RECRA ENVIRONMENTAL INC.
Chemical and Environmental Measurement Information

**Recra LabNet Philadelphia**
**Analytical Report**

**Client :** TNU-HANFORD B99-078
**RFW# :** 9908L930
**SDG/SAF# :** B99-078/H0508

**W.O.# :** 10985-001-001-9999-00
**Date Received:** 08-31-99

RECEIVED
JAN 18 2000
EDMC

***REVISION***

**METALS CASE NARRATIVE**

This package has been revised to include the addition of Antimony and Thallium.

1. This narrative covers the analyses of 8 soil samples.

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

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

4. The cooler temperatures have been recorded on the Chain of Custody.

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

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

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

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

9. All laboratory control samples (LCS) were within the laboratory control limits. Refer to the Inorganics Laboratory Control Standards Report.

10. The matrix spike (MS) recovery for Antimony was 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 22 pages.

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

| Sample ID | Element | PDS Concentration (ppb) | PDS % Recovery |
|---|---|---|---|
| B0W899 | Antimony | 500 | 98.4 |

12. The duplicate analyses for 2 analytes were outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

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

Pat E

for J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

11-9-99
Date

mld/m08-930r

# METALS METHOD GLOSSARY

The following methods are used as reference for the digestion and analysis of samples contained within this Recra Lot#: 9908L930

Leaching Procedure: __1310 __1311 __1312 __Other:_____

CLP Metals __ Digestion and __ Analysis Methods: __ILM03.0 __ILM04.0

Metals Digestion Methods: __3005A __3010A __3015 __3020A ✓3050A __3051 __200.7 __SS17
__Other: _____

## Metals Analysis Methods

| | SW846 | | EPA | | STD MTD | EPA OSWR | USATHAMA |
|---|---|---|---|---|---|---|---|
| Aluminum | __6010B | | __200.7 | | | | __99 |
| Antimony | ✓6010B | __7041 [5] | __200.7 | __204.2 | | | __99 |
| Arsenic | ✓6010B | __7060A [5] | __200.7 | __206.2 | __3113B | | __99 |
| Barium | ✓6010B | | __200.7 | | | | __99 |
| Beryllium | ✓6010B | | __200.7 | | | | __99 |
| Bismuth | __6010B [1] | | __200.7 [1] | | | __1620 | __99 |
| Boron | __6010B | | __200.7 | | | | __99 |
| Cadmium | ✓6010B | __7131A [5] | __200.7 | __213.2 | | | __99 |
| Calcium | __6010B | | __200.7 | | | | __99 |
| Chromium | ✓6010B | __7191 [5] | __200.7 | __218.2 | | | __SS17 |
| Cobalt | __6010B | | __200.7 | | | | __99 |
| Copper | ✓6010B | __7211 [5] | __200.7 | __220.2 | | | __99 |
| Iron | __6010B | | __200.7 | | | | __99 |
| Lead | ✓6010B | __7421 [5] | __200.7 | __239.2 | __3113B | | __99 |
| Lithium | __6010B | __7430 [4] | __200.7 | | | __1620 | __99 |
| Magnesium | __6010B | | __200.7 | | | | __99 |
| Manganese | __6010B | | __200.7 | | | | __99 |
| Mercury | __7470A [3] | ✓7471A [3] | __245.1 [2] | __245.5 [2] | | | __99 |
| Molybdenum | __6010B | | __200.7 | | | | __99 |
| Nickel | ✓6010B | | __200.7 | | | | __99 |
| Potassium | __6010B | __7610 [4] | __200.7 | __258.1 [4] | | | __99 |
| Rare Earths | __6010B [1] | | __200.7 [1] | | | __1620 | __99 |
| Selenium | ✓6010B | __7740 [5] | __200.7 | __270.2 | __3113B | | __99 |
| Silicon | __6010B [1] | | __200.7 | | | __1620 | __99 |
| Silica | __6010B | | __200.7 | | | __1620 | __99 |
| Silver | ✓6010B | __7761 [5] | __200.7 | __272.2 | | | __99 |
| Sodium | __6010B | __7770 [4] | __200.7 | __273.1 [4] | | | __99 |
| Strontium | __6010B | | __200.7 | | | | __99 |
| Thallium | ✓6010B | __7841 [5] | __200.7 | __279.2 | __200.9 | | __99 |
| Tin | __6010B | | __200.7 | | | | __99 |
| Titanium | __6010B | | __200.7 | | | | __99 |
| Uranium | __6010B [1] | | __200.7 [1] | | | __1620 | __99 |
| Vanadium | ✓6010B | | __200.7 | | | | __99 |
| Zinc | ✓6010B | | __200.7 | | | | __99 |
| Zirconium | __6010B [1] | | __200.7 [1] | | | __1620 | __99 |

Other:_____ Method:_____



L-WI-033/M-03/98

# METHOD REFERENCES AND DATA QUALIFIERS

## DATA QUALIFIERS

U = Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.

* = Indicates that the original sample result is greater than 4x the spike amount added.

## ABBREVIATIONS

MB = Method or Preparation Blank.
MS = Matrix Spike.
MSD = Matrix Spike Duplicate.
REP = Sample Replicate
LCS = Laboratory Control Sample.
NC = Not calculated.

## ANALYTICAL METAL METHODS

1. Not included in the method element list.

2. Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, 0.1 grams of sample is taken to a final volume of 50 mL (including all reagents).

3. Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, three 0.1 gram of sample is taken to a final volume of 50 mL (including all reagents).

