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MAR 26 2002
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Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B01-058 H1476

DATE RECEIVED: 08/28/01 LVL LOT # :0108L684

| CLIENT ID /ANALYSIS | LVL # | MTX | PREP # | COLLECTION | EXTR/PREP | ANALYSIS |
|---|---|---|---|---|---|---|
| B12MH4 | | | | | | |
| % SOLIDS | 001 | S | 01L%S114 | 08/23/01 | 08/30/01 | 08/31/01 |
| % SOLIDS | 001 REP | S | 01L%S114 | 08/23/01 | 08/30/01 | 08/31/01 |
| CHLORIDE BY IC | 001 | S | 01LICB62 | 08/23/01 | 09/21/01 | 09/21/01 |
| CHLORIDE BY IC | 001 REP | S | 01LICB62 | 08/23/01 | 09/21/01 | 09/21/01 |
| CHLORIDE BY IC | 001 MS | S | 01LICB62 | 08/23/01 | 09/21/01 | 09/21/01 |
| FLUORIDE BY IC | 001 | S | 01LICB62 | 08/23/01 | 09/21/01 | 09/21/01 |
| FLUORIDE BY IC | 001 REP | S | 01LICB62 | 08/23/01 | 09/21/01 | 09/21/01 |
| FLUORIDE BY IC | 001 MS | S | 01LICB62 | 08/23/01 | 09/21/01 | 09/21/01 |
| NITRITE BY IC | 001 | S | 01LICB62 | 08/23/01 | 09/21/01 | 09/21/01 |
| NITRITE BY IC | 001 REP | S | 01LICB62 | 08/23/01 | 09/21/01 | 09/21/01 |
| NITRITE BY IC | 001 MS | S | 01LICB62 | 08/23/01 | 09/21/01 | 09/21/01 |
| NITRATE BY IC | 001 | S | 01LICB62 | 08/23/01 | 09/21/01 | 09/21/01 |
| NITRATE BY IC | 001 REP | S | 01LICB62 | 08/23/01 | 09/21/01 | 09/21/01 |
| NITRATE BY IC | 001 MS | S | 01LICB62 | 08/23/01 | 09/21/01 | 09/21/01 |
| TOTAL CYANIDE | 001 | S | 01LC082 | 08/23/01 | 08/31/01 | 08/31/01 |
| TOTAL CYANIDE | 001 REP | S | 01LC084 | 08/23/01 | 09/07/01 | 09/07/01 |
| TOTAL CYANIDE | 001 MS | S | 01LC084 | 08/23/01 | 09/07/01 | 09/07/01 |
| PHOSPHATE BY IC | 001 | S | 01LICB62 | 08/23/01 | 09/21/01 | 09/21/01 |
| PHOSPHATE BY IC | 001 REP | S | 01LICB62 | 08/23/01 | 09/21/01 | 09/21/01 |
| PHOSPHATE BY IC | 001 MS | S | 01LICB62 | 08/23/01 | 09/21/01 | 09/21/01 |
| CHROMIUM VI | 001 | S | 01LVI075 | 08/23/01 | 09/18/01 | 09/18/01 |
| CHROMIUM VI | 001 REP | S | 01LVI075 | 08/23/01 | 09/18/01 | 09/18/01 |
| CHROMIUM VI | 001 MS | S | 01LVI075 | 08/23/01 | 09/18/01 | 09/18/01 |
| CHROMIUM VI | 001 MSD | S | 01LVI075 | 08/23/01 | 09/18/01 | 09/18/01 |
| SULFATE BY IC | 001 | S | 01LICB62 | 08/23/01 | 09/21/01 | 09/21/01 |
| SULFATE BY IC | 001 REP | S | 01LICB62 | 08/23/01 | 09/21/01 | 09/21/01 |
| SULFATE BY IC | 001 MS | S | 01LICB62 | 08/23/01 | 09/21/01 | 09/21/01 |
| NITRATE NITRITE | 001 | S | 01LN3050 | 08/23/01 | 09/24/01 | 09/24/01 |
| NITRATE NITRITE | 001 REP | S | 01LN3050 | 08/23/01 | 09/24/01 | 09/24/01 |
| NITRATE NITRITE | 001 MS | S | 01LN3050 | 08/23/01 | 09/24/01 | 09/24/01 |
| AMMONIA | 001 | S | 01LAM043 | 08/23/01 | 09/13/01 | 09/14/01 |
| TOTAL ORGANIC CARBON | 001 | S | 01LTZ025 | 08/23/01 | 09/17/01 | 09/18/01 |
| TOTAL ORGANIC CARBON | 001 REP | S | 01LTZ025 | 08/23/01 | 09/17/01 | 09/18/01 |
| TOTAL ORGANIC CARBON | 001 MS | S | 01LTZ025 | 08/23/01 | 09/17/01 | 09/18/01 |
| PH | 001 | S | 01LPH059 | 08/23/01 | 08/31/01 | 08/31/01 |

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B01-058 H1476

DATE RECEIVED: 08/28/01 LVL LOT # :0108L684

| CLIENT ID /ANALYSIS | LVL # | MTX | PREP # | COLLECTION | EXTR/PREP | ANALYSIS |
|---|---|---|---|---|---|---|
| PH | 001 REP | S | 01LPH059 | 08/23/01 | 08/31/01 | 08/31/01 |
| B12MH7 | | | | | | |
| % SOLIDS | 002 | S | 01L%S114 | 08/22/01 | 08/30/01 | 08/31/01 |
| CHLORIDE BY IC | 002 | S | 01LICB62 | 08/22/01 | 09/21/01 | 09/21/01 |
| FLUORIDE BY IC | 002 | S | 01LICB62 | 08/22/01 | 09/21/01 | 09/21/01 |
| NITRITE BY IC | 002 | S | 01LICB62 | 08/22/01 | 09/21/01 | 09/21/01 |
| NITRATE BY IC | 002 | S | 01LICB62 | 08/22/01 | 09/21/01 | 09/21/01 |
| TOTAL CYANIDE | 002 | S | 01LC082 | 08/22/01 | 08/31/01 | 08/31/01 |
| PHOSPHATE BY IC | 002 | S | 01LICB62 | 08/22/01 | 09/21/01 | 09/21/01 |
| CHROMIUM VI | 002 | S | 01LVI075 | 08/22/01 | 09/18/01 | 09/18/01 |
| SULFATE BY IC | 002 | S | 01LICB62 | 08/22/01 | 09/21/01 | 09/21/01 |
| NITRATE NITRITE | 002 | S | 01LN3050 | 08/22/01 | 09/24/01 | 09/24/01 |
| AMMONIA | 002 | S | 01LAM043 | 08/22/01 | 09/13/01 | 09/14/01 |
| AMMONIA | 002 REP | S | 01LAM043 | 08/22/01 | 09/13/01 | 09/14/01 |
| AMMONIA | 002 MS | S | 01LAM043 | 08/22/01 | 09/13/01 | 09/14/01 |
| TOTAL ORGANIC CARBON | 002 | S | 01LTZ025 | 08/22/01 | 09/17/01 | 09/18/01 |
| PH | 002 | S | 01LPH059 | 08/22/01 | 08/31/01 | 08/31/01 |

LAB QC:

| | | | | | | |
|---|---|---|---|---|---|---|
| CHLORIDE BY IC | MB1 | S | 01LICB62 | N/A | 09/21/01 | 09/21/01 |
| CHLORIDE BY IC | MB1 BS | S | 01LICB62 | N/A | 09/21/01 | 09/21/01 |
| FLUORIDE BY IC | MB1 | S | 01LICB62 | N/A | 09/21/01 | 09/21/01 |
| FLUORIDE BY IC | MB1 BS | S | 01LICB62 | N/A | 09/21/01 | 09/21/01 |
| NITRITE BY IC | MB1 | S | 01LICB62 | N/A | 09/21/01 | 09/21/01 |
| NITRITE BY IC | MB1 BS | S | 01LICB62 | N/A | 09/21/01 | 09/21/01 |
| NITRATE BY IC | MB1 | S | 01LICB62 | N/A | 09/21/01 | 09/21/01 |
| NITRATE BY IC | MB1 BS | S | 01LICB62 | N/A | 09/21/01 | 09/21/01 |
| TOTAL CYANIDE | LCS L | S | 01LC082 | N/A | 08/31/01 | 08/31/01 |
| TOTAL CYANIDE | LCS L | S | 01LC082 | N/A | 08/31/01 | 08/31/01 |
| TOTAL CYANIDE | MB1 | S | 01LC082 | N/A | 08/31/01 | 08/31/01 |
| TOTAL CYANIDE | LCS L | S | 01LC084 | N/A | 09/07/01 | 09/07/01 |
| TOTAL CYANIDE | LCS L | S | 01LC084 | N/A | 09/07/01 | 09/07/01 |
| TOTAL CYANIDE | MB1 | S | 01LC084 | N/A | 09/07/01 | 09/07/01 |
| PHOSPHATE BY IC | MB1 | S | 01LICB62 | N/A | 09/21/01 | 09/21/01 |
| PHOSPHATE BY IC | MB1 BS | S | 01LICB62 | N/A | 09/21/01 | 09/21/01 |

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B01-058 H1476

DATE RECEIVED: 08/28/01 LVL LOT # :0108L684

| CLIENT ID /ANALYSIS | LVL # | MTX | PREP # | COLLECTION | EXTR/PREP | ANALYSIS |
|---|---|---|---|---|---|---|
| CHROMIUM VI | MB1 | S | 01LVI075 | N/A | 09/18/01 | 09/18/01 |
| CHROMIUM VI | MB1 BS | S | 01LVI075 | N/A | 09/18/01 | 09/18/01 |
| CHROMIUM VI | MB1 BSD | S | 01LVI075 | N/A | 09/18/01 | 09/18/01 |
| SULFATE BY IC | MB1 | S | 01LICB62 | N/A | 09/21/01 | 09/21/01 |
| SULFATE BY IC | MB1 BS | S | 01LICB62 | N/A | 09/21/01 | 09/21/01 |
| NITRATE NITRITE | MB1 | S | 01LN3050 | N/A | 09/24/01 | 09/24/01 |
| NITRATE NITRITE | MB1 BS | S | 01LN3050 | N/A | 09/24/01 | 09/24/01 |
| AMMONIA | MB1 | S | 01LAM043 | N/A | 09/13/01 | 09/14/01 |
| AMMONIA | MB1 BS | S | 01LAM043 | N/A | 09/13/01 | 09/14/01 |
| AMMONIA | MB1 BSD | S | 01LAM043 | N/A | 09/13/01 | 09/14/01 |
| TOTAL ORGANIC CARBON | MB1 | ~~W~~S | 01LTZ025 | N/A | 09/17/01 | 09/18/01 |
| TOTAL ORGANIC CARBON | MB1 BS | ~~W~~S | 01LTZ025 | N/A | 09/17/01 | 09/18/01 |

9-26-01

LIONVILLE LABORATORY INC.

## Analytical Report

**Client:** TNU-HANFORD B01-058 H1476
**LVL#:** 0108L684

**W.O.#:** 11343-606-001-9999-00
**Date Received:** 08-28-01

### INORGANIC NARRATIVE

1. This narrative covers the analyses of 2 soil samples.

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

3. Sample holding times as required by the method and/or contract were met with the exception of matrix spike and duplicate for Total Cyanide sample B12MH4.

4. The cooler temperature was recorded on the chain of custody.

5. The method blanks were within the method criteria.

6. The Laboratory Control Samples (LCS) were within the laboratory control limits with the exception of LCS 01LVI072 for Insoluble Chromium VI that was above the 80-120% control limits. The duplicate LCS for Ammonia was within the 20% Relative Percent Difference (RPD) control limit.

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

8. The replicate analyses were within the 20% 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
Deputy Laboratory Manager
Lionville Laboratory Incorporated

09-26-01
Date

njp\i07-684

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 16 pages.



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

Lionville Laboratory Incorporated

## WET CHEMISTRY

## METHODS GLOSSARY FOR SOIL/SOLIDS SAMPLE ANALYSIS

| | ASTM | SW846 | OTHER |
|---|---|---|---|
| % Ash | __ D2216-80 | | |
| % Moisture | __ D2216-80 | | __ ILMO4.0 (e) |
| % Solids | ✓ D2216-80 | | __ ILMO4.0 (e) |
| % Volatile Solids | __ D2216-80 | | |
| ASTM Extraction in Water | __ D3987-81/85 | | |
| BTU | __ D240-87 | | |
| CEC | | __ 9081 | __ c |
| Chromium VI | | ✓ 3060A/7196A | |
| Corrosivity ___ by coupon ___ by pH | | __ 1110(mod) __ 9045C | |
| Cyanide, Total | | ✓ 9010B/9014 | __ ILMO4.0 (e) |
| Cyanide, Reactive | | __ Section 7.3/9014 | |
| Halides, Extractable Organic | | __ 9020B | __ EPA 600/4/84-008 |
| Halides, Total | | __ 9020B | __ EPA 600/4/84-008 |
| EP Toxicity | | __ 1310A | |
| Flash Point | | __ 1010 | |
| Ignitability | | __ 1010 | |
| Oil & Grease | | __ 9071A | |
| Carbon, Total Organic | | ✓ 9060 | ✓ Lloyd Kahn (mod) |
| Oxygen Bomb Prep for Anions | __ D240-87(mod) | __ 5050 | |
| Petroleum Hydrocarbons, Total Recoverable | | __ 9071 | __ EPA 418.1 |
| pH, Soil | | ✓ 9045C | |
| Sulfide, Reactive | | __ Section 7.3/9030B | |
| Sulfide | | __ 9030B(mod) | |
| Specific Gravity | __ D1429-76C/ | __ D5057-90 | |
| Sulfur, Total | | __ 9056 | |
| Synthetic Preparation Leach | | __ 1312 | |
| Paint Filter | | __ 9095A | |

**Other:** Chloride, Fluoride, Nitrate, **Method:** EPA 300.0 (mod.)

**Other:** Nitrite, Phosphate, Sulfate **Method**

Nitrate Nitrite EPA 353.2 (mod.)

Ammonia EPA 350.3

# 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
LC = Laboratory Control Sample.
NC = Not calculated.

A suffix of -R, -S, or -T following these codes indicate a replicate, spike or sample duplicate analysis respectively.

## ANALYTICAL WET CHEMISTRY METHODS

1. ASTM Standard Methods.

2. USEPA Methods for Chemical Analysis of Water and Wastes (USEPA 600/4-79-020).

3. Test Methods for Evaluating Solid Waste (USEPA SW-846).

a. Standard Methods for the Examination of Water and Waste, 16 ed, (1983).

b. Standard Methods for the Examination of Water and Waste, 17 ed, (1989)/18ed (1992).

c. Method of Soil Analysis, Part 1, Physical and Mineralogical Methods, 2nd ed, (1986).

d. Method of Soil Analysis, Part 2, Chemical and Microbiological Properties, Am. Soc. Agron., Madison, WI (1965).

e. USEPA Contract Laboratory Program, Statement of Work for Inorganic Analysis.

f. Code of Federal Regulations.

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 09/25/01

CLIENT: TNUHANFORD B01-058 H1476 LVL LOT #: 0108L684

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

| SAMPLE | SITE ID | ANALYTE | RESULT | | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|---|
| -001 | B12MH4 | % Solids | 94.4 | | % | 0.01 | 1.0 |
| | | Chloride by IC | 12.8 | | MG/KG | 2.6 | 2.0 |
| | | Fluoride by IC | 5.3 | u | MG/KG | 5.3 | 2.0 |
| | | Nitrite by IC | 2.65 | u | MG/KG | 2.65 | 2.0 |
| | | Nitrate by IC | 65.3 | | MG/KG | 2.65 | 2.0 |
| | | Cyanide, Total | 0.44 | u | MG/KG | 0.44 | 1.0 |
| | | Phosphate by IC | 3.0 | | MG/KG | 2.6 | 2.0 |
| | | Chromium VI | 0.42 | u | MG/KG | 0.42 | 1.0 |
| | | Sulfate by IC | 38.3 | | MG/KG | 2.6 | 2.0 |
| | | Nitrate Nitrite | 15.6 | | MG/KG | 1.0 | 5.0 |
| | | Ammonia, as N | 2.4 | u | MG/KG | 2.4 | 1.0 |
| | | Total Organic Carbon | 900 | | MG/KG | 174 | 1.0 |
| | | pH | 8.7 | | SOIL PH | 0.01 | 1.0 |
| -002 | B12MH7 | % Solids | 94.3 | | % | 0.01 | 1.0 |
| | | Chloride by IC | 11.1 | | MG/KG | 2.7 | 2.0 |
| | | Fluoride by IC | 5.3 | u | MG/KG | 5.3 | 2.0 |
| | | Nitrite by IC | 2.65 | u | MG/KG | 2.65 | 2.0 |
| | | Nitrate by IC | 77.3 | | MG/KG | 2.65 | 2.0 |
| | | Cyanide, Total | 0.37 | u | MG/KG | 0.37 | 1.0 |
| | | Phosphate by IC | 3.3 | | MG/KG | 2.7 | 2.0 |
| | | Chromium VI | 0.42 | u | MG/KG | 0.42 | 1.0 |
| | | Sulfate by IC | 67.5 | | MG/KG | 2.7 | 2.0 |
| | | Nitrate Nitrite | 19.4 | | MG/KG | 1.0 | 5.0 |
| | | Ammonia, as N | 2.5 | u | MG/KG | 2.5 | 1.0 |
| | | Total Organic Carbon | 1370 | | MG/KG | 167 | 1.0 |
| | | pH | 8.7 | | SOIL PH | 0.01 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 09/25/01

*CLIENT: TNUHANFORD B01-058 H1476* *LVL LOT #: 0108L684*

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

| SAMPLE | SITE ID | ANALYTE | RESULT | | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|---|
| BLANK10 | 01LICB62-MB1 | Chloride by IC | 1.2 | u | MG/KG | 1.2 | 1.0 |
| | | Fluoride by IC | 2.5 | u | MG/KG | 2.5 | 1.0 |
| | | Nitrite by IC | 1.25 | u | MG/KG | 1.25 | 1.0 |
| | | Nitrate by IC | 1.25 | u | MG/KG | 1.25 | 1.0 |
| | | Phosphate by IC | 1.2 | u | MG/KG | 1.2 | 1.0 |
| | | Sulfate by IC | 1.2 | u | MG/KG | 1.2 | 1.0 |
| BLANK1 | 01LC082-MB1 | Cyanide, Total | 0.50 | u | MG/KG | 0.50 | 1.0 |
| BLANK1 | 01LC084-MB1 | Cyanide, Total | 0.50 | u | MG/KG | 0.50 | 1.0 |
| BLANK10 | 01LVI075-MB1 | Chromium VI | 0.40 | u | MG/KG | 0.40 | 1.0 |
| BLANK10 | 01LN3050-MB1 | Nitrate Nitrite | 0.20 | u | MG/KG | 0.20 | 1.0 |
| BLANK10 | 01LAM043-MB1 | Ammonia, as N | 2.5 | u | MG/KG | 2.5 | 1.0 |
| BLANK10 | 01LTZ025-MB1 | Total Organic Carbon | 20.0 | u | MG/KG | 20.0 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 09/25/01

CLIENT: TNUHANFORD B01-058 H1476 LVL LOT #: 0108L684

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

| SAMPLE | SITE ID | ANALYTE | SPIKED SAMPLE | INITIAL RESULT | SPIKED AMOUNT | %RECOV | DILUTION FACTOR(SPK) |
|---|---|---|---|---|---|---|---|
| -001 | B12MH4 | Chloride by IC | 59.9 | 12.8 | 53.0 | 89.1 | 2.0 |
| | | Fluoride by IC | 114 | 2.0 | 106 | 105.6 | 2.0 |
| | | Nitrite by IC | 53.0 | 2.65u | 53.0 | 100.2 | 2.0 |
| | | Nitrate by IC | 194 | 65.3 | 132 | 97.5 | 5.0 |
| | | Cyanide, Total | 4.67 | 0.44u | 5.15 | 90.7 | 1.0 |
| | | Phosphate by IC | 54.8 | 3.0 | 53.0 | 97.8 | 2.0 |
| | | Soluble Chromium VI | 4.7 | 0.42u | 4.2 | 102.9 | 1.0 |
| | | Insoluble Chromium VI | 1420 | 0.42u | 1300 | 109.7 | 100 |
| | | Sulfate by IC | 94.3 | 38.3 | 53.0 | 105.7 | 2.0 |
| | | Nitrate Nitrite | 42.1 | 15.6 | 26.0 | 101.8 | 5.0 |
| | | Total Organic Carbon | 3910 | 899 | 3510 | 85.9 | 1.0 |
| -002 | B12MH7 | Ammonia, as N | 132 | 2.5 u | 107 | 123.8 | 1.0 |
| BLANK10 | 01LICB62-MB1 | Chloride by IC | 24.9 | 1.2 u | 25.0 | 99.5 | 1.0 |
| | | Fluoride by IC | 54.1 | 2.5 u | 50.0 | 108.2 | 1.0 |
| | | Nitrite by IC | 24.2 | 1.25u | 25.0 | 96.7 | 1.0 |
| | | Nitrate by IC | 24.8 | 1.25u | 25.0 | 99.3 | 1.0 |
| | | Phosphate by IC | 26.1 | 1.2 u | 25.0 | 104.3 | 1.0 |
| | | Sulfate by IC | 24.2 | 1.2 u | 25.0 | 96.9 | 1.0 |
| BLANK10 | 01LVI075-MB1 | Soluble Chromium VI | 4.1 | 0.40u | 4.0 | 102.0 | 1.0 |
| | | Insoluble Chromium VI | 1440 | 0.40u | 1160 | 124.3 | 100 |
| BLANK10 | 01LN3050-MB1 | Nitrate Nitrite | 5.0 | 0.20u | 5.0 | 99.0 | 1.0 |
| BLANK10 | 01LAM043-MB1 | Ammonia, as N | 102 | 2.5 u | 100 | 102.5 | 1.0 |
| | | Ammonia, as N MSD | 104 | 2.5 u | 100 | 103.8 | 1.0 |
| BLANK10 | 01LTZ025-MB1 | Total Organic Carbon | 391 | 20.0 u | 400 | 97.8 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS DUPLICATE SPIKE REPORT 09/25/01

CLIENT: TNUHANFORD B01-058 H1476 LVL LOT #: 0108L684

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

| SAMPLE | SITE ID | ANALYTE | SPIKE#1 %RECOV | SPIKE#2 %RECOV | %DIFF |
|---|---|---|---|---|---|
| BLANK10 | 01LAM043-MB1 | Ammonia, as N | 102.5 | 103.8 | 1.2 |

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 09/25/01

CLIENT: TNUHANFORD B01-058 H1476 LVL LOT #: 0108L684

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

| SAMPLE | SITE ID | ANALYTE | INITIAL RESULT | REPLICATE | RPD | DILUTION FACTOR(REP) |
|---|---|---|---|---|---|---|
| -001REP | B12MH4 | % Solids | 94.4 | 94.3 | 0.13 | 1.0 |
| | | Chloride by IC | 12.8 | 12.3 | 3.7 | 2.0 |
| | | Fluoride by IC | 5.3 u | 5.3 u | NC | 2.0 |
| | | Nitrite by IC | 2.65u | 2.65u | NC | 2.0 |
| | | Nitrate by IC | 65.3 | 64.7 | 0.85 | 2.0 |
| | | Cyanide, Total | 0.44u | 0.51u | NC | 1.0 |
| | | Phosphate by IC | 3.0 | 2.8 | 7.5 | 2.0 |
| | | Chromium VI | 0.42u | 0.42u | NC | 1.0 |
| | | Sulfate by IC | 38.3 | 38.2 | 0.36 | 2.0 |
| | | Nitrate Nitrite | 15.6 | 17.2 | 9.4 | 5.0 |
| | | Total Organic Carbon | 899 | 778 | 14.4 | 1.0 |
| | | pH | 8.7 | 8.7 | 0.6 | 1.0 |
| -002REP | B12MH7 | Ammonia, as N | 2.5 u | 2.3 u | NC | 1.0 |

Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 09/25/01

CLIENT: TNUHANPORD B01-058 H1476 LVL LOT #: 0108L684

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

| SAMPLE | SITE ID | ANALYTE | SPIKED SAMPLE | SPIKED AMOUNT | UNITS | %RECOV |
|---|---|---|---|---|---|---|
| LCSS1 | 01LC082-LCS1 | Cyanide, Total LCS | 1.69 | 2.0 | MG/KG | 84.4 |
| LCSS2 | 01LC082-LCS2 | Cyanide, Total LCS | 10.1 | 10.0 | MG/KG | 100.7 |
| LCSS1 | 01LC084-LCS1 | Cyanide, Total LCS | 1.86 | 2.0 | MG/KG | 93.2 |
| LCSS2 | 01LC084-LCS2 | Cyanide, Total LCS | 10.1 | 10.0 | MG/KG | 100.9 |

Lionville Laboratory Use Only
01081684

# Custody Transfer Record/Lab Work Request

Page 1 of 1

**FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS**

VLI

13

Client: TMU-Hanford B01-058
Est. Final Proj. Sampling Date:
Project #: 11343-006-001-9999-00
Project Contact/Phone #:
Lionville Laboratory Project Manager: OJ
QC: Spec Del: Std TAT: 30 day

Date Rec'd: 8-28-01 Date Due: 9-27-01

| | | A | B | | C | D |
|---|---|---|---|---|---|---|
| Refrigerator # | | 5 | 5 | | 5 | 5 |
| #/Type Container | Liquid | | | | | |
| | Solid | 1Ag | 1Ag | | 1Ag | 1Ag |
| Volume | Liquid | | | | | |
| | Solid | 60 | 500 | | 120 | 1L |
| Preservatives | | - | - | | - | - |

ANALYSES REQUESTED →

| ORGANIC | | | | INORG | |
|---|---|---|---|---|---|
| VOA | BNA | Pest/PCB | Herb | Metal | CN |

Lionville Laboratory Use Only

| Lab ID | Client ID/Description | Matrix QC Chosen (✓) MS | MSD | Matrix | Date Collected | Time Collected | ICP/6 | Met① | | MHGTO | Inorg① |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 001 | B12MH4 | | | S | 8-28-01 | 0945 | ✓ | ✓ | | ✓ | ✓ |
| 002 | 1 7 | | | 1 | 8-28-01 | 2350 | ✓ | ✓ | | ✓ | ✓ |

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

Special Instructions: Saf B01-058
Run Matrix QC

DATE/REVISIONS:
Met① 1. Cd, Cr, Cu, Ni, Ag, Pb
Inorg① 2. ICCL, ICFL, ICNO3, ICNO2, ICPOH, ICSO4,
1 3. IDH3D, ID3D2, ICNTO, IOCT, IPH
4.
5.
6.

Lionville Laboratory Use Only

Samples were:
1) Shipped ✓ or Hand Delivered ___
Airbill # 423579541 6851
2) Ambient or Chilled
3) Received in Good Condition (Y) or N
4) Samples Properly Preserved (Y) or N
5) Received Within Holding Times (Y) or N

Tamper Resistant Seal 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. 5.1 °C

| Relinquished by | Received by | Date | Time |
|---|---|---|---|
| FedEx | TBappel | 8-28-01 | 0900 |

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

COMPOSITE WASTE

ORIGINAL REWRITTEN

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

| Bechtel Hanford Inc. | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | B01-058-224 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: Thomas G./Watson D. | Company Contact: Todd, M.E. | Telephone No.: (509) 372-9631 | Project Coordinator: TRENT, SJ |
| Price Code: 8N | Data Turnaround: 45 Days | Air Quality ☐ | |
| Project Designation: 200-TW-1 & 2 - Soil Sampling | Sampling Location: B-7A/200 E | SAF No.: B01-058 | |
| Ice Chest No.: SM1-463 | Field Logbook No.: EL-1518-1 | COA B20TW2A44C B20TW2634C KT 8/23/01 | Method of Shipment: Fed EX |
| Shipped To: ~~TMX~~/RECRA DSW 08/15/01 | Offsite Property No.: AR10438 | | Bill of Lading/Air Bill No.: 4235 7454-6851 |

POSSIBLE SAMPLE HAZARDS/REMARKS
FIELD RADIOLOGICAL INSTRUMENTS READ BACKGROUND

Samples stored in Ref.# 1B at the 3728 Shipping Facility on 8/23/01.
Collector not available to relenquish samples on 8/27/01 for shipment.

