H1543

0056805



## 1.0 GENERAL

Bechtel Hanford Inc. (BHI) Sample Delivery Group H1543 was composed of one solid (soil) sample designated under SAF No. B01-113 with a Project Designation of: PFP Well Installation Sampling and Analysis – Soil.

The sample was received as stated on the Chain-of-Custody document. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist. The results were transmitted to BHI via e-Fax on December 12, 2001.

RECEIVED
APR 08 2002
EDMC

## 2.0 ANALYSIS NOTES

### 2.1 Isotopic Plutonium Analyses

No problems were encountered during the course of the analyses.

### 2.2 Total Strontium Analyses

No problems were encountered during the course of the analyses.

### 2.3 Neptunium-237 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 Gross Alpha and Beta Analyses

No problems were encountered during the course of the analyses.

### 2.6 Gamma Spectroscopy Analyses

No problems were encountered during the course of the analyses.

***Case Narrative Certification Statement***

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

Melissa Mannion — 12/19/01

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

**Date**

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1543

SDG 7113
Contact Melissa C. Mannion

## SAMPLE SUMMARY

Client Hanford
Contract No. 630
Case no SDG H1543

| CLIENT SAMPLE ID | LOCATION | MATRIX | LEVEL | LAB SAMPLE ID | SAF NO | CHAIN OF CUSTODY | COLLECTED |
|---|---|---|---|---|---|---|---|
| B12XD2 | 200 W.; Well 299-W15-764 | SOLID | | R110100-01 | B01-113 | B01-113-03 | 10/12/01 00:50 |
| Method Blank | | SOLID | | R110100-03 | B01-113 | | |
| Lab Control Sample | | SOLID | | R110100-02 | B01-113 | | |
| Duplicate (R110100-01) | 200 W.; Well 299-W15-764 | SOLID | | R110100-04 | B01-113 | | 10/12/01 00:50 |



Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CS
Version 3.06
Report date 12/13/01

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1543

SDG 7113
Contact Melissa C. Mannion

## QC SUMMARY

Client Hanford
Contract No. 630
Case no SDG H1543

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|
| 7113 | B01-113-03 | B12XD2 | SOLID | 96.1 | 986.4 g | | 10/16/01 | 4 | R110100-01 | 7113-001 |
| | | Method Blank | SOLID | | | | | | R110100-03 | 7113-003 |
| | | Lab Control Sample | SOLID | | | | | | R110100-02 | 7113-002 |
| | | Duplicate (R110100-01) | SOLID | 96.1 | 986.4 g | | 10/16/01 | 4 | R110100-04 | 7113-004 |

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-QS
Version 3.06
Report date 12/13/01

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1543

SDG 7113
Contact Melissa C. Mannion

## PREP BATCH SUMMARY

Client Hanford
Contract No. 630
Case no SDG H1543

| 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 | 7012-056 | 5.0 | 1 | | | 1 | 1 | 1/1 | | |
| NP | SOLID | Neptunium in Soil | 7012-056 | 5.0 | 1 | | | 1 | 1 | 1/1 | | |
| PU | SOLID | Plutonium, Isotopic in Solids | 7012-056 | 5.0 | 1 | | | 1 | 1 | 1/1 | | |
| **Beta Counting** | | | | | | | | | | | | |
| SR | SOLID | Total Strontium in Soil | 7012-056 | 10.0 | 1 | | | 1 | 1 | 1/1 | | |
| **Gas Proportional Counting** | | | | | | | | | | | | |
| 93A | SOLID | Gross Alpha in Soil | 7012-056 | 20.0 | 1 | | | 1 | 1 | 1/1 | | |
| 93B | SOLID | Gross Beta in Soil | 7012-056 | 15.0 | 1 | | | 1 | 1 | 1/1 | | |
| **Gamma Spectroscopy** | | | | | | | | | | | | |
| GAM | SOLID | Gamma Scan | 7012-056 | 15.0 | 1 | | | 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 12/13/01

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1543

SDG 7113
Contact Melissa C. Mannion

## WORK SUMMARY

Client Hanford
Contract No. 630
Case no SDG H1543

| CLIENT SAMPLE ID / LOCATION / CUSTODY | SAF No | MATRIX | LAB SAMPLE ID / COLLECTED / RECEIVED | PLANCHET | TEST | SUF-FIX | ANALYZED | REVIEWED | BY | METHOD |
|---|---|---|---|---|---|---|---|---|---|---|
| B12XD2 | | | R110100-01 | 7113-001 | 93A/93 | | 11/19/01 | 12/13/01 | MCM | Gross Alpha in Soil |
| 200 W.; Well 299-W15-764 | | SOLID | 10/12/01 | 7113-001 | 93B/93 | | 11/19/01 | 12/13/01 | MCM | Gross Beta in Soil |
| B01-113-03 | B01-113 | | 10/16/01 | 7113-001 | AM | | 11/30/01 | 12/13/01 | MCM | Americium 241 in Soil |
| | | | | 7113-001 | GAM | | 11/20/01 | 12/13/01 | MCM | Gamma Scan |
| | | | | 7113-001 | NP | | 12/04/01 | 12/13/01 | MCM | Neptunium in Soil |
| | | | | 7113-001 | PU | | 11/21/01 | 12/13/01 | MCM | Plutonium, Isotopic in Solids |
| | | | | 7113-001 | SR | | 11/15/01 | 12/13/01 | MCM | Total Strontium in Soil |
| Method Blank | | | R110100-03 | 7113-003 | 93A/93 | | 11/19/01 | 12/13/01 | MCM | Gross Alpha in Soil |
| | | SOLID | | 7113-003 | 93B/93 | | 11/19/01 | 12/13/01 | MCM | Gross Beta in Soil |
| | B01-113 | | | 7113-003 | AM | | 12/04/01 | 12/13/01 | MCM | Americium 241 in Soil |
| | | | | 7113-003 | GAM | | 11/20/01 | 12/13/01 | MCM | Gamma Scan |
| | | | | 7113-003 | NP | | 12/02/01 | 12/13/01 | MCM | Neptunium in Soil |
| | | | | 7113-003 | PU | | 11/21/01 | 12/13/01 | MCM | Plutonium, Isotopic in Solids |
| | | | | 7113-003 | SR | | 11/15/01 | 12/13/01 | MCM | Total Strontium in Soil |
| Lab Control Sample | | | R110100-02 | 7113-002 | 93A/93 | | 11/24/01 | 12/13/01 | MCM | Gross Alpha in Soil |
| | | SOLID | | 7113-002 | 93B/93 | | 11/24/01 | 12/13/01 | MCM | Gross Beta in Soil |
| | B01-113 | | | 7113-002 | AM | | 12/04/01 | 12/13/01 | MCM | Americium 241 in Soil |
| | | | | 7113-002 | GAM | | 11/20/01 | 12/13/01 | MCM | Gamma Scan |
| | | | | 7113-002 | NP | | 12/04/01 | 12/13/01 | MCM | Neptunium in Soil |
| | | | | 7113-002 | PU | | 11/21/01 | 12/13/01 | MCM | Plutonium, Isotopic in Solids |
| | | | | 7113-002 | SR | | 11/15/01 | 12/13/01 | MCM | Total Strontium in Soil |
| Duplicate (R110100-01) | | | R110100-04 | 7113-004 | 93A/93 | | 11/19/01 | 12/13/01 | MCM | Gross Alpha in Soil |
| 200 W.; Well 299-W15-764 | | SOLID | 10/12/01 | 7113-004 | 93B/93 | | 11/19/01 | 12/13/01 | MCM | Gross Beta in Soil |
| | B01-113 | | 10/16/01 | 7113-004 | AM | | 11/30/01 | 12/13/01 | MCM | Americium 241 in Soil |
| | | | | 7113-004 | GAM | | 11/20/01 | 12/13/01 | MCM | Gamma Scan |
| | | | | 7113-004 | NP | | 12/02/01 | 12/13/01 | MCM | Neptunium in Soil |
| | | | | 7113-004 | PU | | 11/21/01 | 12/13/01 | MCM | Plutonium, Isotopic in Solids |
| | | | | 7113-004 | SR | | 11/15/01 | 12/13/01 | MCM | Total Strontium in Soil |

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CWS
Version 3.06
Report date 12/13/01

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1543

SDG 7113
Contact Melissa C. Mannion

## WORK SUMMARY, cont.

Client Hanford
Contract No. 630
Case no SDG H1543

### COUNTS OF TESTS BY SAMPLE TYPE

| TEST | SAF No | METHOD | REFERENCE | CLIENT | MORE | RE | BLANK | LCS | DUP SPIKE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|
| 93A/93 | B01-113 | Gross Alpha in Soil | 900.0_ALPHABETA_GPC | 1 | | | 1 | 1 | 1 | 4 |
| 93B/93 | B01-113 | Gross Beta in Soil | 900.0_ALPHABETA_GPC | 1 | | | 1 | 1 | 1 | 4 |
| AM | B01-113 | Americium 241 in Soil | AMCMISO_IE_PLATE_AEA | 1 | | | 1 | 1 | 1 | 4 |
| GAM | B01-113 | Gamma Scan | GAMMA_GS | 1 | | | 1 | 1 | 1 | 4 |
| NP | B01-113 | Neptunium in Soil | NP237_LLE_PLATE_AEA | 1 | | | 1 | 1 | 1 | 4 |
| PU | B01-113 | Plutonium, Isotopic in Solids | PUISO_PLATE_AEA | 1 | | | 1 | 1 | 1 | 4 |
| SR | B01-113 | Total Strontium in Soil | SRTOT_SEP_PRECIP_GPC | 1 | | | 1 | 1 | 1 | 4 |
| TOTALS | | | | 7 | | | 7 | 7 | 7 | 28 |

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CWS
Version 3.06
Report date 12/13/01

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1543

R110100-03 Method Blank

## METHOD BLANK

| | | | | | |
|---|---|---|---|---|---|
| SDG | 7113 | Client/Case no | Hanford | SDG H1543 | |
| Contact | Melissa C. Mannion | Contract | No. 630 | | |
| Lab sample id | R110100-03 | Client sample id | Method Blank | | |
| Dept sample id | 7113-003 | Material/Matrix | | SOLID | |
| | | SAF No | B01-113 | | |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Gross Alpha | 12587-46-1 | 0.633 | 2.2 | 3.7 | 10 | U | 93A |
| Gross Beta | 12587-47-2 | -1.45 | 5.4 | 9.0 | 15 | U | 93B |
| Total Strontium | SR-RAD | 0.058 | 0.17 | 0.34 | 1.0 | U | SR |
| Americium 241 | 14596-10-2 | 0.027 | 0.054 | 0.069 | 1.0 | U | AM |
| Neptunium 237 | 13994-20-2 | 0 | 0.14 | 0.38 | 1.0 | U | NP |
| Plutonium 238 | 13981-16-3 | 0 | 0.051 | 0.20 | 1.0 | U | PU |
| Plutonium 239/240 | PU-239/240 | 0.051 | 0.051 | 0.20 | 1.0 | U | PU |
| Antimony 125 | 14234-35-6 | U | | 0.045 | | U | GAM |
| Potassium 40 | 13966-00-2 | U | | 0.27 | | U | GAM |
| Ruthenium 106 | 13967-48-1 | U | | 0.15 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.025 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.022 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | U | | 0.045 | 0.10 | U | GAM |
| Radium 228 | 15262-20-1 | U | | 0.074 | 0.20 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.056 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.086 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.050 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.026 | | U | GAM |
| Thorium 232 | TH-232 | U | | 0.074 | | U | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.065 | | U | GAM |
| Uranium 238 | U-238 | U | | 2.5 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.065 | | U | GAM |

PFP Well Install. Smpling. & Analys.