4. Flame AA.

5. Graphite Furnace AA.

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 11/09/99

CLIENT: TNU-HANFORD B99-078

RECRA LOT #: 9908L930

WORK ORDER: 10985-001-001-9999-00

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -001 | B0W899 | Silver, Total | 0.09 u | MG/KG | 0.09 | 1.0 |
| | | Arsenic, Total | 3.3 | MG/KG | 0.28 | 1.0 |
| | | Barium, Total | 50.3 | MG/KG | 0.03 | 1.0 |
| | | Beryllium, Total | 0.1 | MG/KG | 0.009 | 1.0 |
| | | Cadmium, Total | 0.22 | MG/KG | 0.03 | 1.0 |
| | | Chromium, Total | 4.0 | MG/KG | 0.07 | 1.0 |
| | | Copper, Total | 14.6 | MG/KG | 0.10 | 1.0 |
| | | Mercury, Total | 0.02 u | MG/KG | 0.02 | 1.0 |
| | | Nickel, Total | 7.0 | MG/KG | 0.10 | 1.0 |
| | | Lead, Total | 3.6 | MG/KG | 0.18 | 1.0 |
| | | Antimony, Total | 0.21 u | MG/KG | 0.21 | 1.0 |
| | | Selenium, Total | 0.66 | MG/KG | 0.32 | 1.0 |
| | | Thallium, Total | 0.59 | MG/KG | 0.45 | 1.0 |
| | | Vanadium, Total | 68.3 | MG/KG | 0.05 | 1.0 |
| | | Zinc, Total | 48.0 | MG/KG | 0.07 | 1.0 |
| -002 | B0W8B2 | Silver, Total | 0.08 u | MG/KG | 0.08 | 1.0 |
| | | Arsenic, Total | 2.8 | MG/KG | 0.27 | 1.0 |
| | | Barium, Total | 50.5 | MG/KG | 0.02 | 1.0 |
| | | Beryllium, Total | 0.16 | MG/KG | 0.008 | 1.0 |
| | | Cadmium, Total | 0.14 | MG/KG | 0.02 | 1.0 |
| | | Chromium, Total | 5.8 | MG/KG | 0.07 | 1.0 |
| | | Copper, Total | 13.9 | MG/KG | 0.1 | 1.0 |
| | | Mercury, Total | 0.01 u | MG/KG | 0.01 | 1.0 |
| | | Nickel, Total | 8.0 | MG/KG | 0.1 | 1.0 |
| | | Lead, Total | 4.0 | MG/KG | 0.17 | 1.0 |
| | | Antimony, Total | 0.21 u | MG/KG | 0.21 | 1.0 |
| | | Selenium, Total | 0.57 | MG/KG | 0.30 | 1.0 |
| | | Thallium, Total | 0.73 | MG/KG | 0.44 | 1.0 |
| | | Vanadium, Total | 62.0 | MG/KG | 0.05 | 1.0 |
| | | Zinc, Total | 45.4 | MG/KG | 0.07 | 1.0 |

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INORGANICS DATA SUMMARY REPORT 11/09/99

CLIENT: TNU-HANFORD B99-078 RECRA LOT #: 9908L930

WORK ORDER: 10985-001-001-9999-00

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -003 | B0W8B3 | Silver, Total | 0.09 u | MG/KG | 0.09 | 1.0 |
| | | Arsenic, Total | 2.9 | MG/KG | 0.31 | 1.0 |
| | | Barium, Total | 67.7 | MG/KG | 0.03 | 1.0 |
| | | Beryllium, Total | 0.20 | MG/KG | 0.009 | 1.0 |
| | | Cadmium, Total | 0.12 | MG/KG | 0.03 | 1.0 |
| | | Chromium, Total | 6.1 | MG/KG | 0.07 | 1.0 |
| | | Copper, Total | 14.9 | MG/KG | 0.11 | 1.0 |
| | | Mercury, Total | 0.02 u | MG/KG | 0.02 | 1.0 |
| | | Nickel, Total | 8.3 | MG/KG | 0.11 | 1.0 |
| | | Lead, Total | 4.3 | MG/KG | 0.19 | 1.0 |
| | | Antimony, Total | 0.23 u | MG/KG | 0.23 | 1.0 |
| | | Selenium, Total | 0.64 | MG/KG | 0.34 | 1.0 |
| | | Thallium, Total | 0.49 u | MG/KG | 0.49 | 1.0 |
| | | Vanadium, Total | 53.6 | MG/KG | 0.06 | 1.0 |
| | | Zinc, Total | 45.9 | MG/KG | 0.07 | 1.0 |
| -004 | B0W894 | Silver, Total | 0.08 u | MG/KG | 0.08 | 1.0 |
| | | Arsenic, Total | 3.1 | MG/KG | 0.26 | 1.0 |
| | | Barium, Total | 85.2 | MG/KG | 0.02 | 1.0 |
| | | Beryllium, Total | 0.30 | MG/KG | 0.008 | 1.0 |
| | | Cadmium, Total | 0.12 | MG/KG | 0.02 | 1.0 |
| | | Chromium, Total | 8.8 | MG/KG | 0.06 | 1.0 |
| | | Copper, Total | 14.3 | MG/KG | 0.1 | 1.0 |
| | | Mercury, Total | 0.02 u | MG/KG | 0.02 | 1.0 |
| | | Nickel, Total | 10.3 | MG/KG | 0.1 | 1.0 |
| | | Lead, Total | 5.1 | MG/KG | 0.17 | 1.0 |
| | | Antimony, Total | 0.20 u | MG/KG | 0.20 | 1.0 |
| | | Selenium, Total | 0.92 | MG/KG | 0.30 | 1.0 |
| | | Thallium, Total | 0.61 | MG/KG | 0.43 | 1.0 |
| | | Vanadium, Total | 64.8 | MG/KG | 0.05 | 1.0 |
| | | Zinc, Total | 50.1 | MG/KG | 0.06 | 1.0 |

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INORGANICS DATA SUMMARY REPORT 11/09/99

