

START

9613490.0243

0045381

Quanterra  
Environmental  
Services

W0118-ITC-124

1802



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

i Kdb 6/10/96

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

DATE: January 13, 1995

TO: W0118-ITC-124

FROM: Pat Reich

H4-14

Telephone: 372-2785

cc:

SUBJECT: SUMMARY VALIDATION REPORT

The Validation Summary Report for this data package 200-UP-1 Project, Round 1 Soil Sampling Task is filed in W0004-ITC-022.

Pat Reich  
SDLA

9613490.0245

DON'T SAY IT --- Write It!

DATE August 31, 1994

To W0118, sample BOBXB1

FROM Jeff Lerch H4-23  
Telephone 372-2596

cc: Doris Ayres  
Jeanette Duncan  
Chris Koerner  
Sandy Walls

SUBJECT Carbon-14 data not reported

Due to an insufficient presence of carbon in the samples (described on page 0008 of the radiochemistry laboratory case narrative), data for C-14 will not be reported for samples BOBXB1.

DON'T SAY IT - - WRITE IT!

Date: 12/21/94 <sup>PKR</sup>

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

Subject: Correction of Validation Date Received Stamp

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

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

Thank You,

Pat Reich  
Sample Management

9613490.0247

**Golder Associates Inc.**

4104-148th Avenue, NE  
Redmond, WA 98052  
Telephone (206) 883-0777  
Fax (206) 882-5498



November 11, 1994

Our ref: 943-1610.036.400  
943-1610.037.400  
94-1610/0/57

CH2M Hill  
P.O. Box 1510  
Richland, Washington 99352



ATTENTION: Ms. Jeanette Duncan

RE: TRANSMITTAL OF DATA VALIDATION PACKAGES, ENVIRONMENTAL AND WASTE CHARACTERIZATION ANALYTICAL DATA VALIDATION, CONTRACT NO. MSH-SWV-315905

Dear Ms. Duncan:

Enclosed are data validation reports for the 200-UP-1 Round 1 Soil validation projects. The package(s) included in this shipment are as follows:

-W0118-QES-124  
-W0034-ITC-055

Please call if you have any questions.

Sincerely,

GOLDER ASSOCIATES INC.

A handwritten signature in cursive script that reads "Christina I. Jensen".

Christina I. Jensen  
Task Manager

A handwritten signature in cursive script that reads "Kent M. Angelos".

Kent M. Angelos  
Project Manager

## RECORD COPY

## MEMORANDUM

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

FR: Diana Waterbury, Golder Associates Inc. *DWN*

RE: VOLATILES DATA VALIDATION SUMMARY FOR  
DATA PACKAGE: W0118-QES-124, (943-1610.036, 124VOA.UP1)



## INTRODUCTION

This memo presents the results of data validation on data package W0118-QES-124 prepared by the International Technology Analytical Services. Sample information is provided in the following table.

SAMPLE ID	MEDIA	ANALYSIS	COMMENTS
BOBXB1*	SOIL	VOLATILES  SEE ATTACHMENT 4	NONE
* Indicates sample results which were 100% recalculated.			

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

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

## DATA QUALITY OBJECTIVES

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

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

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

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

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

**Completeness.** The data package was complete for all requested analyses. A total of one (1) samples were validated in this data package with a total of 33 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent which meets the work plan completeness objective of 90 percent.

## MEMORANDUM

TO: 200-UP-1 Project QA Record

FR: Diana Waterbury, Golder Associates Inc. *DSW*RE: INORGANICS DATA VALIDATION SUMMARY FOR DATA PACKAGE  
W0118-QES-124 (943-1610.036 124MET.UP1)

## INTRODUCTION

This memo presents the results of data validation on data package W0118-QES-124 prepared by International Technology Analytical Services. Sample information is provided in the following table.

SAMPLE ID	MEDIA	ANALYSIS	COMMENTS
B0BXB1*	SOIL	METALS	NONE
SEE ATTACHMENT 4			
* Indicates the sample results which were 100% recalculated.			

