W0083-ITC-094
0000001

INTERNATIONAL TECHNOLOGY CORPORATION

# ANALYTICAL SERVICES

0045262

## CERTIFICATE OF ANALYSIS

IT Corporation
2800 George Washington Way
Richland, WA 99352
Attn: Van Pettey

July 18, 1994

AUG 1994 RECEIVED SDLA

Job Number: 622 & 649

This is the Certificate of Analysis for the following samples:

| | |
|---|---|
| SDG: | W0083 |
| Client Project ID: | WHC SAF-94-046 200-UP-1 Soil Sampling - Round 1 |
| Date Received by Lab: | June 7 & June 14, 1994 |
| Number of Samples: | Nine (9) |
| Sample Type: | Soil |

### I. Introduction

On June 7 and June 14, 1994, nine (9) soil samples arrived at ITAS-Richland, Washington and were transferred to ITAS-Knoxville for chemical analysis. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report. Samples BOBX93 and BOBX95 were cancelled per Record of Disposition 94-00148, dated June 10, 1994.

### II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Soil result are reported on a dry weight basis.

The samples were analyzed for Target Compound List (TCL) volatiles and semivolatiles by gas chromatography/mass spectroscopy (GC/MS) in accordance with the EPA CLP 3/90 Statement of Work.

Reviewed and Approved:

Sheree' A. Schneider
Project Manager

SEP 1996 RECEIVED EDMC

RECORD COPY

IT Corporation
July 18, 1994
Job Number: 622 & 647
Client Project ID: WHC SAF-94-046 200-UP-1 Soil Sampling - Round 1

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II. Analytical Results/Methodology (Continued)

The samples were analyzed for Target Analyte List (TAL) metals by cold vapor atomic absorption spectroscopy (CVAA), graphite furnace atomic absorption spectroscopy (GFAA), and inductively coupled plasma spectroscopy (ICP) in accordance with the EPA CLP ILM03 Statement of Work.

The samples were analyzed for total cyanide in accordance with the EPA CLP ILM03 Statement of Work.

The samples were analyzed for nitrate-nitrite based on EPA method 353.2.

The samples were analyzed for anions by ion chromatography using EPA method 300.0.

III. Quality Control

The volatiles analyses were performed by purge and trap with a J & W DB-624 capillary column on a Finnigan INCOS 500 GC/MS/DS. Matrix spike and matrix spike duplicate analyses were performed using sample BOBX97. All QC results met method specified limits. The samples were extracted outside of holding time in accordance to ROD 94-00148.

The semivolatiles analyses were performed by direct injection of sample extract on a Restek XTI-5 capillary column on a Finnigan 4500 GC/MS/DS. Matrix spike and matrix spike duplicate analyses were performed using sample BOBX97. All QC results met method specified limits. The samples were extracted outside of holding time in accordance to ROD 94-00148.

Data were reported with qualifiers as follows:

U - Compound analyzed for but not detected; value given is quantitation limit.
E - Compound exceeded calibration range.
D - Compound analyzed at a secondary dilution factor.
J - Compound detected but below quantitation limit; value estimated.
S - Spiked compound.
B - Compound found in method blank.
A - Suspected aldol condensation product.
Y - Indistinguishable isomer in tentatively identified compounds.
N - Presumptive evidence of compound presence.

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III. Quality Control (Continued)

The samples for work order #622 were digested on July 5, 1994 for ICP and June 22, 1994 for GFAA. The CVAA analysis for mercury was performed on June 27, 1994; the GFAA analyses for arsenic, lead, selenium and thallium were performed from June 22 through June 28, 1994; the remaining metals were analyzed by ICP on July 5, 1994. All run QC was acceptable. Samples are batched with QC from work order #647.

The samples for work order #649 were digested on June 15, 1994 for ICP and GFAA. The CVAA analysis for mercury was performed on June 21, 1994; the GFAA analyses for arsenic, lead, selenium and thallium were performed from June 16 through June 22, 1994; the remaining metals were analyzed by ICP on July 6, 1994. All run QC was acceptable. A duplicate/spike pair was prepared using sample number BOBX97. Spike recovery (accuracy) results were within acceptance limits for all parameters. Duplicate RPD (precision) results were within acceptance limits for all parameters except for zinc which exhibited a slight variation due to probable sample nonhomogeneity for this analyte.

Data were reported with qualifiers as follows:

"C" Qualifiers

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
B - Value greater than instrument detection limit, but less than contract required quantitation limit.

"Q" Qualifiers

* - Duplicate analysis outside control limits.
N - Spiked sample recovery outside control limits.
W - Post-digestion spike for GFAA was out of control limits (85-115%), while sample absorbance was less than 50% of spike absorbance.
S - The reported value was determined by method of standard additions.

"M" Qualifiers

P - Analysis performed by ICP.
V - Analysis performed by CVAA.
F - Analysis performed by GFAA.
C - Cyanide analysis by manual distillation/colorimetric determination.

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July 18, 1994
Job Number: 622 & 647
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III. Quality Control (Continued)

Miscellaneous

D - Duplicate.
S - Spike.
NR - Not required.
G - Native analyte > 4 times spike added, therefore, acceptance criteria do not apply.
X - Detection limits higher than normal due to sample matrix interferences.

The samples were analyzed for nitrate/nitrite on June 28, 1994. Matrix spike and matrix spike duplicate analyses were performed using sample BOBX97. All quality control results were acceptable.

The samples were analyzed for fluoride, chloride, phosphate, nitrate, nitrite and sulfate by EPA method 300.0 from June 27 through June 29, 1994. Matrix spike and matrix spike duplicate analyses were performed using sample BOBX97. All quality control results were acceptable.

IT Corporation
July 18, 1994
Job Number: 622 & 647
Client Project ID: WHC SAF-94-046 200-UP-1 Soil Sampling - Round 1

IT ANALYTICAL SERVICES
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III. Quality Control (Continued)

Table I is a cross reference between client sample IDs and laboratory sample IDs.

TABLE I

| Knoxville ID | Richland ID | WHC ID | Test |
|---|---|---|---|
| AB0326 | 406042-01A | BOBX94 | VOC |
| AB0327 | 406042-01B | " | SVOC |
| AB0328 | 406042-01C | " | METALS-T |
| AB0329 | 406042-01D | " | CYANIDE |
| AB0330 | 406042-01E | " | ANIONS |
| AB0331 | 406042-01F | " | $NO_3NO_2$ |
| AB0344 | 406042-02A | BOBX95 | VOC |
| AB0345 | 406042-03A | BOBX96 | VOC |
| AB0332 | 406042-04A | BOBJ16 | VOC |
| AB0333 | 406042-04B | " | SVOC |
| AB0334 | 406042-04C | " | METALS-T |
| AB0335 | 406042-04D | " | CYANIDE |
| AB0336 | 406042-04E | " | ANIONS |
| AB0337 | 406042-04F | " | $NO_3NO_2$ |
| AB0338 | 406042-05A | BOBX93 | VOC |
| AB0339 | 406042-05B | " | SVOC |
| AB0340 | 406042-05C | " | METALS-T |
| AB0341 | 406042-05D | " | CYANIDE |
| AB0342 | 406042-05E | " | ANIONS |
| AB0343 | 406042-05F | " | $NO_3NO_2$ |

IT Corporation
July 18, 1994
Job Number: 622 & 647
Client Project ID: WHC SAF-94-046 200-UP-1 Soil Sampling - Round 1

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KNOXVILLE, TN

III. Quality Control (Continued)

Table I is a cross reference between client sample IDs and laboratory sample IDs.

TABLE I

| Knoxville ID | Richland ID | WHC ID | Test |
|---|---|---|---|
| AB0606 | 406264-01A | BOBX98 | VOC |
| AB0607 | 406264-01B | " | SVOC |
| AB0608 | 406264-01C | " | METALS-T |
| AB0674 | 406264-01D | " | CYANIDE |
| AB0610 | 406264-01E | " | ANIONS |
| AB0611 | 406264-01F | " | $NO_3NO_2$ |
| AB0612 | 406264-02A | BOBX97 | VOC |
| AB0613 | 406264-02B | " | SVOC |
| AB0614 | 406264-02C | " | METALS-T |
| AB0615 | 406264-02D | " | CYANIDE |
| AB0616 | 406264-02E | " | ANIONS |
| AB0617 | 406264-02F | " | $NO_3NO_2$ |
| AB0618 | 406264-03A | BOBX99 | VOC |
| AB0619 | 406264-04A | BOBXB0 | VOC |

IT Corporation
July 18, 1994
Job Number: 622 & 647
Client Project ID: WHC SAF-94-046 200-UP-1 Soil Sampling - Round 1

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KNOXVILLE, TN

## IV. Certification

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the laboratory manager or his designee, as verified by the following signature:

Reviewed and Approved:

Sheree A. Schneider

Sheree' A. Schneider
Project Manager

# OFFICE OF SAMPLE MANAGEMENT

# RECORD OF DISPOSITION

ROD-94-00148
Record of Disposition No.

DATE: 06/10/94 | LABORATORY: IT

PROJECT TITLE/NO.: 200-UP-1 Soil Sampling-Round 1 (SAF 94-046) | NCR NO.: N/A

SAMPLE IDENTIFICATION NUMBERS: BOBJ16, BOBX93, BOBX94, BOBX95, BOBX96

DESCRIPTION OF EVENT:
On 6/07/94, IT was instructed to postpone the analysis of samples received on 6/04/94 until further notice from WHC.

DISPOSITION OF SAMPLES:
Per the technical representative, IT is to cancel the analysis of samples BOBX95, and BOBX93. The analysis of BOBJ16, BOBX94, and BOBX96 is to continue.

APPROVAL SIGNATURES:

J.A. Lerch — 6/10/94
HASM Project Coordinator (Print/Sign Name) — Date

B.E. Innis — 6/27/94
Technical Representative (Print/Sign Name) — Date

N/A
Quality Assurance (Print/Sign Name) — Date

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBJ16

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 622 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0332

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB0332

Level: (low/med) LOW Date Received: 06/07/94

% Moisture: not dec. 17 Date Analyzed: 06/29/94

GC Column: DB624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 12 | U |
| 74-83-9 | Bromomethane | 12 | U |
| 75-01-4 | Vinyl Chloride | 12 | U |
| 75-00-3 | Chloroethane | 12 | U |
| 75-09-2 | Methylene Chloride | 7 | BJ |
| 67-64-1 | Acetone | 13 | |
| 75-15-0 | Carbon Disulfide | 12 | U |
| 75-35-4 | 1,1-Dichloroethene | 12 | U |
| 75-34-3 | 1,1-Dichloroethane | 12 | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 12 | U |
| 67-66-3 | Chloroform | 12 | U |
| 107-06-2 | 1,2-Dichloroethane | 12 | U |
| 78-93-3 | 2-Butanone | 12 | U |
| 71-55-6 | 1,1,1-Trichloroethane | 12 | U |
| 56-23-5 | Carbon Tetrachloride | 12 | U |
| 75-27-4 | Bromodichloromethane | 12 | U |
| 78-87-5 | 1,2-Dichloropropane | 12 | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 12 | U |
| 79-01-6 | Trichloroethene | 12 | U |
| 124-48-1 | Dibromochloromethane | 12 | U |
| 79-00-5 | 1,1,2-Trichloroethane | 12 | U |
| 71-43-2 | Benzene | 12 | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 12 | U |
| 75-25-2 | Bromoform | 12 | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 12 | U |
| 591-78-6 | 2-Hexanone | 12 | U |
| 127-18-4 | Tetrachloroethene | 12 | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 12 | U |
| 108-88-3 | Toluene | 17 | |
| 108-90-7 | Chlorobenzene | 12 | U |
| 100-41-4 | Ethylbenzene | 12 | U |
| 100-42-5 | Styrene | 12 | U |
| 1330-20-7 | Xylene (total) | 12 | U |

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBJ16

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 622 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0332

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB0332

Level: (low/med) LOW Date Received: 06/07/94

% Moisture: not dec. 17 Date Analyzed: 06/29/94

GC Column: DB624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Number TICs found: 0

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

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| | | | | |

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBXB0

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 647 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0619

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB0619

Level: (low/med) LOW Date Received: 06/14/94

% Moisture: not dec. 0 Date Analyzed: 06/21/94

GC Column: DB624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 10 | U |
| 74-83-9 | Bromomethane | 10 | U |
| 75-01-4 | Vinyl Chloride | 10 | U |
| 75-00-3 | Chloroethane | 10 | U |
| 75-09-2 | Methylene Chloride | 17 | B |
| 67-64-1 | Acetone | 5 | BJ |
| 75-15-0 | Carbon Disulfide | 10 | U |
| 75-35-4 | 1,1-Dichloroethene | 10 | U |
| 75-34-3 | 1,1-Dichloroethane | 10 | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 10 | U |
| 67-66-3 | Chloroform | 10 | U |
| 107-06-2 | 1,2-Dichloroethane | 10 | U |
| 78-93-3 | 2-Butanone | 10 | U |
| 71-55-6 | 1,1,1-Trichloroethane | 10 | U |
| 56-23-5 | Carbon Tetrachloride | 10 | U |
| 75-27-4 | Bromodichloromethane | 10 | U |
| 78-87-5 | 1,2-Dichloropropane | 10 | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 10 | U |
| 79-01-6 | Trichloroethene | 10 | U |
| 124-48-1 | Dibromochloromethane | 10 | U |
| 79-00-5 | 1,1,2-Trichloroethane | 10 | U |
| 71-43-2 | Benzene | 10 | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 10 | U |
| 75-25-2 | Bromoform | 10 | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 10 | U |
| 591-78-6 | 2-Hexanone | 10 | U |
| 127-18-4 | Tetrachloroethene | 10 | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 10 | U |
| 108-88-3 | Toluene | 10 | U |
| 108-90-7 | Chlorobenzene | 10 | U |
| 100-41-4 | Ethylbenzene | 10 | U |
| 100-42-5 | Styrene | 10 | U |
| 1330-20-7 | Xylene (total) | 10 | U |

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBXB0

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 647 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0619

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB0619

Level: (low/med) LOW Date Received: 06/14/94

% Moisture: not dec. 0 Date Analyzed: 06/21/94

GC Column: DB624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____(uL)

Number TICs found: 2

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

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| 1. | Unknown | 15.93 | 7 | J |
| 2. | Unknown | 17.47 | 7 | J |

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBX94

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 622 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0326

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB0326

Level: (low/med) LOW Date Received: 06/07/94

% Moisture: not dec. 0 Date Analyzed: 06/29/94

GC Column: DB624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 10 | U |
| 74-83-9 | Bromomethane | 10 | U |
| 75-01-4 | Vinyl Chloride | 10 | U |
| 75-00-3 | Chloroethane | 10 | U |
| 75-09-2 | Methylene Chloride | 5 | BJ |
| 67-64-1 | Acetone | 6 | J |
| 75-15-0 | Carbon Disulfide | 10 | U |
| 75-35-4 | 1,1-Dichloroethene | 10 | U |
| 75-34-3 | 1,1-Dichloroethane | 10 | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 10 | U |
| 67-66-3 | Chloroform | 10 | U |
| 107-06-2 | 1,2-Dichloroethane | 10 | U |
| 78-93-3 | 2-Butanone | 10 | U |
| 71-55-6 | 1,1,1-Trichloroethane | 10 | U |
| 56-23-5 | Carbon Tetrachloride | 10 | U |
| 75-27-4 | Bromodichloromethane | 10 | U |
| 78-87-5 | 1,2-Dichloropropane | 10 | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 10 | U |
| 79-01-6 | Trichloroethene | 10 | U |
| 124-48-1 | Dibromochloromethane | 10 | U |
| 79-00-5 | 1,1,2-Trichloroethane | 10 | U |
| 71-43-2 | Benzene | 10 | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 10 | U |
| 75-25-2 | Bromoform | 10 | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 10 | U |
| 591-78-6 | 2-Hexanone | 10 | U |
| 127-18-4 | Tetrachloroethene | 10 | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 10 | U |
| 108-88-3 | Toluene | 13 | |
| 108-90-7 | Chlorobenzene | 10 | U |
| 100-41-4 | Ethylbenzene | 10 | U |
| 100-42-5 | Styrene | 10 | U |
| 1330-20-7 | Xylene (total) | 10 | U |

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBX94

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 622 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0326

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB0326

Level: (low/med) LOW Date Received: 06/07/94

% Moisture: not dec. 0 Date Analyzed: 06/29/94

GC Column: DB624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Number TICs found: 0

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

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| | | | | |

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBX96

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 622 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0345

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB0345

Level: (low/med) LOW Date Received: 06/07/94

% Moisture: not dec. 1 Date Analyzed: 06/29/94

GC Column: DB624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 10 | U |
| 74-83-9 | Bromomethane | 10 | U |
| 75-01-4 | Vinyl Chloride | 10 | U |
| 75-00-3 | Chloroethane | 10 | U |
| 75-09-2 | Methylene Chloride | 5 | BJ |
| 67-64-1 | Acetone | 10 | U |
| 75-15-0 | Carbon Disulfide | 10 | U |
| 75-35-4 | 1,1-Dichloroethene | 10 | U |
| 75-34-3 | 1,1-Dichloroethane | 10 | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 10 | U |
| 67-66-3 | Chloroform | 10 | U |
| 107-06-2 | 1,2-Dichloroethane | 10 | U |
| 78-93-3 | 2-Butanone | 10 | U |
| 71-55-6 | 1,1,1-Trichloroethane | 10 | U |
| 56-23-5 | Carbon Tetrachloride | 10 | U |
| 75-27-4 | Bromodichloromethane | 10 | U |
| 78-87-5 | 1,2-Dichloropropane | 10 | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 10 | U |
| 79-01-6 | Trichloroethene | 10 | U |
| 124-48-1 | Dibromochloromethane | 10 | U |
| 79-00-5 | 1,1,2-Trichloroethane | 10 | U |
| 71-43-2 | Benzene | 10 | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 10 | U |
| 75-25-2 | Bromoform | 10 | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 10 | U |
| 591-78-6 | 2-Hexanone | 10 | U |
| 127-18-4 | Tetrachloroethene | 10 | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 10 | U |
| 108-88-3 | Toluene | 15 | |
| 108-90-7 | Chlorobenzene | 10 | U |
| 100-41-4 | Ethylbenzene | 10 | U |
| 100-42-5 | Styrene | 10 | U |
| 1330-20-7 | Xylene (total) | 10 | U |

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBX96

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 622 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0345

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB0345

Level: (low/med) LOW Date Received: 06/07/94

% Moisture: not dec. 1 Date Analyzed: 06/29/94

GC Column: DB624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____(uL)

Number TICs found: 2

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

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| 1. | UNKNOWN | 15.90 | 7 | J |
| 2. | UNKNOWN | 17.43 | 6 | J |

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBX97

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 647 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0612

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB0612

Level: (low/med) LOW Date Received: 06/14/94

% Moisture: not dec. 11 Date Analyzed: 06/21/94

GC Column: DB624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 11 | U |
| 74-83-9 | Bromomethane | 11 | U |
| 75-01-4 | Vinyl Chloride | 11 | U |
| 75-00-3 | Chloroethane | 11 | U |
| 75-09-2 | Methylene Chloride | 23 | B |
| 67-64-1 | Acetone | 13 | B |
| 75-15-0 | Carbon Disulfide | 11 | U |
| 75-35-4 | 1,1-Dichloroethene | 11 | U |
| 75-34-3 | 1,1-Dichloroethane | 11 | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 11 | U |
| 67-66-3 | Chloroform | 11 | U |
| 107-06-2 | 1,2-Dichloroethane | 11 | U |
| 78-93-3 | 2-Butanone | 11 | U |
| 71-55-6 | 1,1,1-Trichloroethane | 11 | U |
| 56-23-5 | Carbon Tetrachloride | 11 | U |
| 75-27-4 | Bromodichloromethane | 11 | U |
| 78-87-5 | 1,2-Dichloropropane | 11 | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 11 | U |
| 79-01-6 | Trichloroethene | 11 | U |
| 124-48-1 | Dibromochloromethane | 11 | U |
| 79-00-5 | 1,1,2-Trichloroethane | 11 | U |
| 71-43-2 | Benzene | 11 | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 11 | U |
| 75-25-2 | Bromoform | 11 | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 11 | U |
| 591-78-6 | 2-Hexanone | 11 | U |
| 127-18-4 | Tetrachloroethene | 11 | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 11 | U |
| 108-88-3 | Toluene | 11 | U |
| 108-90-7 | Chlorobenzene | 11 | U |
| 100-41-4 | Ethylbenzene | 11 | U |
| 100-42-5 | Styrene | 11 | U |
| 1330-20-7 | Xylene (total) | 11 | U |

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBX97

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 647 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0612

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB0612

Level: (low/med) LOW Date Received: 06/14/94

% Moisture: not dec. 11 Date Analyzed: 06/21/94

GC Column: DB624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____(uL)

Number TICs found: 0

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

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| | | | | |

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBX98

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 647 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0606

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB0606

Level: (low/med) LOW Date Received: 06/14/94

% Moisture: not dec. 19 Date Analyzed: 06/21/94

GC Column: DB624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 12 | U |
| 74-83-9 | Bromomethane | 12 | U |
| 75-01-4 | Vinyl Chloride | 12 | U |
| 75-00-3 | Chloroethane | 12 | U |
| 75-09-2 | Methylene Chloride | 28 | B |
| 67-64-1 | Acetone | 18 | B |
| 75-15-0 | Carbon Disulfide | 12 | U |
| 75-35-4 | 1,1-Dichloroethene | 12 | U |
| 75-34-3 | 1,1-Dichloroethane | 12 | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 12 | U |
| 67-66-3 | Chloroform | 12 | U |
| 107-06-2 | 1,2-Dichloroethane | 12 | U |
| 78-93-3 | 2-Butanone | 12 | U |
| 71-55-6 | 1,1,1-Trichloroethane | 12 | U |
| 56-23-5 | Carbon Tetrachloride | 12 | U |
| 75-27-4 | Bromodichloromethane | 12 | U |
| 78-87-5 | 1,2-Dichloropropane | 12 | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 12 | U |
| 79-01-6 | Trichloroethene | 12 | U |
| 124-48-1 | Dibromochloromethane | 12 | U |
| 79-00-5 | 1,1,2-Trichloroethane | 12 | U |
| 71-43-2 | Benzene | 12 | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 12 | U |
| 75-25-2 | Bromoform | 12 | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 12 | U |
| 591-78-6 | 2-Hexanone | 12 | U |
| 127-18-4 | Tetrachloroethene | 12 | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 12 | U |
| 108-88-3 | Toluene | 12 | U |
| 108-90-7 | Chlorobenzene | 12 | U |
| 100-41-4 | Ethylbenzene | 12 | U |
| 100-42-5 | Styrene | 12 | U |
| 1330-20-7 | Xylene (total) | 12 | U |

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBX98

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 647 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0606

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB0606

Level: (low/med) LOW Date Received: 06/14/94

% Moisture: not dec. 19 Date Analyzed: 06/21/94

GC Column: DB624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____(uL)

Number TICs found: 1

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

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| 1. | UNKNOWN | 2.23 | 10 | J |

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBX99

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 647 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0618

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB0618

Level: (low/med) LOW Date Received: 06/14/94

% Moisture: not dec. 0 Date Analyzed: 06/21/94

GC Column: DB624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 10 | U |
| 74-83-9 | Bromomethane | 10 | U |
| 75-01-4 | Vinyl Chloride | 10 | U |
| 75-00-3 | Chloroethane | 10 | U |
| 75-09-2 | Methylene Chloride | 16 | B |
| 67-64-1 | Acetone | 11 | B |
| 75-15-0 | Carbon Disulfide | 10 | U |
| 75-35-4 | 1,1-Dichloroethene | 10 | U |
| 75-34-3 | 1,1-Dichloroethane | 10 | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 10 | U |
| 67-66-3 | Chloroform | 10 | U |
| 107-06-2 | 1,2-Dichloroethane | 10 | U |
| 78-93-3 | 2-Butanone | 10 | U |
| 71-55-6 | 1,1,1-Trichloroethane | 10 | U |
| 56-23-5 | Carbon Tetrachloride | 10 | U |
| 75-27-4 | Bromodichloromethane | 10 | U |
| 78-87-5 | 1,2-Dichloropropane | 10 | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 10 | U |
| 79-01-6 | Trichloroethene | 10 | U |
| 124-48-1 | Dibromochloromethane | 10 | U |
| 79-00-5 | 1,1,2-Trichloroethane | 10 | U |
| 71-43-2 | Benzene | 10 | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 10 | U |
| 75-25-2 | Bromoform | 10 | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 10 | U |
| 591-78-6 | 2-Hexanone | 10 | U |
| 127-18-4 | Tetrachloroethene | 10 | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 10 | U |
| 108-88-3 | Toluene | 10 | U |
| 108-90-7 | Chlorobenzene | 10 | U |
| 100-41-4 | Ethylbenzene | 10 | U |
| 100-42-5 | Styrene | 10 | U |
| 1330-20-7 | Xylene (total) | 10 | U |

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

BOBX99

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 647 SAS No.: _____ SDG No.:W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0618

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB0618

Level: (low/med) LOW Date Received: 06/14/94

% Moisture: not dec. 0 Date Analyzed: 06/21/94

GC Column: DB624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume:

Number TICs found: 4

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

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| 1 | Unknown | 2.27 | 7 | J |
| 2 | Unknown | 15.30 | 5 | J |
| 3 | Unknown | 15.90 | 10 | J |
| 4 | Unknown | 17.23 | 14 | J |

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBJ16

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 622 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0333

Sample wt/vol: 30.0 (g/mL) G Lab File ID: AB0333

Level: (low/med) LOW Date Received: 06/07/94

% Moisture: 17 decanted: (Y/N) N Date Extracted: 06/22/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/10/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.6

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 108-95-2 | Phenol | 400 | U |
| 111-44-4 | bis(2-Chloroethyl)Ether | 400 | U |
| 95-57-8 | 2-Chlorophenol | 400 | U |
| 541-73-1 | 1,3-Dichlorobenzene | 400 | U |
| 106-46-7 | 1,4-Dichlorobenzene | 400 | U |
| 95-50-1 | 1,2-Dichlorobenzene | 400 | U |
| 95-48-7 | 2-Methylphenol | 400 | U |
| 108-60-1 | 2,2'-oxybis(1-Chloropropane) | 400 | U |
| 106-44-5 | 4-Methylphenol | 400 | U |
| 621-64-7 | N-Nitroso-Di-n-Propylamine | 400 | U |
| 67-72-1 | Hexachloroethane | 400 | U |
| 98-95-3 | Nitrobenzene | 400 | U |
| 78-59-1 | Isophorone | 400 | U |
| 88-75-5 | 2-Nitrophenol | 400 | U |
| 105-67-9 | 2,4-Dimethylphenol | 400 | U |
| 111-91-1 | bis(2-Chloroethoxy)Methane | 400 | U |
| 120-83-2 | 2,4-Dichlorophenol | 400 | U |
| 120-82-1 | 1,2,4-Trichlorobenzene | 400 | U |
| 91-20-3 | Naphthalene | 400 | U |
| 106-47-8 | 4-Chloroaniline | 400 | U |
| 87-68-3 | Hexachlorobutadiene | 400 | U |
| 59-50-7 | 4-Chloro-3-Methylphenol | 400 | U |
| 91-57-6 | 2-Methylnaphthalene | 400 | U |
| 77-47-4 | Hexachlorocyclopentadiene | 400 | U |
| 88-06-2 | 2,4,6-Trichlorophenol | 400 | U |
| 95-95-4 | 2,4,5-Trichlorophenol | 960 | U |
| 91-58-7 | 2-Chloronaphthalene | 400 | U |
| 88-74-4 | 2-Nitroaniline | 960 | U |
| 131-11-3 | Dimethylphthalate | 400 | U |
| 208-96-8 | Acenaphthylene | 400 | U |
| 606-20-2 | 2,6-Dinitrotoluene | 400 | U |
| 99-09-2 | 3-Nitroaniline | 960 | U |
| 83-32-9 | Acenaphthene | 400 | U |

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBJ16

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 622 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0333

Sample wt/vol: 30.0 (g/mL) G Lab File ID: AB0333

Level: (low/med) LOW Date Received: 06/07/94

% Moisture: 17 decanted: (Y/N) N Date Extracted: 06/22/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/10/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.6

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 51-28-5 | 2,4-Dinitrophenol | 960 | U |
| 100-02-7 | 4-Nitrophenol | 960 | U |
| 132-64-9 | Dibenzofuran | 400 | U |
| 121-14-2 | 2,4-Dinitrotoluene | 400 | U |
| 84-66-2 | Diethylphthalate | 400 | U |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 400 | U |
| 86-73-7 | Fluorene | 400 | U |
| 100-01-6 | 4-Nitroaniline | 960 | U |
| 534-52-1 | 4,6-Dinitro-2-Methylphenol | 960 | U |
| 86-30-6 | N-Nitrosodiphenylamine (1) | 400 | U |
| 101-55-3 | 4-Bromophenyl-phenylether | 400 | U |
| 118-74-1 | Hexachlorobenzene | 400 | U |
| 87-86-5 | Pentachlorophenol | 960 | U |
| 85-01-8 | Phenanthrene | 400 | U |
| 120-12-7 | Anthracene | 400 | U |
| 86-74-8 | Carbazole | 400 | U |
| 84-74-2 | Di-n-Butylphthalate | 400 | U |
| 206-44-0 | Fluoranthene | 400 | U |
| 129-00-0 | Pyrene | 400 | U |
| 85-68-7 | Butylbenzylphthalate | 400 | U |
| 91-94-1 | 3,3'-Dichlorobenzidine | 400 | U |
| 56-55-3 | Benzo(a)Anthracene | 400 | U |
| 218-01-9 | Chrysene | 400 | U |
| 117-81-7 | bis(2-Ethylhexyl)Phthalate | 110 | J |
| 117-84-0 | Di-n-Octyl Phthalate | 400 | U |
| 205-99-2 | Benzo(b)Fluoranthene | 400 | U |
| 207-08-9 | Benzo(k)Fluoranthene | 400 | U |
| 50-32-8 | Benzo(a)Pyrene | 400 | U |
| 193-39-5 | Indeno(1,2,3-cd)Pyrene | 400 | U |
| 53-70-3 | Dibenz(a,h)Anthracene | 400 | U |
| 191-24-2 | Benzo(g,h,i)Perylene | 400 | U |

(1) - Cannot be separated from Diphenylamine

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBJ16

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 622 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0333

Sample wt/vol: 30.0 (g/mL) G Lab File ID: AB0333

Level: (low/med) LOW Date Received: 06/07/94

% Moisture: 17 decanted: (Y/N) N Date Extracted: 06/22/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/10/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.6

Number TICs found: 4

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

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| 1. 123-42-2 | 2-PENTANONE, 4-HYDROXY-4-MET | 4.13 | 8100 | BJNA |
| 2. | UNKNOWN | 17.58 | 120 | J |
| 3. | UNKNOWN | 18.42 | 110 | J |
| 4. | UNKNOWN | 19.02 | 120 | J |

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBX94

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 622 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0327

Sample wt/vol: 30.2 (g/mL) G Lab File ID: AB0327

Level: (low/med) LOW Date Received: 06/07/94

% Moisture: 0 decanted: (Y/N) N Date Extracted: 06/22/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/10/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.0

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 108-95-2 | Phenol | 330 | U |
| 111-44-4 | bis(2-Chloroethyl)Ether | 330 | U |
| 95-57-8 | 2-Chlorophenol | 330 | U |
| 541-73-1 | 1,3-Dichlorobenzene | 330 | U |
| 106-46-7 | 1,4-Dichlorobenzene | 330 | U |
| 95-50-1 | 1,2-Dichlorobenzene | 330 | U |
| 95-48-7 | 2-Methylphenol | 330 | U |
| 108-60-1 | 2,2'-oxybis(1-Chloropropane) | 330 | U |
| 106-44-5 | 4-Methylphenol | 330 | U |
| 621-64-7 | N-Nitroso-Di-n-Propylamine | 330 | U |
| 67-72-1 | Hexachloroethane | 330 | U |
| 98-95-3 | Nitrobenzene | 330 | U |
| 78-59-1 | Isophorone | 330 | U |
| 88-75-5 | 2-Nitrophenol | 330 | U |
| 105-67-9 | 2,4-Dimethylphenol | 330 | U |
| 111-91-1 | bis(2-Chloroethoxy)Methane | 330 | U |
| 120-83-2 | 2,4-Dichlorophenol | 330 | U |
| 120-82-1 | 1,2,4-Trichlorobenzene | 330 | U |
| 91-20-3 | Naphthalene | 330 | U |
| 106-47-8 | 4-Chloroaniline | 330 | U |
| 87-68-3 | Hexachlorobutadiene | 330 | U |
| 59-50-7 | 4-Chloro-3-Methylphenol | 330 | U |
| 91-57-6 | 2-Methylnaphthalene | 330 | U |
| 77-47-4 | Hexachlorocyclopentadiene | 330 | U |
| 88-06-2 | 2,4,6-Trichlorophenol | 330 | U |
| 95-95-4 | 2,4,5-Trichlorophenol | 790 | U |
| 91-58-7 | 2-Chloronaphthalene | 330 | U |
| 88-74-4 | 2-Nitroaniline | 790 | U |
| 131-11-3 | Dimethylphthalate | 330 | U |
| 208-96-8 | Acenaphthylene | 330 | U |
| 606-20-2 | 2,6-Dinitrotoluene | 330 | U |
| 99-09-2 | 3-Nitroaniline | 790 | U |
| 83-32-9 | Acenaphthene | 330 | U |

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBX94

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 622 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0327

Sample wt/vol: 30.2 (g/mL) G Lab File ID: AB0327

Level: (low/med) LOW Date Received: 06/07/94

% Moisture: 0 decanted: (Y/N) N Date Extracted: 06/22/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/10/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.0

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 51-28-5 | 2,4-Dinitrophenol | 790 | U |
| 100-02-7 | 4-Nitrophenol | 790 | U |
| 132-64-9 | Dibenzofuran | 330 | U |
| 121-14-2 | 2,4-Dinitrotoluene | 330 | U |
| 84-66-2 | Diethylphthalate | 330 | U |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 330 | U |
| 86-73-7 | Fluorene | 330 | U |
| 100-01-6 | 4-Nitroaniline | 790 | U |
| 534-52-1 | 4,6-Dinitro-2-Methylphenol | 790 | U |
| 86-30-6 | N-Nitrosodiphenylamine (1) | 330 | U |
| 101-55-3 | 4-Bromophenyl-phenylether | 330 | U |
| 118-74-1 | Hexachlorobenzene | 330 | U |
| 87-86-5 | Pentachlorophenol | 790 | U |
| 85-01-8 | Phenanthrene | 330 | U |
| 120-12-7 | Anthracene | 330 | U |
| 86-74-8 | Carbazole | 330 | U |
| 84-74-2 | Di-n-Butylphthalate | 330 | U |
| 206-44-0 | Fluoranthene | 330 | U |
| 129-00-0 | Pyrene | 330 | U |
| 85-68-7 | Butylbenzylphthalate | 330 | U |
| 91-94-1 | 3,3'-Dichlorobenzidine | 330 | U |
| 56-55-3 | Benzo(a)Anthracene | 330 | U |
| 218-01-9 | Chrysene | 330 | U |
| 117-81-7 | bis(2-Ethylhexyl)Phthalate | 53 | J |
| 117-84-0 | Di-n-Octyl Phthalate | 330 | U |
| 205-99-2 | Benzo(b)Fluoranthene | 330 | U |
| 207-08-9 | Benzo(k)Fluoranthene | 330 | U |
| 50-32-8 | Benzo(a)Pyrene | 330 | U |
| 193-39-5 | Indeno(1,2,3-cd)Pyrene | 330 | U |
| 53-70-3 | Dibenz(a,h)Anthracene | 330 | U |
| 191-24-2 | Benzo(g,h,i)Perylene | 330 | U |

(1) - Cannot be separated from Diphenylamine

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBX94

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 622 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0327

Sample wt/vol: 30.2 (g/mL) G Lab File ID: AB0327

Level: (low/med) LOW Date Received: 06/07/94

% Moisture: 0 decanted: (Y/N) N Date Extracted: 06/22/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/10/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.0

Number TICs found: 7

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

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| 1. 123-42-2 | 2-PENTANONE, 4-HYDROXY-4-MET | 4.13 | 7300 | ABJN |
| 2. | UNKNOWN | 7.43 | 67 | AJ |
| 3. | UNKNOWN | 17.58 | 140 | J |
| 4. | UNKNOWN | 18.43 | 110 | J |
| 5. | UNKNOWN | 19.02 | 78 | J |
| 6. | UNKNOWN | 19.08 | 93 | J |
| 7. | UNKNOWN | 19.67 | 83 | J |

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBX97

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 647 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0613

Sample wt/vol: 30.1 (g/mL) G Lab File ID: AB0613

Level: (low/med) LOW Date Received: 06/14/94

% Moisture: 11 decanted: (Y/N) N Date Extracted: 06/22/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/10/94

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.0

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 108-95-2 | Phenol | 370 | U |
| 111-44-4 | bis(2-Chloroethyl)Ether | 370 | U |
| 95-57-8 | 2-Chlorophenol | 370 | U |
| 541-73-1 | 1,3-Dichlorobenzene | 370 | U |
| 106-46-7 | 1,4-Dichlorobenzene | 370 | U |
| 95-50-1 | 1,2-Dichlorobenzene | 370 | U |
| 95-48-7 | 2-Methylphenol | 370 | U |
| 108-60-1 | 2,2'-oxybis(1-Chloropropane) | 370 | U |
| 106-44-5 | 4-Methylphenol | 370 | U |
| 621-64-7 | N-Nitroso-Di-n-Propylamine | 370 | U |
| 67-72-1 | Hexachloroethane | 370 | U |
| 98-95-3 | Nitrobenzene | 370 | U |
| 78-59-1 | Isophorone | 370 | U |
| 88-75-5 | 2-Nitrophenol | 370 | U |
| 105-67-9 | 2,4-Dimethylphenol | 370 | U |
| 111-91-1 | bis(2-Chloroethoxy)Methane | 370 | U |
| 120-83-2 | 2,4-Dichlorophenol | 370 | U |
| 120-82-1 | 1,2,4-Trichlorobenzene | 370 | U |
| 91-20-3 | Naphthalene | 370 | U |
| 106-47-8 | 4-Chloroaniline | 370 | U |
| 87-68-3 | Hexachlorobutadiene | 370 | U |
| 59-50-7 | 4-Chloro-3-Methylphenol | 370 | U |
| 91-57-6 | 2-Methylnaphthalene | 370 | U |
| 77-47-4 | Hexachlorocyclopentadiene | 370 | U |
| 88-06-2 | 2,4,6-Trichlorophenol | 370 | U |
| 95-95-4 | 2,4,5-Trichlorophenol | 900 | U |
| 91-58-7 | 2-Chloronaphthalene | 370 | U |
| 88-74-4 | 2-Nitroaniline | 900 | U |
| 131-11-3 | Dimethylphthalate | 370 | U |
| 208-96-8 | Acenaphthylene | 370 | U |
| 606-20-2 | 2,6-Dinitrotoluene | 370 | U |
| 99-09-2 | 3-Nitroaniline | 900 | U |
| 83-32-9 | Acenaphthene | 370 | U |

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBX97

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 647 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0613

Sample wt/vol: 30.1 (g/mL) G Lab File ID: AB0613

Level: (low/med) LOW Date Received: 06/14/94

% Moisture: 11 decanted: (Y/N) N Date Extracted: 06/22/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/10/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.0

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 51-28-5 | 2,4-Dinitrophenol | 900 | U |
| 100-02-7 | 4-Nitrophenol | 900 | U |
| 132-64-9 | Dibenzofuran | 370 | U |
| 121-14-2 | 2,4-Dinitrotoluene | 370 | U |
| 84-66-2 | Diethylphthalate | 370 | U |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 370 | U |
| 86-73-7 | Fluorene | 370 | U |
| 100-01-6 | 4-Nitroaniline | 900 | U |
| 534-52-1 | 4,6-Dinitro-2-Methylphenol | 900 | U |
| 86-30-6 | N-Nitrosodiphenylamine (1) | 370 | U |
| 101-55-3 | 4-Bromophenyl-phenylether | 370 | U |
| 118-74-1 | Hexachlorobenzene | 370 | U |
| 87-86-5 | Pentachlorophenol | 900 | U |
| 85-01-8 | Phenanthrene | 370 | U |
| 120-12-7 | Anthracene | 370 | U |
| 86-74-8 | Carbazole | 370 | U |
| 84-74-2 | Di-n-Butylphthalate | 370 | U |
| 206-44-0 | Fluoranthene | 370 | U |
| 129-00-0 | Pyrene | 370 | U |
| 85-68-7 | Butylbenzylphthalate | 370 | U |
| 91-94-1 | 3,3'-Dichlorobenzidine | 370 | U |
| 56-55-3 | Benzo(a)Anthracene | 370 | U |
| 218-01-9 | Chrysene | 370 | U |
| 117-81-7 | bis(2-Ethylhexyl)Phthalate | 370 | U |
| 117-84-0 | Di-n-Octyl Phthalate | 370 | U |
| 205-99-2 | Benzo(b)Fluoranthene | 370 | U |
| 207-08-9 | Benzo(k)Fluoranthene | 370 | U |
| 50-32-8 | Benzo(a)Pyrene | 370 | U |
| 193-39-5 | Indeno(1,2,3-cd)Pyrene | 370 | U |
| 53-70-3 | Dibenz(a,h)Anthracene | 370 | U |
| 191-24-2 | Benzo(g,h,i)Perylene | 370 | U |

(1) - Cannot be separated from Diphenylamine

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
BOBX97

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 647 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0613

Sample wt/vol: 30.1 (g/mL) G Lab File ID: AB0613

Level: (low/med) LOW Date Received: 06/14/94

% Moisture: 11 decanted: (Y/N) N Date Extracted: 06/22/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/10/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.0

Number TICs found: 6

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

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| 1. 123-42-2 | 2-PENTANONE, 4-HYDROXY-4-MET | 4.12 | 6500 | ABJN |
| 2. | UNKNOWN | 17.58 | 190 | J |
| 3. | UNKNOWN | 18.42 | 180 | J |
| 4. | UNKNOWN | 19.02 | 180 | J |
| 5. | UNKNOWN | 20.20 | 82 | J |
| 6. | UNKNOWN | 21.32 | 87 | J |

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBX98

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 647 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0607

Sample wt/vol: 30.1 (g/mL) G Lab File ID: AB0607

Level: (low/med) LOW Date Received: 06/14/94

% Moisture: 19 decanted: (Y/N) N Date Extracted: 06/22/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/10/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.7

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 108-95-2 | Phenol | 410 | U |
| 111-44-4 | bis(2-Chloroethyl)Ether | 410 | U |
| 95-57-8 | 2-Chlorophenol | 410 | U |
| 541-73-1 | 1,3-Dichlorobenzene | 410 | U |
| 106-46-7 | 1,4-Dichlorobenzene | 410 | U |
| 95-50-1 | 1,2-Dichlorobenzene | 410 | U |
| 95-48-7 | 2-Methylphenol | 410 | U |
| 108-60-1 | 2,2'-oxybis(1-Chloropropane) | 410 | U |
| 106-44-5 | 4-Methylphenol | 410 | U |
| 621-64-7 | N-Nitroso-Di-n-Propylamine | 410 | U |
| 67-72-1 | Hexachloroethane | 410 | U |
| 98-95-3 | Nitrobenzene | 410 | U |
| 78-59-1 | Isophorone | 410 | U |
| 88-75-5 | 2-Nitrophenol | 410 | U |
| 105-67-9 | 2,4-Dimethylphenol | 410 | U |
| 111-91-1 | bis(2-Chloroethoxy)Methane | 410 | U |
| 120-83-2 | 2,4-Dichlorophenol | 410 | U |
| 120-82-1 | 1,2,4-Trichlorobenzene | 410 | U |
| 91-20-3 | Naphthalene | 410 | U |
| 106-47-8 | 4-Chloroaniline | 410 | U |
| 87-68-3 | Hexachlorobutadiene | 410 | U |
| 59-50-7 | 4-Chloro-3-Methylphenol | 410 | U |
| 91-57-6 | 2-Methylnaphthalene | 410 | U |
| 77-47-4 | Hexachlorocyclopentadiene | 410 | U |
| 88-06-2 | 2,4,6-Trichlorophenol | 410 | U |
| 95-95-4 | 2,4,5-Trichlorophenol | 980 | U |
| 91-58-7 | 2-Chloronaphthalene | 410 | U |
| 88-74-4 | 2-Nitroaniline | 980 | U |
| 131-11-3 | Dimethylphthalate | 410 | U |
| 208-96-8 | Acenaphthylene | 410 | U |
| 606-20-2 | 2,6-Dinitrotoluene | 410 | U |
| 99-09-2 | 3-Nitroaniline | 980 | U |
| 83-32-9 | Acenaphthene | 410 | U |

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBX98

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 647 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0607

Sample wt/vol: 30.1 (g/mL) G Lab File ID: AB0607

Level: (low/med) LOW Date Received: 06/14/94

% Moisture: 19 decanted: (Y/N) N Date Extracted: 06/22/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/10/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.7

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 51-28-5 | 2,4-Dinitrophenol | 980 | U |
| 100-02-7 | 4-Nitrophenol | 980 | U |
| 132-64-9 | Dibenzofuran | 410 | U |
| 121-14-2 | 2,4-Dinitrotoluene | 410 | U |
| 84-66-2 | Diethylphthalate | 410 | U |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 410 | U |
| 86-73-7 | Fluorene | 410 | U |
| 100-01-6 | 4-Nitroaniline | 980 | U |
| 534-52-1 | 4,6-Dinitro-2-Methylphenol | 980 | U |
| 86-30-6 | N-Nitrosodiphenylamine (1) | 410 | U |
| 101-55-3 | 4-Bromophenyl-phenylether | 410 | U |
| 118-74-1 | Hexachlorobenzene | 410 | U |
| 87-86-5 | Pentachlorophenol | 980 | U |
| 85-01-8 | Phenanthrene | 410 | U |
| 120-12-7 | Anthracene | 410 | U |
| 86-74-8 | Carbazole | 410 | U |
| 84-74-2 | Di-n-Butylphthalate | 410 | U |
| 206-44-0 | Fluoranthene | 410 | U |
| 129-00-0 | Pyrene | 410 | U |
| 85-68-7 | Butylbenzylphthalate | 410 | U |
| 91-94-1 | 3,3'-Dichlorobenzidine | 410 | U |
| 56-55-3 | Benzo(a)Anthracene | 410 | U |
| 218-01-9 | Chrysene | 410 | U |
| 117-81-7 | bis(2-Ethylhexyl)Phthalate | 81 | J |
| 117-84-0 | Di-n-Octyl Phthalate | 410 | U |
| 205-99-2 | Benzo(b)Fluoranthene | 410 | U |
| 207-08-9 | Benzo(k)Fluoranthene | 410 | U |
| 50-32-8 | Benzo(a)Pyrene | 410 | U |
| 193-39-5 | Indeno(1,2,3-cd)Pyrene | 410 | U |
| 53-70-3 | Dibenz(a,h)Anthracene | 410 | U |
| 191-24-2 | Benzo(g,h,i)Perylene | 410 | U |

(1) - Cannot be separated from Diphenylamine

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBX98

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 647 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0607

Sample wt/vol: 30.1 (g/mL) G Lab File ID: AB0607

Level: (low/med) LOW Date Received: 06/14/94

% Moisture: 19 decanted: (Y/N) N Date Extracted: 06/22/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/10/94

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.7

Number TICs found: 5

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

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| 1. 123-42-2 | 2-PENTANONE, 4-HYDROXY-4-MET | 4.12 | 6600 | ABJN |
| 2. | UNKNOWN | 17.57 | 210 | J |
| 3. | UNKNOWN | 18.42 | 180 | J |
| 4. | UNKNOWN | 19.02 | 170 | J |
| 5. | UNKNOWN | 21.75 | 85 | J |

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOBJ16

Lab Name: ITAS KNOXVILLE Contract: HANFORD
Lab Code: ITSTU Case No.: W0622 SAS No.: SDG No.: W0083
Matrix (soil/water): SOIL Lab Sample ID: AB0334
Level (low/med): LOW Date Received: 06/07/94
% Solids: 83.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 7690 | | | P |
| 7440-36-0 | Antimony | 12.0 | U | | P |
| 7440-38-2 | Arsenic | 0.48 | U | W | F |
| 7440-39-3 | Barium | 50.3 | | | P |
| 7440-41-7 | Beryllium | 0.58 | B | | P |
| 7440-43-9 | Cadmium | 1.2 | U | | P |
| 7440-70-2 | Calcium | 9680 | | | P |
| 7440-47-3 | Chromium | 16.2 | | | P |
| 7440-48-4 | Cobalt | 9.7 | B | | P |
| 7440-50-8 | Copper | 11.3 | | | P |
| 7439-89-6 | Iron | 21000 | | | P |
| 7439-92-1 | Lead | 6.5 | | | F |
| 7439-95-4 | Magnesium | 4630 | | | P |
| 7439-96-5 | Manganese | 310 | | | P |
| 7439-97-6 | Mercury | 0.12 | U | | CV |
| 7440-02-0 | Nickel | 16.2 | | | P |
| 7440-09-7 | Potassium | 652 | B | | P |
| 7782-49-2 | Selenium | 0.48 | U | W | F |
| 7440-22-4 | Silver | 1.2 | U | | P |
| 7440-23-5 | Sodium | 124 | B | | P |
| 7440-28-0 | Thallium | 0.48 | U | W | F |
| 7440-62-2 | Vanadium | 44.8 | | | P |
| 7440-66-6 | Zinc | 27.2 | | * | P |
| 5955-70-0 | Cyanide | | | | NR |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOBJ16

Lab Name: ITAS_KNOXVILLE Contract: HANFORD
Lab Code: ITSTU Case No.: WO622 SAS No.: SDG No.: W0083
Matrix (soil/water): SOIL Lab Sample ID: AB0335
Level (low/med): LOW Date Received: 06/07/94
% Solids: 83.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | | | | NR |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | | | | NR |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | | | | NR |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | | | | NR |
| 7439-92-1 | Lead | | | | NR |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | | | | NR |
| 7439-97-6 | Mercury | | | | NR |
| 7440-02-0 | Nickel | | | | NR |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | | | | NR |
| 5955-70-0 | Cyanide | 1.2 | U | | AS |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: Clarity After: Artifacts:

Comments:
CYANIDE_ONLY.

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOBX94

Lab Name: ITAS_KNOXVILLE_____ Contract: HANFORD___
Lab Code: ITSTU_ Case No.: WO622 SAS No.: _____ SDG No.: W0083_
Matrix (soil/water): SOIL_ Lab Sample ID: AB0329
Level (low/med): LOW__ Date Received: 06/07/94
% Solids: _99.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum_ | | | | NR |
| 7440-36-0 | Antimony_ | | | | NR |
| 7440-38-2 | Arsenic__ | | | | NR |
| 7440-39-3 | Barium___ | | | | NR |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium__ | | | | NR |
| 7440-70-2 | Calcium__ | | | | NR |
| 7440-47-3 | Chromium_ | | | | NR |
| 7440-48-4 | Cobalt___ | | | | NR |
| 7440-50-8 | Copper___ | | | | NR |
| 7439-89-6 | Iron____ | | | | NR |
| 7439-92-1 | Lead____ | | | | NR |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | | | | NR |
| 7439-97-6 | Mercury__ | | | | NR |
| 7440-02-0 | Nickel___ | | | | NR |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium_ | | | | NR |
| 7440-22-4 | Silver___ | | | | NR |
| 7440-23-5 | Sodium___ | | | | NR |
| 7440-28-0 | Thallium_ | | | | NR |
| 7440-62-2 | Vanadium_ | | | | NR |
| 7440-66-6 | Zinc____ | | | | NR |
| 5955-70-0 | Cyanide__ | 1.00 | U | | AS |

Color Before: WHITE____ Clarity Before: _____ Texture: MEDIUM
Color After: _____ Clarity After: _____ Artifacts: _____

Comments:
CYANIDE_ONLY._____

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOBX94

Lab Name: ITAS_KNOXVILLE_____ Contract: HANFORD___
Lab Code: ITSTU_ Case No.: W0622 SAS No.: _____ SDG No.: W0083_
Matrix (soil/water): SOIL_ Lab Sample ID: AB0328
Level (low/med): LOW_ Date Received: 06/07/94
% Solids: _99.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 98.4 | | | P |
| 7440-36-0 | Antimony | 10.0 | U | | P |
| 7440-38-2 | Arsenic | 0.40 | U | | F |
| 7440-39-3 | Barium | 0.99 | B | | P |
| 7440-41-7 | Beryllium | 0.20 | U | | P |
| 7440-43-9 | Cadmium | 1.0 | U | | P |
| 7440-70-2 | Calcium | 42.8 | B | | P |
| 7440-47-3 | Chromium | 2.2 | | | P |
| 7440-48-4 | Cobalt | 2.0 | U | | P |
| 7440-50-8 | Copper | 2.0 | U | | P |
| 7439-89-6 | Iron | 177 | | | P |
| 7439-92-1 | Lead | 1.1 | | | F |
| 7439-95-4 | Magnesium | 14.7 | B | | P |
| 7439-96-5 | Manganese | 1.1 | B | | P |
| 7439-97-6 | Mercury | 0.10 | U | | CV |
| 7440-02-0 | Nickel | 4.0 | U | | P |
| 7440-09-7 | Potassium | 200 | U | | P |
| 7782-49-2 | Selenium | 0.40 | U | | F |
| 7440-22-4 | Silver | 1.0 | U | | P |
| 7440-23-5 | Sodium | 20.8 | B | | P |
| 7440-28-0 | Thallium | 0.40 | U | | F |
| 7440-62-2 | Vanadium | 2.0 | U | | P |
| 7440-66-6 | Zinc | 2.5 | B | * | P |
| 5955-70-0 | Cyanide | | | | NR |

Color Before: WHITE_____ Clarity Before: _____ Texture: MEDIUM
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOBX97

Lab Name: ITAS_KNOXVILLE Contract: HANFORD/WE
Lab Code: ITSTU Case No.: W0647 SAS No.: SDG No.: W0083
Matrix (soil/water): SOIL Lab Sample ID: AB0614
Level (low/med): LOW Date Received: 06/14/94
% Solids: 89.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 4360 | | | P |
| 7440-36-0 | Antimony | 11.2 | U | | P |
| 7440-38-2 | Arsenic | 0.49 | B | | F |
| 7440-39-3 | Barium | 40.5 | B | | P |
| 7440-41-7 | Beryllium | 0.23 | B | | P |
| 7440-43-9 | Cadmium | 1.1 | U | | P |
| 7440-70-2 | Calcium | 2490 | | | P |
| 7440-47-3 | Chromium | 9.4 | | | P |
| 7440-48-4 | Cobalt | 5.3 | B | | P |
| 7440-50-8 | Copper | 9.0 | | | P |
| 7439-89-6 | Iron | 8410 | | | P |
| 7439-92-1 | Lead | 2.2 | | | F |
| 7439-95-4 | Magnesium | 2830 | | | P |
| 7439-96-5 | Manganese | 153 | | | P |
| 7439-97-6 | Mercury | 0.11 | U | | CV |
| 7440-02-0 | Nickel | 11.3 | | | P |
| 7440-09-7 | Potassium | 578 | B | | P |
| 7782-49-2 | Selenium | 0.43 | U | | F |
| 7440-22-4 | Silver | 1.1 | U | | P |
| 7440-23-5 | Sodium | 275 | B | | P |
| 7440-28-0 | Thallium | 0.43 | U | W | F |
| 7440-62-2 | Vanadium | 15.8 | | | P |
| 7440-66-6 | Zinc | 21.1 | | * | P |
| 5955-70-0 | Cyanide | | | | NR |

Color Before: BROWN Clarity Before: N/A Texture: MEDIUM
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOBX97

Lab Name: ITAS_KNOXVILLE_____ Contract: HANFORD/WE
Lab Code: ITSTU_ Case No.: WO647 SAS No.: _____ SDG No.: W0083_
Matrix (soil/water): SOIL_ Lab Sample ID: AB0615
Level (low/med): LOW_ Date Received: 06/14/94
% Solids: _89.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | | | | NR |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | | | | NR |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | | | | NR |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | | | | NR |
| 7439-92-1 | Lead | | | | NR |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | | | | NR |
| 7439-97-6 | Mercury | | | | NR |
| 7440-02-0 | Nickel | | | | NR |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | | | | NR |
| 5955-70-0 | Cyanide | 1.1 | U | | AS |

Color Before: _____ Clarity Before: _____ Texture: _____
Color After: _____ Clarity After: _____ Artifacts: _____

Comments:
CYANIDE_ONLY.

