START 9613490.0934 0045390 W0161-QES 338

Quanterra
Environmental Services

*Quanterra Incorporated*
*5815 Middlebrook Pike*
*Knoxville, Tennessee 37921*

*615 588-6401 Telephone*
*615 584-4315 Fax*

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

SEP 1994 RECEIVED Data Log In

OCT 1996 RECEIVED EDMC

Dear J.A. Lerch

Thank you for purchasing analytical testing services from IT Corporation. It is our intention to supply our clients with data packages which not only meet the industry's highest standards for quality, but are also easy to use. Features which we point out are:

1. A Data Summary Packet which allows you to review your data without searching through the complete data package.

   Your Data Summary Packet contains the following items:

   - Case Narrative: listing of sample identifications, analyses performed, explanation of any problem associated with samples, corrective action taken.
   - Quality control sample identifications and analyses performed.
   - Data summary.

2. A data package which meets the specific requirements you requested and is easy to use as well. The package is organized in accordance with the Table of Contents which you will find at the beginning of each section. Sections are separated by color-coded tabs, making it easy to find individual analytical parameters which may be of particular interest to you. The data package is custody-sealed at the laboratory - your assurance that parts of the package are not missing.

We are constantly searching for ways to improve our service to you. This current product has many of the features which you have told us are important to you. Your suggestions regarding additional improvements will be appreciated.

Please contact me with any questions or suggestions.

Sincerely,

Sheree Schneider

Sheree' Schneider
Project Manager

9613490.0936

# OFFICE OF SAMPLE MANAGEMENT

## RECORD OF DISPOSITION

ROD-894-014
Record of Disposition No.

DATE: 08/09/94

LABORATORY: Quanterra

PROJECT TITLE/NO.:200-UP-1 Soil Sampling-Round 1 (SAF# 94-046)

NCR NO.: N/A

SAMPLE IDENTIFICATION NUMBERS: B0BXB4

DESCRIPTION OF EVENT:
The cooler containing sample number B0BXB4 arrived at Quanterra with an internal temperature of 10°C.

DISPOSITION OF SAMPLES:
Quanterra is to continue with the chemical analyses for sample number B0BXB4 as directed by the COC/SAR.

APPROVAL SIGNATURES:

J.A. Lerch — 8/12/94
OSM Project Coordinator (Print/Sign Name) — Date

C.D. Wittreich — 8/11/94
Technical Representative (Print/Sign Name) — Date

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

9613490.0936

# OFFICE OF SAMPLE MANAGEMENT

## RECORD OF DISPOSITION

ROD-B94-018
Record of Disposition No.

DATE: 08/17/94

LABORATORY: Quanterra

PROJECT TITLE/NO.:200-UP-1 Soil Sampling-Round 1 (SAF# 94-046)

NCR NO.: N/A

SAMPLE IDENTIFICATION NUMBERS: B0BXB4 & B0BXB5

DESCRIPTION OF EVENT:

1) The VOA trip blank, sample number B0BXB5, was not received by the laboratory.

2) Sample number B0BXB4 does not have a "Time Sampled" indicated on the COC/SAR form. All containers for this sample indicate a sampling time of 12:00.

DISPOSITION OF SAMPLES:

1) With the consent of the project engineer, the VOA analysis for sample B0BXB5 is to be canceled.

2) Quanterra is to proceed with the analyses requested on the Chain-of-Custody for sample number B0BXB4. The correct sampling time is 1200.

APPROVAL SIGNATURES:

J.A. Lerch — 8/18/94
OSM Project Coordinator (Print/Sign Name) — Date

C.D. Wittreich — 9/21/94
Technical Representative (Print/Sign Name) — Date

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

9613490.0957

# OFFICE OF SAMPLE MANAGEMENT

# RECORD OF DISPOSITION

ROD-B94-025
Record of Disposition No.

| | |
|---|---|
| DATE: 08/19/94 | LABORATORY: Quanterra |
| PROJECT TITLE/NO.:200-UP-1 Soil Sampling-Round 1 (SAF# 94-046) | NCR NO.: N/A |

SAMPLE IDENTIFICATION NUMBERS: BOBXB6 and BOBXB7

DESCRIPTION OF EVENT:

1) The COC/SAR indicates that sample number BOBXB7 is to be analyzed for VOA as a trip blank. No sample container was received by Quanterra for sample BOBXB7.

2) An extra 125 mL sample container was received for sample number BOBXB6. The container was received by Quanterra in a separate bag and the bottle label indicates that it is to be analyzed for VOA.

DISPOSITION OF SAMPLES:

Quanterra is to proceed with the analysis of sample BOBXB6 as directed on the COC/SAR. The 125 mL container that was packaged separately will be analyzed for VOA and the results reported under sample number BOBXB7.

APPROVAL SIGNATURES:

J.A. Lerch
OSM Project Coordinator (Print/Sign Name) — Date

C.D. Wittreich — 9/2/94
Technical Representative (Print/Sign Name) — Date

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

9613490.0938

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

DATE October 5, 1994

To W0161, samples B0BXB4, B0BXB6, B0BXB8

FROM Jeff Lerch H4-14
Telephone 372-2596

cc: Doris Ayres
Jeanette Duncan
Chris Koerner

SUBJECT Carbon-14 data not reported

Due to an insufficient presence of carbon in the samples (described on page 0008 of the radiochemistry laboratory case narrative), data for C-14 will not be reported for samples B0BXB4, B0BXB6, and B0BXB8.

9613490.0939

0000001

Quanterra
Environmental Services

*Quanterra Incorporated*
*5815 Middlebrook Pike*
*Knoxville, Tennessee 37921*

*615 588-6401 Telephone*
*615 584-4315 Fax*

SEP 1994
RECEIVED
Date
Log In

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

September 8, 1994

Job Number: 996; 1027; 1097

This is the Certificate of Analysis for the following sample:

| | |
|---|---|
| SDG: | W0161 |
| Client Project ID: | WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1 |
| Received by Knoxville: | August 4, August 9 and August 16, 1994 |
| Number of Samples: | Eight |
| Sample Type: | Soil |

## I. Introduction

On August 4, August 9 and August 16, 1994, eight (8) soil samples arrived at Quanterra Environmental Services, Richland, Washington and were transferred to Quanterra Environmental Services, Knoxville, Tennessee for chemical analysis. Two IT/WHC issue resolution forms are attached. Both forms document condition on receipt variances; and should be used as supplemental documentation to this document.

## 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.

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 OLM01.8 Statement of Work.

Reviewed and Approved:

Sheree A. Schneider

RECORD COPY

Sheree' A. Schneider
Project Manager

Quanterra Environmental Services

IT Corporation
September 8, 1994
Job Number: 996, 1027, and 1097
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 ILM03.0 Statement of Work.

The samples were analyzed for total cyanide in accordance with the EPA CLP ILM03.0 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. A matrix spike and matrix spike duplicate were analyzed using sample BOBXB4. All QC results met method specified limits.

The semivolatiles analyses were performed by direct injection of sample extract on a Restek XTI-5 capillary column on a Finnigan INCOS XL GC/MS/DS. For work order # 996, the samples were extracted three times. The method blanks for the first two extractions exhibited bad surrogate standard recoveries, indicating that the extractions were faulty. The third extraction analyzed demonstrated good results and the data was submitted. The matrix spike/matrix spike duplicate for sample BOBXB4 exhibited high recoveries for spiked compound 2,4-dinitrotoluene. All other QC results were within method specified limits.

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.

Quanterra
Environmental Services

IT Corporation
September 8, 1994
Job Number: 996, 1027, and 1097
Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

**III. Quality Control** (Continued)

All run QC for metals analysis met method specified limits. A duplicate and a spike were analyzed using sample number BOBXB6. Spike recovery (accuracy) results were within acceptance limits for all parameters except for silver which was slightly outside acceptance limits (73.3%). As the manganese and titanium concentrations are greater than 4X the spike added, spiking criteria do not apply for these analytes. The spiked sample was double spiked for ICP elements during sample digestion. Duplicate RPD (precision) results were within acceptance limits for all parameters except for aluminum, barium, calcium, chromium, iron, manganese, vanadium, zinc, and titanium. Sample nonhomogeneity appears to be the probable cause for poor precision for these analytes. The 1/5 serial dilution exhibited slight matrix interferences for aluminum, iron, and magnesium.
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.

Quanterra Environmental Services

IT Corporation
September 8, 1994
Job Number: 996, 1027, and 1097
Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

**III. Quality Control** (Continued)

"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.

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.

A matrix spike/matrix spike duplicate set was analyzed for cyanide using sample BOBXB4. All QC results were acceptable.

A matrix spike and matrix spike duplicate set was analyzed for nitrate/nitrite using sample BOBXB4. All QC results were acceptable.

A matrix spike and matrix spike duplicate set was analyzed for anions using sample BOBXB4. All QC results were acceptable.

Quanterra Environmental Services

IT Corporation
September 8, 1994
Job Number: 996, 1027, and 1097
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 |
|---|---|---|---|
| AB5088 | 408065-01A | BOBXB4 | VOC |
| AB5089 | 408065-01B | " | SVOC |
| AB5090 | 408065-01C | " | CN |
| AB5091 | 408065-01D | " | ANIONS |
| AB5092 | 408065-01E | " | NO3NO2 |
| AB5489 | 40818201-A | BOBXB6 | VOC |
| AB5490 | 40818201-B | " | SVOC |
| AB5491 | 40818201-C | " | METALS |
| AB5492 | 40818201-D | " | CN |
| AB5493 | 40818201-E/F | " | ANIONS |
| AB5494 | 40818201-G | " | NO3NO2 |
| AB5496 | 40818202-A | BOBXB7 | VOC |
| AB6271 | 40833801-A | BOBXB8 | VOC |
| AB6272 | 40833801-B | " | SVOC |
| AB6273 | 40833801-C | " | METALS |
| AB6274 | 40833801-D | " | CN |
| AB6275 | 40833801-E | " | ANIONS |
| AB6276 | 40833801-F | " | NO3NO2 |
| AB6277 | 40833802-A | BOBXB9 | VOC |

Quanterra
Environmental Services

IT Corporation
September 8, 1994
Job Number: 996, 1027, and 1097
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

# IT/WHC ISSUE RESOLUTION FORM

SAF No. 94-046 Project 200 UP-1 Soil Date 8/4/94

Sample No.(s) B0BXB4

Submitted By: Jim Harvey

Phone No. 615-690-3211 x5611

Fax No. 615-693-2348

Submitted To: Jeff Lerch

Phone No. 509-372-2596

Fax No. 509-372-2106

| ISSUE | PROPOSED RESOLUTION |
|---|---|
| Sample cooler was received from Richland at 10°C | Process as is and document in COA |

WO #1097

# QUANTERRA/WHC ISSUE RESOLUTION FORM

SAF No. 94-046 Project 200-UP-1 Soil Sampling - Round 1 Date 8-15-94

Sample No.(s) B0BXB7 & B0BXB8

Submitted By: Jim Harvey

Phone No. 615-690-3211 x5611

Fax No. 615-693-2348

Submitted To: Karl N. Pool

Phone No. 509-372-2596

Fax No. 509-372-2106

| ISSUE | PROPOSED RESOLUTION |
|---|---|
| 1) No sample containers were received for B0BXB7.<br><br>2) Sample containers were received for sample B0BXB8 which matched the analyses requested for B0BXB7 on the COC/RFA. No sample container was received for sample B0BXB8 for the analysis (VOA Trip) which is indicated for that sample on the COC/RFA.<br><br>3) A sample container was received which had sample number B0BXB9 on the container label. The analysis identified on the label was VOA Trip.<br><br>4) The COC/RFA does not have a "Time Sampled" indicated on the COC/SAR form for any of the samples. All containers indicate a sampling time of 10:30. | 1, 2, 3 & 4) Notify WHC/BHI. Proceed with screening and analyses indicated on the bottles, using the sample numbers indicated on the bottles, until directed otherwise by WHC/BHI.<br><br>NOTE ITEMS IN CASE NARRATIVE. |

XC: Jodie Carnes (File)
Tami Heidelberg
Wade Price / Sheree Schneider
Suzi Gaines
Van Pettey

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INTERNATIONAL TECHNOLOGY CORPORATION

CUR # 110

Work Order No.: 996

## Condition Upon Receipt Variance Report
## ITAS - Knoxville Laboratory/Middlebrook Facility

Client: Westinghouse Hanford

Date: 8/04/94

Project No: SAF 94-046

Initiated by: Bryan Blomquist

Analysis Requested: VOA, BNA, CN, Anions, $NO_2$, $NO_3$

RFA/COC Numbers: 481765

Client Sample Numbers Affected: B0B XB4

**Condition/Variance (Check all that apply):**

1. ☐ Not enough sample received for proper analysis.
   Received approximately: _____
2. ☐ Sample received broken/leaking.
3. ☑ Sample received without proper preservative.
   - ☑ Cooler temperature not within 4°C ± 2°C
     Record temperature: 10°C
   - ☐ pH _____
   - ☐ other: _____
4. ☐ Sample received in improper container.
5. ☐ Sample received without proper paperwork. Explain: _____
6. ☐ Paperwork received without sample.
7. ☐ No sample ID on sample container.
8. ☐ Custody tape disturbed/broken/missing.
9. ☐ Sample splits performed by lab.
10. ☐ Volatile sample received with approximately _____ mm headspace.
11. ☐ Sample ID on container does not match sample ID on paperwork. Explain: _____
12. ☐ All coolers on airbill not received with shipment.
13. ☐ Other (explain below): _____

Notes: _____

**Corrective Action:**

☑ Client's Name: Van Petty Informed verbally on: 8/8/94 By: Sherce

☑ Client's Name: Van Petty / Jim Hartwig Informed in writing on: 8/8/94 By: IT/WHC Form

☐ Sample(s) processed "as is". Comments: _____

☐ Sample(s) on hold until: _____ If released, notify: _____

Sample Control Supervisor Review: Kenya A. Klemm Date: 8/5/94 SOS 8/8/94

Project Management Review: Sherie Schneider Date: 8/8/94

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INTERNATIONAL TECHNOLOGY CORPORATION

CUR #147

Work Order No.: 1027

## Condition Upon Receipt Variance Report
## ITAS - Knoxville Laboratory/Middlebrook Facility

Client: DOE - Richland

Date: 8/9/94

Project No: Westinghouse Hanford (SMF-94-046)

Initiated by: Kenyla Klemm

Analysis Requested: CLP VOAs

RFA/COC Numbers: 481778

Client Sample Numbers Affected: Trip Blank

**Condition/Variance (Check all that apply):**

1. ☐ Not enough sample received for proper analysis.
   Received approximately: _____
2. ☐ Sample received broken/leaking.
3. ☐ Sample received without proper preservative.
   - ☐ Cooler temperature not within 4°C ± 2°C
     Record temperature: _____
   - ☐ pH _____
   - ☐ other: _____
4. ☐ Sample received in improper container.
5. ☑ Sample received without proper paperwork. Explain: Trip Blank not listed on RFA/COC and no labels were placed on VOA vials.
6. ☐ Paperwork received without sample.
7. ☐ No sample ID on sample container.
8. ☐ Custody tape disturbed/broken/missing.
9. ☐ Sample splits performed by lab.
10. ☐ Volatile sample received with approximately _____ mm headspace.
11. ☐ Sample ID on container does not match sample ID on paperwork. Explain: _____
12. ☐ All coolers on airbill not received with shipment.
13. ☐ Other (explain below): _____

Notes: _____

**Corrective Action:**

☐ Client's Name: _____ Informed verbally on: _____ By: _____

☐ Client's Name: _____ Informed in writing on: _____ By: _____

☐ Sample(s) processed "as is". Comments: _____

☐ Sample(s) on hold until: _____ If released, notify: _____

Sample Control Supervisor Review: Kenyla Klemm Date: 8/9/94

Project Management Review: Sherie Bahner Date: 8/12/94

9613490.0949

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WO #996

# SAMPLE RECEIPT VARIANCE REPORT
## ITAS-RICHLAND LABORATORY

WORK ORDER NUMBER: 408065, 408066 DATE INITIATED: 8/3/94

INITIATED BY: T. Gilmore

DATE/TIME OF SAMPLE (AND/OR RFA & COC) RECEIPT: 8/3/94 1100

| CLIENT SAMPLE NUMBER | RFA/COC NUMBERS | ANALYSIS REQUESTED |
|---|---|---|
| B0BXB4 | | |
| B0BXB5 | | 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: Sample B0BXB5 was not received. Sample B0BXB4 has no time on COC, all containers show 12:00.

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

WO# 1021

SAMPLE RECEIPT VARIANCE REPORT
ITAS-RICHLAND LABORATORY

WORK ORDER NUMBER: 408182 (02A) DATE INITIATED: 8-8-94

INITIATED BY: R Boyd

DATE/TIME OF SAMPLE (AND/OR RFA & COC) RECEIPT: 8-8-94 1035

| CLIENT SAMPLE NUMBER | RFA/COC NUMBERS | ANALYSIS REQUESTED |
|---|---|---|
| BOBXB7 | | 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: Did not recive above sample. We did recive a sample (BOBXB6) that was not on the chain of Custody, also BOBXB6 Date + time on Bottle say 8-5-94 at 0800

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

~~WO#1097~~ BPB 8/16/94
WO#1097

SAMPLE RECEIPT VARIANCE REPORT
ITAS-RICHLAND LABORATORY

WORK ORDER NUMBER:_____ DATE INITIATED: 8-15-94

INITIATED BY: Karen Fottenberg

DATE/TIME OF SAMPLE (AND/OR RFA & COC) RECEIPT:_____

| CLIENT SAMPLE NUMBER | RFA/COC NUMBERS | ANALYSIS REQUESTED |
|---|---|---|
| B0B XB8 | | Time 10:30 |
| B0B XB9 | | Date 8-11-94 |
| | | |
| | | |

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: Bottles do not match the Paper work. COC has no time sampled - bottles have 10:30. ~~JHO~~ JH 8/15/94

SUPERVISOR REVIEW: Jana Hiedelberg

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

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBXB4

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 996 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB5088

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB5088

Level: (low/med) LOW Date Received: 08/04/94

% Moisture: not dec. 20 Date Analyzed: 08/08/94

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 | 2 | BJ |
| 67-64-1 | Acetone | 9 | BJ |
| 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 | 8 | BJ |
| 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.

BOBXB4

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 996 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB5088

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB5088

Level: (low/med) LOW Date Received: 08/04/94

% Moisture: not dec. 20 Date Analyzed: 08/08/94

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.

BOBXB6

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1027 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB5489

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB5489R

Level: (low/med) LOW Date Received: 08/09/94

% Moisture: not dec. 19 Date Analyzed: 08/09/94

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 | 3 | BJ |
| 67-64-1 | Acetone | 14 | 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.

BOBXB6

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1027 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB5489

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB5489R

Level: (low/med) LOW Date Received: 08/09/94

% Moisture: not dec. 19 Date Analyzed: 08/09/94

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.

BOBXB7

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1027 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB5496

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB5496

Level: (low/med) LOW Date Received: 08/09/94

% Moisture: not dec. 0 Date Analyzed: 08/09/94

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 | 2 | BJ |
| 67-64-1 | Acetone | 2 | 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.

BOBXB7

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1027 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB5496

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB5496

Level: (low/med) LOW Date Received: 08/09/94

% Moisture: not dec. 0 Date Analyzed: 08/09/94

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 | 17.37 | 10 | J |

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBXB8

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1097 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB6271

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB6271

Level: (low/med) LOW Date Received: 08/16/94

% Moisture: not dec. 21 Date Analyzed: 08/24/94

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 | 13 | U |
| 74-83-9 | Bromomethane | 13 | U |
| 75-01-4 | Vinyl Chloride | 13 | U |
| 75-00-3 | Chloroethane | 13 | U |
| 75-09-2 | Methylene Chloride | 16 | |
| 67-64-1 | Acetone | 14 | B |
| 75-15-0 | Carbon Disulfide | 13 | U |
| 75-35-4 | 1,1-Dichloroethene | 13 | U |
| 75-34-3 | 1,1-Dichloroethane | 13 | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 13 | U |
| 67-66-3 | Chloroform | 13 | U |
| 107-06-2 | 1,2-Dichloroethane | 13 | U |
| 78-93-3 | 2-Butanone | 13 | U |
| 71-55-6 | 1,1,1-Trichloroethane | 13 | U |
| 56-23-5 | Carbon Tetrachloride | 13 | U |
| 75-27-4 | Bromodichloromethane | 13 | U |
| 78-87-5 | 1,2-Dichloropropane | 13 | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 13 | U |
| 79-01-6 | Trichloroethene | 13 | U |
| 124-48-1 | Dibromochloromethane | 13 | U |
| 79-00-5 | 1,1,2-Trichloroethane | 13 | U |
| 71-43-2 | Benzene | 13 | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 13 | U |
| 75-25-2 | Bromoform | 13 | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 13 | U |
| 591-78-6 | 2-Hexanone | 13 | U |
| 127-18-4 | Tetrachloroethene | 13 | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 13 | U |
| 108-88-3 | Toluene | 13 | U |
| 108-90-7 | Chlorobenzene | 13 | U |
| 100-41-4 | Ethylbenzene | 13 | U |
| 100-42-5 | Styrene | 13 | U |
| 1330-20-7 | Xylene (total) | 13 | U |

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBXB8

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1097 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB6271

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB6271

Level: (low/med) LOW Date Received: 08/16/94

% Moisture: not dec. 21 Date Analyzed: 08/24/94

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.

BOBXB9

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1097 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB6277

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB6277

Level: (low/med) LOW Date Received: 08/16/94

% Moisture: not dec. 0 Date Analyzed: 08/24/94

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 | 9 | J |
| 67-64-1 | Acetone | 13 | 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 | 5 | J |
| 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.

BOBXB9

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1097 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB6277

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB6277

Level: (low/med) LOW Date Received: 08/16/94

% Moisture: not dec. 0 Date Analyzed: 08/24/94

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

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

Number TICs found: 3

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 ALCOHOL | 15.90 | 8 | J |
| 3. | UNKNOWN | 17.43 | 11 | J |

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBXB4

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 996 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB5089

Sample wt/vol: 30.1 (g/mL) G Lab File ID: AB5089RE

Level: (low/med) LOW Date Received: 08/04/94

% Moisture: 20 decanted: (Y/N) N Date Extracted: 08/15/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 08/20/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.7

| 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 | 1000 | U |
| 91-58-7 | 2-Chloronaphthalene | 410 | U |
| 88-74-4 | 2-Nitroaniline | 1000 | 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 | 1000 | U |
| 83-32-9 | Acenaphthene | 410 | U |

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBXB4

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 996 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB5089

Sample wt/vol: 30.1 (g/mL) G Lab File ID: AB5089RE

Level: (low/med) LOW Date Received: 08/04/94

% Moisture: 20 decanted: (Y/N) N Date Extracted: 08/15/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 08/20/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.7

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 51-28-5 | 2,4-Dinitrophenol | 1000 | U |
| 100-02-7 | 4-Nitrophenol | 1000 | 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 | 1000 | U |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | 1000 | 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 | 1000 | 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 | 84 | BJ |
| 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 | 53 | 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.

BOBXB4

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 996 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB5089

Sample wt/vol: 30.1 (g/mL) G Lab File ID: AB5089RE

Level: (low/med) LOW Date Received: 08/04/94

% Moisture: 20 decanted: (Y/N) N Date Extracted: 08/15/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 08/20/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.7

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 | 4.42 | 12000 | AJN |
| 2. | UNKNOWN | 7.78 | 120 | J |
| 3. | UNKNOWN | 8.48 | 110 | J |
| 4. | UNKNOWN | 18.90 | 290 | J |

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBXB6

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1027 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB5490

Sample wt/vol: 30.2 (g/mL) G Lab File ID: AB5490RE

Level: (low/med) LOW Date Received: 08/09/94

% Moisture: 19 decanted: (Y/N) N Date Extracted: 08/18/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 08/30/94

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 | 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 | 980 | U |
| 91-58-7 | 2-Chloronaphthalene | 400 | U |
| 88-74-4 | 2-Nitroaniline | 980 | 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 | 980 | U |
| 83-32-9 | Acenaphthene | 400 | U |

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBXB6

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1027 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB5490

Sample wt/vol: 30.2 (g/mL) G Lab File ID: AB5490RE

Level: (low/med) LOW Date Received: 08/09/94

% Moisture: 19 decanted: (Y/N) N Date Extracted: 08/18/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 08/30/94

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 | 980 | U |
| 100-02-7 | 4-Nitrophenol | 980 | 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 | 980 | U |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | 980 | 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 | 980 | 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 | 70 | J |
| 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 | 170 | 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.

BOBXB6

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1027 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB5490

Sample wt/vol: 30.2 (g/mL) G Lab File ID: AB5490RE

Level: (low/med) LOW Date Received: 08/09/94

% Moisture: 19 decanted: (Y/N) N Date Extracted: 08/18/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 08/30/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

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

Number TICs found: 4

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

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| 1. | UNKNOWN | 4.40 | 11000 | J |
| 2. 123-42-2 | 2-PENTANONE, 4-HYDROXY-4-MET | 4.60 | 14000 | ABJN |
| 3. | UNKNOWN | 7.90 | 250 | J |
| 4. | UNKNOWN | 16.15 | 110 | J |

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBXB8

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1097 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB6272

Sample wt/vol: 30.1 (g/mL) G Lab File ID: AB6272

Level: (low/med) LOW Date Received: 08/16/94

% Moisture: 21 decanted: (Y/N) N Date Extracted: 08/18/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 09/01/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 5.8

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 108-95-2 | Phenol | 420 | U |
| 111-44-4 | bis(2-Chloroethyl)Ether | 420 | U |
| 95-57-8 | 2-Chlorophenol | 420 | U |
| 541-73-1 | 1,3-Dichlorobenzene | 420 | U |
| 106-46-7 | 1,4-Dichlorobenzene | 420 | U |
| 95-50-1 | 1,2-Dichlorobenzene | 420 | U |
| 95-48-7 | 2-Methylphenol | 420 | U |
| 108-60-1 | 2,2'-Oxybis(1-Chloropropane) | 420 | U |
| 106-44-5 | 4-Methylphenol | 420 | U |
| 621-64-7 | N-Nitroso-Di-n-Propylamine | 420 | U |
| 67-72-1 | Hexachloroethane | 420 | U |
| 98-95-3 | Nitrobenzene | 420 | U |
| 78-59-1 | Isophorone | 420 | U |
| 88-75-5 | 2-Nitrophenol | 420 | U |
| 105-67-9 | 2,4-Dimethylphenol | 420 | U |
| 111-91-1 | bis(2-Chloroethoxy)Methane | 420 | U |
| 120-83-2 | 2,4-Dichlorophenol | 420 | U |
| 120-82-1 | 1,2,4-Trichlorobenzene | 420 | U |
| 91-20-3 | Naphthalene | 420 | U |
| 106-47-8 | 4-Chloroaniline | 420 | U |
| 87-68-3 | Hexachlorobutadiene | 420 | U |
| 59-50-7 | 4-Chloro-3-Methylphenol | 420 | U |
| 91-57-6 | 2-Methylnaphthalene | 420 | U |
| 77-47-4 | Hexachlorocyclopentadiene | 420 | U |
| 88-06-2 | 2,4,6-Trichlorophenol | 420 | U |
| 95-95-4 | 2,4,5-Trichlorophenol | 1000 | U |
| 91-58-7 | 2-Chloronaphthalene | 420 | U |
| 88-74-4 | 2-Nitroaniline | 1000 | U |
| 131-11-3 | Dimethylphthalate | 420 | U |
| 208-96-8 | Acenaphthylene | 420 | U |
| 606-20-2 | 2,6-Dinitrotoluene | 420 | U |
| 99-09-2 | 3-Nitroaniline | 1000 | U |
| 83-32-9 | Acenaphthene | 420 | U |

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBXB8

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1097 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB6272

Sample wt/vol: 30.1 (g/mL) G Lab File ID: AB6272

Level: (low/med) LOW Date Received: 08/16/94

% Moisture: 21 decanted: (Y/N) N Date Extracted: 08/18/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 09/01/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 5.9

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 51-28-5 | 2,4-Dinitrophenol | 1000 | U |
| 100-02-7 | 4-Nitrophenol | 1000 | U |
| 132-64-9 | Dibenzofuran | 420 | U |
| 121-14-2 | 2,4-Dinitrotoluene | 420 | U |
| 84-66-2 | Diethylphthalate | 420 | U |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 420 | U |
| 86-73-7 | Fluorene | 420 | U |
| 100-01-6 | 4-Nitroaniline | 1000 | U |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | 1000 | U |
| 86-30-6 | N-Nitrosodiphenylamine (1) | 420 | U |
| 101-55-3 | 4-Bromophenyl-phenylether | 420 | U |
| 118-74-1 | Hexachlorobenzene | 420 | U |
| 87-86-5 | Pentachlorophenol | 1000 | U |
| 85-01-8 | Phenanthrene | 420 | U |
| 120-12-7 | Anthracene | 420 | U |
| 86-74-8 | Carbazole | 420 | U |
| 84-74-2 | Di-n-Butylphthalate | 420 | U |
| 206-44-0 | Fluoranthene | 420 | U |
| 129-00-0 | Pyrene | 420 | U |
| 85-68-7 | Butylbenzylphthalate | 420 | U |
| 91-94-1 | 3,3'-Dichlorobenzidine | 420 | U |
| 56-55-3 | Benzo(a)Anthracene | 420 | U |
| 218-01-9 | Chrysene | 420 | U |
| 117-81-7 | bis(2-Ethylhexyl)Phthalate | 420 | U |
| 117-84-0 | Di-n-Octyl Phthalate | 420 | U |
| 205-99-2 | Benzo(b)Fluoranthene | 420 | U |
| 207-08-9 | Benzo(k)Fluoranthene | 420 | U |
| 50-32-8 | Benzo(a)Pyrene | 420 | U |
| 193-39-5 | Indeno(1,2,3-cd)Pyrene | 420 | U |
| 53-70-3 | Dibenz(a,h)Anthracene | 420 | U |
| 191-24-2 | Benzo(g,h,i)Perylene | 420 | U |

(1) - Cannot be separated from Diphenylamine

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBXB8

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1097 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB6272

Sample wt/vol: 30.1 (g/mL) G Lab File ID: AB6272

Level: (low/med) LOW Date Received: 08/16/94

% Moisture: 21 decanted: (Y/N) N Date Extracted: 08/18/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 09/01/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 5.8

Number TICs found: 4 Purgable 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 | 4.52 | 25000 | ABJN |
| 2. | UNKNOWN | 7.38 | 97 | J |
| 3. | UNKNOWN | 19.00 | 170 | J |
| 4. | UNKNOWN | 19.70 | 16000 | J |

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOBXB6

Lab Name: ITAS KNOXVILLE Contract: HANFORD/WE
Lab Code: ITSTU Case No.: WO102 SAS No.: SDG No.: WO161
Matrix (soil/water): SOIL Lab Sample ID: AB5491
Level (low/med): LOW Date Received: 08/09/94
% 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 | 10600 | | E* | P |
| 7440-36-0 | Antimony | 12.3 | U | | P |
| 7440-38-2 | Arsenic | 2.0 | B | + | F |
| 7440-39-3 | Barium | 254 | | * | P |
| 7440-41-7 | Beryllium | 0.66 | B | | P |
| 7440-43-9 | Cadmium | 1.2 | U | | P |
| 7440-70-2 | Calcium | 37700 | | * | P |
| 7440-47-3 | Chromium | 20.1 | | * | P |
| 7440-48-4 | Cobalt | 15.2 | | | P |
| 7440-50-8 | Copper | 13.0 | | | P |
| 7439-89-6 | Iron | 25300 | | E* | P |
| 7439-92-1 | Lead | 9.7 | | S | F |
| 7439-95-4 | Magnesium | 5400 | | E | P |
| 7439-96-5 | Manganese | 1190 | | * | P |
| 7439-97-6 | Mercury | 0.12 | U | | CV |
| 7440-02-0 | Nickel | 16.6 | | | P |
| 7440-09-7 | Potassium | 1280 | | | P |
| 7782-49-2 | Selenium | 0.49 | U | W | F |
| 7440-22-4 | Silver | 1.2 | U | N | P |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | 0.49 | U | W | F |
| 7440-62-2 | Vanadium | 68.5 | | * | P |
| 7440-66-6 | Zinc | 47.0 | | * | P |
| | Titanium | 1130 | | * | 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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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOBXB6

Lab Name: ITAS_KNOXVILLE Contract: HANFORD/WE
Lab Code: ITSTU Case No.: WO1027 SAS No.: _____ SDG No.: WO161_
Matrix (soil/water): SOIL_ Lab Sample ID: AB5492
Level (low/med): LOW_ Date Received: 08/09/94
% 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 |
| | Titanium | | | | NR |
| 5955-70-0 | Cyanide | 1.2 | U | | AS |
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Color Before: _____ Clarity Before: _____ Texture: _____
Color After: _____ Clarity After: _____ Artifacts: _____

Comments:
CYANIDE_ONLY.

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8 9/12/94

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOBXB8

Lab Name: ITAS_KNOXVILLE_____ Contract: HANFORD/WE
Lab Code: ITSTU_ Case No.: WO1097 SAS No.: _____ SDG No.: WO161_
Matrix (soil/water): SOIL_ Lab Sample ID: AB6274
Level (low/med): LOW__ Date Received: 08/16/94
% Solids: _78.6

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 |
| | Titanium_ | | | | NR |
| 5955-70-0_ | Cyanide__ | 1.3 | U | | AS |
| | | | | | |
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Color Before: _____ Clarity Before: _____ Texture: _____
Color After: _____ Clarity After: _____ Artifacts: _____

Comments:
CYANIDE_ONLY.

