB1 | S | 06LVI066 | N/A | 07/05/06 | 07/05/06 |
| CHROMIUM VI | MB1 BS | S | 06LVI066 | N/A | 07/05/06 | 07/05/06 |
| CHROMIUM VI | MB1 BSD | S | 06LVI066 | N/A | 07/05/06 | 07/05/06 |
| NITRATE NITRITE | MB1 | S | 06LN3058 | N/A | 07/24/06 | 07/25/06 |
| NITRATE NITRITE | MB1 BS | S | 06LN3058 | N/A | 07/24/06 | 07/25/06 |

## Appendix 5

## Data Validation Supporting Documentation

# GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

| VALIDATION LEVEL: | A | B | C | D | E |
|---|---|---|---|---|---|
| PROJECT: | RCBRA | | DATA PACKAGE: | K0445 | |
| VALIDATOR: | TLT | LAB: | LLT | DATE: | 9/2/06 |
| | | | SDG: | K0445 | |

| 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 | | | | |
|---|---|---|---|---|
| J12N79 | J12N80 | J12N81 | J12N82 | J12N83 |
| J12N84 | J12N85 | J12N86 | J12N87 | J12N88 |
| J12N89 | J12N90 | J12N91 | J12N92 | J12N93 |
| | | | | |
| | | | | |

## 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: nitrate >2x J/UR

$NO_2/NO_3$ <2x J

# 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:

Nitrate – owin 93, 91, 87

CAVT – " " 83, 84,

## Appendix 6

## Additional Documentation Requested by Client

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 08/09/06

CLIENT: TNUHANFORD RC-072 K0445 LVL LOT #: 0606L337

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| BLANK10 | 06LIC070-MB1 | Nitrate by IC | 2.50 u | MG/KG | 2.50 | 1.0 |
| BLANK10 | 06LVI066-MB1 | Chromium VI | 0.20 u | MG/KG | 0.20 | 1.0 |
| BLANK10 | 06LN3058-MB1 | Nitrate Nitrite | 0.20 u | MG/KG | 0.20 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 08/09/06

CLIENT: TNUHANFORD RC-072 K0445 LVL LOT #: 0606L337

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

| SAMPLE | SITE ID | ANALYTE | SPIKED SAMPLE | INITIAL RESULT | SPIKED AMOUNT | %RECOV | DILUTION FACTOR(SPK) |
|---|---|---|---|---|---|---|---|
| -001 | J12N79 | Nitrate by IC | 50.6 | 2.40u | 49.0 | 103.3 | 1.0 |
| | | Nitrate Nitrite | 4.7 | 0.49 | 4.9 | 85.3 | 1.0 |
| -015 | J12N93 | Soluble Chromium VI | 3.9 | 0.20u | 4.0 | 100.2 | 1.0 |
| | | Insoluble Chromium VI | 1260 | 0.20u | 1200 | 104.3 | 100 |
| BLANK10 | 06LIC070-MB1 | Nitrate by IC | 48.1 | 2.50u | 50.0 | 96.2 | 1.0 |
| BLANK10 | 06LVI066-MB1 | Soluble Chromium VI | 4.0 | 0.20u | 4.0 | 101.1 | 1.0 |
| | | Insoluble Chromium VI | 1250 | 0.20u | 1230 | 101.2 | 100 |
| BLANK10 | 06LN3058-MB1 | Nitrate Nitrite | 5.0 | 0.20u | 5.0 | 99.0 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 08/09/06

CLIENT: TNUHANFORD RC-072 K0445 LVL LOT #: 0606L337

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

| SAMPLE | SITE ID | ANALYTE | INITIAL RESULT | REPLICATE | RPD | DILUTION FACTOR(REP) |
|---|---|---|---|---|---|---|
| -001REP | J12N79 | Nitrate by IC | 2.40u | 2.54u | NC | 1.0 |
| | | Nitrate Nitrite | 0.49 | 0.57 | 15.7 | 1.0 |
| -015REP | J12N93 | % Solids | 100 | 100 | 0.00 | 1.0 |
| | | Chromium VI | 0.20u | 0.20u | NC | 1.0 |

Date: 11 September 2006
To: Washington Closure Hanford (technical representative)
From: TechLaw, Inc.
Project: 100 Area and 300 Area Component of the RCBRA – Discrete Soil Sampling
Subject: Semivolatile - Data Package No. K0445-LLI

## INTRODUCTION

This memo presents the results of data validation on Data Package No. K0445 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 |
|---|---|---|---|---|
| J12N79 | 6/19/06 | Soil | C | See note 1 |
| J12N80 | 6/19/06 | Soil | C | See note 1 |
| J12N81 | 6/19/06 | Soil | C | See note 1 |
| J12N82 | 6/19/06 | Soil | C | See note 1 |
| J12N83 | 6/20/06 | Soil | C | See note 1 |
| J12N84 | 6/20/06 | Soil | C | See note 1 |
| J12N85 | 6/20/06 | Soil | C | See note 1 |
| J12N86 | 6/20/06 | Soil | C | See note 1 |
| J12N87 | 6/20/06 | Soil | C | See note 1 |
| J12N88 | 6/20/06 | Soil | C | See note 1 |
| J12N89 | 6/19/06 | Soil | C | See note 1 |
| J12N90 | 6/19/06 | Soil | C | See note 1 |
| J12N91 | 6/19/06 | Soil | C | See note 1 |
| J12N92 | 6/19/06 | Soil | C | See note 1 |
| J12N93 | 6/19/06 | Soil | C | See note 1 |

1 – Semivolatiles by 8270C and PAHs by 8310.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area and 300 Area Component of the RCBRA Sampling and Analysis Plan (DOE/RL-2005-42, Rev. 0, October 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 Preservation**

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 for semivolatile analytes.

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

Due to the holding time being exceeded by greater than twice the limit, all undetected semivolatile organic results in sample J12N85R were rejected and flagged "UR".

All other holding times were acceptable.

- **Method Blanks**

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

Due to method blank contamination, all detected di-n-butylphthalate results were qualified as undetected, raised to the RQL and flagged "U".

Due to method blank contamination, the bis(2-ethylhexyl)phthalate result in sample J12N85R was qualified as undetected, raised to the RQL and flagged "U".

All other method blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis.

- **Accuracy**

Matrix Spike/Matrix Spike Duplicate & Blank Spike Recoveries

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

Due to matrix spike recoveries outside QC limits, all nitrobenzene (47%), isophorone (58%),1,2,4-trichlorobenzene (49%), 4-chloro-3-methylphenol (58%) and 2-methylnaphthalene (58%) results (except J12N85R) were qualified as estimates and flagged "J".

Due to the lack of a matrix spike or matrix spike duplicate analysis, all semivolatile organic results in sample J12N85R were qualified as estimates and flagged "J".

Due to LCS recoveries outside QC limits, all detected phenanthrene (136%) and fluoranthene (143%) results (except J12N85R) 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".

Due to surrogate recoveries outside QC limits (0%), all semivolatile results in sample J12N85 were rejected and flagged "R/UR".

Due to surrogate recoveries outside QC limits, all nitrobenzene associated analytes (2-nitrophenol, 2,4-dinitrophenol, nitrobenzene, n-nitroso-di-n-propylamine, 4-chloroaniline, 2-nitroaniline, 3-nitroaniline, 4-nitroaniline, 2,6-dinitrotoluene, n-nitrosodiphenylamine) in samples J12N88 (11%) and J12N90 (14%) were qualified as estimates and flagged "J".

Due to surrogate recoveries outside QC limits, all 2-fluorophenol associated analytes (2-chlorophenol, 2,4-dichlorophenol, 4-chloro-3-methyl phenol) in samples J12N90 (13%) and J12N92 (21%) were qualified as estimates and flagged "J".

Due to a surrogate recovery outside QC limits (4%), all 2-fluorophenol associated analytes (2-chlorophenol, 2,4-dichlorophenol, 4-chloro-3-methyl phenol) in sample J12N88 were rejected and flagged "UR".

All other surrogate results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of +/-20%. 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 an RPD outside QC limits, all hexochloroethane (35%), nitrobenzene (47%), isophorone (38%), 2-nitrophenol (35%), bis(2-choroethoxy)methane (39%), 2,4-dichlorophenol (34%), 1,2,4-trichlorobenzene (49%), naphthalene (40%), 4-chloroanaline (34%), hexachlorobutadiene (57%), 4-chloro-3-methylphenol (33%) and 2-methylnathalene (38%) results (except J12N85R) were qualified as estimates and flagged "J".

All other precision results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for analysis.

- **Analytical Detection Levels**

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

- **Completeness**

Data package No. K0445 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 86%.

**MAJOR DEFICIENCIES**

The following major deficiencies were noted:

- Due to surrogate recoveries outside QC limits (all 0%), all semivolatile results in sample J12N85 were rejected and flagged "R/UR".

- Due to the holding time being exceeded by greater than twice the limit, all undetected semivolatile organic results in sample J12N85R were rejected and flagged "UR".

- Due to a surrogate recovery outside QC limits (4%), all 2-fluorophenol associated analytes (2-chlorophenol, 2,4-dichlorophenol, 4-chloro-3-methyl phenol) in sample J12N88 were rejected and flagged "UR".

Rejected data is unusable and should not be reported.

## MINOR DEFICIENCIES

The following minor deficiencies were noted:

- Due to method blank contamination, all detected di-n-butylphthalate results were qualified as undetected, raised to the RQL and flagged "U".

- Due to method blank contamination, the bis(2-ethylhexyl)phthalate result in sample J12N85R was qualified as undetected, raised to the RQL and flagged "U".

- Due to matrix spike recoveries outside QC limits, all nitrobenzene (47%), isophorone (58%),1,2,4-trichlorobenzene (49%), 4-chloro-3-methylphenol (58%) and 2-methylnaphthalene (58%) results (except J12N85R) were qualified as estimates and flagged "J".

- Due to the lack of a matrix spike or matrix spike duplicate analysis, all semivolatile organic results in sample J12N85R were qualified as estimates and flagged "J".

- Due to LCS recoveries outside QC limits, all detected phenanthrene (136%) and fluoranthene (143%) results (except J12N85R) were qualified as estimates and flagged "J".

- Due to surrogate recoveries outside QC limits, all nitrobenzene associated analytes (2-nitrophenol, 2,4-dinitrophenol, nitrobenzene, n-nitroso-di-n-propylamine, 4-chloroaniline, 2-nitroaniline, 3-nitroaniline, 4-nitroaniline, 2,6-dinitrotoluene, n-nitrosodiphenylamine) in samples J12N88 (11%) and J12N90 (14%) were qualified as estimates and flagged "J".

- Due to surrogate recoveries outside QC limits, all 2-fluorophenol associated analytes (2-chlorophenol, 2,4-dichlorophenol, 4-chloro-3-methyl phenol) in samples J12N90 (13%) and J12N92 (21%) were qualified as estimates and flagged "J".

- Due to an RPD outside QC limits, all hexochloroethane (35%), nitrobenzene (47%), isophorone (38%), 2-nitrophenol (35%), bis(2-choroethoxy)methane (39%), 2,4-dichlorophenol (34%), 1,2,4-trichlorobenzene (49%), naphthalene (40%), 4-chloroanaline (34%), hexachlorobutadiene (57%), 4-chloro-3-methylphenol (33%) and 2-methylnathalene (38%) results (except J12N85R) 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.

Forty-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-2005-42, Rev. 0, October 2005, *100 Area and 300 Area Component of the RCBRA Sampling and Analysis Plan*.

## 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 DATA QUALIFICATION SUMMARY*

| SDG: K0445 | REVIEWER: TLI | Project: RCBRA | PAGE 1 OF 1 |
|---|---|---|---|
| COMMENTS: | | | |
| COMPOUND | QUALIFIER | SAMPLES AFFECTED | REASON |
| Di-n-butylphthalate | U at RQL | All detected analytes | Blank contamination |
| Bis(2-ethylhexyl)phthalate | U at RQL | J12N85R | Blank contamination |
| All undetected semivolatiles | UR | J12N85R | Holding time |
| 2-Chlorophenol<br>2,4-Dichlorophenol<br>4-Chloro-3-methyl phenol | UR | J12N88 | Surrogate recovery |
| All semivolatiles | R/UR | J12N85 | Surrogate recovery |
| Nitrobenzene<br>Isophorone<br>1,2,4-Trichlorobenzene<br>4-Chloro-3-methylphenol<br>2-Methylnaphthalene | J | All undetected (except J12N85R) | Matrix spike recovery |
| All semivolatiles | J | J12N85R | No MS or MSD |
| Phenanthrene<br>Fluoranthene | J | All detected analytes (except J12N85R) | LCS recovery |
| 2-Nitrophenol<br>2,4-Dinitrophenol<br>Nitrobenzene<br>n-Nitroso-di-n-propylamine<br>4-Chloroaniline<br>2-Nitroaniline<br>3-Nitroaniline<br>4-Nitroaniline<br>2,6-Dinitrotoluene<br>n-Nitrosodiphenylamine | J | J12N88, J12N90 | Surrogate recovery |
| 2-Chlorophenol<br>2,4-Dichlorophenol<br>4-Chloro-3-methyl phenol | J | J12N90, J12N92 | Surrogate recovery |
| Hexochloroethane<br>Nitrobenzene<br>Isophorone<br>2-Nitrophenol<br>Bis(2-choroethoxy)methane<br>2,4-Dichlorophenol<br>1,2,4-Trichlorobenzene | J | All (except J12N85R) | RPD |

SEMIVOLATILE DATA QUALIFICATION SUMMARY*

| SDG: K0445 | REVIEWER: TLI | Project: RCBRA | PAGE 1 OF 1 |
|---|---|---|---|
| Naphthalene<br>4-Chloroanaline<br>Hexachlorobutadiene<br>4-Chloro-3-methylphenol<br>2-Methylnathalene | | | |

* - 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 PAH ANALYSIS, SOIL MATRIX, (UG/KG) 

Project: WASHINGTON CLOSURE HANFORD
Laboratory: LLI SDG: K0445

| Sample Number | | J12N79 | | J12N80 | | J12N81 | | J12N82 | | J12N83 | | J12N84 | | J12N85 | | J12N85R | | J12N86 | | J12N87 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Remarks | | | | | | | | | | | | | | | | | | | | | |
| Sample Date | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | |
| Extraction Date | | 6/23/06 | | 6/23/06 | | 6/23/06 | | 6/23/06 | | 6/23/06 | | 6/23/06 | | 6/23/06 | | 6/23/06 | | 6/23/06 | | 6/23/06 | |
| Analysis Date | | 7/27/06 | | 7/28/06 | | 7/28/06 | | 7/28/06 | | 7/30/06 | | 7/28/06 | | 7/28/06 | | 8/1/06 | | 7/30/06 | | 7/28/06 | |
| Semivolatile (8270C) | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| Phenol | | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 330 | U | 330 | UR | 330 | UR | 330 | U | 330 | U |
| bis(2-Chloroethyl)ether | | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 330 | U | 330 | UR | 330 | UR | 330 | U | 330 | U |
| 2-Chlorophenol | | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 330 | U | 330 | UR | 330 | UR | 330 | U | 330 | U |
| 1,3-Dichlorobenzene | | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 330 | U | 330 | UR | 330 | UR | 330 | U | 330 | U |
| 1,4-Dichlorobenzene | | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 330 | U | 330 | UR | 330 | UR | 330 | U | 330 | U |
| 1,2-Dichlorobenzene | 330 | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 330 | U | 330 | UR | 330 | UR | 330 | U | 330 | U |
| 2-Methylphenol | | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 330 | U | 330 | UR | 330 | UR | 330 | U | 330 | U |
| 2,2'-oxybis(1-chloropropane) | | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 330 | U | 330 | UR | 330 | UR | 330 | U | 330 | U |
| 3 and/or 4-Methylphenol | | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 330 | U | 330 | UR | 330 | UR | 330 | U | 330 | U |
| N-Nitroso-di-n-propylamine | | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 330 | U | 330 | UR | 330 | UR | 330 | U | 330 | U |
| Hexachloroethane | | 340 | UJ | 340 | UJ | 330 | UJ | 340 | UJ | 340 | UJ | 330 | UJ | 330 | UR | 330 | UR | 330 | UJ | 330 | UJ |
| Nitrobenzene | | 340 | UJ | 340 | UJ | 330 | UJ | 340 | UJ | 340 | UJ | 330 | UJ | 330 | UR | 330 | UR | 330 | UJ | 330 | UJ |
| Isophorone | | 340 | UJ | 340 | UJ | 330 | UJ | 340 | UJ | 340 | UJ | 330 | UJ | 330 | UR | 330 | UR | 330 | UJ | 330 | UJ |
| 2-Nitrophenol | | 340 | UJ | 340 | UJ | 330 | UJ | 340 | UJ | 340 | UJ | 330 | UJ | 330 | UR | 330 | UR | 330 | UJ | 330 | UJ |
| 2,4-Dimethylphenol | | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 330 | U | 330 | UR | 330 | UR | 330 | U | 330 | U |
| bis(2-Chloroethoxy)methane | | 340 | UJ | 340 | UJ | 330 | UJ | 340 | UJ | 340 | UJ | 330 | UJ | 330 | UR | 330 | UR | 330 | UJ | 330 | UJ |
| 2,4-Dichlorophenol | | 340 | UJ | 340 | UJ | 330 | UJ | 340 | UJ | 340 | UJ | 330 | UJ | 330 | UR | 330 | UR | 330 | UJ | 330 | UJ |
| 1,2,4-Trichlorobenzene | 330 | 340 | UJ | 340 | UJ | 330 | UJ | 340 | UJ | 340 | UJ | 330 | UJ | 330 | UR | 330 | UR | 330 | UJ | 330 | UJ |
| Naphthalene | | 340 | UJ | 340 | UJ | 330 | UJ | 340 | UJ | 340 | UJ | 330 | UJ | 330 | UR | 330 | UR | 330 | UJ | 330 | UJ |
| 4-Chloroaniline | | 340 | UJ | 340 | UJ | 330 | UJ | 340 | UJ | 340 | UJ | 330 | UJ | 330 | UR | 330 | UR | 330 | UJ | 330 | UJ |
| Hexachlorobutadiene | | 340 | UJ | 340 | UJ | 330 | UJ | 340 | UJ | 340 | UJ | 330 | UJ | 330 | UR | 330 | UR | 330 | UJ | 330 | UJ |
| 4-Chloro-3-methylphenol | | 340 | UJ | 340 | UJ | 330 | UJ | 340 | UJ | 340 | UJ | 330 | UJ | 330 | UR | 330 | UR | 330 | UJ | 330 | UJ |
| 2-Methylnaphthalene | | 340 | UJ | 340 | UJ | 330 | UJ | 340 | UJ | 340 | UJ | 330 | UJ | 330 | UR | 330 | UR | 330 | UJ | 330 | UJ |
| Hexachlorocyclopentadiene | | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 330 | U | 330 | UR | 330 | UR | 330 | U | 330 | U |
| 2,4,6-Trichlorophenol | 330 | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 330 | U | 330 | UR | 330 | UR | 330 | U | 330 | U |
| 2,4,5-Trichlorophenol | 330 | 850 | U | 850 | U | 830 | U | 840 | U | 840 | U | 840 | U | 840 | UR | 840 | UR | 840 | U | 840 | U |
| 2-Chloronaphthalene | | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 330 | U | 330 | UR | 330 | UR | 330 | U | 330 | U |
| 2-Nitroaniline | | 850 | U | 850 | U | 830 | U | 840 | U | 840 | U | 840 | U | 840 | UR | 840 | UR | 840 | U | 840 | U |
| Dimethylphthalate | | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 330 | U | 330 | UR | 330 | UR | 330 | U | 330 | U |
| Acenaphthylene | | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 330 | U | 330 | UR | 330 | UR | 330 | U | 330 | U |
| 2,6-Dinitrotoluene | | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 330 | U | 330 | UR | 330 | UR | 330 | U | 330 | 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

000014

SEMIVOLATILE PAH ANALYSIS, SOIL MATRIX, (UG/KG)



Project: WASHINGTON CLOSURE HANFORD
Laboratory: LLI SDG: K0445

| Sample Number | | J12N79 | | J12N80 | | J12N81 | | J12N82 | | J12N83 | | J12N84 | | J12N85 | | J12N85R | | J12N86 | | J12N87 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Remarks | | | | | | | | | | | | | | | | | | | | | |
| Sample Date | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | |
| Extraction Date | | 6/23/06 | | 6/23/06 | | 6/23/06 | | 6/23/06 | | 6/23/06 | | 6/23/06 | | 6/23/06 | | 8/1/06 | | 6/23/06 | | 6/23/06 | |
| Analysis Date | | 7/27/06 | | 7/28/06 | | 7/28/06 | | 7/28/06 | | 7/30/06 | | 7/28/06 | | 7/28/06 | | 8/6/06 | | 7/30/06 | | 7/28/06 | |
| Semivolatile (8270C) | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| 3-Nitroaniline | | 850 | U | 850 | U | 830 | U | 840 | U | 840 | U | 840 | U | 840 | UR | 840 | UR | 840 | U | 840 | U |
| Acenaphthene | | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 330 | U | 330 | UR | 330 | UR | 330 | U | 330 | U |
| 2,4-Dinitrophenol | | 850 | U | 850 | U | 830 | U | 840 | U | 840 | U | 840 | U | 840 | UR | 840 | UR | 840 | U | 840 | U |
| 4-Nitrophenol | | 850 | U | 850 | U | 830 | U | 840 | U | 840 | U | 840 | U | 840 | UR | 840 | UR | 840 | U | 840 | U |
| Dibenzofuran | 330 | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 18 | | 330 | UR | 330 | UR | 330 | U | 330 | U |
| 2,4-Dinitrotoluene | | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 330 | U | 330 | UR | 330 | UR | 330 | U | 330 | U |
| Diethylphthalate | | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 330 | U | 330 | UR | 330 | UR | 330 | U | 330 | U |
| 4-Chlorophenyl-phenyl ether | | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 330 | U | 330 | UR | 330 | UR | 330 | U | 330 | U |
| Fluorene | | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 330 | U | 330 | UR | 330 | UR | 330 | U | 330 | U |
| 4-Nitroaniline | | 850 | U | 850 | U | 830 | U | 840 | U | 840 | U | 840 | U | 840 | UR | 840 | UR | 840 | U | 840 | U |
| 4,6-Dinitro-2-methylphenol | | 850 | U | 850 | U | 830 | U | 840 | U | 840 | U | 840 | U | 840 | UR | 840 | UR | 840 | U | 840 | U |
| N-Nitrosodiphenylamine | | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 330 | U | 330 | UR | 330 | UR | 330 | U | 330 | U |
| 4-Bromophenyl-phenyl ether | | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 330 | U | 330 | UR | 330 | UR | 330 | U | 330 | U |
| Hexachlorobenzene | | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 330 | U | 330 | UR | 330 | UR | 330 | U | 330 | U |
| Pentachlorophenol | 330 | 850 | U | 850 | U | 830 | U | 840 | U | 840 | U | 840 | U | 840 | UR | 840 | UR | 840 | U | 840 | U |
| Phenanthrene | | 340 | U | 340 | U | 330 | U | 340 | U | 51 | J | 92 | J | 330 | UR | 330 | UR | 330 | U | 330 | U |
| Anthracene | | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 330 | U | 330 | UR | 330 | UR | 330 | U | 330 | U |
| Carbazole | | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 330 | U | 330 | UR | 330 | UR | 330 | U | 330 | U |
| Di-n-butylphthalate | | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 330 | U | 330 | UR | 330 | UR | 330 | U | 330 | U |
| Fluoranthene | | 340 | U | 340 | U | 330 | U | 340 | U | 60 | J | 120 | J | 330 | UR | 330 | UR | 330 | U | 330 | U |
| Pyrene | | 340 | U | 340 | U | 330 | U | 340 | U | 62 | | 150 | | 330 | UR | 330 | UR | 330 | U | 330 | U |
| Butylbenzylphthalate | | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 330 | U | 330 | UR | 330 | UR | 330 | U | 330 | U |
| 3,3'-Dichlorobenzidine | | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 330 | U | 330 | UR | 330 | UR | 330 | U | 330 | U |
| Benzo(a)anthracene | | 340 | U | 340 | U | 330 | U | 340 | U | 33 | | 60 | | 330 | UR | 330 | UR | 330 | U | 330 | U |
| Chrysene | | 340 | U | 340 | U | 330 | U | 340 | U | 50 | | 99 | | 330 | UR | 330 | UR | 330 | U | 330 | U |
| bis(2-Ethylhexyl)phthalate | | 23 | | 340 | U | 330 | U | 340 | U | 30 | | 45 | | 24 | R | 330 | UR | 39 | | 25 | |
| Di-n-octylphthalate | | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 330 | U | 330 | UR | 330 | UR | 330 | U | 330 | U |
| Benzo(b)fluoranthene | | 340 | U | 340 | U | 330 | U | 340 | U | 39 | | 78 | | 330 | UR | 330 | UR | 330 | U | 330 | U |
| Benzo(k)fluoranthene | | 340 | U | 340 | U | 330 | U | 340 | U | 40 | | 76 | | 330 | UR | 330 | UR | 330 | U | 330 | U |
| Benzo(a)pyrene | | 340 | U | 340 | U | 330 | U | 340 | U | 36 | | 67 | | 330 | UR | 330 | UR | 330 | U | 330 | U |
| Indeno(1,2,3-cd)pyrene | | 340 | U | 340 | U | 330 | U | 340 | U | 27 | | 47 | | 330 | UR | 330 | UR | 330 | U | 330 | U |
| Dibenz(a,h)anthracene | | 340 | U | 340 | U | 330 | U | 340 | U | 340 | U | 25 | | 330 | UR | 330 | UR | 330 | U | 330 | U |
| Benzo(g,h,i)perylene | | 340 | U | 340 | U | 330 | U | 340 | U | 33 | | 65 | | 330 | UR | 330 | UR | 330 | U | 330 | 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