KT 8.27.01

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | None | | | | |
| Type of Container | sG | sG | sG | sG | sG | sG | sG | | | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | |
| Volume | 60mL | 500mL | 120mL | 1000mL | 120mL | 500mL | 1000mL | | | | |
| SAMPLE ANALYSIS | Chromium Hex - 7196 | See item (1) in Special Instructions. | Mercury - 7470 - (CV) | See item (2) in Special Instructions. | VOA - 8260A (Add-on) | See item (3) in Special Instructions. | See item (4) in Special Instructions. | | | | |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | |
| B12MH4 | SOIL | 8-23-01 | 0045 | X | X | X | X | | | | |

CHAIN OF POSSESSION — Sign/Print Names

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| D. Watson/Sampler | 08/23/01 0915 | REF-1B | 08/23/01 0915 |
| Ref 1B | 3728 8270 | K. Thor | 8.27.01 0900 |
| K. Thor | 8.27.01 0900 | F. Dep | |
| FedEx | 8.28.01 0900 | Thorp | 8.28.01 0900 |
| | | | |
| | | | |

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010A (TAL) {Cadmium, Chromium, Copper, Nickel, Silver}; ICP Metals - 6010A (Add-on) {Lead}
(2) IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; Ammonia - 350.3; NO2/NO3 - 353.1; Total Cyanide - 9010; TOC - 9060; pH (Soil) - 9045
(3) ~~Semi-VOA - 8270A (Add-On) {Tributyl phosphate}; TPH Diesel Range - WTPH-D~~
(4) ~~Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Radium-226, Radium-228}; Isotopic Plutonium; Isotopic Thorium {Thorium-232}; Americium-241; Carbon-14; Neptunium-237; Nickel-63; Strontium-89,90 - Total Sr; Technetium-99; Total Uranium; Tritium - H3; Isotopic Uranium~~

10/04/01

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

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

BHI-EE-011 (10/99)

14

15

| Bechtel Hanford Inc. | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | B01-058-227 | Page 1 of 1 |
|---|---|---|---|
| Collector: Thomas G./Watson D. | Company Contact: Todd, M.E. — Telephone No.: (509) 372-9631 | Project Coordinator: TRENT, SJ | Price Code: 8N — Data Turnaround: 45 Days |
| Project Designation: 200-TW-1 & 2 - Soil Sampling | Sampling Location: B-7A/200 E | SAF No.: B01-058 | Air Quality ☐ |
| Ice Chest No.: SM1 463 | Field Logbook No.: EL-1518-1 — COA B20TW2A44C ~~B20TW2674C~~ AT | Method of Shipment: Fed EX | |
| Shipped To: TMA/RECRA DJW 08/15/01 | Offsite Property No.: A810438 8/22/01 | Bill of Lading/Air Bill No.: 4235954-6851 | |

POSSIBLE SAMPLE HAZARDS/REMARKS

FIELD RADIOLOGICAL INSTRUMENTS READ BACKGROUND

Samples stored in Ref.# 1B at the 3728 Shipping Facility on 8.23.01. Collector not available to relenquish samples on 8/22/01 for shipment RT 8-27.01

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | None | | | | |
| Type of Container | sG | sG | sG | sG | sG | sG | sG | | | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | |
| Volume | 60mL | 500mL | 120mL | 1000mL | 120mL | 500mL | 1000mL | | | | |
| SAMPLE ANALYSIS | Chromium Hex - 7196 | See item (1) in Special Instructions. | Mercury - 7470 - (CV) | See item (2) in Special Instructions. | VOA - 8260A (TCE) DTW 08/22/01 | See item (3) in Special Instructions. | See item (4) in Special Instructions. DJW 08/22/01 | | | Tit to | |

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B12MH7 | SOIL | 08/22/01 | 2350 | X | X | X | X | | | | | B12M | 16 |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

| CHAIN OF POSSESSION | Date/Time | Sign/Print Names: Received By/Stored In | Date/Time |
|---|---|---|---|
| Relinquished By/Removed From: D Watson/[illegible] | 08/23/01 0915 | Received By/Stored In: REF. 1B | 08/23/01 0915 |
| Relinquished By/Removed From: Ref 1B | 8.27.01 0900 | Received By/Stored In: [illegible] Thorne | 8.27.01 0900 |
| Relinquished By/Removed From: [illegible] Thorne | 8.27.01 0900 | Received By/Stored In: FEDEX | |
| Relinquished By/Removed From: FedEx | 8.28.01 0900 | Received By/Stored In: [illegible] | 8.28.01 0900 |
| Relinquished By/Removed From | | Received By/Stored In | |
| Relinquished By/Removed From | | Received By/Stored In | |

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010A (TAL) {Cadmium, Chromium, Copper, Nickel, Silver}; ICP Metals - 6010A (Add-on) {Lead}
(2) IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; Ammonia - 350.3; NO2/NO3 - 353.1; Total Cyanide - 9010; TOC - 9060; pH (Soil) - 9045
(3) ~~Semi-VOA - 8270A (Add-On) {Tributyl phosphate}; TPH-Diesel Range - WTPH-D.~~
(4) ~~Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Radium-226, Radium-228}; Isotopic Plutonium; Isotopic Thorium {Thorium-232}; Americium-241; Carbon-14; Neptunium-237; Nickel-63; Strontium-89,90 - Total Sr; Technetium-99; Total Uranium; Tritium - H3; Isotopic Uranium~~ DJW 08/22/01

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

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

BHI-EE-011 (10/99)

Figure 1. Sample Check-in List

Date/Time Received: 8-28-01 0900

SDG#: 01081 (084

Work Order Number: — SAF# B01-058

Shipping Container ID: SML-463 Chain of Custody # B01-058-224227

1. Custody Seals on shipping container intact? Yes [✓] No [ ]
2. Custody Seals dated and signed? Yes [✓] No [ ]
3. Chain-of-Custody record present? Yes [✓] No [ ]
4. Cooler temperature 5.1°C
5. Vermiculite/packing materials is Wet [ ] Dry [✓]
6. Number of samples in shipping container: 8
7. Sample holding times exceeded? Yes [ ] No [✓]

8. Samples have:
   ____tape ____hazard labels
   ✓ custody seals ____appropriate sample labels

9. Samples are:
   ✓ in good condition ____leaking
   ____broken ____have air bubbles

10. Were any anomalies identified in sample receipt? Yes [ ] No [✓]
11. Description of anomalies (include sample numbers): _____

Sample Custodian/Laboratory: TKappel / LULI Date: 8-28-01

Telephoned to: _____ On _____ By _____

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B01-058 H1476

DATE RECEIVED: 08/25/01 LVL LOT # :0108L677

| CLIENT ID /ANALYSIS | LVL # | MTX | PREP # | COLLECTION | EXTR/PREP | ANALYSIS |
|---|---|---|---|---|---|---|
| B12MH5 | | | | | | |
| % SOLIDS | 001 | S | 01L%S113 | 08/22/01 | 08/29/01 | 08/30/01 |
| % SOLIDS | 001 REP | S | 01L%S113 | 08/22/01 | 08/29/01 | 08/30/01 |
| CHLORIDE BY IC | 001 | S | 01LICD60 | 08/22/01 | 09/12/01 | 09/12/01 |
| CHLORIDE BY IC | 001 REP | S | 01LICD60 | 08/22/01 | 09/12/01 | 09/12/01 |
| CHLORIDE BY IC | 001 MS | S | 01LIC061 | 08/22/01 | 09/19/01 | 09/19/01 |
| FLUORIDE BY IC | 001 | S | 01LICD60 | 08/22/01 | 09/12/01 | 09/12/01 |
| FLUORIDE BY IC | 001 REP | S | 01LICD60 | 08/22/01 | 09/12/01 | 09/12/01 |
| FLUORIDE BY IC | 001 MS | S | 01LIC061 | 08/22/01 | 09/19/01 | 09/19/01 |
| NITRITE BY IC | 001 | S | 01LICE60 | 08/22/01 | 09/12/01 | 09/12/01 |
| NITRITE BY IC | 001 REP | S | 01LICE60 | 08/22/01 | 09/12/01 | 09/12/01 |
| NITRITE BY IC | 001 MS | S | 01LIC061 | 08/22/01 | 09/19/01 | 09/19/01 |
| NITRATE BY IC | 001 | S | 01LICE60 | 08/22/01 | 09/12/01 | 09/12/01 |
| NITRATE BY IC | 001 REP | S | 01LICE60 | 08/22/01 | 09/12/01 | 09/12/01 |
| NITRATE BY IC | 001 MS | S | 01LIC061 | 08/22/01 | 09/19/01 | 09/19/01 |
| TOTAL CYANIDE | 001 | S | 01LC082 | 08/22/01 | 08/31/01 | 08/31/01 |
| PHOSPHATE BY IC | 001 | S | 01LICD60 | 08/22/01 | 09/12/01 | 09/12/01 |
| PHOSPHATE BY IC | 001 REP | S | 01LICD60 | 08/22/01 | 09/12/01 | 09/12/01 |
| PHOSPHATE BY IC | 001 MS | S | 01LIC061 | 08/22/01 | 09/19/01 | 09/19/01 |
| CHROMIUM VI | 001 | S | 01LVI075 | 08/22/01 | 09/18/01 | 09/18/01 |
| CHROMIUM VI | 001 REP | S | 01LVI075 | 08/22/01 | 09/18/01 | 09/18/01 |
| CHROMIUM VI | 001 MS | S | 01LVI075 | 08/22/01 | 09/18/01 | 09/18/01 |
| CHROMIUM VI | 001 MSD | S | 01LVI075 | 08/22/01 | 09/18/01 | 09/18/01 |
| SULFATE BY IC | 001 | S | 01LICD60 | 08/22/01 | 09/12/01 | 09/12/01 |
| SULFATE BY IC | 001 REP | S | 01LICD60 | 08/22/01 | 09/12/01 | 09/12/01 |
| SULFATE BY IC | 001 MS | S | 01LIC061 | 08/22/01 | 09/19/01 | 09/19/01 |
| NITRATE NITRITE | 001 | S | 01LN3050 | 08/22/01 | 09/24/01 | 09/24/01 |
| NITRATE NITRITE | 001 REP | S | 01LN3050 | 08/22/01 | 09/24/01 | 09/24/01 |
| NITRATE NITRITE | 001 MS | S | 01LN3050 | 08/22/01 | 09/24/01 | 09/24/01 |
| AMMONIA | 001 | S | 01LAM043 | 08/22/01 | 09/13/01 | 09/14/01 |
| AMMONIA | 001 REP | S | 01LAM043 | 08/22/01 | 09/13/01 | 09/14/01 |
| AMMONIA | 001 MS | S | 01LAM043 | 08/22/01 | 09/13/01 | 09/14/01 |
| TOTAL ORGANIC CARBON | 001 | S | 01LTZ025 | 08/22/01 | 09/17/01 | 09/18/01 |
| TOTAL ORGANIC CARBON | 001 REP | S | 01LTZ025 | 08/22/01 | 09/17/01 | 09/18/01 |
| TOTAL ORGANIC CARBON | 001 MS | S | 01LTZ025 | 08/22/01 | 09/17/01 | 09/18/01 |
| PH | 001 | S | 01LPH059 | 08/22/01 | 08/31/01 | 08/31/01 |

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B01-058 H1476

DATE RECEIVED: 08/25/01 LVL LOT # :0108L677

| CLIENT ID /ANALYSIS | LVL # | MTX | PREP # | COLLECTION | EXTR/PREP | ANALYSIS |
|---|---|---|---|---|---|---|
| PH | 001 REP | S | 01LPH059 | 08/22/01 | 08/31/01 | 08/31/01 |
| B12MH6 | | | | | | |
| % SOLIDS | 002 | S | 01L%S113 | 08/22/01 | 08/29/01 | 08/30/01 |
| CHLORIDE BY IC | 002 | S | 01LICD60 | 08/22/01 | 09/12/01 | 09/12/01 |
| FLUORIDE BY IC | 002 | S | 01LICD60 | 08/22/01 | 09/12/01 | 09/12/01 |
| NITRITE BY IC | 002 | S | 01LICE60 | 08/22/01 | 09/12/01 | 09/12/01 |
| NITRATE BY IC | 002 | S | 01LICE60 | 08/22/01 | 09/12/01 | 09/12/01 |
| TOTAL CYANIDE | 002 | S | 01LC082 | 08/22/01 | 08/31/01 | 08/31/01 |
| TOTAL CYANIDE | 002 REP | S | 01LC082 | 08/22/01 | 08/31/01 | 08/31/01 |
| TOTAL CYANIDE | 002 MS | S | 01LC082 | 08/22/01 | 08/31/01 | 08/31/01 |
| PHOSPHATE BY IC | 002 | S | 01LICD60 | 08/22/01 | 09/12/01 | 09/12/01 |
| CHROMIUM VI | 002 | S | 01LVI075 | 08/22/01 | 09/18/01 | 09/18/01 |
| SULFATE BY IC | 002 | S | 01LICD60 | 08/22/01 | 09/12/01 | 09/12/01 |
| NITRATE NITRITE | 002 | S | 01LN3050 | 08/22/01 | 09/24/01 | 09/24/01 |
| AMMONIA | 002 | S | 01LAM043 | 08/22/01 | 09/13/01 | 09/14/01 |
| TOTAL ORGANIC CARBON | 002 | S | 01LTZ025 | 08/22/01 | 09/17/01 | 09/18/01 |
| PH | 002 | S | 01LPH059 | 08/22/01 | 08/31/01 | 08/31/01 |

LAB QC:

| | | | | | | |
|---|---|---|---|---|---|---|
| CHLORIDE BY IC | MB1 | S | 01LICD60 | N/A | 09/12/01 | 09/12/01 |
| CHLORIDE BY IC | MB1 BS | S | 01LICD60 | N/A | 09/12/01 | 09/12/01 |
| CHLORIDE BY IC | MB1 | S | 01LIC061 | N/A | 09/19/01 | 09/19/01 |
| CHLORIDE BY IC | MB1 BS | S | 01LIC061 | N/A | 09/19/01 | 09/19/01 |
| FLUORIDE BY IC | MB1 | S | 01LICD60 | N/A | 09/12/01 | 09/12/01 |
| FLUORIDE BY IC | MB1 BS | S | 01LICD60 | N/A | 09/12/01 | 09/12/01 |
| FLUORIDE BY IC | MB1 | S | 01LIC061 | N/A | 09/19/01 | 09/19/01 |
| FLUORIDE BY IC | MB1 BS | S | 01LIC061 | N/A | 09/19/01 | 09/19/01 |
| NITRITE BY IC | MB1 | S | 01LICE60 | N/A | 09/12/01 | 09/12/01 |
| NITRITE BY IC | MB1 BS | S | 01LICE60 | N/A | 09/12/01 | 09/12/01 |
| NITRATE BY IC | MB1 | S | 01LICE60 | N/A | 09/12/01 | 09/12/01 |
| NITRATE BY IC | MB1 BS | S | 01LICE60 | N/A | 09/12/01 | 09/12/01 |
| NITRITE BY IC | MB1 | S | 01LIC061 | N/A | 09/19/01 | 09/19/01 |
| NITRITE BY IC | MB1 BS | S | 01LIC061 | N/A | 09/19/01 | 09/19/01 |
| NITRATE BY IC | MB1 | S | 01LIC061 | N/A | 09/19/01 | 09/19/01 |
| NITRATE BY IC | MB1 BS | S | 01LIC061 | N/A | 09/19/01 | 09/19/01 |

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B01-058 H1476

DATE RECEIVED: 08/25/01 LVL LOT # :0108L677

| CLIENT ID /ANALYSIS | LVL # | MTX | PREP # | COLLECTION | EXTR/PREP | ANALYSIS |
|---|---|---|---|---|---|---|
| TOTAL CYANIDE | LCS L | S | 01LC082 | N/A | 08/31/01 | 08/31/01 |
| TOTAL CYANIDE | LCS L | S | 01LC082 | N/A | 08/31/01 | 08/31/01 |
| TOTAL CYANIDE | MB1 | S | 01LC082 | N/A | 08/31/01 | 08/31/01 |
| PHOSPHATE BY IC | MB1 | S | 01LICD60 | N/A | 09/12/01 | 09/12/01 |
| PHOSPHATE BY IC | MB1 BS | S | 01LICD60 | N/A | 09/12/01 | 09/12/01 |
| PHOSPHATE BY IC | MB1 | S | 01LIC061 | N/A | 09/19/01 | 09/19/01 |
| PHOSPHATE BY IC | MB1 BS | S | 01LIC061 | N/A | 09/19/01 | 09/19/01 |
| CHROMIUM VI | MB1 | S | 01LVI075 | N/A | 09/18/01 | 09/18/01 |
| CHROMIUM VI | MB1 BS | S | 01LVI075 | N/A | 09/18/01 | 09/18/01 |
| CHROMIUM VI | MB1 BSD | S | 01LVI075 | N/A | 09/18/01 | 09/18/01 |
| SULFATE BY IC | MB1 | S | 01LICD60 | N/A | 09/12/01 | 09/12/01 |
| SULFATE BY IC | MB1 BS | S | 01LICD60 | N/A | 09/12/01 | 09/12/01 |
| SULFATE BY IC | MB1 | S | 01LIC061 | N/A | 09/19/01 | 09/19/01 |
| SULFATE BY IC | MB1 BS | S | 01LIC061 | N/A | 09/19/01 | 09/19/01 |
| NITRATE NITRITE | MB1 | S | 01LN3050 | N/A | 09/24/01 | 09/24/01 |
| NITRATE NITRITE | MB1 BS | S | 01LN3050 | N/A | 09/24/01 | 09/24/01 |
| AMMONIA | MB1 | S | 01LAM043 | N/A | 09/13/01 | 09/14/01 |
| AMMONIA | MB1 BS | S | 01LAM043 | N/A | 09/13/01 | 09/14/01 |
| AMMONIA | MB1 BSD | S | 01LAM043 | N/A | 09/13/01 | 09/14/01 |
| TOTAL ORGANIC CARBON | MB1 | ~~W~~S | 01LTZ025 | N/A | 09/17/01 | 09/18/01 |
| TOTAL ORGANIC CARBON | MB1 BS | ~~W~~S | 01LTZ025 | N/A | 09/17/01 | 09/18/01 |

TSF 9-26-01

LIONVILLE LABORATORY INC.

## Analytical Report

**Client:** TNU-HANFORD B01-058 H1476
**LVL#:** 0108L677

**W.O.#:** 11343-606-001-9999-00
**Date Received:** 08-25-01

## INORGANIC NARRATIVE

1. This narrative covers the analyses of 2 soil samples.

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

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

4. The cooler temperature was recorded on the chain of custody.

5. The method blanks were within the method criteria.

6. The Laboratory Control Samples (LCS) were within the laboratory control limits with the exception of LCS 01LVI072 for Insoluble Chromium VI that was above the 80-120% control limits. The duplicate LCS for Ammonia was within the 20% Relative Percent Difference (RPD) control limit.

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

8. The replicate analyses were within the 20% 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
Deputy Laboratory Manager
Lionville Laboratory Incorporated

09-26-01
Date

njp\i07-677

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 16 pages.

Lionville Laboratory Incorporated

## WET CHEMISTRY

## METHODS GLOSSARY FOR SOIL/SOLIDS SAMPLE ANALYSIS

| | ASTM | SW846 | OTHER |
|---|---|---|---|
| % Ash | __ D2216-80 | | |
| % Moisture | __ D2216-80 | | __ ILMO4.0 (e) |
| % Solids | ✓ D2216-80 | | __ ILMO4.0 (e) |
| % Volatile Solids | __ D2216-80 | | |
| ASTM Extraction in Water | __ D3987-81/85 | | |
| BTU | __ D240-87 | | |
| CEC | | __ 9081 | __ c |
| Chromium VI | | ✓ 3060A/7196A | |
| Corrosivity __ by coupon __ by pH | | __ 1110(mod) __ 9045C | |
| Cyanide, Total | | ✓ 9010B/9014 | __ ILMO4.0 (e) |
| Cyanide, Reactive | | __ Section 7.3/9014 | |
| Halides, Extractable Organic | | __ 9020B | __ EPA 600/4/84-008 |
| Halides, Total | | __ 9020B | __ EPA 600/4/84-008 |
| EP Toxicity | | __ 1310A | |
| Flash Point | | __ 1010 | |
| Ignitability | | __ 1010 | |
| Oil & Grease | | __ 9071A | |
| Carbon, Total Organic | | ✓ 9060 | ✓ Lloyd Kahn (mod) |
| Oxygen Bomb Prep for Anions | __ D240-87(mod) | __ 5050 | |
| Petroleum Hydrocarbons, Total Recoverable | | __ 9071 | __ EPA 418.1 |
| pH, Soil | | ✓ 9045C | |
| Sulfide, Reactive | | __ Section 7.3/9030B | |
| Sulfide | | __ 9030B(mod) | |
| Specific Gravity | __ D1429-76C/ | __ D5057-90 | |
| Sulfur, Total | | __ 9056 | |
| Synthetic Preparation Leach | | __ 1312 | |
| Paint Filter | | __ 9095A | |

**Other:** Chloride, Fluoride, Nitrate, **Method:** EPA 300.0(mod.)

**Other:** Nitrite, Phosphate, Sulfate **Method**

Nitrate Nitrite EPA 353.2 (mod.)

Ammonia EPA 350.3

L-WI-034/B-01/01

# 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
LC = Laboratory Control Sample.
NC = Not calculated.

A suffix of -R, -S, or -T following these codes indicate a replicate, spike or sample duplicate analysis respectively.

## ANALYTICAL WET CHEMISTRY METHODS

1. ASTM Standard Methods.

2. USEPA Methods for Chemical Analysis of Water and Wastes (USEPA 600/4-79-020).

3. Test Methods for Evaluating Solid Waste (USEPA SW-846).

a. Standard Methods for the Examination of Water and Waste, 16 ed, (1983).

b. Standard Methods for the Examination of Water and Waste, 17 ed, (1989)/18ed (1992).

c. Method of Soil Analysis, Part 1, Physical and Mineralogical Methods, 2nd ed, (1986).

d. Method of Soil Analysis, Part 2, Chemical and Microbiological Properties, Am. Soc. Agron., Madison, WI (1965).

e. USEPA Contract Laboratory Program, Statement of Work for Inorganic Analysis.

f. Code of Federal Regulations.

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 09/25/01

CLIENT: TNUHANFORD B01-058 H1476 LVL LOT #: 0108L677

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -001 | B12MH5 | % Solids | 94.1 | % | 0.01 | 1.0 |
| | | Chloride by IC | 6.5 | MG/KG | 2.7 | 2.0 |
| | | Fluoride by IC | 2.7 u | MG/KG | 2.7 | 2.0 |
| | | Nitrite by IC | 2.66 u | MG/KG | 2.66 | 2.0 |
| | | Nitrate by IC | 110 | MG/KG | 6.64 | 5.0 |
| | | Cyanide, Total | 0.45 u | MG/KG | 0.45 | 1.0 |
| | | Phosphate by IC | 7.3 | MG/KG | 2.7 | 2.0 |
| | | Chromium VI | 0.42 u | MG/KG | 0.42 | 1.0 |
| | | Sulfate by IC | 45.9 | MG/KG | 2.7 | 2.0 |
| | | Nitrate Nitrite | 24.9 | MG/KG | 0.98 | 5.0 |
| | | Ammonia, as N | 2.5 u | MG/KG | 2.5 | 1.0 |
| | | Total Organic Carbon | 1050 | MG/KG | 200 | 1.0 |
| | | pH | 9.0 | SOIL PH | 0.01 | 1.0 |
| -002 | B12MH6 | % Solids | 91.0 | % | 0.01 | 1.0 |
| | | Chloride by IC | 9.0 | MG/KG | 2.7 | 2.0 |
| | | Fluoride by IC | 2.7 u | MG/KG | 2.7 | 2.0 |
| | | Nitrite by IC | 2.75 u | MG/KG | 2.75 | 2.0 |
| | | Nitrate by IC | 193 | MG/KG | 6.87 | 5.0 |
| | | Cyanide, Total | 0.48 u | MG/KG | 0.48 | 1.0 |
| | | Phosphate by IC | 3.1 | MG/KG | 2.7 | 2.0 |
| | | Chromium VI | 0.44 u | MG/KG | 0.44 | 1.0 |
| | | Sulfate by IC | 185 | MG/KG | 2.7 | 2.0 |
| | | Nitrate Nitrite | 46.2 | MG/KG | 2.2 | 10.0 |
| | | Ammonia, as N | 21.3 | MG/KG | 2.4 | 1.0 |
| | | Total Organic Carbon | 3850 | MG/KG | 192 | 1.0 |
| | | pH | 8.3 | SOIL PH | 0.01 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 09/25/01

CLIENT: TNUHANFORD B01-058 H1476 LVL LOT #: 0108L677

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

| SAMPLE | SITE ID | ANALYTE | RESULT | | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|---|
| BLANK10 | 01LICD60-MB1 | Chloride by IC | 1.2 | u | MG/KG | 1.2 | 1.0 |
| | | Fluoride by IC | 1.2 | u | MG/KG | 1.2 | 1.0 |
| | | Phosphate by IC | 1.2 | u | MG/KG | 1.2 | 1.0 |
| | | Sulfate by IC | 1.2 | u | MG/KG | 1.2 | 1.0 |
| BLANK10 | 01LIC061-MB1 | Chloride by IC | 1.2 | u | MG/KG | 1.2 | 1.0 |
| | | Fluoride by IC | 2.5 | u | MG/KG | 2.5 | 1.0 |
| | | Nitrite by IC | 1.25 | u | MG/KG | 1.25 | 1.0 |
| | | Nitrate by IC | 1.25 | u | MG/KG | 1.25 | 1.0 |
| | | Phosphate by IC | 1.2 | u | MG/KG | 1.2 | 1.0 |
| | | Sulfate by IC | 1.2 | u | MG/KG | 1.2 | 1.0 |
| BLANK10 | 01LICE60-MB1 | Nitrite by IC | 1.25 | u | MG/KG | 1.25 | 1.0 |
| | | Nitrate by IC | 1.25 | u | MG/KG | 1.25 | 1.0 |
| BLANK1 | 01LC082-MB1 | Cyanide, Total | 0.50 | u | MG/KG | 0.50 | 1.0 |
| BLANK10 | 01LVI075-MB1 | Chromium VI | 0.40 | u | MG/KG | 0.40 | 1.0 |
| BLANK10 | 01LN3050-MB1 | Nitrate Nitrite | 0.20 | u | MG/KG | 0.20 | 1.0 |
| BLANK10 | 01LAM043-MB1 | Ammonia, as N | 2.5 | u | MG/KG | 2.5 | 1.0 |
| BLANK10 | 01LTZ025-MB1 | Total Organic Carbon | 20.0 | u | MG/KG | 20.0 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 09/25/01

CLIENT: TNUHANFORD B01-058 H1476 LVL LOT #: 0108L677

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

| SAMPLE | SITE ID | ANALYTE | SPIKED SAMPLE | INITIAL RESULT | SPIKED AMOUNT | %RECOV | DILUTION FACTOR(SPK) |
|---|---|---|---|---|---|---|---|
| -001 | B12MH5 | Chloride by IC | 125 | 6.5 | 133 | 89.3 | 5.0 |
| | | Fluoride by IC | 275 | 2.1 | 266 | 102.7 | 5.0 |
| | | Nitrite by IC | 129 | 2.66u | 133 | 97.0 | 5.0 |
| | | Nitrate by IC | 255 | 110 | 133 | 108.8 | 5.0 |
| | | Phosphate by IC | 134 | 7.3 | 133 | 95.7 | 5.0 |
| | | Soluble Chromium VI | 4.4 | 0.42u | 4.2 | 102.0 | 1.0 |
| | | Insoluble Chromium VI | 1590 | 0.42u | 1300 | 122.1 | 100 |
| | | Sulfate by IC | 180 | 45.9 | 133 | 100.6 | 5.0 |
| | | Nitrate Nitrite | 71.8 | 24.9 | 50.3 | 93.1 | 10.0 |
| | | Ammonia, as N | 118 | 2.5 u | 98.6 | 120.0 | 1.0 |
| | | Total Organic Carbon | 4580 | 1050 | 3920 | 89.9 | 1.0 |
| -002 | B12MH6 | Cyanide, Total | 4.58 | 0.48u | 4.81 | 95.3 | 1.0 |
| BLANK10 | 01LICD60-MB1 | Chloride by IC | 23.3 | 1.2 u | 25.0 | 93.4 | 1.0 |
| | | Fluoride by IC | 52.7 | 1.2 u | 50.0 | 105.4 | 1.0 |
| | | Phosphate by IC | 25.8 | 1.2 u | 25.0 | 103.3 | 1.0 |
| | | Sulfate by IC | 23.6 | 1.2 u | 25.0 | 94.3 | 1.0 |
| BLANK10 | 01LIC061-MB1 | Chloride by IC | 24.0 | 1.2 u | 25.0 | 95.8 | 1.0 |
| | | Fluoride by IC | 54.2 | 2.5 u | 50.0 | 108.5 | 1.0 |
| | | Nitrite by IC | 23.7 | 1.25u | 25.0 | 95.0 | 1.0 |
| | | Nitrate by IC | 24.7 | 1.25u | 25.0 | 98.6 | 1.0 |
| | | Phosphate by IC | 25.7 | 1.2 u | 25.0 | 102.9 | 1.0 |
| | | Sulfate by IC | 24.2 | 1.2 u | 25.0 | 96.8 | 1.0 |
| BLANK10 | 01LICE60-MB1 | Nitrite by IC | 22.6 | 1.25u | 25.0 | 90.4 | 1.0 |
| | | Nitrate by IC | 24.1 | 1.25u | 25.0 | 96.5 | 1.0 |
| BLANK10 | 01LVI075-MB1 | Soluble Chromium VI | 4.1 | 0.40u | 4.0 | 102.0 | 1.0 |
| | | Insoluble Chromium VI | 1440 | 0.40u | 1160 | 124.3 | 100 |
| BLANK10 | 01LN3050-MB1 | Nitrate Nitrite | 5.0 | 0.20u | 5.0 | 99.0 | 1.0 |
| BLANK10 | 01LAM043-MB1 | Ammonia, as N | 102 | 2.5 u | 100 | 102.5 | 1.0 |
| | | Ammonia, as N MSD | 104 | 2.5 u | 100 | 103.8 | 1.0 |
| BLANK10 | 01LTZ025-MB1 | Total Organic Carbon | 391 | 20.0 u | 400 | 97.8 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS DUPLICATE SPIKE REPORT 09/25/01

