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Thermo Nutech
W.O. No. N9-09-210-7224

Bechtel Hanford Inc.
SDG H0544

EDMC

Case Narrative

1.0 GENERAL

Bechtel Hanford Inc. Sample Delivery Group H0544 is composed of two solid (soil) samples designated under SAF No. B99-075 with a Project Designation of: 105-DR FSB-Soil.

The samples were received as stated on the Chain-of-Custody document. Any discrepancies are noted on the TNU Sample Receipt Checklist. The finalized results were reported to BHI via fax on October 21, 1999 with the exception of Americium-241 and Carbon-14 data, which was forwarded on October 28, 1999.

2.0 ANALYSIS NOTES

2.1 Gamma Scan Analyses

No problems were encountered during the course of the analyses.

2.2 Americium-241 Analyses

No problems were encountered during the course of the analyses . A recount was performed for sample B0WCJ7.

2.3 Isotopic Plutonium Analyses

No problems were encountered during the course of the analyses.

2.4 Nickel-63 Analyses

No problems were encountered during the course of the analyses.

2.5 Isotopic Uranium Analyses

No problems were encountered during the course of the analyses.

2.6 Technetium-99 Analyses

No problems were encountered during the course of the analyses.

2.7 Carbon-14 Analyses

The results of the original and duplicate analyses were not a good match however both sample results were less than the required detection limit.

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0544

SAMPLE SUMMARY

SDG 7224
Contact Kevin C. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0544

| CLIENT SAMPLE ID | LOCATION | MATRIX | LEVEL | LAB | | CHAIN OF | |
|------------------------|----------|--------|-------|------------|---------|------------|----------------|
| | | | | SAMPLE ID | SAF NO | CUSTODY | COLLECTED |
| B0WCJ6 | 105 DR | SOLID | | N909210-01 | B99-075 | B99-075-18 | 09/23/99 08:52 |
| B0WCJ7 | 105 DR | SOLID | | N909210-02 | B99-075 | B99-075-18 | 09/23/99 08:52 |
| Method Blank | | SOLID | | N909210-04 | B99-075 | | |
| Lab Control Sample | | SOLID | | N909210-03 | B99-075 | | |
| Duplicate (N909210-01) | 105 DR | SOLID | | N909210-05 | B99-075 | | 09/23/99 08:52 |

SAMPLE SUMMARY

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SUMMARY DATA SECTION

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Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CS
Version 3.06
Report date 10/28/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0544

SDG 7224
 Contact Kevin C. Johnson

QC SUMMARY

Client Hanford
 Contract TRB-SBB-207925
 Case no SDG H0544

| QC BATCH | CHAIN OF CUSTODY | CLIENT SAMPLE ID | MATRIX | % SOLIDS | SAMPLE AMOUNT | BASIS AMOUNT | DAYS SINCE RECEIVED | LAB COLL | LAB SAMPLE ID | DEPARTMENT SAMPLE ID |
|----------|------------------|------------------------|--------|----------|---------------|--------------|---------------------|----------|---------------|----------------------|
| 7224 | B99-075-18 | B0WCJ6 | SOLID | 95.6 | | | 09/29/99 | 6 | N909210-01 | 7224-001 |
| | | B0WCJ7 | SOLID | 95.6 | | | 09/29/99 | 6 | N909210-02 | 7224-002 |
| | | Method Blank | SOLID | | | | | | N909210-04 | 7224-004 |
| | | Lab Control Sample | SOLID | | | | | | N909210-03 | 7224-003 |
| | | Duplicate (N909210-01) | SOLID | 95.6 | | | 09/29/99 | 6 | N909210-05 | 7224-005 |

QC SUMMARY

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SUMMARY DATA SECTION

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Lab id TMANC
 Protocol Hanford
 Version Ver 1.0
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 Report date 10/28/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0544

SDG 7224
 Contact Kevin C. Johnson

PREP BATCH SUMMARY

Client Hanford
 Contract TRB-SBB-207925
 Case no SDG H0544

| TEST | MATRIX | METHOD | PREPARATION ERROR | | PLANCHETS ANALYZED | | | | QUALI- FIERS | |
|-------------------------------|--------|-------------------------------|-------------------|------|--------------------|------|----|-------|-----------------|-------|
| | | | BATCH | 2σ % | CLIENT | MORE | RE | BLANK | | LCS |
| Alpha Spectroscopy | | | | | | | | | | |
| AM | SOLID | Americium 241 in Soil | 6904-052 | 5.0 | 2 | | | 1 | 1 | 1/1 |
| PU | SOLID | Plutonium, Isotopic in Solids | 6904-052 | 5.0 | 2 | | | 1 | 1 | 1/1 |
| U | SOLID | Uranium, Isotopic in Soil | 6904-052 | 5.0 | 2 | | | 1 | 1 | 1/1 |
| Beta Counting | | | | | | | | | | |
| TC | SOLID | Technetium 99 in Soil | 6904-052 | 10.0 | 2 | | | 1 | 1 | 1/1 |
| Gamma Spectroscopy | | | | | | | | | | |
| GAM | SOLID | Gamma Scan | 6904-052 | 15.0 | 2 | | | 1 | 1 | 1/1 X |
| Liquid Scintillation Counting | | | | | | | | | | |
| C | SOLID | Carbon 14 in Soil | 6904-052 | 10.0 | 2 | | | 1 | 1 | 1/1 |
| NI_L | SOLID | Nickel 63 in Soil | 6904-052 | 10.0 | 2 | | | 1 | 1 | 1/1 |

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.
 Blank and LCS plachets 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 10/28/99

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0544

SDG 7224
Contact Kevin C. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0544

WORK SUMMARY

| CLIENT SAMPLE ID | | LAB SAMPLE ID | | SUF- | | | | | |
|------------------------|---------|---------------|----------|------|-----|----------|----------|-----|-------------------------------|
| LOCATION | MATRIX | COLLECTED | | TEST | FIX | ANALYZED | REVIEWED | BY | METHOD |
| CUSTODY | SAF No | RECEIVED | PLANCHET | | | | | | |
| BOWCJ6 | | N909210-01 | 7224-001 | AM | | 10/22/99 | 10/28/99 | NJV | Americium 241 in Soil |
| 105 DR | SOLID | 09/23/99 | 7224-001 | C | | 10/21/99 | 10/28/99 | NJV | Carbon 14 in Soil |
| B99-075-18 | B99-075 | 09/29/99 | 7224-001 | GAM | | 10/14/99 | 10/21/99 | NJV | Gamma Scan |
| | | | 7224-001 | NI_L | | 10/15/99 | 10/21/99 | NJV | Nickel 63 in Soil |
| | | | 7224-001 | PU | | 10/20/99 | 10/21/99 | NJV | Plutonium, Isotopic in Solids |
| | | | 7224-001 | TC | | 10/20/99 | 10/21/99 | NJV | Technetium 99 in Soil |
| | | | 7224-001 | U | | 10/14/99 | 10/21/99 | NJV | Uranium, Isotopic in Soil |
| BOWCJ7 | | N909210-02 | 7224-002 | AM | | 10/26/99 | 10/28/99 | NJV | Americium 241 in Soil |
| 105 DR | SOLID | 09/23/99 | 7224-002 | C | | 10/21/99 | 10/28/99 | NJV | Carbon 14 in Soil |
| B99-075-18 | B99-075 | 09/29/99 | 7224-002 | GAM | | 10/14/99 | 10/21/99 | NJV | Gamma Scan |
| | | | 7224-002 | NI_L | | 10/15/99 | 10/21/99 | NJV | Nickel 63 in Soil |
| | | | 7224-002 | PU | | 10/20/99 | 10/21/99 | NJV | Plutonium, Isotopic in Solids |
| | | | 7224-002 | TC | | 10/20/99 | 10/21/99 | NJV | Technetium 99 in Soil |
| | | | 7224-002 | U | | 10/14/99 | 10/21/99 | NJV | Uranium, Isotopic in Soil |
| Method Blank | | N909210-04 | 7224-004 | AM | | 10/22/99 | 10/28/99 | NJV | Americium 241 in Soil |
| | SOLID | | 7224-004 | C | | 10/21/99 | 10/28/99 | NJV | Carbon 14 in Soil |
| | B99-075 | | 7224-004 | GAM | | 10/16/99 | 10/21/99 | NJV | Gamma Scan |
| | | | 7224-004 | NI_L | | 10/16/99 | 10/21/99 | NJV | Nickel 63 in Soil |
| | | | 7224-004 | PU | | 10/20/99 | 10/21/99 | NJV | Plutonium, Isotopic in Solids |
| | | | 7224-004 | TC | | 10/19/99 | 10/21/99 | NJV | Technetium 99 in Soil |
| | | | 7224-004 | U | | 10/14/99 | 10/21/99 | NJV | Uranium, Isotopic in Soil |
| Lab Control Sample | | N909210-03 | 7224-003 | AM | | 10/22/99 | 10/28/99 | NJV | Americium 241 in Soil |
| | SOLID | | 7224-003 | C | | 10/22/99 | 10/28/99 | NJV | Carbon 14 in Soil |
| | B99-075 | | 7224-003 | GAM | | 10/15/99 | 10/21/99 | NJV | Gamma Scan |
| | | | 7224-003 | NI_L | | 10/16/99 | 10/21/99 | NJV | Nickel 63 in Soil |
| | | | 7224-003 | PU | | 10/20/99 | 10/21/99 | NJV | Plutonium, Isotopic in Solids |
| | | | 7224-003 | TC | | 10/18/99 | 10/21/99 | NJV | Technetium 99 in Soil |
| | | | 7224-003 | U | | 10/14/99 | 10/21/99 | NJV | Uranium, Isotopic in Soil |
| Duplicate (N909210-01) | | N909210-05 | 7224-005 | AM | | 10/22/99 | 10/28/99 | NJV | Americium 241 in Soil |
| 105 DR | SOLID | 09/23/99 | 7224-005 | C | | 10/21/99 | 10/28/99 | NJV | Carbon 14 in Soil |
| | B99-075 | 09/29/99 | 7224-005 | GAM | | 10/16/99 | 10/21/99 | NJV | Gamma Scan |
| | | | 7224-005 | NI_L | | 10/16/99 | 10/21/99 | NJV | Nickel 63 in Soil |
| | | | 7224-005 | PU | | 10/20/99 | 10/21/99 | NJV | Plutonium, Isotopic in Solids |
| | | | 7224-005 | TC | | 10/20/99 | 10/21/99 | NJV | Technetium 99 in Soil |
| | | | 7224-005 | U | | 10/15/99 | 10/21/99 | NJV | Uranium, Isotopic in Soil |

WORK SUMMARY

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SUMMARY DATA SECTION

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Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CWS
Version 3.06
Report date 10/28/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0544

WORK SUMMARY, cont.

SDG 7224
 Contact Kevin C. Johnson

Client Hanford
 Contract TRB-SBB-207925
 Case no SDG H0544

COUNTS OF TESTS BY SAMPLE TYPE

| TEST | SAF No | METHOD | REFERENCE | CLIENT | MORE | RE | BLANK | LCS | DUP | SPIKE | TOTAL |
|--------|---------|-------------------------------|------------|--------|------|----|-------|-----|-----|-------|-------|
| AM | B99-075 | Americium 241 in Soil | AM/CMPLATE | 2 | | | 1 | 1 | 1 | | 5 |
| C | B99-075 | Carbon 14 in Soil | C14COXLSC | 2 | | | 1 | 1 | 1 | | 5 |
| GAM | B99-075 | Gamma Scan | GAMMAHI | 2 | | | 1 | 1 | 1 | | 5 |
| NI_L | B99-075 | Nickel 63 in Soil | NI63LSC | 2 | | | 1 | 1 | 1 | | 5 |
| PU | B99-075 | Plutonium, Isotopic in Solids | PUPLATE | 2 | | | 1 | 1 | 1 | | 5 |
| TC | B99-075 | Technetium 99 in Soil | TC99TRLSC | 2 | | | 1 | 1 | 1 | | 5 |
| U | B99-075 | Uranium, Isotopic in Soil | UPLATE | 2 | | | 1 | 1 | 1 | | 5 |
| TOTALS | | | | 14 | | | 7 | 7 | 7 | | 35 |

WORK SUMMARY

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SUMMARY DATA SECTION

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Lab id TMANC
 Protocol Hanford
 Version Ver 1.0
 Form DVD-CWS
 Version 3.06
 Report date 10/28/99

TMA / RICHMOND
SAMPLE DELIVERY GROUP H0544

N909210-04

Method Blank

METHOD BLANK

| | | |
|---------------------------------|--------------------------------------|------------------|
| SDG <u>7224</u> | Client/Case no <u>Hanford</u> | SDG <u>H0544</u> |
| Contact <u>Kevin C. Johnson</u> | Contract <u>TRB-SBB-207925</u> | |
| Lab sample id <u>N909210-04</u> | Client sample id <u>Method Blank</u> | |
| Dept sample id <u>7224-004</u> | Material/Matrix <u>SOLID</u> | |
| | SAF No <u>B99-075</u> | |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI- FIERS | TEST |
|-------------------|------------|-----------------|-------------------|--------------|--------------|-----------------|------|
| Carbon 14 | 14762-75-5 | 4.19 | 2.5 | 4.0 | 50 | J | C |
| Technetium 99 | 14133-76-7 | -0.156 | 0.38 | 0.84 | 15 | U | TC |
| Uranium 233/234 | U-233/234 | 0.009 | 0.018 | 0.069 | 1.0 | U | U |
| Uranium 235 | 15117-96-1 | 0 | 0.022 | 0.084 | 1.0 | U | U |
| Uranium 238 | U-238 | 0 | 0.018 | 0.069 | 1.0 | U | U |
| Plutonium 238 | 13981-16-3 | -0.013 | 0.013 | 0.061 | 1.0 | U | PU |
| Plutonium 239/240 | PU-239/240 | -0.006 | 0.013 | 0.048 | 1.0 | U | PU |
| Nickel 63 | 13981-37-8 | -1.15 | 1.3 | 2.3 | 30 | U | NI_L |
| Americium 241 | 14596-10-2 | 0.007 | 0.020 | 0.032 | 1.0 | U | AM |
| Potassium 40 | 13966-00-2 | U | | 0.45 | | U | GAM |
| Barium 133 | 13981-41-4 | U | | 5.9 | | UX | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.032 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.028 | 0.10 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.066 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.094 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.065 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | U | | 0.075 | 0.10 | U | GAM |
| Radium 228 | 15262-20-1 | U | | 0.11 | 0.20 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.037 | | U | GAM |
| Thorium 232 | TH-232 | U | | 0.11 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.069 | | U | GAM |
| Uranium 238 | U-238 | U | | 3.1 | | U | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.096 | | U | GAM |