000015

SEMIVOLATILE PAH ANALYSIS, SOIL MATRIX, (UG/KG)



Project: WASHINGTON CLOSURE HANFORD
Laboratory: LLI SDG: K0445

| Sample Number | | J12N88 | | J12N89 | | J12N90 | | J12N91 | | J12N92 | | J12N93 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Remarks | | | | | | | | | | | | | | | | | | | | | |
| Sample Date | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/19/06 | | | | | | | | | |
| Extraction Date | | 6/3/06 | | 6/3/06 | | 6/3/06 | | 6/3/06 | | 6/3/06 | | 6/3/06 | | | | | | | | | |
| Analysis Date | | 7/28/06 | | 7/28/06 | | 7/30/06 | | 7/28/06 | | 7/30/06 | | 7/30/06 | | | | | | | | | |
| Semivolatile (8270C) | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| Phenol | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| bis(2-Chloroethyl)ether | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| 2-Chlorophenol | | 330 | UR | 330 | U | 330 | UJ | 330 | U | 330 | UJ | 330 | U | | | | | | | | |
| 1,3-Dichlorobenzene | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| 1,4-Dichlorobenzene | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| 1,2-Dichlorobenzene | 330 | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| 2-Methylphenol | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| 2,2'-oxybis(1-chloropropane) | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| 3 and/or 4-Methylphenol | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| N-Nitroso-di-n-propylamine | | 330 | UJ | 330 | U | 330 | UJ | 330 | U | 330 | U | 330 | U | | | | | | | | |
| Hexachloroethane | | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | | | | | | | | |
| Nitrobenzene | | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | | | | | | | | |
| Isophorone | | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | | | | | | | | |
| 2-Nitrophenol | | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | | | | | | | | |
| 2,4-Dimethylphenol | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| bis(2-Chloroethoxy)methane | | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | | | | | | | | |
| 2,4-Dichlorophenol | | 330 | UR | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | | | | | | | | |
| 1,2,4-Trichlorobenzene | 330 | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | | | | | | | | |
| Naphthalene | | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | | | | | | | | |
| 4-Chloroaniline | | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | | | | | | | | |
| Hexachlorobutadiene | | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | | | | | | | | |
| 4-Chloro-3-methylphenol | | 330 | UR | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | | | | | | | | |
| 2-Methylnaphthalene | | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | 330 | UJ | | | | | | | | |
| Hexachlorocyclopentadiene | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| 2,4,6-Trichlorophenol | 330 | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| 2,4,5-Trichlorophenol | 330 | 840 | U | 840 | U | 830 | U | 840 | U | 840 | U | 830 | U | | | | | | | | |
| 2-Chloronaphthalene | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| 2-Nitroaniline | | 840 | UJ | 840 | U | 830 | UJ | 840 | U | 840 | U | 830 | U | | | | | | | | |
| Dimethylphthalate | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| Acenaphthylene | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| 2,6-Dinitrotoluene | | 330 | UJ | 330 | U | 330 | UJ | 330 | U | 330 | U | 330 | 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 PAH ANALYSIS, SOIL MATRIX, (UG/KG)



Project: WASHINGTON CLOSURE HANFORD
Laboratory: LLI SDG: K0445

| Sample Number | | J12N88 | | J12N89 | | J12N90 | | J12N91 | | J12N92 | | J12N93 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Remarks | | | | | | | | | | | | | | | | | | | | | |
| Sample Date | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/19/06 | | | | | | | | | |
| Extraction Date | | 6/3/06 | | 6/3/06 | | 6/3/06 | | 6/3/06 | | 6/3/06 | | 6/3/06 | | | | | | | | | |
| Analysis Date | | 7/28/06 | | 7/28/06 | | 7/30/06 | | 7/28/06 | | 7/30/06 | | 7/30/06 | | | | | | | | | |
| Semivolatile (8270C) | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| 3-Nitroaniline | | 840 | UJ | 840 | U | 830 | UJ | 840 | U | 840 | U | 830 | U | | | | | | | | |
| Acenaphthene | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| 2,4-Dinitrophenol | | 840 | UJ | 840 | U | 830 | UJ | 840 | U | 840 | U | 830 | U | | | | | | | | |
| 4-Nitrophenol | | 840 | U | 840 | U | 830 | U | 840 | U | 840 | U | 830 | U | | | | | | | | |
| Dibenzofuran | 330 | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| 2,4-Dinitrotoluene | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| Diethylphthalate | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| 4-Chlorophenyl-phenyl ether | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| Fluorene | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| 4-Nitroaniline | | 840 | UJ | 840 | U | 830 | UJ | 840 | U | 840 | U | 830 | U | | | | | | | | |
| 4,6-Dinitro-2-methylphenol | | 840 | U | 840 | U | 830 | U | 840 | U | 840 | U | 830 | U | | | | | | | | |
| N-Nitrosodiphenylamine | | 330 | UJ | 330 | U | 330 | UJ | 330 | U | 330 | U | 330 | U | | | | | | | | |
| 4-Bromophenyl-phenyl ether | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| Hexachlorobenzene | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| Pentachlorophenol | 330 | 840 | U | 840 | U | 830 | U | 840 | U | 840 | U | 830 | U | | | | | | | | |
| Phenanthrene | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| Anthracene | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| Carbazole | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| Di-n-butylphthalate | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| Fluoranthene | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| Pyrene | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| Butylbenzylphthalate | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| 3,3'-Dichlorobenzidine | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| Benzo(a)anthracene | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| Chrysene | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| bis(2-Ethylhexyl)phthalate | | 66 | | 34 | | 68 | | 41 | | 71 | | 23 | | | | | | | | | |
| Di-n-octylphthalate | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| Benzo(b)fluoranthene | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| Benzo(k)fluoranthene | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| Benzo(a)pyrene | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| Indeno(1,2,3-cd)pyrene | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| Dibenz(a,h)anthracene | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | | | | | | | | |
| Benzo(g,h,i)perylene | | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | 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 PAH ANALYSIS, SOIL MATRIX, (UG/KG)



Project: WASHINGTON CLOSURE HANFORD
Laboratory: LLI SDG: K0445

| Sample Number | | J12N79 | | J12N80 | | J12N81 | | J12N82 | | J12N83 | | J12N84 | | J12N85 | | J12N86 | | J12N87 | | J12N88 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Remarks | | | | | | | | | | | | | | | | | | | | | |
| Sample Date | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | |
| Extraction Date | | 6/27/06 | | 6/27/06 | | 6/27/06 | | 6/27/06 | | 6/27/06 | | 6/27/06 | | 6/27/06 | | 6/27/06 | | 6/27/06 | | 6/27/06 | |
| Analysis Date | | 7/13/06 | | 7/13/06 | | 7/13/06 | | 7/13/06 | | 7/13/06 | | 7/13/06 | | 7/13/06 | | 7/13/06 | | 7/13/06 | | 7/13/06 | |
| PAH by 8310 | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| Naphthalene | 100 | 34.0 | U | 33.8 | U | 33.4 | U | 33.6 | U | 46 | | 99 | | 33.4 | U | 33.4 | U | 33.4 | U | 33.4 | U |
| Acenaphthylene | 100 | 34.0 | U | 33.8 | U | 33.4 | U | 33.6 | U | 33.6 | U | 33.5 | U | 33.4 | U | 33.4 | U | 33.4 | U | 33.4 | U |
| Acenaphthene | 100 | 34.0 | U | 33.8 | U | 33.4 | U | 33.6 | U | 37 | | 100 | | 33.4 | U | 33.4 | U | 33.4 | U | 33.4 | U |
| Fluorene | 30 | 3.40 | U | 3.38 | U | 3.34 | U | 3.36 | U | 4.6 | | 3.35 | U | 3.34 | U | 3.34 | U | 3.34 | U | 3.34 | U |
| Phenanthrene | 50 | 3.40 | U | 0.90 | | 2.0 | | 1.0 | | 3.36 | U | 93 | | 2.4 | | 3.34 | U | 3.34 | U | 1.3 | |
| Anthracene | 50 | 3.40 | U | 3.38 | U | 3.34 | U | 3.36 | U | 3.2 | | 1.3 | | 3.34 | U | 3.34 | U | 0.89 | | 3.34 | U |
| Fluoranthene | 50 | 3.40 | U | 3.38 | U | 8.7 | | 3.36 | U | 11 | | 340 | | 2.6 | | 3.34 | U | 3.34 | U | 3.34 | U |
| Indeno(1,2,3-cd)pyrene | 30 | 3.40 | U | 3.38 | U | 3.34 | U | 3.36 | U | 3.36 | U | 160 | | 3.34 | U | 3.34 | U | 3.34 | U | 3.34 | U |
| Pyrene | 50 | 3.40 | U | 3.38 | U | 4.3 | | 3.36 | U | 42 | | 100 | | 3.34 | U | 1.4 | | 3.34 | U | 1.1 | |
| Benzo(a)anthracene | | 1.7 | | 3.38 | U | 2.3 | | 3.36 | U | 18 | | 31 | | 3.34 | U | 3.34 | U | 3.34 | U | 3.34 | U |
| Chrysene | 100 | 3.40 | U | 3.38 | U | 3.34 | U | 3.36 | U | 28 | | 48 | | 3.34 | U | 3.34 | U | 3.34 | U | 3.34 | U |
| Benzo(b)fluoranthene | | 1.2 | | 3.38 | U | 2.7 | | 3.36 | U | 31 | | 110 | | 3.34 | U | 3.34 | U | 3.34 | U | 3.34 | U |
| Benzo(k)fluoranthene | 15 | 3.40 | U | 3.38 | U | 1.2 | | 3.36 | U | 11 | | 25 | | 3.34 | U | 3.34 | U | 3.34 | U | 3.34 | U |
| Benzo(a)pyrene | 15 | 1.0 | | 3.38 | U | 1.8 | | 3.36 | U | 26 | | 49 | | 3.34 | U | 3.34 | U | 3.34 | U | 3.34 | U |
| Dibenzo(a,h)anthracene | 30 | 3.40 | U | 3.38 | U | 3.34 | U | 3.36 | U | 5.7 | | 8.1 | | 3.34 | U | 3.34 | U | 3.34 | U | 3.34 | U |
| Benzo(ghi)perylene | 30 | 3.40 | U | 3.38 | U | 3.34 | U | 3.36 | U | 28 | | 72 | | 3.34 | U | 3.34 | U | 3.34 | U | 3.34 | U |

000018

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 PAH ANALYSIS, SOIL MATRIX, (UG/KG)



Project: WASHINGTON CLOSURE HANFORD
Laboratory: LLI SDG: K0445

| Sample Number | | J12N89 | | J12N90 | | J12N91 | | J12N92 | | J12N93 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Remarks | | | | | | | | | | | |
| Sample Date | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/20/06 | |
| Extraction Date | | 6/27/06 | | 6/27/06 | | 6/27/06 | | 6/27/06 | | 6/27/06 | |
| Analysis Date | | 7/13/06 | | 7/13/06 | | 7/13/06 | | 7/13/06 | | 7/13/06 | |
| PAH by 8310 | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| Naphthalene | 100 | 33.4 | U | 33.3 | U | 33.4 | U | 33.4 | U | 33.3 | U |
| Acenaphthylene | 100 | 33.4 | U | 33.3 | U | 33.4 | U | 33.4 | U | 33.3 | U |
| Acenaphthene | 100 | 33.4 | U | 33.3 | U | 33.4 | U | 33.4 | U | 33.3 | U |
| Fluorene | 30 | 3.34 | U | 3.33 | U | 3.34 | U | 3.34 | U | 3.33 | U |
| Phenanthrene | 50 | 3.34 | U | 3.33 | U | 3.34 | U | 3.34 | U | 3.33 | U |
| Anthracene | 50 | 3.34 | U | 3.33 | U | 3.34 | U | 3.34 | U | 3.33 | U |
| Fluoranthene | 50 | 3.34 | U | 3.33 | U | 3.34 | U | 3.34 | U | 3.33 | U |
| Indeno(1,2,3-cd)pyrene | 30 | 3.34 | U | 3.33 | U | 3.34 | U | 3.34 | U | 3.33 | U |
| Pyrene | 50 | 3.34 | U | 3.33 | U | 0.90 | | 3.34 | U | 3.33 | U |
| Benzo(a)anthracene | | 3.34 | U | 3.33 | U | 3.34 | U | 3.34 | U | 3.33 | U |
| Chrysene | 100 | 3.34 | U | 3.33 | U | 3.34 | U | 3.34 | U | 3.33 | U |
| Benzo(b)fluoranthene | | 3.34 | U | 3.33 | U | 3.34 | U | 3.34 | U | 3.33 | U |
| Benzo(k)fluoranthene | 15 | 3.34 | U | 3.33 | U | 3.34 | U | 3.34 | U | 3.33 | U |
| Benzo(a)pyrene | 15 | 3.34 | U | 3.33 | U | 3.34 | U | 3.34 | U | 3.33 | U |
| Dibenzo(a,h)anthracene | 30 | 3.34 | U | 3.33 | U | 3.34 | U | 3.34 | U | 3.33 | U |
| Benzo(ghi)perylene | 30 | 3.34 | U | 3.33 | U | 3.34 | U | 3.34 | U | 3.33 | U |

000019

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

Semivolatiles by GC/MS, HSL List

RFW Batch Number: 0606L337 Client: TNUHANFORD RC-072 K0445 Work Order: 11343606001 Report Date: 08/10/06 09:58 Page: 1a

| | Cust ID: | J12N79 | | J12N79 | | J12N79 | | J12N80 | | J12N81 | | J12N82 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | 66 | % | 46 | % | 68 | % | 97 | % | 68 | % | 58 | % |
| | 2-Fluorobiphenyl | 61 | % | 70 | % | 84 | % | 90 | % | 61 | % | 59 | % |
| | Terphenyl-d14 | 89 | % | 86 | % | 90 | % | 124 | % | 83 | % | 75 | % |
| | Phenol-d5 | 69 | % | 70 | % | 86 | % | 100 | % | 70 | % | 62 | % |
| | 2-Fluorophenol | 72 | % | 63 | % | 68 | % | 95 | % | 64 | % | 60 | % |
| | 2,4,6-Tribromophenol | 75 | % | 94 | % | 104 | % | 88 | % | 44 | % | 53 | % |
| | | | fl | | fl | | fl | | fl | | fl | | fl |
| Phenol | | 340 | U | 69 | % | 74 | % | 340 | U | 330 | U | 340 | U |
| bis(2-Chloroethyl)ether | | 340 | U | 70 | % | 91 | % | 340 | U | 330 | U | 340 | U |
| 2-Chlorophenol | | 340 | U | 68 | % | 87 | % | 340 | U | 330 | U | 340 | U |
| 1,3-Dichlorobenzene | | 340 | U | 66 | % | 86 | % | 340 | U | 330 | U | 340 | U |
| 1,4-Dichlorobenzene | | 340 | U | 64 | % | 84 | % | 340 | U | 330 | U | 340 | U |
| 1,2-Dichlorobenzene | | 340 | U | 68 | % | 90 | % | 340 | U | 330 | U | 340 | U |
| 2-Methylphenol | | 340 | U | 67 | % | 86 | % | 340 | U | 330 | U | 340 | U |
| 2,2'-oxybis(1-Chloropropane) | | 340 | U | 68 | % | 90 | % | 340 | U | 330 | U | 340 | U |
| 4-Methylphenol | | 340 | U | 74 | % | 90 | % | 340 | U | 330 | U | 340 | U |
| N-Nitroso-di-n-propylamine | | 340 | U | 87 | % | 100 | % | 340 | U | 330 | U | 340 | U |
| Hexachloroethane | | 340 | U J | 65 | % | 93 | % | 340 | U J | 330 | U J | 340 | U J |
| Nitrobenzene | | 340 | U J | 47 * | % | 76 | % | 340 | U J | 330 | U J | 340 | U J |
| Isophorone | | 340 | U J | 58 * | % | 85 | % | 340 | U J | 330 | U J | 340 | U J |
| 2-Nitrophenol | | 340 | U J | 52 | % | 74 | % | 340 | U J | 330 | U J | 340 | U J |
| 2,4-Dimethylphenol | | 340 | U | 52 | % | 68 | % | 340 | U | 330 | U | 340 | U |
| bis(2-Chloroethoxy)methane | | 340 | U J | 54 | % | 80 | % | 340 | U J | 330 | U J | 340 | U J |
| 2,4-Dichlorophenol | | 340 | U J | 53 | % | 75 | % | 340 | U | 330 | U | 340 | U |
| 1,2,4-Trichlorobenzene | | 340 | U J | 49 * | % | 81 | % | 340 | U | 330 | U | 340 | U |
| Naphthalene | | 340 | U J | 52 | % | 78 | % | 340 | U | 330 | U | 340 | U |
| 4-Chloroaniline | | 340 | U J | 54 | % | 76 | % | 340 | U | 330 | U | 340 | U |
| Hexachlorobutadiene | | 340 | U J | 55 | % | 99 | % | 340 | U | 330 | U | 340 | U |
| 4-Chloro-3-methylphenol | | 340 | U J | 58 * | % | 81 | % | 340 | U | 330 | U | 340 | U |
| 2-Methylnaphthalene | | 340 | U J | 56 * | % | 85 | % | 340 | U | 330 | U | 340 | U |
| Hexachlorocyclopentadiene | | 340 | U | 66 | % | 82 | % | 340 | U | 330 | U | 340 | U |
| 2,4,6-Trichlorophenol | | 340 | U | 92 | % | 111 | % | 340 | U | 330 | U | 340 | U |
| 2,4,5-Trichlorophenol | | 850 | U | 88 | % | 104 | % | 850 | U | 830 | U | 840 | U |

*= Outside of EPA CLP QC limits.

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| Cust ID: | J12N79 | | J12N79 | | J12N79 | | J12N80 | | J12N81 | | J12N82 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RFW#: | 001 | | 001 MS | | 001 MSD | | 002 | | 003 | | 004 | |
| 2-Chloronaphthalene | 340 | U | 81 | % | 98 | % | 340 | U | 330 | U | 340 | U |
| 2-Nitroaniline | 850 | U | 93 | % | 109 | % | 850 | U | 830 | U | 840 | U |
| Dimethylphthalate | 340 | U | 86 | % | 102 | % | 340 | U | 330 | U | 340 | U |
| Acenaphthylene | 340 | U | 86 | % | 99 | % | 340 | U | 330 | U | 340 | U |
| 2,6-Dinitrotoluene | 340 | U | 83 | % | 99 | % | 340 | U | 330 | U | 340 | U |
| 3-Nitroaniline | 850 | U | 89 | % | 99 | % | 850 | U | 830 | U | 840 | U |
| Acenaphthene | 340 | U | 84 | % | 101 | % | 340 | U | 330 | U | 340 | U |
| 2,4-Dinitrophenol | 850 | U | 71 | % | 78 | % | 850 | U | 830 | U | 840 | U |
| 4-Nitrophenol | 850 | U | 92 | % | 102 | % | 850 | U | 830 | U | 840 | U |
| Dibenzofuran | 340 | U | 86 | % | 104 | % | 340 | U | 330 | U | 340 | U |
| 2,4-Dinitrotoluene | 340 | U | 92 | % | 107 | % | 340 | U | 330 | U | 340 | U |
| Diethylphthalate | 340 | U | 89 | % | 106 | % | 340 | U | 330 | U | 340 | U |
| 4-Chlorophenyl-phenylether | 340 | U | 88 | % | 108 | % | 340 | U | 330 | U | 340 | U |
| Fluorene | 340 | U | 87 | % | 105 | % | 340 | U | 330 | U | 340 | U |
| 4-Nitroaniline | 850 | U | 65 | % | 79 | % | 850 | U | 830 | U | 840 | U |
| 4,6-Dinitro-2-methylphenol | 850 | U | 98 | % | 103 | % | 850 | U | 830 | U | 840 | U |
| N-Nitrosodiphenylamine (1) | 340 | U | 70 | % | 77 | % | 340 | U | 330 | U | 340 | U |
| 4-Bromophenyl-phenylether | 340 | U | 77 | % | 88 | % | 340 | U | 330 | U | 340 | U |
| Hexachlorobenzene | 340 | U | 91 | % | 106 | % | 340 | U | 330 | U | 340 | U |
| Pentachlorophenol | 850 | U | 121 | % | 144 * | % | 850 | U | 830 | U | 840 | U |
| Phenanthrene | 340 | U | 94 | % | 105 | % | 340 | U | 330 | U | 340 | U |
| Anthracene | 340 | U | 94 | % | 109 | % | 340 | U | 330 | U | 340 | U |
| Carbazole | 340 | U | 65 | % | 86 | % | 340 | U | 330 | U | 340 | U |
| Di-n-butylphthalate | 340 | U | 92 | % | 108 | % | 340 | U | ~~275~~ 330 B | U | 340 | U |
| Fluoranthene | 340 | U | 97 | % | 118 | % | 340 | U | 330 | U | 340 | U |
| Pyrene | 340 | U | 99 | % | 107 | % | 340 | U | 330 | U | 340 | U |
| Butylbenzylphthalate | 340 | U | 99 | % | 103 | % | 340 | U | 330 | U | 340 | U |
| 3,3'-Dichlorobenzidine | 340 | U | 83 | % | 88 | % | 340 | U | 330 | U | 340 | U |
| Benzo(a)anthracene | 340 | U | 88 | % | 102 | % | 340 | U | 330 | U | 340 | U |
| Chrysene | 340 | U | 89 | % | 104 | % | 340 | U | 330 | U | 340 | U |
| bis(2-Ethylhexyl)phthalate | 23 | J | 93 | % | 97 | % | 340 | U | 330 | U | 340 | U |
| Di-n-octyl phthalate | 340 | U | 95 | % | 95 | % | 340 | U | 330 | U | 340 | U |
| Benzo(b)fluoranthene | 340 | U | 89 | % | 99 | % | 340 | U | 330 | U | 340 | U |
| Benzo(k)fluoranthene | 340 | U | 92 | % | 100 | % | 340 | U | 330 | U | 340 | U |
| Benzo(a)pyrene | 340 | U | 89 | % | 98 | % | 340 | U | 330 | U | 340 | U |
| Indeno(1,2,3-cd)pyrene | 340 | U | 83 | % | 94 | % | 340 | U | 330 | U | 340 | U |
| Dibenz(a,h)anthracene | 340 | U | 85 | % | 95 | % | 340 | U | 330 | U | 340 | U |
| Benzo(g,h,i)perylene | 340 | U | 82 | % | 92 | % | 340 | U | 330 | U | 340 | U |

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

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Semivolatiles by GC/MS, HSL List

RFW Batch Number: 0606L337 Client: TNUHANFORD RC-072 K0445 Work Order: 11343606001 Report Date: 08/10/06 09:58 Page: 2a

| | Cust ID: | J12N83 | J12N84 | J12N85 | J12N85 | J12N86 | J12N87 |
|---|---|---|---|---|---|---|---|
| Sample Information | RFW#: | 005 | 006 | 007 | 007 | 008 | 009 |
| | 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 REPREP | ug/Kg | ug/Kg |
| Surrogate Recovery | Nitrobenzene-d5 | 75 % | 100 % | 0 * % | 61 % | 62 % | 72 % |
| | 2-Fluorobiphenyl | 82 % | 90 % | 0 * % | 65 % | 63 % | 69 % |
| | Terphenyl-d14 | 91 % | 118 % | 0 * % | 84 % | 72 % | 93 % |
| | Phenol-d5 | 75 % | 103 % | 0 * % | 71 % | 64 % | 79 % |
| | 2-Fluorophenol | 74 % | 99 % | 0 * % | 67 % | 66 % | 75 % |
| | 2,4,6-Tribromophenol | 83 % | 89 % | 0 * % | 85 % | 57 % | 63 % |
| | | fl | fl | fl | fl | fl | fl |
| Phenol | | 340 U | 330 U | 330 U R | 330 U R | 330 U | 330 U |
| bis(2-Chloroethyl)ether | | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2-Chlorophenol | | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 1,3-Dichlorobenzene | | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 1,4-Dichlorobenzene | | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 1,2-Dichlorobenzene | | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2-Methylphenol | | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2,2'-oxybis(1-Chloropropane) | | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 4-Methylphenol | | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| N-Nitroso-di-n-propylamine | | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Hexachloroethane | | 340 U J | 330 U J | 330 U | 330 U | 330 U J | 330 U J |
| Nitrobenzene | | 340 U J | 330 U J | 330 U | 330 U | 330 U J | 330 U J |
| Isophorone | | 340 U J | 330 U J | 330 U | 330 U | 330 U J | 330 U J |
| 2-Nitrophenol | | 340 U J | 330 U J | 330 U | 330 U | 330 U J | 330 U J |
| 2,4-Dimethylphenol | | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| bis(2-Chloroethoxy)methane | | 340 U J | 330 U J | 330 U | 330 U | 330 U J | 330 U J |
| 2,4-Dichlorophenol | | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 1,2,4-Trichlorobenzene | | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Naphthalene | | 23 J | 92 J | 330 U | 330 U | 330 U | 330 U |
| 4-Chloroaniline | | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Hexachlorobutadiene | | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 4-Chloro-3-methylphenol | | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2-Methylnaphthalene | | 340 U J | 44 | 330 U | 330 U | 330 U | 330 U |
| Hexachlorocyclopentadiene | | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2,4,6-Trichlorophenol | | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2,4,5-Trichlorophenol | | 840 U | 840 U | 840 U | 840 U | 840 U | 840 U |

*= Outside of EPA CLP QC limits.