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOBX98

Lab Name: ITAS_KNOXVILLE Contract: HANFORD/WE

Lab Code: ITSTU Case No.: W0647 SAS No.: SDG No.: W0083

Matrix (soil/water): SOIL Lab Sample ID: AB0608

Level (low/med): LOW Date Received: 06/14/94

% Solids: 81.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 4850 | | | P |
| 7440-36-0 | Antimony | 12.3 | U | | P |
| 7440-38-2 | Arsenic | 0.49 | U | | F |
| 7440-39-3 | Barium | 47.2 | B | | P |
| 7440-41-7 | Beryllium | 0.32 | B | | P |
| 7440-43-9 | Cadmium | 1.2 | U | | P |
| 7440-70-2 | Calcium | 2680 | | | P |
| 7440-47-3 | Chromium | 15.5 | | | P |
| 7440-48-4 | Cobalt | 5.0 | B | | P |
| 7440-50-8 | Copper | 11.9 | | | P |
| 7439-89-6 | Iron | 10900 | | | P |
| 7439-92-1 | Lead | 2.4 | | | F |
| 7439-95-4 | Magnesium | 3340 | | | P |
| 7439-96-5 | Manganese | 193 | | | P |
| 7439-97-6 | Mercury | 0.12 | U | | CV |
| 7440-02-0 | Nickel | 15.0 | | | P |
| 7440-09-7 | Potassium | 644 | B | | P |
| 7782-49-2 | Selenium | 0.49 | U | | F |
| 7440-22-4 | Silver | 1.2 | U | | P |
| 7440-23-5 | Sodium | 281 | B | | P |
| 7440-28-0 | Thallium | 0.49 | U | W | F |
| 7440-62-2 | Vanadium | 23.9 | | | P |
| 7440-66-6 | Zinc | 35.0 | | * | P |
| 5955-70-0 | Cyanide | | | | NR |

Color Before: BROWN Clarity Before: N/A Texture: MEDIUM

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOBX98

Lab Name: ITAS_KNOXVILLE_____ Contract: HANFORD/WE

Lab Code: ITSTU_ Case No.: WO647 SAS No.: _____ SDG No.: W0083_

Matrix (soil/water): SOIL_ Lab Sample ID: AB0674

Level (low/med): LOW_ Date Received: 06/14/94

% Solids: _81.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | | | | NR |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | | | | NR |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | | | | NR |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | | | | NR |
| 7439-92-1 | Lead | | | | NR |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | | | | NR |
| 7439-97-6 | Mercury | | | | NR |
| 7440-02-0 | Nickel | | | | NR |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | | | | NR |
| 5955-70-0 | Cyanide | 1.2 | U | | AS |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

CYANIDE_ONLY.

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S 7/15/94

# NITRATE/NITRITE ANALYSIS

| | | | |
|---|---|---|---|
| Laboratory Name: | ITAS-Knoxville | SDG Number: | W0083 |
| Contract Name: | Westinghouse Hanford | Job Number: | 622 |
| Sample Matrix: | Soil | Extraction Date: | N/A |
| Concentration Units: | mg/kg | Analysis Date: | 06/28/94 |

| Client Sample ID | Lab Sample ID | Result | Qualifiers |
|---|---|---|---|
| Method Blank | AB1758/P6352 | 0.50 | U |
| BOBX94 | AB0331 | 0.50 | U |
| BOBJ16 | AB0337 | 0.81 | + |

+ - Positive result.
U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

# NITRATE/NITRITE ANALYSIS

| | | | |
|---|---|---|---|
| Laboratory Name: | ITAS-Knoxville | SDG Number: | W0083 |
| Contract Name: | Westinghouse Hanford | Job Number: | 647 |
| Sample Matrix: | Soil | Extraction Date: | N/A |
| Concentration Units: | mg/kg | Analysis Date: | 06/28/94 |

| Client Sample ID | Lab Sample ID | Result | Qualifiers |
|---|---|---|---|
| Method Blank | AB1758/P6352 | 0.50 | U |
| BOBX98 | AB0611 | 0.90 | + |
| BOBX97 | AB0617 | 1.29 | + |

+ - Positive result.
U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

# ANION ANALYSIS

| | | | |
|---|---|---|---|
| Laboratory Name: | ITAS-Knoxville | SDG Number: | W0083 |
| Contract Name: | Westinghouse Hanford | Job Number: | 622 |
| Client Sample ID: | BOBJ16 | Preparation Date: | 06/22/94 |
| Lab Sample ID: | AB0336 | Analysis Date: | 06/27/94 |
| Sample Matrix: | Soil | Concentration Units: | mg/kg |

| Compound | Result | Qualifier | Detection Limit |
|---|---|---|---|
| fluoride | 0.4 | U | 0.4 |
| chloride | 3.0 | + | 0.4 |
| nitrite | 0.4 | U | 0.4 |
| nitrate | 1.5 | + | 0.4 |
| phosphate | 1.0 | U | 1.0 |
| sulfate | 4.4 | + | 1.5 |

+ - Positive result.
U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

# ANION ANALYSIS

| | | | |
|---|---|---|---|
| Laboratory Name: | ITAS-Knoxville | SDG Number: | W0083 |
| Contract Name: | Westinghouse Hanford | Job Number: | 622 |
| Client Sample ID: | BOBX94 | Preparation Date: | 06/22/94 |
| Lab Sample ID: | AB0330 | Analysis Date: | 06/27/94 |
| Sample Matrix: | Soil | Concentration Units: | mg/kg |

| Compound | Result | Qualifier | Detection Limit |
|---|---|---|---|
| fluoride | 0.4 | U | 0.4 |
| chloride | 3.8 | + | 0.4 |
| nitrite | 0.4 | U | 0.4 |
| nitrate | 0.5 | + | 0.4 |
| phosphate | 1.0 | U | 1.0 |
| sulfate | 2.7 | + | 1.5 |

+ - Positive result.
U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

# ANION ANALYSIS

| | | | |
|---|---|---|---|
| Laboratory Name: | ITAS-Knoxville | SDG Number: | W0083 |
| Contract Name: | Westinghouse Hanford | Job Number: | 647 |
| Client Sample ID: | BOBX97 | Preparation Date: | 06/22/94 |
| Lab Sample ID: | AB0616 | Analysis Date: | 06/29/94 |
| Sample Matrix: | Soil | Concentration Units: | mg/kg |

| Compound | Result | Qualifier | Detection Limit |
|---|---|---|---|
| fluoride | 0.4 | U | 0.4 |
| chloride | 3.7 | + | 0.8 |
| nitrite | 0.4 | U | 0.4 |
| nitrate | 14 | + | 4.0 |
| phosphate | 1.0 | U | 1.0 |
| sulfate | 8.0 | + | 1.5 |

+ - Positive result.
U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

# ANION ANALYSIS

| | | | |
|---|---|---|---|
| Laboratory Name: | ITAS-Knoxville | SDG Number: | W0083 |
| Contract Name: | Westinghouse Hanford | Job Number: | 647 |
| Client Sample ID: | BOBX98 | Preparation Date: | 06/22/94 |
| Lab Sample ID: | AB0610 | Analysis Date: | 06/29/94 |
| Sample Matrix: | Soil | Concentration Units: | mg/kg |

| Compound | Result | Qualifier | Detection Limit |
|---|---|---|---|
| fluoride | 0.4 | U | 0.4 |
| chloride | 3.8 | + | 0.4 |
| nitrite | 0.4 | U | 0.4 |
| nitrate | 14 | + | 2.0 |
| phosphate | 1.0 | U | 1.0 |
| sulfate | 7.5 | + | 1.5 |

+ - Positive result.
U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

INTERNATIONAL TECHNOLOGY CORPORATION

# CERTIFICATE OF ANALYSIS

Westinghouse Hanford Company
P.O. Box 1970
Richland, WA 99352

August 1, 1994

Attention: J.A.Lerch

---

| | | |
|---|---|---|
| SAF Number | : | 94-046 |
| Date SDG Closed | : | June 17, 1994 |
| Number of Samples | : | Four (4) |
| Sample Type | : | Soil |
| SDG Number | : | W0083 |
| Data Deliverable | : | Stand Alone |

---

## I. Introduction

On June 3 and 13, 1994, four soil samples were received by ITAS-Richland for radiochemical analysis. Upon receipt, the samples were assigned the following laboratory ID numbers to correspond with the WHC specific IDs:

| ITAS-Richland ID | WHC ID | Matrix | Date of Receipt |
|---|---|---|---|
| 406043-01A | B0BX94 | Soil | 6/3/94 |
| 406043-02A | B0BJ16 | Soil | 6/3/94 |
| 406265-01A | B0BX98 | Soil | 6/13/94 |
| 406265-02A | B0BX97 | Soil | 6/13/94 |

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## II. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information, the analytical result(s) and the appropriate associated statistical errors.

The requested analyses were:

**Alpha Spectroscopy**
Americium-241, Curium-244 by method ITAS-RD-3302
Neptunium-237 by method ITAS-RD-3208
Plutonium-238, 239/40 by method ITAS-RD-3209
Uranium-234, 235, 238 by method ITAS-RD-3234
**Gamma Spectroscopy**
Gamma Scan by method ITAS-RD-3219
Iodine-129 by method ITAS-RD-3219
**Gas Proportional Counting**
Gross Alpha by method ITAS-RD-3222
Gross Beta by method ITAS-RD-3222
Strontium-90 by method ITAS-RD-3204
**Liquid Scintillation Counting**
Carbon-14 by method ITAS-RD-3247
Technetium-99 by method ITAS-IT-RS-0001

## III. Quality Control

The analytical results for each analysis performed under SDG W0083 include a minimum of one Laboratory Control Sample (LCS), one method (reagent) blank, and one duplicate.

Quality control sample results are reported in the same units as sample results except for Gross Alpha and Gross Beta quality control sample results which are reported in pCi/sample.

## IV. Comments

The initial radioactivity screening of the samples classified samples B0BX94 and B0BJ16 as Category II and samples B0BX98 and B0BX97 as Category I.

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Analysis of sample B0BX93, received with samples B0BX94 and B0BJ16, was cancelled per WHC ROD 94-00148.

**Alpha Spectroscopy**

Americium-241, Curium-244 by method ITAS-RD-3302
The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BJ16) results are within contractual requirements.

Neptunium-237 by method ITAS-RD-3208
The LCS radiochemical recovery is accepted with a low bias (32%). The batch data are accepted based on an acceptable matrix spike recovery (72%), and acceptable batch blank, sample and sample duplicate (duplicate of sample B0BJ16) results.

Plutonium-238, 239/40 by method ITAS-RD-3209
The tracer yield for sample B0BJ16 was less than 20%, however, the sample results are reported as acceptable because the required detection limit was achieved, the sample result was less than contractual detection limit, the sample was duplicated and the sample duplicate yield is acceptable, and the sample duplicate result is within the 3 sigma error around the sample result. The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BJ16) results are accepted and reported.

Uranium-234, 235, 238 by method ITAS-RD-3234
The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BJ16) results are accepted and reported.

**Gamma Spectroscopy**

Gamma Scan by method ITAS-RD-3219
Cd-109 was detected in all of the samples and QC samples. The Cd-109 results are not reported because they are suspected false positive results caused by x-ray lines produced by energy reflection from the detector shielding. The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BX94) results are within contractual requirements.

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Iodine-129 by method ITAS-RD-3219
The LCS was biased high (125%) on the initial count. The recount of the LCS indicated a low bias (42%). The original LCS value is accepted and reported. The cause of the LCS recovery fluctuations is under investigation by the Technical Associate Group. None of the batch samples were above the detection limit for I-129. The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BX94) results are accepted and reported.

**Gas Proportional Counting**

Gross Alpha by method ITAS-RD-3222
The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BX94) results are within contractual requirements.

Gross Beta by method ITAS-RD-3222
The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BX94) results are within contractual requirements.

Strontium-90 by method ITAS-RD-3204
The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BX94) results are within contractual requirements.

**Liquid Scintillation Counting**

Carbon-14 by method ITAS-RD-3247
Carbon-14 results are not reportable for these samples due to an insufficient presence of carbon in the samples to perform the analysis. The carbon-14 method requires that 2 grams of carbon be present in each sample. The samples produced insufficient carbon dioxide during sample preparation. Two separate attempts were made to extrude carbon from the sample matrices. The sample results are considered unreportable due to a matrix effect (lack of carbon in the matrix).

Technetium-99 by method ITAS-IT-RS-0001
The matrix spike, LCS, batch blank, sample and sample duplicate (duplicate of sample B0BJ16) results are within contractual requirements.

---

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

Reviewed and approved:

Suzanne Gaines

Suzanne Gaines
Project Manager

IT ANALYTICAL SERVICES
RICHLAND, WA
(509) 375-3131

# SAMPLE RESULTS

| | | | |
|---|---|---|---|
| LAB NAME: | ITAS-RICHLAND | SDG: | W0083 |
| LAB SAMPLE ID: | 40604301 | MATRIX: | SOIL |
| CLIENT ID: | B0BX94 | DATE RECEIVED: | 6/3/94 |

| ISOTOPE | RESULT | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA | REPORT UNIT | YIELD | METHOD NUMBER |
|---|---|---|---|---|---|---|---|
| AM-241 | -4.93E-04 | 9.86E-04 | 9.90E-04 | 2.48E-02 | pCi/g | 58.80% | RD3302 |
| CM-242 | -5.38E-03 | 3.58E-03 | 3.70E-03 | 4.97E-02 | pCi/g | 58.80% | RD3302 |
| CM-244 | -4.95E-04 | 1.82E-02 | 1.82E-02 | 5.83E-02 | pCi/g | 58.80% | RD3302 |
| NP-237 | 3.83E-03 | 8.36E-03 | 8.40E-03 | 1.68E-02 | pCi/g | 100.00% | RD3208 |
| PU-238 | 0.00E+00 | 0.00E+00 | 1.96E-02 | 1.77E-02 | pCi/g | 63.70% | RD3209 |
| PU239/40 | 3.92E-03 | 1.36E-02 | 1.36E-02 | 3.69E-02 | pCi/g | 63.70% | RD3209 |
| U-234 | 8.89E-02 | 4.49E-02 | 4.63E-02 | 3.49E-02 | pCi/g | 76.60% | RD3234 |
| U-235 | 3.69E-03 | 1.10E-02 | 1.10E-02 | 2.90E-02 | pCi/g | 76.60% | RD3234 |
| U-238DA | 7.47E-02 | 4.07E-02 | 4.18E-02 | 2.71E-02 | pCi/g | 76.60% | RD3234 |
| CO-58 | 5.22E-04 | 3.01E-03 | 3.01E-03 | 5.07E-03 | pCi/g | N/A | RD3219 |
| CO-60 | -1.63E-03 | 2.71E-03 | 2.72E-03 | 4.20E-03 | pCi/g | N/A | RD3219 |
| CS-137DA | -1.39E-03 | 2.63E-03 | 2.64E-03 | 4.15E-03 | pCi/g | N/A | RD3219 |
| EU-152 | -1.08E-02 | 1.41E-02 | 1.42E-02 | 2.26E-02 | pCi/g | N/A | RD3219 |
| EU-154 | -1.21E-03 | 7.76E-03 | 7.76E-03 | 1.33E-02 | pCi/g | N/A | RD3219 |
| EU-155 | 1.30E-02 | 7.52E-03 | 7.63E-03 | 1.23E-02 | pCi/g | N/A | RD3219 |
| FE-59 | 4.12E-03 | 6.43E-03 | 6.44E-03 | 1.16E-02 | pCi/g | N/A | RD3219 |
| I-129LP | 1.39E-01 | 2.65E-01 | 2.66E-01 | 5.09E-01 | pCi/g | N/A | RD3219 |
| K-40 | 5.11E-01 | 8.18E-02 | 9.64E-02 | N/A | pCi/g | N/A | RD3219 |
| RA-224DA | 1.34E-01 | 7.99E-03 | 1.56E-02 | N/A | pCi/g | N/A | RD3219 |
| RA-226DA | 9.29E-02 | 1.26E-02 | 1.56E-02 | N/A | pCi/g | N/A | RD3219 |
| RA-228DA | 1.12E-01 | 1.93E-02 | 2.23E-02 | N/A | pCi/g | N/A | RD3219 |
| U-238DLP | 1.64E-01 | 1.59E-01 | 1.60E-01 | N/A | pCi/g | N/A | RD3219 |
| ALPHA | 4.62E+00 | 3.48E+00 | 3.52E+00 | 5.33E+00 | pCi/g | 100.00% | RD3214 |
| BETA | 2.89E+00 | 1.88E+00 | 1.89E+00 | 3.66E+00 | pCi/g | 100.00% | RD3214 |
| STRONTIUM | -6.23E-03 | 4.49E-02 | 4.49E-02 | 1.23E-01 | pCi/g | 100.00% | RD3204 |



682A-6-93

IT ANALYTICAL SERVICES
RICHLAND, WA
(509) 375-3131

# SAMPLE RESULTS

| | | | |
|---|---|---|---|
| LAB NAME: | ITAS-RICHLAND | SDG: | W0083 |
| LAB SAMPLE ID: | 40604301 | MATRIX: | SOIL |
| CLIENT ID: | B0BX94 | DATE RECEIVED: | 6/3/94 |

| ISOTOPE | RESULT | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA | REPORT UNIT | YIELD | METHOD NUMBER |
|---|---|---|---|---|---|---|---|
| TC-99 | 3.60E-02 | 2.13E-01 | 9.59E-01 | 4.96E-01 | pCi/g | 100.00% | ITAS-IT-RS-0001 |

Number of Results: 26



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# SAMPLE RESULTS

| | | | |
|---|---|---|---|
| LAB NAME: | ITAS-RICHLAND | SDG: | W0083 |
| LAB SAMPLE ID: | 40604302 | MATRIX: | SOIL |
| CLIENT ID: | B0BJ16 | DATE RECEIVED: | 6/3/94 |

| ISOTOPE | RESULT | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA | REPORT UNIT | YIELD | METHOD NUMBER |
|---|---|---|---|---|---|---|---|
| AM-241 | 3.03E-03 | 1.03E-02 | 1.03E-02 | 2.85E-02 | pCi/g | 71.80% | RD3302 |
| CM-242 | -1.71E-03 | 1.28E-02 | 1.28E-02 | 4.86E-02 | pCi/g | 71.80% | RD3302 |
| CM-244 | -4.47E-03 | 1.52E-02 | 1.52E-02 | 5.38E-02 | pCi/g | 71.80% | RD3302 |
| NP-237 | 1.22E-02 | 1.44E-02 | 1.47E-02 | 1.67E-02 | pCi/g | 100.00% | RD3208 |
| PU-238 | 0.00E+00 | 0.00E+00 | 7.11E-02 | 6.42E-02 | pCi/g | 17.60% | RD3209 |
| PU239/40 | -4.74E-03 | 9.47E-03 | 9.55E-03 | 1.13E-01 | pCi/g | 17.60% | RD3209 |
| U-234 | 8.25E-01 | 1.44E-01 | 1.82E-01 | 3.72E-02 | pCi/g | 66.40% | RD3234 |
| U-235 | 8.06E-02 | 4.53E-02 | 4.66E-02 | 2.87E-02 | pCi/g | 66.40% | RD3234 |
| U-238DA | 8.95E-01 | 1.50E-01 | 1.93E-01 | 3.35E-02 | pCi/g | 66.40% | RD3234 |
| CO-58 | 9.60E-04 | 5.71E-03 | 5.71E-03 | 9.46E-03 | pCi/g | N/A | RD3219 |
| CO-60 | -4.57E-03 | 5.83E-03 | 5.85E-03 | 9.06E-03 | pCi/g | N/A | RD3219 |
| CS-137DA | 0.00E+00 | 4.87E-03 | 4.87E-03 | 8.20E-03 | pCi/g | N/A | RD3219 |
| EU-152 | 9.42E-02 | 2.39E-02 | 2.57E-02 | 4.70E-02 | pCi/g | N/A | RD3219 |
| EU-154 | -1.70E-02 | 1.74E-02 | 1.75E-02 | 2.83E-02 | pCi/g | N/A | RD3219 |
| EU-155 | 4.56E-02 | 1.68E-02 | 1.74E-02 | 2.70E-02 | pCi/g | N/A | RD3219 |
| FE-59 | 8.47E-03 | 1.56E-02 | 1.56E-02 | 2.61E-02 | pCi/g | N/A | RD3219 |
| I-129LP | -1.10E-02 | 5.22E-01 | 5.22E-01 | 9.04E-01 | pCi/g | N/A | RD3219 |
| K-40 | 1.12E+01 | 2.48E-01 | 1.15E+00 | N/A | pCi/g | N/A | RD3219 |
| MN-54 | 1.23E-02 | 7.28E-03 | 7.38E-03 | N/A | pCi/g | N/A | RD3219 |
| RA-224DA | 9.19E-01 | 1.86E-02 | 9.37E-02 | N/A | pCi/g | N/A | RD3219 |
| RA-226DA | 5.62E-01 | 2.49E-02 | 6.14E-02 | N/A | pCi/g | N/A | RD3219 |
| RA-228DA | 9.21E-01 | 4.80E-02 | 1.04E-01 | N/A | pCi/g | N/A | RD3219 |
| U-238DLP | 8.15E-01 | 3.03E-01 | 3.13E-01 | N/A | pCi/g | N/A | RD3219 |
| ALPHA | 1.56E+01 | 5.63E+00 | 5.88E+00 | 5.22E+00 | pCi/g | 100.00% | RD3214 |
| BETA | 2.21E+01 | 3.42E+00 | 3.71E+00 | 3.74E+00 | pCi/g | 100.00% | RD3214 |

IT ANALYTICAL SERVICES
RICHLAND, WA
(509) 375-3131

# SAMPLE RESULTS

| | | | |
|---|---|---|---|
| LAB NAME: | ITAS-RICHLAND | SDG: | W0083 |
| LAB SAMPLE ID: | 40604302 | MATRIX: | SOIL |
| CLIENT ID: | B0BJ16 | DATE RECEIVED: | 6/3/94 |

| ISOTOPE | RESULT | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA | REPORT UNIT | YIELD | METHOD NUMBER |
|---|---|---|---|---|---|---|---|
| STRONTIUM | -4.95E-03 | 1.26E-01 | 1.26E-01 | 3.38E-01 | pCi/g | 32.50% | RD3204 |
| TC-99 | 5.97E-01 | 2.30E-01 | 1.01E+00 | 4.96E-01 | pCi/g | 100.00% | ITAS-IT-RS-0001 |

**Number of Results:** 27



682A-6-93

IT ANALYTICAL SERVICES
RICHLAND, WA
(509) 375-3131

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| LAB NAME: | ITAS-RICHLAND | SDG: | W0083 |
| LAB SAMPLE ID: | 40626501 | MATRIX: | SOIL |
| CLIENT ID: | B0BX98 | DATE RECEIVED: | 6/13/94 |

| ISOTOPE | RESULT | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA | REPORT UNIT | YIELD | METHOD NUMBER |
|---|---|---|---|---|---|---|---|
| AM-241 | 0.00E+00 | 0.00E+00 | 1.80E-02 | 1.62E-02 | pCi/g | 60.50% | RD3302 |
| CM-242 | -5.60E-04 | 1.12E-03 | 1.12E-03 | 2.81E-02 | pCi/g | 60.50% | RD3302 |
| CM-244 | -4.82E-04 | 9.63E-04 | 9.67E-04 | 2.42E-02 | pCi/g | 60.50% | RD3302 |
| NP-237 | 7.32E-03 | 1.18E-02 | 1.19E-02 | 2.07E-02 | pCi/g | 100.00% | RD3208 |
| PU-238 | 0.00E+00 | 0.00E+00 | 1.82E-02 | 1.64E-02 | pCi/g | 68.90% | RD3209 |
| PU239/40 | -1.21E-03 | 2.42E-03 | 2.42E-03 | 2.89E-02 | pCi/g | 68.90% | RD3209 |
| U-234 | 5.83E-01 | 1.38E-01 | 1.63E-01 | 4.60E-02 | pCi/g | 51.10% | RD3234 |
| U-235 | 6.84E-03 | 1.64E-02 | 1.64E-02 | 3.72E-02 | pCi/g | 51.10% | RD3234 |
| U-238DA | 5.12E-01 | 1.29E-01 | 1.50E-01 | 3.72E-02 | pCi/g | 51.10% | RD3234 |
| CO-58 | -5.09E-04 | 5.28E-03 | 5.28E-03 | 8.63E-03 | pCi/g | N/A | RD3219 |
| CO-60 | -1.28E-03 | 5.35E-03 | 5.35E-03 | 8.83E-03 | pCi/g | N/A | RD3219 |
| CS-137DA | 1.05E-02 | 5.35E-03 | 5.45E-03 | N/A | pCi/g | N/A | RD3219 |
| EU-152 | 3.86E-02 | 2.17E-02 | 2.20E-02 | 3.93E-02 | pCi/g | N/A | RD3219 |
| EU-154 | 9.37E-03 | 1.71E-02 | 1.71E-02 | 2.85E-02 | pCi/g | N/A | RD3219 |
| EU-155 | 2.17E-02 | 1.33E-02 | 1.35E-02 | 2.23E-02 | pCi/g | N/A | RD3219 |
| FE-59 | -1.23E-02 | 1.46E-02 | 1.46E-02 | 2.35E-02 | pCi/g | N/A | RD3219 |
| I-129LP | 1.76E-01 | 4.81E-01 | 4.81E-01 | 8.56E-01 | pCi/g | N/A | RD3219 |
| K-40 | 1.43E+01 | 2.53E-01 | 1.45E+00 | N/A | pCi/g | N/A | RD3219 |
| RA-224DA | 5.25E-01 | 1.46E-02 | 5.45E-02 | N/A | pCi/g | N/A | RD3219 |
| RA-226DA | 3.73E-01 | 2.14E-02 | 4.30E-02 | N/A | pCi/g | N/A | RD3219 |
| RA-228DA | 5.04E-01 | 3.51E-02 | 6.14E-02 | N/A | pCi/g | N/A | RD3219 |
| U-238DLP | 4.57E-01 | 2.48E-01 | 2.53E-01 | N/A | pCi/g | N/A | RD3219 |
| ALPHA | 1.09E+01 | 4.95E+00 | 5.09E+00 | 5.83E+00 | pCi/g | 100.00% | RD3214 |
| BETA | 2.23E+01 | 3.46E+00 | 3.76E+00 | 3.87E+00 | pCi/g | 100.00% | RD3214 |
| STRONTIUM | 6.08E-02 | 6.57E-02 | 6.73E-02 | 1.57E-01 | pCi/g | 78.20% | RD3208 |

0013

IT ANALYTICAL SERVICES
RICHLAND, WA
(509) 375-3131

# SAMPLE RESULTS

| | | | |
|---|---|---|---|
| LAB NAME: | ITAS-RICHLAND | SDG: | W0083 |
| LAB SAMPLE ID: | 40626501 | MATRIX: | SOIL |
| CLIENT ID: | B0BX98 | DATE RECEIVED: | 6/13/94 |

| ISOTOPE | RESULT | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA | REPORT UNIT | YIELD | METHOD NUMBER |
|---|---|---|---|---|---|---|---|
| TC-99 | 4.41E-01 | 2.25E-01 | 9.92E-01 | 4.96E-01 | pCi/g | 100.00% | ITAS-IT-RS-0001 |

Number of Results: 26



682A-6-93

IT ANALYTICAL SERVICES
RICHLAND, WA
(509) 375-3131

# SAMPLE RESULTS

| | | | |
|---|---|---|---|
| LAB NAME: | ITAS-RICHLAND | SDG: | W0083 |
| LAB SAMPLE ID: | 40626502 | MATRIX: | SOIL |
| CLIENT ID: | B0BX97 | DATE RECEIVED: | 6/13/94 |

| ISOTOPE | RESULT | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA | REPORT UNIT | YIELD | METHOD NUMBER |
|---|---|---|---|---|---|---|---|
| AM-241 | 4.36E-03 | 1.05E-02 | 1.05E-02 | 2.37E-02 | pCi/g | 80.10% | RD3302 |
| CM-242 | -9.69E-04 | 1.37E-03 | 1.38E-03 | 2.77E-02 | pCi/g | 80.10% | RD3302 |
| CM-244 | 4.38E-03 | 1.05E-02 | 1.05E-02 | 2.38E-02 | pCi/g | 80.10% | RD3302 |
| NP-237 | 7.98E-03 | 1.18E-02 | 1.19E-02 | 1.67E-02 | pCi/g | 100.00% | RD3208 |
| PU-238 | -1.12E-03 | 2.24E-03 | 2.25E-03 | 2.69E-02 | pCi/g | 74.30% | RD3209 |
| PU239/40 | 0.00E+00 | 0.00E+00 | 1.68E-02 | 1.52E-02 | pCi/g | 74.30% | RD3209 |
| U-234 | 4.67E-01 | 1.04E-01 | 1.20E-01 | 2.85E-02 | pCi/g | 72.80% | RD3234 |
| U-235 | 1.01E-02 | 1.62E-02 | 1.63E-02 | 2.85E-02 | pCi/g | 72.80% | RD3234 |
| U-238DA | 5.50E-01 | 1.13E-01 | 1.34E-01 | 3.80E-02 | pCi/g | 72.80% | RD3234 |
| CO-58 | 3.20E-03 | 5.21E-03 | 5.22E-03 | 8.85E-03 | pCi/g | N/A | RD3219 |
| CO-60 | 5.24E-04 | 5.65E-03 | 5.65E-03 | 9.33E-03 | pCi/g | N/A | RD3219 |
| CS-137DA | 3.60E-03 | 4.85E-03 | 4.86E-03 | 7.94E-03 | pCi/g | N/A | RD3219 |
| EU-152 | 9.22E-02 | 2.39E-02 | 2.56E-02 | 4.67E-02 | pCi/g | N/A | RD3219 |
| EU-154 | -4.45E-03 | 1.89E-02 | 1.89E-02 | 3.05E-02 | pCi/g | N/A | RD3219 |
| EU-155 | 1.37E-02 | 1.35E-02 | 1.36E-02 | 2.24E-02 | pCi/g | N/A | RD3219 |
| FE-59 | -6.09E-03 | 1.47E-02 | 1.47E-02 | 2.39E-02 | pCi/g | N/A | RD3219 |
| I-129LP | -2.44E-01 | 4.73E-01 | 4.74E-01 | 7.96E-01 | pCi/g | N/A | RD3219 |
| K-40 | 1.49E+01 | 2.75E-01 | 1.51E+00 | N/A | pCi/g | N/A | RD3219 |
| MN-54 | 1.07E-02 | 5.59E-03 | 5.69E-03 | N/A | pCi/g | N/A | RD3219 |
| RA-224DA | 5.32E-01 | 1.52E-02 | 5.53E-02 | N/A | pCi/g | N/A | RD3219 |
| RA-226DA | 3.90E-01 | 2.13E-02 | 4.45E-02 | N/A | pCi/g | N/A | RD3219 |
| RA-228DA | 5.53E-01 | 4.61E-02 | 7.20E-02 | N/A | pCi/g | N/A | RD3219 |
| U-238DLP | 2.62E-01 | 1.98E-01 | 2.00E-01 | N/A | pCi/g | N/A | RD3219 |
| ALPHA | 6.80E+00 | 4.04E+00 | 4.10E+00 | 5.45E+00 | pCi/g | 100.00% | RD3214 |
| BETA | 1.70E+01 | 3.13E+00 | 3.32E+00 | 3.91E+00 | pCi/g | 100.00% | RD3214 |

682A-6-93

0015100

IT ANALYTICAL SERVICES
RICHLAND, WA
(509) 375-3131

# SAMPLE RESULTS

| | | | |
|---|---|---|---|
| LAB NAME: | ITAS-RICHLAND | SDG: | W0083 |
| LAB SAMPLE ID: | 40626502 | MATRIX: | SOIL |
| CLIENT ID: | B0BX97 | DATE RECEIVED: | 6/13/94 |

| ISOTOPE | RESULT | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA | REPORT UNIT | YIELD | METHOD NUMBER |
|---|---|---|---|---|---|---|---|
| STRONTIUM | -5.71E-03 | 5.41E-02 | 5.41E-02 | 1.47E-01 | pCi/g | 80.90% | RD3204 |
| TC-99 | 4.05E-01 | 2.20E-01 | 9.88E-01 | 4.96E-01 | pCi/g | 100.00% | ITAS-IT-RS-0001 |

**Number of Results:** 27



682A-6-93

**Westinghouse Hanford Company**

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 1

Data Turnaround: [ ] Priorty [X] Normal

| | | |
|---|---|---|
| Collector: W. V. SETZER | Company Contact: W. V. SETZER | Telephone No.: (509) 376-2413 |
| Project Designation: 200 UP-1 | Sampling Location: 699-38-68A | SAF No.: 94-046 |
| Ice Chest No.: GWS-015 | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: INTERNATIONAL TECHNOLOGIES | Offsite Property No.: W94-0- | Bill of Lading/Air Bill No.: |
| Possible Sample Hazards/Remarks | | |
| Special Handling and/or Storage: COOL TO 4 DEGREES CENTIGRADE | | |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservative | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | | | COOL 4 | COOL 4 | COOL 4 | | |
| Type of Container | aGs | aG | G | G | G | G | P/G | P/G | | | aGs | aGs | aGs | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | 1 | 1 | 1 | | |
| Volume | 125ml | 500ml | 500ml | 250ml | 250ml | 125ml | 1000ml | 500ml | | | 125ml | 250ml | 40ml | | |
| SAMPLE ANALYSIS | VOA (CLP) | SEMIVOA (CLP) | ICP MTL GFAA METALS Hg (CLP) | Cn (CLP) | ANIONS IC-F,CL SO4,NO2 NO3,PO4 | NO2,NO3 EPA(353.2) | *1 | *1 | | | VOA TRIP | VOA FIELD | ACTIVIY SCAN | | |
| 406042 | A | B | C | D | E | F | 406043 | | | | | | | | |

0048

| Sample No. | Matrix* | Date Sampled | Time Sampled | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~~BOBX93~~ | S | | | X | X | X | X | X | X | X | X | | | | | X | WVS 5-31-94 |
| BOBX94 01 | S | 5-31-94 | 1010 | X | X | X | X | X | X | X 01 | X | | | | | X | |
| BOBX95 2 | S | 5-31-94 | 0940 | | | | | | | | | | | | X 02A | | |
| BOBX96 3 | S | 5-31-94 | 0730 | | | | | | | | | | | X 03A | | | |
| ~~BOBX97~~ | S | | | X | X | X | X | X | X | X | X | | | | | X | WVS 5/31/94 |
| BOBJ16 4 | S | 6-1-94 | 1043 | X | X | X | X | X | X | X | 02 X | | | | | X | |

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By: W. V. Setzer | Date/Time: 6-1-94 1409 | Received By: A. Simpson 6/1/94 | Date/Time: 1409 |
| Relinquished By: Joan C. Rogers for Amy Simpson | Date/Time: 6-3-94 0945 | Received By: [signature] 6/3/94 | Date/Time: |
| Relinquished By: | Date/Time: | Received By: | Date/Time: |
| Relinquished By: | Date/Time: | Received By: | Date/Time: |

SPECIAL INSTRUCTIONS

*1- GROSS ALPHA,BETA(EP-60,070,170) Am-241,Cm 243/244 (EP-60,070,960) Np-237 (EP-60,070,930) Pu-238,239/240 (EP-60,070,940) U-234,235,238 (EP-60,070,901) GAMMA SPEC TO INCLUDE; Co-58,60,Cs-137,Eu-152,154,155 AND Fe-59 (EP-60,070,100) Sr-90 (EP-60,070,500,519,520) I-129 (EP-024,560) C-14 (EP-060,251)Tc-99 (EP-020,540) alternate custodian relinquished custody of samples for custodian due to illness of the shipping facility custodian. Samples stored at shipping facility in locked refrigerator prior to delivery to the laboratory. SB 6-3-94.

LOWEST HOLDING TIME = 7DAYS

Matrix*

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

| | | | | |
|---|---|---|---|---|
| LABORATORY SECTION | Received By: [signature] | Title: IVAS | Date/Time: 6/3/94 1430 | |
| FINAL SAMPLE DISPOSITION | Disposal Method | Disposed By | Date/Time | |

DISTRIBUTION: Original- Sample Yellow - Sampler

BC-6000-828 (12/92)

**Westinghouse Hanford Company**

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 1

Data Turnaround: [ ] Priorty [X] Normal

| | | |
|---|---|---|
| Collector: W. V. SETZER | Company Contact: W. V. SETZER | Telephone No.: (509) 376-2413 |
| Project Designation: 200 UP-1 | Sampling Location: 699-38-68A | SAF No.: 94-046 |
| Ice Chest No.: GWS-015 | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: INTERNATIONAL TECHNOLOGIES | Offsite Property No.: W94-0- | Bill of Lading/Air Bill No.: |

Possible Sample Hazards/Remarks: NONE OBSERVED

Special Handling and/or Storage: COOL TO 4 DEGREES CENTIGRADE

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservative | | | | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | | | COOL 4 | COOL 4 | COOL 4 | | |
| Type of Container | | | | aGs | aG | G | G | G | G | P/G | P/G | | | aGs | aGs | aGs | | |
| No. of Container(s) | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | 1 | 1 | 1 | | |
| Volume | | | | 125ml | 500ml | 500ml | 250ml | 250ml | 125ml | 1000ml | 500ml | | | 125ml | 250ml | 40ml | | |
| SAMPLE ANALYSIS | | | | VOA (CLP) | SEMIVOA (CLP) | ICP MTL GFAA METALS Hg (CLP) | Cn (CLP) | ANIONS IC-F,CL SO4,NO2 NO3,PO4 | NO2,NO3 EPA(353.2) | *1 | *1 | | | VOA TRIP | VOA FIELD | ACTIVIY SCAN | | |
| 406042 | | | | 05A | B | C | D | E | F | 40604303 | | | | | | | | |
| Sample No. | Matrix* | Date Sampled | Time Sampled | | | | | | | | | | | | | | | |
| BOBX93 | S | 6-2-94 | 1245 | X | X | X | X | X | X | X | X | | | | | X | | |

0049

| CHAIN OF POSSESSION | | Sign/Print Names | |
|---|---|---|---|
| Relinquished By: W. V. Setzer | Date/Time: 6/2/94 1405 | Received By: A. Simpson | Date/Time: 6/2/94 1405 |
| Relinquished By: Loren C. Rogers for Amy Simpson | Date/Time: 6-3-94 0957 | Received By: | Date/Time: |
| Relinquished By: | Date/Time: | Received By: | Date/Time: |
| Relinquished By: | Date/Time: | Received By: | Date/Time: |

SPECIAL INSTRUCTIONS

*1- GROSS ALPHA,BETA(EP-60,070,170) Am-241,Cm 243/244 (EP-60,070,960) Np-237 (EP-60,070,930) Pu-238,239/240 (EP-60,070,940) U-234,235,238 (EP-60,070,901) GAMMA SPEC TO INCLUDE; Co-58,60,Cs-137,Eu-152,154,155 AND Fe-59 (EP-60,070,100) Sr-90 (EP-60,070,500,519,520) I-129 (EP-024,560) C-14 (EP-060,251)Tc-99 (EP-020,540) alternate custodian relinquished custody of samples for custodian due to illness of the shipping facility custodian. Samples stored at shipping facility in locked refrigerator prior to delivery to the laboratory. [illegible] 6-3-94

LOWEST HOLDING TIME = 7DAYS

Matrix*

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

| LABORATORY SECTION | Received By | Title | Date/Time |
|---|---|---|---|
| | Tom [illegible] | ITAS | 6/3/94 1430 |

| FINAL SAMPLE DISPOSITION | Disposal Method | Disposed By | Date/Time |
|---|---|---|---|
| | | | |

DISTRIBUTION: Original- Sample Yellow - Sampler

BC-6000-828 (12/92)

Hand Delivery

| Contractor | OFF-SITE PROPERTY CONTROL | CONTROL NUMBER (To be obtained from PROPERTY MANAGEMENT) |
|---|---|---|
| WHC | | W94-0-0594 #38 |

**PART I – TO BE COMPLETED BY ORIGINATOR**

| Department | Section | Unit |
|---|---|---|
| ER Eng Support | Field & Analytical Supp | ER Field Sampling |

The following items are to be shipped from ☒ Contractor ☐ Vendor

Routing ☒ Contractor ☐ Vendor

Shipped to
IT Analytical Services
2800 George Washington Way
Richland, WA 99352

Off-site Custodian

Full Title

| Quantity | Description (Include Serial and any Government Tag Numbers) | Original Cost |
|---|---|---|
| 1 lbs | Sample #: B0BX98 B0BX97 B0BX99 B0BXB0<br>Cooler ID: EG-1D<br>Polycooler with groundwater samples packed in wet ice and vermiculite | N/A |
| ~~1 lbs~~ | ~~Sample #:~~<br>~~Cooler ID:~~ AJS<br>~~Polycooler with groundwater samples packed in wet ice and vermiculite~~ | N/A |

☐ Classified ☒ Unclassified ☐ Shipped Under DOE Contract ☐ Shipped Under Contractor's Use Permit Contract

Necessity for the Off-Site Use of this Property

Sampling supports RI/FS work in the

Bill of lading # NA

*CERTIFICATION OF THE RADIATION MONITORING RELEASE MUST BE SECURED THE SAME DAY THAT MATERIAL IS DELIVERED TO SHIPPING.*

| RM Clearance for Public Release | RM Survey No | Date |
|---|---|---|
| Michael D. Thomas | 178688 | 6-13-94 |

| Location of Property (Area & Bldg.) | Contact | Phone |
|---|---|---|
| 200 UP 1 | P. H. Butcher | (509) 376-4388 |

| Date Ready for Shipment | Cost Code to be Charged | Approximate Date This Property will be Returned |
|---|---|---|
| 6/13/94 | PT1FA / 8B410 | NA |

| Originated By | Date | Authorized By | Date |
|---|---|---|---|
| AJ SIMPSON | | AJ Simpson | 6/13/94 |

| Signature and Name of Property Control | Custodian Date | Property Management Approval | Date |
|---|---|---|---|
| | | [illegible] | 6/13/94 |

**PART II – TO BE COMPLETED BY SHIPPING**

| Signature of Recipient / Date | Return Order No. | Date Issued | Purchase Order No. | Date Issued |
|---|---|---|---|---|
| C Kentigus IT 6-13-94 1045 | | | | 0050 |

**DISTRIBUTION**

| By Originator | Shipping Operation – Sign all Copies and Forward to: |
|---|---|
| White, Green, Yellow, Pink – Property Management<br>Goldenrod – Retain | White – Property Management<br>Yellow – Retain<br>Green – Property Control Custodian (Issuing Office)<br>Pink – Originator |

54-3000-479 (09/89)

SAMPLE STATUS REPORT FOR E 7426. E-BLANK BOBX94 TIME: 6/ 2/94 8:33
DISPATCHED: 5/13/94 7:50 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 6/ 1/94 14:10

| EXT. | DETER. | RESULTS OR STATUS | OUT OF RANGE? | GOOD ANS? | CHARGE CODE |
|---|---|---|---|---|---|
| **** | ******** | ********** | *** | *** | ****** |
| 4271 | TOT-ACT | < 5.00000E 01 pCi/G | N | Y | VOGEL |

END OF REPORT

SAMPLE STATUS REPORT FOR E 7425. E-BLANK BOBX93 TIME: 6/ 3/94 8:21
DISPATCHED: 5/13/94 7:49 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 6/ 2/94 14:46

| EXT. | DETER. | RESULTS OR STATUS | OUT OF RANGE? | GOOD ANS? | CHARGE CODE |
|---|---|---|---|---|---|
| **** | ******** | ********** | *** | *** | ****** |
| 4271 | TOT-ACT | < 5.00000E 01 pCi/G | N | Y | VOGEL |

END OF REPORT

SAMPLE STATUS REPORT FOR E 5537. E-BLANK BOBJ16 TIME: 6/ 2/94 8:26
DISPATCHED: 3/ 8/94 10:43 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 6/ 1/94 14:10

| EXT. | DETER. | RESULTS OR STATUS | OUT OF RANGE? | GOOD ANS? | CHARGE CODE |
|---|---|---|---|---|---|
| **** | ******** | ********** | *** | *** | ****** |
| 4271 | TOT-ACT | < 5.00000E 01 pCi/G | N | Y | VOGEL |

END OF REPORT

| Contractor | OFF-SITE PROPERTY CONTROL | CONTROL NUMBER (To be obtained from PROPERTY MANAGEMENT) |
|---|---|---|
| WHC | | W94-0-0594-22 |

**PART I – TO BE COMPLETED BY ORIGINATOR**

| Department | Section | Unit |
|---|---|---|
| ER Eng Support | Field & Analytical Supp | ER Field Sampling |

The following items are to be shipped from ☒ Contractor ☐ Vendor

Routing ☒ Contractor ☐ Vendor

| Shipped to | Off-site Custodian |
|---|---|
| IT Analytical Services<br>2800 George Washington Way<br>Richland, WA 99352 | Full Title |

| Quantity | Description (Include Serial and any Government Tag Numbers) | Original Cost |
|---|---|---|
| 1<br>lbs. | Sample #: B0BX94, B0BX95, B0BX96, B0BJ16, B0BX93<br>Cooler ID: GWS 015<br>Polycooler with groundwater samples packed in wet ice and vermiculite | N/A |
| 1<br>lbs. | Sample #:<br>Cooler ID: NA<br>Polycooler with groundwater samples packed in wet ice and vermiculite | N/A |

☐ Classified ☒ Unclassified ☐ Shipped Under DOE Contract ☐ Shipped Under Contractor's Use Permit Contract

Necessity for the Off-Site Use of this Property

Sampling supports RI/FS work in the 200 AREA

RECEIVED
JUN 3 1994
PROPERTY RECORDS

Bill of lading #_____

*CERTIFICATION OF THE RADIATION MONITORING RELEASE MUST BE SECURED THE SAME DAY THAT MATERIAL IS DELIVERED TO SHIPPING.*

| RM Clearance for Public Release | RM Survey No | Date |
|---|---|---|
| Michael S. Jones | 157755 | 06-03-94 |

| Location of Property (Area & Bldg.) | Contact | Phone |
|---|---|---|
| 200-UP-1 | P. H. Butcher | (509) 376-4388 |

| Date Ready for Shipment | Cost Code to be Charged | Approximate Date This Property will be Returned |
|---|---|---|
| 6-3-94 | 8B410 PT2AB | NA |

| Originated By | Date | Authorized By | Date |
|---|---|---|---|
| PH Butcher | 6/3/94 | Kevin C. Deacus | 6-3-94 |

| Signature and Name of Property Control | Custodian Date | Property Management Approval | Date |
|---|---|---|---|
| | | [signature] | 6/3/94 |

**PART II – TO BE COMPLETED BY SHIPPING**

| Signature of Recipient | Return Order No. | Date Issued | Purchase Order No. | Date Issued |
|---|---|---|---|---|
| [signature] ITAS | | | | |
| Date 6/3/94 1430 | | | | 0054 |

**DISTRIBUTION**

| By Originator | Shipping Operation – Sign all Copies and Forward to: |
|---|---|
| White, Green, Yellow, Pink – Property Management<br>Goldenrod – Retain | White – Property Management<br>Yellow – Retain<br>Green – Property Control Custodian (Issuing Office)<br>Pink – Originator |

54-3000-479 (09/89)

BOBX95 SGR 6-3-94
BOBX96

SAMPLE STATUS REPORT FOR E 2261. E-BLANK ~~B08NR4~~ TIME: 10/ 4/93 8:21
DISPATCHED: 9/23/93 14:44 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 10/ 4/93 8: 9

| EXT. | DETER. | RESULTS OR STATUS | OUT OF RANGE? | GOOD ANS? | CHARGE CODE |
|---|---|---|---|---|---|
| **** | ******** | ********** | *** | *** | ****** |
| 4271 | TOT-ACT | < 5.00000E 01 pCi/G | N | Y | VOGEL |

END OF REPORT

Silica Sand
W.V. Setzer 6-2-94

INTERNATIONAL TECHNOLOGY CORPORATION

Regional Office
2800 George Washington Way
Richland, Washington 99352

# SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

Date/Time Received 6/3/94 1430 Client Name WHC

Project/Client # 94-046 Batch or Case # N/A

Cooler ID (if noted on the outside of cooler) GWS 015

1. Condition of shipping container? ok
2. Custody Seals on cooler intact? Yes ☑ No ☐
3. Custody Seals dated and signed? Yes ☑ No ☐
4. Chain of Custody record is taped on inside of cooler lid? Yes ☑ No ☐
5. Vermiculite/packing material is: Wet ☐ Dry ☑
6. Each sample is in a plastic bag? Yes ☐ No ☑
7. Number of sample containers in cooler: 29
8. Samples have: ____ tape ____ hazard labels
   ✓ custody seals ✓ appropriate sample labels
9. Samples are: ✓ in good condition ____ leaking
   ____ broken ____ have air bubbles
   ____ other
10. Coolant present? Yes ☑ No ☐

Sample temperature 4°C

11. The following paperwork should be accounted for (N/A if not applicable):
    Chain of Custody #'(s) N/A
    Request for analysis #(s) N/A
    Airbill # N/A Carrier ____
12. Have any anomalies been identified above? Yes ☐ No ☑
13. Memos have been initiated for all anomalies identified above? Yes ☐

Printed Name/Signature Tom Gilmore [signature] Date/Time 6/3/94 1430

FORM NO. LS-042, Rev.0, 2/94

TENNELEC #1

SCREENING CALCULATION SPREADSHEET

Category II
3 June 94

| Customer Code | Recieved Date | | Screening Prep Date | | Count Date | Mnts. Cntd | BACKGROUND Alpha | Beta | Mnts |
|---|---|---|---|---|---|---|---|---|---|
| WHC | 6-3-94 | | 6-3 | | 6-3 | 10 | 5 | 233 | 240 |

| Customer ID WHC/SOIL | pH <2 Rcvd/Req | Residue Wght mG | Vol. Anal. mG mL | Sample Size Gm L | SMPLE CNT DATA Hldr Num. | Total Counts Alpha | Beta | Net Sample Counts/Minute Alpha | Beta | DPM / Aliqout Alpha | Beta | uCi per Sample Alpha | Beta | 2 Sigma Error uCi per Sample Alpha | Beta | pCi/(Gm or L) Alpha | Beta | Category 1 Yes/No | Aliquot to Cat 1 Gm or L Alpha | Beta |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 03 B0BX93 | | 97.3 | 97 | 1300.0 | 4 | 3 | 43 | 0.28 | 3.33 | 2.76E+00 | 8.12E+00 | 1.7E-02 | 4.9E-02 | 2.3E-05 | 1.9E-05 | 1.3E+01 | 3.8E+01 | No | 7.8E+02 | 2.7E+03 |
| 01 B0BX94 | | 84.9 | 85 | 1400.0 | 6 | 2 | 14 | 0.18 | 0.43 | 1.72E+00 | 8.80E-01 | 1.3E-02 | 6.5E-03 | 2.0E-05 | 8.1E-06 | 9.1E+00 | 4.7E+00 | No | 1.1E+03 | 2.1E+04 |
| 02 B0BJ16 | | 97.1 | 97 | 1550.0 | 7 | 5 | 27 | 0.48 | 1.73 | 4.96E+00 | 3.66E+00 | 3.6E-02 | 2.8E-02 | 3.7E-05 | 1.3E-05 | 2.3E+01 | 1.6E+01 | No | 4.3E+02 | 5.6E+03 |
| TOTAL uCi | | | | | | | | | | | | 5.2E-02 | 7.7E-02 | | | | | | | |

4060413

0057

**Westinghouse Hanford Company**

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 1

Data Turnaround: [ ] Priorty [X] Normal

| | | |
|---|---|---|
| Collector: W. V. SETZER | Company Contact: W. V. SETZER | Telephone No.: (509) 376-2413 |
| Project Designation: 200 UP-1 | Sampling Location: 699-38-68A | SAF No.: 94-046 |
| Ice Chest No.: ER-1D | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: INTERNATIONAL TECHNOLOGIES | Offsite Property No.: W94-0- 0594-38 | Bill of Lading/Air Bill No.: |

Possible Sample Hazards/Remarks: NONE OBSERVED

Special Handling and/or Storage: COOL TO 4 DEGREES CENTIGRADE — Ref 3C LCS 6/9/94