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

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

## DATA QUALITY OBJECTIVES

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

**Precision.** Goals for precision were met with the exception of the minor deficiencies identified below.

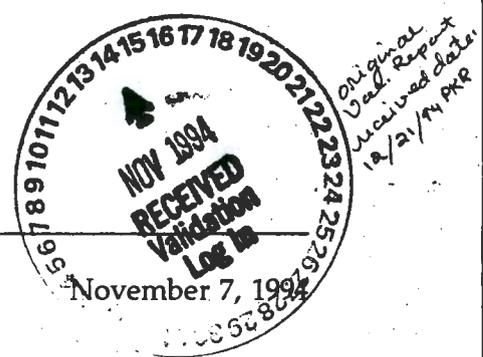
**Accuracy.** Goals for accuracy were met with the exception of the minor deficiencies identified below.

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

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

**Completeness.** The data package was complete for all requested analyses. A total of one (1) sample was validated in this data package with a total of 24 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent which meets the normal work plan completeness objectives of 90 percent.

## M M O R A N D U M



TO: 200-UP-1 Round 1 Soil Project QA Record

FR: Thomas Stapp, Golder Associates Inc. *TS*

RE: RADIOCHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE  
W0118-QES-124 (943-1610.036 124RAD.UP1)

## I N T R O D U C T I O N

This memo presents the results of data validation on data package W0118-QES-124 prepared by Quanterra Environmental Services. Sample information is provided in the following table.

SAMPLE ID	MEDIA	ANALYSIS	COMMENTS
BOBXB1*	SOIL	RADIOCHEMISTRY SEE ATTACHMENT 4	
* Indicates the sample results which were 100% recalculated.			

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

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

## D A T A Q U A L I T Y O B J E C T I V E S

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

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

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

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

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

**Completeness.** The data package was complete for all requested analyses. A total of one sample was validated in this data package with a total of twenty-six (26) determinations



# ANALYTICAL SERVICES

## CERTIFICATE OF ANALYSIS

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



August 11, 1994

Job Number: 770

This is the Certificate of Analysis for the following sample:

SDG:	W0118
Client Project ID:	WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1
Received by Knoxville:	July 2, 1994
Number of Samples:	One (1)
Sample Type:	Soil

### I. Introduction

On July 1, 1994, one (1) soil sample 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 sample was analyzed for Target Compound List (TCL) volatiles and semivolatiles by gas chromatography/mass spectroscopy (GC/MS) in accordance with the EPA CLP OLM01.8 Statement of Work.

Reviewed and Approved:

*Sheree A. Schneider*

Sheree' A. Schneider  
Project Manager



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

IT Corporation  
August 11, 1994  
Job Number: 770

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

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## II. Analytical Results/Methodology (Continued)

The sample was analyzed for Target Analyte List (TAL) metals by cold vapor atomic absorption spectroscopy (CVAA), graphite furnace atomic absorption spectroscopy (GFAA), and inductively coupled plasma spectroscopy (ICP) in accordance with the EPA CLP ILM03.0 Statement of Work.

The sample was analyzed for total cyanide in accordance with the EPA CLP ILM03.0 Statement of Work.

The sample was analyzed for nitrate-nitrite based on EPA method 353.2.

The sample was analyzed for anions by ion chromatography using EPA method 300.0.

## III. Quality Control

The volatiles analyses were performed by purge and trap with a J & W DB-624 capillary column on a Finnigan INCOS 500 GC/MS/DS. A matrix spike and matrix spike duplicate were analyzed using sample BOBXB1. All QC results met method specified limits.

The semivolatiles analyses were performed by direct injection of sample extract on a Restek XTI-5 capillary column on a Finnigan INCOS XL GC/MS/DS. A matrix spike and matrix spike duplicate were analyzed using sample BOBXB1. 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.