CLIENT: TNUHANFORD B01-058 H1476 LVL LOT #: 0108L677

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

| SAMPLE | SITE ID | ANALYTE | SPIKE#1 %RECOV | SPIKE#2 %RECOV | %DIFF |
|---|---|---|---|---|---|
| BLANK10 | 01LAM043-MB1 | Ammonia, as N | 102.5 | 103.8 | 1.2 |

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 09/25/01

CLIENT: TNUHANFORD B01-058 H1476 LVL LOT #: 0108L677

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

| SAMPLE | SITE ID | ANALYTE | INITIAL RESULT | REPLICATE | RPD | DILUTION FACTOR(REP) |
|---|---|---|---|---|---|---|
| -001REP | B12MH5 | % Solids | 94.1 | 94.6 | 0.47 | 1.0 |
| | | Chloride by IC | 6.5 | 7.4 | 13.3 | 2.0 |
| | | Fluoride by IC | 2.7 u | 2.7 u | NC | 2.0 |
| | | Nitrite by IC | 2.66u | 2.66u | NC | 2.0 |
| | | Nitrate by IC | 110 | 103 | 6.9 | 5.0 |
| | | Phosphate by IC | 7.3 | 7.0 | 4.0 | 2.0 |
| | | Chromium VI | 0.42u | 0.43 | NC | 1.0 |
| | | Sulfate by IC | 45.9 | 38.0 | 18.9 | 2.0 |
| | | Nitrate Nitrite | 24.9 | 22.7 | 9.2 | 5.0 |
| | | Ammonia, as N | 2.5 u | 2.7 u | NC | 1.0 |
| | | Total Organic Carbon | 1050 | 949 | 10.4 | 1.0 |
| | | pH | 9.0 | 9.0 | 0.3 | 1.0 |
| -002REP | B12MH6 | Cyanide, Total | 0.48u | 0.51u | NC | 1.0 |

Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 09/25/01

CLIENT: TNUHANFORD B01-058 H1476 LVL LOT #: 0108L677

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

| SAMPLE | SITE ID | ANALYTE | SPIKED SAMPLE | SPIKED AMOUNT | UNITS | %RECOV |
|---|---|---|---|---|---|---|
| LCSS1 | 01LC082-LCS1 | Cyanide, Total LCS | 1.69 | 2.0 | MG/KG | 84.4 |
| LCSS2 | 01LC082-LCS2 | Cyanide, Total LCS | 10.1 | 10.0 | MG/KG | 100.7 |

Lionville Laboratory Use Only

01081677

# Custody Transfer Record/Lab Work Request

Page 1 of 1

**FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS**

VLI

Client: ~~[illegible]~~ Tri-Hanford SAF # B01-058

Est. Final Proj. Sampling Date: 8-27-01

Project #: 11343-6060-001-9999-00

Project Contact/Phone #:

Lionville Laboratory Project Manager: OJ

QC: Spec Del: Std TAT: 30 day

Date Rec'd: 8-25-01 Date Due: 9-24-01

| | | A | B | C | D |
|---|---|---|---|---|---|
| Refrigerator # | | | | | |
| #Type Container | Liquid | | | | |
| | Solid | WG | | | |
| Volume | Liquid | | | | |
| | Solid | 5 | | | |
| Preservatives | | — | | | |

ANALYSES REQUESTED → ORGANIC: VOA, BNA, Pest/PCB, Herb; INORG: Metal, CN; Lionville Laboratory Use Only: Metal(1), Inorg(1), ICP/MS, mHgTO

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 | Metal(1) | | Inorg(1) | ICP/MS | mHgTO |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 001 | B12MH5 | | | S | 8-22-01 | 0425 | 1 | | 1 | 1 | 1 |
| 002 | 1 6 | | | L | | 0530 | 1 | | 1 | 1 | 1 |

Special Instructions: Saf B01-058
Run Matrix QC

DATE/REVISIONS:
Met(1) 1. Cd, Cr, Cu, Ni, Ag, Pb
Inorg(1) 2. ICCL, ICFL, IC003, IC002, ICPO4, ICSO4
1
3. IN1H30, IN3N2, ICN10, IOCT, IPH
4.
5.
6.

Lionville Laboratory Use Only

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

Tamper Resistant Seal 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. 4.5 °C

| Relinquished by | Received by | Date | Time |
|---|---|---|---|
| Ed Ex | V. Bernard | 8/25/01 | 0920 |
| | | | |

| Relinquished by | Received by | Date | Time |
|---|---|---|---|
| COMPOSITE WASTE | | ORIGINAL REWRITTEN | |

Discrepancies Between Samples Labels and COC Record? Y or N

NOTES: 4235795416770

0108L61 1

| Bechtel Hanford Inc. | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | B01-058-225 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: Thomas G./Watson D. | Company Contact: Todd, M.E. — Telephone No.: (509) 372-9631 | Project Coordinator: TRENT, SJ | Price Code: 8N — Data Turnaround: 45 Days — Air Quality ☐ |
| Project Designation: 200-TW-1 & 2 - Soil Sampling | Sampling Location: B-7A/200 E | SAF No.: B01-058 | |
| Ice Chest No.: ERC99-039 | Field Logbook No.: EL-1518-1 — COA: B20TW2444 ~~B20TW2674~~ KT | Method of Shipment: Fed EX | |
| Shipped To: ~~TMA~~/RECRA DSW 08/15/01 | Offsite Property No.: A010344 8/22/01 | Bill of Lading/Air Bill No.: 42357954-6770 | |

POSSIBLE SAMPLE HAZARDS/REMARKS
500 COUNTS ABV ON SOIL
NO DOSE MEASURED ON BOTTLES

Samples stored in Ref.# 1B at the 3728 Shipping Facility on 8/22/01.
Collector not available to relinquish samples on 8/24/01 for shipment. RT 8.24.01

| Preservation | Cool 4C C | Cool 4C A | Cool 4C D | Cool 4C B | Cool 4C | Cool 4C | None | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Type of Container | sG | sG | sG | sG | sG | sG | sG | | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | |
| Volume | 60mL | 500mL | 120mL | 1000mL | 120mL | 500mL | 1000mL | | | |
| SAMPLE ANALYSIS | Chromium Hex - 7196 | See item (1) in Special Instructions. | Mercury - 7470 - (CV) | See item (2) in Special Instructions. | VOA - 8260A (TCL) | See item (3) in Special Instructions. | See item (4) in Special Instructions. | | | |

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B12MH5 | SOIL | 08/22/01 | 0425 | X | X | X | X | | | | | TIETO | BIEMUA |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

CHAIN OF POSSESSION — Sign/Print Names

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| DSWATSON/[illegible] | 08/22/01 0730 | REF. 1B 3728 | 08/22/01 0730 |
| Ref. 1B 3728 | 8.24.01 0900 | R Thore | 8.24.01 0900 |
| R.T. Thore | 8.24.01 0900 | FED EX | |
| Fed Ex | 8/25/01 0920 | [illegible] Vernon | 8/25/01 0920 |
| | | | |
| | | | |

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010A (TAL) {Cadmium, Chromium, Copper, Nickel, Silver}; ICP Metals - 6010A (Add-on) {Lead}
(2) IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Ammonia - 350.3; NO2/NO3 - 353.1; Total Cyanide - 9010; TOC - 9060; pH (Soil) - 9045
~~(3) Semi-VOA - 8270A (Add-On) (Tributyl phosphate); TPH-Diesel Range - WTPH-D~~
(4) ~~Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Radium-226, Radium-228); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241; Carbon-14; Neptunium-237; Nickel-63; Strontium-89,90 -- Total Sr; Technetium-99; Total Uranium; Tritium - H3; Isotopic Uranium~~

10/5/01 DSW

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

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

CE-011 (10/99)

| Bechtel Hanford Inc. | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | B01-058-226 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: Thomas G./Watson D. | Company Contact: Todd, M.E. | Telephone No.: (509) 372-9631 | Project Coordinator: TRENT, SJ |
| Project Designation: 200-TW-1 & 2 - Soil Sampling | Sampling Location: B-7A/200 E | | SAF No.: B01-058 |
| Ice Chest No.: ERC 99-039 | Field Logbook No.: EL-1518-1 | COA: B20TW2A44K ~~B20TW2674C~~ JT | Method of Shipment: Fed EX |
| Shipped To: ~~TMA~~/RECRA DSW 08/15/01 | Offsite Property No.: A 010344 8/22/01 | | Bill of Lading/Air Bill No.: 42351954 - 6770 |

Price Code: 8N

Data Turnaround: 45 Days

Air Quality ☐

POSSIBLE SAMPLE HAZARDS/REMARKS
650 COUNTS B/G ON SOIL
NO DOSE MEASURED ON BOTTLES

Samples stored in Ref.# 1B at the 3728 Shipping Facility on 8 22 01.
Collector not available to relinquish samples on 8 24 01 for shipment.
RT 8-24-01

SAMPLE ANALYSIS

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | None | | | | |
| Type of Container | aG | aG | aG | aG | aG | aG | aG | | | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | |
| Volume | 60mL | 500mL | 120mL | 1000mL | 120mL | 500mL | 1000mL | | | | |
| | Chromium Hex - 7196 | See item (1) in Special Instructions. | Mercury - 7470 - (CV) | See item (2) in Special Instructions. | VOA - 8260A (TCL) DSW 08/22/01 | See item (3) in Special Instructions. | See item (4) in Special Instructions. DSW 08/22/01 | | | | |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | Tie to |
| B12MH6 | SOIL | 8-22-01 | 0530 | X | X | X | X | | | | B12MJ5 |

CHAIN OF POSSESSION

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| DSW 11304 TRENT | 08/22/01 0730 | REF. 1B | 08/22/01 0730 |
| Ref 1B 3728 | 8.24.01 0900 | R.L. Thorer | 8.24.01 0900 |
| R.L. Thorer | 8.24.01 0900 | FED EX | |
| Fed Ex | 8/25/01 0920 | Pete Hennon | 8/25/01 0920 |
| | | | |
| | | | |

Sign/Print Names

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010A (TAL) {Cadmium, Chromium, Copper, Nickel, Silver}; ICP Metals - 6010A (Add-on) {Lead}
(2) IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; Ammonia - 350.3; NO2/NO3 - 353.1; Total Cyanide - 9010; TOC - 9060; pH (Soil) - 9045
(3) ~~Semi-VOA - 8270A (Add-On) {Tributyl phosphate}; TPH-Diesel Range - WTPH-D~~
(4) ~~Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-On {Radium-226, Radium-228}; Isotopic Plutonium; Isotopic Thorium {Thorium-232}; Americium-241; Carbon-14; Neptunium-237; Nickel-63; Strontium-89,90 -- Total Sr; Technetium-99; Total Uranium; Tritium - H3; Isotopic Uranium~~

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

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

BHI-EE-011 (10/99)

Figure 1. Sample Check-in List

Date/Time Received: 8/25/01 0920

SDG#: 01086677

Work Order Number: ERC99-039 SAF# B01-058

Shipping Container ID: _____ Chain of Custody # B01-058-225

1. Custody Seals on shipping container intact? Yes [✓] No [ ]
2. Custody Seals dated and signed? Yes [✓] No [ ]
3. Chain-of-Custody record present? Yes [✓] No [ ]
4. Cooler temperature 4.5
5. Vermiculite/packing materials is Wet [ ] Dry [✓]
6. Number of samples in shipping container: 8
7. Sample holding times exceeded? Yes [ ] No [✓]

8. Samples have:
   - ____ tape
   - ____ hazard labels
   - ✓ custody seals
   - ____ appropriate sample labels

9. Samples are:
   - ✓ in good condition
   - ____ leaking
   - ____ broken
   - ____ have air bubbles

10. Were any anomalies identified in sample receipt? Yes [ ] No [✓]
11. Description of anomalies (include sample numbers): _____

Sample Custodian/Laboratory: Lab Herrowood Laboratory Inc Finneville Date: 8/25/01

Telephoned to: _____ On _____ By _____

OCT 2001
RECEIVED

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B01-058 H1476

DATE RECEIVED: 08/25/01 LVL LOT # :0108L677

| CLIENT ID /ANALYSIS | LVL # | MTX | PREP # | COLLECTION | EXTR/PREP | ANALYSIS |
|---|---|---|---|---|---|---|
| B12MH5 | | | | | | |
| SILVER, TOTAL | 001 | S | 01L0562 | 08/22/01 | 09/08/01 | 09/11/01 |
| SILVER, TOTAL | 001 REP | S | 01L0562 | 08/22/01 | 09/08/01 | 09/11/01 |
| SILVER, TOTAL | 001 MS | S | 01L0562 | 08/22/01 | 09/08/01 | 09/11/01 |
| CADMIUM, TOTAL | 001 | S | 01L0562 | 08/22/01 | 09/08/01 | 09/11/01 |
| CADMIUM, TOTAL | 001 REP | S | 01L0562 | 08/22/01 | 09/08/01 | 09/11/01 |
| CADMIUM, TOTAL | 001 MS | S | 01L0562 | 08/22/01 | 09/08/01 | 09/11/01 |
| CHROMIUM, TOTAL | 001 | S | 01L0562 | 08/22/01 | 09/08/01 | 09/11/01 |
| CHROMIUM, TOTAL | 001 REP | S | 01L0562 | 08/22/01 | 09/08/01 | 09/11/01 |
| CHROMIUM, TOTAL | 001 MS | S | 01L0562 | 08/22/01 | 09/08/01 | 09/11/01 |
| COPPER, TOTAL | 001 | S | 01L0562 | 08/22/01 | 09/08/01 | 09/11/01 |
| COPPER, TOTAL | 001 REP | S | 01L0562 | 08/22/01 | 09/08/01 | 09/11/01 |
| COPPER, TOTAL | 001 MS | S | 01L0562 | 08/22/01 | 09/08/01 | 09/11/01 |
| MERCURY, TOTAL | 001 | S | 01C0276 | 08/22/01 | 09/12/01 | 09/12/01 |
| MERCURY, TOTAL | 001 REP | S | 01C0276 | 08/22/01 | 09/12/01 | 09/12/01 |
| MERCURY, TOTAL | 001 MS | S | 01C0276 | 08/22/01 | 09/12/01 | 09/12/01 |
| NICKEL, TOTAL | 001 | S | 01L0562 | 08/22/01 | 09/08/01 | 09/11/01 |
| NICKEL, TOTAL | 001 REP | S | 01L0562 | 08/22/01 | 09/08/01 | 09/11/01 |
| NICKEL, TOTAL | 001 MS | S | 01L0562 | 08/22/01 | 09/08/01 | 09/11/01 |
| LEAD, TOTAL | 001 | S | 01L0562 | 08/22/01 | 09/08/01 | 09/11/01 |
| LEAD, TOTAL | 001 REP | S | 01L0562 | 08/22/01 | 09/08/01 | 09/11/01 |
| LEAD, TOTAL | 001 MS | S | 01L0562 | 08/22/01 | 09/08/01 | 09/11/01 |
| B12MH6 | | | | | | |
| SILVER, TOTAL | 002 | S | 01L0562 | 08/22/01 | 09/08/01 | 09/11/01 |
| CADMIUM, TOTAL | 002 | S | 01L0562 | 08/22/01 | 09/08/01 | 09/11/01 |
| CHROMIUM, TOTAL | 002 | S | 01L0562 | 08/22/01 | 09/08/01 | 09/11/01 |
| COPPER, TOTAL | 002 | S | 01L0562 | 08/22/01 | 09/08/01 | 09/11/01 |
| MERCURY, TOTAL | 002 | S | 01C0276 | 08/22/01 | 09/12/01 | 09/12/01 |
| NICKEL, TOTAL | 002 | S | 01L0562 | 08/22/01 | 09/08/01 | 09/11/01 |
| LEAD, TOTAL | 002 | S | 01L0562 | 08/22/01 | 09/08/01 | 09/11/01 |

LAB QC:

| | | | | | | |
|---|---|---|---|---|---|---|
| SILVER LABORATORY | LC1 BS | S | 01L0562 | N/A | 09/08/01 | 09/11/01 |

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B01-058 H1476

DATE RECEIVED: 08/25/01 LVL LOT # :0108L677

| CLIENT ID /ANALYSIS | LVL # | MTX | PREP # | COLLECTION | EXTR/PREP | ANALYSIS |
|---|---|---|---|---|---|---|
| SILVER, TOTAL | MB1 | S | 01L0562 | N/A | 09/08/01 | 09/11/01 |
| CADMIUM LABORATORY | LC1 BS | S | 01L0562 | N/A | 09/08/01 | 09/11/01 |
| CADMIUM, TOTAL | MB1 | S | 01L0562 | N/A | 09/08/01 | 09/11/01 |
| CHROMIUM LABORATORY | LC1 BS | S | 01L0562 | N/A | 09/08/01 | 09/11/01 |
| CHROMIUM, TOTAL | MB1 | S | 01L0562 | N/A | 09/08/01 | 09/11/01 |
| COPPER LABORATORY | LC1 BS | S | 01L0562 | N/A | 09/08/01 | 09/11/01 |
| COPPER, TOTAL | MB1 | S | 01L0562 | N/A | 09/08/01 | 09/11/01 |
| MERCURY LABORATORY | LC1 BS | S | 01C0276 | N/A | 09/12/01 | 09/12/01 |
| MERCURY, TOTAL | MB1 | S | 01C0276 | N/A | 09/12/01 | 09/12/01 |
| NICKEL LABORATORY | LC1 BS | S | 01L0562 | N/A | 09/08/01 | 09/11/01 |
| NICKEL, TOTAL | MB1 | S | 01L0562 | N/A | 09/08/01 | 09/11/01 |
| LEAD LABORATORY | LC1 BS | S | 01L0562 | N/A | 09/08/01 | 09/11/01 |
| LEAD, TOTAL | MB1 | S | 01L0562 | N/A | 09/08/01 | 09/11/01 |

LIONVILLE LABORATORY INC.

**Analytical Report**

**Client:** TNU-HANFORD B01-058
**LVL#:** 0108L677
**SDG/SAF#:** H1476/B01-058

**W.O.#:** 11343-606-001-9999-00
**Date Received:** 08-25-01

## METALS CASE NARRATIVE

1. This narrative covers the analyses of 2 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 temperature has been recorded on the Chain of Custody.

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

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

7. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL), MB value less than 5% of the RCRA limit, or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.

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

9. All laboratory control samples (LCS) were within the 80-120% control limits. Refer to the Inorganics Laboratory Control Standards Report.

10. All matrix spike (MS) recoveries were within the 75-125% control limits. Refer to the Inorganics Accuracy Report.

11. All duplicate analyses were within 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.

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 14 pages.

13. 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
Deputy Laboratory Manager
Lionville Laboratory Incorporated

gmb/m08-677

09-24-01
Date

LVLI
LIONVILLE LABORATORY INC

# METALS METHOD GLOSSARY

The following methods are used as reference for the digestion and analysis of samples contained within this Lot#: 01084677

Leaching Procedure: __1310 __1311 __1312 __Other:_____

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

Metals Digestion Methods: __3005A __3010A __3015 __3020A ✓3050B __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-03/01

# 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.

RFW 21-21L-033/N-10/96

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 09/17/01

CLIENT: TNUHANFORD B01-058 H1476 LVL LOT #: 0108L677

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -001 | B12MH5 | Silver, Total | 0.05 u | MG/KG | 0.05 | 1.0 |
| | | Cadmium, Total | 0.03 u | MG/KG | 0.03 | 1.0 |
| | | Chromium, Total | 12.9 | MG/KG | 0.15 | 1.0 |
| | | Copper, Total | 12.8 | MG/KG | 0.05 | 1.0 |
| | | Mercury, Total | 0.02 u | MG/KG | 0.02 | 1.0 |
| | | Nickel, Total | 10.9 | MG/KG | 0.18 | 1.0 |
| | | Lead, Total | 5.9 | MG/KG | 0.25 | 1.0 |
| -002 | B12MH6 | Silver, Total | 0.05 u | MG/KG | 0.05 | 1.0 |
| | | Cadmium, Total | 0.03 u | MG/KG | 0.03 | 1.0 |
| | | Chromium, Total | 13.5 | MG/KG | 0.15 | 1.0 |
| | | Copper, Total | 13.7 | MG/KG | 0.05 | 1.0 |
| | | Mercury, Total | 0.01 u | MG/KG | 0.01 | 1.0 |
| | | Nickel, Total | 13.7 | MG/KG | 0.18 | 1.0 |
| | | Lead, Total | 6.9 | MG/KG | 0.26 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 09/17/01

CLIENT: TNUHANFORD B01-058 H1476 LVL LOT #: 0108L677

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| BLANK1 | 01L0562-MB1 | Silver, Total | 0.05 u | MG/KG | 0.05 | 1.0 |
| | | Cadmium, Total | 0.03 u | MG/KG | 0.03 | 1.0 |
| | | Chromium, Total | 0.14 u | MG/KG | 0.14 | 1.0 |
| | | Copper, Total | 0.05 | MG/KG | 0.05 | 1.0 |
| | | Nickel, Total | 0.17 u | MG/KG | 0.17 | 1.0 |
| | | Lead, Total | 0.24 u | MG/KG | 0.24 | 1.0 |
| BLANK1 | 01C0276-MB1 | Mercury, Total | 0.02 u | MG/KG | 0.02 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 09/17/01

CLIENT: TNUHANFORD B01-058 H1476 LVL LOT #: 0108L677

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

| SAMPLE | SITE ID | ANALYTE | SPIKED SAMPLE | INITIAL RESULT | SPIKED AMOUNT | %RECOV | DILUTION FACTOR(SPK) |
|---|---|---|---|---|---|---|---|
| -001 | B12MH5 | Silver, Total | 4.6 | 0.05u | 5.2 | 88.5 | 1.0 |
| | | Cadmium, Total | 5.1 | 0.03u | 5.2 | 98.1 | 1.0 |
| | | Chromium, Total | 33.4 | 12.9 | 20.8 | 98.6 | 1.0 |
| | | Copper, Total | 37.0 | 12.8 | 26.1 | 92.7 | 1.0 |
| | | Mercury, Total | 0.16 | 0.02u | 0.16 | 103.8 | 1.0 |
| | | Nickel, Total | 61.8 | 10.9 | 52.1 | 97.7 | 1.0 |
| | | Lead, Total | 57.4 | 5.9 | 52.1 | 98.8 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 09/17/01

*CLIENT: TNUHANFORD B01-058 H1476* *LVL LOT #: 0108L677*

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

| SAMPLE | SITE ID | ANALYTE | INITIAL RESULT | REPLICATE | RPD | DILUTION FACTOR(REP) |
|---|---|---|---|---|---|---|
| -001REP | B12MH5 | Silver, Total | 0.05u | 0.05u | NC | 1.0 |
| | | Cadmium, Total | 0.03u | 0.03u | NC | 1.0 |
| | | Chromium, Total | 12.9 | 13.5 | 4.5 | 1.0 |
| | | Copper, Total | 12.8 | 13.2 | 3.1 | 1.0 |
| | | Mercury, Total | 0.02u | 0.01u | NC | 1.0 |
| | | Nickel, Total | 10.9 | 11.6 | 6.2 | 1.0 |
| | | Lead, Total | 5.9 | 5.9 | 0.00 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 09/17/01

CLIENT: TNUHANFORD B01-058 H1476 LVL LOT #: 0108L677

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

| SAMPLE | SITE ID | ANALYTE | SPIKED SAMPLE | SPIKED AMOUNT | UNITS | %RECOV |
|---|---|---|---|---|---|---|
| LCS1 | 01L0562-LC1 | Silver, LCS | 47.4 | 50.0 | MG/KG | 94.8 |
| | | Cadmium, LCS | 24.1 | 25.0 | MG/KG | 96.4 |
| | | Chromium, LCS | 49.1 | 50.0 | MG/KG | 98.2 |
| | | Copper, LCS | 123 | 125 | MG/KG | 98.1 |
| | | Nickel, LCS | 195 | 200 | MG/KG | 97.5 |
| | | Lead, LCS | 241 | 250 | MG/KG | 96.2 |
| LCS1 | 01C0276-LC1 | Mercury, LCS | 2.4 | 2.5 | MG/KG | 94.8 |

Lionville Laboratory Use Only

0108L677

# Custody Transfer Record/Lab Work Request

Page 1 of 1

**FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS**

LVLI

Client [redacted] Tny-Hanford SAF # B01-058

Est. Final Proj. Sampling Date

Project # 1127150/4005-B01-9999-00

Project Contact/Phone #

Lionville Laboratory Project Manager OJ

QC CAC DM CAC TAT 30 day

Date Rec'd 8-25-01 Date Due 9-24-01

| | | A | B | C | D |
|---|---|---|---|---|---|
| Refrigerator # | | | | | |
| #Type Container | Liquid | | | | |
| | Solid | 1AG | 1AG | 1AG | 1AG |
| Volume | Liquid | | | | |
| | Solid | 500 | 500 | 60 | 120 |
| Preservatives | | | | | |
| ANALYSES REQUESTED → | | ORGANIC: VOA, BNA, Pest/PCB, Herb | | INORG: Metal, CN | Inorg, ICP/MS, Hg |
| Lionville Laboratory Use Only | | | | Met(1) | Inorg(1), ICP/MS, Hg(1) |

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

| Lab ID | Client ID/Description | Matrix QC Chosen (✓) MS | MSD | Matrix | Date Collected | Time Collected | Met(1) | Inorg(1) | ICP/MS | Hg(1) |
|---|---|---|---|---|---|---|---|---|---|---|
| 001 | B12MH5 | | | S | 8-25-01 | 0925 | 1 | 1 | 1 | 1 |
| 002 | L 6 | | | L | | 0530 | 1 | 1 | 1 | 1 |

Special Instructions: SAF B01-058

Run Matrix QC

DATE/REVISIONS:

Met(1) 1. Cd, Cr, Cu, Ni, Ag, Pb

Inorg(1) 2. ICCl, ICF1, ICNO3, ICNO2, ICPO4, ICSO4

1 3. IONH3N, IO3N2, ICNTO, IOCT, IPH

4.

5.

6.