0058

| Sample No. | Matrix* | Date Sampled | Time Sampled | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Preservative | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | | | COOL 4 | COOL 4 | COOL 4 | | |
| | | | Type of Container | aGs | aG | G | G | G | G | P/G | P/G | | | aGs | aGs | aGs | | |
| | | | No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | 1 | 1 | 1 | | |
| | | | Volume | 125ml | 500ml | 500ml | 250ml | 250ml | 125ml | 1000ml | 500ml | | | 125ml | 250ml | 40ml | | |
| SAMPLE ANALYSIS 406264 | | | | VOA (CLP) 6/13/94 A | SEMIVOA (CLP) B | ICP MTL GFAA METALS Hg (CLP) C | Cn (CLP) D | ANIONS IC-F,CL SO4,NO2 NO3,PO4 E | NO2,NO3 EPA(353.2) F | *1 406265 | *1 | | | VOA TRIP | VOA FIELD | ACTIVIY SCAN | | |
| BOBX98 01 | S | 6-9-94 | 0940 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 01 ✓ | ✓ | | | | | ✓ | | |
| BOBX97 2 | S | 6-9-94 | 0940 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 02 ✓ | ✓ | | | | | ✓ | | |
| BOBX99 3A | S | 6-9-94 | 0840 | | | | | | | | | | | ✓ | | | | |
| BOBXBO 4A | S | 6-9-94 | 0900 | | | | | | | | | | | | ✓ | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

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

| Relinquished By | Date/Time | Received By | Date/Time |
|---|---|---|---|
| W.V. Setzer | 6-9-94 1205 | L Sweeney L Sweeney | 6/9/94 1205 |
| L Sweeney L Sweeney | 6/9/94 1300 | A J Simpson | 6/9/94 1300 |
| A J Simpson | 6/13/94 1035 | C Kenitzer IT | 6-13-94 1045 |
| | | | |

**SPECIAL INSTRUCTIONS**

*1- GROSS ALPHA,BETA(EP-60,070,170) Am-241,Cm 243/244 (EP-60,070,960) Np-237 (EP-60,070,930) Pu-238,239/240 (EP-60,070,940) U-234,235,238 (EP-60,070,901) GAMMA SPEC TO INCLUDE; Co-58,60,Cs-137,Eu-152,154,155 AND Fe-59 (EP-60,070,100) Sr-90 (EP-60,070,500,519,520) I-129 (EP-024,560) C-14 (EP-060,251)Tc-99 (EP-020,540)

SDG W0083

LOWEST HOLDING TIME = 7DAYS

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

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

DISTRIBUTION: Original- Sample Yellow - Sampler

BC-6000-828 (12/92)

Hand Delivery

| Contractor | OFF-SITE PROPERTY CONTROL | CONTROL NUMBER (To be obtained from PROPERTY MANAGEMENT) |
|---|---|---|
| WHC | | W94-0-0594 #38 |

PART I – TO BE COMPLETED BY ORIGINATOR

| Department | Section | Unit |
|---|---|---|
| ER Eng Support | Field & Analytical Supp | ER Field Sampling |

The following items are to be shipped from ☒ Contractor ☐ Vendor

Routing ☒ Contractor ☐ Vendor

Shipped to
IT Analytical Services
2800 George Washington Way
Richland, WA 99352

Off-site Custodian

Full Title

| Quantity | Description (Include Serial and any Government Tag Numbers) | Original Cost |
|---|---|---|
| 1 lbs | Sample #: BOBX98 BOBX97 BOBX99 BOBXBO<br>Cooler ID: EG-1D<br>Polycooler with groundwater samples packed in wet ice and vermiculite | N/A |
| ~~1 lbs~~ | ~~Sample #:~~ AJS<br>~~Cooler ID:~~<br>~~Polycooler with groundwater samples packed in wet ice and vermiculite~~ | N/A |

☐ Classified ☒ Unclassified ☐ Shipped Under DOE Contract ☐ Shipped Under Contractor's Use Permit Contract

Necessity for the Off-Site Use of this Property

Sampling supports RI/FS work in the

RECEIVED
JUN 13 1994
PROPERTY RECORD

Bill of lading # N/A

*CERTIFICATION OF THE RADIATION MONITORING RELEASE MUST BE SECURED THE SAME DAY THAT MATERIAL IS DELIVERED TO SHIPPING.*

| RM Clearance for Public Release | RM Survey No | Date |
|---|---|---|
| Michael D. Jones | 178688 | 6-13-94 |

| Location of Property (Area & Bldg.) | Contact | Phone |
|---|---|---|
| 200 UP 1 | P. H. Butcher | (509) 376-4388 |

| Date Ready for Shipment | Cost Code to be Charged | Approximate Date This Property will be Returned |
|---|---|---|
| 6/13/94 | PT1FA / 8B410 | NA |

| Originated By | Date | Authorized By | Date |
|---|---|---|---|
| AJ SIMPSON | | AJ Simpson | 6/13/94 |

| Signature and Name of Property Control | Custodian Date | Property Management Approval | Date |
|---|---|---|---|
| | | [illegible] | 6/13/94 |

PART II – TO BE COMPLETED BY SHIPPING

| Signature of Recipient / Date | Return Order No. | Date Issued | Purchase Order No. | Date Issued |
|---|---|---|---|---|
| C Kenny IT 6-13-94 1045 | | | | 0059 |

DISTRIBUTION

| By Originator | Shipping Operation – Sign all Copies and Forward to: | |
|---|---|---|
| White, Green, Yellow, Pink – Property Management<br>Goldenrod – Retain | White – Property Management<br>Yellow – Retain | Green – Property Control Custodian (Issuing Office)<br>Pink – Originator |

54-3000-479 (09/89)

SAMPLE STATUS REPORT FOR E 7430. E-BLANK BOBX98 TIME: 6/10/94 8:32
DISPATCHED: 5/13/94 7:52 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 6/ 9/94 12:59

| EXT. | DETER. | RESULTS OR STATUS | OUT OF RANGE? | GOOD ANS? | CHARGE CODE |
|---|---|---|---|---|---|
| **** | ******** | ********** | *** | *** | ****** |
| 4271 | TOT-ACT | < 5.00000E 01 pCi/G | N | Y | VOGEL |

END OF REPORT

SAMPLE STATUS REPORT FOR E 7429. E-BLANK BOBX97 TIME: 6/10/94 8:32
DISPATCHED: 5/13/94 7:52 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 6/ 9/94 12:59

| EXT. | DETER. | RESULTS OR STATUS | OUT OF RANGE? | GOOD ANS? | CHARGE CODE |
|---|---|---|---|---|---|
| **** | ******** | ********** | *** | *** | ****** |
| 4271 | TOT-ACT | < 5.00000E 01 pCi/G | N | Y | VOGEL |

END OF REPORT

INTERNATIONAL TECHNOLOGY CORPORATION

Regional Office
2800 George Washington Way
Richland, Washington 99352

# SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

Date/Time Received 6-13-94 1045 Client Name WHC

Project/Client # 94-046 Batch or Case # N/A

Cooler ID (if noted on the outside of cooler) ER-10

1. Condition of shipping container? O.K
2. Custody Seals on cooler intact? Yes ☑ No ☐
3. Custody Seals dated and signed? Yes ☑ No ☐
4. Chain of Custody record is taped on inside of cooler lid? Yes ☑ No ☐
5. Vermiculite/packing material is: Wet ☐ Dry ☑
6. Each sample is in a plastic bag? Yes ☑ No ☐
7. Number of sample containers in cooler: 20
8. Samples have: ✓ tape ____ hazard labels
   ✓ custody seals ____ appropriate sample labels
9. Samples are: ✓ in good condition ____ leaking
   ____ broken ____ have air bubbles
   ____ other
10. Coolant present? Yes ☑ No ☐

Sample temperature 4°C

11. The following paperwork should be accounted for (N/A if not applicable):
    Chain of Custody #'(s) NA
    Request for analysis #(s) NA
    Airbill # NA Carrier ____
12. Have any anomalies been identified above? Yes ☒ No ☐
13. Memos have been initiated for all anomalies identified above? Yes ☒

Printed Name/Signature C Kenitzer MAS [illegible] Date/Time 10:50

FORM NO. LS-042, Rev.0, 2/94

O.K. JRM
13 June 94

TENNELEC #1

SCREENING CALCULATION SPREADSHEET

| Customer Code | Recieved Date | | Screening Prep Date | | Count Date | Mnts. Cntd | BACKGROUND Alpha | Beta | Mnts |
|---|---|---|---|---|---|---|---|---|---|
| WHC | 61394 | | 61394 | | 6-13 | 30 | 15 | 238 | 240 |

| | Customer ID WHC/SOIL | pH <2 Rcvd/Relq | Residue Wght mG | Vol. Anal. mG | mL | Sample Size Gm | L | SMPLE CNT DATA Hldr Num. | Total Counts Alpha | Beta | Net Sample Counts/Minute Alpha | Beta | DPM / Aliqout Alpha | Beta | uCi per Sample Alpha | Beta | 2 Sigma Error uCi per Sample Alpha | Beta | pCi/(Gm or L) Alpha | Beta | Category 1 Yes/No | Aliquot to Cat 1 Gm or L Alpha | Beta |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 02 | B0BX97 | | 68.3 | 68 | | 1000.0 | | 50 | 5 | 80 | 0.10 | 1.68 | 8.1E-01 | 3.9E+00 | 5.3E-03 | 2.6E-02 | 7.2E-06 | 8.2E-06 | 5.3E+00 | 2.6E+01 | Yes | 1.9E+03 | 3.9E+03 |
| 01 | B0BX98 | | 95.1 | 95 | | 800.0 | | 51 | 8 | 77 | 0.20 | 1.58 | 2.0E+00 | 3.8E+00 | 7.7E-03 | 1.4E-02 | 7.2E-06 | 4.8E-06 | 9.7E+00 | 1.8E+01 | Yes | 1.0E+03 | 5.6E+03 |
| | TOTAL | uCi | | | | | | | | | | | | | 1.3E-02 | 4.0E-02 | | | | | | | |

SDG-W0083

4-06-264 Chem
4-06-265 - Rad.

0064

Quanterra
Environmental Services

*Quanterra Incorporated*
*2800 George Washington Way*
*Richland, Washington 99352*

*509 375-3131 Telephone*
*509 375-5590 Fax*

December 8, 1994

DEC 1994
RECEIVED
Data
Log In

Joan Kessner
Buyer's Technical Representative
Bechtel Hanford, Inc.
345 Hills
Richland, WA 99352

**Reference: Contract MPV-SVV-239000.**

Dear Ms. Kessner:

Accompanying this letter are the addendum Radiochemical sample results for the following BHI samples:

| SDG NUMBER | SAF NUMBER |
|---|---|
| W0083 | 94-046 |

If you have any questions regarding this data package or require any additional information please contact me at 375-3131.

Sincerely,

Jodie Carnes
Document Control Officer

Receipt of this letter and the package are acknowledged by:

Name: [illegible] Date: 12/8/94 Time: 2:00p

XC: Vicki Parr
Van Pettey
Wade Price
File

IT ANALYTICAL SERVICES
RICHLAND, WA
(509) 375-3131

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| LAB NAME: | ITAS-RICHLAND | SDG: | W0083 |
| LAB SAMPLE ID: | 40626502 | MATRIX: | SOIL |
| CLIENT ID: | B0BX97 | DATE RECEIVED: | 6/13/94 |

| ISOTOPE | RESULT | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA | REPORT UNIT | YIELD | METHOD NUMBER |
|---|---|---|---|---|---|---|---|
| AM-241 | 4.36E-03 | 1.1E-02 | 1.1E-02 | 2.37E-02 | pCi/g | 80.10% | RD3302 |
| CM-242 | -9.69E-04 | 1.4E-03 | 1.4E-03 | 2.77E-02 | pCi/g | 80.10% | RD3302 |
| CM-244 | 4.38E-03 | 1.1E-02 | 1.1E-02 | 2.38E-02 | pCi/g | 80.10% | RD3302 |
| NP-237 | 7.98E-03 | 1.2E-02 | 1.2E-02 | 1.67E-02 | pCi/g | 100.00% | RD3208 |
| PU-238 | -3.16E-04 | 6.3E-04 | 6.3E-04 | 2.37E-02 | pCi/g | 66.10% | RD3209 |
| PU239/40 | -6.30E-04 | 8.9E-04 | 9.0E-04 | 2.63E-02 | pCi/g | 66.10% | RD3209 |
| U-234 | 4.67E-01 | 1.0E-01 | 1.2E-01 | 2.85E-02 | pCi/g | 72.80% | RD3234 |
| U-235 | 1.01E-02 | 1.6E-02 | 1.6E-02 | 2.85E-02 | pCi/g | 72.80% | RD3234 |
| U-238DA | 5.50E-01 | 1.1E-01 | 1.3E-01 | 3.80E-02 | pCi/g | 72.80% | RD3234 |
| CO-58 | 3.20E-03 | 5.2E-03 | 5.2E-03 | 8.85E-03 | pCi/g | N/A | RD3219 |
| CO-60 | 5.24E-04 | 5.7E-03 | 5.7E-03 | 9.33E-03 | pCi/g | N/A | RD3219 |
| CS-137DA | 3.60E-03 | 4.9E-03 | 4.9E-03 | 7.94E-03 | pCi/g | N/A | RD3219 |
| EU-152 | 9.22E-02 | 2.4E-02 | 2.6E-02 | 4.67E-02 | pCi/g | N/A | RD3219 |
| EU-154 | -4.45E-03 | 1.9E-02 | 1.9E-02 | 3.05E-02 | pCi/g | N/A | RD3219 |
| EU-155 | 1.37E-02 | 1.4E-02 | 1.4E-02 | 2.24E-02 | pCi/g | N/A | RD3219 |
| FE-59 | -6.09E-03 | 1.5E-02 | 1.5E-02 | 2.39E-02 | pCi/g | N/A | RD3219 |
| I-129LP | -2.44E-01 | 4.7E-01 | 4.7E-01 | 7.96E-01 | pCi/g | N/A | RD3219 |
| K-40 | 1.49E+01 | 2.8E-01 | 1.5E+00 | N/A | pCi/g | N/A | RD3219 |
| MN-54 | 1.07E-02 | 5.6E-03 | 5.7E-03 | N/A | pCi/g | N/A | RD3219 |
| RA-224DA | 5.32E-01 | 1.5E-02 | 5.5E-02 | N/A | pCi/g | N/A | RD3219 |
| RA-226DA | 3.90E-01 | 2.1E-02 | 4.5E-02 | N/A | pCi/g | N/A | RD3219 |
| RA-228DA | 5.53E-01 | 4.6E-02 | 7.2E-02 | N/A | pCi/g | N/A | RD3219 |
| U-238DLP | 2.62E-01 | 2.0E-01 | 2.0E-01 | N/A | pCi/g | N/A | RD3219 |
| ALPHA | 6.80E+00 | 4.0E+00 | 4.1E+00 | 5.45E+00 | pCi/g | 100.00% | RD3222 |
| BETA | 1.70E+01 | 3.1E+00 | 3.3E+00 | 3.91E+00 | pCi/g | 100.00% | RD3222 |

682A-6-93

**DON'T SAY IT --- Write It!**

DATE August 2, 1994

To W0083, samples B0BX94, B0BJ16, B0BX93 B0BX98 and B0BX97

FROM Jeff Lerch H4-23
Telephone 372-2596

cc: Doris Ayres
Briana Colley
Chris Koerner
Sandy Walls

SUBJECT Carbon-14 data not reported

Due to an insufficient presence of carbon in the samples (described on page 0007 of the radiochemistry laboratory case narrative), data for C-14 will not be reported for samples B0BX94, B0BJ16, B0BX93, B0BX98 and B0BX97.

W0083-ITC-094

# RECORD COPY

MEMORANDUM

TO: 200-UP-1 Round 1 Soil, Project QA Record November 30, 1994

FR: Diana Waterbury, Golder Associates Inc.

RE: VOLATILES DATA VALIDATION SUMMARY FOR
DATA PACKAGE: W0083-ITC-094, (943-1610.034, 094VOA.UP1)

## INTRODUCTION

This memo presents the results of data validation on data package W0083-ITC-094 prepared by the International Technology Analytical Services. Sample information is provided in the following table.

| SAMPLE ID | MEDIA | ANALYSIS | COMMENTS |
|---|---|---|---|
| B0BJ16 | SOIL | VOLATILES | |
| B0BX94 | SOIL | VOLATILES | EQUIPMENT BLANK |
| B0BX96 | SOIL | VOLATILES | TRIP BLANK |
| B0BX97 | SOIL | VOLATILES | |
| B0BX98* | SOIL | VOLATILES | DUPLICATE OF B0BX97 |
| B0BX99 | SOIL | VOLATILES | TRIP BLANK |
| B0BXB0 | SOIL | VOLATILES | FIELD BLANK |
| * Indicates sample results which were 100% recalculated. | | | |

Data validation was conducted to level D in accordance with the WHC statement of work (WHC 1994) and validation procedures (WHC 1993). Attachments 1 through 5 provide the following information:

Attachment 1. Glossary of Data Reporting Qualifiers
Attachment 2. Summary of Data Qualifications
Attachment 3. Qualified Data Summary and Annotated Laboratory Reports
Attachment 4. Laboratory Narrative and Chain-of-Custody Documentation
Attachment 5. Data Validation Supporting Documentation

## DATA QUALITY OBJECTIVES

This section presents a summary of the data quality in terms of the referenced validation criteria.

**Precision.** Goals for precision were met.

**Accuracy.** Goals for accuracy were met.

**Sample Result Verification.** All sample results were supported in the raw data.

**Detection Limits.** Detection limit goals were met.

Revised 11/30/94

**Completeness.** The data package was complete for all requested analyses. A total of seven (7) samples were validated in this data package with a total of 231 determinations reported, 168 of which were deemed valid. This results in a completeness of 73 percent which does not meet the work plan completeness objective of 90 percent.

## MAJOR DEFICIENCIES

The following major deficiencies were identified during data validation which required qualification of data as unusable.

### Holding Times

- The holding times for samples B0BX94 and B0BX96 were greater than two times the maximum allowable holding time. Attachments 2 and 5 provide a summary of the data qualifications applied and supporting documentation.

## MINOR DEFICIENCIES

The following minor deficiencies were identified during data validation which required qualification of data.

### Holding Times

- The maximum allowable holding time for samples B0BJ16, B0BX94, and B0BX96 were exceeded. Attachments 2 and 5 provide supporting documentation.

### Laboratory blanks

- Acetone and methylene chloride were detected in the laboratory blanks. Attachments 2 and 5 provide a summary of the data qualifications applied and supporting documentation.

## FIELD QC

- Samples B0BX94, B0BXB0, B0BX96 and B0BX99 were identified as equipment, field or trip blanks. Toluene was detected in the equipment blank, however no qualification is required for field QC.

- Sample B0BX98 was identified as the field duplicate of sample B0BX97. All relative percent differences (%RPD) were within control limits.

## TENTATIVELY IDENTIFIED COMPOUNDS

Tentatively identified compounds (TICs) reported by the laboratory were evaluated during validation and qualified as follows:

- TICs were detected in the samples and determined to be valid, resulting in qualification of the associated results as presumptive and valid (JN).

Reviewed 1/30/94

REFERENCES

WHC 1994, Environmental and Waste Characterization Analytical Data Validation, Purchase Order MSH-SWV-315905; Validation Statement of Work, Revision 1.0, September 7, 1994; Westinghouse Hanford Company, Richland, Washington.

WHC 1993, Data Validation Procedures for Chemical Analyses, WHC-SD-EN-SPP-002, Rev. 2, 1993. Westinghouse Hanford Company, Richland, Washington.

Reviewed 11/30/94

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

## ATTACHMENT 1. GLOSSARY OF DATA REPORTING QUALIFIERS

B - Indicates the constituent was analyzed for and detected in the associated laboratory blank. This qualifier is applied by the laboratory. During the process of data validation this qualifier may be replaced by other appropriate qualifiers as defined by the validation procedures. The associated data should be considered usable for decision making purposes.

U - Indicates the constituent was analyzed for and not detected. The concentration reported is the sample quantitation limit corrected for aliquot size, dilution and percent solids (in the case of solid matrices) by the laboratory. The associated data should be considered usable for decision making purposes.

UJ - Indicates the constituent was analyzed for and not detected. Due to a minor quality control deficiency identified during data validation the concentration reported may not accurately reflect the sample quantitation limit. The associated data should be considered usable for decision making purposes.

J - Indicates the constituent was analyzed for and detected. This qualifier may be applied by the laboratory to indicate a concentration which is less than the contract required quantitation limit (CRQL) but greater than the instrument detection limit (IDL). During data validation this qualifier may be applied to indicate a minor quality control deficiency. However in either case, the associated data should be considered usable for decision making purposes.

NJ - Indicates presumptive evidence of a constituent at an estimated value. This qualifier is normally applied to GC analysis data (such as organochlorine pesticide and PCB data). The associated data should be considered usable for decision making purposes.

N - Indicates presumptive evidence of a constituent. This qualifier is normally applied to GC analysis data (such as organochlorine pesticide and PCB data). The associated data should be considered usable for decision making purposes.

JN - Indicates a tentatively identified compound (TIC) whose concentration and identification have been determined to be valid as a result of data validation. The associated data should be considered usable for decision making purposes.

UJN - Indicates a tentatively identified compound (TIC) that has been determined to be presumptive and valid (JN) in terms of identification and quantitation and has been qualified as undetected (U) due to associated blank contamination.

UR - Indicates the constituent was analyzed for and not detected. The concentration reported has been qualified as unusable due to a major quality control deficiency identified during data validation. The associated data should be considered unusable for decision making purposes.

R - Indicates the constituent was analyzed for and detected. The concentration reported has been qualified as unusable due to a major quality control deficiency identified during data validation. The associated data should be considered unusable for decision making purposes.

# ATTACHMENT 2

# SUMMARY OF DATA QUALIFICATIONS

# ATTACHMENT 2 - SUMMARY OF DATA QUALIFICATIONS

| SDG: W0083-ITC-094 | BY: D. Waterbury | DATE: 11/30/94 | PAGE 1 OF 1 |
|---|---|---|---|
| COMMENTS: VOLATILE ORGANICS | | | |
| COMPOUND/ ANALYTE | QUALIFIER | SAMPLES AFFECTED | REASON |
| ALL (except Toluene) | UR | B0BX96 | Holding time. |
| ALL (except Acetone and Toluene) | UR | B0BX94 | Holding time. |
| ALL (except Acetone and Toluene) | UJ | B0BJ16 | Holding time. |
| ACETONE | J | B0BJ16, B0BX94 | Holding time. |
| TOLUENE | J | B0BJ16, B0BX94, B0BX96 | Holding time. |
| METHYLENE CHLORIDE | U<br>UJ<br>UR | B0BX97, B0BX98, B0BX99, B0BXB0<br>B0BJ16<br>B0BX94, B0BX96, | COMPOUND DETECTED IN THE LABORATORY BLANK. |
| ACETONE | U | B0BX97, B0BX98, B0BX99, B0BXB0 | COMPOUND DETECTED IN THE LABORATORY BLANK. |
| | | | |
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Reviewed 11/30/94

# ATTACHMENT 3

# QUALIFIED DATA SUMMARY and ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: W0083-ITC-094

| | Samp# | B0BJ16 | | B0BX94 | | B0BX96 | | B0BX97 | | B0BX98 | | B0BX99 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Date | 6-1-94 | | 5-31-94 | | | | 6-9-94 | | 6-9-94 | | 6-9-94 | |
| | Location | 299-W19-34B | | 699-38-68A | | | | 699-38-68A | | 699-38-68A | | | |
| | Depth | 332.00 - 334.00 | | --- | | --- | | 285.00 - 287.00 | | 285.00 - 287.00 | | --- | |
| | Type | SOIL | | SOIL | | SOIL | | SOIL | | SOIL | | SOIL | |
| | Comments | | | EQUIP.BL | | TRIP BLANK | | | | DUPLICATE | | TRIP BLANK | |
| Parameter | Units | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| CHLOROMETHANE | UG/KG | 12.000 | UJ | 10.000 | UR | 10.000 | UR | 11.000 | U | 12.000 | U | 10.000 | U |
| BROMOMETHANE | UG/KG | 12.000 | UJ | 10.000 | UR | 10.000 | UR | 11.000 | U | 12.000 | U | 10.000 | U |
| VINYL CHLORIDE | UG/KG | 12.000 | UJ | 10.000 | UR | 10.000 | UR | 11.000 | U | 12.000 | U | 10.000 | U |
| CHLOROETHANE | UG/KG | 12.000 | UJ | 10.000 | UR | 10.000 | UR | 11.000 | U | 12.000 | U | 10.000 | U |
| METHYLENE CHLORIDE | UG/KG | 12.000 | UJ | 10.000 | UR | 10.000 | UR | 23.000 | U | 28.000 | U | 16.000 | U |
| ACETONE | UG/KG | 13.000 | J | 6.000 | J | 10.000 | UR | 13.000 | U | 18.000 | U | 11.000 | U |
| CARBON DISULFIDE | UG/KG | 12.000 | UJ | 10.000 | UR | 10.000 | UR | 11.000 | U | 12.000 | U | 10.000 | U |
| 1,1-DICHLOROETHENE | UG/KG | 12.000 | UJ | 10.000 | UR | 10.000 | UR | 11.000 | U | 12.000 | U | 10.000 | U |
| 1,1-DICHLOROETHANE | UG/KG | 12.000 | UJ | 10.000 | UR | 10.000 | UR | 11.000 | U | 12.000 | U | 10.000 | U |
| 1,2-DICHLOROETHENE (TOTAL) | UG/KG | 12.000 | UJ | 10.000 | UR | 10.000 | UR | 11.000 | U | 12.000 | U | 10.000 | U |
| CHLOROFORM | UG/KG | 12.000 | UJ | 10.000 | UR | 10.000 | UR | 11.000 | U | 12.000 | U | 10.000 | U |
| 1,2-DICHLOROETHANE | UG/KG | 12.000 | UJ | 10.000 | UR | 10.000 | UR | 11.000 | U | 12.000 | U | 10.000 | U |
| 2-BUTANONE | UG/KG | 12.000 | UJ | 10.000 | UR | 10.000 | UR | 11.000 | U | 12.000 | U | 10.000 | U |
| 1,1,1-TRICHLOROETHANE | UG/KG | 12.000 | UJ | 10.000 | UR | 10.000 | UR | 11.000 | U | 12.000 | U | 10.000 | U |
| CARBON TETRACHLORIDE | UG/KG | 12.000 | UJ | 10.000 | UR | 10.000 | UR | 11.000 | U | 12.000 | U | 10.000 | U |
| BROMODICHLOROMETHANE | UG/KG | 12.000 | UJ | 10.000 | UR | 10.000 | UR | 11.000 | U | 12.000 | U | 10.000 | U |
| 1,2-DICHLOROPROPANE | UG/KG | 12.000 | UJ | 10.000 | UR | 10.000 | UR | 11.000 | U | 12.000 | U | 10.000 | U |
| CIS-1,3-DICHLOROPROPENE | UG/KG | 12.000 | UJ | 10.000 | UR | 10.000 | UR | 11.000 | U | 12.000 | U | 10.000 | U |
| TRICHLOROETHENE | UG/KG | 12.000 | UJ | 10.000 | UR | 10.000 | UR | 11.000 | U | 12.000 | U | 10.000 | U |
| DIBROMOCHLOROMETHANE | UG/KG | 12.000 | UJ | 10.000 | UR | 10.000 | UR | 11.000 | U | 12.000 | U | 10.000 | U |
| 1,1,2-TRICHLOROETHANE | UG/KG | 12.000 | UJ | 10.000 | UR | 10.000 | UR | 11.000 | U | 12.000 | U | 10.000 | U |
| BENZENE | UG/KG | 12.000 | UJ | 10.000 | UR | 10.000 | UR | 11.000 | U | 12.000 | U | 10.000 | U |
| TRANS-1,3-DICHLOROPROPENE | UG/KG | 12.000 | UJ | 10.000 | UR | 10.000 | UR | 11.000 | U | 12.000 | U | 10.000 | U |
| BROMOFORM | UG/KG | 12.000 | UJ | 10.000 | UR | 10.000 | UR | 11.000 | U | 12.000 | U | 10.000 | U |
| 4-METHYL-2-PENTANONE | UG/KG | 12.000 | UJ | 10.000 | UR | 10.000 | UR | 11.000 | U | 12.000 | U | 10.000 | U |
| 2-HEXANONE | UG/KG | 12.000 | UJ | 10.000 | UR | 10.000 | UR | 11.000 | U | 12.000 | U | 10.000 | U |
| TETRACHLOROETHENE | UG/KG | 12.000 | UJ | 10.000 | UR | 10.000 | UR | 11.000 | U | 12.000 | U | 10.000 | U |
| 1,1,2,2-TETRACHLOROETHANE | UG/KG | 12.000 | UJ | 10.000 | UR | 10.000 | UR | 11.000 | U | 12.000 | U | 10.000 | U |
| TOLUENE | UG/KG | 17.000 | J | 13.000 | J | 15.000 | J | 11.000 | U | 12.000 | U | 10.000 | U |
| CHLOROBENZENE | UG/KG | 12.000 | UJ | 10.000 | UR | 10.000 | UR | 11.000 | U | 12.000 | U | 10.000 | U |
| ETHYLBENZENE | UG/KG | 12.000 | UJ | 10.000 | UR | 10.000 | UR | 11.000 | U | 12.000 | U | 10.000 | U |
| STYRENE | UG/KG | 12.000 | UJ | 10.000 | UR | 10.000 | UR | 11.000 | U | 12.000 | U | 10.000 | U |
| XYLENES (TOTAL) | UG/KG | 12.000 | UJ | 10.000 | UR | 10.000 | UR | 11.000 | U | 12.000 | U | 10.000 | U |

The decimal places shown do not reflect the precision reported by the laboratory

Reviewed 11/30/94

Validated Data Summary, Data Package: W0083-ITC-094

| | | |
|---|---|---|
| | Samp# | B0BXB0 |
| | Date | 6-10-94 |
| | Location | |
| | Depth | 0.00 - 0.00 |
| | Type | SOIL |
| | Comments | FIELD BLANK |
| Parameter | Units | Result Q |
| CHLOROMETHANE | UG/KG | 10.000 U |
| BROMOMETHANE | UG/KG | 10.000 U |
| VINYL CHLORIDE | UG/KG | 10.000 U |
| CHLOROETHANE | UG/KG | 10.000 U |
| METHYLENE CHLORIDE | UG/KG | 17.000 U |
| ACETONE | UG/KG | 10.000 U |
| CARBON DISULFIDE | UG/KG | 10.000 U |
| 1,1-DICHLOROETHENE | UG/KG | 10.000 U |
| 1,1-DICHLOROETHANE | UG/KG | 10.000 U |
| 1,2-DICHLOROETHENE (TOTAL) | UG/KG | 10.000 U |
| CHLOROFORM | UG/KG | 10.000 U |
| 1,2-DICHLOROETHANE | UG/KG | 10.000 U |
| 2-BUTANONE | UG/KG | 10.000 U |
| 1,1,1-TRICHLOROETHANE | UG/KG | 10.000 U |
| CARBON TETRACHLORIDE | UG/KG | 10.000 U |
| BROMODICHLOROMETHANE | UG/KG | 10.000 U |
| 1,2-DICHLOROPROPANE | UG/KG | 10.000 U |
| CIS-1,3-DICHLOROPROPENE | UG/KG | 10.000 U |
| TRICHLOROETHENE | UG/KG | 10.000 U |
| DIBROMOCHLOROMETHANE | UG/KG | 10.000 U |
| 1,1,2-TRICHLOROETHANE | UG/KG | 10.000 U |
| BENZENE | UG/KG | 10.000 U |
| TRANS-1,3-DICHLOROPROPENE | UG/KG | 10.000 U |
| BROMOFORM | UG/KG | 10.000 U |
| 4-METHYL-2-PENTANONE | UG/KG | 10.000 U |
| 2-HEXANONE | UG/KG | 10.000 U |
| TETRACHLOROETHENE | UG/KG | 10.000 U |
| 1,1,2,2-TETRACHLOROETHANE | UG/KG | 10.000 U |
| TOLUENE | UG/KG | 10.000 U |
| CHLOROBENZENE | UG/KG | 10.000 U |
| ETHYLBENZENE | UG/KG | 10.000 U |
| STYRENE | UG/KG | 10.000 U |
| XYLENES (TOTAL) | UG/KG | 10.000 U |

The decimal places shown do not reflect the precision reported by the laboratory

DSW
11-15-94

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBJ16

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 622 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0332

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB0332

Level: (low/med) LOW Date Received: 06/07/94

% Moisture: not dec. 17 Date Analyzed: 06/29/94

GC Column: DB624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 12 | ~~U~~ UJ |
| 74-83-9 | Bromomethane | 12 | ~~U~~ |
| 75-01-4 | Vinyl Chloride | 12 | ~~U~~ |
| 75-00-3 | Chloroethane | 12 | ~~U~~ |
| 75-09-2 | Methylene Chloride | 12 ~~7~~ | ~~BJ~~ UJ |
| 67-64-1 | Acetone | 13 | J |
| 75-15-0 | Carbon Disulfide | 12 | ~~U~~ UJ |
| 75-35-4 | 1,1-Dichloroethene | 12 | ~~U~~ |
| 75-34-3 | 1,1-Dichloroethane | 12 | ~~U~~ |
| 540-59-0 | 1,2-Dichloroethene (total) | 12 | ~~U~~ |
| 67-66-3 | Chloroform | 12 | ~~U~~ |
| 107-06-2 | 1,2-Dichloroethane | 12 | ~~U~~ |
| 78-93-3 | 2-Butanone | 12 | ~~U~~ |
| 71-55-6 | 1,1,1-Trichloroethane | 12 | ~~U~~ |
| 56-23-5 | Carbon Tetrachloride | 12 | ~~U~~ |
| 75-27-4 | Bromodichloromethane | 12 | ~~U~~ |
| 78-87-5 | 1,2-Dichloropropane | 12 | ~~U~~ |
| 10061-01-5 | cis-1,3-Dichloropropene | 12 | ~~U~~ |
| 79-01-6 | Trichloroethene | 12 | ~~U~~ |
| 124-48-1 | Dibromochloromethane | 12 | ~~U~~ |
| 79-00-5 | 1,1,2-Trichloroethane | 12 | ~~U~~ |
| 71-43-2 | Benzene | 12 | ~~U~~ |
| 10061-02-6 | trans-1,3-Dichloropropene | 12 | ~~U~~ |
| 75-25-2 | Bromoform | 12 | ~~U~~ |
| 108-10-1 | 4-Methyl-2-Pentanone | 12 | ~~U~~ |
| 591-78-6 | 2-Hexanone | 12 | ~~U~~ |
| 127-18-4 | Tetrachloroethene | 12 | ~~U~~ |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 12 | ~~U~~ UJ |
| 108-88-3 | Toluene | 17 | J |
| 108-90-7 | Chlorobenzene | 12 | ~~U~~ UJ |
| 100-41-4 | Ethylbenzene | 12 | ~~U~~ |
| 100-42-5 | Styrene | 12 | ~~U~~ |
| 1330-20-7 | Xylene (total) | 12 | ~~U~~ UJ |

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBJ16

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 622 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0332

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB0332

Level: (low/med) LOW Date Received: 06/07/94

% Moisture: not dec. 17 Date Analyzed: 06/29/94

GC Column: DB624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____(uL)

Number TICs found: 0

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

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| | | | | |

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBX94

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 622 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0326

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB0326

Level: (low/med) LOW Date Received: 06/07/94

% Moisture: not dec. 0 Date Analyzed: 06/29/94

GC Column: DB624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 10 | ~~U~~ UR |
| 74-83-9 | Bromomethane | 10 | ~~U~~ |
| 75-01-4 | Vinyl Chloride | 10 | ~~U~~ |
| 75-00-3 | Chloroethane | 10 | ~~U~~ |
| 75-09-2 | Methylene Chloride | 10 ~~5~~ | ~~BJ~~ UR |
| 67-64-1 | Acetone | 6 | ~~J~~ ~~UR~~ J 11/29/94 |
| 75-15-0 | Carbon Disulfide | 10 | ~~U~~ |
| 75-35-4 | 1,1-Dichloroethene | 10 | ~~U~~ |
| 75-34-3 | 1,1-Dichloroethane | 10 | ~~U~~ |
| 540-59-0 | 1,2-Dichloroethene (total) | 10 | ~~U~~ |
| 67-66-3 | Chloroform | 10 | ~~U~~ |
| 107-06-2 | 1,2-Dichloroethane | 10 | ~~U~~ |
| 78-93-3 | 2-Butanone | 10 | ~~U~~ |
| 71-55-6 | 1,1,1-Trichloroethane | 10 | ~~U~~ |
| 56-23-5 | Carbon Tetrachloride | 10 | ~~U~~ |
| 75-27-4 | Bromodichloromethane | 10 | ~~U~~ |
| 78-87-5 | 1,2-Dichloropropane | 10 | ~~U~~ |
| 10061-01-5 | cis-1,3-Dichloropropene | 10 | ~~U~~ |
| 79-01-6 | Trichloroethene | 10 | ~~U~~ |
| 124-48-1 | Dibromochloromethane | 10 | ~~U~~ |
| 79-00-5 | 1,1,2-Trichloroethane | 10 | ~~U~~ |
| 71-43-2 | Benzene | 10 | ~~U~~ |
| 10061-02-6 | trans-1,3-Dichloropropene | 10 | ~~U~~ |
| 75-25-2 | Bromoform | 10 | ~~U~~ |
| 108-10-1 | 4-Methyl-2-Pentanone | 10 | ~~U~~ |
| 591-78-6 | 2-Hexanone | 10 | ~~U~~ |
| 127-18-4 | Tetrachloroethene | 10 | ~~U~~ |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 10 | ~~U~~ UR |
| 108-88-3 | Toluene | 13 | |
| 108-90-7 | Chlorobenzene | 10 | ~~U~~ UR |
| 100-41-4 | Ethylbenzene | 10 | ~~U~~ |
| 100-42-5 | Styrene | 10 | ~~U~~ |
| 1330-20-7 | Xylene (total) | 10 | ~~U~~ UR |

FORM I VOA

Revised 11/29/94 3/90

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBX94

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 622 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0326

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB0326

Level: (low/med) LOW Date Received: 06/07/94

% Moisture: not dec. 0 Date Analyzed: 06/29/94

GC Column: DB624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____(uL)

Number TICs found: 0

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

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| | | | | |

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBX96 TRIP BLK

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 622 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0345

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB0345

Level: (low/med) LOW Date Received: 06/07/94

% Moisture: not dec. 1 Date Analyzed: 06/29/94

GC Column: DB624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 10 | U UR |
| 74-83-9 | Bromomethane | 10 | U |
| 75-01-4 | Vinyl Chloride | 10 | U |
| 75-00-3 | Chloroethane | 10 | U |
| 75-09-2 | Methylene Chloride | 10 ~~5~~ | ~~BJ~~ UR |
| 67-64-1 | Acetone | 10 | U |
| 75-15-0 | Carbon Disulfide | 10 | U |
| 75-35-4 | 1,1-Dichloroethene | 10 | U |
| 75-34-3 | 1,1-Dichloroethane | 10 | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 10 | U |
| 67-66-3 | Chloroform | 10 | U |
| 107-06-2 | 1,2-Dichloroethane | 10 | U |
| 78-93-3 | 2-Butanone | 10 | U |
| 71-55-6 | 1,1,1-Trichloroethane | 10 | U |
| 56-23-5 | Carbon Tetrachloride | 10 | U |
| 75-27-4 | Bromodichloromethane | 10 | U |
| 78-87-5 | 1,2-Dichloropropane | 10 | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 10 | U |
| 79-01-6 | Trichloroethene | 10 | U |
| 124-48-1 | Dibromochloromethane | 10 | U |
| 79-00-5 | 1,1,2-Trichloroethane | 10 | U |
| 71-43-2 | Benzene | 10 | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 10 | U |
| 75-25-2 | Bromoform | 10 | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 10 | U |
| 591-78-6 | 2-Hexanone | 10 | U |
| 127-18-4 | Tetrachloroethene | 10 | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 10 | U UR |
| 108-88-3 | Toluene | 15 | J |
| 108-90-7 | Chlorobenzene | 10 | U UR |
| 100-41-4 | Ethylbenzene | 10 | U |
| 100-42-5 | Styrene | 10 | U |
| 1330-20-7 | Xylene (total) | 10 | U UR |

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBX96

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 622 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0345

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB0345

Level: (low/med) LOW Date Received: 06/07/94

% Moisture: not dec. 1 Date Analyzed: 06/29/94

GC Column: DB624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Number TICs found: 2

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

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| 1. | UNKNOWN | 15.90 | 7 | ~~J~~ JN |
| 2. | UNKNOWN | 17.43 | 6 | ~~J~~ JN |

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBX97

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 647 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0612

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB0612

Level: (low/med) LOW Date Received: 06/14/94

% Moisture: not dec. 11 Date Analyzed: 06/21/94

GC Column: DB624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 11 | U |
| 74-83-9 | Bromomethane | 11 | U |
| 75-01-4 | Vinyl Chloride | 11 | U |
| 75-00-3 | Chloroethane | 11 | U |
| 75-09-2 | Methylene Chloride | 23 | ~~B~~ U |
| 67-64-1 | Acetone | 13 | ~~B~~ U |
| 75-15-0 | Carbon Disulfide | 11 | U |
| 75-35-4 | 1,1-Dichloroethene | 11 | U |
| 75-34-3 | 1,1-Dichloroethane | 11 | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 11 | U |
| 67-66-3 | Chloroform | 11 | U |
| 107-06-2 | 1,2-Dichloroethane | 11 | U |
| 78-93-3 | 2-Butanone | 11 | U |
| 71-55-6 | 1,1,1-Trichloroethane | 11 | U |
| 56-23-5 | Carbon Tetrachloride | 11 | U |
| 75-27-4 | Bromodichloromethane | 11 | U |
| 78-87-5 | 1,2-Dichloropropane | 11 | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 11 | U |
| 79-01-6 | Trichloroethene | 11 | U |
| 124-48-1 | Dibromochloromethane | 11 | U |
| 79-00-5 | 1,1,2-Trichloroethane | 11 | U |
| 71-43-2 | Benzene | 11 | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 11 | U |
| 75-25-2 | Bromoform | 11 | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 11 | U |
| 591-78-6 | 2-Hexanone | 11 | U |
| 127-18-4 | Tetrachloroethene | 11 | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 11 | U |
| 108-88-3 | Toluene | 11 | U |
| 108-90-7 | Chlorobenzene | 11 | U |
| 100-41-4 | Ethylbenzene | 11 | U |
| 100-42-5 | Styrene | 11 | U |
| 1330-20-7 | Xylene (total) | 11 | U |

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBX97

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 647 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0612

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB0612

Level: (low/med) LOW Date Received: 06/14/94

% Moisture: not dec. 11 Date Analyzed: 06/21/94

GC Column: DB624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____(uL)

Number TICs found: 0

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

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| | | | | |

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBX98

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 647 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0606

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB0606

Level: (low/med) LOW Date Received: 06/14/94

% Moisture: not dec. 19 Date Analyzed: 06/21/94

GC Column: DB624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 12 | U |
| 74-83-9 | Bromomethane | 12 | U |
| 75-01-4 | Vinyl Chloride | 12 | U |
| 75-00-3 | Chloroethane | 12 | U |
| 75-09-2 | Methylene Chloride | 28 | ~~B~~ U |
| 67-64-1 | Acetone | 18 | ~~B~~ U |
| 75-15-0 | Carbon Disulfide | 12 | U |
| 75-35-4 | 1,1-Dichloroethene | 12 | U |
| 75-34-3 | 1,1-Dichloroethane | 12 | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 12 | U |
| 67-66-3 | Chloroform | 12 | U |
| 107-06-2 | 1,2-Dichloroethane | 12 | U |
| 78-93-3 | 2-Butanone | 12 | U |
| 71-55-6 | 1,1,1-Trichloroethane | 12 | U |
| 56-23-5 | Carbon Tetrachloride | 12 | U |
| 75-27-4 | Bromodichloromethane | 12 | U |
| 78-87-5 | 1,2-Dichloropropane | 12 | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 12 | U |
| 79-01-6 | Trichloroethene | 12 | U |
| 124-48-1 | Dibromochloromethane | 12 | U |
| 79-00-5 | 1,1,2-Trichloroethane | 12 | U |
| 71-43-2 | Benzene | 12 | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 12 | U |
| 75-25-2 | Bromoform | 12 | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 12 | U |
| 591-78-6 | 2-Hexanone | 12 | U |
| 127-18-4 | Tetrachloroethene | 12 | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 12 | U |
| 108-88-3 | Toluene | 12 | U |
| 108-90-7 | Chlorobenzene | 12 | U |
| 100-41-4 | Ethylbenzene | 12 | U |
| 100-42-5 | Styrene | 12 | U |
| 1330-20-7 | Xylene (total) | 12 | U |

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBX98

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 647 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0606

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB0606

Level: (low/med) LOW Date Received: 06/14/94

% Moisture: not dec. 19 Date Analyzed: 06/21/94

GC Column: DB624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____(uL)

Number TICs found: 1

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

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| 1. | UNKNOWN | 2.23 | 10 | ~~J~~ JN |

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBX99 TRIP BLK.

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 647 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0618

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB0618

Level: (low/med) LOW Date Received: 06/14/94

% Moisture: not dec. 0 Date Analyzed: 06/21/94

GC Column: DB624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 10 | U |
| 74-83-9 | Bromomethane | 10 | U |
| 75-01-4 | Vinyl Chloride | 10 | U |
| 75-00-3 | Chloroethane | 10 | U |
| 75-09-2 | Methylene Chloride | 16 | ~~B~~ U |
| 67-64-1 | Acetone | 11 | ~~B~~ U |
| 75-15-0 | Carbon Disulfide | 10 | U |
| 75-35-4 | 1,1-Dichloroethene | 10 | U |
| 75-34-3 | 1,1-Dichloroethane | 10 | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 10 | U |
| 67-66-3 | Chloroform | 10 | U |
| 107-06-2 | 1,2-Dichloroethane | 10 | U |
| 78-93-3 | 2-Butanone | 10 | U |
| 71-55-6 | 1,1,1-Trichloroethane | 10 | U |
| 56-23-5 | Carbon Tetrachloride | 10 | U |
| 75-27-4 | Bromodichloromethane | 10 | U |
| 78-87-5 | 1,2-Dichloropropane | 10 | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 10 | U |
| 79-01-6 | Trichloroethene | 10 | U |
| 124-48-1 | Dibromochloromethane | 10 | U |
| 79-00-5 | 1,1,2-Trichloroethane | 10 | U |
| 71-43-2 | Benzene | 10 | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 10 | U |
| 75-25-2 | Bromoform | 10 | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 10 | U |
| 591-78-6 | 2-Hexanone | 10 | U |
| 127-18-4 | Tetrachloroethene | 10 | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 10 | U |
| 108-88-3 | Toluene | 10 | U |
| 108-90-7 | Chlorobenzene | 10 | U |
| 100-41-4 | Ethylbenzene | 10 | U |
| 100-42-5 | Styrene | 10 | U |
| 1330-20-7 | Xylene (total) | 10 | U |

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

BOBX99

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 647 SAS No.: _____ SDG No.:W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0618

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB0618

Level: (low/med) LOW Date Received: 06/14/94

% Moisture: not dec. 0 Date Analyzed: 06/21/94

GC Column: DB624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume:

Number TICs found: 4

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

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| 1 | Unknown | 2.27 | 7 | ~~J~~ JN |
| 2 | Unknown | 15.30 | 5 | ~~J~~ JN |
| 3 | Unknown | 15.90 | 10 | ~~J~~ JN |
| 4 | Unknown | 17.23 | 14 | ~~J~~ JN |

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBXB0 Field Blk.

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 647 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0619

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB0619

Level: (low/med) LOW Date Received: 06/14/94

% Moisture: not dec. 0 Date Analyzed: 06/21/94

GC Column: DB624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 10 | U |
| 74-83-9 | Bromomethane | 10 | U |
| 75-01-4 | Vinyl Chloride | 10 | U |
| 75-00-3 | Chloroethane | 10 | U |
| 75-09-2 | Methylene Chloride | 17 | ~~B~~ U |
| 67-64-1 | Acetone | 10 ~~5~~ | ~~BJ~~ U |
| 75-15-0 | Carbon Disulfide | 10 | U |
| 75-35-4 | 1,1-Dichloroethene | 10 | U |
| 75-34-3 | 1,1-Dichloroethane | 10 | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 10 | U |
| 67-66-3 | Chloroform | 10 | U |
| 107-06-2 | 1,2-Dichloroethane | 10 | U |
| 78-93-3 | 2-Butanone | 10 | U |
| 71-55-6 | 1,1,1-Trichloroethane | 10 | U |
| 56-23-5 | Carbon Tetrachloride | 10 | U |
| 75-27-4 | Bromodichloromethane | 10 | U |
| 78-87-5 | 1,2-Dichloropropane | 10 | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 10 | U |
| 79-01-6 | Trichloroethene | 10 | U |
| 124-48-1 | Dibromochloromethane | 10 | U |
| 79-00-5 | 1,1,2-Trichloroethane | 10 | U |
| 71-43-2 | Benzene | 10 | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 10 | U |
| 75-25-2 | Bromoform | 10 | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 10 | U |
| 591-78-6 | 2-Hexanone | 10 | U |
| 127-18-4 | Tetrachloroethene | 10 | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 10 | U |
| 108-88-3 | Toluene | 10 | U |
| 108-90-7 | Chlorobenzene | 10 | U |
| 100-41-4 | Ethylbenzene | 10 | U |
| 100-42-5 | Styrene | 10 | U |
| 1330-20-7 | Xylene (total) | 10 | U |

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBXB0

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 647 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0619

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB0619

Level: (low/med) LOW Date Received: 06/14/94

% Moisture: not dec. 0 Date Analyzed: 06/21/94

GC Column: DB624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____(uL)

Number TICs found: 2

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

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| 1. | Unknown | 15.93 | 7 | ~~J~~ JN |
| 2. | Unknown | 17.47 | 7 | ~~J~~ JN |

# ATTACHMENT 4

# LABORATORY NARRATIVE and CHAIN-OF-CUSTODY DOCUMENTATION

INTERNATIONAL TECHNOLOGY CORPORATION

# ANALYTICAL SERVICES

## CERTIFICATE OF ANALYSIS

IT Corporation
2800 George Washington Way
Richland, WA 99352
Attn: Van Pettey

July 18, 1994

AUG 1994 RECEIVED SDLA

Job Number: 622 & 649

This is the Certificate of Analysis for the following samples:

| | |
|---|---|
| SDG: | W0083 |
| Client Project ID: | WHC SAF-94-046 200-UP-1 Soil Sampling - Round 1 |
| Date Received by Lab: | June 7 & June 14, 1994 |
| Number of Samples: | Nine (9) |
| Sample Type: | Soil |

### I. Introduction

On June 7 and June 14, 1994, nine (9) soil samples arrived at ITAS-Richland, Washington and were transferred to ITAS-Knoxville for chemical analysis. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report. Samples BOBX93 and BOBX95 were cancelled per Record of Disposition 94-00148, dated June 10, 1994.

### II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Soil result are reported on a dry weight basis.

The samples were analyzed for Target Compound List (TCL) volatiles and semivolatiles by gas chromatography/mass spectroscopy (GC/MS) in accordance with the EPA CLP 3/90 Statement of Work.

Reviewed and Approved:

Sheree' A. Schneider
Project Manager

RECORD COPY

IT Corporation
July 18, 1994
Job Number: 622 & 647
Client Project ID: WHC SAF-94-046 200-UP-1 Soil Sampling - Round 1

IT ANALYTICAL SERVICES
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KNOXVILLE, TN

## II. Analytical Results/Methodology (Continued)

The samples were analyzed for Target Analyte List (TAL) metals by cold vapor atomic absorption spectroscopy (CVAA), graphite furnace atomic absorption spectroscopy (GFAA), and inductively coupled plasma spectroscopy (ICP) in accordance with the EPA CLP ILM03 Statement of Work.

The samples were analyzed for total cyanide in accordance with the EPA CLP ILM03 Statement of Work.

The samples were analyzed for nitrate-nitrite based on EPA method 353.2.

The samples were analyzed for anions by ion chromatography using EPA method 300.0.

## III. Quality Control

The volatiles analyses were performed by purge and trap with a J & W DB-624 capillary column on a Finnigan INCOS 500 GC/MS/DS. Matrix spike and matrix spike duplicate analyses were performed using sample BOBX97. All QC results met method specified limits. The samples were extracted outside of holding time in accordance to ROD 94-00148.

The semivolatiles analyses were performed by direct injection of sample extract on a Restek XTI-5 capillary column on a Finnigan 4500 GC/MS/DS. Matrix spike and matrix spike duplicate analyses were performed using sample BOBX97. All QC results met method specified limits. The samples were extracted outside of holding time in accordance to ROD 94-00148.

Data were reported with qualifiers as follows:

U - Compound analyzed for but not detected; value given is quantitation limit.
E - Compound exceeded calibration range.
D - Compound analyzed at a secondary dilution factor.
J - Compound detected but below quantitation limit; value estimated.
S - Spiked compound.
B - Compound found in method blank.
A - Suspected aldol condensation product.
Y - Indistinguishable isomer in tentatively identified compounds.
N - Presumptive evidence of compound presence.

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KNOXVILLE, TN

IT Corporation
July 18, 1994
Job Number: 622 & 647
Client Project ID: WHC SAF-94-046 200-UP-1 Soil Sampling - Round 1

III. Quality Control (Continued)

The samples for work order #622 were digested on July 5, 1994 for ICP and June 22, 1994 for GFAA. The CVAA analysis for mercury was performed on June 27, 1994; the GFAA analyses for arsenic, lead, selenium and thallium were performed from June 22 through June 28, 1994; the remaining metals were analyzed by ICP on July 5, 1994. All run QC was acceptable. Samples are batched with QC from work order #647.

The samples for work order #649 were digested on June 15, 1994 for ICP and GFAA. The CVAA analysis for mercury was performed on June 21, 1994; the GFAA analyses for arsenic, lead, selenium and thallium were performed from June 16 through June 22, 1994; the remaining metals were analyzed by ICP on July 6, 1994. All run QC was acceptable. A duplicate/spike pair was prepared using sample number BOBX97. Spike recovery (accuracy) results were within acceptance limits for all parameters. Duplicate RPD (precision) results were within acceptance limits for all parameters except for zinc which exhibited a slight variation due to probable sample nonhomogeneity for this analyte.