QC-BLANK 40201



| | |
|---|---|
| Lab id | TMANC |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 12/13/01 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1543

R110100-02

Lab Control Sample

## LAB CONTROL SAMPLE

SDG 7113

Contact Melissa C. Mannion

Client/Case no Hanford SDG H1543

Case no No. 630

Lab sample id R110100-02

Dept sample id 7113-002

Client sample id Lab Control Sample

Material/Matrix SOLID

SAF No B01-113

| ANALYTE | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST | ADDED pCi/g | 2σ ERR pCi/g | REC % | 3σ LMTS (TOTAL) | PROTOCOL LIMITS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Gross Alpha | 180 | 14 | 3.2 | 10 | | 93A | 200 | 8.0 | 90 | 70-130 | 70-130 |
| Gross Beta | 214 | 11 | 9.1 | 15 | | 93B | 218 | 8.7 | 98 | 76-124 | 70-130 |
| Total Strontium | 23.1 | 0.89 | 0.26 | 1.0 | | SR | 21.8 | 0.87 | 106 | 82-118 | 80-120 |
| Americium 241 | 18.5 | 1.1 | 0.12 | 1.0 | | AM | 19.1 | 0.76 | 97 | 87-113 | 80-120 |
| Neptunium 237 | 21.3 | 1.2 | 0.10 | 1.0 | | NP | 21.2 | 0.85 | 100 | 87-113 | 80-120 |
| Plutonium 238 | 23.8 | 3.1 | 0.37 | 1.0 | | PU | 24.6 | 0.98 | 97 | 79-121 | 80-120 |
| Plutonium 239/240 | 26.6 | 3.5 | 0.37 | 1.0 | | PU | 26.4 | 1.1 | 101 | 78-122 | 80-120 |
| Cobalt 60 | 1.22 | 0.063 | 0.032 | 0.050 | | GAM | 1.10 | 0.044 | 111 | 73-127 | 80-120 |
| Cesium 137 | 1.48 | 0.057 | 0.035 | 0.10 | | GAM | 1.27 | 0.051 | 116 | 72-128 | 80-120 |

PFP Well Install. Smpling. & Analys.

QC-LCS 40200

Lab id TMANC

Protocol Hanford

Version Ver 1.0

Form DVD-LCS

Version 3.06

Report date 12/13/01

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1543

R110100-04 B12XD2

## DUPLICATE

| | | | | | |
|---|---|---|---|---|---|
| SDG | 7113 | | | Client/Case no | Hanford SDG H1543 |
| Contact | Melissa C. Mannion | | | Case no | No. 630 |
| DUPLICATE | | ORIGINAL | | | |
| Lab sample id | R110100-04 | Lab sample id | R110100-01 | Client sample id | B12XD2 |
| Dept sample id | 7113-004 | Dept sample id | 7113-001 | Location/Matrix | 200 W.; Well 299-W15-764 SOLID |
| | | Received | 10/16/01 | Collected/Weight | 10/12/01 00:50 986.4 g |
| % solids | 96.1 | % solids | 96.1 | Custody/SAF No | B01-113-03 B01-113 |

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gross Alpha | 3.10 | 2.9 | 3.7 | 10 | U | 93A | 2.44 | 2.2 | 2.7 | U | - | |
| Gross Beta | 16.9 | 6.2 | 9.3 | 15 | | 93B | 12.4 | 3.9 | 5.3 | J | 31 | 82 |
| Total Strontium | -0.078 | 0.16 | 0.33 | 1.0 | U | SR | -0.029 | 0.14 | 0.30 | U | - | |
| Americium 241 | 0.038 | 0.11 | 0.21 | 1.0 | U | AM | 0.024 | 0.096 | 0.18 | U | - | |
| Neptunium 237 | -0.035 | 0.14 | 0.34 | 1.0 | U | NP | 0.045 | 0.045 | 0.067 | U | - | |
| Plutonium 238 | 0 | 0.064 | 0.25 | 1.0 | U | PU | 0 | 0.049 | 0.19 | U | - | |
| Plutonium 239/240 | 0.032 | 0.064 | 0.25 | 1.0 | U | PU | 0 | 0.049 | 0.19 | U | - | |
| Antimony 125 | U | | 0.048 | | U | GAM | U | | 0.087 | U | - | |
| Potassium 40 | 15.8 | 0.57 | 0.24 | | | GAM | 14.9 | 1.1 | 0.47 | | 6 | 34 |
| Ruthenium 106 | U | | 0.19 | | U | GAM | U | | 0.38 | U | - | |
| Cobalt 60 | U | | 0.025 | 0.050 | U | GAM | U | | 0.058 | U | - | |
| Cesium 137 | U | | 0.021 | 0.10 | U | GAM | U | | 0.046 | U | - | |
| Radium 226 | 0.415 | 0.042 | 0.037 | 0.10 | | GAM | 0.387 | 0.083 | 0.077 | | 7 | 47 |
| Radium 228 | 0.668 | 0.11 | 0.10 | 0.20 | | GAM | 0.579 | 0.23 | 0.23 | | 14 | 69 |
| Europium 152 | U | | 0.050 | 0.10 | U | GAM | U | | 0.093 | U | - | |
| Europium 154 | U | | 0.088 | 0.10 | U | GAM | U | | 0.17 | U | - | |
| Europium 155 | U | | 0.062 | 0.10 | U | GAM | U | | 0.083 | U | - | |
| Thorium 228 | 0.540 | 0.030 | 0.028 | | | GAM | 0.513 | 0.044 | 0.043 | | 5 | 35 |
| Thorium 232 | 0.668 | 0.11 | 0.10 | | | GAM | 0.579 | 0.23 | 0.23 | | 14 | 69 |
| Uranium 235 | U | | 0.093 | | U | GAM | U | | 0.12 | U | - | |
| Uranium 238 | U | | 3.1 | | U | GAM | U | | 6.1 | U | - | |
| Americium 241 | U | | 0.084 | | U | GAM | U | | 0.054 | U | - | |

PFP Well Install. Smpling. & Analys.

QC-DUP#1 40202

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 12/13/01

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1543

R110100-01 B12XD2

## DATA SHEET

| | | | |
|---|---|---|---|
| SDG | 7113 | Client/Case no | Hanford SDG H1543 |
| Contact | Melissa C. Mannion | Contract | No. 630 |
| Lab sample id | R110100-01 | Client sample id | B12XD2 |
| Dept sample id | 7113-001 | Location/Matrix | 200 W.; Well 299-W15-764 SOLID |
| Received | 10/16/01 | Collected/Weight | 10/12/01 00:50 986.4 g |
| % solids | 96.1 | Custody/SAF No | B01-113-03 B01-113 |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Gross Alpha | 12587-46-1 | 2.44 | 2.2 | 2.7 | 10 | U | 93A |
| Gross Beta | 12587-47-2 | 12.4 | 3.9 | 5.3 | 15 | J | 93B |
| Total Strontium | SR-RAD | -0.029 | 0.14 | 0.30 | 1.0 | U | SR |
| Americium 241 | 14596-10-2 | 0.024 | 0.096 | 0.18 | 1.0 | U | AM |
| Neptunium 237 | 13994-20-2 | 0.045 | 0.045 | 0.067 | 1.0 | U | NP |
| Plutonium 238 | 13981-16-3 | 0 | 0.049 | 0.19 | 1.0 | U | PU |
| Plutonium 239/240 | PU-239/240 | 0 | 0.049 | 0.19 | 1.0 | U | PU |
| Antimony 125 | 14234-35-6 | U | | 0.087 | | U | GAM |
| Potassium 40 | 13966-00-2 | 14.9 | 1.1 | 0.47 | | | GAM |
| Ruthenium 106 | 13967-48-1 | U | | 0.38 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.058 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.046 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | 0.387 | 0.083 | 0.077 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.579 | 0.23 | 0.23 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.093 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.17 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.083 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.513 | 0.044 | 0.043 | | | GAM |
| Thorium 232 | TH-232 | 0.579 | 0.23 | 0.23 | | | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.12 | | U | GAM |
| Uranium 238 | U-238 | U | | 6.1 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.054 | | U | GAM |

PFP Well Install. Smpling. & Analys.

| | |
|---|---|
| Lab id | TMANC |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 12/13/01 |

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1543

Test AM Matrix SOLID
SDG 7113
Contact Melissa C. Mannion

## METHOD SUMMARY

AMERICIUM 241 IN SOIL
ALPHA SPECTROSCOPY

Client Hanford
Contract No. 630
Contract SDG H1543

## RESULTS

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | PLANCHET | Americium 241 | |
|---|---|---|---|---|---|---|
| Preparation batch 7012-056 | | | | | | |
| B12XD2 | R110100-01 | | | 7113-001 | U | |
| BLK (QC ID=40201) | R110100-03 | | | 7113-003 | U | |
| LCS (QC ID=40200) | R110100-02 | | | 7113-002 | ok | |
| Duplicate (R110100-01) | R110100-04 | | | 7113-004 | - | U |
| Nominal values and limits from method | | | | RDLs (pCi/g) | 1.0 | |
| PFP Well Install. Smpling. & Analys. | | | | | | |

## 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 7012-056 | 2σ prep error 5.0 % | | | | Reference Lab Notebook 7012 pg. 056 | | | | | | | | | | | |
| B12XD2 | R110100-01 | | | 0.18 | 0.500 | | | 50 | | 203 | | | 49 | 11/30/01 | 11/30 | SS-049 |
| BLK (QC ID=40201) | R110100-03 | | | 0.069 | 0.500 | | | 82 | | 325 | | | | 11/30/01 | 12/04 | SS-042 |
| LCS (QC ID=40200) | R110100-02 | | | 0.12 | 0.500 | | | 79 | | 325 | | | | 11/30/01 | 12/04 | SS-041 |
| Duplicate (R110100-01) (QC ID=40202) | R110100-04 | | | 0.21 | 0.500 | | | 84 | | 204 | | | 49 | 11/30/01 | 11/30 | SS-022 |
| Nominal values and limits from method | | | | 1.0 | 0.500 | | | 20-105 | | 100 | 100 | | 180 | | | |

| 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 FOR 4 SAMPLES | | | | |
|---|---|---|---|---|
| MDA | 0.14 | ± | 0.13 |
| YIELD | 74 | ± | 32 |

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 12/13/01

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1543

Test NP Matrix SOLID
SDG 7113
Contact Melissa C. Mannion

## METHOD SUMMARY

NEPTUNIUM IN SOIL
ALPHA SPECTROSCOPY

Client Hanford
Contract No. 630
Contract SDG H1543

## RESULTS

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | PLANCHET | Neptunium 237 | |
|---|---|---|---|---|---|---|
| Preparation batch 7012-056 | | | | | | |
| B12XD2 | R110100-01 | | | 7113-001 | U | |
| BLK (QC ID=40201) | R110100-03 | | | 7113-003 | U | |
| LCS (QC ID=40200) | R110100-02 | | | 7113-002 | ok | |
| Duplicate (R110100-01) | R110100-04 | | | 7113-004 | - | U |
| Nominal values and limits from method | | | | RDLs (pCi/g) | 1.0 | |
| PFP Well Install. Smpling. & Analys. | | | | | | |

## 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 7012-056 | 2σ prep error 5.0 % | | | | | | | Reference Lab Notebook 7012 pg. 056 | | | | | | | | |
| B12XD2 | R110100-01 | | | 0.067 | 0.500 | | | 34 | | 325 | | | 53 | 11/30/01 | 12/04 | SS-031 |
| BLK (QC ID=40201) | R110100-03 | | | 0.38 | 0.500 | | | 43 | | 214 | | | | 11/30/01 | 12/02 | SS-021 |
| LCS (QC ID=40200) | R110100-02 | | | 0.10 | 0.500 | | | 53 | | 325 | | | | 11/30/01 | 12/04 | SS-032 |
| Duplicate (R110100-01) (QC ID=40202) | R110100-04 | | | 0.34 | 0.500 | | | 43 | | 214 | | | 51 | 11/30/01 | 12/02 | SS-022 |
| 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 4 SAMPLES | | | | |
|---|---|---|---|---|
| | MDA | 0.22 | ± | 0.32 |
| | YIELD | 43 | ± | 16 |

