

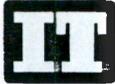
**START**

9613495.2631

W0052-ITC-052

127 2

0045458



INTERNATIONAL  
TECHNOLOGY  
CORPORATION

Analytical Data Package Prepared For

**Westinghouse Hanford**



Radiochemical Analysis By

**IT Analytical Services**  
*Richland Laboratory*

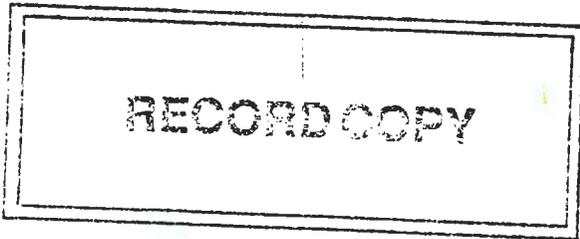
Sample Delivery Group Number: W0052

WHC IDENTIFICATION NUMBER

ITAS RICHLAND ID NUMBER

**B0BW5**

**40508001**



Regional Office

2800 George Washington Way • Richland, Washington 99352-1613 • 509-375-3131 • FAX: 509-375-5590

*IT Corporation is a wholly owned subsidiary of International Technology Corporation*

**0001**



## CERTIFICATE OF ANALYSIS

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

June 28, 1994

Attention: J.A.Lerch

|                   |   |              |
|-------------------|---|--------------|
| SAF Number        | : | 94-088       |
| Date SDG Closed   | : | May 13, 1994 |
| Number of Samples | : | One (1)      |
| Sample Type       | : | Water        |
| SDG Number        | : | W0052        |
| Data Deliverable  | : | Stand Alone  |

### I. Introduction

On May 4, 1994, one water sample was received by ITAS-Richland for radiochemical analysis. Upon receipt, the sample was assigned the following laboratory ID number to correspond with the WHC specific ID:

| <u>ITAS-Richland ID</u> | <u>WHC ID</u> | <u>Matrix</u> | <u>Date of Receipt</u> |
|-------------------------|---------------|---------------|------------------------|
| 405080-01A              | BOBWB5        | Water         | 5/4/94                 |

### 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.

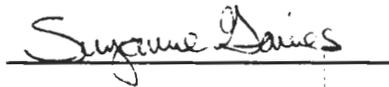


Westinghouse Hanford Company  
June 28, 1994  
Page 3

---

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:

A handwritten signature in cursive script, reading "Suzanne Gaines", is written over a horizontal line.

Suzanne Gaines  
Project Manager

9613495.2635

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

SAMPLE RESULTS

LAB NAME: ITAS-RICHLAND                      SDG NO.: W0052  
LAB SAMPLE ID: 40508001                      MATRIX: WATER  
WHC ID: BOBWB5                                  DATE RECEIVED 5/4/94  
REPORTING UNITS: pCi/L & ug/L

| ISOTOPE | RESULT   | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA      | YIELD | METHOD NUMBER   |
|---------|----------|---------------------|------------------|----------|-------|-----------------|
| TC-99   | 5.16E+02 | 4.18E+00            | 5.91E+01         | 2.15E+00 | 0.951 | ITAS-IT-RS-0001 |
| URANIUM | 6.43E+01 | N/A                 | 9.64E+00         | 3.54E-03 | 1     | RD4200          |

0006



PROJECT ID (Name/Number): WHC

NCM INITIATED BY (Name/Date): SBR 6/27/94

PARAMETER(S): TC99

SAMPLE NUMBER(S) AFFECTED: 40508001 + QC

MATRIX: H<sub>2</sub>O

AREA:  SHIP/REC  RADIOCHEM  COUNTING  BIOASSAY  
 DATA VERIF  REPORTING  OTHER:

**NONCONFORMANCE [check appropriate item(s)]:**

1.  Not enough sample received for proper analysis.

2.  Holding time exceeded by \_\_\_\_\_ days due to:

2.1  CATEGORY I: Out of Laboratory Control  
 Holding time expired at receipt.

2.2  CATEGORY II: Laboratory Dependent  
 work backlog  instrument failure  
 communication  other (see #10)

2.3  CATEGORY III: Laboratory Reruns

2.3.1  QA/QC:  
 surrogates  internal standards  
 spike recoveries  blank contamination

2.3.2  CONFIRMATION:  
 second column  contamination check  
 other (see #10)

2.3.3  DILUTION:  
 over calibration  under calibration  
 other (see #10)

2.3.4  OTHER: (see #10)

3.  Sample lost during extraction/analysis; no re-prep or re-analysis possible.

4.  QC data reported to client outside of:  
 method limits  internal limits  
 QAPP limits  contract limits  
 regulatory limits  blank criteria

5.  Incorrect procedure(s) used. (See #10)

6.  Invalid instrument calibration. (See #10)

7.  Incorrect/incomplete data reported to client. (See #10)

8.  Reported detection limit(s) higher than:  
 method limits  QAPP limits  
 contract limits  other (see #10)

Due to:  
 sample matrix  insufficient sample  
 instrumentation  other (see #10)

9.  Other (specify): Duplicate miss match and matrix spike out of limits. Reanalysis of 6/27/94

10.  Comments/Explanation:

**NOTIFICATION [check appropriate item(s)]:**

1.  Client notified by (name and date): \_\_\_\_\_  
 in writing  by FAX  
 by phone  Other (explain)

2.  Client's name \_\_\_\_\_ and response:  
 process "as is"  resample  
 on hold til \_\_\_\_\_  Other (explain)

PROJECT MANAGER (signature & date): Suzanne 6/28/94

**CORRECTIVE ACTION**

**ROOT CAUSE:** INITIALS/DATE LR 6/27/94

Apparent sediment in sample.

**CORRECTIVE ACTION:** INITIALS/DATE SR 6/27/94

Report Reanalysis results

RESPONSIBILITY FOR PERFORMING CORRECTIVE ACTION ASSIGNED TO:

**ACTIONS TO PREVENT RECURRENCE:** INITIALS/DATE \_\_\_\_\_

FIRST LEVEL SUPERVISOR: John S. [Signature] DATE: 6/27/94

RESPONSIBLE MANAGER: W MacKellan DATE: 6/28/94

**QC REVIEW**

NONCONFORMANCE  DEFICIENCY  RERUN

FURTHER ACTION REQUIRED:

ASSIGNED TO: \_\_\_\_\_

QC COORDINATOR: Jodie Gr DATE: 6/28/94

**CORRECTIVE ACTION VERIFICATION**

VERIFIED  CANNOT VERIFY (specify reason)

REASON: \_\_\_\_\_

**NCM CLOSURE**

QC COORDINATOR: Jodie Gr DATE: 6/28/94

432



INTERNATIONAL TECHNOLOGY CORPORATION

PROJECT ID (Name/Number): WHC

NCM INITIATED BY (Name/Date): File returned 6-15-94

PARAMETER(S): W0052

SAMPLE NUMBER(S) AFFECTED: W0508001

MATRIX: water

AREA:  SHIP/REC  RADIOCHEM  COUNTING  BIOASSAY  
 DATA VERIF  REPORTING  OTHER:

**NONCONFORMANCE [check appropriate item(s)]:**

1.  Not enough sample received for proper analysis.

2.  Holding time exceeded by \_\_\_\_\_ days due to:

2.1  CATEGORY I: Out of Laboratory Control  
 Holding time expired at receipt.

2.2  CATEGORY II: Laboratory Dependent  
 work backlog  instrument failure  
 communication  other (see #10)

2.3  CATEGORY III: Laboratory Reruns

2.3.1  QA/QC:  
 surrogates  internal standards  
 spike recoveries  blank contamination

2.3.2  CONFIRMATION:  
 second column  contamination check  
 other (see #10)

2.3.3  DILUTION:  
 over calibration  under calibration  
 other (see #10)

2.3.4  OTHER: (see #10)

3.  Sample lost during extraction/analysis; no re-prep or re-analysis possible.

4.  QC data reported to client outside of:  
 method limits  internal limits  
 QAPP limits  contract limits  
 regulatory limits  blank criteria

5.  Incorrect procedure(s) used. (See #10)

6.  Invalid instrument calibration. (See #10)

7.  Incorrect/incomplete data reported to client. (See #10)

8.  Reported detection limit(s) higher than:  
 method limits  QAPP limits  
 contract limits  other (see #10)  
 Due to:  
 sample matrix  insufficient sample  
 instrumentation  other (see #10)

9.  Other (specify): matrix spike lost

10.  Comment/Explanation:

**NOTIFICATION [check appropriate item(s)]:**

1.  Client notified by (name and date): \_\_\_\_\_

2.  Client's name \_\_\_\_\_ and response:  
 in writing  by FAX  process "as is"  resample  
 by phone  Other (explain)  on hold til \_\_\_\_\_  Other (explain)

PROJECT MANAGER (signature & date): Sally James 6/16/94

432

**CORRECTIVE ACTION**

**ROOT CAUSE:** W0508001 **INITIALS/DATE:** 7/6-15-94

The reading is too high (164.287 µg/ml) that it masks the spike added to the sample (1.09 µg/ml)

**CORRECTIVE ACTION:** consider W0508001 test **INITIALS/DATE:** 7/6-15-94

Sample 40508001 and F0508001 are within 5% error so this data is accepted

**RESPONSIBILITY FOR PERFORMING CORRECTIVE ACTION ASSIGNED TO:** \_\_\_\_\_

**ACTIONS TO PREVENT RECURRENCE:** **INITIALS/DATE:** \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**FIRST LEVEL SUPERVISOR:** Tom K... **DATE:** 7-15-94

**RESPONSIBLE MANAGER:** W. McDell **DATE:** 6/27/94

**QC REVIEW**

NONCONFORMANCE  DEFICIENCY  RERUN

FURTHER ACTION REQUIRED: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ **ASSIGNED TO:** \_\_\_\_\_

**QC COORDINATOR:** Jodie Cor **DATE:** 6/27/94

**CORRECTIVE ACTION VERIFICATION**

VERIFIED  CANNOT VERIFY (specify reason)

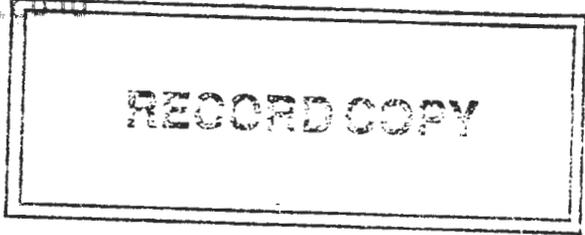
**REASON:** \_\_\_\_\_

\_\_\_\_\_

**NCM CLOSURE**

**QC COORDINATOR:** Jodie Cor **DATE:** 6/27/94

9613495.2410



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

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  
Project Manager

Regional Office

5815 Middlebrook Pike • Knoxville, Tennessee 37921 • 615-588-6401

IT Corporation is a wholly owned subsidiary of International Technology Corporation



# ANALYTICAL SERVICES

## CERTIFICATE OF ANALYSIS

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

June 10, 1994

Job Number: 494

This is the Certificate of Analysis for the following samples:

|                       |   |
|-----------------------|---|
| SDG:                  | W0052                                       |
| Client Project ID:    | WHC SAF 94-088 200-UP-1 Groundwater Round 1 |
| Date Received by Lab: | May 6, 1994                                 |
| Number of Samples:    | Two (2)                                     |
| Sample Type:          | Water                                       |

### I. Introduction

On May 6, 1994, two (2) water samples arrived at ITAS-Richland, Washington and were transferred to ITAS-Knoxville for chemical analysis. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

### 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 by gas chromatography/mass spectroscopy (GC/MS) in accordance with the EPA CLP 3/90 Statement of Work.

Reviewed and Approved:

A handwritten signature in cursive script that reads 'Sheree A. Schneider'.

Sheree' A. Schneider  
Project Manager

American Council of Independent Laboratories  
International Association of Environmental Testing Laboratories  
American Association for Laboratory Accreditation

9613495.2642

0000002

IT Corporation  
June 10, 1994  
Job Number: 494  
Client Project ID: WHC SAF 94-088 200-UP-1 Groundwater Round 1

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

---

## II. Analytical Results/Methodology (Continued)

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 Hewlett-Packard 5970 GC/MS/DS. A matrix spike and a matrix spike duplicate were analyzed using sample BOBWB5. All 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.

The samples were analyzed for nitrate/nitrite on May 19, 1994. A matrix spike and a matrix spike duplicate were analyzed using sample number BOBWB5. All quality control results were acceptable.

The samples were analyzed for fluoride, chloride, nitrate, nitrite, phosphate and sulfate by EPA method 300.0 on May 29 through June 8, 1994. A matrix spike and a matrix spike duplicate were analyzed using sample BOBWB5. All quality control results were acceptable.

9613495.2643

000003

IT Corporation

June 10, 1994

Job Number: 494

Client Project ID: WHC SAF 94-088 200-UP-1 Groundwater Round 1

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

**III. Quality Control (Continued)**

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

**TABLE I**

| <b>Knoxville ID</b> | <b>Richland ID</b> | <b>WHC ID</b> | <b>Test</b> |
|---------------------|--------------------|---------------|-------------|
| AA8197              | 405079-01A         | BOBWB5        | VOC         |
| AA8198              | 405079-01B         | "             | ANIONS      |
| AA8199              | 405079-01C         | "             | NO2NO3      |
| AA8200              | 405079-02A         | BOBWB6        | VOC         |

9613495\_2644

0000004

IT Corporation  
June 10, 1994  
Job Number: 494

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

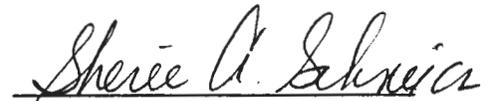
Client Project ID: WHC SAF 94-088 200-UP-1 Groundwater Round 1

---

**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

9613495.2645

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBWB5

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_

Lab Code: ITSTU Case No.: 494 SAS No.: \_\_\_\_\_ SDG No.: W0052

Matrix: (soil/water) WATER Lab Sample ID: AA8197

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: AEF05

Level: (low/med) LOW Date Received: 05/06/94

% Moisture: not dec. \_\_\_\_\_ Date Analyzed: 05/06/94

GC Column: DB-624 ID: 0.250 (mm) Dilution Factor: 1.0

Soil Extract Volume: \_\_\_\_\_ (uL) Soil Aliquot Volume: \_\_\_\_\_ (uL)

| CAS NO.    | COMPOUND                        | CONCENTRATION UNITS:<br>(ug/L or ug/Kg) <u>UG/L</u> | 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  |
| 67-64-1    | -----Acetone                    | 6   | 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                 | 4   | 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       | 95  |    |
| 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            | 11  |    |
| 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  |

9613495.2646

1E  
VOLATILE ORGANICS ANALYSIS DATA SHEET  
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBWB5

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_

Lab Code: ITSTU Case No.: 494 SAS No.: \_\_\_\_\_ SDG No.: W0052

Matrix: (soil/water) WATER Lab Sample ID: AA8197

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: AEF05

Level: (low/med) LOW Date Received: 05/06/94

% Moisture: not dec. \_\_\_\_\_ Date Analyzed: 05/06/94

GC Column: DB-624 ID: 0.250 (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/L

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

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBWB6

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 494 SAS No.: \_\_\_\_\_ SDG No.: W0052  
 Matrix: (soil/water) WATER Lab Sample ID: AA8200  
 Sample wt/vol: 5.0 (g/mL) ML Lab File ID: AEF08  
 Level: (low/med) LOW Date Received: 05/06/94  
 % Moisture: not dec. \_\_\_\_\_ Date Analyzed: 05/06/94  
 GC Column: DB-624 ID: 0.250 (mm) Dilution Factor: 1.0  
 Soil Extract Volume: \_\_\_\_\_ (uL) Soil Aliquot Volume: \_\_\_\_\_ (uL)

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

9613495.2648

0000009

1E  
VOLATILE ORGANICS ANALYSIS DATA SHEET  
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBWB6

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_

Lab Code: ITSTU Case No.: 494 SAS No.: \_\_\_\_\_ SDG No.: W0052

Matrix: (soil/water) WATER Lab Sample ID: AA8200

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: AEF08

Level: (low/med) LOW Date Received: 05/06/94

% Moisture: not dec. \_\_\_\_\_ Date Analyzed: 05/06/94

GC Column: DB-624 ID: 0.250 (mm) Dilution Factor: 1.0

Soil Extract Volume: \_\_\_\_\_ (uL) Soil Aliquot Volume: \_\_\_\_\_ (uL)

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

Number TICs found: 0

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

9613495.2649

## NITRATE/NITRITE ANALYSIS

|                      |                      |                  |          |
|----------------------|----------------------|------------------|----------|
| Laboratory Name:     | ITAS-Knoxville       | SDG Number:      | W0040    |
| Contract Name:       | Westinghouse Hanford | Job Number:      | 494      |
| Sample Matrix:       | Water                | Extraction Date: | N/A      |
| Concentration Units: | mg/l                 | Analysis Date:   | 05/19/94 |

| Client Sample ID | Lab Sample ID | Result | Qualifiers |
|------------------|---------------|--------|------------|
| Method Blank     | P6219         | 0.02   | U          |
| BOBWBS           | AA8199        | 40     | +          |

+ - 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:          | W0052    |
| Contract Name:    | Westinghouse Hanford | Job Number:          | 494      |
| Client Sample ID: | BOBWB5               | Preparation Date:    | 05/29/94 |
| Lab Sample ID:    | AA8198               | Analysis Date:       | 05/29/94 |
| Sample Matrix:    | Water                | Concentration Units: | mg/l     |

| Compound  | Result | Qualifier | Detection Limit |
|-----------|--------|-----------|-----------------|
| fluoride  | 0.40   | +         | 0.40            |
| chloride  | 23     | +         | 4.0             |
| nitrite   | 0.40   | U         | 0.40            |
| nitrate   | 170    | +         | 40              |
| phosphate | 1.0    | U         | 1.0             |
| sulfate   | 67     | +         | 15              |

+ - Positive result.