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9/19/94

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOBXB8

Lab Name: ITAS KNOXVILLE Contract: HANFORD/WE
Lab Code: ITSTU Case No.: W01097 SAS No.: SDG No.: W0161
Matrix (soil/water): SOIL Lab Sample ID: AB6273
Level (low/med): LOW Date Received: 08/16/94
% Solids: 78.6

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

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 20000 | | E* | P |
| 7440-36-0 | Antimony | 12.5 | U | | P |
| 7440-38-2 | Arsenic | 0.51 | U | W | F |
| 7440-39-3 | Barium | 67.3 | | * | P |
| 7440-41-7 | Beryllium | 1.1 | B | | P |
| 7440-43-9 | Cadmium | 1.2 | U | | P |
| 7440-70-2 | Calcium | 6500 | | * | P |
| 7440-47-3 | Chromium | 11.2 | | * | P |
| 7440-48-4 | Cobalt | 5.1 | B | | P |
| 7440-50-8 | Copper | 9.7 | | | P |
| 7439-89-6 | Iron | 20600 | | E* | P |
| 7439-92-1 | Lead | 9.3 | | S | F |
| 7439-95-4 | Magnesium | 9110 | | E | P |
| 7439-96-5 | Manganese | 112 | | * | P |
| 7439-97-6 | Mercury | 0.13 | U | | CV |
| 7440-02-0 | Nickel | 9.6 | B | | P |
| 7440-09-7 | Potassium | 3280 | | | P |
| 7782-49-2 | Selenium | 0.51 | U | | F |
| 7440-22-4 | Silver | 1.2 | U | N | P |
| 7440-23-5 | Sodium | 159 | B | | P |
| 7440-28-0 | Thallium | 0.51 | U | | F |
| 7440-62-2 | Vanadium | 36.1 | | * | P |
| 7440-66-6 | Zinc | 40.5 | | * | P |
| | Titanium | 187 | | * | 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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8/19/94

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOBXB4

Lab Name: ITAS_KNOXVILLE Contract: HANFORD/WE
Lab Code: ITSTU Case No.: WO996 SAS No.: SDG No.: WO161
Matrix (soil/water): SOIL Lab Sample ID: AB5090
Level (low/med): LOW Date Received: 08/04/94
% Solids: 80.5

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

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 5955-70-0 | Cyanide | 1.2 | U | | AS |

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

Comments:

FORM I - IN

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8 9/22/94

# CYANIDE ANALYSIS

| | | | |
|---|---|---|---|
| Laboratory Name: | ITAS-KNOXVILLE | SDG Number: | W0161 |
| Contract Name: | Westinghouse Hanford | Job Number: | 996 |
| Sample Matrix: | Soil | Extraction Date: | N/A |
| Concentration Units: | mg/kg | Analysis Date: | 08/12/94 |

| Client Sample ID | Lab Sample ID | Result | Qualifiers |
|---|---|---|---|
| Method Blank | AB6116 | 1.0 | U |
| BOBXB4 | AB5090 | 1.0 | U |

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: | W0161 |
| Contract Name: | Westinghouse Hanford | Job Number: | 996 |
| Sample Matrix: | Soil | Extraction Date: | N/A |
| Concentration Units: | mg/kg | Analysis Date: | 08/19/94 |

| Client Sample ID | Lab Sample ID | Result | Qualifiers |
|---|---|---|---|
| Method Blank | AB7068 | 0.5 | U |
| BOBXB4 | AB5092 | 1.0 | + |

+ - 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: | W0161 |
| Contract Name: | Westinghouse Hanford | Job Number: | 1027 |
| Sample Matrix: | Soil | Extraction Date: | N/A |
| Concentration Units: | mg/kg | Analysis Date: | 08/19/94 |

| Client Sample ID | Lab Sample ID | Result | Qualifiers |
|---|---|---|---|
| Method Blank | AB7062 | 0.5 | U |
| BOBXB6 | AB5494 | 0.5 | U |

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: | W0161 |
| Contract Name: | Westinghouse Hanford | Job Number: | 1097 |
| Sample Matrix: | Soil | Extraction Date: | N/A |
| Concentration Units: | mg/kg | Analysis Date: | 08/19/94 |

| Client Sample ID | Lab Sample ID | Result | Qualifiers |
|---|---|---|---|
| Method Blank | AB7062 | 0.5 | U |
| BOBXB8 | AB6276 | 1.3 | + |

+ - 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: | W0161 |
| Contract Name: | Westinghouse Hanford | Job Number: | 996 |
| Client Sample ID: | BOBXB4 | Preparation Date: | 08/17/94 |
| Lab Sample ID: | AB5091 | Analysis Date: | 08/18/94 |
| Sample Matrix: | Soil | Concentration Units: | mg/kg |

| Compound | Result | Qualifier | Detection Limit |
|---|---|---|---|
| fluoride | 0.4 | + | 0.4 |
| chloride | 0.7 | + | 0.4 |
| nitrite | 0.4 | U | 0.4 |
| nitrate | 0.8 | + | 0.4 |
| phosphate | 1.0 | U | 1.0 |
| sulfate | 3.9 | + | 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: | W0161 |
| Contract Name: | Westinghouse Hanford | Job Number: | 1027 |
| Client Sample ID: | BOBXB6 | Preparation Date: | 08/17/94 |
| Lab Sample ID: | AB5493 | Analysis Date: | 08/18/94 |
| Sample Matrix: | Soil | Concentration Units: | mg/kg |

| Compound | Result | Qualifier | Detection Limit |
|---|---|---|---|
| fluoride | 0.4 | U | 0.4 |
| chloride | 1.4 | + | 0.4 |
| nitrite | 0.4 | U | 0.4 |
| nitrate | 0.4 | U | 0.4 |
| phosphate | 1.0 | U | 1.0 |
| sulfate | 4.9 | + | 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: | W0161 |
| Contract Name: | Westinghouse Hanford | Job Number: | 1097 |
| Client Sample ID: | BOBXB8 | Preparation Date: | 08/17/94 |
| Lab Sample ID: | AB6275 | Analysis Date: | 08/18/94 |
| Sample Matrix: | Soil | Concentration Units: | mg/kg |

| Compound | Result | Qualifier | Detection Limit |
|---|---|---|---|
| fluoride | 0.6 | + | 0.4 |
| chloride | 1.8 | + | 0.4 |
| nitrite | 0.4 | U | 0.4 |
| nitrate | 0.4 | U | 0.4 |
| phosphate | 1.0 | U | 1.0 |
| sulfate | 4.3 | + | 1.5 |

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

Analytical Data Package Prepared for

# WESTINGHOUSE HANFORD

Chemical Analysis By

## IT Analytical Services

Middlebrook Laboratory

Sample Delivery Group Number: W0161

| WHC IDENTIFICATION NUMBER | ITAS RICHLAND ID NUMBER | KNOXVILLE ID NUMBER |
|---|---|---|

* See attached Table I.

**RECORD COPY**

IT Corporation
September 8, 1994
Job Number: 996, 1027, and 1097
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 |
|---|---|---|---|
| AB5088 | 408065-01A | BOBXB4 | VOC |
| AB5089 | 408065-01B | " | SVOC |
| AB5090 | 408065-01C | " | CN |
| AB5091 | 408065-01D | " | ANIONS |
| AB5092 | 408065-01E | " | NO3NO2 |
| AB5489 | 40818201-A | BOBXB6 | VOC |
| AB5490 | 40818201-B | " | SVOC |
| AB5491 | 40818201-C | " | METALS |
| AB5492 | 40818201-D | " | CN |
| AB5493 | 40818201-E/F | " | ANIONS |
| AB5494 | 40818201-G | " | NO3NO2 |
| AB5496 | 40818202-A | BOBXB7 | VOC |
| AB6271 | 40833801-A | BOBXB8 | VOC |
| AB6272 | 40833801-B | " | SVOC |
| AB6273 | 40833801-C | " | METALS |
| AB6274 | 40833801-D | " | CN |
| AB6275 | 40833801-E | " | ANIONS |
| AB6276 | 40833801-F | " | NO3NO2 |
| AB6277 | 40833802-A | BOBXB9 | VOC |

9613490.0985

Quanterra
Environmental Services

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

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

**Analytical Data Package Prepared For**

# Westinghouse Hanford

**Radiochemical Analysis By**

## Quanterra Environmental Services
## *Richland Laboratory*

**Sample Delivery Group Number: W0161**

| CLIENT ID NUMBER | QUANTERRA ID NUMBER |
|---|---|
| B0BXB4 | 40806601 |
| B0BXB6 | 40818301 |
| B0BXB8 | 40833901 |

RECORD COPY

OCT 1994
RECEIVED
Date
Log In

Quanterra
Environmental Services

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

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

# CERTIFICATE OF ANALYSIS

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

October 3, 1994

Attention: Karl Pool

OCT 1994
RECEIVED
Data
Log In

| | | |
|---|---|---|
| SAF Number | : | 94-046 |
| Date SDG Closed | : | August 17, 1994 |
| Number of Samples | : | Three (3) |
| Sample Type | : | Soil |
| SDG Number | : | W0161 |
| Data Deliverable | : | Stand Alone |

RECORD COPY

## I. Introduction

On August 3, 8, and 15, 1994, three soil samples were received by the Quanterra Environmental Services Richland Laboratory (QTESRL) for radiochemical analysis. Upon receipt, the samples were assigned the following laboratory ID numbers to correspond with the Westinghouse Hanford Company (WHC) specific IDs:

| QTESRL ID | WHC ID | Matrix | Date of Receipt |
|---|---|---|---|
| 40806601 | B0BXB4 | Soil | 8/03/94 |
| 40818301 | B0BXB6 | Soil | 8/08/94 |
| 40833901 | B0BXB8 | Soil | 8/15/94 |

## II. Analytical Results/Methodology

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

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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 W0161 include a minimum of one Laboratory Control Sample (LCS), one method (reagent) blank, and one duplicate. Any exceptions have been noted in the "Comments" section.

Quality control sample results are reported in the same units as sample results with the exception of Gross Alpha and Gross Beta results which are reported in pCi/sample.

## IV. Comments

Results from the initial radioactivity screening of these samples classified B0BXB4 and B0BXB8 as Category I, and sample B0BXB6 as Category II.

Sample B0BXB5 was not received with B0BXB4, as indicated on accompanying paperwork. In addition, sample B0BXB4 has no sample time indicated on the COC, however, all containers show a time of 12:00. The time of 12:00 was used as the time of sampling. Sample Variance Report faxed 8/3/94.

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Sample B0BXB7 was not received with B0BXB6. There was one extra VOA sample received and labeled as B0BXB6. The sample bottles indicate a sample date/time of 8/5/94 08:00, however, the COC states 8/5/94 09:55. The times and analyses indicated by the bottle labels were used. Issue Resolution submit date 8/15/94.

Samples B0BXB8 and B0BXB9 do not have sample times indicated on the COC's, whereas the sample bottles are marked 10:30. The times indicated on the bottle were used. Issue Resolution submit date 8/15/94.

Approximately one half of sample B0BXB6 was lost in the ball mill apparatus. The ball mill jar broke while rolling.

**Alpha Spectroscopy**

Americium-241, Curium-244 by method ITAS-RD-3302
The LCS results were hand corrected for Am-241 tailing. The corrected results are reported. The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BXB8) results are within contractual limits.

Neptunium-237 by method ITAS-RD-3208
The LCS is biased low (62.8%). The matrix spike and matrix spike duplicate are within three sigma and the recoveries are within $\pm$ 30% of the expected values. All of the batch MDAs meet the RDL. The matrix spike, LCS, batch blank, sample and sample duplicate (duplicate of sample B0BXB8) results are within contractual limits except as noted.

Plutonium-238, -239/40 by method ITAS-RD-3209
The LCS tracer yield was low and the radiochemical yield was high on the initial analysis of the batch. A recount of the spike was performed but the results are not used due to a low tracer yield. The batch was reanalyzed and the reanalysis results are accepted and reported. The reanalysis LCS, batch blank, sample and sample duplicate (duplicate of sample B0BXB8) results are within contractual limits.

Uranium-234, -235, -238 by method ITAS-RD-3234
The U-235 recovery for the LCS is biased low. The LCS is accepted based on acceptable recoveries for the U-234 and U-238, and based on the low abundance of U-235 in the spike. The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BXB8) results are within contractual limits except as noted.

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**Gamma Spectroscopy**

Gamma Scan by method ITAS-RD-3219
Sample B0BXB8 was counted on a detector that was not calibrated for the geometry of the samples, therefore, the results were calculated using efficiencies that were not verified and are not reportable. However, the sample was analyzed in duplicate, therefore, the duplicate sample results are reported as the sample results and no duplicate results are provided. Cd-109 was detected in the all of the batch samples. It is not reported because it is a false positive caused by x-ray lines produced by energy reflection from the detector cave liners. The MDAs for the batch samples and blank exceeded the RDL for Fe-59 due to the short half-life of Fe-59 and the small sample sizes used for analysis. The MDAs for the samples exceeded the RDL for Co-58 and Eu-154 due to the small sample sizes that were used for analysis. The sample sizes that were used were reduced due to the large number of requested analyses and the quantity of large rocks in the samples. The LCS, batch blank, and sample results are within contractual limits except as noted.

Iodine-129 by method ITAS-RD-3219
The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BXB8) results are within contractual limits.

**Gas Proportional Counting**

Gross Alpha by method ITAS-RD-3222
The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BXB4) results are within contractual limits.

Gross Beta by method ITAS-RD-3222
The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BXB4) results are within contractual limits.

Strontium-90 by method ITAS-RD-3204
The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BXB4) results are within contractual requirements.

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**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 B0BXB8) 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

Quanterra
Environmental Services

# SAMPLE RESULTS

| | | | |
|---|---|---|---|
| LAB NAME: | ITAS-RICHLAND | SDG: | W0161 |
| LAB SAMPLE ID: | 40806601 | MATRIX: | SOIL |
| CLIENT ID: | B0BXB4 | DATE RECEIVED: | 8/3/94 |

| ISOTOPE | RESULT | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA | REPORT UNIT | YIELD | METHOD NUMBER |
|---|---|---|---|---|---|---|---|
| AM-241 | 1.89E-02 | 2.02E-02 | 2.04E-02 | 2.51E-02 | pCi/g | 72.10% | RD3302 |
| CM-242 | -4.81E-04 | 9.61E-04 | 9.64E-04 | 2.42E-02 | pCi/g | 72.10% | RD3302 |
| CM-244 | -2.02E-03 | 1.81E-03 | 1.83E-03 | 2.85E-02 | pCi/g | 72.10% | RD3302 |
| NP-237 | 6.17E-02 | 3.22E-02 | 3.48E-02 | 1.90E-02 | pCi/g | 100.00% | RD3208 |
| PU-238 | -9.41E-03 | 9.41E-03 | 9.63E-03 | 8.08E-02 | pCi/g | 35.40% | RD3209 |
| PU239/40 | 0.00E+00 | 0.00E+00 | 3.52E-02 | 3.18E-02 | pCi/g | 35.40% | RD3209 |
| U-234 | 7.54E-01 | 1.90E-01 | 2.29E-01 | 8.56E-02 | pCi/g | 35.30% | RD3234 |
| U-235 | 5.51E-02 | 5.28E-02 | 5.36E-02 | 6.29E-02 | pCi/g | 35.30% | RD3234 |
| U-238DA | 7.18E-01 | 1.84E-01 | 2.20E-01 | 4.74E-02 | pCi/g | 35.30% | RD3234 |
| CO-58 | -3.55E-02 | 3.67E-02 | 3.69E-02 | 5.86E-02 | pCi/g | N/A | RD3219 |
| CO-60 | 8.33E-03 | 2.52E-02 | 2.52E-02 | 4.33E-02 | pCi/g | N/A | RD3219 |
| CS-137DA | 7.15E-03 | 2.23E-02 | 2.23E-02 | 3.80E-02 | pCi/g | N/A | RD3219 |
| EU-152 | 6.28E-03 | 5.40E-02 | 5.40E-02 | 8.69E-02 | pCi/g | N/A | RD3219 |
| EU-154 | 3.28E-02 | 7.46E-02 | 7.47E-02 | 1.29E-01 | pCi/g | N/A | RD3219 |
| EU-155 | 6.15E-02 | 5.13E-02 | 5.17E-02 | 8.32E-02 | pCi/g | N/A | RD3219 |
| FE-59 | -6.59E-02 | 1.12E-01 | 1.12E-01 | 1.82E-01 | pCi/g | N/A | RD3219 |
| I-129LP | -1.01E-01 | 3.81E-01 | 3.81E-01 | 6.48E-01 | pCi/g | N/A | RD3219 |
| K-40 | 1.75E+01 | 1.02E+00 | 2.03E+00 | N/A | pCi/g | N/A | RD3219 |
| RA-224DA | 1.06E+00 | 6.81E-02 | 1.26E-01 | N/A | pCi/g | N/A | RD3219 |
| RA-226DA | 4.93E-01 | 9.79E-02 | 1.10E-01 | N/A | pCi/g | N/A | RD3219 |
| RA-228DA | 1.27E+00 | 1.68E-01 | 2.10E-01 | N/A | pCi/g | N/A | RD3219 |
| U-238DLP | 1.19E+00 | 1.21E+00 | 1.21E+00 | N/A | pCi/g | N/A | RD3219 |
| ALPHA | 1.15E+01 | 4.73E+00 | 4.89E+00 | 3.89E+00 | pCi/g | 100.00% | RD3214 |
| BETA | 2.66E+01 | 3.75E+00 | 4.14E+00 | 3.84E+00 | pCi/g | 100.00% | RD3214 |
| STRONTIUM | 2.40E-01 | 8.37E-02 | 1.02E-01 | 1.51E-01 | pCi/g | 80.00% | RD3204 |

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# SAMPLE RESULTS

| | | | |
|---|---|---|---|
| **LAB NAME:** | ITAS-RICHLAND | **SDG:** | W0161 |
| **LAB SAMPLE ID:** | 40806601 | **MATRIX:** | SOIL |
| **CLIENT ID:** | B0BXB4 | **DATE RECEIVED:** | 8/3/94 |

| ISOTOPE | RESULT | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA | REPORT UNIT | YIELD | METHOD NUMBER |
|---|---|---|---|---|---|---|---|
| TC-99 | -9.01E-03 | 2.26E-01 | 1.06E+00 | 5.21E-01 | pCi/g | 100.00% | ITAS-IT-RS-0001 |

**Number of Results:** 26

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# SAMPLE RESULTS

| | | | |
|---|---|---|---|
| LAB NAME: | ITAS-RICHLAND | SDG: | W0161 |
| LAB SAMPLE ID: | 40818301 | MATRIX: | SOIL |
| CLIENT ID: | B0BXB6 | DATE RECEIVED: | 8/8/94 |

| ISOTOPE | RESULT | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA | REPORT UNIT | YIELD | METHOD NUMBER |
|---|---|---|---|---|---|---|---|
| AM-241 | -1.46E-03 | 1.69E-03 | 1.71E-03 | 3.04E-02 | pCi/g | 59.50% | RD3302 |
| CM-242 | -1.15E-03 | 1.62E-03 | 1.63E-03 | 3.27E-02 | pCi/g | 59.50% | RD3302 |
| CM-244 | -9.79E-04 | 1.38E-03 | 1.39E-03 | 2.79E-02 | pCi/g | 59.50% | RD3302 |
| NP-237 | 1.86E-01 | 5.58E-02 | 6.87E-02 | 2.22E-02 | pCi/g | 100.00% | RD3208 |
| PU-238 | 0.00E+00 | 0.00E+00 | 2.74E-02 | 2.47E-02 | pCi/g | 45.60% | RD3209 |
| PU239/40 | 0.00E+00 | 0.00E+00 | 2.74E-02 | 2.47E-02 | pCi/g | 45.60% | RD3209 |
| U-234 | 7.00E-01 | 1.32E-01 | 1.61E-01 | 3.29E-02 | pCi/g | 67.70% | RD3234 |
| U-235 | 4.11E-02 | 3.26E-02 | 3.31E-02 | 3.29E-02 | pCi/g | 67.70% | RD3234 |
| U-238DA | 6.44E-01 | 1.26E-01 | 1.53E-01 | 3.48E-02 | pCi/g | 67.70% | RD3234 |
| CO-58 | -5.71E-03 | 3.48E-02 | 3.48E-02 | 5.56E-02 | pCi/g | N/A | RD3219 |
| CO-60 | -2.67E-03 | 2.29E-02 | 2.29E-02 | 3.99E-02 | pCi/g | N/A | RD3219 |
| CS-137DA | -7.71E-04 | 2.28E-02 | 2.28E-02 | 3.77E-02 | pCi/g | N/A | RD3219 |
| EU-152 | -2.46E-02 | 4.87E-02 | 4.88E-02 | 8.04E-02 | pCi/g | N/A | RD3219 |
| EU-154 | -7.08E-02 | 7.90E-02 | 7.94E-02 | 1.27E-01 | pCi/g | N/A | RD3219 |
| EU-155 | 2.12E-03 | 4.52E-02 | 4.52E-02 | 7.58E-02 | pCi/g | N/A | RD3219 |
| FE-59 | -1.53E-01 | 1.04E-01 | 1.05E-01 | 1.58E-01 | pCi/g | N/A | RD3219 |
| I-129LP | 2.30E-01 | 3.74E-01 | 3.74E-01 | 6.64E-01 | pCi/g | N/A | RD3219 |
| RA-224DA | 8.05E-01 | 6.71E-02 | 1.05E-01 | N/A | pCi/g | N/A | RD3219 |
| RA-226DA | 6.60E-01 | 1.01E-01 | 1.21E-01 | N/A | pCi/g | N/A | RD3219 |
| RA-228DA | 1.07E+00 | 1.76E-01 | 2.05E-01 | N/A | pCi/g | N/A | RD3219 |
| ALPHA | 1.17E+01 | 4.93E+00 | 5.09E+00 | 5.00E+00 | pCi/g | 100.00% | RD3214 |
| BETA | 2.19E+01 | 3.38E+00 | 3.68E+00 | 3.44E+00 | pCi/g | 100.00% | RD3214 |
| STRONTIUM | 5.77E-02 | 6.08E-02 | 6.25E-02 | 1.39E-01 | pCi/g | 88.30% | RD3204 |
| TC-99 | 1.22E-01 | 2.29E-01 | 1.07E+00 | 5.21E-01 | pCi/g | 100.00% | ITAS-IT-RS-0001 |

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# SAMPLE RESULTS

| | | | |
|---|---|---|---|
| LAB NAME: | ITAS-RICHLAND | SDG: | W0161 |
| LAB SAMPLE ID: | 40818301 | MATRIX: | SOIL |
| CLIENT ID: | B0BXB6 | DATE RECEIVED: | 8/8/94 |

| ISOTOPE | RESULT | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA | REPORT UNIT | YIELD | METHOD NUMBER |
|---|---|---|---|---|---|---|---|

Number of Results: 24

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## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| LAB NAME: | ITAS-RICHLAND | SDG: | W0161 |
| LAB SAMPLE ID: | 40833901 | MATRIX: | SOIL |
| CLIENT ID: | B0BXB8 | DATE RECEIVED: | 8/15/94 |

| ISOTOPE | RESULT | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA | REPORT UNIT | YIELD | METHOD NUMBER |
|---|---|---|---|---|---|---|---|
| AM-241 | 2.23E-02 | 2.33E-02 | 2.36E-02 | 2.66E-02 | pCi/g | 62.30% | RD3302 |
| CM-242 | 3.47E-03 | 1.36E-02 | 1.36E-02 | 3.95E-02 | pCi/g | 62.30% | RD3302 |
| CM-244 | 2.33E-04 | 1.21E-02 | 1.21E-02 | 4.24E-02 | pCi/g | 62.30% | RD3302 |
| NP-237 | 1.18E-02 | 1.44E-02 | 1.47E-02 | 1.90E-02 | pCi/g | 100.00% | RD3208 |
| PU-238 | 0.00E+00 | 0.00E+00 | 5.61E-02 | 5.07E-02 | pCi/g | 22.20% | RD3209 |
| PU239/40 | -1.50E-02 | 1.50E-02 | 1.55E-02 | 1.28E-01 | pCi/g | 22.20% | RD3209 |
| U-234 | 6.76E-01 | 1.45E-01 | 1.75E-01 | 3.55E-02 | pCi/g | 53.50% | RD3234 |
| U-235 | 3.05E-02 | 3.11E-02 | 3.15E-02 | 3.13E-02 | pCi/g | 53.50% | RD3234 |
| U-238DA | 7.76E-01 | 1.56E-01 | 1.92E-01 | 3.88E-02 | pCi/g | 53.50% | RD3234 |
| CO-58 | -1.16E-02 | 3.51E-02 | 3.51E-02 | 5.56E-02 | pCi/g | N/A | RD3219 |
| CO-60 | 6.75E-03 | 2.34E-02 | 2.34E-02 | 4.05E-02 | pCi/g | N/A | RD3219 |
| CS-137DA | -8.84E-03 | 2.23E-02 | 2.23E-02 | 3.63E-02 | pCi/g | N/A | RD3219 |
| EU-152 | -2.47E-02 | 5.00E-02 | 5.01E-02 | 8.23E-02 | pCi/g | N/A | RD3219 |
| EU-154 | 2.30E-02 | 7.07E-02 | 7.07E-02 | 1.25E-01 | pCi/g | N/A | RD3219 |
| EU-155 | 6.36E-02 | 4.81E-02 | 4.85E-02 | 8.26E-02 | pCi/g | N/A | RD3219 |
| FE-59 | -8.97E-03 | 9.04E-02 | 9.04E-02 | 1.48E-01 | pCi/g | N/A | RD3219 |
| I-129LP | 4.65E-02 | 4.03E-01 | 4.03E-01 | 7.01E-01 | pCi/g | N/A | RD3219 |
| K-40 | 1.24E+01 | 1.06E+00 | 1.63E+00 | N/A | pCi/g | N/A | RD3219 |
| RA-224DA | 9.82E-01 | 6.91E-02 | 1.20E-01 | N/A | pCi/g | N/A | RD3219 |
| RA-226DA | 4.58E-01 | 9.09E-02 | 1.02E-01 | N/A | pCi/g | N/A | RD3219 |
| RA-228DA | 1.27E+00 | 1.69E-01 | 2.12E-01 | N/A | pCi/g | N/A | RD3219 |
| U-238DLP | 8.89E-01 | 1.39E+00 | 1.40E+00 | N/A | pCi/g | N/A | RD3219 |
| ALPHA | 1.29E+01 | 5.27E+00 | 5.45E+00 | 5.64E+00 | pCi/g | 100.00% | RD3214 |
| BETA | 2.06E+01 | 3.35E+00 | 3.61E+00 | 3.66E+00 | pCi/g | 100.00% | RD3214 |
| STRONTIUM | 9.36E-02 | 6.16E-02 | 6.59E-02 | 1.30E-01 | pCi/g | 90.40% | RD3204 |

Quanterra
Environmental Services

# SAMPLE RESULTS

| | | | |
|---|---|---|---|
| LAB NAME: | ITAS-RICHLAND | SDG: | W0161 |
| LAB SAMPLE ID: | 40833901 | MATRIX: | SOIL |
| CLIENT ID: | B0BXB8 | DATE RECEIVED: | 8/15/94 |

| ISOTOPE | RESULT | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA | REPORT UNIT | YIELD | METHOD NUMBER |
|---|---|---|---|---|---|---|---|
| TC-99 | -1.51E-01 | 2.25E-01 | 1.05E+00 | 5.21E-01 | pCi/g | 100.00% | ITAS-IT-RS-0001 |

Number of Results: 26

9613490.0997

0000026

INTERNATIONAL TECHNOLOGY CORPORATION

Regional Office
2800 George Washington Way
Richland, Washington 99352

WO#996

# SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

Date/Time Received 8-3-94 1100 Client Name WHC

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

Cooler ID (if noted on the outside of cooler) ER21

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: 8
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°

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

Printed Name/Signature Clinitzer Date/Time 8-3-94 1100

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

9613490.0998

0000027

INTERNATIONAL TECHNOLOGY CORPORATION

Regional Office
2300 George Washington Way
Richland, Washington 99352

WO #1027

## SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

Date/Time Received 8/8/94 1040 Client Name WHC

Project/Client # _____ Batch or Case # _____

Cooler ID (if noted on the outside of cooler) KR-21

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: 11
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 2°

11. The following paperwork should be accounted for (N/A if not applicable): N/A
    Chain of Custody #'(s) _____
    Request for analysis #(s) _____
    Airbill # _____ 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 [signature] Date/Time 8-8-94 1040

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

9613490.0999

0000028

WO#1027

INTERNATIONAL TECHNOLOGY CORPORATION

Regional Office
2800 George Washington Way
Richland, Washington 99352

# SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

Date/Time Received 8-15-94 10.50 Client Name WHC

Project/Client # 94-046 Batch or Case # _____

Cooler ID (if noted on the outside of cooler) E12-21

1. Condition of shipping container? Good
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: 12
8. Samples have: X tape ____ hazard labels
   X custody seals ____ appropriate sample labels
9. Samples are: X in good condition ____ leaking
   ____ broken ____ have air bubbles
   ____ other
10. Coolant present? Yes ☒ No ☐

Sample temperature .5 °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 Karen Fittenberg Date/Time 8-15-94 10.50

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

Westinghouse Hanford Company

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

WO #996

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 299-W19-34B WVS 8-1-94 | SAF No.: 94-046 |
| Ice Chest No.: ER-21 | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: INTERNATIONAL TECHNOLOGIES | Offsite Property No.: W94-0-0746-50 WVS 8-1-94 | Bill of Lading/Air Bill No.: NA |
| 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 | | |
| | 4080650 | A | ~~B~~ | C | D | E | 4080660 | | | | | | | | |

| Sample No. | Matrix* | Date Sampled | Time Sampled | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B0BXB4 | S | 8-1-94 | | ✓ | ✓ | ✗ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | ✓ | |
| B0BXB5 | S | 8-1-94 | | | | | | | | | | | | ✓ | | | |

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By: W. V. Setzer | Date/Time: 8-2-94 1010 | Received By: CH2M HILL A.J. Simpson | Date/Time: 8/2/94 1010 |
| Relinquished By: CH2M HILL A.J. Simpson | Date/Time: 8/3/94 1100 | Received By: Lockfin ~~[illegible]~~ quantum | Date/Time: 8/3/94 1100 |
| 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)

SDG W0164

* NOT ENOUGH SAMPLE for metals

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)

9613490.1000

0000029

WO # 1027

**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.: =R-21 | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: INTERNATIONAL TECHNOLOGIES | Offsite Property No.: W94-0-0851-5 | Bill of Lading/Air Bill No.: NA |
| Possible Sample Hazards/Remarks | | |

| 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 | aG | ~~G~~ P | G | G | P/G | P/G | | | aGs | aGs | aGs | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | ~~1~~ 2 | 1 | 1 | 1 | | | 1 | 1 | 1 | | |
| Volume | 125ml | 500ml | 500ml | 250ml | ~~250ml~~ 125 | 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 | | |
| 408182 | A | B | C | D | ~~E~~ F | E | 408150301 | | | | A | | | | |

| Sample No. | Matrix* | Date Sampled | Time Sampled | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B0BXB6 | S | 8-5-94 | 0955 | X | X | X | X | X | X | X | X | | | | | X | |
| B0BXB7 | S | 8-5-94 | 0900 | | | | | | | | | | | X | | | |

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By: W.V. Setzer | Date/Time: 8-8-94 0925 | Received By: CHZ2M HILL A.G. Simpson | Date/Time: 8/8/94 0925 |
| Relinquished By: CH2M HILL R. Simpson | Date/Time: 8/8/94 1035 | Received By: Kristin Quinlan | Date/Time: 8/8/94 1035 |
| 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)

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)

9613490.1001

0000030

WO 1074

**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: 299-W19-34b | SAF No.: 94-046 |
| Ice Chest No.: EIR-21 | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: Quanterra | Offsite Property No.: W94-0-0851-11 | Bill of Lading/Air Bill No.: NA |

Possible Sample Hazards/Remarks

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 408338 | 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 | | |
| | A | B | C | D | E | F | 408338-1 | | | | 02A | | | | |

| Sample No. | Matrix* | Date Sampled | Time Sampled | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BOBXB7 01 | S | 8-11-94 | | X | X | X | X | X | X | X | X | | | | | X | |
| BOBXB8 02 | S | 8-11-94 | | | | | | | | | | | X | | | | |

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

| Relinquished By | Date/Time | Received By | Date/Time |
|---|---|---|---|
| W. V. Setzer | 8-15-94 0905 | A J Simpson | 8/15/94 0905 |
| A J Simpson | 8/15/94 1045 | Quanterra Kim Sterling | 8/15/94 10:50 |
| | | | |
| | | | |

**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 W01101

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)

9613490.1002

0000031

9613490.1003

0000032

WO#10X1

| Contractor BHI | OFF-SITE PROPERTY CONTROL | CONTROL NO. (To be obtained from PROPERTY MANAGEMENT) W94-0-0851-5 |
|---|---|---|

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

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

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

Routing ☐ Prepaid ☐ Collect

Shipped to
Company Quanterra (IT)
Address 2800 George Washington Way
City Richland, WA 99352 State Zip Code
Country

Off-site Custodian

On-site Custodian Payroll No.

| Qty. | Property No. | Description (include Manufacture Name, Model, Serial No.) | Acquisition Cost |
|---|---|---|---|
| 1 lbs. | | Sample #: B0B3XB6 B0B3XB7<br>Cooler ID: EC-21<br>Polycooler with groundwater samples packed in wet ice and vermiculite | N/A |
| 1 lbs. | | samples #:<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

☐ Required for Project Work. List Project No. 200 UP-1

☐ Business Trip

☐ Off-site Assignment

Bill of lading # NA

☐ Shipment to Subcontractor. List Subcontract No.

☐ Other (Please specify) Sampling supports RI/FS work in the 200 area.

RECEIVED AUG 8 1994 PROPERTY RECORDS

*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 |
|---|---|---|
| [signature] | 181227 | 8/8/94 |

Location of and Contact for Property (Name/Phone No./Bldg./Area)
P. H. Butcher/(509)376-4388

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

| Originated By | Date | Authorized By | Date |
|---|---|---|---|
| AJ SIMPSON | | AJ Simpson | 8/8/94 |
| **Property Representative Signature** | **Date** | **Property Management Approval** | **Date** |
| | | [signature] | 8/8/94 |

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

| Authorized Shipping Signature | Date |
|---|---|
| | |

**DISTRIBUTION (AFTER FINAL SIGNATURES)**

White - Property Management Yellow - Shipping Green - Accounts Payable Pink - Originator Goldenrod - Property Management

54-3000-479 (01/94)

Rec'd C. Hinther Quanterra 8-9-94 10 30

BEST AVAILABLE COPY

| Contractor BHI | OFF-SITE PROPERTY CONTROL | CONTROL NO. (To be obtained from PROPERTY MANAGEMENT) W914-0-0851-11 |
|---|---|---|

PART I - TO BE COMPLETED BY ORIGINATOR

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

The following items are to be shipped from [X] Contractor [ ] Vendor

Routing [ ] Prepaid [ ] Collect

Shipped to
Company Quanterra (IT)
Address 2800 George Washington Way
City Richland, WA 99352 State Zip Code
Country

Off-site Custodian

On-site Custodian Payroll No.

| Qty. | Property No. | Description (include Manufacture Name, Model, Serial No.) | Acquisition Cost |
|---|---|---|---|
| 1 lbs. | | Sample #: B0BX57 to B0BX58<br>Cooler ID: ER-21<br>Polycooler with groundwater samples packed in wet ice and vermiculite | N/A |
| 1 lbs. | | Sample #:<br>Cooler ID:<br>Polycooler with groundwater samples packed in wet ice and vermiculite | N/A |

[ ] Classified [X] Unclassified [ ] Shipped Under DOE Contract [ ] Shipped Under Contractor's Use Permit Contract

Necessity for the off-site use of this property
[ ] Required for Project Work. List Project No. 200-UP-1
[ ] Business Trip
[ ] Off-site Assignment
[ ] Shipment to Subcontractor. List Subcontract No.
[ ] Other (Please specify) Sampling supports RI/FS work in the 200 Area.

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. 17157 | Date 8/15/94 |
|---|---|---|

Location of and Contact for Property (Name/Phone No./Bldg./Area)
P. H. Butcher/(509)376-4388

| Date Ready for Shipment 8/15/94 | Cost Code to be Charged 88410 / PTIFA | Approximate Date This Property will be Returned N/A |
|---|---|---|

| Originated By O. Simpson | Date | Authorized By O. Simpson | Date 8/15/94 |
|---|---|---|---|
| Property Representative Signature | Date | Property Management Approval P. Hankel | Date 8/15/94 |

PART II - TO BE COMPLETED BY SHIPPING

| Authorized Shipping Signature | Date |
|---|---|
| | 0063 |

DISTRIBUTION (AFTER FINAL SIGNATURES)

White - Property Management Yellow - Shipping Green - Accounts Payable Pink - Originator Goldenrod - Property Management

Returning Shipment 8/15/94 10:30

54-3000-479 (01/94)

INTERNATIONAL TECHNOLOGY CORPORATION

COC NO. *0000110*

# ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

WO#996 RI #1257

Reference Document No. 481765
Page 1 of 1

Project Name/No. 1 94-046
Sample Team Members 2
Profit Center No. 3 4632
Project Manager 4 Van Pettey
Purchase Order No. 6
Required Report Date 11

Samples Shipment Date 7 8/3/94
Lab Destination 8 Middlebrook
Lab Contact 9
Project Contact/Phone 12
Carrier/Waybill No. 13 327 2064 032

Bill to: 5 Quanterra Richland
Report to: 10 Quanterra Richland

**ONE CONTAINER PER LINE**

| Sample Number 14 | Sample Description/Type 15 | Date/Time Collected 16 | Container Type 17 | Sample Volume 18 | Pre-servative 19 | Requested Testing Program 20 | Condition on Receipt 21 | Disposal Record No. 22 |
|---|---|---|---|---|---|---|---|---|
| 40806501A | 80BXB4 / soil | See WHC COCSAR | | | 4°C | See WHC COCSAR | 10°C BB 8/04/94 | |
| B | | | | | | | | |
| C | | | | | | | | |
| D | | | | | | | | |
| E | | | | | | | | |
| @ 8/3/94 | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

FOR LAB USE ONLY

FOR LAB USE ONLY

Special Instructions: 23

Possible Hazard Identification: 24
Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☑

Sample Disposal: 25
Return to Client ☑ Disposal by Lab ☐ Archive _____ (mos.)

Turnaround Time Required: 26
Normal ☑ Rush ☐

QC Level: 27
I. ☐ II. ☐ III. ☐ Project Specific (specify): SDG W0161

| | | | |
|---|---|---|---|
| 1. Relinquished by 28 (Signature/Affiliation) [signature] | Date: 8/3/94 Time: 1600 | 1. Received by 28 (Signature/Affiliation) [signature] QESKN | Date: 8/04/94 Time: 9:05 |
| 2. Relinquished by (Signature/Affiliation) | Date: Time: | 2. Received by (Signature/Affiliation) | Date: Time: |
| 3. Relinquished by (Signature/Affiliation) | Date: Time: | 3. Received by (Signature/Affiliation) | Date: Time: |

Comments: 29

MCA 3/15/91

White: To accompany samples
Yellow: Field copy
*See back of form for special instructions.