Lionville Laboratory Use Only

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

Tamper Resistant Seal 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. 4.5 °C

Discrepancies Between Samples Labels and COC Record? Y or (N)

NOTES: 4235 795 4 6770

| Relinquished by | Received by | Date | Time |
|---|---|---|---|
| Ed Ex | [signature] | 8/25/01 | 0920 |
| | | | |

| Relinquished by | Received by | Date | Time |
|---|---|---|---|
| COMPOSITE WASTE | | ORIGINAL REWRITTEN | |

0108L671

| Bechtel Hanford Inc. | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | B01-058-225 | Page 1 of 1 |
|---|---|---|---|
| Collector: Thomas G./Watson D. | Company Contact: Todd, M.E. / Telephone No.: (509) 372-9631 | Project Coordinator: TRENT, SJ | Price Code: 8N / Data Turnaround: 45 Days |
| Project Designation: 200-TW-1 & 2 - Soil Sampling | Sampling Location: B-7A/200 E | SAF No.: B01-058 | Air Quality ☐ |
| Ice Chest No.: ERC99-039 | Field Logbook No.: EL-1518-1 / COA: B20TW2444 ~~B20TW2674~~ AT | Method of Shipment: Fed EX | |
| Shipped To: ~~TMA~~/RECRA DSW 08/15/01 | Offsite Property No.: A010344 8/22/01 | Bill of Lading/Air Bill No.: 42357954-6770 | |

POSSIBLE SAMPLE HAZARDS/REMARKS
500 COUNTS AM ON SOIL
NO DOSE MEASURED ON BOTTLES

Samples stored in Ref.# 1B at the 3728 Shipping Facility on 8/22/01.
Collector not available to relinquish samples on 8/24/01 for shipment. RT 8.24.01

| Preservation | Cool 4C C | Cool 4C A | Cool 4C D | Cool 4C B | Cool 4C | Cool 4C | None | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Type of Container | sG | sG | sG | sG | sG | sG | sG | | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | |
| Volume | 60mL | 500mL | 120mL | 1000mL | 120mL | 500mL | 1000mL | | | |
| SAMPLE ANALYSIS | Chromium Hex - 7196 | See item (1) in Special Instructions. | Mercury - 7470 - (CV) | See item (2) in Special Instructions. | VOA - 8260A (TCL) | See item (3) in Special Instructions. | See item (4) in Special Instructions. | | | |

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B12MH5 | SOIL | 08/22/01 | 0425 | X | X | X | X | | | | | TIETO | B12MJ4 |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

| CHAIN OF POSSESSION | Date/Time | Sign/Print Names: Received By/Stored In | Date/Time |
|---|---|---|---|
| Relinquished By/Removed From: D.SWATSON/ | 08/22/01 0730 | Received By/Stored In: REF. 1B 3728 | 08/22/01 0730 |
| Relinquished By/Removed From: Ref. 1B 3728 | 8.24.01 0900 | Received By/Stored In: R Thore | 8.24.01 0900 |
| Relinquished By/Removed From: R.T. R Thore | 8.24.01 0900 | Received By/Stored In: FED EX | |
| Relinquished By/Removed From: Fed Ex | 8/25/01 0920 | Received By/Stored In: Vicki Hernandez | 8/29/01 0920 |
| Relinquished By/Removed From: | | Received By/Stored In: | |
| Relinquished By/Removed From: | | Received By/Stored In: | |

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010A (TAL) {Cadmium, Chromium, Copper, Nickel, Silver}; ICP Metals - 6010A (Add-on) {Lead}
(2) IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; Ammonia - 350.3; NO2/NO3 - 353.1; Total Cyanide - 9010; TOC - 9060; pH (Soil) - 9045
~~(3) Semi-VOA - 8270A (Add-On) {Tributyl phosphate}; TPH-Diesel Range - HTPH-D~~
(4) ~~Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-On {Radium-226, Radium-228}, Isotopic Plutonium; Isotopic Thorium {Thorium-232}; Americium-241; Carbon-14; Neptunium-237; Nickel-63; Strontium-89,90 -- Total Sr; Technetium-99; Total Uranium; Tritium - H3; Isotopic Uranium~~

10/18/01 MSD

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

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

CE-011 (10/99)

| Bechtel Hanford Inc. | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | B01-058-226 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: Thomas G./Watson D. | Company Contact: Todd, M.E. | Telephone No.: (509) 372-9631 | Project Coordinator: TRENT, SJ |
| Price Code: 8N | Data Turnaround: 45 Days | Air Quality ☐ | |
| Project Designation: 200-TW-1 & 2 - Soil Sampling | Sampling Location: B-7A/200 E | SAF No.: B01-058 | |
| Ice Chest No.: ERA 99-039 | Field Logbook No.: EL-1518-1 | COA: B20TW2A44K B20TW262AC | Method of Shipment: Fed EX |
| Shipped To: TMA/RECRA DSW 8/8/01 | Offsite Property No.: A 010344 8/22/01 | Bill of Lading/Air Bill No.: 42351954 - 60770 | |

POSSIBLE SAMPLE HAZARDS/REMARKS
650 COUNTS A/B ON SOIL
NO DOSE MEASURED ON BOTTLES

Samples stored in Ref.# 1B at the 3728 Shipping Facility on 8/22/01.
Collector not available to relinquish samples on 8/24/01 for shipment. RT 8-24-01

SAMPLE ANALYSIS

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | None | | | | |
| Type of Container | sG | sG | sG | sG | sG | sG | sG | | | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | |
| Volume | 60mL | 500mL | 120mL | 1000mL | 120mL | 500mL | 1000mL | | | | |
| | Chromium Hex - 7196 | See item (1) in Special Instructions. | Mercury - 7470 - (CV) | See item (2) in Special Instructions. | VOA - 8260A (TCL) | See item (3) in Special Instructions. | See item (4) in Special Instructions. | | | | |

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B12MH6 | SOIL | 8-22-01 | 0530 | X | X | X | X | | | | | B12MJ5 | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

| CHAIN OF POSSESSION | Date/Time | Sigs/Print Names: Received By/Stored In | Date/Time |
|---|---|---|---|
| Relinquished By/Removed From: DSW 4130/ [illegible] | 8/22/01 0730 | RCF-1B | 08/22/01 0730 |
| Relinquished By/Removed From: Ref 1B 3728 | 8.24.01 0900 | [illegible] Thorer | 8.24.01 0900 |
| Relinquished By/Removed From: [illegible] Thorer | 8.24.01 0900 | FED EX | |
| Relinquished By/Removed From: Fed Ex | 8/25/01 0920 | [illegible] Hennig | 8/25/01 0920 |
| Relinquished By/Removed From | | Received By/Stored In | |
| Relinquished By/Removed From | | Received By/Stored In | |

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010A (TAL) {Cadmium, Chromium, Copper, Nickel, Silver}; ICP Metals - 6010A (Add-on) {Lead}
(2) IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; Ammonia - 350.3; NO2/NO3 - 353.1; Total Cyanide - 9010; TOC - 9060; pH (Soil) - 9045
(3) ~~Semi-VOA - 8270A (Add-On) {Tributyl phosphate}; TPH-Diesel Range - WTPH-D~~
(4) ~~Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - A00-01 {Radium-226, Radium-228}; Isotopic Plutonium; Isotopic Thorium {Thorium-232}; Americium-241; Carbon-14; Neptunium-237; Nickel-63; Strontium-89,90 -- Total Sr; Technetium-99; Total Uranium; Tritium - HD; Isotopic Uranium~~

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

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

BHI-EE-011 (10/99)

OCT 2001
RECEIVED

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B01-058 H1476

DATE RECEIVED: 08/28/01 LVL LOT # :0108L684

| CLIENT ID /ANALYSIS | LVL # | MTX | PREP # | COLLECTION | EXTR/PREP | ANALYSIS |
|---|---|---|---|---|---|---|
| B12MH4 | | | | | | |
| SILVER, TOTAL | 001 | S | 01L0599 | 08/23/01 | 09/20/01 | 09/22/01 |
| SILVER, TOTAL | 001 REP | S | 01L0599 | 08/23/01 | 09/20/01 | 09/22/01 |
| SILVER, TOTAL | 001 MS | S | 01L0599 | 08/23/01 | 09/20/01 | 09/22/01 |
| CADMIUM, TOTAL | 001 | S | 01L0599 | 08/23/01 | 09/20/01 | 09/22/01 |
| CADMIUM, TOTAL | 001 REP | S | 01L0599 | 08/23/01 | 09/20/01 | 09/22/01 |
| CADMIUM, TOTAL | 001 MS | S | 01L0599 | 08/23/01 | 09/20/01 | 09/22/01 |
| CHROMIUM, TOTAL | 001 | S | 01L0599 | 08/23/01 | 09/20/01 | 09/22/01 |
| CHROMIUM, TOTAL | 001 REP | S | 01L0599 | 08/23/01 | 09/20/01 | 09/22/01 |
| CHROMIUM, TOTAL | 001 MS | S | 01L0599 | 08/23/01 | 09/20/01 | 09/22/01 |
| COPPER, TOTAL | 001 | S | 01L0599 | 08/23/01 | 09/20/01 | 09/22/01 |
| COPPER, TOTAL | 001 REP | S | 01L0599 | 08/23/01 | 09/20/01 | 09/22/01 |
| COPPER, TOTAL | 001 MS | S | 01L0599 | 08/23/01 | 09/20/01 | 09/22/01 |
| MERCURY, TOTAL | 001 | S | 01C0276 | 08/23/01 | 09/12/01 | 09/12/01 |
| MERCURY, TOTAL | 001 REP | S | 01C0276 | 08/23/01 | 09/12/01 | 09/12/01 |
| MERCURY, TOTAL | 001 MS | S | 01C0276 | 08/23/01 | 09/12/01 | 09/12/01 |
| NICKEL, TOTAL | 001 | S | 01L0599 | 08/23/01 | 09/20/01 | 09/22/01 |
| NICKEL, TOTAL | 001 REP | S | 01L0599 | 08/23/01 | 09/20/01 | 09/22/01 |
| NICKEL, TOTAL | 001 MS | S | 01L0599 | 08/23/01 | 09/20/01 | 09/22/01 |
| LEAD, TOTAL | 001 | S | 01L0599 | 08/23/01 | 09/20/01 | 09/22/01 |
| LEAD, TOTAL | 001 REP | S | 01L0599 | 08/23/01 | 09/20/01 | 09/22/01 |
| LEAD, TOTAL | 001 MS | S | 01L0599 | 08/23/01 | 09/20/01 | 09/22/01 |
| B12MH7 | | | | | | |
| SILVER, TOTAL | 002 | S | 01L0599 | 08/22/01 | 09/20/01 | 09/22/01 |
| CADMIUM, TOTAL | 002 | S | 01L0599 | 08/22/01 | 09/20/01 | 09/22/01 |
| CHROMIUM, TOTAL | 002 | S | 01L0599 | 08/22/01 | 09/20/01 | 09/22/01 |
| COPPER, TOTAL | 002 | S | 01L0599 | 08/22/01 | 09/20/01 | 09/22/01 |
| MERCURY, TOTAL | 002 | S | 01C0276 | 08/22/01 | 09/12/01 | 09/12/01 |
| NICKEL, TOTAL | 002 | S | 01L0599 | 08/22/01 | 09/20/01 | 09/22/01 |
| LEAD, TOTAL | 002 | S | 01L0599 | 08/22/01 | 09/20/01 | 09/22/01 |

LAB QC:

| | | | | | | |
|---|---|---|---|---|---|---|
| SILVER LABORATORY | LC1 BS | S | 01L0599 | N/A | 09/20/01 | 09/22/01 |

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B01-058 H1476

DATE RECEIVED: 08/28/01 LVL LOT # :0108L684

| CLIENT ID /ANALYSIS | LVL # | MTX | PREP # | COLLECTION | EXTR/PREP | ANALYSIS |
|---|---|---|---|---|---|---|
| SILVER, TOTAL | MB1 | S | 01L0599 | N/A | 09/20/01 | 09/22/01 |
| CADMIUM LABORATORY | LC1 BS | S | 01L0599 | N/A | 09/20/01 | 09/22/01 |
| CADMIUM, TOTAL | MB1 | S | 01L0599 | N/A | 09/20/01 | 09/22/01 |
| CHROMIUM LABORATORY | LC1 BS | S | 01L0599 | N/A | 09/20/01 | 09/22/01 |
| CHROMIUM, TOTAL | MB1 | S | 01L0599 | N/A | 09/20/01 | 09/22/01 |
| COPPER LABORATORY | LC1 BS | S | 01L0599 | N/A | 09/20/01 | 09/22/01 |
| COPPER, TOTAL | MB1 | S | 01L0599 | N/A | 09/20/01 | 09/22/01 |
| MERCURY LABORATORY | LC1 BS | S | 01C0276 | N/A | 09/12/01 | 09/12/01 |
| MERCURY, TOTAL | MB1 | S | 01C0276 | N/A | 09/12/01 | 09/12/01 |
| NICKEL LABORATORY | LC1 BS | S | 01L0599 | N/A | 09/20/01 | 09/22/01 |
| NICKEL, TOTAL | MB1 | S | 01L0599 | N/A | 09/20/01 | 09/22/01 |
| LEAD LABORATORY | LC1 BS | S | 01L0599 | N/A | 09/20/01 | 09/22/01 |
| LEAD, TOTAL | MB1 | S | 01L0599 | N/A | 09/20/01 | 09/22/01 |

LIONVILLE LABORATORY INC.

**Analytical Report**

**Client:** TNU-HANFORD B01-058
**LVL#:** 0108L684
**SDG/SAF#:** H1476/B01-058

**W.O.#:** 11343-606-001-9999-00
**Date Received:** 08-28-01

## METALS CASE NARRATIVE

1. This narrative covers the analyses of 2 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 temperature has been recorded on the Chain of Custody.

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

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

7. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL), MB value less than 5% of the RCRA limit, or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.

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

9. All laboratory control samples (LCS) were within the 80-120% control limits. Refer to the Inorganics Laboratory Control Standards Report.

10. All matrix spike (MS) recoveries were within the 75-125% control limits. Refer to the Inorganics Accuracy Report.

11. The duplicate analyses for 4 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.

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 14 pages.

13. 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
Deputy Laboratory Manager
Lionville Laboratory Incorporated

09-27-01
Date

gmb/m08-684

LVLI
LIONVILLE LABORATORY INC

# METALS METHOD GLOSSARY

The following methods are used as reference for the digestion and analysis of samples contained within this Lot#: 0108L684

Leaching Procedure: __1310 __1311 __1312 __Other:_____

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

Metals Digestion Methods: __3005A __3010A __3015 __3020A ✓3050B __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-03/01

# 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.

RFW 21-21L-033/N-10/96

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 09/25/01

CLIENT: TNUHANFORD B01-058 H1476 LVL LOT #: 0108L684

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -001 | B12MH4 | Silver, Total | 0.05 u | MG/KG | 0.05 | 1.0 |
| | | Cadmium, Total | 0.07 | MG/KG | 0.03 | 1.0 |
| | | Chromium, Total | 12.4 | MG/KG | 0.15 | 1.0 |
| | | Copper, Total | 15.0 | MG/KG | 0.05 | 1.0 |
| | | Mercury, Total | 0.02 u | MG/KG | 0.02 | 1.0 |
| | | Nickel, Total | 10.1 | MG/KG | 0.18 | 1.0 |
| | | Lead, Total | 10.0 | MG/KG | 0.25 | 1.0 |
| -002 | B12MH7 | Silver, Total | 0.05 u | MG/KG | 0.05 | 1.0 |
| | | Cadmium, Total | 0.06 | MG/KG | 0.03 | 1.0 |
| | | Chromium, Total | 14.0 | MG/KG | 0.15 | 1.0 |
| | | Copper, Total | 13.7 | MG/KG | 0.05 | 1.0 |
| | | Mercury, Total | 0.02 u | MG/KG | 0.02 | 1.0 |
| | | Nickel, Total | 11.7 | MG/KG | 0.18 | 1.0 |
| | | Lead, Total | 23.3 | MG/KG | 0.25 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 09/25/01

CLIENT: TNUHANFORD B01-058 H1476 LVL LOT #: 0108L684

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| BLANK1 | 01L0599-MB1 | Silver, Total | 0.05 u | MG/KG | 0.05 | 1.0 |
| | | Cadmium, Total | 0.03 u | MG/KG | 0.03 | 1.0 |
| | | Chromium, Total | 0.14 u | MG/KG | 0.14 | 1.0 |
| | | Copper, Total | 0.20 | MG/KG | 0.05 | 1.0 |
| | | Nickel, Total | 0.17 u | MG/KG | 0.17 | 1.0 |
| | | Lead, Total | 0.24 u | MG/KG | 0.24 | 1.0 |
| BLANK1 | 01C0276-MB1 | Mercury, Total | 0.02 u | MG/KG | 0.02 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 09/25/01

CLIENT: TNUHANFORD B01-058 H1476

LVL LOT #: 0108L684

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

| SAMPLE | SITE ID | ANALYTE | SPIKED SAMPLE | INITIAL RESULT | SPIKED AMOUNT | %RECOV | DILUTION FACTOR(SPK) |
|---|---|---|---|---|---|---|---|
| -001 | B12MH4 | Silver, Total | 5.0 | 0.05u | 5.3 | 94.3 | 1.0 |
| | | Cadmium, Total | 4.9 | 0.07 | 5.3 | 91.2 | 1.0 |
| | | Chromium, Total | 31.7 | 12.4 | 21.2 | 91.0 | 1.0 |
| | | Copper, Total | 38.9 | 15.0 | 26.5 | 90.2 | 1.0 |
| | | Mercury, Total | 0.16 | 0.02u | 0.16 | 103.2 | 1.0 |
| | | Nickel, Total | 57.6 | 10.1 | 52.9 | 89.8 | 1.0 |
| | | Lead, Total | 54.7 | 10.0 | 52.9 | 84.5 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 09/25/01

CLIENT: TNUHANFORD B01-058 H1476 LVL LOT #: 0108L684

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

| SAMPLE | SITE ID | ANALYTE | INITIAL RESULT | REPLICATE | RPD | DILUTION FACTOR(REP) |
|---|---|---|---|---|---|---|
| -001REP | B12MH4 | Silver, Total | 0.05u | 0.05u | NC | 1.0 |
| | | Cadmium, Total | 0.07 | 0.10 | 39.0 | 1.0 |
| | | Chromium, Total | 12.4 | 18.2 | 37.9 | 1.0 |
| | | Copper, Total | 15.0 | 13.9 | 7.6 | 1.0 |
| | | Mercury, Total | 0.02u | 0.01u | NC | 1.0 |
| | | Nickel, Total | 10.1 | 18.7 | 59.7 | 1.0 |
| | | Lead, Total | 10.0 | 6.8 | 38.1 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 09/25/01

CLIENT: TNUHANFORD B01-058 H1476 LVL LOT #: 0108L684

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

| SAMPLE | SITE ID | ANALYTE | SPIKED SAMPLE | SPIKED AMOUNT | UNITS | %RECOV |
|---|---|---|---|---|---|---|
| LCS1 | 01L0599-LC1 | Silver, LCS | 48.2 | 50.0 | MG/KG | 96.4 |
| | | Cadmium, LCS | 24.7 | 25.0 | MG/KG | 98.8 |
| | | Chromium, LCS | 50.7 | 50.0 | MG/KG | 101.4 |
| | | Copper, LCS | 124 | 125 | MG/KG | 99.3 |
| | | Nickel, LCS | 195 | 200 | MG/KG | 97.5 |
| | | Lead, LCS | 244 | 250 | MG/KG | 97.5 |
| LCS1 | 01C0276-LC1 | Mercury, LCS | 2.4 | 2.5 | MG/KG | 94.8 |

Lionville Laboratory Use Only
0108L684

# Custody Transfer Record/Lab Work Request

Page 1 of 1

LVLI

**FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS**

Client: TMU-Hanford Bol-058
Est. Final Proj. Sampling Date:
Project #: 11343-6006-001-9999-00
Project Contact/Phone #:
Lionville Laboratory Project Manager: OJ
QC: Spec Del: Std TAT: 30 day
Date Rec'd: 8-28-01 Date Due: 9-27-01

| | | A | B | | C | D |
|---|---|---|---|---|---|---|
| Refrigerator # | | 5 | 5 | | 5 | 5 |
| #/Type Container | Liquid | | | | | |
| | Solid | 1AG | 1AG | | 1AG | 1AG |
| Volume | Liquid | | | | | |
| | Solid | 60 | 500 | | 120 | 1L |
| Preservatives | | - | - | | - | - |

ANALYSES REQUESTED → ORGANIC: VOA, BNA, Pest/PCB, Herb; INORG: Metal, CN

Lionville Laboratory Use Only

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

| Lab ID | Client ID/Description | Matrix QC Chosen (✓) MS | MSD | Matrix | Date Collected | Time Collected | ICPAL | Met① | | MHGTO | Inorg① |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 001 | B12M1H4 | | | S | 8-28-01 | 0045 | ✓ | ✓ | | ✓ | ✓ |
| 002 | " " | | | " | 8-28-01 | 0350 | ✓ | ✓ | | ✓ | ✓ |

Special Instructions: Saf Bol-058
Run Matrix QC

DATE/REVISIONS:
Met① 1. Cd, Cr, Cu, Ni, Ag, Pb
Inorg① 2. ICCL, ICFL, ICNO3, ICNO2, ICPOH, ICSOH,
" 3. INH3N, IN3N2, ICNTO, IOCT, TPH
4.
5.
6.

Lionville Laboratory Use Only

Samples were:
1) Shipped ✓ or Hand Delivered ___
Airbill # 123579541685 1
2) Ambient or Chilled
3) Received in Good Condition (Y) or N
4) Samples Properly Preserved (Y) or N
5) Received Within Holding Times (Y) or N

Tamper Resistant Seal 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. 5.1 °C

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

| Relinquished by | Received by | Date | Time |
|---|---|---|---|
| FedEx | TKoppel | 8-28-01 | 0900 |

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

COMPOSITE

ORIGINAL

| Bechtel Hanford Inc. | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | B01-058-224 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: Thomas G./Watson D. | Company Contact: Todd, M.E. | Telephone No.: (509) 372-9631 | Project Coordinator: TRENT, SJ |
| Price Code: 8N | Data Turnaround: 45 Days | Air Quality ☐ | |
| Project Designation: 200-TW-1 & 2 - Soil Sampling | Sampling Location: B-7A/200 E | SAF No.: B01-058 | |
| Ice Chest No.: SMI-463 | Field Logbook No.: EL-1518-1 | COA B20TW2A44C B20TW2634C DT 8/23/01 | Method of Shipment: Fed EX |
| Shipped To: ~~TMR~~/RECRA DT 8/15/01 | Offsite Property No.: AD10438 | | Bill of Lading/Air Bill No.: 4235 7454 6851 |

POSSIBLE SAMPLE HAZARDS/REMARKS
FIELD RADIOLOGICAL INSTRUMENTS READ BACKGROUND

Samples stored in Ref.# 1B at the 3728 Shipping Facility on 8/23/01.
Collector not available to relenquish samples on 8/27/01 for shipment.
FT 8.27.01

| Preservation | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | None | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Type of Container | sG | sG | sG | sG | sG | sG | sG | | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | |
| Volume | 60mL | 500mL | 120mL | 1000mL | 120mL | 500mL | 1000mL | | | |
| SAMPLE ANALYSIS | Chromium Hex - 7196 | See item (1) in Special Instructions. | Mercury - 7470 - (CV) | See item (2) in Special Instructions. | VOA - 8260A (TAL) | See item (3) in Special Instructions. | See item (4) in Special Instructions. | | | |

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B12MH4 | SOIL | 8-23-01 | 0045 | X | X | X | X | | | | | B12MH7 |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| D Watson/Smith | 08/23/01 0915 | REF-1B | 08/23/01 0915 |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Ref 1B 3728 | 8.27.01 0900 | | 8.27.01 0900 |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| | 8.27.01 0900 | | |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| FedEx | 8.28.01 0900 | | 8.28.01 0900 |
| 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

(1) ICP Metals - 6010A (TAL) {Cadmium, Chromium, Copper, Nickel, Silver}; ICP Metals - 6010A (Add-on) {Lead}
(2) IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; Ammonia - 350.3; NO2/NO3 - 353.1; Total Cyanide - 9010; TOC - 9060; pH (Soil) - 9045
(3) ~~Semi-VOA - 8270A (Add-On) {Tributyl phosphate}; TPH Diesel Range - WTPH-D~~
(4) ~~Gamma Spectroscopy {Gamma-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma-Spec - Add-on {Radium-226, Radium-228}; Isotopic Plutonium; Isotopic Thorium {Thorium-232}; Americium-241; Carbon-14; Neptunium-237; Nickel-63; Strontium-89,90 - Total Sr; Technetium-99; Total Uranium; Tritium - H3; Isotopic Uranium~~

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

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

(0/99)

| Bechtel Hanford Inc. | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | B01-058-227 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: Thomas G./Watson D. | Company Contact: Todd, M.E. | Telephone No.: (509) 372-9631 | Project Coordinator: TRENT, SJ |
| Price Code: 8N | Data Turnaround: 45 Days | Air Quality ☐ | |
| Project Designation: 200-TW-1 & 2 - Soil Sampling | Sampling Location: B-7A/200 E | SAF No.: B01-058 | |
| Ice Chest No.: SM1 463 | Field Logbook No.: EL-1518-1 | COA B20TW2A44C B20TW2G74C AT | Method of Shipment: Fed EX |
| Shipped To: TMA/RECRA DSW 08/15/01 | Offsite Property No.: A810438 8/22/01 | Bill of Lading/Air Bill No.: 4235 7954-6851 | |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

FIELD RADIOLOGICAL INSTRUMENTS READ BACKGROUND

Samples stored in Ref.# 1B at the 3728 Shipping Facility on 8/22/01. Collector not available to relenquish samples on 8/22/01 for shipment RT 8-27-01

**SAMPLE ANALYSIS**

| Preservation | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | None | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Type of Container | sG | sG | sG | sG | sG | sG | sG | | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | |
| Volume | 60mL | 500mL | 120mL | 1000mL | 120mL | 500mL | 1000mL | | | |
| | Chromium Hex - 7196 | See item (1) in Special Instructions. | Mercury - 7470 - (CV) | See item (2) in Special Instructions. | VOA - 8260A (TCL) DTW 08/22/01 | See item (3) in Special Instructions. | See item (4) in Special Instructions. DTW 8/22/01 | | | TIR to |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | |
| B12MH7 | SOIL | 08/22/01 | 2350 | X | X | X | X | | | B12M16 |

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

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| DWATSON/ | 08/23/01 0915 | REF. 1B | 08/23/01 0915 |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| REF 1B | 8.27.01 0900 | RTHOMPSON | 8.27.01 0900 |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| RTHOMPSON | 8.27.01 0900 | FEDEX | |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| FEDEX | 8-28-01 0900 | TRapp | 8-28-01 0900 |
| 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**

(1) ICP Metals - 6010A (TAL) {Cadmium, Chromium, Copper, Nickel, Silver}; ICP Metals - 6010A (Add-on) {Lead}
(2) IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; Ammonia - 350.3; NO2/NO3 - 353.1; Total Cyanide - 9010; TOC - 9060; pH (Soil) - 9045
(3) ~~Semi-VOA - 8270A (Add-On) {Tributyl phosphate}; TPH Diesel Range - WTMH-D~~
(4) ~~Gamma Spectrometry {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Radium-226, Radium-228}; Isotopic Plutonium; Isotopic Thorium {Thorium-232}; Americium-241; Carbon-14; Neptunium-237; Nickel-63; Strontium-89,90 - Total Sr; Technetium-99; Total Uranium; Tritium - H3; Isotopic Uranium~~ DSW 08/15/01

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

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

H1476

EBERLINE SERVICES

November 12, 2001

Ms. Joan Kessner
Bechtel Hanford Inc.
3550 George Washington Way
Richland, WA 99352
MSIN: H0-25

Reference: **P.O. #630**
**Eberline Services R1-08-137-7066 SDG H1476**

Dear Ms. Kessner:

Enclosed is the data report for four solid samples designated under SAF No. B01-058 received at Eberline Services on August 27, 2001. The samples were analyzed according to the accompanying chain-of-custody documents.

Please call if you have any questions concerning this report.

Sincerely,

Melissa Mannion

Melissa C. Mannion
Program Manager

*MCM*

*Enclosure: Data Package*

NOV 2001 RECEIVED

**Analytical Services**
**2030 Wright Avenue**
**P.O. Box 4040**
**Richmond, California 94804-0040**
**(510) 235-2633 Fax (510) 235-0438**
**Toll Free (800) 841-5487**
**www.eberlineservices.com**

## 1.0 GENERAL

Bechtel Hanford Inc. (BHI) Sample Delivery Group H1476 was composed of four solid (soil) samples designated under SAF No. B01-058 with a Project Designation of: 200-TW-1 & -2 - Soil Sampling.

The samples were received as stated on the Chain-of-Custody documents. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist. The results were transmitted to BHI via e-Fax on November 6 and 10, 2001.

## 2.0 ANALYSIS NOTES

### 2.1 Isotopic Plutonium Analyses

Due to low yields (less than 20%) the Pu samples had to be reanalyzed with new QC samples. No problems were encountered during the course of the reanalyses.

### 2.2 Total Strontium Analyses

No problems were encountered during the course of the analyses.

### 2.3 Nickel-63 Analyses

No problems were encountered during the course of the analyses.

### 2.4 Americium-241 Analyses

No problems were encountered during the course of the analyses.

### 2.5 Gamma Spectroscopy Analyses

No problems were encountered during the course of the analyses.

### 2.6 Isotopic Thorium Analyses

No problems were encountered during the course of the analyses.

### 2.7 Technetium-99 Analyses

No problems were encountered during the course of the analyses.