Data were reported with qualifiers as follows:

"C" Qualifiers

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
B - Value greater than instrument detection limit, but less than contract required quantitation limit.

"Q" Qualifiers

* - Duplicate analysis outside control limits.
N - Spiked sample recovery outside control limits.
W - Post-digestion spike for GFAA was out of control limits (85-115%), while sample absorbance was less than 50% of spike absorbance.
S - The reported value was determined by method of standard additions.

"M" Qualifiers

P - Analysis performed by ICP.
V - Analysis performed by CVAA.
F - Analysis performed by GFAA.
C - Cyanide analysis by manual distillation/colorimetric determination.

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KNOXVILLE, TN

IT Corporation
July 18, 1994
Job Number: 622 & 647
Client Project ID: WHC SAF-94-046 200-UP-1 Soil Sampling - Round 1

## III. Quality Control (Continued)

Miscellaneous

D - Duplicate.
S - Spike.
NR - Not required.
G - Native analyte > 4 times spike added, therefore, acceptance criteria do not apply.
X - Detection limits higher than normal due to sample matrix interferences.

The samples were analyzed for nitrate/nitrite on June 28, 1994. Matrix spike and matrix spike duplicate analyses were performed using sample BOBX97. All quality control results were acceptable.

The samples were analyzed for fluoride, chloride, phosphate, nitrate, nitrite and sulfate by EPA method 300.0 from June 27 through June 29, 1994. Matrix spike and matrix spike duplicate analyses were performed using sample BOBX97. All quality control results were acceptable.

IT Corporation
July 18, 1994
Job Number: 622 & 647
Client Project ID: WHC SAF-94-046 200-UP-1 Soil Sampling - Round 1

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KNOXVILLE, TN

III. Quality Control (Continued)

Table I is a cross reference between client sample IDs and laboratory sample IDs.

**TABLE I**

| Knoxville ID | Richland ID | WHC ID | Test |
|---|---|---|---|
| AB0326 | 406042-01A | BOBX94 | VOC |
| AB0327 | 406042-01B | " | SVOC |
| AB0328 | 406042-01C | " | METALS-T |
| AB0329 | 406042-01D | " | CYANIDE |
| AB0330 | 406042-01E | " | ANIONS |
| AB0331 | 406042-01F | " | $NO_3NO_2$ |
| AB0344 | 406042-02A | BOBX95 | VOC |
| AB0345 | 406042-03A | BOBX96 | VOC |
| AB0332 | 406042-04A | BOBJ16 | VOC |
| AB0333 | 406042-04B | " | SVOC |
| AB0334 | 406042-04C | " | METALS-T |
| AB0335 | 406042-04D | " | CYANIDE |
| AB0336 | 406042-04E | " | ANIONS |
| AB0337 | 406042-04F | " | $NO_3NO_2$ |
| AB0338 | 406042-05A | BOBX93 | VOC |
| AB0339 | 406042-05B | " | SVOC |
| AB0340 | 406042-05C | " | METALS-T |
| AB0341 | 406042-05D | " | CYANIDE |
| AB0342 | 406042-05E | " | ANIONS |
| AB0343 | 406042-05F | " | $NO_3NO_2$ |

III. Quality Control (Continued)

Table I is a cross reference between client sample IDs and laboratory sample IDs.

**TABLE I**

| Knoxville ID | Richland ID | WHC ID | Test |
|---|---|---|---|
| AB0606 | 406264-01A | BOBX98 | VOC |
| AB0607 | 406264-01B | " | SVOC |
| AB0608 | 406264-01C | " | METALS-T |
| AB0674 | 406264-01D | " | CYANIDE |
| AB0610 | 406264-01E | " | ANIONS |
| AB0611 | 406264-01F | " | $NO_3NO_2$ |
| AB0612 | 406264-02A | BOBX97 | VOC |
| AB0613 | 406264-02B | " | SVOC |
| AB0614 | 406264-02C | " | METALS-T |
| AB0615 | 406264-02D | " | CYANIDE |
| AB0616 | 406264-02E | " | ANIONS |
| AB0617 | 406264-02F | " | $NO_3NO_2$ |
| AB0618 | 406264-03A | BOBX99 | VOC |
| AB0619 | 406264-04A | BOBXB0 | VOC |

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5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

IT Corporation
July 18, 1994
Job Number: 622 & 647
Client Project ID: WHC SAF-94-046 200-UP-1 Soil Sampling - Round 1

## IV. Certification

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the laboratory manager or his designee, as verified by the following signature:

Reviewed and Approved:

Sheree' A. Schneider
Project Manager

031

# OFFICE OF SAMPLE MANAGEMENT

# RECORD OF DISPOSITION

ROD-94-00148
Record of Disposition No.

| | |
|---|---|
| DATE: 06/10/94 | LABORATORY: IT |
| PROJECT TITLE/NO.: 200-UP-1 Soil Sampling-Round 1 (SAF 94-046) | NCR NO.: N/A |

SAMPLE IDENTIFICATION NUMBERS: BOBJ16, BOBX93, BOBX94, BOBX95, BOBX96

DESCRIPTION OF EVENT:
On 6/07/94, IT was instructed to postpone the analysis of samples received on 6/04/94 until further notice from WHC.

DISPOSITION OF SAMPLES:
Per the technical representative, IT is to cancel the analysis of samples BOBX95, and BOBX93. The analysis of BOBJ16, BOBX94, and BOBX96 is to continue.

APPROVAL SIGNATURES:

J.A. Lerch — 6/10/94
HASM Project Coordinator (Print/Sign Name) — Date

B.E. Innis — 6/27/94
Technical Representative (Print/Sign Name) — Date

N/A
Quality Assurance (Print/Sign Name) — Date

Revised 11/30/94

031A

0000027

| Westinghouse Hanford Company | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST wo#622 | Page 1 of 1 |
|---|---|---|
| | | Data Turnaround: ☐ Priorty ☒ Normal |

| | | |
|---|---|---|
| Collector: W. V. SETZER | Company Contact: W. V. SETZER | Telephone No.: (509) 376-2413 |
| Project Designation: 200 UP-1 | Sampling Location: 699-38-68A | SAF No.: 94-046 |
| Ice Chest No.: GWS-015 | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: INTERNATIONAL TECHNOLOGIES | Offsite Property No.: W94-0- | Bill of Lading/Air Bill No.: |

Possible Sample Hazards/Remarks: NONE OBSERVED

Special Handling and/or Storage: COOL TO 4 DEGREES CENTIGRADE

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservative | | | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | | | COOL 4 | COOL 4 | COOL 4 | | |
| Type of Container | | | aGs | aG | G | G | G | G | P/G | P/G | | | aGs | aGs | aGs | | |
| No. of Container(s) | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | 1 | 1 | 1 | | |
| Volume | | | 125ml | 500ml | 500ml | 250ml | 250ml | 125ml | 1000ml | 500ml | | | 125ml | 250ml | 40ml | | |
| SAMPLE ANALYSIS | | | VOA (CLP) | SEMIVOA (CLP) | ICP MTL GFAA METALS Hg (CLP) | Cn (CLP) | ANIONS IC-F,CL SO4,NO2 NO3,PO4 | NO2,NO3 EPA(353.2) | *1 | *1 | | | VOA TRIP | VOA FIELD | ACTIVIY SCAN | | |
| 406042 | | | 05A | B | C | D | E | F | 40604303 | | | | | | | | |
| Sample No. | Matrix* | Date Sampled | Time Sampled | | | | | | | | | | | | | | |
| BOBX93 | S | 6-2-94 | 1245 | X | X | X | X | X | X | X | X | | | | X | | |

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By: W. V. Setzer | Date/Time: 6/2/94 1405 | Received By: A. Simpson | Date/Time: 6/2/94 1405 |
| Relinquished By: Loren C. Hogers for Amy Simpson | Date/Time: 6394 0957 | Received By: | Date/Time: |
| Relinquished By: | Date/Time: | Received By: | Date/Time: |
| Relinquished By: | Date/Time: | Received By: | Date/Time: |

SPECIAL INSTRUCTIONS

*1- GROSS ALPHA,BETA(EP-60,070,170) Am-241,Cm 243/244 (EP-60,070,960) Np-237 (EP-60,070,930) Pu-238,239/240 (EP-60,070,940) U-234,235,238 (EP-60,070,901) GAMMA SPEC TO INCLUDE; Co-58,60,Cs-137,Eu-152,154,155 AND Fe-59 (EP-60,070,100) Sr-90 (EP-60,070,500,519,520) I-129 (EP-024,560) C-14 (EP-060,251)Tc-99 (EP-020,540) alternate custodian relinquished custody of samples for custodian due to illness of the shipping facility custodian. Samples stored at shipping facility in locked refrigerator prior to delivery to the laboratory. [illegible] 6-3-94

LOWEST HOLDING TIME = 7DAYS

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

| LABORATORY SECTION | Received By | Title | Date/Time |
|---|---|---|---|
| | Tom [illegible] | ITAS | 6/3/94 1430 |

| FINAL SAMPLE DISPOSITION | Disposal Method | Disposed By | Date/Time |
|---|---|---|---|
| | | | |

DISTRIBUTION: Original- Sample Yellow - Sampler

BC-6000-828 (12/92)

032

**Westinghouse Hanford Company**

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

WO#622

Page 1 of 1

Data Turnaround: [ ] Priorty [X] Normal

| | | |
|---|---|---|
| Collector: W. V. SETZER | Company Contact: W. V. SETZER | Telephone No.: (509) 376-2413 |
| Project Designation: 200 UP-1 | Sampling Location: 699-38-68A | SAF No.: 94-046 |
| Ice Chest No.: GWS-015 | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: INTERNATIONAL TECHNOLOGIES | Offsite Property No.: W94-0- | Bill of Lading/Air Bill No.: |

Possible Sample Hazards/Remarks

Special Handling and/or Storage: COOL TO 4 DEGREES CENTIGRADE

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservative | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | | | COOL 4 | COOL 4 | COOL 4 | | |
| Type of Container | aGs | aG | G | G | G | G | P/G | P/G | | | aGs | aGs | aGs | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | 1 | 1 | 1 | | |
| Volume | 125ml | 500ml | 500ml | 250ml | 250ml | 125ml | 1000ml | 500ml | | | 125ml | 250ml | 40ml | | |
| SAMPLE ANALYSIS | VOA (CLP) | SEMIVOA (CLP) | ICP MTL GFAA METALS Hg (CLP) | Cn (CLP) | ANIONS IC-F,CL SO4,NO2 NO3,PO4 | NO2,NO3 EPA(353.2) | *1 | *1 | | | VOA TRIP | VOA FIELD | ACTIVITY SCAN | | |
| 406042 | A | B | C | D | E | F | 406043 | | | | | | | | |

| Sample No. | Matrix* | Date Sampled | Time Sampled | A | B | C | D | E | F | 406043 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~~BOBX93~~ | ~~S~~ | | | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | | | ~~X~~ | WVS 5-31-94 |
| BOBX94 01 | S | 5·31·94 | 1010 | X | X | X | X | X | X | X 01 | X | | | | | X | |
| BOBX95 2 | S | 5·31·94 | 0940 | | | | | | | | | | | | X 02A | | |
| BOBX96 3 | S | 5·31·94 | 0730 | | | | | | | | | | | X 03A | | | |
| ~~BOBX97~~ | ~~S~~ | | | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | | | ~~X~~ | WVS 5/31/94 |
| BOBJ16 4 | S | 6·1·94 | 1043 | X | X | X | X | X | X | X 02 | X | | | | | X | |

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

| Relinquished By | Date/Time | Received By | Date/Time |
|---|---|---|---|
| W. V. Setzer | 6-1-94 1409 | A. Simpson | 6/1/94 1469 |
| Loren C. Rogers for Amy Simpson | 6-3-94 0945 | [illegible] | 6/3/94 |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS**

*1- GROSS ALPHA,BETA(EP-60,070,170) Am-241,Cm 243/244 (EP-60,070,960) Np-237 (EP-60,070,930) Pu-238,239/240 (EP-60,070,940) U-234,235,238 (EP-60,070,901) GAMMA SPEC TO INCLUDE; Co-58,60,Cs-137,Eu-152,154,155 AND Fe-59 (EP-60,070,100) Sr-90 (EP-60,070,500,519,520) I-129 (EP-024,560) C-14 (EP-060,251)Tc-99 (EP-020,540). Alternate custodian relinquished custody of samples for custodian due to illness of the shipping facility custodian. Samples stored at shipping facility in locked refrigerator prior to delivery to the laboratory [illegible] 6-3-94.

LOWEST HOLDING TIME = 7DAYS

**Matrix***

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

| LABORATORY SECTION | Received By | Title | Date/Time |
|---|---|---|---|
| | [illegible] | IJAS | 6/3/94 1430 |

| FINAL SAMPLE DISPOSITION | Disposal Method | Disposed By | Date/Time |
|---|---|---|---|
| | | | |

DISTRIBUTION: Original- Sample Yellow - Sampler

BC-6000-828 (12/92)

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**Westinghouse Hanford Company**

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST wo#647

Page 1 of 1

Data Turnaround: [ ] Priorty [X] Normal

| | | |
|---|---|---|
| Collector: W. V. SETZER | Company Contact: W. V. SETZER | Telephone No.: (509) 376-2413 |
| Project Designation: 200 UP-1 | Sampling Location: 699-38-68A | SAF No.: 94-046 |
| Ice Chest No.: ER-1D | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: INTERNATIONAL TECHNOLOGIES | Offsite Property No.: W94-0- 0594-38 | Bill of Lading/Air Bill No. |
| Possible Sample Hazards/Remarks: NONE OBSERVED | | |
| Special Handling and/or Storage: COOL TO 4 DEGREES CENTIGRADE Rot 3C LS 6/7/94 | | |

| Sample No. | Matrix* | Date Sampled | Time Sampled | VOA (CLP) A | SEMIVOA (CLP) B | ICP MTL GFAA METALS Hg (CLP) C | Cn (CLP) D | ANIONS IC-F,CL SO4,NO2 NO3,PO4 E | NO2,NO3 EPA(353.2) F | *1 4062 | *1 65 | | | VOA TRIP | VOA FIELD | ACTIVIY SCAN | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | | | COOL 4 | COOL 4 | COOL 4 | | |
| | | | | aGs | aG | G | G | G | G | P/G | P/G | | | aGs | aGs | aGs | | |
| | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | 1 | 1 | 1 | | |
| | | | | 125ml | 500ml | 500ml | 250ml | 250ml | 125ml | 1000ml | 500ml | | | 125ml | 250ml | 40ml | | |
| BOBX98 01 | S | 6-9-94 | 0940 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 01 ✓ | ✓ | | | | | ✓ | | |
| BOBX97 2 | S | 6-9-94 | 0940 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 02 ✓ | ✓ | | | | | ✓ | | |
| BOBX99 3A | S | 6-9-94 | 0840 | | | | | | | | | | | ✓ | | | | |
| BOBXBO 4A | S | 6-9-94 | 0900 | | | | | | | | | | | | ✓ | | | |

SAMPLE ANALYSIS: 406264 6/13/94

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By: W.V. Setzer | Date/Time: 6-9-94 1205 | Received By: L Sweeney L Sweeney | Date/Time: 6/9/94 1205 |
| Relinquished By: L Sweeney L Sweeney | Date/Time: 6/9/94 1300 | Received By: A J Simpson | Date/Time: 6/9/94 1300 |
| Relinquished By: A J Simpson | Date/Time: 6/13/94 1035 | Received By: C Kenitzer IT | Date/Time: 6-13-94 1045 |
| Relinquished By: | Date/Time: | Received By: | Date/Time: |

SPECIAL INSTRUCTIONS

*1- GROSS ALPHA,BETA(EP-60,070,170) Am-241,Cm 243/244 (EP-60,070,960) Np-237 (EP-60,070,930) Pu-238,239/240 (EP-60,070,940) U-234,235,238 (EP-60,070,901) GAMMA SPEC TO INCLUDE; Co-58,60,Cs-137,Eu-152,154,155 AND Fe-59 (EP-60,070,100) Sr-90 (EP-60,070,500,519,520) I-129 (EP-024,560) C-14 (EP-060,251)Tc-99 (EP-020,540)

SDG W0083

LOWEST HOLDING TIME = 7DAYS

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

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

DISTRIBUTION: Original- Sample Yellow - Sampler

BC-6000-828 (12/92)

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# ATTACHMENT 5

# DATA VALIDATION SUPPORTING DOCUMENTATION

# GC/MS ORGANIC DATA VALIDATION CHECKLIST

| VALIDATION LEVEL: | A | B | C | (D) | E |
|---|---|---|---|---|---|

| | | |
|---|---|---|
| PROJECT: 200-UP-1 | | DATA PACKAGE: W0083-ITC-094 |
| VALIDATOR: WATERBURY | LAB: IT CORP. | DATE: 11-11-94 |
| CASE: | | SDG: W0083 |

ANALYSES PERFORMED

| | | | | | |
|---|---|---|---|---|---|
| ☒ CLP Volatiles | ☐ SW-846 8240 (cap column) | ☐ SW-846 8260 (packed column) | ☐ CLP Semivolatiles | ☐ SW-846 8270 (cap column) | ☐ SW-846 (packed column) |
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

| SAMPLES/MATRIX | | |
|---|---|---|
| | B0BX98 - SOIL | B0BJ16 - SOIL |
| | B0BX97 - SOIL | B0BX93 - cancelled |
| | B0BX99 - SOIL | B0BX94 - SOIL |
| | B0BXB0 - SOIL | B0BX95 - cancelled |
| | | B0BX96 - SOIL |
| | | |

## 1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . . (Yes) No N/A

Is a case narrative present? . . . . . (Yes) No N/A

Comments:

## 2. HOLDING TIMES

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

Comments: Samples B0BJ16, B0BX94, and B0BX96 exceeded the holding time limits. See attachments 2 & 5.

036

## GC/MS ORGANIC DATA VALIDATION CHECKLIST

### 3. INSTRUMENT TUNING AND CALIBRATION

Is the GC/MS tuning/performance check acceptable? . . . . . (Yes) No N/A

Are initial calibrations acceptable? . . . . . (Yes) No N/A

Are continuing calibrations acceptable? . . . . . (Yes) No N/A

Comments:

### 4. BLANKS

Were laboratory blanks analyzed? . . . . . (Yes) No N/A

Are laboratory blank results acceptable? . . . . . Yes (No) N/A 11/29/94

Were field/trip blanks analyzed? . . . . . (Yes) No N/A

Are field/trip blank results acceptable? . . . . . (Yes) No N/A

Comments: Samples B0BX96 and B0BX99 are trip blanks. For the assoc. samples, no qualification is required based on trip blank results. Sample B0BXB0 is a field blank. Sample B0BX94 is an equipment blank.
Methylene chloride and acetone detected in lab blanks. Associated sample results qualified as non-detects (u). Less than 5X blanks.

### 5. ACCURACY

Were surrogates/System Monitoring Compounds analyzed? . . . . . (Yes) No N/A

Are surrogate/System Monitoring Compound recoveries acceptable? (Yes) No N/A

Were MS/MSD samples analyzed? . . . . . (Yes) No N/A

Are MS/MSD results acceptable? . . . . . (Yes) No N/A

Comments:

Reviewed 11/30/94

037

## GC/MS ORGANIC DATA VALIDATION CHECKLIST

### 6. PRECISION

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

Are field duplicate RPD values acceptable? . . . . . Yes No N/A

Are field split RPD values acceptable? . . . . . Yes No N/A

Comments: Sample B0BX98 is the field duplicate of sample B0BX97.

### 7. SYSTEM PERFORMANCE

Were internal standards analyzed? . . . . . Yes No N/A

Are internal standard areas acceptable? . . . . . Yes No N/A

Are internal standard retention times acceptable? . . . . . Yes No N/A

Comments:

### 8. COMPOUND IDENTIFICATION AND QUANTITATION

Is compound identification acceptable? . . . . . Yes No N/A

Is compound quantitation acceptable? . . . . . Yes No N/A

Comments:

### 9. REPORTED RESULTS AND QUANTITATION LIMITS

Are results reported for all requested analyses? . . . . . Yes No N/A

Are all results supported in the raw data? . . . . . Yes No N/A

Do results meet the CRQLs? . . . . . Yes No N/A

Has the laboratory properly identified and coded all TIC? . . . Yes No N/A

Comments:

# HOLDING TIME SUMMARY

SDG: W0083 | VALIDATOR: WATERBURY | DATE: 11.11.94 | PAGE 1 OF 1

COMMENTS: Volatiles

| | FIELD SAMPLE ID | ANALYSIS TYPE | DATE SAMPLED | DATE PREPARED | DATE ANALYZED | PREP. HOLDING TIME, DAYS | ANALYSIS HOLDING TIME, DAYS | QUALIFIER |
|---|---|---|---|---|---|---|---|---|
| | B0BJ16 | VOA | 6.01.94 | | 6.29.94 | | 28 | J or UJ |
| EQUIP | B0BX94 | VOA | 5.31.94 | | 6.29.94 | | 29 | J or UR |
| | B0BX97 | VOA | 6.09.94 | | 6.21.94 | | 12 | none |
| DUP | B0BX98 | VOA | 6.09.94 | | 6.21.94 | | 12 | none |
| TRIP | B0BX99 | VOA | 6.09.94 | | 6.21.94 | | 12 | none |
| FIELD | B0BXB0 | VOA | 6.10.94 | | 6.21.94 | | 11 | none |
| TRIP | B0BX96 | VOA | 5.31.94 | | 6.29.94 | | 29 | J or UR |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
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| | | | | | | | | |
| | | | | | | | | |

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VBLKAB2114

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 622 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB2114

Sample wt/vol: 5.0 (g/mL) G Lab File ID: WB0629

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ Date Analyzed: 06/29/94

GC Column: DB624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Number TICs found: 1

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

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| 1. | UNKNOWN | 2.23 | 7 | J |



DSW 11-15-94

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKAB2114

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 622 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB2114

Sample wt/vol: 5.0 (g/mL) G Lab File ID: WB0629

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 06/29/94

GC Column: DB624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 10 | U |
| 74-83-9 | Bromomethane | 10 | U |
| 75-01-4 | Vinyl Chloride | 10 | U |
| 75-00-3 | Chloroethane | 10 | U |
| 75-09-2 | Methylene Chloride | 3 | J x10 = 30 |
| 67-64-1 | Acetone | 10 | U |
| 75-15-0 | Carbon Disulfide | 10 | U |
| 75-35-4 | 1,1-Dichloroethene | 10 | U |
| 75-34-3 | 1,1-Dichloroethane | 10 | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 10 | U |
| 67-66-3 | Chloroform | 10 | U |
| 107-06-2 | 1,2-Dichloroethane | 10 | U |
| 78-93-3 | 2-Butanone | 10 | U |
| 71-55-6 | 1,1,1-Trichloroethane | 10 | U |
| 56-23-5 | Carbon Tetrachloride | 10 | U |
| 75-27-4 | Bromodichloromethane | 10 | U |
| 78-87-5 | 1,2-Dichloropropane | 10 | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 10 | U |
| 79-01-6 | Trichloroethene | 10 | U |
| 124-48-1 | Dibromochloromethane | 10 | U |
| 79-00-5 | 1,1,2-Trichloroethane | 10 | U |
| 71-43-2 | Benzene | 10 | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 10 | U |
| 75-25-2 | Bromoform | 10 | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 10 | U |
| 591-78-6 | 2-Hexanone | 10 | U |
| 127-18-4 | Tetrachloroethene | 10 | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 10 | U |
| 108-88-3 | Toluene | 10 | U |
| 108-90-7 | Chlorobenzene | 10 | U |
| 100-41-4 | Ethylbenzene | 10 | U |
| 100-42-5 | Styrene | 10 | U |
| 1330-20-7 | Xylene (total) | 10 | U |

FORM I VOA 3/90

Reviewed 11/30/94

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKAB1724

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 647 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB1724

Sample wt/vol: 5.0 (g/mL) G Lab File ID: WB0621

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 06/21/94

GC Column: DB624 ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q | |
|---|---|---|---|---|
| 74-87-3 | Chloromethane | 10 | U | |
| 74-83-9 | Bromomethane | 10 | U | |
| 75-01-4 | Vinyl Chloride | 10 | U | |
| 75-00-3 | Chloroethane | 10 | U | |
| 75-09-2 | Methylene Chloride | 14 | | x 10 = 140 |
| 67-64-1 | Acetone | 10 | | x 10 = 100 |
| 75-15-0 | Carbon Disulfide | 10 | U | |
| 75-35-4 | 1,1-Dichloroethene | 10 | U | |
| 75-34-3 | 1,1-Dichloroethane | 10 | U | |
| 540-59-0 | 1,2-Dichloroethene (total) | 10 | U | |
| 67-66-3 | Chloroform | 10 | U | |
| 107-06-2 | 1,2-Dichloroethane | 10 | U | |
| 78-93-3 | 2-Butanone | 10 | U | |
| 71-55-6 | 1,1,1-Trichloroethane | 10 | U | |
| 56-23-5 | Carbon Tetrachloride | 10 | U | |
| 75-27-4 | Bromodichloromethane | 10 | U | |
| 78-87-5 | 1,2-Dichloropropane | 10 | U | |
| 10061-01-5 | cis-1,3-Dichloropropene | 10 | U | |
| 79-01-6 | Trichloroethene | 10 | U | |
| 124-48-1 | Dibromochloromethane | 10 | U | |
| 79-00-5 | 1,1,2-Trichloroethane | 10 | U | |
| 71-43-2 | Benzene | 10 | U | |
| 10061-02-6 | trans-1,3-Dichloropropene | 10 | U | |
| 75-25-2 | Bromoform | 10 | U | |
| 108-10-1 | 4-Methyl-2-Pentanone | 10 | U | |
| 591-78-6 | 2-Hexanone | 3 | J | |
| 127-18-4 | Tetrachloroethene | 10 | U | |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 10 | U | |
| 108-88-3 | Toluene | 10 | U | |
| 108-90-7 | Chlorobenzene | 10 | U | |
| 100-41-4 | Ethylbenzene | 10 | U | |
| 100-42-5 | Styrene | 10 | U | |
| 1330-20-7 | Xylene (total) | 10 | U | |

FORM I VOA

3/90 Revised 11/30/94

DON'T SAY IT - - WRITE IT!

Date: 12/16/94 PKR.

From: P. K. Reich H4-14, (509) 372-2785

Subject: Correction of Validation Date Received Stamp

The date stamped on this validation report is the date the final correction documents were received in the completion of the Validation Review Process.

The original front pages(s) are maintained as a documented record of the date the Validation Report was originally received from the Validators.

Thank You,

Pat Reich
Sample Management

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MEMORANDUM

NOV 1994
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original validation data rec'd 12-6-94 PKR

TO: 200-UP-1 Round 1 Soil, Project QA Record November 16, 1994

FR: Diana Waterbury, Golder Associates Inc. DSW

RE: VOLATILES DATA VALIDATION SUMMARY FOR
DATA PACKAGE: W0083-ITC-094, (943-1610.034, 094VOA.UP1)

## INTRODUCTION

This memo presents the results of data validation on data package W0083-ITC-094 prepared by the International Technology Analytical Services. Sample information is provided in the following table.

| SAMPLE ID | MEDIA | ANALYSIS | COMMENTS |
|---|---|---|---|
| B0BJ16 | SOIL | VOLATILES | |
| B0BX94 | SOIL | VOLATILES | EQUIPMENT BLANK |
| B0BX96 | SOIL | VOLATILES | TRIP BLANK |
| B0BX97 | SOIL | VOLATILES | |
| B0BX98* | SOIL | VOLATILES | DUPLICATE OF B0BX97 |
| B0BX99 | SOIL | VOLATILES | TRIP BLANK |
| B0BXB0 | SOIL | VOLATILES | FIELD BLANK |
| * Indicates sample results which were 100% recalculated. | | | |

Data validation was conducted to level D in accordance with the WHC statement of work (WHC 1994) and validation procedures (WHC 1993). Attachments 1 through 5 provide the following information:

Attachment 1. Glossary of Data Reporting Qualifiers
Attachment 2. Summary of Data Qualifications
Attachment 3. Qualified Data Summary and Annotated Laboratory Reports
Attachment 4. Laboratory Narrative and Chain-of-Custody Documentation
Attachment 5. Data Validation Supporting Documentation

## DATA QUALITY OBJECTIVES

This section presents a summary of the data quality in terms of the referenced validation criteria.

**Precision.** Goals for precision were met.

**Accuracy.** Goals for accuracy were met.

**Sample Result Verification.** All sample results were supported in the raw data.

**Detection Limits.** Detection limit goals were met.

**Completeness.** The data package was complete for all requested analyses. A total of seven (7) samples were validated in this data package with a total of 231 determinations reported, 167 of which were deemed valid. This results in a completeness of 72 percent which does not meets the work plan completeness objective of 90 percent.

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MEMORANDUM

NOV 1994 RECEIVED

original validation data rec'd 12-16-94 PKR

TO: 200-UP-1 Round 1 Soil Project QA Record November 15, 1994

FR: Thomas Stapp, Golder Associates Inc.

RE: RADIOCHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE W0083-ITC-094 (943-1610.034 094RAD.UP1)

## INTRODUCTION

This memo presents the results of data validation on data package W0083-ITC-094 prepared by International Technology Laboratory. Sample information is provided in the following table.

| SAMPLE ID | COMMENTS | MEDIA | ANALYSIS |
|---|---|---|---|
| B0BX94 | EQUIPMENT BLANK | SOIL | RADIOCHEMISTRY |
| B0BJ16 | | SOIL | |
| B0BX98* | DUPLICATE OF B0BX97 | SOIL | SEE ATTACHMENT 4 |
| B0BX97 | | SOIL | |
| * Indicates the sample results which were 100% recalculated. | | | |

Data validation was conducted to level D in accordance with the WHC statement of work (WHC 1994) and validation procedures (WHC 1993). Attachments 1 through 5 provide the following information as indicated below:

Attachment 1. Glossary of Data Reporting Qualifiers
Attachment 2. Summary of Data Qualifications
Attachment 3. Qualified Data Summary and Annotated Laboratory Reports
Attachment 4. Laboratory Narrative and Chain-of-Custody Documentation
Attachment 5. Data Validation Supporting Documentation

## DATA QUALITY OBJECTIVES

This section presents a summary of the data quality in terms of the referenced validation criteria.

**Precision.** Goals for precision were met.

**Accuracy.** Goals for accuracy were met with the exception of the major and minor deficiencies identified below.

**Sample Result Verification.** All sample results were supported in the raw data with the exception of carbon-14 which was not reported due to a deficiency of carbon in the samples.

**Detection Limits.** Detection limit goals were met for all results.

W0083-ITC-094

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MEMORANDUM

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TO: 200-UP-1 Project QA Record November 10, 1994

FR: Sandra Schildt, Golder Associates Inc.

RE: GENERAL CHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE W0083-ITC-094 (943-1610.034,094gen.up1)

## INTRODUCTION

This memorandum presents the results of data validation on data package W0083-ITC-094 prepared by International Technology Corporation. A list of the samples validated along with the analytes reported and the method of analysis is provided in the following table.

| SAMPLE ID | COMMENTS | MEDIA | ANALYSIS |
|---|---|---|---|
| B0BX94 | EQUIP. BLANK | SOIL | GENERAL CHEMISTRY |
| B0BJ16 | | SOIL | |
| B0BX97* | | SOIL | |
| B0BX98 | | SOIL | SEE ATTACHMENT 4 |
| *Indicates the sample results which were 100% recalculated. | | | |

Data validation was conducted to level D in accordance with the WHC statement of work (WHC 1994) and validation procedures (WHC 1993). Attachments 1 through 5 to this memo provide the following information:

Attachment 1. Glossary of Data Reporting Qualifiers
Attachment 2. Summary of Data Qualifications
Attachment 3. Qualified Data Summary and Annotated Laboratory Reports
Attachment 4. Laboratory Narrative and Chain-of-Custody Documentation
Attachment 5. Data Validation Supporting Documentation

## DATA QUALITY OBJECTIVES

This section presents a summary of the data quality in terms of the referenced validation criteria.

**Precision.** Goals for precision were met.

**Accuracy.** Goals for accuracy were met.

**Sample Result Verification.** All sample results were supported in the raw data.

**Detection Limits.** Detection limit goals were met.

**Completeness.** The data package was complete for all requested analyses. Four samples (4) were validated in this data set with a total of 28 determinations reported, of which 20 were deemed valid. This results in a completeness of 71% which does not meet normal work plan objectives of 90%.

## MAJOR DEFICIENCIES

Major deficiencies were identified during data validation which required qualification of data as unusable.

- The holding time for nitrite and phosphate analysis was exceeded by more than two times the maximum holding time (MHT) and sample results were undetected. Attachments 2 and 5 provide a summary of the samples and data qualification applied.

## MINOR DEFICIENCIES

Minor deficiencies were identified during validation which required qualification of data.

- The holding time for nitrate analysis was exceeded by more than two times the MHT and nitrate was detected in the samples. Attachments 2 and 5 provide a summary of the samples and data qualification applied.

## FIELD QUALITY CONTROL

- Sample B0BX94 was identified as an equipment blank. Chloride, nitrate, and sulfate were detected in the equipment blank. No qualification was applied in accordance with validation procedures.

## REFERENCES

WHC 1994, Environmental and Waste Characterization Analytical Data Validation, Purchase Order MSH-SWV-315905; Validation Statement of Work, Revision 1.0, September 7, 1994; Westinghouse Hanford Company, Richland, Washington.

WHC 1993, Data Validation Procedures for Chemical Analyses, WHC-SD-EN-SPP-002, Rev. 2, 1993, Westinghouse Hanford Company, Richland, Washington.

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

## GLOSSARY OF INORGANIC DATA REPORTING QUALIFIERS

B - Indicates the constituent was analyzed for and detected. The concentration reported is less than the contract required detection limit (CRDL) but greater than the instrument detection limit (IDL). The associated data should be considered usable for decision making purposes.

U - Indicates the constituent was analyzed for and not detected. The concentration reported is the sample detection limit corrected for sample aliquot size, dilution factors and percent solids (in the case of solid matrices) by the laboratory. The associated data should be considered usable for decision making purposes.

UJ - Indicates the constituent was analyzed for and was not detected. Due to a minor quality control deficiency identified during data validation, the concentration reported may not accurately reflect the sample detection limit. The associated data have been qualified as estimated but should be considered usable for decision making purposes.

BJ - Indicates the constituent was analyzed for and detected at a concentration less than the CRDL but greater then the IDL. Due to a minor quality control deficiency identified during data validation, The associated data have been qualified as estimated, but should be considered usable for decision making purposes.

J - Indicates the constituent was analyzed for and detected. Due to a minor quality control deficiency identified during data validation the associated data have been qualified as estimated, but should be considered usable for decision making purposes.

UR - Indicates the constituent was analyzed for and not detected. Due to a major quality control deficiency identified during data validation, the associated data have been qualified as unusable for decision making purposes.

R - Indicates the constituent was analyzed for and detected. Due to a major quality control deficiency identified during data validation, the associated data have been qualified as unusable for decision making purposes.

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

# DATA QUALIFICATION SUMMARY - FORM B-7

| PKG: W0083-ITC-094 | REVIEWER: S. Schildt | DATE: 11/10/94 | PAGE 1 OF 1 |
|---|---|---|---|
| COMMENTS: General Chemistry | | | |
| PARAMETER | QUALIFIER | SAMPLES AFFECTED | REASON |
| Nitrite<br>Phosphate | UR | All | Holding time grossly exceeded |
| Nitrate | J | All | Holding time grossly exceeded |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

ATTACHMENT 3

QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: W0083-ITC-094

| | Samp# | B0BJ16 | | B0BX94 | | B0BX97 | | B0BX98 | |
|---|---|---|---|---|---|---|---|---|---|
| | Date | 6-1-94 | | 5-31-94 | | 6-9-94 | | 6-9-94 | |
| | Location | 299-W19-35 | | 299-W19-35 | | 299-W19-35 | | 299-W19-35 | |
| | Depth | 332.00 - 334.00 | | --- | | 285.00 - 287.00 | | 285.00 - 287.00 | |
| | Type | SOIL | | SOIL | | SOIL | | SOIL | |
| | Comments | | | EQUIP | | | | DUPLI | |
| Parameter | Units | Result | Q | Result | Q | Result | Q | Result | Q |
| FLUORIDE | MG/KG | 0.400 | U | 0.400 | U | 0.400 | U | 0.400 | U |
| CHLORIDE | MG/KG | 3.000 | | 3.800 | | 3.700 | | 3.800 | |
| NITRITE | MG/KG | 0.400 | UR | 0.400 | UR | 0.400 | UR | 0.400 | UR |
| NITRATE | MG/KG | 1.500 | J | 0.500 | J | 14.000 | J | 14.000 | J |
| PHOSPHATE | MG/KG | 1.000 | UR | 1.000 | UR | 1.000 | UR | 1.000 | UR |
| SULFATE | MG/KG | 4.400 | | 2.700 | | 8.000 | | 7.500 | |
| NITRATE+NITRITE | MG-N/K | 0.810 | | 0.500 | U | 1.290 | | 0.900 | |

The decimal places shown do not reflect the precision reported by the laboratory

Revised 11/30/94

008

# ANION ANALYSIS

| | | | |
|---|---|---|---|
| Laboratory Name: | ITAS-Knoxville | SDG Number: | W0083 |
| Contract Name: | Westinghouse Hanford | Job Number: | 622 |
| Client Sample ID: | BOBJ16 | Preparation Date: | 06/22/94 |
| Lab Sample ID: | AB0336 | Analysis Date: | 06/27/94 |
| Sample Matrix: | Soil | Concentration Units: | mg/kg |

| Compound | Result | Qualifier Q | Detection Limit |
|---|---|---|---|
| fluoride | 0.4 | U | 0.4 |
| chloride | 3.0 | + | 0.4 |
| nitrite | 0.4 | ~~U~~ UR | 0.4 |
| nitrate | 1.5 | ~~+~~ J | 0.4 |
| phosphate | 1.0 | ~~U~~ UR | 1.0 |
| sulfate | 4.4 | + | 1.5 |

11/10/94

+ - Positive result.
U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

# ANION ANALYSIS

| | | | |
|---|---|---|---|
| Laboratory Name: | ITAS-Knoxville | SDG Number: | W0083 |
| Contract Name: | Westinghouse Hanford | Job Number: | 622 |
| Client Sample ID: | BOBX94 | Preparation Date: | 06/22/94 |
| Lab Sample ID: | AB0330 | Analysis Date: | 06/27/94 |
| Sample Matrix: | Soil | Concentration Units: | mg/kg |

| Compound | Result | Qualifier | Q | Detection Limit |
|---|---|---|---|---|
| fluoride | 0.4 | U | | 0.4 |
| chloride | 3.8 | + | | 0.4 |
| nitrite | 0.4 | ~~U~~ | UR | 0.4 |
| nitrate | 0.5 | ~~+~~ | J | 0.4 |
| phosphate | 1.0 | ~~U~~ | UR | 1.0 |
| sulfate | 2.7 | + | | 1.5 |

+ - Positive result.
U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

11/10/94

# NITRATE/NITRITE ANALYSIS

| | | | |
|---|---|---|---|
| Laboratory Name: | ITAS-Knoxville | SDG Number: | W0083 |
| Contract Name: | Westinghouse Hanford | Job Number: | 622 |
| Sample Matrix: | Soil | Extraction Date: | N/A |
| Concentration Units: | mg/kg | Analysis Date: | 06/28/94 |

| Client Sample ID | Lab Sample ID | Result | Qualifiers |
|---|---|---|---|
| Method Blank | AB1758/P6352 | 0.50 | U |
| BOBX94 | AB0331 | 0.50 | U |
| BOBJ16 | AB0337 | 0.81 | + |

+ - Positive result.
U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

11/10/94

# ANION ANALYSIS

| | | | |
|---|---|---|---|
| Laboratory Name: | ITAS-Knoxville | SDG Number: | W0083 |
| Contract Name: | Westinghouse Hanford | Job Number: | 647 |
| Client Sample ID: | BOBX97 | Preparation Date: | 06/22/94 |
| Lab Sample ID: | AB0616 | Analysis Date: | 06/29/94 |
| Sample Matrix: | Soil | Concentration Units: | mg/kg |

| Compound | Result | Qualifier | CQ | Detection Limit |
|---|---|---|---|---|
| fluoride | 0.4 | U | | 0.4 |
| chloride | 3.7 | + | | 0.8 |
| nitrite | 0.4 | ~~U~~ | UR | 0.4 |
| nitrate | 14 | ~~+~~ | J | 4.0 |
| phosphate | 1.0 | ~~U~~ | UR | 1.0 |
| sulfate | 8.0 | + | | 1.5 |

+ - Positive result.
U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

11/10/94

# ANION ANALYSIS

| | | | |
|---|---|---|---|
| Laboratory Name: | ITAS-Knoxville | SDG Number: | W0083 |
| Contract Name: | Westinghouse Hanford | Job Number: | 647 |
| Client Sample ID: | BOBX98 | Preparation Date: | 06/22/94 |
| Lab Sample ID: | AB0610 | Analysis Date: | 06/29/94 |
| Sample Matrix: | Soil | Concentration Units: | mg/kg |

| Compound | Result | Qualifier | Q | Detection Limit |
|---|---|---|---|---|
| fluoride | 0.4 | U | | 0.4 |
| chloride | 3.8 | + | | 0.4 |
| nitrite | 0.4 | ~~U~~ | UR | 0.4 |
| nitrate | 14 | ~~+~~ | J | 2.0 |
| phosphate | 1.0 | ~~U~~ | UR | 1.0 |
| sulfate | 7.5 | + | | 1.5 |

11/10/94

+ - Positive result.
U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

# NITRATE/NITRITE ANALYSIS

| | | | |
|---|---|---|---|
| Laboratory Name: | ITAS-Knoxville | SDG Number: | W0083 |
| Contract Name: | Westinghouse Hanford | Job Number: | 647 |
| Sample Matrix: | Soil | Extraction Date: | N/A |
| Concentration Units: | mg/kg | Analysis Date: | 06/28/94 |

| Client Sample ID | Lab Sample ID | Result | Qualifiers |
|---|---|---|---|
| Method Blank | AB1758/P6352 | 0.50 | U |
| BOBX98 | AB0611 | 0.90 | + |
| BOBX97 | AB0617 | 1.29 | + |

+ - Positive result.
U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

11/10/94

ATTACHMENT 4

LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

0000001

INTERNATIONAL TECHNOLOGY CORPORATION

# ANALYTICAL SERVICES

W0083-ITC-001

## CERTIFICATE OF ANALYSIS

IT Corporation
2800 George Washington Way
Richland, WA 99352
Attn: Van Pettey

July 18, 1994

AUG 1994 RECEIVED SDLA

Job Number: 622 & 649

This is the Certificate of Analysis for the following samples:

| | |
|---|---|
| SDG: | W0083 |
| Client Project ID: | WHC SAF-94-046 200-UP-1 Soil Sampling - Round 1 |
| Date Received by Lab: | June 7 & June 14, 1994 |
| Number of Samples: | Nine (9) |
| Sample Type: | Soil |

### I. Introduction

On June 7 and June 14, 1994, nine (9) soil samples arrived at ITAS-Richland, Washington and were transferred to ITAS-Knoxville for chemical analysis. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report. Samples BOBX93 and BOBX95 were cancelled per Record of Disposition 94-00148, dated June 10, 1994.

### II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Soil result are reported on a dry weight basis.

The samples were analyzed for Target Compound List (TCL) volatiles and semivolatiles by gas chromatography/mass spectroscopy (GC/MS) in accordance with the EPA CLP 3/90 Statement of Work.

Reviewed and Approved:

Sheree' A. Schneider
Project Manager

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

IT Corporation
July 18, 1994
Job Number: 622 & 647
Client Project ID: WHC SAF-94-046 200-UP-1 Soil Sampling - Round 1

## II. Analytical Results/Methodology (Continued)

The samples were analyzed for Target Analyte List (TAL) metals by cold vapor atomic absorption spectroscopy (CVAA), graphite furnace atomic absorption spectroscopy (GFAA), and inductively coupled plasma spectroscopy (ICP) in accordance with the EPA CLP ILM03 Statement of Work.

The samples were analyzed for total cyanide in accordance with the EPA CLP ILM03 Statement of Work.

The samples were analyzed for nitrate-nitrite based on EPA method 353.2.

The samples were analyzed for anions by ion chromatography using EPA method 300.0.

## III. Quality Control

The volatiles analyses were performed by purge and trap with a J & W DB-624 capillary column on a Finnigan INCOS 500 GC/MS/DS. Matrix spike and matrix spike duplicate analyses were performed using sample BOBX97. All QC results met method specified limits. The samples were extracted outside of holding time in accordance to ROD 94-00148.

The semivolatiles analyses were performed by direct injection of sample extract on a Restek XTI-5 capillary column on a Finnigan 4500 GC/MS/DS. Matrix spike and matrix spike duplicate analyses were performed using sample BOBX97. All QC results met method specified limits. The samples were extracted outside of holding time in accordance to ROD 94-00148.

Data were reported with qualifiers as follows:

U - Compound analyzed for but not detected; value given is quantitation limit.
E - Compound exceeded calibration range.
D - Compound analyzed at a secondary dilution factor.
J - Compound detected but below quantitation limit; value estimated.
S - Spiked compound.
B - Compound found in method blank.
A - Suspected aldol condensation product.
Y - Indistinguishable isomer in tentatively identified compounds.
N - Presumptive evidence of compound presence.

11/10/94

017

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

IT Corporation
July 18, 1994
Job Number: 622 & 647
Client Project ID: WHC SAF-94-046 200-UP-1 Soil Sampling - Round 1

III. Quality Control (Continued)

The samples for work order #622 were digested on July 5, 1994 for ICP and June 22, 1994 for GFAA. The CVAA analysis for mercury was performed on June 27, 1994; the GFAA analyses for arsenic, lead, selenium and thallium were performed from June 22 through June 28, 1994; the remaining metals were analyzed by ICP on July 5, 1994. All run QC was acceptable. Samples are batched with QC from work order #647.

The samples for work order #649 were digested on June 15, 1994 for ICP and GFAA. The CVAA analysis for mercury was performed on June 21, 1994; the GFAA analyses for arsenic, lead, selenium and thallium were performed from June 16 through June 22, 1994; the remaining metals were analyzed by ICP on July 6, 1994. All run QC was acceptable. A duplicate/spike pair was prepared using sample number BOBX97. Spike recovery (accuracy) results were within acceptance limits for all parameters. Duplicate RPD (precision) results were within acceptance limits for all parameters except for zinc which exhibited a slight variation due to probable sample nonhomogeneity for this analyte.

Data were reported with qualifiers as follows:

"C" Qualifiers

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
B - Value greater than instrument detection limit, but less than contract required quantitation limit.

"Q" Qualifiers

* - Duplicate analysis outside control limits.
N - Spiked sample recovery outside control limits.
W - Post-digestion spike for GFAA was out of control limits (85-115%), while sample absorbance was less than 50% of spike absorbance.
S - The reported value was determined by method of standard additions.

"M" Qualifiers

P - Analysis performed by ICP.
V - Analysis performed by CVAA.
F - Analysis performed by GFAA.
C - Cyanide analysis by manual distillation/colorimetric determination.

AH 11/10/94

018

682-1-89

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

IT Corporation
July 18, 1994
Job Number: 622 & 647
Client Project ID: WHC SAF-94-046 200-UP-1 Soil Sampling - Round 1

III. Quality Control (Continued)

Miscellaneous

D - Duplicate.
S - Spike.
NR - Not required.
G - Native analyte > 4 times spike added, therefore, acceptance criteria do not apply.
X - Detection limits higher than normal due to sample matrix interferences.

The samples were analyzed for nitrate/nitrite on June 28, 1994. Matrix spike and matrix spike duplicate analyses were performed using sample BOBX97. All quality control results were acceptable.

The samples were analyzed for fluoride, chloride, phosphate, nitrate, nitrite and sulfate by EPA method 300.0 from June 27 through June 29, 1994. Matrix spike and matrix spike duplicate analyses were performed using sample BOBX97. All quality control results were acceptable.

AA 11/10/94

019

682-1-89

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

IT Corporation
July 18, 1994
Job Number: 622 & 647
Client Project ID: WHC SAF-94-046 200-UP-1 Soil Sampling - Round 1

III. Quality Control (Continued)

Table I is a cross reference between client sample IDs and laboratory sample IDs.

TABLE I

| Knoxville ID | Richland ID | WHC ID | Test |
|---|---|---|---|
| AB0326 | 406042-01A | BOBX94 | VOC |
| AB0327 | 406042-01B | " | SVOC |
| AB0328 | 406042-01C | " | METALS-T |
| AB0329 | 406042-01D | " | CYANIDE |
| AB0330 | 406042-01E | " | ANIONS |
| AB0331 | 406042-01F | " | $NO_3NO_2$ |
| AB0344 | 406042-02A | BOBX95 | VOC |
| AB0345 | 406042-03A | BOBX96 | VOC |
| AB0332 | 406042-04A | BOBJ16 | VOC |
| AB0333 | 406042-04B | " | SVOC |
| AB0334 | 406042-04C | " | METALS-T |
| AB0335 | 406042-04D | " | CYANIDE |
| AB0336 | 406042-04E | " | ANIONS |
| AB0337 | 406042-04F | " | $NO_3NO_2$ |
| AB0338 | 406042-05A | BOBX93 | VOC |
| AB0339 | 406042-05B | " | SVOC |
| AB0340 | 406042-05C | " | METALS-T |
| AB0341 | 406042-05D | " | CYANIDE |
| AB0342 | 406042-05E | " | ANIONS |
| AB0343 | 406042-05F | " | $NO_3NO_2$ |

11/10/94

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682-1-89

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

IT Corporation
July 18, 1994
Job Number: 622 & 647
Client Project ID: WHC SAF-94-046 200-UP-1 Soil Sampling - Round 1

III. Quality Control (Continued)

Table I is a cross reference between client sample IDs and laboratory sample IDs.

TABLE I

| Knoxville ID | Richland ID | WHC ID | Test |
|---|---|---|---|
| AB0606 | 406264-01A | BOBX98 | VOC |
| AB0607 | 406264-01B | " | SVOC |
| AB0608 | 406264-01C | " | METALS-T |
| AB0674 | 406264-01D | " | CYANIDE |
| AB0610 | 406264-01E | " | ANIONS |
| AB0611 | 406264-01F | " | $NO_3NO_2$ |
| AB0612 | 406264-02A | BOBX97 | VOC |
| AB0613 | 406264-02B | " | SVOC |
| AB0614 | 406264-02C | " | METALS-T |
| AB0615 | 406264-02D | " | CYANIDE |
| AB0616 | 406264-02E | " | ANIONS |
| AB0617 | 406264-02F | " | $NO_3NO_2$ |
| AB0618 | 406264-03A | BOBX99 | VOC |
| AB0619 | 406264-04A | BOBXB0 | VOC |

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

IT Corporation
July 18, 1994
Job Number: 622 & 647
Client Project ID: WHC SAF-94-046 200-UP-1 Soil Sampling - Round 1

## IV. Certification

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the laboratory manager or his designee, as verified by the following signature:

Reviewed and Approved:

Sheree A. Schneider

Sheree' A. Schneider
Project Manager

11/10/94

022
682-1-89

# OFFICE OF SAMPLE MANAGEMENT

## RECORD OF DISPOSITION

ROD-94-00148
Record of Disposition No.

| | |
|---|---|
| DATE: 06/10/94 | LABORATORY: IT |
| PROJECT TITLE/NO.: 200-UP-1 Soil Sampling-Round 1 (SAF 94-046) | NCR NO.: N/A |

SAMPLE IDENTIFICATION NUMBERS: B0BJ16, B0BX93, B0BX94, B0BX95, B0BX96

DESCRIPTION OF EVENT:
On 6/07/94, IT was instructed to postpone the analysis of samples received on 6/04/94 until further notice from WHC.

DISPOSITION OF SAMPLES:
Per the technical representative, IT is to cancel the analysis of samples B0BX95, and B0BX93. The analysis of B0BJ16, B0BX94, and B0BX96 is to continue.

APPROVAL SIGNATURES:

J.A. Lerch 6/10/94
HASM Project Coordinator (Print/Sign Name) Date

B.E. Innis
Technical Representative (Print/Sign Name) Date

N/A
Quality Assurance (Print/Sign Name) Date

11/10/94

SAMPLE RECEIPT VARIANCE REPORT
ITAS-RICHLAND LABORATORY

WO #647

WORK ORDER NUMBER: 4062640L, 3, 4 DATE INITIATED: 6/13/94

INITIATED BY: TGilmore

DATE/TIME OF SAMPLE (AND/OR RFA & COC) RECEIPT: 6/13/94 1045

| CLIENT SAMPLE NUMBER | RFA/COC NUMBERS | ANALYSIS REQUESTED |
|---|---|---|
| B0BX97 | | CN |
| | | |
| B0BX99 | | Voa |
| B0BXB0 | | Voa |

Samples were received with the following deficiencies:

- ☐ 1. Not enough sample received for proper analysis.
- ☐ 2. Sample received without proper preservative.
- ☐ 3. No sample received in container.
- ☐ 4. Sample received without a RFA/COC form.
- ☐ 5. No sample ID on container.
- ☐ 6. Sample received broken or leaking.
- ☐ 7. Holding time exceeded at receipt.
- ☐ 8. Custody tape broken.
- ☐ 9. COC not relinquished by client.
- ☐ 10. Sample information on container does not match sample information on the paper work (Explain below).
- ☐ 11. All shipping containers (coolers) on waybill not received with shipment.
  - ☐ RFA/COC received
  - ☐ RFA/COC not received
- ☒ 12. Other (Explain below).

NOTES: container has no lable. All other containers are accounted for and match COC. B0BX99, B0BXB0 were not screened. Voa Samples supplied without separate aliquot.