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 12/13/01

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1543

Test PU Matrix SOLID
SDG 7113
Contact Melissa C. Mannion

## METHOD SUMMARY

PLUTONIUM, ISOTOPIC IN SOLIDS
ALPHA SPECTROSCOPY

Client Hanford
Contract No. 630
Contract SDG H1543

## RESULTS

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | PLANCHET | Plutonium 238 | | Plutonium 239/240 | |
|---|---|---|---|---|---|---|---|---|
| Preparation batch 7012-056 | | | | | | | | |
| B12XD2 | R110100-01 | | | 7113-001 | U | | U | |
| BLK (QC ID=40201) | R110100-03 | | | 7113-003 | U | | U | |
| LCS (QC ID=40200) | R110100-02 | | | 7113-002 | ok | | ok | |
| Duplicate (R110100-01) | R110100-04 | | | 7113-004 | - | U | - | U |
| Nominal values and limits from method PFP Well Install. Smpling. & Analys. | | | | 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 7012-056 2σ prep error 5.0 % Reference Lab Notebook 7012 pg. 056 | | | | | | | | | | | | | | | | |
| B12XD2 | R110100-01 | | | 0.19 | 0.500 | | | 86 | | 104 | | | 40 | 11/21/01 | 11/21 | SS-045 |
| BLK (QC ID=40201) | R110100-03 | | | 0.20 | 0.500 | | | 87 | | 104 | | | | 11/21/01 | 11/21 | SS-048 |
| LCS (QC ID=40200) | R110100-02 | | | 0.37 | 0.500 | | | 46 | | 103 | | | | 11/21/01 | 11/21 | SS-047 |
| Duplicate (R110100-01) (QC ID=40202) | R110100-04 | | | 0.25 | 0.500 | | | 66 | | 116 | | | 40 | 11/21/01 | 11/21 | 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 4 SAMPLES | | | | |
|---|---|---|---|---|
| MDA | 0.25 | ± | 0.17 |
| YIELD | 71 | ± | 39 |

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 12/13/01

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1543

Test SR Matrix SOLID
SDG 7113
Contact Melissa C. Mannion

## METHOD SUMMARY

TOTAL STRONTIUM IN SOIL
BETA COUNTING

Client Hanford
Contract No. 630
Contract SDG H1543

## RESULTS

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | PLANCHET | Total Strontium | |
|---|---|---|---|---|---|---|
| Preparation batch 7012-056 | | | | | | |
| B12XD2 | R110100-01 | | | 7113-001 | U | |
| BLK (QC ID=40201) | R110100-03 | | | 7113-003 | U | |
| LCS (QC ID=40200) | R110100-02 | | | 7113-002 | ok | |
| Duplicate (R110100-01) | R110100-04 | | | 7113-004 | - | U |
| Nominal values and limits from method PFP Well Install. Smpling. & Analys. | | | | 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 7012-056 2σ prep error 10.0 % Reference Lab Notebook 7012 pg. 056 | | | | | | | | | | | | | | | | |
| B12XD2 | R110100-01 | | | 0.30 | 1.00 | | | 94 | | 100 | | | 34 | 11/15/01 | 11/15 | GRB-205 |
| BLK (QC ID=40201) | R110100-03 | | | 0.34 | 1.00 | | | 85 | | 100 | | | | 11/15/01 | 11/15 | GRB-207 |
| LCS (QC ID=40200) | R110100-02 | | | 0.26 | 1.00 | | | 84 | | 100 | | | | 11/15/01 | 11/15 | GRB-217 |
| Duplicate (R110100-01) (QC ID=40202) | R110100-04 | | | 0.33 | 1.00 | | | 94 | | 100 | | | 34 | 11/15/01 | 11/15 | GRB-208 |
| 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 4 SAMPLES | | | | |
|---|---|---|---|---|
| | MDA | 0.31 | ± | 0.072 |
| | YIELD | 89 | ± | 11 |

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 12/13/01

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1543

Test 93A Matrix SOLID
SDG 7113
Contact Melissa C. Mannion

## METHOD SUMMARY

GROSS ALPHA IN SOIL
GAS PROPORTIONAL COUNTING

Client Hanford
Contract No. 630
Contract SDG H1543

## RESULTS

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | PLANCHET | Gross Alpha | |
|---|---|---|---|---|---|---|
| Preparation batch 7012-056 | | | | | | |
| B12XD2 | R110100-01 | 93 | | 7113-001 | U | |
| BLK (QC ID=40201) | R110100-03 | 93 | | 7113-003 | U | |
| LCS (QC ID=40200) | R110100-02 | 93 | | 7113-002 | ok | |
| Duplicate (R110100-01) | R110100-04 | 93 | | 7113-004 | - | U |

Nominal values and limits from method RDLs (pCi/g) 10
PFP Well Install. Smpling. & Analys.

## METHOD PERFORMANCE

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | MDA pCi/g | ALIQ g | PREP FAC | DILU-TION | RESID mg | EFF % | COUNT min | FWHM keV | DRIFT KeV | DAYS HELD | PREPARED | ANAL-YZED | DETECTOR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preparation batch 7012-056 | 2σ prep error 20.0 % | | | | Reference Lab Notebook 7012 pg. 056 | | | | | | | | | | | |
| B12XD2 | R110100-01 | 93 | | 2.7 | 0.100 | | | 24 | | 100 | | | 38 | 11/16/01 | 11/19 | GRB-101 |
| BLK (QC ID=40201) | R110100-03 | 93 | | 3.7 | 0.100 | | | 21 | | 100 | | | | 11/16/01 | 11/19 | GRB-105 |
| LCS (QC ID=40200) | R110100-02 | 93 | | 3.2 | 0.100 | | | 21 | | 100 | | | | 11/16/01 | 11/24 | GRB-114 |
| Duplicate (R110100-01) (QC ID=40202) | R110100-04 | 93 | | 3.7 | 0.100 | | | 25 | | 100 | | | 38 | 11/16/01 | 11/19 | GRB-108 |
| Nominal values and limits from method | | | | 10 | 0.100 | | | 5-250 | | 100 | | | 180 | | | |

| PROCEDURES | REFERENCE | 900.0_ALPHABETA_GPC |
|---|---|---|
| | CP-060 | Soil Preparation, rev 3 |
| | CP-070 | Soil Dissolution, < 1.0g Aliquot, rev 4 |
| | CP-170 | Soil Preparation for Direct Gross Alpha and Gross Beta Counting, rev 3 |

| AVERAGES ± 2 SD FOR 4 SAMPLES | | | | |
|---|---|---|---|---|
| | MDA | 3.3 | ± | 0.96 |
| | RESIDUE | 23 | ± | 4 |

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 12/13/01

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1543

Test 93B Matrix SOLID
SDG 7113
Contact Melissa C. Mannion

## METHOD SUMMARY

GROSS BETA IN SOIL
GAS PROPORTIONAL COUNTING

Client Hanford
Contract No. 630
Contract SDG H1543

## RESULTS

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | PLANCHET | Gross Beta | |
|---|---|---|---|---|---|---|
| Preparation batch 7012-056 | | | | | | |
| B12XD2 | R110100-01 | 93 | | 7113-001 | 12.4 | J |
| BLK (QC ID=40201) | R110100-03 | 93 | | 7113-003 | U | |
| LCS (QC ID=40200) | R110100-02 | 93 | | 7113-002 | ok | |
| Duplicate (R110100-01) | R110100-04 | 93 | | 7113-004 | ok | |

Nominal values and limits from method RDLs (pCi/g) 15
PFP Well Install. Smpling. & Analys.

## METHOD PERFORMANCE

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | MDA pCi/g | ALIQ g | PREP FAC | DILU-TION | RESID mg | EFF % | COUNT min | FWHM keV | DRIFT KeV | DAYS HELD | PREPARED | ANAL-YZED | DETECTOR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preparation batch 7012-056 | 2σ prep error 15.0 % Reference Lab Notebook 7012 pg. 056 | | | | | | | | | | | | | | | |
| B12XD2 | R110100-01 | 93 | | 5.3 | 0.100 | | | 24 | | 100 | | | 38 | 11/16/01 | 11/19 | GRB-101 |
| BLK (QC ID=40201) | R110100-03 | 93 | | 9.0 | 0.100 | | | 21 | | 100 | | | | 11/16/01 | 11/19 | GRB-105 |
| LCS (QC ID=40200) | R110100-02 | 93 | | 9.1 | 0.100 | | | 21 | | 100 | | | | 11/16/01 | 11/24 | GRB-114 |
| Duplicate (R110100-01) (QC ID=40202) | R110100-04 | 93 | | 9.3 | 0.100 | | | 25 | | 100 | | | 38 | 11/16/01 | 11/19 | GRB-108 |
| Nominal values and limits from method | | | | 15 | 0.100 | | | 5-250 | | 100 | | | 180 | | | |

| PROCEDURES | REFERENCE | 900.0_ALPHABETA_GPC |
|---|---|---|
| | CP-060 | Soil Preparation, rev 3 |
| | CP-070 | Soil Dissolution, < 1.0g Aliquot, rev 4 |
| | CP-170 | Soil Preparation for Direct Gross Alpha and Gross Beta Counting, rev 3 |

AVERAGES ± 2 SD FOR 4 SAMPLES
MDA 8.2 ± 3.8
RESIDUE 23 ± 4

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 12/13/01

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1543

Test GAM Matrix SOLID
SDG 7113
Contact Melissa C. Mannion

## METHOD SUMMARY

GAMMA SCAN

GAMMA SPECTROSCOPY

Client Hanford
Contract No. 630
Contract SDG H1543

## RESULTS

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF-FIX | PLANCHET | Cobalt 60 | | Cesium 137 | |
|---|---|---|---|---|---|---|---|---|
| Preparation batch 7012-056 | | | | | | | | |
| B12XD2 | R110100-01 | | | 7113-001 | U | | U | |
| BLK (QC ID=40201) | R110100-03 | | | 7113-003 | U | | U | |
| LCS (QC ID=40200) | R110100-02 | | | 7113-002 | ok | | ok | |
| Duplicate (R110100-01) | R110100-04 | | | 7113-004 | - | U | - | U |
| Nominal values and limits from method PFP Well Install. Smpling. & Analys. | | | | 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 7012-056 2σ prep error 15.0 % Reference Lab Notebook 7012 pg. 056 | | | | | | | | | | | | | | | | |
| B12XD2 | R110100-01 | | | 0.058 | 755 | | | | | 106 | | | 39 | 11/19/01 | 11/20 | 02,01,00 |
| BLK (QC ID=40201) | R110100-03 | | | 0.025 | 755 | | | | | 106 | | | | 11/19/01 | 11/20 | 01,03,00 |
| LCS (QC ID=40200) | R110100-02 | | | 0.032 | 755 | | | | | 107 | | | | 11/19/01 | 11/20 | MB,07,00 |
| Duplicate (R110100-01) (QC ID=40202) | R110100-04 | | | 0.025 | 755 | | | | | 140 | | | 39 | 11/19/01 | 11/20 | 02,04,00 |
| Nominal values and limits from method | | | | 0.050 | 755 | | | | | 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 4 SAMPLES
MDA 0.035 ± 0.031
YIELD ____ ± ____

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 12/13/01

A1543 K

| Bechtel Hanford Inc. | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | B01-113-03 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: Renee Nielson | Company Contact: Virginia Rohay; Telephone No.: 372-9100 | Project Coordinator: TRENT, SJ | Price Code: 8N; Data Turnaround: 45 Days |
| Project Designation: PFP Well Installation Sampling and Analysis - Soil | Sampling Location: 200 West; Well 299-W15-764; 60.0' - 62.5' depth (A1543 (7113)) | SAF No.: B01-113 | Air Quality ☐ |
| Ice Chest No.: ERC-01-027 | Field Logbook No.: EL-1662; COA: T20ZP1D722 | Method of Shipment: Federal Express | |
| Shipped To: TMA/RECRA TMA | Offsite Property No.: A020011 | Bill of Lading/Air Bill No.: 4235 7954-8030 | |

POSSIBLE SAMPLE HAZARDS/REMARKS

Samples stored in Ref.# 2C at the 3728 Shipping Facility on 10/12/01. Collector not available to relinquish samples on 10/15/01 for shipment.