IT Corporation  
August 11, 1994  
Job Number: 770  
Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

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IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

### III. Quality Control (Continued)

The sample was digested on July 22, 1994 for ICP and July 22 and 25, 1994 for GFAA. The CVAA analysis for mercury was performed on July 25, 1994; the GFAA analyses for arsenic, lead, selenium and thallium were performed July 22 and July 29, 1994; the remaining metals were analyzed by ICP on July 25, 1994. All run QC was acceptable. A duplicate/spike pair was prepared using sample number BOBXB1. Spike recovery (accuracy) results were within acceptance limits for all parameters except for antimony, chromium and manganese. A post digestion spike was performed as required per CLP protocol. Poor spike recovery for antimony is attributable to matrix interferences. Poor spike recovery for chromium and manganese is attributable to sample nonhomogeneity as exhibited by the duplicate RPD results for these analytes. Duplicate RPD (precision) results were within acceptance limits for all parameters except for aluminum, chromium, iron, magnesium, manganese, vanadium and zinc. Poor duplicate precision for these analytes is attributable to sample nonhomogeneity. Cadmium was not outside acceptance limits for spike recovery per CLP rounding rules.

Data were reported with qualifiers as follows:

#### "C" Qualifiers

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

#### "O" Qualifiers

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

#### "M" Qualifiers

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

IT Corporation  
August 11, 1994  
Job Number: 770

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

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### III. Quality Control (Continued)

#### Miscellaneous

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

The sample was analyzed for nitrate/nitrite on July 26, 1994. A matrix spike and matrix spike duplicate were analyzed using sample BOBXB1.

The sample was analyzed for fluoride, chloride, phosphate, nitrate, nitrite and sulfate by EPA method 300.0 on July 26, 1994. A matrix spike and matrix spike duplicate were analyzed using sample BOBXB1. All QC results were acceptable.

IT Corporation  
August 11, 1994  
Job Number: 770  
Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

IT ANALYTICAL SERVICES  
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KNOXVILLE, TN

### III. Quality Control (Continued)

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

**TABLE I**

<b>Knoxville ID</b>	<b>Richland ID</b>	<b>WHC ID</b>	<b>Test</b>
AB2176	407007-01A	BOBXB1	VOC
AB2177	407007-01B	"	SVOC
AB2178	407007-01C	"	METALS-T
AB2179	407007-01D	"	CN
AB2180	407007-01E	"	ANIONS
AB2181	407007-01F	"	NO3NO2

IT Corporation  
August 11, 1994  
Job Number: 770  
Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

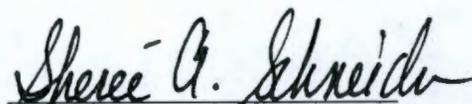
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IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

#### IV. Certification

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

Reviewed and Approved:



Sheree' A. Schneider  
Project Manager

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBXB1

Lab Name: ITAS-KNOXVILLE Contract: HANFORD  
 Lab Code: ITSTU Case No.: 770 SAS No.: \_\_\_\_\_ SDG No.: W0118  
 Matrix: (soil/water) SOIL Lab Sample ID: AB2176  
 Sample wt/vol: 5.0 (g/mL) G Lab File ID: AG13H  
 Level: (low/med) LOW Date Received: 07/02/94  
 % Moisture: not dec. 18 Date Analyzed: 07/13/94  
 GC Column: DB624 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) <u>UG/KG</u>	Q
74-87-3	-----Chloromethane	12	U
74-83-9	-----Bromomethane	12	U
75-01-4	-----Vinyl Chloride	12	U
75-00-3	-----Chloroethane	12	U
75-09-2	-----Methylene Chloride	6	BJ
67-64-1	-----Acetone	5	J
75-15-0	-----Carbon Disulfide	12	U
75-35-4	-----1,1-Dichloroethene	12	U
75-34-3	-----1,1-Dichloroethane	12	U
540-59-0	-----1,2-Dichloroethene (total)	12	U
67-66-3	-----Chloroform	12	U
107-06-2	-----1,2-Dichloroethane	12	U
78-93-3	-----2-Butanone	12	U
71-55-6	-----1,1,1-Trichloroethane	12	U
56-23-5	-----Carbon Tetrachloride	12	U
75-27-4	-----Bromodichloromethane	12	U
78-87-5	-----1,2-Dichloropropane	12	U
10061-01-5	-----cis-1,3-Dichloropropene	12	U
79-01-6	-----Trichloroethene	12	U
124-48-1	-----Dibromochloromethane	12	U
79-00-5	-----1,1,2-Trichloroethane	12	U
71-43-2	-----Benzene	12	U
10061-02-6	-----trans-1,3-Dichloropropene	12	U
75-25-2	-----Bromoform	12	U
108-10-1	-----4-Methyl-2-Pentanone	12	U
591-78-6	-----2-Hexanone	12	U
127-18-4	-----Tetrachloroethene	12	U
79-34-5	-----1,1,2,2-Tetrachloroethane	12	U
108-88-3	-----Toluene	12	U
108-90-7	-----Chlorobenzene	12	U
100-41-4	-----Ethylbenzene	12	U
100-42-5	-----Styrene	12	U
1330-20-7	-----Xylene (total)	12	U