SUPERVISOR REVIEW: _____

PROJECT MANAGER REVIEW: _____

TELEPHONED TO: _____ ON _____ BY _____

TELEFAXED TO: _____ ON _____ BY _____

SIGNED ORIGINAL MUST BE RETAINED IN WORK ORDER FILE

FORM NO. LS-023, 3/92, Rev. 0

11/10/94

**Westinghouse Hanford Company**

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

WO#622

Page 1 of 1

Data Turnaround: [ ] Priorty [X] Normal

| | | |
|---|---|---|
| Collector: W. V. SETZER | Company Contact: W. V. SETZER | Telephone No.: (509) 376-2413 |
| Project Designation: 200 UP-1 | Sampling Location: 699-38-68A | SAF No.: 94-046 |
| Ice Chest No.: 6W5-015 | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: INTERNATIONAL TECHNOLOGIES | Offsite Property No.: W94-0- | Bill of Lading/Air Bill No.: |
| Possible Sample Hazards/Remarks: NONE OBSERVED | | |
| Special Handling and/or Storage: COOL TO 4 DEGREES CENTIGRADE | | |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservative | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | | | COOL 4 | COOL 4 | COOL 4 | | |
| Type of Container | aGs | aG | G | G | G | G | P/G | P/G | | | aGs | aGs | aGs | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | 1 | 1 | 1 | | |
| Volume | 125ml | 500ml | 500ml | 250ml | 250ml | 125ml | 1000ml | 500ml | | | 125ml | 250ml | 40ml | | |
| SAMPLE ANALYSIS | VOA (CLP) | SEMIVOA (CLP) | ICP MTL GFAA METALS Hg (CLP) | Cn (CLP) | ANIONS IC-F,CL SO4,NO2 NO3,PO4 | NO2,NO3 EPA(353.2) | *1 | *1 | | | VOA TRIP | VOA FIELD | ACTIVIY SCAN | | |
| 406042 | 05A | B | C | D | E | F | 40604303 | | | | | | | | |

| Sample No. | Matrix* | Date Sampled | Time Sampled | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BORK93 | S | 6-2-94 | 1245 | X | X | X | X | X | X | X | X | | | | | X | |

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

| Relinquished By | Date/Time | Received By | Date/Time |
|---|---|---|---|
| W. V. Setzer | 6/2/94 1405 | A J Simpson | 6/2/94 1405 |
| Karen Hoover for Tom Simpson | 6394 0957 | | |
| | | | |
| | | | |

SPECIAL INSTRUCTIONS

*1- GROSS ALPHA,BETA(EP-60,070,170) Am-241,Cm 243/244 (EP-60,070,960) Np-237 (EP-60,070,930) Pu-238,239/240 (EP-60,070,940) U-234,235,238 (EP-60,070,901) GAMMA SPEC TO INCLUDE; Co-58,60,Cs-137,Eu-152,154,155 AND Fe-59 (EP-60,070,100) Sr-90 (EP-60,070,500,519,520) I-129 (EP-024,560) C-14 (EP-060,251)Tc-99 (EP-020,540) Alternate median relinquished custody to samples for registration due to illness of the shipping/receiving custodian. Samples stored at shipping/receiving refrigerator prior to delivery to the laboratory. WVS 6-3-94

LOWEST HOLDING TIME = 7DAYS

Matrix*

| | |
|---|---|
| S | = Soil |
| SE | = Sediment |
| SO | = Solid |
| SL | = Sludge |
| W | = Water |
| O | = Oil |
| A | = Air |
| DS | = Drum Solids |
| DL | = Drum Liquids |
| T | = Tissue |
| WI | = Wipes |
| L | = Liquid |
| V | = Vegetation |
| X | = Other |

**LABORATORY SECTION**: Received By: Tom [illegible] Title: ITAS Date/Time: 6/3/94 1430

**FINAL SAMPLE DISPOSITION**: Disposal Method: Disposed By: Date/Time:

DISTRIBUTION: Original- Sample Yellow - Sampler

BC-6000-028 (12/92)

0000027

6/10/94

025

0000028

**Westinghouse Hanford Company**

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

WV#622

Page 1 of 1

Data Turnaround: [ ] Priorty [X] Normal

| | | |
|---|---|---|
| Collector: W. V. SETZER | Company Contact: W. V. SETZER | Telephone No.: (509) 376-2413 |
| Project Designation: 200 UP-1 | Sampling Location: 699-38-68A | SAF No.: 94-046 |
| Ice Chest No.: GWS-015 | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: INTERNATIONAL TECHNOLOGIES | Offsite Property No.: W94-0- | Bill of Lading/Air Bill No.: |
| Possible Sample Hazards/Remarks: | | |
| Special Handling and/or Storage: COOL TO 4 DEGREES CENTIGRADE | | |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservative | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | | | COOL 4 | COOL 4 | COOL 4 | | |
| Type of Container | aGs | aG | G | G | G | G | P/G | P/G | | | aGs | aGs | aGs | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | 1 | 1 | 1 | | |
| Volume | 125ml | 500ml | 500ml | 250ml | 250ml | 125ml | 1000ml | 500ml | | | 125ml | 250ml | 40ml | | |
| SAMPLE ANALYSIS | VOA (CLP) | SEMIVOA (CLP) | ICP MTL GFAA METALS Hg (CLP) | Cn (CLP) | ANIONS IC-F,CL SO4,NO2 NO3,PO4 | NO2,NO3 EPA(353.2) | *1 | *1 | | | VOA TRIP | VOA FIELD | ACTIVIY SCAN | | |
| 406042 | A | B | C | D | E | F | 406043 | | | | | | | | |

| Sample No. | Matrix* | Date Sampled | Time Sampled | A | B | C | D | E | F | *1 | *1 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~~BOBX93~~ | ~~S~~ | | | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | | | ~~X~~ | WVS | 5-31-94 |
| BOBX94 01 | S | 5-31-94 | 1010 | X | X | X | X | X | X | X 01 | X | | | | | X | | |
| BOBX95 2 | S | 5-31-94 | 0940 | | | | | | | | | | | | X 02A | | | |
| BOBX96 3 | S | 5-31-94 | 0730 | | | | | | | | | | | X 03A | | | | |
| ~~BOBX97~~ | ~~S~~ | | | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | | | ~~X~~ | WVS | 5/31/94 |
| BOBJ16 4 | S | 6-1-94 | 1043 | X | X | X | X | X | X | X 02 | X | | | | | X | | |

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

| Relinquished By | Date/Time | Received By | Date/Time |
|---|---|---|---|
| W. V. Setzer | 6-1-94 1409 | A. Simpson | 6/1/94 1469 |
| Joren C. Rogers for Amy Simpson | 6-3-94 0945 | [signature] | 6/3/94 |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS**

*1- GROSS ALPHA,BETA(EP-60,070,170) Am-241,Cm 243/244 (EP-60,070,960) Np-237 (EP-60,070,930) Pu-238,239/240 (EP-60,070,940) U-234,235,238 (EP-60,070,901) GAMMA SPEC TO INCLUDE; Co-58,60,Cs-137,Eu-152,154,155 AND Fe-59 (EP-60,070,100) Sr-90 (EP-60,070,500,519,520) I-129 (EP-024,560) C-14 (EP-060,251)Tc-99 (EP-020,540). alternate custodian relinquished custody of samples for custodian due to illness of the shipping facility custodian. Samples stored at shipping facility in locked refrigerator prior to delivery to the laboratory. [initials] 6-3-94.

LOWEST HOLDING TIME = 7DAYS

**Matrix***

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

| LABORATORY SECTION | Received By | Title | Date/Time |
|---|---|---|---|
| | [signature] | IJAS | 6/3/94 1430 |

| FINAL SAMPLE DISPOSITION | Disposal Method | Disposed By | Date/Time |
|---|---|---|---|
| | | | |

DISTRIBUTION: Original- Sample Yellow - Sampler

BC-6000-828 (12/92)

11/10/94

026

0000029

**Westinghouse Hanford Company**

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

WO#647

Page 1 of 1

Data Turnaround: [ ] Priorty [X] Normal

| | | |
|---|---|---|
| Collector: W. V. SETZER | Company Contact: W. V. SETZER | Telephone No.: (509) 376-2413 |
| Project Designation: 200 UP-1 | Sampling Location: 699-38-68A | SAF No.: 94-046 |
| Ice Chest No.: ER-1D | Field Logbook No.: EFL-111B | Method of Shipment: BY DOE VEHICLE |
| Shipped To: INTERNATIONAL TECHNOLOGIES | Offsite Property No.: U94-0- 0544-38 | Bill of Lading/Air Bill No.: |
| Possible Sample Hazards/Remarks: NONE OBSERVED | | |
| Special Handling and/or Storage: COOL TO 4 DEGREES CENTIGRADE — Rot 3C LCS 6/7/94 | | |

| Sample No. | Matrix* | Date Sampled | Time Sampled | Preservative | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | | | COOL 4 | COOL 4 | COOL 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Type of Container | aGs | aG | G | G | G | G | P/G | P/G | | | aGs | aGs | aGs | | |
| | | | | No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | 1 | 1 | 1 | | |
| | | | | Volume | 125ml | 500ml | 500ml | 250ml | 250ml | 125ml | 1000ml | 500ml | | | 125ml | 250ml | 40ml | | |
| SAMPLE ANALYSIS | | | | | VOA (CLP) | SEMIVOA (CLP) | ICP MTL GFAA METALS Hg (CLP) | Cn (CLP) | ANIONS IC-F,CL SO4,NO2 NO3,PO4 | NO2,NO3 EPA(353.2) | *1 | *1 | | | VOA TRIP | VOA FIELD | ACTIVIY SCAN | | |
| 4060264 | | | | | 6/13/94 A | B | C | D | E | F | 4060265 | | | | | | | | |
| BOBX98 | 01 | S | 6-9-94 | 0940 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 01 ✓ | ✓ | | | | | ✓ | | |
| BOBX97 | 2 | S | 6-9-94 | 0940 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 02 ✓ | ✓ | | | | | ✓ | | |
| BOBX99 | 3A | S | 6-9-94 | 0840 | | | | | | | | | | | ✓ | | | | |
| BOBXB0 | 4A | S | 6-9-94 | 0900 | | | | | | | | | | | | ✓ | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |

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

| Relinquished By | Date/Time | Received By | Date/Time |
|---|---|---|---|
| W V Setzer | 6-9-94 1205 | L Sweeney L Sweeney | 1205 6/9/94 |
| L Sweeney L Sweeney | 6/9/94 1300 | A G Simpson | 6/9/94 1300 |
| A G Simpson | 6/13/94 1035 | R Leitzke IT | 6-13-94 1045 (4:00 C.F.) |
| | | | |

**SPECIAL INSTRUCTIONS**

*1- GROSS ALPHA,BETA(EP-60,070,170) Am-241,Cm 243/244 (EP-60,070,960) Np-237 (EP-60,070,930) Pu-238,239/240 (EP-60,070,940) U-234,235,238 (EP-60,070,901) GAMMA SPEC TO INCLUDE; Co-58,60,Cs-137,Eu-152,154,155 AND Fe-59 (EP-60,070,100) Sr-90 (EP-60,070,500,519,520) I-129 (EP-024,560) C-14 (EP-060,251)Tc-99 (EP-020,540)

SDG W0083

LOWEST HOLDING TIME = 7DAYS

**Matrix***

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

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

DISTRIBUTION: Original- Sample Yellow - Sampler

BC-6000-828 (12/92)

11/10/94

027

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

## GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

| VALIDATION LEVEL: | A | B | C | D | E |
|---|---|---|---|---|---|

| | | |
|---|---|---|
| PROJECT: 200-UP-1 | | DATA PACKAGE: W0083-ITC-094 |
| VALIDATOR: S. Schildt | LAB: IT | DATE: 11/9/94 |
| CASE: 622, 647 | | SDG: W0083 |

ANALYSES PERFORMED

| | | | | | |
|---|---|---|---|---|---|
| ☑ Anions/IC | ☐ TOC | ☐ TOX | ☐ TPH-418.1 | Oil and Grease | Alkalinity |
| ☐ Ammonia | ☐ BOD/COD | ☐ Chloride | ☐ Chromium-VI | ☐ pH | ☑ $NO_3/NO_2$ |
| ☐ Sulfate | ☐ TDS | ☐ TKN | ☐ Phosphate | ☐ | ☐ |
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

SAMPLES/MATRIX BOBX94, BOBJ16, BOBX98, BOBX97/soil

### 1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . . Yes No N/A

Is a case narrative present? . . . . . Yes No N/A

Comments:

### 2. HOLDING TIMES

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

Comments: Holding time for $NO_2$, $NO_3$, $PO_4$ exceeded, result qualified (J, UR)

029

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

3. INSTRUMENT CALIBRATION

Was initial calibration performed for all applicable analyses? Yes No N/A
Are initial calibration results acceptable? . . . . . Yes No N/A
Was a calibration check performed for all applicable analyses? Yes No N/A
Are calibration check results acceptable? . . . . . Yes No N/A
Comments:

4. BLANKS

Were laboratory blanks analyzed? . . . . . Yes No N/A
Are laboratory blank results acceptable? . . . . . Yes No N/A
Were field/trip blanks analyzed? . . . . . Yes No N/A
Are field/trip blank results acceptable? . . . . . Yes No N/A
Comments: Chloride, nitrate and sulfate in equip blank

5. ACCURACY

Were spike samples analyzed at the required frequency? . . . . Yes No N/A
Are spike recoveries acceptable? . . . . . Yes No N/A
Were LCS analyses performed at the required frequency? . . . . Yes No N/A 12/13/94
Are LCS recoveries acceptable? . . . . . Yes No N/A
Comments: No LCS for $NO_3/NO_2$. No qualification required: all other LCS performed at the required frequency.

6. PRECISION

Were laboratory duplicate samples analyzed at the required frequency? . . . . . Yes No N/A
Are laboratory duplicate sample RPD values acceptable? . . . . Yes No N/A
Are field duplicate RPD values acceptable? . . . . . Yes No N/A
Are field split RPD values acceptable? . . . . . Yes No N/A

Reviewed 12/13

030

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

Comments:

7. ANALYTE QUANTITATION

Was analyte quantitation performed properly? . . . . . Yes No N/A

Comments:

8. REPORTED RESULTS AND DETECTION LIMITS

Are results reported for all requested analyses? . . . . . Yes No N/A

Are results supported in the raw data? . . . . . Yes No N/A

Are results calculated properly? . . . . . Yes No N/A

Do results meet the CRDLs? . . . . . Yes No N/A

Comments:

# HOLDING TIME SUMMARY

SDG: W0083-ITC-094 | VALIDATOR: S. Schildt | DATE: 11/9/94 | PAGE 1 OF 1

COMMENTS: General Chemistry

| FIELD SAMPLE ID | ANALYSIS TYPE | DATE SAMPLED | DATE PREPARED | DATE ANALYZED | PREP. HOLDING TIME, DAYS | ANALYSIS HOLDING TIME, DAYS | QUALIFIER |
|---|---|---|---|---|---|---|---|
| BOBX94 | $NO_3/NO_2$ | 5/31/94 | NA | 6/28/94 | — | 28 | none |
| BOBJ16 | ↓ | 6/1/94 | ↓ | ↓ | — | 27 | ↓ |
| BOBX97,98 | ↓ | 6/9/94 | ↓ | ↓ | — | 19 | ↓ |
| BOBX94 | F, Cl, $SO_4$ anions | 5/31/94 | 6/22/94 | 6/27/94 | 22 | 5 | none |
| BOBJ16 | F, Cl, $SO_4$ anions | 6/1/94 | 6/22/94 | 6/27/94 | 21 | 5 | ↓ |
| BOBX97,98 | F, Cl, $SO_4$ anions | 6/9/94 | 6/22/94 | 6/29/94 | 13 | 7 | ↓ |
| BOBX94 | $NO_2$, $PO_4$ | 5/31/94 | 6/22/94 | 6/27/94 | 22 | 5 | UR |
| BOBJ16 | ↓ | 6/1/94 | ↓ | 6/27/94 | 21 | 5 | ↓ |
| BOBX97,98 | ↓ | 6/9/94 | ↓ | 6/29/94 | 13 | 7 | ↓ |
| BOBX94 | $NO_3$ | 5/31/94 | ↓ | 6/27/94 | 22 | 5 | J |
| BOBJ16 | ↓ | 6/1/94 | ↓ | 6/27/94 | 21 | 5 | ↓ |
| BOBX97,98 | ↓ | 6/9/94 | ↓ | 6/29/94 | 13 | 7 | ↓ |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |



032

W0083-ITC-094

RECORD COPY

NOV 1994 RECEIVED Validation Log In

MEMORANDUM

TO: 200-UP-1 Round 1 Soil, Project QA Record November 16, 1994

FR: Diana Waterbury, Golder Associates Inc. DSW

RE: SEMIVOLATILES DATA VALIDATION SUMMARY FOR DATA PACKAGE: W0083-ITC-094, (943-1610.034, 094SVOA.UP1)

## INTRODUCTION

This memo presents the results of data validation on data package W0083-ITC-094 prepared by the International Technology Analytical Services. Sample information is provided in the following table.

| SAMPLE ID | MEDIA | ANALYSIS | COMMENTS |
|---|---|---|---|
| B0BJ16 | SOIL | Semivolatiles | |
| B0BX94 | SOIL | Semivolatiles | equip. blank |
| B0BX97 | SOIL | Semivolatiles | |
| B0BX98* | SOIL | Semivolatiles | duplicate of B0BX97 |

* Indicates sample results which were 100% recalculated.

Data validation was conducted to level D in accordance with the WHC statement of work (WHC 1994) and validation procedures (WHC 1993). Attachments 1 through 5 provide the following information:

Attachment 1. Glossary of Data Reporting Qualifiers
Attachment 2. Summary of Data Qualifications
Attachment 3. Qualified Data Summary and Annotated Laboratory Reports
Attachment 4. Laboratory Narrative and Chain-of-Custody Documentation
Attachment 5. Data Validation Supporting Documentation

## DATA QUALITY OBJECTIVES

This section presents a summary of the data quality in terms of the referenced validation criteria.

**Precision.** Goals for precision were met.

**Accuracy.** Goals for accuracy were met.

**Sample Result Verification.** All sample results were supported in the raw data.

**Detection Limits.** Detection limit goals were met.

**Completeness.** The data package was complete for all requested analyses. A total of five (5) samples were validated in this data package with a total of 320 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent which meets the work plan completeness objective of 90 percent.

## MAJOR DEFICIENCIES

No major deficiencies were identified during data validation which required qualification of data as unusable.

## MINOR DEFICIENCIES

The following minor deficiencies were identified during data validation which required qualification of data.

Holding Times

- The holding time for samples B0BJ16 and B0BX94 was exceeded. Attachments 2 and 5 provide a summary of the data qualifications applied and supporting documentation.

Continuing Calibrations Verification

- The continuing calibration verifications percent difference for N-nitroso-di-n-propylamine, pentachlorophenol, benzo(b)fluoranthene, and benzo(k)fluoranthene percent difference (%D) was unacceptable. Attachment 2 and 5 provide a summary of the samples affected, data qualifications applied and supporting documentation.

## FIELD QC

- Sample B0BX94 was identified as an equipment blank. There were no target analytes detected in the sample which required qualifications of data.
- Sample B0BX98 was identified as a field duplicate of sample B0BX97. All relative percent difference (%RPD) were within control limits.

## TENTATIVELY IDENTIFIED COMPOUNDS

Tentatively identified compounds (TICs) reported by the laboratory were evaluated during validation and qualified as follows:

- TICs were detected in the samples and associated laboratory blank and were common laboratory contaminants, resulting in qualification of the TICs as unusable (UR) as shown in Attachment 3.
- TICs were detected in the samples and associated laboratory blank and have been qualified due to associated blank contamination and have been determined to be presumptive and estimated (UJN).
- TICs were detected in the samples and determined to be valid, resulting in qualification of the results as presumptive and estimated (JN).

Reviewed 11/30/94

**REFERENCES**

WHC 1994, Environmental and Waste Characterization Analytical Data Validation, Purchase Order MSH-SWV-315905; Validation Statement of Work, Revision 1.0, September 7, 1994; Westinghouse Hanford Company, Richland, Washington.

WHC 1993, Data Validation Procedures for Chemical Analyses, WHC-SD-EN-SPP-002, Rev. 2, 1993. Westinghouse Hanford Company, Richland, Washington.

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

## ATTACHMENT 1. GLOSSARY OF DATA REPORTING QUALIFIERS

B - Indicates the constituent was analyzed for and detected in the associated laboratory blank. This qualifier is applied by the laboratory. During the process of data validation this qualifier may be replaced by other appropriate qualifiers as defined by the validation procedures. The associated data should be considered usable for decision making purposes.

U - Indicates the constituent was analyzed for and not detected. The concentration reported is the sample quantitation limit corrected for aliquot size, dilution and percent solids (in the case of solid matrices) by the laboratory. The associated data should be considered usable for decision making purposes.

UJ - Indicates the constituent was analyzed for and not detected. Due to a minor quality control deficiency identified during data validation the concentration reported may not accurately reflect the sample quantitation limit. The associated data should be considered usable for decision making purposes.

J - Indicates the constituent was analyzed for and detected. This qualifier may be applied by the laboratory to indicate a concentration which is less than the contract required quantitation limit (CRQL) but greater than the instrument detection limit (IDL). During data validation this qualifier may be applied to indicate a minor quality control deficiency. However in either case, the associated data should be considered usable for decision making purposes.

NJ - Indicates presumptive evidence of a constituent at an estimated value. This qualifier is normally applied to GC analysis data (such as organochlorine pesticide and PCB data). The associated data should be considered usable for decision making purposes.

N - Indicates presumptive evidence of a constituent. This qualifier is normally applied to GC analysis data (such as organochlorine pesticide and PCB data). The associated data should be considered usable for decision making purposes.

JN - Indicates a tentatively identified compound (TIC) whose concentration and identification have been determined to be valid as a result of data validation. The associated data should be considered usable for decision making purposes.

UJN - Indicates a tentatively identified compound (TIC) that has been determined to be presumptive and valid (JN) in terms of identification and quantitation and has been qualified as undetected (U) due to associated blank contamination.

UR - Indicates the constituent was analyzed for and not detected. The concentration reported has been qualified as unusable due to a major quality control deficiency identified during data validation. The associated data should be considered unusable for decision making purposes.

R - Indicates the constituent was analyzed for and detected. The concentration reported has been qualified as unusable due to a major quality control deficiency identified during data validation. The associated data should be considered unusable for decision making purposes.

# ATTACHMENT 2

# SUMMARY OF DATA QUALIFICATIONS

# ATTACHMENT 2 - SUMMARY OF DATA QUALIFICATIONS

| SDG: W0083-ITC-094 | BY: D. Waterbury | DATE: 11/16/94 | PAGE 1 OF 1 |
|---|---|---|---|
| COMMENTS: SEMIVOLATILE ORGANICS | | | |
| COMPOUND/ ANALYTE | QUALIFIER | SAMPLES AFFECTED | REASON |
| | | | |
| ALL | UJ | B0BJ16 | HOLDING TIMES. |
| | UJ | B0BX94 | |
| N-Nitroso-di-n-propylamine | UJ | B0BJ16 | CONTINUING CALIBRATIONS. |
| | UJ | B0BX94 | |
| | UJ | B0BX97 | |
| | UJ | B0BX98 | |
| Pentachlorophenol | UJ | B0BJ16 | CONTINUING CALIBRATIONS. |
| | UJ | B0BX94 | |
| | UJ | B0BX97 | |
| | UJ | B0BX98 | |
| Benzo (b) fluoranthene | UJ | B0BJ16 | CONTINUING CALIBRATIONS. |
| | UJ | B0BX94 | |
| | UJ | B0BX97 | |
| | UJ | B0BX98 | |
| Benzo (k) fluoranthene | UJ | B0BJ16 | CONTINUING CALIBRATIONS. |
| | UJ | B0BX94 | |
| | UJ | B0BX97 | |
| | UJ | B0BX98 | |
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# ATTACHMENT 3

## QUALIFIED DATA SUMMARY and ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: W0083-ITC-094

| | Samp# | B0BJ16 | | B0BX94 | | B0BX97 | | B0BX98 | |
|---|---|---|---|---|---|---|---|---|---|
| | Date | 6-1-94 | | 5-31-94 | | 6-9-94 | | 6-9-94 | |
| | Location | 299-W19-34B | | 699-38-68A | | 699-38-68A | | 699-38-68A | |
| | Depth | 332.00 - 334.00 | | --- | | 285.00 - 287.00 | | 285.00 - 287.00 | |
| | Type | SOIL | | SOIL | | SOIL | | SOIL | |
| | Comments | | | EQUIP.BLANK | | | | DUPLICATE | |
| Parameter | Units | Result | Q | Result | Q | Result | Q | Result | Q |
| PHENOL | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| BIS(2-CHLOROETHYL)ETHER | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| 2-CHLOROPHENOL | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| 1,3-DICHLOROBENZENE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| 1,4-DICHLOROBENZENE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| 1,2-DICHLOROBENZENE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| 2-METHYLPHENOL | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| 2,2'-OXYBIS(1-CHLOROPROPANE) | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| 4-METHYLPHENOL | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| N-NITROSO-DI-N-PROPYLAMINE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | UJ | 410.000 | UJ |
| HEXACHLOROETHANE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| NITROBENZENE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| ISOPHORONE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| 2-NITROPHENOL | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| 2,4-DIMETHYLPHENOL | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| BIS(2-CHLOROETHOXY)METHANE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| 2,4-DICHLOROPHENOL | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| 1,2,4-TRICHLOROBENZENE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| NAPHTHALENE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| 4-CHLOROANILINE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| HEXACHLOROBUTADIENE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| 4-CHLORO-3-METHYLPHENOL | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| 2-METHYLNAPHTHALENE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| HEXACHLOROCYCLOPENTADIENE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| 2,4,6-TRICHLOROPHENOL | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| 2,4,5-TRICHLOROPHENOL | UG/KG | 960.000 | UJ | 790.000 | UJ | 900.000 | U | 980.000 | U |
| 2-CHLORONAPHTHALENE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| 2-NITROANILINE | UG/KG | 960.000 | UJ | 790.000 | UJ | 900.000 | U | 980.000 | U |
| DIMETHYLPHTHALATE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| ACENAPHTHYLENE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| 2,6-DINITROTOLUENE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| 3-NITROANILINE | UG/KG | 960.000 | UJ | 790.000 | UJ | 900.000 | U | 980.000 | U |
| ACENAPHTHENE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| 2,4-DINITROPHENOL | UG/KG | 960.000 | UJ | 790.000 | UJ | 900.000 | U | 980.000 | U |
| 4-NITROPHENOL | UG/KG | 960.000 | UJ | 790.000 | UJ | 900.000 | U | 980.000 | U |
| DIBENZOFURAN | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| 2,4-DINITROTOLUENE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| DIETHYLPHTHALATE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| 4-CHLOROPHENYL-PHENYLETHER | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| FLUORENE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| 4-NITROANILINE | UG/KG | 960.000 | UJ | 790.000 | UJ | 900.000 | U | 980.000 | U |

The decimal places shown do not reflect the precision reported by the laboratory

RDBW 11-15-94

Validated Data Summary, Data Package: W0083-ITC-094

| | Samp# | B0BJ16 | | B0BX94 | | B0BX97 | | B0BX98 | |
|---|---|---|---|---|---|---|---|---|---|
| | Date | 6-1-94 | | 5-31-94 | | 6-9-94 | | 6-9-94 | |
| | Location | 299-W19-34B | | 699-38-68A | | 699-38-68A | | 699-38-68A | |
| | Depth | 332.00 - 334.00 | | --- | | 285.00 - 287.00 | | 285.00 - 287.00 | |
| | Type | SOIL | | SOIL | | SOIL | | SOIL | |
| | Comments | | | EQUIP.BLANK | | | | DUPLICATE | |
| Parameter | Units | Result | Q | Result | Q | Result | Q | Result | Q |
| 4,6-DINITRO-2-METHYLPHENOL | UG/KG | 960.000 | UJ | 790.000 | UJ | 900.000 | U | 980.000 | U |
| N-NITROSODIPHENYLAMINE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| 4-BROMOPHENYL-PHENYLETHER | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| HEXACHLOROBENZENE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| PENTACHLOROPHENOL | UG/KG | 960.000 | UJ | 790.000 | UJ | 900.000 | UJ | 980.000 | UJ |
| PHENANTHRENE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| ANTHRACENE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| CARBAZOLE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| DI-N-BUTYLPHTHALATE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| FLUORANTHENE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| PYRENE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| BUTYLBENZYLPHTHALATE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| 3,3'-DICHLOROBENZIDINE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| BENZO(A)ANTHRACENE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| CHRYSENE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| BIS(2-ETHYLHEXYL)PHTHALATE | UG/KG | 110.000 | J | 53.000 | J | 370.000 | U | 81.000 | J |
| DI-N-OCTYLPHTHALATE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| BENZO(B)FLUORANTHENE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | UJ | 410.000 | UJ |
| BENZO(K)FLUORANTHENE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | UJ | 410.000 | UJ |
| BENZO(A)PYRENE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| INDENO(1,2,3-CD)PYRENE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| DIBENZ(A,H)ANTHRACENE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |
| BENZO(G,H,I)PERYLENE | UG/KG | 400.000 | UJ | 330.000 | UJ | 370.000 | U | 410.000 | U |

The decimal places shown do not reflect the precision reported by the laboratory

Received 1/30/94

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBJ16

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 622 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0333

Sample wt/vol: 30.0 (g/mL) G Lab File ID: AB0333

Level: (low/med) LOW Date Received: 06/07/94

% Moisture: 17 decanted: (Y/N) N Date Extracted: 06/22/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/10/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.6

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 108-95-2 | Phenol | 400 | ~~U~~ UJ |
| 111-44-4 | bis(2-Chloroethyl)Ether | 400 | ~~U~~ |
| 95-57-8 | 2-Chlorophenol | 400 | ~~U~~ |
| 541-73-1 | 1,3-Dichlorobenzene | 400 | ~~U~~ |
| 106-46-7 | 1,4-Dichlorobenzene | 400 | ~~U~~ |
| 95-50-1 | 1,2-Dichlorobenzene | 400 | ~~U~~ |
| 95-48-7 | 2-Methylphenol | 400 | ~~U~~ |
| 108-60-1 | 2,2'-oxybis(1-Chloropropane) | 400 | ~~U~~ |
| 106-44-5 | 4-Methylphenol | 400 | ~~U~~ |
| 621-64-7 | N-Nitroso-Di-n-Propylamine | 400 | ~~U~~ |
| 67-72-1 | Hexachloroethane | 400 | ~~U~~ |
| 98-95-3 | Nitrobenzene | 400 | ~~U~~ |
| 78-59-1 | Isophorone | 400 | ~~U~~ |
| 88-75-5 | 2-Nitrophenol | 400 | ~~U~~ |
| 105-67-9 | 2,4-Dimethylphenol | 400 | ~~U~~ |
| 111-91-1 | bis(2-Chloroethoxy)Methane | 400 | ~~U~~ |
| 120-83-2 | 2,4-Dichlorophenol | 400 | ~~U~~ |
| 120-82-1 | 1,2,4-Trichlorobenzene | 400 | ~~U~~ |
| 91-20-3 | Naphthalene | 400 | ~~U~~ |
| 106-47-8 | 4-Chloroaniline | 400 | ~~U~~ |
| 87-68-3 | Hexachlorobutadiene | 400 | ~~U~~ |
| 59-50-7 | 4-Chloro-3-Methylphenol | 400 | ~~U~~ |
| 91-57-6 | 2-Methylnaphthalene | 400 | ~~U~~ |
| 77-47-4 | Hexachlorocyclopentadiene | 400 | ~~U~~ |
| 88-06-2 | 2,4,6-Trichlorophenol | 400 | ~~U~~ |
| 95-95-4 | 2,4,5-Trichlorophenol | 960 | ~~U~~ |
| 91-58-7 | 2-Chloronaphthalene | 400 | ~~U~~ |
| 88-74-4 | 2-Nitroaniline | 960 | ~~U~~ |
| 131-11-3 | Dimethylphthalate | 400 | ~~U~~ |
| 208-96-8 | Acenaphthylene | 400 | ~~U~~ |
| 606-20-2 | 2,6-Dinitrotoluene | 400 | ~~U~~ |
| 99-09-2 | 3-Nitroaniline | 960 | ~~U~~ |
| 83-32-9 | Acenaphthene | 400 | ~~U~~ UJ |

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBJ16

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 622 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0333

Sample wt/vol: 30.0 (g/mL) G Lab File ID: AB0333

Level: (low/med) LOW Date Received: 06/07/94

% Moisture: 17 decanted: (Y/N) N Date Extracted: 06/22/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/10/94

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.6

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 51-28-5 | 2,4-Dinitrophenol | 960 | ~~U~~ UJ |
| 100-02-7 | 4-Nitrophenol | 960 | ~~U~~ |
| 132-64-9 | Dibenzofuran | 400 | ~~U~~ |
| 121-14-2 | 2,4-Dinitrotoluene | 400 | ~~U~~ |
| 84-66-2 | Diethylphthalate | 400 | ~~U~~ |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 400 | ~~U~~ |
| 86-73-7 | Fluorene | 400 | ~~U~~ |
| 100-01-6 | 4-Nitroaniline | 960 | ~~U~~ |
| 534-52-1 | 4,6-Dinitro-2-Methylphenol | 960 | ~~U~~ |
| 86-30-6 | N-Nitrosodiphenylamine (1) | 400 | ~~U~~ |
| 101-55-3 | 4-Bromophenyl-phenylether | 400 | ~~U~~ |
| 118-74-1 | Hexachlorobenzene | 400 | ~~U~~ |
| 87-86-5 | Pentachlorophenol | 960 | ~~U~~ |
| 85-01-8 | Phenanthrene | 400 | ~~U~~ |
| 120-12-7 | Anthracene | 400 | ~~U~~ |
| 86-74-8 | Carbazole | 400 | ~~U~~ |
| 84-74-2 | Di-n-Butylphthalate | 400 | ~~U~~ |
| 206-44-0 | Fluoranthene | 400 | ~~U~~ |
| 129-00-0 | Pyrene | 400 | ~~U~~ |
| 85-68-7 | Butylbenzylphthalate | 400 | ~~U~~ |
| 91-94-1 | 3,3'-Dichlorobenzidine | 400 | ~~U~~ |
| 56-55-3 | Benzo(a)Anthracene | 400 | ~~U~~ |
| 218-01-9 | Chrysene | 400 | ~~U~~ |
| 117-81-7 | bis(2-Ethylhexyl)Phthalate | 110 | ~~J~~ J |
| 117-84-0 | Di-n-Octyl Phthalate | 400 | ~~U~~ UJ |
| 205-99-2 | Benzo(b)Fluoranthene | 400 | ~~U~~ |
| 207-08-9 | Benzo(k)Fluoranthene | 400 | ~~U~~ |
| 50-32-8 | Benzo(a)Pyrene | 400 | ~~U~~ |
| 193-39-5 | Indeno(1,2,3-cd)Pyrene | 400 | ~~U~~ |
| 53-70-3 | Dibenz(a,h)Anthracene | 400 | ~~U~~ |
| 191-24-2 | Benzo(g,h,i)Perylene | 400 | ~~U~~ UJ |

(1) - Cannot be separated from Diphenylamine

Reviewed 11/29/94

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBJ16

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 622 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0333

Sample wt/vol: 30.0 (g/mL) G Lab File ID: AB0333

Level: (low/med) LOW Date Received: 06/07/94

% Moisture: 17 decanted: (Y/N) N Date Extracted: 06/22/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/10/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.6

Number TICs found: 4

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

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q | |
|---|---|---|---|---|---|
| 1. 123-42-2 | 2-PENTANONE, 4-HYDROXY-4-MET | 4.13 | 8100 | ~~BJNA~~ | UR |
| 2. | UNKNOWN | 17.58 | 120 | ~~J~~ | UN |
| 3. | UNKNOWN | 18.42 | 110 | ~~J~~ | UJ |
| 4. | UNKNOWN | 19.02 | 120 | ~~J~~ | UJ |

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBX94

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 622 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0327

Sample wt/vol: 30.2 (g/mL) G Lab File ID: AB0327

Level: (low/med) LOW Date Received: 06/07/94

% Moisture: 0 decanted: (Y/N) N Date Extracted: 06/22/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/10/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.0

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 108-95-2 | Phenol | 330 | U |
| 111-44-4 | bis(2-Chloroethyl)Ether | 330 | U |
| 95-57-8 | 2-Chlorophenol | 330 | U |
| 541-73-1 | 1,3-Dichlorobenzene | 330 | U |
| 106-46-7 | 1,4-Dichlorobenzene | 330 | U |
| 95-50-1 | 1,2-Dichlorobenzene | 330 | U |
| 95-48-7 | 2-Methylphenol | 330 | U |
| 108-60-1 | 2,2'-oxybis(1-Chloropropane) | 330 | U |
| 106-44-5 | 4-Methylphenol | 330 | U |
| 621-64-7 | N-Nitroso-Di-n-Propylamine | 330 | U |
| 67-72-1 | Hexachloroethane | 330 | U |
| 98-95-3 | Nitrobenzene | 330 | U |
| 78-59-1 | Isophorone | 330 | U |
| 88-75-5 | 2-Nitrophenol | 330 | U |
| 105-67-9 | 2,4-Dimethylphenol | 330 | U |
| 111-91-1 | bis(2-Chloroethoxy)Methane | 330 | U |
| 120-83-2 | 2,4-Dichlorophenol | 330 | U |
| 120-82-1 | 1,2,4-Trichlorobenzene | 330 | U |
| 91-20-3 | Naphthalene | 330 | U |
| 106-47-8 | 4-Chloroaniline | 330 | U |
| 87-68-3 | Hexachlorobutadiene | 330 | U |
| 59-50-7 | 4-Chloro-3-Methylphenol | 330 | U |
| 91-57-6 | 2-Methylnaphthalene | 330 | U |
| 77-47-4 | Hexachlorocyclopentadiene | 330 | U |
| 88-06-2 | 2,4,6-Trichlorophenol | 330 | U |
| 95-95-4 | 2,4,5-Trichlorophenol | 790 | U |
| 91-58-7 | 2-Chloronaphthalene | 330 | U |
| 88-74-4 | 2-Nitroaniline | 790 | U |
| 131-11-3 | Dimethylphthalate | 330 | U |
| 208-96-8 | Acenaphthylene | 330 | U |
| 606-20-2 | 2,6-Dinitrotoluene | 330 | U |
| 99-09-2 | 3-Nitroaniline | 790 | U |
| 83-32-9 | Acenaphthene | 330 | U |

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBX94

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 622 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0327

Sample wt/vol: 30.2 (g/mL) G Lab File ID: AB0327

Level: (low/med) LOW Date Received: 06/07/94

% Moisture: 0 decanted: (Y/N) N Date Extracted: 06/22/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/10/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.0

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 51-28-5 | 2,4-Dinitrophenol | 790 | U UJ |
| 100-02-7 | 4-Nitrophenol | 790 | U |
| 132-64-9 | Dibenzofuran | 330 | U |
| 121-14-2 | 2,4-Dinitrotoluene | 330 | U |
| 84-66-2 | Diethylphthalate | 330 | U |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 330 | U |
| 86-73-7 | Fluorene | 330 | U |
| 100-01-6 | 4-Nitroaniline | 790 | U |
| 534-52-1 | 4,6-Dinitro-2-Methylphenol | 790 | U |
| 86-30-6 | N-Nitrosodiphenylamine (1) | 330 | U |
| 101-55-3 | 4-Bromophenyl-phenylether | 330 | U |
| 118-74-1 | Hexachlorobenzene | 330 | U |
| 87-86-5 | Pentachlorophenol | 790 | U |
| 85-01-8 | Phenanthrene | 330 | U |
| 120-12-7 | Anthracene | 330 | U |
| 86-74-8 | Carbazole | 330 | U |
| 84-74-2 | Di-n-Butylphthalate | 330 | U |
| 206-44-0 | Fluoranthene | 330 | U |
| 129-00-0 | Pyrene | 330 | U |
| 85-68-7 | Butylbenzylphthalate | 330 | U |
| 91-94-1 | 3,3'-Dichlorobenzidine | 330 | U |
| 56-55-3 | Benzo(a)Anthracene | 330 | U |
| 218-01-9 | Chrysene | 330 | U |
| 117-81-7 | bis(2-Ethylhexyl)Phthalate | 53 | J J |
| 117-84-0 | Di-n-Octyl Phthalate | 330 | U UJ |
| 205-99-2 | Benzo(b)Fluoranthene | 330 | U |
| 207-08-9 | Benzo(k)Fluoranthene | 330 | U |
| 50-32-8 | Benzo(a)Pyrene | 330 | U |
| 193-39-5 | Indeno(1,2,3-cd)Pyrene | 330 | U |
| 53-70-3 | Dibenz(a,h)Anthracene | 330 | U |
| 191-24-2 | Benzo(g,h,i)Perylene | 330 | U UJ |

(1) - Cannot be separated from Diphenylamine

Reviewed 11/29/94

FORM I SV-2 3/90

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBX94

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 622 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0327

Sample wt/vol: 30.2 (g/mL) G Lab File ID: AB0327

Level: (low/med) LOW Date Received: 06/07/94

% Moisture: 0 decanted: (Y/N) N Date Extracted: 06/22/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/10/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.0

Number TICs found: 7

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

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| 1. 123-42-2 | 2-PENTANONE, 4-HYDROXY-4-MET | 4.13 | 7300 | ~~ABJN~~ UR |
| 2. | UNKNOWN | 7.43 | 67 | ~~AJ~~ UR |
| 3. | UNKNOWN | 17.58 | 140 | ~~J~~ JN |
| 4. | UNKNOWN | 18.43 | 110 | ~~J~~ U |
| 5. | UNKNOWN | 19.02 | 78 | ~~J~~ JN |
| 6. | UNKNOWN | 19.08 | 93 | ~~J~~ JN |
| 7. | UNKNOWN | 19.67 | 83 | ~~J~~ JN |

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBX97

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 647 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0613

Sample wt/vol: 30.1 (g/mL) G Lab File ID: AB0613

Level: (low/med) LOW Date Received: 06/14/94

% Moisture: 11 decanted: (Y/N) N Date Extracted: 06/22/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/10/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.0

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q | |
|---|---|---|---|---|
| 108-95-2 | Phenol | 370 | U | |
| 111-44-4 | bis(2-Chloroethyl)Ether | 370 | U | |
| 95-57-8 | 2-Chlorophenol | 370 | U | |
| 541-73-1 | 1,3-Dichlorobenzene | 370 | U | |
| 106-46-7 | 1,4-Dichlorobenzene | 370 | U | |
| 95-50-1 | 1,2-Dichlorobenzene | 370 | U | |
| 95-48-7 | 2-Methylphenol | 370 | U | |
| 108-60-1 | 2,2'-oxybis(1-Chloropropane) | 370 | U | |
| 106-44-5 | 4-Methylphenol | 370 | U | |
| 621-64-7 | N-Nitroso-Di-n-Propylamine | 370 | ~~U~~ | UJ |
| 67-72-1 | Hexachloroethane | 370 | U | |
| 98-95-3 | Nitrobenzene | 370 | U | |
| 78-59-1 | Isophorone | 370 | U | |
| 88-75-5 | 2-Nitrophenol | 370 | U | |
| 105-67-9 | 2,4-Dimethylphenol | 370 | U | |
| 111-91-1 | bis(2-Chloroethoxy)Methane | 370 | U | |
| 120-83-2 | 2,4-Dichlorophenol | 370 | U | |
| 120-82-1 | 1,2,4-Trichlorobenzene | 370 | U | |
| 91-20-3 | Naphthalene | 370 | U | |
| 106-47-8 | 4-Chloroaniline | 370 | U | |
| 87-68-3 | Hexachlorobutadiene | 370 | U | |
| 59-50-7 | 4-Chloro-3-Methylphenol | 370 | U | |
| 91-57-6 | 2-Methylnaphthalene | 370 | U | |
| 77-47-4 | Hexachlorocyclopentadiene | 370 | U | |
| 88-06-2 | 2,4,6-Trichlorophenol | 370 | U | |
| 95-95-4 | 2,4,5-Trichlorophenol | 900 | U | |
| 91-58-7 | 2-Chloronaphthalene | 370 | U | |
| 88-74-4 | 2-Nitroaniline | 900 | U | |
| 131-11-3 | Dimethylphthalate | 370 | U | |
| 208-96-8 | Acenaphthylene | 370 | U | |
| 606-20-2 | 2,6-Dinitrotoluene | 370 | U | |
| 99-09-2 | 3-Nitroaniline | 900 | U | |
| 83-32-9 | Acenaphthene | 370 | U | |

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBX97

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 647 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0613

Sample wt/vol: 30.1 (g/mL) G Lab File ID: AB0613

Level: (low/med) LOW Date Received: 06/14/94

% Moisture: 11 decanted: (Y/N) N Date Extracted: 06/22/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/10/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.0

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q | |
|---|---|---|---|---|
| 51-28-5 | 2,4-Dinitrophenol | 900 | U | |
| 100-02-7 | 4-Nitrophenol | 900 | U | |
| 132-64-9 | Dibenzofuran | 370 | U | |
| 121-14-2 | 2,4-Dinitrotoluene | 370 | U | |
| 84-66-2 | Diethylphthalate | 370 | U | |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 370 | U | |
| 86-73-7 | Fluorene | 370 | U | |
| 100-01-6 | 4-Nitroaniline | 900 | U | |
| 534-52-1 | 4,6-Dinitro-2-Methylphenol | 900 | U | |
| 86-30-6 | N-Nitrosodiphenylamine (1) | 370 | U | |
| 101-55-3 | 4-Bromophenyl-phenylether | 370 | U | |
| 118-74-1 | Hexachlorobenzene | 370 | U | |
| 87-86-5 | Pentachlorophenol | 900 | ~~U~~ | UJ |
| 85-01-8 | Phenanthrene | 370 | U | |
| 120-12-7 | Anthracene | 370 | U | |
| 86-74-8 | Carbazole | 370 | U | |
| 84-74-2 | Di-n-Butylphthalate | 370 | U | |
| 206-44-0 | Fluoranthene | 370 | U | |
| 129-00-0 | Pyrene | 370 | U | |
| 85-68-7 | Butylbenzylphthalate | 370 | U | |
| 91-94-1 | 3,3'-Dichlorobenzidine | 370 | U | |
| 56-55-3 | Benzo(a)Anthracene | 370 | U | |
| 218-01-9 | Chrysene | 370 | U | |
| 117-81-7 | bis(2-Ethylhexyl)Phthalate | 370 | U | |
| 117-84-0 | Di-n-Octyl Phthalate | 370 | U | |
| 205-99-2 | Benzo(b)Fluoranthene | 370 | ~~U~~ | UJ |
| 207-08-9 | Benzo(k)Fluoranthene | 370 | ~~U~~ | UJ |
| 50-32-8 | Benzo(a)Pyrene | 370 | U | |
| 193-39-5 | Indeno(1,2,3-cd)Pyrene | 370 | U | |
| 53-70-3 | Dibenz(a,h)Anthracene | 370 | U | |
| 191-24-2 | Benzo(g,h,i)Perylene | 370 | U | |

(1) - Cannot be separated from Diphenylamine

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBX97

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 647 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0613

Sample wt/vol: 30.1 (g/mL) G Lab File ID: AB0613

Level: (low/med) LOW Date Received: 06/14/94

% Moisture: 11 decanted: (Y/N) N Date Extracted: 06/22/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/10/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.0

Number TICs found: 6

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

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q | |
|---|---|---|---|---|---|
| 1. 123-42-2 | 2-PENTANONE, 4-HYDROXY-4-MET | 4.12 | 6500 | ~~ABJN~~ | UR |
| 2. | UNKNOWN | 17.58 | 190 | ~~J~~ | JN |
| 3. | UNKNOWN | 18.42 | 180 | ~~J~~ | UJ |
| 4. | UNKNOWN | 19.02 | 180 | ~~J~~ | JN |
| 5. | UNKNOWN | 20.20 | 82 | ~~J~~ | JN |
| 6. | UNKNOWN | 21.32 | 87 | ~~J~~ | JN |

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBX98

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 647 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0607

Sample wt/vol: 30.1 (g/mL) G Lab File ID: AB0607

Level: (low/med) LOW Date Received: 06/14/94

% Moisture: 19 decanted: (Y/N) N Date Extracted: 06/22/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/10/94

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.7

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

| CAS NO. | COMPOUND | | Q |
|---|---|---|---|
| 108-95-2 | Phenol | 410 | U |
| 111-44-4 | bis(2-Chloroethyl)Ether | 410 | U |
| 95-57-8 | 2-Chlorophenol | 410 | U |
| 541-73-1 | 1,3-Dichlorobenzene | 410 | U |
| 106-46-7 | 1,4-Dichlorobenzene | 410 | U |
| 95-50-1 | 1,2-Dichlorobenzene | 410 | U |
| 95-48-7 | 2-Methylphenol | 410 | U |
| 108-60-1 | 2,2'-oxybis(1-Chloropropane) | 410 | U |
| 106-44-5 | 4-Methylphenol | 410 | U |
| 621-64-7 | N-Nitroso-Di-n-Propylamine | 410 | ~~U~~ UJ |
| 67-72-1 | Hexachloroethane | 410 | U |
| 98-95-3 | Nitrobenzene | 410 | U |
| 78-59-1 | Isophorone | 410 | U |
| 88-75-5 | 2-Nitrophenol | 410 | U |
| 105-67-9 | 2,4-Dimethylphenol | 410 | U |
| 111-91-1 | bis(2-Chloroethoxy)Methane | 410 | U |
| 120-83-2 | 2,4-Dichlorophenol | 410 | U |
| 120-82-1 | 1,2,4-Trichlorobenzene | 410 | U |
| 91-20-3 | Naphthalene | 410 | U |
| 106-47-8 | 4-Chloroaniline | 410 | U |
| 87-68-3 | Hexachlorobutadiene | 410 | U |
| 59-50-7 | 4-Chloro-3-Methylphenol | 410 | U |
| 91-57-6 | 2-Methylnaphthalene | 410 | U |
| 77-47-4 | Hexachlorocyclopentadiene | 410 | U |
| 88-06-2 | 2,4,6-Trichlorophenol | 410 | U |
| 95-95-4 | 2,4,5-Trichlorophenol | 980 | U |
| 91-58-7 | 2-Chloronaphthalene | 410 | U |
| 88-74-4 | 2-Nitroaniline | 980 | U |
| 131-11-3 | Dimethylphthalate | 410 | U |
| 208-96-8 | Acenaphthylene | 410 | U |
| 606-20-2 | 2,6-Dinitrotoluene | 410 | U |
| 99-09-2 | 3-Nitroaniline | 980 | U |
| 83-32-9 | Acenaphthene | 410 | U |

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBX98

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 647 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0607

Sample wt/vol: 30.1 (g/mL) G Lab File ID: AB0607

Level: (low/med) LOW Date Received: 06/14/94

% Moisture: 19 decanted: (Y/N) N Date Extracted: 06/22/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/10/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.7

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q | |
|---|---|---|---|---|
| 51-28-5 | 2,4-Dinitrophenol | 980 | U | |
| 100-02-7 | 4-Nitrophenol | 980 | U | |
| 132-64-9 | Dibenzofuran | 410 | U | |
| 121-14-2 | 2,4-Dinitrotoluene | 410 | U | |
| 84-66-2 | Diethylphthalate | 410 | U | |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 410 | U | |
| 86-73-7 | Fluorene | 410 | U | |
| 100-01-6 | 4-Nitroaniline | 980 | U | |
| 534-52-1 | 4,6-Dinitro-2-Methylphenol | 980 | U | |
| 86-30-6 | N-Nitrosodiphenylamine (1) | 410 | U | |
| 101-55-3 | 4-Bromophenyl-phenylether | 410 | U | |
| 118-74-1 | Hexachlorobenzene | 410 | U | |
| 87-86-5 | Pentachlorophenol | 980 | ~~U~~ | UJ |
| 85-01-8 | Phenanthrene | 410 | U | |
| 120-12-7 | Anthracene | 410 | U | |
| 86-74-8 | Carbazole | 410 | U | |
| 84-74-2 | Di-n-Butylphthalate | 410 | U | |
| 206-44-0 | Fluoranthene | 410 | U | |
| 129-00-0 | Pyrene | 410 | U | |
| 85-68-7 | Butylbenzylphthalate | 410 | U | |
| 91-94-1 | 3,3'-Dichlorobenzidine | 410 | U | |
| 56-55-3 | Benzo(a)Anthracene | 410 | U | |
| 218-01-9 | Chrysene | 410 | U | |
| 117-81-7 | bis(2-Ethylhexyl)Phthalate | 81 | J | |
| 117-84-0 | Di-n-Octyl Phthalate | 410 | U | |
| 205-99-2 | Benzo(b)Fluoranthene | 410 | ~~U~~ | UJ |
| 207-08-9 | Benzo(k)Fluoranthene | 410 | ~~U~~ | UJ |
| 50-32-8 | Benzo(a)Pyrene | 410 | U | |
| 193-39-5 | Indeno(1,2,3-cd)Pyrene | 410 | U | |
| 53-70-3 | Dibenz(a,h)Anthracene | 410 | U | |
| 191-24-2 | Benzo(g,h,i)Perylene | 410 | U | |

(1) - Cannot be separated from Diphenylamine

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBX98

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 647 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB0607

Sample wt/vol: 30.1 (g/mL) G Lab File ID: AB0607

Level: (low/med) LOW Date Received: 06/14/94

% Moisture: 19 decanted: (Y/N) N Date Extracted: 06/22/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/10/94

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.7

Number TICs found: 5

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

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| 1. 123-42-2 | 2-PENTANONE, 4-HYDROXY-4-MET | 4.12 | 6600 | ~~ABJN~~ UE |
| 2. | UNKNOWN | 17.57 | 210 | ~~J~~ JN |
| 3. | UNKNOWN | 18.42 | 180 | ~~J~~ UJ |
| 4. | UNKNOWN | 19.02 | 170 | ~~J~~ JN |
| 5. | UNKNOWN | 21.75 | 85 | ~~J~~ JN |

# ATTACHMENT 4

## LABORATORY NARRATIVE and CHAIN-OF-CUSTODY DOCUMENTATION

INTERNATIONAL TECHNOLOGY CORPORATION

# ANALYTICAL SERVICES

## CERTIFICATE OF ANALYSIS

IT Corporation
2800 George Washington Way
Richland, WA 99352
Attn: Van Pettey

July 18, 1994

AUG 1994 RECEIVED SDLA

Job Number: 622 & 649

This is the Certificate of Analysis for the following samples:

| | |
|---|---|
| SDG: | W0083 |
| Client Project ID: | WHC SAF-94-046 200-UP-1 Soil Sampling - Round 1 |
| Date Received by Lab: | June 7 & June 14, 1994 |
| Number of Samples: | Nine (9) |
| Sample Type: | Soil |

### I. Introduction

On June 7 and June 14, 1994, nine (9) soil samples arrived at ITAS-Richland, Washington and were transferred to ITAS-Knoxville for chemical analysis. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report. Samples BOBX93 and BOBX95 were cancelled per Record of Disposition 94-00148, dated June 10, 1994.