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| Cust ID: | J12N83 | J12N84 | J12N85 | J12N85 | J12N86 | J12N87 |
|---|---|---|---|---|---|---|
| RFW#: | 005 | 006 | 007 | 007 REPREP | 008 | 009 |
| 2-Chloronaphthalene | 340 U | 330 U | 330 U R | 330 U R | 330 U | 330 U |
| 2-Nitroaniline | 840 U | 840 U | 840 U | 840 U | 840 U | 840 U |
| Dimethylphthalate | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Acenaphthylene | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2,6-Dinitrotoluene | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 3-Nitroaniline | 840 U | 840 U | 840 U | 840 U | 840 U | 840 U |
| Acenaphthene | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2,4-Dinitrophenol | 840 U | 840 U | 840 U | 840 U | 840 U | 840 U |
| 4-Nitrophenol | 840 U | 840 U | 840 U | 840 U | 840 U | 840 U |
| Dibenzofuran | 340 U | 18 J | 330 U | 330 U | 330 U | 330 U |
| 2,4-Dinitrotoluene | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Diethylphthalate | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 4-Chlorophenyl-phenylether | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Fluorene | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 4-Nitroaniline | 840 U | 840 U | 840 U | 840 U | 840 U | 840 U |
| 4,6-Dinitro-2-methylphenol | 840 U | 840 U | 840 U | 840 U | 840 U | 840 U |
| N-Nitrosodiphenylamine (1) | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 4-Bromophenyl-phenylether | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Hexachlorobenzene | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Pentachlorophenol | 840 U | 840 U | 840 U | 840 U | 840 U | 840 U |
| Phenanthrene | 51 ~~J~~ J | 92 ~~J~~ J | 330 U | 330 U | 330 U | 330 U |
| Anthracene | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Carbazole | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Di-n-butylphthalate | 340 U | 330 ~~660~~ ~~20~~ JB U | 330 U | 330 ~~660~~ ~~24~~ JB U | 330 ~~660~~ ~~36~~ JB U | 330 U |
| Fluoranthene | 60 ~~J~~ J | 120 ~~J~~ J | 330 U | 330 U | 330 U | 330 U |
| Pyrene | 62 J | 150 J | 330 U | 330 U | 330 U | 330 U |
| Butylbenzylphthalate | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 3,3'-Dichlorobenzidine | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Benzo(a)anthracene | 33 J | 60 J | 330 U | 330 U | 330 U | 330 U |
| Chrysene | 50 J | 99 J | 330 U | 330 U | 330 U | 330 U |
| bis(2-Ethylhexyl)phthalate | 30 J | 45 J | 24 J | 330 ~~660~~ ~~220~~ JB U | 39 J | 25 J |
| Di-n-octyl phthalate | 340 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| Benzo(b)fluoranthene | 39 J | 78 J | 330 U | 330 U | 330 U | 330 U |
| Benzo(k)fluoranthene | 40 J | 76 J | 330 U | 330 U | 330 U | 330 U |
| Benzo(a)pyrene | 36 J | 67 J | 330 U | 330 U | 330 U | 330 U |
| Indeno(1,2,3-cd)pyrene | 27 J | 47 J | 330 U | 330 U | 330 U | 330 U |
| Dibenz(a,h)anthracene | 340 U | 25 J | 330 U | 330 U | 330 U | 330 U |
| Benzo(g,h,i)perylene | 33 J | 65 J | 330 U | 330 U | 330 U | 330 U |

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

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Semivolatiles by GC/MS, HSL List

RFW Batch Number: 0606L337 Client: TNUHANFORD RC-072 K0445 Work Order: 11343606001 Report Date: 08/10/06 09:58 Page: 3a

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| | Cust ID: | J12N88 | J12N89 | J12N90 | J12N91 | J12N92 | J12N93 |
|---|---|---|---|---|---|---|---|
| Sample Information | RFW#: | 010 | 011 | 012 | 013 | 014 | 015 |
| | 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 | 11 * % | 63 % | 14 * % | 55 % | 52 % | 78 % |
| | 2-Fluorobiphenyl | 56 % | 66 % | 65 % | 59 % | 73 % | 79 % |
| | Terphenyl-d14 | 91 % | 96 % | 88 % | 99 % | 95 % | 86 % |
| | Phenol-d5 | 49 % | 76 % | 57 % | 65 % | 60 % | 76 % |
| | 2-Fluorophenol | 4 * % | 36 % | 13 * % | 26 % | 21 * % | 81 % |
| | 2,4,6-Tribromophenol | 64 % | 63 % | 73 % | 56 % | 65 % | 70 % |
| | | fl | fl | fl | fl | fl | fl |
| Phenol | | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| bis(2-Chloroethyl)ether | | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2-Chlorophenol | | 330 UR | 330 U | 330 UJ | 330 U | 330 UJ | 330 U |
| 1,3-Dichlorobenzene | | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 1,4-Dichlorobenzene | | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 1,2-Dichlorobenzene | | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2-Methylphenol | | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2,2'-oxybis(1-Chloropropane) | | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 4-Methylphenol | | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| N-Nitroso-di-n-propylamine | | 330 UJ | 330 U | 330 UJ | 330 U | 330 U | 330 U |
| Hexachloroethane | | 330 UJ | 330 UJ | 330 UJ | 330 UJ | 330 UJ | 330 UJ |
| Nitrobenzene | | 330 UJ | 330 UJ | 330 UJ | 330 UJ | 330 UJ | 330 UJ |
| Isophorone | | 330 UJ | 330 UJ | 330 UJ | 330 UJ | 330 UJ | 330 UJ |
| 2-Nitrophenol | | 330 UJ | 330 UJ | 330 UJ | 330 UJ | 330 UJ | 330 UJ |
| 2,4-Dimethylphenol | | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| bis(2-Chloroethoxy)methane | | 330 UJ | 330 UJ | 330 UJ | 330 UJ | 330 UJ | 330 UJ |
| 2,4-Dichlorophenol | | 330 UR | 330 U | 330 U | 330 U | 330 U | 330 U |
| 1,2,4-Trichlorobenzene | | 330 UJ | 330 U | 330 U | 330 U | 330 U | 330 U |
| Naphthalene | | 330 UJ | 330 U | 330 U | 330 U | 330 U | 330 U |
| 4-Chloroaniline | | 330 UJ | 330 U | 330 U | 330 U | 330 U | 330 U |
| Hexachlorobutadiene | | 330 UJ | 330 U | 330 U | 330 U | 330 U | 330 U |
| 4-Chloro-3-methylphenol | | 330 UR | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2-Methylnaphthalene | | 330 UJ | 330 UJ | 330 UJ | 330 UJ | 330 UJ | 330 UJ |
| Hexachlorocyclopentadiene | | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2,4,6-Trichlorophenol | | 330 U | 330 U | 330 U | 330 U | 330 U | 330 U |
| 2,4,5-Trichlorophenol | | 840 U | 840 U | 830 U | 840 U | 840 U | 830 U |

*= Outside of EPA CLP QC limits.

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| Cust ID: | J12N88 | | J12N89 | | J12N90 | | J12N91 | | J12N92 | | J12N93 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RFW#: | 010 | | 011 | | 012 | | 013 | | 014 | | 015 | |
| 2-Chloronaphthalene | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U |
| 2-Nitroaniline | 840 | U J | 840 | U | 830 | U J | 840 | U | 840 | U | 830 | U |
| Dimethylphthalate | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U |
| Acenaphthylene | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U |
| 2,6-Dinitrotoluene | 330 | U J | 330 | U | 330 | U J | 330 | U | 330 | U | 330 | U |
| 3-Nitroaniline | 840 | U J | 840 | U | 830 | U | 840 | U | 840 | U | 830 | U |
| Acenaphthene | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U |
| 2,4-Dinitrophenol | 840 | U J | 840 | U | 830 | U | 840 | U | 840 | U | 830 | U |
| 4-Nitrophenol | 840 | U | 840 | U | 830 | U | 840 | U | 840 | U | 830 | U |
| Dibenzofuran | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U |
| 2,4-Dinitrotoluene | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U |
| Diethylphthalate | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U |
| 4-Chlorophenyl-phenylether | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U |
| Fluorene | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U |
| 4-Nitroaniline | 840 | U J | 840 | U | 830 | U J | 840 | U | 840 | U | 830 | U |
| 4,6-Dinitro-2-methylphenol | 840 | U | 840 | U | 830 | U | 840 | U | 840 | U | 830 | U |
| N-Nitrosodiphenylamine (1) | 330 | U J | 330 | U | 330 | U J | 330 | U | 330 | U | 330 | U |
| 4-Bromophenyl-phenylether | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U |
| Hexachlorobenzene | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U |
| Pentachlorophenol | 840 | U | 840 | U | 830 | U | 840 | U | 840 | U | 830 | U |
| Phenanthrene | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U |
| Anthracene | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U |
| Carbazole | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U |
| Di-n-butylphthalate | 330 | U | 330 | U | ~~312~~ 330 JB | U | 330 | U | 330 | U | ~~354~~ 330 JB | U |
| Fluoranthene | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U |
| Pyrene | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U |
| Butylbenzylphthalate | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U |
| 3,3'-Dichlorobenzidine | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U |
| Benzo(a)anthracene | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U |
| Chrysene | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U |
| bis(2-Ethylhexyl)phthalate | 66 | J | 34 | J | 68 | J | 41 | J | 71 | J | 23 | J |
| Di-n-octyl phthalate | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U |
| Benzo(b)fluoranthene | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U |
| Benzo(k)fluoranthene | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U |
| Benzo(a)pyrene | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U |
| Indeno(1,2,3-cd)pyrene | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U |
| Dibenz(a,h)anthracene | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U |
| Benzo(g,h,i)perylene | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U | 330 | U |

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

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| | Cust ID: | SBLKZS | | SBLKZS BS | | SBLKBA | | SBLKBA BS | |
|---|---|---|---|---|---|---|---|---|---|
| Sample Information | RFW#: | 06LE0520-MB1 | | 06LE0520-MB1 | | 06LE0619-MB1 | | 06LE0619-MB1 | |
| | Matrix: | SOIL | | SOIL | | SOIL | | SOIL | |
| | D.F.: | 1.00 | | 1.00 | | 1.00 | | 1.00 | |
| | Units: | ug/Kg | | ug/Kg | | ug/Kg | | ug/Kg | |
| Surrogate Recovery | Nitrobenzene-d5 | 71 | % | 83 | % | 69 | % | 56 | % |
| | 2-Fluorobiphenyl | 73 | % | 105 | % | 72 | % | 82 | % |
| | Terphenyl-d14 | 111 | % | 120 | % | 88 | % | 102 | % |
| | Phenol-d5 | 79 | % | 111 | % | 80 | % | 83 | % |
| | 2-Fluorophenol | 76 | % | 98 | % | 76 | % | 84 | % |
| | 2,4,6-Tribromophenol | 53 | % | 143 * | % | 90 | % | 113 | % |
| Phenol | | 330 | U | 103 | % | 34 | J | 90 | % |
| bis(2-Chloroethyl)ether | | 330 | U | 103 | % | 330 | U | 90 | % |
| 2-Chlorophenol | | 330 | U | 108 | % | 330 | U | 78 | % |
| 1,3-Dichlorobenzene | | 330 | U | 104 | % | 330 | U | 76 | % |
| 1,4-Dichlorobenzene | | 330 | U | 103 | % | 330 | U | 74 | % |
| 1,2-Dichlorobenzene | | 330 | U | 111 * | % | 330 | U | 81 | % |
| 2-Methylphenol | | 330 | U | 101 | % | 330 | U | 87 | % |
| 2,2'-oxybis(1-Chloropropane) | | 330 | U | 99 | % | 330 | U | 85 | % |
| 4-Methylphenol | | 330 | U | 108 | % | 330 | U | 90 | % |
| N-Nitroso-di-n-propylamine | | 330 | U | 102 | % | 330 | U | 96 | % |
| Hexachloroethane | | 330 | U | 103 | % | 330 | U | 78 | % |
| Nitrobenzene | | 330 | U | 87 | % | 330 | U | 62 | % |
| Isophorone | | 330 | U | 99 | % | 330 | U | 68 | % |
| 2-Nitrophenol | | 330 | U | 100 | % | 330 | U | 67 | % |
| 2,4-Dimethylphenol | | 330 | U | 72 | % | 330 | U | 65 | % |
| bis(2-Chloroethoxy)methane | | 330 | U | 98 | % | 330 | U | 68 | % |
| 2,4-Dichlorophenol | | 330 | U | 99 | % | 330 | U | 70 | % |
| 1,2,4-Trichlorobenzene | | 330 | U | 96 | % | 330 | U | 62 | % |
| Naphthalene | | 330 | U | 99 | % | 330 | U | 62 | % |
| 4-Chloroaniline | | 330 | U | 96 | % | 330 | U | 76 | % |
| Hexachlorobutadiene | | 330 | U | 114 | % | 330 | U | 67 | % |
| 4-Chloro-3-methylphenol | | 330 | U | 102 | % | 330 | U | 74 | % |
| 2-Methylnaphthalene | | 330 | U | 110 * | % | 330 | U | 71 | % |
| Hexachlorocyclopentadiene | | 330 | U | 118 * | % | 330 | U | 82 | % |
| 2,4,6-Trichlorophenol | | 330 | U | 139 | % | 330 | U | 102 | % |
| 2,4,5-Trichlorophenol | | 830 | U | 128 | % | 830 | U | 107 | % |

*= Outside of EPA CLP QC limits.

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| Cust ID: | SBLKZS | | SBLKZS BS | | SBLKBA | | SBLKBA BS | |
|---|---|---|---|---|---|---|---|---|
| RFW#: | 06LE0520-MB1 | | 06LE0520-MB1 | | 06LE0619-MB1 | | 06LE0619-MB1 | |
| 2-Chloronaphthalene | 330 | U | 121 | % | 330 | U | 95 | % |
| 2-Nitroaniline | 830 | U | 122 | % | 830 | U | 122 | % |
| Dimethylphthalate | 330 | U | 118 | % | 330 | U | 97 | % |
| Acenaphthylene | 330 | U | 124 | % | 330 | U | 103 | % |
| 2,6-Dinitrotoluene | 330 | U | 114 * | % | 330 | U | 100 | % |
| 3-Nitroaniline | 830 | U | 123 | % | 830 | U | 120 | % |
| Acenaphthene | 330 | U | 123 | % | 330 | U | 99 | % |
| 2,4-Dinitrophenol | 830 | U | 187 * | % | 830 | U | 22 | % |
| 4-Nitrophenol | 830 | U | 122 | % | 830 | U | 101 | % |
| Dibenzofuran | 330 | U | 126 | % | 330 | U | 99 | % |
| 2,4-Dinitrotoluene | 330 | U | 124 | % | 330 | U | 106 | % |
| Diethylphthalate | 330 | U | 124 | % | 330 | U | 98 | % |
| 4-Chlorophenyl-phenylether | 330 | U | 129 * | % | 330 | U | 97 | % |
| Fluorene | 330 | U | 127 | % | 330 | U | 101 | % |
| 4-Nitroaniline | 830 | U | 93 | % | 830 | U | 94 | % |
| 4,6-Dinitro-2-methylphenol | 830 | U | 160 * | % | 830 | U | 85 | % |
| N-Nitrosodiphenylamine (1) | 330 | U | 101 | % | 330 | U | 87 | % |
| 4-Bromophenyl-phenylether | 330 | U | 112 | % | 330 | U | 91 | % |
| Hexachlorobenzene | 330 | U | 132 * | % | 330 | U | 106 | % |
| Pentachlorophenol | 830 | U | 201 * | % | 830 | U | 85 | % |
| Phenanthrene | 330 | U | 136 * | % | 330 | U | 104 | % |
| Anthracene | 330 | U | 143 * | % | 330 | U | 105 | % |
| Carbazole | 330 | U | 100 | % | 330 | U | 95 | % |
| Di-n-butylphthalate | 19 | J | 137 | % | 51 | J | 105 | % |
| Fluoranthene | 330 | U | 143 * | % | 330 | U | 106 | % |
| Pyrene | 330 | U | 130 | % | 330 | U | 103 | % |
| Butylbenzylphthalate | 330 | U | 135 | % | 35 | J | 111 | % |
| 3,3'-Dichlorobenzidine | 330 | U | 115 | % | 330 | U | 140 | % |
| Benzo(a)anthracene | 330 | U | 120 | % | 330 | U | 103 | % |
| Chrysene | 330 | U | 123 | % | 330 | U | 102 | % |
| bis(2-Ethylhexyl)phthalate | 330 | U | 134 | % | 70 | J | 114 | % |
| Di-n-octyl phthalate | 330 | U | 128 | % | 330 | U | 112 | % |
| Benzo(b)fluoranthene | 330 | U | 118 | % | 330 | U | 100 | % |
| Benzo(k)fluoranthene | 330 | U | 120 | % | 330 | U | 101 | % |
| Benzo(a)pyrene | 330 | U | 119 | % | 330 | U | 104 | % |
| Indeno(1,2,3-cd)pyrene | 330 | U | 116 | % | 330 | U | 112 | % |
| Dibenz(a,h)anthracene | 330 | U | 120 | % | 330 | U | 107 | % |
| Benzo(g,h,i)perylene | 330 | U | 113 | % | 330 | U | 105 | % |

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

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Lionville Laboratory, Inc.
PAH'S by HPLC / Method 8310

Report Date: 07/24/06 17:36

RFW Batch Number: 0606L337 Client: TNUHANFORD RC-072 K0445 Work Order: 11343606001 Page: 1

| | Cust ID: | J12N79 | | J12N79 | | J12N79 | | J12N80 | | J12N81 | | J12N82 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | |
| Triphenylene | | 93 | % fl | 98 | % fl | 95 | % fl | 93 | % fl | 97 | % fl | 88 | % fl |
| Naphthalene | | 34.0 | U | 111 | % | 107 | % | 33.8 | U | 33.4 | U | 33.6 | U |
| Acenaphthylene | | 34.0 | U | 99 | % | 99 | % | 33.8 | U | 33.4 | U | 33.6 | U |
| Acenaphthene | | 34.0 | U | 100 | % | 98 | % | 33.8 | U | 33.4 | U | 33.6 | U |
| Fluorene | | 3.40 | U | 95 | % | 93 | % | 3.38 | U | 3.34 | U | 3.36 | U |
| Phenathrene | | 3.40 | U | 96 | % | 94 | % | 0.90 | J | 2.0 | J | 1.0 | J |
| Anthracene | | 3.40 | U | 91 | % | 89 | % | 3.38 | U | 3.34 | U | 3.36 | U |
| Fluoranthrene | | 3.40 | U | 104 | % | 99 | % | 3.38 | U | 8.7 | | 3.36 | U |
| Indeno (1,2,3-cd) pyrene | | 3.40 | U | 107 | % | 101 | % | 3.38 | U | 3.34 | U | 3.36 | U |
| Pyrene | | 3.40 | U | 100 | % | 95 | % | 3.38 | U | 4.3 | | 3.36 | U |
| Benzo (a) anthracene | | 1.7 | J | 80 | % | 78 | % | 3.38 | U | 2.3 | J | 3.36 | U |
| Chrysene | | 3.40 | U | 102 | % | 97 | % | 3.38 | U | 3.34 | U | 3.36 | U |
| Benzo (b) fluoranthrene | | 1.2 | J | 92 | % | 89 | % | 3.38 | U | 2.7 | J | 3.36 | U |
| Benzo (k) fluoranthrene | | 3.40 | U | 98 | % | 94 | % | 3.38 | U | 1.2 | J | 3.36 | U |
| Benzo (a) pyrene | | 1.0 | J | 96 | % | 93 | % | 3.38 | U | 1.8 | J | 3.36 | U |
| Dibenzo (a,h) anthracene | | 3.40 | U | 95 | % | 92 | % | 3.38 | U | 3.34 | U | 3.36 | U |
| Benzo (ghi) perylene | | 3.40 | U | 97 | % | 93 | % | 3.38 | U | 3.34 | U | 3.36 | 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

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9/9/06

PAH'S by HPLC / Method 8310

Report Date: 07/24/06 17:36

RFW Batch Number: 0606L337 Client: TNUHANFORD RC-072 K0445 Work Order: 11343606001 Page: 2

| | Cust ID: | J12N83 | | J12N84 | | J12N85 | | J12N86 | | J12N87 | | J12N88 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | |
| | Triphenylene | 110 | % | 121 | % | 96 | % | 95 | % | 101 | % | 76 | % |
| | | | fl | | fl | | fl | | fl | | fl | | fl |
| Naphthalene | | 46 | | 99 | | 33.4 | U | 33.4 | U | 33.4 | U | 33.4 | U |
| Acenaphthylene | | 33.6 | U | 33.5 | U | 33.4 | U | 33.4 | U | 33.4 | U | 33.4 | U |
| Acenaphthene | | 37 | | 100 | | 33.4 | U | 33.4 | U | 33.4 | U | 33.4 | U |
| Fluorene | | 4.6 | | 3.35 | U | 3.34 | U | 3.34 | U | 3.34 | U | 3.34 | U |
| Phenathrene | | 3.36 | U | 93 | | 2.4 | J | 3.34 | U | 3.34 | U | 1.3 | J |
| Anthracene | | 3.2 | J | 1.3 | J | 3.34 | U | 3.34 | U | 0.89 | J | 3.34 | U |
| Fluoranthrene | | 11 | | 340 | | 2.6 | J | 3.34 | U | 3.34 | U | 3.34 | U |
| Indeno (1,2,3-cd) pyrene | | 3.36 | U | 160 | | 3.34 | U | 3.34 | U | 3.34 | U | 3.34 | U |
| Pyrene | | 42 | | 100 | | 3.34 | U | 1.4 | J | 3.34 | U | 1.1 | J |
| Benzo (a) anthracene | | 18 | | 31 | | 3.34 | U | 3.34 | U | 3.34 | U | 3.34 | U |
| Chrysene | | 28 | | 48 | | 3.34 | U | 3.34 | U | 3.34 | U | 3.34 | U |
| Benzo (b) fluoranthrene | | 31 | | 110 | | 3.34 | U | 3.34 | U | 3.34 | U | 3.34 | U |
| Benzo (k) fluoranthrene | | 11 | | 25 | | 3.34 | U | 3.34 | U | 3.34 | U | 3.34 | U |
| Benzo (a) pyrene | | 26 | | 49 | | 3.34 | U | 3.34 | U | 3.34 | U | 3.34 | U |
| Dibenzo (a,h) anthracene | | 5.7 | | 8.1 | | 3.34 | U | 3.34 | U | 3.34 | U | 3.34 | U |
| Benzo (ghi) perylene | | 28 | | 72 | | 3.34 | U | 3.34 | U | 3.34 | U | 3.34 | 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

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PAH'S by HPLC / Method 8310 Report Date: 07/24/06 17:36

RFW Batch Number: 0606L337 Client: TNUHANFORD RC-072 K0445 Work Order: 11343606001 Page: 3

| Cust ID: | J12N89 | J12N90 | J12N91 | J12N92 | J12N93 | BLK |
|---|---|---|---|---|---|---|
| Sample Information RFW#: | 011 | 012 | 013 | 014 | 015 | 06LE0521-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 |
| Triphenylene | 96 % | 94 % | 93 % | 91 % | 91 % | 95 % |
| | fl | fl | fl | fl | fl | fl |
| Naphthalene | 33.4 U | 33.3 U | 33.4 U | 33.4 U | 33.3 U | 33.3 U |
| Acenaphthylene | 33.4 U | 33.3 U | 33.4 U | 33.4 U | 33.3 U | 33.3 U |
| Acenaphthene | 33.4 U | 33.3 U | 33.4 U | 33.4 U | 33.3 U | 33.3 U |
| Fluorene | 3.34 U | 3.33 U | 3.34 U | 3.34 U | 3.33 U | 3.33 U |
| Phenathrene | 3.34 U | 3.33 U | 3.34 U | 3.34 U | 3.33 U | 3.33 U |
| Anthracene | 3.34 U | 3.33 U | 3.34 U | 3.34 U | 3.33 U | 3.33 U |
| Fluoranthrene | 3.34 U | 3.33 U | 3.34 U | 3.34 U | 3.33 U | 3.33 U |
| Indeno (1,2,3-cd) pyrene | 3.34 U | 3.33 U | 3.34 U | 3.34 U | 3.33 U | 3.33 U |
| Pyrene | 3.34 U | 3.33 U | 0.90 J | 3.34 U | 3.33 U | 3.33 U |
| Benzo (a) anthracene | 3.34 U | 3.33 U | 3.34 U | 3.34 U | 3.33 U | 3.33 U |
| Chrysene | 3.34 U | 3.33 U | 3.34 U | 3.34 U | 3.33 U | 3.33 U |
| Benzo (b) fluoranthrene | 3.34 U | 3.33 U | 3.34 U | 3.34 U | 3.33 U | 3.33 U |
| Benzo (k) fluoranthrene | 3.34 U | 3.33 U | 3.34 U | 3.34 U | 3.33 U | 3.33 U |
| Benzo (a) pyrene | 3.34 U | 3.33 U | 3.34 U | 3.34 U | 3.33 U | 3.33 U |
| Dibenzo (a,h) anthracene | 3.34 U | 3.33 U | 3.34 U | 3.34 U | 3.33 U | 3.33 U |
| Benzo (ghi) perylene | 3.34 U | 3.33 U | 3.34 U | 3.34 U | 3.33 U | 3.33 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

9/9/06 9/27/06

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Cust ID: BLK BS

Sample Information
RFW#: 06LE0521-MB1
Matrix: SOIL
D.F.: 1.00
Units: ug/Kg

| | | |
|---|---|---|
| Triphenylene | 97 | % |
| Naphthalene | 105 | % |
| Acenaphthylene | 99 | % |
| Acenaphthene | 100 | % |
| Fluorene | 94 | % |
| Phenathrene | 94 | % |
| Anthracene | 90 | % |
| Fluoranthrene | 99 | % |
| Indeno (1,2,3-cd) pyrene | 103 | % |
| Pyrene | 95 | % |
| Benzo (a) anthracene | 80 | % |
| Chrysene | 97 | % |
| Benzo (b) fluoranthrene | 91 | % |
| Benzo (k) fluoranthrene | 96 | % |
| Benzo (a) pyrene | 95 | % |
| Dibenzo (a,h) anthracene | 94 | % |
| Benzo (ghi) perylene | 95 | % |

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

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## Appendix 4

## Laboratory Narrative and Chain-of-Custody Documentation

LVLI
LIONVILLE LABORATORY INC.