9613490.1005

0000034

INTERNATIONAL TECHNOLOGY CORPORATION

COC NO. *0000147*

# ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

WO# 1027
RL# 1286

Reference Document No. 481778
Page 1 of ___

Project Name/No. 1 SDF 94-046
Sample Team Members 2
Profit Center No. 3 4632
Project Manager 4 Van Pettey
Purchase Order No. 6
Required Report Date 11

Samples Shipment Date 7 8-8-94
Lab Destination 8 Middlebrook
Lab Contact 9
Project Contact/Phone 12
Carrier/Waybill No. 13 Fed Ex: 339 6515 656

Bill to: 5 Quantera
Richland
Report to: 10 Quantera
Richland

ONE CONTAINER PER LINE

| Sample Number 14 | Sample Description/Type 15 | Date/Time Collected 16 | Container Type 17 | Sample Volume 18 | Preservative 19 | Requested Testing Program 20 | Condition on Receipt 21 | Disposal Record No. 22 |
|---|---|---|---|---|---|---|---|---|
| 40818201A (8-8-94) | BOBXB6 / S | AS Per WHC | | | Cool 4° | AS Per WHC | 2°C BB 8/9/94 | |
| B | | COC | | | | COC | | |
| C | | | | | | | | |
| D | | | | | | | | |
| E | | | | | | | | |
| F | | | | | | | | |
| G | | | | | | | | |
| 40818202A | BOBXB7/BOBXB6 | SEE | SVF | | | | | |

FOR LAB USE ONLY

FOR LAB USE ONLY

Special Instructions: 23

Possible Hazard Identification: 24
Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☒

Sample Disposal: 25
Return to Client ☒ Disposal by Lab ☐ Archive _____ (mos.)

Turnaround Time Required: 26
Normal ☒ Rush ☐ AS Per WHC Contract

QC Level: 27
I. ☐ II. ☐ III. ☐ Project Specific (specify): SDG W0161

| | | | |
|---|---|---|---|
| 1. Relinquished by 28 (Signature/Affiliation) A. Boyd Quantera | Date: 8-8-94 Time: 16:00 | 1. Received by 28 (Signature/Affiliation) Bryan Blomquist QESKN | Date: 8/09/94 Time: 9:10 |
| 2. Relinquished by (Signature/Affiliation) | Date: Time: | 2. Received by (Signature/Affiliation) | Date: Time: |
| 3. Relinquished by (Signature/Affiliation) | Date: Time: | 3. Received by (Signature/Affiliation) | Date: Time: |

Comments: 29

KASclemon 8/9/94 Trip Blank rec'd but not listed on RFA/COC + No labels on Trip Blank vials.

MCA 3/15/91

White: To accompany samples
Yellow: Field copy
*See back of form for special instructions.

0001 0645196

0000035

INTERNATIONAL TECHNOLOGY CORPORATION

COC NO. *0000225*

# ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

WO #109 RI #1398

Reference Document No. 453529
Page 1 of 1

Project Name/No.[1] SAF 94-046
Sample Team Members[2]
Profit Center No.[3]
Project Manager[4] VAN PETTEY
Purchase Order No.[6]
Required Report Date[11]

Samples Shipment Date[7] 8-15-94
Lab Destination[8] Middlebrook
Lab Contact[9]
Project Contact/Phone[12]
Carrier/Waybill No.[13] FEDX: 263 5387 684

Bill to:[5] Quanterra Richland
Report to:[10] Quanterra Richland

White: To accompany samples
Yellow: Field copy

ONE CONTAINER PER LINE

| Sample Number[14] | Sample Description/Type[15] | Date/Time Collected[16] | Container Type[17] | Sample Volume[18] | Pre-servative[19] | Requested Testing Program[20] | Condition on Receipt[21] | Disposal Record No.[22] |
|---|---|---|---|---|---|---|---|---|
| 40833801A | BOBXBB / Soil | SEE BOTTLES | + SVF | | Cool 4° | SEE BOTTLES | Rec'd @ 5°C with Cooler Int. BPB | |
| B | | | | | | | | |
| C | | | | | | | | |
| D | | | | | | | | |
| E | | | | | | | | |
| F | | | | | | | | |
| 02A | BOBXB9 / Soil | | | | | | | |
| | | | | | | | | |

FOR LAB USE ONLY

FOR LAB USE ONLY

Special Instructions:[23] As per WHC Contract

Possible Hazard Identification:[24] Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☒

Sample Disposal:[25] Return to Client ☒ Disposal by Lab ☐ Archive _____ (mos.)

Turnaround Time Required:[26] Normal ☒ Rush ☐

QC Level:[27] I. ☐ II. ☐ III. ☐ Project Specific (specify): SDG W0161

| | | | |
|---|---|---|---|
| 1. Relinquished by[28] (Signature/Affiliation) Heidelberg Quanterra | Date: 8-15-94 Time: 16:00 | 1. Received by[28] (Signature/Affiliation) Bryan Blomquist QESKN | Date: 8/16/94 Time: 9:00 |
| 2. Relinquished by (Signature/Affiliation) | Date: Time: | 2. Received by (Signature/Affiliation) | Date: Time: |
| 3. Relinquished by (Signature/Affiliation) | Date: Time: | 3. Received by (Signature/Affiliation) | Date: Time: |

Comments:[29]

*See back of form for special instructions.

MCA 3/15/91

9613490.1007

0000036

080394B.WQ2

WO #996

TENNELEC #2

SCREENING CALCULATION SPREADSHEET

Cat I (B) 8/5/94

| Cust Code | Recieved Date | | Screening Prep Date | | Count Date | Mnts. Cntd | BACKGROUND Alpha | Beta | Mnts |
|---|---|---|---|---|---|---|---|---|---|
| WHC | 8-3-94 | | 8-3 | | 8-3 | 10 | 15 | 240 | 240 |

| Customer ID WHC/SOLID | pH <2 Rcvd/Reiq | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B0BXB4 | | 79.5 | 80 | | 1064.0 | | 5 | 3 | 35 | 0.24 | 2.50 | 1.4E+00 | 5.7E+00 | 8.6E-03 | 3.4E-02 | 1.3E-05 | 1.5E-05 | 8.1E+00 | 3.2E+01 | Yes | 1.2E+03 | 3.1E+03 |

BD01-0645196

WO # 1027

060694B.WO2

TENNELEC #2

SCREENING CALCULATION SPREADSHEET

| Cust Code | Recieved Date | | Screening Prep Date | | Count Date | Mnts. Cntd | BACKGROUND Alpha | Beta | Mnts |
|---|---|---|---|---|---|---|---|---|---|
| WHC | 6-8-94 | | 6-8 | | 6-8 | 30 | 11 | 233 | 240 |

Cat II (B3) 8/8/94

| Customer ID | pH <2 | Residue Wght | Vol. Anal. | Sample Size | SMPLE CNT DATA Hldr | Total Counts | | Net Sample Counts/Minute | | DPM / Aliqout | | uCi per Sample | | 2 Sigma Error uCi per Sample | | pCi/(Gm or L) | | Category 1 | Aliquot to Cat 1 Gm or L | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WHC/SOLID | Rcvd/Reiq | mG | mG mL | Gm L | Num. | Alpha | Beta | Alpha | Beta | Alpha | Beta | Alpha | Beta | Alpha | Beta | Alpha | Beta | Yes/No | Alpha | Beta |
| B0BXB6 | | 61.5 | 62 | 1276.3 | 1 | 18 | 115 | 0.49 | 2.66 | 3.13E+00 | 6.40E+00 | 2.2E-02 | 4.5E-02 | 1.4E-05 | 1.2E-05 | 1.7E+01 | 3.5E+01 | No | 5.8E+02 | 2.8E+03 |

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0000038

081594B.WQ1

TENNELEC #1

SCREENING CALCULATION SPREADSHEET

WO #1097

Correct. JRH 15 Aug 94

| Customer Code | Recieved Date | | Screening Prep Date | | Count Date | Mnts. Cntd | BACKGROUND Alpha | Beta | Mnts |
|---|---|---|---|---|---|---|---|---|---|
| WHC | 8/15/94 | | 8/15 | | 8/15 | 10 | 14 | 260 | 240 |

| Customer ID | pH <2 | Residue Wght | Vol. Anal. | | Sample Size | | SMPLE CNT DATA Hldr | Total Counts | | Net Sample Counts/Minute | | DPM / Aliqout | | uCi per Sample | | 2 Sigma Error uCi per Sample | | pCi/(Gm or L) | | Category 1 | Aliquot to Cat 1 Gm or L | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WHC\SOLID | Rcvd/Relq | mG | mG | mL | Gm | L | Num. | Alpha | Beta | Alpha | Beta | Alpha | Beta | Alpha | Beta | Alpha | Beta | Alpha | Beta | Yes/No | Alpha | Beta |
| BOBXB6 | | 87.0 | 87 | | 973.1 | | 4 | 0 | 43 | -0.06 | 3.13 | -7.5E-01 | 7.85E+00 | -3.8E-03 | 4.0E-02 | -7.9E-06 | 1.5E-05 | -3.9E+00 | 4.1E+01 | Yes | -2.6E+03 | 2.5E+03 |

000003

/ 08/02/94 07:41 ☎373 3176 222S 3B ☑002

WO #996

SAMPLE STATUS REPORT FOR E 7436. E-BLANK BOBXB4 TIME: 8/ 2/94 7:58
DISPATCHED: 5/13/94 7:55 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 8/ 1/94 14:32

| 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

BOBXB4
BOBXB5

WO#1027

SAMPLE STATUS REPORT FOR E 7438. E-BLANK BOBXB6 TIME: 8/ 8/94 8:17
DISPATCHED: 5/13/94 7:57 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 8/ 5/94 13:48

| 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

BOBXB6
BOBXB7

WO#1097

08/12/94 07:39 ☎373 3176 222S 3B 002

SAMPLE STATUS REPORT FOR E 7440. E-BLANK BOBXB8 TIME: 8/12/94 7:59
DISPATCHED: 5/13/94 7:59 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 8/12/94 7:56

| 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

BO BX B7

BO BX B8

9613490.1014

# SAMPLE RECEIPT VARIANCE REPORT
## ITAS-RICHLAND LABORATORY

WORK ORDER NUMBER: 408065, 408066 DATE INITIATED: 8/3/94

INITIATED BY: T Gilmore

DATE/TIME OF SAMPLE (AND/OR RFA & COC) RECEIPT: 8/3/94 1100

| CLIENT SAMPLE NUMBER | RFA/COC NUMBERS | ANALYSIS REQUESTED |
|---|---|---|
| BOBXB4 | | all |
| BOBXB5 | | 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: Sample BOBXB5 was not received. Sample BOBXB4 has no time on COC, all containers show 12:00.

SUPERVISOR REVIEW: Tami Heidelberg

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

9613490.1015

# SAMPLE RECEIPT VARIANCE REPORT
## ITAS-RICHLAND LABORATORY

WORK ORDER NUMBER: 408182 (02A) DATE INITIATED: 8-8-94

INITIATED BY: R Boyd

DATE/TIME OF SAMPLE (AND/OR RFA & COC) RECEIPT: 8-8-94 1035

| CLIENT SAMPLE NUMBER | RFA/COC NUMBERS | ANALYSIS REQUESTED |
|---|---|---|
| BOBXB7 | | 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: Did not recive above sample. We did recive a sample (BOBXB6) that was not on the chain of Custody, also BOBXB6 date + time on Bottle say 8-5-94 at 0800

SUPERVISOR REVIEW: Tami Heidelberg

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

9613490.1016

# SAMPLE RECEIPT VARIANCE REPORT
## ITAS-RICHLAND LABORATORY

WORK ORDER NUMBER: _____ DATE INITIATED: 8-15-94

INITIATED BY: Karen Feldenberg

DATE/TIME OF SAMPLE (AND/OR RFA & COC) RECEIPT: _____

| CLIENT SAMPLE NUMBER | RFA/COC NUMBERS | ANALYSIS REQUESTED |
|---|---|---|
| B0BXB8 | | Time 10:30 |
| B0BXB9 | | Date 8-11-94 |
| | | |
| | | |

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: Bottles do not match the Paper work. COC has no time sampled - bottles have 10:30. KO 8/15/94

SUPERVISOR REVIEW: Tami Hiedelberg

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

9613490.1017

INTERNATIONAL TECHNOLOGY CORPORATION

DUE DATE 9-21

# REANALYSIS / RECOUNT

## CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

ANALYSIS Am

NAME/DATE mmp / 9-14-94

CUSTOMER WHC

SAMPLE DELIVERY GROUP W0161

MATRIX soil

BATCH NUMBER

| ITAS ID | CUSTOMER ID | COMMENTS |
|---|---|---|
| 1 ) L090665 | | Remove from dec + put |
| 2 ) | | through Am col + recoppt |
| 3 ) | | |
| 4 ) | | |
| 5 ) | | |
| 6 ) | | |
| 7 ) | | |
| 8 ) | | |
| 9 ) | | |
| 10) | | |

## REANALYSIS

*REFERENCED QC*

ITAS ID - BLANK

ITAS ID - SPIKE

CLIENT CODE

ACTIONS (Initial & Date)

PREP LAB RECEIVED

SAMPLE REMAINDER RETURNED TO SCG ☐ (CHECK ONE)

NO SAMPLE REMAINING ☐

SEPARATION LAB

COUNTING/MEASUREMENT

DATA REVIEWED

ANALYTICAL PREP STORED

## RECOUNT

ACTIONS (Initial & Date)

COUNTING/MEASUREMENT Pw 9-20-94

DATA REVIEWED mmp 9-21-94

ANALYTICAL PREP STORED mmp 9-21-94

ADDITIONAL COMMENTS:

MeOH: 9-19-94 AB, CY
Coppt 9-20-94 a

Do not use this data. 9-21-94 mmp

RC-048 12/92 REV 2

0073

9613490.1018

INTERNATIONAL TECHNOLOGY CORPORATION

DUE DATE 9/7/94

# REANALYSIS / RECOUNT
## CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

ANALYSIS Pu

NAME/DATE mmk 19-12-94

CUSTOMER WHC

SAMPLE DELIVERY GROUP W0161

MATRIX soil

BATCH NUMBER

| | ITAS ID | CUSTOMER ID | COMMENTS |
|---|---|---|---|
| 1 ) | 40806601 | ESH18107 | spike recov at 141% |
| 2 ) | 810301 | 18108 | being rected |
| 3 ) | 033901 | 18109 | |
| 4 ) | F0833901 | 18110 | |
| 5 ) | | | |
| 6 ) | | | |
| 7 ) | | | |
| 8 ) | | | |
| 9 ) | | | |
| 10) | | | |

## REANALYSIS

*REFERENCED QC*

ITAS ID - BLANK ESH18106 L08066 23 ✓

ITAS ID - SPIKE IQHI082 L08066 25 ✓

CLIENT CODE WHC

ACTIONS (Initial & Date)

PREP LAB RECEIVED 9/13/94 BM

SAMPLE REMAINDER RETURNED TO SCG ☐ (CHECK ONE) BM

NO SAMPLE REMAINING ☐

RD 3221 9/15/94 BM

SEPARATION LAB

COUNTING/MEASUREMENT AS 9-18-94

DATA REVIEWED mm 9-20-94

ANALYTICAL PREP STORED mm 9-28-94

## RECOUNT

ACTIONS (Initial & Date)

COUNTING/MEASUREMENT

DATA REVIEWED

ANALYTICAL PREP STORED

ADDITIONAL COMMENTS:

Pu Col 9-16-94 CY
ASh 4X
ED 9-18-94

RC-048 12/92 REV 2

9613490.1019

INTERNATIONAL TECHNOLOGY CORPORATION

DUE DATE 9-21

# REANALYSIS / RECOUNT

## CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

ANALYSIS Rn

NAME/DATE MMM 19-12-94

CUSTOMER WHC

SAMPLE DELIVERY GROUP W0161

MATRIX soil

BATCH NUMBER

| ITAS ID | CUSTOMER ID | COMMENTS |
|---|---|---|
| 1 ) L0806615 | | |
| 2 ) | | |
| 3 ) | | |
| 4 ) | | |
| 5 ) | | |
| 6 ) | | |
| 7 ) | | |
| 8 ) | | |
| 9 ) | | |
| 10) | | |

## REANALYSIS

*REFERENCED QC*

ITAS ID - BLANK

ITAS ID - SPIKE

CLIENT CODE

ACTIONS (Initial & Date)

PREP LAB RECEIVED

SAMPLE REMAINDER RETURNED TO SCG ☐ (CHECK ONE)

NO SAMPLE REMAINING ☐

SEPARATION LAB

COUNTING/MEASUREMENT

DATA REVIEWED

ANALYTICAL PREP STORED

## RECOUNT

ACTIONS (Initial & Date)

COUNTING/MEASUREMENT Rw 9-13-94

DATA REVIEWED MMM 9-15-94

ANALYTICAL PREP STORED MMM 9-15-94

ADDITIONAL COMMENTS:

Data not used. Use data counted 9/26/94.
SCG 10/3/94

RC-048 12/92 REV 2

9613490.1020

RECORD COPY

NOV 1994 RECEIVED

MEMORANDUM

TO: 200-UP-1 Project QA Record

November 7, 1994

FR: Sandra Schildt, Golder Associates Inc.

RE: GENERAL CHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE W0161-QES (943-1610.033,W0161c.up1)

## INTRODUCTION

This memorandum presents the results of data validation on data package W0161-QES prepared by Quanterra Environmental Services. A list of the samples validated along with the analytes reported and the method of analysis is provided in the following table.

| SAMPLE ID | SAMPLE DATE | MEDIA | ANALYSIS |
|---|---|---|---|
| B0BXB4 | 8/1/94 | SOIL | SEE NOTE 1 |
| B0BXB6 | 8/5/94 | SOIL | |
| B0BXB7A* | 8/11/94 | SOIL | |

Note 1: The samples were analyzed for anions and nitrate/nitrite using SW-846 methods, B0BXB4 was also analyzed for cyanide.
* - Indicates sample results which were 100% recalculated.

Data validation was conducted 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. A Quanterra/WHC Issue Resolution Form was submitted with the data package. The accompanying Office of Sample Management Record of Disposition (ROD) did not resolve all issues described in the Quanterra form. Further direction from Bechtel Hanford resulted in changing the sample reported as B0BXB8 to B0BXB7A, and sample B0BXB9 to B0BXB8.

**Detection Limits.** Detection limit goals were met with slight variations due to moisture content and media.

**Completeness.** The data package was complete for all requested analyses. Three samples (3) were validated in this data set with a total of 22 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

No minor deficiencies were identified during validation which required qualification of data.

## 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.

9613490.1022

# 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.

9613490.1024

# ATTACHMENT 2

# SUMMARY OF DATA QUALIFICATIONS

# DATA QUALIFICATION SUMMARY - FORM B-7

| PKG: W0161-QES | REVIEWER: S. Schildt | DATE: 11/1/94 | PAGE 1 OF 1 |
|---|---|---|---|
| COMMENTS: General Chemistry | | | |
| PARAMETER | QUALIFIER | SAMPLES AFFECTED | REASON |
| No qualification required | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

9613490.1026

# ATTACHMENT 3

# QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: W0161-QES

| | Samp# | B0BXB4 | | B0BXB6 | | B0BXB7A | |
|---|---|---|---|---|---|---|---|
| | Date | 8-1-94 | | 8-5-94 | | 8-11-94 | |
| | Location | 299-W19-34B | | 299-W19-34B | | 299-W19-34B | |
| | Depth | 440.00 - 442.00 | | 460.00 - 462.00 | | 480.50 - 481.50 | |
| | Type | SOIL | | SOIL | | SOIL | |
| | Comments | | | | | | |
| Parameter | Units | Result | Q | Result | Q | Result | Q |
| FLUORIDE | MG/KG | 0.400 | | 0.400 | U | 0.600 | |
| CHLORIDE | MG/KG | 0.700 | | 1.400 | | 1.800 | |
| NITRITE | MG/KG | 0.400 | U | 0.400 | U | 0.400 | U |
| NITRATE | MG/KG | 0.800 | | 0.400 | U | 0.400 | U |
| PHOSPHATE | MG/KG | 1.000 | U | 1.000 | U | 1.000 | U |
| SULFATE | MG/KG | 3.900 | | 4.900 | | 4.300 | |
| NITRATE+NITRITE | MG/KG | 1.000 | | 0.500 | U | 1.300 | |
| CYANIDE | MG/KG | 1.000 | U | --- | | --- | |

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

Verified
Sgm 11/15/94

Revised
Sgm 11/15/94

008

9513942.1027

# CYANIDE ANALYSIS

299-W19-34B

| | | | |
|---|---|---|---|
| Laboratory Name: | ITAS-KNOXVILLE | SDG Number: | W0161 |
| Contract Name: | Westinghouse Hanford | Job Number: | 996 |
| Sample Matrix: | Soil | Extraction Date: | N/A |
| Concentration Units: | mg/kg | Analysis Date: | 08/12/94 |

| Client Sample ID | Lab Sample ID | Result | Qualifiers |
|---|---|---|---|
| Method Blank | AB6116 | 1.0 | U |
| BOBXB4 | AB5090 | 1.0 | U |

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

11/1/94

## NITRATE/NITRITE ANALYSIS

299-W19-34B

| | | | |
|---|---|---|---|
| Laboratory Name: | ITAS-KNOXVILLE | SDG Number: | W0161 |
| Contract Name: | Westinghouse Hanford | Job Number: | 996 |
| Sample Matrix: | Soil | Extraction Date: | N/A |
| Concentration Units: | mg/kg | Analysis Date: | 08/19/94 |

| Client Sample ID | Lab Sample ID | Result | Qualifiers |
|---|---|---|---|
| Method Blank | AB7068 | 0.5 | U |
| BOBXB4 | AB5092 | 1.0 | + |

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

11/1/94

# NITRATE/NITRITE ANALYSIS

299-W19-34B

| | | | |
|---|---|---|---|
| Laboratory Name: | ITAS-KNOXVILLE | SDG Number: | W0161 |
| Contract Name: | Westinghouse Hanford | Job Number: | 1027 |
| Sample Matrix: | Soil | Extraction Date: | N/A |
| Concentration Units: | mg/kg | Analysis Date: | 08/19/94 |

| Client Sample ID | Lab Sample ID | Result | Qualifiers |
|---|---|---|---|
| Method Blank | AB7062 | 0.5 | U |
| BOBXB6 | AB5494 | 0.5 | U |

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

11/1/94

# NITRATE/NITRITE ANALYSIS

299-W19-34B

| | | | |
|---|---|---|---|
| Laboratory Name: | ITAS-KNOXVILLE | SDG Number: | W0161 |
| Contract Name: | Westinghouse Hanford | Job Number: | 1097 |
| Sample Matrix: | Soil | Extraction Date: | N/A |
| Concentration Units: | mg/kg | Analysis Date: | 08/19/94 |

| Client Sample ID | Lab Sample ID | Result | Qualifiers |
|---|---|---|---|
| Method Blank | AB7062 | 0.5 | U |
| BOBXB~~8~~7A | AB6276 | 1.3 | + |

AHS 11/2/94

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

AHS 11/1/94

# ANION ANALYSIS

299-W19-34B

| | | | |
|---|---|---|---|
| Laboratory Name: | ITAS-Knoxville | SDG Number: | W0161 |
| Contract Name: | Westinghouse Hanford | Job Number: | 996 |
| Client Sample ID: | BOBXB4 | Preparation Date: | 08/17/94 |
| Lab Sample ID: | AB5091 | Analysis Date: | 08/18/94 |
| Sample Matrix: | Soil | Concentration Units: | mg/kg |

| Compound | Result | Qualifier | Detection Limit |
|---|---|---|---|
| fluoride | 0.4 | + | 0.4 |
| chloride | 0.7 | + | 0.4 |
| nitrite | 0.4 | U | 0.4 |
| nitrate | 0.8 | + | 0.4 |
| phosphate | 1.0 | U | 1.0 |
| sulfate | 3.9 | + | 1.5 |

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

11/1/94

# ANION ANALYSIS

299-W19-34B

| | | | |
|---|---|---|---|
| Laboratory Name: | ITAS-Knoxville | SDG Number: | W0161 |
| Contract Name: | Westinghouse Hanford | Job Number: | 1027 |
| Client Sample ID: | BOBXB6 | Preparation Date: | 08/17/94 |
| Lab Sample ID: | AB5493 | Analysis Date: | 08/18/94 |
| Sample Matrix: | Soil | Concentration Units: | mg/kg |

| Compound | Result | Qualifier | Detection Limit |
|---|---|---|---|
| fluoride | 0.4 | U | 0.4 |
| chloride | 1.4 | + | 0.4 |
| nitrite | 0.4 | U | 0.4 |
| nitrate | 0.4 | U | 0.4 |
| phosphate | 1.0 | U | 1.0 |
| sulfate | 4.9 | + | 1.5 |

11/1/94

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

# ANION ANALYSIS

299-W19-34B

| | | | |
|---|---|---|---|
| Laboratory Name: | ITAS-Knoxville | SDG Number: | W0161 |
| Contract Name: | Westinghouse Hanford | Job Number: | 1097 |
| Client Sample ID: | BOBXB87A 11/2/94 | Preparation Date: | 08/17/94 |
| Lab Sample ID: | AB6275 | Analysis Date: | 08/18/94 |
| Sample Matrix: | Soil | Concentration Units: | mg/kg |

| Compound | Result | Qualifier | Detection Limit |
|---|---|---|---|
| fluoride | 0.6 | + | 0.4 |
| chloride | 1.8 | + | 0.4 |
| nitrite | 0.4 | U | 0.4 |
| nitrate | 0.4 | U | 0.4 |
| phosphate | 1.0 | U | 1.0 |
| sulfate | 4.3 | + | 1.5 |

11/1/94

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

9613490.1035

# ATTACHMENT 4

## LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

9613490.1036

Quanterra
Environmental Services

Quanterra Incorporated
5815 Middlebrook Pike
Knoxville, Tennessee 37921

615 588-6401 Telephone
615 584-4315 Fax

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

SEP 1994
RECEIVED
Data
Log In

W0161-285

Dear J.A. Lerch

Thank you for purchasing analytical testing services from IT Corporation. It is our intention to supply our clients with data packages which not only meet the industry's highest standards for quality, but are also easy to use. Features which we point out are:

1. A Data Summary Packet which allows you to review your data without searching through the complete data package.

   Your Data Summary Packet contains the following items:

   - Case Narrative: listing of sample identifications, analyses performed, explanation of any problem associated with samples, corrective action taken.
   - Quality control sample identifications and analyses performed.
   - Data summary.

2. A data package which meets the specific requirements you requested and is easy to use as well. The package is organized in accordance with the Table of Contents which you will find at the beginning of each section. Sections are separated by color-coded tabs, making it easy to find individual analytical parameters which may be of particular interest to you. The data package is custody-sealed at the laboratory - your assurance that parts of the package are not missing.

We are constantly searching for ways to improve our service to you. This current product has many of the features which you have told us are important to you. Your suggestions regarding additional improvements will be appreciated.

Please contact me with any questions or suggestions.

Sincerely,

Sheree Schneider

Sheree' Schneider
Project Manager

11/1/94

017

9613490.1037

0000001

Quanterra
Environmental Services

*Quanterra Incorporated*
*5815 Middlebrook Pike*
*Knoxville, Tennessee 37921*

*615 588-6401 Telephone*
*615 584-4315 Fax*

SEP 1994 RECEIVED Data Log In

September 8, 1994

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

Job Number: 996; 1027; 1097

This is the Certificate of Analysis for the following sample:

| | |
|---|---|
| SDG: | W0161 |
| Client Project ID: | WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1 |
| Received by Knoxville: | August 4, August 9 and August 16, 1994 |
| Number of Samples: | Eight |
| Sample Type: | Soil |

## I. Introduction

On August 4, August 9 and August 16, 1994, eight (8) soil samples arrived at Quanterra Environmental Services, Richland, Washington and were transferred to Quanterra Environmental Services, Knoxville, Tennessee for chemical analysis. Two IT/WHC issue resolution forms are attached. Both forms document condition on receipt variances; and should be used as supplemental documentation to this document.

## 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.

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 OLM01.8 Statement of Work.

Reviewed and Approved:

Sheree A. Schneider

**RECORD COPY**

Sheree' A. Schneider
Project Manager

11/1/94

Quanterra
Environmental Services

IT Corporation
September 8, 1994
Job Number: 996, 1027, and 1097
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 ILM03.0 Statement of Work.

The samples were analyzed for total cyanide in accordance with the EPA CLP ILM03.0 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. A matrix spike and matrix spike duplicate were analyzed using sample BOBXB4. All QC results met method specified limits.

The semivolatiles analyses were performed by direct injection of sample extract on a Restek XTI-5 capillary column on a Finnigan INCOS XL GC/MS/DS. For work order # 996, the samples were extracted three times. The method blanks for the first two extractions exhibited bad surrogate standard recoveries, indicating that the extractions were faulty. The third extraction analyzed demonstrated good results and the data was submitted. The matrix spike/matrix spike duplicate for sample BOBXB4 exhibited high recoveries for spiked compound 2,4-dinitrotoluene. All other QC results were within method specified limits.

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.



11/1/94

Quanterra Environmental Services

IT Corporation
September 8, 1994
Job Number: 996, 1027, and 1097
Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

## III. Quality Control (Continued)

All run QC for metals analysis met method specified limits. A duplicate and a spike were analyzed using sample number BOBXB6. Spike recovery (accuracy) results were within acceptance limits for all parameters except for silver which was slightly outside acceptance limits (73.3%). As the manganese and titanium concentrations are greater than 4X the spike added, spiking criteria do not apply for these analytes. The spiked sample was double spiked for ICP elements during sample digestion. Duplicate RPD (precision) results were within acceptance limits for all parameters except for aluminum, barium, calcium, chromium, iron, manganese, vanadium, zinc, and titanium. Sample nonhomogeneity appears to be the probable cause for poor precision for these analytes. The 1/5 serial dilution exhibited slight matrix interferences for aluminum, iron, and magnesium.
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.



AKL 11/1/94

Quanterra Environmental Services

IT Corporation
September 8, 1994
Job Number: 996, 1027, and 1097
Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

## III. Quality Control (Continued)

### "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.

### 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.

A matrix spike/matrix spike duplicate set was analyzed for cyanide using sample BOBXB4. All QC results were acceptable.

A matrix spike and matrix spike duplicate set was analyzed for nitrate/nitrite using sample BOBXB4. All QC results were acceptable.

A matrix spike and matrix spike duplicate set was analyzed for anions using sample BOBXB4. All QC results were acceptable.



AH 11/1/94

Quanterra Environmental Services

IT Corporation
September 8, 1994
Job Number: 996, 1027, and 1097
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 |
|---|---|---|---|
| AB5088 | 408065-01A | BOBXB4 | VOC |
| AB5089 | 408065-01B | " | SVOC |
| AB5090 | 408065-01C | " | CN |
| AB5091 | 408065-01D | " | ANIONS |
| AB5092 | 408065-01E | " | NO3NO2 |
| AB5489 | 40818201-A | BOBXB6 | VOC |
| AB5490 | 40818201-B | " | SVOC |
| AB5491 | 40818201-C | " | METALS |
| AB5492 | 40818201-D | " | CN |
| AB5493 | 40818201-E/F | " | ANIONS |
| AB5494 | 40818201-G | " | NO3NO2 |
| AB5496 | 40818202-A | BOBXB7 | VOC |
| AB6271 | 40833801-A | BOBXB8 | VOC |
| AB6272 | 40833801-B | " | SVOC |
| AB6273 | 40833801-C | " | METALS |
| AB6274 | 40833801-D | " | CN |
| AB6275 | 40833801-E | " | ANIONS |
| AB6276 | 40833801-F | " | NO3NO2 |
| AB6277 | 40833802-A | BOBXB9 | VOC |

Quanterra
Environmental Services

IT Corporation
September 8, 1994
Job Number: 996, 1027, and 1097
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



11/1/94
023

9613490.1043

# OFFICE OF SAMPLE MANAGEMENT

# RECORD OF DISPOSITION

ROD-B94-014
Record of Disposition No.

| | |
|---|---|
| DATE: 08/09/94 | LABORATORY: Quanterra |
| PROJECT TITLE/NO.:200-UP-1 Soil Sampling-Round 1 (SAF# 94-046) | NCR NO.: N/A |

SAMPLE IDENTIFICATION NUMBERS: B0BXB4

DESCRIPTION OF EVENT:
The cooler containing sample number B0BXB4 arrived at Quanterra with an internal temperature of 10°C.

DISPOSITION OF SAMPLES:
Quanterra is to continue with the chemical analyses for sample number B0BXB4 as directed by the COC/SAR.

APPROVAL SIGNATURES:

J.A. Lerch — 8/12/94
OSM Project Coordinator (Print/Sign Name) — Date

C.D. Wittreich — 8/11/94
Technical Representative (Print/Sign Name) — Date

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

1024

9613490.1044

# OFFICE OF SAMPLE MANAGEMENT

## RECORD OF DISPOSITION

ROD-894-018
Record of Disposition No.

| | |
|---|---|
| DATE: 08/17/94 | LABORATORY: Quanterra |
| PROJECT TITLE/NO.:200-UP-1 Soil Sampling-Round 1 (SAF# 94-046) | NCR NO.: N/A |

SAMPLE IDENTIFICATION NUMBERS: B0BXB4 & B0BXB5

DESCRIPTION OF EVENT:

1) The VOA trip blank, sample number B0BXB5, was not received by the laboratory.

2) Sample number B0BXB4 does not have a "Time Sampled" indicated on the COC/SAR form. All containers for this sample indicate a sampling time of 12:00.

DISPOSITION OF SAMPLES:

1) With the consent of the project engineer, the VOA analysis for sample B0BXB5 is to be canceled.

2) Quanterra is to proceed with the analyses requested on the Chain-of-Custody for sample number B0BXB4. The correct sampling time is 1200.

APPROVAL SIGNATURES:

J.A. Lerch — 8/18/94
OSM Project Coordinator (Print/Sign Name) — Date

C.D. Wittreich — 9/21/94
Technical Representative (Print/Sign Name) — Date

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

025 1/1/94

9613490.1045

# OFFICE OF SAMPLE MANAGEMENT

# RECORD OF DISPOSITION

ROD-B94-025
Record of Disposition No.

| | |
|---|---|
| DATE: 08/19/94 | LABORATORY: Quanterra |
| PROJECT TITLE/NO.:200-UP-1 Soil Sampling-Round 1 (SAF# 94-046) | NCR NO.: N/A |

SAMPLE IDENTIFICATION NUMBERS: BOBXB6 and BOBXB7

DESCRIPTION OF EVENT:

1) The COC/SAR indicates that sample number BOBXB7 is to be analyzed for VOA as a trip blank. No sample container was received by Quanterra for sample BOBXB7.

2) An extra 125 mL sample container was received for sample number BOBXB6. The container was received by Quanterra in a separate bag and the bottle label indicates that it is to be analyzed for VOA.

DISPOSITION OF SAMPLES:

Quanterra is to proceed with the analysis of sample BOBXB6 as directed on the COC/SAR. The 125 mL container that was packaged separately will be analyzed for VOA and the results reported under sample number BOBXB7.