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

WO#494



Regional Office  
2800 George Washington Way  
Richland, Washington 99352

SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

Date/Time Received 5-4-94 14:05 Client Name WHC

Project/Client # 94-088 Batch or Case # \_\_\_\_\_

Cooler ID (if noted on the outside of cooler) ER-11

1. Condition of shipping container? OK.

2. Custody Seals on cooler intact? Yes  No

3. Custody Seals dated and signed? Yes  No

4. Chain of Custody record is taped on inside of cooler lid? Yes  No

5. Vermiculite/packing material is: Wet  Dry

6. Each sample is in a plastic bag? Yes  No

7. Number of sample containers in cooler: 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 3°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 N/A

12. Have any anomalies been identified above? Yes  No

13. Memos have been initiated for all anomalies identified above? Yes

Printed Name/Signature [Signature] Date/Time 5-4-94 14:05

W0#474

| Westinghouse Hanford Company      |                 | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST  |              |                 |                                |   |        |     |                |  |  | Page <u>1</u> of <u>1</u> |  |  |  |  |  |
|-----------------------------------|-----------------|---|--------------|-----------------|--------------------------------|---|--------|-----|----------------|--|--|---------------------------|--|--|--|--|--|
| Collector                         |                 | Company Contact<br>P. H. Butcher          |              |                 |                                | Telephone No.<br>376-4388               |        |     |                | Data Turnaround<br><input type="checkbox"/> Priority<br><input checked="" type="checkbox"/> Normal |  |                           |  |  |  |  |  |
| Project Designation<br>200-UP-1   |                 | Sampling Location<br>200 W                |              |                 |                                | SAF No.<br>94-088                       |        |     |                |  |  |                           |  |  |  |  |  |
| Ice Chest No. <u>ER-11</u>        |                 | Field Logbook No.                         |              |                 |                                | Method of Shipment                      |        |     |                |  |  |                           |  |  |  |  |  |
| Shipped To<br>IT                  |                 | Offsite Property No. <u>W94-0-0518-31</u> |              |                 |                                | Bill of Lading/Air Bill No. <u>NONE</u> |        |     |                |  |  |                           |  |  |  |  |  |
| Possible Sample Hazards/Remarks   |                 | Preservative                              | HCl          | Nona            | H <sub>2</sub> SO <sub>4</sub> | HNO <sub>3</sub>                        | Nona   | HCl | HCl            | N/A  |  |                           |  |  |  |  |  |
| Ref. 3A LCS 5/3/94 1500           |                 | Type of Container                         | ags          | G               | P                              | P                                       | ags    | P   | ags            | G  |  |                           |  |  |  |  |  |
|                                   |                 | No. of Container(s)                       | 3            | 1               | 1                              | 1                                       | 1      | 1   | 3              | 1  |  |                           |  |  |  |  |  |
| Special Handling and/or Storage   |                 | Volume                                    | 40mL         | 500mL           | 500mL                          | 2L                                      | 40mL   | 1L  | 40mL           | 40mL   |  |                           |  |  |  |  |  |
| SAMPLE ANALYSIS<br><u>405079</u>  |                 | VOA                                       | Anions (IC)  | NO <sub>3</sub> | Total U                        | Activity Scan                           | Tc-99m | VOA | Total Activity |  |  |                           |  |  |  |  |  |
|                                   |                 | A   | B            | C               | 40508001                       |   |        | A   |                |  |  |                           |  |  |  |  |  |
| Sample No.                        | Matrix*         | Date Sampled                              | Time Sampled |                 |                                |   |        |     |                |  |  |                           |  |  |  |  |  |
| B0BW35 01                         | W               | 05/03/94                                  | 1040         | X               | X                              | X                                       | X      | X   | X              |  |  | X                         |  |  |  |  |  |
| B0BW36 02                         | W               | 05/03/94                                  | 1040         |                 |                                |   |        |     |                |  |  | X                         |  |  |  |  |  |
| CHAIN OF POSSESSION               |                 | Sign/Print Names                          |              |                 |                                | SPECIAL INSTRUCTIONS                    |        |     |                |  |  | Matrix*                   |  |  |  |  |  |
| Relinquished By <u>ro lee</u>     | Date/Time       | Received By                               |              | Date/Time       | SOG<br>W0052                   |   |        |     |                |  | <ul style="list-style-type: none"> <li>S = Soil</li> <li>SE = Sediment</li> <li>SO = Solid</li> <li>SL = Sludge</li> <li>W = Water</li> <li>O = Oil</li> <li>A = Air</li> <li>DS = Drum Solids</li> <li>DL = Drum Liquids</li> <li>T = Tissue</li> <li>WI = Wipe</li> <li>L = Liquid</li> <li>V = Vegetation</li> <li>X = Other</li> </ul> |                           |  |  |  |  |  |
| <u>Kutepke</u>                    | 05/3/94 1441    | <u>L. Sweeney</u>                         |              | 5/3/94          |                                |   |        |     |                |  |  |                           |  |  |  |  |  |
| Relinquished By <u>L. Sweeney</u> | 5/4/94          | <u>Karen Acton</u>                        |              | 5/4/94          |                                |   |        |     |                |  |  |                           |  |  |  |  |  |
| Relinquished By                   | Date/Time       | Received By                               |              | Date/Time       |                                |   |        |     |                |  |  |                           |  |  |  |  |  |
| Relinquished By                   | Date/Time       | Received By                               |              | Date/Time       |                                |   |        |     |                |  |  |                           |  |  |  |  |  |
| 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)

0000021

25975412196

9613495.2653

000022

WO#494

|                          |                                      |   |
|--------------------------|--------------------------------------|---|
| Contractor<br><b>WHC</b> | <b>OFF-SITE<br/>PROPERTY CONTROL</b> | CONTROL NUMBER<br>(To be obtained from PROPERTY MANAGEMENT)<br><b>W94-0-0518-31</b> |
|--------------------------|--------------------------------------|---|

PART I - TO BE COMPLETED BY ORIGINATOR

| Department<br><b>ER Eng Support</b>   | Section<br><b>Field &amp; Analytical Supp</b>   | Unit<br><b>ER Field Sampling</b>   |
|---|---|--|
| The following items are to be shipped from  |   | <input checked="" type="checkbox"/> Contractor <input type="checkbox"/> Vendor |
| Routing   |   | <input checked="" type="checkbox"/> Contractor <input type="checkbox"/> Vendor |
| Shipped to<br><b>IT Analytical Services<br/>2800 George Washington Way<br/>Richland, WA 99352</b> |   | Off-site Custodian<br><br>Full Title   |
| Quantity  | Description (Include Serial and any Government Tag Numbers)   | Original Cost  |
| 1<br>lbs.   | Sample #: B0BWB35, B0BWB36<br>Cooler ID: ER-11<br>Polycooler with groundwater samples packed in wet ice and vermiculite         | N/A  |
| 1<br>lbs.   | Sample #: <u>NA</u><br>Cooler ID: <u>NA</u><br><del>Polycooler with groundwater samples packed in wet ice and vermiculite</del> | N/A  |

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

Necessity for the Off-Site Use of this Property

Sampling supports RI/FS work in the JCO AREA

Bill of lading # None

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

|  |   |  |
|--|---|--|
| RM Clearance for Public Release<br><u>Approved, JCO</u>      | RM Survey No.<br><u>107197</u>          | Date<br><u>5-4-94</u>  |
| Location of Property (Area & Bldg.)<br><u>JCO-UP-1</u>       | Contact<br><b>P. H. Butcher</b>         | Phone<br><b>(509) 376-4388</b>                               |
| Date Ready for Shipment<br><u>5-4-94</u>                     | Cost Code to be Charged<br><b>88410</b> | Approximate Date This Property will be Returned<br><u>NA</u> |
| Originated By<br><u>P.H. Butcher</u>                         | Date<br><u>5/4/94</u>                   | Authorized By<br><u>[Signature]</u>                          |
| Signature and Name of Property Control<br><u>[Signature]</u> | Custodian Date<br><u>[Signature]</u>    | Property Management Approval<br><u>[Signature]</u>           |
|  |   | Date<br><u>5/4/94</u>  |

PART II - TO BE COMPLETED BY SHIPPING

|  |                  |             |                    |             |
|--|------------------|-------------|--------------------|-------------|
| Signature of Recipient<br><u>[Signature]</u> | Return Order No. | Date Issued | Purchase Order No. | Date Issued |
| Date<br><u>5-4-94</u>                        |                  |             |                    |             |

DISTRIBUTION

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



INTERNATIONAL  
TECHNOLOGY  
CORPORATION



**ANALYSIS REQUEST AND  
CHAIN OF CUSTODY RECORD\***

WO #494  
RL #619

Reference Document No. 453627

Page 1 of 1

Project Name/No. 1 SAP 94-088

Samples Shipment Date 7 5-5-94

Bill to: 5 IT

Sample Team Members 2 \_\_\_\_\_

Lab Destination 8 Middlebrook

Richard

Profit Center No. 3 4632

Lab Contact 9 \_\_\_\_\_

Project Manager 4 Van Petter

Project Contact/Phone 12 \_\_\_\_\_

Report to: 10 IT

Purchase Order No. 6 \_\_\_\_\_

Carrier/Waybill No. 13 151 2116 846

Richard

Required Report Date 11 \_\_\_\_\_

**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 |
|----------------------|----------------------------|------------------------|-------------------|------------------|------------------|------------------------------|--|------------------------|
| 40507901A            | BOBWBS /water              | 5/3 1040               | ab-s              | 40ml             | COOL 40          | VOA                          | 2°C KAK 5/6/94                             |                        |
| ↓ B                  | ↓                          | ↓                      | G                 | 500ml            | ↓                | ANIONS NO3                   | FOR LAB USE ONLY<br>pH = 7.2<br>KAK 5/6/94 |                        |
| ↓ C                  | ↓                          | ↓                      | P                 | ↓                | ↓                | NO3                          |  |                        |
| 40507902A            | BOBWBS /water              | ↓                      | ab-s              | 40ml             | ↓                | VOA                          |  |                        |
| <del>JH 5/5/94</del> |                            |                        |                   |                  |                  |                              |  | 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-W0052

|   |   |   |   |
|---|---|---|---|
| 1. Relinquished by 18<br>(Signature/Affiliation) <u>Heidelberg IT</u> | Date: <u>5-5-94</u><br>Time: <u>16:00</u> | 1. Received by 28<br>(Signature/Affiliation) <u>Kenny A. Lemm ITAS-KN</u> | Date: <u>05-06-94</u><br>Time: <u>09105</u> |
| 2. Relinquished by<br>(Signature/Affiliation)                         | Date:<br>Time:                            | 2. Received by<br>(Signature/Affiliation)                                 | Date:<br>Time:                              |
| 3. Relinquished by<br>(Signature/Affiliation)                         | Date:<br>Time:                            | 3. Received by<br>(Signature/Affiliation)                                 | Date:<br>Time:                              |

Comments: 29 \_\_\_\_\_

White: To accompany samples

Yellow: Field copy

\* See back of form for special instructions.

0000023

4597.5412195.2654

00000024

W0#494

TENNELEC #1

SCREENING CALCULATION SPREADSHEET

| Customer Code | Received Date | Time | Screening Date | Prep Time | Count Date | Mnts. Cntd | BACKGROUND |      |      |
|---------------|---------------|------|----------------|-----------|------------|------------|------------|------|------|
| WHC           |               |      | 50494          |           | 504        | 10         | Alpha      | Beta | Mnts |
|               |               |      |                |           |            |            | 16         | 231  | 240  |

all Cat I  
 Mail Lady 5-4-94

| Customer ID | pH <2 | RESIDUE Wght (mGrms) | Vol. Anal. mG | Sample Size Gm | SMPL CNT DATA |             |             | Net Sample          |       | DPM / Aliquot |         | uCi per Sample |         | 2 Sigma Error |         | pCi/(Gm or L) |         | Category 1 Yes/No | Aliquot to Cat 1 Gm or Ltr |         |
|-------------|-------|----------------------|---------------|----------------|---------------|-------------|-------------|---------------------|-------|---------------|---------|----------------|---------|---------------|---------|---------------|---------|-------------------|----------------------------|---------|
|             |       |                      |               |                | Hldr Num.     | Total Alpha | Counts Beta | Counts/Minute Alpha | Beta  | Alpha         | Beta    | Alpha          | Beta    | Alpha         | Beta    | Alpha         | Beta    |                   | Alpha                      | Beta    |
| BOBRL1      |       | 0.0                  | 5             | 4.0            | 4             | 2           | 11          | 0.13                | 0.14  | 5.1E-01       | 2.1E-01 | 1.8E-04        | 7.4E-05 | 3.4E-07       | 1.9E-07 | 4.6E+01       | 1.9E+01 | Yes               | 2.2E+02                    | 5.4E+03 |
| BOBWBS      |       | 2.2                  | 5             | 2.0            | 5             | 4           | 42          | 0.33                | 3.24  | 1.2E+00       | 6.7E+00 | 2.2E-04        | 1.2E-03 | 2.8E-07       | 4.7E-07 | 1.1E+02       | 6.0E+02 | Yes               | 9.0E+01                    | 1.7E+02 |
| TOTAL       | uCi   |                      |               |                |               |             |             | -0.07               | -0.96 | -2E-01        | -2E+00  | 4.1E-04        | 1.3E-03 | ERR           | ERR     | ERR           | ERR     | Yes               | ERR                        | ERR     |

96395.265

9613495.2656

0000025

05/04/94 07:52 373 3178

222S 3B

W0#494

009

SAMPLE STATUS REPORT FOR E 7126. E-BLANK 299W1935 TIME: 5/ 4/94 8:35  
 DISPATCHED: 5/ 2/94 8:30 SAMPLE HAS NOT BEEN SLURPED  
 RECEIVED: 5/ 3/94 14:50

| 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 BWBS  
BO BWBG

les  
5/4/94



Westinghouse  
Hanford Company

P.O. Box 1970 Richland, WA 99352

June 24, 1994

9454473

Mr. Donald Smith  
Los Alamos Technical Associates  
8633 West Gage Boulevard  
Kennewick, Washington 99336

Dear Mr. Smith:

INTERIM GUIDANCE FOR THE VALIDATION OF MERCURY AND TOTAL ORGANIC HALIDE ANALYSES

- References:
- (1) Purchase Order MPV-SWV-243789, Data Validation Services.
  - (2) WHC-SD-EN-SPP-002, Data Validation Procedures for Chemical Analyses, Revision 2, dated October 21, 1993.
  - (3) WHC-CM-5-3, Data Validation for RCRA Analyses, Section 2.0, Revision 0, dated August 27, 1990.
  - (4) Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, Third Edition, U.S. Environmental Protection Agency, Washington, D.C., 1986.
  - (5) Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, Third Edition, Final Update I, U.S. Environmental Protection Agency, Washington, D.C., 1992.

"The following data and/or information are provided pursuant to the provisions of the referenced Purchase Order and nothing contained herein shall be deemed to change the terms of the referenced Purchase Order between the Buyer and Seller."