### 2.8 Neptunium-237 Analyses

No problems were encountered during the course of the analyses.

**2.9 Carbon-14 Analyses**

The C-14 LCS percent recovery (75%) was below the 3σ limits (87 to 113%) and the laboratory protocol limits (80 to 120%), but within BHI's limits (70 to 130%). No other problems were encountered during the course of the analyses.

**2.10 Isotopic Uranium Analyses**

No problems were encountered during the course of the analyses.

**2.11 Total Uranium Analyses**

No problems were encountered during the course of the analyses.

**2.12 Tritium Analyses**

The matrix spike percent recovery (77%) was below the 3σ limits (87 to 113%) and the laboratory protocol limits (80 to 120%), but within BHI's limits (60 to 140%). No other problems were encountered during the course of the analyses.

**Case Narrative Certification Statement**

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

Melissa Mannion

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

11/12/01

**Date**

E B E R L I N E  S E R V I C E S / R I C H M O N D
**SAMPLE DELIVERY GROUP H1476**

| | |
|---|---|
| SDG | 7066 |
| Contact | Melissa C. Mannion |

| | |
|---|---|
| Client | Hanford |
| Contract | No. 630 |
| Case no | SDG H1476 |

# S U M M A R Y  D A T A  S E C T I O N

## T A B L E  O F  C O N T E N T S


| | |
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| Prep Batch Summary | 5 |
| Work Summary | 6 |
| Method Blanks | 10 |
| Lab Control Samples | 13 |
| Duplicates | 15 |
| Matrix Spikes | 18 |
| Data Sheets | 19 |
| Method Summaries | 27 |
| Report Guides | 43 |
| End of Section | 57 |


Melissa Mannion
Prepared by

Melissa Mannion
Reviewed by

| | |
|---|---|
| Lab id | TMANC |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-TOC |
| Version | 3.06 |
| Report date | 11/10/01 |

SDG 7066
Contact Melissa C. Mannion

# REPORT GUIDE

Client Hanford
Contract No. 630
Case no SDG H1476

## ABOUT THE DATA SUMMARY SECTION

The Data Summary Section of a Data Package has all data, in several useful orders, necessary for first level, routine review of the data package for a Sample Delivery Group (SDG). This section follows the Data Package Narrative, which has an overview of the data package and a discussion of special problems. It is followed by the Raw Data Section, which has full details.

The Data Summary Section has several groups of reports:

SAMPLE SUMMARIES

The Sample and QC Summary Reports show all samples, including QC samples, reported in one SDG. These reports cross-reference client and lab sample identifiers.

PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches (lab groupings reflecting how work was organized) relevant to the reported SDG with information necessary to check the completeness and consistency of the SDG.

WORK SUMMARY

The Work Summary Report shows all samples and work done on them relevant to the reported SDG.

METHOD BLANKS

The Method Blank Reports, one for each Method Blank relevant to the SDG, show all results and primary supporting information for the blanks.

LAB CONTROL SAMPLES

The Lab Control Sample Reports, one for each Lab Control Sample relevant to the SDG, show all results, recoveries and primary supporting information for these QC samples.



Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 11/10/01

SDG 7066
Contact Melissa C. Mannion

Client Hanford
Contract No. 630
Case no SDG H1476

# ABOUT THE DATA SUMMARY SECTION

DUPLICATES

The Duplicate Reports, one for each Duplicate and Original sample pair relevant to the SDG, show all results, differences and primary supporting information for these QC samples.

MATRIX SPIKES

The Matrix Spike Reports, one for each Spiked and Original sample pair relevant to the SDG, show all results, recoveries and primary supporting information for these QC samples.

DATA SHEETS

The Data Sheet Reports, one for each client sample in the SDG, show all results and primary supporting information for these samples.

METHOD SUMMARIES

The Method Summary Reports, one for each test used in the SDG, show all results, QC and method performance data for one analyte on one or two pages. (A test is a short code for the method used to do certain work to the client's specification.)

REPORT GUIDES

The Report Guides, one for each of the above groups of reports, have documentation on how to read the associated reports.



Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 11/10/01

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1476

SDG 7066
Contact Melissa C. Mannion

## SAMPLE SUMMARY

Client Hanford
Contract No. 630
Case no SDG H1476

| CLIENT SAMPLE ID | LOCATION | MATRIX | LEVEL | LAB SAMPLE ID | SAF NO | CHAIN OF CUSTODY | COLLECTED |
|---|---|---|---|---|---|---|---|
| B12MH4 | B-7A/200 E | SOLID | | R108137-03 | B01-058 | B01-058-224 | 08/23/01 00:45 |
| B12MH5 | B-7A/200 E | SOLID | | R108137-01 | B01-058 | B01-058-225 | 08/22/01 04:25 |
| B12MH6 | B-7A/200 E | SOLID | | R108137-02 | B01-058 | B01-058-225 | 08/22/01 05:30 |
| B12MH7 | B-7A/200 E | SOLID | | R108137-04 | B01-058 | B01-058-224 | 08/22/01 23:40 |
| Method Blank | | SOLID | | R108137-06 | B01-058 | | |
| Method Blank | | SOLID | | R108137-10 | B01-058 | | |
| Lab Control Sample | | SOLID | | R108137-05 | B01-058 | | |
| Lab Control Sample | | SOLID | | R108137-09 | B01-058 | | |
| Duplicate (R108137-01) | B-7A/200 E | SOLID | | R108137-07 | B01-058 | | 08/22/01 04:25 |
| Duplicate (R108137-01) | B-7A/200 E | SOLID | | R108137-11 | B01-058 | | 08/22/01 04:25 |
| Spike (R108137-01) | B-7A/200 E | SOLID | | R108137-08 | B01-058 | | 08/22/01 04:25 |

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CS
Version 3.06
Report date 11/10/01

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1476

SDG 7066
Contact Melissa C. Mannion

## QC SUMMARY

Client Hanford
Contract No. 630
Case no SDG H1476

| QC BATCH | CHAIN OF CUSTODY | CLIENT SAMPLE ID | MATRIX | % SOLIDS | SAMPLE AMOUNT | BASIS AMOUNT | DAYS SINCE RECEIVED | DAYS SINCE COLL | LAB SAMPLE ID | DEPARTMENT SAMPLE ID |
|---|---|---|---|---|---|---|---|---|---|---|
| 7066 | B01-058-224 | B12MH4 | SOLID | 94.5 | 1168 g | | 08/28/01 | 5 | R108137-03 | 7066-003 |
| | | B12MH7 | SOLID | 95.2 | 1171 g | | 08/28/01 | 6 | R108137-04 | 7066-004 |
| | B01-058-225 | B12MH5 | SOLID | 94.2 | 1218 g | | 08/27/01 | 5 | R108137-01 | 7066-001 |
| | | B12MH6 | SOLID | 91.2 | 1097 g | | 08/27/01 | 5 | R108137-02 | 7066-002 |
| | | Method Blank | SOLID | | | | | | R108137-06 | 7066-006 |
| | | Method Blank | SOLID | | | | | | R108137-10 | 7066-010 |
| | | Lab Control Sample | SOLID | | | | | | R108137-05 | 7066-005 |
| | | Lab Control Sample | SOLID | | | | | | R108137-09 | 7066-009 |
| | | Duplicate (R108137-01) | SOLID | 94.2 | 1218 g | | 08/27/01 | 5 | R108137-07 | 7066-007 |
| | | Duplicate (R108137-01) | SOLID | 94.2 | 1218 g | | 08/27/01 | 5 | R108137-11 | 7066-011 |
| | | Spike (R108137-01) | SOLID | 94.2 | 1218 g | | 08/27/01 | 5 | R108137-08 | 7066-008 |

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-QS
Version 3.06
Report date 11/10/01

# EBERLINE SERVICES/RICHMOND

*SAMPLE DELIVERY GROUP H1476*

SDG 7066
Contact Melissa C. Mannion

## PREP BATCH SUMMARY

Client Hanford
Contract No. 630
Case no SDG H1476

| TEST | MATRIX | METHOD | PREPARATION BATCH | ERROR 2σ % | PLANCHETS ANALYZED CLIENT | MORE | RE | BLANK | LCS | DUP/ORIG | MS/ORIG | QUALIFIERS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Alpha Spectroscopy** | | | | | | | | | | | | |
| AM | SOLID | Americium 241 in Soil | 7008-047 | 5.0 | 4 | | | 1 | 1 | 1/1 | | |
| NP | SOLID | Neptunium in Soil | 7008-047 | 5.0 | 4 | | | 1 | 1 | 1/1 | | |
| PU | SOLID | Plutonium, Isotopic in Solids | 7008-047 | 5.0 | 4 | | | 1 | 1 | 1/1 | | |
| TH | SOLID | Thorium, Isotopic in Soil | 7008-047 | 5.0 | 4 | | | 1 | 1 | 1/1 | | |
| U | SOLID | Uranium, Isotopic in Soil | 7008-047 | 5.0 | 4 | | | 1 | 1 | 1/1 | | |
| **Beta Counting** | | | | | | | | | | | | |
| SR | SOLID | Total Strontium in Soil | 7008-047 | 10.0 | 4 | | | 1 | 1 | 1/1 | | |
| TC | SOLID | Technetium 99 in Soil | 7008-047 | 10.0 | 4 | | | 1 | 1 | 1/1 | | |
| **Gamma Spectroscopy** | | | | | | | | | | | | |
| GAM | SOLID | Gamma Scan | 7008-047 | 15.0 | 4 | | | 1 | 1 | 1/1 | | |
| **Kinetic Phosphorimetry** | | | | | | | | | | | | |
| U_T | SOLID | Uranium, Total in Soil | 7008-047 | 9.0 | 4 | | | 1 | 1 | 1/1 | | |
| **Liquid Scintillation Counting** | | | | | | | | | | | | |
| C | SOLID | Carbon 14 in Soil | 7008-047 | 10.0 | 4 | | | 1 | 1 | 1/1 | | |
| H | SOLID | Tritium in Soil | 7008-047 | 10.0 | 4 | | | 1 | 1 | 1/1 | 1/1 | X |
| NI_L | SOLID | Nickel 63 in Soil | 7008-047 | 10.0 | 4 | | | 1 | 1 | 1/1 | | |

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.
Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-PBS
Version 3.06
Report date 11/10/01

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1476

SDG 7066
Contact Melissa C. Mannion

## WORK SUMMARY

Client Hanford
Contract No. 630
Case no SDG H1476

| CLIENT SAMPLE ID / LOCATION / CUSTODY | SAF No | MATRIX | LAB SAMPLE ID / COLLECTED / RECEIVED | PLANCHET | TEST | SUF-FIX | ANALYZED | REVIEWED | BY | METHOD |
|---|---|---|---|---|---|---|---|---|---|---|
| B12MH4 | | | R108137-03 | 7066-003 | AM | | 10/27/01 | 11/06/01 | MCM | Americium 241 in Soil |
| B-7A/200 E | | SOLID | 08/23/01 | 7066-003 | C | | 10/15/01 | 11/06/01 | MCM | Carbon 14 in Soil |
| B01-058-224 | B01-058 | | 08/28/01 | 7066-003 | GAM | | 11/07/01 | 11/10/01 | MCM | Gamma Scan |
| | | | | 7066-003 | H | | 10/27/01 | 11/06/01 | MCM | Tritium in Soil |
| | | | | 7066-003 | NI_L | | 10/06/01 | 11/06/01 | MCM | Nickel 63 in Soil |
| | | | | 7066-003 | NP | | 10/20/01 | 11/06/01 | MCM | Neptunium in Soil |
| | | | | 7066-003 | PU | A1 | 10/31/01 | 11/06/01 | MCM | Plutonium, Isotopic in Solids |
| | | | | 7066-003 | SR | | 10/04/01 | 11/06/01 | MCM | Total Strontium in Soil |
| | | | | 7066-003 | TC | | 10/09/01 | 11/06/01 | MCM | Technetium 99 in Soil |
| | | | | 7066-003 | TH | | 10/18/01 | 11/06/01 | MCM | Thorium, Isotopic in Soil |
| | | | | 7066-003 | U | | 10/04/01 | 11/06/01 | MCM | Uranium, Isotopic in Soil |
| | | | | 7066-003 | U_T | | 10/09/01 | 11/06/01 | MCM | Uranium, Total in Soil |
| B12MH5 | | | R108137-01 | 7066-001 | AM | | 10/18/01 | 11/06/01 | MCM | Americium 241 in Soil |
| B-7A/200 E | | SOLID | 08/22/01 | 7066-001 | C | | 10/14/01 | 11/06/01 | MCM | Carbon 14 in Soil |
| B01-058-225 | B01-058 | | 08/27/01 | 7066-001 | GAM | | 11/05/01 | 11/10/01 | MCM | Gamma Scan |
| | | | | 7066-001 | H | | 10/27/01 | 11/06/01 | MCM | Tritium in Soil |
| | | | | 7066-001 | NI_L | | 10/06/01 | 11/06/01 | MCM | Nickel 63 in Soil |
| | | | | 7066-001 | NP | | 10/23/01 | 11/06/01 | MCM | Neptunium in Soil |
| | | | | 7066-001 | PU | A1 | 10/31/01 | 11/06/01 | MCM | Plutonium, Isotopic in Solids |
| | | | | 7066-001 | SR | | 10/04/01 | 11/06/01 | MCM | Total Strontium in Soil |
| | | | | 7066-001 | TC | | 10/09/01 | 11/06/01 | MCM | Technetium 99 in Soil |
| | | | | 7066-001 | TH | | 11/07/01 | 11/10/01 | MCM | Thorium, Isotopic in Soil |
| | | | | 7066-001 | U | | 10/04/01 | 11/06/01 | MCM | Uranium, Isotopic in Soil |
| | | | | 7066-001 | U_T | | 10/09/01 | 11/06/01 | MCM | Uranium, Total in Soil |
| B12MH6 | | | R108137-02 | 7066-002 | AM | | 10/18/01 | 11/06/01 | MCM | Americium 241 in Soil |
| B-7A/200 E | | SOLID | 08/22/01 | 7066-002 | C | | 10/14/01 | 11/06/01 | MCM | Carbon 14 in Soil |
| B01-058-225 | B01-058 | | 08/27/01 | 7066-002 | GAM | | 10/29/01 | 11/10/01 | MCM | Gamma Scan |
| | | | | 7066-002 | H | | 10/27/01 | 11/06/01 | MCM | Tritium in Soil |
| | | | | 7066-002 | NI_L | | 10/06/01 | 11/06/01 | MCM | Nickel 63 in Soil |
| | | | | 7066-002 | NP | | 10/18/01 | 11/06/01 | MCM | Neptunium in Soil |
| | | | | 7066-002 | PU | A1 | 10/31/01 | 11/06/01 | MCM | Plutonium, Isotopic in Solids |
| | | | | 7066-002 | SR | | 10/04/01 | 11/06/01 | MCM | Total Strontium in Soil |
| | | | | 7066-002 | TC | | 10/16/01 | 11/06/01 | MCM | Technetium 99 in Soil |
| | | | | 7066-002 | TH | | 10/10/01 | 11/06/01 | MCM | Thorium, Isotopic in Soil |
| | | | | 7066-002 | U | | 10/04/01 | 11/06/01 | MCM | Uranium, Isotopic in Soil |
| | | | | 7066-002 | U_T | | 10/09/01 | 11/06/01 | MCM | Uranium, Total in Soil |

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CWS
Version 3.06
Report date 11/10/01

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1476

SDG 7066
Contact Melissa C. Mannion

## WORK SUMMARY, cont.

Client Hanford
Contract No. 630
Case no SDG H1476

| CLIENT SAMPLE ID / LOCATION / CUSTODY | SAF No | MATRIX | LAB SAMPLE ID / COLLECTED / RECEIVED | PLANCHET | TEST | SUF-FIX | ANALYZED | REVIEWED | BY | METHOD |
|---|---|---|---|---|---|---|---|---|---|---|
| B12MH7 | | | R108137-04 | 7066-004 | AM | | 10/27/01 | 11/06/01 | MCM | Americium 241 in Soil |
| B-7A/200 E | | SOLID | 08/22/01 | 7066-004 | C | | 10/15/01 | 11/06/01 | MCM | Carbon 14 in Soil |
| B01-058-224 | B01-058 | | 08/28/01 | 7066-004 | GAM | | 10/30/01 | 11/10/01 | MCM | Gamma Scan |
| | | | | 7066-004 | H | | 10/27/01 | 11/06/01 | MCM | Tritium in Soil |
| | | | | 7066-004 | NI_L | | 10/06/01 | 11/06/01 | MCM | Nickel 63 in Soil |
| | | | | 7066-004 | NP | | 10/23/01 | 11/06/01 | MCM | Neptunium in Soil |
| | | | | 7066-004 | PU | A1 | 10/31/01 | 11/06/01 | MCM | Plutonium, Isotopic in Solids |
| | | | | 7066-004 | SR | | 10/04/01 | 11/06/01 | MCM | Total Strontium in Soil |
| | | | | 7066-004 | TC | | 10/09/01 | 11/06/01 | MCM | Technetium 99 in Soil |
| | | | | 7066-004 | TH | | 10/30/01 | 11/06/01 | MCM | Thorium, Isotopic in Soil |
| | | | | 7066-004 | U | | 10/04/01 | 11/06/01 | MCM | Uranium, Isotopic in Soil |
| | | | | 7066-004 | U_T | | 10/09/01 | 11/06/01 | MCM | Uranium, Total in Soil |
| Method Blank | | | R108137-06 | 7066-006 | AM | | 10/18/01 | 11/06/01 | MCM | Americium 241 in Soil |
| | | SOLID | | 7066-006 | C | | 10/14/01 | 11/06/01 | MCM | Carbon 14 in Soil |
| | B01-058 | | | 7066-006 | GAM | | 10/31/01 | 11/10/01 | MCM | Gamma Scan |
| | | | | 7066-006 | H | | 10/27/01 | 11/06/01 | MCM | Tritium in Soil |
| | | | | 7066-006 | NI_L | | 10/07/01 | 11/06/01 | MCM | Nickel 63 in Soil |
| | | | | 7066-006 | NP | | 10/23/01 | 11/06/01 | MCM | Neptunium in Soil |
| | | | | 7066-006 | SR | | 10/04/01 | 11/06/01 | MCM | Total Strontium in Soil |
| | | | | 7066-006 | TC | | 10/09/01 | 11/06/01 | MCM | Technetium 99 in Soil |
| | | | | 7066-006 | TH | | 10/18/01 | 11/06/01 | MCM | Thorium, Isotopic in Soil |
| | | | | 7066-006 | U | | 10/04/01 | 11/06/01 | MCM | Uranium, Isotopic in Soil |
| | | | | 7066-006 | U_T | | 10/09/01 | 11/06/01 | MCM | Uranium, Total in Soil |
| Method Blank | | | R108137-10 | 7066-010 | PU | | 11/02/01 | 11/06/01 | MCM | Plutonium, Isotopic in Solids |
| | | SOLID | | | | | | | | |
| | B01-058 | | | | | | | | | |

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# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1476

SDG 7066
Contact Melissa C. Mannion

## WORK SUMMARY, cont.

Client Hanford
Contract No. 630
Case no SDG H1476

| CLIENT SAMPLE ID / LOCATION / CUSTODY | SAF No | MATRIX | LAB SAMPLE ID / COLLECTED / RECEIVED | PLANCHET | TEST | SUF-FIX | ANALYZED | REVIEWED | BY | METHOD |
|---|---|---|---|---|---|---|---|---|---|---|
| Lab Control Sample | | | R108137-05 | 7066-005 | AM | | 10/18/01 | 11/06/01 | MCM | Americium 241 in Soil |
| | | SOLID | | 7066-005 | C | | 10/15/01 | 11/06/01 | MCM | Carbon 14 in Soil |
| | B01-058 | | | 7066-005 | GAM | | 10/30/01 | 11/10/01 | MCM | Gamma Scan |
| | | | | 7066-005 | H | | 10/27/01 | 11/06/01 | MCM | Tritium in Soil |
| | | | | 7066-005 | NI_L | | 10/07/01 | 11/06/01 | MCM | Nickel 63 in Soil |
| | | | | 7066-005 | NP | | 10/23/01 | 11/06/01 | MCM | Neptunium in Soil |
| | | | | 7066-005 | SR | | 10/04/01 | 11/06/01 | MCM | Total Strontium in Soil |
| | | | | 7066-005 | TC | | 10/16/01 | 11/06/01 | MCM | Technetium 99 in Soil |
| | | | | 7066-005 | TH | | 10/16/01 | 11/06/01 | MCM | Thorium, Isotopic in Soil |
| | | | | 7066-005 | U | | 10/04/01 | 11/06/01 | MCM | Uranium, Isotopic in Soil |
| | | | | 7066-005 | U_T | | 10/09/01 | 11/06/01 | MCM | Uranium, Total in Soil |
| Lab Control Sample | | | R108137-09 | 7066-009 | PU | | 11/02/01 | 11/06/01 | MCM | Plutonium, Isotopic in Solids |
| | | SOLID | | | | | | | | |
| | B01-058 | | | | | | | | | |
| Duplicate (R108137-01) | | | R108137-07 | 7066-007 | AM | | 10/18/01 | 11/06/01 | MCM | Americium 241 in Soil |
| B-7A/200 E | | SOLID | 08/22/01 | 7066-007 | C | | 10/14/01 | 11/06/01 | MCM | Carbon 14 in Soil |
| | B01-058 | | 08/27/01 | 7066-007 | GAM | | 11/05/01 | 11/10/01 | MCM | Gamma Scan |
| | | | | 7066-007 | H | | 10/27/01 | 11/06/01 | MCM | Tritium in Soil |
| | | | | 7066-007 | NI_L | | 10/07/01 | 11/06/01 | MCM | Nickel 63 in Soil |
| | | | | 7066-007 | NP | | 10/18/01 | 11/06/01 | MCM | Neptunium in Soil |
| | | | | 7066-007 | SR | | 10/04/01 | 11/06/01 | MCM | Total Strontium in Soil |
| | | | | 7066-007 | TC | | 10/09/01 | 11/06/01 | MCM | Technetium 99 in Soil |
| | | | | 7066-007 | TH | | 10/18/01 | 11/06/01 | MCM | Thorium, Isotopic in Soil |
| | | | | 7066-007 | U | | 10/04/01 | 11/06/01 | MCM | Uranium, Isotopic in Soil |
| | | | | 7066-007 | U_T | | 10/09/01 | 11/06/01 | MCM | Uranium, Total in Soil |
| Duplicate (R108137-01) | | | R108137-11 | 7066-011 | PU | | 11/07/01 | 11/10/01 | MCM | Plutonium, Isotopic in Solids |
| B-7A/200 E | | SOLID | 08/22/01 | | | | | | | |
| | B01-058 | | 08/27/01 | | | | | | | |
| Spike (R108137-01) | | | R108137-08 | 7066-008 | H | | 10/27/01 | 11/06/01 | MCM | Tritium in Soil |
| B-7A/200 E | | SOLID | 08/22/01 | | | | | | | |
| | B01-058 | | 08/27/01 | | | | | | | |

Lab id TMANC
Protocol Hanford
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Report date 11/10/01

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1476

SDG 7066
Contact Melissa C. Mannion

## WORK SUMMARY, cont.

Client Hanford
Contract No. 630
Case no SDG H1476

### COUNTS OF TESTS BY SAMPLE TYPE

| TEST | SAF No | METHOD | REFERENCE | CLIENT | MORE | RE | BLANK | LCS | DUP | SPIKE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| AM | B01-058 | Americium 241 in Soil | AMCMISO_IE_PLATE_AEA | 4 | | | 1 | 1 | 1 | | 7 |
| C | B01-058 | Carbon 14 in Soil | C14_COX_LSC | 4 | | | 1 | 1 | 1 | | 7 |
| GAM | B01-058 | Gamma Scan | GAMMA_GS | 4 | | | 1 | 1 | 1 | | 7 |
| H | B01-058 | Tritium in Soil | 906.0_H3_LSC | 4 | | | 1 | 1 | 1 | 1 | 8 |
| NI_L | B01-058 | Nickel 63 in Soil | NI63_LSC | 4 | | | 1 | 1 | 1 | | 7 |
| NP | B01-058 | Neptunium in Soil | NP237_LLE_PLATE_AEA | 4 | | | 1 | 1 | 1 | | 7 |
| PU | B01-058 | Plutonium, Isotopic in Solids | PUISO_PLATE_AEA | 4 | | | 1 | 1 | 1 | | 7 |
| SR | B01-058 | Total Strontium in Soil | SRTOT_SEP_PRECIP_GPC | 4 | | | 1 | 1 | 1 | | 7 |
| TC | B01-058 | Technetium 99 in Soil | TC99_TR_SEP_LSC | 4 | | | 1 | 1 | 1 | | 7 |
| TH | B01-058 | Thorium, Isotopic in Soil | THISO_IE_PLATE_AEA | 4 | | | 1 | 1 | 1 | | 7 |
| U | B01-058 | Uranium, Isotopic in Soil | UISO_PLATE_AEA | 4 | | | 1 | 1 | 1 | | 7 |
| U_T | B01-058 | Uranium, Total in Soil | UTOT_KPA | 4 | | | 1 | 1 | 1 | | 7 |
| TOTALS | | | | 48 | | | 12 | 12 | 12 | 1 | 85 |

Lab id TMANC
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Version 3.06
Report date 11/10/01

# EBERLINE SERVICES/RICHMOND

**SAMPLE DELIVERY GROUP H1476**

R108137-06 **Method Blank**

## METHOD BLANK

| | | | |
|---|---|---|---|
| SDG | 7066 | Client/Case no | Hanford SDG H1476 |
| Contact | Melissa C. Mannion | Contract | No. 630 |
| Lab sample id | R108137-06 | Client sample id | Method Blank |
| Dept sample id | 7066-006 | Material/Matrix | SOLID |
| | | SAF No | B01-058 |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Tritium | 10028-17-8 | 0.107 | 0.17 | 0.29 | 400 | U | H |
| Carbon 14 | 14762-75-5 | 2.54 | 2.4 | 3.9 | 50 | U | C |
| Nickel 63 | 13981-37-8 | -0.755 | 1.1 | 2.0 | 30 | U | NI_L |
| Total Strontium | SR-RAD | 0.008 | 0.094 | 0.19 | 1.0 | U | SR |
| Americium 241 | 14596-10-2 | 0.079 | 0.11 | 0.20 | 1.0 | U | AM |
| Technetium 99 | 14133-76-7 | -0.055 | 0.14 | 0.41 | 15 | U | TC |
| Thorium 228 | 14274-82-9 | 0.186 | 0.30 | 0.57 | | U | TH |
| Thorium 230 | 14269-63-7 | 0.073 | 0.29 | 0.49 | 1.0 | U | TH |
| Thorium 232 | TH-232 | 0 | 0.073 | 0.28 | 1.0 | U | TH |
| Total Uranium (ug/g) | 7440-61-1 | 0.002 | 0.002 | 0.003 | 0.10 | U | U_T |
| Uranium 233 | U-233/234 | -0.019 | 0.009 | 0.016 | 1.0 | U | U |
| Uranium 235 | 15117-96-1 | -0.009 | 0.007 | 0.013 | 1.0 | U | U |
| Uranium 238 | U-238 | -0.001 | 0.005 | 0.009 | 1.0 | U | U |
| Neptunium 237 | 13994-20-2 | -0.028 | 0.055 | 0.21 | 1.0 | U | NP |
| Potassium 40 | 13966-00-2 | U | | 0.50 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.031 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.029 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | U | | 0.058 | 0.10 | U | GAM |
| Radium 228 | 15262-20-1 | U | | 0.13 | 0.20 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.080 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.086 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.072 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.043 | | U | GAM |
| Thorium 232 | TH-232 | U | | 0.13 | | U | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.10 | | U | GAM |
| Uranium 238 | U-238 | U | | 3.7 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.095 | | U | GAM |

*200-TW-1 & 2 - Soil Sampling*

| | |
|---|---|
| Lab id | TMANC |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 11/10/01 |

# B L A N K ,  c o n t .

| | | | | | |
|---|---|---|---|---|---|
| SDG | 7066 | Client/Case no | Hanford | SDG | H1476 |
| Contact | Melissa C. Mannion | Contract | No. 630 | | |
| Lab sample id | R108137-06 | Client sample id | Method Blank | | |
| Dept sample id | 7066-006 | Material/Matrix | | | SOLID |
| | | SAF No | B01-058 | | |

QC-BLANK 39819



| | |
|---|---|
| Lab id | TMANC |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 11/10/01 |