APPROVAL SIGNATURES:

J.A. Lerch
OSM Project Coordinator (Print/Sign Name) — Date

C.D. Wittreich — 9/2/94
Technical Representative (Print/Sign Name) — Date

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

9/6/94
026

WO #1097

# QUANTERRA/WHC ISSUE RESOLUTION FORM

SAF No. 94-046 Project 200-UP-1 Soil Sampling - Round 1 Date 8-15-94

Sample No.(s) B0BXB7 & B0BXB8

Submitted By: Jim Harvey

Phone No. 615-690-3211 x5611

Fax No. 615-693-2348

Submitted To: Karl N. Pool

Phone No. 509-372-2596

Fax No. 509-372-2106

| ISSUE | PROPOSED RESOLUTION |
|---|---|
| 1) No sample containers were received for B0BXB7.<br><br>2) Sample containers were received for sample B0BXB8 which matched the analyses requested for B0BXB7 on the COC/RFA. No sample container was received for sample B0BXB8 for the analysis (VOA Trip) which is indicated for that sample on the COC/RFA.<br><br>3) A sample container was received which had sample number B0BXB9 on the container label. The analysis identified on the label was VOA Trip.<br><br>4) The COC/RFA does not have a "Time Sampled" indicated on the COC/SAR form for any of the samples. All containers indicate a sampling time of 10:30. | 1, 2, 3 & 4) Notify WHC/BHI. Proceed with screening and analyses indicated on the bottles, using the sample numbers indicated on the bottles, until directed otherwise by WHC/BHI.<br><br>NOTE ITEMS IN CASE NARRATIVE. |

XC: Jodie Carnes (File)
Tami Heidelberg
Wade Price / Sheree Schneider
Suzi Gaines
Van Pettey

027 4/1/94

Westinghouse Hanford Company

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

WO #996

Page 1 of 1

Date 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 299-W19-34B WVS 8-1-94 | SAF No.: 94-046 |
| Ice Chest No.: EP-21 | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: INTERNATIONAL TECHNOLOGIES | Offsite Property No.: W94-0-0746-50 WVS 8-1-94 | Bill of Lading/Air Bill No.: NA |
| 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 | | |
| 4080650 | A | B | | C | D | E | 4080660 | 1 | | | | | | | |
| Sample No. / Matrix* / Date Sampled / Time Sampled | | | | | | | | | | | | | | | |
| BOBXB4 / S / 8-1-94 | ✓ | ✓ | X | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | ✓ | | |
| BOBXB5 / S / 8-1-94 | | | | | | | | | | | ✓ | | | | |

| CHAIN OF POSSESSION | Sign/Print Names | Date/Time |
|---|---|---|
| Relinquished By | W. V. Setzer | 8-1-94 1010 |
| Received By | CH2M HILL / A.J. Simpson | 8/2/94 1010 |
| Relinquished By | CH2M HILL / A.J. Simpson | 8/3/94 1100 |
| Received By | [illegible] / [illegible] | 8/3/94 1100 |
| Relinquished By | | |
| Received By | | |
| 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 W0164

* NOT ENOUGH SAMPLE for metals

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)

9613490.1047

0000026

028

11/1/94

WO #1027

**Westinghouse Hanford Company**

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 1

Date 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-21 | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: INTERNATIONAL TECHNOLOGIES | Offsite Property No.: W94-0-0851-5 | Bill of Lading/Air Bill No.: NA |
| Possible Sample Hazards/Remarks | | |
| Special Handling and/or Storage: COOL TO 4 DEGREES CENTIGRADE | | |

SAMPLE ANALYSIS: 408182

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | aG | P | G | G | PG | PG | | | aGs | aGs | aGs | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 2 + 120 | 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 | | |
| | A | B | C | D | F/E | E | 408150301 | | | | A | | | | |

| 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 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B0BXB6 | S | 8-5-94 | 0955 | X | X | X | X | X | X | X | X | | | | | X | | |
| B0BXB7 | S | 8-5-94 | 0900 | | | | | | | | | | | X | | | | |

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

| Relinquished By | Date/Time | Received By | Date/Time |
|---|---|---|---|
| W.V. Setzer | 8-8-94 0925 | A.G. Simpson | 8/8/94 0925 |
| R Simpson | 8/8/94 1035 | K Kerrigan Quinlan | 8/8/94 1035 |
| | | | |
| | | | |

**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)

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)

0000030

BH01 0643196

WO" 1094

**Westinghouse Hanford Company**

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 1

Date 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: 299-W19-34b | SAF No.: 94-046 |
| Ice Chest No.: EL2-21 | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: Quanterra | Offsite Property No.: W94-0-0851-11 | Bill of Lading/Air Bill No.: NA |
| Possible Sample Hazards/Remarks | | |
| Special Handling and/or Storage: COOL TO 4 DEGREES CENTIGRADE | | |

SAMPLE ANALYSIS: 408338

| 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 | *1 | VOA TRIP 02A | VOA FIELD | ACTIVIY SCAN | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | | |
| BOBXB7A 01 | S | 8-11-94 | | X | X | X | X | X | X | X | X | | | X | | |
| BOBXB8. 02 | S | 8-11-94 | | | | | | | | | | X | | | | |

11/2/94

| CHAIN OF POSSESSION | Sign/Print Names | |
|---|---|---|
| Relinquished By: W.V. Setzer, Date/Time: 8-15-94 0905 | Received By: [illegible], Date/Time: 8/15/94 0905 | |
| Relinquished By: AJ Simpson, Date/Time: 8/15/94 1045 | Received By: [illegible], Date/Time: 8/15/94 10:50 | |
| 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)

SDG W01101

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)

9413190.1049

0000031

0.30

11/1/94

9613490.1050

# ATTACHMENT 5

# DATA VALIDATION SUPPORTING DOCUMENTATION

# GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

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

| | | |
|---|---|---|
| PROJECT: 200-UP-1 | DATA PACKAGE: W0161-QES | |
| VALIDATOR: S. Schildt | LAB: Quanterra | DATE: 11/1/94 |
| CASE: — | SDG: W0161 | |

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 | ☑ CN | ☐ |
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

SAMPLES/MATRIX B0BXB4, 6, ~~87A~~ soil
11/2/94

## 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:

032

## 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:

### 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

Are LCS recoveries acceptable? . . . . . Yes No N/A

Comments:

### 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

033

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: W0161-QES | VALIDATOR: S. Sahulak | DATE: 11/1/94 | 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 |
|---|---|---|---|---|---|---|---|
| B0BXB4 | $NO_3/NO_2$ | 8/1/94 | ~~8~~ NA | 8/12/94 | NA | 11 | none |
| B0BXB6 | ↓ | 8/5/94 | ↓ | 8/19/94 | ↓ | 14 | ↓ |
| B0BXB7A | 11/7/94 ↓ | 8/11/94 | ↓ | ↓ | ↓ | 8 | ↓ |
| B0BXB4 | Anions | 8/1/94 | 8/17/94 | 8/18/94 | 16 | 1 | none |
| B0BXB6 | ↓ | 8/5/94 | ↓ | ↓ | 12 | ↓ | ↓ |
| B0BXB7A | 11/7/94 ↓ | 8/11/94 | ↓ | ↓ | 6 | ↓ | ↓ |
| B0BXB4 | CN | 8/1/94 | — | 8/12/94 | — | 11 | none |
| | | | | | | | |
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9513490.1054

9613490 1056

# Golder Associates

## TELECON/ CONTACT MEMORANDUM

☐ Personal Visit
☒ Telephone: ☐ Incoming ☐ Outgoing

ROUTE TO:
Files
☒ Project
☐ Business Development
☐ Mailing List

Company Name: BHI/CHZ
Address:

Person: Janice Scott
Telephone:
Job/subject:

Job No. 943-1610.033
Date: 11/2/94
Time: 1100 am

Remarks: W0161-QES

The sample IDs do not match.

B0BXB9 is really B0BXB8

and ~~B0XB8~~ B0BXB8 is really now B0BXB7A

B0BXB5 cancelled.

We will make appropriate changes to form 1s to reflect this change + chain-of-custody.

And, we will note this in the memo.

Action/Next Contact:
let validators know.

BY: C Jensen

036

9613490.1056

RECORD COPY

NOV 1994
RECEIVED
Validation
Log In

MEMORANDUM

TO: 200-UP-1 Project QA Record November 5, 1994

FR: Sandra Schildt, Golder Associates Inc.

RE: VOLATILES DATA VALIDATION SUMMARY FOR DATA PACKAGE W0161-QES (943-1610.033,W0161v.UP1)

## INTRODUCTION

This memorandum presents the results of data validation on data package W0161-QES prepared by the Quanterra Environmental Services. A list of the samples validated along with the analytes reported and the method of analysis is provided in the following table.

| SAMPLE ID | SAMPLE DATE | MEDIA | ANALYSIS |
|---|---|---|---|
| B0BXB4 | 8/1/94 | SOIL | SEE NOTE 1 |
| B0BXB6 | 8/5/94 | SOIL | |
| B0BXB7 | 8/5/94 | SOIL | |
| B0BXB7A | 8/11/94 | SOIL | |
| B0BXB8* | 8/11/94 | SOIL | |

Note 1: The samples were analyzed for volatile target compound list (TCL) organics using EPA CLP methods.
* - Indicates sample results which were 100% recalculated.

Data validation was conducted 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. A Quanterra/WHC Issue Resolution Form was submitted with the data package. The accompanying Office of Sample Management Record of Disposition (ROD) did not resolve all

issues described in the Quanterra form. Further direction from Bechtel Hanford resulted in changing the sample reported as B0BXB8 to B0BXB7A, and sample B0BXB9 to B0BXB8. Sample analysis for B0BXB5 was canceled.

**Detection Limits.** Detection limit goals were met with slight deviations due to moisture content.

**Completeness.** The data package was complete for all requested analyses. Five samples (5) were validated in this data set with a total of 165 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

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

Blanks

- Methylene chloride, acetone, 2-butanone, and chloroform were detected in the laboratory blanks. Attachments 2 and 5 provide a summary of the samples and data qualification applied.

## FIELD QUALITY CONTROL

- Samples B0BXB7 and B0BXB8 were identified as trip blanks. No target compounds were detected but tentatively identified compounds were detected in the trip blanks.

## TENTATIVELY IDENTIFIED COMPOUNDS

Tentatively identified compounds (TICs) were evaluated during validation and qualified as follows:

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

## 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.

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

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# ATTACHMENT 1

## GLOSSARY OF DATA REPORTING QUALIFIERS

## GLOSSARY OF ORGANIC 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 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.

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# ATTACHMENT 2

# SUMMARY OF DATA QUALIFICATIONS

# DATA QUALIFICATION SUMMARY - FORM B-7

| PKG: W0161-QES | REVIEWER: S. Schildt | DATE: 11/1/94 | PAGE 1 OF 1 |
|---|---|---|---|
| COMMENTS: Volatiles | | | |
| PARAMETER | QUALIFIER | SAMPLES AFFECTED | REASON |
| Methylene chloride<br>Acetone | U | B0BXB4, B0BXB6, BOBXB7, B0BXB8 | Compound detected in the laboratory blank |
| Acetone | U | B0BXB7A | Compound detected in the laboratory blank |
| Chloroform | U | B0BXB4 | Compound detected in the laboratory blank |
| 2-Butanone | U | B0BXB8 | Compound detected in the laboratory blank |
| | | | |
| | | | |
| | | | |
| | | | |

# ATTACHMENT 3

## QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: W0161-QES

| | Samp# | B0BXB4 | | B0BXB6 | | B0BXB7 | | B0BXB7A | | B0BXB8 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Date | 8-1-94 | | 8-5-94 | | 8-5-94 | | 8-11-94 | | 8-11-94 | |
| | Location | 299-W19-34B | | 299-W19-34B | | 299-W19-34B | | 299-W19-34B | | 299-W19-34B | |
| | Depth | 440.00 - 442.00 | | 460.00 - 462.00 | | --- | | 480.50 - 481.50 | | --- | |
| | Type | SOIL | | SOIL | | SOIL | | SOIL | | SOIL | |
| | Comments | | | | | TRIP BLANK | | | | TRIP BLANK | |
| Parameter | Units | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| CHLOROMETHANE | UG/KG | 12.000 | U | 12.000 | U | 10.000 | U | 13.000 | U | 10.000 | U |
| BROMOMETHANE | UG/KG | 12.000 | U | 12.000 | U | 10.000 | U | 13.000 | U | 10.000 | U |
| VINYL CHLORIDE | UG/KG | 12.000 | U | 12.000 | U | 10.000 | U | 13.000 | U | 10.000 | U |
| CHLOROETHANE | UG/KG | 12.000 | U | 12.000 | U | 10.000 | U | 13.000 | U | 10.000 | U |
| METHYLENE CHLORIDE | UG/KG | 12.000 | U | 12.000 | U | 10.000 | U | 16.000 | | 10.000 | U |
| ACETONE | UG/KG | 12.000 | U | 14.000 | U | 10.000 | U | 14.000 | U | 13.000 | U |
| CARBON DISULFIDE | UG/KG | 12.000 | U | 12.000 | U | 10.000 | U | 13.000 | U | 10.000 | U |
| 1,1-DICHLOROETHENE | UG/KG | 12.000 | U | 12.000 | U | 10.000 | U | 13.000 | U | 10.000 | U |
| 1,1-DICHLOROETHANE | UG/KG | 12.000 | U | 12.000 | U | 10.000 | U | 13.000 | U | 10.000 | U |
| 1,2-DICHLOROETHENE (TOTAL) | UG/KG | 12.000 | U | 12.000 | U | 10.000 | U | 13.000 | U | 10.000 | U |
| CHLOROFORM | UG/KG | 12.000 | U | 12.000 | U | 10.000 | U | 13.000 | U | 10.000 | U |
| 1,2-DICHLOROETHANE | UG/KG | 12.000 | U | 12.000 | U | 10.000 | U | 13.000 | U | 10.000 | U |
| 2-BUTANONE | UG/KG | 12.000 | U | 12.000 | U | 10.000 | U | 13.000 | U | 10.000 | U |
| 1,1,1-TRICHLOROETHANE | UG/KG | 12.000 | U | 12.000 | U | 10.000 | U | 13.000 | U | 10.000 | U |
| CARBON TETRACHLORIDE | UG/KG | 12.000 | U | 12.000 | U | 10.000 | U | 13.000 | U | 10.000 | U |
| BROMODICHLOROMETHANE | UG/KG | 12.000 | U | 12.000 | U | 10.000 | U | 13.000 | U | 10.000 | U |
| 1,2-DICHLOROPROPANE | UG/KG | 12.000 | U | 12.000 | U | 10.000 | U | 13.000 | U | 10.000 | U |
| CIS-1,3-DICHLOROPROPENE | UG/KG | 12.000 | U | 12.000 | U | 10.000 | U | 13.000 | U | 10.000 | U |
| TRICHLOROETHENE | UG/KG | 12.000 | U | 12.000 | U | 10.000 | U | 13.000 | U | 10.000 | U |
| DIBROMOCHLOROMETHANE | UG/KG | 12.000 | U | 12.000 | U | 10.000 | U | 13.000 | U | 10.000 | U |
| 1,1,2-TRICHLOROETHANE | UG/KG | 12.000 | U | 12.000 | U | 10.000 | U | 13.000 | U | 10.000 | U |
| BENZENE | UG/KG | 12.000 | U | 12.000 | U | 10.000 | U | 13.000 | U | 10.000 | U |
| TRANS-1,3-DICHLOROPROPENE | UG/KG | 12.000 | U | 12.000 | U | 10.000 | U | 13.000 | U | 10.000 | U |
| BROMOFORM | UG/KG | 12.000 | U | 12.000 | U | 10.000 | U | 13.000 | U | 10.000 | U |
| 4-METHYL-2-PENTANONE | UG/KG | 12.000 | U | 12.000 | U | 10.000 | U | 13.000 | U | 10.000 | U |
| 2-HEXANONE | UG/KG | 12.000 | U | 12.000 | U | 10.000 | U | 13.000 | U | 10.000 | U |
| TETRACHLOROETHENE | UG/KG | 12.000 | U | 12.000 | U | 10.000 | U | 13.000 | U | 10.000 | U |
| 1,1,2,2-TETRACHLOROETHANE | UG/KG | 12.000 | U | 12.000 | U | 10.000 | U | 13.000 | U | 10.000 | U |
| TOLUENE | UG/KG | 12.000 | U | 12.000 | U | 10.000 | U | 13.000 | U | 10.000 | U |
| CHLOROBENZENE | UG/KG | 12.000 | U | 12.000 | U | 10.000 | U | 13.000 | U | 10.000 | U |
| ETHYLBENZENE | UG/KG | 12.000 | U | 12.000 | U | 10.000 | U | 13.000 | U | 10.000 | U |
| STYRENE | UG/KG | 12.000 | U | 12.000 | U | 10.000 | U | 13.000 | U | 10.000 | U |
| XYLENES (TOTAL) | UG/KG | 12.000 | U | 12.000 | U | 10.000 | U | 13.000 | U | 10.000 | U |

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

Revised
gjm 11/15/94

Verified
gjm 11/15/94



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9613490.1065

0000015

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBXB4
299-W19-348

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 996 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB5088

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB5088

Level: (low/med) LOW Date Received: 08/04/94

% Moisture: not dec. 20 Date Analyzed: 08/08/94

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 | 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 | 12 ~~102~~ | ~~BJ~~ | U ~~B~~ |
| 67-64-1 | Acetone | 12 ~~109~~ | ~~BJ~~ | U ~~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 ~~108~~ | ~~BJ~~ | U ~~B~~ |
| 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 | |

Revised and Replaced ~~Revised~~ 11/15/94 3/90

FORM I VOA

11/15/94

010

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBXB4

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 996 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB5088

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB5088

Level: (low/med) LOW Date Received: 08/04/94

% Moisture: not dec. 20 Date Analyzed: 08/08/94

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 |
|---|---|---|---|---|
| | | | | |

RED 11/1/94

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBXB6
299-W19-34B

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1027 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB5489

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB5489R

Level: (low/med) LOW Date Received: 08/09/94

% Moisture: not dec. 19 Date Analyzed: 08/09/94

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 | 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 agm 11/15/94 | 12 ~~10~~ ~~3~~ | ~~BJ~~ | U ~~B~~ AW 11/1/94 |
| 67-64-1 | Acetone | 14 | ~~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 | |

AW 11/1/94

Revised and Replaced ~~Revised~~ agm 11/15/94

FORM I VOA 3/90

agm 11/15/94

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBXB6

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1027 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB5489

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB5489R

Level: (low/med) LOW Date Received: 08/09/94

% Moisture: not dec. 19 Date Analyzed: 08/09/94

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 |
|---|---|---|---|---|

11/1/94

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBXB7
299-W19-34B
Trip blank

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1027 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB5496

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB5496

Level: (low/med) LOW Date Received: 08/09/94

% Moisture: not dec. 0 Date Analyzed: 08/09/94

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

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

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

| CAS NO. | COMPOUND | | Q | 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 | 10 ~~2~~ | ~~BJ~~ | U ~~J~~ |
| 67-64-1 | Acetone | 10 ~~2~~ | ~~BJ~~ | U ~~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 | 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 | |

11/1/94

11/1/94

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBXB7
trip blank

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1027 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB5496

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB5496

Level: (low/med) LOW Date Received: 08/09/94

% Moisture: not dec. 0 Date Analyzed: 08/09/94

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 | 17.37 | 10 | J |

Q

JN

AHS
11/1/94

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBXB87A 11/7/94
299-W19-34B

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1097 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB6271

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB6271

Level: (low/med) LOW Date Received: 08/16/94

% Moisture: not dec. 21 Date Analyzed: 08/24/94

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 | Q |
|---|---|---|---|---|
| 74-87-3 | Chloromethane | 13 | U | |
| 74-83-9 | Bromomethane | 13 | U | |
| 75-01-4 | Vinyl Chloride | 13 | U | |
| 75-00-3 | Chloroethane | 13 | U | |
| 75-09-2 | Methylene Chloride | 16 | | |
| 67-64-1 | Acetone | 14 | ~~B~~ | u |
| 75-15-0 | Carbon Disulfide | 13 | U | |
| 75-35-4 | 1,1-Dichloroethene | 13 | U | |
| 75-34-3 | 1,1-Dichloroethane | 13 | U | |
| 540-59-0 | 1,2-Dichloroethene (total) | 13 | U | |
| 67-66-3 | Chloroform | 13 | U | |
| 107-06-2 | 1,2-Dichloroethane | 13 | U | |
| 78-93-3 | 2-Butanone | 13 | U | |
| 71-55-6 | 1,1,1-Trichloroethane | 13 | U | |
| 56-23-5 | Carbon Tetrachloride | 13 | U | |
| 75-27-4 | Bromodichloromethane | 13 | U | |
| 78-87-5 | 1,2-Dichloropropane | 13 | U | |
| 10061-01-5 | cis-1,3-Dichloropropene | 13 | U | |
| 79-01-6 | Trichloroethene | 13 | U | |
| 124-48-1 | Dibromochloromethane | 13 | U | |
| 79-00-5 | 1,1,2-Trichloroethane | 13 | U | |
| 71-43-2 | Benzene | 13 | U | |
| 10061-02-6 | trans-1,3-Dichloropropene | 13 | U | |
| 75-25-2 | Bromoform | 13 | U | |
| 108-10-1 | 4-Methyl-2-Pentanone | 13 | U | |
| 591-78-6 | 2-Hexanone | 13 | U | |
| 127-18-4 | Tetrachloroethene | 13 | U | |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 13 | U | |
| 108-88-3 | Toluene | 13 | U | |
| 108-90-7 | Chlorobenzene | 13 | U | |
| 100-41-4 | Ethylbenzene | 13 | U | |
| 100-42-5 | Styrene | 13 | U | |
| 1330-20-7 | Xylene (total) | 13 | U | |

11/1/94

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBXB7A

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1097 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB6271

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB6271

Level: (low/med) LOW Date Received: 08/16/94

% Moisture: not dec. 21 Date Analyzed: 08/24/94

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.

BOBXB98 11/2/94
Trip blank

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1097 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB6277

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB6277

Level: (low/med) LOW Date Received: 08/16/94

% Moisture: not dec. 0 Date Analyzed: 08/24/94

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 | 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 | ~~9~~ 10 | ~~J~~ | u |
| 67-64-1 | Acetone | 13 | ~~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 | ~~5~~ 10 | ~~J~~ | 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 | |

AHS 11/1/94

FORM I VOA 3/90

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBXB98 11/2/94
Trip blank

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1097 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB6277

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AB6277

Level: (low/med) LOW Date Received: 08/16/94

% Moisture: not dec. 0 Date Analyzed: 08/24/94

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

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

Number TICs found: 3

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 ALCOHOL | 15.90 | 8 | J |
| 3. | UNKNOWN | 17.43 | 11 | J |

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JN

11/1/94

9613490.1075

# ATTACHMENT 4

## LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

9613490.1076

Quanterra
Environmental Services

Quanterra Incorporated
5815 Middlebrook Pike
Knoxville, Tennessee 37921

615 588-6401 Telephone
615 584-4315 Fax

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

SEP 1994
RECEIVED
Data
Log In

Dear J.A. Lerch

Thank you for purchasing analytical testing services from IT Corporation. It is our intention to supply our clients with data packages which not only meet the industry's highest standards for quality, but are also easy to use. Features which we point out are:

1. A Data Summary Packet which allows you to review your data without searching through the complete data package.

   Your Data Summary Packet contains the following items:

   - Case Narrative: listing of sample identifications, analyses performed, explanation of any problem associated with samples, corrective action taken.
   - Quality control sample identifications and analyses performed.
   - Data summary.

2. A data package which meets the specific requirements you requested and is easy to use as well. The package is organized in accordance with the Table of Contents which you will find at the beginning of each section. Sections are separated by color-coded tabs, making it easy to find individual analytical parameters which may be of particular interest to you. The data package is custody-sealed at the laboratory - your assurance that parts of the package are not missing.

We are constantly searching for ways to improve our service to you. This current product has many of the features which you have told us are important to you. Your suggestions regarding additional improvements will be appreciated.

Please contact me with any questions or suggestions.

Sincerely,

Sheree Schneider

Sheree' Schneider
Project Manager

11/1/94

021

9613490.1077

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Quanterra
Environmental Services

*Quanterra Incorporated*
*5815 Middlebrook Pike*
*Knoxville, Tennessee 37921*

*615 588-6401 Telephone*
*615 584-4315 Fax*

SEP 1994 RECEIVED Data Log In

September 8, 1994

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

Job Number: 996; 1027; 1097

This is the Certificate of Analysis for the following sample:

| | |
|---|---|
| SDG: | W0161 |
| Client Project ID: | WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1 |
| Received by Knoxville: | August 4, August 9 and August 16, 1994 |
| Number of Samples: | Eight |
| Sample Type: | Soil |

## I. Introduction

On August 4, August 9 and August 16, 1994, eight (8) soil samples arrived at Quanterra Environmental Services, Richland, Washington and were transferred to Quanterra Environmental Services, Knoxville, Tennessee for chemical analysis. Two IT/WHC issue resolution forms are attached. Both forms document condition on receipt variances; and should be used as supplemental documentation to this document.

## 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.

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 OLM01.8 Statement of Work.

Reviewed and Approved:

Sheree A. Schneider

**RECORD COPY**

Sheree' A. Schneider
Project Manager

11/1/94

022

Quanterra
Environmental Services

IT Corporation
September 8, 1994
Job Number: 996, 1027, and 1097
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 ILM03.0 Statement of Work.

The samples were analyzed for total cyanide in accordance with the EPA CLP ILM03.0 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. A matrix spike and matrix spike duplicate were analyzed using sample BOBXB4. All QC results met method specified limits.

The semivolatiles analyses were performed by direct injection of sample extract on a Restek XTI-5 capillary column on a Finnigan INCOS XL GC/MS/DS. For work order # 996, the samples were extracted three times. The method blanks for the first two extractions exhibited bad surrogate standard recoveries, indicating that the extractions were faulty. The third extraction analyzed demonstrated good results and the data was submitted. The matrix spike/matrix spike duplicate for sample BOBXB4 exhibited high recoveries for spiked compound 2,4-dinitrotoluene. All other QC results were within method specified limits.

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.



11/1/94
023

Quanterra Environmental Services

IT Corporation
September 8, 1994
Job Number: 996, 1027, and 1097
Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

**III. Quality Control** (Continued)

All run QC for metals analysis met method specified limits. A duplicate and a spike were analyzed using sample number BOBXB6. Spike recovery (accuracy) results were within acceptance limits for all parameters except for silver which was slightly outside acceptance limits (73.3%). As the manganese and titanium concentrations are greater than 4X the spike added, spiking criteria do not apply for these analytes. The spiked sample was double spiked for ICP elements during sample digestion. Duplicate RPD (precision) results were within acceptance limits for all parameters except for aluminum, barium, calcium, chromium, iron, manganese, vanadium, zinc, and titanium. Sample nonhomogeneity appears to be the probable cause for poor precision for these analytes. The 1/5 serial dilution exhibited slight matrix interferences for aluminum, iron, and magnesium.
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.

Quanterra Environmental Services

IT Corporation
September 8, 1994
Job Number: 996, 1027, and 1097
Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

## III. Quality Control (Continued)

"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.

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.

A matrix spike/matrix spike duplicate set was analyzed for cyanide using sample BOBXB4. All QC results were acceptable.

A matrix spike and matrix spike duplicate set was analyzed for nitrate/nitrite using sample BOBXB4. All QC results were acceptable.

A matrix spike and matrix spike duplicate set was analyzed for anions using sample BOBXB4. All QC results were acceptable.



AH 11/1/94
025

Quanterra Environmental Services

IT Corporation
September 8, 1994
Job Number: 996, 1027, and 1097
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 |
|---|---|---|---|
| AB5088 | 408065-01A | BOBXB4 | VOC |
| AB5089 | 408065-01B | " | SVOC |
| AB5090 | 408065-01C | " | CN |
| AB5091 | 408065-01D | " | ANIONS |
| AB5092 | 408065-01E | " | NO3NO2 |
| AB5489 | 40818201-A | BOBXB6 | VOC |
| AB5490 | 40818201-B | " | SVOC |
| AB5491 | 40818201-C | " | METALS |
| AB5492 | 40818201-D | " | CN |
| AB5493 | 40818201-E/F | " | ANIONS |
| AB5494 | 40818201-G | " | NO3NO2 |
| AB5496 | 40818202-A | BOBXB7 | VOC |
| AB6271 | 40833801-A | BOBXB8 | VOC |
| AB6272 | 40833801-B | " | SVOC |
| AB6273 | 40833801-C | " | METALS |
| AB6274 | 40833801-D | " | CN |
| AB6275 | 40833801-E | " | ANIONS |
| AB6276 | 40833801-F | " | NO3NO2 |
| AB6277 | 40833802-A | BOBXB9 | VOC |

Quanterra
Environmental Services

IT Corporation
September 8, 1994
Job Number: 996, 1027, and 1097
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



027 1/1/94

9613490.1003

# OFFICE OF SAMPLE MANAGEMENT

# RECORD OF DISPOSITION

ROD-894-014
Record of Disposition No.

DATE: 08/09/94 | LABORATORY: Quanterra

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

SAMPLE IDENTIFICATION NUMBERS: B0BXB4

DESCRIPTION OF EVENT:
The cooler containing sample number B0BXB4 arrived at Quanterra with an internal temperature of 10°C.

DISPOSITION OF SAMPLES:
Quanterra is to continue with the chemical analyses for sample number B0BXB4 as directed by the COC/SAR.

APPROVAL SIGNATURES:

J.A. Lerch — 8/12/94
OSM Project Coordinator (Print/Sign Name) — Date

C.D. Wittreich — 8/11/94
Technical Representative (Print/Sign Name) — Date

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

028 11/1/94

9613490.1084

# OFFICE OF SAMPLE MANAGEMENT

# RECORD OF DISPOSITION

ROD-B94-018
Record of Disposition No.

DATE: 08/17/94 | LABORATORY: Quanterra

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

SAMPLE IDENTIFICATION NUMBERS: B0BXB4 & B0BXB5

DESCRIPTION OF EVENT:

1) The VOA trip blank, sample number B0BXB5, was not received by the laboratory.

2) Sample number B0BXB4 does not have a "Time Sampled" indicated on the COC/SAR form. All containers for this sample indicate a sampling time of 12:00.

DISPOSITION OF SAMPLES:

1) With the consent of the project engineer, the VOA analysis for sample B0BXB5 is to be canceled.

2) Quanterra is to proceed with the analyses requested on the Chain-of-Custody for sample number B0BXB4. The correct sampling time is 1200.

APPROVAL SIGNATURES:

J.A. Lerch — 8/18/94
OSM Project Coordinator (Print/Sign Name) — Date

C.D. Wittreich — 9/21/94
Technical Representative (Print/Sign Name) — Date

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

029 9/1/94

9613490.1085

# OFFICE OF SAMPLE MANAGEMENT

# RECORD OF DISPOSITION

ROD-B94-025
Record of Disposition No.

| | |
|---|---|
| DATE: 08/19/94 | LABORATORY: Quanterra |
| PROJECT TITLE/NO.:200-UP-1 Soil Sampling-Round 1 (SAF# 94-046) | NCR NO.: N/A |

SAMPLE IDENTIFICATION NUMBERS: B0BXB6 and B0BXB7

DESCRIPTION OF EVENT:

1) The COC/SAR indicates that sample number B0BXB7 is to be analyzed for VOA as a trip blank. No sample container was received by Quanterra for sample B0BXB7.

2) An extra 125 mL sample container was received for sample number B0BXB6. The container was received by Quanterra in a separate bag and the bottle label indicates that it is to be analyzed for VOA.

DISPOSITION OF SAMPLES:

Quanterra is to proceed with the analysis of sample B0BXB6 as directed on the COC/SAR. The 125 mL container that was packaged separately will be analyzed for VOA and the results reported under sample number B0BXB7.

APPROVAL SIGNATURES:

J.A. Lerch
OSM Project Coordinator (Print/Sign Name) — Date

C.D. Wittreich — 9/2/94
Technical Representative (Print/Sign Name) — Date

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

030 11/1/94

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WO #1097

# QUANTERRA/WHC ISSUE RESOLUTION FORM

SAF No. 94-046 Project 200-UP-1 Soil Sampling - Round 1 Date 8-15-94

Sample No.(s) B0BXB7 & B0BXB8

Submitted By: Jim Harvey

Phone No. 615-690-3211 x5611

Fax No. 615-693-2348

Submitted To: Karl N. Pool

Phone No. 509-372-2596

Fax No. 509-372-2106

| ISSUE | PROPOSED RESOLUTION |
|---|---|
| 1) No sample containers were received for B0BXB7.<br><br>2) Sample containers were received for sample B0BXB8 which matched the analyses requested for B0BXB7 on the COC/RFA. No sample container was received for sample B0BXB8 for the analysis (VOA Trip) which is indicated for that sample on the COC/RFA.<br><br>3) A sample container was received which had sample number B0BXB9 on the container label. The analysis identified on the label was VOA Trip.<br><br>4) The COC/RFA does not have a "Time Sampled" indicated on the COC/SAR form for any of the samples. All containers indicate a sampling time of 10:30. | 1, 2, 3 & 4) Notify WHC/BHI. Proceed with screening and analyses indicated on the bottles, using the sample numbers indicated on the bottles, until directed otherwise by WHC/BHI.<br><br>NOTE ITEMS IN CASE NARRATIVE. |

XC: Jodie Carnes (File)
Tami Heidelberg
Wade Price / Sheree Schneider
Suzi Gaines
Van Pettey

11/1/94

031

Westinghouse Hanford Company

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

WO #996

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~~ 299-W19-34B WVS 8-1-94 | SAF No.: 94-046 |
| Ice Chest No.: ER-21 | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: INTERNATIONAL TECHNOLOGIES | Offsite Property No.: W94-0-0746-50 WVS 8-1-94 | Bill of Lading/Air Bill No.: NA |
| 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 | | |
| 4080650 | A | B | | C | D | E | 4080660 | | | | | | | | |

| Sample No. | Matrix* | Date Sampled | Time Sampled | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B0BXB4 | S | 8-1-94 | | ✓ | ✓ | X | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | ✓ | |
| B0BXB5 | S | 8-1-94 | | | | | | | | | | | | ✓ | | | |

| CHAIN OF POSSESSION | Sign/Print Names | |
|---|---|---|
| Relinquished By: W. V. Setzer 8-2-94 1010 | Received By: CH2M HILL AJ Simpson 8/2/94 1010 | |
| Relinquished By: CH2M HILL AJ Simpson 8/3/94 1100 | Received By: Lockheed Martin 8/3/94 1100 | |
| Relinquished By: | Received By: | |
| 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 W0164

* NOT ENOUGH SAMPLE for metals

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)

9613490.1087

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WO #1027

**Westinghouse Hanford Company**

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

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-21 | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: INTERNATIONAL TECHNOLOGIES | Offsite Property No.: W94-0-0851-5 | Bill of Lading/Air Bill No.: NA |
| Possible Sample Hazards/Remarks | | |
| Special Handling and/or Storage: COOL TO 4 DEGREES CENTIGRADE | | |

| 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 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | aG | P | G | G | PG | PG | | | aGs | aGs | aGs | | |
| No. of Container(s) | | | | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | | | 1 | 1 | 1 | | |
| Volume | | | | 125ml | 500ml | 500ml | 250ml | 250ml | 125ml | 1000ml | 500ml | | | 125ml | 250ml | 40ml | | |
| SAMPLE ANALYSIS 408182 | | | | A | B | C | D | F/E | B | 408150 | 301 | | | A | | | | |
| BOBXB6 | S | 8-5-94 | 0955 | X | X | X | X | X | X | X | X | | | | | X | | |
| BOBXB7 | S | 8-5-94 | 0900 | | | | | | | | | | | X | | | | |

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

| Relinquished By | Date/Time | Received By | Date/Time |
|---|---|---|---|
| W.V. Setzer | 8-8-94 0925 | C.A. Simpson | 8/8/94 0925 |
| R. Simpson | 8/8/94 1035 | Charles Chandler | 8/8/94 1035 |
| | | | |
| | | | |

**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)

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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WO-1047

**Westinghouse Hanford Company**

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 1

Date 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: 299-W19-34b | SAF No.: 94-046 |
| Ice Chest No.: EK-21 | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: Quanterra | Offsite Property No.: W94-0-0851-11 | Bill of Lading/Air Bill No.: NA |

Possible Sample Hazards/Remarks

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

SAMPLE ANALYSIS: 408338

| 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 | *1 | | | VOA TRIP 02A | VOA FIELD | ACTIVITY SCAN | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | | |
| BOBXB7A 01 | S | 8-11-94 | | X | X | X | X | X | X | X | X | | | | | X | | |
| BOBXB8 02 | S | 8-11-94 | | | | | | | | | | | | X | | | | |

AED 11/2/94

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By: W. V. Setzer | Date/Time: 8-15-94 0905 | Received By: [illegible] | Date/Time: 8/15/94 0905 |
| Relinquished By: A. P. Simpson | Date/Time: 8/15/94 1045 | Received By: Quanterra Kim Sterling | Date/Time: 8/15/94 10:50 |
| 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)

SDL WX1101

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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AED 11/1/94

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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: W0161-QES | |
| VALIDATOR: L. Schibolt | LAB: Quanterra | DATE: 11/1/94 |
| CASE: — | SDG: W0161 | |

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 B0BXB4, 6, 7, ~~8, 9~~ / soil
7A, 8 11/2/94

## 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:

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

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

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

Comments: Methylene chloride, acetone, chloroform, detected in lab blanks and samples. Methylene chloride and 2-butanone detected @ low levels, but within 10X@ sample result, and not reported on Vblk form. Associated results qualified U.