Westinghouse Hanford Company (WHC) provides the following interim guidance to Los Alamos Technical Associates for the validation of Mercury and Total Organic Halide (TOX) analyses. The holding time criteria provided in References 2 and 3 for Mercury and TOX analyses are based on Reference 4. Holding time criteria for validation should be based on Reference 5 which is the current and approved version of SW-846. This interim guidance only affects Mercury and TOX analyses results from aqueous samples as the holding time criteria for other sample matrices have not been revised. The following are guidelines for the qualification of Mercury analyses of aqueous samples based on holding times:

Mr. Donald Smith  
 Page 2  
 June 24, 1994

9454473

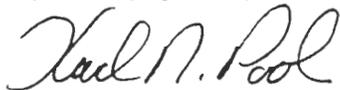
| <u>Holding Time</u>     | <u>Container Type</u> | <u>Qualification</u>          |
|-------------------------|-----------------------|-------------------------------|
| ≤ 38 days               | Glass                 | No qualifier                  |
| ≤ 13 days               | Plastic               | No qualifier                  |
| > 38 days and ≤ 76 days | Glass                 | J (detects)/ UJ (non-detects) |
| > 13 days and ≤ 26 days | Plastic               | J (detects)/ UJ (non-detects) |
| > 76 days               | Glass                 | J (detects)/ UR (non-detects) |
| > 26 days               | Plastic               | J (detects)/ UR (non-detects) |

The holding time for TOX analyses of aqueous samples is 28 days. If the holding time is exceeded but not by greater than 56 days, qualify all associated sample results as estimated (J for detects, UJ for non-detects). If the holding time is exceeded by greater than 56 days, qualify all associated sample results as estimated for detected results (J) and unusable for non-detects (UR).

WHC guidance provided in this letter is applicable for the validation of all projects. Validation procedures are currently being revised to incorporate the holding times and qualification criteria, listed above.

Should you have any questions on this guidance, please contact Ms. C. J. Simiele on (509) 373-0066 or myself on (509) 372-2557.

Very truly yours,



K. N. Pool, Manager  
 Technical and Quality Oversight  
 Analytical Services

glb

RL - D. M. Wanek

USACE - J. W. Day

Dames & Moore - M. M. Ran

9615495.2659

**LATA** Los Alamos Technical Associates, Inc.

8633 Gage Blvd. / Kennewick, WA 99336 / Telephone (509) 783-4369 / FAX (509) 783-9661

September 7, 1994

Jeanette Duncan  
CH2M Hill  
450 Hills  
Richland, WA 99352



Dear Jeanette,

Attached is the data validation report for analytical results for 200-UP-1 Groundwater Operable Unit (SDG W0052-ITC-054). The package was received by Los Alamos Technical Associates on July 18, 1994. Validation of this package began on July 26, and was completed on September 7.

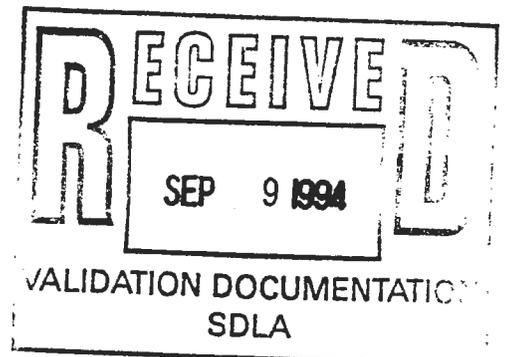
If you have any questions, please let me know.

Sincerely,

A handwritten signature in cursive script, appearing to read "Janet M. Jones".

Janet M. Jones  
Senior Environmental Engineer

cc: Chris Haecker, LATA  
Joan Kessner, BECHTEL-Hanford  
VW402.26 file



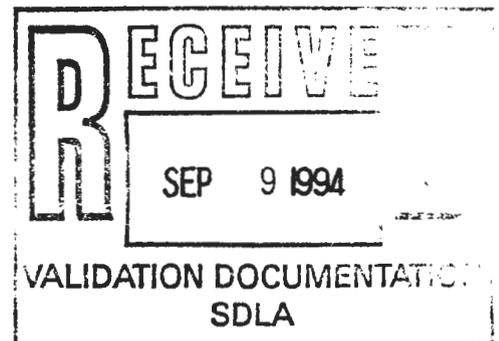
9613495.2660



**DATA VALIDATION REPORT**  
for  
**200-UP-1 Groundwater Operable Unit**  
**SDG W0052-ITC-054**  
**LATA VW402.26**

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

September 7, 1994



000000

**Table of Contents**

|  |    |
|--|----|
| Data Validation Narrative .....          | 2  |
| INTRODUCTION .....                       | 2  |
| ANALYSES REQUESTED .....                 | 2  |
| DATA QUALITY OBJECTIVES .....            | 2  |
| MAJOR DEFICIENCIES (REJECTED DATA) ..... | 3  |
| MINOR DEFICIENCIES .....                 | 3  |
| REFERENCES .....                         | 5  |
| DATA VALIDATION APPLIED QUALIFIERS ..... | 6  |
| LABORATORY APPLIED QUALIFIERS .....      | 7  |
| Data Qualification Summary .....         | 9  |
| Data Summary Tables .....                | 11 |
| Sample Results .....                     | 15 |
| Checklist .....                          | 23 |
| Laboratory Case Narratives .....         | 72 |
| Chain-of-Custody Information .....       | 80 |
| VEDD Printout .....                      | 87 |

200-UP-1 Groundwater Operable Unit  
Data Validation Narrative

## INTRODUCTION

All samples in Sample Delivery Group (SDG) W0052-ITC-054 were validated at level "D" as defined in the Data Validation Procedures for Chemical Analysis (WHC-SD-EN-SPP-002) and/or Data Validation Procedures for Radiochemical Analyses (WHC-SD-EN-SPP-001).

The data package was received by Los Alamos Technical Associates (LATA) on July 18, 1994. Validation began on July 26, 1994 and was completed on September 7, 1994.

The chemical and radiochemical analyses were performed by ITC.

## ANALYSES REQUESTED

Two (2) water samples numbered BOBWB5 and BOBWB6 were collected on May 3, 1994 by WHC and transferred to ITC for analysis. The following determinations were conducted on all of the samples in this SDG:

Volatile Organics

Method EPA CLP

A subset of the SDG which includes one (1) water sample numbered BOBWB5 was analyzed for the following:

Anions (F, CL, NO<sub>2</sub>, NO<sub>3</sub>, PO<sub>4</sub>, & SO<sub>4</sub>) Method 300.0

Nitrate+Nitrite

Method 353.2

Technetium-99

Method ITAS-IT-RS-0001

Total Uranium

Method ITAS-RD-4200

## DATA QUALITY OBJECTIVES

The data quality objectives for 200-UP-1 Groundwater Operable Unit are specified in the *Remedial Investigation/Feasibility Study Work Plan for the 200-UP-1, Groundwater Operable Unit* (DOE-RL-92-76 Rev. 0) The primary objective of the data validation effort was to ensure these data quality objectives were met, and that the data are usable and defensible. This was accomplished through a detailed examination of the data package to recreate the analytical process and verify that proper and acceptable analytical techniques had been applied.

The data package was checked for correct submission of required deliverables, correct transcription of raw data to the summary forms, and for proper calculation of a number of parameters.

**DATA QUALITY OBJECTIVES (cont.)**

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

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

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

**Detection Limits.** Detection limit goals were met for all sample results as specified in the work plan (DOE/RL-92-76, 1994).

**Completeness.** The data package was complete for all requested analyses.

Data qualifiers are assigned to any results that have been determined to be deficient. These are discussed below.

**MAJOR DEFICIENCIES (REJECTED DATA)**

The following major deficiencies resulted in the qualification of the results as unusable.

- The holding time for nitrite and phosphate was exceeded by greater than two times, and the results were non-detect. Therefore, the non-detects for nitrate and phosphate were qualified as unusable (UR).

**MINOR DEFICIENCIES**

The following minor deficiencies were discovered. These minor shortcomings are not expected to significantly affect the overall quality of the data.

**VOLATILES**

- Small amounts of acetone were detected in the associated blank. Therefore, both samples, BOBWB5 and BOBWB6, were qualified as non-detects (U) for acetone.

**MINOR DEFICIENCIES (cont.)**GENERAL CHEMISTRY

- The holding time for nitrate was exceeded by greater than two times and the results were positive. Therefore, the nitrate result was qualified as estimated (J).

RADIOCHEMISTRY

- The U-total spike value was entered as the blank value on the Form 1. The Form 1 was edited.
- The U-total blank was greater than the MDA but less than the RDL. The sample activity was greater than five times the blank. No qualifier was necessary.
- The U-total matrix spike was outside the spike limits. No qualifier was assigned because the sample activity was >4 times the spike level.
- BOBWB5 is a split sample with Ecoloty (H93062). Comparison of RPD values is not possible.

**REFERENCES**

EPA July 1992, *Test Methods for Evaluating Solid Waste (SW-846)*, Third Edition; U.S. Environmental Protection Agency, Washington, D.C.

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

WHC 1993, *Data Validation Procedures for Radiochemical Analyses*, WHC-SD-EN-SPP-001, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

DOE 1994, *Remedial Investigation/Feasibility Study Work Plan for the 200-UP-1 Groundwater Operable Unit*, DOE/RL-92-76, Rev. 0, Department of Energy, Hanford Site, Richland, Washington.

**DATA VALIDATION APPLIED QUALIFIERS**

Qualifiers which may be applied by data validators in compliance with the procedures herein are as follows.

- U- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ- Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during data validation, the associated quantitation limit is an estimate.
- J- Indicates the compound or analyte was analyzed for and detected. The associated concentration is an estimate, but the data are usable for decision making purposes.
- BJ- Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.
- R- Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency the data are unusable.
- UR- Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data are unusable due to an identified QC deficiency.
- JN- Indicates a tentatively identified compound (TIC) that has been determined to be valid in terms of identification and quantitation.
- UJN- Indicates a tentatively identified compound (TIC) that has been determined to be presumptive and valid (JN) in terms of identification and quantitation and has been qualified as undetected (U) due to associated blank contamination.
- NJ- Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific application (i.e., usable for decision making purposes).
- N- Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision making purposes).

**LABORATORY APPLIED QUALIFIERS**

Qualifiers which may be applied by the laboratory in compliance with applicable requirements are as follows.

**Organic Data Qualifiers**

- U- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- J- Indicates an estimated value. This flag is used when estimating concentrations of tentatively identified compounds (TICs) or when the presence of a TCL compound is confirmed at a concentration of less than the CRQL but greater than the IDL.
- N- Indicates presumptive evidence of a compound. This flag is used only by the laboratory for TIC results when the identification is based on a mass spectral library search.
- P- This flag is used for pesticide/Aroclor target analytes when there is greater than 25% difference for detected values between the quantitation and confirmation GC columns. The lower of the two concentrations is reported on the report form and the result is flagged with a "P".
- C- This flag applies to pesticide results where the identification has been confirmed by GC/MS. This flag should not be used by the laboratory if GC/MS confirmation was attempted but unsuccessful, in which case, the laboratory should use an "X" flag as defined below. The "X" flag is then defined in the SDG narrative.
- B- This flag applies to results in which the analyte was detected in both the sample and the associated blank. The combination of the "B" flag with the "U" flag ("BU" or "UB") is expressly prohibited in the analytical SOW.
- E- This flag identifies compounds whose concentrations exceed the calibrated range of the GC/MS instrument.
- D- This flag identifies compounds identified in an analysis at a secondary dilution factor.
- A- Indicates a TIC which is a suspected aldol-condensate product.
- X- This is a non-specific flag used to properly define the results. If used, this flag must be properly defined within the body of the SDG.

**LABORATORY APPLIED QUALIFIERS****Inorganic Qualifiers**

- U- Indicates the analyte was analyzed for but not detected in the sample.
- B- Indicates the analyte concentration is less than the CRDL but greater than the IDL.
- E- Indicates the value reported is estimated due to the presence of interference.
- M- Indicates duplicate injection precision criteria were not met during graphite furnace (GFAA) analysis.
- N- Indicates spiked sample recovery was not within the control limits.
- S- Indicates the reported value was determined by the Method of Standard Additions (MSA).
- W- Indicates post-digestion spike for GFAA analysis is outside control limits and the sample absorbance is less than 50% of the spike absorbance.
- \*- Indicates duplicate analysis was not within control limits.
- + - Indicates the correlation coefficient (r) for the MSA was less than 0.995.

9613495.2669

## Data Qualification Summary

000009

| W0052-ITC-054                          |           |                  |  |
|--|-----------|------------------|--|
| Compound/Analyte                       | Qualifier | Samples Affected | Reasons  |
| Acetone                                | 10U       | BOBWB5 BOBWB6    | Analyte detected in blanks associated with samples containing levels less than the CRQL and less than 10 times the blank result. Result adjusted upward to CRQL. |
| NO <sub>2</sub> , PO <sub>4</sub> (IC) | UR        | BOBWB5           | Holding time was exceeded by >2 times and results were non-detects.  |
| NO <sub>3</sub> (IC)                   | J         | BOBWB5           | Holding time was exceeded by >2 times.   |
|  |           |                  |  |

entered by:

*AF*

checked by:

*PM*

000010

9613495.2671

## **Data Summary Tables**

**000011**

9618495.2672

## VOLATILE ORGANICS DATA SUMMARY TABLE

| FILE #:VW402.26            |            | HEIS #: | BOBWB5   |   | BOBWB6   |   |
|----------------------------|------------|---------|----------|---|----------|---|
|                            |            | Date:   | 3-May-94 |   | 3-May-94 |   |
|                            |            | Matrix: | WATER    |   | WATER    |   |
| Constituent                | CAS #      | Units   | Results  | Q | Results  | Q |
| Chloromethane              | 74-87-3    | µg/L    | 10       | U | 10       | U |
| Bromomethane               | 74-83-9    | µg/L    | 10       | U | 10       | U |
| Vinyl Chloride             | 75-01-4    | µg/L    | 10       | U | 10       | U |
| Chloroethane               | 75-00-3    | µg/L    | 10       | U | 10       | U |
| Methylene Chloride         | 75-09-2    | µg/L    | 10       | U | 4        | J |
| Acetone                    | 67-64-1    | µg/L    | 10       | U | 10       | U |
| Carbon Disulfide           | 75-15-0    | µg/L    | 10       | U | 10       | U |
| 1,1-Dichloroethene         | 75-35-4    | µg/L    | 10       | U | 10       | U |
| 1,1-Dichloroethane         | 75-34-3    | µg/L    | 10       | U | 10       | U |
| 1,2-Dichloroethene (total) | 540-59-0   | µg/L    | 10       | U | 10       | U |
| Chloroform                 | 67-66-3    | µg/L    | 4        | J | 10       | U |
| 1,2-Dichloroethane         | 107-06-2   | µg/L    | 10       | U | 10       | U |
| 2-Butanone                 | 78-93-3    | µg/L    | 10       | U | 10       | U |
| 1,1,1-Trichloroethane      | 71-55-6    | µg/L    | 10       | U | 10       | U |
| Carbon Tetrachloride       | 56-23-5    | µg/L    | 95       |   | 10       | U |
| Bromodichloromethane       | 75-27-4    | µg/L    | 10       | U | 10       | U |
| 1,2-Dichloropropane        | 78-87-5    | µg/L    | 10       | U | 10       | U |
| cis-1,3-Dichloropropene    | 10061-01-5 | µg/L    | 10       | U | 10       | U |
| Trichloroethene            | 79-01-6    | µg/L    | 11       |   | 10       | U |
| Dibromochloromethane       | 124-48-1   | µg/L    | 10       | U | 10       | U |
| 1,1,2-Trichloroethane      | 79-00-5    | µg/L    | 10       | U | 10       | U |
| Benzene                    | 71-43-2    | µg/L    | 10       | U | 10       | U |
| trans-1,3-Dichloropropene  | 10061-02-6 | µg/L    | 10       | U | 10       | U |
| 2-Chloroethyl Vinyl Ether  | 110-75-8   | µg/L    | 10       | U | 10       | U |
| Bromoform                  | 75-25-2    | µg/L    | 10       | U | 10       | U |
| 4-Methyl-2-pentanone       | 108-10-1   | µg/L    | 10       | U | 10       | U |
| 2-Hexanone                 | 591-78-6   | µg/L    | 10       | U | 10       | U |
| Tetrachloroethene          | 127-18-4   | µg/L    | 10       | U | 10       | U |
| 1,1,2,2-Tetrachloroethane  | 79-34-5    | µg/L    | 10       | U | 10       | U |
| Toluene                    | 108-88-3   | µg/L    | 10       | U | 10       | U |
| Chlorobenzene              | 108-90-7   | µg/L    | 10       | U | 10       | U |
| Ethylbenzene               | 100-41-4   | µg/L    | 10       | U | 10       | U |
| Styrene                    | 100-42-5   | µg/L    | 10       | U | 10       | U |
| Xylene (Total)             | 1330-20-7  | µg/L    | 10       | U | 10       | U |

entered by: *CMP*  
date: *9/7/94*

shaded areas show changes  
by validator  
ITC054.XLS

checked by: *Qm*  
date: *9/7/94*

000012

9610495.2673

**GENERAL CHEMISTRY DATA SUMMARY TABLE**

| FILE# VW 402.26 |            | HEIS #: | BOBWB5   |    |
|-----------------|------------|---------|----------|----|
|                 |            | Date:   | 3-May-94 |    |
|                 |            | Matrix: | WATER    |    |
| Constituent     | CAS #      | Units   | Results  | Q  |
| Fluoride        | 16984-48-8 | mg/L    | 0.4      |    |
| Chloride        | 16884-00-6 | mg/L    | 23       |    |
| Nitrite         | 14797-65-0 | mg/L    | 0.4      | UR |
| Nitrate         | 14797-55-8 | mg/L    | 170      |    |
| Nitrite+Nitrate |            | mg/L    | 40       |    |
| Phosphate       | 14265-44-2 | mg/L    | 1        | UR |
| Sulfate         | 14808-79-8 | mg/L    | 67       |    |

entered by: *AF*  
 date: *9/26/94*

Shaded areas indicate changes by the validator.