1E  
 VOLATILE ORGANICS ANALYSIS DATA SHEET  
 TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBXB1
--------

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 770 SAS No.: \_\_\_\_\_ SDG No.: W0118

Matrix: (soil/water) SOIL Lab Sample ID: AB2176

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AG13H

Level: (low/med) LOW Date Received: 07/02/94

% Moisture: not dec. 18 Date Analyzed: 07/13/94

GC Column: DB624 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/KG

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

1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBXB1

Lab Name: ITAS-KNOXVILLE Contract: HANFORD  
 Lab Code: ITSTU Case No.: 770 SAS No.: \_\_\_\_\_ SDG No.: W0118  
 Matrix: (soil/water) SOIL Lab Sample ID: AB2177R  
 Sample wt/vol: 30.2 (g/mL) G Lab File ID: AB2177R  
 Level: (low/med) LOW Date Received: 07/02/94  
 % Moisture: 18 decanted: (Y/N) N Date Extracted: 07/07/94  
 Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/25/94  
 Injection Volume: 2.0 (uL) Dilution Factor: 1.0  
 GPC Cleanup: (Y/N) Y pH: 8.2

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

CAS NO. COMPOUND (ug/L or ug/Kg) UG/KG Q

108-95-2	Phenol	400	U
111-44-4	bis(2-Chloroethyl) Ether	400	U
95-57-8	2-Chlorophenol	400	U
541-73-1	1,3-Dichlorobenzene	400	U
106-46-7	1,4-Dichlorobenzene	400	U
95-50-1	1,2-Dichlorobenzene	400	U
95-48-7	2-Methylphenol	400	U
108-60-1	2,2'-Oxybis(1-Chloropropane)	400	U
106-44-5	4-Methylphenol	400	U
621-64-7	N-Nitroso-Di-n-Propylamine	400	U
67-72-1	Hexachloroethane	400	U
98-95-3	Nitrobenzene	400	U
78-59-1	Isophorone	400	U
88-75-5	2-Nitrophenol	400	U
105-67-9	2,4-Dimethylphenol	400	U
111-91-1	bis(2-Chloroethoxy)Methane	400	U
120-83-2	2,4-Dichlorophenol	400	U
120-82-1	1,2,4-Trichlorobenzene	400	U
91-20-3	Naphthalene	400	U
106-47-8	4-Chloroaniline	400	U
87-68-3	Hexachlorobutadiene	400	U
59-50-7	4-Chloro-3-Methylphenol	400	U
91-57-6	2-Methylnaphthalene	400	U
77-47-4	Hexachlorocyclopentadiene	400	U
88-06-2	2,4,6-Trichlorophenol	400	U
95-95-4	2,4,5-Trichlorophenol	970	U
91-58-7	2-Chloronaphthalene	400	U
88-74-4	2-Nitroaniline	970	U
131-11-3	Dimethylphthalate	400	U
208-96-8	Acenaphthylene	400	U
606-20-2	2,6-Dinitrotoluene	400	U
99-09-2	3-Nitroaniline	970	U
83-32-9	Acenaphthene	400	U