### II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Soil result are reported on a dry weight basis.

The samples were analyzed for Target Compound List (TCL) volatiles and semivolatiles by gas chromatography/mass spectroscopy (GC/MS) in accordance with the EPA CLP 3/90 Statement of Work.

Reviewed and Approved:

Sheree' A. Schneider
Project Manager

RECORD COPY

IT Corporation
July 18, 1994
Job Number: 622 & 647
Client Project ID: WHC SAF-94-046 200-UP-1 Soil Sampling - Round 1

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

## II. Analytical Results/Methodology (Continued)

The samples were analyzed for Target Analyte List (TAL) metals by cold vapor atomic absorption spectroscopy (CVAA), graphite furnace atomic absorption spectroscopy (GFAA), and inductively coupled plasma spectroscopy (ICP) in accordance with the EPA CLP ILM03 Statement of Work.

The samples were analyzed for total cyanide in accordance with the EPA CLP ILM03 Statement of Work.

The samples were analyzed for nitrate-nitrite based on EPA method 353.2.

The samples were analyzed for anions by ion chromatography using EPA method 300.0.

## III. Quality Control

The volatiles analyses were performed by purge and trap with a J & W DB-624 capillary column on a Finnigan INCOS 500 GC/MS/DS. Matrix spike and matrix spike duplicate analyses were performed using sample BOBX97. All QC results met method specified limits. The samples were extracted outside of holding time in accordance to ROD 94-00148.

The semivolatiles analyses were performed by direct injection of sample extract on a Restek XTI-5 capillary column on a Finnigan 4500 GC/MS/DS. Matrix spike and matrix spike duplicate analyses were performed using sample BOBX97. All QC results met method specified limits. The samples were extracted outside of holding time in accordance to ROD 94-00148.

Data were reported with qualifiers as follows:

U - Compound analyzed for but not detected; value given is quantitation limit.
E - Compound exceeded calibration range.
D - Compound analyzed at a secondary dilution factor.
J - Compound detected but below quantitation limit; value estimated.
S - Spiked compound.
B - Compound found in method blank.
A - Suspected aldol condensation product.
Y - Indistinguishable isomer in tentatively identified compounds.
N - Presumptive evidence of compound presence.

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

IT Corporation
July 18, 1994
Job Number: 622 & 647
Client Project ID: WHC SAF-94-046 200-UP-1 Soil Sampling - Round 1

III. Quality Control (Continued)

The samples for work order #622 were digested on July 5, 1994 for ICP and June 22, 1994 for GFAA. The CVAA analysis for mercury was performed on June 27, 1994; the GFAA analyses for arsenic, lead, selenium and thallium were performed from June 22 through June 28, 1994; the remaining metals were analyzed by ICP on July 5, 1994. All run QC was acceptable. Samples are batched with QC from work order #647.

The samples for work order #649 were digested on June 15, 1994 for ICP and GFAA. The CVAA analysis for mercury was performed on June 21, 1994; the GFAA analyses for arsenic, lead, selenium and thallium were performed from June 16 through June 22, 1994; the remaining metals were analyzed by ICP on July 6, 1994. All run QC was acceptable. A duplicate/spike pair was prepared using sample number BOBX97. Spike recovery (accuracy) results were within acceptance limits for all parameters. Duplicate RPD (precision) results were within acceptance limits for all parameters except for zinc which exhibited a slight variation due to probable sample nonhomogeneity for this analyte.

Data were reported with qualifiers as follows:

"C" Qualifiers

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
B - Value greater than instrument detection limit, but less than contract required quantitation limit.

"Q" Qualifiers

* - Duplicate analysis outside control limits.
N - Spiked sample recovery outside control limits.
W - Post-digestion spike for GFAA was out of control limits (85-115%), while sample absorbance was less than 50% of spike absorbance.
S - The reported value was determined by method of standard additions.

"M" Qualifiers

P - Analysis performed by ICP.
V - Analysis performed by CVAA.
F - Analysis performed by GFAA.
C - Cyanide analysis by manual distillation/colorimetric determination.

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

IT Corporation
July 18, 1994
Job Number: 622 & 647
Client Project ID: WHC SAF-94-046 200-UP-1 Soil Sampling - Round 1

III. Quality Control (Continued)

Miscellaneous

D - Duplicate.
S - Spike.
NR - Not required.
G - Native analyte > 4 times spike added, therefore, acceptance criteria do not apply.
X - Detection limits higher than normal due to sample matrix interferences.

The samples were analyzed for nitrate/nitrite on June 28, 1994. Matrix spike and matrix spike duplicate analyses were performed using sample BOBX97. All quality control results were acceptable.

The samples were analyzed for fluoride, chloride, phosphate, nitrate, nitrite and sulfate by EPA method 300.0 from June 27 through June 29, 1994. Matrix spike and matrix spike duplicate analyses were performed using sample BOBX97. All quality control results were acceptable.

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

IT Corporation
July 18, 1994
Job Number: 622 & 647
Client Project ID: WHC SAF-94-046 200-UP-1 Soil Sampling - Round 1

III. Quality Control (Continued)

Table I is a cross reference between client sample IDs and laboratory sample IDs.

**TABLE I**

| Knoxville ID | Richland ID | WHC ID | Test |
|---|---|---|---|
| AB0326 | 406042-01A | BOBX94 | VOC |
| AB0327 | 406042-01B | " | SVOC |
| AB0328 | 406042-01C | " | METALS-T |
| AB0329 | 406042-01D | " | CYANIDE |
| AB0330 | 406042-01E | " | ANIONS |
| AB0331 | 406042-01F | " | $NO_3NO_2$ |
| AB0344 | 406042-02A | BOBX95 | VOC |
| AB0345 | 406042-03A | BOBX96 | VOC |
| AB0332 | 406042-04A | BOBJ16 | VOC |
| AB0333 | 406042-04B | " | SVOC |
| AB0334 | 406042-04C | " | METALS-T |
| AB0335 | 406042-04D | " | CYANIDE |
| AB0336 | 406042-04E | " | ANIONS |
| AB0337 | 406042-04F | " | $NO_3NO_2$ |
| AB0338 | 406042-05A | BOBX93 | VOC |
| AB0339 | 406042-05B | " | SVOC |
| AB0340 | 406042-05C | " | METALS-T |
| AB0341 | 406042-05D | " | CYANIDE |
| AB0342 | 406042-05E | " | ANIONS |
| AB0343 | 406042-05F | " | $NO_3NO_2$ |

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

IT Corporation
July 18, 1994
Job Number: 622 & 647
Client Project ID: WHC SAF-94-046 200-UP-1 Soil Sampling - Round 1

III. Quality Control (Continued)

Table I is a cross reference between client sample IDs and laboratory sample IDs.

**TABLE I**

| Knoxville ID | Richland ID | WHC ID | Test |
|---|---|---|---|
| AB0606 | 406264-01A | BOBX98 | VOC |
| AB0607 | 406264-01B | " | SVOC |
| AB0608 | 406264-01C | " | METALS-T |
| AB0674 | 406264-01D | " | CYANIDE |
| AB0610 | 406264-01E | " | ANIONS |
| AB0611 | 406264-01F | " | $NO_3NO_2$ |
| AB0612 | 406264-02A | BOBX97 | VOC |
| AB0613 | 406264-02B | " | SVOC |
| AB0614 | 406264-02C | " | METALS-T |
| AB0615 | 406264-02D | " | CYANIDE |
| AB0616 | 406264-02E | " | ANIONS |
| AB0617 | 406264-02F | " | $NO_3NO_2$ |
| AB0618 | 406264-03A | BOBX99 | VOC |
| AB0619 | 406264-04A | BOBXB0 | VOC |

IT Corporation
July 18, 1994
Job Number: 622 & 647
Client Project ID: WHC SAF-94-046 200-UP-1 Soil Sampling - Round 1

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

## IV. Certification

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the laboratory manager or his designee, as verified by the following signature:

Reviewed and Approved:

Sheree' A. Schneider

Sheree' A. Schneider
Project Manager

030

682-1-89

# OFFICE OF SAMPLE MANAGEMENT

# RECORD OF DISPOSITION

ROD-94-00148
Record of Disposition No.

DATE: 06/10/94 | LABORATORY: IT

PROJECT TITLE/NO.: 200-UP-1 Soil Sampling-Round 1 (SAF 94-046) | NCR NO.: N/A

SAMPLE IDENTIFICATION NUMBERS: B0BJ16, B0BX93, B0BX94, B0BX95, B0BX96

DESCRIPTION OF EVENT:
On 6/07/94, IT was instructed to postpone the analysis of samples received on 6/04/94 until further notice from WHC.

DISPOSITION OF SAMPLES:
Per the technical representative, IT is to cancel the analysis of samples B0BX95, and B0BX93. The analysis of B0BJ16, B0BX94, and B0BX96 is to continue.

APPROVAL SIGNATURES:

J.A. Lerch — 6/10/94
HASM Project Coordinator (Print/Sign Name) — Date

B.E. Innis — 6/27/94
Technical Representative (Print/Sign Name) — Date

N/A
Quality Assurance (Print/Sign Name) — Date

Revised 11/30/9

030A

**Westinghouse Hanford Company**

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

wo#622

Page 1 of 1

Data Turnaround: [ ] Priorty [X] Normal

| | | |
|---|---|---|
| Collector: W. V. SETZER | Company Contact: W. V. SETZER | Telephone No.: (509) 376-2413 |
| Project Designation: 200 UP-1 | Sampling Location: 699-38-68A | SAF No.: 94-046 |
| Ice Chest No.: GWS-015 | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: INTERNATIONAL TECHNOLOGIES | Offsite Property No.: W94-0- | Bill of Lading/Air Bill No.: |
| Possible Sample Hazards/Remarks: NONE OBSERVED | | |
| Special Handling and/or Storage: COOL TO 4 DEGREES CENTIGRADE | | |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservative | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | | | COOL 4 | COOL 4 | COOL 4 | | |
| Type of Container | aGs | aG | G | G | G | G | P/G | P/G | | | aGs | aGs | aGs | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | 1 | 1 | 1 | | |
| Volume | 125ml | 500ml | 500ml | 250ml | 250ml | 125ml | 1000ml | 500ml | | | 125ml | 250ml | 40ml | | |
| SAMPLE ANALYSIS | VOA (CLP) | SEMIVOA (CLP) | ICP MTL GFAA METALS Hg (CLP) | Cn (CLP) | ANIONS IC-F,CL SO4,NO2 NO3,PO4 | NO2,NO3 EPA(353.2) | *1 | *1 | | | VOA TRIP | VOA FIELD | ACTIVIY SCAN | | |
| 406042 | 05A | B | C | D | E | F | 40604303 | | | | | | | | |

| Sample No. | Matrix* | Date Sampled | Time Sampled | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BOBX93 | S | 6-2-94 | 1245 | X | X | X | X | X | X | X | X | | | | | X | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

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

| Relinquished By | Date/Time | Received By | Date/Time |
|---|---|---|---|
| W. V. Setzer | 6/2/94 1405 | A Simpson | 6/2/94 1405 |
| Loren C. Hagert for Amy Simpson | 6394 0957 | | |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS**

*1- GROSS ALPHA,BETA(EP-60,070,170) Am-241,Cm 243/244 (EP-60,070,960) Np-237 (EP-60,070,930) Pu-238,239/240 (EP-60,070,940) U-234,235,238 (EP-60,070,901) GAMMA SPEC TO INCLUDE; Co-58,60,Cs-137,Eu-152,154,155 AND Fe-59 (EP-60,070,100) Sr-90 (EP-60,070,500,519,520) I-129 (EP-024,560) C-14 (EP-060,251)Tc-99 (EP-020,540) alternate custodian relinquished custody of samples for custodian due to illness of the shipping facility custodian. Samples stored at shipping facility in locked refrigerator prior to delivery to the laboratory. [illegible] 6-3-94

LOWEST HOLDING TIME = 7DAYS

**Matrix***

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

| | | | |
|---|---|---|---|
| LABORATORY SECTION | Received By: Tom [illegible] | Title: ITAS 6/3/94 1430 | Date/Time |
| FINAL SAMPLE DISPOSITION | Disposal Method | Disposed By | Date/Time |

DISTRIBUTION: Original- Sample Yellow - Sampler

BC-6000-828 (12/92)

0000028

**Westinghouse Hanford Company**

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

WU#622

Page 1 of 1

Data Turnaround: [ ] Priorty [X] Normal

| | | |
|---|---|---|
| Collector: W. V. SETZER | Company Contact: W. V. SETZER | Telephone No.: (509) 376-2413 |
| Project Designation: 200 UP-1 | Sampling Location: 699-38-68A | SAF No.: 94-046 |
| Ice Chest No.: GWS-015 | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: INTERNATIONAL TECHNOLOGIES | Offsite Property No.: W94-0- | Bill of Lading/Air Bill No.: |

Possible Sample Hazards/Remarks

Special Handling and/or Storage: COOL TO 4 DEGREES CENTIGRADE

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservative | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | | | COOL 4 | COOL 4 | COOL 4 | | |
| Type of Container | aGs | aG | G | G | G | G | P/G | P/G | | | aGs | aGs | aGs | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | 1 | 1 | 1 | | |
| Volume | 125ml | 500ml | 500ml | 250ml | 250ml | 125ml | 1000ml | 500ml | | | 125ml | 250ml | 40ml | | |
| SAMPLE ANALYSIS | VOA (CLP) | SEMIVOA (CLP) | ICP MTL GFAA METALS Hg (CLP) | Cn (CLP) | ANIONS IC-F,CL SO4,NO2 NO3,PO4 | NO2,NO3 EPA(353.2) | *1 | *1 | | | VOA TRIP | VOA FIELD | ACTIVIY SCAN | | |
| 406042 | A | B | C | D | E | F | 406043 | | | | | | | | |

| Sample No. | Matrix* | Date Sampled | Time Sampled | A | B | C | D | E | F | 406043 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~~BOBX93~~ | ~~S~~ | | | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | | | ~~X~~ | WVS 5-31-94 |
| BOBX94 01 | S | 5·31·94 | 1010 | X | X | X | X | X | X | X 01 | X | | | | | X | |
| BOBX95 2 | S | 5·31·94 | 0940 | | | | | | | | | | | | X 02A | | |
| BOBX96 3 | S | 5·31·94 | 0730 | | | | | | | | | | | X 03A | | | |
| ~~BOBX97~~ | ~~S~~ | | | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | | | ~~X~~ | WVS 5/31/94 |
| BOBJ16 4 | S | 6·1·94 | 1043 | X | X | X | X | X | X | X 02 | X | | | | | X | |

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

| Relinquished By | Date/Time | Received By | Date/Time |
|---|---|---|---|
| W. V. Setzer | 6-1-94 1409 | A. Simpson | 6/1/94 1469 |
| Joren C. Rogers for Amy Simpson | 6-3-94 0945 | [signature] | 6/3/94 |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS**

*1- GROSS ALPHA,BETA(EP-60,070,170) Am-241,Cm 243/244 (EP-60,070,960) Np-237 (EP-60,070,930) Pu-238,239/240 (EP-60,070,940) U-234,235,238 (EP-60,070,901) GAMMA SPEC TO INCLUDE; Co-58,60,Cs-137,Eu-152,154,155 AND Fe-59 (EP-60,070,100) Sr-90 (EP-60,070,500,519,520) I-129 (EP-024,560) C-14 (EP-060,251)Tc-99 (EP-020,540). Alternate custodian relinquished custody of samples for custodian due to illness of the shipping for fully custodian. Samples stored at shipping facility in locked refrigerator prior to delivery to the laboratory [signature] 6-3-94.

LOWEST HOLDING TIME = 7DAYS

**Matrix***

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

| LABORATORY SECTION | Received By | Title | Date/Time |
|---|---|---|---|
| | [signature] | ITAS | 6/3/94 1430 |

| FINAL SAMPLE DISPOSITION | Disposal Method | Disposed By | Date/Time |
|---|---|---|---|
| | | | |

DISTRIBUTION: Original- Sample Yellow - Sampler

BC-6000-828 (12/92)

032

0000029 MRD

**Westinghouse Hanford Company**

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST WO#647

Page 1 of 1

Data Turnaround: [ ] Priorty [X] Normal

| | | |
|---|---|---|
| Collector: W. V. SETZER | Company Contact: W. V. SETZER | Telephone No.: (509) 376-2413 |
| Project Designation: 200 UP-1 | Sampling Location: 699-38-68A | SAF No.: 94-046 |
| Ice Chest No.: ER-1D | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: INTERNATIONAL TECHNOLOGIES | Offsite Property No.: W94-0- 0544-38 | Bill of Lading/Air Bill No.: |
| Possible Sample Hazards/Remarks: NONE OBSERVED | | |
| Special Handling and/or Storage: COOL TO 4 DEGREES CENTIGRADE Rot 3C LPS 6/9/94 | | |

| Sample No. | Matrix* | Date Sampled | Time Sampled | A | B | C | D | E | F | 4062 | 65 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Preservative | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | | | COOL 4 | COOL 4 | COOL 4 | | |
| | | | | Type of Container | aGs | aG | G | G | G | G | P/G | P/G | | | aGs | aGs | aGs | | |
| | | | | No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | 1 | 1 | 1 | | |
| | | | | Volume | 125ml | 500ml | 500ml | 250ml | 250ml | 125ml | 1000ml | 500ml | | | 125ml | 250ml | 40ml | | |
| SAMPLE ANALYSIS 406264 | | | | | VOA (CLP) 6/13/94 | SEMIVOA (CLP) | ICP MTL GFAA METALS Hg (CLP) | Cn (CLP) | ANIONS IC-F,CL SO4,NO2 NO3,PO4 | NO2,NO3 EPA(353.2) | *1 | *1 | | | VOA TRIP | VOA FIELD | ACTIVIY SCAN | | |
| BOBX98 01 | S | 6-9-94 | 0940 | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 01 ✓ | ✓ | | | | | ✓ | | |
| BOBX97 2 | S | 6-9-94 | 0940 | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 02 ✓ | ✓ | | | | | ✓ | | |
| BOBX99 3A | S | 6-9-94 | 0840 | | | | | | | | | | | | ✓ | | | | |
| BOBXBO 4A | S | 6-9-94 | 0900 | | | | | | | | | | | | | ✓ | | | |

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

| Relinquished By | Date/Time | Received By | Date/Time |
|---|---|---|---|
| W. V. Setzer | 6-9-94 1205 | L Sweeney L Sweeney | 6/9/94 1205 |
| L Sweeney L Sweeney | 6/9/94 1300 | A J Simpson | 6/9/94 1300 |
| A J Simpson | 6/13/94 1035 | C Kenitzer IT | 6-13-94 1045 |
| | | | |

**SPECIAL INSTRUCTIONS**

*1- GROSS ALPHA,BETA(EP-60,070,170) Am-241,Cm 243/244 (EP-60,070,960) Np-237 (EP-60,070,930) Pu-238,239/240 (EP-60,070,940) U-234,235,238 (EP-60,070,901) GAMMA SPEC TO INCLUDE; Co-58,60,Cs-137,Eu-152,154,155 AND Fe-59 (EP-60,070,100) Sr-90 (EP-60,070,500,519,520) I-129 (EP-024,560) C-14 (EP-060,251)Tc-99 (EP-020,540)

SPG W0083

LOWEST HOLDING TIME = 7DAYS

**Matrix***

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

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

DISTRIBUTION: Original- Sample Yellow - Sampler

BC-6000-828 (12/92)

033

# ATTACHMENT 5

# DATA VALIDATION SUPPORTING DOCUMENTATION

# GC/MS ORGANIC DATA VALIDATION CHECKLIST

| VALIDATION LEVEL: | A | B | C | (D) | E |
|---|---|---|---|---|---|

| | | |
|---|---|---|
| PROJECT: 200-UP-1 | DATA PACKAGE: WC083-QES-094 | |
| VALIDATOR: WATERBURY | LAB: IT CORP | DATE: 11.11.94 |
| CASE: | SDG: WC083 | |

ANALYSES PERFORMED

| ☐ CLP Volatiles | ☐ SW-846 8240 (cap column) | ☐ SW-846 8260 (packed column) | ☒ CLP Semivolatiles | ☐ SW-846 8270 (cap column) | ☐ SW-846 (packed column) |
|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

SAMPLES/MATRIX BOBJ16 - SOIL
BOBX93 - cancelled
BOBX94 - SOIL
BOBX97 - SOIL
*BOBX98 - SOIL

## 1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . . (Yes) No N/A

Is a case narrative present? . . . . . (Yes) No N/A

Comments:

## 2. HOLDING TIMES

Are sample holding times acceptable? . . . . . Yes (No)[1] N/A

Comments: (1) Samples BOBJ16 and BOBX94 exceeded prep. holding times.

035

GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. INSTRUMENT TUNING AND CALIBRATION

Is the GC/MS tuning/performance check acceptable? . . . . . Yes No N/A

Are initial calibrations acceptable? . . . . . Yes No N/A

Are continuing calibrations acceptable? . . . . . Yes No[1] N/A

Comments: (1) N-Nitroso-Di-n-propylamine, pentachlorophenol, benzo(b)fluoranthene, and benzo(k)fluoranthene percent difference (%D) was unacceptable.

4. BLANKS

Were laboratory blanks analyzed? . . . . . Yes No N/A

Are laboratory blank results acceptable? . . . . . Yes No N/A

Were field/trip blanks analyzed? . . . . . Yes ~~No~~ N/A 11/30/

Are field/trip blank results acceptable? . . . . . Yes No ~~N/A~~ 11/30/

Comments: Sample BOBX94 was identified as an equipment blank. Bis(2-ethylhexyl)phthalate was detected in the equipment blank. 11/30/94

5. ACCURACY

Were surrogates/System Monitoring Compounds analyzed? . . . . . Yes No N/A

Are surrogate/System Monitoring Compound recoveries acceptable? Yes No N/A

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

Are MS/MSD results acceptable? . . . . . Yes No N/A

Comments:

Reviewed 11/30/94

036

GC/MS ORGANIC DATA VALIDATION CHECKLIST

6. PRECISION

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

Are field duplicate RPD values acceptable? . . . . . Yes No N/A

Are field split RPD values acceptable? . . . . . Yes No N/A

Comments: (1) Sample BOBX98 is the field duplicate of sample BOBX97.

7. SYSTEM PERFORMANCE

Were internal standards analyzed? . . . . . Yes No N/A

Are internal standard areas acceptable? . . . . . Yes No N/A

Are internal standard retention times acceptable? . . . . . Yes No N/A

Comments:

8. COMPOUND IDENTIFICATION AND QUANTITATION

Is compound identification acceptable? . . . . . Yes No N/A

Is compound quantitation acceptable? . . . . . Yes No N/A

Comments:

9. REPORTED RESULTS AND QUANTITATION LIMITS

Are results reported for all requested analyses? . . . . . Yes No N/A

Are all results supported in the raw data? . . . . . Yes No N/A

Do results meet the CRQLs? . . . . . Yes No N/A

Has the laboratory properly identified and coded all TIC? . . . Yes No N/A

Comments:

037

HOLDING TIME SUMMARY

| SDG: W0083 | VALIDATOR: WATERBURY | DATE: 11.11.94 | PAGE 1 OF 1 |
|---|---|---|---|
| COMMENTS: SEMIVOLATILE | | | |

| | FIELD SAMPLE ID | ANALYSIS TYPE | DATE SAMPLED | DATE PREPARED | DATE ANALYZED | PREP. HOLDING TIME, (DAYS) | ANALYSIS HOLDING TIME, (DAYS) | QUALIFIER |
|---|---|---|---|---|---|---|---|---|
| | B0BJ16 | SVOC | 6.01.94 | 6.22.94 | 7.10.94 | 21 | 19 | J or UJ |
| EQUIP | B0BX94 | SVOC | 5.31.94 | 6.22.94 | 7.10.94 | 22 | 19 | J or UJ |
| | B0BX97 | SVOC | 6.09.94 | 6.22.94 | 7.10.94 | 13 | 19 | none |
| DUP. | B0BX98 | SVOC | 6.09.94 | 6.22.94 | 7.10.94 | 13 | 19 | none |

7B
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 622 SAS No.: _____ SDG No.: W0083

Instrument ID: FINN Calibration date: 07/10/94 Time: 1638

Lab File ID: CCA0710 Init. Calib. Date(s): 07/01/94 07/01/94

Init. Calib. Times: 1200 1458

| COMPOUND | $\overline{RRF}$ | RRF50 | MIN RRF | %D | MAX %D |
|---|---|---|---|---|---|
| Phenol | 1.951 | 1.982 | 0.800 | -1.6 | 25.0 |
| bis(2-Chloroethyl)Ether | 1.729 | 1.600 | 0.700 | 7.5 | 25.0 |
| 2-Chlorophenol | 1.444 | 1.430 | 0.800 | 1.0 | 25.0 |
| 1,3-Dichlorobenzene | 1.453 | 1.503 | 0.600 | -3.4 | 25.0 |
| 1,4-Dichlorobenzene | 1.574 | 1.465 | 0.500 | 6.9 | 25.0 |
| 1,2-Dichlorobenzene | 1.366 | 1.291 | 0.400 | 5.5 | 25.0 |
| 2-Methylphenol | 1.231 | 1.144 | 0.700 | 7.1 | 25.0 |
| 2,2'-oxybis(1-Chloropropane) | 2.417 | 1.424 | | 41.1 | |
| 4-Methylphenol | 1.264 | 1.133 | 0.600 | 10.4 | 25.0 |
| N-Nitroso-Di-n-Propylamine | 1.150 | 0.836 | 0.500 | 27.3 | 25.0 |
| Hexachloroethane | 0.684 | 0.586 | 0.300 | 14.3 | 25.0 |
| Nitrobenzene | 0.518 | 0.407 | 0.200 | 21.4 | 25.0 |
| Isophorone | 0.947 | 0.771 | 0.400 | 18.6 | 25.0 |
| 2-Nitrophenol | 0.218 | 0.221 | 0.100 | -1.4 | 25.0 |
| 2,4-Dimethylphenol | 0.392 | 0.354 | 0.200 | 9.7 | 25.0 |
| bis(2-Chloroethoxy)Methane | 0.545 | 0.489 | 0.300 | 10.3 | 25.0 |
| 2,4-Dichlorophenol | 0.286 | 0.284 | 0.200 | 0.7 | 25.0 |
| 1,2,4-Trichlorobenzene | 0.317 | 0.322 | 0.200 | -1.6 | 25.0 |
| Naphthalene | 1.002 | 0.958 | 0.700 | 4.4 | 25.0 |
| 4-Chloroaniline | 0.340 | 0.290 | | 14.7 | |
| Hexachlorobutadiene | 0.192 | 0.159 | | 17.2 | |
| 4-Chloro-3-Methylphenol | 0.328 | 0.325 | 0.200 | 0.9 | 25.0 |
| 2-Methylnaphthalene | 0.654 | 0.671 | 0.400 | -2.6 | 25.0 |
| Hexachlorocyclopentadiene | 0.441 | 0.276 | | 37.4 | |
| 2,4,6-Trichlorophenol | 0.400 | 0.381 | 0.200 | 4.8 | 25.0 |
| 2,4,5-Trichlorophenol | 0.395 | 0.433 | 0.200 | -9.6 | 25.0 |
| 2-Chloronaphthalene | 1.217 | 1.157 | 0.800 | 4.9 | 25.0 |
| 2-Nitroaniline | 0.530 | 0.394 | | 25.7 | |
| Dimethylphthalate | 1.304 | 1.262 | | 3.2 | |
| Acenaphthylene | 1.695 | 1.480 | 1.300 | 12.7 | 25.0 |
| 2,6-Dinitrotoluene | 0.297 | 0.314 | 0.200 | -5.7 | 25.0 |
| 3-Nitroaniline | 0.194 | 0.257 | | -32.5 | |
| Acenaphthene | 1.070 | 1.017 | 0.800 | 5.0 | 25.0 |
| 2,4-Dinitrophenol | 0.167 | 0.095 | | 43.1 | |
| 4-Nitrophenol | 0.202 | 0.119 | | 41.1 | |
| Dibenzofuran | 1.508 | 1.498 | 0.800 | 0.7 | 25.0 |
| 2,4-Dinitrotoluene | 0.357 | 0.322 | 0.200 | 9.8 | 25.0 |

(1) Cannot be separated from Diphenylamine
All other compounds must meet a minimum RRF of 0.010.

DSW 11-15-94

7C
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 622 SAS No.: _____ SDG No.: W0083

Instrument ID: FINN Calibration date: 07/10/94 Time: 1638

Lab File ID: CCA0710 Init. Calib. Date(s): 07/01/94 07/01/94

Init. Calib. Times: 1200 1458

| COMPOUND | $\overline{RRF}$ | RRF50 | MIN RRF | %D | MAX %D |
|---|---|---|---|---|---|
| Diethylphthalate | 1.308 | 1.130 | | 13.6 | |
| 4-Chlorophenyl-phenylether | 0.642 | 0.621 | 0.400 | 3.3 | 25.0 |
| Fluorene | 1.229 | 1.177 | 0.900 | 4.2 | 25.0 |
| 4-Nitroaniline | 0.122 | 0.130 | | -6.6 | |
| 4,6-Dinitro-2-Methylphenol | 0.159 | 0.116 | | 27.0 | |
| N-Nitrosodiphenylamine (1) | 0.535 | 0.541 | | -1.1 | |
| 4-Bromophenyl-phenylether | 0.262 | 0.264 | 0.100 | -0.8 | 25.0 |
| Hexachlorobenzene | 0.293 | 0.270 | 0.100 | 7.8 | 25.0 |
| Pentachlorophenol | 0.184 | 0.135 | 0.050 | 26.6 | 25.0 |
| Phenanthrene | 1.179 | 1.146 | 0.700 | 2.8 | 25.0 |
| Anthracene | 1.132 | 1.081 | 0.700 | 4.5 | 25.0 |
| Carbazole | 0.740 | 0.718 | | 3.0 | |
| Di-n-Butylphthalate | 1.617 | 1.409 | | 12.9 | |
| Fluoranthene | 1.197 | 1.099 | 0.600 | 8.2 | 25.0 |
| Pyrene | 1.263 | 1.379 | 0.600 | -9.2 | 25.0 |
| Butylbenzylphthalate | 0.769 | 0.730 | | 5.1 | |
| 3,3'-Dichlorobenzidine | 0.367 | 0.311 | | 15.3 | |
| Benzo(a)Anthracene | 1.113 | 1.127 | 0.800 | -1.3 | 25.0 |
| Chrysene | 1.028 | 1.081 | 0.700 | -5.2 | 25.0 |
| bis(2-Ethylhexyl)Phthalate | 1.070 | 1.087 | | -1.6 | |
| Di-n-Octyl Phthalate | 1.532 | 2.130 | | -39.0 | |
| Benzo(b)Fluoranthene | 1.256 | 1.649 | 0.700 | -31.3 | 25.0 |
| Benzo(k)Fluoranthene | 1.116 | 1.547 | 0.700 | -38.6 | 25.0 |
| Benzo(a)Pyrene | 0.952 | 0.994 | 0.700 | -4.4 | 25.0 |
| Indeno(1,2,3-cd)Pyrene | 1.029 | 0.825 | 0.500 | 19.8 | 25.0 |
| Dibenz(a,h)Anthracene | 0.823 | 0.721 | 0.400 | 12.4 | 25.0 |
| Benzo(g,h,i)Perylene | 0.869 | 0.589 | 0.500 | 32.2 | 25.0 |
| Nitrobenzene-d5 | 0.506 | 0.437 | 0.200 | 13.6 | 25.0 |
| 2-Fluorobiphenyl | 1.324 | 1.296 | 0.700 | 2.1 | 25.0 |
| Terphenyl-d14 | 0.914 | 1.015 | 0.500 | -11.0 | 25.0 |
| Phenol-d5 | 2.014 | 1.993 | 0.800 | 1.0 | 25.0 |
| 2-Fluorophenol | 1.669 | 1.568 | 0.600 | 6.1 | 25.0 |
| 2,4,6-Tribromophenol | 0.157 | 0.132 | | 15.9 | |
| 2-Chlorophenol-d4 | 1.481 | 1.495 | 0.800 | -0.9 | 25.0 |
| 1,2-Dichlorobenzene-d4 | 0.861 | 0.852 | 0.400 | 1.0 | 25.0 |

(1) Cannot be separated from Diphenylamine
All other compounds must meet a minimum RRF of 0.010.

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SBLKAB1392A

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 622 SAS No.: _____ SDG No.: W0083

Matrix: (soil/water) SOIL Lab Sample ID: AB1392

Sample wt/vol: 30.0 (g/mL) G Lab File ID: AB1392

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N) N Date Extracted: 06/22/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/09/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

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

Number TICs found: 4

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

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| 1. 123-42-2 | 2-PENTANONE, 4-HYDROXY-4-MET | 4.23 | 7100 | ~~AJN~~ |
| 2. | UNKNOWN | 7.55 | 84 | AJ |
| 3. | UNKNOWN | 18.57 | 110 | J |
| 4. | UNKNOWN | 19.27 | 210 | J |

W0083-ITC-094

RECORD COPY

MEMORANDUM

NOV 1994
RECEIVED
Validation
Log In

TO: 200-UP-1 Project QA Record

November 10, 1994

FR: Sandra Schildt, Golder Associates Inc.

RE: METALS DATA VALIDATION SUMMARY FOR DATA PACKAGE W0083-ITC-094 (943-1610.034,094ino.up1)

## INTRODUCTION

This memorandum presents the results of data validation on data package W0083-ITC-094 prepared by International Technology Corporation. A list of the samples validated along with the analytes reported and the method of analysis is provided in the following table.

| SAMPLE ID | COMMENTS | MEDIA | ANALYSIS |
|---|---|---|---|
| B0BX94 | EQUIP. BLANK | SOIL | INORGANICS |
| B0BJ16 | | SOIL | |
| B0BX97* | | SOIL | |
| B0BX98 | | SOIL | SEE ATTACHMENT 4 |
| *Indicates the sample results which were 100% recalculated. | | | |

Data validation was conducted to level D in accordance with the WHC statement of work (WHC 1994) and validation procedures (WHC 1993). Attachments 1 through 5 to this memo provide the following information:

Attachment 1. Glossary of Data Reporting Qualifiers
Attachment 2. Summary of Data Qualifications
Attachment 3. Qualified Data Summary and Annotated Laboratory Reports
Attachment 4. Laboratory Narrative and Chain-of-Custody Documentation
Attachment 5. Data Validation Supporting Documentation

## DATA QUALITY OBJECTIVES

This section presents a summary of the data quality in terms of the referenced validation criteria.

**Precision.** Goals for precision were met.

**Accuracy.** Goals for accuracy were met.

**Sample Result Verification.** All sample results were supported in the raw data.

**Detection Limits.** Detection limit goals were met.

**Completeness.** The data package was complete for all requested analyses. Four samples (4) were validated in this data set with a total of 96 determinations reported, all of which were deemed valid. This results in a completeness of 100% which meets normal work plan objectives of 90%.

## MAJOR DEFICIENCIES

No major deficiencies were identified during data validation which required qualification of data as unusable.

## MINOR DEFICIENCIES

The following minor deficiencies were identified during validation which required qualification of data.

Holding Time

- The holding time for cyanide analysis was exceeded. Attachments 2 and 5 provide a summary of the samples and data qualification applied.

Laboratory Blanks

- Manganese, calcium, and lead were detected in one or more of the calibration and preparation blanks. Attachments 2 and 5 provide a summary of the samples and data qualification applied.

Analytical Spikes

- The analytical spike recovery of arsenic, selenium, and thallium were outside control limits. Attachments 2 and 5 provide a summary of the samples and data qualification applied.

## FIELD QUALITY CONTROL

- Sample B0BX94 was identified as an equipment blank. Aluminum, barium, chromium, iron, magnesium, sodium, and zinc were detected. No qualification was applied in accordance with the validation procedures.

## REFERENCES

WHC 1994, Environmental and Waste Characterization Analytical Data Validation, Purchase Order MSH-SWV-315905; Validation Statement of Work, Revision 1.0, September 7, 1994; Westinghouse Hanford Company, Richland, Washington.

WHC 1993, Data Validation Procedures for Chemical Analyses, WHC-SD-EN-SPP-002, Rev. 2, 1993, Westinghouse Hanford Company, Richland, Washington.

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

## GLOSSARY OF INORGANIC DATA REPORTING QUALIFIERS

B - Indicates the constituent was analyzed for and detected. The concentration reported is less than the contract required detection limit (CRDL) but greater than the instrument detection limit (IDL). The associated data should be considered usable for decision making purposes.

U - Indicates the constituent was analyzed for and not detected. The concentration reported is the sample detection limit corrected for sample aliquot size, dilution factors and percent solids (in the case of solid matrices) by the laboratory. The associated data should be considered usable for decision making purposes.

UJ - Indicates the constituent was analyzed for and was not detected. Due to a minor quality control deficiency identified during data validation, the concentration reported may not accurately reflect the sample detection limit. The associated data have been qualified as estimated but should be considered usable for decision making purposes.

BJ - Indicates the constituent was analyzed for and detected at a concentration less than the CRDL but greater then the IDL. Due to a minor quality control deficiency identified during data validation, The associated data have been qualified as estimated, but should be considered usable for decision making purposes.

J - Indicates the constituent was analyzed for and detected. Due to a minor quality control deficiency identified during data validation the associated data have been qualified as estimated, but should be considered usable for decision making purposes.

UR - Indicates the constituent was analyzed for and not detected. Due to a major quality control deficiency identified during data validation, the associated data have been qualified as unusable for decision making purposes.

R - Indicates the constituent was analyzed for and detected. Due to a major quality control deficiency identified during data validation, the associated data have been qualified as unusable for decision making purposes.

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

# DATA QUALIFICATION SUMMARY - FORM B-7

| PKG: W0083-ITC-094 | REVIEWER: S. Schildt | DATE: 11/9/94 | PAGE 1 OF 1 |
|---|---|---|---|
| COMMENTS: Metals | | | |
| PARAMETER | QUALIFIER | SAMPLES AFFECTED | REASON |
| Cyanide | UJ | B0BX94, B0BJ16 | Holding time exceeded |
| Calcium<br>Lead<br>Manganese | U | B0BX94 | Analyte detected in the blanks |
| Arsenic<br>Selenium<br>Thallium | UJ | B0BJ16 | Analytical spike recovery <85% |
| Thallium | UJ | B0BX97, B0BX98 | Analytical spike recovery <85% |
| | | | |
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ATTACHMENT 3

QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: W0083-ITC-094

| | Samp# | B0BJ16 | | B0BX94 | | B0BX97 | | B0BX98 | |
|---|---|---|---|---|---|---|---|---|---|
| | Date | 6-1-94 | | 5-31-94 | | 6-9-94 | | 6-9-94 | |
| | Location | 299-W19-34B | | 699-38-68A | | 699-38-68A | | 699-38-68A | |
| | Depth | 332.00 - 334.00 | | --- | | 285.00 - 287.00 | | 285.00 - 287.00 | |
| | Type | SOIL | | SOIL | | SOIL | | SOIL | |
| | Comments | | | EQUIP. BLANK | | | | DUPLICATE | |
| Parameter | Units | Result | Q | Result | Q | Result | Q | Result | Q |
| ALUMINUM | MG/KG | 7690.000 | | 98.400 | | 4360.000 | | 4850.000 | |
| ANTIMONY | MG/KG | 12.000 | U | 10.000 | U | 11.200 | U | 12.300 | U |
| ARSENIC | MG/KG | 0.480 | UJ | 0.400 | U | 0.490 | B | 0.490 | U |
| BARIUM | MG/KG | 50.300 | | 0.990 | B | 40.500 | B | 47.200 | B |
| BERYLLIUM | MG/KG | 0.580 | B | 0.200 | U | 0.230 | B | 0.320 | B |
| CADMIUM | MG/KG | 1.200 | U | 1.000 | U | 1.100 | U | 1.200 | U |
| CALCIUM | MG/KG | 9680.000 | | 42.800 | U | 2490.000 | | 2680.000 | |
| CHROMIUM | MG/KG | 16.200 | | 2.200 | | 9.400 | | 15.500 | |
| COBALT | MG/KG | 9.700 | B | 2.000 | U | 5.300 | B | 5.000 | B |
| COPPER | MG/KG | 11.300 | | 2.000 | U | 9.000 | | 11.900 | |
| IRON | MG/KG | 21000.000 | | 177.000 | | 8410.000 | | 10900.000 | |
| LEAD | MG/KG | 6.500 | | 1.100 | U | 2.200 | | 2.400 | |
| MAGNESIUM | MG/KG | 4630.000 | | 14.700 | B | 2830.000 | | 3340.000 | |
| MANGANESE | MG/KG | 310.000 | | 1.100 | U | 153.000 | | 193.000 | |
| MERCURY | MG/KG | 0.120 | U | 0.100 | U | 0.110 | U | 0.120 | U |
| NICKEL | MG/KG | 16.200 | | 4.000 | U | 11.300 | | 15.000 | |
| POTASSIUM | MG/KG | 652.000 | B | 200.000 | U | 578.000 | B | 644.000 | B |
| SELENIUM | MG/KG | 0.480 | UJ | 0.400 | U | 0.430 | U | 0.490 | U |
| SILVER | MG/KG | 1.200 | U | 1.000 | U | 1.100 | U | 1.200 | U |
| SODIUM | MG/KG | 124.000 | B | 20.800 | B | 275.000 | B | 281.000 | B |
| THALLIUM | MG/KG | 0.480 | UJ | 0.400 | U | 0.430 | UJ | 0.490 | UJ |
| VANADIUM | MG/KG | 44.800 | | 2.000 | U | 15.800 | | 23.900 | |
| ZINC | MG/KG | 27.200 | | 2.500 | B | 21.100 | | 35.000 | |
| CYANIDE | MG/KG | 1.200 | UJ | 1.000 | UJ | 1.100 | U | 1.200 | U |

The decimal places shown do not reflect the precision reported by the laboratory

Revised [illegible] 11/30/94

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1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOBX94
Equip Blank

Lab Name: ITAS_KNOXVILLE_____ Contract: HANFORD___
Lab Code: ITSTU_ Case No.: W0622 SAS No.: _____ SDG No.: W0083_
Matrix (soil/water): SOIL_ Lab Sample ID: AB0328
Level (low/med): LOW__ Date Received: 06/07/94
% Solids: _99.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M | |
|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 98.4 | | | P | |
| 7440-36-0 | Antimony | 10.0 | U | | P | |
| 7440-38-2 | Arsenic | 0.40 | U | | F | |
| 7440-39-3 | Barium | 0.99 | B | | P | |
| 7440-41-7 | Beryllium | 0.20 | U | | P | |
| 7440-43-9 | Cadmium | 1.0 | U | | P | |
| 7440-70-2 | Calcium | 42.8 | B | | P | u |
| 7440-47-3 | Chromium | 2.2 | | | P | |
| 7440-48-4 | Cobalt | 2.0 | U | | P | |
| 7440-50-8 | Copper | 2.0 | U | | P | |
| 7439-89-6 | Iron | 177 | | | P | |
| 7439-92-1 | Lead | 1.1 | | | F | u |
| 7439-95-4 | Magnesium | 14.7 | B | | P | |
| 7439-96-5 | Manganese | 1.1 | B | | P | u |
| 7439-97-6 | Mercury | 0.10 | U | | CV | |
| 7440-02-0 | Nickel | 4.0 | U | | P | |
| 7440-09-7 | Potassium | 200 | U | | P | |
| 7782-49-2 | Selenium | 0.40 | U | | F | |
| 7440-22-4 | Silver | 1.0 | U | | P | |
| 7440-23-5 | Sodium | 20.8 | B | | P | |
| 7440-28-0 | Thallium | 0.40 | U | | F | |
| 7440-62-2 | Vanadium | 2.0 | U | | P | |
| 7440-66-6 | Zinc | 2.5 | B | * | P | |
| 5955-70-0 | Cyanide | | | | NR | |

Color Before: WHITE_____ Clarity Before: _____ Texture: MEDIUM
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

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AH 11/10/94

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOBX94

Lab Name: ITAS KNOXVILLE Contract: HANFORD
Lab Code: ITSTU Case No.: W0622 SAS No.: SDG No.: W0083
Matrix (soil/water): SOIL Lab Sample ID: AB0329
Level (low/med): LOW Date Received: 06/07/94
% Solids: 99.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M | Q |
|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR | |
| 7440-36-0 | Antimony | | | | NR | |
| 7440-38-2 | Arsenic | | | | NR | |
| 7440-39-3 | Barium | | | | NR | |
| 7440-41-7 | Beryllium | | | | NR | |
| 7440-43-9 | Cadmium | | | | NR | |
| 7440-70-2 | Calcium | | | | NR | |
| 7440-47-3 | Chromium | | | | NR | |
| 7440-48-4 | Cobalt | | | | NR | |
| 7440-50-8 | Copper | | | | NR | |
| 7439-89-6 | Iron | | | | NR | |
| 7439-92-1 | Lead | | | | NR | |
| 7439-95-4 | Magnesium | | | | NR | |
| 7439-96-5 | Manganese | | | | NR | |
| 7439-97-6 | Mercury | | | | NR | |
| 7440-02-0 | Nickel | | | | NR | |
| 7440-09-7 | Potassium | | | | NR | |
| 7782-49-2 | Selenium | | | | NR | |
| 7440-22-4 | Silver | | | | NR | |
| 7440-23-5 | Sodium | | | | NR | |
| 7440-28-0 | Thallium | | | | NR | |
| 7440-62-2 | Vanadium | | | | NR | |
| 7440-66-6 | Zinc | | | | NR | |
| 5955-70-0 | Cyanide | 1.00 | U | | AS | UJ |

Color Before: WHITE Clarity Before: Texture: MEDIUM
Color After: Clarity After: Artifacts:

Comments:
CYANIDE ONLY.

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11/10/94

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1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOBJ16
299-419-343

Lab Name: ITAS KNOXVILLE Contract: HANFORD
Lab Code: ITSTU Case No.: WO622 SAS No.: SDG No.: W0083
Matrix (soil/water): SOIL Lab Sample ID: AB0334
Level (low/med): LOW Date Received: 06/07/94
% Solids: 83.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M | Q |
|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 7690 | | | P | |
| 7440-36-0 | Antimony | 12.0 | U | | P | |
| 7440-38-2 | Arsenic | 0.48 | U | W | F | UJ |
| 7440-39-3 | Barium | 50.3 | | | P | |
| 7440-41-7 | Beryllium | 0.58 | B | | P | |
| 7440-43-9 | Cadmium | 1.2 | U | | P | |
| 7440-70-2 | Calcium | 9680 | | | P | |
| 7440-47-3 | Chromium | 16.2 | | | P | |
| 7440-48-4 | Cobalt | 9.7 | B | | P | |
| 7440-50-8 | Copper | 11.3 | | | P | |
| 7439-89-6 | Iron | 21000 | | | P | |
| 7439-92-1 | Lead | 6.5 | | | F | |
| 7439-95-4 | Magnesium | 4630 | | | P | |
| 7439-96-5 | Manganese | 310 | | | P | |
| 7439-97-6 | Mercury | 0.12 | U | | CV | |
| 7440-02-0 | Nickel | 16.2 | | | P | |
| 7440-09-7 | Potassium | 652 | B | | P | |
| 7782-49-2 | Selenium | 0.48 | U | W | F | UJ |
| 7440-22-4 | Silver | 1.2 | U | | P | |
| 7440-23-5 | Sodium | 124 | B | | P | |
| 7440-28-0 | Thallium | 0.48 | U | W | F | UJ |
| 7440-62-2 | Vanadium | 44.8 | | | P | |
| 7440-66-6 | Zinc | 27.2 | | * | P | |
| 5955-70-0 | Cyanide | | | | NR | |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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11/10/94

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1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOBJ16

Lab Name: ITAS KNOXVILLE Contract: HANFORD
Lab Code: ITSTU Case No.: W0622 SAS No.: SDG No.: W0083
Matrix (soil/water): SOIL Lab Sample ID: AB0335
Level (low/med): LOW Date Received: 06/07/94
% Solids: 83.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M | Q |
|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR | |
| 7440-36-0 | Antimony | | | | NR | |
| 7440-38-2 | Arsenic | | | | NR | |
| 7440-39-3 | Barium | | | | NR | |
| 7440-41-7 | Beryllium | | | | NR | |
| 7440-43-9 | Cadmium | | | | NR | |
| 7440-70-2 | Calcium | | | | NR | |
| 7440-47-3 | Chromium | | | | NR | |
| 7440-48-4 | Cobalt | | | | NR | |
| 7440-50-8 | Copper | | | | NR | |
| 7439-89-6 | Iron | | | | NR | |
| 7439-92-1 | Lead | | | | NR | |
| 7439-95-4 | Magnesium | | | | NR | |
| 7439-96-5 | Manganese | | | | NR | |
| 7439-97-6 | Mercury | | | | NR | |
| 7440-02-0 | Nickel | | | | NR | |
| 7440-09-7 | Potassium | | | | NR | |
| 7782-49-2 | Selenium | | | | NR | |
| 7440-22-4 | Silver | | | | NR | |
| 7440-23-5 | Sodium | | | | NR | |
| 7440-28-0 | Thallium | | | | NR | |
| 7440-62-2 | Vanadium | | | | NR | |
| 7440-66-6 | Zinc | | | | NR | |
| 5955-70-0 | Cyanide | 1.2 | ~~U~~ | | AS | UJ |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: Clarity After: Artifacts:

Comments:
CYANIDE ONLY.

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11/10/94

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOBX97
699-38-68A

Lab Name: ITAS_KNOXVILLE_____ Contract: HANFORD/WE
Lab Code: ITSTU_____ Case No.: W0647 SAS No.: _____ SDG No.: W0083_
Matrix (soil/water): SOIL_ Lab Sample ID: AB0614
Level (low/med): LOW__ Date Received: 06/14/94
% Solids: _89.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 4360 | | | P |
| 7440-36-0 | Antimony | 11.2 | U | | P |
| 7440-38-2 | Arsenic | 0.49 | B | | F |
| 7440-39-3 | Barium | 40.5 | B | | P |
| 7440-41-7 | Beryllium | 0.23 | B | | P |
| 7440-43-9 | Cadmium | 1.1 | U | | P |
| 7440-70-2 | Calcium | 2490 | | | P |
| 7440-47-3 | Chromium | 9.4 | | | P |
| 7440-48-4 | Cobalt | 5.3 | B | | P |
| 7440-50-8 | Copper | 9.0 | | | P |
| 7439-89-6 | Iron | 8410 | | | P |
| 7439-92-1 | Lead | ~~2.2~~ 2.3 ~~2.2~~ | | | F |
| 7439-95-4 | Magnesium | 2830 | | | P |
| 7439-96-5 | Manganese | 153 | | | P |
| 7439-97-6 | Mercury | 0.11 | U | | CV |
| 7440-02-0 | Nickel | 11.3 | | | P |
| 7440-09-7 | Potassium | 578 | B | | P |
| 7782-49-2 | Selenium | 0.43 | U | | F |
| 7440-22-4 | Silver | 1.1 | U | | P |
| 7440-23-5 | Sodium | 275 | B | | P |
| 7440-28-0 | Thallium | 0.43 | U | W | F |
| 7440-62-2 | Vanadium | 15.8 | | | P |
| 7440-66-6 | Zinc | 21.1 | | * | P |
| 5955-70-0 | Cyanide | | | | NR |

Q

AA 11/10/94

US

Color Before: BROWN Clarity Before: N/A Texture: MEDIUM
Color After: COLORLESS Clarity After: CLEAR Artifacts: _____

Comments:

FORM I - IN

ILM02.1

8 7/10/94
AA 11/10/94

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOBX97

Lab Name: ITAS KNOXVILLE Contract: HANFORD/WE
Lab Code: ITSTU Case No.: W0647 SAS No.: SDG No.: W0083
Matrix (soil/water): SOIL Lab Sample ID: AB0615
Level (low/med): LOW Date Received: 06/14/94
% Solids: 89.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | | | | NR |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | | | | NR |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | | | | NR |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | | | | NR |
| 7439-92-1 | Lead | | | | NR |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | | | | NR |
| 7439-97-6 | Mercury | | | | NR |
| 7440-02-0 | Nickel | | | | NR |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | | | | NR |
| 5955-70-0 | Cyanide | 1.1 | U | | AS |

Color Before: Clarity Before: Texture:
Color After: Clarity After: Artifacts:

Comments:
CYANIDE ONLY.

FORM I - IN

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015

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOBX98
699-38-68A

Lab Name: ITAS KNOXVILLE Contract: HANFORD/WE
Lab Code: ITSTU Case No.: W0647 SAS No.: _____ SDG No.: W0083
Matrix (soil/water): SOIL Lab Sample ID: AB0608
Level (low/med): LOW Date Received: 06/14/94
% Solids: 81.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M | Q |
|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 4850 | | | P | |
| 7440-36-0 | Antimony | 12.3 | U | | P | |
| 7440-38-2 | Arsenic | 0.49 | U | | F | |
| 7440-39-3 | Barium | 47.2 | B | | P | |
| 7440-41-7 | Beryllium | 0.32 | B | | P | |
| 7440-43-9 | Cadmium | 1.2 | U | | P | |
| 7440-70-2 | Calcium | 2680 | | | P | |
| 7440-47-3 | Chromium | 15.5 | | | P | |
| 7440-48-4 | Cobalt | 5.0 | B | | P | |
| 7440-50-8 | Copper | 11.9 | | | P | |
| 7439-89-6 | Iron | 10900 | | | P | |
| 7439-92-1 | Lead | 2.4 | | | F | |
| 7439-95-4 | Magnesium | 3340 | | | P | |
| 7439-96-5 | Manganese | 193 | | | P | |
| 7439-97-6 | Mercury | 0.12 | U | | CV | |
| 7440-02-0 | Nickel | 15.0 | | | P | |
| 7440-09-7 | Potassium | 644 | B | | P | |
| 7782-49-2 | Selenium | 0.49 | U | | F | |
| 7440-22-4 | Silver | 1.2 | U | | P | |
| 7440-23-5 | Sodium | 281 | B | | P | |
| 7440-28-0 | Thallium | 0.49 | ~~U~~ | W | F | UJ |
| 7440-62-2 | Vanadium | 23.9 | | | P | |
| 7440-66-6 | Zinc | 35.0 | | * | P | |
| 5955-70-0 | Cyanide | | | | NR | |

Color Before: BROWN Clarity Before: N/A Texture: MEDIUM
Color After: COLORLESS Clarity After: CLEAR Artifacts: _____

Comments:

FORM I - IN

ILM02.1

11/10/94

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U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOBX98

Lab Name: ITAS_KNOXVILLE Contract: HANFORD/WE
Lab Code: ITSTU Case No.: W0647 SAS No.: SDG No.: W0083
Matrix (soil/water): SOIL Lab Sample ID: AB0674
Level (low/med): LOW Date Received: 06/14/94
% Solids: 81.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | | | | NR |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | | | | NR |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | | | | NR |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | | | | NR |
| 7439-92-1 | Lead | | | | NR |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | | | | NR |
| 7439-97-6 | Mercury | | | | NR |
| 7440-02-0 | Nickel | | | | NR |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | | | | NR |
| 5955-70-0 | Cyanide | 1.2 | U | | AS |

Color Before: Clarity Before: Texture:
Color After: Clarity After: Artifacts:

Comments:
CYANIDE_ONLY.