checked by: *gpm*  
 date: *9/26/94*  
*000013*

9613195\_2674

**RADIOCHEMISTRY DATA SUMMARY TABLE**

| FILE #:VW402.26 |            | HEIS #: | BOBWB5   |   |       |
|-----------------|------------|---------|----------|---|-------|
|                 |            | Date:   | 3-May-94 |   |       |
|                 |            | Matrix: | WATER    |   |       |
| Constituent     | CAS #      | Units   | Results  | Q | MDA   |
| Technetium-99   | 14133-76-7 | ug/L    | 516.00   |   | 2.15  |
| Uranium         | 7440-61-1  | ug/L    | 64.30    |   | 0.004 |

*pw*  
*9-1-94*

Shaded areas indicate  
changes by the validator  
ITC 054

entered by: *C.S.*  
date: *08/29/94*

checked by: *MJF*  
date: *9/7/94*  
**000014**

9613495.2675

**Sample Results (Form I's)**

**000015**

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBWB5

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 494 SAS No.: \_\_\_\_\_ SDG No.: W0052  
 Matrix: (soil/water) WATER Lab Sample ID: AA8197  
 Sample wt/vol: 5.0 (g/mL) ML Lab File ID: AEF05  
 Level: (low/med) LOW Date Received: 05/06/94  
 % Moisture: not dec. \_\_\_\_\_ Date Analyzed: 05/06/94  
 GC Column: DB-624 ID: 0.250 (mm) Dilution Factor: 1.0  
 Soil Extract Volume: \_\_\_\_\_ (uL) Soil Aliquot Volume: \_\_\_\_\_ (uL)

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L 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 |
| 67-64-1    | Acetone                    | 10 | U |
| 75-15-0    | Carbon Disulfide           | 10 | U |
| 75-35-4    | 1,1-Dichloroethene         | 10 | U |
| 75-34-3    | 1,1-Dichloroethane         | 10 | U |
| 540-59-0   | 1,2-Dichloroethene (total) | 10 | U |
| 67-66-3    | Chloroform                 | 4  | 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       | 95 | 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            | 11 | 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 |

9613495.2677

0000045

1E  
VOLATILE ORGANICS ANALYSIS DATA SHEET  
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBWB5

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_

Lab Code: ITSTU Case No.: 494 SAS No.: \_\_\_\_\_ SDG No.: W0052

Matrix: (soil/water) WATER Lab Sample ID: AA8197

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: AEF05

Level: (low/med) LOW Date Received: 05/06/94

% Moisture: not dec. \_\_\_\_\_ Date Analyzed: 05/06/94

GC Column: DB-624 ID: 0.250 (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/L

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

8-18-94 (WJC)

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBWB6

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_  
 Lab Code: ITSTU Case No.: 494 SAS No.: \_\_\_\_\_ SDG No.: W0052  
 Matrix: (soil/water) WATER Lab Sample ID: AA8200  
 Sample wt/vol: 5.0 (g/mL) ML Lab File ID: AEF08  
 Level: (low/med) LOW Date Received: 05/06/94  
 % Moisture: not dec. \_\_\_\_\_ Date Analyzed: 05/06/94  
 GC Column: DB-624 ID: 0.250 (mm) Dilution Factor: 1.0  
 Soil Extract Volume: \_\_\_\_\_ (uL) Soil Aliquot Volume: \_\_\_\_\_ (uL)

| CAS NO.    | COMPOUND                        | CONCENTRATION UNITS:<br>(ug/L or ug/Kg) UG/L | 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         | 4  | J  |
| 67-64-1    | -----Acetone                    | 10   | BU |
| 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  |

8-18-94 WJC

1E  
VOLATILE ORGANICS ANALYSIS DATA SHEET  
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBWB6

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_

Lab Code: ITSTU Case No.: 494 SAS No.: \_\_\_\_\_ SDG No.: W0052

Matrix: (soil/water) WATER Lab Sample ID: AA8200

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: AEF08

Level: (low/med) LOW Date Received: 05/06/94

% Moisture: not dec. \_\_\_\_\_ Date Analyzed: 05/06/94

GC Column: DB-624 ID: 0.250 (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/L

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

## ANION ANALYSIS

|                   |                      |                      |          |
|-------------------|----------------------|----------------------|----------|
| Laboratory Name:  | ITAS-Knoxville       | SDG Number:          | W0052    |
| Contract Name:    | Westinghouse Hanford | Job Number:          | 494      |
| Client Sample ID: | BOBWB5               | Preparation Date:    | 05/29/94 |
| Lab Sample ID:    | AA8198               | Analysis Date:       | 05/29/94 |
| Sample Matrix:    | Water                | Concentration Units: | mg/l     |

| Compound  | Result | Qualifier      | Detection Limit |
|-----------|--------|----------------|-----------------|
| fluoride  | 0.40   | +              | 0.40            |
| chloride  | 23     | +              | 4.0             |
| nitrite   | 0.40   | <del>+</del> U | 0.40            |
| nitrate   | 170    | <del>+</del> J | 40              |
| phosphate | 1.0    | <del>+</del> U | 1.0             |
| sulfate   | 67     | +              | 15              |

*mu*  
July 28, 1994

+ - 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:      | W0040    |
| Contract Name:       | Westinghouse Hanford | Job Number:      | 494      |
| Sample Matrix:       | Water                | Extraction Date: | N/A      |
| Concentration Units: | mg/l                 | Analysis Date:   | 05/19/94 |

| Client Sample ID | Lab Sample ID | Result | Qualifiers |
|------------------|---------------|--------|------------|
| Method Blank     | P6219         | 0.02   | U          |
| BOBWB5           | AA8199        | 40     | +          |

*mu*  
7-28-94

+ - Positive result.

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

9613495.2682

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

SAMPLE RESULTS

LAB NAME: ITAS-RICHLAND      SDG NO.: W0052  
LAB SAMPLE ID: 40508001      MATRIX: WATER  
WHC ID: BOBWB5      DATE RECEIVED 5/4/94  
REPORTING UNITS: pCi/L & ug/L

| ISOTOPE | RESULT   | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA      | YIELD | METHOD NUMBER   |
|---------|----------|---------------------|------------------|----------|-------|-----------------|
| TC-99   | 5.16E+02 | 4.18E+00            | 5.91E+01         | 2.15E+00 | 0.951 | ITAS-IT-RS-0001 |
| URANIUM | 6.43E+01 | N/A                 | 9.64E+00         | 3.54E-03 | 1     | RD4200          |

J

NO QUALIFIER  
MAY 5-1-94

MW  
8-13-94

Jan 9/17/94  
0006  
000022  
682A-6-93

9613495.2683

## Checklists

000023

LATA GC/MS DATA VALIDATION CHECKLIST

|  |            |           |                    |               |   |
|--|------------|-----------|--------------------|---------------|---|
| VALIDATION LEVEL:  | A          | B         | C                  | <b>D</b>      | E |
| PROJECT:   | 200-UP-1   |           | SDG: W0052-ITC-054 |               |   |
| VALIDATOR:   | COWAN      | LATA NO.: | WW407.26           | DATE: 8-18-94 |   |
| SAF NO.:   | SAF-94-088 | LAB:      | IT Corporation     | CASE:         |   |
| QAPP REFERENCE:  |            |           | SAP REFERENCE:     |               |   |
| If there is no QAPP or SAP reference, contact the WHC Technical Representative.<br>If the document(s) are not provided, default to the Method acceptance criteria. |            |           |                    |               |   |

ANALYSES PERFORMED

|   |  |  |   |  |  |
|---|--|--|---|--|--|
| <input checked="" type="checkbox"/> CLP <i>TCL</i><br>Volatiles <i>3/90 JOW</i> | <input type="checkbox"/> SW-846 8240<br>(cap column) | <input type="checkbox"/> SW-846 8260<br>(pac column) | <input type="checkbox"/> CLP<br>Semivolatiles | <input type="checkbox"/> SW-846 8270<br>(cap column) | <input type="checkbox"/> SW-846 8270<br>(pac column) |
| <input type="checkbox"/>  | <input type="checkbox"/>                             | <input type="checkbox"/>                             | <input type="checkbox"/>                      | <input type="checkbox"/>                             | <input type="checkbox"/>                             |

SAMPLES/MATRIX

There are two water samples: BOBW35 and BOBW36.

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 (see HOLDING TIME SUMMARY form)

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

Comments: *Both samples were preserved with HCl and analysed within their fourteen day holding time.*

Reviewed by *Jones* 9-7-94

qpm 9/7/94  
Page 1 of 1

## LATA GC/MS DATA VALIDATION CHECKLIST

## 3. INSTRUMENT TUNING AND CALIBRATION (see CALIBRATION DATA SUMMARY form)

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

★ VOA: Verify the calculation of the mass abundance percentages for the 95/96, 176/177 and 174/176 ratios. *Acceptable ✓ Raw data matches data presented in tables.*

★ SVOA: Verify the calculation of the mass abundance percentages for the 199/198 and 443/442 ratios.

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

★ Verify the RRF and %RSD values and recalculate the individual and average RRF values and RSD values for two TCL compounds for Volatiles (V) and Semivolatiles (S).

★ Relative Response Factor

$$RRF = \frac{A_x C_{is}}{A_{is} C_x}$$

where:

$A_x$  (V/S) = area of the characteristic ion measured for the sample

$A_{is}$  (V/S) = area of the characteristic ion measured for the internal standard

$C_x$  (V/S) = concentration [(VOA ng) (SVOA ng/μL)] of the compound of interest

$C_{is}$  (V/S) = concentration [(VOA ng) (SVOA ng/μL)] of the associated internal standard

★ Relative Standard Deviation

$$\%RSD = \frac{STDEV}{MEAN} \times 100$$

where:

MEAN = mean of the initial five relative response factors

STDEV = standard deviation of the initial five RRFs per compound

$$= \sqrt{\sum_{i=1}^n \frac{(RRF_i - RRF)^2}{n-1}}$$

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

★ Verify that the RRF and %D values are within the required limits and recalculate the individual RRF and %D values for at least two TCL compounds for Volatiles (V) and Semivolatiles (S).

★ Percent Difference

$$\%D = \frac{(RRF_i - RRF_s)}{RRF_i} \times 100$$

where:

$RRF_i$  (V/S) = initial calibration average relative response factor

$RRF_s$  (V/S) = continuing calibration average relative response factor

Comments: \_\_\_\_\_

LATA GC/MS DATA VALIDATION CHECKLIST

4. BLANKS (see BLANK AND SAMPLE DATA SUMMARY form)

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

Are laboratory blank results acceptable? ..... Yes No N/A

Comments: Low Acetone contamination found in blank.

5. ACCURACY (see ACCURACY DATA SUMMARY form)

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

Are all surrogate/System Monitoring Compound recoveries acceptable? ..... Yes No N/A

★

Surrogate Recovery

%R = (Qd / Qa) x 100

where:

Qd (V/S) = quantity of surrogate determined (analysis result)

Qa (V/S) = quantity of surrogate added (true value)

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

Are all MS/MSD recoveries acceptable? ..... Yes No N/A

★

Spike Recovery

MS%R = (MS - OS) / SA x 100 or MSD%R = (MSD - OS) / SA x 100

where:

MS/MSD (V/S) = spiked sample result

OS (V/S) = sample result

SA (V/S) = spike added

Comments:

Blank lines for additional comments.

LATA GC/MS DATA VALIDATION CHECKLIST

6. PRECISION (see PRECISION DATA SUMMARY form)

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

★

Relative Percent Difference

RPD = (|MS - MSD| / ((MS + MSD) / 2)) x 100

where = MS = MS recovery MSD = MSD recovery

Comments: \_\_\_\_\_

7. FIELD QC SAMPLES

Were field QC samples (field/trip blanks, duplicates, splits, performance audit) identified? (Yes) No N/A

Are field/trip blank results 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)

Are performance audit sample results acceptable? ..... Yes No (N/A)

Comments: \_\_\_\_\_

BOBWB5 is a split with Ecology (H93062)

BOBWB6 is a trip blank

Validation done on both samples

8. 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: \_\_\_\_\_

## LATA GC/MS DATA VALIDATION CHECKLIST

## 9. COMPOUND IDENTIFICATION AND QUANTITATION

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

★

Results Calculations for VOA water (WW) samples

$$\text{Concentration } (\mu\text{g/L}) = \frac{(A_x\text{WW}) (I_s\text{WW}) (D_f\text{WW})}{(A_s\text{WW}) (\text{RRFW}) (V_o\text{WW})}$$

where:

- $A_x\text{WW}$  = area of the quantitation ion (EICP) for the compound of interest  
 $A_s\text{WW}$  = area of the quantitation ion (EICP) for the specified internal standard  
 $I_s\text{WW}$  = amount of internal standard added (ng)  
 RRFW = relative response factor (ambient temperature purge of the calibration standard)  
 $V_o\text{WW}$  = volume of water purged (ml)  
 $D_f\text{WW}$  = dilution factor

★

Results Calculations for VOA soil/sediment (VLS) samples (low level)

$$\text{Concentration } (\mu\text{g/Kg}) = \frac{(A_x\text{VLS}) (I_s\text{VLS})}{(A_s\text{VLS}) (\text{RRFVLS}) (W_s\text{VLS}) (\text{SVLS})}$$

where:

- $A_x\text{VLS}$  = area of the quantitation ion (EICP) for the compound of interest  
 $A_s\text{VLS}$  = area of the quantitation ion (EICP) for the specified internal standard  
 $I_s\text{VLS}$  = amount of internal standard added (ng)  
 RRFVLS = relative response factor (ambient temperature purge of the calibration standard)  
 $W_s\text{VLS}$  = weight of sample added (g)  
 SVLS = dry weight conversion factor [(100 - %moisture)/100]

★

Results Calculations for VOA soil/sediment (VMS) samples (medium level)

$$\text{Concentration } (\mu\text{g/Kg}) = \frac{(A_x\text{VMS}) (I_s\text{VMS}) (V_t\text{VMS}) (1000) (D_f\text{VMS})}{(A_s\text{VMS}) (\text{RRFVMS}) (V_a\text{VMS}) (W_s\text{VMS}) (\text{SVMS})}$$

where:

- $A_x\text{VMS}$  = area of the quantitation ion (EICP) for the compound of interest  
 $A_s\text{VMS}$  = area of the quantitation ion (EICP) for the specified internal standard  
 $I_s\text{VMS}$  = amount of internal standard added (ng)  
 RRFVMS = relative response factor (ambient temperature purge of the calibration standard)  
 $W_s\text{VMS}$  = weight of sample extracted (g)  
 $D_f\text{VMS}$  = dilution factor  
 SVMS = dry weight conversion factor [(100 - %moisture)/100]  
 $V_t\text{VMS}$  = total volume methanol extract (ml)  
 $V_a\text{VMS}$  = volume of the aliquot (ml)

LATA GC/MS DATA VALIDATION CHECKLIST

9. COMPOUND IDENTIFICATION AND QUANTITATION (continued)

★

Results Calculations for SVOA-water (SW) samples

$$\text{Concentration } (\mu\text{g/L}) = \frac{(A_x\text{SW}) (I_s\text{SW}) (V_i\text{SW}) (D_f\text{SW})}{(A_s\text{SW}) (\text{RRFSW}) (V_o\text{SW}) (V_i\text{SW})}$$

where:

- A<sub>x</sub>SW = area of the quantitation ion (EICP) for the compound of interest
- A<sub>s</sub>SW = area of the quantitation ion (EICP) for the specified internal standard
- I<sub>s</sub>SW = amount of internal standard added (ng)
- RRFSW = relative response factor for the daily calibration standard
- V<sub>o</sub>SW = volume of water extracted (ml)
- V<sub>i</sub>SW = volume of extract injected (μL)
- V<sub>f</sub>SW = volume of concentrated extract (μL)
- D<sub>f</sub>SW = dilution factor

★

Results Calculations for SVOA soil/sediment (SS) samples

$$\text{Concentration } (\mu\text{g/Kg}) = \frac{(A_x\text{SS}) (I_s\text{SS}) (V_i\text{SS}) (D_f\text{SS})}{(A_s\text{SS}) (\text{RRFSS}) (V_i\text{SS}) (W_s\text{SS}) (\text{SSS})}$$

where:

- A<sub>x</sub>SS = area of the quantitation ion (EICP) for the compound of interest
- A<sub>s</sub>SS = area of the quantitation ion (EICP) for the specified internal standard
- I<sub>s</sub>SS = amount of internal standard added (ng)
- RRFSS = relative response factor for the daily calibration standard
- W<sub>s</sub>SS = weight of sample extracted (g)
- D<sub>f</sub>SS = dilution factor
- SSS = dry weight conversion factor [(100 - %moisture)/100]
- V<sub>i</sub>SS = total volume of concentrated extract (μL)
- V<sub>f</sub>SS = volume of the extract injected (μL)

Comments: \_\_\_\_\_

10. 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: \_\_\_\_\_

## LATA GC/MS DATA VALIDATION CHECKLIST

## VALIDATION SUMMARY

## MAJOR DEFICIENCIES:

There are no major deficiencies.