1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBXB1

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 770 SAS No.: \_\_\_\_\_ SDG No.: W0118

Matrix: (soil/water) SOIL Lab Sample ID: AB2177R

Sample wt/vol: 30.2 (g/mL) G Lab File ID: AB2177R

Level: (low/med) LOW Date Received: 07/02/94

% Moisture: 18 decanted: (Y/N) N Date Extracted: 07/07/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/25/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.2

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>UG/KG</u>	Q
51-28-5	2,4-Dinitrophenol	970	U
100-02-7	4-Nitrophenol	970	U
132-64-9	Dibenzofuran	400	U
121-14-2	2,4-Dinitrotoluene	400	U
84-66-2	Diethylphthalate	400	U
7005-72-3	4-Chlorophenyl-phenylether	400	U
86-73-7	Fluorene	400	U
100-01-6	4-Nitroaniline	970	U
534-52-1	4,6-Dinitro-2-methylphenol	970	U
86-30-6	N-Nitrosodiphenylamine (1)	400	U
101-55-3	4-Bromophenyl-phenylether	400	U
118-74-1	Hexachlorobenzene	400	U
87-86-5	Pentachlorophenol	970	U
85-01-8	Phenanthrene	400	U
120-12-7	Anthracene	400	U
86-74-8	Carbazole	400	U
84-74-2	Di-n-Butylphthalate	50	BJ
206-44-0	Fluoranthene	400	U
129-00-0	Pyrene	400	U
85-68-7	Butylbenzylphthalate	400	U
91-94-1	3,3'-Dichlorobenzidine	400	U
56-55-3	Benzo(a)Anthracene	400	U
218-01-9	Chrysene	400	U
117-81-7	bis(2-Ethylhexyl)Phthalate	52	J
117-84-0	Di-n-Octyl Phthalate	400	U
205-99-2	Benzo(b)Fluoranthene	400	U
207-08-9	Benzo(k)Fluoranthene	400	U
50-32-8	Benzo(a)Pyrene	400	U
193-39-5	Indeno(1,2,3-cd)Pyrene	400	U
53-70-3	Dibenz(a,h)Anthracene	400	U
191-24-2	Benzo(g,h,i)Perylene	400	U

(1) - Cannot be separated from Diphenylamine

1F  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET  
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBXB1

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 770 SAS No.: \_\_\_\_\_ SDG No.: W0118

Matrix: (soil/water) SOIL Lab Sample ID: AB2177R

Sample wt/vol: 30.2 (g/mL) G Lab File ID: AB2177R

Level: (low/med) LOW Date Received: 07/02/94

% Moisture: 18 decanted: (Y/N) N Date Extracted: 07/07/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/25/94

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.2

Number TICs found: 20

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	4.20	250	J
2. 123-42-2	2-PENTANONE, 4-HYDROXY-4-MET	4.87	9800	ABJN
3.	UNKNOWN	8.07	120	J
4.	UNKNOWN	8.27	260	J
5.	UNKNOWN	16.68	500	J
6.	UNKNOWN	18.37	89	J
7.	UNKNOWN	18.53	140	J
8.	UNKNOWN	18.72	530	J
9.	UNKNOWN	18.80	120	J
10.	UNKNOWN	18.87	140	J
11.	UNKNOWN	19.48	230	J
12.	UNKNOWN	20.05	450	J
13.	UNKNOWN	20.72	440	J
14.	UNKNOWN	20.82	1700	J
15.	UNKNOWN	20.95	82	J
16.	UNKNOWN	21.22	190	J
17.	UNKNOWN	21.82	150	J
18.	UNKNOWN	22.47	100	J
19.	UNKNOWN	22.60	140	J
20.	UNKNOWN	23.20	140	J





## NITRATE/NITRITE ANALYSIS

Laboratory Name:	ITAS-KNOXVILLE	SDG Number:	W0118
Contract Name:	Westinghouse Hanford	Job Number:	770
Sample Matrix:	Soil	Extraction Date:	N/A
Concentration Units:	mg/kg	Analysis Date:	07/26/94