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:

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:_____

**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: W0161-QES | VALIDATOR: S. Schilcott | DATE: 10/1/94 | 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 |
|---|---|---|---|---|---|---|---|
| BOBXB4 | VOA | 8/1/94 | NA | 8/8/94 | NA | 7 | none |
| BOBXB6 | | 8/5/94 | | 8/9/94 | | 4 | |
| BOBXB7 | | 8/5/94 | | 8/9/94 | | 4 | |
| BOBXB~~8~~7A | 11/21/94 | 8/11/94 | | 8/24/94 | | 13 | |
| BOBXB~~7~~8 | 11/21/94 | 8/11/94 | | 8/24/94 | | 13 | none |
| | | | | | | | |
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150BX154

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKAB5486

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 996 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB5486

Sample wt/vol: 5.0 (g/mL) G Lab File ID: WB0808

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

% Moisture: not dec. ____ Date Analyzed: 08/08/94

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 | 1 | J |
| 67-64-1 | Acetone | 9 | 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 | 1 | J |
| 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 | 1 | J |
| 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 |

AHS 11/1/94

FORM I VOA 3/90

040

BOBXB6
BOBXB7

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKAB5705

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1027 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB5705

Sample wt/vol: 5.0 (g/mL) G Lab File ID: WB0809B

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

% Moisture: not dec. ____ Date Analyzed: 08/09/94

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 | 2 | J |
| 67-64-1 | Acetone | 3 | 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 | 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 |

11/1/94

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BOBXB87A
BOBXB88 11/2/9

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKAB7494

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1097 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB7494

Sample wt/vol: 5.0 (g/mL) G Lab File ID: WB0824

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

% Moisture: not dec. ____ Date Analyzed: 08/24/94

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 | 10 | ~~U~~ 11/3/94 |
| 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 | .7 ~~10~~ | ~~U~~ 11/3/94 |
| 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) | 1 | J |

11/1/94

FORM I VOA 3/90

042

| No | m/z | Scan | Time | Ref | RRT | Meth | Area(Hght) | Amount | %Tot |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 128 | 184 | 6:08 | 1 | 1.000 | A BB | 27558. | 50.000 UG/L | 15.60 |
| 2 | 114 | 229 | 7:38 | 2 | 1.000 | A BB | 92160. | 50.000 UG/L | 15.60 |
| 3 | 117 | 354 | 11:48 | 3 | 1.000 | A BB | 117519. | 50.000 UG/L | 15.60 |
| 4 | 65 | 209 | 6:58 | 1 | 1.136 | A BB | 35873. | 49.204 UG/L | 15.35 |
| 5 | 98 | 291 | 9:42 | 3 | 0.822 | A BB | 102214. | 51.131 UG/L | 15.96 |
| 6 | 95 | 408 | 13:36 | 3 | 1.153 | A BB | 100598. | 51.000 UG/L | 15.92 |
| 7 | NOT | FOUND | | | | | | | |
| 8 | 94 | 65 | 2:10 | 1 | 0.353 | A BB | 100. | 0.216 UG/L | 0.07 |
| 9 | NOT | FOUND | | | | | | | |
| 10 | NOT | FOUND | | | | | | | |
| 11 | 84 | 114 | 3:48 | 1 | 0.620 | A BB | 729. | 0.991 UG/L | 0.31 |
| 12 | 43 | 98 | 3:16 | 1 | 0.533 | A BB | 890. | 6.019 UG/L | 1.88 |
| 13 | NOT | FOUND | | | | | | | |
| 14 | NOT | FOUND | | | | | | | |
| 15 | 76 | 100 | 3:20 | 1 | 0.543 | A BB | 224. | 0.142 UG/L | 0.04 |
| 16 | 96 | 93 | 3:06 | 1 | 0.505 | A BB | 116. | 0.184 UG/L | 0.06 |
| 17 | 63 | 147 | 4:54 | 1 | 0.799 | A BB | 84. | 0.059 UG/L | 0.02 |
| 18 | NOT | FOUND | | | | | | | |
| 19 | 83 | 189 | 6:18 | 1 | 1.027 | A BB | 295. | 0.172 UG/L | 0.05 |
| 20 | 62 | 213 | 7:06 | 1 | 1.158 | A BB | 215. | 0.235 UG/L | 0.07 |
| 21 | 43 | 177 | 5:54 | 1 | 0.962 | A BV | 209. | 0.733 UG/L | 0.23 |
| 22 | 97 | 194 | 6:28 | 2 | 0.847 | A BB | 174. | 0.134 UG/L | 0.04 |
| 23 | NOT | FOUND | | | | | | | |
| 24 | 43 | 152 | 5:04 | 2 | 0.664 | A BB | 137. | 0.114 UG/L | 0.04 |
| 25 | 83 | 261 | 8:42 | 2 | 1.140 | A BB | 274. | 0.156 UG/L | 0.05 |
| 26 | 63 | 248 | 8:16 | 2 | 1.083 | A BB | 294. | 0.327 UG/L | 0.10 |
| 27 | 75 | 280 | 9:20 | 2 | 1.223 | A BB | 229. | 0.175 UG/L | 0.05 |
| 28 | 130 | 238 | 7:56 | 2 | 1.039 | A BB | 254. | 0.256 UG/L | 0.08 |
| 29 | 129 | 329 | 10:58 | 2 | 1.437 | A BB | 263. | 0.147 UG/L | 0.05 |
| 30 | 97 | 313 | 10:26 | 2 | 1.367 | A BB | 208. | 0.193 UG/L | 0.06 |
| 31 | 78 | 210 | 7:00 | 2 | 0.917 | A BB | 405. | 0.233 UG/L | 0.07 |
| 32 | 75 | 305 | 10:10 | 2 | 1.332 | A BB | 168. | 0.153 UG/L | 0.05 |
| 33 | NOT | FOUND | | | | | | | |
| 34 | 173 | 393 | 13:06 | 2 | 1.716 | A BB | 366. | 0.228 UG/L | 0.07 |
| ~~35~~ | 43 | 291 | 9:42 | 3 | 0.822 | A BB | 1000. | 1.261 UG/L | 0.39 |
| 36 | 43 | 326 | 10:52 | 3 | 0.921 | A BB | 231. | 0.451 UG/L | 0.14 |
| 37 | 164 | 317 | 10:34 | 3 | 0.895 | A BB | 385. | 0.321 UG/L | 0.10 |
| 38 | 83 | 416 | 13:52 | 3 | 1.175 | A BB | 691. | 0.381 UG/L | 0.12 |
| 39 | 91 | 294 | 9:48 | 3 | 0.831 | A BB | 980. | 0.430 UG/L | 0.13 |
| 40 | 112 | 356 | 11:52 | 3 | 1.006 | A BB | 896. | 0.408 UG/L | 0.13 |
| ~~41~~ | 106 | 367 | 12:14 | 3 | 1.037 | A VB | 1452. | 1.601 UG/L | 0.50 |
| 42 | 104 | 385 | 12:50 | 3 | 1.088 | A BB | 1292. | 0.681 UG/L | 0.21 |
| 43 | 106 | 367 | 12:14 | 3 | 1.037 | A VB | 1452. | 1.287 UG/L | 0.40 |
| 44 | 106 | 385 | 12:50 | 3 | 1.088 | A BB | 624. | 0.571 UG/L | 0.18 |
| 45 | 96 | 174 | 5:48 | 1 | 0.946 | A BB | 125. | 0.156 UG/L | 0.05 |
| 46 | 96 | 174 | 5:48 | 1 | 0.946 | A BB | 125. | 0.159 UG/L | 0.05 |
| 47 | 106 | 385 | 12:50 | 3 | 1.088 | A BB | 624. | 0.571 UG/L | 0.18 |

methylene chloride

2-butanone

| No | Ret(L) | Ratio | RRT(L) | Ratio | Amnt | Amnt(L) | R.Fac | R.Fac(L) | Ratio |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 6:08 | 1.00 | 1.000 | 1.00 | 50.00 | 50.00 | 1.000 | 1.000 | 1.00 |
| 2 | 7:38 | 1.00 | 1.000 | 1.00 | 50.00 | 50.00 | 1.000 | 1.000 | 1.00 |
| 3 | 11:48 | 1.00 | 1.000 | 1.00 | 50.00 | 50.00 | 1.000 | 1.000 | 1.00 |
| 4 | 6:58 | 1.00 | 1.136 | 1.00 | 49.20 | 50.00 | 1.302 | 1.323 | 0.98 |
| 5 | 9:42 | 1.00 | 0.822 | 1.00 | 51.13 | 50.00 | 0.870 | 0.851 | 1.02 |
| 6 | 13:36 | 1.00 | 1.153 | 1.00 | 51.00 | 50.00 | 0.856 | 0.839 | 1.02 |
| 7 | 1:46 | | 0.288 | | | | | | |

9613490 1008

# Golder Associates

## TELECON/ CONTACT MEMORANDUM

☐ Personal Visit
☒ Telephone: ☐ Incoming ☐ Outgoing

ROUTE TO:
Files
☒ Project
☐ Business Development
☐ Mailing List

Company Name: BHI/CHZ
Address:

Person: Janice Scott
Telephone:
Job/subject:

Job No. 943-1610.033
Date: 11/2/94
Time: 1100 am

Remarks: WO161-QES

The sample IDs do not match.

BOBXB9 is really BOBXB8

and ~~BOXBX~~ BOBXB8 is really now BOBXB7A

BOBXB5 cancelled.

We will make appropriate changes to form 1s to reflect this change + chain-of-custody.

And, we will note this in the memo.

Action/Next Contact:
let validators know.

BY: C Jensen

9613490.1100

RECORD COPY

NOV 1994 RECEIVED Validation Log In

MEMORANDUM

TO: 200-UP-1 Project QA Record

November 7, 1994

FR: Sandra Schildt, Golder Associates Inc.

RE: SEMIVOLATILES DATA VALIDATION SUMMARY FOR DATA PACKAGE W0161-QES (943-1610.033,W0161sv.up1)

## INTRODUCTION

This memorandum presents the results of data validation on data package W0161-QES prepared by Quanterra Environmental Services. A list of the samples validated along with the analytes reported and the method of analysis is provided in the following table.

| SAMPLE ID | SAMPLE DATE | MEDIA | ANALYSIS |
|---|---|---|---|
| B0BXB4 | 8/1/94 | SOIL | SEE NOTE 1 |
| B0BXB6 | 8/5/94 | SOIL | |
| B0BXB7A* | 8/11/94 | SOIL | |

Note 1: The samples were analyzed for semivolatile target compound list (TCL) organics using EPA CLP methods.
* - Indicates sample results which were 100% recalculated.

Data validation was conducted 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. A Quanterra/WHC Issue Resolution Form was submitted with the data package. The accompanying Office of Sample Management Record of Disposition (ROD) did not resolve all issues described in the Quanterra form. Further direction from Bechtel Hanford resulted in changing the sample reported as B0BXB8 to B0BXB7A, and sample B0BXB9 to B0BXB8.

**Detection Limits.** Detection limit goals were met for all sample results as specified in the reference analytical method with slight variations due to moisture content.

**Completeness.** The data package was complete for all requested analyses. Three samples (3) were validated in this data set with a total of 192 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.

Continuing Calibration

- The percent difference (%D) for acenaphthylene was greater than control limits. Attachments 2 and 5 provide a summary of the samples and data qualification applied.

Laboratory Blanks

- Di-n-butylphthalate was detected in the laboratory blank. Attachments 2 and 5 provide a summary of the samples and data qualification applied.

## TENTATIVELY IDENTIFIED COMPOUND EVALUATION

Tentatively identified compounds (TICs) were evaluated during validation and qualified as follows:

- TICs were detected in the samples and determined to be valid, resulting in qualification of the results as presumptive and valid (JN).
- TICs were detected in the samples and associated laboratory blanks and have been qualified due to associated blank contamination and have been determined to be presumptive and valid (UJN).

- TICs were detected in the samples and identified as common laboratory contaminant, resulting in qualification of the results as unusable (R) as shown in attachment 3.

## 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.

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# ATTACHMENT 1

## GLOSSARY OF DATA REPORTING QUALIFIERS

## GLOSSARY OF ORGANIC 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 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.

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# ATTACHMENT 2

## SUMMARY OF DATA QUALIFICATIONS

# DATA QUALIFICATION SUMMARY - FORM B-7

| PKG: W0161-QES | REVIEWER: S. Schildt | DATE: 11/1/94 | PAGE 1 OF 1 |
|---|---|---|---|
| COMMENTS: Semivolatiles | | | |
| PARAMETER | QUALIFIER | SAMPLES AFFECTED | REASON |
| Di-N-Butylphthalate | U | B0BXB4 | Compound detected in the laboratory blank |
| Acenaphthylene | U | B0BXB7A | %D in continuing calibration > 25% |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

# ATTACHMENT 3

## QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: W0161-QES

| Parameter | Units | BOBXB4 8-1-94 299-W19-34B 440.00 - 442.00 SOIL Result | Q | BOBXB6 8-5-94 299-W19-34B 460.00 - 462.00 SOIL Result | Q | BOBXB7A 8-11-94 299-W19-34B 480.50 - 481.50 SOIL Result | Q |
|---|---|---|---|---|---|---|---|
| PHENOL | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| BIS(2-CHLOROETHYL)ETHER | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| 2-CHLOROPHENOL | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| 1,3-DICHLOROBENZENE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| 1,4-DICHLOROBENZENE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| 1,2-DICHLOROBENZENE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| 2-METHYLPHENOL | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| 2,2'-OXYBIS(1-CHLOROPROPANE) | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| 4-METHYLPHENOL | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| N-NITROSO-DI-N-PROPYLAMINE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| HEXACHLOROETHANE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| NITROBENZENE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| ISOPHORONE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| 2-NITROPHENOL | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| 2,4-DIMETHYLPHENOL | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| BIS(2-CHLOROETHOXY)METHANE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| 2,4-DICHLOROPHENOL | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| 1,2,4-TRICHLOROBENZENE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| NAPHTHALENE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| 4-CHLOROANILINE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| HEXACHLOROBUTADIENE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| 4-CHLORO-3-METHYLPHENOL | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| 2-METHYLNAPHTHALENE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| HEXACHLOROCYCLOPENTADIENE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| 2,4,6-TRICHLOROPHENOL | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| 2,4,5-TRICHLOROPHENOL | UG/KG | 1000.000 | U | 980.000 | U | 1000.000 | U |
| 2-CHLORONAPHTHALENE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| 2-NITROANILINE | UG/KG | 1000.000 | U | 980.000 | U | 1000.000 | U |
| DIMETHYLPHTHALATE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| ACENAPHTHYLENE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | UJ |
| 2,6-DINITROTOLUENE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| 3-NITROANILINE | UG/KG | 1000.000 | U | 980.000 | U | 1000.000 | U |
| ACENAPHTHENE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| 2,4-DINITROPHENOL | UG/KG | 1000.000 | U | 980.000 | U | 1000.000 | U |
| 4-NITROPHENOL | UG/KG | 1000.000 | U | 980.000 | U | 1000.000 | U |
| DIBENZOFURAN | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| 2,4-DINITROTOLUENE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| DIETHYLPHTHALATE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| 4-CHLOROPHENYL-PHENYLETHER | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| FLUORENE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| 4-NITROANILINE | UG/KG | 1000.000 | U | 980.000 | U | 1000.000 | U |

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

Revised dgm 11/15/94

Verified dgm 11/15/94

009

9613490.1108

Validated Data Summary, Data Package: W0161-QES

| | Samp# | B0BXB4 | | B0BXB6 | | B0BXB7A | |
|---|---|---|---|---|---|---|---|
| | Date | 8-1-94 | | 8-5-94 | | 8-11-94 | |
| | Location | 299-W19-34B | | 299-W19-34B | | 299-W19-34B | |
| | Depth | 440.00 - 442.00 | | 460.00 - 462.00 | | 480.50 - 481.50 | |
| | Type | SOIL | | SOIL | | SOIL | |
| | Comments | | | | | | |
| Parameter | Units | Result | Q | Result | Q | Result | Q |
| 4,6-DINITRO-2-METHYLPHENOL | UG/KG | 1000.000 | U | 980.000 | U | 1000.000 | U |
| N-NITROSODIPHENYLAMINE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| 4-BROMOPHENYL-PHENYLETHER | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| HEXACHLOROBENZENE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| PENTACHLOROPHENOL | UG/KG | 1000.000 | U | 980.000 | U | 1000.000 | U |
| PHENANTHRENE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| ANTHRACENE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| CARBAZOLE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| DI-N-BUTYLPHTHALATE | UG/KG | 410.000 | U | 70.000 | J | 420.000 | U |
| FLUORANTHENE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| PYRENE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| BUTYLBENZYLPHTHALATE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| 3,3'-DICHLOROBENZIDINE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| BENZO(A)ANTHRACENE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| CHRYSENE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| BIS(2-ETHYLHEXYL)PHTHALATE | UG/KG | 53.000 | J | 170.000 | J | 420.000 | U |
| DI-N-OCTYLPHTHALATE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| BENZO(B)FLUORANTHENE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| BENZO(K)FLUORANTHENE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| BENZO(A)PYRENE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| INDENO(1,2,3-CD)PYRENE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| DIBENZ(A,H)ANTHRACENE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |
| BENZO(G,H,I)PERYLENE | UG/KG | 410.000 | U | 400.000 | U | 420.000 | U |

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

Revised
ogm 11/15/94

Verified
ogm 11/15/94

010

9613490.1109

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBXB4
299-W19-34B

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 996 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB5089

Sample wt/vol: 30.1 (g/mL) G Lab File ID: AB5089RE

Level: (low/med) LOW Date Received: 08/04/94

% Moisture: 20 decanted: (Y/N) N Date Extracted: 08/15/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 08/20/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.7

| 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 | 1000 | U |
| 91-58-7 | 2-Chloronaphthalene | 410 | U |
| 88-74-4 | 2-Nitroaniline | 1000 | 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 | 1000 | U |
| 83-32-9 | Acenaphthene | 410 | U |

SSS 11/1/94

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1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBXB4
299-W19-34B

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 996 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB5089

Sample wt/vol: 30.1 (g/mL) G Lab File ID: AB5089RE

Level: (low/med) LOW Date Received: 08/04/94

% Moisture: 20 decanted: (Y/N) N Date Extracted: 08/15/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 08/20/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.7

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 51-28-5 | 2,4-Dinitrophenol | 1000 | U |
| 100-02-7 | 4-Nitrophenol | 1000 | 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 | 1000 | U |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | 1000 | 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 | 1000 | 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 agm 11/15/94 | 410 ~~330~~ ~~84~~ | ~~BJ~~ 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 | 53 | 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

Revised and Replaced ~~Revised~~ agm 11/15/94

FORM I SV-2 3/90

agm 11/15/94

AKS 11/1/94

012

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBXB4
299-W19-3443

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 996 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB5089

Sample wt/vol: 30.1 (g/mL) G Lab File ID: AB5089RE

Level: (low/med) LOW Date Received: 08/04/94

% Moisture: 20 decanted: (Y/N) N Date Extracted: 08/15/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 08/20/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.7

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 | 4.42 | 12000 | ~~AJN~~ | R |
| 2. | UNKNOWN | 7.78 | 120 | ~~J~~ | JN |
| 3. | UNKNOWN | 8.48 | 110 | ~~J~~ | JN |
| 4. | UNKNOWN | 18.90 | 290 | ~~J~~ | UJN |

11/1/94

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBXB6
299-W19-3413

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1027 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB5490

Sample wt/vol: 30.2 (g/mL) G Lab File ID: AB5490RE

Level: (low/med) LOW Date Received: 08/09/94

% Moisture: 19 decanted: (Y/N) N Date Extracted: 08/18/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 08/30/94

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 | 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 | 980 | U |
| 91-58-7 | 2-Chloronaphthalene | 400 | U |
| 88-74-4 | 2-Nitroaniline | 980 | 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 | 980 | U |
| 83-32-9 | Acenaphthene | 400 | U |

MS 11/1/94

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBXB6
299-W19-34B

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1027 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB5490

Sample wt/vol: 30.2 (g/mL) G Lab File ID: AB5490RE

Level: (low/med) LOW Date Received: 08/09/94

% Moisture: 19 decanted: (Y/N) N Date Extracted: 08/18/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 08/30/94

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 | 980 | U |
| 100-02-7 | 4-Nitrophenol | 980 | 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 | 980 | U |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | 980 | 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 | 980 | 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 | 70 | J |
| 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 | 170 | 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

11/1/94

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBXB6
299-W19-34B

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1027 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB5490

Sample wt/vol: 30.2 (g/mL) G Lab File ID: AB5490RE

Level: (low/med) LOW Date Received: 08/09/94

% Moisture: 19 decanted: (Y/N) N Date Extracted: 08/18/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 08/30/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

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

Number TICs found: 4

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

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q | |
|---|---|---|---|---|---|
| 1. | UNKNOWN | 4.40 | 11000 | ~~J~~ | UJN |
| 2. 123-42-2 | 2-PENTANONE, 4-HYDROXY-4-MET | 4.60 | 14000 | ~~ABJN~~ ~~UGR~~ | UR |
| 3. | UNKNOWN | 7.90 | 250 | ~~J~~ | JN |
| 4. | UNKNOWN | 16.15 | 110 | ~~J~~ | JN |

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AKD 11/1/94

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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBXB87A 11/2/94
299-W19-34/B

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1097 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB6272

Sample wt/vol: 30.1 (g/mL) G Lab File ID: AB6272

Level: (low/med) LOW Date Received: 08/16/94

% Moisture: 21 decanted: (Y/N) N Date Extracted: 08/18/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 09/01/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 5.8

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 108-95-2 | Phenol | 420 | U |
| 111-44-4 | bis(2-Chloroethyl)Ether | 420 | U |
| 95-57-8 | 2-Chlorophenol | 420 | U |
| 541-73-1 | 1,3-Dichlorobenzene | 420 | U |
| 106-46-7 | 1,4-Dichlorobenzene | 420 | U |
| 95-50-1 | 1,2-Dichlorobenzene | 420 | U |
| 95-48-7 | 2-Methylphenol | 420 | U |
| 108-60-1 | 2,2'-Oxybis(1-Chloropropane) | 420 | U |
| 106-44-5 | 4-Methylphenol | 420 | U |
| 621-64-7 | N-Nitroso-Di-n-Propylamine | 420 | U |
| 67-72-1 | Hexachloroethane | 420 | U |
| 98-95-3 | Nitrobenzene | 420 | U |
| 78-59-1 | Isophorone | 420 | U |
| 88-75-5 | 2-Nitrophenol | 420 | U |
| 105-67-9 | 2,4-Dimethylphenol | 420 | U |
| 111-91-1 | bis(2-Chloroethoxy)Methane | 420 | U |
| 120-83-2 | 2,4-Dichlorophenol | 420 | U |
| 120-82-1 | 1,2,4-Trichlorobenzene | 420 | U |
| 91-20-3 | Naphthalene | 420 | U |
| 106-47-8 | 4-Chloroaniline | 420 | U |
| 87-68-3 | Hexachlorobutadiene | 420 | U |
| 59-50-7 | 4-Chloro-3-Methylphenol | 420 | U |
| 91-57-6 | 2-Methylnaphthalene | 420 | U |
| 77-47-4 | Hexachlorocyclopentadiene | 420 | U |
| 88-06-2 | 2,4,6-Trichlorophenol | 420 | U |
| 95-95-4 | 2,4,5-Trichlorophenol | 1000 | U |
| 91-58-7 | 2-Chloronaphthalene | 420 | U |
| 88-74-4 | 2-Nitroaniline | 1000 | U |
| 131-11-3 | Dimethylphthalate | 420 | U |
| 208-96-8 | Acenaphthylene | 420 | U |
| 606-20-2 | 2,6-Dinitrotoluene | 420 | U |
| 99-09-2 | 3-Nitroaniline | 1000 | U |
| 83-32-9 | Acenaphthene | 420 | U |

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11/1/94

9613490.1117

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1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBXB87A 11/2/94
299-W19-34B

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1097 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB6272

Sample wt/vol: 30.1 (g/mL) G Lab File ID: AB6272

Level: (low/med) LOW Date Received: 08/16/94

% Moisture: 21 decanted: (Y/N) N Date Extracted: 08/18/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 09/01/94

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 5.9

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 51-28-5 | 2,4-Dinitrophenol | 1000 | U |
| 100-02-7 | 4-Nitrophenol | 1000 | U |
| 132-64-9 | Dibenzofuran | 420 | U |
| 121-14-2 | 2,4-Dinitrotoluene | 420 | U |
| 84-66-2 | Diethylphthalate | 420 | U |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 420 | U |
| 86-73-7 | Fluorene | 420 | U |
| 100-01-6 | 4-Nitroaniline | 1000 | U |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | 1000 | U |
| 86-30-6 | N-Nitrosodiphenylamine (1) | 420 | U |
| 101-55-3 | 4-Bromophenyl-phenylether | 420 | U |
| 118-74-1 | Hexachlorobenzene | 420 | U |
| 87-86-5 | Pentachlorophenol | 1000 | U |
| 85-01-8 | Phenanthrene | 420 | U |
| 120-12-7 | Anthracene | 420 | U |
| 86-74-8 | Carbazole | 420 | U |
| 84-74-2 | Di-n-Butylphthalate | 420 | U |
| 206-44-0 | Fluoranthene | 420 | U |
| 129-00-0 | Pyrene | 420 | U |
| 85-68-7 | Butylbenzylphthalate | 420 | U |
| 91-94-1 | 3,3'-Dichlorobenzidine | 420 | U |
| 56-55-3 | Benzo(a)Anthracene | 420 | U |
| 218-01-9 | Chrysene | 420 | U |
| 117-81-7 | bis(2-Ethylhexyl)Phthalate | 420 | U |
| 117-84-0 | Di-n-Octyl Phthalate | 420 | U |
| 205-99-2 | Benzo(b)Fluoranthene | 420 | U |
| 207-08-9 | Benzo(k)Fluoranthene | 420 | U |
| 50-32-8 | Benzo(a)Pyrene | 420 | U |
| 193-39-5 | Indeno(1,2,3-cd)Pyrene | 420 | U |
| 53-70-3 | Dibenz(a,h)Anthracene | 420 | U |
| 191-24-2 | Benzo(g,h,i)Perylene | 420 | U |

(1) - Cannot be separated from Diphenylamine

11/1/94

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBXB87A 11/2/94
299-W19-3443

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1097 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB6272

Sample wt/vol: 30.1 (g/mL) G Lab File ID: AB6272

Level: (low/med) LOW Date Received: 08/16/94

% Moisture: 21 decanted: (Y/N) N Date Extracted: 08/18/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 09/01/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 5.8

Number TICs found: 4 Page 2 of 2 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 | 4.52 | 25000 | ~~ABJN~~ ~~UC~~ R | |
| 2. | UNKNOWN | 7.38 | 97 | ~~J~~ | JN |
| 3. | UNKNOWN | 19.00 | 170 | ~~J~~ | UJN |
| 4. | UNKNOWN | 19.70 | 16000 | ~~J~~ | JN |

11/1/94

9613490.1119

# ATTACHMENT 4

# LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

9613490.1120

Quanterra
Environmental Services

Quanterra Incorporated
5815 Middlebrook Pike
Knoxville, Tennessee 37921

615 588-6401 Telephone
615 584-4315 Fax

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

SEP 1994
RECEIVED
Data
Log In

Dear J.A. Lerch

Thank you for purchasing analytical testing services from IT Corporation. It is our intention to supply our clients with data packages which not only meet the industry's highest standards for quality, but are also easy to use. Features which we point out are:

1. A Data Summary Packet which allows you to review your data without searching through the complete data package.

   Your Data Summary Packet contains the following items:

   - Case Narrative: listing of sample identifications, analyses performed, explanation of any problem associated with samples, corrective action taken.
   - Quality control sample identifications and analyses performed.
   - Data summary.

2. A data package which meets the specific requirements you requested and is easy to use as well. The package is organized in accordance with the Table of Contents which you will find at the beginning of each section. Sections are separated by color-coded tabs, making it easy to find individual analytical parameters which may be of particular interest to you. The data package is custody-sealed at the laboratory - your assurance that parts of the package are not missing.

We are constantly searching for ways to improve our service to you. This current product has many of the features which you have told us are important to you. Your suggestions regarding additional improvements will be appreciated.

Please contact me with any questions or suggestions.

Sincerely,

Sheree Schneider

Sheree' Schneider
Project Manager

11/1/94 021

9613490.1121

0000001

Quanterra
Environmental Services

Quanterra Incorporated
5815 Middlebrook Pike
Knoxville, Tennessee 37921

615 588-6401 Telephone
615 584-4315 Fax

SEP 1994
RECEIVED
Data
Log In

September 8, 1994

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

Job Number: 996; 1027; 1097

This is the Certificate of Analysis for the following sample:

| | |
|---|---|
| SDG: | W0161 |
| Client Project ID: | WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1 |
| Received by Knoxville: | August 4, August 9 and August 16, 1994 |
| Number of Samples: | Eight |
| Sample Type: | Soil |

## I. Introduction

On August 4, August 9 and August 16, 1994, eight (8) soil samples arrived at Quanterra Environmental Services, Richland, Washington and were transferred to Quanterra Environmental Services, Knoxville, Tennessee for chemical analysis. Two IT/WHC issue resolution forms are attached. Both forms document condition on receipt variances; and should be used as supplemental documentation to this document.

## 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.

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 OLM01.8 Statement of Work.

Reviewed and Approved:

Sheree A. Schneider

Sheree' A. Schneider
Project Manager

**RECORD COPY**

11/1/94

022

Quanterra Environmental Services

IT Corporation
September 8, 1994
Job Number: 996, 1027, and 1097
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 ILM03.0 Statement of Work.

The samples were analyzed for total cyanide in accordance with the EPA CLP ILM03.0 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. A matrix spike and matrix spike duplicate were analyzed using sample BOBXB4. All QC results met method specified limits.

The semivolatiles analyses were performed by direct injection of sample extract on a Restek XTI-5 capillary column on a Finnigan INCOS XL GC/MS/DS. For work order # 996, the samples were extracted three times. The method blanks for the first two extractions exhibited bad surrogate standard recoveries, indicating that the extractions were faulty. The third extraction analyzed demonstrated good results and the data was submitted. The matrix spike/matrix spike duplicate for sample BOBXB4 exhibited high recoveries for spiked compound 2,4-dinitrotoluene. All other QC results were within method specified limits.

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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Quanterra Environmental Services

IT Corporation
September 8, 1994
Job Number: 996, 1027, and 1097
Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

**III. Quality Control** (Continued)

All run QC for metals analysis met method specified limits. A duplicate and a spike were analyzed using sample number BOBXB6. Spike recovery (accuracy) results were within acceptance limits for all parameters except for silver which was slightly outside acceptance limits (73.3%). As the manganese and titanium concentrations are greater than 4X the spike added, spiking criteria do not apply for these analytes. The spiked sample was double spiked for ICP elements during sample digestion. Duplicate RPD (precision) results were within acceptance limits for all parameters except for aluminum, barium, calcium, chromium, iron, manganese, vanadium, zinc, and titanium. Sample nonhomogeneity appears to be the probable cause for poor precision for these analytes. The 1/5 serial dilution exhibited slight matrix interferences for aluminum, iron, and magnesium.
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.



11/1/94

Quanterra Environmental Services

IT Corporation
September 8, 1994
Job Number: 996, 1027, and 1097
Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

**III. Quality Control** (Continued)

"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.

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.

A matrix spike/matrix spike duplicate set was analyzed for cyanide using sample BOBXB4. All QC results were acceptable.

A matrix spike and matrix spike duplicate set was analyzed for nitrate/nitrite using sample BOBXB4. All QC results were acceptable.

A matrix spike and matrix spike duplicate set was analyzed for anions using sample BOBXB4. All QC results were acceptable.



AKS 11/1/94

Quanterra Environmental Services

IT Corporation
September 8, 1994
Job Number: 996, 1027, and 1097
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 |
|---|---|---|---|
| AB5088 | 408065-01A | BOBXB4 | VOC |
| AB5089 | 408065-01B | " | SVOC |
| AB5090 | 408065-01C | " | CN |
| AB5091 | 408065-01D | " | ANIONS |
| AB5092 | 408065-01E | " | NO3NO2 |
| AB5489 | 40818201-A | BOBXB6 | VOC |
| AB5490 | 40818201-B | " | SVOC |
| AB5491 | 40818201-C | " | METALS |
| AB5492 | 40818201-D | " | CN |
| AB5493 | 40818201-E/F | " | ANIONS |
| AB5494 | 40818201-G | " | NO3NO2 |
| AB5496 | 40818202-A | BOBXB7 | VOC |
| AB6271 | 40833801-A | BOBXB8 | VOC |
| AB6272 | 40833801-B | " | SVOC |
| AB6273 | 40833801-C | " | METALS |
| AB6274 | 40833801-D | " | CN |
| AB6275 | 40833801-E | " | ANIONS |
| AB6276 | 40833801-F | " | NO3NO2 |
| AB6277 | 40833802-A | BOBXB9 | VOC |



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Quanterra Environmental Services

IT Corporation
September 8, 1994
Job Number: 996, 1027, and 1097
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



0127/94

9613490.1127

# OFFICE OF SAMPLE MANAGEMENT

# RECORD OF DISPOSITION

ROD-B94-014
Record of Disposition No.

| | |
|---|---|
| DATE: 08/09/94 | LABORATORY: Quanterra |
| PROJECT TITLE/NO.:200-UP-1 Soil Sampling-Round 1 (SAF# 94-046) | NCR NO.: N/A |

SAMPLE IDENTIFICATION NUMBERS: B0BXB4

DESCRIPTION OF EVENT:
The cooler containing sample number B0BXB4 arrived at Quanterra with an internal temperature of 10°C.

DISPOSITION OF SAMPLES:
Quanterra is to continue with the chemical analyses for sample number B0BXB4 as directed by the COC/SAR.

APPROVAL SIGNATURES:

J.A. Lerch — 8/12/94
OSM Project Coordinator (Print/Sign Name) — Date

C.D. Wittreich — 8/11/94
Technical Representative (Print/Sign Name) — Date

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

028 11/1/94

9613490.1128

# OFFICE OF SAMPLE MANAGEMENT

## RECORD OF DISPOSITION

ROD-B94-018
Record of Disposition No.

DATE: 08/17/94 | LABORATORY: Quanterra

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

SAMPLE IDENTIFICATION NUMBERS: B0BXB4 & B0BXB5

DESCRIPTION OF EVENT:

1) The VOA trip blank, sample number B0BXB5, was not received by the laboratory.

2) Sample number B0BXB4 does not have a "Time Sampled" indicated on the COC/SAR form. All containers for this sample indicate a sampling time of 12:00.

DISPOSITION OF SAMPLES:

1) With the consent of the project engineer, the VOA analysis for sample B0BXB5 is to be canceled.

2) Quanterra is to proceed with the analyses requested on the Chain-of-Custody for sample number B0BXB4. The correct sampling time is 1200.

APPROVAL SIGNATURES:

J.A. Lerch — 8/18/94
OSM Project Coordinator (Print/Sign Name) — Date

C.D. Wittreich — 9/21/94
Technical Representative (Print/Sign Name) — Date

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

029 11/1/94

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# OFFICE OF SAMPLE MANAGEMENT

# RECORD OF DISPOSITION

ROD-B94-025
Record of Disposition No.

| | |
|---|---|
| DATE: 08/19/94 | LABORATORY: Quanterra |
| PROJECT TITLE/NO.:200-UP-1 Soil Sampling-Round 1 (SAF# 94-046) | NCR NO.: N/A |

SAMPLE IDENTIFICATION NUMBERS: B0BXB6 and B0BXB7

DESCRIPTION OF EVENT:

1) The COC/SAR indicates that sample number B0BXB7 is to be analyzed for VOA as a trip blank. No sample container was received by Quanterra for sample B0BXB7.