FORM I - IN

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ATTACHMENT 4

LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

IT Corporation
July 18, 1994
Job Number: 622 & 647
Client Project ID: WHC SAF-94-046 200-UP-1 Soil Sampling - Round 1

## II. Analytical Results/Methodology (Continued)

The samples were analyzed for Target Analyte List (TAL) metals by cold vapor atomic absorption spectroscopy (CVAA), graphite furnace atomic absorption spectroscopy (GFAA), and inductively coupled plasma spectroscopy (ICP) in accordance with the EPA CLP ILM03 Statement of Work.

The samples were analyzed for total cyanide in accordance with the EPA CLP ILM03 Statement of Work.

The samples were analyzed for nitrate-nitrite based on EPA method 353.2.

The samples were analyzed for anions by ion chromatography using EPA method 300.0.

## III. Quality Control

The volatiles analyses were performed by purge and trap with a J & W DB-624 capillary column on a Finnigan INCOS 500 GC/MS/DS. Matrix spike and matrix spike duplicate analyses were performed using sample BOBX97. All QC results met method specified limits. The samples were extracted outside of holding time in accordance to ROD 94-00148.

The semivolatiles analyses were performed by direct injection of sample extract on a Restek XTI-5 capillary column on a Finnigan 4500 GC/MS/DS. Matrix spike and matrix spike duplicate analyses were performed using sample BOBX97. All QC results met method specified limits. The samples were extracted outside of holding time in accordance to ROD 94-00148.

Data were reported with qualifiers as follows:

U - Compound analyzed for but not detected; value given is quantitation limit.
E - Compound exceeded calibration range.
D - Compound analyzed at a secondary dilution factor.
J - Compound detected but below quantitation limit; value estimated.
S - Spiked compound.
B - Compound found in method blank.
A - Suspected aldol condensation product.
Y - Indistinguishable isomer in tentatively identified compounds.
N - Presumptive evidence of compound presence.

11/10/94

020

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

IT Corporation
July 18, 1994
Job Number: 622 & 647
Client Project ID: WHC SAF-94-046 200-UP-1 Soil Sampling - Round 1

III. Quality Control (Continued)

The samples for work order #622 were digested on July 5, 1994 for ICP and June 22, 1994 for GFAA. The CVAA analysis for mercury was performed on June 27, 1994; the GFAA analyses for arsenic, lead, selenium and thallium were performed from June 22 through June 28, 1994; the remaining metals were analyzed by ICP on July 5, 1994. All run QC was acceptable. Samples are batched with QC from work order #647.

The samples for work order #649 were digested on June 15, 1994 for ICP and GFAA. The CVAA analysis for mercury was performed on June 21, 1994; the GFAA analyses for arsenic, lead, selenium and thallium were performed from June 16 through June 22, 1994; the remaining metals were analyzed by ICP on July 6, 1994. All run QC was acceptable. A duplicate/spike pair was prepared using sample number BOBX97. Spike recovery (accuracy) results were within acceptance limits for all parameters. Duplicate RPD (precision) results were within acceptance limits for all parameters except for zinc which exhibited a slight variation due to probable sample nonhomogeneity for this analyte.

Data were reported with qualifiers as follows:

"C" Qualifiers

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
B - Value greater than instrument detection limit, but less than contract required quantitation limit.

"O" Qualifiers

* - Duplicate analysis outside control limits.
N - Spiked sample recovery outside control limits.
W - Post-digestion spike for GFAA was out of control limits (85-115%), while sample absorbance was less than 50% of spike absorbance.
S - The reported value was determined by method of standard additions.

"M" Qualifiers

P - Analysis performed by ICP.
V - Analysis performed by CVAA.
F - Analysis performed by GFAA.
C - Cyanide analysis by manual distillation/colorimetric determination.

AKS 11/10/94

021

682-1-89

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

IT Corporation
July 18, 1994
Job Number: 622 & 647
Client Project ID: WHC SAF-94-046 200-UP-1 Soil Sampling - Round 1

III. Quality Control (Continued)

Miscellaneous

D - Duplicate.
S - Spike.
NR - Not required.
G - Native analyte > 4 times spike added, therefore, acceptance criteria do not apply.
X - Detection limits higher than normal due to sample matrix interferences.

The samples were analyzed for nitrate/nitrite on June 28, 1994. Matrix spike and matrix spike duplicate analyses were performed using sample BOBX97. All quality control results were acceptable.

The samples were analyzed for fluoride, chloride, phosphate, nitrate, nitrite and sulfate by EPA method 300.0 from June 27 through June 29, 1994. Matrix spike and matrix spike duplicate analyses were performed using sample BOBX97. All quality control results were acceptable.

11/10/94
022

682-1-89

IT Corporation
July 18, 1994
Job Number: 622 & 647
Client Project ID: WHC SAF-94-046 200-UP-1 Soil Sampling - Round 1

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

III. Quality Control (Continued)

Table I is a cross reference between client sample IDs and laboratory sample IDs.

**TABLE I**

| Knoxville ID | Richland ID | WHC ID | Test |
|---|---|---|---|
| AB0326 | 406042-01A | BOBX94 | VOC |
| AB0327 | 406042-01B | " | SVOC |
| AB0328 | 406042-01C | " | METALS-T |
| AB0329 | 406042-01D | " | CYANIDE |
| AB0330 | 406042-01E | " | ANIONS |
| AB0331 | 406042-01F | " | $NO_3NO_2$ |
| AB0344 | 406042-02A | BOBX95 | VOC |
| AB0345 | 406042-03A | BOBX96 | VOC |
| AB0332 | 406042-04A | BOBJ16 | VOC |
| AB0333 | 406042-04B | " | SVOC |
| AB0334 | 406042-04C | " | METALS-T |
| AB0335 | 406042-04D | " | CYANIDE |
| AB0336 | 406042-04E | " | ANIONS |
| AB0337 | 406042-04F | " | $NO_3NO_2$ |
| AB0338 | 406042-05A | BOBX93 | VOC |
| AB0339 | 406042-05B | " | SVOC |
| AB0340 | 406042-05C | " | METALS-T |
| AB0341 | 406042-05D | " | CYANIDE |
| AB0342 | 406042-05E | " | ANIONS |
| AB0343 | 406042-05F | " | $NO_3NO_2$ |

11/10/94

023

682-1-89

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

IT Corporation
July 18, 1994
Job Number: 622 & 647
Client Project ID: WHC SAF-94-046 200-UP-1 Soil Sampling - Round 1

## III. Quality Control (Continued)

Table I is a cross reference between client sample IDs and laboratory sample IDs.

**TABLE I**

| Knoxville ID | Richland ID | WHC ID | Test |
|---|---|---|---|
| AB0606 | 406264-01A | BOBX98 | VOC |
| AB0607 | 406264-01B | " | SVOC |
| AB0608 | 406264-01C | " | METALS-T |
| AB0674 | 406264-01D | " | CYANIDE |
| AB0610 | 406264-01E | " | ANIONS |
| AB0611 | 406264-01F | " | $NO_3NO_2$ |
| AB0612 | 406264-02A | BOBX97 | VOC |
| AB0613 | 406264-02B | " | SVOC |
| AB0614 | 406264-02C | " | METALS-T |
| AB0615 | 406264-02D | " | CYANIDE |
| AB0616 | 406264-02E | " | ANIONS |
| AB0617 | 406264-02F | " | $NO_3NO_2$ |
| AB0618 | 406264-03A | BOBX99 | VOC |
| AB0619 | 406264-04A | BOBXB0 | VOC |

11/10/94

024

682-1-89

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

IT Corporation
July 18, 1994
Job Number: 622 & 647
Client Project ID: WHC SAF-94-046 200-UP-1 Soil Sampling - Round 1

## IV. Certification

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the laboratory manager or his designee, as verified by the following signature:

Reviewed and Approved:

Sheree A. Schneider

Sheree' A. Schneider
Project Manager

AS 11/10/94 025

682-1-89

# OFFICE OF SAMPLE MANAGEMENT
# RECORD OF DISPOSITION

ROD-94-00148
Record of Disposition No.

| | |
|---|---|
| DATE: 06/10/94 | LABORATORY: IT |
| PROJECT TITLE/NO.: 200-UP-1 Soil Sampling-Round 1 (SAF 94-046) | NCR NO.: N/A |

SAMPLE IDENTIFICATION NUMBERS: B0BJ16, B0BX93, B0BX94, B0BX95, B0BX96

DESCRIPTION OF EVENT:
On 6/07/94, IT was instructed to postpone the analysis of samples received on 6/04/94 until further notice from WHC.

DISPOSITION OF SAMPLES:
Per the technical representative, IT is to cancel the analysis of samples B0BX95, and B0BX93. The analysis of B0BJ16, B0BX94, and B0BX96 is to continue.

APPROVAL SIGNATURES:

J.A. Lerch — 6/10/94
HASM Project Coordinator (Print/Sign Name) — Date

B.E. Innis
Technical Representative (Print/Sign Name) — Date

N/A
Quality Assurance (Print/Sign Name) — Date

11/16/94

SAMPLE RECEIPT VARIANCE REPORT
ITAS-RICHLAND LABORATORY

WO#647

WORK ORDER NUMBER: 4062640L, 3, 4 DATE INITIATED: 6/13/94

INITIATED BY: TGilmore

DATE/TIME OF SAMPLE (AND/OR RFA & COC) RECEIPT: 6/13/94 1045

| CLIENT SAMPLE NUMBER | RFA/COC NUMBERS | ANALYSIS REQUESTED |
|---|---|---|
| B0BX97 | | CN |
| | | |
| B0BX99 | | Voa |
| B0BXB0 | | Voa |

Samples were received with the following deficiencies:

- ☐ 1. Not enough sample received for proper analysis.
- ☐ 2. Sample received without proper preservative.
- ☐ 3. No sample received in container.
- ☐ 4. Sample received without a RFA/COC form.
- ☐ 5. No sample ID on container.
- ☐ 6. Sample received broken or leaking.
- ☐ 7. Holding time exceeded at receipt.
- ☐ 8. Custody tape broken.
- ☐ 9. COC not relinquished by client.
- ☐ 10. Sample information on container does not match sample information on the paper work (Explain below).
- ☐ 11. All shipping containers (coolers) on waybill not received with shipment.
  - ☐ RFA/COC received
  - ☐ RFA/COC not received
- ☑ 12. Other (Explain below).

NOTES: container has no lable. All other containers are accounted for and match COC. B0BX99, B0BXB0 were not screened. Voa Samples supplied without separate aliquot.

SUPERVISOR REVIEW: _____

PROJECT MANAGER REVIEW: _____

TELEPHONED TO: _____ ON _____ BY _____

TELEFAXED TO: _____ ON _____ BY _____

SIGNED ORIGINAL MUST BE RETAINED IN WORK ORDER FILE

FORM NO. LS-023, 3/92, Rev. 0

11/10/94

Westinghouse Hanford Company

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

WO#622

Page 1 of 1

Data Turnaround: [ ] Priorty [X] Normal

| | | |
|---|---|---|
| Collector: W. V. SETZER | Company Contact: W. V. SETZER | Telephone No.: (509) 376-2413 |
| Project Designation: 200 UP-1 | Sampling Location: 699-38-68A | SAF No.: 94-046 |
| Ice Chest No.: 6W5-015 | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: INTERNATIONAL TECHNOLOGIES | Offsite Property No.: W94-0- | Bill of Lading/Air Bill No.: |
| Possible Sample Hazards/Remarks: NONE OBSERVED | | |
| Special Handling and/or Storage: COOL TO 4 DEGREES CENTIGRADE | | |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservative | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | | | COOL 4 | COOL 4 | COOL 4 | | |
| Type of Container | aGs | aG | G | G | G | G | P/G | P/G | | | aGs | aGs | aGs | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | 1 | 1 | 1 | | |
| Volume | 125ml | 500ml | 500ml | 250ml | 250ml | 125ml | 1000ml | 500ml | | | 125ml | 250ml | 40ml | | |
| SAMPLE ANALYSIS | VOA (CLP) | SEMIVOA (CLP) | ICP MTL GFAA METALS Hg (CLP) | Cn (CLP) | ANIONS IC-F,CL SO4,NO2 NO3,PO4 | NO2,NO3 EPA(353.2) | *1 | *1 | | | VOA TRIP | VOA FIELD | ACTIVIY SCAN | | |
| 466642 | 05A | B | C | D | E | F | 40604303 | | | | | | | | |

| Sample No. | Matrix* | Date Sampled | Time Sampled | VOA (CLP) | SEMIVOA (CLP) | ICP MTL GFAA METALS Hg (CLP) | Cn (CLP) | ANIONS IC-F,CL SO4,NO2 NO3,PO4 | NO2,NO3 EPA(353.2) | *1 | *1 | | | VOA TRIP | VOA FIELD | ACTIVIY SCAN | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BOBK93 | S | 6-2-94 | 1245 | X | X | X | X | X | X | X | X | | | | | X | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By: W. V. Setzer | Date/Time: 6/2/94 1405 | Received By: A. Simpson | Date/Time: 6/2/94 1405 |
| Relinquished By: Karen Hoerk for Anna Simpson | Date/Time: 6394 0957 | Received By: | Date/Time: |
| Relinquished By: | Date/Time: | Received By: | Date/Time: |
| Relinquished By: | Date/Time: | Received By: | Date/Time: |

SPECIAL INSTRUCTIONS

*1- GROSS ALPHA,BETA(EP-60,070,170) Am-241,Cm 243/244 (EP-60,070,960) Np-237 (EP-60,070,930) Pu-238,239/240 (EP-60,070,940) U-234,235,238 (EP-60,070,901) GAMMA SPEC TO INCLUDE; Co-58,60,Cs-137,Eu-152,154,155 AND Fe-59 (EP-60,070,100) Sr-90 (EP-60,070,500,519,520) I-129 (EP-024,560) C-14 (EP-060,251)Tc-99 (EP-020,540) Alternate matrix/medium relinquished custody of samples from matrix/medium due to illness of the shipping technician. Samples stored at shipping technician's refrigerator prior to delivery to the laboratory. WVS 6-3-94

LOWEST HOLDING TIME = 7DAYS

Matrix*

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

| LABORATORY SECTION | Received By | Title | Date/Time |
|---|---|---|---|
| | Tom [illegible] | ITAS | 6/3/94 1430 |

| FINAL SAMPLE DISPOSITION | Disposal Method | Disposed By | Date/Time |
|---|---|---|---|
| | | | |

DISTRIBUTION: Original- Sample Yellow - Sampler

BC-6000-828 (12/92)

9400000

0000028

**Westinghouse Hanford Company**

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

WU#622

Page 1 of 1

Data Turnaround: [ ] Priorty [X] Normal

| | | |
|---|---|---|
| Collector: W. V. SETZER | Company Contact: W. V. SETZER | Telephone No.: (509) 376-2413 |
| Project Designation: 200 UP-1 | Sampling Location: 699-38-68A | SAF No.: 94-046 |
| Ice Chest No.: GWS-015 | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: INTERNATIONAL TECHNOLOGIES | Offsite Property No.: W94-0- | Bill of Lading/Air Bill No.: |
| Possible Sample Hazards/Remarks | | |
| Special Handling and/or Storage: COOL TO 4 DEGREES CENTIGRADE | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservative | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | | | COOL 4 | COOL 4 | COOL 4 | | |
| Type of Container | aGs | aG | G | G | G | G | P/G | P/G | | | aGs | aGs | aGs | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | 1 | 1 | 1 | | |
| Volume | 125ml | 500ml | 500ml | 250ml | 250ml | 125ml | 1000ml | 500ml | | | 125ml | 250ml | 40ml | | |
| SAMPLE ANALYSIS | VOA (CLP) | SEMIVOA (CLP) | ICP MTL GFAA METALS Hg (CLP) | Cn (CLP) | ANIONS IC-F,CL SO4,NO2 NO3,PO4 | NO2,NO3 EPA(353.2) | *1 | *1 | | | VOA TRIP | VOA FIELD | ACTIVIY SCAN | | |
| 406042 | A | B | C | D | E | F | 406043 | | | | | | | | |

| Sample No. | Matrix* | Date Sampled | Time Sampled | A | B | C | D | E | F | 406043 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~~BOBX93~~ | ~~S~~ | | | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | | | ~~X~~ | WVS | 5-31-94 |
| BOBX94 01 | S | 5·31·94 | 1010 | X | X | X | X | X | X | X 01 | X | | | | | X | | |
| BOBX95 2 | S | 5·31·94 | 0940 | | | | | | | | | | | | X 02A | | | |
| BOBX96 3 | S | 5·31·94 | 0730 | | | | | | | | | | | X 03A | | | | |
| ~~BOBX97~~ | ~~S~~ | | | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | | | ~~X~~ | WVS | 5/31/94 |
| BOBJ16 4 | S | 6·1·94 | 1043 | X | X | X | X | X | X | X 02 | X | | | | | X | | |

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

| Relinquished By | Date/Time | Received By | Date/Time |
|---|---|---|---|
| W. V. Setzer | 6-1-94 1409 | A. Simpson | 6/1/94 1469 |
| Joren C. Rogers for Amy Simpson | 6-3-94 0945 | [illegible] | 6/3/94 |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS**

*1- GROSS ALPHA,BETA(EP-60,070,170) Am-241,Cm 243/244 (EP-60,070,960) Np-237 (EP-60,070,930) Pu-238,239/240 (EP-60,070,940) U-234,235,238 (EP-60,070,901) GAMMA SPEC TO INCLUDE; Co-58,60,Cs-137,Eu-152,154,155 AND Fe-59 (EP-60,070,100) Sr-90 (EP-60,070,500,519,520) I-129 (EP-024,560) C-14 (EP-060,251)Tc-99 (EP-020,540). Alternate custodian relinquished custody of samples for custodian due to illness of the shipping for fully custodian. Samples stored at shipping facility in locked refrigerator prior to delivery to the laboratory. [illegible] 6-3-94.

LOWEST HOLDING TIME = 7DAYS

**Matrix***

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

| LABORATORY SECTION | Received By | Title | Date/Time |
|---|---|---|---|
| | [illegible] | IVAS | 6/3/94 1430 |

| FINAL SAMPLE DISPOSITION | Disposal Method | Disposed By | Date/Time |
|---|---|---|---|
| | | | |

DISTRIBUTION: Original- Sample Yellow - Sampler

BC-6000-828 (12/92)

029 11/10/94

0000029

**Westinghouse Hanford Company**

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST wo#647

Page 1 of 1

Data Turnaround: [ ] Priority [X] Normal

| | | |
|---|---|---|
| Collector: W. V. SETZER | Company Contact: W. V. SETZER | Telephone No.: (509) 376-2413 |
| Project Designation: 200 UP-1 | Sampling Location: 699-38-68A | SAF No.: 94-046 |
| Ice Chest No.: ER-1D | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: INTERNATIONAL TECHNOLOGIES | Offsite Property No.: W94-0- 0594-38 | Bill of Lading/Air Bill No.: |

Possible Sample Hazards/Remarks: NONE OBSERVED

Special Handling and/or Storage: COOL TO 4 DEGREES CENTIGRADE — Rot 3C LCS 6/7/94

| Sample No. | Matrix* | Date Sampled | Time Sampled | A | B | C | D | E | F | 406265 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservative | | | | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | | | COOL 4 | COOL 4 | COOL 4 | |
| Type of Container | | | | aGs | aG | G | G | G | G | P/G | P/G | | | aGs | aGs | aGs | |
| No. of Container(s) | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | 1 | 1 | 1 | |
| Volume | | | | 125ml | 500ml | 500ml | 250ml | 250ml | 125ml | 1000ml | 500ml | | | 125ml | 250ml | 40ml | |
| SAMPLE ANALYSIS | | | | VOA (CLP) | SEMIVOA (CLP) | ICP MTL GFAA METALS Hg (CLP) | Cn (CLP) | ANIONS IC-F,CL SO4,NO2 NO3,PO4 | NO2,NO3 EPA(353.2) | *1 | *1 | | | VOA TRIP | VOA FIELD | ACTIVIY SCAN | |
| 406264 | | | | 6/13/94 | | | | | | | | | | | | | |
| BOBX98 01 | S | 6-9-94 | 0940 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 01 ✓ | ✓ | | | | | ✓ | |
| BOBX97 2 | S | 6-9-94 | 0940 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 02 ✓ | ✓ | | | | | ✓ | |
| BOBX99 3A | S | 6-9-94 | 0840 | | | | | | | | | | | ✓ | | | |
| BOBXBO 4A | S | 6-9-94 | 0900 | | | | | | | | | | | | ✓ | | |

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

| Relinquished By | Date/Time | Received By | Date/Time |
|---|---|---|---|
| W.V. Setzer | 6-9-94 1205 | L Sweeney L Sweeney | 6/9/94 1205 |
| L Sweeney L Sweeney | 6/9/94 1300 | A J Simpson | 6/9/94 1300 |
| A J Simpson | 6/13/94 1035 | C Kentzer IT | 6-13-94 1045 |
| | | | |

**SPECIAL INSTRUCTIONS**

*1- GROSS ALPHA,BETA(EP-60,070,170) Am-241,Cm 243/244 (EP-60,070,960) Np-237 (EP-60,070,930) Pu-238,239/240 (EP-60,070,940) U-234,235,238 (EP-60,070,901) GAMMA SPEC TO INCLUDE; Co-58,60,Cs-137,Eu-152,154,155 AND Fe-59 (EP-60,070,100) Sr-90 (EP-60,070,500,519,520) I-129 (EP-024,560) C-14 (EP-060,251)Tc-99 (EP-020,540)

SDG W0083

LOWEST HOLDING TIME = 7DAYS

**Matrix***

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

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

DISTRIBUTION: Original- Sample Yellow - Sampler

BC-6000-828 (12/92)

031

11/10/94

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

# INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

| VALIDATION LEVEL: | A | B | C | D | E |
|---|---|---|---|---|---|
| PROJECT: 200-UP-1 | | | DATA PACKAGE: W0083-ITC-094 | | |
| VALIDATOR: S. Schilde | | LAB: IT | | DATE: 11/9/94 | |
| CASE: W0622, W0647 | | | SDG: W0083 | | |
| ANALYSES PERFORMED | | | | | |
| ☑ CLP/ICP | ☑ CLP/GFAA | ☑ CLP/Hg | ☑ CLP/Cyanide | ☐ | ☐ |
| ☐ SW-846/ICP | ☐ SW-846/GFAA | ☐ SW-846/Hg | ☐ SW-846 Cyanide | ☐ | ☐ |
| SAMPLES/MATRIX BOBX94, BOBJ16, BOBX97, BOBX98 Soil | | | | | |

## 1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . . (Yes) No N/A

Is a case narrative present? . . . . . (Yes) No N/A

Comments:

## 2. HOLDING TIMES

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

Comments: CN holding time exceeded in BOBX94, BOBJ16.

032

## INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

### 3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

Were initial calibrations performed on all instruments? . . . . Yes No N/A
Are initial calibrations acceptable? . . . . . Yes No N/A
Are ICP interference checks acceptable? . . . . . Yes No N/A
Were ICV and CCV checks performed on all instruments? . . . . . Yes No N/A
Are ICV and CCV checks acceptable? . . . . . Yes No N/A
Comments:

### 4. BLANKS

Were ICB and CCB checks performed for all applicable analyses? Yes No N/A
Are ICB and CCB results acceptable? . . . . . Yes No N/A
Were preparation blanks analyzed? . . . . . Yes No N/A
Are preparation blank results acceptable? . . . . . Yes No N/A
Were field/trip blanks analyzed? . . . . . Yes No N/A
Are field/trip blank results acceptable? . . . . . Yes No N/A
Comments: Mn, Ca, Pb, detected in lab blanks. Associated results qualified
Al, Ba, Co, Fe, Mg, Na, Zn detected in equip. blank.

### 5. ACCURACY

Were spike samples analyzed? . . . . . Yes No N/A
Are spike sample recoveries acceptable? . . . . . Yes No N/A
Were laboratory control samples (LCS) analyzed? . . . . . Yes No N/A
Are LCS recoveries acceptable? . . . . . Yes No N/A
Comments:

033

## INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

### 6. PRECISION

Were laboratory duplicates analyzed? . . . . . Yes No N/A
Are laboratory duplicate samples RPD values acceptable? . . . . Yes No N/A
Were ICP serial dilution samples analyzed? . . . . . Yes No N/A
Are ICP serial dilution %D values acceptable? . . . . . Yes No N/A
Are field duplicate RPD values acceptable? . . . . . Yes No N/A
Are field split RPD values acceptable? . . . . . Yes No N/A

Comments: Zinc noted in narrative as exceeding RPD limit, but soil limit is 35%, Zinc RPD is 21.3%, no qualification required

### 7. FURNACE AA QUALITY CONTROL

Were duplicate injections performed as required? . . . . . Yes No N/A
Are duplicate injection %RSD values acceptable? . . . . . Yes No N/A
Were analytical spikes performed as required? . . . . . Yes No N/A
Are analytical spike recoveries acceptable? . . . . . Yes No N/A
Was MSA performed as required? . . . . . Yes No N/A
Are MSA results acceptable? . . . . . Yes No N/A

Comments: Analytical spike recovery of As, Se, Tl <85% in B0BJ16, Tl recovery <85% in B013X98, 97% Associated results qualified UJ.

### 8. REPORTED RESULTS AND DETECTION LIMITS

Are results reported for all requested analyses? . . . . . Yes No N/A
Are all results supported in the raw data? . . . . . Yes No N/A
Are results calculated properly? . . . . . Yes No N/A
Do results meet the CRDLs? . . . . . Yes No N/A

Comments:

034

# HOLDING TIME SUMMARY

SDG: W0083-ITC-094 | VALIDATOR: [signature] | DATE: 11/9/94 | PAGE 1 OF 2

COMMENTS: Inorganics

| FIELD SAMPLE ID | ANALYSIS TYPE | DATE SAMPLED | DATE PREPARED | DATE ANALYZED | PREP. HOLDING TIME, DAYS | ANALYSIS HOLDING TIME, DAYS | QUALIFIER |
|---|---|---|---|---|---|---|---|
| BOBX94 | ICP | 5/31/94 | ~~6/22/94~~ 7/5/94 | 7/5/94 | ~~36~~ 35 | ~~36~~ 35 | none |
| BOBJ16 | ↓ | 6/1/94 | ↓ | ↓ | ~~35~~ 34 | ~~35~~ 34 | ↓ |
| BOBX97 | ↓ | 6/9/94 | 6/15/94 | 7/6/94 | 6 | 27 | ↓ |
| BOBX98 | ↓ | 6/9/94 | ↓ | ↓ | 6 | 27 | ↓ |
| BOBX94 | CV-Hg | 5/31/94 | 6/27/94 | 6/27/94 | 27 | 27 | ↓ |
| BOBJ16 | ↓ | 6/1/94 | ↓ | ↓ | 27 | 27 | ↓ |
| BOBX97,98 | ↓ | 6/9/94 | ↓ | ↓ | 18 | 18 | ↓ |
| BOBX94 | CN | 5/31/94 | 6/21/94 | 6/23/94 | ~~22~~ 21 | ~~24~~ 23 | UJ |
| BOBJ16 | ↓ | 6/1/94 | ↓ | ↓ | 20 | 22 | UJ |
| BOBX97,98 | ↓ | 6/9/94 | ↓ | ↓ | 12 | 14 | none |
| BOBX94 | GFAA-As | 5/31/94 | 6/22/94 | 6/22/94 | 22 | 22 | none |
| BOBJ16 | ↓ | 6/1/94 | ↓ | ↓ | 21 | 21 | ↓ |
| BOBX97,98 | ↓ | | 6/15/94 | ↓ | 14 | 21 | ↓ |
| BOBX94 | GFAA-Pb | 5/31/94 | 6/22/94 | 6/28/94 | 22 | 28 | ↓ |
| BOBJ16 | ↓ | 6/1/94 | ↓ | ↓ | 21 | 27 | ↓ |
| BOBX97,98 | ↓ | 6/9/94 | 6/15/94 | 6/20/94 | 6 | 11 | ↓ |
| | | | | | | | |

# HOLDING TIME SUMMARY

SDG: W0083-ITC-094 | VALIDATOR: S. Schildt | DATE: 11/9/94 | PAGE 2 OF 2

COMMENTS: Inorganics

| FIELD SAMPLE ID | ANALYSIS TYPE | DATE SAMPLED | DATE PREPARED | DATE ANALYZED | PREP. HOLDING TIME, DAYS | ANALYSIS HOLDING TIME, DAYS | QUALIFIER |
|---|---|---|---|---|---|---|---|
| B0BX94 | GFAA-Se | 5/31/94 | 6/22/94 | 6/27/94 | 22 | 27 | none |
| B0BJ16 | ↓ | 6/1/94 | ↓ | 6/28/94 | 21 | 27 | ↓ |
| B0BX97,98 | ↓ | 6/9/94 | 6/15/94 | 6/17/94 | 6 | 8 | ↓ |
| B0BX94 | GFAA-Tl | 5/31/94 | 6/22/94 | 6/23/94 | 22 | 23 | ↓ |
| B0BJ16 | ↓ | 6/1/94 | ↓ | ↓ | 21 | 22 | ↓ |
| B0BX97,98 | ↓ | 6/9/94 | 6/15/94 | 6/22/94 | 6 | 13 | ↓ |
| ~~B0BX94~~ | | | | | | | |
| ~~B0BJ16~~ | | | | | | | |
| ~~B0BX97,98~~ | | | | | | | |
| ~~B0BX94~~ | | | | | | | |
| ~~B0BJ16~~ | | | | | | | |
| ~~B0BX97,98~~ | | | | | | | |
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U.S. EPA - CLP

3
BLANKS

Lab Name: ITAS_KNOXVILLE_____ Contract: HANFORD___

Lab Code: ITSTU_ Case No.: W0622 SAS No.: _____ SDG No.: W0083_

Preparation Blank Matrix (soil/water): SOIL_

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

| Analyte | Initial Calib. Blank (ug/L) | C | Continuing Calibration Blank (ug/L) 1 | C | 2 | C | 3 | C | Preparation Blank PBS0621 ~~PBS0622A~~ (CN) APBS0622A (0996) CPBS0622A (1479) PBS0705A (7591 7598) | C | M |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 40.0 | U | 40.0 | U | 40.0 | U | 40.0 | U | 8.000 | U | P |
| Antimony | 50.0 | U | 50.0 | U | 50.0 | U | 50.0 | U | 10.000 | U | P |
| Arsenic | 2.0 | U | 2.0 | U | 2.0 | U | 2.0 | U | 0.400 | U | F |
| Barium | 2.0 | U | 2.0 | U | 2.0 | U | 2.0 | U | 0.400 | U | P |
| Beryllium | 1.0 | U | 1.0 | U | 1.0 | U | 1.0 | U | 0.200 | U | P |
| Cadmium | 5.0 | U | 5.0 | U | 5.0 | U | 5.0 | U | 1.000 | U | P |
| Calcium | 20.0 | U | 20.0 | U | 20.0 | U | 20.0 | U | 16.442 | B | P |
| Chromium | 10.0 | U | 10.0 | U | 10.0 | U | 10.0 | U | 2.000 | U | P |
| Cobalt | 10.0 | U | 10.0 | U | 10.0 | U | 10.0 | U | 2.000 | U | P |
| Copper | 10.0 | U | 10.0 | U | 10.0 | U | 10.0 | U | 2.000 | U | P |
| Iron | 10.0 | U | 10.0 | U | 10.0 | U | 10.0 | U | 2.000 | U | P |
| Lead | 2.0 | U | 2.0 | U | 2.0 | U | 2.0 | U | 0.520 | B | F |
| Magnesium | 30.0 | U | 30.0 | U | 30.0 | U | 30.0 | U | 6.000 | U | P |
| Manganese | 2.0 | U | 2.0 | B | 2.0 | U | 2.0 | U | 0.400 | U | P |
| Mercury | 0.2 | U | 0.2 | U | 0.2 | U | 0.2 | U | 0.100 | U | CV |
| Nickel | 20.0 | U | 20.0 | U | 20.0 | U | 20.0 | U | 4.000 | U | P |
| Potassium | 1000.0 | U | 1000.0 | U | 1000.0 | U | 1000.0 | U | 200.000 | U | P |
| Selenium | 2.0 | U | 2.0 | U | 2.0 | U | 2.0 | U | 0.400 | U | F |
| Silver | 5.2 | B | 5.0 | U | 5.0 | U | 5.0 | U | 1.000 | U | P |
| Sodium | 100.0 | U | 100.0 | U | 100.0 | U | 100.0 | U | 20.000 | U | P |
| Thallium | 2.0 | U | 2.0 | U | 2.0 | U | 2.0 | U | 0.400 | U | F |
| Vanadium | 10.0 | U | 10.0 | U | 10.0 | U | 10.0 | U | 2.000 | U | P |
| Zinc | 5.0 | U | 5.0 | U | 5.0 | U | 5.0 | U | 1.000 | U | P |
| Cyanide | 10.0 | U | 10.0 | U | 10.0 | U | | | 1.000 | U | AS |

FORM III - IN ILM02.1

11/10/94

ACCURACY DATA SUMMARY

| SDG: W0083JTC-09 | VALIDATOR: S. Schulatt | DATE: 11/9/94 | PAGE 1 OF 1 | |
|---|---|---|---|---|
| COMMENTS: Inorganics, Analytical Spike | | | | |
| SAMPLE ID | COMPOUND | % RECOVERY | SAMPLE(S) AFFECTED | QUALIFIER REQUIRED |
| B0BJ16 | Arsenic | 77.1 | B0BJ16 | UJ |
| B0BJ16 | Selenium | 81 | | |
| B0BJ16 | Thallium | 73.5 | | |
| B0BX98 | Thallium | 76.6 | B0BX98 | UJ |
| B0BX97 | Thallium | 76.9 | B0BX97 | UJ |
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W0083-ITC-094

RECORD COPY

MEMORANDUM

DEC 1994

TO: 200-UP-1 Round 1 Soil Project QA Record December 7, 1994

FR: Thomas Stapp, Golder Associates Inc.

RE: RADIOCHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE W0083-ITC-094 (943-1610.034 094RAD.UP1)

## INTRODUCTION

This memo presents the results of data validation on data package W0083-ITC-094 prepared by International Technology Laboratory. Sample information is provided in the following table.

| SAMPLE ID | COMMENTS | MEDIA | ANALYSIS |
|---|---|---|---|
| B0BX94 | EQUIPMENT BLANK | SOIL | RADIOCHEMISTRY |
| B0BJ16 | | SOIL | |
| B0BX98* | DUPLICATE OF B0BX97 | SOIL | SEE ATTACHMENT 4 |
| B0BX97 | | SOIL | |
| * Indicates the sample results which were 100% recalculated. | | | |

Data validation was conducted to level D in accordance with the WHC statement of work (WHC 1994) and validation procedures (WHC 1993). Attachments 1 through 5 provide the following information as indicated below:

Attachment 1. Glossary of Data Reporting Qualifiers
Attachment 2. Summary of Data Qualifications
Attachment 3. Qualified Data Summary and Annotated Laboratory Reports
Attachment 4. Laboratory Narrative and Chain-of-Custody Documentation
Attachment 5. Data Validation Supporting Documentation

## DATA QUALITY OBJECTIVES

This section presents a summary of the data quality in terms of the referenced validation criteria.

**Precision.** Goals for precision were met.

**Accuracy.** Goals for accuracy were met with the exception of the major and minor deficiencies identified below.

**Sample Result Verification.** All sample results were supported in the raw data with the exception of carbon-14 which was not reported due to a deficiency of carbon in the samples.

**Detection Limits.** Detection limit goals were met for all results.

Revised 12-7-94

**Completeness.** The data package was complete for all requested analyses. A total of four samples were validated in this data package with a total of 106 determinations reported, 105 of which were deemed valid. This results in a completeness of 99 percent, which meets normal work plan objectives of 90 percent.

## MAJOR DEFICIENCIES

The following major deficiency was identified during data validation which required qualification of data as unusable.

### Continuing Calibration

- The strontium-90 detector efficiency check data for sample B0BJ16 was unacceptable. Attachments 2 and 5 provide a summary of the sample affected, qualification applied, and supporting documentation.

## MINOR DEFICIENCIES

The following minor deficiencies were identified during data validation which required qualification of data.

### Laboratory Blanks

- Radium-224/226/228 and europium-152 were detected in the method blank. Attachments 2 and 5 provide a summary of the samples affected, qualification applied, and supporting documentation.

### Laboratory Control Sample

- The laboratory control sample recovery for neptunium-237 was unacceptable. Attachments 2 and 5 provide a summary of the samples affected, qualification applied, and supporting documentation.

### Tracer Recovery

- The chemical tracer recovery for plutonium-238/239 analysis was unacceptable. Attachments 2 and 5 provide a summary of the samples affected, qualification applied, and supporting documentation.

## FIELD QC

- Sample B0BX98 is identified as the field duplicate of sample B0BX97. All relative percent differences were acceptable with the exception of uranium-238 and gross alpha however, no qualification is required.

- Sample B0BX94 was identified as an equipment blank. Positive results were detected for uranium-234/238 (alpha spectroscopy), potassium-40, radium-224/226/228, and uranium-238 (gamma analysis). Attachment 3 provides a summary of the results.

Revised
12-7-94

## REFERENCES

WHC 1993, Data Validation Procedures for Radiochemical Analyses, WHC-SD-EN-SPP-001, Rev. 1, 1993. Westinghouse Hanford Company, Richland, Washington.

WHC 1994, Environmental and Waste Characterization Analytical Data Validation, Purchase Order MSH-SWV-315905; Validation Statement of Work, Revision 1.0, September 7, 1994, Westinghouse Hanford Company, Richland, Washington.

Revised
12-7-94

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

ATTACHMENT 1

GLOSSARY OF RADIOCHEMISTRY DATA REPORTING QUALIFIERS

U - Indicates the constituent was analyzed for, but was not detected at a concentration above the minimum detectable activity (MDA). The concentration reported is the MDA corrected for sample aliquot size, dilution factors and percent solids (in the case of solid matrices) by the laboratory. The associated data should be considered usable for decision making purposes.

UJ - Indicates the constituent was analyzed for and was not detected at a concentration above the MDA. Due to a quality control deficiency identified during data validation, the concentration reported may not accurately reflect the sample MDA. The associated data should be considered usable for decision making purposes.

J - Indicates the constituent was analyzed for and detected. The concentration reported is qualified as estimated due to a quality control deficiency identified during data validation. The associated data should be considered usable for decision making purposes.

UR - Indicates the constituent was analyzed for and not detected.. The concentration reported is qualified as unusable due to a quality control deficiency identified during data validation. The associated data should be considered unusable for decision making purposes.

R - Indicates the constituent was analyzed for and detected. The concentration reported is qualified as unusable due to a quality control deficiency identified during data validation. The associated data should be considered unusable for decision making purposes.

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

# DATA QUALIFICATION SUMMARY - FORM B-7

| SDG: W0083-ITC-094 | REVIEWER: T. STAPP | DATE: 11-09-94 | PAGE 1 OF 1 |
|---|---|---|---|
| COMMENTS: RADIOCHEMISTRY | | | |
| COMPOUND/ANALYTE | QUALIFIER | SAMPLES AFFECTED | REASON |
| NEPTUNIUM-237 | UJ | ALL | LABORATORY CONTROL SAMPLE RECOVERY <70% BUT >30% |
| RADIUM-224/226/228 | J | B0BX94 | DETECTED IN BLANK |
| EUROPIUM-152 | J | B0BJ16, B0BX97 | DETECTED IN BLANK |
| PLUTONIUM-238/239 | UJ | B0BJ16 | TRACER RECOVERY <20% BUT >5% |
| STRONTIUM-90 | UR | B0BJ16 | CONTINUING CALIBRATION OUT OF CONTROL LIMITS |
| | | | |
| | | | |

Revised
12-7-94

ATTACHMENT 3

QUALIFIED DATA SUMMARY and ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: W0083-ITC-094

| | Samp# | B0BJ16 | | B0BX94 | | B0BX97 | | B0BX98 | |
|---|---|---|---|---|---|---|---|---|---|
| | Date | 6-1-94 | | 5-31-94 | | 6-9-94 | | 6-9-94 | |
| | Location | 299-W19-34B | | 699-38-68A | | 699-38-68A | | 699-38-68A | |
| | Depth | 332.00 - 334.00 | | --- | | 285.00 - 287.00 | | 285.00 - 287.00 | |
| | Type | SOIL | | SOIL | | SOIL | | SOIL | |
| | Comments | | | EQUIP.BLANK | | | | DUPLICATE | |
| Parameter | Units | Result | Q | Result | Q | Result | Q | Result | Q |
| AMERICIUM-241 | PCI/G | 0.029 | U | 0.025 | U | 0.024 | U | 0.016 | U |
| CURIUM-242 | PCI/G | 0.049 | U | 0.050 | U | 0.028 | U | 0.028 | U |
| CURIUM-244 | PCI/G | 0.054 | U | 0.058 | U | 0.024 | U | 0.024 | U |
| NEPTUNIUM-237 | PCI/G | 0.017 | UJ | 0.017 | UJ | 0.017 | UJ | 0.021 | UJ |
| PLUTONIUM-238 | PCI/G | 0.064 | UJ | 0.018 | U | 0.024 | U | 0.016 | U |
| PLUTONIUM-239/240 | PCI/G | 0.113 | UJ | 0.037 | U | 0.026 | U | 0.029 | U |
| URANIUM-234 | PCI/G | 0.825 | | 0.089 | | 0.467 | | 0.583 | |
| URANIUM-235 | PCI/G | 0.081 | | 0.029 | U | 0.029 | U | 0.037 | U |
| URANIUM-238 | PCI/G | 0.895 | | 0.075 | | 0.550 | | 0.512 | |
| COBALT-58 | PCI/G | 0.009 | U | 0.005 | U | 0.009 | U | 0.009 | U |
| COBALT-60 | PCI/G | 0.009 | U | 0.004 | U | 0.009 | U | 0.009 | U |
| CESIUM-137 | PCI/G | 0.008 | U | 0.004 | U | 0.008 | U | 0.010 | |
| EUROPIUM-152 | PCI/G | 0.094 | J | 0.023 | U | 0.092 | J | 0.039 | U |
| EUROPIUM-154 | PCI/G | 0.028 | U | 0.013 | U | 0.031 | U | 0.029 | U |
| EUROPIUM-155 | PCI/G | 0.046 | | 0.013 | | 0.022 | U | 0.022 | U |
| IRON-59 | PCI/G | 0.026 | U | 0.012 | U | 0.024 | U | 0.023 | U |
| IODINE-129 | PCI/G | 0.904 | U | 0.509 | U | 0.796 | U | 0.856 | U |
| POTASSIUM-40 | PCI/G | 11.200 | | 0.511 | | 14.900 | | 14.300 | |
| MANGANESE-54 | PCI/G | 0.012 | | --- | | 0.011 | | --- | |
| RADIUM-224 | PCI/G | 0.919 | | 0.134 | J | 0.532 | | 0.525 | |
| RADIUM-226 | PCI/G | 0.562 | | 0.093 | J | 0.390 | | 0.373 | |
| RADIUM-228 | PCI/G | 0.921 | | 0.112 | J | 0.553 | | 0.504 | |
| URANIUM-238DLP | PCI/G | 0.815 | | 0.164 | | 0.262 | | 0.457 | |
| GROSS ALPHA | PCI/G | 15.600 | | 5.330 | U | 6.800 | | 10.900 | |
| GROSS BETA | PCI/G | 22.100 | | 3.660 | U | 17.000 | | 22.300 | |
| STRONTIUM-90 | PCI/G | 0.338 | UR | 0.123 | U | 0.147 | U | 0.157 | U |
| TECHNETIUM-99 | PCI/G | 0.597 | | 0.496 | U | 0.496 | U | 0.496 | U |

The decimal places shown do not reflect the precision reported by the laboratory

Verified 12-7-94

Revised 12-7-94

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IT ANALYTICAL SERVICES
RICHLAND, WA
(509) 375-3131

Verified 11-9-94

## SAMPLE RESULTS

BOREHOLE: 299-W19-34B
INTERVAL: 332' - 334'

| | | | |
|---|---|---|---|
| LAB NAME: | ITAS-RICHLAND | SDG: | W0083 |
| LAB SAMPLE ID: | 40604302 | MATRIX: | SOIL |
| CLIENT ID: | B0BJ16 | DATE RECEIVED: | 6/3/94 |

| ISOTOPE | RESULT | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA | REPORT UNIT | YIELD | METHOD NUMBER |
|---|---|---|---|---|---|---|---|
| AM-241 | ~~3.03E-03~~ | ~~1.03E-02~~ | ~~1.03E-02~~ | 2.85E-02 U | pCi/g | 71.80% | RD3302 |
| CM-242 | ~~-1.71E-03~~ | ~~1.28E-02~~ | ~~1.28E-02~~ | 4.86E-02 U | pCi/g | 71.80% | RD3302 |
| CM-244 | ~~-4.47E-03~~ | ~~1.52E-02~~ | ~~1.52E-02~~ | 5.38E-02 U | pCi/g | 71.80% | RD3302 |
| NP-237 | ~~1.22E-02~~ | ~~1.44E-02~~ | ~~1.47E-02~~ | 1.67E-02 UJ | pCi/g | 100.00% | RD3208 |
| PU-238 | ~~0.00E+00~~ | ~~0.00E+00~~ | ~~7.11E-02~~ | 6.42E-02 UJ | pCi/g | 17.60% | RD3209 |
| PU239/40 | ~~-4.74E-03~~ | ~~9.47E-03~~ | ~~9.55E-03~~ | 1.13E-01 UJ | pCi/g | 17.60% | RD3209 |
| U-234 | 8.25E-01 | 1.44E-01 | 1.82E-01 | 3.72E-02 | pCi/g | 66.40% | RD3234 |
| U-235 | 8.06E-02 | 4.53E-02 | 4.66E-02 | 2.87E-02 | pCi/g | 66.40% | RD3234 |
| U-238DA | 8.95E-01 | 1.50E-01 | 1.93E-01 | 3.35E-02 | pCi/g | 66.40% | RD3234 |
| CO-58 | ~~9.60E-04~~ | ~~5.71E-03~~ | ~~5.71E-03~~ | 9.46E-03 U | pCi/g | N/A | RD3219 |
| CO-60 | ~~-4.57E-03~~ | ~~5.83E-03~~ | ~~5.85E-03~~ | 9.06E-03 U | pCi/g | N/A | RD3219 |
| CS-137DA | ~~0.00E+00~~ | ~~4.87E-03~~ | ~~4.87E-03~~ | 8.20E-03 U | pCi/g | N/A | RD3219 |
| EU-152 | 9.42E-02 J | 2.39E-02 | 2.57E-02 | 4.70E-02 | pCi/g | N/A | RD3219 |
| EU-154 | ~~-1.70E-02~~ | ~~1.74E-02~~ | ~~1.75E-02~~ | 2.83E-02 U | pCi/g | N/A | RD3219 |
| EU-155 | 4.56E-02 | 1.68E-02 | 1.74E-02 | 2.70E-02 | pCi/g | N/A | RD3219 |
| FE-59 | ~~8.47E-03~~ | ~~1.56E-02~~ | ~~1.56E-02~~ | 2.61E-02 U | pCi/g | N/A | RD3219 |
| I-129LP | ~~-1.10E-02~~ | ~~5.22E-01~~ | ~~5.22E-01~~ | 9.04E-01 U | pCi/g | N/A | RD3219 |
| K-40 | 1.12E+01 | 2.48E-01 | 1.15E+00 | N/A | pCi/g | N/A | RD3219 |
| MN-54 | 1.23E-02 | 7.28E-03 | 7.38E-03 | N/A | pCi/g | N/A | RD3219 |
| RA-224DA | 9.19E-01 | 1.86E-02 | 9.37E-02 | N/A | pCi/g | N/A | RD3219 |
| RA-226DA | 5.62E-01 | 2.49E-02 | 6.14E-02 | N/A | pCi/g | N/A | RD3219 |
| RA-228DA | 9.21E-01 | 4.80E-02 | 1.04E-01 | N/A | pCi/g | N/A | RD3219 |
| U-238DLP | 8.15E-01 | 3.03E-01 | 3.13E-01 | N/A | pCi/g | N/A | RD3219 |
| ALPHA | 1.56E+01 | 5.63E+00 | 5.88E+00 | 5.22E+00 | pCi/g | 100.00% | RD3214 |
| BETA | 2.21E+01 | 3.42E+00 | 3.71E+00 | 3.74E+00 | pCi/g | 100.00% | RD3214 |

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682A-6-93

IT ANALYTICAL SERVICES
RICHLAND, WA
(509) 375-3131

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| LAB NAME: | ITAS-RICHLAND | SDG: | W0083 |
| LAB SAMPLE ID: | 40604302 | MATRIX: | SOIL |
| CLIENT ID: | B0BJ16 | DATE RECEIVED: | 6/3/94 |

| ISOTOPE | RESULT | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA | REPORT UNIT | YIELD | METHOD NUMBER |
|---|---|---|---|---|---|---|---|
| STRONTIUM | ~~-4.95E-03~~ | ~~1.26E-01~~ | ~~1.26E-01~~ | 3.38E-01 UR | pCi/g | 32.50% | RD3204 |
| TC-99 | 5.97E-01 | 2.30E-01 | 1.01E+00 | 4.96E-01 | pCi/g | 100.00% | ITAS-IT-RS-0001 |

Number of Results: 27

Verified 11-9-94

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IT ANALYTICAL SERVICES
RICHLAND, WA
(509) 375-3131

Verified 11-9-94

## SAMPLE RESULTS

BOREHOLE : 699-38-68A
INTERVAL : 285'-287'

| | | | |
|---|---|---|---|
| LAB NAME: | ITAS-RICHLAND | SDG: | W0083 |
| LAB SAMPLE ID: | 40626502 | MATRIX: | SOIL |
| CLIENT ID: | B0BX97 | DATE RECEIVED: | 6/13/94 |

| ISOTOPE | RESULT | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA | Q | REPORT UNIT | YIELD | METHOD NUMBER |
|---|---|---|---|---|---|---|---|---|
| AM-241 | ~~4.36E-03~~ | ~~1.05E-02~~ | ~~1.05E-02~~ | 2.37E-02 | U | pCi/g | 80.10% | RD3302 |
| CM-242 | ~~-9.69E-04~~ | ~~1.37E-03~~ | ~~1.38E-03~~ | 2.77E-02 | U | pCi/g | 80.10% | RD3302 |
| CM-244 | ~~4.38E-03~~ | ~~1.05E-02~~ | ~~1.05E-02~~ | 2.38E-02 | U | pCi/g | 80.10% | RD3302 |
| NP-237 | ~~7.98E-03~~ | ~~1.18E-02~~ | ~~1.19E-02~~ | 1.67E-02 | UJ | pCi/g | 100.00% | RD3208 |
| PU-238 | ~~-1.12E-03~~ | ~~2.24E-03~~ | ~~2.25E-03~~ | 0.0237 ~~2.69E-02~~ | UR | pCi/g | 74.30% | RD3209 12- |
| PU239/40 | ~~0.00E+00~~ | ~~0.00E+00~~ | ~~1.68E-02~~ | 0.0263 ~~1.52E-02~~ | UR | pCi/g | 74.30% | RD3209 12- |
| U-234 | 4.67E-01 | 1.04E-01 | 1.20E-01 | 2.85E-02 | | pCi/g | 72.80% | RD3234 |
| U-235 | ~~1.01E-02~~ | ~~1.62E-02~~ | ~~1.63E-02~~ | 2.85E-02 | U | pCi/g | 72.80% | RD3234 |
| U-238DA | 5.50E-01 | 1.13E-01 | 1.34E-01 | 3.80E-02 | | pCi/g | 72.80% | RD3234 |
| CO-58 | ~~3.20E-03~~ | ~~5.21E-03~~ | ~~5.22E-03~~ | 8.85E-03 | U | pCi/g | N/A | RD3219 |
| CO-60 | ~~5.24E-04~~ | ~~5.65E-03~~ | ~~5.65E-03~~ | 9.33E-03 | U | pCi/g | N/A | RD3219 |
| CS-137DA | ~~3.60E-03~~ | ~~4.85E-03~~ | ~~4.86E-03~~ | 7.94E-03 | U | pCi/g | N/A | RD3219 |
| EU-152 | 9.22E-02 J | 2.39E-02 | 2.56E-02 | 4.67E-02 | | pCi/g | N/A | RD3219 |
| EU-154 | ~~-4.45E-03~~ | ~~1.89E-02~~ | ~~1.89E-02~~ | 3.05E-02 | U | pCi/g | N/A | RD3219 |
| EU-155 | ~~1.37E-02~~ | ~~1.35E-02~~ | ~~1.36E-02~~ | 2.24E-02 | U | pCi/g | N/A | RD3219 |
| FE-59 | ~~-6.09E-03~~ | ~~1.47E-02~~ | ~~1.47E-02~~ | 2.39E-02 | U | pCi/g | N/A | RD3219 |
| I-129LP | ~~-2.44E-01~~ | ~~4.73E-01~~ | ~~4.74E-01~~ | 7.96E-01 | U | pCi/g | N/A | RD3219 |
| K-40 | 1.49E+01 | 2.75E-01 | 1.51E+00 | N/A | | pCi/g | N/A | RD3219 |
| MN-54 | 1.07E-02 | 5.59E-03 | 5.69E-03 | N/A | | pCi/g | N/A | RD3219 |
| RA-224DA | 5.32E-01 | 1.52E-02 | 5.53E-02 | N/A | | pCi/g | N/A | RD3219 |
| RA-226DA | 3.90E-01 | 2.13E-02 | 4.45E-02 | N/A | | pCi/g | N/A | RD3219 |
| RA-228DA | 5.53E-01 | 4.61E-02 | 7.20E-02 | N/A | | pCi/g | N/A | RD3219 |
| U-238DLP | 2.62E-01 | 1.98E-01 | 2.00E-01 | N/A | | pCi/g | N/A | RD3219 |
| ALPHA | 6.80E+00 | 4.04E+00 | 4.10E+00 | 5.45E+00 | | pCi/g | 100.00% | RD3214 |
| BETA | 1.70E+01 | 3.13E+00 | 3.32E+00 | 3.91E+00 | | pCi/g | 100.00% | RD3214 |