105-DR FSB-Soil

QC-BLANK 32006

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0544

N909210-03

Lab Control Sample

LAB CONTROL SAMPLE

| | |
|---|---|
| SDG <u>7224</u> Contact <u>Kevin C. Johnson</u> | Client/Case no <u>Hanford</u> <u>SDG H0544</u> Case no <u>TRB-SBB-207925</u> |
| Lab sample id <u>N909210-03</u> Dept sample id <u>7224-003</u> | Client sample id <u>Lab Control Sample</u> Material/Matrix _____ <u>SOLID</u> SAF No <u>B99-075</u> |

| ANALYTE | RESULT | 2σ ERR | MDA | RDL | QUALI- | ADDED | 2σ ERR | REC | 3σ LM | PROTOCOL |
|-------------------|--------|---------|-------|-------|------------|-------|--------|-----------|---------|----------|
| | pCi/g | (COUNT) | pCi/g | pCi/g | FIERS TEST | pCi/g | pCi/g | % | (TOTAL) | LIMITS |
| Carbon 14 | 10100 | 51 | 5.8 | 50 | C | 10900 | 440 | 93 | 85-115 | |
| Technetium 99 | 52.6 | 1.7 | 0.86 | 15 | TC | 53.5 | 2.1 | 98 | 83-117 | 80-120 |
| Uranium 233/234 | 5.26 | 0.28 | 0.13 | 1.0 | U | 5.20 | 0.21 | 101 | 87-113 | 80-120 |
| Uranium 235 | 4.36 | 0.25 | 0.023 | 1.0 | U | 4.23 | 0.17 | 103 | 87-113 | 80-120 |
| Uranium 238 | 5.56 | 0.30 | 0.12 | 1.0 | U | 5.64 | 0.23 | 99 | 88-112 | 80-120 |
| Plutonium 238 | 12.4 | 0.98 | 0.060 | 1.0 | PU | 12.5 | 0.50 | 99 | 85-115 | 80-120 |
| Plutonium 239/240 | 13.5 | 1.1 | 0.035 | 1.0 | PU | 13.2 | 0.53 | 102 | 84-116 | 80-120 |
| Nickel 63 | 171 | 4.0 | 2.0 | 30 | NI_L | 167 | 6.7 | 102 | 83-117 | |
| Americium 241 | 10.0 | 0.62 | 0.036 | 1.0 | AM | 11.5 | 0.46 | <u>87</u> | 88-112 | 80-120 |
| Cobalt 60 | 1.09 | 0.068 | 0.039 | 0.050 | GAM | 1.16 | 0.046 | 94 | 76-124 | 80-120 |
| Cesium 137 | 1.20 | 0.063 | 0.044 | 0.10 | GAM | 1.30 | 0.052 | 92 | 77-123 | 80-120 |

105-DR FSB-Soil

QC-LCS 32005

Lab id TMANC
 Protocol Hanford
 Version Ver 1.0
 Form DVD-LCS
 Version 3.06
 Report date 10/28/99

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0544

N909210-05

B0WCJ6

DUPLICATE

| | | |
|---------------------------------|---------------------------------|---|
| SDG <u>7224</u> | Client/Case no <u>Hanford</u> | SDG <u>H0544</u> |
| Contact <u>Kevin C. Johnson</u> | Case no <u>TRB-SBB-207925</u> | |
| DUPLICATE | ORIGINAL | |
| Lab sample id <u>N909210-05</u> | Lab sample id <u>N909210-01</u> | Client sample id <u>B0WCJ6</u> |
| Dept sample id <u>7224-005</u> | Dept sample id <u>7224-001</u> | Location/Matrix <u>105 DR</u> <u>SOLID</u> |
| | Received <u>09/29/99</u> | Collected <u>09/23/99 08:52</u> |
| % solids <u>95.6</u> | % solids <u>95.6</u> | Custody/SAF No <u>B99-075-1B</u> <u>B99-075</u> |

| 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 |
|-------------------|--------------------|-------------------|--------------|--------------|-----------------|------|-------------------|-------------------|--------------|-----------------|----------|----------------------|
| Carbon 14 | 4.04 | 2.7 | 4.3 | 50 | U | C | 12.2 | 2.8 | 4.2 | J | 100 | 76 |
| Technetium 99 | 0.507 | 0.21 | 0.49 | 15 | J | TC | 1.01 | 0.30 | 0.50 | J | 66 | 76 |
| Uranium 233/234 | 0.277 | 0.098 | 0.087 | 1.0 | J | U | 0.362 | 0.13 | 0.092 | J | 27 | 77 |
| Uranium 235 | 0.057 | 0.039 | 0.073 | 1.0 | U | U | 0.044 | 0.059 | 0.11 | U | - | - |
| Uranium 238 | 0.411 | 0.12 | 0.060 | 1.0 | J | U | 0.338 | 0.13 | 0.092 | J | 19 | 72 |
| Plutonium 238 | -0.005 | 0.010 | 0.039 | 1.0 | U | PU | 0 | 0.024 | 0.056 | U | - | - |
| Plutonium 239/240 | 0.098 | 0.052 | 0.049 | 1.0 | J | PU | 0.130 | 0.060 | 0.056 | J | 28 | 105 |
| Nickel 63 | 1.07 | 1.9 | 3.1 | 30 | U | NI_L | 0.634 | 1.7 | 2.8 | U | - | - |
| Americium 241 | 0.039 | 0.028 | 0.039 | 1.0 | J | AM | 0.010 | 0.031 | 0.049 | U | 118 | 256 |
| Potassium 40 | 7.79 | 0.39 | 0.19 | | | GAM | 7.61 | 0.46 | 0.24 | | 2 | 34 |
| Barium 133 | U | | 0.021 | | UX | GAM | U | | 0.024 | UX | - | - |
| Cobalt 60 | U | | 0.022 | 0.050 | U | GAM | U | | 0.026 | U | - | - |
| Cesium 137 | 1.38 | 0.040 | 0.023 | 0.10 | | GAM | 1.23 | 0.045 | 0.028 | | 11 | 33 |
| Europium 152 | 0.055 | 0.024 | 0.041 | 0.10 | J | GAM | U | | 0.071 | U | 25 | 181 |
| Europium 154 | U | | 0.065 | 0.10 | U | GAM | U | | 0.072 | U | - | - |
| Europium 155 | U | | 0.048 | 0.10 | U | GAM | U | | 0.054 | U | - | - |
| Radium 226 | 0.290 | 0.041 | 0.040 | 0.10 | | GAM | 0.318 | 0.052 | 0.048 | | 9 | 46 |
| Radium 228 | 0.608 | 0.11 | 0.090 | 0.20 | | GAM | 0.388 | 0.099 | 0.10 | | 44 | 55 |
| Thorium 228 | 0.356 | 0.025 | 0.027 | | | GAM | 0.366 | 0.029 | 0.030 | | 3 | 36 |
| Thorium 232 | 0.608 | 0.11 | 0.090 | | | GAM | 0.388 | 0.099 | 0.10 | | 44 | 55 |
| Americium 241 | U | | 0.051 | | U | GAM | U | | 0.058 | U | - | - |
| Uranium 238 | U | | 2.3 | | U | GAM | U | | 2.9 | U | - | - |
| Uranium 235 | U | | 0.071 | | U | GAM | U | | 0.081 | U | - | - |

105-DR FSB-Soil

QC-DUP#1 32007

| |
|-----------------------------|
| Lab id <u>TMANC</u> |
| Protocol <u>Hanford</u> |
| Version <u>Ver 1.0</u> |
| Form <u>DVD-DUP</u> |
| Version <u>3.06</u> |
| Report date <u>10/28/99</u> |

TMA / RICHMOND
SAMPLE DELIVERY GROUP H0544

N909210-01

B0WCJ6

DATA SHEET

| | | |
|---------------------------------|----------------------------------|------------------|
| SDG <u>7224</u> | Client/Case no <u>Hanford</u> | SDG <u>H0544</u> |
| Contact <u>Kevin C. Johnson</u> | Contract <u>TRB-SBB-207925</u> | |
| Lab sample id <u>N909210-01</u> | Client sample id <u>B0WCJ6</u> | |
| Dept sample id <u>7224-001</u> | Location/Matrix <u>105 DR</u> | <u>SOLID</u> |
| Received <u>09/29/99</u> | Collected <u>09/23/99 08:52</u> | |
| % solids <u>95.6</u> | Custody/SAF No <u>B99-075-18</u> | <u>B99-075</u> |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI- FIERS | TEST |
|-------------------|------------|-----------------|-------------------|--------------|--------------|-----------------|------|
| Carbon 14 | 14762-75-5 | 12.2 | 2.8 | 4.2 | 50 | J | C |
| Technetium 99 | 14133-76-7 | 1.01 | 0.30 | 0.50 | 15 | J | TC |
| Uranium 233/234 | U-233/234 | 0.362 | 0.13 | 0.092 | 1.0 | J | U |
| Uranium 235 | 15117-96-1 | 0.044 | 0.059 | 0.11 | 1.0 | U | U |
| Uranium 238 | U-238 | 0.338 | 0.13 | 0.092 | 1.0 | J | U |
| Plutonium 238 | 13981-16-3 | 0 | 0.024 | 0.056 | 1.0 | U | PU |
| Plutonium 239/240 | PU-239/240 | 0.130 | 0.060 | 0.056 | 1.0 | J | PU |
| Nickel 63 | 13981-37-8 | 0.634 | 1.7 | 2.8 | 30 | U | NI_L |
| Americium 241 | 14596-10-2 | 0.010 | 0.031 | 0.049 | 1.0 | U | AM |
| Potassium 40 | 13966-00-2 | 7.61 | 0.46 | 0.24 | | | GAM |
| Barium 133 | 13981-41-4 | U | | 0.024 | | UX | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.026 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | 1.23 | 0.045 | 0.028 | 0.10 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.071 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.072 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.054 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | 0.318 | 0.052 | 0.048 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.388 | 0.099 | 0.10 | 0.20 | | GAM |
| Thorium 228 | 14274-82-9 | 0.366 | 0.029 | 0.030 | | | GAM |
| Thorium 232 | TH-232 | 0.388 | 0.099 | 0.10 | | | GAM |
| Americium 241 | 14596-10-2 | U | | 0.058 | | U | GAM |
| Uranium 238 | U-238 | U | | 2.9 | | U | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.081 | | U | GAM |

105-DR FSB-Soil

| |
|-----------------------------|
| Lab id <u>TMANC</u> |
| Protocol <u>Hanford</u> |
| Version <u>Ver 1.0</u> |
| Form <u>DVD-DS</u> |
| Version <u>3.06</u> |
| Report date <u>10/28/99</u> |

TMA / RICHMOND
SAMPLE DELIVERY GROUP H0544

N909210-02

B0WCJ7

DATA SHEET

| | | |
|---------------------------------|----------------------------------|------------------|
| SDG <u>7224</u> | Client/Case no <u>Hanford</u> | SDG <u>H0544</u> |
| Contact <u>Kevin C. Johnson</u> | Contract <u>TRB-SBB-207925</u> | |
| Lab sample id <u>N909210-02</u> | Client sample id <u>B0WCJ7</u> | |
| Dept sample id <u>7224-002</u> | Location/Matrix <u>105 DR</u> | <u>SOLID</u> |
| Received <u>09/29/99</u> | Collected <u>09/23/99 08:52</u> | |
| % solids <u>95.6</u> | Custody/SAF No <u>B99-075-18</u> | <u>B99-075</u> |

| ANALYTE | CAS NO | RESULT pCi/g | 2 σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI- FIERS | TEST |
|-------------------|------------|-----------------|---------------------------|--------------|--------------|-----------------|------|
| Carbon 14 | 14762-75-5 | 3.77 | 2.8 | 4.5 | 50 | U | C |
| Technetium 99 | 14133-76-7 | -0.043 | 0.34 | 0.98 | 15 | U | TC |
| Uranium 233/234 | U-233/234 | 0.315 | 0.11 | 0.075 | 1.0 | J | U |
| Uranium 235 | 15117-96-1 | 0.010 | 0.038 | 0.073 | 1.0 | U | U |
| Uranium 238 | U-238 | 0.354 | 0.11 | 0.060 | 1.0 | J | U |
| Plutonium 238 | 13981-16-3 | 0.006 | 0.025 | 0.048 | 1.0 | U | PU |
| Plutonium 239/240 | PU-239/240 | 0.019 | 0.025 | 0.047 | 1.0 | U | PU |
| Nickel 63 | 13981-37-8 | 0.493 | 1.3 | 2.2 | 30 | U | NI_L |
| Americium 241 | 14596-10-2 | 0.027 | 0.037 | 0.051 | 1.0 | U | AM |
| Potassium 40 | 13966-00-2 | 11.0 | 6.6 | 0.43 | | | GAM |
| Barium 133 | 13981-41-4 | U | | 0.042 | | UX | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.044 | 0.050 | U | GAM |
| Cesium 137 | 10045-97-3 | 3.03 | 0.083 | 0.052 | 0.10 | | GAM |
| Europium 152 | 14683-23-9 | 0.214 | 0.079 | <u>0.11</u> | 0.10 | | GAM |
| Europium 154 | 15585-10-1 | U | | <u>0.12</u> | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.084 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | U | | 0.096 | 0.10 | U | GAM |
| Radium 228 | 15262-20-1 | U | | <u>0.21</u> | 0.20 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.075 | | U | GAM |
| Thorium 232 | TH-232 | U | | 0.21 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.039 | | U | GAM |
| Uranium 238 | U-238 | U | | 4.7 | | U | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.14 | | U | GAM |

105-DR FSB-Soil

| |
|-----------------------------|
| Lab id <u>TMANC</u> |
| Protocol <u>Hanford</u> |
| Version <u>Ver 1.0</u> |
| Form <u>DVD-DS</u> |
| Version <u>3.06</u> |
| Report date <u>10/28/99</u> |

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0544

METHOD SUMMARY

AMERICIUM 241 IN SOIL
ALPHA SPECTROSCOPY

Test AM Matrix SOLID
SDG 7224
Contact Kevin C. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0544

RESULTS

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF- FIX | Americium 241 PLANCHET |
|----------------------------|---------------|----------|----------|------------------------|
| Preparation batch 6904-052 | | | | |
| BOWCJ6 | N909210-01 | 7224-001 | | U |
| BOWCJ7 | N909210-02 | 7224-002 | | U |
| BLK (QC ID=32006) | N909210-04 | 7224-004 | | U |
| LCS (QC ID=32005) | N909210-03 | 7224-003 | | <u>LOW</u> |
| Duplicate (N909210-01) | N909210-05 | 7224-005 | | ok J |