Case Narrative

Client: TNU-HANFORD RC-072
LVL #: 0606L337
SDG/SAF # K0445/RC-072

W.O. #: 11343-606-001-9999-00
Date Received: 06-22-2006

## SEMIVOLATILE

Fifteen (15) soil samples were collected on 06-19,20-2006.

The samples and their associated QC samples were extracted according to Lionville Laboratory SOPs based on SW 846 method 3540C on 06-23-2006 and analyzed according to criteria set forth in Lionville Laboratory SOPs based on SW 846 Method 8270C for TCL Semivolatile target compounds on 07-27,28,30-2006 and 08-06-2006.

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. All samples were initially extracted and analyzed within required holding time; however, sample J12N85 was re-extracted outside required holding time. A copy of the Sample Discrepancy Report (SDR) has been enclosed. See item # 4.

2. All sample results were reported on a dry-weight basis.

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

4. Twelve (12) of one hundred thirty-two (132) surrogate recoveries were outside acceptance criteria. The surrogate recovery criteria were not met for samples J12N85 and J12N88. The out of criteria sample J12N85 was re-extracted on 08-01-2006, analyzed on 08-06-2006 and reported. A copy of the Sample Discrepancy Report (SDR) has been enclosed.

5. Six (6) of one hundred twenty-eight (128) matrix spike recoveries were outside acceptance criteria.

   Twelve (12) of one hundred twenty-eight (128) blank spike recoveries were outside acceptance criteria.

   A copy of the Sample Discrepancy Report (SDR) has been enclosed.

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 4 4 pages.



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6. The method blank 06LE0520-MB1 contained the common laboratory contaminant Di-n-butylphthalate at a level less than the CRQL. The method blank 06LE0619-MB1 contained the target compound Phenol and the common laboratory contaminants Di-n-butylphthalate, Bis (2-Ethylhexyl) phthalate and Butylbenzylphthalate at levels less than the CRQL.

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

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").

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

8/11/00
Date

som\gorup\data\bna\tmu-hanford\0606-337.doc

# Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 06MS258

Initiator: Sharon Saylor
Date: 8-1-06
Client: MU

Batch: 06061337
Samples: 007, 010, 012
Method: SW846/MCAWW/CLP/

Parameter: 8270
Matrix: Solid
Prep Batch: 06LE0510

**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 sample 007 (J12N85) was not surrogated (2 recovery of all 6)
② <10% recovery of 2 Fluorophenol in sample 010 (J12N88)
③ low recovery of 2 surrogates in samples 012 (J12N90) + J12N88 (010)
④ several low spike recovers in MS but msd + BS are ok

**2. Known or Probable Causes(s)**
① extraction error - not added surrogate
② loss during extraction + matrix issues
③ loss due to highly erratic chromatographic behavior of these compounds

**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:
re-extract sample 007
narrate sample 010 + 012

**4. Project Manager Instructions**...signature/date: [signature] 8/1/06
__ Concur with Proposed Action
__ Disagree with Proposed Action; See Instruction
__ Include in Case Narrative
__ Client Contacted:
Date/Person _____
__ Add
__ Cancel

007 - Reextracted in batch
06LE0619 8/1/06
RBC 8/1/06

**5. Final Action**...signature/date: [signature] 8/11/06
__ 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 |
| I | X Project Mgr: Stone/Johnson | __ | __ GC/LC: Kiger |
| __ | __ Data Management: Stilwell | I | X MS: Rychlak/Daley |
| __ | __ Sample Prep: Beegle/Kiger | __ | __ Log-in: Perry |
| | | __ | __ Admin: _____ |
| | | __ | __ Other: _____ |

QA-105-A-0805

SV

Lionville Laboratory, Inc.
BNA ANALYTICAL DATA PACKAGE FOR
TNUHANFORD RC-072 K0445

RECEIVED AUG 2006

DATE RECEIVED: 06/22/06 LVL LOT # 0606L337

| CLIENT ID | LVL # | MTX | PREP # | COLLECTION | EXTR/PREP | ANALYSIS |
|---|---|---|---|---|---|---|
| J12N79 | 001 | S | 06LE0520 | 06/19/06 | 06/23/06 | 07/27/06 |
| J12N79 | 001 MS | S | 06LE0520 | 06/19/06 | 06/23/06 | 07/27/06 |
| J12N79 | 001 MSD | S | 06LE0520 | 06/19/06 | 06/23/06 | 07/28/06 |
| J12N80 | 002 | S | 06LE0520 | 06/19/06 | 06/23/06 | 07/28/06 |
| J12N81 | 003 | S | 06LE0520 | 06/19/06 | 06/23/06 | 07/28/06 |
| J12N82 | 004 | S | 06LE0520 | 06/19/06 | 06/23/06 | 07/28/06 |
| J12N83 | 005 | S | 06LE0520 | 06/20/06 | 06/23/06 | 07/30/06 |
| J12N84 | 006 | S | 06LE0520 | 06/20/06 | 06/23/06 | 07/28/06 |
| J12N85 | 007 | S | 06LE0520 | 06/20/06 | 06/23/06 | 07/28/06 |
| J12N85 | 007 R1 | S | 06LE0619 | 06/20/06 | 08/01/06 | 08/06/06 |
| J12N86 | 008 | S | 06LE0520 | 06/20/06 | 06/23/06 | 07/30/06 |
| J12N87 | 009 | S | 06LE0520 | 06/20/06 | 06/23/06 | 07/28/06 |
| J12N88 | 010 | S | 06LE0520 | 06/20/06 | 06/23/06 | 07/28/06 |
| J12N89 | 011 | S | 06LE0520 | 06/20/06 | 06/23/06 | 07/28/06 |
| J12N90 | 012 | S | 06LE0520 | 06/19/06 | 06/23/06 | 07/30/06 |
| J12N91 | 013 | S | 06LE0520 | 06/19/06 | 06/23/06 | 07/28/06 |
| J12N92 | 014 | S | 06LE0520 | 06/19/06 | 06/23/06 | 07/30/06 |
| J12N93 | 015 | S | 06LE0520 | 06/19/06 | 06/23/06 | 07/30/06 |

LAB QC:

| | | | | | | |
|---|---|---|---|---|---|---|
| SBLKZS | MB1 | S | 06LE0520 | N/A | 06/23/06 | 07/27/06 |
| SBLKZS | MB1 BS | S | 06LE0520 | N/A | 06/23/06 | 07/27/06 |
| SBLKBA | MB1 | S | 06LE0619 | N/A | 08/01/06 | 08/06/06 |
| SBLKBA | MB1 BS | S | 06LE0619 | N/A | 08/01/06 | 08/06/06 |

LIONVILLE LABORATORY INC.

Case Narrative

Client: TNU-HANFORD RC-072
LVL #: 0606L337
SDG/SAF # K0445/RC-072

W.O. #: 11343-606-001-9999-00
Date Received: 06-22-2006

PAH

Fifteen (15) soil samples were collected on 06-19,20-2006.

The samples and their associated QC samples were extracted on 06-27-2006 and analyzed according to criteria set for the in Lionville Laboratory SOPs based on SW846, 3rd Edition for Polyaromatic Hydrocarbons on 07-13-2006. The extraction procedure was based on method 3540C and the extracts were analyzed based on method 8310.

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. The sample was extracted and analyzed within required holding time.
2. The sample results were reported on a dry-weight basis.
3. The method blank was below the reporting limits for all target compounds.
4. All surrogate recoveries were within acceptance criteria.
5. All blank spike recoveries were within acceptance criteria.
6. All matrix spike recoveries were within acceptance criteria.
7. The initial calibrations associated with this data set were within acceptance criteria.
8. The continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.
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.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 1 8 pages.



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

LIONVILLE LABORATORY INC.

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.

Iam Daniels
Laboratory Manager
Lionville Laboratory Incorporated

8/3/6
Date

som\r:\group\data\pah\mu hanford\0606-337s



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-072-2 | Page 2 of 2 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: Tiller, B. | Company Contact: JOAN KESSNER — Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH | Price Code: 8N — Data Turnaround: 45 Days |
| Project Designation: 100 & 300 Area Component of the RCBRA - Discrete Soil S. | Sampling Location: 1607-D2:1 | SAF No.: RC-072 | Air Quality ☐ |
| Ice Chest No.: ERC-02-406 | Field Logbook No.: EL-1597-2 BT 06-19-06 — COA: BESRAS6520 | Method of Shipment: FED EX | |
| Shipped To: EBERLINE SERVICES (LIONVILLE) | Offsite Property No.: A060510 | Bill of Lading/Air Bill No.: SEE OSPC | |

000000036

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*NONE*

Special Handling and/or Storage COOL 4C

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| COOL 4C → Preservation | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | A/D 6/19/06 | |
| Type of Container | G/P | G/P | aG | aG | aG | aG | aG | G/P | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Volume | 30g | 30g | 250g | 125g | 125g | 125g | 125g | 125g | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Chromium-Hex - 7196 | Semi-VOA - 8270A (TCL) | PAHs - 8310 | Pesticides - 8081 | PCBs - 8082 | See item (2) in Special Instructions. | See item (3) in Special Instructions. | | |

000039

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J12N79 | SOIL | 06-19-06 | 1210 | X | X | X | X | X | X | X | X | | |
| J12N80 | SOIL | 6-19-06 | 1240 | X | X | X | X | X | X | X | X | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

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

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| BRETT TILLER | 6-19-06 1700 | EAS LOCKED STORAGE | 6-19-06 1700 |
| EAS LOCKED STORAGE | 6-21-06 0900 | [illegible] | 6-21-06 0900 |
| [illegible] | 6-21-06 1500 | Fed Ex | 2 |
| [illegible] | 6.22.06 1095 | [illegible] | 6.22.06 1095 |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS**

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 – Total Sr analysis fraction.

^ These marks indicate that this is a non-analysis used to properly format COC form.

Contact Joan Kessner for any questions.

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

(2) Chloro-Herbicides - EPA8151+ (2,4,5-Trichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid, 2-(2,4,5-Trichlorophenoxy)propionic acid, 2-secButyl-4,6-dinitrophenol(DNBP), 4-(2,4-Dichlorophenoxy)butanoic acid, Dalapon, Dicamba, Dichloroprop)

(3) IC Anions - 300.0 (Nitrate); NO2/NO3 - 353.2 (Nitrogen in Nitrite and Nitrate)

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-072-3 Page 4 of 4 |
|---|---|---|

| | | | |
|---|---|---|---|
| Collector: Tiller, B. | Company Contact: JOAN KESSNER | Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH |
| Price Code: 8N | Data Turnaround: 45 Days | Air Quality ☐ | |
| Project Designation: 100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location: 116-DR-1&2 | | SAF No.: RC-072 |
| Ice Chest No.: EPRC-02-406 | Field Logbook No.: EL-1597-1 | COA: BESRAS6520 | Method of Shipment: FED EX |
| Shipped To: EBERLINE SERVICES / LIONVILLE | Offsite Property No.: A060510 | | Bill of Lading/Air Bill No.: SEE OSPC |

00000037

POSSIBLE SAMPLE HAZARDS/REMARKS

*NONE*

Special Handling and/or Storage COOL 4C

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ COOL 4C | | |
| Type of Container | G/P | G/P | aG | aG | aG | aG | aG | G/P | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Volume | 30g | 30g | 250g | 125g | 125g | 125g | 125g | 125g | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Chromium Hex - 7196 | Semi-VOA - 8270A (TCL) | PAHs - 8310 | Pesticides - 8081 | PCBs - 8082 | See item (2) in Special Instructions. | See item (3) in Special Instructions. | | |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | |
| J12N81 | SOIL | 06-19-06 | 1310 | X | X | X | X | X | X | X |

000040

CHAIN OF POSSESSION — Sign/Print Names

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| BRETT TILLER | 6-19-06 1700 | EAS LOCKED STORAGE | 6-19-06 1700 |
| EAS LOCKED STORAGE | 6-21-06 0900 | [illegible] | 6-21-06 0900 |
| [illegible] | 6/21/06 1500 | Fed Ex | |
| Fed Ex | 6-22-06 0925 | [illegible] | 6-22-06 0925 |
| | | | |
| | | | |

SPECIAL INSTRUCTIONS

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

~ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions.

2(✓) ICP Metals - 6010 (Full List) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Uranium, Vanadium, Zinc]; Mercury - 7471 - (CV)

3(✓) Chloro-Herbicides - EPA8151+ [2,4,5-Trichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid, 2-(2,4,5-Trichlorophenoxy)propionic acid, 2-sec Butyl-4,6-dinitrophenol(DNBP), 4-(2,4-Dichlorophenoxy)butanoic acid, Dalapon, Dicamba, Dichloroprop]

4(✓) IC Anions - 300.0 [Nitrate]; NO2/NO3 - 353.2 [Nitrogen in Nitrite and Nitrate]

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-072-4 | Page 2 of 2 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: Tiller, B. | Company Contact: JOAN KESSNER — Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH | Price Code: 8N — Data Turnaround: 45 Days |
| Project Designation: 100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location: 600-139 | SAF No.: RC-072 | Air Quality ☐ |
| Ice Chest No.: ERC-02-406 | Field Logbook No.: EL-1597-Y2 BT 06-19-06 — COA: BESRAS6520 | Method of Shipment: FED EX | |
| Shipped To: EBERLINE SERVICES / LIONVILLE | Offsite Property No.: A060510 | Bill of Lading/Air Bill No.: SEE OSPC | |

000000038

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*NONE*

**Special Handling and/or Storage** COOL 4C

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | COOL 4C | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ 1/S 61406 | |
| Type of Container | | G/P | G/P | aG | aG | aG | aG | aG | G/P | |
| No. of Container(s) | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| Volume | | 30g 2 | 30g | 250g | 125g | 125g | 125g | 125g 3 | 125g 4 | |
| SAMPLE ANALYSIS | | See item (1) in Special Instructions. | Chromium Hex - 7196 | Semi-VOA - 8270A (TCL) | PAHs - 8310 | Pesticides - 8081 | PCBs - 8082 | See item (2) in Special Instructions. | See item (3) in Special Instructions. | |

000041

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J12N82 | SOIL | 06-19-06 | 1350 | X* | X* | X* | X* | X* | X* | X* | X* | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

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

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| BRETT TILLER | 1700 6-19-06 | EAS LOCKED STORAGE | 1700 6-19-06 |
| EAS LOCKED STORAGE | 0900 6-21-06 | [signature] | 6-21-06 0900 |
| [signature] WCH | 6/21/06 1500 | Fed Ex | |
| [signature] | 6-22-06 0925 | [signature] | 6-22-06 0925 |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS**

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

^- These marks indicate that this is a non-analysis used to properly format COC form.

Contact Joan Kessner for any questions.

2(1) ICP Metals - 6010 (Full List) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Uranium, Vanadium, Zinc]; Mercury - 7471 - (CV)

3(2) Chloro-Herbicides - EPA8151+ [2,4,5-Trichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid, 2-(2,4,5-Trichlorophenoxy)propionic acid, 2-secButyl-4,6-dinitrophenol(DNBP), 4-(2,4-Dichlorophenoxy)butanoic acid, Dalapon, Dicamba, Dichloroprop]

4(3) IC Anions - 300.0 [Nitrate]; NO2/NO3 - 353.2 [Nitrogen in Nitrite and Nitrate]

Matrix *: S=Soil, SE=Sediment, SO=Solid, Sl=Sludge, W=Water, O=Oil, A=Air, OS=Drum Solids, OL=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-072-5 | Page 2 of 2 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: Tiller, B. | Company Contact: JOAN KESSNER — Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH | Price Code: Air Quality ☐ — Data Turnaround: 45 Days |
| Project Designation: 100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location: 600-171 | SAF No.: RC-072 | |
| Ice Chest No.: ERC-02-406 | Field Logbook No.: EL-1597 ~~12~~ 06-20-06 AT — COA: BESRAS6520 | Method of Shipment: FED EX | |
| Shipped To: EBERLINE SERVICES / LIONVILLE | Offsite Property No.: A060510 | Bill of Lading/Air Bill No.: SEE OSPC | |

000000039

POSSIBLE SAMPLE HAZARDS/REMARKS

*NONE*

Special Handling and/or Storage COOL 4C

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Preservation | COOL 4C→ ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ A/A 61406 | |
| Type of Container | G/P | G/P | aG | aG | aG | aG | aG | G/P | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| Volume | 30g | 30g | 250g | 125g | 125g | 125g | 125g | 125g | |
| SAMPLE ANALYSIS | Item 2 See item (1) in Special Instructions. | Chromium Hex - 7196 | Semi-VOA - 8270A (TCL) | PAHs - 8310 | Pesticides - 8081 | PCBs - 8082 | 3 See item (2) in Special Instructions. | Item 4 See item (3) in Special Instructions. | |

000042

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J12N83 | SOIL | 06-20-06 | 0910 | X* | X* | X* | X* | X* | X* | X* | X* | | |
| J12N84 | SOIL | 06-20-06 | 0930 | X* | X* | X* | X* | X* | X* | X* | X* | | |
| J12N85 | SOIL | 06-20-06 | ~~0940~~ 1000 | X* | X* | X* | X* | X* | X* | X* | X* | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

| CHAIN OF POSSESSION | | Sign/Print Names | |
|---|---|---|---|
| Relinquished By/Removed From: BRETT TILLER | Date/Time: 1330 6-20-06 | Received By/Stored In: EAS LOCKED STORAGE | Date/Time: 1330 6-20-06 |
| Relinquished By/Removed From: EAS LOCKED STORAGE | Date/Time: 0900 6-21-06 | Received By/Stored In: [signature] | Date/Time: 6-21-06 0900 |
| Relinquished By/Removed From: [signature] WCH | Date/Time: 6/21/06 1500 | Received By/Stored In: Fed Ex | Date/Time: |
| Relinquished By/Removed From: Fed Ex | Date/Time: 6-22-06 1025 | Received By/Stored In: [signature] | Date/Time: 6-22-06 1025 |
| 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**

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

^ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions.

1(1) ICP Metals - 6010 (Full List) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Uranium, Vanadium, Zinc]; Mercury - 7471 - (CV)

3(2) Chloro-Herbicides - EPA8151+ [2,4,5-Trichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid, 2-(2,4,5-Trichlorophenoxy)propionic acid, 2-secButyl-4,6-dinitrophenol(DNBP), 4-(2,4-Dichlorophenoxy)butanoic acid, Dalapon, Dicamba, Dichloroprop]

4(3) IC Anions - 300.0 [Nitrate]; NO2/NO3 - 353.2 [Nitrogen in Nitrite and Nitrate]

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-072-6 | Page 2 of 2 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: Tiller, B. | Company Contact: JOAN KESSNER | Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH |
| Project Designation: 100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location: 600-181 | | SAF No.: RC-072 |
| Ice Chest No.: ERC-02-406 | Field Logbook No.: EL-1597-1 2 | COA: BESRAS6520 | Method of Shipment: FED EX |
| Shipped To: EBERLINE SERVICES LIONVILLE | Offsite Property No.: A060510 | | Bill of Lading/Air Bill No.: SEE OSPC |

Price Code: 8N

Air Quality ☐

Data Turnaround: 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

*NONE*

Special Handling and/or Storage: COOL 4C

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Preservation: COOL 4C → | None | None | None | None | None | None | None | None 3/6/06 | | |
| Type of Container | G/P | G/P | aG | aG | aG | aG | aG | G/P | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Volume | 30g 1 of 2 | 30g | 250g | 125g | 125g | 125g | 125g 3 of 5 | 125g 4 | | |

SAMPLE ANALYSIS

| Sample No. | Matrix * | Sample Date | Sample Time | See item (✓) in Special Instructions. | Chromium Hex - 7196 | Semi-VOA - 8270A (TCL) | PAHs - 8310 | Pesticides - 8081 | PCBs - 8082 | See item (✓) in Special Instructions. | See item (✓) in Special Instructions. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J12N86 | SOIL | 06-20-06 | 1045 | X | X | X | X | X | X | X | X | | |
| J12N87 | SOIL | 06-20-06 | 1130 | X | X | X | X | X | X | X | X | | |
| J12N88 | SOIL | 06-20-06 | 1200 | X | X | X | X | X | X | X | X | | |
| J12N89 | SOIL | 06-20-06 | 1055 | X | X | X | X | X | X | X | X | | |

CHAIN OF POSSESSION — Sign/Print Names

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| BRETT TILLER | 6-20-06 1330 | EAS LOCKED STORAGE | 6-20-06 1330 |
| EAS LOCKED STORAGE | 6-21-06 1700 | [illegible] | 6-21-06 0900 |
| [illegible] | 6/21/06 1500 | Fed Ex | |
| Fed Ex | 6-22-06 0925 | [illegible] | 6-22-06 1092 |
| | | | |
| | | | |

SPECIAL INSTRUCTIONS

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 – Total Sr analysis fraction.

~ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions.

2(✓) ICP Metals - 6010 (Full List) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Uranium, Vanadium, Zinc]; Mercury - 7471 - (CV)

3(✓) Chloro-Herbicides - EPA8151 + [2,4,5-Trichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid, 2-(2,4,5-Trichlorophenoxy)propionic acid, 2-secButyl-4,6-dinitrophenol(DNBP), 4-(2,4-Dichlorophenoxy)butanoic acid, Dalapon, Dicamba, Dichloroprop]

4(✓) IC Anions - 300.0 [Nitrate]; NO2/NO3 - 353.2 [Nitrogen in Nitrite and Nitrate]

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
Li=Liquid
Va=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-072-7 | Page 2 of 2 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector<br>Tiller, B. | Company Contact<br>JOAN KESSNER | Telephone No.<br>375-4688 | Project Coordinator<br>KESSNER, JH |
| Price Code 8N | Data Turnaround<br>45 Days | Air Quality ☐ | |
| Project Designation<br>100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location<br>618-4 | | SAF No.<br>RC-072 |
| Ice Chest No. ERC-02-406 | Field Logbook No.<br>EL-1597,12 ST 06-19-06 | COA<br>BESRAS6520 | Method of Shipment<br>FED EX |
| Shipped To<br>EBERLINE SERVICES (LIONVILLE) | Offsite Property No. A060510 | | Bill of Lading/Air Bill No.<br>SEE OSPC |

POSSIBLE SAMPLE HAZARDS/REMARKS

*NONE*

Special Handling and/or Storage COOL 4C

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | COOL 4C → ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | 061406 | |
| Type of Container | G/P | G/P | aG | aG | aG | aG | aG | G/P | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Volume | 30g | 30g | 250g | 125g | 125g | 125g | 125g | 125g | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions | Chromium Hex - 7196 | Semi-VOA - 8270A (TCL) | PAHs - 8310 | Pesticides - 8081 | PCBs - 8082 | See item (2) in Special Instructions | See item (3) in Special Instructions | | |
| Sample No. / Matrix* / Sample Date / Sample Time | | | | | | | | | | |
| J12N90 / SOIL / 06-19-06 / 1500 | X | X | X | X | X | X | X | X | | |
| J12N91 / SOIL / 06-19-06 / 1530 | X | X | X | X | X | X | X | X | | |
| J12N92 / SOIL / 06-19-06 / 1600 | X | X | X | X | X | X | X | X | | |

0000440

| CHAIN OF POSSESSION | Date/Time | Sign/Print Names | Date/Time |
|---|---|---|---|
| Relinquished By/Removed From<br>BRETT TILLER | 1700<br>6-19-06 | Received By/Stored In<br>EAS LOCKED STORAGE | 1700<br>6-19-06 |
| Relinquished By/Removed From<br>EAS LOCKED STORAGE | 0900<br>6-21-06 | Received By/Stored In<br>[illegible] | 6-21-06 0900 |
| Relinquished By/Removed From<br>[illegible] | 6/21/06 1500 | Received By/Stored In<br>Fed Ex | |
| Relinquished By/Removed From<br>Fed Ex | 6-22-06 0905 | Received By/Stored In<br>[illegible] | 6-22-06 [illegible] |
| Relinquished By/Removed From | | Received By/Stored In | |
| Relinquished By/Removed From | | Received By/Stored In | |

SPECIAL INSTRUCTIONS

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

~ These marks indicate that this is a non-analysis used to properly format COC form.

Contact Joan Kessner for any questions.