CLIENT: TNU-HANFORD B99-078 RECRA LOT #: 9908L930

WORK ORDER: 10985-001-001-9999-00

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -005 | B0W895 | Silver, Total | 0.10 u | MG/KG | 0.10 | 1.0 |
| | | Arsenic, Total | 2.8 | MG/KG | 0.34 | 1.0 |
| | | Barium, Total | 80.3 | MG/KG | 0.03 | 1.0 |
| | | Beryllium, Total | 0.22 | MG/KG | 0.01 | 1.0 |
| | | Cadmium, Total | 0.18 | MG/KG | 0.03 | 1.0 |
| | | Chromium, Total | 7.4 | MG/KG | 0.08 | 1.0 |
| | | Copper, Total | 13.2 | MG/KG | 0.13 | 1.0 |
| | | Mercury, Total | 0.02 u | MG/KG | 0.02 | 1.0 |
| | | Nickel, Total | 9.0 | MG/KG | 0.13 | 1.0 |
| | | Lead, Total | 4.6 | MG/KG | 0.22 | 1.0 |
| | | Antimony, Total | 0.26 u | MG/KG | 0.26 | 1.0 |
| | | Selenium, Total | 0.94 | MG/KG | 0.39 | 1.0 |
| | | Thallium, Total | 0.55 u | MG/KG | 0.55 | 1.0 |
| | | Vanadium, Total | 69.8 | MG/KG | 0.06 | 1.0 |
| | | Zinc, Total | 51.3 | MG/KG | 0.08 | 1.0 |
| -006 | B0W896 | Silver, Total | 0.08 u | MG/KG | 0.08 | 1.0 |
| | | Arsenic, Total | 2.9 | MG/KG | 0.27 | 1.0 |
| | | Barium, Total | 83.4 | MG/KG | 0.02 | 1.0 |
| | | Beryllium, Total | 0.35 | MG/KG | 0.008 | 1.0 |
| | | Cadmium, Total | 0.16 | MG/KG | 0.02 | 1.0 |
| | | Chromium, Total | 8.5 | MG/KG | 0.07 | 1.0 |
| | | Copper, Total | 13.8 | MG/KG | 0.1 | 1.0 |
| | | Mercury, Total | 0.02 u | MG/KG | 0.02 | 1.0 |
| | | Nickel, Total | 9.7 | MG/KG | 0.1 | 1.0 |
| | | Lead, Total | 5.0 | MG/KG | 0.17 | 1.0 |
| | | Antimony, Total | 0.20 u | MG/KG | 0.20 | 1.0 |
| | | Selenium, Total | 0.58 | MG/KG | 0.30 | 1.0 |
| | | Thallium, Total | 0.43 u | MG/KG | 0.43 | 1.0 |
| | | Vanadium, Total | 61.6 | MG/KG | 0.05 | 1.0 |
| | | Zinc, Total | 49.6 | MG/KG | 0.07 | 1.0 |

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INORGANICS DATA SUMMARY REPORT 11/09/99

CLIENT: TNU-HANFORD B99-078 RECRA LOT #: 9908L930

WORK ORDER: 10985-001-001-9999-00

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -007 | B0W897 | Silver, Total | 0.10 u | MG/KG | 0.10 | 1.0 |
| | | Arsenic, Total | 2.8 | MG/KG | 0.33 | 1.0 |
| | | Barium, Total | 49.3 | MG/KG | 0.03 | 1.0 |
| | | Beryllium, Total | 0.28 | MG/KG | 0.01 | 1.0 |
| | | Cadmium, Total | 0.1 | MG/KG | 0.03 | 1.0 |
| | | Chromium, Total | 4.9 | MG/KG | 0.08 | 1.0 |
| | | Copper, Total | 15.3 | MG/KG | 0.12 | 1.0 |
| | | Mercury, Total | 0.02 u | MG/KG | 0.02 | 1.0 |
| | | Nickel, Total | 8.3 | MG/KG | 0.12 | 1.0 |
| | | Lead, Total | 3.6 | MG/KG | 0.21 | 1.0 |
| | | Antimony, Total | 0.25 u | MG/KG | 0.25 | 1.0 |
| | | Selenium, Total | 0.58 | MG/KG | 0.37 | 1.0 |
| | | Thallium, Total | 0.53 u | MG/KG | 0.53 | 1.0 |
| | | Vanadium, Total | 68.0 | MG/KG | 0.06 | 1.0 |
| | | Zinc, Total | 48.5 | MG/KG | 0.08 | 1.0 |
| -008 | B0W898 | Silver, Total | 0.08 u | MG/KG | 0.08 | 1.0 |
| | | Arsenic, Total | 2.4 | MG/KG | 0.26 | 1.0 |
| | | Barium, Total | 32.9 | MG/KG | 0.02 | 1.0 |
| | | Beryllium, Total | 0.11 | MG/KG | 0.008 | 1.0 |
| | | Cadmium, Total | 0.07 | MG/KG | 0.02 | 1.0 |
| | | Chromium, Total | 3.6 | MG/KG | 0.06 | 1.0 |
| | | Copper, Total | 12.5 | MG/KG | 0.09 | 1.0 |
| | | Mercury, Total | 0.01 u | MG/KG | 0.01 | 1.0 |
| | | Nickel, Total | 6.5 | MG/KG | 0.09 | 1.0 |
| | | Lead, Total | 2.8 | MG/KG | 0.17 | 1.0 |
| | | Antimony, Total | 0.20 u | MG/KG | 0.20 | 1.0 |
| | | Selenium, Total | 0.64 | MG/KG | 0.29 | 1.0 |
| | | Thallium, Total | 0.43 | MG/KG | 0.42 | 1.0 |
| | | Vanadium, Total | 56.3 | MG/KG | 0.05 | 1.0 |
| | | Zinc, Total | 41.0 | MG/KG | 0.06 | 1.0 |

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INORGANICS METHOD BLANK DATA SUMMARY PAGE 11/09/99

CLIENT: TNU-HANFORD B99-078

RECRA LOT #: 9908L930

WORK ORDER: 10985-001-001-9999-00

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| BLANK1 | 99L0643-MB1 | Silver, Total | 0.10 u | MG/KG | 0.10 | 1.0 |
| | | Arsenic, Total | 0.33 u | MG/KG | 0.33 | 1.0 |
| | | Barium, Total | 0.10 | MG/KG | 0.03 | 1.0 |
| | | Beryllium, Total | 0.01 u | MG/KG | 0.01 | 1.0 |
| | | Cadmium, Total | 0.03 u | MG/KG | 0.03 | 1.0 |
| | | Chromium, Total | 0.09 | MG/KG | 0.08 | 1.0 |
| | | Copper, Total | 0.12 u | MG/KG | 0.12 | 1.0 |
| | | Nickel, Total | 0.12 u | MG/KG | 0.12 | 1.0 |
| | | Lead, Total | 0.21 u | MG/KG | 0.21 | 1.0 |
| | | Antimony, Total | 0.25 u | MG/KG | 0.25 | 1.0 |
| | | Selenium, Total | 0.37 u | MG/KG | 0.37 | 1.0 |
| | | Thallium, Total | 0.53 u | MG/KG | 0.53 | 1.0 |
| | | Vanadium, Total | 0.06 u | MG/KG | 0.06 | 1.0 |
| | | Zinc, Total | 0.08 u | MG/KG | 0.08 | 1.0 |
| BLANK1 | 99C0270-MB1 | Mercury, Total | 0.02 u | MG/KG | 0.02 | 1.0 |