# M E T H O D  B L A N K

| | | | | |
|---|---|---|---|---|
| SDG | 7066 | Client/Case no | Hanford | SDG H1476 |
| Contact | Melissa C. Mannion | Contract | No. 630 | |
| Lab sample id | R108137-10 | Client sample id | Method Blank | |
| Dept sample id | 7066-010 | Material/Matrix | | SOLID |
| | | SAF No | B01-058 | |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Plutonium 238 | 13981-16-3 | 0.028 | 0.11 | 0.22 | 1.0 | U | PU |
| Plutonium 239/240 | PU-239/240 | 0 | 0.056 | 0.22 | 1.0 | U | PU |

200-TW-1 & 2 - Soil Sampling

QC-BLANK #40118



| | |
|---|---|
| Lab id | TMANC |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 11/10/01 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1476

R108137-05

Lab Control Sample

## LAB CONTROL SAMPLE

SDG 7066
Contact Melissa C. Mannion

Client/Case no Hanford SDG H1476
Case no No. 630

Lab sample id R108137-05
Dept sample id 7066-005

Client sample id Lab Control Sample
Material/Matrix SOLID
SAF No B01-058

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Tritium | 23.2 | 0.61 | 0.28 | 400 | J | H | 23.6 | 0.94 | 98 | 84-116 | 80-120 |
| Carbon 14 | 8460 | 85 | 11 | 50 | | C | 11300 | 450 | 75 | 87-113 | 80-120 |
| Nickel 63 | 225 | 4.3 | 2.0 | 30 | | NI_L | 232 | 9.3 | 97 | 84-116 | 80-120 |
| Total Strontium | 22.4 | 0.79 | 0.22 | 1.0 | | SR | 21.9 | 0.88 | 102 | 83-117 | 80-120 |
| Americium 241 | 17.8 | 1.7 | 0.18 | 1.0 | | AM | 19.1 | 0.76 | 93 | 84-116 | 80-120 |
| Technetium 99 | 118 | 2.3 | 0.52 | 15 | | TC | 118 | 4.7 | 100 | 84-116 | 80-120 |
| Thorium 230 | 40.8 | 1.6 | 0.31 | 1.0 | | TH | 40.8 | 1.6 | 100 | 89-111 | 80-120 |
| Total Uranium (ug/g) | 14.6 | 1.6 | 0.030 | 0.10 | | U_T | 14.4 | 0.58 | 101 | 78-122 | 80-120 |
| Uranium 233 | 17.9 | 0.25 | 0.11 | 1.0 | | U | 18.6 | 0.74 | 96 | 90-110 | 80-120 |
| Uranium 235 | 14.7 | 0.22 | 0.009 | 1.0 | | U | 15.1 | 0.60 | 97 | 90-110 | 80-120 |
| Uranium 238 | 20.0 | 0.27 | 0.11 | 1.0 | | U | 20.2 | 0.81 | 99 | 90-110 | 80-120 |
| Neptunium 237 | 19.8 | 1.2 | 0.046 | 1.0 | | NP | 21.2 | 0.85 | 93 | 87-113 | 80-120 |
| Cobalt 60 | 1.16 | 0.049 | 0.026 | 0.050 | | GAM | 1.12 | 0.045 | 104 | 75-125 | 80-120 |
| Cesium 137 | 1.35 | 0.045 | 0.034 | 0.10 | | GAM | 1.30 | 0.052 | 104 | 75-125 | 80-120 |

200-TW-1 & 2 - Soil Sampling

QC-LCS 39818

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 11/10/01

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1476

R108137-09

Lab Control Sample

## LAB CONTROL SAMPLE

SDG 7066
Contact Melissa C. Mannion

Client/Case no Hanford SDG H1476
Case no No. 630

Lab sample id R108137-09
Dept sample id 7066-009

Client sample id Lab Control Sample
Material/Matrix SOLID
SAF No B01-058

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Plutonium 238 | 28.2 | 2.8 | 0.27 | 1.0 | | PU | 27.2 | 1.1 | 104 | 82-118 | 80-120 |
| Plutonium 239/240 | 31.5 | 3.0 | 0.22 | 1.0 | | PU | 29.0 | 1.2 | 109 | 81-119 | 80-120 |

200-TW-1 & 2 - Soil Sampling

QC-LCS #40117

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 11/10/01

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1476

R108137-07 B12MH5

## DUPLICATE

| | | | | | |
|---|---|---|---|---|---|
| SDG | 7066 | | | Client/Case no | Hanford SDG H1476 |
| Contact | Melissa C. Mannion | | | Case no | No. 630 |
| | DUPLICATE | | ORIGINAL | | |
| Lab sample id | R108137-07 | Lab sample id | R108137-01 | Client sample id | B12MH5 |
| Dept sample id | 7066-007 | Dept sample id | 7066-001 | Location/Matrix | B-7A/200 E SOLID |
| | | Received | 08/27/01 | Collected/Weight | 08/22/01 04:25 1218 g |
| % solids | 94.2 | % solids | 94.2 | Custody/SAF No | B01-058-225 B01-058 |

| 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 PROT TOT LIMIT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tritium | 0.051 | 0.056 | 0.091 | 400 | U | H | 0.058 | 0.058 | 0.095 | U | - | |
| Carbon 14 | 3.28 | 2.3 | 3.7 | 50 | U | C | 2.85 | 2.3 | 3.8 | U | - | |
| Nickel 63 | -1.23 | 1.3 | 2.2 | 30 | U | NI_L | -1.25 | 1.2 | 2.1 | U | - | |
| Total Strontium | 0.761 | 0.16 | 0.18 | 1.0 | J | SR | 0.689 | 0.16 | 0.19 | J | 10 | 51 |
| Americium 241 | -0.039 | 0.039 | 0.15 | 1.0 | U | AM | 0 | 0.043 | 0.16 | U | - | |
| Technetium 99 | -0.035 | 0.15 | 0.46 | 15 | U | TC | 0.071 | 0.17 | 0.54 | U | - | |
| Thorium 228 | 0.077 | 0.31 | 0.62 | | U | TH | 0.676 | 0.52 | 0.70 | U | - | |
| Thorium 230 | -0.076 | 0.23 | 0.42 | 1.0 | U | TH | 0.352 | 0.40 | 0.38 | U | - | |
| Thorium 232 | 0.419 | 0.31 | 0.29 | 1.0 | J | TH | 0.302 | 0.20 | 0.38 | U | 32 | 154 |
| Total Uranium (ug/g) | 0.903 | 0.11 | 0.003 | 0.10 | | U_T | 0.930 | 0.10 | 0.003 | | 3 | 31 |
| Uranium 233 | 0.467 | 0.033 | 0.016 | 1.0 | J | U | 0.474 | 0.031 | 0.013 | J | 1 | 18 |
| Uranium 235 | 0.029 | 0.011 | 0.008 | 1.0 | J | U | 0.016 | 0.008 | 0.007 | J | 58 | 91 |
| Uranium 238 | 0.472 | 0.032 | 0.010 | 1.0 | J | U | 0.464 | 0.030 | 0.009 | J | 2 | 18 |
| Neptunium 237 | 0 | 0.079 | 0.12 | 1.0 | U | NP | 0 | 0.036 | 0.053 | U | - | |
| Potassium 40 | 9.99 | 0.71 | 0.41 | | | GAM | 10.8 | 0.78 | 0.33 | | 8 | 35 |
| Cobalt 60 | U | | 0.041 | 0.050 | U | GAM | U | | 0.042 | U | - | |
| Cesium 137 | 5.97 | 0.11 | 0.068 | 0.10 | | GAM | 6.67 | 0.14 | 0.063 | | 11 | 32 |
| Radium 226 | 0.412 | 0.086 | 0.093 | 0.10 | | GAM | 0.396 | 0.082 | 0.092 | | 4 | 54 |
| Radium 228 | 0.575 | 0.16 | 0.15 | 0.20 | | GAM | 0.654 | 0.16 | 0.16 | | 13 | 64 |
| Europium 152 | U | | 0.13 | 0.10 | U | GAM | U | | 0.15 | U | - | |
| Europium 154 | U | | 0.12 | 0.10 | U | GAM | U | | 0.14 | U | - | |
| Europium 155 | U | | 0.11 | 0.10 | U | GAM | U | | 0.13 | U | - | |
| Thorium 228 | 0.553 | 0.050 | 0.057 | | | GAM | 0.768 | 0.094 | 0.10 | | 33 | 40 |
| Thorium 232 | 0.575 | 0.16 | 0.15 | | | GAM | 0.654 | 0.16 | 0.16 | | 13 | 64 |
| Uranium 235 | U | | 0.19 | | U | GAM | U | | 0.19 | U | - | |
| Uranium 238 | U | | 4.4 | | U | GAM | U | | 4.6 | U | - | |
| Americium 241 | U | | 0.10 | | U | GAM | U | | 0.21 | U | - | |

200-TW-1 & 2 - Soil Sampling

| | |
|---|---|
| Lab id | TMANC |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DUP |
| Version | 3.06 |
| Report date | 11/10/01 |

# DUPLICATE, cont.

| | | | | | |
|---|---|---|---|---|---|
| SDG | 7066 | | | Client/Case no | Hanford SDG H1476 |
| Contact | Melissa C. Mannion | | | Case no | No. 630 |
| | DUPLICATE | | ORIGINAL | | |
| Lab sample id | R108137-07 | Lab sample id | R108137-01 | Client sample id | B12MH5 |
| Dept sample id | 7066-007 | Dept sample id | 7066-001 | Location/Matrix | B-7A/200 E SOLID |
| | | Received | 08/27/01 | Collected/Weight | 08/22/01 04:25 1218 g |
| % solids | 94.2 | % solids | 94.2 | Custody/SAF No | B01-058-225 B01-058 |

QC-DUP#1 39820

| | |
|---|---|
| Lab id | TMANC |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DUP |
| Version | 3.06 |
| Report date | 11/10/01 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1476

R108137-11 B12MH5

## DUPLICATE

| | | | | | |
|---|---|---|---|---|---|
| SDG | 7066 | | | Client/Case no | Hanford SDG H1476 |
| Contact | Melissa C. Mannion | | | Case no | No. 630 |
| | DUPLICATE | | ORIGINAL | | |
| Lab sample id | R108137-11 | Lab sample id | R108137-01 | Client sample id | B12MH5 |
| Dept sample id | 7066-011 | Dept sample id | 7066-001 | Location/Matrix | B-7A/200 E SOLID |
| | | Received | 08/27/01 | Collected/Weight | 08/22/01 04:25 1218 g |
| % solids | 94.2 | % solids | 94.2 | Custody/SAF No | B01-058-225 B01-058 |

| 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 PROT TOT LIMIT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plutonium 238 | 0 | 0.045 | 0.17 | 1.0 | U | PU | 0 | 0.050 | 0.19 | U | - | |
| Plutonium 239/240 | 0 | 0.045 | 0.17 | 1.0 | U | PU | 0 | 0.050 | 0.19 | U | - | |

200-TW-1 & 2 - Soil Sampling

QC-DUP#1A1 40119

| | |
|---|---|
| Lab id | TMANC |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DUP |
| Version | 3.06 |
| Report date | 11/10/01 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1476

R108137-08 B12MH5

## MATRIX SPIKE

| | | | | | |
|---|---|---|---|---|---|
| SDG | 7066 | | | Client/Case no | Hanford SDG H1476 |
| Contact | Melissa C. Mannion | | | Case no | No. 630 |
| | MATRIX SPIKE | | ORIGINAL | | |
| Lab sample id | R108137-08 | Lab sample id | R108137-01 | Client sample id | B12MH5 |
| Dept sample id | 7066-008 | Dept sample id | 7066-001 | Location/Matrix | B-7A/200 E SOLID |
| | | Received | 08/27/01 | Collected/Weight | 08/22/01 04:25 1218 g |
| % solids | 94.2 | % solids | 94.2 | Custody/SAF No | B01-058-225 B01-058 |

| ANALYTE | SPIKE pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST | ADDED pCi/g | 2σ ERR pCi/g | ORIGINAL pCi/g | 2σ ERR (COUNT) | REC % | 3σ LMTS (TOTAL) | PROTOCOL LIMITS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tritium | 36.1 | 0.41 | 0.090 | 400 | JX | H | 47.1 | 1.9 | 0.058 | 0.058 | 77 | 87-113 | 60-140 |

200-TW-1 & 2 - Soil Sampling

QC-MS#1 39821

| | |
|---|---|
| Lab id | TMANC |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-MS |
| Version | 3.06 |
| Report date | 11/10/01 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1476

R108137-03 B12MH4

## DATA SHEET

| | | | |
|---|---|---|---|
| SDG | 7066 | Client/Case no | Hanford SDG H1476 |
| Contact | Melissa C. Mannion | Contract | No. 630 |
| Lab sample id | R108137-03 | Client sample id | B12MH4 |
| Dept sample id | 7066-003 | Location/Matrix | B-7A/200 E SOLID |
| Received | 08/28/01 | Collected/Weight | 08/23/01 00:45 1168 g |
| % solids | 94.5 | Custody/SAF No | B01-058-224 B01-058 |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Tritium | 10028-17-8 | 0.051 | 0.056 | 0.092 | 400 | U | H |
| Carbon 14 | 14762-75-5 | 3.72 | 2.4 | 3.9 | 50 | U | C |
| Nickel 63 | 13981-37-8 | -1.16 | 1.2 | 2.2 | 30 | U | NI_L |
| Total Strontium | SR-RAD | 13.5 | 0.56 | 0.18 | 1.0 | | SR |
| Americium 241 | 14596-10-2 | 0.034 | 0.067 | 0.13 | 1.0 | U | AM |
| Technetium 99 | 14133-76-7 | -0.150 | 0.16 | 0.59 | 15 | U | TC |
| Thorium 228 | 14274-82-9 | 0.540 | 0.26 | 0.20 | | | TH |
| Thorium 230 | 14269-63-7 | 0.685 | 0.36 | 0.31 | 1.0 | J | TH |
| Thorium 232 | TH-232 | 0.381 | 0.20 | 0.19 | 1.0 | J | TH |
| Total Uranium (ug/g) | 7440-61-1 | 0.964 | 0.11 | 0.003 | 0.10 | | U_T |
| Uranium 233 | U-233/234 | 0.463 | 0.031 | 0.015 | 1.0 | J | U |
| Uranium 235 | 15117-96-1 | 0.023 | 0.009 | 0.008 | 1.0 | J | U |
| Uranium 238 | U-238 | 0.463 | 0.030 | 0.009 | 1.0 | J | U |
| Neptunium 237 | 13994-20-2 | 0.037 | 0.075 | 0.11 | 1.0 | U | NP |
| Plutonium 238 | 13981-16-3 | 0.126 | 0.19 | 0.30 | 1.0 | U | PU |
| Plutonium 239/240 | PU-239/240 | 0 | 0.063 | 0.24 | 1.0 | U | PU |
| Potassium 40 | 13966-00-2 | 12.2 | 0.73 | 0.30 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.045 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | 4.54 | 0.10 | 0.047 | 0.10 | | GAM |
| Radium 226 | 13982-63-3 | 0.544 | 0.073 | 0.071 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.646 | 0.15 | 0.15 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.11 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.13 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.090 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.742 | 0.050 | 0.057 | | | GAM |
| Thorium 232 | TH-232 | 0.646 | 0.15 | 0.15 | | | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.14 | | U | GAM |
| Uranium 238 | U-238 | U | | 4.5 | | U | GAM |

200-TW-1 & 2 - Soil Sampling

| | |
|---|---|
| Lab id | TMANC |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 11/10/01 |

# DATA SHEET, cont

| | | | | |
|---|---|---|---|---|
| SDG | 7066 | Client/Case no | Hanford | SDG H1476 |
| Contact | Melissa C. Mannion | Contract | No. 630 | |
| Lab sample id | R108137-03 | Client sample id | B12MH4 | |
| Dept sample id | 7066-003 | Location/Matrix | B-7A/200 E | SOLID |
| Received | 08/28/01 | Collected/Weight | 08/23/01 00:45 | 1168 g |
| % solids | 94.5 | Custody/SAF No | B01-058-224 | B01-058 |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Americium 241 | 14596-10-2 | U | | 0.056 | | U | GAM |

200-TW-1 & 2 - Soil Sampling

| | |
|---|---|
| Lab id | TMANC |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 11/10/01 |

# EBERLINE SERVICES/RICHMOND

**SAMPLE DELIVERY GROUP H1476**

R108137-01 B12MH5

## DATA SHEET

| | | | | | |
|---|---|---|---|---|---|
| SDG | 7066 | Client/Case no | Hanford | SDG H1476 | |
| Contact | Melissa C. Mannion | Contract | No. 630 | | |
| Lab sample id | R108137-01 | Client sample id | B12MH5 | | |
| Dept sample id | 7066-001 | Location/Matrix | B-7A/200 E | SOLID | |
| Received | 08/27/01 | Collected/Weight | 08/22/01 04:25 | 1218 g | |
| % solids | 94.2 | Custody/SAF No | B01-058-225 | B01-058 | |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Tritium | 10028-17-8 | 0.058 | 0.058 | 0.095 | 400 | U | H |
| Carbon 14 | 14762-75-5 | 2.85 | 2.3 | 3.8 | 50 | U | C |
| Nickel 63 | 13981-37-8 | -1.25 | 1.2 | 2.1 | 30 | U | NI_L |
| Total Strontium | SR-RAD | 0.689 | 0.16 | 0.19 | 1.0 | J | SR |
| Americium 241 | 14596-10-2 | 0 | 0.043 | 0.16 | 1.0 | U | AM |
| Technetium 99 | 14133-76-7 | 0.071 | 0.17 | 0.54 | 15 | U | TC |
| Thorium 228 | 14274-82-9 | 0.676 | 0.52 | 0.70 | | U | TH |
| Thorium 230 | 14269-63-7 | 0.352 | 0.40 | 0.38 | 1.0 | U | TH |
| Thorium 232 | TH-232 | 0.302 | 0.20 | 0.38 | 1.0 | U | TH |
| Total Uranium (ug/g) | 7440-61-1 | 0.930 | 0.10 | 0.003 | 0.10 | | U_T |
| Uranium 233 | U-233/234 | 0.474 | 0.031 | 0.013 | 1.0 | J | U |
| Uranium 235 | 15117-96-1 | 0.016 | 0.008 | 0.007 | 1.0 | J | U |
| Uranium 238 | U-238 | 0.464 | 0.030 | 0.009 | 1.0 | J | U |
| Neptunium 237 | 13994-20-2 | 0 | 0.036 | 0.053 | 1.0 | U | NP |
| Plutonium 238 | 13981-16-3 | 0 | 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 | 10.8 | 0.78 | 0.33 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.042 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | 6.67 | 0.14 | 0.063 | 0.10 | | GAM |
| Radium 226 | 13982-63-3 | 0.396 | 0.082 | 0.092 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.654 | 0.16 | 0.16 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.15 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.14 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.13 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.768 | 0.094 | 0.10 | | | GAM |
| Thorium 232 | TH-232 | 0.654 | 0.16 | 0.16 | | | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.19 | | U | GAM |
| Uranium 238 | U-238 | U | | 4.6 | | U | GAM |

200-TW-1 & 2 - Soil Sampling

| | |
|---|---|
| Lab id | TMANC |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 11/10/01 |

# EBERLINE SERVICES/RICHMOND

***SAMPLE DELIVERY GROUP H1476***

R108137-01 B12MH5

## DATA SHEET, cont

| | | | | | |
|---|---|---|---|---|---|
| SDG | 7066 | Client/Case no | Hanford | SDG H1476 | |
| Contact | Melissa C. Mannion | Contract | No. 630 | | |
| Lab sample id | R108137-01 | Client sample id | B12MH5 | | |
| Dept sample id | 7066-001 | Location/Matrix | B-7A/200 E | SOLID | |
| Received | 08/27/01 | Collected/Weight | 08/22/01 04:25 | 1218 g | |
| % solids | 94.2 | Custody/SAF No | B01-058-225 | B01-058 | |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Americium 241 | 14596-10-2 | U | | 0.21 | | U | GAM |

*200-TW-1 & 2 - Soil Sampling*

| | |
|---|---|
| Lab id | TMANC |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 11/10/01 |

# EBERLINE SERVICES/RICHMOND

**SAMPLE DELIVERY GROUP H1476**

R108137-02 B12MH6

## DATA SHEET

| | | | |
|---|---|---|---|
| SDG | 7066 | Client/Case no | Hanford SDG H1476 |
| Contact | Melissa C. Mannion | Contract | No. 630 |
| Lab sample id | R108137-02 | Client sample id | B12MH6 |
| Dept sample id | 7066-002 | Location/Matrix | B-7A/200 E SOLID |
| Received | 08/27/01 | Collected/Weight | 08/22/01 05:30 1097 g |
| % solids | 91.2 | Custody/SAF No | B01-058-225 B01-058 |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Tritium | 10028-17-8 | 0.027 | 0.056 | 0.093 | 400 | U | H |
| Carbon 14 | 14762-75-5 | 6.30 | 2.6 | 4.1 | 50 | J | C |
| Nickel 63 | 13981-37-8 | -0.101 | 1.3 | 2.2 | 30 | U | NI_L |
| Total Strontium | SR-RAD | 2.66 | 0.26 | 0.18 | 1.0 | | SR |
| Americium 241 | 14596-10-2 | 0.018 | 0.072 | 0.14 | 1.0 | U | AM |
| Technetium 99 | 14133-76-7 | -0.048 | 0.17 | 0.59 | 15 | U | TC |
| Thorium 228 | 14274-82-9 | 0.687 | 0.11 | 0.11 | | | TH |
| Thorium 230 | 14269-63-7 | 0.414 | 0.15 | 0.28 | 1.0 | J | TH |
| Thorium 232 | TH-232 | 0.644 | 0.085 | 0.035 | 1.0 | J | TH |
| Total Uranium (ug/g) | 7440-61-1 | 0.995 | 0.11 | 0.003 | 0.10 | | U_T |
| Uranium 233 | U-233/234 | 0.467 | 0.032 | 0.016 | 1.0 | J | U |
| Uranium 235 | 15117-96-1 | 0.029 | 0.010 | 0.010 | 1.0 | J | U |
| Uranium 238 | U-238 | 0.458 | 0.030 | 0.010 | 1.0 | J | U |
| Neptunium 237 | 13994-20-2 | 0 | 17 | 0.41 | 1.0 | U | NP |
| Plutonium 238 | 13981-16-3 | 0 | 0.057 | 0.22 | 1.0 | U | PU |
| Plutonium 239/240 | PU-239/240 | 0.172 | 0.12 | 0.22 | 1.0 | U | PU |
| Potassium 40 | 13966-00-2 | 14.5 | 0.42 | 0.18 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.019 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | 42.5 | 0.17 | 0.048 | 0.10 | | GAM |
| Radium 226 | 13982-63-3 | 0.584 | 0.063 | 0.079 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.763 | 0.083 | 0.083 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.15 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.068 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.15 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.701 | 0.073 | 0.097 | | | GAM |
| Thorium 232 | TH-232 | 0.763 | 0.083 | 0.083 | | | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.16 | | U | GAM |
| Uranium 238 | U-238 | U | | 2.4 | | U | GAM |

200-TW-1 & 2 - Soil Sampling

| | |
|---|---|
| Lab id | TMANC |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 11/10/01 |

# DATA SHEET, cont

| | | | | | |
|---|---|---|---|---|---|
| SDG | 7066 | Client/Case no | Hanford | | SDG H1476 |
| Contact | Melissa C. Mannion | Contract | No. 630 | | |
| Lab sample id | R108137-02 | Client sample id | B12MH6 | | |
| Dept sample id | 7066-002 | Location/Matrix | B-7A/200 E | | SOLID |
| Received | 08/27/01 | Collected/Weight | 08/22/01 05:30 | 1097 g | |
| % solids | 91.2 | Custody/SAF No | B01-058-225 | B01-058 | |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Americium 241 | 14596-10-2 | U | | 0.32 | | U | GAM |

200-TW-1 & 2 - Soil Sampling

| | |
|---|---|
| Lab id | TMANC |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 11/10/01 |

# EBERLINE SERVICES/RICHMOND

**SAMPLE DELIVERY GROUP H1476**

**R108137-04** **B12MH7**

## DATA SHEET

| | | | |
|---|---|---|---|
| SDG | 7066 | Client/Case no | Hanford SDG H1476 |
| Contact | Melissa C. Mannion | Contract | No. 630 |
| Lab sample id | R108137-04 | Client sample id | B12MH7 |
| Dept sample id | 7066-004 | Location/Matrix | B-7A/200 E SOLID |
| Received | 08/28/01 | Collected/Weight | 08/22/01 23:40 1171 g |
| % solids | 95.2 | Custody/SAF No | B01-058-224 B01-058 |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Tritium | 10028-17-8 | -0.011 | 0.055 | 0.095 | 400 | U | H |
| Carbon 14 | 14762-75-5 | 2.22 | 2.3 | 3.8 | 50 | U | C |
| Nickel 63 | 13981-37-8 | 0 | 1.3 | 2.2 | 30 | U | NI_L |
| Total Strontium | SR-RAD | 9.44 | 0.48 | 0.19 | 1.0 | | SR |
| Americium 241 | 14596-10-2 | -0.017 | 0.035 | 0.13 | 1.0 | U | AM |
| Technetium 99 | 14133-76-7 | -0.076 | 0.16 | 0.57 | 15 | U | TC |
| Thorium 228 | 14274-82-9 | 0.884 | 0.34 | 0.26 | | | TH |
| Thorium 230 | 14269-63-7 | 0.729 | 0.40 | 0.41 | 1.0 | J | TH |
| Thorium 232 | TH-232 | 0.265 | 0.20 | 0.25 | 1.0 | J | TH |
| Total Uranium (ug/g) | 7440-61-1 | 0.939 | 0.11 | 0.003 | 0.10 | | U_T |
| Uranium 233 | U-233/234 | 0.470 | 0.030 | 0.012 | 1.0 | J | U |
| Uranium 235 | 15117-96-1 | 0.023 | 0.010 | 0.009 | 1.0 | J | U |
| Uranium 238 | U-238 | 0.465 | 0.029 | 0.007 | 1.0 | J | U |
| Neptunium 237 | 13994-20-2 | 0 | 0.035 | 0.14 | 1.0 | U | NP |
| Plutonium 238 | 13981-16-3 | -0.025 | 0.051 | 0.19 | 1.0 | U | PU |
| Plutonium 239/240 | PU-239/240 | 0.025 | 0.051 | 0.19 | 1.0 | U | PU |
| Potassium 40 | 13966-00-2 | 2.27 | 0.093 | 0.052 | | | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.005 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | 1.52 | 0.017 | 0.007 | 0.10 | | GAM |
| Radium 226 | 13982-63-3 | 0.094 | 0.011 | 0.011 | 0.10 | J | GAM |
| Radium 228 | 15262-20-1 | 0.132 | 0.020 | 0.018 | 0.20 | J | GAM |
| Europium 152 | 14683-23-9 | U | | 0.017 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.015 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.018 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.113 | 0.008 | 0.009 | | | GAM |
| Thorium 232 | TH-232 | 0.132 | 0.020 | 0.018 | | | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.024 | | U | GAM |
| Uranium 238 | U-238 | U | | 0.58 | | U | GAM |

200-TW-1 & 2 - Soil Sampling

| | |
|---|---|
| Lab id | TMANC |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 11/10/01 |

# DATA SHEET, cont

| | | | | |
|---|---|---|---|---|
| SDG | 7066 | Client/Case no | Hanford | SDG H1476 |
| Contact | Melissa C. Mannion | Contract | No. 630 | |
| Lab sample id | R108137-04 | Client sample id | B12MH7 | |
| Dept sample id | 7066-004 | Location/Matrix | B-7A/200 E | SOLID |
| Received | 08/28/01 | Collected/Weight | 08/22/01 23:40 | 1171 g |
| % solids | 95.2 | Custody/SAF No | B01-058-224 | B01-058 |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Americium 241 | 14596-10-2 | U | | 0.020 | | U | GAM |

*200-TW-1 & 2 - Soil Sampling*



| | |
|---|---|
| Lab id | TMANC |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 11/10/01 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1476

Test AM Matrix SOLID
SDG 7066
Contact Melissa C. Mannion

## METHOD SUMMARY

*AMERICIUM 241 IN SOIL*

ALPHA SPECTROSCOPY

Client Hanford
Contract No. 630
Contract SDG H1476

## RESULTS

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | PLANCHET | Americium 241 | |
|---|---|---|---|---|---|---|
| Preparation batch 7008-047 | | | | | | |
| B12MH4 | R108137-03 | | | 7066-003 | U | |
| B12MH5 | R108137-01 | | | 7066-001 | U | |
| B12MH6 | R108137-02 | | | 7066-002 | U | |
| B12MH7 | R108137-04 | | | 7066-004 | U | |
| BLK (QC ID=39819) | R108137-06 | | | 7066-006 | U | |
| LCS (QC ID=39818) | R108137-05 | | | 7066-005 | ok | |
| Duplicate (R108137-01) | R108137-07 | | | 7066-007 | - | U |
| Nominal values and limits from method | | | | RDLs (pCi/g) | 1.0 | |
| 200-TW-1 & 2 - Soil Sampling | | | | | | |