## MINOR DEFICIENCIES:

Both samples, BOBW35 and BOBW36, were u-qualified ~~as~~ for acetone as small amounts of acetone were detected in the associated blank.

## COMMENTS:

9613495.2691

0000099

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBKAA8324

Lab Name: ITAS-KNOXVILLE Contract: \_\_\_\_\_

Lab Code: ITSTU Case No.: 494 SAS No.: \_\_\_\_\_ SDG No.: W0052

Matrix: (soil/water) WATER Lab Sample ID: AA8324

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: AEF02

Level: (low/med) LOW Date Received: \_\_\_\_\_

% Moisture: not dec. \_\_\_\_\_ Date Analyzed: 05/06/94

GC Column: DB-624 ID: 0.250 (mm) Dilution Factor: 1.0

Soil Extract Volume: \_\_\_\_\_ (uL) Soil Aliquot Volume: \_\_\_\_\_ (uL)

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L 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 |
| 67-64-1    | Acetone                    | 2  | 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 |

FORM I VOA

8-18-94 (WJC)

3/90

000031

RELATIVE RESPONSE FACTOR

Analysis: GC/MS VOA  
 SDG: W0052-ITC-054  
 Sample ID: RRF10

Date: 18-Aug-94  
 Validator: Cowan

| Constituent   | Response for Analyte of Interest | Concentration of Internal Standard | Area of Internal Standard | Concentration of Analyte of Interest | RRF     |
|---------------|----------------------------------|------------------------------------|---------------------------|--------------------------------------|---------|
|               | AxV                              | CisV                               | AisV                      | CxV                                  |         |
| Acetone       | 6200.00                          | 50.00                              | 33454.00                  | 10.00                                | 0.927   |
| Chlorobenzene | 24913.00                         | 50.00                              | 133989.00                 | 10.00                                | 0.930   |
|               |                                  |                                    |                           |                                      | #DIV/0! |

3613195.2692

RELATIVE RESPONSE FACTOR

Analysis: GC/MS SVOA  
 SDG: W0052-ITC-054  
 Sample ID: \_\_\_\_\_

Date: 18-Aug-94  
 Validator: Cowan

| Target Constituent | Response for Analyte of Interest | Concentration of Internal Standard | Area of Internal Standard | Concentration of Analyte of Interest | RRF     |
|--------------------|----------------------------------|------------------------------------|---------------------------|--------------------------------------|---------|
|                    | AxS                              | CisS                               | AisS                      | CxS                                  |         |
|                    |                                  |                                    |                           |                                      | #DIV/0! |

000032

RELATIVE STANDARD DEVIATION

Analysis GC/MS VOA

SDG: W0052-ITC-054

Date: 18-Aug-94

Sample ID:           

Validator: Cowan

RRF1

Constituent: Chloroform

3.65

3.988

3.745

3.829

3.68

MEAN

3.778

STDEV

0.1358

RSD

3.6

RELATIVE STANDARD DEVIATION

Analysis GC/MS VOA

SDG: W0052-ITC-054

Date: 18-Aug-94

Sample ID:           

Validator: Cowan

RRF2

Constituent: Bromoform

0.264

0.323

0.314

0.334

0.329

MEAN

0.313

STDEV

0.0283

RSD

9.0

RELATIVE STANDARD DEVIATION

Analysis GC/MS SVOA

SDG: W0052-ITC-054

Date: 18-Aug-94

Sample ID:           

Validator: Cowan

RRF3

Constituent:           

MEAN

#DIV/0!

STDEV

#DIV/0!

RSD

#DIV/0!

RELATIVE STANDARD DEVIATION

Analysis GC/MS SVOA

SDG: W0052-ITC-054

Date: 18-Aug-94

Sample ID:           

Validator: Cowan

RRF4

Constituent:           

MEAN

#DIV/0!

STDEV

#DIV/0!

RSD

#DIV/0!

000033

2025052693

PERCENT DIFFERENCE

Analysis: GC/MS VOA  
 SDG: W0052-ITC-054  
 Sample ID: RRF 50

Date: 18-Aug-94  
 Validator: Cowan

| Constituent  | Initial Calibration | Continuing Calibration | %D      |
|--------------|---------------------|------------------------|---------|
|              | Average RRF         | Average RRF            |         |
|              | RRF <sub>iV</sub>   | RRF <sub>sV</sub>      |         |
| Bromomethane | 0.974               | 0.937                  | 3.8%    |
| Chloroform   | 3.778               | 3.764                  | 0.4%    |
|              |                     |                        | #DIV/0! |

9613495-2694

PERCENT DIFFERENCE

Analysis: GC/MS SVOA  
 SDG: W0052-ITC-054  
 Sample ID: \_\_\_\_\_

Date: 18-Aug-94  
 Validator: Cowan

| Constituent | Initial Calibration | Continuing Calibration | %D      |
|-------------|---------------------|------------------------|---------|
|             | Average RRF         | Average RRF            |         |
|             | RRF <sub>iS</sub>   | RRF <sub>sS</sub>      |         |
|             |                     |                        | #DIV/0! |

000034

%D

40226.VOA

**SURROGATE RECOVERY**

Analysis: GC/MS VOA  
 SDG: W0052-ITC-054  
 Sample ID: B0BW5

Date: 18-Aug-94  
 Validator: Cowan

| Constituent           | quantity of<br>surrogate determined | quantity of<br>surrogate added | %RV     |
|-----------------------|-------------------------------------|--------------------------------|---------|
|                       | QdV                                 | QaV                            |         |
| Toluene-d8            | 47.55                               | 50.00                          | 95.1%   |
| Bromofluorobenzene    | 46.64                               | 50.00                          | 93.3%   |
| 1,2-Dichloroethane-d4 | 51.72                               | 50.00                          | 103.4%  |
|                       |                                     |                                | #DIV/0! |

9613495.2695

**SURROGATE RECOVERY**

Analysis: GC/MS SVOA  
 SDG: W0052-ITC-054  
 Sample ID: \_\_\_\_\_

Date: 18-Aug-94  
 Validator: Cowan

| Constituent | quantity of<br>surrogate determined | quantity of<br>surrogate added | %RS     |
|-------------|-------------------------------------|--------------------------------|---------|
|             | QdS                                 | QaS                            |         |
|             |                                     |                                | #DIV/0! |

000035

PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (MS/MSD)

Analysis: GC/MS VOA  
 SDG: W0052-ITC-054  
 Sample ID: B0BW5

Date: 18-Aug-94  
 Validator: Cowan

| Constituent     | MS Result | MSD Result | Sample Result | Spike Added | MSV %R  | MSDV %R | RPDV    |
|-----------------|-----------|------------|---------------|-------------|---------|---------|---------|
|                 | MSV       | MSDV       | OSV           | SAV         |         |         |         |
| Trichloroethene | 59.40     | 54.20      | 11.00         | 50.00       | 96.8%   | 86.4%   | 11.4%   |
| Tolulene        | 48.00     | 43.00      | 0.00          | 50.00       | 96.0%   | 86.0%   | 11.0%   |
|                 |           |            |               |             | #DIV/0! | #DIV/0! | #DIV/0! |
|                 |           |            |               |             | #DIV/0! | #DIV/0! | #DIV/0! |
|                 |           |            |               |             | #DIV/0! | #DIV/0! | #DIV/0! |
|                 |           |            |               |             | #DIV/0! | #DIV/0! | #DIV/0! |
|                 |           |            |               |             | #DIV/0! | #DIV/0! | #DIV/0! |
|                 |           |            |               |             | #DIV/0! | #DIV/0! | #DIV/0! |
|                 |           |            |               |             | #DIV/0! | #DIV/0! | #DIV/0! |
|                 |           |            |               |             | #DIV/0! | #DIV/0! | #DIV/0! |

PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (MS/MSD)

Analysis: GC/MS SVOA  
 SDG: W0052-ITC-054  
 Sample ID: \_\_\_\_\_

Date: 18-Aug-94  
 Validator: Cowan

| Constituent | MS Result | MSD Result | Sample Result | Spike Added | MSS %R  | MSDS %R | RPDS    |
|-------------|-----------|------------|---------------|-------------|---------|---------|---------|
|             | MSS       | MSDS       | OSV           | SAS         |         |         |         |
|             |           |            |               |             | #DIV/0! | #DIV/0! | #DIV/0! |
|             |           |            |               |             | #DIV/0! | #DIV/0! | #DIV/0! |
|             |           |            |               |             | #DIV/0! | #DIV/0! | #DIV/0! |
|             |           |            |               |             | #DIV/0! | #DIV/0! | #DIV/0! |
|             |           |            |               |             | #DIV/0! | #DIV/0! | #DIV/0! |
|             |           |            |               |             | #DIV/0! | #DIV/0! | #DIV/0! |
|             |           |            |               |             | #DIV/0! | #DIV/0! | #DIV/0! |
|             |           |            |               |             | #DIV/0! | #DIV/0! | #DIV/0! |
|             |           |            |               |             | #DIV/0! | #DIV/0! | #DIV/0! |
|             |           |            |               |             | #DIV/0! | #DIV/0! | #DIV/0! |

000036

962195-296

RESULTS CALCULATIONS FOR VOA WATER SAMPLES

Analysis: GC/MS VOA  
 SDG: W0052-ITC-054  
 Sample ID: B0BWB5

Date: 18-Aug-94  
 Validator: Cowan

| Constituent      | Area of the<br>Quant Ion for<br>the Constituent<br>of Interest | Area of the<br>Quant Ion for<br>the Internal<br>Standard | Amount of<br>Internal<br>Standard added<br>(ng) | Relative<br>Response<br>Factor | Volume of<br>Water Purged<br>(ml) | Dilution<br>Factor | Conc<br>(µg/L) |
|------------------|--|--|---|--------------------------------|-----------------------------------|--------------------|----------------|
|                  | AxVW   | AisVW  | IsVW  | RRFW                           | VoVW                              | DfVW               |                |
| Chloroform (WB5) | 8715.00  | 29791.00   | 50.00   | 3.78                           | 1.00                              | 1.00               | 3.87           |
| Chloroform (WB6) | 0.00   | 28099.00   | 50.00   | 3.78                           | 1.00                              | 1.00               | 0.00           |
|                  |  |  |   |                                |                                   |                    | #DIV/0!        |
|                  |  |  |   |                                |                                   |                    | #DIV/0!        |
|                  |  |  |   |                                |                                   |                    | #DIV/0!        |
|                  |  |  |   |                                |                                   |                    | #DIV/0!        |
|                  |  |  |   |                                |                                   |                    | #DIV/0!        |
|                  |  |  |   |                                |                                   |                    | #DIV/0!        |
|                  |  |  |   |                                |                                   |                    | #DIV/0!        |
|                  |  |  |   |                                |                                   |                    | #DIV/0!        |

9617195.2697

000037

LATA GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

|  |  |  |  |  |                                    |
|--|--|--|--|--|------------------------------------|
| VALIDATION LEVEL:  | A  | B  | C  | (D)  | E                                  |
| PROJECT: 200-UP-1  |  |  | SDG: W0052-ITC-054                         |  |                                    |
| VALIDATOR: MWebb   |  | LATA NO: VW401. 402.26                         |  | DATE: 7-28-94                                  |                                    |
| SAF NO.: 94-088  |  | LAB: ITC                                       |  | CASE: -  |                                    |
| QAPP REFERENCE:  |  |  | SAP REFERENCE:                             |  |                                    |
| If there is no QAPP or SAP reference, contact the WHC Technical Representative.<br>If the document(s) are not provided, default to the Method acceptance criteria. |  |  |  |  |                                    |
| <b>ANALYSES PERFORMED</b>  |  |  |  |  |                                    |
| <input type="checkbox"/> Alkalinity<br>310.1   | <input type="checkbox"/> Chloride<br>325.3                   | <input type="checkbox"/> pH<br>9040/150.1      | <input type="checkbox"/> TOC<br>9060/415.1 | <input type="checkbox"/> TDS 160.1             | <input type="checkbox"/> TSS 160.2 |
| <input checked="" type="checkbox"/> Anions<br>300.0  | <input type="checkbox"/> Chromium+6<br>7196                  | <input type="checkbox"/> Phenols<br>9065/420.1 | <input type="checkbox"/> TOX<br>9020/9022  | <input type="checkbox"/> Sulfate<br>375.4      | <input type="checkbox"/>           |
| <input type="checkbox"/> Ammonia<br>350.3  | <input type="checkbox"/> COD<br>410.1                        | <input type="checkbox"/> Phosphorus<br>365.2   | <input type="checkbox"/> TKN<br>351.3      | <input type="checkbox"/> Sulfide<br>9030/376.1 | <input type="checkbox"/>           |
| <input type="checkbox"/> BOD<br>405.1  | <input checked="" type="checkbox"/> Nitrate+Nitrite<br>353.2 | <input type="checkbox"/> Oil & Grease<br>413.1 | <input type="checkbox"/> TPH<br>9070/418.1 | <input type="checkbox"/>                       | <input type="checkbox"/>           |
| SAMPLES/MATRIX: BOBWB5 (water)   |  |  |  |  |                                    |
|  |  |  |  |  |                                    |
|  |  |  |  |  |                                    |
|  |  |  |  |  |                                    |
|  |  |  |  |  |                                    |
|  |  |  |  |  |                                    |

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 (see HOLDING TIME SUMMARY form)

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

Comments: NO<sub>2</sub>, NO<sub>3</sub> & PO<sub>4</sub> (anions) exceeded HT > 2 NO<sub>2</sub> & PO<sub>4</sub> are qualified unusable (UR) and NO<sub>3</sub> is qualified estimated (E)

Reviewed by J. Jones 9-7-94 Jan 9/7/94  
 PNO-DVF-013, R1 Page 1 of 5

LATA GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

3. INSTRUMENT CALIBRATION (see CALIBRATION DATA SUMMARY form)

- 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

★ For methods requiring a calibration curve (three standards and a blank) use the following equation for correlation coefficient (r).

$$r = \frac{\text{Correlation Coefficient (r)}}{N \sum x_i y_i - \sum x_i \sum y_i} \sqrt{\frac{N \sum x_i^2 - (\sum x_i)^2}{N \sum y_i^2 - (\sum y_i)^2}}$$

★ For methods requiring ICV/CCV or a calibration check standard, calculate recovery as follows:

$$\%R = \frac{\text{Recovery observed value}}{\text{true value}} \times 100$$

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

LATA GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

4. BLANKS (see BLANK AND SAMPLE DATA SUMMARY form)

Were laboratory blanks analyzed?  Yes No N/A

Are laboratory blank results acceptable?  Yes No N/A

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5. ACCURACY (see ACCURACY DATA SUMMARY form)

Were spike samples analyzed at the required frequency?  Yes No N/A

Are all spike recoveries acceptable?  Yes No N/A

★

Spike Recovery  
$$\%R = \frac{SSR - SR}{SA} \times 100$$

where:  
SSR = spiked sample result  
SR = sample result  
SA = spike added

Were LCS analyses performed at the required frequency?  Yes No N/A

Are all LCS recoveries acceptable?  Yes No N/A

★

Recovery  
$$\%R = \frac{\text{observed value}}{\text{true value}} \times 100$$

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

LATA GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

6. PRECISION (see PRECISION DATA SUMMARY form)

Were laboratory duplicate samples analyzed at the required frequency? ..... Yes No N/A

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

★

Relative Percent Difference

RPD = (|OS - D| / ((OS + D) / 2)) x 100

where:

OS = sample concentration (original sample/MS)

D = duplicate concentration (duplicate sample/MSD)

Comments: \_\_\_\_\_

7. FIELD QC SAMPLES

Were field QC samples (field/trip blanks, duplicates, splits, performance audit) identified? Yes No N/A

Are field/trip blank results 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

Are performance audit sample results acceptable? ..... Yes No N/A

Comments: BOBWBS is a split sample with Ecology (493062)

\_\_\_\_\_

LATA GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

8. ANALYTE QUANTITATION

Was analyte quantitation performed properly?  Yes No N/A

Are results calculated properly?  Yes No N/A

★ For methods with calibration curves:

General Chemistry Results Calculation, water sample

Concentration (µg/L) = CONCW × DfW

where:

CONCW = concentration off calibration curve (µg/L)

DfW = dilution factor (if any)

or

General Chemistry Results Calculation, soil sample

Concentration (mg/Kg) = (CONCS × DfS × VOL) / (WS × SS)

where:

CONCS = concentration off calibration curve (mg/L)

VOL = volume of final extract (ml)

WS = weight of sample (g)

DfS = dilution factor (if any)

SS = dry weight conversion [(100 - %moisture) × 100 ]

★ For all other results calculations, see the analytical method.