RT 10-15-01

SAMPLE ANALYSIS

| Preservation | Cool 4C | None | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | None |
|---|---|---|---|---|---|---|---|---|---|
| Type of Container | aG | aG | aG | aG | aG | aG | aG | aG | aG |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Volume | 60mL | 60mL | 120mL | 120mL | 250mL | 250mL | 500mL | 500mL | 1000mL |
| | Oil & Grease - 413.1 | Gross Alpha; Gross Beta | Chromium Hex - 7196 | TIC - 415.1M; TOC - 415.1 | See item (1) in Special Instructions. | VOA - 8260A (TCL); VOA - 8260A (Add-On) (n-Butylbenzene) | See item (2) in Special Instructions. | See item (3) in Special Instructions. | See item (4) in Special Instructions. |

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B12XD2 | SOIL | 10/12/01 | 0050 | | X | (2X) | | | | | X | B12XD1- |

CHAIN OF POSSESSION

| Relinquished By | Date/Time | Received By | Date/Time |
|---|---|---|---|
| R. Nielson | 10/12/01 0430 | Stored in REF #2C | 10/12/01 0430 |
| Removed from Ref 2C 3728 | 10-15-01 0900 | R. Thore | 10-15-01 0900 |
| R. Thore ERC | 10-15-01 0900 | FED EX | 10-15-01 |
| Fed Ex | 10-16-01 9:45 | Elvia R. Marsters | 10-16-01 9:45 |
| | | | |
| | | | |

SPECIAL INSTRUCTIONS

** The ERC acknowledges that the analytical holding time for Nitrate by EPA Method 300.0 will not be met.

** If a limited quantity of sample material is received, perform analyses in the order listed on the ESP.

(1) ~~Semi-VOA - 8270A (TCL); Semi-VOA - 8270A (Add-On) (Tributyl phosphate)~~
(2) IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); ~~NO2/NO3 - 353.2, pH (Soil) - 9045~~
(3) ~~ICP Metals - 6010A (TCL) (Calcium, Cobalt, Chromium, Iron, Magnesium, Nickel, Sodium); ICP Metals - 6010A (Add-on) (Phosphorus)~~
(4) Gamma Spectroscopy (Cesium-137, Cobalt-60); Gamma Spec - Add-on (Antimony-125, ~~Cesium-134~~, Ruthenium-106); Americium-241; Neptunium-237; Isotopic Plutonium; Strontium-89,90 – Total Sr

Matrix *: S=Soil; SD=Sediment; SO=Solid; S=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)

From: Melissa Mannion

## SAMPLE RECEIPT CHECKLIST

### SAMPLE RECEIPT

Client: BECHTEL HANFORD INC. Date/Time received 10-16-01 9:45

CoC No. B01-113-18

Container I.D. No. ERC-01-029 Requested TAT (Days) 45 DAYS 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: Check on (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 _____
14. Received by Elvia J. Maestas Date: 10-16-01 Time: 9:45 Am

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

Ion Chamber Ser. No. _____ Calibration date _____

Survey Meter Ser No. _____ Calibration date _____

LIONVILLE LABORATORY INC.

**Client:** TNU-HANFORD B01-113
**LVL #:** 0110L105
**SDG/SAF #:** H1543/B01-113

**W.O. #:** 11343-606-001-9999-00
**Date Received:** 10-16-2001

**GC/MS VOLATILE**

One (1) soil sample was collected on 10-12-2001.

The sample and its associated QC samples were analyzed according to criteria set forth in Lionville Laboratory OPs based on SW 846 Method 8260B for client specified Volatile target compounds on 10-23-2001.

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

1. The cooler temperature upon receipt has been recorded on the chain-of-custody.

2. The sample was analyzed within required holding time.

3. Non-target compounds were not detected in the sample.

4. All surrogate recoveries were within EPA QC limits.

5. All matrix spike recoveries were within EPA QC limits.

6. All blank spike recoveries were within EPA QC limits.

7. The method blank contained the common laboratory contaminant Acetone at a level less than the CRQL.

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

9. "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."

J. Michael Taylor
President
Lionville Laboratory Incorporated

11/7/01
Date

som\group\data\voa\tnu-hanford\0110-105.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 9 pages.



208 Welsh Pool Road • Lionville, PA 19341-1333 • (610) 280-3000 • Fax (610) 280-3041

## GLOSSARY OF VOA DATA

### ABBREVIATIONS

| | | |
|---|---|---|
| **BS** | = | Indicates blank spike in which reagent grade water is spiked with the CLP matrix spike solutions and carried through all the steps in the method. Spike recoveries are reported. |
| **BSD** | = | Indicates blank spike duplicate. |
| **MS** | = | Indicates matrix spike. |
| **MSD** | = | Indicates matrix spike duplicate. |
| **DL** | = | Suffix added to sample number to indicate that results are from a diluted analysis. |
| **NA** | = | Not Applicable. |
| **DF** | = | Dilution Factor. |
| **NR** | = | Not Required. |
| **SP, Z** | = | Indicates Spiked Compound. |

## GLOSSARY OF VOA DATA

### DATA QUALIFIERS

| | | |
|---|---|---|
| U | = | Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture. |
| J | = | Indicates an estimated value. This flag is used under the following circumstances: 1) when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed; or 2) when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. For example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J. |
| B | = | This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound. |
| E | = | Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution. |
| D | = | Identifies all compounds identified in an analysis at a secondary dilution factor. |
| I | = | Interference. |
| NQ | = | Result qualitatively confirmed but not able to quantify. |
| N | = | Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds (TICs), where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N code is not used. |
| X | = | This flag is used for a TIC compound which is quantified relative to a response factor generated from a daily calibration standard (rather than quantified relative to the closest internal standard). |
| Y | = | Additional qualifiers used as required are explained in the case narrative. |

VLI
LIONVILLE LABORATORY INC.

## TECHNICAL FLAGS FOR MANUAL INTEGRATION

Manual quan modifications or integrations are performed routinely to improve the data quality for a variety of technical reasons. Documentation of these modifications should be clear and concise. The following "flags" are used to indicate the technical reasons for quan modifications:

**MP** - Missed Peak: manually added peak not found by automatic quan program.

**PA** - Peak Assignment: quan report was changed to reflect correct peak assignment.

**RI** - Routine Integration: routine integrations are performed for some analytes that are consistently integrated improperly by the automatic integration programs. Examples are the dichlorobenzene isomers on the VOA packed column and benzo(b)fluoranthene/benzo(k)fluoranthene which are poorly resolved on the BNA column.

**SP** - Split Peak: the automatic integration improperly split the peak; a manual integration was performed to get the correct area.

**CB** - Coelution/Background: peak was manually integrated to eliminate contribution from coeluting compounds, background signal, or other interference.

**PI** - Proper Integration: a peak with poor or inconsistent integration (e.g., excessive tail) was properly integrated manually.

**Lionville Laboratory, Inc.**

Volatiles By GC/MS, Special List — Report Date: 11/03/01 09:26

RFW Batch Number: 0110L105 — Client: TNUHANFORD B01-113 H1543 — Work Order: 11343606001 — Page: 1a

| | Cust ID: | B12XD2 | | B12XD2 | | B12XD2 | | VBLKWV | | VBLKWV BS | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Information | RFW#: | 001 | | 001 MS | | 001 MSD | | 01LVX455-MB1 | | 01LVX455-MB1 | |
| | Matrix: | SOIL | | SOIL | | SOIL | | SOIL | | SOIL | |
| | D.F.: | 0.926 | | 0.980 | | 0.943 | | 1.00 | | 1.00 | |
| | Units: | ug/Kg | | ug/Kg | | ug/Kg | | ug/Kg | | ug/Kg | |
| Surrogate Recovery | Toluene-d8 | 107 | % | 96 | % | 93 | % | 94 | % | 92 | % |
| | Bromofluorobenzene | 118 | % | 108 | % | 108 | % | 116 | % | 100 | % |
| | 1,2-Dichloroethane-d4 | 109 | % | 99 | % | 102 | % | 94 | % | 87 | % |
| Chloromethane | | 10 | U | 10 | U | 10 | U | 10 | U | 10 | U |
| Bromomethane | | 10 | U | 10 | U | 10 | U | 10 | U | 10 | U |
| Vinyl Chloride | | 10 | U | 10 | U | 10 | U | 10 | U | 10 | U |
| Chloroethane | | 10 | U | 10 | U | 10 | U | 10 | U | 10 | U |
| Methylene Chloride | | 6 | | 5 | U | 2 | J | 5 | U | 5 | U |
| Acetone | | 10 | U | 3 | JB | 10 | U | 1 | J | 1 | JB |
| Carbon Disulfide | | 5 | U | 5 | U | 5 | U | 5 | U | 5 | U |
| 1,1-Dichloroethene | | 5 | U | 98 | % | 94 | % | 5 | U | 90 | % |
| 1,1-Dichloroethane | | 5 | U | 5 | U | 5 | U | 5 | U | 5 | U |
| 1,2-Dichloroethene (total) | | 5 | U | 5 | U | 5 | U | 5 | U | 5 | U |
| Chloroform | | 5 | U | 5 | U | 5 | U | 5 | U | 5 | U |
| 1,2-Dichloroethane | | 5 | U | 5 | U | 5 | U | 5 | U | 5 | U |
| 2-Butanone | | 10 | U | 10 | U | 10 | U | 10 | U | 10 | U |
| 1,1,1-Trichloroethane | | 5 | U | 5 | U | 5 | U | 5 | U | 5 | U |
| Carbon Tetrachloride | | 5 | U | 5 | U | 5 | U | 5 | U | 5 | U |
| Bromodichloromethane | | 5 | U | 5 | U | 5 | U | 5 | U | 5 | U |
| 1,2-Dichloropropane | | 5 | U | 5 | U | 5 | U | 5 | U | 5 | U |
| cis-1,3-Dichloropropene | | 5 | U | 5 | U | 5 | U | 5 | U | 5 | U |
| Trichloroethene | | 5 | U | 106 | % | 98 | % | 5 | U | 99 | % |
| Dibromochloromethane | | 5 | U | 5 | U | 5 | U | 5 | U | 5 | U |
| 1,1,2-Trichloroethane | | 5 | U | 5 | U | 5 | U | 5 | U | 5 | U |
| Benzene | | 5 | U | 97 | % | 93 | % | 5 | U | 92 | % |
| Trans-1,3-Dichloropropene | | 5 | U | 5 | U | 5 | U | 5 | U | 5 | U |
| Bromoform | | 5 | U | 5 | U | 5 | U | 5 | U | 5 | U |
| 4-Methyl-2-pentanone | | 10 | U | 10 | U | 10 | U | 10 | U | 10 | U |
| 2-Hexanone | | 10 | U | 10 | U | 10 | U | 10 | U | 10 | U |
| Tetrachloroethene | | 5 | U | 5 | U | 5 | U | 5 | U | 5 | U |
| 1,1,2,2-Tetrachloroethane | | 5 | U | 5 | U | 5 | U | 5 | U | 5 | U |
| Toluene | | 5 | U | 96 | % | 91 | % | 5 | U | 89 | % |

*= Outside of EPA CLP QC limits.

RFW Batch Number: 0110L105 Client: TNUHANFORD B01-113 H1543 Work Order: 11343606001 Page: 1b

| Cust ID: | B12XD2 | B12XD2 | B12XD2 | VBLKWV | VBLKWV BS |
|---|---|---|---|---|---|
| RFW#: | 001 | 001 MS | 001 MSD | 01LVX455-MB1 | 01LVX455-MB1 |
| Chlorobenzene | 5 U | 99 % | 97 % | 5 U | 94 % |
| Ethylbenzene | 5 U | 5 U | 5 U | 5 U | 5 U |
| Styrene | 5 U | 5 U | 5 U | 5 U | 5 U |
| Xylene (total) | 5 U | 5 U | 5 U | 5 U | 5 U |
| N-butylbenzene | 5 U | 5 U | 5 U | 5 U | 5 U |

*= Outside of EPA CLP QC limits.

Lionville Laboratory Use Only

01101105

# Custody Transfer Record/Lab Work Request

Page 1 of 1

**FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS**

Client: TAU-HANFORD SAF B01-113

Est. Final Proj. Sampling Date:

Project #: 11343-606-001-9999-00

Project Contact/Phone #:

Lionville Laboratory Project Manager: OJ

QC: SPEC  Del: STD  TAT: 30

Date Rec'd: 10-16-01  Date Due: 11-15-01

| | | A | B | | | C | D | | E | | F | G | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Refrigerator # | | 1 | 6 | | | 1 | 6 | | 6 | | 6 | 6 | | | | |
| #/Type Container | Liquid | 1AG | 1AG | | | 1AG | 1AG | | 1AG | | 1AG | 1AG | | | | |
| | Solid | | | | | | | | | | | | | | | |
| Volume | Liquid | | | | | | | | | | | | | | | |
| | Solid | 250 | 250 | | | 125 | 60 | | 500 | | 500 | 125 | | | | |
| Preservatives | | | | | | | | | | | | | | | | |
| ANALYSES REQUESTED → | | ORGANIC: VOA | BNA | Pest/PCB | Herb | TIC TOC | OIL Gasoline | | INORG: Metal | CN | I.C. Anions | HEX Chrom. | | | | |
| Lionville Laboratory Use Only | | 0624X | 0625X | | | ITIC IOCT | IOGGR | | MET① | | INORG① | ICRL | | | | |

| Lab ID | Client ID/Description | Matrix QC Chosen (✓) MS | MSD | Matrix | Date Collected | Time Collected | VOA | BNA | Pest/PCB | Herb | TIC TOC | OIL Gasoline | | Metal | CN | I.C. Anions | HEX Chrom. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 001 | B12XD2 | ✓ | ✓ | S | 10-12-01 | 0050 | X | X | | | X | X | | X | | X | X | | | |

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 # B01-113

DATE/REVISIONS:

MET① 1. Cd, Ca, Cr, Fe, Mg, Ni, Na, P

INORG① 2. ICCL, ICFL, ICNO3, ICNO2, ICPO4, ICSO4, IN3N2

3.