Recra LabNet - Lionville

INORGANICS ACCURACY REPORT 11/09/99

CLIENT: TNU-HANFORD B99-078

RECRA LOT #: 9908L930

WORK ORDER: 10985-001-001-9999-00

| SAMPLE | SITE ID | ANALYTE | SPIKED SAMPLE | INITIAL RESULT | SPIKED AMOUNT | %RECOV | DILUTION FACTOR(SPK) |
|---|---|---|---|---|---|---|---|
| -001 | B0W899 | Silver, Total | 4.2 | 0.09u | 4.6 | 91.3 | 1.0 |
| | | Arsenic, Total | 173 | 3.3 | 183 | 92.7 | 1.0 |
| | | Barium, Total | 219 | 50.3 | 183 | 92.2 | 1.0 |
| | | Beryllium, Total | 4.5 | 0.1 | 4.6 | 95.7 | 1.0 |
| | | Cadmium, Total | 4.5 | 0.22 | 4.6 | 93.1 | 1.0 |
| | | Chromium, Total | 22.7 | 4.0 | 18.3 | 102.2 | 1.0 |
| | | Copper, Total | 36.1 | 14.6 | 22.9 | 93.9 | 1.0 |
| | | Mercury, Total | 0.15 | 0.02u | 0.15 | 100 | 1.0 |
| | | Nickel, Total | 49.8 | 7.0 | 45.8 | 93.4 | 1.0 |
| | | Lead, Total | 45.7 | 3.6 | 45.8 | 91.9 | 1.0 |
| | | Antimony, Total | 33.8 | 0.21u | 45.8 | 73.8 | 1.0 |
| | | Selenium, Total | 165 | 0.66 | 183 | 89.9 | 1.0 |
| | | Thallium, Total | 169 | 0.59 | 183 | 91.9 | 1.0 |
| | | Vanadium, Total | 117 | 68.3 | 45.8 | 106.8 | 1.0 |
| | | Zinc, Total | 92.6 | 48.0 | 45.8 | 97.4 | 1.0 |

Recra LabNet - Lionville

INORGANICS PRECISION REPORT 11/09/99

CLIENT: TNU-HANFORD B99-078 RECRA LOT #: 9908L930

WORK ORDER: 10985-001-001-9999-00

| SAMPLE | SITE ID | ANALYTE | INITIAL RESULT | REPLICATE | RPD | DILUTION FACTOR(REP) |
|---|---|---|---|---|---|---|
| -001REP | B0W899 | Silver, Total | 0.09u | 0.09u | NC | 1.0 |
| | | Arsenic, Total | 3.3 | 2.9 | 12.9 | 1.0 |
| | | Barium, Total | 50.3 | 56.8 | 12.1 | 1.0 |
| | | Beryllium, Total | 0.1 | 0.26 | 90.9 | 1.0 |
| | | Cadmium, Total | 0.22 | 0.16 | 28.3 | 1.0 |
| | | Chromium, Total | 4.0 | 4.5 | 11.8 | 1.0 |
| | | Copper, Total | 14.6 | 14.8 | 1.4 | 1.0 |
| | | Mercury, Total | 0.02u | 0.02u | NC | 1.0 |
| | | Nickel, Total | 7.0 | 8.1 | 14.6 | 1.0 |
| | | Lead, Total | 3.6 | 3.3 | 8.7 | 1.0 |
| | | Antimony, Total | 0.21u | 0.23u | NC | 1.0 |
| | | Selenium, Total | 0.66 | 0.55 | 18.6 | 1.0 |
| | | Thallium, Total | 0.59 | 0.56 | 5.4 | 1.0 |
| | | Vanadium, Total | 68.3 | 73.4 | 7.2 | 1.0 |
| | | Zinc, Total | 48.0 | 49.4 | 2.9 | 1.0 |

Recra LabNet - Lionville

INORGANICS LABORATORY CONTROL STANDARDS REPORT 11/09/99

CLIENT: TNU-HANFORD B99-078 RECRA LOT #: 9908L930

WORK ORDER: 10985-001-001-9999-00

| SAMPLE | SITE ID | ANALYTE | SPIKED SAMPLE | SPIKED AMOUNT | UNITS | %RECOV |
|---|---|---|---|---|---|---|
| LCS1 | 99L0643-LC1 | Silver, LCS | 49.7 | 50.0 | MG/KG | 99.4 |
| | | Arsenic, LCS | 974 | 1000 | MG/KG | 97.4 |
| | | Barium, LCS | 497 | 500 | MG/KG | 99.4 |
| | | Beryllium, LCS | 24.4 | 25.0 | MG/KG | 97.6 |
| | | Cadmium, LCS | 24.6 | 25.0 | MG/KG | 98.4 |
| | | Chromium, LCS | 50.3 | 50.0 | MG/KG | 100.6 |
| | | Copper, LCS | 124 | 125 | MG/KG | 99.5 |
| | | Nickel, LCS | 197 | 200 | MG/KG | 98.4 |
| | | Lead, LCS | 246 | 250 | MG/KG | 98.6 |
| | | Antimony, LCS | 292 | 300 | MG/KG | 97.5 |
| | | Selenium, LCS | 945 | 1000 | MG/KG | 94.5 |
| | | Thallium, LCS | 1020 | 1000 | MG/KG | 101.6 |
| | | Vanadium, LCS | 256 | 250 | MG/KG | 102.5 |
| | | Zinc, LCS | 96.7 | 100 | MG/KG | 96.7 |
| LCS1 | 99C0270-LC1 | Mercury, LCS | 1.1 | 1.0 | MG/KG | 105.5 |

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNU-HANFORD B99-078

DATE RECEIVED: 08/31/99 RFW LOT # :9908L930

| CLIENT ID /ANALYSIS | RFW # | MTX | PREP # | COLLECTION | EXTR/PREP | ANALYSIS |
|---|---|---|---|---|---|---|
| B0W899 | | | | | | |
| SILVER, TOTAL | 001 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| SILVER, TOTAL | 001 REP | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| SILVER, TOTAL | 001 MS | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| ARSENIC, TOTAL | 001 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| ARSENIC, TOTAL | 001 REP | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| ARSENIC, TOTAL | 001 MS | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| BARIUM, TOTAL | 001 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| BARIUM, TOTAL | 001 REP | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| BARIUM, TOTAL | 001 MS | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| BERYLLIUM, TOTAL | 001 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| BERYLLIUM, TOTAL | 001 REP | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| BERYLLIUM, TOTAL | 001 MS | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| CADMIUM, TOTAL | 001 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| CADMIUM, TOTAL | 001 REP | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| CADMIUM, TOTAL | 001 MS | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| CHROMIUM, TOTAL | 001 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| CHROMIUM, TOTAL | 001 REP | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| CHROMIUM, TOTAL | 001 MS | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| COPPER, TOTAL | 001 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| COPPER, TOTAL | 001 REP | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| COPPER, TOTAL | 001 MS | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| MERCURY, TOTAL | 001 | S | 99C0270 | 08/27/99 | 09/12/99 | 09/12/99 |
| MERCURY, TOTAL | 001 REP | S | 99C0270 | 08/27/99 | 09/12/99 | 09/12/99 |
| MERCURY, TOTAL | 001 MS | S | 99C0270 | 08/27/99 | 09/12/99 | 09/12/99 |
| NICKEL, TOTAL | 001 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| NICKEL, TOTAL | 001 REP | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| NICKEL, TOTAL | 001 MS | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| LEAD, TOTAL | 001 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| LEAD, TOTAL | 001 REP | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| LEAD, TOTAL | 001 MS | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| ANTIMONY, TOTAL | 001 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| ANTIMONY, TOTAL | 001 REP | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| ANTIMONY, TOTAL | 001 MS | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| SELENIUM, TOTAL | 001 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| SELENIUM, TOTAL | 001 REP | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNU-HANFORD B99-078