Nominal values and limits from method RDLs (pCi/g) 1.0
105-DR FSB-Soil

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 | ANAL- PREPARED | YZED | DETECTOR |
|--|---------------|----------|----------|-----------|--------|----------|------------|---------|-------|------------|----------|-----------|-----------|----------------|-------|----------|
| Preparation batch 6904-052 2σ prep error 5.0 % Reference Lab Notebook 6904 pg. 052 | | | | | | | | | | | | | | | | |
| BOWCJ6 | N909210-01 | | | 0.049 | 0.500 | | | 57 | | 819 | | | 29 | 10/22/99 | 10/22 | SS-002 |
| BOWCJ7 | N909210-02 | | | 0.051 | 0.500 | | | 74 | | <u>678</u> | | | 33 | 10/22/99 | 10/26 | SS-061 |
| BLK (QC ID=32006) | N909210-04 | | | 0.032 | 0.500 | | | 82 | | 820 | | | | 10/22/99 | 10/22 | SS-006 |
| LCS (QC ID=32005) | N909210-03 | | | 0.036 | 0.500 | | | 99 | | 820 | | | | 10/22/99 | 10/22 | SS-005 |
| Duplicate (N909210-01) | N909210-05 | | | 0.039 | 0.500 | | | 82 | | 820 | | | 29 | 10/22/99 | 10/22 | SS-008 |
| | (QC ID=32007) | | | | | | | | | | | | | | | |

Nominal values and limits from method 1.0 0.500 20-105 700 100 180

| PROCEDURES | REFERENCE | AM/CMPLATE |
|------------|-----------|--------------------------------------|
| EP-060 | | Soil Preparation, rev 0 |
| EP-070 | | Soil Dissolution, rev 0 |
| EP-940 | | Plutonium Purification, rev 0 |
| EP-960 | | Americium-Curium Purification, rev 0 |
| EP-008 | | Heavy Elements Electroplating, rev 0 |

| | |
|-----------------|---------------------------------|
| AVERAGES ± 2 SD | MDA <u>0.041</u> ± <u>0.017</u> |
| FOR 5 SAMPLES | YIELD <u>79</u> ± <u>30</u> |

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 10/28/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0544

METHOD SUMMARY

PLUTONIUM, ISOTOPIC IN SOLIDS
ALPHA SPECTROSCOPY

Test PU Matrix SOLID
SDG 7224
Contact Kevin C. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0544

RESULTS

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW SUP- TEST FIX | PLANCHET | Plutonium 238 | Plutonium 239/240 |
|---------------------------------------|---------------|-------------------|----------|---------------|-------------------|
| Preparation batch 6904-052 | | | | | |
| B0WCJ6 | N909210-01 | | 7224-001 | U | 0.130 J |
| B0WCJ7 | N909210-02 | | 7224-002 | U | U |
| BLK (QC ID=32006) | N909210-04 | | 7224-004 | U | U |
| LCS (QC ID=32005) | N909210-03 | | 7224-003 | ok | ok |
| Duplicate (N909210-01) | N909210-05 | | 7224-005 | - U | ok J |
| Nominal values and limits from method | | RDLs (pCi/g) | | 1.0 | 1.0 |
| 105-DR FSB-Soil | | | | | |

METHOD PERFORMANCE

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW SUP- TEST FIX | MAX MDA pCi/g | ALIQ g | PREP FAC | DILU- TION | YIELD % | EFF % | COUNT min | FWHM keV | DRIFT keV | DAYS HELD | ANAL- PREPARED | YZED | DETECTOR |
|--|---------------|-------------------|---------------|--------|----------|------------|---------|-------|-----------|----------|-----------|-----------|----------------|-------|----------|
| Preparation batch 6904-052 2σ prep error 5.0 % Reference Lab Notebook 6904 pg. 052 | | | | | | | | | | | | | | | |
| B0WCJ6 | N909210-01 | | 0.056 | 0.500 | | | 64 | 638 | | | | 27 | 10/20/99 | 10/20 | SS-002 |
| B0WCJ7 | N909210-02 | | 0.048 | 0.500 | | | 66 | 549 | | | | 27 | 10/20/99 | 10/20 | SS-006 |
| BLK (QC ID=32006) | N909210-04 | | 0.061 | 0.500 | | | 68 | 549 | | | | | 10/20/99 | 10/20 | SS-008 |
| LCS (QC ID=32005) | N909210-03 | | 0.060 | 0.500 | | | 85 | 606 | | | | | 10/20/99 | 10/20 | SS-056 |
| Duplicate (N909210-01) | N909210-05 | | 0.049 | 0.500 | | | 80 | 548 | | | | 27 | 10/20/99 | 10/20 | SS-010 |
| (QC ID=32007) | | | | | | | | | | | | | | | |
| Nominal values and limits from method | | | 1.0 | 0.500 | | | 20-105 | 10 | 100 | | 180 | | | | |

| PROCEDURES | REFERENCE | PUPLATE |
|------------|-----------|--------------------------------------|
| EP-060 | | Soil Preparation, rev 0 |
| EP-070 | | Soil Dissolution, rev 0 |
| EP-940 | | Plutonium Purification, rev 0 |
| EP-008 | | Heavy Elements Electroplating, rev 0 |

| | | |
|-----------------|-------|---------------|
| AVERAGES ± 2 SD | MDA | 0.055 ± 0.012 |
| FOR 5 SAMPLES | YIELD | 73 ± 19 |

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 10/28/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0544

METHOD SUMMARY

URANIUM, ISOTOPIC IN SOIL
ALPHA SPECTROSCOPY

Test U Matrix SOLID
SDG 7224
Contact Kevin C. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0544

RESULTS

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW SUP- TEST FIX | PLANCHET | 1: Uranium | | 2: Uranium | | 3: Uranium | | RESULT RATIOS (%) | | | | | | |
|---------------------------------------|------------------|----------------------|----------|--------------|-----|------------|-----|------------|-----|-------------------|----------|-----|----|----|----|--|
| | | | | 233/234 | | 235 | | 238 | | 1+3 | 2σ | 2+3 | 2σ | | | |
| Preparation batch 6904-052 | | | | | | | | | | | | | | | | |
| B0WCJ6 | N909210-01 | | 7224-001 | 0.362 | J | U | | 0.338 | J | | | 107 | 56 | 13 | 18 | |
| B0WCJ7 | N909210-02 | | 7224-002 | 0.315 | J | U | | 0.354 | J | | | 89 | 42 | 3 | 11 | |
| BLK (QC ID=32006) | N909210-04 | | 7224-004 | U | | U | | U | | | | | | | | |
| LCS (QC ID=32005) | N909210-03 | | 7224-003 | ok | | ok | | ok | | | | | | | | |
| Duplicate (N909210-01) | N909210-05 | | 7224-005 | ok | J | - | U | ok | J | | | 67 | 31 | 14 | 10 | |
| Nominal values and limits from method | | | | RDls (pCi/g) | 1.0 | | 1.0 | | 1.0 | | | 100 | | 4 | | |
| 105-DR FSB-Soil | | | | | | | | | | | Averages | 88 | | 10 | | |

METHOD PERFORMANCE

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW SUP- TEST FIX | MAX MDA pCi/g | ALIQ g | PREP FAC | DILU- TION | YIELD % | EFF % | COUNT min | FWHM keV | DRIFT KeV | DAYS HELD | ANAL- | | | |
|---------------------------------------|------------------|----------------------|------------------|-----------|-------------|---------------|------------|----------|--------------|-------------|--------------|--------------|---------------|--------|------------------------|--------------|
| | | | | | | | | | | | | | PREPARED | YZED | DETECTOR | |
| Preparation batch 6904-052 | | | | | | | | | | | | | 2σ prep error | 5.0 % | Reference Lab Notebook | 6904 pg. 052 |
| B0WCJ6 | N909210-01 | | 0.11 | 1.00 | | | 61 | 160 | | | 21 | 10/13/99 | 10/14 | SS-035 | | |
| B0WCJ7 | N909210-02 | | 0.075 | 1.00 | | | 95 | 160 | | | 21 | 10/13/99 | 10/14 | SS-036 | | |
| BLK (QC ID=32006) | N909210-04 | | 0.084 | 1.00 | | | 85 | 160 | | | | 10/13/99 | 10/14 | SS-038 | | |
| LCS (QC ID=32005) | N909210-03 | | 0.13 | 1.00 | | | 99 | 705 | | | | 10/13/99 | 10/14 | SS-036 | | |
| Duplicate (N909210-01) | N909210-05 | | 0.087 | 1.00 | | | 80 | 184 | | | 22 | 10/13/99 | 10/15 | SS-033 | | |
| (QC ID=32007) | | | | | | | | | | | | | | | | |
| Nominal values and limits from method | | | 1.0 | 1.00 | | | 30-105 | 150 | 100 | 180 | | | | | | |

| PROCEDURES | REFERENCE | UPLATE |
|------------|-----------|--------------------------------------|
| EP-060 | | Soil Preparation, rev 0 |
| EP-070 | | Soil Dissolution, rev 0 |
| EP-910 | | Uranium Purification, rev 0 |
| EP-008 | | Heavy Elements Electroplating, rev 0 |

| | | |
|-----------------|-------|---------------|
| AVERAGES ± 2 SD | MDA | 0.097 ± 0.045 |
| FOR 5 SAMPLES | YIELD | 84 ± 30 |

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 10/28/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0544

METHOD SUMMARY

TECHNETIUM 99 IN SOIL

BETA COUNTING

Test TC Matrix SOLID
SDG 7224
Contact Kevin C. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0544

RESULTS

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUP-FIX | PLANCHET | Technetium |
|----------------------------|---------------|----------|---------|----------|------------|
| | | | | | 99 |
| Preparation batch 6904-052 | | | | | |
| B0WCJ6 | N909210-01 | 7224-001 | | | 1.01 J |
| B0WCJ7 | N909210-02 | 7224-002 | | | U |
| BLK (QC ID=32006) | N909210-04 | 7224-004 | | | U |
| LCS (QC ID=32005) | N909210-03 | 7224-003 | | | ok |
| Duplicate (N909210-01) | N909210-05 | 7224-005 | | | ok J |

Nominal values and limits from method RDLs (pCi/g) 15
105-DR FSB-Soil

METHOD PERFORMANCE

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUP-FIX | MDA pCi/g | ALIQ g | PREP FAC | DILU-TION | YIELD % | EFF % | COUNT min | FWHM keV | DRIFT KeV | DAYS HELD | ANAL- PREPARED | YZED | DETECTOR |
|---|---------------|----------|---------|-----------|-------------|----------|-----------|---------|-------|-----------|----------|-----------|-----------|----------------|-------|---------------|
| Preparation batch 6904-052 2σ prep error 10.0 % Reference Lab Notebook 6904 pg. 052 | | | | | | | | | | | | | | | | |
| B0WCJ6 | N909210-01 | | | 0.50 | <u>1.01</u> | | | 67 | | 101 | | | 27 | 10/15/99 | 10/20 | GRB-222 |
| B0WCJ7 | N909210-02 | | | 0.98 | 1.02 | | | 35 | | 101 | | | 27 | 10/15/99 | 10/20 | GRB-223 |
| BLK (QC ID=32006) | N909210-04 | | | 0.84 | 1.02 | | | 40 | | 101 | | | | 10/15/99 | 10/19 | GRB-232 |
| LCS (QC ID=32005) | N909210-03 | | | 0.86 | 1.02 | | | 67 | | 101 | | | | 10/15/99 | 10/18 | GRB-210 |
| Duplicate (N909210-01) | N909210-05 | | | 0.49 | <u>1.01</u> | | | 68 | | 101 | | | 27 | 10/15/99 | 10/20 | GRB-224 |
| | | | | | | | | | | | | | | | | (QC ID=32007) |

Nominal values and limits from method 15 1.02 20-105 50 180

PROCEDURES REFERENCE TC99TRLSC
EP-060 Soil Preparation, rev 0
EP-020 Sample Leach For Technetium-99, rev 0
EP-540 Technetium-99 Purification, rev 0

AVERAGES ± 2 SD MDA 0.73 ± 0.45
FOR 5 SAMPLES YIELD 55 ± 33

METHOD SUMMARIES

Page 4

SUMMARY DATA SECTION

Page 16

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 10/28/99

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0544

METHOD SUMMARY
GAMMA SCAN
GAMMA SPECTROSCOPY

Test GAM Matrix SOLID
SDG 7224
Contact Kevin C. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0544

RESULTS

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST FIX | SUF- PLANCHET | Cobalt 60 | Cesium 137 |
|----------------------------|------------------|-----------------|------------------|-----------|------------|
| Preparation batch 6904-052 | | | | | |
| B0WCJ6 | N909210-01 | 7224-001 | | U | 1.23 |
| B0WCJ7 | N909210-02 | 7224-002 | | U | 3.03 |
| BLK (QC ID=32006) | N909210-04 | 7224-004 | | U | U |
| LCS (QC ID=32005) | N909210-03 | 7224-003 | | ok | ok |
| Duplicate (N909210-01) | N909210-05 | 7224-005 | | - U | ok |

Nominal values and limits from method RDLs (pCi/g) 0.050 0.10
105-DR FSB-Soil

METHOD PERFORMANCE

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST FIX | SUF- pCi/g | MAX pCi/g | MDA g | ALIQ g | PREP FAC | DILU- TION | YIELD % | EFF % | COUNT min | FWHM keV | DRIFT KeV | DAYS HELD | ANAL- YZED | DETECTOR |
|---|------------------|-----------------|---------------|--------------|----------|-----------|-------------|---------------|------------|----------|--------------|-------------|--------------|--------------|---------------|----------|
| Preparation batch 6904-052 2σ prep error 15.0 % Reference Lab Notebook 6904 pg. 052 | | | | | | | | | | | | | | | | |
| B0WCJ6 | N909210-01 | | <u>0.058</u> | 198 | | | | | | | 521 | | | 21 | 10/01/99 | JR,04,00 |
| B0WCJ7 | N909210-02 | | <u>0.084</u> | 200 | | | | | | | 521 | | | 21 | 10/01/99 | JR,07,00 |
| BLK (QC ID=32006) | N909210-04 | | 0.045 | 199 | | | | | | | 683 | | | | 10/01/99 | JR,03,00 |
| LCS (QC ID=32005) | N909210-03 | | 0.039 | 199 | | | | | | | 812 | | | | 10/01/99 | JR,01,00 |
| Duplicate (N909210-01) | N909210-05 | | <u>0.052</u> | 198 | | | | | | | 683 | | | 23 | 10/01/99 | JR,04,00 |
| | (QC ID=32007) | | | | | | | | | | | | | | | |

Nominal values and limits from method 0.050 199 100 180

| PROCEDURES | REFERENCE | GAMMAHI |
|------------|-----------|---|
| | EP-060 | Soil Preparation, rev 0 |
| | EP-100 | Ge(Li) Preparation for Environmental Samples, rev 0 |

| | |
|-----------------|---------------------------------|
| AVERAGES ± 2 SD | MDA <u>0.056</u> ± <u>0.035</u> |
| FOR 5 SAMPLES | YIELD _____ ± _____ |

METHOD SUMMARIES

Page 5

SUMMARY DATA SECTION

Page 17

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 10/28/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0544

METHOD SUMMARY

CARBON 14 IN SOIL

LIQUID SCINTILLATION COUNTING

Test C Matrix SOLID
SDG 7224
Contact Kevin C. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0544