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682A-6-93

IT ANALYTICAL SERVICES
RICHLAND, WA
(509) 375-3131

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| LAB NAME: | ITAS-RICHLAND | SDG: | W0083 |
| LAB SAMPLE ID: | 40626502 | MATRIX: | SOIL |
| CLIENT ID: | B0BX97 | DATE RECEIVED: | 6/13/94 |

| ISOTOPE | RESULT | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA | Q | REPORT UNIT | YIELD | METHOD NUMBER |
|---|---|---|---|---|---|---|---|---|
| STRONTIUM | ~~-5.71E-03~~ | ~~5.41E-02~~ | ~~5.41E-02~~ | 1.47E-01 | U | pCi/g | 80.90% | RD3204 |
| TC-99 | ~~4.05E-01~~ | ~~2.20E-01~~ | ~~9.88E-01~~ | 4.96E-01 | U | pCi/g | 100.00% | ITAS-IT-RS-0001 |

Number of Results: 27

Verified 11-9-94

IT ANALYTICAL SERVICES
RICHLAND, WA
(509) 375-3131

Verified 11-9-94

## SAMPLE RESULTS

BOREHOLE: 699-38-68A FIELD DUPLICATE OF B0BX97
INTERVAL: 285' - 287'

| | | | |
|---|---|---|---|
| LAB NAME: | ITAS-RICHLAND | SDG: | W0083 |
| LAB SAMPLE ID: | 40626501 | MATRIX: | SOIL |
| CLIENT ID: | B0BX98 | DATE RECEIVED: | 6/13/94 |

| ISOTOPE | RESULT | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA | Q | REPORT UNIT | YIELD | METHOD NUMBER |
|---|---|---|---|---|---|---|---|---|
| AM-241 | ~~-0.00E+00~~ | ~~0.00E+00~~ | ~~1.80E-02~~ | 1.62E-02 | U | pCi/g | 60.50% | RD3302 |
| CM-242 | ~~-5.60E-04~~ | ~~1.12E-03~~ | ~~1.12E-03~~ | 2.81E-02 | U | pCi/g | 60.50% | RD3302 |
| CM-244 | ~~-4.82E-04~~ | ~~9.63E-04~~ | ~~9.67E-04~~ | 2.42E-02 | U | pCi/g | 60.50% | RD3302 |
| NP-237 | ~~-7.32E-03~~ | ~~1.18E-02~~ | ~~1.19E-02~~ | 2.07E-02 | UJ | pCi/g | 100.00% | RD3208 |
| PU-238 | ~~-0.00E+00~~ | ~~0.00E+00~~ | ~~1.82E-02~~ | 1.64E-02 | U | pCi/g | 68.90% | RD3209 |
| PU239/40 | ~~-1.21E-03~~ | ~~2.42E-03~~ | ~~2.42E-03~~ | 2.89E-02 | U | pCi/g | 68.90% | RD3209 |
| U-234 | 5.83E-01 | 1.38E-01 | 1.63E-01 | 4.60E-02 | | pCi/g | 51.10% | RD3234 |
| U-235 | ~~-6.84E-03~~ | ~~1.64E-02~~ | ~~1.64E-02~~ | 3.72E-02 | U | pCi/g | 51.10% | RD3234 |
| U-238DA | 5.12E-01 | 1.29E-01 | 1.50E-01 | 3.72E-02 | | pCi/g | 51.10% | RD3234 |
| CO-58 | ~~-5.09E-04~~ | ~~5.28E-03~~ | ~~5.28E-03~~ | 8.63E-03 | U | pCi/g | N/A | RD3219 |
| CO-60 | ~~-1.28E-03~~ | ~~5.35E-03~~ | ~~5.35E-03~~ | 8.83E-03 | U | pCi/g | N/A | RD3219 |
| CS-137DA | 1.05E-02 | 5.35E-03 | 5.45E-03 | N/A | | pCi/g | N/A | RD3219 |
| EU-152 | ~~-3.86E-02~~ | ~~2.17E-02~~ | ~~2.20E-02~~ | 3.93E-02 | U | pCi/g | N/A | RD3219 |
| EU-154 | ~~-0.37E-03~~ | ~~1.71E-02~~ | ~~1.71E-02~~ | 2.85E-02 | U | pCi/g | N/A | RD3219 |
| EU-155 | ~~-2.17E-02~~ | ~~1.33E-02~~ | ~~1.35E-02~~ | 2.23E-02 | U | pCi/g | N/A | RD3219 |
| FE-59 | ~~-1.23E-02~~ | ~~1.46E-02~~ | ~~1.46E-02~~ | 2.35E-02 | U | pCi/g | N/A | RD3219 |
| I-129LP | ~~-1.76E-01~~ | ~~4.81E-01~~ | ~~4.81E-01~~ | 8.56E-01 | U | pCi/g | N/A | RD3219 |
| K-40 | 1.43E+01 | 2.53E-01 | 1.45E+00 | N/A | | pCi/g | N/A | RD3219 |
| RA-224DA | 5.25E-01 | 1.46E-02 | 5.45E-02 | N/A | | pCi/g | N/A | RD3219 |
| RA-226DA | 3.73E-01 | 2.14E-02 | 4.30E-02 | N/A | | pCi/g | N/A | RD3219 |
| RA-228DA | 5.04E-01 | 3.51E-02 | 6.14E-02 | N/A | | pCi/g | N/A | RD3219 |
| U-238DLP | 4.57E-01 | 2.48E-01 | 2.53E-01 | N/A | | pCi/g | N/A | RD3219 |
| ALPHA | 1.09E+01 | 4.95E+00 | 5.09E+00 | 5.83E+00 | | pCi/g | 100.00% | RD3214 |
| BETA | 2.23E+01 | 3.46E+00 | 3.76E+00 | 3.87E+00 | | pCi/g | 100.00% | RD3214 |
| STRONTIUM | ~~-6.08E-02~~ | ~~6.57E-02~~ | ~~6.73E-02~~ | 1.57E-01 | U | pCi/g | 78.20% | RD3204 |



B2A-6-93

IT ANALYTICAL SERVICES
RICHLAND, WA
(509) 375-3131

# SAMPLE RESULTS

| | | | |
|---|---|---|---|
| LAB NAME: | ITAS-RICHLAND | SDG: | W0083 |
| LAB SAMPLE ID: | 40626501 | MATRIX: | SOIL |
| CLIENT ID: | B0BX98 | DATE RECEIVED: | 6/13/94 |

| ISOTOPE | RESULT | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA | REPORT UNIT | YIELD | METHOD NUMBER |
|---|---|---|---|---|---|---|---|
| TC-99 | ~~4.41E-01~~ | ~~2.25E-01~~ | ~~9.92E-01~~ | 4.96E-01 U | pCi/g | 100.00% | ITAS-IT-RS-0001 |

Number of Results: 26

Verified 11-9-94



682A-6-93

IT ANALYTICAL SERVICES
RICHLAND, WA
(509) 375-3131

## SAMPLE RESULTS

BOREHOLE : 699-38-68 A EQUIPMENT BLANK
INTERVAL : N/A

| | | | |
|---|---|---|---|
| LAB NAME: | ITAS-RICHLAND | SDG: | W0083 |
| LAB SAMPLE ID: | 40604301 | MATRIX: | SOIL |
| CLIENT ID: | B0BX94 | DATE RECEIVED: | 6/3/94 |

| ISOTOPE | RESULT | Q | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA | Q | REPORT UNIT | YIELD | METHOD NUMBER |
|---|---|---|---|---|---|---|---|---|---|
| AM-241 | ~~-4.93E-04~~ | | ~~9.86E-04~~ | ~~9.90E-04~~ | 2.48E-02 | U | pCi/g | 58.80% | RD3302 |
| CM-242 | ~~-5.38E-03~~ | | ~~3.58E-03~~ | ~~3.70E-03~~ | 4.97E-02 | U | pCi/g | 58.80% | RD3302 |
| CM-244 | ~~-4.95E-04~~ | | ~~1.82E-02~~ | ~~1.82E-02~~ | 5.83E-02 | U | pCi/g | 58.80% | RD3302 |
| NP-237 | ~~-3.83E-03~~ | | ~~8.36E-03~~ | ~~8.40E-03~~ | 1.68E-02 | UJ | pCi/g | 100.00% | RD3208 |
| PU-238 | ~~0.00E+00~~ | | ~~0.00E+00~~ | ~~1.96E-02~~ | 1.77E-02 | U | pCi/g | 63.70% | RD3209 |
| PU239/40 | ~~-3.92E-03~~ | | ~~1.36E-02~~ | ~~1.36E-02~~ | 3.69E-02 | U | pCi/g | 63.70% | RD3209 |
| U-234 | 8.89E-02 | | 4.49E-02 | 4.63E-02 | 3.49E-02 | | pCi/g | 76.60% | RD3234 |
| U-235 | ~~-3.69E-03~~ | | ~~1.10E-02~~ | ~~1.10E-02~~ | 2.90E-02 | U | pCi/g | 76.60% | RD3234 |
| U-238DA | 7.47E-02 | | 4.07E-02 | 4.18E-02 | 2.71E-02 | | pCi/g | 76.60% | RD3234 |
| CO-58 | ~~-5.22E-04~~ | | ~~3.01E-03~~ | ~~3.01E-03~~ | 5.07E-03 | U | pCi/g | N/A | RD3219 |
| CO-60 | ~~-1.63E-03~~ | | ~~2.71E-03~~ | ~~2.72E-03~~ | 4.20E-03 | U | pCi/g | N/A | RD3219 |
| CS-137DA | ~~-1.39E-03~~ | | ~~2.63E-03~~ | ~~2.64E-03~~ | 4.15E-03 | U | pCi/g | N/A | RD3219 |
| EU-152 | ~~-1.08E-02~~ | | ~~1.41E-02~~ | ~~1.42E-02~~ | 2.26E-02 | U | pCi/g | N/A | RD3219 |
| EU-154 | ~~-1.21E-03~~ | | ~~7.76E-03~~ | ~~7.76E-03~~ | 1.33E-02 | U | pCi/g | N/A | RD3219 |
| EU-155 | 1.30E-02 | | 7.52E-03 | 7.63E-03 | 1.23E-02 | | pCi/g | N/A | RD3219 |
| FE-59 | ~~-4.12E-03~~ | | ~~6.43E-03~~ | ~~6.44E-03~~ | 1.16E-02 | U | pCi/g | N/A | RD3219 |
| I-129LP | ~~-1.39E-01~~ | | ~~2.65E-01~~ | ~~2.66E-01~~ | 5.09E-01 | U | pCi/g | N/A | RD3219 |
| K-40 | 5.11E-01 | | 8.18E-02 | 9.64E-02 | N/A | | pCi/g | N/A | RD3219 |
| RA-224DA | 1.34E-01 | J | 7.99E-03 | 1.56E-02 | N/A | | pCi/g | N/A | RD3219 |
| RA-226DA | 9.29E-02 | J | 1.26E-02 | 1.56E-02 | N/A | | pCi/g | N/A | RD3219 |
| RA-228DA | 1.12E-01 | J | 1.93E-02 | 2.23E-02 | N/A | | pCi/g | N/A | RD3219 |
| U-238DLP | 1.64E-01 | | 1.59E-01 | 1.60E-01 | N/A | | pCi/g | N/A | RD3219 |
| ALPHA | ~~-4.62E+00~~ | | ~~3.48E+00~~ | ~~3.52E+00~~ | 5.33E+00 | U | pCi/g | 100.00% | RD3214 |
| BETA | ~~-2.89E+00~~ | | ~~1.88E+00~~ | ~~1.89E+00~~ | 3.66E+00 | U | pCi/g | 100.00% | RD3214 |
| STRONTIUM | ~~-8.23E-03~~ | | ~~4.49E-02~~ | ~~4.49E-02~~ | 1.23E-01 | U | pCi/g | 100.00% | RD3204 |

016

Verified RS 11-9-94

~~0003~~

682A-6-93

IT ANALYTICAL SERVICES
RICHLAND, WA
(509) 375-3131

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| LAB NAME: | ITAS-RICHLAND | SDG: | W0083 |
| LAB SAMPLE ID: | 40604301 | MATRIX: | SOIL |
| CLIENT ID: | B0BX94 | DATE RECEIVED: | 6/3/94 |

| ISOTOPE | RESULT | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA | Q | REPORT UNIT | YIELD | METHOD NUMBER |
|---|---|---|---|---|---|---|---|---|
| TC-99 | ~~3.60E-02~~ | ~~2.13E-01~~ | ~~9.59E-01~~ | 4.96E-01 | U | pCi/g | 100.00% | ITAS-IT-RS-0001 |

Number of Results: 26

Verified RS 11-9-94

ATTACHMENT 4

LABORATORY NARRATIVE and CHAIN-OF-CUSTODY DOCUMENTATION

INTERNATIONAL TECHNOLOGY CORPORATION

# CERTIFICATE OF ANALYSIS

Westinghouse Hanford Company
P.O. Box 1970
Richland, WA 99352

August 1, 1994

Attention: J.A.Lerch

---

| | | |
|---|---|---|
| SAF Number | : | 94-046 |
| Date SDG Closed | : | June 17, 1994 |
| Number of Samples | : | Four (4) |
| Sample Type | : | Soil |
| SDG Number | : | W0083 |
| Data Deliverable | : | Stand Alone |

---

## I. Introduction

On June 3 and 13, 1994, four soil samples were received by ITAS-Richland for radiochemical analysis. Upon receipt, the samples were assigned the following laboratory ID numbers to correspond with the WHC specific IDs:

| ITAS-Richland ID | WHC ID | Matrix | Date of Receipt |
|---|---|---|---|
| 406043-01A | B0BX94 | Soil | 6/3/94 |
| 406043-02A | B0BJ16 | Soil | 6/3/94 |
| 406265-01A | B0BX98 | Soil | 6/13/94 |
| 406265-02A | B0BX97 | Soil | 6/13/94 |

019

11-9-94

---

## II. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information, the analytical result(s) and the appropriate associated statistical errors.

The requested analyses were:

**Alpha Spectroscopy**
Americium-241, Curium-244 by method ITAS-RD-3302
Neptunium-237 by method ITAS-RD-3208
Plutonium-238, 239/40 by method ITAS-RD-3209
Uranium-234, 235, 238 by method ITAS-RD-3234
**Gamma Spectroscopy**
Gamma Scan by method ITAS-RD-3219
Iodine-129 by method ITAS-RD-3219
**Gas Proportional Counting**
Gross Alpha by method ITAS-RD-3222
Gross Beta by method ITAS-RD-3222
Strontium-90 by method ITAS-RD-3204
**Liquid Scintillation Counting**
Carbon-14 by method ITAS-RD-3247
Technetium-99 by method ITAS-IT-RS-0001

## III. Quality Control

The analytical results for each analysis performed under SDG W0083 include a minimum of one Laboratory Control Sample (LCS), one method (reagent) blank, and one duplicate.

Quality control sample results are reported in the same units as sample results except for Gross Alpha and Gross Beta quality control sample results which are reported in pCi/sample.

## IV. Comments

The initial radioactivity screening of the samples classified samples B0BX94 and B0BJ16 as Category II and samples B0BX98 and B0BX97 as Category I.

11-9-94 020

~~0005~~

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Analysis of sample B0BX93, received with samples B0BX94 and B0BJ16, was cancelled per WHC ROD 94-00148.

**Alpha Spectroscopy**

Americium-241, Curium-244 by method ITAS-RD-3302
The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BJ16) results are within contractual requirements.

Neptunium-237 by method ITAS-RD-3208
The LCS radiochemical recovery is accepted with a low bias (32%). The batch data are accepted based on an acceptable matrix spike recovery (72%), and acceptable batch blank, sample and sample duplicate (duplicate of sample B0BJ16) results.

Plutonium-238, 239/40 by method ITAS-RD-3209
The tracer yield for sample B0BJ16 was less than 20%, however, the sample results are reported as acceptable because the required detection limit was achieved, the sample result was less than contractual detection limit, the sample was duplicated and the sample duplicate yield is acceptable, and the sample duplicate result is within the 3 sigma error around the sample result. The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BJ16) results are accepted and reported.

Uranium-234, 235, 238 by method ITAS-RD-3234
The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BJ16) results are accepted and reported.

**Gamma Spectroscopy**

Gamma Scan by method ITAS-RD-3219
Cd-109 was detected in all of the samples and QC samples. The Cd-109 results are not reported because they are suspected false positive results caused by x-ray lines produced by energy reflection from the detector shielding. The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BX94) results are within contractual requirements.

---

Iodine-129 by method ITAS-RD-3219
The LCS was biased high (125%) on the initial count. The recount of the LCS indicated a low bias (42%). The original LCS value is accepted and reported. The cause of the LCS recovery fluctuations is under investigation by the Technical Associate Group. None of the batch samples were above the detection limit for I-129. The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BX94) results are accepted and reported.

**Gas Proportional Counting**

Gross Alpha by method ITAS-RD-3222
The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BX94) results are within contractual requirements.

Gross Beta by method ITAS-RD-3222
The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BX94) results are within contractual requirements.

Strontium-90 by method ITAS-RD-3204
The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BX94) results are within contractual requirements.

**Liquid Scintillation Counting**

Carbon-14 by method ITAS-RD-3247
Carbon-14 results are not reportable for these samples due to an insufficient presence of carbon in the samples to perform the analysis. The carbon-14 method requires that 2 grams of carbon be present in each sample. The samples produced insufficient carbon dioxide during sample preparation. Two separate attempts were made to extrude carbon from the sample matrices. The sample results are considered unreportable due to a matrix effect (lack of carbon in the matrix).

Technetium-99 by method ITAS-IT-RS-0001
The matrix spike, LCS, batch blank, sample and sample duplicate (duplicate of sample B0BJ16) results are within contractual requirements.

---

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

Reviewed and approved:

Suzanne Gaines

Suzanne Gaines
Project Manager



11-9-94

~~0008~~

Westinghouse Hanford Company

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 1

Data Turnaround: [ ] Priorty [X] Normal

| | | |
|---|---|---|
| Collector: W. V. SETZER | Company Contact: W. V. SETZER | Telephone No.: (509) 376-2413 |
| Project Designation: 200 UP-1 | Sampling Location: 699-38-68A | SAF No.: 94-046 |
| Ice Chest No.: ER-1D | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: INTERNATIONAL TECHNOLOGIES | Offsite Property No.: W94-0-0594-38 | Bill of Lading/Air Bill No.: |
| Possible Sample Hazards/Remarks: NONE OBSERVED | | |
| Special Handling and/or Storage: COOL TO 4 DEGREES CENTIGRADE | | |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservative | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | | | COOL 4 | COOL 4 | COOL 4 | | |
| Type of Container | aGs | aG | G | G | G | G | P/G | P/G | | | aGs | aGs | aGs | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | 1 | 1 | 1 | | |
| Volume | 125ml | 500ml | 500ml | 250ml | 250ml | 125ml | 1000ml | 500ml | | | 125ml | 250ml | 40ml | | |
| SAMPLE ANALYSIS | VOA (CLP) | SEMIVOA (CLP) | ICP MTL GFAA METALS Hg (CLP) | Cn (CLP) | ANIONS IC-F,CL SO4,NO2 NO3,PO4 | NO2,NO3 EPA(353.2) | *1 | *1 | | | VOA TRIP | VOA FIELD | ACTIVIY SCAN | | |
| | 6/13/94 A | B | C | D | E | F | 4062265 | | | | | | | | |

4062264

| Sample No. | Matrix* | Date Sampled | Time Sampled | VOA (CLP) | SEMIVOA (CLP) | ICP MTL GFAA METALS Hg (CLP) | Cn (CLP) | ANIONS IC-F,CL SO4,NO2 NO3,PO4 | NO2,NO3 EPA(353.2) | *1 | *1 | | | VOA TRIP | VOA FIELD | ACTIVIY SCAN | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B0BX98 01 | S | 6-9-94 | 0940 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 01 ✓ | ✓ | | | | | ✓ | | |
| B0BX97 2 | S | 6-9-94 | 0940 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 02 ✓ | ✓ | | | | | ✓ | | |
| B0BX99 3A | S | 6-9-94 | 0840 | | | | | | | | | | | ✓ | | | | |
| B0BXB0 4A | S | 6-9-94 | 0900 | | | | | | | | | | | | ✓ | | | |

| CHAIN OF POSSESSION | Sign/Print Names | Date/Time |
|---|---|---|
| Relinquished By | W. V. Setzer | 6-9-94 1205 |
| Received By | L Sweeney L Sweeney | 6/9/94 1205 |
| Relinquished By | L Sweeney L Sweeney | 6/9/94 1300 |
| Received By | A J Simpson | 6/9/94 1300 |
| Relinquished By | A J Simpson | 6/13/94 1035 |
| Received By | C Keitzer IT | 6-13-94 1045 |
| Relinquished By | | |
| Received By | | |

SPECIAL INSTRUCTIONS

*1- GROSS ALPHA,BETA(EP-60,070,170) Am-241,Cm 243/244 (EP-60,070,960) Np-237 (EP-60,070,930) Pu-238,239/240 (EP-60,070,940) U-234,235,238 (EP-60,070,901) GAMMA SPEC TO INCLUDE; Co-58,60,Cs-137,Eu-152,154,155 AND Fe-59 (EP-60,070,100) Sr-90 (EP-60,070,500,519,520) I-129 (EP-024,560) C-14 (EP-060,251)Tc-99 (EP-020,540)

SDG W0083

LOWEST HOLDING TIME = 7DAYS

Matrix*

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

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

DISTRIBUTION: Original- Sample Yellow - Sampler

BC-6000-828 (12/92)

02

**Westinghouse Hanford Company**

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 1

Data Turnaround: [ ] Priorty [X] Normal

| | | |
|---|---|---|
| Collector: W. V. SETZER | Company Contact: W. V. SETZER | Telephone No.: (509) 376-2413 |
| Project Designation: 200 UP-1 | Sampling Location: 699-38-68A | SAF No.: 94-046 |
| Ice Chest No.: GWS-015 | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: INTERNATIONAL TECHNOLOGIES | Offsite Property No.: W94-0- | Bill of Lading/Air Bill No.: |

Possible Sample Hazards/Remarks

Special Handling and/or Storage: COOL TO 4 DEGREES CENTIGRADE

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservative | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | | | COOL 4 | COOL 4 | COOL 4 | | |
| Type of Container | aGs | aG | G | G | G | G | P/G | P/G | | | aGs | aGs | aGs | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | 1 | 1 | 1 | | |
| Volume | 125ml | 500ml | 500ml | 250ml | 250ml | 125ml | 1000ml | 500ml | | | 125ml | 250ml | 40ml | | |
| SAMPLE ANALYSIS | VOA (CLP) | SEMIVOA (CLP) | ICP MTL GFAA METALS Hg (CLP) | Cn (CLP) | ANIONS IC-F,CL SO4,NO2 NO3,PO4 | NO2,NO3 EPA(353.2) | *1 | *1 | | | VOA TRIP | VOA FIELD | ACTIVIY SCAN | | |
| 406042 | A | B | C | D | E | F | 406043 | | | | | | | | |

~~0048~~ 11-9-94

| Sample No. | Matrix* | Date Sampled | Time Sampled | A | B | C | D | E | F | *1 | *1 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~~BOBX93~~ | ~~S~~ | | | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | | | ~~X~~ | WVS | 5-31-94 |
| BOBX94 01 | S | 5·31·94 | 1010 | X | X | X | X | X | X | X 01 | X | | | | | X | | |
| BOBX95 2 | S | 5·31·94 | 0940 | | | | | | | | | | | | X 02A | | | |
| BOBX96 3 | S | 5·31·94 | 0730 | | | | | | | | | | | X 03A | | | | |
| ~~BOBX97~~ | ~~S~~ | | | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | | | ~~X~~ | WVS | 5/31/94 |
| BOBJ16 4 | S | 6·1·94 | 1043 | X | X | X | X | X | X | X 02 | X | | | | | X | | |

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

| Relinquished By | Date/Time | Received By | Date/Time |
|---|---|---|---|
| W.V. Setzer | 6-1-94 1409 | A Simpson | 6/1/94 1409 |
| Joven C. Rogers for Amy Simpson | 6-3-94 0945 | [signature] | 6/3/94 |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS**

*1- GROSS ALPHA,BETA(EP-60,070,170) Am-241,Cm 243/244 (EP-60,070,960) Np-237 (EP-60,070,930) Pu-238,239/240 (EP-60,070,940) U-234,235,238 (EP-60,070,901) GAMMA SPEC TO INCLUDE; Co-58,60,Cs-137,Eu-152,154,155 AND Fe-59 (EP-60,070,100) Sr-90 (EP-60,070,500,519,520) I-129 (EP-024,560) C-14 (EP-060,251)Tc-99 (EP-020,540) alternate custodian relinquished custody of samples for custodian due to illness of the shipping facility custodian. Samples stored at shipping facility in locked refrigerator prior to delivery to the laboratory. [initials] 6-3-94.

LOWEST HOLDING TIME = 7DAYS

**Matrix***

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

| LABORATORY SECTION | Received By | Title | Date/Time |
|---|---|---|---|
| | [signature] | IJAS | 6/3/94 1430 |

| FINAL SAMPLE DISPOSITION | Disposal Method | Disposed By | Date/Time |
|---|---|---|---|
| | | | |

DISTRIBUTION: Original- Sample Yellow - Sampler

BC-6000-828 (12/92)

**Westinghouse Hanford Company**

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 1

Data Turnaround: [ ] Priorty [X] Normal

| | | |
|---|---|---|
| Collector: W. V. SETZER | Company Contact: W. V. SETZER | Telephone No.: (509) 376-2413 |
| Project Designation: 200 UP-1 | Sampling Location: 699-38-68A | SAF No.: 94-046 |
| Ice Chest No.: GWS-015 | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: INTERNATIONAL TECHNOLOGIES | Offsite Property No.: W94-0- | Bill of Lading/Air Bill No.: |

Possible Sample Hazards/Remarks: NONE OBSERVED

Special Handling and/or Storage: COOL TO 4 DEGREES CENTIGRADE

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservative | | | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | COOL 4 | | | COOL 4 | COOL 4 | COOL 4 | | |
| Type of Container | | | aGs | aG | G | G | G | G | P/G | P/G | | | aGs | aGs | aGs | | |
| No. of Container(s) | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | 1 | 1 | 1 | | |
| Volume | | | 125ml | 500ml | 500ml | 250ml | 250ml | 125ml | 1000ml | 500ml | | | 125ml | 250ml | 40ml | | |
| SAMPLE ANALYSIS | | | VOA (CLP) | SEMIVOA (CLP) | ICP MTL GFAA METALS Hg (CLP) | Cn (CLP) | ANIONS IC-F,CL SO4,NO2 NO3,PO4 | NO2,NO3 EPA(353.2) | *1 | *1 | | | VOA TRIP | VOA FIELD | ACTIVIY SCAN | | |
| 406042 | | | 05A | B | C | D | E | F | 40604303 | | | | | | | | |
| Sample No. | Matrix* | Date Sampled | Time Sampled | | | | | | | | | | | | | | |
| BOBX93 | S | 6-2-94 | 1245 | X | X | X | X | X | X | X | X | | | | X | | |

~~0049~~ 11-9-94

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By: W. V. Setzer | Date/Time: 6/2/94 1405 | Received By: A. Simpson | Date/Time: 6/2/94 1405 |
| Relinquished By: Loren C. Rogers for Amy Simpson | Date/Time: 6394 0957 | Received By: | Date/Time: |
| Relinquished By: | Date/Time: | Received By: | Date/Time: |
| Relinquished By: | Date/Time: | Received By: | Date/Time: |

SPECIAL INSTRUCTIONS

*1- GROSS ALPHA,BETA(EP-60,070,170) Am-241,Cm 243/244 (EP-60,070,960) Np-237 (EP-60,070,930) Pu-238,239/240 (EP-60,070,940) U-234,235,238 (EP-60,070,901) GAMMA SPEC TO INCLUDE; Co-58,60,Cs-137,Eu-152,154,155 AND Fe-59 (EP-60,070,100) Sr-90 (EP-60,070,500,519,520) I-129 (EP-024,560) C-14 (EP-060,251)Tc-99 (EP-020,540) alternate custodian relinquished custody of samples for custodian due to illness of the shipping facility custodian. Samples stored at shipping facility in locked refrigerator prior to delivery to the laboratory. [illegible] 6-3-94

LOWEST HOLDING TIME = 7DAYS

Matrix*

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

| LABORATORY SECTION | Received By | Title | Date/Time |
|---|---|---|---|
| | [signature] | ITAS | 6/3/94 1430 |

| FINAL SAMPLE DISPOSITION | Disposal Method | Disposed By | Date/Time |
|---|---|---|---|
| | | | |

DISTRIBUTION: Original- Sample Yellow - Sampler

BC-6000-828 (12/92)

021

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

# RADIOCHEMICAL DATA VALIDATION CHECKLIST

| VALIDATION LEVEL: | A | B | C | D | E |
|---|---|---|---|---|---|

| | | |
|---|---|---|
| PROJECT: 200-UP-1 ROUND 1 SOIL. | DATA PACKAGE: W0083-ITC-094 | |
| VALIDATOR: T. Stapp | LAB: ITC Analytical | DATE: 11-8-94 |
| CASE: | SDG: | |

ANALYSES PERFORMED

| | | | | | |
|---|---|---|---|---|---|
| ☒ Gross Alpha/Beta | ☒ Strontium-90 | ☒ Technetium-99 | ☒ Alpha Spectroscopy | ☒ Gamma Spectroscopy | |
| ☐ Total Uranium | ☐ Radium-22 | ☐ Tritium | ☒ I-129 | | |

SAMPLES/MATRIX

| | |
|---|---|
| BOBX94 | SOIL |
| BOBJ16 | |
| BOBX98 | |
| BOBX97 | |

1. Completeness . . . . . ☐ N/A

Technical verification forms present? . . . . . (Yes) No N/A

Comments:

2. Initial Calibration . . . . . ☐ N/A

Instruments/detectors calibrated within one year of sample analysis? . . . Note ① . . . . . Yes (No) N/A

Initial calibration acceptable? . . . . . (Yes) No N/A

Standards NIST traceable? . . . . . (Yes) No N/A

Standards Expired? . . . . . Yes (No) N/A

Comments: ① Initial calibration for Am-241, Cm-242/244, Np-237, Pu-238/239, U-234/235/238, Gamma, I-129, and gross α/β detectors not performed within one year of sample analysis, however Continuing calib. Criteria is acceptable and no qualification applies.

Revised 12-7-94

3. Continuing Calibration . . . . . ☐ N/A

Calibration checked within one week of sample analysis? . . . (Yes) No N/A
Calibration check acceptable? .NOTE ①. . . . . Yes (No) N/A
Calibration check standards NIST traceable? . . . . . (Yes) No N/A
Calibration check standards expired? . . . . . Yes (No) N/A

Comments: ① Sr-90 analysis efficiency check data for July 6 '94 on detector # 46 was out of control limits qualifying sample BOBJ16 results as rejected (R/UR).

4. Blanks . . . . . ☐ N/A

Method blank analyzed? . . . . . (Yes) No N/A
Method blank results acceptable? . . . . . Yes (No) N/A
Analytes detected in method blank? .NOTE ①. . . . . (Yes) No N/A
Field blank(s) analyzed? . . . NOTE ②. . . . . (Yes) No N/A
Field blank results acceptable? . . . . . Yes (No) N/A
Analytes detected in field blank(s)? . . NOTE ③. . . . . (Yes) No N/A
Transcription/Calculation Errors? . . . . . Yes (No) N/A

Comments: ① See Blank Results Summary page. ② Sample BOBX94 is identified as an Equipment Blank. ③ See Sample results FORM 1 for positive results. however qualification of associated samples is not required per DV procedures.

5. Matrix Spikes . . . . . ☐ N/A

Matrix spike analyzed? . . . . . (Yes) No N/A
Spike recoveries acceptable? . . . . . (Yes) No N/A
Spike source traceable? . . . . . (Yes) No N/A
Spike source expired? . . . . . Yes (No) N/A
Transcription/Calculation Errors? . . . . . Yes (No) N/A

Comments:

029

6. Laboratory Control Samples . . . . . ☐ N/A

LCS analyzed? . . . . . Yes No N/A
LCS recoveries acceptable? . . . . NOTE ① . . . . . Yes No N/A
LCS traceable? . . . . . Yes No N/A
Transcription/Calculation Errors? . . . . . Yes No N/A

Comments: ① See LCS Recovery Summary page.

7. Chemical Recovery . . . . . ☐ N/A

Chemical carrier added? . . . . . Yes No N/A
Chemical recovery acceptable? . . . NOTE ① . . . . . Yes No N/A
Chemical carrier traceable? . . . . . Yes No N/A
Chemical carrier expired? . . . . . Yes No N/A
Transcription/Calculation errors? . . . . . Yes No N/A

Comments: ① Pu-242 yield for Pu 238/239 analysis of Sample BOBJ16 was below 20% (@ 18%) but above 5% which qualifies indicated results as estimated (J/UJ).

8. Duplicates . . . . . ☐ N/A

Duplicates Analyzed? . . . . . Yes No N/A
RPD Values Acceptable? . . . . . Yes No N/A
Transcription/Calculation Errors? . . . . . Yes No N/A

Comments:

030

9. Field QC Samples . . . . . ☐ N/A

Field duplicate sample(s) analyzed? . NOTE ① . . . . . (Yes) No N/A
Field duplicate RPD values acceptable? . NOTE ② . . . . Yes (No) N/A
Field split sample(s) analyzed? . . . . . Yes No (N/A)
Field split RPD values acceptable? . . . . . Yes No (N/A)
Performance audit sample(s) analyzed? . . . . . Yes No (N/A)
Performance audit sample results acceptable? . . . . . Yes No (N/A)

Comments: ① Sample BOBX98 is identified as the field duplicate of sample BOBX97.
② RPD values for soil samples exceeded the 35% limit for U-238 by gamma spec and gross alpha for the field duplic. pair however qualification is not required.

10. Holding Times

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

Comments: See holding time Summary pages (B-1).

11. Results and Detection Limits (Levels D & E) . . . . . ☐ N/A

Results reported for all required sample analyses? NOTE ①. Yes (No) N/A
Results supported in raw data? . . . . . (Yes) No N/A
Results Acceptable? . . . . . (Yes) No N/A
Transcription/Calculation errors? . . . . . Yes (No) N/A
MDA's meet required detection limits? . . . . . (Yes) No N/A
Transcription/calculation errors? . . . . . Yes (No) N/A

Comments: ① Carbon-14 analysis results were not reported due to insufficient carbon available in the samples for analysis.

031

IT ANALYTICAL SERVICES
RICHLAND, WA
(509) 375-3131

# LABORATORY CONTROL SAMPLE
Summary

LAB NAME: ITAS-RICHLAND SDG: W0083
LAB SAMPLE ID: L060431S MATRIX: SOIL

| ISOTOPE | RESULT | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA | REPORT UNIT | YIELD | EXPECTED | RECOVER |
|---|---|---|---|---|---|---|---|---|
| AM-241 | 1.80E+00 | 1.65E-01 | 2.86E-01 | 2.02E-02 | pCi/g | 96.10% | 2.27E+00 | 79.30% |
| CM-242 | 3.31E-03 | 1.20E-02 | 1.20E-02 | 3.23E-02 | pCi/g | 96.10% | 1.00E-02 | 33.10% N |
| CM-244 | 2.27E-03 | 1.35E-02 | 1.35E-02 | 3.75E-02 | pCi/g | 96.10% | 1.00E-02 | 22.70% N |
| NP-237 | 1.85E+00 | 1.75E-01 | 4.35E-01 | 1.68E-02 | pCi/g | 100.00% | 5.76E+00 | 32.12% |
| PU239/40 | 3.36E+00 | 3.36E-01 | 5.97E-01 | 4.02E-02 | pCi/g | 49.70% | 3.39E+00 | 99.12% |
| U-234 | 1.48E+00 | 1.61E-01 | 2.41E-01 | 2.57E-02 | pCi/g | 96.00% | 1.62E+00 | 91.36% |
| U-238DA | 1.72E+00 | 1.73E-01 | 2.70E-01 | 2.45E-02 | pCi/g | 96.00% | 1.70E+00 | 101.18% |
| CS-137DA | 3.26E-01 | 2.10E-02 | 3.88E-02 | N/A | pCi/g | N/A | 3.50E-01 | 93.14% |
| I-129LP | 1.13E+01 | 1.12E+00 | 1.59E+00 | N/A | pCi/g | N/A | 9.01E+00 | 125.42% |
| K-40 | 1.79E+01 | 4.39E-01 | 1.85E+00 | N/A | pCi/g | N/A | 1.95E+01 | 91.79% |
| RA-226DA | 9.31E-01 | 4.44E-02 | 1.03E-01 | N/A | pCi/g | N/A | 1.16E+00 | 80.26% |
| RA-228DA | 2.01E+00 | 8.70E-02 | 2.19E-01 | N/A | pCi/g | N/A | 1.87E+00 | 107.49% |
| U-238DLP | 8.50E-01 | 7.13E-01 | 7.18E-01 | N/A | pCi/g | N/A | 1.05E+00 | 80.95% |
| ALPHA | 3.86E+00 | 3.96E-01 | 7.61E-01 | 1.00E-01 | pCi/sa | 100.00% | 4.52E+00 | 85.40% |
| BETA | 1.12E+01 | 1.05E+00 | 1.31E+00 | 7.94E-01 | pCi/sa | 100.00% | 1.13E+01 | 99.12% |
| STRONTIUM | 5.37E+00 | 2.76E-01 | 1.36E+00 | 1.39E-01 | pCi/g | 88.50% | 6.03E+00 | 89.05% |
| U-235 | 0.05574 | | | 0.0198 | pCi/g | | 0.07384 | 75.48% |

Number of Results: 16

Sample results of the circled recovery for the isotope indicated are qualified as estimated (J/UJ)

NA - NOT ADDED.

~~0022~~
032 11-9-94

682A-6-93

IT ANALYTICAL SERVICES
RICHLAND, WA
(509) 375-3131

# BLANK RESULTS
SUMMARY

11-9-94

LAB NAME: ITAS-RICHLAND SDG: W0083
LAB SAMPLE ID: L060431B MATRIX: SOIL

| ISOTOPE | RESULT | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA | REPORT UNIT | YIELD | METHOD NUMBER |
|---|---|---|---|---|---|---|---|
| AM-241 | 4.64E-02 | 3.20E-02 | 3.28E-02 | 3.46E-02 | pCi/g | 72.10% | RD3302 |
| CM-242 | -7.07E-03 | 3.53E-03 | 3.70E-03 | 4.40E-02 | pCi/g | 72.10% | RD3302 |
| CM-244 | 5.25E-03 | 2.08E-02 | 2.08E-02 | 5.41E-02 | pCi/g | 72.10% | RD3302 |
| NP-237 | -1.67E-03 | 1.49E-03 | 1.53E-03 | 2.35E-02 | pCi/g | 100.00% | RD3208 |
| PU-238 | 0.00E+00 | 0.00E+00 | 2.38E-02 | 2.15E-02 | pCi/g | 52.60% | RD3209 |
| PU239/40 | 0.00E+00 | 0.00E+00 | 2.38E-02 | 2.14E-02 | pCi/g | 52.60% | RD3209 |
| U-234 | 7.75E-03 | 1.99E-02 | 1.99E-02 | 4.89E-02 | pCi/g | 60.20% | RD3234 |
| U-235 | -2.77E-03 | 2.48E-03 | 2.51E-03 | 3.91E-02 | pCi/g | 60.20% | RD3234 |
| U-238DA | 5.26E-03 | 1.40E-02 | 1.40E-02 | 3.45E-02 | pCi/g | 60.20% | RD3234 |
| CO-58 | -1.05E-03 | 2.41E-03 | 2.42E-03 | 3.96E-03 | pCi/g | N/A | RD3219 |
| CO-60 | -1.03E-03 | 2.18E-03 | 2.18E-03 | 3.60E-03 | pCi/g | N/A | RD3219 |
| CS-137DA | 1.55E-04 | 1.95E-03 | 1.95E-03 | 3.34E-03 | pCi/g | N/A VALUE x 5 | RD3219 |
| EU-152 | 2.57E-02 | 1.05E-02 | 1.08E-02 | 2.18E-02 | pCi/g | N/A 0.129 | RD3219 |
| EU-154 | -2.66E-03 | 6.43E-03 | 6.44E-03 | 1.06E-02 | pCi/g | N/A | RD3219 |
| EU-155 | 6.72E-03 | 6.17E-03 | 6.20E-03 | 9.92E-03 | pCi/g | N/A | RD3219 |
| FE-59 | 2.25E-03 | 5.58E-03 | 5.58E-03 | 9.97E-03 | pCi/g | N/A | RD3219 |
| I-129LP | -8.23E-03 | 2.47E-01 | 2.47E-01 | 4.50E-01 | pCi/g | N/A | RD3219 |
| K-40 | 5.83E-02 | 5.35E-02 | 5.39E-02 | N/A | pCi/g | N/A | RD3219 |
| RA-224DA | 3.27E-02 | 6.52E-03 | 7.29E-03 | N/A | pCi/g | N/A 0.164 | RD3219 |
| RA-226DA | 5.98E-02 | 9.90E-03 | 1.16E-02 | N/A | pCi/g | N/A 0.299 | RD3219 |
| RA-228DA | 4.35E-02 | 8.97E-03 | 9.97E-03 | 1.90E-02 | pCi/g | N/A 0.218 | RD3219 |
| ALPHA | 9.97E-03 | 4.80E-02 | 4.81E-02 | 1.20E-01 | pCi/sa | 100.00% | RD3214 |
| BETA | -8.34E-02 | 3.33E-01 | 3.33E-01 | 8.23E-01 | pCi/sa | 100.00% | RD3214 |
| STRONTIUM | -2.55E-03 | 4.93E-02 | 4.93E-02 | 1.32E-01 | pCi/g | 97.20% | RD3204 |
| TC-99 | -1.91E-01 | 2.10E-01 | 9.41E-01 | 4.96E-01 | pCi/g | 100.00% | ITAS-IT-RS-0001 |

Results less than 5 x the circled value for the isotopes indicated and above the MDA are qualified as estimated (J).

682A-6-93

0019
03.

HOLDING TIME SUMMARY

| SDG: W0083-ITC-094 | VALIDATOR: T. Stapp | DATE: 11-8-94 | PAGE 2 OF 3 |
|---|---|---|---|

COMMENTS:

| FIELD SAMPLE ID | ANALYSIS TYPE | DATE SAMPLED | DATE PREPARED | DATE ANALYZED | PREP. HOLDING TIME, DAYS | ANALYSIS HOLDING TIME, DAYS | QUALIFIER |
|---|---|---|---|---|---|---|---|
| BOBX94 | U-234/235/238 | 5-31-94 | N/A | 7-06-94 | N/A | ≤ 180 | NONE |
| BOBJ16 | | 6-01-94 | | 7-06-94 | | | |
| BOBX98 | | 6-09-94 | | 7-07-94 | | | |
| BOBX97 | | 6-09-94 | | 7-07-94 | | | |
| | | | | | | | |
| BOBX94 | GAMMA | 5-31-94 | | 6-27-94 | | ≤ 180 | NONE |
| BOBJ16 | | 6-01-94 | | 6-27-94 | | | |
| BOBX98 | | 6-09-94 | | 6-30-94 | | | |
| BOBX97 | | 6-09-94 | | 6-30-94 | | | |
| | | | | | | | |
| BOBX94 | I-129 | 5-31-94 | | 6-24-94 | | ≤ 180 | NONE |
| BOBJ16 | | 6-01-94 | | 6-25-94 | | | |
| BOBX98 | | 6-09-94 | | 6-28-94 | | | |
| BOBX97 | | 6-09-94 | | 6-28-94 | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

11-8-94

11-8-94

# HOLDING TIME SUMMARY

SDG: W0083-ITC-094 | VALIDATOR: T. Stapp | DATE: 11-8-94 | PAGE 3 OF 3

COMMENTS:

| FIELD SAMPLE ID | ANALYSIS TYPE | DATE SAMPLED | DATE PREPARED | DATE ANALYZED | PREP. HOLDING TIME, DAYS | ANALYSIS HOLDING TIME, DAYS | QUALIFIER |
|---|---|---|---|---|---|---|---|
| BOBX94 | Grs α/β | 5-31-94 | N/A | 7-02-94 | N/A | ≤180 | NONE |
| BOBJ16 | ↓ | 6-01-94 | ↓ | ↓ | ↓ | ↓ | ↓ |
| BOBX98 | ↓ | 6-09-94 | ↓ | ↓ | ↓ | ↓ | ↓ |
| BOBX97 | ↓ | 6-09-94 | ↓ | ↓ | ↓ | ↓ | ↓ |
| | | | | | | | |
| BOBX94 | Sr-90 | 5-31-94 | ↓ | 7-06-94 | ↓ | ≤180 | NONE |
| BOBJ16 | ↓ | 6-01-94 | ↓ | ↓ | ↓ | ↓ | ↓ |
| BOBX98 | ↓ | 6-09-94 | ↓ | ↓ | ↓ | ↓ | ↓ |
| BOBX97 | ↓ | 6-09-94 | ↓ | ↓ | ↓ | ↓ | ↓ |
| | | | | | | | |
| BOBX94 | Tc-99 | 5-31-94 | ↓ | 7-01-94 | ↓ | ≤180 | NONE |
| BOBJ16 | ↓ | 6-01-94 | ↓ | ↓ | ↓ | ↓ | ↓ |
| BOBX98 | ↓ | 6-09-94 | ↓ | ↓ | ↓ | ↓ | ↓ |
| BOBX97 | ↓ | 6-09-94 | ↓ | ↓ | ↓ | ↓ | ↓ |
| | | | | | | | |
| | | | | | | | |
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11-8-94 B-1

11-8-94

# HOLDING TIME SUMMARY

SDG: W0083-ITC-094 | VALIDATOR: T. Stapp | DATE: 11-8-94 | PAGE 1 OF 3

COMMENTS: RADIOCHEMISTRY

| FIELD SAMPLE ID | ANALYSIS TYPE | DATE SAMPLED | DATE PREPARED | DATE ANALYZED | PREP. HOLDING TIME, DAYS | ANALYSIS HOLDING TIME, DAYS | QUALIFIER |
|---|---|---|---|---|---|---|---|
| BOBX94 | Am-/Cm- | 5-31-94 | N/A | 7-15-94 | N/A | ≤180 | NONE |
| BOBJ16 | | 6-01-94 | | | | | |
| BOBX98 | | 6-09-94 | | | | | |
| BOBX97 | | 6-09-94 | | | | | |
| | | | | | | | |
| BOBX94 | Np-237 | 5-31-94 | | 7-10-94 | | ≤180 | NONE |
| BOBJ16 | | 6-01-94 | | | | | |
| BOBX98 | | 6-09-94 | | | | | |
| BOBX97 | | 6-09-94 | | | | | |
| | | | | | | | |
| BOBX94 | Pu238/239 | 5-31-94 | | 7-15-94 | | ≤180 | NONE |
| BOBJ16 | | 6-01-94 | | | | | |
| BOBX98 | | 6-09-94 | | | | | |
| BOBX97 | | 6-09-94 | | 11-16-94 | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

11-8-94 B-1

11-8-94

12-7-94

Revised 12-7-94

036

| Americium/Curium | |
|---|---|
| | |
| HEIS No.: | B0BX98 |
| Lab ID: | 40626501 |
| Aliquot: | 2.00E+00 |
| Am241 net cpm: | 0.0000 |
| Am241 bkg cpm: | 0.0000 |
| Spl count time: | 200 |
| Bkg count time: | 2500 |
| Eff d/c: | 3.225 |
| Decay: | 1 |
| Yield: | 0.605 |
| Am241 calc: | 0.00E+00 |
| Am241 rptd: | 0.00E+00 |
| Am241 MDA calc: | 1.63E-02 |
| Am241 MDA rptd: | 1.62E-02 |
| Cm244 net cpm: | -0.0004 |
| Cm244 bkg cpm: | 0.0004 |
| Cm244 decay: | 1.004 |
| Cm244 calc: | -4.82E-04 |
| Cm244 rptd: | -4.82E-04 |
| Cm244 MDA calc: | 2.42E-02 |
| Cm244 MDA rptd: | 2.42E-02 |
| Cm242 net cpm: | -0.0004 |
| Cm242 bkg cpm: | 0.0004 |
| Cm242 decay: | 1.166 |
| Cm242 calc.: | -5.60E-04 |
| Cm242 rptd: | -5.59E-04 |
| Cm242 MDA calc: | 2.82E-02 |
| Cm242 MDA rptd: | 2.81E-02 |

| Neptunium | |
|---|---|
| | |
| HEIS No.: | B0BX98 |
| Lab ID: | 40626501 |
| Aliquot: | 2.00E+00 |
| Np237 net cpm: | 0.0088 |
| Np237 bkg cpm: | 0.0012 |
| Spl count time: | 200 |
| Bkg count time: | 2500 |
| Eff d/c: | 3.7 |
| Decay: | 1 |
| Yield: | 1 |
| Np237 calc: | 7.32E-03 |
| Np237 rptd: | 7.32E-03 |
| Np237 MDA calc: | 2.08E-02 |
| Np237 MDA rptd: | 2.07E-02 |

| Plutonium | |
|---|---|
| | |
| HEIS No.: | B0BX98 |
| Lab ID: | 40626501 |
| Aliquot: | 2.00E+00 |
| Pu238 net cpm: | 0 |
| Pu238 bkg cpm: | 0 |
| Spl count time: | 200 |
| Bkg count time: | 1000 |
| Pu238 Eff d/c: | 3.703 |
| Decay: | 1.001 |
| Yield: | 0.689 |
| Pu238 calc: | 0.00E+00 |
| Pu238 rptd: | 0.00E+00 |
| Pu238 MDA calc: | 1.64E-02 |
| Pu238 MDA rptd: | 1.64E-02 |
| Pu239 net cpm: | -0.001 |
| Pu239 bkg cpm: | 0.001 |
| Pu239 d/c: | 3.7 |
| Pu239 decay: | 1 |
| Pu239 calc: | -1.21E-03 |
| Pu239 rptd: | -1.21E-03 |
| Pu239 MDA calc: | 2.89E-02 |
| Pu239 MDA rptd: | 2.89E-02 |

| Uranium | |
|---|---|
| | |
| HEIS No.: | B0BX98 |
| Lab ID: | 40626501 |
| Aliquot: | 2.00E+00 |
| U-234 net cpm: | 0.358 |
| U-234 bkg cpm: | 0.002 |
| Spl count time: | 200 |
| Bkg count time: | 2500 |
| Eff d/c: | 3.7 |
| Decay: | 1 |
| Yield: | 0.511 |
| U-234 calc: | 5.83E-01 |
| U-234 rptd: | 5.83E-01 |
| U-234 MDA calc: | 4.60E-02 |
| U-234 MDA rptd: | 4.60E-02 |
| U-235 net cpm: | 0.0042 |
| U-235 bkg cpm: | 0.0008 |
| U-235 decay: | 1 |
| U-235 calc: | 6.84E-03 |
| U-235 rptd: | 6.84E-03 |
| U-235 MDA calc: | 3.72E-02 |
| U-235 MDA rptd: | 3.72E-02 |
| U-238 net cpm: | 0.3142 |
| U-238 bkg cpm: | 0.0008 |
| U-238 decay: | 1 |
| U-238 calc.: | 5.12E-01 |
| U-238 rptd: | 5.12E-01 |
| U-238 MDA calc: | 3.72E-02 |
| U-238 MDA rptd: | 3.72E-02 |

| Gross Alpha | |
|---|---|
| | |
| HEIS No.: | B0BX98 |
| Lab ID: | 40626501 |
| Aliquot: | 5.04E-02 |
| Net counts: | 0.242 |
| Bkg counts: | 0.048 |
| Spl count time: | 100 |
| Bkg count time: | 500 |
| d/c: | 5.056 |
| Calc.: | 1.09E+01 |
| Rptd: | 1.09E+01 |
| MDA calc: | 5.83E+00 |
| MDA rptd: | 5.83E+00 |

| Gross Beta | |
|---|---|
| | |
| HEIS No.: | B0BX98 |
| Lab ID: | 40626501 |
| Aliquot: | 2.50E-01 |
| Net counts: | 4.272 |
| Bkg counts: | 1.088 |
| Spl count time: | 50 |
| Bkg count time: | 500 |
| d/c: | 2.897 |
| Calc.: | 2.23E+01 |
| Rptd: | 2.23E+01 |
| MDA calc: | 3.87E+00 |
| MDA rptd: | 3.87E+00 |

| Strontium 90 | |
|---|---|
| | |
| HEIS No.: | B0BX98 |
| Sample: | 40626501 |
| Sep date: | 7/05/94 |
| Sep time: | 23:00 |
| Count date: | 7/06/94 |
| Count time: | 09:55 |
| Hours: | 10.916666 |
| Sample amt: | 5.94E+00 |
| Net, cpm: | 0.324 |
| Count time: | 50 |
| Bkg, cpm: | 1.096 |
| Count time: | 500 |
| D/C 1: | 2.175 |
| D/C 2: | 1.833 |
| D/C 3: | 1.926 |
| Yield: | 0.782 |
| Calc: | 6.07E-02 |
| Rptd: | 6.08E-02 |
| MDA, Calc: | 1.57E-01 |
| MDA, rptd: | 1.57E-01 |

| Technetium-99 | |
|---|---|
| | |
| HEIS No.: | B0BX98 |
| Sample: | 40626501 |
| Bkg cpm: | 23.34 |
| Spl, amt: | 2.00E+00 |
| Spl cpm: | 25.01 |
| Count time: | 125 |
| Spl dpm: | 27.98 |
| d/c: | 1.119 |
| Yield: | 1 |
| Blk, dpm: | 2.60E+01 |
| Blk, d/c: | 1.078 |
| Calc: | 4.41E-01 |
| Rptd: | 4.41E-01 |
| MDA, calc: | 4.93E-01 |
| MDA, rptd: | 4.96E-01 |