DATE RECEIVED: 08/31/99 RFW LOT # :9908L930

| CLIENT ID /ANALYSIS | RFW # | MTX | PREP # | COLLECTION | EXTR/PREP | ANALYSIS |
|---|---|---|---|---|---|---|
| SELENIUM, TOTAL | 001 MS | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| THALLIUM, TOTAL | 001 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| THALLIUM, TOTAL | 001 REP | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| THALLIUM, TOTAL | 001 MS | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| VANADIUM, TOTAL | 001 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| VANADIUM, TOTAL | 001 REP | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| VANADIUM, TOTAL | 001 MS | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| ZINC, TOTAL | 001 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| ZINC, TOTAL | 001 REP | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| ZINC, TOTAL | 001 MS | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| B0W8B2 | | | | | | |
| SILVER, TOTAL | 002 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| ARSENIC, TOTAL | 002 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| BARIUM, TOTAL | 002 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| BERYLLIUM, TOTAL | 002 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| CADMIUM, TOTAL | 002 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| CHROMIUM, TOTAL | 002 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| COPPER, TOTAL | 002 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| MERCURY, TOTAL | 002 | S | 99C0270 | 08/27/99 | 09/12/99 | 09/12/99 |
| NICKEL, TOTAL | 002 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| LEAD, TOTAL | 002 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| ANTIMONY, TOTAL | 002 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| SELENIUM, TOTAL | 002 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| THALLIUM, TOTAL | 002 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| VANADIUM, TOTAL | 002 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| ZINC, TOTAL | 002 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| B0W8B3 | | | | | | |
| SILVER, TOTAL | 003 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| ARSENIC, TOTAL | 003 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| BARIUM, TOTAL | 003 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| BERYLLIUM, TOTAL | 003 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| CADMIUM, TOTAL | 003 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| CHROMIUM, TOTAL | 003 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| COPPER, TOTAL | 003 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNU-HANFORD B99-078

DATE RECEIVED: 08/31/99 RFW LOT # :9908L930

| CLIENT ID /ANALYSIS | RFW # | MTX | PREP # | COLLECTION | EXTR/PREP | ANALYSIS |
|---|---|---|---|---|---|---|
| MERCURY, TOTAL | 003 | S | 99C0270 | 08/27/99 | 09/12/99 | 09/12/99 |
| NICKEL, TOTAL | 003 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| LEAD, TOTAL | 003 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| ANTIMONY, TOTAL | 003 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| SELENIUM, TOTAL | 003 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| THALLIUM, TOTAL | 003 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| VANADIUM, TOTAL | 003 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| ZINC, TOTAL | 003 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| B0W894 | | | | | | |
| SILVER, TOTAL | 004 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| ARSENIC, TOTAL | 004 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| BARIUM, TOTAL | 004 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| BERYLLIUM, TOTAL | 004 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| CADMIUM, TOTAL | 004 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| CHROMIUM, TOTAL | 004 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| COPPER, TOTAL | 004 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| MERCURY, TOTAL | 004 | S | 99C0270 | 08/27/99 | 09/12/99 | 09/12/99 |
| NICKEL, TOTAL | 004 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| LEAD, TOTAL | 004 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| ANTIMONY, TOTAL | 004 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| SELENIUM, TOTAL | 004 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| THALLIUM, TOTAL | 004 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| VANADIUM, TOTAL | 004 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| ZINC, TOTAL | 004 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| B0W895 | | | | | | |
| SILVER, TOTAL | 005 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| ARSENIC, TOTAL | 005 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| BARIUM, TOTAL | 005 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| BERYLLIUM, TOTAL | 005 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| CADMIUM, TOTAL | 005 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| CHROMIUM, TOTAL | 005 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| COPPER, TOTAL | 005 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| MERCURY, TOTAL | 005 | S | 99C0270 | 08/27/99 | 09/12/99 | 09/12/99 |
| NICKEL, TOTAL | 005 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNU-HANFORD B99-078

DATE RECEIVED: 08/31/99 RFW LOT # :9908L930

| CLIENT ID /ANALYSIS | RFW # | MTX | PREP # | COLLECTION | EXTR/PREP | ANALYSIS |
|---|---|---|---|---|---|---|
| LEAD, TOTAL | 005 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| ANTIMONY, TOTAL | 005 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| SELENIUM, TOTAL | 005 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| THALLIUM, TOTAL | 005 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| VANADIUM, TOTAL | 005 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| ZINC, TOTAL | 005 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| B0W896 | | | | | | |
| SILVER, TOTAL | 006 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| ARSENIC, TOTAL | 006 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| BARIUM, TOTAL | 006 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| BERYLLIUM, TOTAL | 006 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| CADMIUM, TOTAL | 006 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| CHROMIUM, TOTAL | 006 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| COPPER, TOTAL | 006 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| MERCURY, TOTAL | 006 | S | 99C0270 | 08/27/99 | 09/12/99 | 09/12/99 |
| NICKEL, TOTAL | 006 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| LEAD, TOTAL | 006 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| ANTIMONY, TOTAL | 006 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| SELENIUM, TOTAL | 006 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| THALLIUM, TOTAL | 006 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| VANADIUM, TOTAL | 006 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| ZINC, TOTAL | 006 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| B0W897 | | | | | | |
| SILVER, TOTAL | 007 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| ARSENIC, TOTAL | 007 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| BARIUM, TOTAL | 007 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| BERYLLIUM, TOTAL | 007 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| CADMIUM, TOTAL | 007 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| CHROMIUM, TOTAL | 007 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| COPPER, TOTAL | 007 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| MERCURY, TOTAL | 007 | S | 99C0270 | 08/27/99 | 09/12/99 | 09/12/99 |
| NICKEL, TOTAL | 007 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| LEAD, TOTAL | 007 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| ANTIMONY, TOTAL | 007 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNU-HANFORD B99-078