RESULTS

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF- FIX | PLANCHET | Carbon 14 |
|----------------------------|---------------|----------|----------|----------|-----------|
| Preparation batch 6904-052 | | | | | |
| B0WCJ6 | N909210-01 | 7224-001 | | | 12.2 J |
| B0WCJ7 | N909210-02 | 7224-002 | | | U |
| BLK (QC ID=32006) | N909210-04 | 7224-004 | | | 4.19 J |
| LCS (QC ID=32005) | N909210-03 | 7224-003 | | | ok |
| Duplicate (N909210-01) | N909210-05 | 7224-005 | | | OUT U |

Nominal values and limits from method RDLs (pCi/g) 50
105-DR FSB-Soil

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 | ANAL- PREPARED | YZED | DETECTOR |
|---|---------------|----------|----------|-----------|--------|----------|------------|---------|-------|-----------|----------|-----------|-----------|----------------|-------|----------|
| Preparation batch 6904-052 2σ prep error 10.0 % Reference Lab Notebook 6904 pg. 052 | | | | | | | | | | | | | | | | |
| B0WCJ6 | N909210-01 | | | 4.2 | 0.213 | | | 100 | 100 | | | | 28 | 10/21/99 | 10/21 | LSC-005 |
| B0WCJ7 | N909210-02 | | | 4.5 | 0.202 | | | 100 | 100 | | | | 28 | 10/21/99 | 10/21 | LSC-005 |
| BLK (QC ID=32006) | N909210-04 | | | 4.0 | 0.207 | | | 100 | 100 | | | | | 10/21/99 | 10/21 | LSC-005 |
| LCS (QC ID=32005) | N909210-03 | | | 5.8 | 0.207 | | | 100 | 52 | | | | | 10/21/99 | 10/22 | LSC-005 |
| Duplicate (N909210-01) | N909210-05 | | | 4.3 | 0.206 | | | 100 | 100 | | | | 28 | 10/21/99 | 10/21 | LSC-005 |
| | (QC ID=32007) | | | | | | | | | | | | | | | |

Nominal values and limits from method 50 0.207 25 180

| | | |
|------------|-----------|--------------------------------------|
| PROCEDURES | REFERENCE | C14COXLSC |
| | EP-060 | Soil Preparation, rev 0 |
| | EP-251 | Tritium / Carbon-14 Oxidation, rev 0 |

| | | |
|-----------------|-------|-----------|
| AVERAGES ± 2 SD | MDA | 4.6 ± 1.4 |
| FOR 5 SAMPLES | YIELD | 100 ± 0 |

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0544

METHOD SUMMARY

NICKEL 63 IN SOIL

LIQUID SCINTILLATION COUNTING

Test NI L Matrix SOLID
 SDG 7224
 Contact Kevin C. Johnson

Client Hanford
 Contract TRB-SBB-207925
 Case no SDG H0544

RESULTS

| CLIENT SAMPLE ID | LAB SAMPLE ID | RAW TEST | SUF- FIX | PLANCHET | Nickel 63 |
|----------------------------|---------------|----------|----------|----------|-----------|
| Preparation batch 6904-052 | | | | | |
| B0WCJ6 | N909210-01 | | | 7224-001 | U |
| B0WCJ7 | N909210-02 | | | 7224-002 | U |
| BLK (QC ID=32006) | N909210-04 | | | 7224-004 | U |
| LCS (QC ID=32005) | N909210-03 | | | 7224-003 | ok |
| Duplicate (N909210-01) | N909210-05 | | | 7224-005 | - U |

Nominal values and limits from method RDLs (pCi/g) 30
 105-DR FSB-Soil

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 | ANAL- PREPARED | YZED | DETECTOR |
|---|---------------|----------|----------|-----------|--------|----------|------------|---------|-------|-----------|----------|-----------|-----------|----------------|-------|----------|
| Preparation batch 6904-052 2σ prep error 10.0 % Reference Lab Notebook 6904 pg. 052 | | | | | | | | | | | | | | | | |
| B0WCJ6 | N909210-01 | | | 2.8 | 0.500 | | | 66 | 100 | | | | 22 | 10/15/99 | 10/15 | LSC-005 |
| B0WCJ7 | N909210-02 | | | 2.2 | 0.500 | | | 83 | 100 | | | | 22 | 10/15/99 | 10/15 | LSC-005 |
| BLK (QC ID=32006) | N909210-04 | | | 2.3 | 0.500 | | | 82 | 100 | | | | | 10/15/99 | 10/16 | LSC-005 |
| LCS (QC ID=32005) | N909210-03 | | | 2.0 | 0.500 | | | 91 | 100 | | | | | 10/15/99 | 10/16 | LSC-005 |
| Duplicate (N909210-01) | N909210-05 | | | 3.1 | 0.500 | | | 60 | 100 | | | | 23 | 10/15/99 | 10/16 | LSC-005 |
| | (QC ID=32007) | | | | | | | | | | | | | | | |

Nominal values and limits from method 30 0.500 10 180

| | | |
|------------|-----------|-------------------------------|
| PROCEDURES | REFERENCE | NI63LSC |
| | EP-060 | Soil Preparation, rev 0 |
| | EP-431 | Nickel-63 Purification, rev 0 |

| | | |
|-----------------|-------|------------|
| AVERAGES ± 2 SD | MDA | 2.5 ± 0.91 |
| FOR 5 SAMPLES | YIELD | 76 ± 26 |

METHOD SUMMARIES

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SUMMARY DATA SECTION

Page 19

Lab id TMANC
 Protocol Hanford
 Version Ver 1.0
 Form DVD-CMS
 Version 3.06
 Report date 10/28/99

TMA / RICHMOND
SAMPLE DELIVERY GROUP H0544

SDG 7224
Contact Kevin C. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0544

SAMPLE SUMMARY

The Sample and QC Summary Reports show all samples, including QC samples, reported in one Sample Delivery Group (SDG).

The Sample Summary Report fully identifies client samples and gives the corresponding lab sample identification. The QC Summary Report shows at the sample level how the lab organized the samples into batches and generated QC samples. The Preparation Batch and Method Summary Reports show this at the analysis level.

The following notes apply to these reports:

- * LAB SAMPLE ID is the lab's primary identification for a sample.
- * DEPARTMENT SAMPLE ID is an alternate lab id, for example one assigned by a radiochemistry department in a lab.
- * CLIENT SAMPLE ID is the client's primary identification for a sample. It includes any sample preparation done by the client that is necessary to identify the sample.
- * QC BATCH is a lab assigned code that groups samples to be processed and QCed together. These samples should have similar matrices.

QC BATCH is not necessarily the same as SDG, which reflects samples received and reported together.

- * All Lab Control Samples, Method Blanks, Duplicates and Matrix Spikes are shown that QC any of the samples. Due to possible reanalyses, not all results for all these QC samples may be relevant to the SDG. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.

REPORT GUIDES

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SUMMARY DATA SECTION

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Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 10/28/99

TMA / RICHMOND
SAMPLE DELIVERY GROUP H0544

SDG 7224
Contact Kevin C. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0544

PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches in one Sample Delivery Group (SDG) with information necessary to check the completeness and consistency of the SDG.

The following notes apply to this report:

- * The preparation batches are shown in the same order as the Method Summary Reports are printed.
- * Only analyses of planchets relevant to the SDG are included.
- * Each preparation batch should have at least one Method Blank and LCS in it to validate client sample results.
- * The QUALIFIERS shown are all qualifiers other than U, J, B, L and H that occur on any analysis in the preparation batch. The Method Summary Report has these qualifiers on a per sample basis.

These qualifiers should be reviewed as follows:

- X Some data has been manually entered or modified. Transcription errors are possible.
- P One or more results are 'preliminary'. The data is not ready for final reporting.
- 2 There were two or more results for one analyte on one planchet imported at one time. The results in DVD may not be the same as on the raw data sheets.

Other lab defined qualifiers may occur. In general, these should be addressed in the SDG narrative.

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SAMPLE DELIVERY GROUP H0544

SDG 7224
Contact Kevin C. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0544

WORK SUMMARY

The Work Summary Report shows all samples, including QC samples, and all relevant analyses in one Sample Delivery Group (SDG). This report is often useful as supporting documentation for an invoice.

The following notes apply to this report:

- * TEST is a code for the method used to measure associated analytes. Results and related information for each analyte are on the Data Sheet Report. In special cases, a test code used in the summary data section is not the same as in associated raw data. In this case, both codes are shown on the Work Summary.
- * SUFFIX is the lab's code to distinguish multiple analyses (recounts, reworks, reanalyses) of a fraction of the sample. The suffix indicates which result is being reported. An empty suffix normally identifies the first attempt to analyze the sample.
- * The LAB SAMPLE ID, TEST and SUFFIX uniquely identify all supporting data for a result. The Method Summary Report for each TEST has method performance data, such as yield, for each lab sample id and suffix and procedures used in the method.
- * PLANCHET is an alternate lab identifier for work done for one test. It, combined with the TEST and SUFFIX, may be the best link to raw data.
- * For QC samples, only analyses that directly QC some regular sample are shown. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.
- * The SAS (Special Analytical Services) Number is a client or lab assigned code that reflects special processing for samples, such as rapid turn around. Counts of tests done are lists by SAS number since it is likely to affect prices.

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SUMMARY DATA SECTION

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Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
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SAMPLE DELIVERY GROUP H0544

SDG 7224
Contact Kevin C. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG_H0544

DATA SHEET

The Data Sheet Report shows all results and primary supporting information for one client sample or Method Blank. This report corresponds to both the CLP Inorganics and Organics Data Sheet.

The following notes apply to this report:

- * TEST is a code for the method used to measure an analyte. If the TEST is empty, no data is available; the analyte was not analyzed for.
- * The LAB SAMPLE ID and TEST uniquely identify work within the Summary Data Section of a Data Package. The Work Summary and Method Summary Reports further identify raw data that underlies this work.

The Method Summary Report for each TEST has method performance data, such as yield, for each Lab Sample ID and a list of procedures used in the method.

- * ERRORS can be labeled TOTAL or COUNT. TOTAL implies a preparation (non-counting method) error has been added, as square root of sum of squares, to the counting error denoted by COUNT. The preparation errors, which may vary by preparation batch, are shown on the Method Summary Report.
- * A RESULT can be 'N.R.' (Not Reported). This means the lab did this work but chooses not to report it now, possibly because it was reported at another time.
- * When reporting a Method Blank, a RESULT can be 'N.A.' (Not Applicable). This means there is no reported client sample work in the same preparation batch as the Blank's result. This is likely to occur when the Method Blank is associated with reanalyses of selected work for a few samples in the SDG.

The following qualifiers are defined by the DVD system:

- U The RESULT is less than the MDA (Minimum Detectable Activity).

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SUMMARY DATA SECTION

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Protocol Hanford
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Form DVD-RG
Version 3.06
Report date 10/28/99

TMA / RICHMOND
SAMPLE DELIVERY GROUP H0544

SDG 7224
Contact Kevin C. Johnson

GUIDE, cont.

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0544

DATA SHEET

If the MDA is blank, the ERROR is used as the limit.

J The RESULT is less than the RDL (Required Detection Limit) and no U qualifier is assigned.

B A Method Blank associated with this sample had a result without a U flag and, after correcting for possibly different aliquots, that result is greater than or equal to the MDA for this sample.

Normally, B is not assigned if U is. When method blank subtraction is shown on this report, B flags are assigned based on the unsubtracted values while U's are assigned based on the subtracted ones. Both flags can be assigned in this case.

For each sample result, all Method Blank results in the same preparation batch are compared. The Method Summary Report documents this and other QC relationships.

L Some Lab Control Sample that QC's this sample had a low recovery. The lab can disable assignment of this qualifier.

H Similar to 'L' except the recovery was high.

P The RESULT is 'preliminary'.

X Some data necessary to compute the RESULT, ERROR or MDA was manually entered or modified.

2 There were two or more results available for this analyte. The reported result may not be the same as in the raw data.

Other qualifiers are lab defined. Definitions should be in the SDG narrative.

The following values are underlined to indicate possible problems:

* An MDA is underlined if it is bigger than its RDL.

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SUMMARY DATA SECTION

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TMA / RICHMOND
SAMPLE DELIVERY GROUP H0544

SDG 7224
Contact Kevin C. Johnson

GUIDE, cont.

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0544

DATA SHEET

- * An ERROR is underlined if the 1.645 sigma counting error is bigger than both the MDA and the RESULT, implying that the MDA may not be a good estimate of the 'real' minimum detectable activity.
- * A negative RESULT is underlined if it is less than the negative of its 2 sigma counting ERROR.
- * When reporting a Method Blank, a RESULT is underlined if greater than its MDA. If the MDA is blank, the 2 sigma counting error is used in the comparison.

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Contact Kevin C. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0544

LAB CONTROL SAMPLE

The Lab Control Sample Report shows all results, recoveries and primary supporting information for one Lab Control Sample.

The following notes apply to this report:

- * All fields in common with the Data Sheet Report have similar usage. Refer to its Report Guide for details.
- * An amount ADDED is the lab's value for the actual amount spiked into this sample with its ERROR an estimate of the error of this amount.

An amount added is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

- * REC (Recovery) is RESULT divided by ADDED expressed as a percent.
- * The first, computed limits for the recovery reflect:
 1. The error of RESULT, including that introduced by rounding the result prior to printing.

If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.
 2. The error of ADDED.
 3. A lab specified, per analyte bias. The bias changes the center of the computed limits.
- * The second limits are protocol defined upper and lower QC limits for the recovery.
- * The recovery is underlined if it is outside either of these ranges.

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Version 3.06
Report date 10/28/99

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SAMPLE DELIVERY GROUP H0544

SDG 7224
Contact Kevin C. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0544

DUPLICATE

The Duplicate Report shows all results, differences and primary supporting information for one Duplicate and associated Original sample.

The following notes apply to this report:

- * All fields in common with the Data Sheet Report have similar usage. This applies both to the Duplicate and Original sample data. Refer to the Data Sheet Report Guide for details.

If the Duplicate has data for a TEST and the lab did not do this test to the Original, the Original's RESULTS are underlined.

- * The RPD (Relative Percent Difference) is the absolute value of the difference of the RESULTS divided by their average expressed as a percent.

If both RESULTS are less than their MDAs, no RPD is computed and a '-' is printed.

For an analyte, if the lab did work for both samples but has data for only one, the MDA from the sample with data is used as the other's result in the RPD.

- * The first, computed limit is the sum, as square root of sum of squares, of the errors of the results divided by the average result as a percent, hence the relative error of the difference rather than the error of the relative difference. The errors include those introduced by rounding the RESULTS prior to printing.

If this limit is labeled TOT, it includes the preparation error in the RESULTS. If labeled CNT, it does not.

This value reported for this limit is at most 999.

- * The second limit for the RPD is the larger of:
 1. A fixed percentage specified in the protocol.

TMA / RICHMOND
SAMPLE DELIVERY GROUP H0544

SDG 7224
Contact Kevin C. Johnson

GUIDE, cont.