2) An extra 125 mL sample container was received for sample number B0BXB6. The container was received by Quanterra in a separate bag and the bottle label indicates that it is to be analyzed for VOA.

DISPOSITION OF SAMPLES:

Quanterra is to proceed with the analysis of sample B0BXB6 as directed on the COC/SAR. The 125 mL container that was packaged separately will be analyzed for VOA and the results reported under sample number B0BXB7.

APPROVAL SIGNATURES:

J.A. Lerch
OSM Project Coordinator (Print/Sign Name) — Date

C.D. Wittreich — 9/2/94
Technical Representative (Print/Sign Name) — Date

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

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WO #1097

# QUANTERRA/WHC ISSUE RESOLUTION FORM

SAF No. 94-046 Project 200-UP-1 Soil Sampling - Round 1 Date 8-15-94

Sample No.(s) B0BXB7 & B0BXB8

Submitted By: Jim Harvey

Phone No. 615-690-3211 x5611

Fax No. 615-693-2348

Submitted To: Karl N. Pool

Phone No. 509-372-2596

Fax No. 509-372-2106

| ISSUE | PROPOSED RESOLUTION |
|---|---|
| 1) No sample containers were received for B0BXB7.<br><br>2) Sample containers were received for sample B0BXB8 which matched the analyses requested for B0BXB7 on the COC/RFA. No sample container was received for sample B0BXB8 for the analysis (VOA Trip) which is indicated for that sample on the COC/RFA.<br><br>3) A sample container was received which had sample number B0BXB9 on the container label. The analysis identified on the label was VOA Trip.<br><br>4) The COC/RFA does not have a "Time Sampled" indicated on the COC/SAR form for any of the samples. All containers indicate a sampling time of 10:30. | 1, 2, 3 & 4) Notify WHC/BHI. Proceed with screening and analyses indicated on the bottles, using the sample numbers indicated on the bottles, until directed otherwise by WHC/BHI.<br><br>NOTE ITEMS IN CASE NARRATIVE. |

XC: Jodie Carnes (File)
Tami Heidelberg
Wade Price / Sheree Schneider
Suzi Gaines
Van Pettey

11/1/94

031

Westinghouse Hanford Company

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

WO #996

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 299-W19-348 WVS 8-1-94 | SAF No.: 94-046 |
| Ice Chest No.: ER-21 | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: INTERNATIONAL TECHNOLOGIES | Offsite Property No.: W94-0-0746-50 WVS 8-1-94 | Bill of Lading/Air Bill No.: NA |
| Possible Sample Hazards/Remarks | | |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | | |
| 4080650 | A | B | | C | D | E | 4080660 | | | | | | | | |

| Sample No. | Matrix* | Date Sampled | Time Sampled | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B0BXB4 | S | 8-1-94 | | ✓ | ✓ | ✗ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | ✓ | |
| B0BXB5 | S | 8-1-94 | | | | | | | | | | | | ✓ | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

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

| Relinquished By | Date/Time | Received By | Date/Time |
|---|---|---|---|
| W. V. Setzer | 8-2-94 1010 | CH2M HILL A.J. Simpson | 8/2/94 1010 |
| CH2M HILL A.J. Simpson | 8/3/94 1100 | [illegible] | 8/3/94 1100 |
| | | | |
| | | | |

**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 W0164

* NOT ENOUGH SAMPLE for metals

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)

9613490.1131

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032

11/1/94

WO #1027

**Westinghouse Hanford Company**

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 1

Date 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.: =R-21 | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: INTERNATIONAL TECHNOLOGIES | Offsite Property No.: W94-0-0851-5 | Bill of Lading/Air Bill No.: NA |
| 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 | aG | P | G | G | P/G | P/G | | | aGs | aGs | aGs | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 2 + 120 | 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 | | |
| 408182 | A | B | C | D | E | E | 408 | 1530 | | | A | | | | |

| Sample No. | Matrix* | Date Sampled | Time Sampled | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B0BXB6 | S | 8-5-94 | 0955 | X | X | X | X | X | X | X | X | | | | | X | |
| B0BXB7 | S | 8-5-94 | 0900 | | | | | | | | | | | X | | | |

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By: W.V. Setzer | Date/Time: 8-8-94 0925 | Received By: C.A. Simpson | Date/Time: 8/8/94 0925 |
| Relinquished By: C.A. Simpson | Date/Time: 8/8/94 1035 | Received By: Kristin Quinlan | Date/Time: 8/8/94 1035 |
| 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)

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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11/1/94

WO-1074

**Westinghouse Hanford Company**

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 1

Date 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: 299-W19-34b | SAF No.: 94-046 |
| Ice Chest No.: EK-21 | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: Quanterra | Offsite Property No.: W94-0-0851-11 | Bill of Lading/Air Bill No.: NA |
| 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 408338 | 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 | | |
| | A | B | C | D | E | F | 408338-01 | | | | 02A | | | | |

| Sample No. | Matrix* | Date Sampled | Time Sampled | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BOBXB7A 01 | S | 8-11-94 | | X | X | X | X | X | X | X | X | | | | | X | |
| BOBXB8 02 | S | 8-11-94 | | | | | | | | | | | X | | | | |

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

| Relinquished By | Date/Time | Received By | Date/Time |
|---|---|---|---|
| W. V. Setzer | 8-15-94 0905 | A. J. Simpson | 8/15/94 0905 |
| A. J. Simpson | 8/15/94 1045 | [illegible] | 8/15/94 10:50 |
| | | | |
| | | | |

**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)

SIDL W01101

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)

9613490.1133

0000031

034

9613490.1134

# 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: W0161-QES |
| VALIDATOR: S. Schilde | LAB: Quanterra | DATE: 11/1/94 |
| CASE: — | | SDG: W0161 |

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 BOBXB4, 6, 87 / soil
AHS 11/2/94

## 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:

## 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: %D for acenaphthylene >25% on 9/1/94

### 4. BLANKS

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

Are laboratory blank results acceptable? . . . . . ~~Yes~~ (No) N/A 11/1/94

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

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

Comments: Di-n-butylphthalate was detected in the laboratory blank.
TICs detected in blanks and samples, associated results qualified UJH.

### 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:

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 KMD 11/1/94

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

Comments:

## 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: W0161-QES | VALIDATOR: L. Schilsl | DATE: 11/1/94 | 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 |
|---|---|---|---|---|---|---|---|
| B0BXB4 | BNA | 8/1/94 | 8/15/94 | 8/20/94 | 14 | 5 | none |
| B0BXB6 | | 8/5/94 | 8/18/94 | 8/30/94 | 13 | 12 | |
| B0BXB7A | | 8/11/94 | | 9/1/94 | 7 | 14 | |
| 11/2/94 | | | | | | | |
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7B

SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1097 SAS No.: _____ SDG No.: W0161

Instrument ID: FINN Calibration date: 09/01/94 Time: 1629

Lab File ID: CCA0901 Init. Calib. Date(s): 08/31/94 08/31/94

Init. Calib. Times: 1840 2126

| COMPOUND | $\overline{RRF}$ | RRF50 | MIN RRF | %D | MAX %D |
|---|---|---|---|---|---|
| Phenol | 1.688 | 1.287 | 0.800 | 23.8 | 25.0 |
| bis(2-Chloroethyl)Ether | 1.405 | 1.145 | 0.700 | 18.5 | 25.0 |
| 2-Chlorophenol | 1.321 | 1.179 | 0.800 | 10.8 | 25.0 |
| 1,3-Dichlorobenzene | 1.443 | 1.332 | 0.600 | 7.7 | 25.0 |
| 1,4-Dichlorobenzene | 1.540 | 1.538 | 0.500 | 0.1 | 25.0 |
| 1,2-Dichlorobenzene | 1.389 | 1.345 | 0.400 | 3.2 | 25.0 |
| 2-Methylphenol | 1.041 | 0.903 | 0.700 | 13.3 | 25.0 |
| 2,2'-Oxybis(1-Chloropropane) | 1.597 | 1.283 | | 19.7 | |
| 4-Methylphenol | 1.110 | 1.011 | 0.600 | 8.9 | 25.0 |
| N-Nitroso-Di-n-Propylamine | 0.922 | 0.880 | 0.500 | 4.6 | 25.0 |
| Hexachloroethane | 0.636 | 0.662 | 0.300 | -4.1 | 25.0 |
| Nitrobenzene | 0.447 | 0.443 | 0.200 | 0.9 | 25.0 |
| Isophorone | 0.873 | 0.812 | 0.400 | 7.0 | 25.0 |
| 2-Nitrophenol | 0.200 | 0.185 | 0.100 | 7.5 | 25.0 |
| 2,4-Dimethylphenol | 0.399 | 0.376 | 0.200 | 5.8 | 25.0 |
| bis(2-Chloroethoxy)Methane | 0.473 | 0.408 | 0.300 | 13.7 | 25.0 |
| 2,4-Dichlorophenol | 0.297 | 0.294 | 0.200 | 1.0 | 25.0 |
| 1,2,4-Trichlorobenzene | 0.349 | 0.367 | 0.200 | -5.2 | 25.0 |
| Naphthalene | 1.155 | 1.021 | 0.700 | 11.6 | 25.0 |
| 4-Chloroaniline | 0.369 | 0.307 | | 16.8 | |
| Hexachlorobutadiene | 0.209 | 0.248 | | -18.7 | |
| 4-Chloro-3-Methylphenol | 0.337 | 0.309 | 0.200 | 8.3 | 25.0 |
| 2-Methylnaphthalene | 0.768 | 0.730 | 0.400 | 4.9 | 25.0 |
| Hexachlorocyclopentadiene | 0.402 | 0.401 | | 0.2 | |
| 2,4,6-Trichlorophenol | 0.372 | 0.354 | 0.200 | 4.8 | 25.0 |
| 2,4,5-Trichlorophenol | 0.372 | 0.347 | 0.200 | 6.7 | 25.0 |
| 2-Chloronaphthalene | 1.206 | 1.122 | 0.800 | 7.0 | 25.0 |
| 2-Nitroaniline | 0.413 | 0.359 | | 13.1 | |
| Dimethylphthalate | 1.270 | 1.272 | | -0.2 | |
| Acenaphthylene | 1.855 | 1.370 | 1.300 | 26.2 | 25.0 |
| 2,6-Dinitrotoluene | 0.275 | 0.272 | | 1.1 | |
| 3-Nitroaniline | 0.214 | 0.223 | | -4.2 | |
| Acenaphthene | 1.272 | 1.184 | 0.800 | 6.9 | 25.0 |
| 2,4-Dinitrophenol | 0.160 | 0.135 | | 15.6 | |
| 4-Nitrophenol | 0.191 | 0.196 | | -2.6 | |
| Dibenzofuran | 1.652 | 1.592 | 0.800 | 3.6 | 25.0 |
| 2,4-Dinitrotoluene | 0.337 | 0.332 | 0.200 | 1.5 | 25.0 |

(1) Cannot be separated from Diphenylamine
All other compounds must meet a minimum RRF of 0.010.

11/1/94

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BOBXBY

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLKAB6736A

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 996 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB6736

Sample wt/vol: 30.0 (g/mL) G Lab File ID: AB6736

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

% Moisture: _____ decanted: (Y/N) N Date Extracted: 08/15/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 08/20/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.0

| 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 | 800 | U |
| 91-58-7 | 2-Chloronaphthalene | 330 | U |
| 88-74-4 | 2-Nitroaniline | 800 | 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 | 800 | U |
| 83-32-9 | Acenaphthene | 330 | U |

11/1/94

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLKAB6736A

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 996 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB6736

Sample wt/vol: 30.0 (g/mL) G Lab File ID: AB6736

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

% Moisture: _____ decanted: (Y/N) N Date Extracted: 08/15/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 08/20/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.0

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 51-28-5 | 2,4-Dinitrophenol | 800 | U |
| 100-02-7 | 4-Nitrophenol | 800 | 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 | 800 | U |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | 800 | 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 | 800 | 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 | 35 | BJ |
| 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 | 330 | U |
| 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

11/1/94

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SBLKAB6736A

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 996 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB6736

Sample wt/vol: 30.0 (g/mL) G Lab File ID: AB6736

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

% Moisture: _____ decanted: (Y/N) N Date Extracted: 08/15/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 08/20/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.0

Number TICs found: 1

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

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| 1. | UNKNOWN | 18.90 | 80 | J |

KRS 11/1/94

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BOBXB6
BOBXB8

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLKAB7076A

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1027 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB7076

Sample wt/vol: 30.0 (g/mL) G Lab File ID: AB7076

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

% Moisture: _____ decanted: (Y/N) N Date Extracted: 08/18/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 08/30/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

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

| 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 | 800 | U |
| 91-58-7 | 2-Chloronaphthalene | 330 | U |
| 88-74-4 | 2-Nitroaniline | 800 | 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 | 800 | U |
| 83-32-9 | Acenaphthene | 330 | U |

AAS 11/1/94

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLKAB7076A

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1027 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB7076

Sample wt/vol: 30.0 (g/mL) G Lab File ID: AB7076

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

% Moisture: _____ decanted: (Y/N) N Date Extracted: 08/18/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 08/30/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

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

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 51-28-5 | 2,4-Dinitrophenol | 800 | U |
| 100-02-7 | 4-Nitrophenol | 800 | 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 | 800 | U |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | 800 | 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 | 800 | 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 | 330 | U |
| 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

11/1/94

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SBLKAB7076A

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 1027 SAS No.: _____ SDG No.: W0161

Matrix: (soil/water) SOIL Lab Sample ID: AB7076

Sample wt/vol: 30.0 (g/mL) G Lab File ID: AB7076

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

% Moisture: _____ decanted: (Y/N) N Date Extracted: 08/18/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 08/30/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

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

Number TICs found: 3

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

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| 1. | UNKNOWN | 4.42 | 7900 | J |
| 2. 123-42-2 | 2-PENTANONE, 4-HYDROXY-4-MET | 4.60 | 9800 | AJN |
| 3. | UNKNOWN | 19.05 | 120 | J |

11/1/94

9613490.1146

# Golder Associates

## TELECON/ CONTACT MEMORANDUM

☐ Personal Visit
☒ Telephone: ☐ Incoming ☐ Outgoing

ROUTE TO:
Files
☒ Project
☐ Business Development
☐ Mailing List

Company Name: BHI/CHZ
Address:

Person: Janice Scott
Telephone:
Job/subject:

Job No. 943-1610.033
Date: 11/2/94
Time: 1100 am

Remarks: WD161-QES

The sample IDs do not match.

BOBXB9 is really BOBXB8

and ~~BOXBX~~ BOBXB8 is really now BOBXB7A

BOBXB5 cancelled.

We will make appropriate changes to form 1s to reflect this change + chain-of-custody.

And, we will note this in the memo.

Action/Next Contact:
let validators know.

017

BY: C Jensen

9613490.1147

RECORD COPY

MEMORANDUM

NOV 1994 RECEIVED Validation Log in

TO: 200-UP-1 Project QA Record

November 16, 1994

FR: Sandra Schildt, Golder Associates Inc. sgm

RE: METALS DATA VALIDATION SUMMARY FOR DATA PACKAGE W0161-QES (943-1610.033,W0161M.UP1)

## INTRODUCTION

This memorandum presents the results of data validation on data package W0161-QES prepared by Quanterra Environmental Services. A list of the samples validated along with the analytes reported and the method of analysis is provided in the following table.

| SAMPLE ID | SAMPLE DATE | MEDIA | ANALYSIS |
|---|---|---|---|
| B0BXB4 | 8/1/94 | SOIL | SEE NOTE 1 |
| B0BXB6 | 8/5/94 | SOIL | SEE NOTE 2 |
| B0BXB7A* | 8/11/94 | SOIL | SEE NOTE 2 |

Note 1: Sample B0BXB4 was analyzed for cyanide only.
Note 2: Samples B0BXB6 and B0BXB7A were analyzed for target analyte list (TAL) metals and cyanide.
* - Indicates sample results which were 100% recalculated.

Data validation was conducted 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 with the exception of minor deficiencies described below.

**Accuracy.** Goals for accuracy were met with the exception of minor deficiencies described below.

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

A Quanterra/WHC Issue Resolution Form was submitted with the data package (see Attachment 5). The accompanying Office of Sample Management Record of Disposition (ROD) did not resolve all issues described in the Quanterra form. Further direction from Bechtel Hanford resulted in changing the sample reported as B0BXB8 to B0BXB7A, and sample B0BXB9 to B0BXB8.

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

**Completeness.** The data package was complete for all requested analyses. Three samples (3) were validated in this data set with a total of 47 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 was exceeded. Attachments 2 and 5 provide a summary of the samples and data qualification applied.

Spike Samples

- Sample spike recovery of silver was outside control limits. Attachments 2 and 5 provide a summary of the samples and data qualification applied.

Laboratory Duplicates

- The relative percent difference (RPD) for calcium, manganese, and titanium exceeded the control limit. Attachments 2 and 5 provide a summary of the samples and data qualification applied.

Serial Dilution

- The percent difference (%D) for aluminum, iron, and magnesium exceeded the control limit for sample results greater than 50 times the instrument detection limit (IDL). Attachments 2 and 5 provide a summary of the samples and data qualification applied.

GFAA Analytical Spikes

- The GFAA analytical spike percent recoveries for arsenic, selenium and thallium were unacceptable. Attachments 2 and 5 provide a summary of the samples affected and data qualifications applied.

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GFAA MSA Correlation Coefficient

- The method of standard additions (MSA) correlation coefficient for arsenic was unacceptable. Attachments 2 and 5 provide a summary of the sample affected and data qualification applied.

**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.



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sgm 11/14/94

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# 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.

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# ATTACHMENT 2

## SUMMARY OF DATA QUALIFICATIONS

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WHC-SD-EN-SPP-002. Rev. 2

# DATA QUALIFICATION SUMMARY - FORM B-7

| PKG: W0161-QES | REVIEWER: S. Schildt | DATE: 11/14/94 | PAGE 1 OF 1 |
|---|---|---|---|
| COMMENTS: Metals | | | |
| PARAMETER | QUALIFIER | SAMPLES AFFECTED | REASON |
| Cyanide | UJ | B0BXB7A | Holding time exceeded |
| Silver | UJ | B0BXB6, B0BXB7A | Matrix spike recovery <75% but > 30% |
| Calcium<br>Manganese<br>Titanium | J | B0BXB6, B0BXB7A | Duplicate RPDs >35% |
| Aluminum<br>Iron<br>Magnesium | J | B0BXB6, B0BXB7A | ICP Serial Dilution %D >10% |
| Arsenic | UJ | B0BXB7A | GFAA Analytical Spike %R < 85% |
| Arsenic | BJ | B0BXB6 | MSA Correlation Coefficient < 0.995 |
| Selenium | UJ | B0BXB6 | GFAA Analytical Spike %R < 85% |
| Thallium | UJ | B0BXB6 | GFAA Analytical Spike %R < 85% |
| | | | |
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# ATTACHMENT 3

## QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: W0161-QES

| | Samp# | B0BXB4 | | B0BXB6 | | B0BXB7A | |
|---|---|---|---|---|---|---|---|
| | Date | 8-1-94 | | 8-5-94 | | 8-11-94 | |
| | Location | 299-W19-34B | | 299-W19-34B | | 299-W19-34B | |
| | Depth | 440.00 - 442.00 | | 460.00 - 462.00 | | 480.50 - 481.50 | |
| | Type | SOIL | | SOIL | | SOIL | |
| | Comments | | | | | | |
| Parameter | Units | Result | Q | Result | Q | Result | Q |
| ALUMINUM | MG/KG | --- | | 10600.000 | J | 20000.000 | J |
| ANTIMONY | MG/KG | --- | | 12.300 | U | 12.500 | U |
| ARSENIC | MG/KG | --- | | 2.000 | BJ | 0.510 | UJ |
| BARIUM | MG/KG | --- | | 254.000 | | 67.300 | |
| BERYLLIUM | MG/KG | --- | | 0.660 | B | 1.100 | B |
| CADMIUM | MG/KG | --- | | 1.200 | U | 1.200 | U |
| CALCIUM | MG/KG | --- | | 37700.000 | J | 6500.000 | J |
| CHROMIUM | MG/KG | --- | | 20.100 | | 11.200 | |
| COBALT | MG/KG | --- | | 15.200 | | 5.100 | B |
| COPPER | MG/KG | --- | | 13.000 | | 9.700 | |
| IRON | MG/KG | --- | | 25300.000 | J | 20600.000 | J |
| LEAD | MG/KG | --- | | 9.700 | | 9.300 | |
| MAGNESIUM | MG/KG | --- | | 5400.000 | J | 9110.000 | J |
| MANGANESE | MG/KG | --- | | 1190.000 | J | 112.000 | J |
| MERCURY | MG/KG | --- | | 0.120 | U | 0.130 | U |
| NICKEL | MG/KG | --- | | 16.600 | | 9.600 | B |
| POTASSIUM | MG/KG | --- | | 1280.000 | | 3280.000 | |
| SELENIUM | MG/KG | --- | | 0.490 | UJ | 0.510 | U |
| SILVER | MG/KG | --- | | 1.200 | UJ | 1.200 | UJ |
| SODIUM | MG/KG | --- | | --- | | 159.000 | B |
| THALLIUM | MG/KG | --- | | 0.490 | UJ | 0.510 | U |
| VANADIUM | MG/KG | --- | | 68.500 | | 36.100 | |
| ZINC | MG/KG | --- | | 47.000 | | 40.500 | |
| TITANIUM | MG/KG | --- | | 1130.000 | J | 187.000 | J |
| CYANIDE | MG/KG | 1.200 | U | 1.200 | U | 1.300 | UJ |

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

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOBXB4
299-W19-34B

Lab Name: ITAS KNOXVILLE Contract: HANFORD/WE
Lab Code: ITSTU Case No.: WO996 SAS No.: SDG No.: WO161
Matrix (soil/water): SOIL Lab Sample ID: AB5090
Level (low/med): LOW Date Received: 08/04/94
% Solids: 80.5

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

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 5955-70-0 | Cyanide | 1.2 | U | | AS |

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Color After: Clarity After: Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOBXB6
299-W19-3468

Lab Name: ITAS KNOXVILLE Contract: HANFORD/WE
Lab Code: ITSTU Case No.: WO102 SAS No.: SDG No.: WO161
Matrix (soil/water): SOIL Lab Sample ID: AB5491
Level (low/med): LOW Date Received: 08/09/94
% 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 | 10600 | | E* | P | J |
| 7440-36-0 | Antimony | 12.3 | U | | P | |
| 7440-38-2 | Arsenic | 2.0 | B | + | F | BJ |
| 7440-39-3 | Barium | 254 | | * | P | |
| 7440-41-7 | Beryllium | 0.66 | B | | P | |
| 7440-43-9 | Cadmium | 1.2 | U | | P | |
| 7440-70-2 | Calcium | 37700 | | * | P | J |
| 7440-47-3 | Chromium | 20.1 | | * | P | |
| 7440-48-4 | Cobalt | 15.2 | | | P | |
| 7440-50-8 | Copper | 13.0 | | | P | |
| 7439-89-6 | Iron | 25300 | | E* | P | J |
| 7439-92-1 | Lead | 9.7 | | S | F | |
| 7439-95-4 | Magnesium | 5400 | | E | P | J |
| 7439-96-5 | Manganese | 1190 | | * | P | J |
| 7439-97-6 | Mercury | 0.12 | U | | CV | |
| 7440-02-0 | Nickel | 16.6 | | | P | |
| 7440-09-7 | Potassium | 1280 | | | P | |
| 7782-49-2 | Selenium | 0.49 | ~~U~~ | W | F | UJ |
| 7440-22-4 | Silver | 1.2 | ~~U~~ | N | P | UJ |
| 7440-23-5 | Sodium | | | | NR | |
| 7440-28-0 | Thallium | 0.49 | ~~U~~ | W | F | UJ |
| 7440-62-2 | Vanadium | 68.5 | | * | P | |
| 7440-66-6 | Zinc | 47.0 | | * | P | |
| | Titanium | 1130 | | * | P | J |
| 5955-70-0 | Cyanide | | | | NR | |

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Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOBXB6
299-W19-34B

Lab Name: ITAS_KNOXVILLE_____ Contract: HANFORD/WE
Lab Code: ITSTU_ Case No.: WO1027 SAS No.: _____ SDG No.: WO161_
Matrix (soil/water): SOIL_ Lab Sample ID: AB5492
Level (low/med): LOW_ Date Received: 08/09/94
% 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 |
| | Titanium | | | | NR |
| 5955-70-0 | Cyanide | 1.2 | U | | AS |

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

Comments:
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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOBXB87A 11/2/94
299-W19-3413

Lab Name: ITAS KNOXVILLE Contract: HANFORD/WE
Lab Code: ITSTU Case No.: W01097 SAS No.: SDG No.: W0161
Matrix (soil/water): SOIL Lab Sample ID: AB6273
Level (low/med): LOW Date Received: 08/16/94
% Solids: 78.6

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

| CAS No. | Analyte | Concentration | C | Q | M | |
|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 20000 | | E* | P | J |
| 7440-36-0 | Antimony | 12.5 | U | | P | |
| 7440-38-2 | Arsenic | 0.51 | U | W | F | UJ |
| 7440-39-3 | Barium | 67.3 | | * | P | |
| 7440-41-7 | Beryllium | 1.1 | B | | P | |
| 7440-43-9 | Cadmium | 1.2 | U | | P | |
| 7440-70-2 | Calcium | 6500 | | * | P | J |
| 7440-47-3 | Chromium | 11.2 | | * | P | |
| 7440-48-4 | Cobalt | 5.1 | B | | P | |
| 7440-50-8 | Copper | 9.7 | | | P | |
| 7439-89-6 | Iron | 20600 | | E* | P | J |
| 7439-92-1 | Lead | 9.3 ~~4.65~~ ~~9.3~~ | | S | F | sgm 11/14/94 |
| 7439-95-4 | Magnesium | 9110 | | E | P | J |
| 7439-96-5 | Manganese | 112 | | * | P | J |
| 7439-97-6 | Mercury | 0.13 | U | | CV | |
| 7440-02-0 | Nickel | 9.6 | B | | P | |
| 7440-09-7 | Potassium | 3280 | | | P | |
| 7782-49-2 | Selenium | 0.51 | U | | F | |
| 7440-22-4 | Silver | 1.2 | U | N | P | UJ |
| 7440-23-5 | Sodium | 159 | B | | P | |
| 7440-28-0 | Thallium | 0.51 | U | | F | |
| 7440-62-2 | Vanadium | 36.1 | | * | P | |
| 7440-66-6 | Zinc | 40.5 | | * | P | |
| | Titanium | 187 | | * | P | J |
| 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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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOBXB87A 11/2/94
299-W19-34B

Lab Name: ITAS KNOXVILLE Contract: HANFORD/WE
Lab Code: ITSTU Case No.: W01097 SAS No.: SDG No.: W0161
Matrix (soil/water): SOIL Lab Sample ID: AB6274
Level (low/med): LOW Date Received: 08/16/94
% Solids: 78.6

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 |
| | Titanium | | | | NR |
| 5955-70-0 | Cyanide | 1.3 | ~~U~~ | | AS UJ |

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Color After: Clarity After: Artifacts:

Comments:
CYANIDE ONLY.

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# ATTACHMENT 4

## LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

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Quanterra
Environmental Services

Quanterra Incorporated
5815 Middlebrook Pike
Knoxville, Tennessee 37921

615 588-6401 Telephone
615 584-4315 Fax

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

SEP 1994
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Dear J.A. Lerch

Thank you for purchasing analytical testing services from IT Corporation. It is our intention to supply our clients with data packages which not only meet the industry's highest standards for quality, but are also easy to use. Features which we point out are:

1. A Data Summary Packet which allows you to review your data without searching through the complete data package.

   Your Data Summary Packet contains the following items:

   - Case Narrative: listing of sample identifications, analyses performed, explanation of any problem associated with samples, corrective action taken.
   - Quality control sample identifications and analyses performed.
   - Data summary.

2. A data package which meets the specific requirements you requested and is easy to use as well. The package is organized in accordance with the Table of Contents which you will find at the beginning of each section. Sections are separated by color-coded tabs, making it easy to find individual analytical parameters which may be of particular interest to you. The data package is custody-sealed at the laboratory - your assurance that parts of the package are not missing.

We are constantly searching for ways to improve our service to you. This current product has many of the features which you have told us are important to you. Your suggestions regarding additional improvements will be appreciated.

Please contact me with any questions or suggestions.

Sincerely,

Sheree Schneider

Sheree' Schneider
Project Manager

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Quanterra
Environmental Services

*Quanterra Incorporated*
*5815 Middlebrook Pike*
*Knoxville, Tennessee 37921*

*615 588-6401 Telephone*
*615 584-4315 Fax*

SEP 1994 RECEIVED Data Log In

September 8, 1994

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

Job Number: 996; 1027; 1097

This is the Certificate of Analysis for the following sample:

| | |
|---|---|
| SDG: | W0161 |
| Client Project ID: | WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1 |
| Received by Knoxville: | August 4, August 9 and August 16, 1994 |
| Number of Samples: | Eight |
| Sample Type: | Soil |

## I. Introduction

On August 4, August 9 and August 16, 1994, eight (8) soil samples arrived at Quanterra Environmental Services, Richland, Washington and were transferred to Quanterra Environmental Services, Knoxville, Tennessee for chemical analysis. Two IT/WHC issue resolution forms are attached. Both forms document condition on receipt variances; and should be used as supplemental documentation to this document.

## 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.

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 OLM01.8 Statement of Work.

Reviewed and Approved:

Sheree A. Schneider

**RECORD COPY**

Sheree' A. Schneider
Project Manager

11/6/94
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Quanterra Environmental Services

IT Corporation
September 8, 1994
Job Number: 996, 1027, and 1097
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 ILM03.0 Statement of Work.

The samples were analyzed for total cyanide in accordance with the EPA CLP ILM03.0 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. A matrix spike and matrix spike duplicate were analyzed using sample BOBXB4. All QC results met method specified limits.

The semivolatiles analyses were performed by direct injection of sample extract on a Restek XTI-5 capillary column on a Finnigan INCOS XL GC/MS/DS. For work order # 996, the samples were extracted three times. The method blanks for the first two extractions exhibited bad surrogate standard recoveries, indicating that the extractions were faulty. The third extraction analyzed demonstrated good results and the data was submitted. The matrix spike/matrix spike duplicate for sample BOBXB4 exhibited high recoveries for spiked compound 2,4-dinitrotoluene. All other QC results were within method specified limits.

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.

Quanterra Environmental Services

IT Corporation
September 8, 1994
Job Number: 996, 1027, and 1097
Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

**III. Quality Control** (Continued)

All run QC for metals analysis met method specified limits. A duplicate and a spike were analyzed using sample number BOBXB6. Spike recovery (accuracy) results were within acceptance limits for all parameters except for silver which was slightly outside acceptance limits (73.3%). As the manganese and titanium concentrations are greater than 4X the spike added, spiking criteria do not apply for these analytes. The spiked sample was double spiked for ICP elements during sample digestion. Duplicate RPD (precision) results were within acceptance limits for all parameters except for aluminum, barium, calcium, chromium, iron, manganese, vanadium, zinc, and titanium. Sample nonhomogeneity appears to be the probable cause for poor precision for these analytes. The 1/5 serial dilution exhibited slight matrix interferences for aluminum, iron, and magnesium.
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.



11/1/94
019

Quanterra
Environmental Services

IT Corporation
September 8, 1994
Job Number: 996, 1027, and 1097
Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

**III. Quality Control** (Continued)

"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.

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.

A matrix spike/matrix spike duplicate set was analyzed for cyanide using sample BOBXB4. All QC results were acceptable.

A matrix spike and matrix spike duplicate set was analyzed for nitrate/nitrite using sample BOBXB4. All QC results were acceptable.

A matrix spike and matrix spike duplicate set was analyzed for anions using sample BOBXB4. All QC results were acceptable.



AH 11/1/94
020

Quanterra Environmental Services

IT Corporation
September 8, 1994
Job Number: 996, 1027, and 1097
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 |
|---|---|---|---|
| AB5088 | 408065-01A | BOBXB4 | VOC |
| AB5089 | 408065-01B | " | SVOC |
| AB5090 | 408065-01C | " | CN |
| AB5091 | 408065-01D | " | ANIONS |
| AB5092 | 408065-01E | " | NO3NO2 |
| AB5489 | 40818201-A | BOBXB6 | VOC |
| AB5490 | 40818201-B | " | SVOC |
| AB5491 | 40818201-C | " | METALS |
| AB5492 | 40818201-D | " | CN |
| AB5493 | 40818201-E/F | " | ANIONS |
| AB5494 | 40818201-G | " | NO3NO2 |
| AB5496 | 40818202-A | BOBXB7 | VOC |
| AB6271 | 40833801-A | BOBXB8 | VOC |
| AB6272 | 40833801-B | " | SVOC |
| AB6273 | 40833801-C | " | METALS |
| AB6274 | 40833801-D | " | CN |
| AB6275 | 40833801-E | " | ANIONS |
| AB6276 | 40833801-F | " | NO3NO2 |
| AB6277 | 40833802-A | BOBXB9 | VOC |

Quanterra
Environmental Services

IT Corporation
September 8, 1994
Job Number: 996, 1027, and 1097
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

9613490.1169

# OFFICE OF SAMPLE MANAGEMENT

# RECORD OF DISPOSITION

ROD-B94-014
Record of Disposition No.

DATE: 08/09/94 | LABORATORY: Quanterra

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

SAMPLE IDENTIFICATION NUMBERS: B08XB4

DESCRIPTION OF EVENT:
The cooler containing sample number B08XB4 arrived at Quanterra with an internal temperature of 10°C.

DISPOSITION OF SAMPLES:
Quanterra is to continue with the chemical analyses for sample number B08XB4 as directed by the COC/SAR.

APPROVAL SIGNATURES:

J.A. Lerch — 8/12/94
OSM Project Coordinator (Print/Sign Name) — Date

C.D. Wittreich — 8/11/94
Technical Representative (Print/Sign Name) — Date

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

10/2/94

9613490.1170

# OFFICE OF SAMPLE MANAGEMENT

# RECORD OF DISPOSITION

ROD-894-018
Record of Disposition No.

DATE: 08/17/94 | LABORATORY: Quanterra

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

SAMPLE IDENTIFICATION NUMBERS: B0BXB4 & B0BXB5

DESCRIPTION OF EVENT:

1) The VOA trip blank, sample number B0BXB5, was not received by the laboratory.

2) Sample number B0BXB4 does not have a "Time Sampled" indicated on the COC/SAR form. All containers for this sample indicate a sampling time of 12:00.

DISPOSITION OF SAMPLES:

1) With the consent of the project engineer, the VOA analysis for sample B0BXB5 is to be canceled.

2) Quanterra is to proceed with the analyses requested on the Chain-of-Custody for sample number B0BXB4. The correct sampling time is 1200.

APPROVAL SIGNATURES:

J.A. Lerch — 8/18/94
OSM Project Coordinator (Print/Sign Name) — Date

C.D. Wittreich — 9/21/94
Technical Representative (Print/Sign Name) — Date

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

024 9/1/94

9613490.1171

# OFFICE OF SAMPLE MANAGEMENT

# RECORD OF DISPOSITION

ROD-B94-025
Record of Disposition No.

| | |
|---|---|
| DATE: 08/19/94 | LABORATORY: Quanterra |
| PROJECT TITLE/NO.:200-UP-1 Soil Sampling-Round 1 (SAF# 94-046) | NCR NO.: N/A |

SAMPLE IDENTIFICATION NUMBERS: BOBXB6 and BOBXB7

DESCRIPTION OF EVENT:

1) The COC/SAR indicates that sample number BOBXB7 is to be analyzed for VOA as a trip blank. No sample container was received by Quanterra for sample BOBXB7.

2) An extra 125 mL sample container was received for sample number BOBXB6. The container was received by Quanterra in a separate bag and the bottle label indicates that it is to be analyzed for VOA.

DISPOSITION OF SAMPLES:

Quanterra is to proceed with the analysis of sample BOBXB6 as directed on the COC/SAR. The 125 mL container that was packaged separately will be analyzed for VOA and the results reported under sample number BOBXB7.