4.

5.

6.

| Relinquished by | Received by | Date | Time |
|---|---|---|---|
| FEDEX | [illegible] | 10-16-01 | 0930 |

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

Discrepancies Between Samples Labels and COC Record? Y or N

NOTES:

4237795 4 8041

Lionville Laboratory Use Only

Samples were:
1) Shipped ✓ or
Hand Delivered
Airbill # SEE BELOW
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. 4.0 °C

| Bechtel Hanford Inc. | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | B01-113-03 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: Renee Nielson | Company Contact: Virginia Rohay — Telephone No.: 372-9100 | Project Coordinator: TRENT, SJ | Price Code: 8N — Data Turnaround: 45 Days — Air Quality ☐ |
| Project Designation: PFP Well Installation Sampling and Analysis - Soil | Sampling Location: 200 West; Well 299-W15-764; 60.0' - 62.5' depth | SAF No.: B01-113 | |
| Ice Chest No.: ERC99-046 | Field Logbook No.: EL-1562 — COA: T20ZP1D722 | Method of Shipment: Federal Express | |
| Shipped To: TMA/RECRA | Offsite Property No.: A020023 | Bill of Lading/Air Bill No.: 4238795 4-8041 | |

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | Cool 4C | None R 10/15/01 | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | None R 10/15/01 | |
| Type of Container | sG | | sG | sG | sG | sG | sG | sG | | |
| No. of Container(s) | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Volume | 60mL | 60mL | 120mL | 120mL | 250mL | 250mL | 500mL | 500mL | 100mL | |
| SAMPLE ANALYSIS | Oil & Grease - 413.1 | Gross Alpha; Gross Beta | Chromium Hex - 7196 | TIC - 415.1M; TOC - 415.1 | See item (1) in Special Instructions. | VOA - 8260A (TCL); VOA - 8260A (Add-On) (n-Butylbenzene) | See item (2) in Special Instructions. | See item (3) in Special Instructions. | See item (4) in Special Instructions. | |

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B12XD2 | SOIL | 10/12/01 | 0050 | X | | X | X | X | X | X | X | | B12XD1-1 |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

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

| Relinquished By | Date/Time | Received By | Date/Time |
|---|---|---|---|
| Renee Nielson / R. Nielson | 10/12/01 0430 | Stored in RCF #2C | 10/12/01 0430 |
| Removed from RCF 2C 3728 | 10-15-01 0900 | R Thorer | 10-15-01 0900 |
| R Thorer ERC | 10-15-01 0900 | FEDEX | |
| FEDEX | 10-16-01 0930 | Carla Bennett | 10-16-01 0930 |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS**

** The ERC acknowledges that the analytical holding time for Nitrate by EPA Method 300.0 will not be met.

** If a limited quantity of sample material is received, perform analyses in the order listed on the FSR.

(1) Semi-VOA - 8270A (TCL); Semi-VOA -- 8270A (Add-On) (Tributyl phosphate) RJN 9/24/01
(2) IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); NO2/NO3 - 353.2; ~~pH (Soil) - 9045~~ RJN 9/20/01
(3) ICP Metals - 6010A (TAL) (Cadmium, Calcium, Chromium, Iron, Magnesium, Nickel, Sodium); ICP Metals - 6010A (Add-on) (Phosphorus) RJN 9/20/01
(4) ~~Gamma Spectroscopy (Cesium-137, Cobalt-60); Gamma Spec - Add-on (Antimony-125, Europium-154, Ruthenium-106); Americium-241, Neptunium-237/Isotopic Plutonium, Strontium-89,90 -- Total Sr~~ RT 10 15.01

Matrix *: S=Soil; SD=Sediment; SO=Solid; S=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)

NOV 2001
RECEIVED

Lionville Laboratory, Inc.
VOA ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B01-113 H1543

DATE RECEIVED: 10/16/01 LVL LOT # :0110L105

| CLIENT ID | LVL # | MTX | PREP # | COLLECTION | EXTR/PREP | ANALYSIS |
|---|---|---|---|---|---|---|
| B12XD2 | 001 | S | 01LVX455 | 10/12/01 | N/A | 10/23/01 |
| B12XD2 | 001 MS | S | 01LVX455 | 10/12/01 | N/A | 10/23/01 |
| B12XD2 | 001 MSD | S | 01LVX455 | 10/12/01 | N/A | 10/23/01 |
| LAB QC: | | | | | | |
| VBLKWV | MB1 | S | 01LVX455 | N/A | N/A | 10/23/01 |
| VBLKWV | MB1 BS | S | 01LVX455 | N/A | N/A | 10/23/01 |

12/06/01

LIONVILLE LABORATORY INC.

Analytical Report

**Client:** TNU-HANFORD B01-113
**LVL#:** 0110L105
**SDG/SAF#:** H1543/B01-113

**W.O.#:** 11343-606-001-9999-00
**Date Received:** 10-16-01

## METALS CASE NARRATIVE

1. This narrative covers the analysis of 1 soil sample.

2. The sample was 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. The matrix spike (MS) recovery for 1 analyte was outside the 75-125% control limits. Refer to the Inorganics Accuracy Report.

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

| Sample ID | Element | PDS Concentration (ppb) | PDS % Recovery |
|---|---|---|---|
| B12XD2 | Iron | 20,000 | 85.1 |

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

12. All duplicate analyses were within the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

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

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

Iain Daniels
Deputy Laboratory Manager
Lionville Laboratory Incorporated

11-05-01
Date

gmb/m10-105

LVLI
LIONVILLE LABORATORY INC

# METALS METHOD GLOSSARY

'he following methods are used as reference for the digestion and analysis of samples contained within this ,ot#: 0110L105

,eaching Procedure: __1310 __1311 __1312 __Other:_____

:LP 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: Phosphorous Method: 6010B

# 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.

B = Indicates that the parameter was between the Instrument Detection Limit (IDL) and the Contract Required Detection Limit (CRDL)

## Q QUALIFIERS

E = The reported value is estimated because of the presence of interference.

M = Duplicate injection precision not met.

N = Spiked sample recovery not within control limits.

S = The reported value was determined by the Method of Standard Additions (MSA).

W = Post Digestion spike for Furnace AA analysis is out of control limits (85 -115 %), while sample absorbance is less than 50% of spike absorbance.

* = Duplicate analysis not within control limits.

+ = Correlation coefficient for the MSA is less than 0.995.

## ABBREVIATIONS

PB = Method or Preparation Blank.
S = Matrix Spike.
T = Matrix Spike Duplicate.
R or D = Sample Replicate

## 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/O-01/97

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 11/02/01

CLIENT: TNUHANFORD B01-113 H1543 LVL LOT #: 0110L105

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| -001 | B12XD2 | Calcium, Total | 9100 | MG/KG | 0.91 | 1.0 |
| | | Cadmium, Total | 0.03 u | MG/KG | 0.03 | 1.0 |
| | | Chromium, Total | 10.2 | MG/KG | 0.06 | 1.0 |
| | | Iron, Total | 17400 | MG/KG | 1.8 | 1.0 |
| | | Magnesium, Total | 5090 | MG/KG | 0.42 | 1.0 |
| | | Sodium, Total | 225 | MG/KG | 0.37 | 1.0 |
| | | Nickel, Total | 9.0 | MG/KG | 0.10 | 1.0 |
| | | Phosphorus, Total | 469 | MG/KG | 0.51 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 11/02/01

CLIENT: TNUHANFORD B01-113 H1543 LVL LOT #: 0110L105

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|
| BLANK1 | 01L0697-MB1 | Calcium, Total | 1.4 | MG/KG | 0.89 | 1.0 |
| | | Cadmium, Total | 0.03 u | MG/KG | 0.03 | 1.0 |
| | | Chromium, Total | 0.06 u | MG/KG | 0.06 | 1.0 |
| | | Iron, Total | 6.5 | MG/KG | 1.7 | 1.0 |
| | | Magnesium, Total | 1.5 | MG/KG | 0.41 | 1.0 |
| | | Sodium, Total | 3.0 | MG/KG | 0.36 | 1.0 |
| | | Nickel, Total | 0.10 u | MG/KG | 0.10 | 1.0 |
| | | Phosphorus, Total | 2.5 | MG/KG | 0.50 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 11/02/01

CLIENT: TNUHANFORD B01-113 H1543 LVL LOT #: 0110L105

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

| SAMPLE | SITE ID | ANALYTE | SPIKED SAMPLE | INITIAL RESULT | SPIKED AMOUNT | %RECOV | DILUTION FACTOR(SPK) |
|---|---|---|---|---|---|---|---|
| -001 | B12XD2 | Calcium, Total | 11800 | 9100 | 2570 | 105.2 | 1.0 |
| | | Cadmium, Total | 4.6 | 0.03u | 5.1 | 90.2 | 1.0 |
| | | Chromium, Total | 28.9 | 10.2 | 20.5 | 91.2 | 1.0 |
| | | Iron, Total | 17500 | 17400 | 103 | 144.6* | 1.0 |
| | | Magnesium, Total | 7470 | 5090 | 2570 | 92.7 | 1.0 |
| | | Sodium, Total | 2780 | 225 | 2570 | 99.3 | 1.0 |
| | | Nickel, Total | 55.0 | 9.0 | 51.3 | 89.7 | 1.0 |
| | | Phosphorus, Total | 909 | 469 | 514 | 85.9 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 11/02/01

CLIENT: TNUHANFORD B01-113 H1543 LVL LOT #: 0110L105

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

| SAMPLE | SITE ID | ANALYTE | INITIAL RESULT | REPLICATE | RPD | DILUTION FACTOR(REP) |
|---|---|---|---|---|---|---|
| -001REP | B12XD2 | Calcium, Total | 9100 | 8940 | 1.8 | 1.0 |
| | | Cadmium, Total | 0.03u | 0.03u | NC | 1.0 |
| | | Chromium, Total | 10.2 | 10.7 | 4.8 | 1.0 |
| | | Iron, Total | 17400 | 17800 | 2.6 | 1.0 |
| | | Magnesium, Total | 5090 | 5180 | 1.6 | 1.0 |
| | | Sodium, Total | 225 | 221 | 1.9 | 1.0 |
| | | Nickel, Total | 9.0 | 8.8 | 2.2 | 1.0 |
| | | Phosphorus, Total | 469 | 425 | 9.8 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 11/02/01

CLIENT: TNUHANFORD B01-113 H1543 LVL LOT #: 0110L105

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

| SAMPLE | SITE ID | ANALYTE | SPIKED SAMPLE | SPIKED AMOUNT | UNITS | %RECOV |
|---|---|---|---|---|---|---|
| LCS1 | 01L0697-LC1 | Calcium, LCS | 2430 | 2500 | MG/KG | 97.3 |
| | | Cadmium, LCS | 24.3 | 25.0 | MG/KG | 97.2 |
| | | Chromium, LCS | 49.7 | 50.0 | MG/KG | 99.4 |
| | | Iron, LCS | 498 | 500 | MG/KG | 99.5 |
| | | Magnesium, LCS | 2480 | 2500 | MG/KG | 99.4 |
| | | Sodium, LCS | 2380 | 2500 | MG/KG | 95.4 |
| | | Nickel, LCS | 195 | 200 | MG/KG | 97.6 |
| | | Phosphorus, LCS | 475 | 500 | MG/KG | 95.1 |

Lionville Laboratory Use Only

2110L105

# Custody Transfer Record/Lab Work Request

Page 1 of 1

**FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS**

LVLI

Client: TAU-HANFORD SAF B01-113

Est. Final Proj. Sampling Date:

Project #: 11343-606-001-9999-00

Project Contact/Phone #:

Lionville Laboratory Project Manager: OJ

QC: SPEC Del: STD TAT: 30

Date Rec'd: 10-16-01 Date Due: 11-15-01

| | | A | B | | | C | D | | E | | F | G | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Refrigerator # | | 1 | 6 | | | 1 | 6 | | 6 | | 6 | 6 | | | | |
| #/Type Container | Liquid | 1AG | 1AG | | | 1AG | 1AG | | 1AG | | 1AG | 1AG | | | | |
| | Solid | | | | | | | | | | | | | | | |
| Volume | Liquid | | | | | | | | | | | | | | | |
| | Solid | 250 | 250 | | | 125 | 60 | | 500 | | 500 | 125 | | | | |
| Preservatives | | | | | | | | | | | | | | | | |
| ANALYSES REQUESTED | | ORGANIC | | | | | | | INORG | | | | | | | |
| | | VOA | BNA | Pest/PCB | Herb | TIC TOC | OIL Grease | | Metal | CN | F.C Anions | HEX Chrom. | | | | |
| | | Lionville Laboratory Use Only | | | | | | | | | | | | | | |
| | | 0624X | 0625X | | | ITIC IOCT | IOGGR | | MET① | | INORG① | ICR6 | | | | |

MATRIX CODES:
S - Soil
SE - Sediment
SG - 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 | 0624X | 0625X | | | ITIC IOCT | IOGGR | | MET① | | INORG① | ICR6 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 001 | B12XD2 | ✓ | ✓ | S | 10-12-01 | 0050 | X | X | | | X | X | | X | | X | X | | | | |

Special Instructions:

SAF # B01-113

DATE/REVISIONS:

1. MET① Cd, Ca, Cr, Fe, Mg, Ni, Na, P
2. INORG① ICCL, ICFL, ICNO3, ICNO2, ICPO4, ICSO4, IN3N2
3.
4.
5.
6.

| Relinquished by | Received by | Date | Time |
|---|---|---|---|
| FEDEX | [illegible] | 10-16-01 | 0930 |

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

Lionville Laboratory Use Only

Samples were:
1) Shipped ✓ or Hand Delivered
Airbill # SEE BELOW
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. 4.0 °C

Discrepancies Between Samples Labels and COC Record? Y or N

NOTES: 4235795 4B041

| Bechtel Hanford Inc. | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | B01-113-03 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: Renee Nielson | Company Contact: Virginia Rohay | Telephone No.: 372-9100 | Project Coordinator: TRENT, SJ |
| Price Code: 8N | Data Turnaround: 45 Days | Air Quality ☐ | |
| Project Designation: PFP Well Installation Sampling and Analysis - Soil | Sampling Location: 200 West; Well 299-W15-764; 60.0' - 62.5' depth | SAF No.: B01-113 | |
| Ice Chest No.: ERC99-046 | Field Logbook No.: EL-1562 | COA: T20ZP1D722 | Method of Shipment: Federal Express |
| Shipped To: TMA/RECRA | Offsite Property No.: A020023 | Bill of Lading/Air Bill No.: 4235954-8041 | |

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | Cool 4C | None | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | None | | |
| Type of Container | aG | aG | aG | aG | aG | aG | aG | aG | | | |
| No. of Container(s) | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | | | |
| Volume | 60mL | 60mL | 120mL | 120mL | 250mL | 250mL | 500mL | 500mL | 100mL | | |
| SAMPLE ANALYSIS | Oil & Grease - 413.1 | Gross Alpha; Gross Beta | Chromium Hex - 7196 | TIC - 415.1M; TOC - 415.1 | See item (1) in Special Instructions. | VOA - 8260A (TCL); VOA - 8260A (Add-On) (n-Butylbenzene) | See item (2) in Special Instructions. | See item (3) in Special Instructions. | See item (4) in Special Instructions. | | |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | |
| B12XD2 | SOIL | 10/12/01 | 0050 | X | | X | X | X | X | X | X | B12XD1-1 |

CHAIN OF POSSESSION — Sign/Print Names

| Relinquished By | Date/Time | Received By | Date/Time |
|---|---|---|---|
| R. Nielson | 10/12/01 0430 | Stored in Ref #2C | 10/12/01 0430 |
| Removed from Ref 2C 3728 | 10-15-01 0900 | R. Thorer | 10-15-01 0900 |
| R. Thorer | 10-15-01 0900 | FEDEX | |
| FEDEX | 10-16-01 0930 | Carla Bennett | 10-16-01 0930 |
| | | | |
| | | | |

SPECIAL INSTRUCTIONS

** The ERC acknowledges that the analytical holding time for Nitrate by EPA Method 300.0 will not be met.

** If a limited quantity of sample material is received, perform analyses in the order listed on the FSR.

(1) Semi-VOA - 8270A (TCL); Semi-VOA -- 8270A (Add-On) (Tributyl phosphate) RJN 9/20/01

(2) IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); NO2/NO3 - 353.2; ~~pH (Soil) - 9045~~ RJN 9/20/01

(3) ICP Metals - 6010A (TAL) (Cadmium, Calcium, Chromium, Iron, Magnesium, Nickel, Sodium); ICP Metals - 6010A (Add-on) (Phosphorus) RJN 9/20/01

~~(4) Gamma Spectroscopy (Cesium-137, Cobalt-60); Gamma Spec - Add-on (Antimony-125, Europium-154, Ruthenium-106); Americium-241; Neptunium-237; Isotopic Plutonium; Strontium-89,90 -- Total Sr~~ RT 10.15.01

Matrix *: S=Soil; SE=Sediment; SO=Solid; S=Sludge; W=Water; O=Oil; A=Air; DS=Drum Solids; DL=Drum Liquids; T=Tissue; WP=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)

LIONVILLE LABORATORY INC.

**Client:** TNU-HANFORD B01-113
**LVL #:** 0110L105
**SDG/SAF #:** H1543/B01-113

**W.O. #:** 11343-606-001-9999-00
**Date Received:** 10-16-2001

**SEMIVOLATILE**

One (1) soil sample was collected on 10-12-2001.

The sample and its associated QC samples were extracted on 10-18-2001 and analyzed according to criteria set forth in Lionville Laboratory OPs based on SW 846 Method 8270C for TCL and Tributylphosphate Semivolatile target compounds on 10-23-2001.

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

1. The cooler temperature upon receipt has been recorded on the chain-of-custody.
2. Samples were extracted and analyzed within required holding time.
3. A non-target compound was detected in the sample.
4. All surrogate recoveries were within EPA QC limits.
5. One (1) of twenty-two (22) matrix spike recoveries was outside EPA QC limits.
6. Two (2) of twenty-two (22) blank spike recoveries were outside EPA QC limits.
7. Internal standard area and retention time criteria were met.
8. 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.

J. Michael Taylor
President
Lionville Laboratory Incorporated

11/5/01
Date

som\gorup\data\bna\tnu-hanford-0110-105.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. *Therefore, this report should only be reproduced in its entirety of 11 pages.*



208 Welsh Pool Road • Lionville, PA 19341-1333 • (610) 280-3000 • Fax (610) 280-3041

## GLOSSARY OF BNA DATA

### DATA QUALIFIERS

U = Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture.

J = Indicates an estimated value. This flag is used under the following circumstances: 1) when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed; or 2) when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. For example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.

B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.

E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.

D = Identifies all compounds identified in an analysis at a secondary dilution factor.

I = Interference.

NQ = Result qualitatively confirmed but not able to quantify.

A = Indicates that a TIC is a suspected aldol-condensation product.

N = Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds (TICs), where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N code is not used.

X = This flag is used for a TIC compound which is quantified relative to a response factor generated from a daily calibration standard (rather than quantified relative to the closest internal standard).

Y = Additional qualifiers used as required are explained in the case narrative.

# GLOSSARY OF BNA DATA

## ABBREVIATIONS

| | | |
|---|---|---|
| BS | = | Indicates blank spike in which reagent grade water is spiked with the CLP matrix spike solutions and carried through all the steps in the method. Spike recoveries are reported. |
| BSD | = | Indicates blank spike duplicate. |
| MS | = | Indicates matrix spike. |
| MSD | = | Indicates matrix spike duplicate. |
| DL | = | Suffix added to sample number to indicate that results are from a diluted analysis. |
| NA | = | Not Applicable. |
| DF | = | Dilution Factor. |
| NR | = | Not Required. |
| SP, Z | = | Indicates Spiked Compound. |

VLI
LIONVILLE LABORATORY INC

## TECHNICAL FLAGS FOR MANUAL INTEGRATION

Manual quantitation modifications or integrations are performed routinely to improve the data quality for a variety of technical reasons. Documentation of these modifications should be clear and concise. The following "flags" are used to indicate the technical reasons for quantitation modifications:

**MP** - Missed Peak: manually added peak not found by automatic quantitation program.

**PA** - Peak Assignment: quantitation report was changed to reflect correct peak assignment.

**RI** - Routine Integration: routine integrations are performed for some analytes that are consistently integrated improperly by the automatic integration programs. Examples are the dichlorobenzene isomers on the VOA packed column and benzo(b)fluoranthene/benzo(k)fluoranthene which are poorly resolved on the BNA column.

**SP** - Split Peak: the automatic integration improperly split the peak; a manual integration was performed to get the correct area.

**CB** - Coelution/Background: peak was manually integrated to eliminate contribution from coeluting compounds, background signal, or other interference.

**PI** - Proper Integration: a peak with poor or inconsistent integration (e.g., excessive tail) was properly integrated manually.

**Lionville Laboratory, Inc.**

Semivolatiles by GC/MS, Special List — Report Date: 10/24/01 12:53

RFW Batch Number: **0110L105** — Client: **TNUHANFORD B01-113 H1543** — Work Order: 11343606001 — Page: 1a

| | Cust ID: | B12XD2 | | B12XD2 | | B12XD2 | | SBLKID | | SBLKID BS | | SBLKID BSD | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Information | RFW#: | 001 | | 001 MS | | 001 MSD | | 01LE1248-MB1 | | 01LE1248-MB1 | | 01LE1248-MB1 | |
| | Matrix: | SOIL | | SOIL | | SOIL | | SOIL | | SOIL | | SOIL | |
| | D.F.: | 1.00 | | 1.00 | | 1.00 | | 1.00 | | 1.00 | | 1.00 | |
| | Units: | ug/Kg | | ug/Kg | | ug/Kg | | ug/Kg | | ug/Kg | | ug/Kg | |
| Surrogate Recovery | Nitrobenzene-d5 | 90 | % | 69 | % | 85 | % | 85 | % | 75 | % | 82 | % |
| | 2-Fluorobiphenyl | 80 | % | 62 | % | 77 | % | 81 | % | 69 | % | 78 | % |
| | p-Terphenyl-d14 | 114 | % | 85 | % | 106 | % | 121 | % | 99 | % | 112 | % |
| | Phenol-d5 | 91 | % | 66 | % | 77 | % | 84 | % | 75 | % | 82 | % |
| | 2-Fluorophenol | 81 | % | 64 | % | 74 | % | 77 | % | 65 | % | 73 | % |
| | 2,4,6-Tribromophenol | 93 | % | 66 | % | 85 | % | 87 | % | 90 | % | 95 | % |
| | | | fl | | fl | | fl | | fl | | fl | | fl |
| Phenol | | 350 | U | 61 | % | 72 | % | 330 | U | 69 | % | 73 | % |
| bis(2-Chloroethyl)ether | | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| 2-Chlorophenol | | 350 | U | 63 | % | 74 | % | 330 | U | 69 | % | 74 | % |
| 1,3-Dichlorobenzene | | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| 1,4-Dichlorobenzene | | 350 | U | 56 | % | 65 | % | 330 | U | 62 | % | 67 | % |
| 1,2-Dichlorobenzene | | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| 2-Methylphenol | | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| 2,2'-oxybis(1-Chloropropane) | | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| 4-Methylphenol | | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| N-Nitroso-Di-n-propylamine | | 350 | U | 57 | % | 72 | % | 330 | U | 80 | % | 81 | % |
| Hexachloroethane | | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| Nitrobenzene | | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| Isophorone | | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| 2-Nitrophenol | | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| 2,4-Dimethylphenol | | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| bis(2-Chloroethoxy)methane | | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| 2,4-Dichlorophenol | | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| 1,2,4-Trichlorobenzene | | 350 | U | 61 | % | 75 | % | 330 | U | 66 | % | 71 | % |
| Naphthalene | | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| 4-Chloroaniline | | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| Hexachlorobutadiene | | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| 4-Chloro-3-methylphenol | | 350 | U | 67 | % | 84 | % | 330 | U | 86 | % | 90 | % |
| 2-Methylnaphthalene | | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| Hexachlorocyclopentadiene | | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| 2,4,6-Trichlorophenol | | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| 2,4,5-Trichlorophenol | | 860 | U | 860 | U | 860 | U | 830 | U | 830 | U | 830 | U |

*= Outside of EPA CLP QC limits.