Client Sample ID	Lab Sample ID	Result	Qualifiers
Method Blank	AB4339	0.50	U
BOBXB1	AB2181	0.70	+

+ - 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:	W0118
Contract Name:	Westinghouse Hanford	Job Number:	770
Client Sample ID:	BOBXB1	Preparation Date:	07/25/94
Lab Sample ID:	AB2180	Analysis Date:	07/26/94
Sample Matrix:	Soil	Concentration Units:	mg/kg

Compound	Result	Qualifier	Detection Limit
fluoride	0.4	+	0.40
chloride	2.8	+	0.40
nitrite	0.4	U	0.40
nitrate	0.8	+	0.40
phosphate	1.0	U	1.0
sulfate	3.9	+	1.5

+ - Positive result.

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

Analytical Data Package Prepared for

**WESTINGHOUSE HANFORD**

Chemical Analysis By  
**IT Analytical Services**  
Middlebrook Laboratory

Sample Delivery Group Number: W0118

WHC IDENTIFICATION  
NUMBER

ITAS RICHLAND ID  
NUMBER

KNOXVILLE ID  
NUMBER

\* See attached Table I.

**RECORD COPY**





Regional Office  
2800 George Washington Way  
Richland, Washington 99352

W0 #770

SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

Date/Time Received 7/1/94 1145 Client Name WMC

Project/Client # 94-250, 94-040 Batch or Case # N/A

Cooler ID (if noted on the outside of cooler) SR-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: 29

8. Samples have: ✓ tape ✓ custody seals ✓ hazard labels ✓ 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    

12. Have any anomalies been identified above? Yes  No

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

Printed Name/Signature Jon Gilmore Date/Time 7/1/94 1145

<b>Westinghouse Hanford Company</b>		<b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b>										Page <u>1</u> of <u>1</u>			
Collector <b>W. V. SETZER</b>		Company Contact <b>W. V. SETZER</b>					Telephone No. <b>(509) 376-2413</b>					Data Turnaround <input type="checkbox"/> Priority <input checked="" type="checkbox"/> Normal			
Project Designation <b>200 UP-1</b>		Sampling Location <b>699-38-68A</b>					SAF No. <b>94-046</b>								
Ice Chest No. <b>ER-1D</b>		Field Logbook No. <b>EFL-1118</b>					Method of Shipment <b>BY DOE VEHICLE</b>								
Shipped To <b>INTERNATIONAL TECHNOLOGIES</b>		Offsite Property No. <b>W94-0-0746-1D</b>					Bill of Lading/Air Bill No. <b>N/A</b>								
Possible Sample Hazards/Remarks		Preservative	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	
		Type of Container	aGs	aG	G	G	G	G	P/G	P/G			aGs	aGs	
		No. of Container(s)	1	1	1	1	1	1	1	1			1	1	
Special Handling and/or Storage <b>COOL TO 4 DEGREES CENTIGRADE</b>		Volume	125ml	500ml	500ml	250ml	250ml	125ml	1000ml	500ml			125ml	250ml	
SAMPLE ANALYSIS		VOA (CLP)	SEMIVOA (CLP)	ICP MTL GFAA METALS Hg (CLP)	Cn (CLP)	ANIONS NO2, NO3 IC-F, CL EPA(353 SO4, NO2, .2) NO3, PO4							VOA	VOA	ACTIVITY SCAN
<b>407007</b>			<b>01A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>40700801</b>	<b>*1</b>	<b>*1</b>		TRIP	FIELD	<b>50ml</b>
Sample No.	Matrix*	Date Sampled	Time Sampled												
<b>B024B1</b>	<b>S</b>	<b>6-30-94</b>	<b>1502</b>	<b>✓</b>	<b>✓</b>	<b>✓</b>	<b>✓</b>	<b>✓</b>	<b>✓</b>	<b>✓</b>	<b>✓</b>	<b>✓</b>	<b>✓</b>	<b>✓</b>	<b>✓</b>
CHAIN OF POSSESSION		Sign/Print Names					SPECIAL INSTRUCTIONS					Matrix*			
Relinquished By <i>W.V. Setzer</i>		Date/Time <b>6-30-94 1710</b>	Received By <i>J. Thompson</i>		Date/Time <b>6-30-94 1710</b>	*1- GROSS ALPHA, BETA (EP-60,070,170) Am-241, Cm 243/244 (EP-60,070,960) Np-237 (EP-60,070,930) Pu-238,239/240 (EP-60,070,940) U-234,235,238 (EP-60,070,901) GAMMA SPEC TO INCLUDE; Co-58,60, Cs-137, Eu-152,154,155 AND Fe-59 (EP-60,070,100) Sr-90 (EP-60,070,500,519,520) I-129 (EP-024,560) C-14 (EP-060,251) Tc-99 (EP-020,540)					LOWEST HOLDING TIME = 7DAYS		S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air DS = Drum Solids DL = Drum Liquids T = Tissue WI = Wipe L = Liquid V = Vegetation X = Other		
Relinquished By <i>J. Thompson</i>		Date/Time <b>7-1-94 0800</b>	Received By <i>A. Simpson</i>		Date/Time <b>7/1/94 0800</b>										
Relinquished By <i>A. Simpson</i>		Date/Time <b>7/1/94 1145</b>	Received By <i>J. Thompson</i>		Date/Time <b>7/1/94 1145</b>										
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)