## METHOD PERFORMANCE

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | MDA pCi/g | ALIQ g | PREP FAC | DILU-TION | YIELD % | EFF % | COUNT min | FWHM keV | DRIFT KeV | DAYS HELD | PREPARED | ANAL-YZED | DETECTOR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preparation batch 7008-047 | 2σ prep error 5.0 % | | | | Reference Lab Notebook 7008 pg. 047 | | | | | | | | | | | |
| B12MH4 | R108137-03 | | | 0.13 | 0.500 | | | 95 | | 147 | | | 65 | 10/09/01 | 10/27 | SS-042 |
| B12MH5 | R108137-01 | | | 0.16 | 0.500 | | | 81 | | 133 | | | 57 | 10/09/01 | 10/18 | SS-043 |
| B12MH6 | R108137-02 | | | 0.14 | 0.500 | | | 93 | | 133 | | | 57 | 10/09/01 | 10/18 | SS-044 |
| B12MH7 | R108137-04 | | | 0.13 | 0.500 | | | 92 | | 146 | | | 66 | 10/09/01 | 10/27 | SS-043 |
| BLK (QC ID=39819) | R108137-06 | | | 0.20 | 0.500 | | | 64 | | 133 | | | | 10/09/01 | 10/18 | SS-048 |
| LCS (QC ID=39818) | R108137-05 | | | 0.18 | 0.500 | | | 76 | | 133 | | | | 10/09/01 | 10/18 | SS-047 |
| Duplicate (R108137-01) (QC ID=39820) | R108137-07 | | | 0.15 | 0.500 | | | 89 | | 133 | | | 57 | 10/09/01 | 10/18 | SS-049 |
| Nominal values and limits from method | | | | 1.0 | 0.500 | | | 20-105 | | 100 | 100 | | 180 | | | |

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 11/10/01

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1476

Test AM Matrix SOLID
SDG 7066
Contact Melissa C. Mannion

## METHOD SUMMARY, cont.

AMERICIUM 241 IN SOIL
ALPHA SPECTROSCOPY

Client Hanford
Contract No. 630
Contract SDG H1476

| PROCEDURES | REFERENCE | AMCMISO_IE_PLATE_AEA |
|---|---|---|
| | CP-060 | Soil Preparation, rev 3 |
| | CP-070 | Soil Dissolution, < 1.0g Aliquot, rev 4 |
| | CP-940 | Plutonium Separation and Purification, rev 3 |
| | CP-960 | Americium-Curium Purification, Large Aliquot, rev 4 |
| | CP-008 | Heavy Element Electroplating, rev 6 |

| AVERAGES ± 2 SD | MDA | 0.16 | ± | 0.053 |
|---|---|---|---|---|
| FOR 7 SAMPLES | YIELD | 84 | ± | 23 |

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 11/10/01

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1476

Test NP Matrix SOLID
SDG 7066
Contact Melissa C. Mannion

## METHOD SUMMARY

NEPTUNIUM IN SOIL
ALPHA SPECTROSCOPY

Client Hanford
Contract No. 630
Contract SDG H1476

## RESULTS

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | PLANCHET | Neptunium 237 | |
|---|---|---|---|---|---|---|
| Preparation batch 7008-047 | | | | | | |
| B12MH4 | R108137-03 | | | 7066-003 | U | |
| B12MH5 | R108137-01 | | | 7066-001 | U | |
| B12MH6 | R108137-02 | | | 7066-002 | U | |
| B12MH7 | R108137-04 | | | 7066-004 | U | |
| BLK (QC ID=39819) | R108137-06 | | | 7066-006 | U | |
| LCS (QC ID=39818) | R108137-05 | | | 7066-005 | ok | |
| Duplicate (R108137-01) | R108137-07 | | | 7066-007 | - | U |
| Nominal values and limits from method 200-TW-1 & 2 - Soil Sampling | | | | RDLs (pCi/g) | 1.0 | |

## METHOD PERFORMANCE

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | MDA pCi/g | ALIQ g | PREP FAC | DILU-TION | YIELD % | EFF % | COUNT min | FWHM keV | DRIFT KeV | DAYS HELD | PREPARED | ANAL-YZED | DETECTOR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preparation batch 7008-047 | 2σ prep error 5.0 % | | | Reference Lab Notebook 7008 pg. 047 | | | | | | | | | | | | |
| B12MH4 | R108137-03 | | | 0.11 | 0.500 | | | 61 | | 107 | | | 58 | 10/07/01 | 10/20 | SS-027 |
| B12MH5 | R108137-01 | | | 0.053 | 0.500 | | | 58 | | 221 | | | 62 | 10/07/01 | 10/23 | SS-044 |
| B12MH6 | R108137-02 | | | 0.41 | 0.500 | | | 52 | | 135 | | | 57 | 10/07/01 | 10/18 | SS-024 |
| B12MH7 | R108137-04 | | | 0.14 | 0.500 | | | 59 | | 222 | | | 62 | 10/07/01 | 10/23 | SS-047 |
| BLK (QC ID=39819) | R108137-06 | | | 0.21 | 0.500 | | | 39 | | 222 | | | | 10/07/01 | 10/23 | SS-049 |
| LCS (QC ID=39818) | R108137-05 | | | 0.046 | 0.500 | | | 66 | | 222 | | | | 10/07/01 | 10/23 | SS-048 |
| Duplicate (R108137-01) (QC ID=39820) | R108137-07 | | | 0.12 | 0.500 | | | 57 | | 107 | | | 57 | 10/07/01 | 10/18 | SS-032 |
| Nominal values and limits from method | | | | 1.0 | 0.500 | | | 20-105 | | 100 | | | 180 | | | |

| PROCEDURES | REFERENCE | NP237_LLE_PLATE_AEA |
|---|---|---|
| | CP-060 | Soil Preparation, rev 3 |
| | CP-070 | Soil Dissolution, < 1.0g Aliquot, rev 4 |
| | CP-934 | Neptunium from Solids and Water by Extraction Chromatography, rev 2 |

| AVERAGES ± 2 SD FOR 7 SAMPLES | | | | |
|---|---|---|---|---|
| MDA | 0.16 | ± | 0.25 |
| YIELD | 56 | ± | 17 |

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 11/10/01

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1476

Test PU Matrix SOLID
SDG 7066
Contact Melissa C. Mannion

## METHOD SUMMARY

PLUTONIUM, ISOTOPIC IN SOLIDS
ALPHA SPECTROSCOPY

Client Hanford
Contract No. 630
Contract SDG H1476

## RESULTS

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | PLANCHET | Plutonium 238 | | Plutonium 239/240 | |
|---|---|---|---|---|---|---|---|---|
| Preparation batch 7008-047 | | | | | | | | |
| B12MH4 | R108137-03 | | A1 | 7066-003 | U | | U | |
| B12MH5 | R108137-01 | | A1 | 7066-001 | U | | U | |
| B12MH6 | R108137-02 | | A1 | 7066-002 | U | | U | |
| B12MH7 | R108137-04 | | A1 | 7066-004 | U | | U | |
| BLK (QC ID=40118) | R108137-10 | | | 7066-010 | U | | U | |
| LCS (QC ID=40117) | R108137-09 | | | 7066-009 | ok | | ok | |
| Duplicate (R108137-01) | R108137-11 | | | 7066-011 | - | U | - | U |
| Nominal values and limits from method 200-TW-1 & 2 - Soil Sampling | | | | RDLs (pCi/g) | 1.0 | | 1.0 | |

## METHOD PERFORMANCE

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | MAX MDA pCi/g | ALIQ g | PREP FAC | DILU-TION | YIELD % | EFF % | COUNT min | FWHM keV | DRIFT KeV | DAYS HELD | PREPARED | ANAL-YZED | DETECTOR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preparation batch 7008-047 2σ prep error 5.0 % Reference Lab Notebook 7008 pg. 047 | | | | | | | | | | | | | | | | |
| B12MH4 | R108137-03 | | A1 | 0.30 | 0.500 | | | 69 | | 106 | | | 69 | 10/31/01 | 10/31 | SS-041 |
| B12MH5 | R108137-01 | | A1 | 0.19 | 0.500 | | | 94 | | 106 | | | 70 | 10/31/01 | 10/31 | SS-031 |
| B12MH6 | R108137-02 | | A1 | 0.22 | 0.500 | | | 81 | | 106 | | | 70 | 10/31/01 | 10/31 | SS-032 |
| B12MH7 | R108137-04 | | A1 | 0.19 | 0.500 | | | 85 | | 106 | | | 70 | 10/31/01 | 10/31 | SS-042 |
| BLK (QC ID=40118) | R108137-10 | | | 0.22 | 0.500 | | | 78 | | 104 | | | | 10/31/01 | 11/02 | SS-042 |
| LCS (QC ID=40117) | R108137-09 | | | 0.27 | 0.500 | | | 79 | | 104 | | | | 10/31/01 | 11/02 | SS-041 |
| Duplicate (R108137-01) (QC ID=40119) | R108137-11 | | | 0.17 | 0.500 | | | 95 | | 117 | | | 77 | 10/31/01 | 11/07 | SS-031 |
| Nominal values and limits from method | | | | 1.0 | 0.500 | | | 20-105 | | 100 | 100 | | 180 | | | |

| PROCEDURES | REFERENCE | PUISO_PLATE_AEA |
|---|---|---|
| | CP-060 | Soil Preparation, rev 3 |
| | CP-940 | Plutonium Separation and Purification, rev 3 |
| | CP-008 | Heavy Element Electroplating, rev 6 |

| AVERAGES ± 2 SD FOR 7 SAMPLES | | | | |
|---|---|---|---|---|
| | MDA | 0.22 | ± | 0.094 |
| | YIELD | 83 | ± | 18 |

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 11/10/01

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1476

Test TH Matrix SOLID
SDG 7066
Contact Melissa C. Mannion

## METHOD SUMMARY

THORIUM, ISOTOPIC IN SOIL
ALPHA SPECTROSCOPY

Client Hanford
Contract No. 630
Contract SDG H1476

## RESULTS

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | PLANCHET | Thorium 228 | Thorium 230 | Thorium 232 |
|---|---|---|---|---|---|---|---|
| Preparation batch 7008-047 | | | | | | | |
| B12MH4 | R108137-03 | | | 7066-003 | 0.540 | 0.685 J | 0.381 J |
| B12MH5 | R108137-01 | | | 7066-001 | U | U | U |
| B12MH6 | R108137-02 | | | 7066-002 | 0.687 | 0.414 J | 0.644 J |
| B12MH7 | R108137-04 | | | 7066-004 | 0.884 | 0.729 J | 0.265 J |
| BLK (QC ID=39819) | R108137-06 | | | 7066-006 | U | U | U |
| LCS (QC ID=39818) | R108137-05 | | | 7066-005 | | ok | |
| Duplicate (R108137-01) | R108137-07 | | | 7066-007 | - U | - U | ok J |
| Nominal values and limits from method 200-TW-1 & 2 - Soil Sampling | | | | RDLs (pCi/g) | | 1.0 | 1.0 |

## METHOD PERFORMANCE

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | MAX MDA pCi/g | ALIQ g | PREP FAC | DILU-TION | YIELD % | EFF % | COUNT min | FWHM keV | DRIFT KeV | DAYS HELD | PREPARED | ANAL-YZED | DETECTOR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preparation batch 7008-047 2σ prep error 5.0 % Reference Lab Notebook 7008 pg. 047 | | | | | | | | | | | | | | | | |
| B12MH4 | R108137-03 | | | 0.31 | 0.250 | | | 91 | | 204 | | | 56 | 10/08/01 | 10/18 | SS-042 |
| B12MH5 | R108137-01 | | | 0.38 | 0.250 | | | 76 | | 153 | | | 77 | 10/08/01 | 11/07 | SS-024 |
| B12MH6 | R108137-02 | | | 0.28 | 0.250 | | | 89 | | 2607 | | | 49 | 10/08/01 | 10/10 | SS-024 |
| B12MH7 | R108137-04 | | | 0.41 | 0.250 | | | 95 | | 156 | | | 69 | 10/08/01 | 10/30 | SS-032 |
| BLK (QC ID=39819) | R108137-06 | | | 0.49 | 0.250 | | | 94 | | 181 | | | | 10/08/01 | 10/18 | SS-019 |
| LCS (QC ID=39818) | R108137-05 | | | 0.31 | 0.250 | | | 82 | | 895 | | | | 10/08/01 | 10/16 | SS-024 |
| Duplicate (R108137-01) (QC ID=39820) | R108137-07 | | | 0.42 | 0.250 | | | 92 | | 181 | | | 57 | 10/08/01 | 10/18 | SS-021 |
| Nominal values and limits from method | | | | 1.0 | 0.250 | | | 20-105 | | 150 | | | 180 | | | |

| PROCEDURES | REFERENCE | THISO_IE_PLATE_AEA |
|---|---|---|
| | CP-070 | Soil Dissolution, < 1.0g Aliquot, rev 4 |
| | CP-905 | Thorium in Water and Dissolved Solid Sample Using TRU and AG 1x8 Resin, rev 1 |
| | CP-008 | Heavy Element Electroplating, rev 6 |

| AVERAGES ± 2 SD FOR 7 SAMPLES | | | | |
|---|---|---|---|---|
| | MDA | 0.37 | ± | 0.15 |
| | YIELD | 88 | ± | 14 |

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 11/10/01

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1476

Test U Matrix SOLID
SDG 7066
Contact Melissa C. Mannion

## METHOD SUMMARY

URANIUM, ISOTOPIC IN SOIL
ALPHA SPECTROSCOPY

Client Hanford
Contract No. 630
Contract SDG H1476

## RESULTS

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | PLANCHET | 1: Uranium 233 | 2: Uranium 235 | 3: Uranium 238 | RESULT RATIOS (%) 1÷3 | 2σ | 2÷3 | 2σ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Preparation batch 7008-047 | | | | | | | | | | | |
| B12MH4 | R108137-03 | | | 7066-003 | 0.463 J | 0.023 J | 0.463 J | 100 | 9 | 5 | 2 |
| B12MH5 | R108137-01 | | | 7066-001 | 0.474 J | 0.016 J | 0.464 J | 102 | 9 | 3 | 2 |
| B12MH6 | R108137-02 | | | 7066-002 | 0.467 J | 0.029 J | 0.458 J | 102 | 10 | 6 | 2 |
| B12MH7 | R108137-04 | | | 7066-004 | 0.470 J | 0.023 J | 0.465 J | 101 | 9 | 5 | 2 |
| BLK (QC ID=39819) | R108137-06 | | | 7066-006 | U | U | U | | | | |
| LCS (QC ID=39818) | R108137-05 | | | 7066-005 | ok | ok | ok | | | | |
| Duplicate (R108137-01) | R108137-07 | | | 7066-007 | ok J | ok J | ok J | 99 | 10 | 6 | 2 |
| Nominal values and limits from method | | | | RDLs (pCi/g) | 1.0 | 1.0 | 1.0 | 100 | | 4 | |
| 200-TW-1 & 2 - Soil Sampling | | | | | | | Averages | 101 | | 5 | |

## METHOD PERFORMANCE

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | MAX MDA pCi/g | ALIQ g | PREP FAC | DILU-TION | YIELD % | EFF % | COUNT min | FWHM keV | DRIFT KeV | DAYS HELD | PREPARED | ANAL-YZED | DETECTOR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preparation batch 7008-047 | 2σ prep error 5.0 % | | | Reference Lab Notebook 7008 pg. 047 | | | | | | | | | | | | |
| B12MH4 | R108137-03 | | | 0.015 | 0.500 | | | 92 | | 5464 | | | 42 | 10/04/01 | 10/04 | SS-046 |
| B12MH5 | R108137-01 | | | 0.013 | 0.500 | | | 92 | | 5465 | | | 43 | 10/04/01 | 10/04 | SS-043 |
| B12MH6 | R108137-02 | | | 0.016 | 0.500 | | | 88 | | 5465 | | | 43 | 10/04/01 | 10/04 | SS-044 |
| B12MH7 | R108137-04 | | | 0.012 | 0.500 | | | 98 | | 5463 | | | 43 | 10/04/01 | 10/04 | SS-047 |
| BLK (QC ID=39819) | R108137-06 | | | 0.016 | 0.500 | | | 89 | | 5464 | | | | 10/04/01 | 10/04 | SS-049 |
| LCS (QC ID=39818) | R108137-05 | | | 0.11 | 0.500 | | | 95 | | 5464 | | | | 10/04/01 | 10/04 | SS-048 |
| Duplicate (R108137-01) (QC ID=39820) | R108137-07 | | | 0.016 | 0.500 | | | 85 | | 5464 | | | 43 | 10/04/01 | 10/04 | SS-050 |
| Nominal values and limits from method | | | | 1.0 | 0.500 | | | 20-105 | | 100 | 100 | | 180 | | | |

| PROCEDURES | REFERENCE | UISO_PLATE_AEA |
|---|---|---|
| | CP-911 | Uranium in Water and Dissolved Sample by Extraction Chromatography, rev 3 |
| | CP-008 | Heavy Element Electroplating, rev 6 |

AVERAGES ± 2 SD FOR 7 SAMPLES
MDA 0.028 ± 0.072
YIELD 91 ± 9

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 11/10/01

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1476

Test SR Matrix SOLID
SDG 7066
Contact Melissa C. Mannion

## METHOD SUMMARY

TOTAL STRONTIUM IN SOIL
BETA COUNTING

Client Hanford
Contract No. 630
Contract SDG H1476

## RESULTS

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | PLANCHET | Total Strontium |
|---|---|---|---|---|---|
| *Preparation batch 7008-047* | | | | | |
| B12MH4 | R108137-03 | | | 7066-003 | 13.5 |
| B12MH5 | R108137-01 | | | 7066-001 | 0.689 J |
| B12MH6 | R108137-02 | | | 7066-002 | 2.66 |
| B12MH7 | R108137-04 | | | 7066-004 | 9.44 |
| BLK (QC ID=39819) | R108137-06 | | | 7066-006 | U |
| LCS (QC ID=39818) | R108137-05 | | | 7066-005 | ok |
| Duplicate (R108137-01) | R108137-07 | | | 7066-007 | ok J |
| *Nominal values and limits from method* 200-TW-1 & 2 - Soil Sampling | | | | RDLs (pCi/g) | 1.0 |

## METHOD PERFORMANCE

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | MDA pCi/g | ALIQ g | PREP FAC | DILU-TION | YIELD % | EFF % | COUNT min | FWHM keV | DRIFT KeV | DAYS HELD | PREPARED | ANAL-YZED | DETECTOR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Preparation batch 7008-047* *2σ prep error 10.0 % Reference Lab Notebook 7008 pg. 047* | | | | | | | | | | | | | | | | |
| B12MH4 | R108137-03 | | | 0.18 | 1.00 | | | 99 | | 100 | | | 42 | 10/04/01 | 10/04 | GRB-203 |
| B12MH5 | R108137-01 | | | 0.19 | 1.00 | | | 100 | | 100 | | | 43 | 10/04/01 | 10/04 | GRB-222 |
| B12MH6 | R108137-02 | | | 0.18 | 1.00 | | | 98 | | 100 | | | 43 | 10/04/01 | 10/04 | GRB-202 |
| B12MH7 | R108137-04 | | | 0.19 | 1.00 | | | 98 | | 100 | | | 43 | 10/04/01 | 10/04 | GRB-217 |
| BLK (QC ID=39819) | R108137-06 | | | 0.19 | 1.00 | | | 92 | | 100 | | | | 10/04/01 | 10/04 | GRB-218 |
| LCS (QC ID=39818) | R108137-05 | | | 0.22 | 1.00 | | | 91 | | 100 | | | | 10/04/01 | 10/04 | GRB-217 |
| Duplicate (R108137-01) (QC ID=39820) | R108137-07 | | | 0.18 | 1.00 | | | 97 | | 100 | | | 43 | 10/04/01 | 10/04 | GRB-231 |
| Nominal values and limits from method | | | | 1.0 | 1.00 | | | 30-105 | | 100 | | | 180 | | | |

| PROCEDURES | REFERENCE | SRTOT_SEP_PRECIP_GPC |
|---|---|---|
| | CP-502 | Strontium in Solids, rev 4 |
| | CP-519 | Strontium Planchet Demounting and Preparation for 90Y Decontamination, rev 3 |

| AVERAGES ± 2 SD FOR 7 SAMPLES | | | | |
|---|---|---|---|---|
| | MDA | 0.19 | ± | 0.028 |
| | YIELD | 96 | ± | 7 |

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 11/10/01

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1476

Test IC Matrix SOLID
SDG 7066
Contact Melissa C. Mannion

## METHOD SUMMARY

TECHNETIUM 99 IN SOIL
BETA COUNTING

Client Hanford
Contract No. 630
Contract SDG H1476

## RESULTS

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | PLANCHET | Technetium 99 | |
|---|---|---|---|---|---|---|
| Preparation batch 7008-047 | | | | | | |
| B12MH4 | R108137-03 | | | 7066-003 | U | |
| B12MH5 | R108137-01 | | | 7066-001 | U | |
| B12MH6 | R108137-02 | | | 7066-002 | U | |
| B12MH7 | R108137-04 | | | 7066-004 | U | |
| BLK (QC ID=39819) | R108137-06 | | | 7066-006 | U | |
| LCS (QC ID=39818) | R108137-05 | | | 7066-005 | ok | |
| Duplicate (R108137-01) | R108137-07 | | | 7066-007 | - | U |
| Nominal values and limits from method | | | | RDLs (pCi/g) | 15 | |
| 200-TW-1 & 2 - Soil Sampling | | | | | | |

## METHOD PERFORMANCE

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | MDA pCi/g | ALIQ g | PREP FAC | DILU-TION | YIELD % | EFF % | COUNT min | FWHM keV | DRIFT KeV | DAYS HELD | PREPARED | ANAL-YZED | DETECTOR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preparation batch 7008-047 | 2σ prep error 10.0 % Reference Lab Notebook 7008 pg. 047 | | | | | | | | | | | | | | | |
| B12MH4 | R108137-03 | | | 0.59 | 1.01 | | | 89 | | 50 | | | 47 | 10/06/01 | 10/09 | GRB-202 |
| B12MH5 | R108137-01 | | | 0.54 | 1.08 | | | 92 | | 50 | | | 48 | 10/06/01 | 10/09 | GRB-232 |
| B12MH6 | R108137-02 | | | 0.59 | 1.00 | | | 89 | | 50 | | | 55 | 10/06/01 | 10/16 | GRB-230 |
| B12MH7 | R108137-04 | | | 0.57 | 1.00 | | | 93 | | 50 | | | 48 | 10/06/01 | 10/09 | GRB-203 |
| BLK (QC ID=39819) | R108137-06 | | | 0.41 | 1.00 | | | 100 | | 78 | | | | 10/06/01 | 10/09 | GRB-205 |
| LCS (QC ID=39818) | R108137-05 | | | 0.52 | 1.00 | | | 96 | | 50 | | | | 10/06/01 | 10/16 | GRB-224 |
| Duplicate (R108137-01) (QC ID=39820) | R108137-07 | | | 0.46 | 1.08 | | | 88 | | 78 | | | 48 | 10/06/01 | 10/09 | GRB-206 |
| Nominal values and limits from method | | | | 15 | 1.00 | | | 20-105 | | 50 | | | 180 | | | |



Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 11/10/01

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1476

| | |
|---|---|
| Test | TC |
| Matrix | SOLID |
| SDG | 7066 |
| Contact | Melissa C. Mannion |

## METHOD SUMMARY, cont.

TECHNETIUM 99 IN SOIL

BETA COUNTING

| | |
|---|---|
| Client | Hanford |
| Contract | No. 630 |
| Contract | SDG H1476 |

| PROCEDURES | REFERENCE | TC99_TR_SEP_LSC |
|---|---|---|
| | CP-060 | Soil Preparation, rev 3 |
| | CP-021 | Preparation of Tc-99m Tracer, rev 1 |
| | CP-002 | Q.C. Preparation, rev 3 |
| | CP-003 | Tracing, rev 3 |
| | CP-542 | Technetium-99 Purification (Soil) by Extraction Chromatography, rev 1 |
| | CP-008 | Heavy Element Electroplating, rev 6 |

| AVERAGES ± 2 SD FOR 7 SAMPLES | | | | |
|---|---|---|---|---|
| | MDA | 0.53 | ± | 0.14 |
| | YIELD | 92 | ± | 9 |

| | |
|---|---|
| Lab id | TMANC |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-CMS |
| Version | 3.06 |
| Report date | 11/10/01 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1476

Test GAM Matrix SOLID
SDG 7066
Contact Melissa C. Mannion

## METHOD SUMMARY

GAMMA SCAN

GAMMA SPECTROSCOPY

Client Hanford
Contract No. 630
Contract SDG H1476

## RESULTS

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | PLANCHET | Cobalt 60 | Cesium 137 |
|---|---|---|---|---|---|---|
| Preparation batch 7008-047 | | | | | | |
| B12MH4 | R108137-03 | | | 7066-003 | U | 4.54 |
| B12MH5 | R108137-01 | | | 7066-001 | U | 6.67 |
| B12MH6 | R108137-02 | | | 7066-002 | U | 42.5 |
| B12MH7 | R108137-04 | | | 7066-004 | U | 1.52 |
| BLK (QC ID=39819) | R108137-06 | | | 7066-006 | U | U |
| LCS (QC ID=39818) | R108137-05 | | | 7066-005 | ok | ok |
| Duplicate (R108137-01) | R108137-07 | | | 7066-007 | - U | ok |
| Nominal values and limits from method 200-TW-1 & 2 - Soil Sampling | | | | RDLs (pCi/g) | 0.050 | 0.10 |

## METHOD PERFORMANCE

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | MAX MDA pCi/g | ALIQ g | PREP FAC | DILU-TION | YIELD % | EFF % | COUNT min | FWHM keV | DRIFT KeV | DAYS HELD | PREPARED | ANAL-YZED | DETECTOR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preparation batch 7008-047 2σ prep error 15.0 % Reference Lab Notebook 7008 pg. 047 | | | | | | | | | | | | | | | | |
| B12MH4 | R108137-03 | | | 0.12 | 720 | | | | | 203 | | | 76 | 09/26/01 | 11/07 | 02,01,00 |
| B12MH5 | R108137-01 | | | 0.11 | 186 | | | | | 431 | | | 75 | 09/26/01 | 11/05 | JR,05,00 |
| B12MH6 | R108137-02 | | | 0.057 | 771 | | | | | 424 | | | 68 | 09/26/01 | 10/29 | MB,05,00 |
| B12MH7 | R108137-04 | | | 0.014 | 703 | | | | | 1117 | | | 69 | 09/26/01 | 10/30 | 02,04,00 |
| BLK (QC ID=39819) | R108137-06 | | | 0.056 | 186 | | | | | 696 | | | | 09/26/01 | 10/31 | 01,03,00 |
| LCS (QC ID=39818) | R108137-05 | | | 0.026 | 186 | | | | | 1117 | | | | 09/26/01 | 10/30 | MB,05,00 |
| Duplicate (R108137-01) (QC ID=39820) | R108137-07 | | | 0.10 | 186 | | | | | 929 | | | 75 | 09/26/01 | 11/05 | JR,03,00 |
| Nominal values and limits from method | | | | 0.050 | 186 | | | | | 100 | | | 180 | | | |

| PROCEDURES | REFERENCE | GAMMA_GS |
|---|---|---|
| | CP-060 | Soil Preparation, rev 3 |
| | CP-100 | Ge(Li) Preparation for Commercial Samples, rev 3 |

AVERAGES ± 2 SD FOR 7 SAMPLES
MDA 0.069 ± 0.083
YIELD ____ ± ____

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 11/10/01

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1476

Test U T Matrix SOLID
SDG 7066
Contact Melissa C. Mannion

## METHOD SUMMARY

*URANIUM, TOTAL IN SOIL*
KINETIC PHOSPHORIMETRY

Client Hanford
Contract No. 630
Contract SDG H1476

## RESULTS

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | PLANCHET | Total Uranium (ug/g) |
|---|---|---|---|---|---|
| Preparation batch 7008-047 | | | | | |
| B12MH4 | R108137-03 | | | 7066-003 | 0.964 |
| B12MH5 | R108137-01 | | | 7066-001 | 0.930 |
| B12MH6 | R108137-02 | | | 7066-002 | 0.995 |
| B12MH7 | R108137-04 | | | 7066-004 | 0.939 |
| BLK (QC ID=39819) | R108137-06 | | | 7066-006 | U |
| LCS (QC ID=39818) | R108137-05 | | | 7066-005 | ok |
| Duplicate (R108137-01) | R108137-07 | | | 7066-007 | ok |
| Nominal values and limits from method 200-TW-1 & 2 - Soil Sampling | | | | RDLs (ug/g) | 0.10 |