RFW Batch Number: 0110L105 Client: TNUHANFORD B01-113 H1543 Work Order: 11343606001 Page: 1b

| Cust ID: | B12XD2 | | B12XD2 | | B12XD2 | | SBLKID | | SBLKID BS | | SBLKID BSD | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RFW#: | 001 | | 001 MS | | 001 MSD | | 01LE1248-MB1 | | 01LE1248-MB1 | | 01LE1248-MB1 | |
| 2-Chloronaphthalene | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| 2-Nitroaniline | 860 | U | 860 | U | 860 | U | 830 | U | 830 | U | 830 | U |
| Dimethylphthalate | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| Acenaphthylene | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| 2,6-Dinitrotoluene | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| 3-Nitroaniline | 860 | U | 860 | U | 860 | U | 830 | U | 830 | U | 830 | U |
| Acenaphthene | 350 | U | 63 | % | 79 | % | 330 | U | 72 | % | 80 | % |
| 2,4-Dinitrophenol | 860 | U | 860 | U | 860 | U | 830 | U | 830 | U | 830 | U |
| 4-Nitrophenol | 860 | U | 72 | % | 91 | % | 830 | U | 100 | % | 103 | % |
| Dibenzofuran | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| 2,4-Dinitrotoluene | 350 | U | 73 | % | 91 * | % | 330 | U | 95 * | % | 100 * | % |
| Diethylphthalate | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| 4-Chlorophenyl-phenylether | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| Fluorene | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| 4-Nitroaniline | 860 | U | 860 | U | 860 | U | 830 | U | 830 | U | 830 | U |
| 4,6-Dinitro-2-methylphenol | 860 | U | 860 | U | 860 | U | 830 | U | 830 | U | 830 | U |
| N-Nitrosodiphenylamine (1) | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| 4-Bromophenyl-phenylether | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| Hexachlorobenzene | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| Pentachlorophenol | 860 | U | 65 | % | 82 | % | 830 | U | 87 | % | 94 | % |
| Phenanthrene | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| Anthracene | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| Carbazole | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| Di-n-Butylphthalate | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| Fluoranthene | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| Pyrene | 350 | U | 74 | % | 94 | % | 330 | U | 89 | % | 99 | % |
| Butylbenzylphthalate | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| 3,3'-Dichlorobenzidine | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| Benzo(a)anthracene | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| Chrysene | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| bis(2-Ethylhexyl)phthalate | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| Di-n-Octyl phthalate | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| Benzo(b)fluoranthene | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| Benzo(k)fluoranthene | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| Benzo(a)pyrene | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| Indeno(1,2,3-cd)pyrene | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| Dibenzo(a,h)anthracene | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| Benzo(g,h,i)perylene | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |
| Tributylphosphate | 350 | U | 350 | U | 350 | U | 330 | U | 330 | U | 330 | U |

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

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

B12XD2

Lab Name: Lionville Labs, Inc. Work Order: 11343606001

Client: TNUHANFORD B01-113 H1543

Matrix: (soil/water) SOIL

Lab Sample ID: 0110L105-001

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: D102310

Level: (low/med) LOW

Date Received: 10/16/01

% Moisture: 4 decanted: (Y/N)__

Date Extracted: 10/18/01

Concentrated Extract Volume: 1000(uL)

Date Analyzed: 10/23/01

Injection Volume: 2.0(uL)

Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: ____

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/Kg

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| 1. | UNKNOWN | 5.077 | 400 | JB |

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

SBLKID

Lab Name: Lionville Labs, Inc. Work Order: 11343606001

Client: TNUHANFORD B01-113 H1543

Matrix: (soil/water) SOIL

Lab Sample ID: 01LE1248-MB1

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: D102307

Level: (low/med) LOW

Date Received: 10/18/01

% Moisture: _____ decanted: (Y/N)__

Date Extracted: 10/18/01

Concentrated Extract Volume: 1000(uL)

Date Analyzed: 10/23/01

Injection Volume: 2.0(uL)

Dilution Factor: 1.00

GPC Cleanup: (Y/N) N

pH: _____

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/Kg

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| 1. | UNKNOWN | 5.085 | 400 | J |



9

Lionville Laboratory Use Only

0110L105

# Custody Transfer Record/Lab Work Request

Page 1 of 1

**FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS**

Client: TAU-HANFORD SAF B01-113

Est. Final Proj. Sampling Date:

Project #: 11343-606-001-9999-00

Project Contact/Phone #:

Lionville Laboratory Project Manager: 05

QC: SPEC Del: STD TAT: 30

Date Rec'd: 10-16-01 Date Due: 11-05-01

| | | A | B | | | C | D | | E | | F | G | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Refrigerator # | | 1 | 6 | | | 1 | 6 | | 6 | | 6 | 6 | | | | |
| #/Type Container | Liquid | 1AG | 1AG | | | 1AG | 1AG | | 1AG | | 1AG | 1AG | | | | |
| | Solid | | | | | | | | | | | | | | | |
| Volume | Liquid | | | | | | | | | | | | | | | |
| | Solid | 250 | 250 | | | 125 | 60 | | 500 | | 500 | 125 | | | | |
| Preservatives | | | | | | | | | | | | | | | | |
| ANALYSES REQUESTED → | | ORGANIC | | | | | | | INORG | | | | | | | |
| | | VOA | BNA | Pest/PCB | Herb | TIC TOC | OIL Gravimetric | | Metal | CN | I.C Anions | HEX Chrom. | | | | |
| Lionville Laboratory Use Only | | 0624X | 0625X | | | ITIC IOCT | IOGGR | | MET① | | INORG① | ICRG | | | | |

| MATRIX CODES: | Lab ID | Client ID/Description | Matrix QC Chosen (✓) MS | MSD | Matrix | Date Collected | Time Collected | 0624X | 0625X | | | ITIC IOCT | IOGGR | | MET① | | INORG① | ICRG | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S - Soil<br>SE - Sediment<br>SO - Solid<br>SL - Sludge<br>W - Water<br>O - Oil<br>A - Air<br>DS - Drum Solids<br>DL - Drum Liquids<br>L - EP/TCLP Leachate<br>Wi - Wipe<br>X - Other<br>F - Fish | 001 | B12XD2 | ✓ | ✓ | S | 10-12-01 | 0050 | X | X | | | X | X | | X | | X | X | | | | |

Special Instructions:

SAF # B01-113

DATE/REVISIONS:

MET① 1. Cd, Ca, Cr, Fe, Mg, Ni, Na, P

INORG① 2. ICCL, ICFL, ICNO3, ICNO2, ICPO4, ICSO4, IN3N2

3.

4.

5.

6.

| Relinquished by | Received by | Date | Time |
|---|---|---|---|
| FEDEX | [signature] | 10-16-01 | 0930 |

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

Discrepancies Between Samples Labels and COC Record? Y or N

NOTES:

4275795 4 R041

Lionville Laboratory Use Only

Samples were:
1) Shipped ✓ or Hand Delivered
Airbill # SEE BELOW
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. 4.0 °C

| Bechtel Hanford Inc. | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | B01-113-03 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: Renee Nielson | Company Contact: Virginia Rohay; Telephone No.: 372-9100 | Project Coordinator: TRENT, SJ | Price Code: 8N; Data Turnaround: 45 Days; Air Quality ☐ |
| Project Designation: PFP Well Installation Sampling and Analysis - Soil | Sampling Location: 200 West; Well 299-W15-764; 60.0' - 62.5' depth | SAF No.: B01-113 | |
| Ice Chest No.: ERC99-046 | Field Logbook No.: EL-1562; COA: T20ZP1D722 | Method of Shipment: Federal Express | |
| Shipped To: TMA/RECRA | Offsite Property No.: A020023 | Bill of Lading/Air Bill No.: 4235795 4-8041 | |

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | Cool 4C | None RJN 10.15.01 | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | None | | |
| Type of Container | aG | aG | aG | aG | aG | aG | aG | aG | aG RJN 10.15.01 | | |
| No. of Container(s) | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | | | |
| Volume | 60mL | 60mL | 120mL | 120mL | 250mL | 250mL | 500mL | 500mL | 1000mL | | |
| SAMPLE ANALYSIS | Oil & Grease - 413.1 | Gross Alpha; Gross Beta | Chromium Hex - 7196 | TIC - 415.1M; TOC - 415.1 | See item (1) in Special Instructions. | VOA - 8260A (TCL); VOA - 8260A (Add-On) (n-Butylbenzene) | See item (2) in Special Instructions. | See item (3) in Special Instructions. | See item (4) in Special Instructions. | | |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | |
| B12XD2 | SOIL | 10/12/01 | 0050 | X | | X | X | X | X | X | B12XD1 |

CHAIN OF POSSESSION — Sign/Print Names

| Relinquished By | Date/Time | Received By | Date/Time |
|---|---|---|---|
| R. Nielson / R. Nielson | 10/12/01 0430 | STORED IN REF #2C | 10/12/01 0430 |
| Removed from Ref 2C 3728 | 10-15-01 0900 | R Thorer | 10-15-01 0900 |
| R Thorer ERC | 10-15-01 0900 | FEDEX | |
| FEDEX | 10-16-01 0930 | Carla Hemry | 10-16-01 0930 |
| | | | |
| | | | |

SPECIAL INSTRUCTIONS

** The ERC acknowledges that the analytical holding time for Nitrate by EPA Method 300.0 will not be met.

** If a limited quantity of sample material is received, perform analyses in the order listed on the FSR.

(1) Semi-VOA - 8270A (TCL); Semi-VOA -- 8270A (Add-On) (Tributyl phosphate) RJN 9/24/01

(2) IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); NO2/NO3 - 353.2; ~~pH (Soil) - 9045~~ RJN 9/20/01

(3) ICP Metals - 6010A (TAL) (Cadmium, Calcium, Chromium, Iron, Magnesium, Nickel, Sodium); ICP Metals - 6010A (Add-on) (Phosphorus) RJN 9/20/01

~~(4) Gamma Spectroscopy (Cesium-137, Cobalt-60); Gamma Spec - Add-on (Antimony-125, Europium-154, Ruthenium-106); Americium-241, Neptunium-237, Isotopic Plutonium, Strontium-89,90 -- Total Sr~~ RT 10.15.01

Matrix *: S=Soil; SD=Sediment; SO=Solid; S=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)

LIONVILLE LABORATORY INC.

**Analytical Report**

**Client:** TNU-HANFORD B01-112 H11543 H1543 **W.O.#:** 11343-606-001-9999-00
**LVL#:** 0110L105 cg 11/9/01 **Date Received:** 10-16-01

**INORGANIC NARRATIVE**

1. This narrative covers the analyses of 1 soil sample.

2. The sample was 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.

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

8. The replicate analyses were within the 20% Relative Percent Difference (RPD) control limit.

9. Results for solid samples are reported on a dry weight basis and Total Organic Carbon samples are dried prior to analysis.

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

11-9-01
Date

njp\i10-105

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 12 pages.



208 Welsh Pool Road • Lionville, PA 19341-1333 • (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 | __ 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 /413.1 | |
| Carbon, Total Organic and Inorganic | | __ 9060 | ✓ Lloyd Kahn (mod)/ /415.1 |
| 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.)