(1) ICP Metals - 6010 (Full List) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Uranium, Vanadium, Zinc]; Mercury - 7471 - (CV)

(2) Chloro-Herbicides - EPA8151+ [2,4,5-Trichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid, 2-(2,4,5-Trichlorophenoxy)propionic acid, 2-secButyl-4,6-dinitrophenol(DNBP), 4-(2,4-Dichlorophenoxy)butanoic acid, Dalapon, Dicamba, Dichloroprop]

(3) IC Anions - 300.0 [Nitrate]; NO2/NO3 - 353.2 [Nitrogen in Nitrite and Nitrate]

Matrix *

SoSoil
SdSediment
SOSolid
SlSludge
WaWater
OaOil
AaAir
DSaDrum Solids
DLaDrum Liquids
TaTissue
WipWipe
LaLiquid
VaVegetation
XaOther

| 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-072-8 | Page 2 of 2 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: Tiller, B. | Company Contact: JOAN KESSNER — Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH | Price Code: 8N — Data Turnaround: 45 Days |
| Project Designation: 100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location: EQUIPMENT BLANK | SAF No.: RC-072 | Air Quality ☐ |
| Ice Chest No.: ERC-02-406 | Field Logbook No.: EL-1597-1 — COA: BESRAS6520 | Method of Shipment: FED EX | |
| Shipped To: EBERLINE SERVICES / LIONVILLE | Offsite Property No.: A060510 | Bill of Lading/Air Bill No.: SEE OSPC | |

000000042

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*NONE*

**Special Handling and/or Storage** COOL 4C

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| COOL 4C → Preservation | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | |
| Type of Container | G/P | G/P | aG | aG | aG | aG | aG | G/P | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| Volume | 30g | 30g | 250g | 125g | 125g | 125g | 125g | 125g | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Chromium Hex - 7196 | Semi-VOA - 8270A (TCL) | PAHs - 8310 | Pesticides - 8081 | PCBs - 8082 | See item (2) in Special Instructions. | See item (3) in Special Instructions. | |

000045

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J12N93 | SOIL | 6-19-06 | 1140 | X | X | X | X | X | X | X | X | | |

| CHAIN OF POSSESSION | | Sign/Print Names | |
|---|---|---|---|
| Relinquished By/Removed From: BRETT TILLER | Date/Time: 1700 6-19-06 | Received By/Stored In: EAS LOCKED STORAGE | Date/Time: 1700 6-19-06 |
| Relinquished By/Removed From: EAS LOCKED STORAGE | Date/Time: 0900 6-21-06 | Received By/Stored In: TR Elandon | Date/Time: 6-21-06 0900 |
| Relinquished By/Removed From: TR Elandon | Date/Time: 1500 6/21/06 | Received By/Stored In: Fed Ex | Date/Time: |
| Relinquished By/Removed From: Fed Ex | Date/Time: 6 22 06 1 0925 | Received By/Stored In: [illegible] | Date/Time: 6 22 06 0925 |
| 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**

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

^ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions.

2(1) ICP Metals - 6010 (Full List) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Uranium, Vanadium, Zinc]; Mercury - 7471 - (CV).

3(2) Chloro-Herbicides - EPA8151+ [2,4,5-Trichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid, 2-(2,4,5-Trichlorophenoxy)propionic acid, 2-secButyl-4,6-dinitrophenol(DNBP), 4-(2,4-Dichlorophenoxy)butanoic acid, Dalapon, Dicamba, Dichloroprop]

4(3) IC Anions - 300.0 [Nitrate]; NO2/NO3 - 353.2 [Nitrogen in Nitrite and Nitrate]

Matrix *: S=Soil, SS=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

# GC/MS ORGANIC DATA VALIDATION CHECKLIST

| VALIDATION LEVEL: | A | B | C | D | E |
|---|---|---|---|---|---|
| PROJECT: RCBRA | | | DATA PACKAGE: K0445 | | |
| VALIDATOR: TLI | | LAB: LLI | | DATE: 9/2/06 | |
| | | | SDG: K0445 | | |
| ANALYSES PERFORMED | | | | | |
| SW-846 8260 | | SW-846 8260 (TCLP) | SW-846 8270 | 8310 | SW-846 8270 (TCLP) |
| | | | | | |
| SAMPLES/MATRIX | | | | | |
| J12N79 | J12N80 | J12N81 | J12N82 | J12N83 | |
| J12N84 | J12N85 | J12N86 | J12N87 | J12N88 | |
| J12N89 | J12N90 | J12N91 | J12N92 | J12N93 | |
| J12P5R | | | | | |
| | | | | 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: SSR – bis(2-ethylhexyl)phthalate – U at RQL
" di-n-butylphthalate " " "
– di-n-butylphthalate – all detects (except SSR) U at RQL

no FR

## 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: J12N85 – UR all – surr
MS – Nitrobenzene (472%) Isophorone (58%) 1,2,4 trichlorobenzene (49%)
3-chloro 3 methylphenol (58%) 2-methylnaphthalene (58%) – J all
SSR – NO MS/MSD – J all
(see comments page) no PAS

# GC/MS ORGANIC DATA VALIDATION CHECKLIST

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

MS/MSD samples analyzed? ..... Yes No N/A

MS/MSD RPD values acceptable? ..... Yes No N/A

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

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

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

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

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

Comments: hexachloroethane (35%) nitrobenzene (47%) isophorone (47%) 2-nitrophenol (38%) bis(2-chloroethyl)methane (37%) 2,4 dichlorophenol (34%) 1,2,4-trichlorobenzene (49%) ~~naphthalene (40%)~~ naphthalene (40%) 4-chloroaniline (34%) hexachlorocyclopentadiene (57%) 4-chloro-3-methylphenol (33%) 2-methylnaphthalene (37%) – J all

## 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: 8SR – >2X J/UR all

# 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 [illegible]~~ 48 [illegible]

## 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:

## GC/MS ORGANIC DATA VALIDATION CHECKLIST

Comments (attach additional sheets as necessary):

Surrogate

88 – nitrobenzene assoc – J
2-Fluorophenol assoc – UR

90 – nitrobenzene assoc – J
2-Fluorophenol " – J

92 2-Fluorophenol assoc – J

LCS – J detect phenanthrene (1362) 83, 84
J detected fluoranthene (1432) 83, 84

Date: 11 September 2006
To: Washington Closure Hanford (technical representative)
From: TechLaw, Inc.
Project: 100 Area and 300 Area Component of the RCBRA – Discrete Soil Sampling
Subject: Inorganic - Data Package No. K0445-LLI

## INTRODUCTION

This memo presents the results of data validation on Data Package No. K0445 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 |
|---|---|---|---|---|
| J12N79 | 6/19/06 | Soil | C | See note 1 |
| J12N80 | 6/19/06 | Soil | C | See note 1 |
| J12N81 | 6/19/06 | Soil | C | See note 1 |
| J12N82 | 6/19/06 | Soil | C | See note 1 |
| J12N83 | 6/20/06 | Soil | C | See note 1 |
| J12N84 | 6/20/06 | Soil | C | See note 1 |
| J12N85 | 6/20/06 | Soil | C | See note 1 |
| J12N86 | 6/20/06 | Soil | C | See note 1 |
| J12N87 | 6/20/06 | Soil | C | See note 1 |
| J12N88 | 6/20/06 | Soil | C | See note 1 |
| J12N89 | 6/19/06 | Soil | C | See note 1 |
| J12N90 | 6/19/06 | Soil | C | See note 1 |
| J12N91 | 6/19/06 | Soil | C | See note 1 |
| J12N92 | 6/19/06 | Soil | C | See note 1 |
| J12N93 | 6/19/06 | Soil | C | See note 1 |

1 – ICP metals by 6010B and mercury by 7471A.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area and 300 Area Component of the RCBRA Sampling & Analysis Plan (DOE/RL-2005-42, Rev. 0, October 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 6 months for ICP metals and 28 days for mercury.

All holding times were acceptable.

- **Preparation (Method) Blanks**

Preparation Blanks

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

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

Due to method blank contamination, the boron result in samples J12N80, J12N81, J12N82, J12N85, J12N86, J12N87, J12N88, J12N89 and J12N92 were qualified as estimate and flagged "UJ".

Due to method blank contamination, the lithium result in sample J12N93 was qualified as an estimate and flagged "UJ".

All other preparation blank results were acceptable.

Field (Equipment) Blank

No field blanks were submitted for analysis.

- **Accuracy**

Matrix Spike and Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data . The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 80% to 120%. 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 79% and a sample result less than the IDL are qualified "UJ". Samples with a recovery of greater than 120% or less than 80% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 120% and a sample result less than the IDL, no qualification is required.

Due to a matrix spike recovery outside QC limits (57%), all antimony results were qualified as estimates and flagged "J".

Due to an LCS recovery outside QC limits (33.7%), all silicon 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

No field duplicates were submitted for analysis.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the 100 and 300 Area RQLs to ensure that laboratory detection levels meet the required criteria. All results met the RQL.

- **Completeness**

Data package No. K0445 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 method blank contamination, the boron result in samples J12N80, J12N81, J12N82, J12N85, J12N86, J12N87, J12N88, J12N89 and J12N92 were qualified as estimate and flagged "UJ".

- Due to method blank contamination, the lithium result in sample J12N93 was qualified as an estimate and flagged "UJ".

- Due to a matrix spike recovery outside QC limits (57%), all antimony results were qualified as estimates and flagged "J".

- Due to an LCS recovery outside QC limits (33.7%), all silicon 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-2005-42, Rev. 0, October 2005, *100 Area and 300 Area Component of the RCBRA Sampling & Analysis Plan*.

## 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: K0445 | REVIEWER: [illegible] | Project: RCBRA [illegible] | PAGE 1 OF 1 |
|---|---|---|---|
| COMMENTS: | | | |
| COMPOUND | QUALIFIER | SAMPLES AFFECTED | REASON |
| Boron | UJ | J12N80, J12N81<br>J12N82, J12N85<br>J12N86, J12N87<br>J12N88, J12N89<br>J12N92 | Blank contamination |
| Lithium | UJ | J12N93 | Blank contamination |
| Antimony | J | All | MS recovery |
| Silicon | J | All | LCS recovery |

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

## Appendix 3

## Qualified Data Summary and Annotated Laboratory Reports

Project: WASHINGTON CLOSURE HANFORD
Laboratory: LLI SDG: K0445

| Sample Number | | J12N79 | | J12N80 | | J12N81 | | J12N82 | | J12N83 | | J12N84 | | J12N85 | | J12N86 | | J12N87 | | J12N88 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Remarks | | | | | | | | | | | | | | | | | | | | | |
| Sample Date | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | | 6/20/06 | |
| Inorganics | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| Silver | 1 | 0.20 | U | 0.20 | U | 0.20 | U | 0.20 | U | 0.20 | U | 1.2 | | 0.20 | U | 0.20 | U | 0.20 | U | 0.20 | U |
| Aluminum | | 4750 | | 4160 | | 3830 | | 3920 | | 4300 | | 3910 | | 3680 | | 4790 | | 3610 | | 3960 | |
| Arsenic | 10 | 2.6 | | 2.1 | | 2.0 | | 1.7 | U | 5.3 | | 1.7 | U | 2.1 | | 1.7 | U | 1.7 | U | 1.7 | U |
| Boron | | 2.6 | | 1.6 | UJ | 1.7 | UJ | 1.3 | UJ | 2.2 | | 3.6 | | 1.2 | UJ | 0.96 | UJ | 1.2 | UJ | 0.99 | UJ |
| Barium | 2 | 51.6 | | 47.0 | | 38.5 | | 46.3 | | 57.9 | | 55.0 | | 51.6 | | 68.1 | | 52.9 | | 58.0 | |
| Beryllium | | 0.22 | | 0.20 | | 0.18 | | 0.20 | | 0.21 | | 0.16 | | 0.18 | | 0.28 | | 0.24 | | 0.25 | |
| Bismuth | | 1.5 | U | 1.5 | U | 1.4 | U | 1.4 | U | 1.4 | U | 1.4 | U | 1.4 | U | 1.4 | U | 1.4 | U | 1.4 | U |
| Calcium | | 6700 | | 7610 | | 6170 | | 4640 | | 4170 | | 2760 | | 2260 | | 3210 | | 2780 | | 3260 | |
| Cadmium | 0.5 | 0.20 | U | 0.20 | U | 0.20 | U | 0.20 | U | 0.20 | U | 0.26 | | 0.20 | U | 0.20 | U | 0.20 | U | 0.20 | U |
| Cobalt | | 5.6 | | 4.6 | | 4.1 | | 5.0 | | 4.3 | | 5.5 | | 4.0 | | 7.5 | | 6.0 | | 7.0 | |
| Chromium | 1 | 8.5 | | 8.3 | | 7.4 | | 6.6 | | 7.7 | | 12.7 | | 5.5 | | 6.7 | | 5.3 | | 6.1 | |
| Copper | 1 | 12.2 | | 10.4 | | 10.5 | | 10.9 | | 13.2 | | 10.4 | | 9.8 | | 12.8 | | 9.8 | | 10.9 | |
| Iron | | 13900 | | 11600 | | 10600 | | 13600 | | 12100 | | 11100 | | 10100 | | 20400 | | 16400 | | 19300 | |
| Mercury | | 0.02 | U | 0.01 | U | 0.01 | U | 0.01 | U | 0.02 | U | 0.01 | U | 0.01 | U | 0.02 | U | 0.01 | U | 0.01 | U |
| Potassium | 400 | 909 | | 873 | | 687 | | 716 | | 945 | | 710 | | 856 | | 953 | | 966 | | 772 | |
| Lithium | 5 | 6.3 | | 6.2 | | 5.2 | | 4.7 | | 5.0 | | 4.4 | | 3.6 | | 4.5 | | 3.7 | | 3.6 | |
| Magnesium | | 3970 | | 3640 | | 3260 | | 3400 | | 3080 | | 2620 | | 2310 | | 3890 | | 3110 | | 3410 | |
| Manganese | | 248 | | 224 | | 199 | | 222 | | 213 | | 206 | | 209 | | 314 | | 263 | | 293 | |
| Molybdenum | | 0.83 | U | 0.83 | U | 0.81 | U | 0.82 | U | 0.82 | U | 0.82 | U | 0.82 | U | 0.82 | U | 0.82 | U | 0.81 | U |
| Sodium | | 117 | | 99.3 | | 79.6 | | 84.5 | | 89.7 | | 93.9 | | 67.2 | | 101 | | 73.9 | | 117 | |
| Nickel | | 10.1 | | 9.6 | | 8.7 | | 9.4 | | 8.2 | | 13.3 | | 9.4 | | 9.8 | | 7.7 | | 7.9 | |
| Phosphorous | 5 | 748 | | 729 | | 625 | | 743 | | 605 | | 558 | | 635 | | 983 | | 925 | | 1070 | |
| Lead | 5 | 4.0 | | 3.2 | | 2.7 | | 2.6 | | 33.1 | | 11.6 | | 5.9 | | 2.9 | | 3.2 | | 3.1 | |
| Antimony | 6 | 1.3 | UJ | 1.3 | UJ | 1.2 | UJ | 1.2 | UJ | 1.2 | UJ | 1.2 | UJ | 1.2 | UJ | 1.2 | UJ | 1.2 | UJ | 1.2 | UJ |
| Selenium | | 1.3 | U | 1.3 | U | 1.3 | U | 1.3 | U | 1.3 | U | 1.3 | U | 1.3 | U | 1.3 | U | 1.3 | U | 1.3 | U |
| Silicon | | 463 | J | 474 | J | 466 | J | 418 | J | 386 | J | 420 | J | 526 | J | 456 | J | 393 | J | 451 | J |
| Tin | | 3.1 | U | 3.1 | U | 3.0 | U | 3.0 | U | 3.0 | U | 3.0 | U | 3.0 | U | 3.0 | U | 3.0 | U | 3.0 | U |
| Strontium | | 32.2 | | 35.2 | | 27.3 | | 20.1 | | 24.5 | | 20.7 | | 17.7 | | 17.7 | | 14.3 | | 15.3 | |
| Thallium | | 2.0 | U | 2.0 | U | 2.0 | U | 2.0 | U | 2.0 | U | 2.0 | U | 2.0 | U | 2.0 | U | 2.0 | U | 2.0 | U |
| Uranium | 30 | 2.5 | U | 2.5 | U | 2.8 | | 2.5 | U | 2.5 | U | 2.5 | U | 2.5 | U | 2.5 | U | 2.5 | U | 2.5 | U |
| Vanadium | | 29.6 | | 22.8 | | 22.7 | | 33.3 | | 26.3 | | 24.5 | | 22.5 | | 52.6 | | 43.1 | | 51.6 | |
| Zinc | 1 | 31.2 | | 26.7 | | 24.9 | | 28.5 | | 41.9 | | 60.7 | | 28.4 | | 38.0 | | 33.4 | | 36.2 | |

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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| Project: WASHINGTON CLOSURE HANFORD | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Laboratory: LLI SDG: K0445 | | | | | | | | | | | | | | | | | | | | | |
| Sample Number | | J12N89 | | J12N90 | | J12N91 | | J12N92 | | J12N93 | | | | | | | | | | | |
| Remarks | | | | | | | | | | | | | | | | | | | | | |
| Sample Date | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/19/06 | | 6/19/06 | | | | | | | | | | | |
| Inorganics | RQL | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | | |
| Silver | 1 | 0.20 | U | 0.20 | U | 0.20 | U | 0.20 | U | 0.07 | U | | | | | | | | | | |
| Aluminum | 5 | 3970 | | 3040 | | 3700 | | 4240 | | 43.2 | | | | | | | | | | | |
| Arsenic | 10 | 1.7 | U | 1.9 | | 1.7 | U | 2.1 | | 0.57 | U | | | | | | | | | | |
| Boron | | 0.74 | UJ | 0.68 | U | 0.68 | U | 0.76 | UJ | 0.22 | U | | | | | | | | | | |
| Barium | 2 | 68.0 | | 45.2 | | 55.4 | | 57.4 | | 1.2 | | | | | | | | | | | |
| Beryllium | 0.05 | 0.27 | | 0.18 | | 0.22 | | 0.26 | | 0.02 | U | | | | | | | | | | |
| Bismuth | | 1.4 | U | 1.4 | U | 1.4 | U | 1.4 | U | 0.48 | U | | | | | | | | | | |
| Calcium | | 3140 | | 5580 | | 6780 | | 4900 | | 24.5 | | | | | | | | | | | |
| Cadmium | 0.5 | 0.20 | U | 0.20 | U | 0.20 | U | 0.20 | U | 0.07 | U | | | | | | | | | | |
| Cobalt | | 6.7 | | 3.6 | | 4.3 | | 5.8 | | 0.13 | U | | | | | | | | | | |
| Chromium | | 6.7 | | 4.3 | | 5.2 | | 6.8 | | 0.14 | | | | | | | | | | | |
| Copper | 1 | 12.0 | | 6.9 | | 8.3 | | 9.9 | | 0.11 | U | | | | | | | | | | |
| Iron | 5 | 17500 | | 10600 | | 13200 | | 16800 | | 103 | | | | | | | | | | | |
| Mercury | 0.2 | 0.01 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | | | | | | | | | | |
| Potassium | | 882 | | 552 | | 740 | | 873 | | 20.0 | | | | | | | | | | | |
| Lithium | 2 | 3.7 | | 3.7 | | 4.3 | | 5.1 | | 0.05 | UJ | | | | | | | | | | |
| Magnesium | | 3470 | | 2330 | | 2850 | | 3370 | | 7.1 | | | | | | | | | | | |
| Manganese | 5 | 280 | | 178 | | 222 | | 276 | | 3.6 | | | | | | | | | | | |
| Molybdenum | | 0.81 | U | 0.82 | U | 0.82 | U | 0.82 | U | 0.27 | U | | | | | | | | | | |
| Sodium | | 79.7 | | 58.2 | | 78.2 | | 71.3 | | 8.0 | | | | | | | | | | | |
| Nickel | 40 | 9.6 | | 6.2 | | 6.5 | | 8.2 | | 0.22 | U | | | | | | | | | | |
| Phosphorous | | 1020 | | 598 | | 684 | | 782 | | 3.6 | | | | | | | | | | | |
| Lead | 5 | 3.3 | | 2.4 | | 2.7 | | 3.0 | | 0.42 | | | | | | | | | | | |
| Antimony | 6 | 1.2 | UJ | 1.2 | UJ | 1.2 | UJ | 1.2 | UJ | 0.41 | UJ | | | | | | | | | | |
| Selenium | | 1.3 | U | 1.3 | U | 1.3 | U | 1.3 | U | 0.44 | U | | | | | | | | | | |
| Silicon | | 514 | J | 420 | J | 445 | J | 403 | J | 33.1 | J | | | | | | | | | | |
| Tin | 5 | 3.0 | U | 3.0 | U | 3.0 | U | 3.0 | U | 1.0 | U | | | | | | | | | | |
| Titanium | | 16.3 | | 19.1 | | 24.5 | | 19.3 | | 0.24 | | | | | | | | | | | |
| Thallium | | 2.0 | U | 2.0 | U | 2.0 | U | 2.0 | U | 0.65 | U | | | | | | | | | | |
| Uranium | 30 | 2.5 | U | 2.5 | U | 2.5 | U | 2.5 | U | 0.82 | U | | | | | | | | | | |
| Vanadium | 2.5 | 42.3 | | 23.8 | | 31.3 | | 40.0 | | 0.08 | U | | | | | | | | | | |
| Zinc | 1 | 34.1 | | 22.6 | | 26.7 | | 32.1 | | 0.50 | | | | | | | | | | | |

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 07/28/06

CLIENT: TNUHANFORD RC-072 K0445 LVL LOT #: 0606L337

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

| SAMPLE | SITE ID | ANALYTE | RESULT | | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|---|
| -001 | J12N79 | Silver, Total | 0.20 | u | MG/KG | 0.20 | 3.0 |
| | | Aluminum, Total | 4750 | | MG/KG | 8.2 | 3.0 |
| | | Arsenic, Total | 2.6 | | MG/KG | 1.7 | 3.0 |
| | | Boron, Total | 2.6 | | MG/KG | 0.69 | 3.0 |
| | | Barium, Total | 51.6 | | MG/KG | 0.06 | 3.0 |
| | | Beryllium, Total | 0.22 | | MG/KG | 0.06 | 3.0 |
| | | Bismuth, Total | 1.5 | u | MG/KG | 1.5 | 3.0 |
| | | Calcium, Total | 6700 | | MG/KG | 4.7 | 3.0 |
| | | Cadmium, Total | 0.20 | u | MG/KG | 0.20 | 3.0 |
| | | Cobalt, Total | 5.6 | | MG/KG | 0.40 | 3.0 |
| | | Chromium, Total | 8.5 | | MG/KG | 0.27 | 3.0 |
| | | Copper, Total | 12.2 | | MG/KG | 0.34 | 3.0 |
| | | Iron, Total | 13900 | | MG/KG | 10 | 3.0 |
| | | Mercury, Total | 0.02 | u | MG/KG | 0.02 | 1.0 |
| | | Potassium, Total | 909 | | MG/KG | 6.5 | 3.0 |
| | | Lithium, Total | 6.3 | | MG/KG | 0.09 | 3.0 |
| | | Magnesium, Total | 3970 | | MG/KG | 2.8 | 3.0 |
| | | Manganese, Total | 248 | | MG/KG | 0.09 | 3.0 |
| | | Molybdenum, Total | 0.83 | u | MG/KG | 0.83 | 3.0 |
| | | Sodium, Total | 117 | | MG/KG | 2.2 | 3.0 |
| | | Nickel, Total | 10.1 | | MG/KG | 0.69 | 3.0 |
| | | Phosphorus, Total | 748 | | MG/KG | 2.6 | 3.0 |
| | | Lead, Total | 4.0 | | MG/KG | 0.89 | 3.0 |
| | | Antimony, Total | 1.3 | u J | MG/KG | 1.3 | 3.0 |
| | | Selenium, Total | 1.3 | u | MG/KG | 1.3 | 3.0 |
| | | Silicon, Total | 463 | J | MG/KG | 6.5 | 3.0 |
| | | Tin, Total | 3.1 | u | MG/KG | 3.1 | 3.0 |
| | | Strontium, Total | 32.2 | | MG/KG | 0.03 | 3.0 |
| | | Thallium, Total | 2.0 | u | MG/KG | 2.0 | 3.0 |
| | | Uranium, Total | 2.5 | u | MG/KG | 2.5 | 3.0 |
| | | Vanadium, Total | 29.6 | | MG/KG | 0.26 | 3.0 |
| | | Zinc, Total | 31.2 | | MG/KG | 0.46 | 3.0 |