DATE RECEIVED: 08/31/99 RFW LOT # :9908L930

| CLIENT ID /ANALYSIS | RFW # | MTX | PREP # | COLLECTION | EXTR/PREP | ANALYSIS |
|---|---|---|---|---|---|---|
| SELENIUM, TOTAL | 007 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| THALLIUM, TOTAL | 007 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| VANADIUM, TOTAL | 007 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| ZINC, TOTAL | 007 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| B0W898 | | | | | | |
| SILVER, TOTAL | 008 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| ARSENIC, TOTAL | 008 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| BARIUM, TOTAL | 008 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| BERYLLIUM, TOTAL | 008 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| CADMIUM, TOTAL | 008 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| CHROMIUM, TOTAL | 008 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| COPPER, TOTAL | 008 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| MERCURY, TOTAL | 008 | S | 99C0270 | 08/27/99 | 09/12/99 | 09/12/99 |
| NICKEL, TOTAL | 008 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| LEAD, TOTAL | 008 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| ANTIMONY, TOTAL | 008 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| SELENIUM, TOTAL | 008 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| THALLIUM, TOTAL | 008 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/28/99 |
| VANADIUM, TOTAL | 008 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |
| ZINC, TOTAL | 008 | S | 99L0643 | 08/27/99 | 09/22/99 | 09/27/99 |

LAB QC:

| | | | | | | |
|---|---|---|---|---|---|---|
| SILVER LABORATORY | LC1 BS | S | 99L0643 | N/A | 09/22/99 | 09/27/99 |
| SILVER, TOTAL | MB1 | S | 99L0643 | N/A | 09/22/99 | 09/27/99 |
| ARSENIC LABORATORY | LC1 BS | S | 99L0643 | N/A | 09/22/99 | 09/28/99 |
| ARSENIC, TOTAL | MB1 | S | 99L0643 | N/A | 09/22/99 | 09/28/99 |
| BARIUM LABORATORY | LC1 BS | S | 99L0643 | N/A | 09/22/99 | 09/27/99 |
| BARIUM, TOTAL | MB1 | S | 99L0643 | N/A | 09/22/99 | 09/27/99 |
| BERYLLIUM LABORATORY | LC1 BS | S | 99L0643 | N/A | 09/22/99 | 09/28/99 |
| BERYLLIUM, TOTAL | MB1 | S | 99L0643 | N/A | 09/22/99 | 09/28/99 |
| CADMIUM LABORATORY | LC1 BS | S | 99L0643 | N/A | 09/22/99 | 09/28/99 |
| CADMIUM, TOTAL | MB1 | S | 99L0643 | N/A | 09/22/99 | 09/28/99 |
| CHROMIUM LABORATORY | LC1 BS | S | 99L0643 | N/A | 09/22/99 | 09/28/99 |
| CHROMIUM, TOTAL | MB1 | S | 99L0643 | N/A | 09/22/99 | 09/28/99 |
| COPPER LABORATORY | LC1 BS | S | 99L0643 | N/A | 09/22/99 | 09/27/99 |

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNU-HANFORD B99-078

DATE RECEIVED: 08/31/99 RFW LOT # :9908L930

| CLIENT ID /ANALYSIS | RFW # | MTX | PREP # | COLLECTION | EXTR/PREP | ANALYSIS |
|---|---|---|---|---|---|---|
| COPPER, TOTAL | MB1 | S | 99L0643 | N/A | 09/22/99 | 09/27/99 |
| MERCURY LABORATORY | LC1 BS | S | 99C0270 | N/A | 09/12/99 | 09/12/99 |
| MERCURY, TOTAL | MB1 | S | 99C0270 | N/A | 09/12/99 | 09/12/99 |
| NICKEL LABORATORY | LC1 BS | S | 99L0643 | N/A | 09/22/99 | 09/28/99 |
| NICKEL, TOTAL | MB1 | S | 99L0643 | N/A | 09/22/99 | 09/28/99 |
| LEAD LABORATORY | LC1 BS | S | 99L0643 | N/A | 09/22/99 | 09/28/99 |
| LEAD, TOTAL | MB1 | S | 99L0643 | N/A | 09/22/99 | 09/28/99 |
| ANTIMONY LABORATORY | LC1 BS | S | 99L0643 | N/A | 09/22/99 | 09/28/99 |
| ANTIMONY, TOTAL | MB1 | S | 99L0643 | N/A | 09/22/99 | 09/28/99 |
| SELENIUM LABORATORY | LC1 BS | S | 99L0643 | N/A | 09/22/99 | 09/28/99 |
| SELENIUM, TOTAL | MB1 | S | 99L0643 | N/A | 09/22/99 | 09/28/99 |
| THALLIUM LABORATORY | LC1 BS | S | 99L0643 | N/A | 09/22/99 | 09/28/99 |
| THALLIUM, TOTAL | MB1 | S | 99L0643 | N/A | 09/22/99 | 09/28/99 |
| VANADIUM LABORATORY | LC1 BS | S | 99L0643 | N/A | 09/22/99 | 09/27/99 |
| VANADIUM, TOTAL | MB1 | S | 99L0643 | N/A | 09/22/99 | 09/27/99 |
| ZINC LABORATORY | LC1 BS | S | 99L0643 | N/A | 09/22/99 | 09/27/99 |
| ZINC, TOTAL | MB1 | S | 99L0643 | N/A | 09/22/99 | 09/27/99 |

| RECRA LabNet Use Only |
|---|
| 9908L930 |

# Custody Transfer Record/Lab Work Request

Page 1 of 1

RECRA LabNet

ALL FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Client: TNU-Hanford B99-078
Est. Final Proj. Sampling Date:
Project #: 10985-001-001-9999-00
Project Contact/Phone #:
RECRA Project Manager: OJ
QC: spec Del: std TAT: 30 day
Date Rec'd: 8/31/99 Date Due: 9/30/99
Account #:

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Refrigerator # | | 1 | 6 | 1 | | | | | 6 | | 6 | 6 | | | | | |
| #/Type Container | Liquid | | | | | | | | | | | | | | | | |
| | Solid | 1g | 1g | 1 | | | | | 1g | | 1g | 1g | | | | | |
| Volume | Liquid | | | | | | | | | | | | | | | | |
| | Solid | 250 | 500 | 1 | | | | | 500 | | 250 | ltr | | | | | |
| Preservatives | | | | | | | | | | | | | | | | | |
| ANALYSES REQUESTED → | | ORGANIC | | | | | | | INORG | | | | | | | | |
| | | VOA | BNA | Pest/PCB | Herb | | | | Metal | CN | | | | | | | |

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

| Lab ID | Client ID/Description | Matrix QC Chosen (✓) MS | MSD | Matrix | Date Collected | Time Collected | 0624H OGCSC | 0625H ODRO | OPCB | | | | | Met① | | IPH | Ang① | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 001 | BØW899 | | | S | 8/27/99 | 0910 | ✓ | ✓ | ✓ | | | | | ✓ | | ✓ | ✓ | | | | |
| 2 | B2 | | | | | 0926 | | | | | | | | | | | | | | | |
| 3 | B3 | | | | | 0945 | | | | | | | | | | | | | | | |
| 4 | 94 | | | | | 0748 | | | | | | | | | | | | | | | |
| 5 | 95 | | | | | 0750 | | | | | | | | | | | | | | | |
| 6 | 96 | | | | | 0820 | | | | | | | | | | | | | | | |
| 7 | 97 | | | | | 0835 | | | | | | | | | | | | | | | |
| 8 | 98 | | | | | 0854 | | | | | | | | | | | | | | | |

Met① = As, Ba, Be, Cd, Cr, Cu, Pb, Ni, Se, Ag, V, Zn, HG, ICRG

Special Instructions:
saf # B99-078
11/3/99 - Sb + Tl added per client

COMPOSITE WASTE

OGCSC = 1-propanol, ethanol

DATE/REVISIONS:
1. Run matrix QC
Ang① = ICCL, ICFL, ICNO2, ICNO3, ICPO4,
3. ICSO4, ISFD, INH3N, ICNTO
* 4. 423579528808 - 4.2°C
5. 423579528819 - 4.7°C
6. 423579528820 - 5.8°C

| Relinquished by | Received by | Date | Time |
|---|---|---|---|
| Fed Ex | D. Smith | 8-31-99 | 0930 |

| Relinquished by | Received by | Date | Time |
|---|---|---|---|
| | Original Rewritten | | |

RECRA LabNet Use Only

Samples were:
1) Shipped ✓ or Hand Delivered ___
Airbill # *
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N
COC Record Present Upon Sample Rec't Y or N
Cooler Temp. ___ °C

Discrepancies Between Samples Labels and COC Record? Y or N
NOTES:

Bechtel Hanford Inc.

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-078-102



| | | | |
|---|---|---|---|
| Collector: Bowers/Porter/Nielson | Company Contact: Chris Cearlock | Telephone No.: 372-9574 | Project Coordinator: TRENT, SJ |
| Project Designation: 200 Area Source characterization - 200-CW-1 OU | Sampling Location: GP-8 <15' bgs | | SAF No.: B99-078 |
| Ice Chest No.: ERC 96-047 | Field Logbook No.: EL-1511 | | Method of Shipment: Federal Express |
| Shipped To: ~~TMA~~/RECRA ~~8-27-99~~ | Offsite Property No.: A990233 | | Bill of Lading/Air Bill No.: 4235 7952 8819 |
| | | | COA: B20CW167/C |

Price Code: 8N

Data Turnaround: 45 Days

| POSSIBLE SAMPLE HAZARDS/REMARKS | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Preservation | None | Cool 4C | None | Cool 4C | None | Cool 4C | None | | | |
| | Type of Container | aG | aG | aG | aG | aG | aG | aG | | | |
| | No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | |
| Special Handling and/or Storage | Volume | 60mL | 250mL | 250mL | 500mL | 500mL | 1000mL | 1000mL | | | |
| SAMPLE ANALYSIS | | Isotopic Uranium | VOA - 8260A (TCL); VOA - 8260A (Add-On) {1-Propanol, Ethanol} | pH (Soil) - 9045 | Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082 | See item (1) in Special Instructions. | See item (2) in Special Instructions. | See item (3) in Special Instructions. | | | |

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 001 B0W899 | Soil | 8-27-99 | 0910 | | X | X | X | X | X | | B0W5L8 | | |
| ~~B0W8B0~~ | ~~Soil~~ | ~~8-27-99~~ | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

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

| Relinquished By | Date/Time | Received By | Date/Time |
|---|---|---|---|
| Bruce Porter | 8/27/99 13:00 | Peter IB | 8/27/99 13:00 |
| PETER IB | 8/30/99 11:00 | CTRICE/CAric | 8/30/99 11:00 |
| CAric | 8/30/99 14:00 | FEDEX | 8/30/99 14:00 |
| Fed Ex | 8.31.99 / 09:30 | D Smith | 8.31.99 / 0930 |

**SPECIAL INSTRUCTIONS**

See chain of custody comments on SAF B99-078.

COLLECTOR NOT AVAILABLE TO SIGN COC'S

(1) ICP Metals - 6010A (Supertrace) {Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc}; Mercury - 7471 - (CV); Chromium Hex - 7196

(2) NO2/NO3 - 353.1; IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010

(3) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Americium-241}; Strontium-89,90 -- Total Sr; Total Uranium {Uranium}; Isotopic Plutonium; Isotopic Thorium {Thorium-232}; Americium-241

Matrix *: Soil, Water, Vapor, Other Solid, Other Liquid

| LABORATORY SECTION | Received By | Title | Date/Time |
|---|---|---|---|
| | | | 4235 7952 8819 4.7° |

| FINAL SAMPLE DISPOSITION | Disposal Method | Disposed By | Date/Time |
|---|---|---|---|
| | | 4235 7952 8808 | 4235 7952 8820 5.8° |

temp. 4.2°

~~019~~ 020

Bechtel Hanford Inc.