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0544

DUPLICATE

2. A protocol factor (typically 2) times the average MDA as a percent of the average result. This limit applies when the results are close to the MDAs.

- * The RPD is underlined if it is greater than either limit.
- * If specified by the lab, the second limit column is replaced by the Difference Error Ratio (DER), which is the absolute value of the difference of the results divided by the quadratic sum of their one sigma errors, the same errors as used in the first limit.

Except for differences due to rounding, the DER is the same as the RPD divided by the first RPD limit with the limit scaled to 1 sigma.

- * The DER is underlined if it is greater than the sigma factor, typically 2 or 3, shown in the header for the first RPD limit.

REPORT GUIDES

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SUMMARY DATA SECTION

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Protocol Hanford
Version Ver 1.0
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Version 3.06
Report date 10/28/99

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SAMPLE DELIVERY GROUP H0544

SDG 7224
Contact Kevin C. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0544

MATRIX SPIKE

The Matrix Spike Report shows all results, recoveries and primary supporting information for one Matrix Spike and associated Original sample.

The following notes apply to this report:

- * All fields in common with the Data Sheet Report have similar usage. This applies both to the Spiked and Original sample data. Refer to the Data Sheet Report Guide for details.

If the Spike has data for a TEST and the lab did not do this test to the Original, the Original's RESULTS are underlined.

- * An amount ADDED is the lab's value for the actual amount spiked into the Spike sample with its ERROR an estimate of the error of this amount.

An amount is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

- * REC (Recovery) is the Spike RESULT minus the Original RESULT divided by ADDED expressed as a percent.

- * The first, computed limits for the recovery reflect:

1. The errors of the two RESULTS, including those introduced by rounding them prior to printing.

If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.

2. The error of ADDED.

3. A lab specified, per analyte bias. The bias changes the center of the computed limits.

- * The second limits are protocol defined upper and lower QC limits

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SUMMARY DATA SECTION

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Version Ver 1.0
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Version 3.06
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TMA / RICHMOND
SAMPLE DELIVERY GROUP H0544

SDG 7224
Contact Kevin C. Johnson

GUIDE, cont.

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0544

MATRIX SPIKE

for the recovery.

These limits are left blank if the Original RESULT is more than a protocol defined factor (typically 4) times ADDED. This is a way of accounting for that when the spike is small compared to the amount in the original sample, the recovery is unreliable.

- * The recovery is underlined (out of spec) if it is outside either of these ranges.

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SUMMARY DATA SECTION

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SAMPLE DELIVERY GROUP H0544

SDG 7224
Contact Kevin C. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0544

METHOD SUMMARY

The Method Summary Report has two tables. One shows up to five results measured using one method. The other has performance data for the method. There is one report for each TEST, as used on the Data Sheet Report.

The following notes apply to this report:

- * Each table is subdivided into sections, one for each preparation batch. A preparation batch is a group of aliquots prepared at roughly the same time in one work area of the lab using the same method.

There should be Lab Control Sample and Method Blank results in each preparation batch since this close correspondence makes the QC meaningful. Depending on lab policy, Duplicates need not occur in each batch since they QC sample dependencies such as matrix effects.

- * The RAW TEST column shows the test code used in the raw data to identify a particular analysis if it is different than the test code in the header of the report. This occurs in special cases due to method specific details about how the lab labels work.

The Lab Sample or Planchet ID combined with the (Raw) Test Code and Suffix uniquely identify the raw data for each analysis.

- * If a result is less than both its MDA and RDL, it is replaced by just 'U' on this report. If it is greater than or equal to the RDL but less than the MDA, the result is shown with a 'U' flag.

The J and X flags are as on the data sheet.

- * Non-U results for Method Blanks are underlined to indicate possible contamination of other samples in the preparation batch. The Method Blank Report has supporting data.

- * Lab Control Sample and Matrix Spike results are shown as: ok, No data, LOW or HIGH, with the last two underlined. 'No data'

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TMA / RICHMOND
SAMPLE DELIVERY GROUP H0544

SDG 7224
Contact Kevin C. Johnson

GUIDE, cont.

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0544

METHOD SUMMARY

means no amount ADDED was specified. 'LOW' and 'HIGH' correspond to when the recovery is underlined on the Lab Control Sample or Matrix Spike Report. See these reports for supporting data.

- * Duplicate sample results are shown as: ok, No data, or OUT, with the last two underlined. 'No data' means there was no original sample data found for this duplicate. 'OUT' corresponds to when the RPD is underlined on the Duplicate Report. See this report for supporting data.
- * If the MDA column is labeled 'MAX MDA', there was more than one result measured by the reported method and the MDA shown is the largest MDA. If not all these results have the same RDL, the MAX MDA reflects only those results with RDL equal to the smallest one.

MDAs are underlined if greater than the printed RDL.

- * Aliquots are underlined if less than the nominal value specified for the method.
- * Preparation factors are underlined if greater than the nominal value specified for the method.
- * Dilution factors are underlined if greater than the nominal value specified for the method.
- * Residues are underlined if outside the range specified for the method. Residues are not printed if yields are.
- * Yields, which may be gravimetric, radiometric or some type of recovery depending on the method, are underlined if outside the range specified for the method.
- * Efficiencies are underlined if outside the range specified for the method. Efficiencies are detector and geometry dependent so this test is only approximate.

REPORT GUIDES

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SUMMARY DATA SECTION

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Protocol Hanford
Version Ver 1.0
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SAMPLE DELIVERY GROUP H0544

SDG 7224
Contact Kevin C. Johnson

GUIDE, cont.

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0544

METHOD SUMMARY

- * Count times are underlined if less than the nominal value specified for the method.
- * Resolutions (as FWHM; Full Width at Half Max) are underlined if greater than the method specified limit.
- * Tracer drifts are underlined if their absolute values are greater than the method specified limit. Tracer drifts are not printed if percent moistures are.
- * Days Held are underlined if greater than the holding time specified in the protocol.
- * Analysis dates are underlined if before their planchet's preparation date or, if a limit is specified, too far after it.

For some methods, ratios as percentages and error estimates for them are computed for pairs of results. A ratio column header like '1-3' means the ratio of the first result column and the third result column.

Ratios are not computed for Lab Control Sample, Method Blank or Matrix Spike results since their matrices are not necessarily similar to client samples'.

The error estimate for a ratio of results from one planchet reflects only counting errors since other errors should be correlated. For a ratio involving different planchets, if QC limits are computed based on total errors, the error for the ratio allows for the preparation errors for the planchets.

The ratio is underlined (out of spec) if the absolute value of its difference from the nominal value is greater than its error estimate. If no nominal value is specified, this test is not done.

For Gross Alpha or Gross Beta results, there may be a column showing the sum of other Alpha or Beta emitters. This sum includes all relevant

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SUMMARY DATA SECTION

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SAMPLE DELIVERY GROUP H0544

SDG 7224
Contact Kevin C. Johnson

GUIDE, cont.

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0544

METHOD SUMMARY

results in the DVD database, whether reported or not. Results in the sum are weighted by a particles/decay value specified by the lab for each relevant analyte. Results less than their MDA are not included. No sums are computed for Lab Control, Method Blank or Matrix Spike samples since their various planchets may not be physically related.

If a ratio of total isotopic to Gross Alpha or Beta is shown, the error for the ratio reflects both the error in the Gross result and the sum, as square root of sum of squares, of the errors in the isotopic results.

For total elemental uranium or thorium results, there may be a column showing the total weight computed from associated isotopic results. Ignoring results less than their MDAs, this is a weighted sum of the isotopic results. The weights depend on the molecular weight and half-life of each isotope so as to convert activities (decays) to weight (atoms).

If a ratio of total computed to measured elemental uranium or thorium is shown, the error for the ratio reflects the errors in all the measurements.

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SUMMARY DATA SECTION

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CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-075-18

Page 1 of 1

| | | | | | |
|--|---------------------------------|---|----------------------------------|------------------|----------------------------|
| Collector Fahlberg/Behnke | Company Contact Jason Adler | Telephone No. 373-4316 | Project Coordinator TRENT, SJ | Price Code 8L | Data Turnaround 21 Days |
| Project Designation 105-DR FSB - Soil | Sampling Location 105 DR | SAF No. B99-075 | | | |
| Ice Chest No. ERC-99-011 | Field Logbook No. EL-1281 | Method of Shipment FedEx | | | |
| Shipped To TMA/RECRA 9-23-99 | Offsite Property No. A990272 | Bill of Lading/Air Bill No. 4235 7952 9789 | | | |

COA R105 ~~9-23-99~~ D4 2800

| POSSIBLE SAMPLE HAZARDS/REMARKS 9/20/99 SDG# 9/23/99 SDG# H0544 | Preservation | Cool 4C | Cool 4C | None | None | | | | | | |
|---|---------------------------------|---------------------|----------------------------|---|---------------------------------------|-------|--|--|--|--|---------|
| | Type of Container | aG | aG | aG | aG | | | | | | |
| | No. of Container(s) | 1 | 1 | 1 | 1 | | | | | | |
| | Special Handling and/or Storage | Volume | 60mL | 60mL | 60mL | 500mL | | | | | |
| SAMPLE ANALYSIS | | Chromium Hex - 7196 | PCBs - 8080 (Aroclor-1254) | ICP Metals - 6010A (Add-on) (Lead); Mercury - 7471 - (CV) | See item (1) in Special Instructions. | | | | | | |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | |
| BOWCJ6 | Soil | 9-23-99 | 0852 | | | | | | | | BOW CPO |
| BOWCJ7 | Soil | 9-23-99 | 0852 | | | | | | | | BOW CPO |
| BOWCJ8 | Soil | 9-23-99 | 0852 | | | | | | | | |
| BOWCJ9 | Soil | 9-23-99 | 0852 | | | | | | | | |

| | | | | | | | | |
|--------------------------------|---------------------------|----------------------------|---------------------------|--|--|-----------|----------|---|
| CHAIN OF POSSESSION | Sign/Print Names | | SPECIAL INSTRUCTIONS | | | | Matrix * | |
| Relinquished By [Signature] | Date/Time 9-23-99 1400 | Received By Ref 1-C | Date/Time 9-23-99 1400 | (1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Barium-133) Isotopic Plutonium Isotopic Uranium Americium-241 Carbon-14; Nickel-63; Technetium-99 COLLECTOR UNAVAILABLE TO SIGN COE RECEIVED: TNV M. Goldenberg 9-29-99 | | | | Soil Water Vapor Other Solid Other Liquid |
| Relinquished By Ref 1-C | Date/Time 9-24-99 0755 | Received By C. W. H. | Date/Time 9-24-99 0755 | | | | | |
| Relinquished By C. W. H. | Date/Time 9-24-99 1400 | Received By FEDEX | Date/Time 9-24-99 1400 | | | | | |
| Relinquished By FedEx | Date/Time 9-25-99 1000 | Received By [Signature] | Date/Time 9-25-99 1000 | | | | | |
| LABORATORY SECTION | Received By | Title | | Date/Time | | | | |
| FINAL SAMPLE DISPOSITION | Disposal Method | Disposed By | | | | Date/Time | | |

Thermo NUtech - Richmond

SAMPLE RECEIPT CHECKLIST

| SAMPLE RECEIPT | | | |
|--|---|--|--|
| Client: <u>Beecham Vanford Inc</u> | Date/Time received <u>9-29-99 10:00</u> | | |
| CoC No. <u>B99-075-18</u> | | | |
| Container I.D. No. _____ | Requested TAT (Days) <u>21</u> | P.O. Received Yes [] No [<input checked="" type="checkbox"/>] | |
| INSPECTION | | | |
| 1. Custody seals on shipping container intact? | Yes [] | No [<input checked="" type="checkbox"/>] | N/A [] |
| 2. Custody seals on shipping container dated & signed? | Yes [] | No [<input checked="" type="checkbox"/>] | N/A [] |
| 3. Custody seals on sample containers intact? | Yes [<input checked="" type="checkbox"/>] | No [] | N/A [] |
| 4. Custody seals on sample containers dated & signed? | Yes [<input checked="" type="checkbox"/>] | No [] | N/A [] |
| 5. Cooler Temperature: _____ | Packing material is: | Wet [] | Dry [<input checked="" type="checkbox"/>] |
| 6. Number of samples in shipping container: | <u>2</u> | | |
| 7. Number of containers per sample: | <u>1</u> (Or see CoC _____) | | |
| 8. Paperwork agrees with samples? | Yes [<input checked="" type="checkbox"/>] | No [] | |
| 9. Samples have: | Tape [] | Hazard labels [] | Rad labels [<input checked="" type="checkbox"/>] Appropriate sample labels [<input checked="" type="checkbox"/>] |
| 10. Samples are: | In good condition [<input checked="" type="checkbox"/>] | Leaking [] | Broken Container [] Missing [] |
| 11. Describe any anomalies: | <u>NO ANOMALIES ON THE SAMPLES RECEIVED</u> | | |
| <u>Impt. Note: Samples were sent to Penna - instead of sending it to TMA NORCAL! RECEIVED ON 9/29/99. I INFORMED JOE VERVILLE 9/30/99. DUE DATE SHOULD BE 21 DAYS ON THE DAY RECEIPT AT TMA. Jgf 9/30/99</u> | | | |
| 13. Was P.M. notified of any anomalies? | Yes [] | No [] | Date _____ |
| 14. Received by <u>M. Goldenberg</u> | Date: <u>9-29-99</u> | Time: <u>10:00</u> | |
| LOGIN | | | |
| TNU W.O. No. _____ | Group No. _____ | Client W.O. No. _____ | |
| PROGRAM MANAGER | | | |
| Sample holding times exceeded? | Yes [] | No [] | |
| Client Notified: Name _____ | Date/time _____ | | |

SDR # B00-011
 Revision #: 0
 Date Initiated: 10/25/99

SAMPLE DISPOSITION RECORD

SAF: B99-075
 OU: 100-DR
 Project ID: 105F/DR
 Task ID: 3
 Sampling Event: 105-DR Phase III Sampling and Analysis

Laboratory: TMA/RECRA

Task Manager: R. S. Day

Sampling Information:
 Number of Samples: 2
 ID Numbers: B0WCJ6, B0WCJ7
 Matrix: Soil
 Collection Date: 09/23/99

Issue Background:

Class: Project Data Use General Laboratory Direction Validation Direction Sample Management Direction

Type: Insufficient Sample Volume

Description: Insufficient Sample Volume to Complete All Laboratory QC Requirements

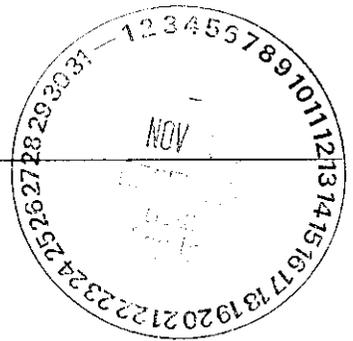
Disposition:

Description: The laboratory was not able to complete the matrix spike and matrix spike duplicate analyses on the listed samples for the PCB analysis due to lack of sample volume. The laboratory will note this issue in the case narrative of the final data report.