R 9/9/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT - 07/28/06

CLIENT: TNUHANFORD RC-072 K0445 LVL LOT #: 0606L337

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -002 | J12N80 | Silver, Total | 0.20 u | MG/KG | 0.20 | 3.0 |
| | | Aluminum, Total | 4160 | MG/KG | 8.3 | 3.0 |
| | | Arsenic, Total | 2.1 | MG/KG | 1.8 | 3.0 |
| | | Boron, Total | 1.6 UJ | MG/KG | 0.69 | 3.0 |
| | | Barium, Total | 47.0 | MG/KG | 0.06 | 3.0 |
| | | Beryllium, Total | 0.20 | MG/KG | 0.06 | 3.0 |
| | | Bismuth, Total | 1.5 u | MG/KG | 1.5 | 3.0 |
| | | Calcium, Total | 7610 | MG/KG | 4.7 | 3.0 |
| | | Cadmium, Total | 0.20 u | MG/KG | 0.20 | 3.0 |
| | | Cobalt, Total | 4.6 | MG/KG | 0.40 | 3.0 |
| | | Chromium, Total | 8.3 | MG/KG | 0.37 | 3.0 |
| | | Copper, Total | 10.4 | MG/KG | 0.34 | 3.0 |
| | | Iron, Total | 11600 | MG/KG | 10.0 | 3.0 |
| | | Mercury, Total | 0.01 u | MG/KG | 0.01 | 1.0 |
| | | Potassium, Total | 873 | MG/KG | 6.5 | 3.0 |
| | | Lithium, Total | 6.2 | MG/KG | 0.09 | 3.0 |
| | | Magnesium, Total | 3640 | MG/KG | 2.8 | 3.0 |
| | | Manganese, Total | 224 | MG/KG | 0.09 | 3.0 |
| | | Molybdenum, Total | 0.83 u | MG/KG | 0.83 | 3.0 |
| | | Sodium, Total | 99.3 | MG/KG | 2.2 | 3.0 |
| | | Nickel, Total | 9.6 | MG/KG | 0.69 | 3.0 |
| | | Phosphorus, Total | 729 | MG/KG | 2.6 | 3.0 |
| | | Lead, Total | 3.2 | MG/KG | 0.89 | 3.0 |
| | | Antimony, Total | 1.3 uJ | MG/KG | 1.3 | 3.0 |
| | | Selenium, Total | 1.3 u | MG/KG | 1.3 | 3.0 |
| | | Silicon, Total | 474 J | MG/KG | 6.5 | 3.0 |
| | | Tin, Total | 3.1 u | MG/KG | 3.1 | 3.0 |
| | | Strontium, Total | 35.2 | MG/KG | 0.03 | 3.0 |
| | | Thallium, Total | 2.0 u | MG/KG | 2.0 | 3.0 |
| | | Uranium, Total | 2.5 u | MG/KG | 2.5 | 3.0 |
| | | Vanadium, Total | 22.8 | MG/KG | 0.26 | 3.0 |
| | | Zinc, Total | 26.7 | MG/KG | 0.46 | 3.0 |

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 07/28/06

CLIENT: TNUHANFORD RC-072 K0445 LVL LOT #: 0606L337

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -003 | J12N81 | Silver, Total | 0.20 u | MG/KG | 0.20 | 3.0 |
| | | Aluminum, Total | 3830 | MG/KG | 8.1 | 3.0 |
| | | Arsenic, Total | 2.0 | MG/KG | 1.7 | 3.0 |
| | | Boron, Total | 1.7 J | MG/KG | 0.67 | 3.0 |
| | | Barium, Total | 38.5 | MG/KG | 0.06 | 3.0 |
| | | Beryllium, Total | 0.18 | MG/KG | 0.06 | 3.0 |
| | | Bismuth, Total | 1.4 u | MG/KG | 1.4 | 3.0 |
| | | Calcium, Total | 6170 | MG/KG | 4.6 | 3.0 |
| | | Cadmium, Total | 0.20 u | MG/KG | 0.20 | 3.0 |
| | | Cobalt, Total | 4.1 | MG/KG | 0.39 | 3.0 |
| | | Chromium, Total | 7.4 | MG/KG | 0.37 | 3.0 |
| | | Copper, Total | 10.5 | MG/KG | 0.34 | 3.0 |
| | | Iron, Total | 10600 | MG/KG | 9.8 | 3.0 |
| | | Mercury, Total | 0.01 u | MG/KG | 0.01 | 1.0 |
| | | Potassium, Total | 687 | MG/KG | 6.4 | 3.0 |
| | | Lithium, Total | 5.2 | MG/KG | 0.08 | 3.0 |
| | | Magnesium, Total | 3260 | MG/KG | 2.7 | 3.0 |
| | | Manganese, Total | 199 | MG/KG | 0.08 | 3.0 |
| | | Molybdenum, Total | 0.81 u | MG/KG | 0.81 | 3.0 |
| | | Sodium, Total | 79.6 | MG/KG | 2.1 | 3.0 |
| | | Nickel, Total | 8.7 | MG/KG | 0.67 | 3.0 |
| | | Phosphorus, Total | 625 | MG/KG | 2.5 | 3.0 |
| | | Lead, Total | 2.7 | MG/KG | 0.87 | 3.0 |
| | | Antimony, Total | 1.2 u J | MG/KG | 1.2 | 3.0 |
| | | Selenium, Total | 1.3 u | MG/KG | 1.3 | 3.0 |
| | | Silicon, Total | 466 J | MG/KG | 6.4 | 3.0 |
| | | Tin, Total | 3.0 u | MG/KG | 3.0 | 3.0 |
| | | Strontium, Total | 27.3 | MG/KG | 0.03 | 3.0 |
| | | Thallium, Total | 2.0 u | MG/KG | 2.0 | 3.0 |
| | | Uranium, Total | 2.8 | MG/KG | 2.5 | 3.0 |
| | | Vanadium, Total | 22.7 | MG/KG | 0.25 | 3.0 |
| | | Zinc, Total | 24.9 | MG/KG | 0.45 | 3.0 |

R 9/9/04

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 07/28/06

CLIENT: TNURANFORD RC-072 K0445

LVL LOT #: 0606L337

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -004 | J12N82 | Silver, Total | 0.20 u | MG/KG | 0.20 | 3.0 |
| | | Aluminum, Total | 3920 | MG/KG | 8.1 | 3.0 |
| | | Arsenic, Total | 1.7 u | MG/KG | 1.7 | 3.0 |
| | | Boron, Total | 1.3 UJ | MG/KG | 0.68 | 3.0 |
| | | Barium, Total | 46.3 | MG/KG | 0.06 | 3.0 |
| | | Beryllium, Total | 0.20 | MG/KG | 0.06 | 3.0 |
| | | Bismuth, Total | 1.4 u | MG/KG | 1.4 | 3.0 |
| | | Calcium, Total | 4640 | MG/KG | 4.6 | 3.0 |
| | | Cadmium, Total | 0.20 u | MG/KG | 0.20 | 3.0 |
| | | Cobalt, Total | 5.0 | MG/KG | 0.40 | 3.0 |
| | | Chromium, Total | 6.6 | MG/KG | 0.37 | 3.0 |
| | | Copper, Total | 10.9 | MG/KG | 0.34 | 3.0 |
| | | Iron, Total | 13600 | MG/KG | 9.9 | 3.0 |
| | | Mercury, Total | 0.01 u | MG/KG | 0.01 | 1.0 |
| | | Potassium, Total | 716 | MG/KG | 6.4 | 3.0 |
| | | Lithium, Total | 4.7 | MG/KG | 0.08 | 3.0 |
| | | Magnesium, Total | 3400 | MG/KG | 2.7 | 3.0 |
| | | Manganese, Total | 222 | MG/KG | 0.08 | 3.0 |
| | | Molybdenum, Total | 0.82 u | MG/KG | 0.82 | 3.0 |
| | | Sodium, Total | 84.5 | MG/KG | 2.2 | 3.0 |
| | | Nickel, Total | 9.4 | MG/KG | 0.68 | 3.0 |
| | | Phosphorus, Total | 743 | MG/KG | 2.5 | 3.0 |
| | | Lead, Total | 2.6 | MG/KG | 0.88 | 3.0 |
| | | Antimony, Total | 1.2 u J | MG/KG | 1.2 | 3.0 |
| | | Selenium, Total | 1.3 u | MG/KG | 1.3 | 3.0 |
| | | Silicon, Total | 418 J | MG/KG | 6.4 | 3.0 |
| | | Tin, Total | 3.0 u | MG/KG | 3.0 | 3.0 |
| | | Strontium, Total | 20.1 | MG/KG | 0.03 | 3.0 |
| | | Thallium, Total | 2.0 u | MG/KG | 2.0 | 3.0 |
| | | Uranium, Total | 2.5 u | MG/KG | 2.5 | 3.0 |
| | | Vanadium, Total | 33.3 | MG/KG | 0.25 | 3.0 |
| | | Zinc, Total | 28.5 | MG/KG | 0.45 | 3.0 |

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 07/28/06

CLIENT: TNUHANFORD RC-072 K0445 LVL LOT #: 0606L337

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

| SAMPLE | SITE ID | ANALYTE | RESULT | | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|---|
| -005 | J12N8J | Silver, Total | 0.20 | u | MG/KG | 0.20 | 3.0 |
| | | Aluminum, Total | 4300 | | MG/KG | 8.1 | 3.0 |
| | | Arsenic, Total | 5.3 | | MG/KG | 1.7 | 3.0 |
| | | Boron, Total | 2.2 | | MG/KG | 0.68 | 3.0 |
| | | Barium, Total | 57.9 | | MG/KG | 0.06 | 3.0 |
| | | Beryllium, Total | 0.21 | | MG/KG | 0.06 | 3.0 |
| | | Bismuth, Total | 1.4 | u | MG/KG | 1.4 | 3.0 |
| | | Calcium, Total | 4170 | | MG/KG | 4.6 | 3.0 |
| | | Cadmium, Total | 0.20 | u | MG/KG | 0.20 | 3.0 |
| | | Cobalt, Total | 4.3 | | MG/KG | 0.40 | 3.0 |
| | | Chromium, Total | 7.7 | | MG/KG | 0.37 | 3.0 |
| | | Copper, Total | 13.2 | | MG/KG | 0.34 | 3.0 |
| | | Iron, Total | 12100 | | MG/KG | 9.9 | 3.0 |
| | | Mercury, Total | 0.02 | u | MG/KG | 0.02 | 1.0 |
| | | Potassium, Total | 945 | | MG/KG | 6.4 | 3.0 |
| | | Lithium, Total | 5.0 | | MG/KG | 0.08 | 3.0 |
| | | Magnesium, Total | 3080 | | MG/KG | 2.7 | 3.0 |
| | | Manganese, Total | 213 | | MG/KG | 0.08 | 3.0 |
| | | Molybdenum, Total | 0.82 | u | MG/KG | 0.82 | 3.0 |
| | | Sodium, Total | 89.7 | | MG/KG | 2.1 | 3.0 |
| | | Nickel, Total | 8.2 | | MG/KG | 0.68 | 3.0 |
| | | Phosphorus, Total | 605 | | MG/KG | 2.5 | 3.0 |
| | | Lead, Total | 33.1 | | MG/KG | 0.88 | 3.0 |
| | | Antimony, Total | 1.2 | u J | MG/KG | 1.2 | 3.0 |
| | | Selenium, Total | 1.3 | u | MG/KG | 1.3 | 3.0 |
| | | Silicon, Total | 386 | J | MG/KG | 6.4 | 3.0 |
| | | Tin, Total | 3.0 | u | MG/KG | 3.0 | 3.0 |
| | | Strontium, Total | 24.5 | | MG/KG | 0.03 | 3.0 |
| | | Thallium, Total | 2.0 | u | MG/KG | 2.0 | 3.0 |
| | | Uranium, Total | 2.5 | u | MG/KG | 2.5 | 3.0 |
| | | Vanadium, Total | 26.3 | | MG/KG | 0.25 | 3.0 |
| | | Zinc, Total | 41.9 | | MG/KG | 0.45 | 3.0 |

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 07/20/06

CLIENT: TNUHANFORD RC-072 K0445 LVL LOT #: 0606L337

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

| SAMPLE | SITE ID | ANALYTE | RESULT | | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|---|
| -006 | J12N84 | Silver, Total | 1.2 | | MG/KG | 0.20 | 3.0 |
| | | Aluminum, Total | 3910 | | MG/KG | 8.1 | 3.0 |
| | | Arsenic, Total | 1.7 | u | MG/KG | 1.7 | 3.0 |
| | | Boron, Total | 3.6 | | MG/KG | 0.68 | 3.0 |
| | | Barium, Total | 55.0 | | MG/KG | 0.06 | 3.0 |
| | | Beryllium, Total | 0.16 | | MG/KG | 0.06 | 3.0 |
| | | Bismuth, Total | 1.4 | u | MG/KG | 1.4 | 3.0 |
| | | Calcium, Total | 2760 | | MG/KG | 4.6 | 3.0 |
| | | Cadmium, Total | 0.26 | | MG/KG | 0.20 | 3.0 |
| | | Cobalt, Total | 5.5 | | MG/KG | 0.39 | 3.0 |
| | | Chromium, Total | 12.7 | | MG/KG | 0.37 | 3.0 |
| | | Copper, Total | 10.4 | | MG/KG | 0.34 | 3.0 |
| | | Iron, Total | 11100 | | MG/KG | 9.8 | 3.0 |
| | | Mercury, Total | 0.01 | u | MG/KG | 0.01 | 1.0 |
| | | Potassium, Total | 710 | | MG/KG | 6.4 | 3.0 |
| | | Lithium, Total | 4.4 | | MG/KG | 0.08 | 3.0 |
| | | Magnesium, Total | 2620 | | MG/KG | 2.7 | 3.0 |
| | | Manganese, Total | 206 | | MG/KG | 0.08 | 3.0 |
| | | Molybdenum, Total | 0.82 | u | MG/KG | 0.82 | 3.0 |
| | | Sodium, Total | 93.9 | | MG/KG | 2.1 | 3.0 |
| | | Nickel, Total | 13.3 | | MG/KG | 0.68 | 3.0 |
| | | Phosphorus, Total | 558 | | MG/KG | 2.5 | 3.0 |
| | | Lead, Total | 11.6 | | MG/KG | 0.87 | 3.0 |
| | | Antimony, Total | 1.2 | u J | MG/KG | 1.2 | 3.0 |
| | | Selenium, Total | 1.3 | u | MG/KG | 1.3 | 3.0 |
| | | Silicon, Total | 420 | J | MG/KG | 6.4 | 3.0 |
| | | Tin, Total | 3.0 | u | MG/KG | 3.0 | 3.0 |
| | | Strontium, Total | 20.7 | | MG/KG | 0.03 | 3.0 |
| | | Thallium, Total | 2.0 | u | MG/KG | 2.0 | 3.0 |
| | | Uranium, Total | 2.5 | u | MG/KG | 2.5 | 3.0 |
| | | Vanadium, Total | 24.5 | | MG/KG | 0.25 | 3.0 |
| | | Zinc, Total | 60.7 | | MG/KG | 0.45 | 3.0 |

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 07/28/06

CLIENT: TNUHANFORD RC-072 K0445 LVL LOT #: 0606L337

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -007 | J12N85 | Silver, Total | 0.20 u | MG/KG | 0.20 | 3.0 |
| | | Aluminum, Total | 3680 | MG/KG | 8.2 | 3.0 |
| | | Arsenic, Total | 2.1 | MG/KG | 1.7 | 3.0 |
| | | Boron, Total | 1.2 UJ | MG/KG | 0.68 | 3.0 |
| | | Barium, Total | 51.6 | MG/KG | 0.06 | 3.0 |
| | | Beryllium, Total | 0.18 | MG/KG | 0.06 | 3.0 |
| | | Bismuth, Total | 1.4 u | MG/KG | 1.4 | 3.0 |
| | | Calcium, Total | 2260 | MG/KG | 4.6 | 3.0 |
| | | Cadmium, Total | 0.20 u | MG/KG | 0.20 | 3.0 |
| | | Cobalt, Total | 4.0 | MG/KG | 0.40 | 3.0 |
| | | Chromium, Total | 5.5 | MG/KG | 0.37 | 3.0 |
| | | Copper, Total | 9.8 | MG/KG | 0.34 | 3.0 |
| | | Iron, Total | 10100 | MG/KG | 9.9 | 3.0 |
| | | Mercury, Total | 0.01 u | MG/KG | 0.01 | 1.0 |
| | | Potassium, Total | 856 | MG/KG | 6.4 | 3.0 |
| | | Lithium, Total | 3.6 | MG/KG | 0.09 | 3.0 |
| | | Magnesium, Total | 2310 | MG/KG | 2.7 | 3.0 |
| | | Manganese, Total | 209 | MG/KG | 0.09 | 3.0 |
| | | Molybdenum, Total | 0.82 u | MG/KG | 0.82 | 3.0 |
| | | Sodium, Total | 67.2 | MG/KG | 2.2 | 3.0 |
| | | Nickel, Total | 9.4 | MG/KG | 0.68 | 3.0 |
| | | Phosphorus, Total | 635 | MG/KG | 2.6 | 3.0 |
| | | Lead, Total | 5.9 | MG/KG | 0.88 | 3.0 |
| | | Antimony, Total | 1.2 uJ | MG/KG | 1.2 | 3.0 |
| | | Selenium, Total | 1.3 u | MG/KG | 1.3 | 3.0 |
| | | Silicon, Total | 526 J | MG/KG | 6.4 | 3.0 |
| | | Tin, Total | 3.0 u | MG/KG | 3.0 | 3.0 |
| | | Strontium, Total | 17.7 | MG/KG | 0.03 | 3.0 |
| | | Thallium, Total | 2.0 u | MG/KG | 2.0 | 3.0 |
| | | Uranium, Total | 2.5 u | MG/KG | 2.5 | 3.0 |
| | | Vanadium, Total | 22.5 | MG/KG | 0.26 | 3.0 |
| | | Zinc, Total | 28.4 | MG/KG | 0.45 | 3.0 |

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 07/28/06

CLIENT: TNUHANFORD RC-072 K0445 LVL LOT #: 0606L337

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -008 | J12N86 | Silver, Total | 0.20 u | MG/KG | 0.20 | 3.0 |
| | | Aluminum, Total | 4790 | MG/KG | 8.2 | 3.0 |
| | | Arsenic, Total | 1.7 u | MG/KG | 1.7 | 3.0 |
| | | Boron, Total | 0.96 UJ | MG/KG | 0.68 | 3.0 |
| | | Barium, Total | 68.1 | MG/KG | 0.06 | 3.0 |
| | | Beryllium, Total | 0.28 | MG/KG | 0.06 | 3.0 |
| | | Bismuth, Total | 1.4 u | MG/KG | 1.4 | 3.0 |
| | | Calcium, Total | 3210 | MG/KG | 4.7 | 3.0 |
| | | Cadmium, Total | 0.20 u | MG/KG | 0.20 | 3.0 |
| | | Cobalt, Total | 7.5 | MG/KG | 0.40 | 3.0 |
| | | Chromium, Total | 6.7 | MG/KG | 0.37 | 3.0 |
| | | Copper, Total | 12.8 | MG/KG | 0.34 | 3.0 |
| | | Iron, Total | 20400 | MG/KG | 9.9 | 3.0 |
| | | Mercury, Total | 0.02 u | MG/KG | 0.02 | 1.0 |
| | | Potassium, Total | 953 | MG/KG | 6.4 | 3.0 |
| | | Lithium, Total | 4.5 | MG/KG | 0.09 | 3.0 |
| | | Magnesium, Total | 3890 | MG/KG | 2.8 | 3.0 |
| | | Manganese, Total | 314 | MG/KG | 0.09 | 3.0 |
| | | Molybdenum, Total | 0.82 u | MG/KG | 0.82 | 3.0 |
| | | Sodium, Total | 101 | MG/KG | 2.2 | 3.0 |
| | | Nickel, Total | 9.8 | MG/KG | 0.68 | 3.0 |
| | | Phosphorus, Total | 982 | MG/KG | 2.6 | 3.0 |
| | | Lead, Total | 2.9 | MG/KG | 0.88 | 3.0 |
| | | Antimony, Total | 1.2 uJ | MG/KG | 1.2 | 3.0 |
| | | Selenium, Total | 1.3 u | MG/KG | 1.3 | 3.0 |
| | | Silicon, Total | 456 J | MG/KG | 6.4 | 3.0 |
| | | Tin, Total | 3.0 u | MG/KG | 3.0 | 3.0 |
| | | Strontium, Total | 17.7 | MG/KG | 0.03 | 3.0 |
| | | Thallium, Total | 2.0 u | MG/KG | 2.0 | 3.0 |
| | | Uranium, Total | 2.5 u | MG/KG | 2.5 | 3.0 |
| | | Vanadium, Total | 52.6 | MG/KG | 0.26 | 3.0 |
| | | Zinc, Total | 28.0 | MG/KG | 0.45 | 3.0 |

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 07/28/06

CLIENT: TNUHANFORD RC-072 K0445 LVL LOT #: 0606L337

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

| SAMPLE | SITE ID | ANALYTE | RESULT | | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|---|
| -009 | J12N87 | Silver, Total | 0.20 | u | MG/KG | 0.20 | 3.0 |
| | | Aluminum, Total | 3610 | | MG/KG | 8.2 | 3.0 |
| | | Arsenic, Total | 1.7 | u | MG/KG | 1.7 | 3.0 |
| | | Boron, Total | 1.2 | UJ | MG/KG | 0.68 | 3.0 |
| | | Barium, Total | 52.9 | | MG/KG | 0.06 | 3.0 |
| | | Beryllium, Total | 0.24 | | MG/KG | 0.06 | 3.0 |
| | | Bismuth, Total | 1.4 | u | MG/KG | 1.4 | 3.0 |
| | | Calcium, Total | 2780 | | MG/KG | 4.7 | 3.0 |
| | | Cadmium, Total | 0.20 | u | MG/KG | 0.20 | 3.0 |
| | | Cobalt, Total | 6.0 | | MG/KG | 0.40 | 3.0 |
| | | Chromium, Total | 5.3 | | MG/KG | 0.37 | 3.0 |
| | | Copper, Total | 9.8 | | MG/KG | 0.24 | 3.0 |
| | | Iron, Total | 16400 | | MG/KG | 9.9 | 3.0 |
| | | Mercury, Total | 0.01 | u | MG/KG | 0.01 | 1.0 |
| | | Potassium, Total | 966 | | MG/KG | 6.4 | 3.0 |
| | | Lithium, Total | 3.7 | | MG/KG | 0.09 | 3.0 |
| | | Magnesium, Total | 3110 | | MG/KG | 2.8 | 3.0 |
| | | Manganese, Total | 263 | | MG/KG | 0.09 | 3.0 |
| | | Molybdenum, Total | 0.82 | u | MG/KG | 0.82 | 3.0 |
| | | Sodium, Total | 73.9 | | MG/KG | 2.2 | 3.0 |
| | | Nickel, Total | 7.7 | | MG/KG | 0.68 | 3.0 |
| | | Phosphorus, Total | 925 | | MG/KG | 2.6 | 3.0 |
| | | Lead, Total | 3.2 | | MG/KG | 0.88 | 3.0 |
| | | Antimony, Total | 1.2 | u J | MG/KG | 1.2 | 3.0 |
| | | Selenium, Total | 1.3 | u | MG/KG | 1.3 | 3.0 |
| | | Silicon, Total | 393 | J | MG/KG | 6.4 | 3.0 |
| | | Tin, Total | 3.0 | u | MG/KG | 3.0 | 3.0 |
| | | Strontium, Total | 14.3 | | MG/KG | 0.03 | 3.0 |
| | | Thallium, Total | 2.0 | u | MG/KG | 2.0 | 3.0 |
| | | Uranium, Total | 2.5 | u | MG/KG | 2.5 | 3.0 |
| | | Vanadium, Total | 43.1 | | MG/KG | 0.26 | 3.0 |
| | | Zinc, Total | 33.4 | | MG/KG | 0.45 | 3.0 |

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 07/28/06

CLIENT: TNUHANFORD RC-072 K0445 LVL LOT #: 0606L337

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

| SAMPLE | SITE ID | ANALYTE | RESULT | | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|---|
| -010 | J12N88 | Silver, Total | 0.20 | u | MG/KG | 0.20 | 3.0 |
| | | Aluminum, Total | 3960 | | MG/KG | 8.1 | 3.0 |
| | | Arsenic, Total | 1.7 | u | MG/KG | 1.7 | 3.0 |
| | | Boron, Total | 0.99 | UJ | MG/KG | 0.67 | 3.0 |
| | | Barium, Total | 58.0 | | MG/KG | 0.06 | 3.0 |
| | | Beryllium, Total | 0.25 | | MG/KG | 0.06 | 3.0 |
| | | Bismuth, Total | 1.4 | u | MG/KG | 1.4 | 3.0 |
| | | Calcium, Total | 3260 | | MG/KG | 4.6 | 3.0 |
| | | Cadmium, Total | 0.20 | u | MG/KG | 0.20 | 3.0 |
| | | Cobalt, Total | 7.0 | | MG/KG | 0.39 | 3.0 |
| | | Chromium, Total | 6.1 | | MG/KG | 0.37 | 3.0 |
| | | Copper, Total | 10.9 | | MG/KG | 0.34 | 3.0 |
| | | Iron, Total | 19300 | | MG/KG | 9.8 | 3.0 |
| | | Mercury, Total | 0.01 | u | MG/KG | 0.01 | 1.0 |
| | | Potassium, Total | 772 | | MG/KG | 6.4 | 3.0 |
| | | Lithium, Total | 2.6 | | MG/KG | 0.08 | 3.0 |
| | | Magnesium, Total | 3410 | | MG/KG | 2.7 | 3.0 |
| | | Manganese, Total | 293 | | MG/KG | 0.08 | 3.0 |
| | | Molybdenum, Total | 0.81 | u | MG/KG | 0.81 | 3.0 |
| | | Sodium, Total | 117 | | MG/KG | 2.1 | 3.0 |
| | | Nickel, Total | 7.9 | | MG/KG | 0.67 | 3.0 |
| | | Phosphorus, Total | 1070 | | MG/KG | 2.5 | 3.0 |
| | | Lead, Total | 3.1 | | MG/KG | 0.87 | 3.0 |
| | | Antimony, Total | 1.2 | u J | MG/KG | 1.2 | 3.0 |
| | | Selenium, Total | 1.3 | u | MG/KG | 1.3 | 3.0 |
| | | Silicon, Total | 451 | J | MG/KG | 6.4 | 3.0 |
| | | Tin, Total | 3.0 | u | MG/KG | 3.0 | 3.0 |
| | | Strontium, Total | 15.3 | | MG/KG | 0.03 | 3.0 |
| | | Thallium, Total | 2.0 | u | MG/KG | 2.0 | 3.0 |
| | | Uranium, Total | 2.5 | u | MG/KG | 2.5 | 3.0 |
| | | Vanadium, Total | 51.6 | | MG/KG | 0.25 | 3.0 |
| | | Zinc, Total | 36.2 | | MG/KG | 0.45 | 3.0 |