## METHOD PERFORMANCE

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | MDA ug/g | ALIQ g | PREP FAC | DILU-TION | YIELD % | EFF % | COUNT min | FWHM keV | DRIFT KeV | DAYS HELD | PREPARED | ANAL-YZED | DETECTOR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preparation batch 7008-047 | 2σ prep error 9.0 % | | | | Reference Lab Notebook 7008 pg. 047 | | | | | | | | | | | |
| B12MH4 | R108137-03 | | | 0.003 | 0.100 | | | | | | | | 47 | 10/09/01 | 10/09 | KPA-001 |
| B12MH5 | R108137-01 | | | 0.003 | 0.100 | | | | | | | | 48 | 10/09/01 | 10/09 | KPA-001 |
| B12MH6 | R108137-02 | | | 0.003 | 0.100 | | | | | | | | 48 | 10/09/01 | 10/09 | KPA-001 |
| B12MH7 | R108137-04 | | | 0.003 | 0.100 | | | | | | | | 48 | 10/09/01 | 10/09 | KPA-001 |
| BLK (QC ID=39819) | R108137-06 | | | 0.003 | 0.100 | | | | | | | | | 10/09/01 | 10/09 | KPA-001 |
| LCS (QC ID=39818) | R108137-05 | | | 0.030 | 0.100 | | | | | | | | | 10/09/01 | 10/09 | KPA-001 |
| Duplicate (R108137-01) (QC ID=39820) | R108137-07 | | | 0.003 | 0.100 | | | | | | | | 48 | 10/09/01 | 10/09 | KPA-001 |
| Nominal values and limits from method | | | | 0.10 | 0.100 | | | | | | | | 180 | | | |

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 11/10/01

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1476

| | |
|---|---|
| Test U T | Matrix SOLID |
| SDG 7066 | |
| Contact Melissa C. Mannion | |

## METHOD SUMMARY, cont.

URANIUM, TOTAL IN SOIL

*KINETIC PHOSPHORIMETRY*

| | |
|---|---|
| Client Hanford | |
| Contract No. 630 | |
| Contract SDG H1476 | |

| PROCEDURES | REFERENCE | UTOT_KPA |
|---|---|---|
| | CP-060 | Soil Preparation, rev 3 |
| | CP-070 | Soil Dissolution, < 1.0g Aliquot, rev 4 |
| | CP-044 | Sample Preparation for Total Uranium by Kinetic Phosphorimetry, rev 3 |
| | CP-928 | Total Uranium by Kinetic Phosphorimetry, rev 3 |

| | | |
|---|---|---|
| AVERAGES ± 2 SD | MDA | 0.007 ± 0.020 |
| FOR 7 SAMPLES | YIELD | ± |



| | |
|---|---|
| Lab id | TMANC |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-CMS |
| Version | 3.06 |
| Report date | 11/10/01 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1476

Test C Matrix SOLID
SDG 7066
Contact Melissa C. Mannion

## METHOD SUMMARY

CARBON 14 IN SOIL
LIQUID SCINTILLATION COUNTING

Client Hanford
Contract No. 630
Contract SDG H1476

## RESULTS

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | PLANCHET | Carbon 14 | |
|---|---|---|---|---|---|---|
| Preparation batch 7008-047 | | | | | | |
| B12MH4 | R108137-03 | | | 7066-003 | U | |
| B12MH5 | R108137-01 | | | 7066-001 | U | |
| B12MH6 | R108137-02 | | | 7066-002 | 6.30 | J |
| B12MH7 | R108137-04 | | | 7066-004 | U | |
| BLK (QC ID=39819) | R108137-06 | | | 7066-006 | U | |
| LCS (QC ID=39818) | R108137-05 | | | 7066-005 | LOW | |
| Duplicate (R108137-01) | R108137-07 | | | 7066-007 | - | U |

Nominal values and limits from method RDLs (pCi/g) 50
200-TW-1 & 2 - Soil Sampling

## METHOD PERFORMANCE

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | MDA pCi/g | ALIQ g | PREP FAC | DILU-TION | YIELD % | EFF % | COUNT min | FWHM keV | DRIFT KeV | DAYS HELD | PREPARED | ANAL-YZED | DETECTOR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preparation batch 7008-047 | 2σ prep error 10.0 % Reference Lab Notebook 7008 pg. 047 | | | | | | | | | | | | | | | |
| B12MH4 | R108137-03 | | | 3.9 | 0.203 | | | 100 | | 100 | | | 53 | 10/11/01 | 10/15 | LSC-007 |
| B12MH5 | R108137-01 | | | 3.8 | 0.207 | | | 100 | | 100 | | | 53 | 10/11/01 | 10/14 | LSC-007 |
| B12MH6 | R108137-02 | | | 4.1 | 0.236 | | | 100 | | 100 | | | 53 | 10/11/01 | 10/14 | LSC-007 |
| B12MH7 | R108137-04 | | | 3.8 | 0.207 | | | 100 | | 100 | | | 54 | 10/11/01 | 10/15 | LSC-007 |
| BLK (QC ID=39819) | R108137-06 | | | 3.9 | 0.200 | | | 100 | | 100 | | | | 10/11/01 | 10/14 | LSC-007 |
| LCS (QC ID=39818) | R108137-05 | | | 11 | 0.200 | | | 100 | | 15 | | | | 10/11/01 | 10/15 | LSC-007 |
| Duplicate (R108137-01) (QC ID=39820) | R108137-07 | | | 3.7 | 0.214 | | | 100 | | 100 | | | 53 | 10/11/01 | 10/14 | LSC-007 |
| Nominal values and limits from method | | | | 50 | 0.200 | | | | | 50 | | | 180 | | | |

| PROCEDURES | REFERENCE | C14_COX_LSC |
|---|---|---|
| | CP-060 | Soil Preparation, rev 3 |
| | CP-251 | Tritium/Carbon-14 Oxidation, rev 3 |

AVERAGES ± 2 SD FOR 7 SAMPLES
MDA 4.9 ± 5.4
YIELD 100 ± 0

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 11/10/01

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1476

Test H Matrix SOLID
SDG 7066
Contact Melissa C. Mannion

## METHOD SUMMARY

TRITIUM IN SOIL
LIQUID SCINTILLATION COUNTING

Client Hanford
Contract No. 630
Contract SDG H1476

## RESULTS

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | PLANCHET | Tritium | |
|---|---|---|---|---|---|---|
| Preparation batch 7008-047 | | | | | | |
| B12MH4 | R108137-03 | | | 7066-003 | U | |
| B12MH5 | R108137-01 | | | 7066-001 | U | |
| B12MH6 | R108137-02 | | | 7066-002 | U | |
| B12MH7 | R108137-04 | | | 7066-004 | U | |
| BLK (QC ID=39819) | R108137-06 | | | 7066-006 | U | |
| LCS (QC ID=39818) | R108137-05 | | | 7066-005 | ok | J |
| Duplicate (R108137-01) | R108137-07 | | | 7066-007 | - | U |
| Spike (R108137-01) | R108137-08 | | | 7066-008 | LOW | JX |

Nominal values and limits from method RDLs (pCi/g) 400
200-TW-1 & 2 - Soil Sampling

## METHOD PERFORMANCE

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | MDA pCi/g | ALIQ g | PREP FAC | DILU-TION | YIELD % | EFF % | COUNT min | FWHM keV | DRIFT KeV | DAYS HELD | PREPARED | ANAL-YZED | DETECTOR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preparation batch 7008-047 | 2σ prep error 10.0 % Reference Lab Notebook 7008 pg. 047 | | | | | | | | | | | | | | | |
| B12MH4 | R108137-03 | | | 0.092 | 21.1 | | | 100 | | 100 | | | 65 | 10/10/01 | 10/27 | LSC-005 |
| B12MH5 | R108137-01 | | | 0.095 | 20.4 | | | 100 | | 100 | | | 66 | 10/10/01 | 10/27 | LSC-005 |
| B12MH6 | R108137-02 | | | 0.093 | 21.0 | | | 99 | | 100 | | | 66 | 10/10/01 | 10/27 | LSC-005 |
| B12MH7 | R108137-04 | | | 0.095 | 20.6 | | | 96 | | 100 | | | 66 | 10/10/01 | 10/27 | LSC-005 |
| BLK (QC ID=39819) | R108137-06 | | | 0.29 | 20.0 | | | 33 | | 100 | | | | 10/10/01 | 10/27 | LSC-005 |
| LCS (QC ID=39818) | R108137-05 | | | 0.28 | 20.0 | | | 33 | | 100 | | | | 10/10/01 | 10/27 | LSC-005 |
| Duplicate (R108137-01) (QC ID=39820) | R108137-07 | | | 0.091 | 21.0 | | | 100 | | 100 | | | 66 | 10/10/01 | 10/27 | LSC-005 |
| Spike (R108137-01) (QC ID=39821) | R108137-08 | | | 0.090 | 21.3 | | | 100 | | 100 | | | 66 | 10/10/01 | 10/27 | LSC-005 |
| Nominal values and limits from method | | | | 400 | 20.0 | | | | | 25 | | | 180 | | | |

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 11/10/01

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1476

| | |
|---|---|
| Test H | Matrix SOLID |
| SDG 7066 | |
| Contact Melissa C. Mannion | |

## METHOD SUMMARY, cont.

TRITIUM IN SOIL

LIQUID SCINTILLATION COUNTING

| | |
|---|---|
| Client Hanford | |
| Contract No. 630 | |
| Contract SDG H1476 | |

| | | |
|---|---|---|
| PROCEDURES | REFERENCE | 906.0_H3_LSC |
| | CP-060 | Soil Preparation, rev 3 |
| | CP-216 | Tritium in Solid Samples by Azeotropic Distillation, rev 4 |

| | | | | |
|---|---|---|---|---|
| AVERAGES ± 2 SD | MDA | 0.14 | ± | 0.18 |
| FOR 8 SAMPLES | YIELD | 83 | ± | 61 |

| | |
|---|---|
| Lab id | TMANC |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-CMS |
| Version | 3.06 |
| Report date | 11/10/01 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1476

Test NI L Matrix SOLID
SDG 7066
Contact Melissa C. Mannion

## METHOD SUMMARY

NICKEL 63 IN SOIL
LIQUID SCINTILLATION COUNTING

Client Hanford
Contract No. 630
Contract SDG H1476

## RESULTS

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | PLANCHET | Nickel 63 | |
|---|---|---|---|---|---|---|
| Preparation batch 7008-047 | | | | | | |
| B12MH4 | R108137-03 | | | 7066-003 | U | |
| B12MH5 | R108137-01 | | | 7066-001 | U | |
| B12MH6 | R108137-02 | | | 7066-002 | U | |
| B12MH7 | R108137-04 | | | 7066-004 | U | |
| BLK (QC ID=39819) | R108137-06 | | | 7066-006 | U | |
| LCS (QC ID=39818) | R108137-05 | | | 7066-005 | ok | |
| Duplicate (R108137-01) | R108137-07 | | | 7066-007 | - | U |
| Nominal values and limits from method 200-TW-1 & 2 - Soil Sampling | | | | RDLs (pCi/g) | 30 | |

## METHOD PERFORMANCE

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | MDA pCi/g | ALIQ g | PREP FAC | DILU-TION | YIELD % | EFF % | COUNT min | FWHM keV | DRIFT KeV | DAYS HELD | PREPARED | ANAL-YZED | DETECTOR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preparation batch 7008-047 2σ prep error 10.0 % Reference Lab Notebook 7008 pg. 047 | | | | | | | | | | | | | | | | |
| B12MH4 | R108137-03 | | | 2.2 | 0.500 | | | 85 | | 100 | | | 44 | 10/03/01 | 10/06 | LSC-007 |
| B12MH5 | R108137-01 | | | 2.1 | 0.500 | | | 86 | | 100 | | | 45 | 10/03/01 | 10/06 | LSC-007 |
| B12MH6 | R108137-02 | | | 2.2 | 0.500 | | | 85 | | 100 | | | 45 | 10/03/01 | 10/06 | LSC-007 |
| B12MH7 | R108137-04 | | | 2.2 | 0.500 | | | 83 | | 100 | | | 45 | 10/03/01 | 10/06 | LSC-007 |
| BLK (QC ID=39819) | R108137-06 | | | 2.0 | 0.500 | | | 94 | | 100 | | | | 10/03/01 | 10/07 | LSC-007 |
| LCS (QC ID=39818) | R108137-05 | | | 2.0 | 0.500 | | | 91 | | 100 | | | | 10/03/01 | 10/07 | LSC-007 |
| Duplicate (R108137-01) (QC ID=39820) | R108137-07 | | | 2.2 | 0.500 | | | 84 | | 100 | | | 46 | 10/03/01 | 10/07 | LSC-007 |
| Nominal values and limits from method | | | | 30 | 0.500 | | | 30-105 | | 50 | | | 180 | | | |

| PROCEDURES | REFERENCE | NI63_LSC |
|---|---|---|
| | CP-060 | Soil Preparation, rev 3 |
| | CP-431 | Nickel-63 Purification, rev 4 |

AVERAGES ± 2 SD FOR 7 SAMPLES
MDA 2.1 ± 0.19
YIELD 87 ± 8

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 11/10/01

| Bechtel Hanford Inc. | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | | B01-058-225 | Page 1 of 1 |
|---|---|---|---|---|
| Collector: Thomas G./Watson D. | Company Contact: Todd, M.E. | Telephone No.: (509) 372-9631 | Project Coordinator: TRENT, SJ | Price Code: 8N |
| Project Designation: 200-TW-1 & 2 - Soil Sampling | Sampling Location: B-7A/200 E H1476 (7066) | | SAF No.: B01-058 | Air Quality ☐ |
| Ice Chest No.: ERC00.005 | Field Logbook No.: EL-1518-1 | COA B20TW2A44C ~~B20TW2674C~~ BT | Method of Shipment: Fed EX | Data Turnaround: 45 Days |
| Shipped To: TMA/~~REGRA~~ DJW 08/15/01 | Offsite Property No.: A010348 8/22/01 | | Bill of Lading/Air Bill No.: 4235795 4-6759 | |

POSSIBLE SAMPLE HAZARDS/REMARKS
500 COUNTS A/B on SOIL
NO DOSE MEASURED ON BOTTLES

Samples stored in Ref.# IB at the 3728 Shipping Facility on 8 22 01.
Collector not available to relinquish samples on 8 24 01 for shipment.. RT 8/24/01

SAMPLE ANALYSIS

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | None | | | | |
| Type of Container | aG | aG | aG | aG | aG | aG | aG | | | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | |
| Volume | 60mL | 500mL | 120mL | 1000mL | 120mL | 500mL | 1000mL ✓ | | | | |
| | Chromium Hex - 7196 | See item (1) in Special Instructions. | Mercury - 7470 - (CV) | See item (2) in Special Instructions. | VOA - 8260A (TCL) | See item (3) in Special Instructions. | See item (4) in Special Instructions. | | | | |
| | DJW 08/15/01 | | | | | | | | | | |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | |
| ✓ B12MH5 | SOIL | 08/22/01 | 0425 | | | | X | | | HETO | B12MJ4 |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

| CHAIN OF POSSESSION | Date/Time | Sign/Print Names: Received By/Stored In | Date/Time |
|---|---|---|---|
| Relinquished By/Removed From: DJWATSON/RWT | 08/22/01 0730 | REF IB | 08/22/01 0730 |
| Relinquished By/Removed From: Ref IB 3728 | 8.24.01 0900 | R Y Thorson | 8.24.01 0900 |
| Relinquished By/Removed From: R Y Thorson | 8.24.01 0900 | FED EX | |
| Relinquished By/Removed From: Fed Ex 8-25-01 | | D Lind J Lind | 8-27-01 800 |
| 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

(1) ~~ICP Metals - 6010A (TAL) {Cadmium, Chromium, Copper, Nickel, Silver}; ICP Metals - 6010A (Add-on) {Lead}~~
~~(2) IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; Ammonia - 350.3; NO2/NO3 - 353.1; Total Cyanide - 9010; TOC - 9060; pH (Soil) - 9045~~
(3) ~~Semi-VOA - 8270A (Add-On) {Tributyl phosphate}; TPH Diesel Range - WTPH-D~~
(4) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Radium-226, Radium-228}; Isotopic Plutonium; Isotopic Thorium {Thorium-232}; Americium-241; Carbon-14; Neptunium-237; Nickel-63; Strontium-89,90 -- Total Sr; Technetium-99; Total Uranium; Tritium - H3; Isotopic Uranium

DJW 08/15/01

Matrix *
S=Soil
SD=Sediment
SO=Solid
SL=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solid
DL=Drum Liqui
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 (10/99)

| Bechtel Hanford Inc. | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | B01-058-226 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: Thomas G./Watson D. | Company Contact: Todd, M.E. | Telephone No.: (509) 372-9631 | Project Coordinator: TRENT, SJ |
| Price Code: 8N | Data Turnaround: 45 Days | Air Quality ☐ | |
| Project Designation: 200-TW-1 & 2 - Soil Sampling | Sampling Location: B-7A/200 E H1476 (7066) | SAF No.: B01-058 | |
| Ice Chest No.: EPC 06.005 | Field Logbook No.: EL-1518-1 | COA B20TW2A4HC ~~B20TW2674C~~ BT | Method of Shipment: Fed EX |
| Shipped To: TMA/~~RECRA~~ DSW 08/15/01 | Offsite Property No.: A010348 8/22/01 | Bill of Lading/Air Bill No.: 4235 7954 - 6759 | |

POSSIBLE SAMPLE HAZARDS/REMARKS
650 COUNTS B/G ON SOIL
NO DOSE MEASURED ON BOTTLES

Samples stored in Ref.# 1B at the 3728 Shipping Facility on 8/22/01.
Collector not available to relinquish samples on 8/24/01 for shipment..
ZT 8/24/01 24 8.24.01

SAMPLE ANALYSIS

| Preservation | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | None | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Type of Container | aG | aG | aG | aG | aG | aG | aG | | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | |
| Volume | 60mL | 500mL | 120mL | 1000mL | 120mL | 500mL | 1000mL ✓ | | | |
| | Chromium Hex - 7196 | See item (1) in Special Instructions. | Mercury - 7470 - (CV) | See item (2) in Special Instructions. | VOA - 8260A (TCL) | See item (3) in Special Instructions. | See item (4) in Special Instructions. | | | |
| | DSW 08/15/01 | | | | | | | | | |

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B12MH6 | SOIL | 8-22-01 | 0530 | | | | | | | X | TIETO | 812MJ5 |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

| CHAIN OF POSSESSION | Date/Time | Sign/Print Names: Received By/Stored In | Date/Time |
|---|---|---|---|
| Relinquished By/Removed From: D Watson D Watson | 8/22/01 0730 | REF.IB | 08/22/01 0730 |
| Relinquished By/Removed From: R of IB 3728 | 8.24.01 0900 | R Thorne | 8.24.01 0900 |
| Relinquished By/Removed From: R R Thorne | 8.24.01 0900 | FEDEX | |
| Relinquished By/Removed From: Fed EX | 8-25-01 | J Lind JLind | 8-27-01 800 |
| Relinquished By/Removed From | | Received By/Stored In | |
| Relinquished By/Removed From | | Received By/Stored In | |

SPECIAL INSTRUCTIONS

(1) ~~ICP Metals - 6010A (FAL) {Cadmium, Chromium, Copper, Nickel, Silver}; ICP Metals - 6010A (Add-on) {Lead}~~
(2) ~~IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; Ammonia - 350.3; NO2/NO3 - 353.1; Total Cyanide - 9010; TOC - 9060; pH (Soil) - 9045~~
(3) ~~Semi-VOA - 8270A (Add On) {Tributyl phosphate}; TPH-Diesel Range - WTPH-D~~
(4) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Radium-226, Radium-228}; Isotopic Plutonium; Isotopic Thorium {Thorium-232}; Americium-241; Carbon-14; Neptunium-237; Nickel-63; Strontium-89,90 -- Total Sr; Technetium-99; Total Uranium; Tritium - H3; Isotopic Uranium

~~Analysis~~ Deleted

Matrix *
S=Soil
SD=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 (10/99)

| Bechtel Hanford Inc. | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | | B01-058-224 | Page 1 of 1 |
|---|---|---|---|---|
| Collector: Thomas G./Watson D. | Company Contact: Todd, M.E. | Telephone No.: (509) 372-9631 | Project Coordinator: TRENT, SJ | Price Code: 8N |
| Project Designation: 200-TW-1 & 2 - Soil Sampling | Sampling Location: B-7A/200 E H1476 (7066) | | SAF No.: B01-058 | Air Quality ☐ |
| Ice Chest No.: multiple SEE OSPC | Field Logbook No.: EL-1518-1 | COA B20TW2 A44C ~~B20TW2674C~~ BT | Method of Shipment: Fed EX | Data Turnaround: 45 Days |
| Shipped To: TMA/~~HBORA~~ DSW 08/15/01 | Offsite Property No.: A010285 8/23/01 | | Bill of Lading/Air Bill No.: 42357454 - Multiple See OSPC | |

POSSIBLE SAMPLE HAZARDS/REMARKS

FIELD RADIOLOGICAL INSTRUMENTS READ BACKGROUND.

Samples stored in Ref.# 1B at the 3728 Shipping Facility on 8 23 01.
Collector not available to relenquish samples on 8 27 01 for shipment.

RT 8.27.01

| SAMPLE ANALYSIS | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | | | | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | None | | |
| Type of Container | | | | sG | sG | sG | sG | sG | sG | sG | | |
| No. of Container(s) | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Volume | | | | 60mL | 500mL | 120mL | 1000mL | 120mL | 500mL | 1000mL | | |
| | | | | Chromium Hex - 7196 DSW 08/15/01 | See item (1) in Special Instructions. | Mercury - 7470 - (CV) | See item (2) in Special Instructions. | VOA - 8260A (TCL) | See item (3) in Special Instructions. | See item (4) in Special Instructions. | | |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | Tie to |
| B12MH4 | SOIL | 8-23-01 | 0045 | | | | | | | X | | B12MJ7 |

| CHAIN OF POSSESSION | | Sign/Print Names | |
|---|---|---|---|
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| DSWATSON/DSW | 08/23/01 0915 | REF. 1B | 08/23/01 0915 |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| R.H. 1B 3728 | 8.27.01 0900 | R.H. Thorne | 8.27.01 0900 |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| R.H. Thorne | 8.27.01 0900 | Fed Ex | 8-27-01 |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Fed Ex | 8-28-01 10:00 | JR Cooper | 8-28-01 10:00 |
| 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

(1) ~~ICP Metals - 6010A (TAL) (Cadmium, Chromium, Copper, Nickel, Silver); ICP Metals - 6010A (Addon) (Lead)~~
(2) ~~TC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Ammonia - 350.3; NO2/NO3 - 353.1; Total Cyanide - 9010; TOC - 9060; pH (Soil) - 9045~~
(3) ~~Semi-VOA - 8270A (Add-On) (Tributyl phosphate); TPH-Diesel Range - WTPH-D~~
(4) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Radium-226, Radium-228}; Isotopic Plutonium; Isotopic Thorium {Thorium-232}; Americium-241; Carbon-14; Neptunium-237; Nickel-63; Strontium-89,90 -- Total Sr; Technetium-99; Total Uranium; Tritium - H3; Isotopic Uranium

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

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

BHI-EE-011 (10/99)

| Bechtel Hanford Inc. | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | B01-058-227 | Page 1 of 1 |
|---|---|---|---|
| Collector: Thomas G./Watson D. | Company Contact: Todd, M.E. — Telephone No.: (509) 372-9631 | Project Coordinator: TRENT, SJ | Price Code: 8N — Data Turnaround: 45 Days |
| Project Designation: 200-TW-1 & 2 - Soil Sampling | Sampling Location: B-7A/200 E — H1476 (7066) | SAF No.: B01-058 | Air Quality ☐ |
| Ice Chest No.: Multiple SEE OSPC | Field Logbook No.: EL-1518-1 — COA: B20TW2A44C ~~B20TW2674C~~ BT | Method of Shipment: Fed EX | |
| Shipped To: TMA/RECRA DSW 08/15/01 | Offsite Property No.: A010285 8/23/01 | Bill of Lading/Air Bill No.: 42357454 — Multiple See OSPC | |

POSSIBLE SAMPLE HAZARDS/REMARKS

FIELD RADIOLOGICAL INSTRUMENTS READ BACKGROUND

Samples stored in Ref.# 1B at the 3728 Shipping Facility on 8/23/01. Collector not available to relenquish samples on 8/27/01 for shipment. RT 8.27.01

SAMPLE ANALYSIS

| Preservation | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | None | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Type of Container | aG | aG | aG | aG | aG | aG | aG | | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | |
| Volume | 60mL | 500mL | 120mL | 1000mL | 120mL | 500mL | 1000mL | | | |
| | Chromium Hex - 7196 DSW 08/15/01 | See item (1) in Special Instructions. | Mercury - 7470 - (CV) | See item (2) in Special Instructions. | VOA - 8260A (TCL) | See item (3) in Special Instructions. | See item (4) in Special Instructions. | | | |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | Tie to |
| ✓ B12MH7 | SOIL | 08/22/01 | 2350 | | | | | | X | B12MJ6 |

| CHAIN OF POSSESSION | Date/Time | Sign/Print Names: Received By/Stored In | Date/Time |
|---|---|---|---|
| Relinquished By/Removed From: D Watson/Bwat | 8/23/01 0915 | Received By/Stored In: REF. 1B | 08/23/01 0915 |
| Relinquished By/Removed From: Ref 1B 3728 | 8.27.01 0900 | Received By/Stored In: B.T. Thore | 0900 8.27.01 |
| Relinquished By/Removed From: B.T. Thore | 8.27.01 0900 | Received By/Stored In: FEDEX | 8-27-01 |
| Relinquished By/Removed From: FedEx | 8-28-01 10:00 | Received By/Stored In: J R Cover | 8-28-01 10:00 |
| 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

(1) ICP Metals - 6010A (TAL) {~~Cadmium, Chromium, Copper, Nickel, Silver~~}, ICP Metals - 6010A ~~(Add-on) {Lead}~~
(2) IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; ~~Ammonia - 350.3, NO2/NO3 - 353.1; Total Cyanide - 9010; TOC - 9060; pH (Soil) - 9045~~
~~(3) Semi-VOA - 8270A (Add-On) {Tributyl phosphate}; TPH-Diesel Range - WTPH-D~~
(4) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Radium-226, Radium-228}; Isotopic Plutonium; Isotopic Thorium {Thorium-232}; Americium-241; Carbon-14; Neptunium-237; Nickel-63; Strontium-89,90 -- Total Sr; Technetium-99; Total Uranium; Tritium - H3; Isotopic Uranium

DSW 8/15/01

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

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

BHI-EE-011 (10/99)

## SAMPLE RECEIPT CHECKLIST

### SAMPLE RECEIPT

Client: Bechtel Hanford Date/Time received 8-28-01 10:00

CoC No. B01-058-224, B01-058-227

Container I.D. No. _____ Requested TAT (Days) 45 P.O. Received Yes [ ] No [✓]

### INSPECTION

1. Custody seals on shipping container intact? Yes [✓] No [ ] N/A [ ]
2. Custody seals on shipping container dated & signed? Yes [✓] No [ ] N/A [ ]
3. Custody seals on sample containers intact? Yes [✓] No [ ] N/A [ ]
4. Custody seals on sample containers dated & signed? Yes [✓] No [ ] N/A [ ]
5. Cooler Temperature: _____ Packing material is: Wet [ ] Dry [✓]
6. Number of samples in shipping container: 2
7. Number of containers per sample: 1 (Or see CoC _____ )
8. Paperwork agrees with samples? Yes [✓] No [ ]
9. Samples have: Tape [✓] Hazard labels [ ] Rad labels [✓] Appropriate sample labels [✓]
10. Samples are: In good condition [✓] Leaking [ ] Broken Container [ ] Missing [ ]
11. Describe any anomalies: _____
13. Was P.M. notified of any anomalies? Yes [✓] No [ ] Date 8-28-01
14. Received by [signature] Date: 8-28-01 Time: 10:00

| Customer Sample No. | cpm | mr/hr | Customer Sample No. | Cpm | mr/hr |
|---|---|---|---|---|---|
| | | | | | |
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| | | | | | |
| | | | | | |

Ion Chamber Ser. No. _____ Calibration date _____

Survey Meter Ser No. _____ Calibration date _____