Justification: The PCB results for the listed samples can be used by the 105-F/DR project. The impact of sample matrix on PCB concentration can be assessed from other samples collected for this project for which matrix spike and matrix spike duplicate analyses were performed.

Approval Signatures:

| | | |
|---------------------------------------|---|----------|
| S. J. Trent |  | 10/26/99 |
| Project Coordinator (Print/Sign Name) | | Date |
| R. S. Day |  | 11-19-99 |
| Task Manager (Print/Sign Name) | | Date |



**Recra LabNet Philadelphia
Analytical Report**

Client: TNU-HANFORD B99-075
RFW#: 9909L190
SDG/SAF#: H0544/B99-075

W.O.#: 10985-001-001-9999-00
Date Received: 09-25-99

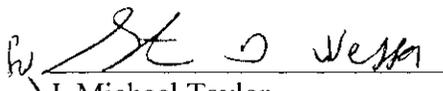
PCB

The set of samples consisted of two (2) soil samples collected on 09-23-99.

The samples and their associated QC samples were extracted on 10-06-99 and analyzed according to Recra OPs based on SW846, 3rd Edition procedures on 10-11,12-99. The extraction procedure was based on method 3540 and the extracts were analyzed based on method 8082 for Aroclors only.

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 has been recorded on the chain-of-custody.
2. All required holding times for extraction and analysis have been met.
3. The samples and their associated QC samples received a sulfuric acid and sulfur cleanup.
4. The method blank was below the reporting limits for all target compounds.
5. All surrogate recoveries were within acceptance criteria.
6. The blank spike recovery was within acceptance criteria.
7. Due to insufficient sample volume, matrix spike QC could not be performed on any samples in this data set. However, blank spike QC were performed with these samples to demonstrate that systems were in control. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
8. All initial calibrations associated with this data set were within acceptance criteria.
9. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.


J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

10-20-99
Date

pefr:\group\data\pest\09L-190.pcb

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.

GLOSSARY OF PESTICIDE/PCB DATA

DATA QUALIFIERS

- U** = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J** = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification 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.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I** = Interference.

ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking 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** = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- SP** = Indicates Spiked Compound.



GLOSSARY OF PESTICIDE/PCB DATA

- P** = This flag is used for a pesticide/Aroclor target analyte when there is greater than 25% difference for detected concentrations between the two GC columns (see Form X). The lower of the two values is reported on Form I and flagged with a "P".
- D** = This flag identifies all compounds identified in an analysis at a secondary dilution factor.
- C** = This flag applies to a compound that has been confirmed by GC/MS.



Recra LabNet Philadelphia Sample Discrepancy Report (SDR) SDR #:

99EX087

Initiator: Bernard Foley
 Date: 10/6/99
 Client: TN
H0544

RFW Batch: 9909L190
 Samples: 1,2
 Method: SW846/MCAWW/CLP/

Parameter: PCB
 Matrix: S
 Prep Batch: 99LE1208

1. Reason for SDR

- a. COC Discrepancy Tech Profile Error Client Request Sampler Error on C-O-C
 Transcription Error Wrong Test Code Other _____
- b. General Discrepancy
 Missing Sample/Extract Container Broken Wrong Sample Pulled Label ID's Illegible
 Hold Time Exceeded Insufficient Sample Preservation Wrong Received Past Hold
 Improper Bottle Type Not Amenable to Analysis

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

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

No MS, MSD performed

2. Known or Probable Causes(s)

insufficient sample volume

3. Discussion and Proposed Action

Other Description:

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

[Signature] 10/14/99

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

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

5. Final Action...signature/date: *[Signature]* 10/10/99 Other Explanation:

- Verified re-[log][leach][extract][digest][analysis] (circle)
 Included in Case Narrative
 Hard Copy COC Revised
 Electronic COC Revised
 EDD Corrections Completed

When Final Action has been recorded, forward original to QA Specialist for distribution and filing.

| Route | Distribution of Completed SDR | Route | Distribution of Completed SDR |
|----------|--|----------|--|
| — | <input checked="" type="checkbox"/> Initiator | — | <input type="checkbox"/> Metals: Doughty |
| — | <input checked="" type="checkbox"/> Lab Manager: M. Taylor | — | <input type="checkbox"/> Inorganic: Perrone |
| <u>1</u> | <input checked="" type="checkbox"/> Project Mgr: Stone/Carey/Schrenkel/Johnson | <u>2</u> | <input checked="" type="checkbox"/> GC/LC: Schnell |
| — | <input checked="" type="checkbox"/> Section Mgr: Wesson/Daniels | — | <input type="checkbox"/> MS: LeMin/Taylor |
| — | <input checked="" type="checkbox"/> QA (file): Racioppi | — | <input type="checkbox"/> Log-in: Toder |
| — | <input type="checkbox"/> Data Management: Feldman | — | <input type="checkbox"/> Admin: Soos |
| — | <input type="checkbox"/> Sample Prep: Schnell/Doughty/Kauffman | — | <input type="checkbox"/> Other: _____ |

Recra LabNet - Lionville Laboratory
PCB ANALYTICAL DATA PACKAGE FOR
TNU-HANFORD B99-075

DATE RECEIVED: 09/25/99

RFW LOT # :9909L190

| CLIENT ID | RFW # | MTX | PREP # | COLLECTION | EXTR/PREP | ANALYSIS |
|-----------|-------|-----|----------|------------|-----------|----------|
| BOWCJ6 | 001 | S | 99LE1208 | 09/23/99 | 10/06/99 | 10/12/99 |
| BOWCJ7 | 002 | S | 99LE1208 | 09/23/99 | 10/06/99 | 10/12/99 |

LAB QC:

| | | | | | | |
|--------|--------|---|----------|-----|----------|----------|
| PBLKWH | MB1 | S | 99LE1208 | N/A | 10/06/99 | 10/11/99 |
| PBLKWH | MB1 BS | S | 99LE1208 | N/A | 10/06/99 | 10/11/99 |

aw
10-18-99

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-075-18

Page 1 of 1

008

| | | | | | |
|---|--|--|----------------------------------|----------------------|-----------------------------------|
| Collector Fahlberg/Behnke | Company Contact Jason Adler | Telephone No. 373-4316 | Project Coordinator TRENT, SJ | Price Code 8L | Data Turnaround 21 Days |
| Project Designation 105-DR FSB - Soil | Sampling Location 105 DR | SAF No. B99-075 | | | |
| Ice Chest No. SML-465 | Field Logbook No. EL-1281 | Method of Shipment FEDEX | | | |
| Shipped To SA/RECRA 9-23-99 | Offsite Property No. A990271 | Bill of Lading/Air Bill No. 4235 7952 9790 | | | |
| COA R105D4 2800 | | | | | |

| | | | | | | | | | | | |
|---|---------------------|---------|---------|------|-------|--|--|--|--|--|--|
| POSSIBLE SAMPLE HAZARDS/REMARKS <div style="font-size: 2em; font-weight: bold; text-align: center;">COPY</div> | Preservation | Cool 4C | Cool 4C | None | None | | | | | | |
| | Type of Container | aG | aG | aG | aG | | | | | | |
| | No. of Container(s) | 1 | 1 | 1 | 1 | | | | | | |
| Special Handling and/or Storage | Volume | 60mL | 60mL | 60mL | 500mL | | | | | | |

| | | | | | | | | | | |
|-----------------|---------------------|----------------------------|---|--------------------------------------|--|--|--|--|--|--|
| SAMPLE ANALYSIS | Chromium Hex - 7196 | PCBs - 8080 (Aroclor-1254) | ICP Metals - 6010A (Add-on) (Lead); Mercury - 7471 - (CV) | See item (1) in Special Instructions | | | | | | |
|-----------------|---------------------|----------------------------|---|--------------------------------------|--|--|--|--|--|--|

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | |
|-------------------|-----------------|--------------------|-------------|---|---|---|--|--|--|--|--|--------|
| B0WCJ6 | Soil | 9-23-99 | 0852 | X | X | X | | | | | | B0WCJ6 |
| B0WCJ7 | Soil | 9-23-99 | 0852 | X | X | X | | | | | | B0WCJ7 |
| B0WCJ8 | Soil | 9-23-99 | | | | | | | | | | |
| B0WCJ9 | Soil | 9-23-99 | | | | | | | | | | |

| | | | |
|---------------------------------------|----------------------|-----------------------------------|----------------------|
| CHAIN OF POSSESSION | Sign/Print Names | SPECIAL INSTRUCTIONS | Matrix * |
| Relinquished By <i>[Signature]</i> | Date/Time 1400 | Received By <i>[Signature]</i> | Date/Time 1400 |
| Relinquished By <i>[Signature]</i> | Date/Time 9-23-99 | Received By <i>[Signature]</i> | Date/Time 9-23-99 |
| Relinquished By <i>[Signature]</i> | Date/Time 9-24-99 | Received By <i>[Signature]</i> | Date/Time 0755 |
| Relinquished By <i>[Signature]</i> | Date/Time 9-24-99 | Received By <i>[Signature]</i> | Date/Time 1400 |
| Relinquished By <i>[Signature]</i> | Date/Time 9-25-99 | Received By <i>[Signature]</i> | Date/Time 1000 |

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Barium-133); Isotopic Plutonium; Isotopic Uranium; Americium-241; Carbon-14; Nickel-63; Technetium-99

COLLECTOR UNAVAILABLE TO SIGN COC

Soil
Water
Vapor
Other Solid
Other Liquid

| | | | |
|--------------------------|-----------------------------------|-------------------------|-----------|
| LABORATORY SECTION | Received By <i>[Signature]</i> | Title <i>[Title]</i> | Date/Time |
| FINAL SAMPLE DISPOSITION | Disposal Method | Disposed By | Date/Time |

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-075-18

Page 1 of 1

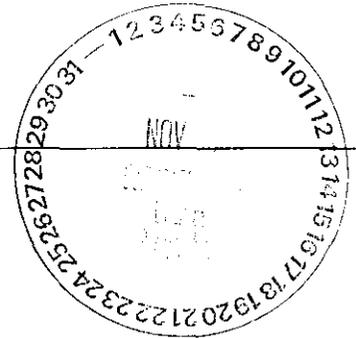
600

| | | | |
|---|--|--|--|
| Collector Fahlberg/Behnke | Company Contact Jason Adler | Telephone No. 373-4316 | Project Coordinator TRENT, SJ |
| Project Designation 105-DR FSB - Soil | Sampling Location 105 DR | SAF No. B99-075 | Price Code 8L Data Turnaround 21 Days |
| Ice Chest No. ERC-99-011 | Field Logbook No. EL-1281 | Method of Shipment FedEx | |
| Shipped To TMA/RECRA 9-23-99 | Offsite Property No. A990272 | Bill of Lading/Air Bill No. 4235 7952 9789 | |

COA **R05** ~~9-23-99~~ **D4 2800**

| POSSIBLE SAMPLE HAZARDS/REMARKS | Preservation | Cool 4C | Cool 4C | None | None | | | | | | |
|---------------------------------|---------------------------------|----------------------------|---|--------------------------------------|------|-------|--|--|--|--|---------|
| | Type of Container | aG | aG | aG | aG | | | | | | |
| | No. of Container(s) | 1 | 1 | 1 | 1 | | | | | | |
| | Special Handling and/or Storage | Volume | 60mL | 60mL | 60mL | 500mL | | | | | |
| SAMPLE ANALYSIS | Chromium Hex - 7196 | PCBs - 8080 (Aroclor-1254) | ICP Metals - 6010A (Add-on) (Lead); Mercury - 7471 - (CV) | See item (1) in Special Instructions | | | | | | | |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | |
| B0WCJ6 | Soil | 9-23-99 | 0852 | | | | | | | | Bow CDO |
| B0WCJ7 | Soil | 9-23-99 | 0852 | | | | | | | | Bow CDO |
| B0WCJ8 | Soil | 9-23-99 | 9-23-99 | | | | | | | | |
| B0WCJ9 | Soil | | | | | | | | | | |

| CHAIN OF POSSESSION | Sign/Print Names | SPECIAL INSTRUCTIONS | Matrix * |
|---------------------------------------|-----------------------------------|---|---|
| Relinquished By <i>[Signature]</i> | Received By <i>[Signature]</i> | (1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Barium-133); Isotopic Plutonium; Isotopic Uranium; Americium-241; Carbon-14; Nickel-63; Technetium-99 COLLECTOR UNAVAILABLE TO SIGN | Soil Water Vapor Other Solid Other Liquid |
| Relinquished By <i>[Signature]</i> | Received By <i>[Signature]</i> | | |
| Relinquished By <i>[Signature]</i> | Received By <i>[Signature]</i> | | |
| Relinquished By <i>[Signature]</i> | Received By <i>[Signature]</i> | | |
| Relinquished By <i>[Signature]</i> | Received By <i>[Signature]</i> | | |
| LABORATORY SECTION | Received By <i>[Signature]</i> | Title <i>[Signature]</i> | Date/Time |
| FINAL SAMPLE DISPOSITION | Disposal Method | Disposed By | Date/Time |



**Recra LabNet Philadelphia
Analytical Report**

Client : TNU-HANFORD B99-075
RFW# : 9909L190
SDG/SAF# : H0544/B99-075

W.O.# : 10985-001-001-9999-00
Date Received: 09-25-99

METALS CASE NARRATIVE

1. This narrative covers the analyses 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 (80-120% for Mercury).
6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).
7. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL) or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.
8. All ICP Interference Check Standards were within control limits.
9. All laboratory control samples (LCS) were within the laboratory control limits. Refer to the Inorganics Laboratory Control Standards Report.
10. All matrix spike (MS) recoveries were within the 75-125% control limits. Refer to the Inorganics Accuracy Report.
11. All duplicate analyses were within the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

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. 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.