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 07/28/06

CLIENT: TNUHANFORD RC-072 K0445 LVL LOT #: 0606L337

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

| SAMPLE | SITE ID | ANALYTE | RESULT | | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|---|
| -011 | J12N89 | Silver, Total | 0.20 | u | MG/KG | 0.20 | 3.0 |
| | | Aluminum, Total | 3970 | | MG/KG | 8.1 | 3.0 |
| | | Arsenic, Total | 1.7 | u | MG/KG | 1.7 | 3.0 |
| | | Boron, Total | 0.74 | UJ | MG/KG | 0.67 | 3.0 |
| | | Barium, Total | 68.0 | | MG/KG | 0.06 | 3.0 |
| | | Beryllium, Total | 0.27 | | MG/KG | 0.06 | 3.0 |
| | | Bismuth, Total | 1.4 | u | MG/KG | 1.4 | 3.0 |
| | | Calcium, Total | 3140 | | MG/KG | 4.6 | 3.0 |
| | | Cadmium, Total | 0.20 | u | MG/KG | 0.20 | 3.0 |
| | | Cobalt, Total | 6.7 | | MG/KG | 0.39 | 3.0 |
| | | Chromium, Total | 6.7 | | MG/KG | 0.37 | 3.0 |
| | | Copper, Total | 12.0 | | MG/KG | 0.34 | 3.0 |
| | | Iron, Total | 17500 | | MG/KG | 9.8 | 3.0 |
| | | Mercury, Total | 0.01 | u | MG/KG | 0.01 | 1.0 |
| | | Potassium, Total | 882 | | MG/KG | 6.4 | 3.0 |
| | | Lithium, Total | 3.7 | | MG/KG | 0.08 | 3.0 |
| | | Magnesium, Total | 3470 | | MG/KG | 2.7 | 3.0 |
| | | Manganese, Total | 280 | | MG/KG | 0.08 | 3.0 |
| | | Molybdenum, Total | 0.81 | u | MG/KG | 0.81 | 3.0 |
| | | Sodium, Total | 79.7 | | MG/KG | 2.1 | 3.0 |
| | | Nickel, Total | 9.6 | | MG/KG | 0.67 | 3.0 |
| | | Phosphorus, Total | 1020 | | MG/KG | 2.5 | 3.0 |
| | | Lead, Total | 3.3 | | MG/KG | 0.87 | 3.0 |
| | | Antimony, Total | 1.2 | uJ | MG/KG | 1.2 | 3.0 |
| | | Selenium, Total | 1.3 | u | MG/KG | 1.3 | 3.0 |
| | | Silicon, Total | 514 | J | MG/KG | 6.4 | 3.0 |
| | | Tin, Total | 3.0 | u | MG/KG | 3.0 | 3.0 |
| | | Strontium, Total | 16.3 | | MG/KG | 0.03 | 3.0 |
| | | Thallium, Total | 2.0 | u | MG/KG | 2.0 | 3.0 |
| | | Uranium, Total | 2.5 | u | MG/KG | 2.5 | 3.0 |
| | | Vanadium, Total | 42.3 | | MG/KG | 0.25 | 3.0 |
| | | Zinc, Total | 34.1 | | MG/KG | 0.45 | 3.0 |

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 07/28/06

CLIENT: TNUHANFORD RC-072 K0445 LVL LOT #: 0606L337

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

| SAMPLE | SITE ID | ANALYTE | RESULT | | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|---|
| -012 | J12N90 | Silver, Total | 0.20 | u | MG/KG | 0.20 | 3.0 |
| | | Aluminum, Total | 3040 | | MG/KG | 8.1 | 3.0 |
| | | Arsenic, Total | 1.9 | | MG/KG | 1.7 | 3.0 |
| | | Boron, Total | 0.68 | u | MG/KG | 0.68 | 3.0 |
| | | Barium, Total | 45.2 | | MG/KG | 0.06 | 3.0 |
| | | Beryllium, Total | 0.18 | | MG/KG | 0.06 | 3.0 |
| | | Bismuth, Total | 1.4 | u | MG/KG | 1.4 | 3.0 |
| | | Calcium, Total | 5580 | | MG/KG | 4.6 | 3.0 |
| | | Cadmium, Total | 0.20 | u | MG/KG | 0.20 | 3.0 |
| | | Cobalt, Total | 3.6 | | MG/KG | 0.40 | 3.0 |
| | | Chromium, Total | 4.3 | | MG/KG | 0.37 | 3.0 |
| | | Copper, Total | 6.9 | | MG/KG | 0.34 | 3.0 |
| | | Iron, Total | 10600 | | MG/KG | 9.9 | 3.0 |
| | | Mercury, Total | 0.02 | u | MG/KG | 0.02 | 1.0 |
| | | Potassium, Total | 552 | | MG/KG | 6.4 | 3.0 |
| | | Lithium, Total | 3.7 | | MG/KG | 0.08 | 3.0 |
| | | Magnesium, Total | 2330 | | MG/KG | 2.7 | 3.0 |
| | | Manganese, Total | 178 | | MG/KG | 0.08 | 3.0 |
| | | Molybdenum, Total | 0.82 | u | MG/KG | 0.82 | 3.0 |
| | | Sodium, Total | 58.2 | | MG/KG | 2.2 | 3.0 |
| | | Nickel, Total | 6.2 | | MG/KG | 0.68 | 3.0 |
| | | Phosphorus, Total | 598 | | MG/KG | 2.5 | 3.0 |
| | | Lead, Total | 2.4 | | MG/KG | 0.88 | 3.0 |
| | | Antimony, Total | 1.2 | u J | MG/KG | 1.2 | 3.0 |
| | | Selenium, Total | 1.3 | u | MG/KG | 1.3 | 3.0 |
| | | Silicon, Total | 420 | J | MG/KG | 6.4 | 3.0 |
| | | Tin, Total | 3.0 | u | MG/KG | 3.0 | 3.0 |
| | | Strontium, Total | 19.1 | | MG/KG | 0.03 | 3.0 |
| | | Thallium, Total | 2.0 | u | MG/KG | 2.0 | 3.0 |
| | | Uranium, Total | 2.5 | u | MG/KG | 2.5 | 3.0 |
| | | Vanadium, Total | 23.8 | | MG/KG | 0.25 | 3.0 |
| | | Zinc, Total | 22.6 | | MG/KG | 0.45 | 3.0 |

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 07/28/06

CLIENT: TNUHANFORD RC-072 K0445 LVL LOT #: 0606L337

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

| SAMPLE | SITE ID | ANALYTE | RESULT | | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|---|
| -013 | J12N91 | Silver, Total | 0.20 | u | MG/KG | 0.20 | 3.0 |
| | | Aluminum, Total | 3700 | | MG/KG | 8.2 | 3.0 |
| | | Arsenic, Total | 1.7 | u | MG/KG | 1.7 | 3.0 |
| | | Boron, Total | 0.68 | u | MG/KG | 0.68 | 3.0 |
| | | Barium, Total | 55.4 | | MG/KG | 0.06 | 3.0 |
| | | Beryllium, Total | 0.22 | | MG/KG | 0.06 | 3.0 |
| | | Bismuth, Total | 1.4 | u | MG/KG | 1.4 | 3.0 |
| | | Calcium, Total | 6780 | | MG/KG | 4.7 | 3.0 |
| | | Cadmium, Total | 0.20 | u | MG/KG | 0.20 | 3.0 |
| | | Cobalt, Total | 4.3 | | MG/KG | 0.40 | 3.0 |
| | | Chromium, Total | 5.2 | | MG/KG | 0.37 | 3.0 |
| | | Copper, Total | 8.3 | | MG/KG | 0.34 | 3.0 |
| | | Iron, Total | 13200 | | MG/KG | 9.9 | 3.0 |
| | | Mercury, Total | 0.02 | u | MG/KG | 0.02 | 1.0 |
| | | Potassium, Total | 740 | | MG/KG | 6.4 | 3.0 |
| | | Lithium, Total | 4.3 | | MG/KG | 0.09 | 3.0 |
| | | Magnesium, Total | 2850 | | MG/KG | 2.8 | 3.0 |
| | | Manganese, Total | 222 | | MG/KG | 0.09 | 3.0 |
| | | Molybdenum, Total | 0.82 | u | MG/KG | 0.82 | 3.0 |
| | | Sodium, Total | 78.2 | | MG/KG | 2.2 | 3.0 |
| | | Nickel, Total | 6.5 | | MG/KG | 0.68 | 3.0 |
| | | Phosphorus, Total | 684 | | MG/KG | 2.6 | 3.0 |
| | | Lead, Total | 2.7 | | MG/KG | 0.88 | 3.0 |
| | | Antimony, Total | 1.2 | u J | MG/KG | 1.2 | 3.0 |
| | | Selenium, Total | 1.3 | u | MG/KG | 1.3 | 3.0 |
| | | Silicon, Total | 445 | J | MG/KG | 6.4 | 3.0 |
| | | Tin, Total | 3.0 | u | MG/KG | 3.0 | 3.0 |
| | | Strontium, Total | 24.5 | | MG/KG | 0.03 | 3.0 |
| | | Thallium, Total | 2.0 | u | MG/KG | 2.0 | 3.0 |
| | | Uranium, Total | 2.5 | u | MG/KG | 2.5 | 3.0 |
| | | Vanadium, Total | 31.3 | | MG/KG | 0.26 | 3.0 |
| | | Zinc, Total | 26.7 | | MG/KG | 0.45 | 3.0 |

9/2/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 07/28/06

CLIENT: TNUHANFORD RC-072 X0445 LVL LOT #: 0606L337

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

| SAMPLE | SITE ID | ANALYTE | RESULT | | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|---|
| -014 | J12N92 | Silver, Total | 0.20 | u | MG/KG | 0.20 | 3.0 |
| | | Aluminum, Total | 4240 | | MG/KG | 8.1 | 3.0 |
| | | Arsenic, Total | 2.1 | | MG/KG | 1.7 | 3.0 |
| | | Boron, Total | 0.76 | UJ | MG/KG | 0.67 | 3.0 |
| | | Barium, Total | 57.4 | | MG/KG | 0.06 | 3.0 |
| | | Beryllium, Total | 0.26 | | MG/KG | 0.06 | 3.0 |
| | | Bismuth, Total | 1.4 | u | MG/KG | 1.4 | 3.0 |
| | | Calcium, Total | 4900 | | MG/KG | 4.6 | 3.0 |
| | | Cadmium, Total | 0.20 | u | MG/KG | 0.20 | 3.0 |
| | | Cobalt, Total | 5.8 | | MG/KG | 0.39 | 3.0 |
| | | Chromium, Total | 6.8 | | MG/KG | 0.37 | 3.0 |
| | | Copper, Total | 9.9 | | MG/KG | 0.34 | 3.0 |
| | | Iron, Total | 16800 | | MG/KG | 9.8 | 3.0 |
| | | Mercury, Total | 0.02 | u | MG/KG | 0.02 | 1.0 |
| | | Potassium, Total | 873 | | MG/KG | 6.4 | 3.0 |
| | | Lithium, Total | 5.1 | | MG/KG | 0.08 | 3.0 |
| | | Magnesium, Total | 3370 | | MG/KG | 2.7 | 3.0 |
| | | Manganese, Total | 276 | | MG/KG | 0.08 | 3.0 |
| | | Molybdenum, Total | 0.82 | u | MG/KG | 0.82 | 3.0 |
| | | Sodium, Total | 71.3 | | MG/KG | 2.1 | 3.0 |
| | | Nickel, Total | 8.2 | | MG/KG | 0.67 | 3.0 |
| | | Phosphorus, Total | 782 | | MG/KG | 2.5 | 3.0 |
| | | Lead, Total | 3.0 | | MG/KG | 0.87 | 3.0 |
| | | Antimony, Total | 1.2 | u J | MG/KG | 1.2 | 3.0 |
| | | Selenium, Total | 1.3 | u | MG/KG | 1.3 | 3.0 |
| | | Silicon, Total | 403 | J | MG/KG | 6.4 | 3.0 |
| | | Tin, Total | 3.0 | u | MG/KG | 3.0 | 3.0 |
| | | Strontium, Total | 19.3 | | MG/KG | 0.03 | 3.0 |
| | | Thallium, Total | 2.0 | u | MG/KG | 2.0 | 3.0 |
| | | Uranium, Total | 2.5 | u | MG/KG | 2.5 | 3.0 |
| | | Vanadium, Total | 40.0 | | MG/KG | 0.25 | 3.0 |
| | | Zinc, Total | 32.1 | | MG/KG | 0.45 | 3.0 |

9/9/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 07/28/06

CLIENT: TNUHANFORD RC-072 K0445 LVL LOT #: 0606L337

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -015 | J12N93 | Silver, Total | 0.07 u | MG/KG | 0.07 | 1.0 |
| | | Aluminum, Total | 43.2 | MG/KG | 2.7 | 1.0 |
| | | Arsenic, Total | 0.57 u | MG/KG | 0.57 | 1.0 |
| | | Boron, Total | 0.22 u | MG/KG | 0.22 | 1.0 |
| | | Barium, Total | 1.2 | MG/KG | 0.02 | 1.0 |
| | | Beryllium, Total | 0.02 u | MG/KG | 0.02 | 1.0 |
| | | Bismuth, Total | 0.48 u | MG/KG | 0.48 | 1.0 |
| | | Calcium, Total | 24.5 | MG/KG | 1.5 | 1.0 |
| | | Cadmium, Total | 0.07 u | MG/KG | 0.07 | 1.0 |
| | | Cobalt, Total | 0.13 u | MG/KG | 0.13 | 1.0 |
| | | Chromium, Total | 0.14 | MG/KG | 0.12 | 1.0 |
| | | Copper, Total | 0.11 u | MG/KG | 0.11 | 1.0 |
| | | Iron, Total | 103 | MG/KG | 3.3 | 1.0 |
| | | Mercury, Total | 0.02 u | MG/KG | 0.02 | 1.0 |
| | | Potassium, Total | 20.0 | MG/KG | 2.1 | 1.0 |
| | | Lithium, Total | 0.05 UJ | MG/KG | 0.03 | 1.0 |
| | | Magnesium, Total | 7.1 | MG/KG | 0.91 | 1.0 |
| | | Manganese, Total | 3.6 | MG/KG | 0.03 | 1.0 |
| | | Molybdenum, Total | 0.27 u | MG/KG | 0.27 | 1.0 |
| | | Sodium, Total | 8.0 | MG/KG | 0.71 | 1.0 |
| | | Nickel, Total | 0.22 u | MG/KG | 0.22 | 1.0 |
| | | Phosphorus, Total | 3.6 | MG/KG | 0.84 | 1.0 |
| | | Lead, Total | 0.42 | MG/KG | 0.29 | 1.0 |
| | | Antimony, Total | 0.41 u J | MG/KG | 0.41 | 1.0 |
| | | Selenium, Total | 0.44 u | MG/KG | 0.44 | 1.0 |
| | | Silicon, Total | 33.1 J | MG/KG | 2.1 | 1.0 |
| | | Tin, Total | 1.0 u | MG/KG | 1.0 | 1.0 |
| | | Strontium, Total | 0.24 | MG/KG | 0.009 | 1.0 |
| | | Thallium, Total | 0.65 u | MG/KG | 0.65 | 1.0 |
| | | Uranium, Total | 0.82 u | MG/KG | 0.82 | 1.0 |
| | | Vanadium, Total | 0.08 u | MG/KG | 0.08 | 1.0 |
| | | Zinc, Total | 0.50 | MG/KG | 0.15 | 1.0 |

9/9/06

## Appendix 4

## Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD RC-072
LVL#: 0606L337
SDG/SAF#: K0445/RC-072

W.O.#: 11343-606-001-9999-00
Date Received: 06-22-06

## METALS CASE NARRATIVE

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

All soil samples are reported on a dry weight basis unless requested by the client, required by the method, or noted otherwise.

1. This narrative covers the analyses of 15 soil samples.

2. The samples were prepared and analyzed in accordance with methods checked on the attached glossary. All samples, with the exception of sample J12N93, were reported with 3-fold dilutions due to high concentrations and sample matrix.

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

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

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

6. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL), or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.

7. All ICP Interference Check Standards were within control limits.

8 All laboratory control samples (LCS) were within the 80-120% control limits with the exception of Phosphorous at 78.4% and Silicon at 33.7%. Refer to the Inorganics Laboratory Control Standards Report. Associated sample results may be biased low.

9. The matrix spike (MS) recoveries for 4 analytes were outside the 75-125% control limits. Refer to the Inorganics Accuracy Report.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 53 pages.



[illegible] Welsh Road • Exton, PA 19341-1313 • (610) 280-2000 • Fax (610) 280-2041

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

| Sample ID | Element | PDS Concentration (ppb) | PDS % Recovery |
|---|---|---|---|
| J12N79 | Aluminum | 66,000 | 85.8 |
| | Iron | 66,000 | 94.1 |
| | Antimony | 300 | 103.3 |
| | Silicon | 6,300 | 99.8 |

11. The duplicate analysis for 1 analytes were outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

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

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

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

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

7/31/06
Date

jjw/m06-337

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-072-2 | Page 2 of 2 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector<br>Tiller, B. | Company Contact<br>JOAN KESSNER<br>Telephone No.<br>375-4688 | Project Coordinator<br>KESSNER, JH | Price Code 8N<br>Air Quality ☐<br>Data Turnaround<br>45 Days |
| Project Designation<br>100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location<br>1607-D2:1 | SAF No.<br>RC-072 | |
| Ice Chest No. ERC-02-406 | Field Logbook No.<br>EL-1597-X2 BT 06-19-06<br>COA<br>BESRAS6520 | Method of Shipment<br>FED EX | |
| Shipped To<br>EBERLINE SERVICES (LIONVILLE) | Offsite Property No. A060510 | Bill of Lading/Air Bill No.<br>SEE OSPC | |

000000046

POSSIBLE SAMPLE HAZARDS/REMARKS

*NONE*

Special Handling and/or Storage COOL 4 C

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| COOL 4C → Preservation | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | AAD 61406 | |
| Type of Container | G/P | G/P | aG | aG | aG | aG | aG | G/P | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Volume | 30g | 30g | 250g | 125g | 125g | 125g | 125g | 125g | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. 2 AAD 61406 | Chromium Hex - 7196 | Semi-VOA - 8270A (TCL) | PAHs - 8310 | Pesticides - 8081 | PCBs - 8082 | See item (2) in Special Instructions. 3 AAD 61406 | See item (3) in Special Instructions. 4 | | |

000031

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J12N79 | SOIL | 06-19-06 | 1210 | X * | X * | X * | X * | X * | X * | X * | X * | | |
| J12N80 | SOIL | 6-19-06 | 1240 | X * | X * | X * | X * | X * | X * | X * | X * | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By/Removed From BRETT TILLER | Date/Time 6-19-06 1700 | Received By/Stored In EAS LOCKED STORAGE | Date/Time 6-19-06 0700 |
| Relinquished By/Removed From EAS LOCKED STORAGE | Date/Time 6-21-06 0900 | Received By/Stored In TR Edmonton | Date/Time 6-21-06 0900 |
| Relinquished By/Removed From TR Edmonton | Date/Time 6-21-06 1500 | Received By/Stored In Fed Ex | Date/Time 2 |
| Relinquished By/Removed From Fed Ex | Date/Time 6 22 06 1095 | Received By/Stored In [signature] | Date/Time 6.22.06 1095 |
| 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

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

^ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions.

(1) ICP Metals - 6010 (Full List) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Uranium, Vanadium, Zinc]; Mercury - 7471 - (CV)

(2) Chloro-Herbicides - EPA8151+ [2,4,5-Trichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid, 2-(2,4,5-Trichlorophenoxy)propionic acid, 2-secButyl-4,6-dinitrophenol(DNBP), 4-(2,4-Dichlorophenoxy)butanoic acid, Dalapon, Dicamba, Dichloroprop]

(3) IC Anions - 300.0 [Nitrate]; NO2/NO3 - 353.2 [Nitrogen in Nitrite and Nitrate]

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-072-3



| | | | |
|---|---|---|---|
| Collector: Tiller, B. | Company Contact: JOAN KESSNER | Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH |
| Price Code: 8N | Data Turnaround: 45 Days | Air Quality ☐ | |
| Project Designation: 100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location: 116-DR-1&2 | | SAF No.: RC-072 |
| Ice Chest No.: ERC-02-406 | Field Logbook No.: EL-1597-1 | COA: BESRAS6520 | Method of Shipment: FED EX |
| Shipped To: EBERLINE SERVICES LIONVILLE | Offsite Property No.: A060510 | | Bill of Lading/Air Bill No.: SEE OSPC |

00000047

POSSIBLE SAMPLE HAZARDS/REMARKS

*NONE*

Special Handling and/or Storage COOL 4C

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | COOL 4C | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ 4/AGH06 | |
| Type of Container | G/P | G/P | aG | aG | aG | aG | aG | G/P | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Volume | 30g Item 2 | 30g | 250g | 125g | 125g | 125g | 125g 3 | 125g 4 | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Chromium Hex - 7196 | Semi-VOA - 8270A (TCL) | PAHs - 8310 | Pesticides - 8081 | PCBs - 8082 | See item (2) in Special Instructions. | See item (3) in Special Instructions. | | |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | |
| J12N81 | SOIL | 06-19-06 | 1310 | X | X | X | X | X | X | X |
| | | | | | | | | | | |
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| CHAIN OF POSSESSION | Date/Time | Sign/Print Names | Date/Time |
|---|---|---|---|
| Relinquished By/Removed From: BRETT TILLER | 6-19-06 1700 | Received By/Stored In: EAS LOCKED STORAGE | 1700 6-19-06 |
| Relinquished By/Removed From: EAS LOCKED STORAGE | 6-21-06 0900 | Received By/Stored In: FR Ellenson | 6-21-06 0900 |
| Relinquished By/Removed From: FR Ellenson | 6/21/06 0900 | Received By/Stored In: Fed Ex | |
| Relinquished By/Removed From: Fed Ex | 6-22-06 0925 | Received By/Stored In: [illegible] | 6-22-06 0925 |
| Relinquished By/Removed From | | Received By/Stored In | |
| Relinquished By/Removed From | | Received By/Stored In | |

SPECIAL INSTRUCTIONS

* These marks indicate that unless fixed out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

^ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions.

2(1) ICP Metals - 6010 (Full List) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Uranium, Vanadium, Zinc]; Mercury - 7471 - (CV)

3(2) Chloro-Herbicides - EPA8151+ [2,4,5-Trichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid, 2-(2,4,5-Trichlorophenoxy)propionic acid, 2-sec Butyl-4,6-dinitrophenol(DNBP), 4-(2,4-Dichlorophenoxy)butanoic acid, Dalapon, Dicamba, Dichloroprop]

4(3) IC Anions - 300.0 [Nitrate]; NO2/NO3 - 353.2 [Nitrogen In Nitrite and Nitrate]

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
Lr=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-072-4 | Page 2 of 2 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector<br>Tiller, B. | Company Contact<br>JOAN KESSNER | Telephone No.<br>375-4688 | Project Coordinator<br>KESSNER, JH |
| Project Designation<br>100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location<br>600-139 | | SAF No.<br>RC-072 |
| Ice Chest No.<br>ERC-02-406 | Field Logbook No.<br>EL-1597-Y2 BT 06-19-06 | COA<br>BESRAS6520 | Method of Shipment<br>FED EX |
| Shipped To<br>EBERLINE SERVICES (LIONVILLE) | Offsite Property No.<br>A060510 | | Bill of Lading/Air Bill No.<br>SEE OSPC |

Price Code 8N

Air Quality ☐

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

*NONE*

Special Handling and/or Storage COOL 4C

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

000033

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ JA 061406 | | | | |
| Type of Container | G/P | G/P | aG | aG | aG | aG | aG | G/P | | | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | |
| Volume | 30g | 30g | 250g | 125g | 125g | 125g | 125g | 125g | | | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Chromium Hex - 7196 | Semi-VOA - 8270A (TCL) | PAHs - 8310 | Pesticides - 8081 | PCBs - 8082 | See item (2) in Special Instructions. | See item (3) in Special Instructions. | | | | |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | |
| J12N82 | SOIL | 06-19-06 | 1350 | X* | X* | X* | X* | X* | X* | X* | X* | |
| | | | | | | | | | | | | |
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| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By/Removed From<br>BRETT TILLER | Date/Time 1700<br>6-19-06 | Received By/Stored In<br>EAS LOCKED STORAGE | Date/Time 1700<br>6-19-06 |
| Relinquished By/Removed From<br>EAS LOCKED STORAGE | Date/Time 0900<br>6-21-06 | Received By/Stored In<br>[illegible] | Date/Time<br>6-21-06 0900 |
| Relinquished By/Removed From<br>WCH | Date/Time<br>6/21/06 1500 | Received By/Stored In<br>FED EX | Date/Time |
| Relinquished By/Removed From<br>FED EX | Date/Time<br>6.22.06 0925 | Received By/Stored In<br>[illegible] | Date/Time<br>6.22.06 0925 |
| 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

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 — Total Sr analysis fraction.