Comments: \_\_\_\_\_

9. 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

Do results meet the CRDLs?  Yes No N/A

Comments: \_\_\_\_\_

Validator  
MC Webb

Date  
8-18-94

SDG  
W0052-ITC-054

**GENERAL CHEMISTRY DATA QUALIFICATION SUMMARY**

**MAJOR DEFICIENCIES:**

1. Nitrite and Phosphate by IC were qualified as unusable (UR) because the holding time was exceeded by greater than two times.

**MINOR DEFICIENCIES:**

1. Nitrate by IC was qualified as estimated (J) because the holding time was exceeded by greater than two times.

**COMMENTS:**

1. BOBWB5 is a split sample with Ecology (H93062). Comparison of RPD values is not possible.





## LINEAR REGRESSION ANALYSIS

Analysis: General Chemistry  
 Constituent: Anions NO3  
 SDG: W0052-ITC-054

Calibration Date: 29-May-94

Date: 28-Jul-94  
 Validator: MC Webb

| Concentration | Absorbance  |
|---------------|-------------|
| 0.00          | 0.000       |
| 0.40          | 142955.000  |
| 2.50          | 1007259.000 |
| 5.00          | 2139238.000 |
|               |             |
|               |             |
|               |             |

r  
0.9995

r<sup>2</sup>  
0.9991

slope  
0.0000

x intercept  
0.0579

1/slope  
428972.1040

y intercept  
-24091.6769

## LINEAR REGRESSION ANALYSIS

Analysis: General Chemistry  
 Constituent: NO2/NO3  
 SDG: W0052-ITC-054

Calibration Date: 19-May-94

Date: 28-Jul-94  
 Validator: MC Webb

| Concentration | Absorbance |
|---------------|------------|
| 2.00          | 2.026      |
| 1.00          | 0.965      |
| 0.40          | 0.378      |
| 0.10          | 0.105      |
| 0.04          | 0.004      |
| 0.02          | 0.027      |
| 0.00          | 0.022      |

r  
0.9994

r<sup>2</sup>  
0.9989

slope  
0.9917

x intercept  
0.0089

1/slope  
1.0083

y intercept  
-0.0084

## PERCENT RECOVERY (ICV/CCV)

Analysis: General Chemistry  
 SDG: W0052-ITC-054

Date: 28-Jul-94  
 Validator: MC Webb

| Constituent      | Observed Value | True Value  | %R     |
|------------------|----------------|-------------|--------|
|                  | O              | A           |        |
| <u>Anion NO3</u> | <u>2.14</u>    | <u>2.00</u> | 107.0% |
| <u>NO2/NO3</u>   | <u>1.01</u>    | <u>1.00</u> | 100.7% |

9613495.2708

## MATRIX SPIKE RECOVERY (MS)

Analysis: General Chemistry  
 SDG: W0052-ITC-054  
 Sample ID: BOBWB5

Date: 28-Jul-94  
 Validator: MC Webb

| Constituent           | Spike Sample  | Sample        | Spike         | %R    |
|-----------------------|---------------|---------------|---------------|-------|
|                       | Result        | Result        | Added         |       |
|                       | SSR           | SR            | SA            |       |
| <u>Anions NO3 MS</u>  | <u>410.00</u> | <u>170.00</u> | <u>250.00</u> | 96.0% |
| <u>Anions NO3 MSD</u> | <u>410.00</u> | <u>170.00</u> | <u>250.00</u> | 96.0% |
| <u>NO2/NO3 MS</u>     | <u>58.00</u>  | <u>40.00</u>  | <u>20.00</u>  | 90.0% |
| <u>NO2/NO3 MSD</u>    | <u>57.00</u>  | <u>40.00</u>  | <u>20.00</u>  | 85.0% |

9613495.2709

PERCENT RECOVERY (LCS)

Analysis: General Chemistry  
SDG: W0052-ITC-054

Date: 28-Jul-94  
Validator: MC Webb

| Constituent | Observed value |      | True value | %R |
|-------------|----------------|------|------------|----|
|             | OLCS           | ALCS |            |    |
| Anions NO3  | 2.30           | 2.50 | 92.0%      |    |
| Anions NO3  | 2.70           | 2.50 | 108.0%     |    |
| NO2/NO3     | 1.01           | 1.00 | 101.1%     |    |
| NO2/NO3     | 0.99           | 1.00 | 99.2%      |    |

9613495.2710

RELATIVE PERCENT DIFFERENCE

Analysis: General Chemistry  
SDG: W0052-ITC-054  
Sample ID: BOBWB5

Date: 28-Jul-94  
Validator: MC Webb

| Constituent       | Original (Sample)<br>concentration | Duplicate<br>concentration | RPD  |
|-------------------|------------------------------------|----------------------------|------|
|                   | OS                                 | D                          |      |
| <u>Anions NO3</u> | <u>96.00</u>                       | <u>96.00</u>               | 0.0% |
| <u>NO2/NO3</u>    | <u>90.00</u>                       | <u>85.00</u>               | 5.7% |

9613495.2711

GENERAL CHEMISTRY RESULTS CALCULATION, WATER

Analysis: General Chemistry  
SDG: W0052-ITC-054  
Sample ID: BOBWB5

Date: 28-Jul-94  
Validator: MC Webb

| Constituent       | Concentration<br>from curve | Dilution<br>Factor | Concentration (µg/L) |
|-------------------|-----------------------------|--------------------|----------------------|
|                   | CONCW                       | DfW                |                      |
| <u>Anions NO3</u> | <u>1.665</u>                | <u>100</u>         | <u>166.5</u>         |
| <u>NO2/NO3</u>    | <u>39.817</u>               | <u>1</u>           | <u>39.8</u>          |

9613495.2712

LATA RADIOCHEMISTRY DATA VALIDATION CHECKLIST

|   |          |                  |                      |               |   |
|---|----------|------------------|----------------------|---------------|---|
| VALIDATION LEVEL:   | A        | B                | C                    | <b>D</b>      | E |
| PROJECT:  | 200-UP-1 |                  | SDG: W0052 - ITC-054 |               |   |
| VALIDATOR:  | MWebb    | LATA NO.: VW401. | <sup>402</sup> 26    | DATE: 8-18-94 |   |
| SAF NO.:  | 94-088   | LAB:             | ITC                  | CASE:         |   |
| QAPP REFERENCE:   |          |                  | SAP REFERENCE:       |               |   |
| <p>If there is no QAPP or SAP reference, contact the WHC Technical Representative.<br/>         If the document(s) are not provided, default to the Method acceptance criteria.</p> |          |                  |                      |               |   |

ANALYSES PERFORMED

|   |  |   |  |   |                                     |
|---|--|---|--|---|-------------------------------------|
| <input type="checkbox"/> Gross Alpha<br><input type="checkbox"/> Gross Beta | <input type="checkbox"/> Strontium-89<br><input type="checkbox"/> Strontium-90 | <input checked="" type="checkbox"/> Technetium-99   | <input type="checkbox"/> Isotopic Anal.<br>Alpha Spec. | <input type="checkbox"/> Gamma Spectroscopy | <input type="checkbox"/> Iodine-129 |
| <input checked="" type="checkbox"/> Total Uranium (KPA)                     | <input type="checkbox"/> Radium-226<br><input type="checkbox"/> Radium-228     | <input type="checkbox"/> (LSC) Liquid Scintillation | <input type="checkbox"/>                               | <input type="checkbox"/>                    | <input type="checkbox"/>            |

SAMPLES/MATRIX BOBWB5 (W)

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification forms present? ..... **Yes** No N/A  
 Compliance screening form present? ..... **Yes** No N/A  
 Is a case narrative present? ..... **Yes** No N/A  
 Were all analyses requested reported? ..... **Yes** No N/A  
 Are all results supported in the raw data? ..... **Yes** No N/A  
 Comments: \_\_\_\_\_

2. CHAIN-OF-CUSTODY/HOLDING TIMES

Are sample holding times acceptable? ..... **Yes** No N/A  
 Are samples preserved correctly? ..... **Yes** No N/A  
 Was the pH of the sample checked prior to analysis? ..... Yes **No** ~~N/A~~  
 Comments: There is no evidence of pH being checked before analysis. No indication of pH problems on the sample receiving documentation.

Reviewed by [Signature] 9-7-94 documentation Accepted MW 9-8-94  
 PNO-DVF-015, R1 Page 1 of 9  
**W0052**

## LATA RADIOCHEMISTRY DATA VALIDATION CHECKLIST

## 3. INITIAL CALIBRATION

Instruments/detectors calibrated within one year of sample analysis? ..... Yes  No  N/AInitial calibration acceptable? .....  Yes  No  N/AStandards NIST traceable? .....  Yes  No  N/AStandards Expired? ..... Yes  No  N/AComments: The continuing calibration is acceptable. The fact that the detectors were not re-calibrated yearly has no effect on the data

## 4. CONTINUING CALIBRATION

Background checked at proper frequency? .....  Yes  No  N/ABackground check acceptable? .....  Yes  No  N/AEfficiency checked at proper frequency? .....  Yes  No  N/AEfficiency check acceptable? .....  Yes  No  N/ACalibration check standards NIST traceable? .....  Yes  No  N/ACalibration check standards expired? ..... Yes  No  N/A

Comments: \_\_\_\_\_

## 5. BLANKS (see BLANK AND SAMPLE DATA SUMMARY form)

Method blank analyzed? .....  Yes  No  N/AMethod blank results acceptable? ..... Yes  No  N/AAnalytes detected in method blank? .....  Yes  No  N/ATranscription/Calculation Errors? ..... Yes  No  N/AComments: Spike values reported as blank value  
blank value is 0.021  $\mu\text{S/L}$  MDD = .00854  $\mu\text{S/L}$   
Sample activity > .105 (5x blank) NO problem

LATA RADIOCHEMISTRY DATA VALIDATION CHECKLIST

6. MATRIX SPIKES (see ACCURACY DATA SUMMARY form)

- 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

★

Spike Recovery

$$\%R = \frac{SSR - SR}{SA} \times 100$$

where:

- SSR = spiked sample result
- SR = sample result
- SA = spike added

Comments: Sample activity > 4x spike level. No qualifier

---



---



---



---

7. LABORATORY CONTROL SAMPLES (see ACCURACY DATA SUMMARY form)

- 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

★

Recovery

$$\%R = \frac{\text{observed value}}{\text{true value}} \times 100$$

Comments: \_\_\_\_\_

---



---



---



---

LATA RADIOCHEMISTRY DATA VALIDATION CHECKLIST

8. CHEMICAL RECOVERY (see ACCURACY DATA SUMMARY form)

- Chemical carrier added? ..... Yes No  N/A
- Chemical recovery acceptable? ..... Yes No  N/A
- Tracer added? ..... Yes No  N/A
- Tracer recovery acceptable? ..... Yes No  N/A
- Standards traceable? ..... Yes No  N/A
- Standards expired? ..... Yes No  N/A
- Transcription/Calculation errors? ..... Yes No  N/A

★

Alpha Spec Tracer Recovery

$$A.1 - B.1$$

$$(2.22)(E.1)(T.1)$$

where:

- A.1 = gross counts per minute
- B.1 = background counts per minute of tracer
- 2.22 = conversion factor, dpm/pCi
- E.1 = detector efficiency
- T.1 = activity (pCi) of tracer added to sample  
(can be determined by taking dpm of tracer added divided by 2.22)

Comments: \_\_\_\_\_

9. DUPLICATES (see PRECISION DATA SUMMARY form)

- Duplicates Analyzed? .....  Yes No N/A
- RPD Values Acceptable? .....  Yes No N/A
- Transcription/Calculation Errors? ..... Yes  No N/A

★

Relative Percent Difference

$$RPD = \frac{|OS - D|}{\left(\frac{OS + D}{2}\right)} \times 100$$

where:

- OS = sample concentration (original sample/MS)
- D = duplicate concentration (duplicate sample/MSD)

Comments: \_\_\_\_\_

LATA RADIOCHEMISTRY DATA VALIDATION CHECKLIST

10. FIELD QC SAMPLES

- Field blank(s) identified? 8-16-94  
 Yes  No  N/A
- Field blank results acceptable? 9-18-94  
 Yes  No  N/A
- Analytes detected in field blank(s)?  Yes  No  N/A
- Field duplicate sample(s) identified?  Yes  No  N/A
- Field duplicate RPD values acceptable?  Yes  No  N/A
- Field split sample(s) identified?  Yes  No  N/A
- Field split RPD values acceptable?  Yes  No  N/A
- Performance audit sample(s) identified?  Yes  No  N/A
- Performance audit sample results acceptable?  Yes  No  N/A

Comments: BOBWBS is a split sample with lowly (493062)

11. DETECTION LIMITS (LEVELS D & E)

- MDA's meet required detection limits?  Yes  No  N/A
- Transcription/calculation errors?  Yes  No  N/A

★

Minimum Detectable Activity (MDA)  

$$\frac{4.66 \times \sqrt{(B.2)(T.2)}}{2.22(E.2)(I.2)(R.2)(D.2)(V.2)(Y.2)(T.2)}$$

- where:
- B.2 = background counts per minute (cpm) or the reported standard deviation of the background (S) cpm
  - T.2 = counting time for associated sample
  - 2.22 = conversion dpm/pCi
  - E.2 = detector efficiency
  - I.2 = ingrowth correction factor (if applicable or 1)
  - R.2 = carrier recovery factor (if applicable or 1)
  - D.2 = decay factor (if applicable or 1)
  - Y.2 = chemical yield factor (if applicable or 1)
  - V.2 = sample volume in liters or grams

Comments: \_\_\_\_\_

## LATA RADIOCHEMISTRY DATA VALIDATION CHECKLIST

Results Calculation EquationsGross  $\alpha/\beta$  and Tritium

$$\frac{(A.3 - B.3) \times C.3}{(2.22)(E.3)(V.3)}$$

where:

- A.3 = gross counts per minute  
 B.3 = background counts per minute  
 C.3 = activity of  $\alpha$  fraction in  $\beta$  channel\*  
 2.22 = conversion factor, dpm/pCi  
 E.3 = detector efficiency  
 V.3 = sample volume, liters or grams  
 \*if for calculation of gross  $\beta$ , otherwise substitute 1

Strontium (total)

$$\frac{A.4 - B.4}{(2.22)(E.4)(I.4)(D.4)(R.4)(V.4)}$$

where:

- A.4 = gross counts per minute  
 B.4 = background counts per minute  
 2.22 = conversion factor, dpm/pCi  
 E.4 = detector efficiency  
 I.4 = ingrowth correction factor  
 R.4 = carrier recovery factor  
 D.4 = strontium decay factor  
 V.4 = sample volume, liters or grams

Strontium-90 (corrected for Sr-89)

$$\frac{A.5 - B.5}{(2.22)(Y.5)(E.5)(I.5)(D.5)(R.5)(V.5)}$$

where:

- A.5 = gross counts per minute  
 B.5 = background counts per minute  
 Y.5 = yttrium-90 yield factor  
 2.22 = conversion factor, dpm/pCi  
 E.5 = detector efficiency  
 I.5 = ingrowth correction factor  
 R.5 = strontium-89 yield factor  
 D.5 = strontium decay factor  
 V.5 = sample volume, liters or grams

## LATA RADIOCHEMISTRY DATA VALIDATION CHECKLIST

Results Calculation Equations, continuedTechnetium-99

A.6 - B.6

$$\frac{A.6 - B.6}{(2.22)(E.6)(R.6)(V.6)}$$

where:

- A.6 = gross counts per minute
- B.6 = background counts per minute
- 2.22 = conversion factor, dpm/pCi
- E.6 = detector efficiency
- R.6 = carrier recovery factor
- V.6 = sample volume, liters or grams

Alpha Spec Isotopes

A.7 - B.7

$$\frac{A.7 - B.7}{(2.22)(E.7)(R.7)(V.7)}$$

where:

- A.7 = gross counts per minute for isotope
- B.7 = background counts per minute for detector
- 2.22 = conversion factor, dpm/pCi
- E.7 = detector efficiency
- R.7 = tracer recovery factor
- V.7 = sample amount, liters or grams

Gamma Spec Isotopes

A.8

$$\frac{A.8}{(2.22)(B.8)(D.8)(E.8)(V.8)(T.8)}$$

where:

- A.8 = peak area for isotope
- D.8 = decay factor for isotope
- 2.22 = conversion factor, dpm/pCi
- B.8 = abundance factor for isotope
- E.8 = efficiency factor for isotope
- V.8 = sample amount, liters or grams
- T.8 = live time (minutes)

## LATA RADIOCHEMISTRY DATA VALIDATION CHECKLIST

Results Calculation Equations, continuedTotal Uranium by Laser Fluorometry

$$\frac{(W.9 - I.9)(R.9)(D.9)}{U.9 - W.9}$$

where:

- W.9 = sample reading with Fluran  
 I.9 = initial sample reading  
 R.9 = concentration of uranium standard  
 after dilution with sample ( $\mu\text{g/L}$ )  
 D.9 = dilution factor  
 U.9 = sample reading with uranium standard

Radium-226 by Radon Emanation

$$D = \frac{\text{COUNT}}{(2.22)(\text{CAL})(\text{VOL})} \times \frac{1}{1 - e^{-\lambda t_1}} \times \frac{1}{e^{-\lambda t_2}} \times \frac{t_3}{1 - e^{-\lambda t_3}}$$

where:

- COUNT = net count rate, cpm  
 CAL = calibration constant of the de-emanation system  
 and the scintillation cell in counts per  
 minutes/disintegrations per minute of radon-222  
 VOL = sample aliquot in liters  
 $t_1$  = the elapsed time in days between the first  
 and second de-emanations, and  $\lambda$  is the  
 decay constant for radon-222 ( $0.181 \text{ d}^{-1}$ )  
 $t_2$  = the time interval in hours between the second  
 de-emanation and counting, and  $\lambda$  is the  
 decay constant of radon-222 ( $0.00755 \text{ hr}^{-1}$ )  
 $t_3$  = the counting time in minutes, and  $\lambda$  is the  
 decay constant of radon-222 ( $1.26 \times 10^{-4} \text{ min}^{-1}$ )  
 2.22 = conversion factor, dpm/pCi

Validator  
MC Webb

Date  
8-18-94

SDG  
W0052-ITC-054

#### DATA VALIDATION SUMMARY

##### MAJOR DEFICIENCIES:

1. None

##### MINOR DEFICIENCIES:

1. None

##### COMMENTS:

1. The U-total spike value was entered as the blank value on the Form 1. The Form 1 was edited.
2. The U-total blank was greater than the MDA but less than the RDL. The sample activity was greater than 5 times the blank. No qualifier was necessary.
3. The U-total matrix spike was outside the spike limits. No qualifier was assigned because the sample activity was >4 times the spike level.
4. BOBWB5 is a split sample with Ecology (H93062). Comparison of RPD values is not possible.





9613495.2723

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

BLANK RESULTS

LAB NAME: ITAS-IT-RS-0001 SDG NO.: W0052  
LAB SAMPLE ID: L050801B  
REPORTING UNITS: pCi/L & ug/L

| ISOTOPE | RESULT                   | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA      | YIELD | METHOD NUMBER   |
|---------|--------------------------|---------------------|------------------|----------|-------|-----------------|
| TC-99   | 1.32E+00                 | 9.74E-01            | 4.26E+00         | 2.15E+00 | 0.951 | ITAS-IT-RS-0001 |
| URANIUM | <del>8.32E-01</del> ,021 | N/A                 | 1.25E-02         | 3.54E-03 | 1     | RD4200          |

*entry error blank = .021*

*blank is detected*

*but sample activity > .105 ug/L no*

*found*

*per  
8-18-94*

*Jan 917/94  
~~0003~~*

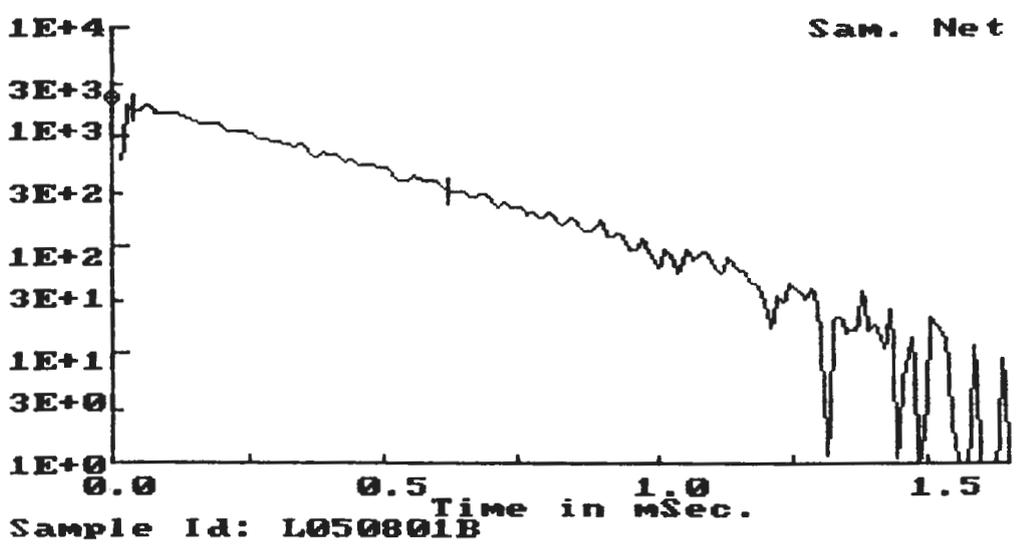
**000063**

Total Sample Volume (V1): 100 ml  
Volume of Total Sample Analyzed (V2): 100 ml  
Final Volume after dissolving Residue (V3): 10 ml  
Volume of concentrate Pipetted into Cell (V4): 1 ml  
Standard Concentration into Sample: 10.188 ng

ANALYTICAL REPORT

27683 Disk Seq. #: 27683  
Sample ID: L050801B  
Description: W0052 U-LASER WHC  
Lifetime = 330.059 ± 4.654 µs  
R<sup>2</sup> = 0.992  
Calibrated at 1.086 ng / 1.000 ml  
Calibration Seq. #: 27666  
Bkgd. Type: Calibration  
Uranium in Cell = 1.1941E+00 ng  
Uranium/Sample = 1.1941E+01 ng / 100 ml  
Total Uncert./Sample = 1.0354E+00 ng / 100 ml  
Calc. Result = 0.021 ng/ml  
Reported Average = 0.021 ng/ml ± 0.010 ng/ml

User ID: APURYEAR  
Time/Date: 05:30:18 06-15-1994  
Concentration = 0.119 ng/ml  
Uncertainty = 0.008 ng/ml  
Intercept = 1.103E+00/pulse ± 1.6%  
Ref. Ratio = 0.978  
Ref. Lifetime = 313.450 µs  
LASER Pulses = 2000  
Analysis Channels: 4 - 48



*mu*  
8-18-94

0032  
00064

9613495.2725

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

MATRIX SPIKE RESULTS

LAB NAME: ITAS-RICHLAND SDG NO.: W0052

LAB SAMPLE ID: W0508001

REPORTING UNITS: pCi/L & ug/L

| ISOTOPE | SPIKE RESULT* | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA      | SAMPLE RESULT | EXPECTED | % RECOVERY |
|---------|---------------|---------------------|------------------|----------|---------------|----------|------------|
| TC-99   | 2.32E+02      | 5.02E+00            | 8.43E+01         | 2.15E+00 | 5.16E+02      | 2.71E+02 | 85.61      |
| URANIUM | 6.20E+01      | N/A                 | 9.30E+00         | 3.54E-03 | 6.43E+01      | 9.03E-01 | 6866.00    |

*Sample activity > 4x spike level*

*ms  
8-18-94*

~~0010~~  
**000065**

RESULTS CALCULATION TOTAL URANIUM BY KPA

Analysis: Radiochemistry  
SDG: W0052-ITC-054

Date: 18-Aug-94  
Validator: MC Webb

| Constituent   | Sample reading             | Result       |
|---------------|----------------------------|--------------|
| <u>BOBWB5</u> | <u>W.9</u><br><u>64.29</u> | <u>64.29</u> |

000066

922-541196  
963195-2726

RESULTS CALCULATION TECHNETIUM-99

Analysis: Radiochemistry  
 SDG: W0052-ITC-054

Date: 18-Aug-94  
 Validator: MC Webb

000067

| Constituent   | DPM of the sample | DPM of the blank | Decay Factor | Yield       | Sample volume (L or g) | Result          |
|---------------|-------------------|------------------|--------------|-------------|------------------------|-----------------|
|               | A.6               | B.6              | E.6          | R.6         | V.6                    |                 |
| <u>BOBWB5</u> | <u>572.440</u>    | <u>27.790</u>    | <u>1.000</u> | <u>0.95</u> | <u>0.500</u>           | <u>515.9576</u> |

962095-2727

MINIMUM DETECTABLE ACTIVITY (MDA)

Analysis: Radiochemistry  
 SDG: W0052-ITC-054

Date: 18-Aug-94  
 Validator: MC Webb

| Constituent | Background counts per minute (cpm) or Standard Deviation of background (cpm) | Counting time for associated sample | Detector Efficiency | Ingrowth correction factor | Carrier recovery factor | Decay factor | Chemical yield factor | Sample volume (L or g) |
|-------------|--|-------------------------------------|---------------------|----------------------------|-------------------------|--------------|-----------------------|------------------------|
|             | B.2  | T.2                                 | E.2                 | I.2                        | R.2                     | D.2          | Y.2                   | V.2                    |
| Tc99 BOBWB5 | 26.460   | 125.000                             | 1.051               | 1.000                      | 1.000                   | 1.000        | 0.951                 | 0.500                  |
| U-total     | MDC for water = .00354   |                                     |                     |                            |                         |              |                       |                        |

|       |
|-------|
| MDA   |
| 2.152 |
| NC    |

9613195.2228

RELATIVE PERCENT DIFFERENCE

Analysis: Radiochemistry  
SDG: W0052-ITC-054

Date: 18-Aug-94  
Validator: MC Webb

| Constituent |        | Original (Sample)<br>concentration | Duplicate<br>concentration | RPD  |
|-------------|--------|------------------------------------|----------------------------|------|
|             |        | OS                                 | D                          |      |
| Tc99        | BOBWB5 | 516.000                            | 529.400                    | 2.6% |
| U-total     | BOBWB5 | 64.287                             | 63.878                     | 0.6% |

9613495-2729

PERCENT RECOVERY (LCS)

Analysis: Radiochemistry  
SDG: W0052-ITC-054

Date: 18-Aug-94  
Validator: MC Webb

| Constituent | Observed value | True value | %R    |
|-------------|----------------|------------|-------|
|             | OLCS           | ALCS       |       |
| Tc99        | 264.500        | 270.324    | 97.8% |
| U-total     | 0.832          | 0.901      | 92.3% |

9612495.2730

000071

MATRIX SPIKE RECOVERY (MS)

Analysis: Radiochemistry  
SDG: W0052-ITC-054

Date: 18-Aug-94  
Validator: MC Webb

| Constituent        | Spike Sample Result                             | Sample Result | Spike Added   | %R           |
|--------------------|---|---------------|---------------|--------------|
|                    | SSR   | SR            | SA            |              |
| <u>Tc99 BOBWR5</u> | <u>747.70</u>                                   | <u>515.96</u> | <u>270.77</u> | <u>85.6%</u> |
| <u>U-total</u>     | <u>sample activity &gt; 4 times spike level</u> |               |               | <u>NC</u>    |

9613195.2731

9613495.2732

## **Laboratory Case Narratives**

**000072**



# ANALYTICAL SERVICES

## CERTIFICATE OF ANALYSIS

---

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

June 10, 1994

---

Job Number: 494

This is the Certificate of Analysis for the following samples:

|                       |   |
|-----------------------|---|
| SDG:                  | W0052                                       |
| Client Project ID:    | WHC SAF 94-088 200-UP-1 Groundwater Round 1 |
| Date Received by Lab: | May 6, 1994                                 |
| Number of Samples:    | Two (2)                                     |
| Sample Type:          | Water                                       |

---

### I. Introduction

On May 6, 1994, two (2) water samples arrived at ITAS-Richland, Washington and were transferred to ITAS-Knoxville for chemical analysis. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

### 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 by gas chromatography/mass spectroscopy (GC/MS) in accordance with the EPA CLP 3/90 Statement of Work.

Reviewed and Approved:

A handwritten signature in cursive script that reads 'Sheree A. Schneider'. The signature is written in black ink and is positioned above a horizontal line.

Sheree' A. Schneider  
Project Manager

---

American Council of Independent Laboratories  
International Association of Environmental Testing Laboratories  
American Association for Laboratory Accreditation

IT Corporation  
June 10, 1994  
Job Number: 494  
Client Project ID: WHC SAF 94-088 200-UP-1 Groundwater Round 1

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

---

## II. Analytical Results/Methodology (Continued)

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 Hewlett-Packard 5970 GC/MS/DS. A matrix spike and a matrix spike duplicate were analyzed using sample BOBWB5. All 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.

The samples were analyzed for nitrate/nitrite on May 19, 1994. A matrix spike and a matrix spike duplicate were analyzed using sample number BOBWB5. All quality control results were acceptable.

The samples were analyzed for fluoride, chloride, nitrate, nitrite, phosphate and sulfate by EPA method 300.0 on May 29 through June 8, 1994. A matrix spike and a matrix spike duplicate were analyzed using sample BOBWB5. All quality control results were acceptable.

IT Corporation

June 10, 1994

Job Number: 494

Client Project ID: WHC SAF 94-088 200-UP-1 Groundwater Round 1

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN**III. Quality Control (Continued)**

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

**TABLE I**

| <b>Knoxville ID</b> | <b>Richland ID</b> | <b>WHC ID</b> | <b>Test</b> |
|---------------------|--------------------|---------------|-------------|
| AA8197              | 405079-01A         | BOBWB5        | VOC         |
| AA8198              | 405079-01B         | "             | ANIONS      |
| AA8199              | 405079-01C         | "             | NO2NO3      |
| AA8200              | 405079-02A         | BOBWB6        | VOC         |

IT Corporation  
June 10, 1994  
Job Number: 494

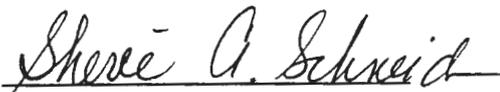
IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: WHC SAF 94-088 200-UP-1 Groundwater 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



INTERNATIONAL  
TECHNOLOGY  
CORPORATION

## CERTIFICATE OF ANALYSIS

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

June 28, 1994

Attention: J.A.Lerch

---

|                   |   |              |
|-------------------|---|--------------|
| SAF Number        | : | 94-088       |
| Date SDG Closed   | : | May 13, 1994 |
| Number of Samples | : | One (1)      |
| Sample Type       | : | Water        |
| SDG Number        | : | W0052        |
| Data Deliverable  | : | Stand Alone  |

---

### I. Introduction

On May 4, 1994, one water sample was received by ITAS-Richland for radiochemical analysis. Upon receipt, the sample was assigned the following laboratory ID number to correspond with the WHC specific ID:

| <u>ITAS-Richland ID</u> | <u>WHC ID</u> | <u>Matrix</u> | <u>Date of Receipt</u> |
|-------------------------|---------------|---------------|------------------------|
| 405080-01A              | B0BWB5        | Water         | 5/4/94                 |

### 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.

Regional Office

2800 George Washington Way • Richland, Washington 99352-1613 • 509-375-3131 • FAX: 509-375-5590

IT Corporation is a wholly owned subsidiary of International Technology Corporation

Jan 9/17/94  
000077

Westinghouse Hanford Company  
June 28, 1994  
Page 2

---

The requested analyses were:      **Liquid Scintillation Counting**  
Technetium-99 by method ITAS-IT-RS-0001  
**Total Uranium**  
Total Uranium by method ITAS-RD-4200

### III. Quality Control

The analytical results for each analysis performed under SDG W0052 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.