J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

mld/m09-190

10-8-99
Date



METALS METHOD GLOSSARY

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

Recra Lot#: 9909L190

Leaching Procedure: 1310 1311 1312 Other: _____

CLP Metals Digestion and Analysis Methods: ILM03.0 ILM04.0

Metals Digestion Methods: 3005A 3010A 3015 3020A 3050A 3051 200.7 SS17
Other: _____

Metals Analysis Methods

| | SW846 | EPA | STD MTD | EPA OSWR | USATHAMA |
|-------------|---|---|--------------|-------------|-------------|
| Aluminum | <u>6010B</u> | <u>200.7</u> | | | <u>99</u> |
| Antimony | <u>6010B</u> <u>7041</u> ⁵ | <u>200.7</u> <u>204.2</u> | | | <u>99</u> |
| Arsenic | <u>6010B</u> <u>7060A</u> ⁵ | <u>200.7</u> <u>206.2</u> | <u>3113B</u> | | <u>99</u> |
| Barium | <u>6010B</u> | <u>200.7</u> | | | <u>99</u> |
| Beryllium | <u>6010B</u> | <u>200.7</u> | | | <u>99</u> |
| Bismuth | <u>6010B</u> ¹ | <u>200.7</u> ¹ | | <u>1620</u> | <u>99</u> |
| Boron | <u>6010B</u> | <u>200.7</u> | | | <u>99</u> |
| Cadmium | <u>6010B</u> <u>7131A</u> ⁵ | <u>200.7</u> <u>213.2</u> | | | <u>99</u> |
| Calcium | <u>6010B</u> | <u>200.7</u> | | | <u>99</u> |
| Chromium | <u>6010B</u> <u>7191</u> ⁵ | <u>200.7</u> <u>218.2</u> | | | <u>SS17</u> |
| Cobalt | <u>6010B</u> | <u>200.7</u> | | | <u>99</u> |
| Copper | <u>6010B</u> <u>7211</u> ⁵ | <u>200.7</u> <u>220.2</u> | | | <u>99</u> |
| Iron | <u>6010B</u> | <u>200.7</u> | | | <u>99</u> |
| Lead | <input checked="" type="checkbox"/> <u>6010B</u> <u>7421</u> ⁵ | <u>200.7</u> <u>239.2</u> | <u>3113B</u> | | <u>99</u> |
| Lithium | <u>6010B</u> <u>7430</u> ⁴ | <u>200.7</u> | | <u>1620</u> | <u>99</u> |
| Magnesium | <u>6010B</u> | <u>200.7</u> | | | <u>99</u> |
| Manganese | <u>6010B</u> | <u>200.7</u> | | | <u>99</u> |
| Mercury | <u>7470A</u> ³ <input checked="" type="checkbox"/> <u>7471A</u> ³ | <u>245.1</u> ² <u>245.5</u> ² | | | <u>99</u> |
| Molybdenum | <u>6010B</u> | <u>200.7</u> | | | <u>99</u> |
| Nickel | <u>6010B</u> | <u>200.7</u> | | | <u>99</u> |
| Potassium | <u>6010B</u> <u>7610</u> ⁴ | <u>200.7</u> <u>258.1</u> ⁴ | | | <u>99</u> |
| Rare Earths | <u>6010B</u> ¹ | <u>200.7</u> ¹ | | <u>1620</u> | <u>99</u> |
| Selenium | <u>6010B</u> <u>7740</u> ⁵ | <u>200.7</u> <u>270.2</u> | <u>3113B</u> | | <u>99</u> |
| Silicon | <u>6010B</u> ¹ | <u>200.7</u> | | <u>1620</u> | <u>99</u> |
| Silica | <u>6010B</u> | <u>200.7</u> | | <u>1620</u> | <u>99</u> |
| Silver | <u>6010B</u> <u>7761</u> ⁵ | <u>200.7</u> <u>272.2</u> | | | <u>99</u> |
| Sodium | <u>6010B</u> <u>7770</u> ⁴ | <u>200.7</u> <u>273.1</u> ⁴ | | | <u>99</u> |
| Strontium | <u>6010B</u> | <u>200.7</u> | | | <u>99</u> |
| Thallium | <u>6010B</u> <u>7841</u> ⁵ | <u>200.7</u> <u>279.2</u> <u>200.9</u> | | | <u>99</u> |
| Tin | <u>6010B</u> | <u>200.7</u> | | | <u>99</u> |
| Titanium | <u>6010B</u> | <u>200.7</u> | | | <u>99</u> |
| Uranium | <u>6010B</u> ¹ | <u>200.7</u> ¹ | | <u>1620</u> | <u>99</u> |
| Vanadium | <u>6010B</u> | <u>200.7</u> | | | <u>99</u> |
| Zinc | <u>6010B</u> | <u>200.7</u> | | | <u>99</u> |
| Zirconium | <u>6010B</u> ¹ | <u>200.7</u> ¹ | | <u>1620</u> | <u>99</u> |

Other: _____

Method: _____

METHOD REFERENCES AND DATA QUALIFIERS

DATA QUALIFIERS

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

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

ABBREVIATIONS

MB = Method or Preparation Blank.

MS = Matrix Spike.

MSD = Matrix Spike Duplicate.

REP = Sample Replicate

LCS = Laboratory Control Sample.

NC = Not calculated.

ANALYTICAL METAL METHODS

1. Not included in the method element list.
2. Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, 0.1 grams of sample is taken to a final volume of 50 mL (including all reagents).
3. Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, three 0.1 gram of sample is taken to a final volume of 50 mL (including all reagents).
4. Flame AA.
5. Graphite Furnace AA.

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

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 10/08/99

CLIENT: TNU-HANFORD B99-075

RECRA LOT #: 9909L190

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING | DILUTION |
|--------|---------|----------------|--------|-------|-----------|----------|
| | | | | | LIMIT | FACTOR |
| -001 | B0WCJ6 | Mercury, Total | 0.02 u | MG/KG | 0.02 | 1.0 |
| | | Lead, Total | 3.0 u | MG/KG | 3.0 | 1.0 |
| -002 | B0WCJ7 | Mercury, Total | 0.01 u | MG/KG | 0.01 | 1.0 |
| | | Lead, Total | 3.3 u | MG/KG | 3.3 | 1.0 |

Recre LabNet - Lionville

INORGANICS METHOD BLANK DATA SUMMARY PAGE 10/08/99

CLIENT: TNU-HANFORD B99-075

RECRA LOT #: 9909L190

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING | DILUTION |
|--------|-------------|----------------|--------|-------|-----------|----------|
| | | | | | LIMIT | FACTOR |
| BLANK1 | 99C0290-MB1 | Mercury, Total | 0.02 u | MG/KG | 0.02 | 1.0 |
| BLANK1 | 99L0660-MB1 | Lead, Total | 3.1 u | MG/KG | 3.1 | 1.0 |

Recra LabNet - Lionville

INORGANICS ACCURACY REPORT 10/08/99

CLIENT: TNU-HANFORD B99-075
 WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 9909L190

| SAMPLE | SITE ID | ANALYTE | SPIKED SAMPLE | INITIAL RESULT | SPIKED AMOUNT | %RECOV | DILUTION FACTOR (SPK) |
|--------|---------|----------------|------------------|-------------------|------------------|--------|--------------------------|
| -001 | B0WCJ6 | Mercury, Total | 0.18 | 0.02u | 0.16 | 107.4 | 1.0 |
| | | Lead, Total | 44.7 | 3.0 u | 51.2 | 87.3 | 1.0 |

Recra LabNet - Lionville

INORGANICS PRECISION REPORT 10/08/99

CLIENT: TNU-HANFORD B99-075

RECRA LOT #: 9909L190

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

| SAMPLE | SITE ID | ANALYTE | INITIAL | | | DILUTION FACTOR (REP) |
|---------|---------|----------------|---------|-----------|-------|--------------------------|
| | | | RESULT | REPLICATE | RPD | |
| ----- | ----- | ----- | ----- | ----- | ----- | |
| -001REP | BOWCJ6 | Mercury, Total | 0.02u | 0.01u | NC | 1.0 |
| | | Lead, Total | 3.0 u | 3.1 u | NC | 1.0 |

Recra LabNet - Lionville

INORGANICS LABORATORY CONTROL STANDARDS REPORT 10/08/99

CLIENT: TNU-HANFORD B99-075

RECRA LOT #: 9909L190

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

| SAMPLE | SITE ID | ANALYTE | SPIKED SAMPLE | SPIKED AMOUNT | UNITS | %RECOV |
|--------|-------------|--------------|------------------|------------------|-------|--------|
| ***** | ***** | ***** | ***** | ***** | ***** | ***** |
| LCS1 | 99C0290-LC1 | Mercury, LCS | 1.0 | 1.0 | MG/KG | 102.5 |
| LCS1 | 99L0660-LC1 | Lead, LCS | 246 | 250 | MG/KG | 98.3 |

Recra LabNet - Lionville Laboratory
 INORGANIC ANALYTICAL DATA PACKAGE FOR
 TNU-HANFORD B99-075

DATE RECEIVED: 09/25/99

RFW LOT # :9909L190

| CLIENT ID /ANALYSIS | RFW # | MTX | PREP # | COLLECTION | EXTR/PREP | ANALYSIS |
|---------------------|-------|-----|--------|------------|-----------|----------|
|---------------------|-------|-----|--------|------------|-----------|----------|

B0WCJ6

| | | | | | | |
|----------------|---------|---|---------|----------|----------|----------|
| MERCURY, TOTAL | 001 | S | 99C0290 | 09/23/99 | 10/06/99 | 10/07/99 |
| MERCURY, TOTAL | 001 REP | S | 99C0290 | 09/23/99 | 10/06/99 | 10/07/99 |
| MERCURY, TOTAL | 001 MS | S | 99C0290 | 09/23/99 | 10/06/99 | 10/07/99 |
| LEAD, TOTAL | 001 | S | 99L0660 | 09/23/99 | 09/29/99 | 10/01/99 |
| LEAD, TOTAL | 001 REP | S | 99L0660 | 09/23/99 | 09/29/99 | 10/01/99 |
| LEAD, TOTAL | 001 MS | S | 99L0660 | 09/23/99 | 09/29/99 | 10/01/99 |

B0WCJ7

| | | | | | | |
|----------------|-----|---|---------|----------|----------|----------|
| MERCURY, TOTAL | 002 | S | 99C0290 | 09/23/99 | 10/06/99 | 10/07/99 |
| LEAD, TOTAL | 002 | S | 99L0660 | 09/23/99 | 09/29/99 | 10/01/99 |

LAB QC:

| | | | | | | |
|--------------------|--------|---|---------|-----|----------|----------|
| MERCURY LABORATORY | LC1 BS | S | 99C0290 | N/A | 10/06/99 | 10/07/99 |
| MERCURY, TOTAL | MB1 | S | 99C0290 | N/A | 10/06/99 | 10/07/99 |
| LEAD LABORATORY | LC1 BS | S | 99L0660 | N/A | 09/29/99 | 10/01/99 |
| LEAD, TOTAL | MB1 | S | 99L0660 | N/A | 09/29/99 | 10/01/99 |

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-075-18

Page 1 of 1

| | | | | | |
|--|---------------------------------|---|----------------------------------|------------------|----------------------------|
| Collector Fahlberg/Behnke | Company Contact Jason Adler | Telephone No. 373-4316 | Project Coordinator IRENT, SJ | Price Code 8L | Data Turnaround 21 Days |
| Project Designation 105-DR FSB - Soil | Sampling Location 105 DR | SAF No. B99-075 | | | |
| Ice Chest No. SML-465 | Field Logbook No. EL-1281 | Method of Shipment FedEx | | | |
| Shipped To EPA/RECRA 9-23-99 | Offsite Property No. A990271 | Bill of Lading/Air Bill No. 4235 7952 9790 | | | |

COA R105D4 2800

| POSSIBLE SAMPLE HAZARDS/REMARKS COPY | Preservation | Cool 4C | Cool 4C | None | None | | | | | | |
|---|---------------------------------|---------------------|----------------------------|---|--------------------------------------|-------|--|--|--|--|--------|
| | Type of Container | aG | aG | aG | aG | | | | | | |
| | No. of Container(s) | 1 | 1 | 1 | 1 | | | | | | |
| | Special Handling and/or Storage | Volume | 60mL | 60mL | 60mL | 500mL | | | | | |
| SAMPLE ANALYSIS | | Chromium Hex - 7196 | PCBs - 8080 (Aroclor-1254) | ICP Metals - 6010A (Add-on) (Lead); Mercury - 7471 - (CV) | See item (1) in Special Instructions | | | | | | |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | |
| B0WCJ6 | Soil | 9-23-99 | 0852 | X | X | X | | | | | B0WCJ0 |
| B0WCJ7 | Soil | 9-23-99 | 0852 | X | X | X | | | | | B0WCJ0 |
| B0WCJ8 | Soil | 9-23-99 | | | | | | | | | |
| B0WCJ9 | Soil | 9-23-99 | | | | | | | | | |

| CHAIN OF POSSESSION | Sign/Print Names | SPECIAL INSTRUCTIONS | Matrix * |
|---------------------------------------|---------------------------|-----------------------------------|---------------------------|
| Relinquished By <i>[Signature]</i> | Date/Time 9-23-99 1400 | Received By <i>[Signature]</i> | Date/Time 9-23-99 1400 |
| Relinquished By <i>[Signature]</i> | Date/Time 9-24-99 0755 | Received By <i>[Signature]</i> | Date/Time 9-24-99 0755 |
| Relinquished By <i>[Signature]</i> | Date/Time 9-24-99 1400 | Received By FEDEX | Date/Time 9-24-99 1400 |
| Relinquished By FedEx | Date/Time 9-25-99 1000 | Received By <i>[Signature]</i> | Date/Time 9-25-99 1000 |

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Barium-133); Isotopic Plutonium; Isotopic Uranium; Americium-241; Carbon-14; Nickel-63; Technetium-99

COLLECTOR UNAVAILABLE TO SIGN COC

012

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

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-075-18

Page 1 of 1

| | | | | | |
|--|---|------------------------------|----------------------------------|------------------|----------------------------|
| Collector Fahlberg/Behnke | Company Contact Jason Adler | Telephone No. 373-4316 | Project Coordinator Trent, SJ | Price Code 8L | Data Turnaround 21 Days |
| Project Designation 105-DR FSB - Soil | Sampling Location 105 DR | Field Logbook No. EL-1281 | SAF No. B99-075 | | |
| Ice Chest No. ERC-99-011 | Offsite Property No. A990272 | Method of Shipment FedEx | | | |
| Shipped To TMA/RECRA 9-23-99 | Bill of Lading/Air Bill No. 4235 7952 9789 | | | | |

COA R05 ~~DR-9239~~ D4 2800

| POSSIBLE SAMPLE HAZARDS/REMARKS | Preservation | Cool 4C | Cool 4C | None | None | | | | | | |
|---------------------------------|---------------------|----------------------------|---|--------------------------------------|-------|--|--|--|--|--|---------|
| | Type of Container | aG | aG | aG | aG | | | | | | |
| | No. of Container(s) | 1 | 1 | 1 | 1 | | | | | | |
| | Volume | 60mL | 60mL | 60mL | 500mL | | | | | | |
| SPECIAL HANDLING AND/OR STORAGE | | | | | | | | | | | |
| SAMPLE ANALYSIS | Chromium Hex - 7196 | PCBs - 8080 (Aroclor-1254) | ICP Metals - 6010A (Add-on) (Lead); Mercury - 7471 - (CV) | See item (1) in Special Instructions | | | | | | | |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | |
| B0WCJ6 | Soil | 9-23-99 | 0852 | | | | | | | | Box CPO |
| B0WCJ7 | Soil | 9-23-99 | 0852 | | | | | | | | Box CPO |
| B0WCJ8 | Soil | 9-23-99 | 0852 | | | | | | | | |
| B0WCJ9 | Soil | 9-23-99 | 0852 | | | | | | | | |

| CHAIN OF POSSESSION | Sign/Print Names | SPECIAL INSTRUCTIONS | Matrix * |
|---------------------------------------|-----------------------------------|-----------------------------------|---------------------------|
| Relinquished By <i>[Signature]</i> | Date/Time 1400 | Received By <i>[Signature]</i> | Date/Time 400 |
| Relinquished By <i>[Signature]</i> | Date/Time 9-23-99 5:23 | Received By <i>[Signature]</i> | Date/Time 9-23-99 |
| Relinquished By <i>[Signature]</i> | Date/Time 9-24-99 0755 | Received By <i>[Signature]</i> | Date/Time 9-24-99 0755 |
| Relinquished By <i>[Signature]</i> | Date/Time 9-24-99 1400 | Received By FEDEX | Date/Time 9-24-99 1400 |
| Relinquished By FedEx | Date/Time 9-25-99 1000 | Received By <i>[Signature]</i> | Date/Time 9-25-99 1000 |
| LABORATORY SECTION | Received By <i>[Signature]</i> | Title | Date/Time |
| FINAL SAMPLE DISPOSITION | Disposal Method | Disposed By | Date/Time |