** These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions.

(1) ICP Metals - 6010 (Full List) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Uranium, Vanadium, Zinc]; Mercury - 7471 - (CV)

(2) Chloro-Herbicides - EPA8151+ [2,4,5-Trichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid, 2-(2,4,5-Trichlorophenoxy)propionic acid, 2-secButyl-4,6-dinitrophenol(DNBP), 4-(2,4-Dichlorophenoxy)butanoic acid, Dalapon, Dicamba, Dichloroprop]

(3) IC Anions - 300.0 [Nitrate]; NO2/NO3 - 353.2 [Nitrogen in Nitrite and Nitrate]

Matrix *

| | | | |
|---|---|---|---|
| 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-072-5 | Page 2 of 2

| | | | |
|---|---|---|---|
| Collector: Tiller, B. | Company Contact: JOAN KESSNER | Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH |
| Project Designation: 100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location: 600-171 | | SAF No.: RC-072 |
| Ice Chest No.: ERC-02-406 | Field Logbook No.: EL-1597-12 06-20-06 | COA: BESRAS6520 | Method of Shipment: FED EX |
| Shipped To: EBERLINE SERVICES / LIONVILLE | Offsite Property No.: A060510 | | Bill of Lading/Air Bill No.: SEE OSPC |

Price Code: Air Quality ☐

Data Turnaround: 45 Days

000000049

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage: COOL 4C

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

000034

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| COOL 4C → Preservation | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ A/A 6406 | | |
| Type of Container | G/P | G/P | aG | aG | aG | aG | aG | G/P | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Volume | 30g | 30g | 250g | 125g | 125g | 125g | 125g | 125g | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Chromium Hex - 7196 | Semi-VOA - 8270A (TCL) | PAHs - 8310 | Pesticides - 8081 | PCBs - 8082 | See item (2) in Special Instructions. | See item (3) in Special Instructions. | | |

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J12N83 | SOIL | 06-20-06 | 0910 | X* | X* | X* | X* | X* | X* | X* | X* | | |
| J12N84 | SOIL | 06-20-06 | 0930 | X* | X* | X* | X* | X* | X* | X* | X* | | |
| J12N85 | SOIL | 06-20-06 | ~~0940~~ 1000 | X* | X* | X* | X* | X* | X* | X* | X* | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By/Removed From: BRETT TILLER | Date/Time: 1330 6-20-06 | Received By/Stored In: EAS LOCKED STORAGE | Date/Time: 1330 6-20-06 |
| Relinquished By/Removed From: EAS LOCKED STORAGE | Date/Time: 0900 6-21-06 | Received By/Stored In: [signature] | Date/Time: 6-21-06 0900 |
| Relinquished By/Removed From: [signature] WCH | Date/Time: 6/21/06 1500 | Received By/Stored In: Fed EX | Date/Time: |
| Relinquished By/Removed From: Fed Ex | Date/Time: 6 22 06 1 0925 | Received By/Stored In: [signature] | Date/Time: 6 22 06 1 0925 |
| 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

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 – Total Sr analysis fraction.

^ These marks indicate that this is a non-analysis used to properly format COC form.

Contact Joan Kessner for any questions.

1(1) ICP Metals - 6010 (Full List) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Uranium, Vanadium, Zinc]; Mercury - 7471 - (CV)

3(2) Chloro-Herbicides - EPA8151+ [2,4,5-Trichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid, 2-(2,4,5-Trichlorophenoxy)propionic acid, 2-secButyl-4,6-dinitrophenol(DNBP), 4-(2,4-Dichlorophenoxy)butanoic acid, Dalapon, Dicamba, Dichlproprop]

4(3) IC Anions - 300.0 [Nitrate]; NO2/NO3 - 353.2 [Nitrogen in Nitrite and Nitrate]

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-072-6 | Page 2 of 2 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: Tiller, B. | Company Contact: JOAN KESSNER — Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH | Price Code: 8N — Data Turnaround: 45 Days |
| Project Designation: 100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location: 600-181 | SAF No.: RC-072 | Air Quality ☐ |
| Ice Chest No.: ERC-02-406 | Field Logbook No.: EL-1597-~~1~~ 2 [illegible] — COA: BESRAS6520 | Method of Shipment: FED EX | |
| Shipped To: EBERLINE SERVICES (LIONVILLE) | Offsite Property No.: A060510 | Bill of Lading/Air Bill No.: SEE OSPC | |

000000050

POSSIBLE SAMPLE HAZARDS/REMARKS

*NONE*

Special Handling and/or Storage: COOL 4C

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| COOL 4C → Preservation | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | J/S 61406 | |
| Type of Container | G/P | G/P | aG | aG | aG | aG | aG | G/P | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Volume | 30g | 30g | 250g | 125g | 125g | 125g | 125g | 125g | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Chromium Hex - 7196 | Semi-VOA - 8270A (TCL) | PAHs - 8310 | Pesticides - 8081 | PCBs - 8082 | See item (2) in Special Instructions. | See item (3) in Special Instructions. | | |

000035

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J12N86 | SOIL | 06-20-06 | 1045 | X* | X* | X* | X* | X* | X* | X* | X* | | |
| J12N87 | SOIL | 06-20-06 | 1130 | X* | X* | X* | X* | X* | X* | X* | X* | | |
| J12N88 | SOIL | 06-20-06 | 1200 | X* | X* | X* | X* | X* | X* | X* | X* | | |
| J12N89 | SOIL | 06-20-06 | 1055 | X* | X* | X* | X* | X* | X* | X* | X* | | |

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By/Removed From: BRETT TILLER | Date/Time: 1330 6-20-06 | Received By/Stored In: EAS LOCKED STORAGE | Date/Time: 1330 6-20-06 |
| Relinquished By/Removed From: EAS LOCKED STORAGE | Date/Time: 1700 6-21-06 | Received By/Stored In: [illegible] | Date/Time: 6-21-06 0900 |
| Relinquished By/Removed From: [illegible] | Date/Time: 1500 6/21/06 | Received By/Stored In: Fed Exp | Date/Time: |
| Relinquished By/Removed From: [illegible] | Date/Time: 6-22-06 0925 | Received By/Stored In: [illegible] | Date/Time: 6-22-06 1092[illegible] |
| 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

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

^ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions.

2(1) ICP Metals - 6010 (Full List) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Uranium, Vanadium, Zinc]; Mercury - 7471 - (CV)

3(2) Chloro-Herbicides - EPA8151+ [2,4,5-Trichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid, 2-(2,4,5-Trichlorophenoxy)propionic acid, 2-secButyl-4,6-dinitrophenol(DNBP), 4-(2,4-Dichlorophenoxy)butanoic acid, Dalapon, Dicamba, Dichloroprop]

4(3) IC Anions - 300.0 [Nitrate]; NO2/NO3 - 353.2 [Nitrogen in Nitrite and Nitrate]

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-072-7 | Page 2 of 2 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector<br>Tiller, B. | Company Contact<br>JOAN KESSNER | Telephone No.<br>375-4688 | Project Coordinator<br>KESSNER, JH |
| Price Code 8N | Data Turnaround<br>45 Days | Air Quality ☐ | |
| Project Designation<br>100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location<br>618-4 | | SAF No.<br>RC-072 |
| Ice Chest No. EKC-02-406 | Field Logbook No.<br>EL-1597-X2 DT 06-19-06 | COA<br>BESRAS6520 | Method of Shipment<br>FED EX |
| Shipped To<br>EBERLINE SERVICES (LIONVILLE) | Offsite Property No. A060510 | | Bill of Lading/Air Bill No.<br>SEE OSPC |

POSSIBLE SAMPLE HAZARDS/REMARKS
NONE

Special Handling and/or Storage COOL 4C
*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | COOL 4C → ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ A061406 | | |
| Type of Container | G/P | G/P | aG | aG | aG | aG | aG | G/P | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Volume | 30g A061406 2 | 30g | 250g | 125g | 125g | 125g | 125g 3 | 125g A061406 4 | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Chromium Hex - 7196 | Semi-VOA - 8270A (TCL) | PAHs - 8310 | Pesticides - 8081 | PCBs - 8082 | See item (2) in Special Instructions. | See item (3) in Special Instructions. | | |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | |
| J12N90 | SOIL | 06-19-06 | 1500 | X1 | X* | X* | X* | X* | X* | X* |
| J12N91 | SOIL | 06-19-06 | 1530 | X* | X* | X* | X* | X* | X* | X* |
| J12N92 | SOIL | 06-19-06 | 1600 | X* | X* | X* | X* | X* | X* | X* |

000036

| CHAIN OF POSSESSION | Date/Time | Sign/Print Names: Received By/Stored In | Date/Time |
|---|---|---|---|
| Relinquished By/Removed From: BRETT TILLER | 6-19-06 1700 | EAS LOCKED STORAGE | 6-19-06 1700 |
| Relinquished By/Removed From: EAS LOCKED STORAGE | 6-21-06 0900 | Received By/Stored In: [illegible] | 6-21-06 0900 |
| Relinquished By/Removed From: [illegible] | 6/21/06 1500 | Received By/Stored In: Fed Ex | |
| Relinquished By/Removed From: Fed Ex | 6-22-06 0925 | Received By/Stored In: [illegible] | 6-22-06 0925 |
| Relinquished By/Removed From | | Received By/Stored In | |
| Relinquished By/Removed From | | Received By/Stored In | |

SPECIAL INSTRUCTIONS

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.

~ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions.

1(✓) ICP Metals - 6010 (Full List) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Uranium, Vanadium, Zinc]; Mercury - 7471 - (CV)

2(✓) Chloro-Herbicides - EPA8151+ [2,4,5-Trichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid, 2-(2,4,5-Trichlorophenoxy)propionic acid, 2-secButyl-4,6-dinitrophenol(DNBP), 4-(2,4-Dichlorophenoxy)butanoic acid, Dalapon, Dicamba, Dichloroprop]

3(✓) IC Anions - 300.0 [Nitrate]; NO2/NO3 - 353.2 [Nitrogen in Nitrite and Nitrate]

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
Ve=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-072-8 | Page 1 of 1 S/S 61406

| | | | |
|---|---|---|---|
| Collector: Tiller, B. | Company Contact: JOAN KESSNER | Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH |
| Project Designation: 100 & 300 Area Component of the RCBRA - Discrete Soil S | Sampling Location: EQUIPMENT BLANK | | SAF No.: RC-072 |
| Ice Chest No.: ERC-02-406 | Field Logbook No.: EL-1597-1 | COA: BESRAS6520 | Method of Shipment: FED EX |
| Shipped To: EBERLINE SERVICES / LIONVILLE | Offsite Property No.: A060510 | | Bill of Lading/Air Bill No.: SEE OSPC |

Price Code: 8N

Air Quality ☐

Data Turnaround: 45 Days

000000052

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*NONE*

**Special Handling and/or Storage** COOL 4C

*Use page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.*

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| COOL 4C → Preservation | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ | ~~None~~ S/S 61406 | | |
| Type of Container | G/P | G/P | aG | aG | aG | aG | aG | G/P | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Volume | 30g S/S 61402 | 30g | 250g | 125g | 125g | 125g | 125g 3 S/S 61404 | 125g | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Chromium Hex - 7196 | Semi-VOA - 8270A (TCL) | PAHs - 8310 | Pesticides - 8081 | PCBs - 8082 | See item (2) in Special Instructions. | See item (3) in Special Instructions. | | |

000037

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J12N93 | SOIL | 6-19-06 | 1140 | X | X | X | X | X | X | X | X | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

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

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| ~~BRETT TILLER~~ BRETT TILLER | 1700 6-19-06 | EAS LOCKED STORAGE | 1700 6-19-06 |
| EAS LOCKED STORAGE | 0400 6-21-06 | [signature] | 6-21-06 0900 |
| [signature] | 1500 6/21/06 | Fed Ex | |
| Fed Ex | 6 22 06 0925 | [signature] | 6 22 06 0925 |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS**

* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 – Total Sr analysis fraction.

~ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions.

2(1) ICP Metals - 6010 (Full List) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Thallium, Tin, Uranium, Vanadium, Zinc]; Mercury - 7471 - (CV)

3(2) Chloro-Herbicides - EPA8151+ [2,4,5-Trichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid, 2-(2,4,5-Trichlorophenoxy)propionic acid, 2-secButyl-4,6-dinitrophenol(DNBP), 4-(2,4-Dichlorophenoxy)butanoic acid, Dalapon, Dicamba, Dichloroprop]

4(3) IC Anions - 300.0 [Nitrate]; NO2/NO3 - 353.2 [Nitrogen in Nitrite and Nitrate]

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, LI=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: | RCBRA | | DATA PACKAGE: | K0445 | |
| VALIDATOR: | TLI | LAB: LLI | | DATE: 9/7/06 | |
| | | | SDG: | K0445 | |
| ANALYSES PERFORMED | | | | | |
| SW-846/ICP | SW-846/GFAA | SW-846/Hg | SW-846 Cyanide | | |
| | | | | | |
| SAMPLES/MATRIX | | | | | |
| J12N79 | J12N80 | J12N81 | J12N82 | J12N83 | J12N84 |
| J12N85 | J12N86 | J12N87 | J12N88 | J12N89 | J12N90 |
| J12N91 | J12N92 | J12N93 | | | |
| | | | | | |
| | | | | | 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: Boron, - 80, 81, 82, 83, 86, 87, 88, 89, Na + 92 - UJ all
Lithium - UJ-93

no FB

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

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

Comments: MS - antimony - 5770 - J all no PAS

LCS - Silicon - 33.770 - 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 07/28/06

CLIENT: TNUHANFORD RC-072 K0445 LVL LOT #: 0606L337

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| BLANK1 | 06L0439-MB1 | Silver, Total | 0.07 u | MG/KG | 0.07 | 1.0 |
| | | Aluminum, Total | 2.9 u | MG/KG | 2.9 | 1.0 |
| | | Arsenic, Total | 0.61 u | MG/KG | 0.61 | 1.0 |
| | | Boron, Total | 0.44 | 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 |
| | | Bismuth, Total | 0.51 u | MG/KG | 0.51 | 1.0 |
| | | Calcium, Total | 1.6 u | MG/KG | 1.6 | 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 | 3.5 u | MG/KG | 3.5 | 1.0 |
| | | Potassium, Total | 2.3 u | MG/KG | 2.3 | 1.0 |
| | | Lithium, Total | 0.05 | MG/KG | 0.03 | 1.0 |
| | | Magnesium, Total | 0.97 u | MG/KG | 0.97 | 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 | 0.76 u | MG/KG | 0.76 | 1.0 |
| | | Nickel, Total | 0.24 u | MG/KG | 0.24 | 1.0 |
| | | Phosphorus, Total | 0.90 u | 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 u | MG/KG | 0.01 | 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 | 0.09 u | MG/KG | 0.09 | 1.0 |
| | | Zinc, Total | 0.16 u | MG/KG | 0.16 | 1.0 |
| BLANK1 | 06C0128-MB1 | Mercury, Total | 0.02 u | MG/KG | 0.02 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 07/28/06

CLIENT: TNUHANFORD RC-D72 K0445 LVL LOT #: 0606L337

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

| SAMPLE | SITE ID | ANALYTE | SPIKED SAMPLE | INITIAL RESULT | SPIKED AMOUNT | %RECOV | DILUTION FACTOR(SPK) |
|---|---|---|---|---|---|---|---|
| -001 | J12N79 | Silver, Total | 4.5 | 0.20u | 4.8 | 93.8 | 3.0 |
| | | Aluminum, Total | 5600 | 4750 | 191 | 448.1* | 3.0 |
| | | Arsenic, Total | 181 | 2.6 | 191 | 93.7 | 3.0 |
| | | Boron, Total | 89.2 | 2.6 | 95.3 | 90.9 | 3.0 |
| | | Barium, Total | 236 | 51.6 | 191 | 96.6 | 3.0 |
| | | Beryllium, Total | 4.8 | 0.22 | 4.8 | 95.4 | 3.0 |
| | | Bismuth, Total | 90.6 | 1.5 u | 95.3 | 95.1 | 3.0 |
| | | Calcium, Total | 9140 | 6700 | 2380 | 102.5 | 3.0 |
| | | Cadmium, Total | 4.5 | 0.20u | 4.8 | 93.8 | 3.0 |
| | | Cobalt, Total | 50.4 | 5.6 | 47.7 | 93.9 | 3.0 |
| | | Chromium, Total | 28.0 | 8.5 | 19.1 | 102.1 | 3.0 |
| | | Copper, Total | 35.9 | 12.2 | 23.8 | 99.6 | 3.0 |
| | | Iron, Total | 15200 | 13900 | 95.3 | 1375 * | 3.0 |
| | | Potassium, Total | 3220 | 909 | 2380 | 97.0 | 3.0 |
| | | Lithium, Total | 102 | 6.3 | 95.3 | 100.5 | 3.0 |
| | | Magnesium, Total | 6460 | 3970 | 2380 | 104.1 | 3.0 |
| | | Manganese, Total | 302 | 248 | 47.7 | 113.0* | 3.0 |
| | | Molybdenum, Total | 89.8 | 0.83u | 95.3 | 94.2 | 3.0 |
| | | Sodium, Total | 2390 | 117 | 2380 | 95.3 | 3.0 |
| | | Nickel, Total | 55.7 | 10.1 | 47.7 | 95.6 | 3.0 |
| | | Phosphorus, Total | 837 | 748 | 95.3 | 93.1* | 3.0 |
| | | Lead, Total | 48.0 | 4.0 | 47.7 | 92.2 | 3.0 |
| | | Antimony, Total | 27.2 | 1.3 u | 47.7 | 57.0 | 3.0 |
| | | Selenium, Total | 176 | 1.3 u | 191 | 92.1 | 3.0 |
| | | Silicon, Total | 681 | 463 | 95.3 | 228.6* | 3.0 |
| | | Tin, Total | 87.9 | 3.1 u | 95.3 | 92.2 | 3.0 |
| | | Strontium, Total | 122 | 32.2 | 95.3 | 93.8 | 3.0 |
| | | Thallium, Total | 178 | 2.0 u | 191 | 93.4 | 3.0 |
| | | Uranium, Total | 90.7 | 2.5 u | 95.3 | 95.2 | 3.0 |
| | | Vanadium, Total | 78.6 | 29.6 | 47.7 | 102.7 | 3.0 |
| | | Zinc, Total | 77.4 | 31.2 | 47.7 | 96.9 | 3.0 |

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 07/28/06

CLIENT: TNUHANFORD RC-072 K0445 LVL LOT #: 0606L337

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

| SAMPLE | SITE ID | ANALYTE | SPIKED SAMPLE | INITIAL RESULT | SPIKED AMOUNT | %RECOV | DILUTION FACTOR(SPK) |
|---|---|---|---|---|---|---|---|
| -014 | J12N92 | Mercury, Total | 0.16 | 0.02u | 0.15 | 107.2 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 07/28/06

CLIENT: TNUHANFORD RC-072 K044S LVL LOT #: 0606L337

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

| SAMPLE | SITE ID | ANALYTE | INITIAL RESULT | REPLICATE | RPD | DILUTION FACTOR(REP) |
|---|---|---|---|---|---|---|
| -001REP | J12N79 | Silver, Total | 0.20u | 0.20u | NC | 3.0 |
| | | Aluminum, Total | 4750 | 4650 | 2.1 | 3.0 |
| | | Arsenic, Total | 2.6 | 2.4 | 8.0 | 3.0 |
| | | Boron, Total | 2.6 | 1.8 | 36.4 | 3.0 |
| | | Barium, Total | 51.6 | 51.9 | 0.58 | 3.0 |
| | | Beryllium, Total | 0.22 | 0.22 | 1.3 | 3.0 |
| | | Bismuth, Total | 1.5 u | 1.5 u | NC | 3.0 |
| | | Calcium, Total | 6700 | 6810 | 1.6 | 3.0 |
| | | Cadmium, Total | 0.20u | 0.20u | NC | 3.0 |
| | | Cobalt, Total | 5.6 | 5.5 | 1.8 | 3.0 |
| | | Chromium, Total | 8.5 | 8.4 | 1.2 | 3.0 |
| | | Copper, Total | 12.2 | 12.5 | 2.4 | 3.0 |
| | | Iron, Total | 13900 | 13800 | 0.12 | 3.0 |
| | | Potassium, Total | 909 | 908 | 0.12 | 3.0 |
| | | Lithium, Total | 6.3 | 6.3 | 0.00 | 3.0 |
| | | Magnesium, Total | 3970 | 3860 | 2.9 | 3.0 |
| | | Manganese, Total | 248 | 241 | 2.9 | 3.0 |
| | | Molybdenum, Total | 0.83u | 0.83u | NC | 3.0 |
| | | Sodium, Total | 117 | 115 | 2.4 | 3.0 |
| | | Nickel, Total | 10.1 | 9.5 | 6.1 | 3.0 |
| | | Phosphorus, Total | 748 | 727 | 2.9 | 3.0 |
| | | Lead, Total | 4.0 | 3.6 | 10.5 | 3.0 |
| | | Antimony, Total | 1.3 u | 1.3 u | NC | 3.0 |
| | | Selenium, Total | 1.3 u | 1.3 u | NC | 3.0 |
| | | Silicon, Total | 463 | 462 | 0.22 | 3.0 |
| | | Tin, Total | 3.1 u | 3.1 u | NC | 3.0 |
| | | Strontium, Total | 32.2 | 28.7 | 11.5 | 3.0 |
| | | Thallium, Total | 2.0 u | 2.0 u | NC | 3.0 |
| | | Uranium, Total | 2.5 u | 2.5 u | NC | 3.0 |
| | | Vanadium, Total | 29.6 | 29.7 | 0.34 | 3.0 |
| | | Zinc, Total | 31.2 | 30.8 | 1.3 | 3.0 |

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 07/28/06

CLIENT: TNUHANFORD RC-072 K0445 LVL LOT #: 0606L337

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

| SAMPLE | SITE ID | ANALYTE | INITIAL RESULT | REPLICATE | RPD | DILUTION FACTOR(REP) |
|---|---|---|---|---|---|---|
| -014REP | J12N92 | Mercury, Total | 0.02u | 0.02u | NC | 1.0 |

Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 07/28/06

CLIENT: TNUHANFORD RC-072 K0445 LVL LOT #: 0606L337

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

| SAMPLE | SITE ID | ANALYTE | SPIKED SAMPLE | SPIKED AMOUNT | UNITS | %RECOV |
|---|---|---|---|---|---|---|
| LCS1 | 06L0439-LC1 | Silver, LCS | 49.0 | 50.0 | MG/KG | 98.0 |
| | | Aluminum, LCS | 495 | 500 | MG/KG | 99.0 |
| | | Arsenic, LCS | 938 | 1000 | MG/KG | 93.8 |
| | | Boron, LCS | 468 | 500 | MG/KG | 93.7 |
| | | Barium, LCS | 489 | 500 | MG/KG | 97.8 |
| | | Beryllium, LCS | 24.4 | 25.0 | MG/KG | 97.6 |
| | | Bismuth, LCS | 98.6 | 100 | MG/KG | 98.6 |
| | | Calcium, LCS | 2450 | 2500 | MG/KG | 98.1 |
| | | Cadmium, LCS | 24.0 | 25.0 | MG/KG | 96.0 |
| | | Cobalt, LCS | 243 | 250 | MG/KG | 97.0 |
| | | Chromium, LCS | 49.4 | 50.0 | MG/KG | 98.8 |
| | | Copper, LCS | 123 | 125 | MG/KG | 98.4 |
| | | Iron, LCS | 495 | 500 | MG/KG | 98.9 |
| | | Potassium, LCS | 2340 | 2500 | MG/KG | 93.5 |
| | | Lithium, LCS | 504 | 500 | MG/KG | 100.8 |
| | | Magnesium, LCS | 2410 | 2500 | MG/KG | 96.3 |
| | | Manganese, LCS | 74.3 | 75.0 | MG/KG | 99.1 |
| | | Molybdenum, LCS | 488 | 500 | MG/KG | 97.7 |
| | | Sodium, LCS | 2370 | 2500 | MG/KG | 94.7 |
| | | Nickel, LCS | 194 | 200 | MG/KG | 97.0 |
| | | Phosphorus, LCS | 78.4 | 100 | MG/KG | 78.4 |
| | | Lead, LCS | 240 | 250 | MG/KG | 96.2 |
| | | Antimony, LCS | 286 | 300 | MG/KG | 95.3 |
| | | Selenium, LCS | 896 | 1000 | MG/KG | 89.6 |
| | | Silicon, LCS | 169 | 500 | MG/KG | 33.7 |
| | | Tin, LCS | 489 | 500 | MG/KG | 97.9 |
| | | Strontium, LCS | 493 | 500 | MG/KG | 98.5 |
| | | Thallium, LCS | 966 | 1000 | MG/KG | 96.6 |
| | | Uranium, LCS | 100 | 100 | MG/KG | 100.3 |
| | | Vanadium, LCS | 246 | 250 | MG/KG | 98.3 |
| | | Zinc, LCS | 95.1 | 100 | MG/KG | 95.1 |
| LCS1 | 06C0128-LC1 | | | | | |
| LCS1 | 06C0128-LC1 | Mercury, LCS | 6.7 | 6.2 | MG/KG | 108.0 |