# 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 11/09/01

CLIENT: TNUHANFORD B01-113 H1543 LVL LOT #: 0110L105

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

| SAMPLE | SITE ID | ANALYTE | RESULT | | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|---|
| -001 | B12XD2 | % Solids | 96.4 | | % | 0.01 | 1.0 |
| | | Chloride by IC | 5.5 | | MG/KG | 1.3 | 1.0 |
| | | Fluoride by IC | 2.6 | u | MG/KG | 2.6 | 1.0 |
| | | Nitrite by IC | 1.30 | u | MG/KG | 1.30 | 1.0 |
| | | Nitrate by IC | 4.69 | | MG/KG | 1.30 | 1.0 |
| | | Phosphate by IC | 1.3 | u | MG/KG | 1.3 | 1.0 |
| | | Chromium VI | 1.3 | | MG/KG | 0.42 | 1.0 |
| | | Sulfate by IC | 10 | | MG/KG | 1.3 | 1.0 |
| | | Nitrate Nitrite | 1.1 | | MG/KG | 0.21 | 1.0 |
| | | Total Organic Carbon | 111 | u | MG/KG | 111 | 1.0 |
| | | Oil & Grease Gravimetri | 166 | | MG/KG | 138 | 1.0 |
| | | Total Inorganic Carbon | 1190 | | MG/KG | 110 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 11/09/01

CLIENT: TNUHANFORD B01-113 H1543 LVL LOT #: 0110L105

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

| SAMPLE | SITE ID | ANALYTE | RESULT | | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---|---|---|---|---|---|---|---|
| BLANK10 | 01LIC072-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 | 01LVI084-MB1 | Chromium VI | 0.40 | u | MG/KG | 0.40 | 1.0 |
| BLANK10 | 01LN3A58-MB1 | Nitrate Nitrite | 0.20 | u | MG/KG | 0.20 | 1.0 |
| BLANK10 | 01LTZ035-MB1 | Total Organic Carbon | 20.0 | u | MG/KG | 20.0 | 1.0 |
| BLANK10 | 01LOG037-MB1 | Oil & Grease Gravimetri | 133 | u | MG/KG | 133 | 1.0 |
| BLANK10 | 01LTZA35-MB1 | Total Inorganic Carbon | 20.0 | u | MG/KG | 20.0 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 11/09/01

CLIENT: TNUHANFORD B01-113 H1543 LVL LOT #: 0110L105

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

| SAMPLE | SITE ID | ANALYTE | SPIKED SAMPLE | INITIAL RESULT | SPIKED AMOUNT | %RECOV | DILUTION FACTOR(SPK) |
|---|---|---|---|---|---|---|---|
| -001 | B12XD2 | Chloride by IC | 32.0 | 5.5 | 25.9 | 102.1 | 1.0 |
| | | Fluoride by IC | 56.0 | 0.35 | 51.9 | 107.2 | 1.0 |
| | | Nitrite by IC | 25.6 | 1.30u | 25.9 | 98.8 | 1.0 |
| | | Nitrate by IC | 31.2 | 4.69 | 25.9 | 102.1 | 1.0 |
| | | Phosphate by IC | 25.9 | 1.3 u | 25.9 | 99.8 | 1.0 |
| | | Soluble Chromium VI | 6.1 | 1.3 | 4.1 | 114.1 | 1.0 |
| | | Insoluble Chromium VI | 1270 | 1.3 | 1340 | 95.1 | 100 |
| | | Sulfate by IC | 36.8 | 10 | 25.9 | 103.7 | 1.0 |
| | | Nitrate Nitrite | 6.0 | 1.1 | 5.3 | 92.0 | 1.0 |
| | | Total Organic Carbon | 2300 | 0.0 | 2290 | 100.6 | 1.0 |
| | | Oil & Grease Gravimetr | 5250 | 166 | 6060 | 84.0 | 1.0 |
| BLANK10 | 01LIC072-MB1 | Chloride by IC | 24.9 | 1.2 u | 25.0 | 99.5 | 1.0 |
| | | Fluoride by IC | 53.9 | 2.5 u | 50.0 | 107.8 | 1.0 |
| | | Nitrite by IC | 24.0 | 1.25u | 25.0 | 96.2 | 1.0 |
| | | Nitrate by IC | 25.5 | 1.25u | 25.0 | 102.1 | 1.0 |
| | | Phosphate by IC | 26.4 | 1.2 u | 25.0 | 105.4 | 1.0 |
| | | Sulfate by IC | 24.6 | 1.2 u | 25.0 | 98.6 | 1.0 |
| BLANK10 | 01LVI084-MB1 | Soluble Chromium VI | 4.0 | 0.40u | 4.0 | 100.3 | 1.0 |
| | | Insoluble Chromium VI | 1400 | 0.40u | 1350 | 103.6 | 100 |
| BLANK10 | 01LN3A58-MB1 | Nitrate Nitrite | 5.2 | 0.20u | 5.0 | 104.0 | 1.0 |
| BLANK10 | 01LTZ035-MB1 | Total Organic Carbon | 401 | 20.0 u | 400 | 100.2 | 1.0 |
| BLANK10 | 01LOG037-MB1 | Oil & Grease Gravimetr | 5040 | 133 u | 5840 | 86.3 | 1.0 |
| BLANK10 | 01LTZA35-MB1 | Total Inorganic Carbon | 401 | 20.0 u | 400 | 100.2 | 1.0 |

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 11/09/01

CLIENT: TNUHANFORD B01-113 H1543 LVL LOT #: 0110L105

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

| SAMPLE | SITE ID | ANALYTE | INITIAL RESULT | REPLICATE | RPD | DILUTION FACTOR(REP) |
|---|---|---|---|---|---|---|
| -001REP | B12XD2 | % Solids | 96.4 | 96.3 | 0.11 | 1.0 |
| | | Chloride by IC | 5.5 | 4.9 | 12.1 | 1.0 |
| | | Fluoride by IC | 2.6 u | 2.6 u | NC | 1.0 |
| | | Nitrite by IC | 1.30u | 1.30u | NC | 1.0 |
| | | Nitrate by IC | 4.69 | 4.62 | 1.6 | 1.0 |
| | | Phosphate by IC | 1.3 u | 1.3 u | NC | 1.0 |
| | | Chromium VI | 1.3 | 1.5 | 9.8 | 1.0 |
| | | Sulfate by IC | 10 | 9.3 | 7.1 | 1.0 |
| | | Nitrate Nitrite | 1.1 | 1.1 | 3.9 | 1.0 |
| | | Total Organic Carbon | 111 u | 113 u | NC | 1.0 |
| | | Oil & Grease Gravimetri | 166 | 180 | 8.0 | 1.0 |

Lionville Laboratory Use Only

0110L105

# Custody Transfer Record/Lab Work Request

Page 1 of 1

**FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS**

Client: TNU HANFORD SAF B01-113

Est. Final Proj. Sampling Date:

Project #: 11343-606-001-9999-00

Project Contact/Phone #:

Lionville Laboratory Project Manager: OJ

QC: SPEC Del: STD TAT: 30

Date Rec'd: 10-16-01 Date Due: 11-15-01

| | | A | B | | | C | D | | E | | F | G | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Refrigerator # | | 1 | 6 | | | 1 | 6 | | 6 | | 6 | 6 | | | | |
| #/Type Container | Liquid | 1AG | 1AG | | | 1AG | 1AG | | 1AG | | 1AG | 1AG | | | | |
| | Solid | | | | | | | | | | | | | | | |
| Volume | Liquid | | | | | | | | | | | | | | | |
| | Solid | 250 | 250 | | | 125 | 60 | | 500 | | 500 | 125 | | | | |
| Preservatives | | | | | | | | | | | | | | | | |
| ANALYSES REQUESTED → | | ORGANIC | | | | | | | INORG | | | | | | | |
| | | VOA | BNA | Pest/PCB | Herb | TIC TOC | OIL Grease | | Metal | CN | I.C Anions | HEX Chrom. | | | | |
| | | Lionville Laboratory Use Only | | | | | | | | | | | | | | |
| | | 0624X | 0625X | | | ITIC IOCT | IOGGR | | ALL(1) | | INORG(1) | ICRL | | | | |

| MATRIX CODES: | Lab ID | Client ID/Description | Matrix QC Chosen (✓) MS | MSD | Matrix | Date Collected | Time Collected | 0624X | 0625X | | | ITIC IOCT | IOGGR | | ALL(1) | | INORG(1) | ICRL | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S - Soil<br>SE - Sediment<br>SO - Solid<br>SL - Sludge<br>W - Water<br>O - Oil<br>A - Air<br>DS - Drum Solids<br>DL - Drum Liquids<br>L - EP/TCLP Leachate<br>Wi - Wipe<br>X - Other<br>F - Fish | 001 | B12XD2 | ✓ | ✓ | S | 10-12-01 | 0050 | X | X | | | X | X | | X | | X | X | | | | |

**Special Instructions:**

SAF # B01-113

**DATE/REVISIONS:**

MET(1) 1. Cd, Ca, Cr, Fe, Mg, Ni, Na, P

INORG(1) 2. ICCL, ICFL, ICNO3, ICNO2, ICPO4, ICSO4, IN3N2

3.

4.

5.

6.

**Lionville Laboratory Use Only**

Samples were:
1) Shipped ✓ or Hand Delivered ___
Airbill # SEE BELOW
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. 4.0 °C

Discrepancies Between Samples Labels and COC Record? Y or N

NOTES: 4235795480 41

| Relinquished by | Received by | Date | Time |
|---|---|---|---|
| FEDEX | [signature] | 10-16-01 | 0930 |

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

**Bechtel Hanford Inc.**

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B01-113-03 | Page 1 of 1

| | | | |
|---|---|---|---|
| **Collector** Renee Nielson | **Company Contact** Virginia Rohay | **Telephone No.** 372-9100 | **Project Coordinator** TRENT, SJ |
| **Price Code** 8N | **Data Turnaround** 45 Days | **Air Quality** ☐ | |
| **Project Designation** PFP Well Installation Sampling and Analysis - Soil | **Sampling Location** 200 West; Well 299-W15-764; 60.0' - 62.5' depth | **SAF No.** B01-113 | |
| **Ice Chest No.** ERC99-046 | **Field Logbook No.** EL-1562 | **COA** T20ZP1D722 | **Method of Shipment** Federal Express |
| **Shipped To** TMA/RECRA RECRA | **Offsite Property No.** A020023 | | **Bill of Lading/Air Bill No.** 4230754-8041 |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

**Special Handling and/or Storage**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Preservation** | Cool 4C | None RT 10/15/01 | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | Cool 4C | None RT 10/15/01 | |
| **Type of Container** | aG | | aG | aG | aG | aG | aG | aG | | |
| **No. of Container(s)** | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | | |
| **Volume** | 60mL | 60mL | 120mL | 120mL | 250mL | 250mL | 500mL | 500mL | 100mL | |
| **SAMPLE ANALYSIS** | Oil & Grease - 413.1 | Gross Alpha; Gross Beta | Chromium Hex - 7196 | TIC - 415.1M; TOC - 415.1 | See item (1) in Special Instructions. | VOA - 8260A (TCL); VOA - 8260A (Add-On) (n-Butylbenzene) | See item (2) in Special Instructions. | See item (3) in Special Instructions. | See item (4) in Special Instructions. | |

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B12XD2 | SOIL | 10/12/01 | 0050 | X | | X | X | X | X | X | X | | B12XD1-A |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

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

| Relinquished By | Date/Time | Received By | Date/Time |
|---|---|---|---|
| Renee Nielson / R. Nielson | 10/12/01 0430 | Stored in Ref #2C | 10/12/01 0430 |
| Removed from Ref 2C 3728 | 10-15-01 0900 | R Thorer | 10-15-01 0900 |
| R Thorer ERC | 10-15-01 | FEDEX | |
| FEDEX | 10-16-01 0930 | Carla Henry | 10-16-01 0930 |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS**

** The ERC acknowledges that the analytical holding time for Nitrate by EPA Method 300.0 will not be met.

** If a limited quantity of sample material is received, perform analyses in the order listed on the FSR.

(1) Semi-VOA - 8270A (TCL); Semi-VOA -- 8270A (Add-On) (Tributyl phosphate) RJN 9/20/01

(2) IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); NO2/NO3 - 353.2; ~~pH (Soil) - 9045~~ RJN 9/20/01

(3) ICP Metals - 6010A (TAL) (Cadmium, Calcium, Chromium, Iron, Magnesium, Nickel, Sodium); ICP Metals - 6010A (Add-on) (Phosphorus) RJN 9/20/01

~~(4) Gamma Spectroscopy (Cesium-137, Cobalt-60); Gamma Spec. - Add-on (Antimony-125, Europium-154, Ruthenium-106); Americium-241; Neptunium-237; Isotopic Plutonium; Strontium-89,90 -- Total Sr~~ RT 10/15/01

**Matrix ***

S=Soil, SB=Sediment, SO=Solid, S=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)