APPROVAL SIGNATURES:

J.A. Lerch
OSM Project Coordinator (Print/Sign Name) — Date

C.D. Wittreich — 9/2/94
Technical Representative (Print/Sign Name) — Date

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

025 9/1/94

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WO #1097

# QUANTERRA/WHC ISSUE RESOLUTION FORM

SAF No. 94-046 Project 200-UP-1 Soil Sampling - Round 1 Date 8-15-94

Sample No.(s) B0BXB7 & B0BXB8

Submitted By: Jim Harvey

Phone No. 615-690-3211 x5611

Fax No. 615-693-2348

Submitted To: Karl N. Pool

Phone No. 509-372-2596

Fax No. 509-372-2106

| ISSUE | PROPOSED RESOLUTION |
|---|---|
| 1) No sample containers were received for B0BXB7.<br><br>2) Sample containers were received for sample B0BXB8 which matched the analyses requested for B0BXB7 on the COC/RFA. No sample container was received for sample B0BXB8 for the analysis (VOA Trip) which is indicated for that sample on the COC/RFA.<br><br>3) A sample container was received which had sample number B0BXB9 on the container label. The analysis identified on the label was VOA Trip.<br><br>4) The COC/RFA does not have a "Time Sampled" indicated on the COC/SAR form for any of the samples. All containers indicate a sampling time of 10:30. | 1, 2, 3 & 4) Notify WHC/BHI. Proceed with screening and analyses indicated on the bottles, using the sample numbers indicated on the bottles, until directed otherwise by WHC/BHI.<br><br>NOTE ITEMS IN CASE NARRATIVE. |

XC: Jodie Carnes (File)
Taini Heidelberg
Wade Price / Sheree Schneider
Suzi Gaines
Van Pettey

11/1/94

026

**Westinghouse Hanford Company**

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

WO #996

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: ~~600-38-68A~~ 299-W19-34B WVS 8-1-94 | SAF No.: 94-046 |
| Ice Chest No.: ER-21 | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: INTERNATIONAL TECHNOLOGIES | Offsite Property No.: W94-0-0746-50 WVS 8-1-94 | Bill of Lading/Air Bill No.: NA |
| 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 | | |
| | 4080650/A | B | | C | D | E | 4080660/ | | | | | | | | |
| Sample No. / Matrix* / Date Sampled / Time Sampled | | | | | | | | | | | | | | | |
| B0BXB4 / S / 8-1-94 | ✓ | ✓ | X | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | ✓ | | |
| B0BXB5 / S / 8-1-94 | | | | | | | | | | | ✓ | | | | |

| CHAIN OF POSSESSION | Sign/Print Names | Date/Time |
|---|---|---|
| Relinquished By | W. V. Setzer | 8-1-94 1010 |
| Received By | CH2M HILL / A.J. Simpson | 8/2/94 1010 |
| Relinquished By | CH2M HILL / A.J. Simpson | 8/3/94 1100 |
| Received By | [illegible] / [illegible] | 8/3/94 1100 |
| Relinquished By | | |
| Received By | | |
| 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 W0164

& NOT ENOUGH SAMPLE for metals

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)

027

9613490.1173

0000029

WO #1027

**Westinghouse Hanford Company**

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

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-21 | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: INTERNATIONAL TECHNOLOGIES | Offsite Property No.: W94-0-0851-5 | Bill of Lading/Air Bill No.: NA |
| 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 | aG | P | G | G | P/G | P/G | | | aGs | aGs | aGs | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 2 | 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 | | |
| 408182 | A | B | C | D | E | G | 408 | 1830 | | | A | | | | |

| Sample No. | Matrix* | Date Sampled | Time Sampled | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B0BXB6 | S | 8-5-94 | 0955 | X | X | X | X | X | X | X | X | | | | | X | |
| B0BXB7 | S | 8-5-94 | 0900 | | | | | | | | | | | X | | | |

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By: W. V. Setzer | Date/Time: 8-8-94 0925 | Received By: C.L. Hill / A.G. Simpson | Date/Time: 8/8/94 0925 |
| Relinquished By: C.L. Hill / A.G. Simpson | Date/Time: 8/8/94 1035 | Received By: C. Reichen Quinlan | Date/Time: 8/8/94 1035 |
| 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)

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)

9613490.1174

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02

WO" 1044

**Westinghouse Hanford Company**

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 1

Date 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: 299-W19-34b | SAF No.: 94-046 |
| Ice Chest No.: EK-21 | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: Quanterra | Offsite Property No.: W94-0-0851-11 | Bill of Lading/Air Bill No.: NA |

Possible Sample Hazards/Remarks

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

SAMPLE ANALYSIS: 408338

| 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 408334 | *1 408334 | | | VOA TRIP 02A | VOA FIELD | ACTIVITY SCAN | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | | |
| BOBXB7A 01 | S | 8-11-94 | | X | X | X | X | X | X | X | X | | | | | X | | |
| BOBXB8 02 | S | 8-11-94 | | | | | | | | | | | | X | | | | |

11/2/94

| CHAIN OF POSSESSION | Sign/Print Names | Date/Time |
|---|---|---|
| Relinquished By | | |
| Received By | | |
| Relinquished By | W. V. Setzer | 8-15-94 0905 |
| Received By | A. J. Simpson | 8/15/94 0905 |
| Relinquished By | A. J. Simpson | 8/15/94 1045 |
| Received By | [illegible] | 8/15/94 10:50 |
| Relinquished By | | |
| Received By | | |
| 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 W01101

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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11/1/94

9613490.1176

# ATTACHMENT 5

# DATA VALIDATION SUPPORTING DOCUMENTATION

# INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

| VALIDATION LEVEL: | A | B | C | D | E |
|---|---|---|---|---|---|
| PROJECT: 200-UP-1 | | | DATA PACKAGE: W0161-QES | | |
| VALIDATOR: J Schlobt | | LAB: Quanterra | | DATE: 10/31/94 | |
| CASE: W01027/W0996 | | | SDG: W0161- | | |
| ANALYSES PERFORMED | | | | | |
| ☑ CLP/ICP | ☑ CLP/GFAA | ☑ CLP/Hg | ☑ CLP/Cyanide | ☐ | ☐ |
| ☐ SW-846/ICP | ☐ SW-846/GFAA | ☐ SW-846/Hg | ☐ SW-846 Cyanide | ☐ | ☐ |

SAMPLES/MATRIX ~~BOBXB6, BOBXB8, 7A/soil~~

BOBXB6, BOBXB7A, BOBXB4 / soil 11/2/94

## 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 sgm 11/14/94

Comments:

The cyanide analysis for sample BOBXB7A was performed out of the required holding time. Therefore, the associated result has been qualified as estimated (UJ).

sgm 11/14/94

Revised sgm 11/14/94

031

## 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:

### 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: Recovery of Ag <75% for B0BXB6, 87A MS 11/2/94

Manganese and titanium ~~[illegible]~~ sgm 11/4/94 MS&R are also ~~unacceptable~~ out of control limits - however, they do not require qualification since the sample results are greater than 4x spike amount. sgm 11/4/94

sgm 11/4/94

Revised sgm 11/4/94

032

## 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: RPDs for Ca, Mn, and Ti >35% in BOBXB6 duplicate
%D >10% for Al, Fe, Mg in dilution

### 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? . . . . . sgm 11/14/94 Yes No N/A

Comments: ~~Results reported in error for Pb, MSA result 18.3 ug/L~~
~~∴ result reported s/b 4.65~~ sgm 11/14/94
~~Spike recovery of Cs in BOBXB7A 85%~~ 11/12/94
Corr. Coeff. for BOBXB6 Cs MSA <.995. The result has been qualified as estimated. ~~no qualification required~~
~~Refer to attached accuracy data summary for GFAA~~ analytical spikes. sgm 11/14/94

### 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 sgm 11/14/94

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

Comments: ~~Pb for BOBXB7A calculated incorrectly, s/b 4.65~~ 11/12/94 Pb for BOBXB7A was analyzed at a 2x dilution multiplying 4.65 mg/L by 2 = 9.3 mg/L. The laboratory reported result is acceptable. sgm 11/14/94 sgm 11/14/94

Revised sgm 11/14/94

033

# HOLDING TIME SUMMARY

SDG: w0161-QES | VALIDATOR: sgm for s.s. schildt | DATE: 11/4/94 | PAGE 1 OF 1

COMMENTS: Holding Times

| FIELD SAMPLE ID | ANALYSIS TYPE | DATE SAMPLED | DATE PREPARED | DATE ANALYZED | PREP. HOLDING TIME, DAYS | ANALYSIS HOLDING TIME, DAYS | QUALIFIER |
|---|---|---|---|---|---|---|---|
| BOBXB6 | ICP | 8/5/94 | 8/10/94 | 8/11/94 | 5 | 6 | none |
| BOBXB~~8~~7A | ICP | 8/11/94 | 8/31/94 | 8/31/94 | 20 | 20 | none |
| BOBXB4 | CN | 8/1/94 | 8/12/94 | 8/12/94 | 11 | 11 | none |
| BOBXB~~8~~7A | CN | 8/11/94 | 8/24/94 | 8/29/94 | 13 | 18 | UJ |
| | Hg | | 8/18/94 | 8/18/94 | 7 | 7 | none |
| | GFAA-Tl | | 8/22/94 | 8/22/94 | 11 | 11 | |
| | GFAA-Se | | | 8/24/94 | 11 | 13 | |
| | GFAA-Pb | | | 8/23/94 | 11 | 12 | |
| | GFAA-As | | | 8/23/94 | 11 | 12 | |
| BOBXB6 | GFAA-As | 8/5/94 | 8/10/94 | 8/15/94 | 5 | 10 | |
| | GFAA-Pb | | | 8/16/94 | 5 | 11 | |
| | GFAA-Se | | | 8/11/94 | 5 | 6 | |
| | GFAA-Tl | | | 8/19/94 | 5 | 14 | |
| | Hg | | 8/11/94 | 8/11/94 | 6 | 6 | |
| | CN | | 8/12/94 | 8/12/94 | 7 | 7 | |
| | | | | | | | |
| | | | | | | | |

Reviewed and Approved sgm 11/14/94







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U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

BOBXB6S

Lab Name: ITAS_KNOXVILLE_____ Contract:HANFORD/WE

Lab Code: ITSTU_ Case No.: WO1027 SAS No.: _____ SDG No.: WO161_
Matrix: __SOIL_____ Level (low/med): _LOW____
% Solids for Sample: _81.1

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

| Analyte | Control Limit %R | Spiked Sample Result (SSR) | C | Sample Result (SR) | C | Spike Added (SA) | %R | Q | M |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | | | | | | | | | NR |
| Antimony | 75-125 | 113.2035 | | 9.8644 | U | 123.30 | 91.8 | | P |
| Arsenic | 75-125 | 10.6535 | | 1.9975 | B | 9.86 | 87.8 | | F |
| Barium | 75-125 | 1112.1258 | | 253.9655 | | 986.44 | 87.0 | | P |
| Beryllium | 75-125 | 22.0740 | | 0.6634 | B | 24.66 | 86.8 | | P |
| Cadmium | 75-125 | 22.0543 | | 1.2330 | U | 24.66 | 89.4 | | P |
| Calcium | | | | | | | | | NR |
| Chromium | 75-125 | 108.1282 | | 20.1036 | | 98.64 | 89.2 | | P |
| Cobalt | 75-125 | 219.2947 | | 15.2109 | | 246.61 | 82.8 | | P |
| Copper | 75-125 | 121.7583 | | 13.0136 | | 123.30 | 88.2 | | P |
| Iron | | | | | | | | | NR |
| Lead | 75-125 | 15.2898 | | 9.6671 | | 4.93 | 114.1 | | F |
| Magnesium | | | | | | | | | NR |
| Manganese | | 1298.3847 | | 1194.0222 | | 246.61 | 42.3 | | P ok |
| Mercury | 75-125 | 0.6412 | | 0.1233 | U | 0.62 | 103.4 | | CV |
| Nickel | 75-125 | 226.9642 | | 16.5968 | | 246.61 | 85.3 | | P |
| Potassium | | | | | | | | | NR |
| Selenium | 75-125 | 2.0986 | | 0.4932 | U | 2.47 | 85.0 | | F |
| Silver | 75-125 | 18.0838 | | 1.2330 | U | 24.66 | 73.3 | N | P |
| Sodium | | | | | | | | | NR |
| Thallium | 75-125 | 11.5487 | | 0.4932 | U | 12.33 | 93.7 | | F |
| Vanadium | 75-125 | 280.5031 | | 68.5203 | | 246.61 | 86.0 | | P |
| Zinc | 75-125 | 264.1258 | | 47.0358 | | 246.61 | 88.0 | | P |
| Titanium | | 1443.6498 | | 1128.3453 | | 123.30 | 255.7 | | P ok |
| Cyanide | | | | | | | | | NR |

Comments:
Qualify Ag results as estimated (UJ).
No qualification is required for Mn & Ti since the sample result (SR) > 4X ~~sample~~ spiked amount.

FORM V (Part 1) - IN ILM02.1

agm 11/4/94 agm 11/4/94 & 9/12/94 11/1/94

Revised agm 11/4/94

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6
DUPLICATES

EPA SAMPLE NO.

BOBXB6D

Lab Name: ITAS_KNOXVILLE_____ Contract: HANFORD/WE

Lab Code: ITSTU_ Case No.: W01027 SAS No.: _____ SDG No.: W0161_

Matrix (soil/water): SOIL_ Level (low/med): _LOW__

% Solids for Sample: _81.1 % Solids for Duplicate: __81.1

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

| Analyte | Control Limit | Sample (S) | C | Duplicate (D) | C | RPD | Q | M |
|---|---|---|---|---|---|---|---|---|
| Aluminum | | 10567.2158 | | 7531.3070 | | 33.5 | * | P |
| Antimony | | 9.8644 | U | 9.8644 | U | | | P |
| Arsenic | | 1.9975 | B | 1.6030 | B | 21.9 | | F |
| Barium | 49.3 | 253.9655 | | 184.7670 | | 31.5 | * | P |
| Beryllium | | 0.6634 | B | 0.5450 | B | 19.6 | | P |
| Cadmium | | 1.2330 | U | 1.2330 | U | | | P |
| Calcium | | 37710.8113 | | 23715.2133 | | 45.6 | * | P |
| Chromium | | 20.1036 | | 15.4747 | | 26.0 | * | P |
| Cobalt | 12.3 | 15.2109 | | 12.5919 | | 18.8 | | P |
| Copper | 6.2 | 13.0136 | | 9.8372 | | 27.8 | | P |
| Iron | | 25326.7571 | | 19215.7830 | | 27.4 | * | P |
| Lead | | 9.6671 | | 8.1134 | | 17.5 | | F |
| Magnesium | 1233.0 | 5398.0321 | | 4256.6535 | | 23.6 | | P |
| Manganese | | 1194.0222 | | 795.9630 | | 40.0 | * | P |
| Mercury | | 0.1233 | U | 0.1233 | U | | | CV |
| Nickel | 9.9 | 16.5968 | | 15.1714 | | 9.0 | | P |
| Potassium | 1233.0 | 1277.1739 | | 1063.3070 | B | 18.3 | | P |
| Selenium | | 0.4932 | U | 0.4932 | U | | | F |
| Silver | | 1.2330 | U | 1.2330 | U | | | P |
| Sodium | | | | | | | | NR |
| Thallium | | 0.4932 | U | 0.4932 | U | | | F |
| Vanadium | 12.3 | 68.5203 | | 50.1628 | | 30.9 | * | P |
| Zinc | | 47.0358 | | 38.1529 | | 20.9 | * | P |
| Titanium | | 1128.3453 | | 651.8619 | | 53.5 | * | P |
| Cyanide | | | | | | | | NR |

FORM VI - IN

ILM02.1

8/12/94 11/1/94

U.S. EPA - CLP

9

ICP SERIAL DILUTION

EPA SAMPLE NO.

BOBXB6L

Lab Name: ITAS_KNOXVILLE_____ Contract: HANFORD/WE

Lab Code: ITSTU_ Case No.: WO1097 SAS No.: _____ SDG No.: WO161_

Matrix (soil/water): SOIL_ Level (low/med): LOW__

Assoc. with Samples ~~BOBXB4~~, BOBXB6 and BOBXB7A. agm 11/14/94

Concentration Units: ug/L

| Analyte | Initial Sample Result (I) | C | Serial Dilution Result (S) | C | % Difference | Q | M |
|---|---|---|---|---|---|---|---|
| Aluminum | 42850.06 | | 38467.75 | | 10.2 | E | P |
| Antimony | 50.00 | U | 250.00 | U | | | P |
| Arsenic | | | | | | | NR |
| Barium | 1029.83 | | 928.05 | B | 9.9 | | P |
| Beryllium | 2.69 | B | 5.20 | B | 93.3 | | P |
| Cadmium | 5.00 | U | 25.00 | U | | | P |
| Calcium | 152917.34 | | 151102.55 | | 1.2 | | P |
| Chromium | 81.52 | | 87.30 | | 7.1 | | P |
| Cobalt | 61.68 | | 70.70 | B | 14.6 | | P |
| Copper | 52.77 | | 63.25 | B | 19.9 | | P |
| Iron | 102700.00 | | 89971.80 | | 12.4 | E | P |
| Lead | | | | | | | NR |
| Magnesium | 21889.02 | | 19255.25 | B | 12.0 | E | P |
| Manganese | 4841.76 | | 4476.90 | | 7.5 | | P |
| Mercury | | | | | | | NR |
| Nickel | 67.30 | | 100.00 | U | 100.0 | | P |
| Potassium | 5178.94 | | 7216.60 | B | 39.3 | | P |
| Selenium | | | | | | | NR |
| Silver | 5.00 | U | 25.00 | U | | | P |
| Sodium | | | | B | | | P |
| Thallium | | | | | | | NR |
| Vanadium | 277.85 | | 250.10 | | 10.0 | | P |
| Zinc | 190.73 | | 179.75 | | 5.8 | | P |
| Titanium | 4575.44 | | 4131.95 | | 9.7 | | P |
| Cyanide | | | | | | | NR |

FORM IX - IN ILM02.1

Additional Page agm 11/14/94

8 9/19/94

036A

ACCURACY DATA SUMMARY

| SDG: W0161-QES | VALIDATOR: S. Schulst | DATE: 10/31/94 | PAGE 1 OF 1 | |
|---|---|---|---|---|
| COMMENTS: Analytical Spike | | | | |
| SAMPLE ID | COMPOUND | % RECOVERY | SAMPLE(S) AFFECTED | QUALIFIER REQUIRED |
| B0BXB87A 11/2/94 | As | 76 | B0BXB8 ~~7A~~ 7A sgm 11/14/94 | UJ |
| | | | | |
| B0BXB6 | Selenium | 82% | B0BXB6 | UJ |
| B0BXB6 | Thallium | 79% | B0BXB6 | UJ |
| B0BXB6 | Lead | 80% | B0BXB6 | None - analyzed by ~~MSA~~ MSA sgm 11/14/94 |
| | | | | |
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Revised sgm 11/14/94







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8

STANDARD ADDITION RESULTS

Lab Name: ITAS_KNOXVILLE_____ Contract:HANFORD/WE

Lab Code: ITSTU_ Case No.: WO1027 SAS No.:_____ SDG No.:WO161_

Concentration Units: ug/L

| EPA Sample No. | An | 0 ADD ABS | 1 ADD CON | 1 ADD ABS | 2 ADD CON | 2 ADD ABS | 3 ADD CON | 3 ADD ABS | Final Conc. | r | Q |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BOBXB6D | AS | 0.032 | 5.00 | 0.067 | 10.00 | 0.066 | 15.00 | 0.090 | 10.9 | 0.9347 | + |
| BOBXB6D | AS | 0.023 | 5.00 | 0.048 | 10.00 | 0.073 | 15.00 | 0.082 | 6.5 | 0.9817 | + |
| BOBXB6S | AS | 0.098 | 10.00 | 0.158 | 20.00 | 0.202 | 30.00 | 0.243 | 21.6 | 0.9957 | |
| BOBXB6 | AS | 0.042 | 5.00 | 0.051 | 10.00 | 0.085 | 15.00 | 0.107 | 8.1 | 0.9795 | + |
| BOBXB6 | AS | 0.046 | 5.00 | 0.055 | 10.00 | 0.067 | 15.00 | 0.106 | 10.3 | 0.9375 | + |
| BOBXB6D | PB | 0.076 | 12.00 | 0.108 | 24.00 | 0.137 | 36.00 | 0.161 | 32.9 | 0.9980 | |
| BOBXB6S | PB | 0.084 | 12.00 | 0.115 | 24.00 | 0.153 | 36.00 | 0.180 | 31.0 | 0.9981 | |
| BOBXB6 | PB | 0.094 | 12.00 | 0.124 | 24.00 | 0.152 | 36.00 | 0.181 | 39.2 | 0.9999 | |

Qualify As result as estimated (BJ).
AGM 11/14/94

FORM VIII - IN ILM02.1

8 9/12/94

Additional Page
AGM 11/14/94

037A

9613490

# Golder Associates

## TELECON/ CONTACT MEMORANDUM

☐ Personal Visit
☒ Telephone: ☐ Incoming ☐ Outgoing

ROUTE TO:
Files
☒ Project
☐ Business Development
☐ Mailing List

Company Name: BHI/CHZ
Address:

Job No. 943-1610.033

Person: Janice Scott
Telephone:
Job/subject:

Date: 11/2/94
Time: 1100 am

Remarks: W0161-QES

The sample IDs do not match.

BOBXB9 is really BOBXB8

and ~~BOXBX~~ BOBXB8 is really now BOBXB7A

BOBXB5 cancelled.

We will make appropriate changes to form 1s to reflect this change + chain-of-custody.

And, we will note this in the memo.

Action/Next Contact:
let validators know.

BY: C Jensen

028

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MEMORANDUM

TO: 200-UP-1 Project QA Record

November 8, 1994

FR: Susan Manchester, Golder Associates Inc.

RE: RADIOCHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE: W0161-QES (943-1610.033, Filename W0161RAD.UP1)

## INTRODUCTION

This memo presents the results of data validation on data package W0161-QES prepared by the Quanterra Environmental Services (QES) Laboratory. Sample information is provided in the following table.

| SAMPLE ID | MEDIA | ANALYSIS | COMMENTS |
|---|---|---|---|
| B0BXB4<br>B0BXB6<br>B0BXB7A* | SOIL<br>SOIL<br>SOIL | RADIOCHEMISTRY, SEE ATTACHMENT 4 | NONE |
| * 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 exceptions of the deficiencies identified below.

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

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

**Completeness.** The data package was complete for all requested analyses. A total of three samples were validated in this data package with a total of 76 determinations reported, all of

001

which were deemed valid. This results in a completeness of 100 percent, which meets normal work plan objectives 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.

Laboratory Control Sample Recovery

- The laboratory control sample percent recovery (LCS %R) for neptunium-237 was unacceptable. Attachments 2 and 5 provide a summary of the samples affected, data qualifications applied and supporting documentation.

## DATA REPORTING

- Reported sample results which are less than the minimum detectable activity (MDA) have been qualified as undetected (U) on the laboratory results form (see Attachment 3).

- Secondary results reported by the laboratory have been crossed out to clarify reported laboratory results (see Attachment 3).

## 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 Radiochemical Analyses, WHC-SD-EN-SPP-001, Rev. 1, 1993. Westinghouse Hanford Company, Richland, Washington.

Revised
sgm 11/15/94

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# ATTACHMENT 1

## GLOSSARY OF DATA REPORTING QUALIFIERS

# 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.

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# ATTACHMENT 2

## SUMMARY OF DATA QUALIFICATIONS

# DATA QUALIFICATION SUMMARY

| SDG: W0161-QES | VALIDATOR: | DATE: November 7, 1994 | PAGE 1 OF 1 |
|---|---|---|---|
| COMMENTS: RADIOCHEMISTRY | | | |
| COMPOUND/ANALYTE | QUALIFIER | SAMPLES AFFECTED | REASON |
| NEPTUNIUM-237 | J - DETECTS<br>UJ - NONDETECTS | B0BXB4<br>B0BXB6<br>B0BXB7A | Np-237 LCS %R < 70%<br>BUT > 30% |

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# ATTACHMENT 3

# QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: W0161-QES

| | Samp# | B0BXB4 | | B0BXB6 | | B0BXB7A | |
|---|---|---|---|---|---|---|---|
| | Date | 8-1-94 | | 8-5-94 | | 8-11-94 | |
| | Location | 299-W19-34B | | 299-W19-34B | | 299-W19-34B | |
| | Depth | 440.00 - 442.00 | | 460.00 - 462.00 | | 480.50 - 481.50 | |
| | Type | SOIL | | SOIL | | SOIL | |
| | Comments | | | | | | |
| Parameter | Units | Result | Q | Result | Q | Result | Q |
| AMERICIUM-241 | pCi/G | 0.025 | U | 0.030 | U | 0.027 | U |
| CURIUM-244 | pCi/G | 0.024 | U | 0.033 | U | 0.040 | U |
| CURIUM-242 | pCi/G | 0.029 | U | 0.028 | U | 0.042 | U |
| NEPTUNIUM-237 | pCi/G | 0.062 | J | 0.186 | J | 0.019 | UJ |
| PLUTONIUM-238 | pCi/G | 0.081 | U | 0.025 | U | 0.051 | U |
| PLUTONIUM-239/240 | pCi/G | 0.032 | U | 0.025 | U | 0.128 | U |
| URANIUM-234 | pCi/G | 0.754 | | 0.700 | | 0.676 | |
| URANIUM-235 | pCi/G | 0.063 | U | 0.041 | | 0.031 | U |
| URANIUM-238 | pCi/G | 0.718 | | 0.644 | | 0.776 | |
| COBALT-58 | pCi/G | 0.059 | U | 0.056 | U | 0.056 | U |
| COBALT-60 | pCi/G | 0.043 | U | 0.040 | U | 0.041 | U |
| CESIUM-137 | pCi/G | 0.038 | U | 0.038 | U | 0.036 | U |
| EUROPIUM-152 | pCi/G | 0.087 | U | 0.080 | U | 0.082 | U |
| EUROPIUM-154 | pCi/G | 0.129 | U | 0.127 | U | 0.125 | U |
| EUROPIUM-155 | pCi/G | 0.083 | U | 0.076 | U | 0.083 | U |
| IRON-59 | pCi/G | 0.182 | U | 0.158 | U | 0.148 | U |
| IODINE-129 | pCi/G | 0.648 | U | 0.664 | U | 0.701 | U |
| POTASSIUM-40 | pCi/G | 17.500 | | --- | | 12.400 | |
| RADIUM-224 | pCi/G | 1.060 | | 0.805 | | 0.982 | |
| RADIUM-226 | pCi/G | 0.493 | | 0.660 | | 0.458 | |
| RADIUM-228 | pCi/G | 1.270 | | 1.070 | | 1.270 | |
| URANIUM-238DLP | pCi/G | 1.190 | | --- | | 0.889 | |
| GROSS ALPHA | pCi/G | 11.500 | | 11.700 | | 12.900 | |
| GROSS BETA | pCi/G | 26.600 | | 21.900 | | 20.600 | |
| STRONTIUM | pCi/G | 0.240 | | 0.139 | U | 0.130 | U |
| TECHNETIUM-99 | pCi/G | 0.521 | U | 0.521 | U | 0.521 | U |

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

Verified 11-7-94

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Quanterra
Environmental Services

# SAMPLE RESULTS

Borehole 299-W19-34B
440' - 442'

| | | | |
|---|---|---|---|
| LAB NAME: | ITAS-RICHLAND | SDG: | W0161 |
| LAB SAMPLE ID: | 40806601 | MATRIX: | SOIL |
| CLIENT ID: | B0BXB4 | DATE RECEIVED: | 8/3/94 |

| ISOTOPE | RESULT | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA | REPORT UNIT | YIELD | METHOD NUMBER | Q |
|---|---|---|---|---|---|---|---|---|
| AM-241 | ~~1.89E-02~~ | ~~2.02E-02~~ | ~~2.04E-02~~ | 2.51E-02 | pCi/g | 72.10% | RD3302 | U |
| CM-242 | ~~4.81E-04~~ | ~~9.61E-04~~ | ~~9.64E-04~~ | 2.42E-02 | pCi/g | 72.10% | RD3302 | U |
| CM-244 | ~~2.02E-03~~ | ~~1.81E-03~~ | ~~1.83E-03~~ | 2.85E-02 | pCi/g | 72.10% | RD3302 | U |
| NP-237 | 6.17E-02 | 3.22E-02 | 3.48E-02 | ~~1.90E-02~~ | pCi/g | 100.00% | RD3208 | J |
| PU-238 | ~~9.41E-03~~ | ~~9.41E-03~~ | ~~9.63E-03~~ | 8.08E-02 | pCi/g | 35.40% | RD3209 | U |
| PU239/40 | ~~0.00E+00~~ | ~~0.00E+00~~ | ~~3.52E-02~~ | 3.18E-02 | pCi/g | 35.40% | RD3209 | U |
| U-234 | 7.54E-01 | 1.90E-01 | 2.29E-01 | ~~8.50E-02~~ | pCi/g | 35.30% | RD3234 | |
| U-235 | ~~5.51E-02~~ | ~~5.28E-02~~ | ~~5.36E-02~~ | 6.29E-02 | pCi/g | 35.30% | RD3234 | U |
| U-238DA | 7.18E-01 | 1.84E-01 | 2.20E-01 | ~~4.74E-02~~ | pCi/g | 35.30% | RD3234 | |
| CO-58 | ~~3.55E-02~~ | ~~3.67E-02~~ | ~~3.69E-02~~ | 5.86E-02 | pCi/g | N/A | RD3219 | U |
| CO-60 | ~~8.33E-03~~ | ~~2.52E-02~~ | ~~2.52E-02~~ | 4.33E-02 | pCi/g | N/A | RD3219 | U |
| CS-137DA | ~~7.15E-03~~ | ~~2.23E-02~~ | ~~2.23E-02~~ | 3.80E-02 | pCi/g | N/A | RD3219 | U |
| EU-152 | ~~6.28E-03~~ | ~~5.40E-02~~ | ~~5.40E-02~~ | 8.69E-02 | pCi/g | N/A | RD3219 | U |
| EU-154 | ~~3.28E-02~~ | ~~7.46E-02~~ | ~~7.47E-02~~ | 1.29E-01 | pCi/g | N/A | RD3219 | U |
| EU-155 | ~~6.15E-02~~ | ~~5.13E-02~~ | ~~5.17E-02~~ | 8.32E-02 | pCi/g | N/A | RD3219 | U |
| FE-59 | ~~6.59E-02~~ | ~~1.12E-01~~ | ~~1.12E-01~~ | 1.82E-01 | pCi/g | N/A | RD3219 | U |
| I-129LP | ~~1.01E-01~~ | ~~3.81E-01~~ | ~~3.81E-01~~ | 6.48E-01 | pCi/g | N/A | RD3219 | U |
| K-40 | 1.75E+01 | 1.02E+00 | 2.03E+00 | ~~N/A~~ | pCi/g | N/A | RD3219 | |
| RA-224DA | 1.06E+00 | 6.81E-02 | 1.26E-01 | ~~N/A~~ | pCi/g | N/A | RD3219 | |
| RA-226DA | 4.93E-01 | 9.79E-02 | 1.10E-01 | ~~N/A~~ | pCi/g | N/A | RD3219 | |
| RA-228DA | 1.27E+00 | 1.68E-01 | 2.10E-01 | ~~N/A~~ | pCi/g | N/A | RD3219 | |
| U-238DLP | 1.19E+00 | 1.21E+00 | 1.21E+00 | ~~N/A~~ | pCi/g | N/A | RD3219 | |
| ALPHA | 1.15E+01 | 4.73E+00 | 4.89E+00 | ~~3.89E+00~~ | pCi/g | 100.00% | RD3214 | |
| BETA | 2.66E+01 | 3.75E+00 | 4.14E+00 | ~~3.84E+00~~ | pCi/g | 100.00% | RD3214 | |
| STRONTIUM | 2.40E-01 | 8.37E-02 | 1.02E-01 | ~~1.51E-01~~ | pCi/g | 80.00% | RD3204 | |

009

Revised sgm 11/14/94 Verified sgm 11/8/94

Quanterra
Environmental Services

# SAMPLE RESULTS

| | | | |
|---|---|---|---|
| LAB NAME: | ITAS-RICHLAND | SDG: | W0161 |
| LAB SAMPLE ID: | 40806601 | MATRIX: | SOIL |
| CLIENT ID: | B0BXB4 | DATE RECEIVED: | 8/3/94 |

| ISOTOPE | RESULT | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA | REPORT UNIT | YIELD | METHOD NUMBER | Q |
|---|---|---|---|---|---|---|---|---|
| TC-99 | ~~-9.01E-03~~ | ~~2.26E-01~~ | ~~1.06E+00~~ | 5.21E-01 | pCi/g | 100.00% | ITAS-IT-RS-0001 | U |

Number of Results: 26

Revised sgm 11/14/94 Verified sgm 11/21/94

Quanterra Environmental Services

## SAMPLE RESULTS

Borehole 299-W19-34B
460' - 462'

| | | | |
|---|---|---|---|
| LAB NAME: | ITAS-RICHLAND | SDG: | W0161 |
| LAB SAMPLE ID: | 40818301 | MATRIX: | SOIL |
| CLIENT ID: | B0BXB6 | DATE RECEIVED: | 8/8/94 |

| ISOTOPE | RESULT | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA | REPORT UNIT | YIELD | METHOD NUMBER | Q |
|---|---|---|---|---|---|---|---|---|
| AM-241 | ~~-1.46E-03~~ | ~~1.69E-03~~ | ~~1.71E-03~~ | 3.04E-02 | pCi/g | 59.50% | RD3302 | U |
| CM-242 | ~~-1.15E-03~~ | ~~1.62E-03~~ | ~~1.63E-03~~ | 3.27E-02 | pCi/g | 59.50% | RD3302 | U |
| CM-244 | ~~-9.79E-04~~ | ~~1.38E-03~~ | ~~1.39E-03~~ | 2.79E-02 | pCi/g | 59.50% | RD3302 | U |
| NP-237 | 1.86E-01 | 5.58E-02 | 6.87E-02 | ~~2.22E-02~~ | pCi/g | 100.00% | RD3208 | J |
| PU-238 | ~~0.00E+00~~ | ~~0.00E+00~~ | ~~2.74E-02~~ | 2.47E-02 | pCi/g | 45.60% | RD3209 | U |
| PU239/40 | ~~0.00E+00~~ | ~~0.00E+00~~ | ~~2.74E-02~~ | 2.47E-02 | pCi/g | 45.60% | RD3209 | U |
| U-234 | 7.00E-01 | 1.32E-01 | 1.61E-01 | ~~3.29E-02~~ | pCi/g | 67.70% | RD3234 | |
| U-235 | 4.11E-02 | 3.26E-02 | 3.31E-02 | ~~3.29E-02~~ | pCi/g | 67.70% | RD3234 | |
| U-238DA | 6.44E-01 | 1.26E-01 | 1.53E-01 | ~~3.48E-02~~ | pCi/g | 67.70% | RD3234 | |
| CO-58 | ~~-5.71E-03~~ | ~~3.48E-02~~ | ~~3.48E-02~~ | 5.56E-02 | pCi/g | N/A | RD3219 | U |
| CO-60 | ~~-2.67E-03~~ | ~~2.29E-02~~ | ~~2.29E-02~~ | 3.99E-02 | pCi/g | N/A | RD3219 | U |
| CS-137DA | ~~-7.71E-04~~ | ~~2.28E-02~~ | ~~2.28E-02~~ | 3.77E-02 | pCi/g | N/A | RD3219 | U |
| EU-152 | ~~-2.46E-02~~ | ~~4.87E-02~~ | ~~4.88E-02~~ | 8.04E-02 | pCi/g | N/A | RD3219 | U |
| EU-154 | ~~-7.08E-02~~ | ~~7.90E-02~~ | ~~7.94E-02~~ | 1.27E-01 | pCi/g | N/A | RD3219 | U |
| EU-155 | ~~-2.12E-03~~ | ~~4.52E-02~~ | ~~4.52E-02~~ | 7.58E-02 | pCi/g | N/A | RD3219 | U |
| FE-59 | ~~-1.53E-01~~ | ~~1.04E-01~~ | ~~1.05E-01~~ | 1.58E-01 | pCi/g | N/A | RD3219 | U |
| I-129LP | ~~2.30E-01~~ | ~~3.74E-01~~ | ~~3.74E-01~~ | 6.64E-01 | pCi/g | N/A | RD3219 | U |
| RA-224DA | 8.05E-01 | 6.71E-02 | 1.05E-01 | ~~N/A~~ | pCi/g | N/A | RD3219 | |
| RA-226DA | 6.60E-01 | 1.01E-01 | 1.21E-01 | ~~N/A~~ | pCi/g | N/A | RD3219 | |
| RA-228DA | 1.07E+00 | 1.76E-01 | 2.05E-01 | ~~N/A~~ | pCi/g | N/A | RD3219 | |
| ALPHA | 1.17E+01 | 4.93E+00 | 5.09E+00 | ~~5.00E+00~~ | pCi/g | 100.00% | RD3214 | |
| BETA | 2.19E+01 | 3.38E+00 | 3.68E+00 | ~~3.44E+00~~ | pCi/g | 100.00% | RD3214 | |
| STRONTIUM | ~~5.77E-02~~ | ~~6.08E-02~~ | ~~6.25E-02~~ | 1.39E-01 | pCi/g | 88.30% | RD3204 | U |
| TC-99 | ~~1.22E-01~~ | ~~2.29E-01~~ | ~~1.07E+00~~ | 5.21E-01 | pCi/g | 100.00% | ITAS-IT-RS-0001 | U |