### IV. Comments

Results from the initial radioactivity screening of this sample classified the sample as Category I.

#### **Liquid Scintillation Counting**

##### Technetium-99 by method ITAS-IT-RS-0001

The batch was reanalyzed because of quality control samples that were out of limits on the initial analysis. The reanalysis matrix spike, LCS, batch blank, sample and sample duplicate (duplicate of sample B0BWB5) results are within contractual requirements.

#### **Total Uranium**

##### Total Uranium by method ITAS-RD-4200

The matrix spike yield of sample B0BWB5 is low. The cause of the low spike yield is a matrix effect due to the high activity of the sample (64.3  $\mu\text{g/l}$ ) compared to the activity of the added spike (0.9  $\mu\text{g/l}$ ). The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BWB5) results are within contractual requirements.

Jan 9/7/94  
0004  
**000078**

Westinghouse Hanford Company  
June 28, 1994  
Page 3

---

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

000079

gm 9/7/94  
-0005

9613495.2740

## **Chain-of-Custody Information**

000080

W0#494



Regional Office  
2800 George Washington Way  
Richland, Washington 99352

SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

Date/Time Received 5-4-94 14:05 Client Name WHC

Project/Client # 94-088 Batch or Case # \_\_\_\_\_

Cooler ID (if noted on the outside of cooler) ER-11

1. Condition of shipping container? OK.

2. Custody Seals on cooler intact? Yes  No

3. Custody Seals dated and signed? Yes  No

4. Chain of Custody record is taped on inside of cooler lid? Yes  No

5. Vermiculite/packing material is: Wet  Dry

6. Each sample is in a plastic bag? Yes  No

7. Number of sample containers in cooler: 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 3°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 N/A

12. Have any anomalies been identified above? Yes  No

13. Memos have been initiated for all anomalies identified above? Yes

Printed Name/Signature [Signature] Date/Time 5-4-94 14:05

W0#494

000002

|                                 |         |  |              |                  |                 |                                     |                  |                      |     |  |      |  |  |  |  |  |  |  |
|---------------------------------|---------|--|--------------|------------------|-----------------|-------------------------------------|------------------|----------------------|-----|--|------|--|--|--|--|--|--|--|
| Westinghouse Hanford Company    |         | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST |              |                  |                 |                                     |                  |                      |     |  |      | Page 1 of 1  |  |  |  |  |  |  |
| Collector                       |         | Company Contact<br>P. H. Butcher         |              |                  |                 | Telephone No.<br>376-4388           |                  |                      |     | Data Turnaround<br><input type="checkbox"/> Priority<br><input checked="" type="checkbox"/> Normal |      |  |  |  |  |  |  |  |
| Project Designation<br>200-UP-1 |         | Sampling Location<br>200 W               |              |                  |                 | SAF No.<br>94-088                   |                  |                      |     |  |      |  |  |  |  |  |  |  |
| Ice Chest No.<br>ER-11          |         | Field Logbook No.                        |              |                  |                 | Method of Shipment                  |                  |                      |     |  |      |  |  |  |  |  |  |  |
| Shipped To<br>IT                |         | Offsite Property No.<br>W94-0-0518-31    |              |                  |                 | Bill of Lading/Air Bill No.<br>NONE |                  |                      |     |  |      |  |  |  |  |  |  |  |
| Possible Sample Hazards/Remarks |         | Preservative                             |              | HCl              | None            | H <sub>2</sub> SO <sub>4</sub>      | HNO <sub>3</sub> | None                 | HCl |  | HCl  | None   |  |  |  |  |  |  |
| Ref. 3A LCS 5/3/94 1520         |         | Type of Container                        |              | AGS              | G               | P                                   | P                | AGS                  | P   |  | AGS  | G  |  |  |  |  |  |  |
|                                 |         | No. of Container(s)                      |              | 3                | 1               | 1                                   | 1                | 1                    | 1   |  | 3    | 1  |  |  |  |  |  |  |
| Special Handling and/or Storage |         | Volume                                   |              | 40mL             | 500mL           | 500mL                               | 2L               | 40mL                 | 1L  |  | 40mL | 40mL   |  |  |  |  |  |  |
| SAMPLE ANALYSIS<br>405079       |         | VOA                                      |              | Anions (C)       | NO <sub>3</sub> | Total U                             | Activity Scan    | Tc-99                |     |  | VOA  | Total Activity   |  |  |  |  |  |  |
|                                 |         | A  |              | B                | C               | 40508001                            |                  |                      |     |  | A    |  |  |  |  |  |  |  |
| Sample No.                      | Matrix* | Date Sampled                             | Time Sampled |                  |                 |                                     |                  |                      |     |  |      |  |  |  |  |  |  |  |
| B0BW35 01                       | W       | 05/03/94                                 | 1040         | X                | X               | X                                   | X                | X                    | X   |  |      | X  |  |  |  |  |  |  |
| B0BW36 02                       | W       | 05/03/94                                 | 1040         |                  |                 |                                     |                  |                      |     |  | X    |  |  |  |  |  |  |  |
| CHAIN OF POSSESSION             |         |  |              | Sign/Print Names |                 |                                     |                  | SPECIAL INSTRUCTIONS |     |  |      | Matrix*  |  |  |  |  |  |  |
| Relinquished By                 |         | Date/Time                                |              | Received By      |                 | Date/Time                           |                  | SOG<br>W0052         |     |  |      | S = Soil<br>SE = Sediment<br>SO = Solid<br>SL = Sludge<br>W = Water<br>O = Oil<br>A = Air<br>DS = Drum Solids<br>DL = Drum Liquids<br>T = Tissue<br>WI = Wipe<br>L = Liquid<br>V = Vegetation<br>X = Other |  |  |  |  |  |  |
| Relinquished By                 |         | Date/Time                                |              | Received By      |                 | Date/Time                           |                  |                      |     |  |      |  |  |  |  |  |  |  |
| Relinquished By                 |         | Date/Time                                |              | Received By      |                 | Date/Time                           |                  |                      |     |  |      |  |  |  |  |  |  |  |
| Relinquished By                 |         | Date/Time                                |              | Received By      |                 | Date/Time                           |                  |                      |     |  |      |  |  |  |  |  |  |  |
| 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)

0000021

96124952742

WO#494

|                          |                                      |   |
|--------------------------|--------------------------------------|---|
| Contractor<br><b>WHC</b> | <b>OFF-SITE<br/>PROPERTY CONTROL</b> | CONTROL NUMBER<br>(To be obtained from PROPERTY MANAGEMENT)<br><b>W94-0-0518-31</b> |
|--------------------------|--------------------------------------|---|

PART I - TO BE COMPLETED BY ORIGINATOR

|   |   |                                      |
|---|---|--------------------------------------|
| Department<br><b>ER Eng Support</b>   | Section<br><b>Field &amp; Analytical Supp</b> | Unit<br><b>ER Field Sampling</b>     |
| The following items are to be shipped from <input checked="" type="checkbox"/> Contractor <input type="checkbox"/> Vendor |   |                                      |
| Routing <input checked="" type="checkbox"/> Contractor <input type="checkbox"/> Vendor                                    |   |                                      |
| Shipped to<br><b>IT Analytical Services<br/>2800 George Washington Way<br/>Richland, WA 99352</b>                         |   | Off-site Custodian<br><br>Full Title |

| Quantity  | Description (Include Serial and any Government Tag Numbers)   | Original Cost |
|-----------|---|---------------|
| 1<br>lbs. | Sample #: <b>B05WB5, B03WB6</b><br>Cooler ID: <b>ER-11</b><br>Polycooler with groundwater samples packed in wet ice and vermiculite | N/A           |
| 1<br>lbs. | Sample #: <b>NA</b><br>Cooler ID: <b>NA</b><br><del>Polycooler with groundwater samples packed in wet ice and vermiculite</del>     | N/A           |

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

Necessity for the Off-Site Use of this Property

Sampling supports RI/FS work in the **JCO AREA**

Bill of lading # NAWF

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

|  |   |  |
|--|---|--|
| RM Clearance for Public Release<br><i>Approved, Jico</i> | RM Survey No<br><b>107197</b>                 | Date<br><b>5-4-94</b>  |
| Location of Property (Area & Bldg.)<br><b>711-41P-1</b>  | Contact<br><b>P. H. Butcher</b>               | Phone<br><b>(509) 376-4388</b>                               |
| Date Ready for Shipment<br><b>5-4-94</b>                 | Cost Code to be Charged<br><b>88410 PTIFA</b> | Approximate Date This Property will be Returned<br><b>NA</b> |
| Originated By<br><i>P.H. Butcher</i>                     | Date<br><b>5/4/94</b>                         | Authorized By<br><i>[Signature]</i>                          |
| Signature and Name of Property Control                   | Custodian Date<br><i>[Signature]</i>          | Property Management Approval<br><i>[Signature]</i>           |
|  |   | Date<br><b>5/4/94</b>  |

PART II - TO BE COMPLETED BY SHIPPING

|  |                  |             |                    |             |
|--|------------------|-------------|--------------------|-------------|
| Signature of Recipient<br><i>[Signature]</i> | Return Order No. | Date Issued | Purchase Order No. | Date Issued |
| Date<br><b>5-4-94</b>                        |                  |             |                    |             |

DISTRIBUTION

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



INTERNATIONAL  
TECHNOLOGY  
CORPORATION

COC NO.



\*0001588\*

**ANALYSIS REQUEST AND  
CHAIN OF CUSTODY RECORD\***

WO #494  
RL #619

Reference Document No. 453627

Page 1 of 1

Project Name/No. 1 SAF 94-088  
Sample Team Members 2 \_\_\_\_\_  
Profit Center No. 3 4632  
Project Manager 4 Van Petten  
Purchase Order No. 6 \_\_\_\_\_  
Required Report Date 11 \_\_\_\_\_

Samples Shipment Date 7 5-5-94  
Lab Destination 8 Middlebrook  
Lab Contact 9 \_\_\_\_\_  
Project Contact/Phone 12 \_\_\_\_\_  
Carrier/Waybill No. 13 151 2116 846

Bill to: 5 IT  
Richard  
Report to: 10 IT  
Richard

**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 |
|----------------------|----------------------------|------------------------|-------------------|------------------|------------------|------------------------------|--|------------------------|
| 40507901A            | BOBWB5 /water              | 5/3 1040               | ab-s              | 40ml             | cool 40          | VOA                          | 2°C KAX 5/6/94                           |                        |
| ↓ B                  | ↓                          | ↓                      | G                 | 500ml            | ↓                | Anions NO3                   | FOR LAB USE ONLY<br>pH < 2<br>KAX 5/6/94 |                        |
| ↓ C                  | ↓                          | ↓                      | P                 | ↓                | ↓                | NO3                          |  |                        |
| 40507902A            | BOBWB6 /water              | ↓                      | ab-s              | 40ml             | ↓                | VOA                          |  |                        |
| <del>IT 5/5/94</del> |                            |                        |                   |                  |                  |                              |  |                        |

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-W0052

|   |   |  |   |
|---|---|--|---|
| 1. Relinquished by 28<br>(Signature/Affiliation) <u>Heidelberg IT</u> | Date: <u>5-5-94</u><br>Time: <u>16:00</u> | 1. Received by 28<br>(Signature/Affiliation) <u>Kerry Ahlman ITAS-KN</u> | Date: <u>05-06-94</u><br>Time: <u>09:05</u> |
| 2. Relinquished by<br>(Signature/Affiliation)                         | Date: _____<br>Time: _____                | 2. Received by<br>(Signature/Affiliation)                                | Date: _____<br>Time: _____                  |
| 3. Relinquished by<br>(Signature/Affiliation)                         | Date: _____<br>Time: _____                | 3. Received by<br>(Signature/Affiliation)                                | Date: _____<br>Time: _____                  |

Comments: 29

White: To accompany samples

Yellow: Field copy

\* See back of form for special instructions.

0080000

W0#494

000085

TENNELEC #1

SCREENING CALCULATION SPREADSHEET

all Cat I  
Mail Lady 5-4-94

| Customer Code | Received Date | Time | Screening Prep Date | Time | Count Date | Mnts. Cntd | BACKGROUND |      |      |
|---------------|---------------|------|---------------------|------|------------|------------|------------|------|------|
| WHC           |               |      | 50494               |      | 504        | 10         | Alpha      | Beta | Mnts |
|               |               |      |                     |      |            |            | 16         | 231  | 240  |

| Customer ID | pH <2 | RESIDUE Wght (mGrms) | Vol. Anal. mG | Sample Size mL | SMPL CNT DATA |             |             | Net Sample          |       | DPM / Aliquot |         | uCi per Sample |         | 2 Sigma Error |         | pCi/(Gm or L) |         | Category 1 Yes/No | Aliquot to Cat 1 Gm or Ltr |         |
|-------------|-------|----------------------|---------------|----------------|---------------|-------------|-------------|---------------------|-------|---------------|---------|----------------|---------|---------------|---------|---------------|---------|-------------------|----------------------------|---------|
|             |       |                      |               |                | Hldr Num.     | Total Alpha | Counts Beta | Counts/Minute Alpha | Beta  | Alpha         | Beta    | Alpha          | Beta    | Alpha         | Beta    | Alpha         | Beta    |                   | Alpha                      | Beta    |
| BOBRL1      |       | 0.0                  | 5             | 4.0            | 4             | 2           | 11          | 0.13                | 0.14  | 5.1E-01       | 2.1E-01 | 1.8E-04        | 7.4E-05 | 3.4E-07       | 1.9E-07 | 4.6E+01       | 1.9E+01 | Yes               | 2.2E+02                    | 5.4E+03 |
| BOBWBS      |       | 2.2                  | 5             | 2.0            | 5             | 4           | 42          | 0.33                | 3.24  | 1.2E+00       | 6.7E+00 | 2.2E-04        | 1.2E-03 | 2.8E-07       | 4.7E-07 | 1.1E+02       | 6.0E+02 | Yes               | 9.0E+01                    | 1.7E+02 |
| TOTAL       | uCi   |                      |               |                |               |             |             | -0.07               | -0.96 | -2E-01        | -2E+00  | 4.1E-04        | 1.3E-03 | ERR           | ERR     | ERR           | ERR     | Yes               | ERR                        | ERR     |

4172 561397

9613495.2746

0000025

05/04/94 07:52 3373 3178

222S JB

W0#494

009

SAMPLE STATUS REPORT FOR E 7126. E-BLANK 299W1935 TIME: 5/ 4/94 8:35  
 DISPATCHED: 5/ 2/94 8:30 SAMPLE HAS NOT BEEN SLURPED  
 RECEIVED: 5/ 3/94 14:50

| EXT. | DETER.  | RESULTS OR STATUS   |
|------|---------|---------------------|
| **** | *****   | *****               |
| 4271 | TOT-ACT | < 5.00000E 01 pCi/G |

| OUT OF RANGE? | GOOD ANS? | CHARGE CODE |
|---------------|-----------|-------------|
| ***           | ***       | *****       |
| N             | Y         | VOGEL       |

END OF REPORT

BO BWBS  
 BO BWBG

LOS  
 5/4/94

000086

9613495.2747

**VEDD Printout**

**000087**

VALIDATION ELECTRONIC DELIVERABLE SDG W0052-ITC-054

Monday, September 26, 1994

Page 1

| HEIS-SN | Form | FormNr | LabCode | ConstID    | Media | Value | ConcFlag | Qual | CountErr | Units |
|---------|------|--------|---------|------------|-------|-------|----------|------|----------|-------|
| BOBWB5  | NCLP | NA     | ITASKN  | 67-64-1    | SW    |       |          | U    |          |       |
| BOBWB6  | NCLP | NA     | ITASKN  | 67-64-1    | SW    |       |          | U    |          |       |
| BOBWB5  | NCLP | NA     | ITASKN  | 14797-65-0 | SW    |       |          | UR   |          |       |
| BOBWB5  | NCLP | NA     | ITASKN  | 14797-55-8 | SW    |       |          | J    |          |       |
| BOBWB5  | NCLP | NA     | ITASKN  | 14265-44-2 | SW    |       |          | UR   |          |       |

9612952748

Entered by: *UME*

Checked by: *AT*

9613495.2749

**END OF PACKAGE**

000088.