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-078-103



| | | | |
|---|---|---|---|
| Collector: Bowers/Porter/Nielson | Company Contact: Chris Cearlock | Telephone No.: 372-9574 | Project Coordinator: TRENT, SJ |
| Price Code: 8N | Data Turnaround: 45 Days | | |
| Project Designation: 200 Area Source characterization - 200-CW-1 OU | Sampling Location: GP-8 >15' bgs | | SAF No.: B99-078 |
| Ice Chest No.: SML-579 | Field Logbook No.: EL-1511 | | Method of Shipment: Federal Express |
| Shipped To: TMA/RECRA | Offsite Property No.: A99 0234 | | Bill of Lading/Air Bill No.: 4235 7952 8820 |
| | | | COA: Bow B20CW1 671C |

| POSSIBLE SAMPLE HAZARDS/REMARKS | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Preservation | None | None | None | None | Cool 4C | None | Cool 4C | None | Cool 4C | None |
| | Type of Container | aG | aG | aG | aG | aG | aG | aG | aG | aG | aG |
| | No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Special Handling and/or Storage | Volume | 60mL | 60mL | 60mL | 120mL | 250mL | 250mL | 500mL | 500mL | 1000mL | 1000mL |
| SAMPLE ANALYSIS | | Isotopic Uranium | Nickel-63 | Technetium-99 | Tritium - H3 | VOA - 8260A (TCL); VOA - 8260A (Add-On) {1-Propanol, Ethanol} | pH (Soil) - 9045 | Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082 | See item (1) in Special Instructions. | See item (2) in Special Instructions. | See item (3) in Special Instructions. |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | |
| 002 B0W8B2 | Soil | 8-27-99 | 0976 | | | | X | X | X | X | X |
| 003 B0W8B3 | Soil | 8-27-99 | 0945 | | | | X | X | X | X | X |
| ~~B0W8B4~~ | ~~Soil~~ | | | | | | | | | | |
| ~~B0W8B5~~ | ~~Soil~~ | | | | | | | | | | |
| ~~B0W8B6~~ | ~~Soil~~ | | | | | | | | | | |

8-27-99

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By: Brent Porter | Date/Time: 8/27/99 12:00 | Received By: Peter JB | Date/Time: 8/27/99 13:00 |
| Relinquished By: PETER JB | Date/Time: 8/30/99 11:00 | Received By: C Price | Date/Time: 8/30/99 11:00 |
| Relinquished By: C Price | Date/Time: 8/30/99 14:00 | Received By: FEDEX | Date/Time: 8/30/99 14:00 |
| Relinquished By: Geo Ex | Date/Time: 8.31.99/0930 | Received By: D. Smith | Date/Time: 8.31.99/0930 |
| LABORATORY SECTION | Received By | Title | Date/Time |
| FINAL SAMPLE DISPOSITION | Disposal Method | Disposed By | Date/Time |

**SPECIAL INSTRUCTIONS**

See chain of custody comments on SAF B99-078.

COLLECTOR NOT AVAILABLE TO SIGN COC

(1) ICP Metals - 6010A (Supertrace) {Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc}; Mercury - 7471 - (CV); Chromium Hex - 7196

(2) NO2/NO3 - 353.1; IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010

(3) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Americium-241}; Strontium-89,90 -- Total Sr; Total Uranium {Uranium}; Isotopic Plutonium; Isotopic Thorium {Thorium-232}; Americium-241

use BOW5L8 to ship

Matrix *

Soil
Water
Vapor
Other Solid
Other Liquid

| Bechtel Hanford Inc. | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | B99-078-102 | Page 1 of 2 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector<br>Bowers/Porter/Nielson | Company Contact<br>Chris Cearlock<br>Telephone No.<br>372-9574 | Project Coordinator<br>TRENT, SJ | Price Code 8N<br>Data Turnaround<br>45 Days |
| Project Designation<br>200 Area Source characterization - 200-CW-1 OU | Sampling Location<br>GP-8 <15' bgs | SAF No.<br>B99-078 | |
| Ice Chest No.<br>ERC-96-060/047 | Field Logbook No.<br>EL-1511 | Method of Shipment<br>Federal Express | |
| Shipped To<br>~~TMA~~/RECRA<br>~~AZB~~ 8-27-99 | Offsite Property No.<br>A990233 | Bill of Lading/Air Bill No.<br>4235 7952 8808 | |
| | | COA B20CW1 671C | |

| POSSIBLE SAMPLE HAZARDS/REMARKS | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Preservation | None | Cool 4C | None | Cool 4C | None | Cool 4C | None | | | |
| | Type of Container | aG | aG | aG | aG | aG | aG | aG | | | |
| | No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | |
| Special Handling and/or Storage | Volume | 60mL | 250mL | 250mL | 500mL | 500mL | 1000mL | 1000mL | | | |
| SAMPLE ANALYSIS | | Isotopic Uranium | VOA - 8260A (TCL); VOA - 8260A (Add-On) {1-Propanol, Ethanol} | pH (Soil) - 9045 | Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082 | See item (1) in Special Instructions. | See item (2) in Special Instructions. | See item (3) in Special Instructions. | | | |

| | Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 004 | B0W894 | Soil | 8-27-99 | 0748 | | X | X | X | X | X | | B0W5L8 | |
| 005 | B0W895 | Soil | 8-27-99 | 0750 | | X | X | X | X | X | | B0W5L8 | |
| 006 | B0W896 | Soil | 8-27-99 | 0820 | | X | X | X | X | X | | B0W5L8 | |
| 007 | B0W897 | Soil | 8-27-99 | 0835 | | X | X | X | X | X | | B0W5L8 | |
| 008 | B0W898 | Soil | 8-27-99 | 0854 | | X | X | X | X | X | | B0W5L8 | |

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By: Brent Porter | Date/Time: 8/27/99 1300 | Received By: Peter IB | Date/Time: 8/27/99 1300 |
| Relinquished By: PEPER IB | Date/Time: 8/30/99 11:00 | Received By: CTRICE/CAnice | Date/Time: 8/30/99 11:00 |
| Relinquished By: CTRICE/CAnice | Date/Time: 8/30/99 1400 | Received By: FEDEX | Date/Time: 8/30/99 14:00 |
| Relinquished By: Fed Ex | Date/Time: 8-31-99/0930 | Received By: [signature] | Date/Time: 8-31-99/0930 |

**SPECIAL INSTRUCTIONS**

See chain of custody comments on SAF B99-078.

COLLECTOR NOT AVAILABLE TO SIGN COCs.

(1) ICP Metals - 6010A (Supertrace) {Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Vanadium, Zinc}; Mercury - 7471 - (CV); Chromium Hex - 7196

(2) NO2/NO3 - 353.1; IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; Sulfides - 9030; Ammonia - 350.3; Total Cyanide - 9010

(3) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Americium-241}; Strontium-89,90 -- Total Sr; Total Uranium {Uranium}; Isotopic Plutonium; Isotopic Thorium {Thorium-232}; Americium-241

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

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

021
022