Revised sgm 11/14/94 Verified sgm 11/06/94 ~~0011~~ 011

9613490.1198

Quanterra Environmental Services

## SAMPLE RESULTS

Borehole 299-W19-34B
480.5' - 481.5'

Verified sgm 11/06/94
Revised sgm 11/14/94

| | | | |
|---|---|---|---|
| LAB NAME: | ITAS-RICHLAND | SDG: | W0161 |
| LAB SAMPLE ID: | 40833901 | MATRIX: | SOIL |
| CLIENT ID: | ~~B0BXB8~~ B0BXB7A | DATE RECEIVED: | 8/15/94 |

11-7-94

| ISOTOPE | RESULT | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA | REPORT UNIT | YIELD | METHOD NUMBER | Q |
|---|---|---|---|---|---|---|---|---|
| AM-241 | 2.23E-02 | 2.33E-02 | 2.36E-02 | 2.66E-02 | pCi/g | 62.30% | RD3302 | U |
| CM-242 | 3.47E-03 | 1.36E-02 | 1.36E-02 | 3.95E-02 | pCi/g | 62.30% | RD3302 | U |
| CM-244 | 2.33E-04 | 1.21E-02 | 1.21E-02 | 4.24E-02 | pCi/g | 62.30% | RD3302 | U |
| NP-237 | 1.18E-02 | 1.44E-02 | 1.47E-02 | 1.90E-02 | pCi/g | 100.00% | RD3208 | UJ |
| PU-238 | 0.00E+00 | 0.00E+00 | 5.61E-02 | 5.07E-02 | pCi/g | 22.20% | RD3209 | U |
| PU239/40 | 1.50E-02 | 1.50E-02 | 1.55E-02 | 1.28E-01 | pCi/g | 22.20% | RD3209 | U |
| U-234 | 6.76E-01 | 1.45E-01 | 1.75E-01 | 3.55E-02 | pCi/g | 53.50% | RD3234 | |
| U-235 | 3.05E-02 | 3.11E-02 | 3.15E-02 | 3.13E-02 | pCi/g | 53.50% | RD3234 | U |
| U-238DA | 7.76E-01 | 1.56E-01 | 1.92E-01 | 3.88E-02 | pCi/g | 53.50% | RD3234 | |
| CO-58 | 1.16E-02 | 3.51E-02 | 3.51E-02 | 5.56E-02 | pCi/g | N/A | RD3219 | U |
| CO-60 | 6.75E-03 | 2.34E-02 | 2.34E-02 | 4.05E-02 | pCi/g | N/A | RD3219 | U |
| CS-137DA | 8.84E-03 | 2.23E-02 | 2.23E-02 | 3.63E-02 | pCi/g | N/A | RD3219 | U |
| EU-152 | 2.47E-02 | 5.00E-02 | 5.01E-02 | 8.23E-02 | pCi/g | N/A | RD3219 | U |
| EU-154 | 2.30E-02 | 7.07E-02 | 7.07E-02 | 1.25E-01 | pCi/g | N/A | RD3219 | U |
| EU-155 | 6.36E-02 | 4.81E-02 | 4.85E-02 | 8.26E-02 | pCi/g | N/A | RD3219 | U |
| FE-59 | 8.97E-03 | 9.04E-02 | 9.04E-02 | 1.48E-01 | pCi/g | N/A | RD3219 | U |
| I-129LP | 4.65E-02 | 4.03E-01 | 4.03E-01 | 7.01E-01 | pCi/g | N/A | RD3219 | U |
| K-40 | 1.24E+01 | 1.06E+00 | 1.63E+00 | N/A | pCi/g | N/A | RD3219 | |
| RA-224DA | 9.82E-01 | 6.91E-02 | 1.20E-01 | N/A | pCi/g | N/A | RD3219 | |
| RA-226DA | 4.58E-01 | 9.09E-02 | 1.02E-01 | N/A | pCi/g | N/A | RD3219 | |
| RA-228DA | 1.27E+00 | 1.69E-01 | 2.12E-01 | N/A | pCi/g | N/A | RD3219 | |
| U-238DLP | 8.89E-01 | 1.39E+00 | 1.40E+00 | N/A | pCi/g | N/A | RD3219 | |
| ALPHA | 1.29E+01 | 5.27E+00 | 5.45E+00 | 5.64E+00 | pCi/g | 100.00% | RD3214 | |
| BETA | 2.06E+01 | 3.35E+00 | 3.61E+00 | 3.66E+00 | pCi/g | 100.00% | RD3214 | |
| STRONTIUM | 9.36E-02 | 6.16E-02 | 6.59E-02 | 1.30E-01 | pCi/g | 90.40% | RD3204 | U |

01

Verified sgm 11/6/94 Revised sgm 11/14/94 ~~AA13~~

Quanterra
Environmental Services

# SAMPLE RESULTS

| | | | |
|---|---|---|---|
| LAB NAME: | ITAS-RICHLAND | SDG: | W0161 |
| LAB SAMPLE ID: | 40833901 | MATRIX: | SOIL |
| CLIENT ID: | ~~B0BXB8~~ B0BXB7A | DATE RECEIVED: | 8/15/94 |

11-7-94

| ISOTOPE | RESULT | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA | REPORT UNIT | YIELD | METHOD NUMBER | Q |
|---|---|---|---|---|---|---|---|---|
| TC-99 | ~~1.51E-01~~ | ~~2.25E-01~~ | ~~1.05E+00~~ | 5.21E-01 | pCi/g | 100.00% | ITAS-IT-RS-0001 | U |

Number of Results: 26

Verified
sgm 11/06/94

Revised
sgm 11/14/94

9613490.1200

# ATTACHMENT 4

## LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

9613490.1201

Quanterra
Environmental Services

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

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

# CERTIFICATE OF ANALYSIS

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

October 3, 1994

Attention: Karl Pool

OCT 1994
RECEIVED
Data
Log In

| | | |
|---|---|---|
| SAF Number | : | 94-046 |
| Date SDG Closed | : | August 17, 1994 |
| Number of Samples | : | Three (3) |
| Sample Type | : | Soil |
| SDG Number | : | W0161 |
| Data Deliverable | : | Stand Alone |

RECORD COPY

## I. Introduction

On August 3, 8, and 15, 1994, three soil samples were received by the Quanterra Environmental Services Richland Laboratory (QTESRL) for radiochemical analysis. Upon receipt, the samples were assigned the following laboratory ID numbers to correspond with the Westinghouse Hanford Company (WHC) specific IDs:

| QTESRL ID | WHC ID | Matrix | Date of Receipt |
|---|---|---|---|
| 40806601 | B0BXB4 | Soil | 8/03/94 |
| 40818301 | B0BXB6 | Soil | 8/08/94 |
| 40833901 | ~~B0BXB8~~ B0BXB7A | Soil | 8/15/94 |

11-7-94

## II. Analytical Results/Methodology

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

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Environmental Services



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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 W0161 include a minimum of one Laboratory Control Sample (LCS), one method (reagent) blank, and one duplicate. Any exceptions have been noted in the "Comments" section.

Quality control sample results are reported in the same units as sample results with the exception of Gross Alpha and Gross Beta results which are reported in pCi/sample.

## IV. Comments

Results from the initial radioactivity screening of these samples classified B0BXB4 and B0BXB8 as Category I, and sample B0BXB6 as Category II.

Sample B0BXB5 was not received with B0BXB4, as indicated on accompanying paperwork. In addition, sample B0BXB4 has no sample time indicated on the COC, however, all containers show a time of 12:00. The time of 12:00 was used as the time of sampling. Sample Variance Report faxed 8/3/94.

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Sample B0BXB7 was not received with B0BXB6. There was one extra VOA sample received and labeled as B0BXB6. The sample bottles indicate a sample date/time of 8/5/94 08:00, however, the COC states 8/5/94 09:55. The times and analyses indicated by the bottle labels were used. Issue Resolution submit date 8/15/94.

Samples B0BXB8 and B0BXB9 do not have sample times indicated on the COC's, whereas the sample bottles are marked 10:30. The times indicated on the bottle were used. Issue Resolution submit date 8/15/94.

Approximately one half of sample B0BXB6 was lost in the ball mill apparatus. The ball mill jar broke while rolling.

**Alpha Spectroscopy**

Americium-241, Curium-244 by method ITAS-RD-3302
The LCS results were hand corrected for Am-241 tailing. The corrected results are reported. The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BXB8) results are within contractual limits.

Neptunium-237 by method ITAS-RD-3208
The LCS is biased low (62.8%). The matrix spike and matrix spike duplicate are within three sigma and the recoveries are within $\pm$ 30% of the expected values. All of the batch MDAs meet the RDL. The matrix spike, LCS, batch blank, sample and sample duplicate (duplicate of sample B0BXB8) results are within contractual limits except as noted.

Plutonium-238, -239/40 by method ITAS-RD-3209
The LCS tracer yield was low and the radiochemical yield was high on the initial analysis of the batch. A recount of the spike was performed but the results are not used due to a low tracer yield. The batch was reanalyzed and the reanalysis results are accepted and reported. The reanalysis LCS, batch blank, sample and sample duplicate (duplicate of sample B0BXB8) results are within contractual limits.

Uranium-234, -235, -238 by method ITAS-RD-3234
The U-235 recovery for the LCS is biased low. The LCS is accepted based on acceptable recoveries for the U-234 and U-238, and based on the low abundance of U-235 in the spike. The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BXB8) results are within contractual limits except as noted.

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**Gamma Spectroscopy**

Gamma Scan by method ITAS-RD-3219
Sample B0BXB8 was counted on a detector that was not calibrated for the geometry of the samples, therefore, the results were calculated using efficiencies that were not verified and are not reportable. However, the sample was analyzed in duplicate, therefore, the duplicate sample results are reported as the sample results and no duplicate results are provided. Cd-109 was detected in the all of the batch samples. It is not reported because it is a false positive caused by x-ray lines produced by energy reflection from the detector cave liners. The MDAs for the batch samples and blank exceeded the RDL for Fe-59 due to the short half-life of Fe-59 and the small sample sizes used for analysis. The MDAs for the samples exceeded the RDL for Co-58 and Eu-154 due to the small sample sizes that were used for analysis. The sample sizes that were used were reduced due to the large number of requested analyses and the quantity of large rocks in the samples. The LCS, batch blank, and sample results are within contractual limits except as noted.

Iodine-129 by method ITAS-RD-3219
The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BXB8) results are within contractual limits.

**Gas Proportional Counting**

Gross Alpha by method ITAS-RD-3222
The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BXB4) results are within contractual limits.

Gross Beta by method ITAS-RD-3222
The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BXB4) results are within contractual limits.

Strontium-90 by method ITAS-RD-3204
The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BXB4) results are within contractual requirements.

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**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 B0BXB8) 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

9613490 1206

# Golder Associates

## TELECON/ CONTACT MEMORANDUM

☐ Personal Visit
☒ Telephone: ☐ Incoming ☐ Outgoing

ROUTE TO:
Files
☒ Project
☐ Business Development
☐ Mailing List

Company Name: BHI/CHZ
Address:

Job No. 943-1610.033

Person: Janice Scott
Telephone:
Job/subject:

Date: 11/2/94
Time: 1100am

Remarks: WD161-QES

The sample IDs do not match.

BOBXB9 is really BOBXB8

and ~~BOXBX~~ 9/17/94 BOBXB8 is really now BOBXB7A

BOBXB5 cancelled.

We will make appropriate changes to form 1s to reflect this change + chain-of-custody.

And, we will note this in the memo.

Action/Next Contact:
let validators know.

020

BY: C Jensen

9613490.1207

# SAMPLE RECEIPT VARIANCE REPORT
## ITAS-RICHLAND LABORATORY

WORK ORDER NUMBER: _____ DATE INITIATED: 8-15-94

INITIATED BY: Karen Feldberg

DATE/TIME OF SAMPLE (AND/OR RFA & COC) RECEIPT: _____

| CLIENT SAMPLE NUMBER | RFA/COC NUMBERS | ANALYSIS REQUESTED |
|---|---|---|
| B0BXB8 | | Time 10:30 |
| B0BXB9 | | Date 8-11-94 |
| | | |
| | | |

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: Bottles do not match the Paper work. COC has no time sampled - bottles have 10:30. 8/15/94

SUPERVISOR REVIEW: Tami Heidelberg

PROJECT MANAGER REVIEW: _____

TELEPHONED TO: _____ ON _____ BY _____

TELEFAXED TO: _____ ON _____ BY _____

SIGNED ORIGINAL MUST BE RETAINED IN WORK ORDER FILE

11-7-94

FORM NO. LS-023, 3/92, Rev. 0

~~0066~~ 021

9613490.1208

# QUANTERRA/WHC ISSUE RESOLUTION FORM

SAF No. 94-046 Project 200-UP-1 Soil Sampling - Round 1 Date 8-15-94

Sample No.(s) B0BXB7 & B0BXB8

Submitted By: Jim Harvey

Phone No. 615-690-3211 x5611

Fax No. 615-693-2348

Submitted To: Karl N. Pool

Phone No. 509-372-2596

Fax No. 509-372-2106

| ISSUE | PROPOSED RESOLUTION |
|---|---|
| 1) No sample containers were received for B0BXB7.<br><br>2) Sample containers were received for sample B0BXB8 which matched the analyses requested for B0BXB7 on the COC/RFA. No sample container was received for sample B0BXB8 for the analysis (VOA Trip) which is indicated for that sample on the COC/RFA.<br><br>3) A sample container was received which had sample number B0BXB9 on the container label. The analysis identified on the label was VOA Trip.<br><br>4) The COC/RFA does not have a "Time Sampled" indicated on the COC/SAR form for any of the samples. All containers indicate a sampling time of 10:30. | 1, 2, 3 & 4) Notify WHC/BHI. Proceed with screening and analyses indicated on the bottles, using the sample numbers indicated on the bottles, until directed otherwise by WHC/BHI.<br><br>NOTE ITEMS IN CASE NARRATIVE. |

XC: Jodie Carnes (File)
Tami Heidelberg
Wade Price / Sheree Schneider
Suzi Gaines
Van Pettey

~~0068~~
11-7-94

022

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~~ 299-W19-34B WVS 8-1-94 | SAF No.: 94-046 |
| Ice Chest No.: ER-21 | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: INTERNATIONAL TECHNOLOGIES | Offsite Property No.: W94-0-0746-50 WVS 8-1-94 | Bill of Lading/Air Bill No.: NA |
| Possible Sample Hazards/Remarks | | |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | | |
| | 4080650/A | B | | C | D | E | 4080660/ | | | | | | | | |

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

| Sample No. | Matrix* | Date Sampled | Time Sampled | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B0BXB4 | S | 8-1-94 | | ✓ | ✓ | X | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | ✓ | |
| B0BXB5 | S | 8-1-94 | | | | | | | | | | | | ✓ | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

TSOP

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By: W. V. Setzer | Date/Time: 8-2-94 1010 | Received By: CH2M HILL AG Simpson | Date/Time: 8/2/94 1010 |
| Relinquished By: CH2M HILL AG Simpson | Date/Time: 8/3/94 1100 | Received By: Stockfin quantum | Date/Time: 8/3/94 1100 |
| 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)

SDG W0164

* NOT ENOUGH SAMPLE for metals

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)

9613490.1209

2

**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-21 | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: INTERNATIONAL TECHNOLOGIES | Offsite Property No.: W94-0-0851-5 | Bill of Lading/Air Bill No.: NA |
| 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 | aG | P | G | G | PG | PG | | | aGs | aGs | aGs | | |
| No. of Container(s) | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | | | 1 | 1 | 1 | | |
| Volume | 125ml | 500ml | 500ml | 250ml | 120 250ml | 125ml | 1000ml | 500ml | | | 125ml | 250ml | 40ml | | |
| SAMPLE ANALYSIS 408182 | VOA (CLP) A | SEMIVOA (CLP) B | ICP MTL GFAA METALS Hg (CLP) C | Cn (CLP) D | ANIONS IC-F,CL SO4,NO2 NO3,PO4 F/E | NO2,NO3 EPA(353.2) G | *1 408183 | *1 01 | | | VOA TRIP A | VOA FIELD | ACTIVIY SCAN | | |

| Sample No. | Matrix* | Date Sampled | Time Sampled | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 21 B0BXB6 | S | 8-5-94 | 0955 | X | X | X | X | X | X | X | X | | | | | X | |
| 22 B0BXB7 | S | 8-5-94 | 0900 | | | | | | | | | | | X | | | |

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

| Relinquished By | Date/Time | Received By | Date/Time |
|---|---|---|---|
| W.V. Setzer | 8-8-94 0925 | CHLM HILL A.G. Simpson | 8/8/94 0925 |
| A.G. Simpson (CH2M HILL) | 8/8/94 1035 | C. Renitz Courier | 8/8/94 1035 |
| | | | |
| | | | |

**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 W0161

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)

9613490.1210

**Westinghouse Hanford Company**

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 1

Date 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: 299-W19-34b | SAF No.: 94-046 |
| Ice Chest No.: ER-21 | Field Logbook No.: EFL-1118 | Method of Shipment: BY DOE VEHICLE |
| Shipped To: Quanterra | Offsite Property No.: W94-0-0851-11 | Bill of Lading/Air Bill No.: NA |

Possible Sample Hazards/Remarks

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | | |
| 11-7-94 408338 | A | B | C | D | E | F | 40833901 | | | | 02A | | | | |

| Sample No. | Matrix* | Date Sampled | Time Sampled | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B0BXB7A01 | S | 8-11-94 | | X | X | X | X | X | X | X | X | | | | | X | |
| B0BXB8 02 | S | 8-11-94 | | | | | | | | | | | X | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

0002

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By: W. V. Setzer | Date/Time: 8-15-94 0905 | Received By: CH2M HILL A J Simpson | Date/Time: 8/15/94 0905 |
| Relinquished By: A J Simpson | Date/Time: 8/15/94 1045 | Received By: [illegible] | Date/Time: 8/15/94 10:50 |
| 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)

SDG W0161

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)

9413490.1211

9613490.1212

# ATTACHMENT 5

# DATA VALIDATION SUPPORTING DOCUMENTATION

# RADIOCHEMICAL DATA VALIDATION CHECKLIST

| VALIDATION LEVEL: | A | B | C | D | E |
|---|---|---|---|---|---|
| PROJECT: 200-UP-1 | | | DATA PACKAGE: ~~W0061~~ agm 11/4/94 W0161-QES | | |
| VALIDATOR: agm | | LAB: QES | | DATE: 11/04/94 | |
| CASE: | | | SDG: W0161-QES | | |

ANALYSES PERFORMED

| | | | | | |
|---|---|---|---|---|---|
| ☒ Gross Alpha/Beta | ☒ Strontium-90 | ☒ Technetium-99 | ☒ Alpha Spectroscopy | ☒ Gamma Spectroscopy | |
| ☐ Total Uranium | ☐ Radium-22 | ☐ Tritium | ☐ | | |

SAMPLES/MATRIX Soil

B0BXB4

B0BXB6

~~B0BXB8~~ B0BXB7A *Sample identifier changed subsequent to validation procedures per WHC request. See case narrative and RDD's.

11-7-94 *

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? . . . . . (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:

3. Continuing Calibration . . . . . ☐ N/A

Calibration checked within one week of sample analysis? . . . Yes No N/A
Calibration check acceptable? . . . . . Yes No N/A
Calibration check standards NIST traceable? . . . . . Yes No N/A
Calibration check standards expired? . . . . . Yes No N/A

Comments:

4. Blanks . . . . . ☐ N/A

Method blank analyzed? . . . . . Yes No N/A
Method blank results acceptable? . . . . . Yes No N/A
Analytes detected in method blank? . . . . . Yes No N/A
Field blank(s) analyzed? . . . . . Yes No N/A
Field blank results acceptable? . . . . . Yes No N/A
Analytes detected in field blank(s)? . . . . . Yes No N/A
Transcription/Calculation Errors? . . . . . Yes No N/A

Comments: ~~Am-241, Pu-239/240 & Gross Beta were detected in the lab blank. However, All Am-241 and Pu-239/240 Sample results were nondetects and all gross beta Sample results were > 5x blank conc. Therefore, no qual is required.~~ gross sgm 11/4/94 detected sgm 11/4/94

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:

6. Laboratory Control Samples . . . . . ☐ N/A

LCS analyzed? . . . . . Yes No N/A
LCS recoveries acceptable? . . . . . Yes No N/A
LCS traceable? . . . . . Yes No N/A
Transcription/Calculation Errors? . . . . . Yes No N/A

Comments: LCS %R for Np-237 is 633. The assoc. results have been qualified as estimated (J/UJ).

7. Chemical Recovery . . . . . ☐ N/A

Chemical carrier added? . . . . . Yes No N/A
Chemical recovery acceptable? . . . . . 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:

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:

9. Field QC Samples . . . . . ☐ N/A

Field duplicate sample(s) analyzed? . . . . . Yes (No) N/A
Field duplicate RPD values acceptable? . . . . . 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:

10. Holding Times

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

Comments: Samples B0BXB4, B0BXB6 and B0BXB7 were collected on 8/01/94, 8/05/94 and 8/11/94, respectively. The rad chem analyses were performed in August and September of 1994 which is within the 180 day holding time.

11. Results and Detection Limits (Levels D & E) . . . . . ☐ N/A

Results reported for all required sample analyses? . . . . . (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: Carbon-14 results were not reported due to an insufficient amount of carbon present in the samples. No qualification is required.

Quanterra
Environmental Services

# LABORATORY CONTROL SAMPLE

| | | | |
|---|---|---|---|
| LAB NAME: | ITAS-RICHLAND | SDG: | W0161 |
| LAB SAMPLE ID: | L080661S | MATRIX: | SOIL |

| ISOTOPE | RESULT | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA | REPORT UNIT | YIELD | EXPECTED | RECOVER |
|---|---|---|---|---|---|---|---|---|
| AM-241 | 3.91E+00 | 3.10E-01 | 7.25E-01 | 3.47E-02 | pCi/g | 59.10% | 4.58E+00 | 85.37% |
| NP-237 | 3.54E+00 | 2.43E-01 | 8.01E-01 | 1.90E-02 | pCi/g | 100.00% | 5.64E+00 | 62.77% |
| PU239/40 | 3.55E+00 | 6.18E-01 | 1.03E+00 | 7.28E-02 | pCi/g | 15.50% | 3.38E+00 | 105.03% |
| U-234 | 1.64E+00 | 2.31E-01 | 3.33E-01 | 4.33E-02 | pCi/g | 51.40% | 1.63E+00 | 100.61% |
| U-235 | 5.29E-02 | 4.30E-02 | 4.37E-02 | 4.81E-02 | pCi/g | 51.40% | 7.43E-02 | 71.20% |
| U-238DA | 1.90E+00 | 2.48E-01 | 3.71E-01 | 3.70E-02 | pCi/g | 51.40% | 1.71E+00 | 111.11% |
| ALPHA | 4.58E+00 | 4.34E-01 | 8.82E-01 | 1.02E-01 | pCi/sa | 100.00% | 4.53E+00 | 101.10% |
| BETA | 1.18E+01 | 1.07E+00 | 1.36E+00 | 7.82E-01 | pCi/sa | 100.00% | 1.13E+01 | 104.42% |
| STRONTIUM | 5.79E+00 | 2.84E-01 | 1.50E+00 | 1.28E-01 | pCi/g | 93.80% | 6.03E+00 | 96.02% |

Number of Results: 9

Qualify Np-237 results as estimated (J/UJ).

AGM 11/06/94

| Americium/Curium | | | |
|---|---|---|---|
| HEIS No.: | B0BXB4 | B0BXB6 | B0BXB7A |
| Lab ID: | 40806601 | 40818301 | 40833901 |
| Aliquot: | 2.00E+00 | 2.00E+00 | 2.00E+00 |
| Am241 net cpm: | 0.0188 | -0.0012 | 0.0192 |
| Am241 bkg cpm: | 0.0012 | 0.0012 | 0.0008 |
| Spl count time: | 200 | 200 | 200 |
| Bkg count time: | 2500 | 2500 | 2500 |
| Eff d/c: | 3.225 | 3.225 | 3.225 |
| Decay: | 1 | 1 | 1 |
| Yield: | 0.721 | 0.595 | 0.623 |
| Am241 calc: | 1.89E-02 | -1.46E-03 | 2.24E-02 |
| Am241 rptd: | 1.89E-02 | -1.46E-03 | 2.23E-02 |
| Am241 MDA calc: | 2.51E-02 | 3.04E-02 | 2.66E-02 |
| Am241 MDA rptd: | 2.51E-02 | 3.04E-02 | 2.66E-02 |
| Cm244 net cpm: | -0.0020 | -0.0008 | 0.0002 |
| Cm244 bkg cpm: | 0.0020 | 0.0008 | 0.0048 |
| Cm244 decay: | 1.004 | 1.004 | 1.003 |
| Cm244 calc: | -2.02E-03 | -9.80E-04 | 2.34E-04 |
| Cm244 rptd: | -2.02E-03 | -9.79E-04 | 2.33E-04 |
| Cm244 MDA calc: | 2.85E-02 | 2.80E-02 | 4.24E-02 |
| Cm244 MDA rptd: | 2.85E-02 | 2.79E-02 | 4.24E-02 |
| Cm242 net cpm: | -0.0004 | -0.0008 | 0.0026 |
| Cm242 bkg cpm: | 0.0004 | 0.0008 | 0.0024 |
| Cm242 decay: | 1.196 | 1.176 | 1.146 |
| Cm242 calc.: | -4.81E-04 | -1.15E-03 | 3.47E-03 |
| Cm242 rptd: | -4.81E-04 | -1.15E-03 | 3.47E-03 |
| Cm242 MDA calc: | 2.42E-02 | 3.28E-02 | 3.96E-02 |
| Cm242 MDA rptd: | 2.42E-02 | 3.27E-02 | 3.95E-02 |

| Neptunium | | | |
|---|---|---|---|
| HEIS No.: | B0BXB4 | B0BXB6 | B0BXB7A |
| Lab ID: | 40806601 | 40818301 | 40833901 |
| Aliquot: | 2.00E+00 | 2.00E+00 | 2.00E+00 |
| Np237 net cpm: | 0.0742 | 0.2234 | 0.0142 |
| Np237 bkg cpm: | 0.0008 | 0.0016 | 0.0008 |
| Spl count time: | 200 | 200 | 200 |
| Bkg count time: | 2500 | 2500 | 2500 |
| Eff d/c: | 3.7 | 3.7 | 3.7 |
| Decay: | 1 | 1 | 1 |
| Yield: | 1 | 1 | 1 |
| Np237 calc: | 6.17E-02 | 1.86E-01 | 1.18E-02 |
| Np237 rptd: | 6.17E-02 | 1.86E-01 | 1.18E-02 |
| Np237 MDA calc: | 1.90E-02 | 2.22E-02 | 1.90E-02 |
| Np237 MDA rptd: | 1.90E-02 | 2.22E-02 | 1.90E-02 |

| Plutonium | | | |
|---|---|---|---|
| | | | |
| HEIS No.: | B0BXB4 | B0BXB6 | B0BXB7A |
| Lab ID: | 40806601 | 40818301 | 40833901 |
| Aliquot: | 2.00E+00 | 2.00E+00 | 2.00E+00 |
| Pu238 net cpm: | -0.004 | 0 | 0 |
| Pu238 bkg cpm: | 0.004 | 0 | 0 |
| Spl count time: | 200 | 200 | 200 |
| Bkg count time: | 1000 | 1000 | 1000 |
| Pu238 Eff d/c: | 3.703 | 3.703 | 3.703 |
| Decay: | 1.001 | 1.001 | 1.001 |
| Yield: | 0.354 | 0.456 | 0.222 |
| Pu238 calc: | -9.42E-03 | 0.00E+00 | 0.00E+00 |
| Pu238 rptd: | -9.41E-03 | 0.00E+00 | 0.00E+00 |
| Pu238 MDA calc: | 8.09E-02 | 2.48E-02 | 5.08E-02 |
| Pu238 MDA rptd: | 8.08E-02 | 2.47E-02 | 5.06E-02 |
| Pu239 net cpm: | 0 | 0 | -0.004 |
| Pu239 bkg cpm: | 0 | 0 | 0.004 |
| Pu239 d/c: | 3.7 | 3.7 | 3.7 |
| Pu239 decay: | 1 | 1 | 1 |
| Pu239 calc: | 0.00E+00 | 0.00E+00 | -1.50E-02 |
| Pu239 rptd: | 0.00E+00 | 0.00E+00 | -1.49E-02 |
| Pu239 MDA calc: | 3.19E-02 | 2.48E-02 | 1.29E-01 |
| Pu239 MDA rptd: | 3.18E-02 | 2.47E-02 | 1.28E-01 |
| | | | |

| Isotopic Uranium | | | |
|---|---|---|---|
| HEIS No.: | B0BXB4 | B0BXB6 | B0BXB7A |
| Lab ID: | 40806601 | 40818301 | 40833901 |
| Aliquot: | 2.00E+00 | 2.001 | 2.004 |
| U-234 net cpm: | 0.3202 | 0.5684 | 0.4342 |
| U-234 bkg cpm: | 0.0048 | 0.0016 | 0.0008 |
| Spl count time: | 200 | 200 | 200 |
| Bkg count time: | 2500 | 2500 | 2500 |
| Eff d/c: | 3.7 | 3.7 | 3.7 |
| Decay: | 1 | 1 | 1 |
| Yield: | 0.353 | 0.677 | 0.535 |
| U-234 calc: | 7.54E-01 | 6.99E-01 | 6.75E-01 |
| U-234 rptd: | 7.54E-01 | 7.00E-01 | 6.75E-01 |
| U-234 MDA calc: | 8.56E-02 | 3.29E-02 | 3.55E-02 |
| U-234 MDA rptd: | 8.56E-02 | 3.29E-02 | 3.55E-02 |
| U-235 net cpm: | 0.0234 | 0.0334 | 0.0196 |
| U-235 bkg cpm: | 0.0016 | 0.0016 | 0.0004 |
| U-235 decay: | 1 | 1 | 1 |
| U-235 calc: | 5.51E-02 | 4.11E-02 | 3.05E-02 |
| U-235 rptd: | 5.51E-02 | 4.11E-02 | 3.05E-02 |
| U-235 MDA calc: | 6.29E-02 | 3.29E-02 | 3.13E-02 |
| U-235 MDA rptd: | 6.29E-02 | 3.29E-02 | 3.13E-02 |
| U-238 net cpm: | 0.3046 | 0.523 | 0.4988 |
| U-238 bkg cpm: | 0.0004 | 0.002 | 0.0012 |
| U-238 decay: | 1 | 1 | 1 |
| U-238 calc.: | 7.17E-01 | 6.43E-01 | 7.75E-01 |
| U-238 rptd: | 7.18E-01 | 6.44E-01 | 7.76E-01 |
| U-238 MDA calc: | 4.74E-02 | 3.48E-02 | 3.88E-02 |
| U-238 MDA rptd: | 4.74E-02 | 3.48E-02 | 3.88E-02 |

| Gross Alpha | | | |
|---|---|---|---|
| | | | |
| HEIS No.: | B0BXB4 | B0BXB6 | B0BXB7A |
| Lab ID: | 40806601 | 40818301 | 40833901 |
| Aliquot: | 5.00E-02 | 4.98E-02 | 5.02E-02 |
| Net counts: | 0.254 | 0.258 | 0.286 |
| Bkg counts: | 0.016 | 0.032 | 0.044 |
| Spl count time: | 100 | 100 | 100 |
| Bkg count time: | 500 | 500 | 500 |
| d/c: | 5.024 | 5.008 | 5.04 |
| Calc.: | 1.15E+01 | 1.17E+01 | 1.29E+01 |
| Rptd: | 1.15E+01 | 1.17E+01 | 1.29E+01 |
| MDA calc: | 3.89E+00 | 5.00E+00 | 5.64E+00 |
| MDA rptd: | 3.89E+00 | 5.00E+00 | 5.64E+00 |

| Gross Beta | | | |
|---|---|---|---|
| | | | |
| HEIS No.: | B0BXB4 | B0BXB6 | B0BXB7A |
| Lab ID: | 40806601 | 40818301 | 40833901 |
| Aliquot: | 2.50E-01 | 2.50E-01 | 2.50E-01 |
| Net counts: | 5.105 | 4.195 | 3.935 |
| Bkg counts: | 1.075 | 0.845 | 0.965 |
| Spl count time: | 50 | 50 | 50 |
| Bkg count time: | 200 | 200 | 200 |
| d/c: | 2.899 | 2.898 | 2.898 |
| Calc.: | 2.66E+01 | 2.19E+01 | 2.06E+01 |
| Rptd: | 2.66E+01 | 2.19E+01 | 2.06E+01 |
| MDA calc: | 3.84E+00 | 3.44E+00 | 3.66E+00 |
| MDA rptd: | 3.84E+00 | 3.44E+00 | 3.66E+00 |

| Strontium 90 | | | |
|---|---|---|---|
| | | | |
| HEIS No.: | B0BXB4 | B0BXB6 | B0BXB7A |
| Sample: | 40806601 | 40818301 | 40833901 |
| Sep date & time: | 09/06/94 | 09/06/94 | 09/06/94 |
| Count date & time: | 09/06/94 | 09/06/94 | 09/06/94 |
| Hours: | 6.92 | 6.92 | 6.92 |
| Sample amt: | 6.07E+00 | 6.11E+00 | 6.05E+00 |
| Net, cpm: | 1.28 | 0.334 | 0.546 |
| Count time: | 50 | 50 | 50 |
| Bkg, cpm: | 1.1 | 1.106 | 0.974 |
| Count time: | 500 | 500 | 500 |
| D/C 1: | 2.184 | 2.233 | 2.248 |
| D/C 2: | 1.836 | 1.856 | 1.862 |
| D/C 3: | 1.972 | 2.008 | 2.014 |
| Yield: | 0.8 | 0.883 | 0.904 |
| Calc: | 2.40E-01 | 5.76E-02 | 9.36E-02 |
| Rptd: | 2.40E-01 | 5.76E-02 | 9.35E-02 |
| MDA, Calc: | 1.51E-01 | 1.39E-01 | 1.30E-01 |
| MDA, rptd: | 1.51E-01 | 1.39E-01 | 1.30E-01 |

| Technetium-99 | | | |
|---|---|---|---|
| HEIS No.: | B0BXB4 | B0BXB6 | B0BXB7A |
| Sample: | 40806601 | 40818301 | 40833901 |
| Bkg cpm: | 27.5 | 27.5 | 27.5 |
| Spl, amt: | 2.00E+00 | 2.00E+00 | 2.00E+00 |
| Spl cpm: | 26.4 | 26.89 | 25.63 |
| Count time: | 125 | 125 | 125 |
| Spl dpm: | 28.87 | 29.45 | 28.24 |
| d/c: | 1.094 | 1.095 | 1.102 |
| Yield: | 1 | 1 | 1 |
| Blk, dpm: | 2.89E+01 | 2.89E+01 | 2.89E+01 |
| Blk, d/c: | 1.051 | 1.051 | 1.051 |
| Calc: | -9.01E-03 | 1.22E-01 | -1.51E-01 |
| Rptd: | -9.01E-03 | 1.22E-01 | -1.51E-01 |
| MDA, calc: | 5.21E-01 | 5.21E-01 | 5.21E-01 |
| MDA, rptd: | 5.21E-01 | 5.21E-01 | 5.21E-01 |