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Barium-133); Isotopic Plutonium; Isotopic Uranium; Americium-241; Carbon-14; Nickel-63; Technetium-99

COLLECTOR UNAVAILABLE TO SIGN FOR

Soil
Water
Vapor
Other Solid
Other Liquid

013



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Virtual Laboratories Everywhere



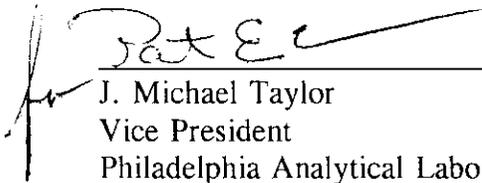
**Recra LabNet Philadelphia
Analytical Report**

Client : TNU-HANFORD B99-075
RFW# : 9909L190
SDG# : H0544
SAF# : B99-075

W.O. # : 10985-001-001-9999-00
Date Received: 09-25-99

INORGANIC CASE NARRATIVE

1. This narrative covers the analyses of 2 soil samples.
2. The samples were prepared and analyzed in accordance with the methods checked 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 blank for Chromium VI was within method criteria.
6. The Laboratory Control Samples (LCS) for Chromium VI were within the laboratory control limits.
7. The matrix spike recoveries for Chromium VI were within the 75-125% control limits.
8. The replicate analyses were within the 20% Relative Percent Difference (RPD) control limit.
9. Results for solid samples are reported on a dry weight basis.



J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

10-28-99
Date

njpl09-190

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.

Recra LabNet Philadelphia

WET CHEMISTRY METHODS GLOSSARY FOR SOIL/SOLIDS SAMPLE ANALYSIS

| | <u>ASTM</u> | <u>SW846</u> | <u>OTHER</u> |
|---|------------------|-------------------------|----------------------|
| % Ash | ___ D2216-80 | | |
| % Moisture | ___ D2216-80 | | ___ ILMO4.0 (e) |
| % Solids | ___ | | ___ ✓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 | |
| Halides, Extractable Organic | | ___ 9020B | ___ EPA 600/4/84-008 |
| Halides, Total | | ___ 9020B | ___ EPA 600/4/84-008 |
| EP Toxicity | | ___ 1310A | |
| Flash Point | | ___ 1010 | |
| Ignitability | | ___ 1010 | |
| Oil & Grease | | ___ 9071A | |
| Carbon, Total Organic | | ___ 9060 | ___ Lloyd Kahn (mod) |
| Oxygne Bomb Prep for Anions | ___ D240-87(mod) | ___ 5050 | |
| Petroleum Hydrocarbons, Total Recoverable | | ___ 9071 | ___ EPA 418.1 |
| pH, Soil | | ___ 9045C | |
| Sulfide, Reactive | | ___ Section 7.3 | |
| Sulfide | | ___ 9030B(mod) | |
| Specific Gravity | ___ D1429-76C/ | ___ D5057-90 | |
| Sulfur, Total | | ___ 9056 | |
| Synthetic Prparation Leach | | ___ 1312 | |
| Paint Filter | | 9095A | |

Other: _____ **Method:** _____

Other: _____ **Method:** _____

Recra LabNet Philadelphia
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.

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 10/08/99

CLIENT: TNU-HANFORD B99-075
 WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 9909L190

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|--------|---------|-------------|--------|-------|--------------------|--------------------|
| -001 | BOWCJ6 | % Solids | 95.7 | % | 0.01 | 1.0 |
| | | Chromium VI | 0.42 u | MG/KG | 0.42 | 1.0 |
| -002 | BOWCJ7 | % Solids | 94.6 | % | 0.01 | 1.0 |
| | | Chromium VI | 0.42 u | MG/KG | 0.42 | 1.0 |

Recra LabNet - Lionville

INORGANICS METHOD BLANK DATA SUMMARY PAGE 10/08/99

CLIENT: TNU-HANFORD B99-075

RECRA LOT #: 9909L190

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

| SAMPLE | SITE ID | ANALYTE | RESULT | UNITS | REPORTING LIMIT | DILUTION FACTOR |
|---------|--------------|-------------|--------|-------|--------------------|--------------------|
| BLANK10 | 99LVI068-MB1 | Chromium VI | 0.40 u | MG/KG | 0.40 | 1.0 |

Recre LabNet - Lionville

INORGANICS ACCURACY REPORT 10/08/99

CLIENT: TNU-HANFORD B99-075

RECRA LOT #: 9909L190

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

| SAMPLE | SITE ID | ANALYTE | SPIKED SAMPLE | INITIAL RESULT | SPIKED AMOUNT | %RECOV | DILUTION FACTOR(SPK) |
|---------|--------------|-----------------------|------------------|-------------------|------------------|--------|-------------------------|
| -001 | B0WCJ6 | Soluble Chromium VI | 3.9 | 0.42u | 4.2 | 93.6 | 1.0 |
| | | Insoluble Chromium VI | 1230 | 0.42u | 1180 | 104.6 | 100 |
| BLANK10 | 99LVIO68-ME1 | Soluble Chromium VI | 4.0 | 0.40u | 4.0 | 99.9 | 1.0 |
| | | Insoluble Chromium VI | 1180 | 0.40u | 1160 | 101.3 | 100 |

Recra LabNet - Lionville

INORGANICS PRECISION REPORT 10/08/99

CLIENT: TNU-HANFORD B99-075

RECRA LOT #: 9909L190

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

| SAMPLE | SITE ID | ANALYTE | INITIAL | | | DILUTION FACTOR (REP) |
|---------|---------|-------------|---------|---------------|-----|--------------------------|
| | | | RESULT | REPLICATE RPD | | |
| -001REP | B0WCJ6 | Chromium VI | 0.42u | 0.42u | NC | 1.0 |
| -002REP | B0WCJ7 | % Solids | 94.6 | 95.6 | 1.0 | 1.0 |

Recra LabNet - Lionville Laboratory
 INORGANIC ANALYTICAL DATA PACKAGE FOR
 TNU-HANFORD B99-075

DATE RECEIVED: 09/25/99

RFW LOT # :9909L190

| CLIENT ID /ANALYSIS | RFW # | MTX | PREP # | COLLECTION | EXTR/PREP | ANALYSIS |
|---------------------|-------|-----|--------|------------|-----------|----------|
|---------------------|-------|-----|--------|------------|-----------|----------|

BOWCJ6

| | | | | | | |
|-------------|---------|---|----------|----------|----------|----------|
| % SOLIDS | 001 | S | 99L%S128 | 09/23/99 | 10/01/99 | 10/03/99 |
| CHROMIUM VI | 001 | S | 99LVI068 | 09/23/99 | 10/05/99 | 10/05/99 |
| CHROMIUM VI | 001 REP | S | 99LVI068 | 09/23/99 | 10/05/99 | 10/05/99 |
| CHROMIUM VI | 001 MS | S | 99LVI068 | 09/23/99 | 10/05/99 | 10/05/99 |
| CHROMIUM VI | 001 MSD | S | 99LVI068 | 09/23/99 | 10/05/99 | 10/05/99 |

BOWCJ7

| | | | | | | |
|-------------|---------|---|----------|----------|----------|----------|
| % SOLIDS | 002 | S | 99L%S128 | 09/23/99 | 10/01/99 | 10/03/99 |
| % SOLIDS | 002 REP | S | 99L%S128 | 09/23/99 | 10/01/99 | 10/03/99 |
| CHROMIUM VI | 002 | S | 99LVI068 | 09/23/99 | 10/05/99 | 10/05/99 |

LAB QC:

| | | | | | | |
|-------------|---------|---|----------|-----|----------|----------|
| CHROMIUM VI | MB1 | S | 99LVI068 | N/A | 10/05/99 | 10/05/99 |
| CHROMIUM VI | MB1 BS | S | 99LVI068 | N/A | 10/05/99 | 10/05/99 |
| CHROMIUM VI | MB1 BSD | S | 99LVI068 | N/A | 10/05/99 | 10/05/99 |

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-075-18

Page 1 of 1

| | | | | | |
|--|--|--|----------------------------------|----------------------|-----------------------------------|
| Collector Fahlberg/Behnke | Company Contact Jason Adler | Telephone No. 373-4316 | Project Coordinator TRENT, SJ | Price Code 8L | Data Turnaround 21 Days |
| Project Designation 105-DR FSB - Soil | Sampling Location 105 DR | SAF No. B99-075 | | | |
| Ice Chest No. SML-465 | Field Logbook No. EL-1281 | Method of Shipment FEDEX | | | |
| Shipped To FMA/RECRA 9-23-99 | Offsite Property No. A990271 | Bill of Lading/Air Bill No. 4235 7952 9790 | | | |
| COA R105D4 2800 | | | | | |

| | | | | | | | | | | | |
|---|---------------------------------|---------|---------|------|------|-------|--|--|--|--|--|
| POSSIBLE SAMPLE HAZARDS/REMARKS COV | Preservation | Cool 4C | Cool 4C | None | None | | | | | | |
| | Type of Container | aG | aG | aG | aG | | | | | | |
| | No. of Container(s) | 1 | 1 | 1 | 1 | | | | | | |
| | Special Handling and/or Storage | Volume | 60mL | 60mL | 60mL | 500mL | | | | | |

| | | | | | | | | | | |
|-----------------|---------------------|----------------------------|---|--------------------------------------|--|--|--|--|--|--|
| SAMPLE ANALYSIS | Chromium Hex - 7196 | PCBs - 8080 (Aroclor-1254) | ICP Metals - 6010A (Add-on) (Lead); Mercury - 7471 - (CV) | See item (1) in Special Instructions | | | | | | |
| | | | | | | | | | | |

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | |
|-------------------|-----------------|--------------------|-------------|---|---|---|--|--|--|--|--------|
| BOWCJ6 | Soil | 9-23-99 | 0852 | X | X | X | | | | | BOWCJ6 |
| BOWCJ7 | Soil | 9-23-99 | 0852 | X | X | X | | | | | BOWCJ7 |
| BOWCJ8 | Soil | 9-23-99 | | | | | | | | | |
| BOWCJ9 | Soil | 9-23-99 | | | | | | | | | |

| | | | |
|---------------------------------------|---------------------------|--|---|
| CHAIN OF POSSESSION | Sign/Print Names | SPECIAL INSTRUCTIONS | Matrix * |
| Relinquished By <i>[Signature]</i> | Date/Time 1400 | Received By <i>[Signature]</i> | Date/Time 1400 |
| Relinquished By <i>[Signature]</i> | Date/Time 9-23-99 | Received By <i>[Signature]</i> | Date/Time 9-23-99 |
| Relinquished By <i>[Signature]</i> | Date/Time 9-24-99 0755 | Received By <i>[Signature]</i> | Date/Time 9-24-99 0755 |
| Relinquished By <i>[Signature]</i> | Date/Time 9-24-99 1400 | Received By <i>[Signature]</i> | Date/Time 9-24-99 1400 |
| Relinquished By <i>[Signature]</i> | Date/Time 9-25-99 1000 | Received By <i>[Signature]</i> | Date/Time 9-25-99 1000 |
| | | (1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Barium-133); Isotopic Plutonium, Isotopic Uranium, Americium-241, Carbon-14; Nickel-63; Technetium-99 | Soil Water Vapor Other Solid Other Liquid |
| | | COLLECTOR UNAVAILABLE TO SIGN COC | |

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

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-075-18

Page 1 of 1

| | | | | | |
|---|--|--|----------------------------------|---------------|-----------------------------------|
| Collector Fahlberg/Behnke | Company Contact Jason Adler | Telephone No. 373-4316 | Project Coordinator TRENT, SJ | Price Code 8L | Data Turnaround 21 Days |
| Project Designation 105-DR FSB - Soil | Sampling Location 105 DR | SAF No. B99-075 | | | |
| Ice Chest No. ERC-99-011 | Field Logbook No. EL-1281 | Method of Shipment FedEx | | | |
| Shipped To TMA/RECRA 9-23-99 | Offsite Property No. A990272 | Bill of Lading/Air Bill No. 4235 7952 9789 | | | |
| COA R05 # 9-23-99 D4 2800 | | | | | |

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| POSSIBLE SAMPLE HAZARDS/REMARKS | Preservation | Cool 4C | Cool 4C | None | None | | | | |
|---------------------------------|---------------------|----------------------------|---|--------------------------------------|-------|--|--|--|--|
| | Type of Container | aG | aG | aG | aG | | | | |
| Special Handling and/or Storage | No. of Container(s) | 1 | 1 | 1 | 1 | | | | |
| | Volume | 60mL | 60mL | 60mL | 500mL | | | | |
| SAMPLE ANALYSIS | Chromium Hex - 7196 | PCBs - 8080 (Aroclor-1254) | ICP Metals - 6010A (Add-on) (Lead), Mercury - 7471 - (CV) | See item (1) in Special Instructions | | | | | |

| CHAIN OF POSSESSION | Sign/Print Names | SPECIAL INSTRUCTIONS | Matrix * | |
|---------------------------------------|---------------------------|-----------------------------------|---------------------------|--|
| Relinquished By <i>[Signature]</i> | Date/Time 1400 | Received By <i>[Signature]</i> | Date/Time 1400 | (1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Barium-133); Isotopic Plutonium; Isotopic Uranium; Americium-241; Carbon-14; Nickel-63; Technetium-99 COLLECTOR UNAVAILABLE TO SIGN COC Soil Water Vapor Other Solid Other Liquid |
| Relinquished By <i>[Signature]</i> | Date/Time 9-23-99 0755 | Received By <i>[Signature]</i> | Date/Time 9-23-99 0755 | |
| Relinquished By <i>[Signature]</i> | Date/Time 9-24-99 1400 | Received By FEDEx | Date/Time 9-24-99 1400 | |
| Relinquished By FEDEx | Date/Time 9-25-99 1000 | Received By <i>[Signature]</i> | Date/Time 9-25-99 1000 | |
| LABORATORY SECTION | Received By | Title | Date/Time | |
| FINAL SAMPLE DISPOSITION | Disposal Method | Disposed By | Date/Time | |