9613490.0268

0000021

WO#770

Contractor <b>WHC</b>	<b>OFF-SITE PROPERTY CONTROL</b>	CONTROL NUMBER (To be obtained from PROPERTY MANAGEMENT) <b>W94-0-0746-10</b>
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PART I - TO BE COMPLETED BY ORIGINATOR

Department <b>ER Eng Support</b>	Section <b>Field &amp; Analytical Supp</b>	Unit <b>ER Field Sampling</b>
----------------------------------	--	-------------------------------

The following items are to be shipped from  Contractor  Vendor

Routing  Contractor  Vendor

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

Quantity	Description (Include Serial and any Government Tag Numbers)	Original Cost
1 lbs	Sample #: <b>BOC6PO BOC2Y9 BOC2ZO BOC2Y8 BOC1K9</b> Cooler ID: <b>BETA4 BOC1L0</b> <b>AJS 7/1/94</b> Polycooler with groundwater samples packed in wet ice and vermiculite	N/A
1 lbs	Sample #: <b>BOB4B1 BOC1L1 BOC1K6 BO C1K8 BO BOC1K9</b> Cooler ID: <b>ER-1D BOC1L0</b> Polycooler with groundwater samples packed in wet ice and vermiculite	N/A

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

Necessity for the Off-Site Use of this Property  
**Sampling supports RI/FS work in the 200 area.**

RECEIVED  
JUL 1 1994

Bill of lading # NA

PROPERTY RECORD

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

RM Clearance for Public Release <u>Michael S. Jones</u>	RM Survey No <b>178891</b>	Date <b>7-1-94</b>
Location of Property (Area & Bldg.) <b>200-UP-1</b>	Contact <b>P. H. Butcher</b>	Phone <b>(509) 376-4388</b>
Date Ready for Shipment <b>7/1/94</b>	Cost Code to be Charged <b>88410 / PTIFA</b>	Approximate Date This Property will be Returned <b>NA</b>
Originated By <b>AJ SIMPSON</b>	Date	Authorized By <b>AJ Simpson</b>
Signature and Name of Property Control	Custodian Date	Property Management Approval <b>[Signature]</b>

PART II - TO BE COMPLETED BY SHIPPING

Signature of Recipient <b>R. Boyd Quastner</b>	Return Order No.	Date Issued	Purchase Order No.	Date Issued
Date <b>7-1-94 1155</b>				

DISTRIBUTION

By Originator White, Green, Yellow, Pink - Property Management Goldenrod - Retain	Shipping Operation - Sign all Copies and Forward to: White - Property Management Green - Property Control Custodian (Issuing Office) Yellow - Retain Pink - Originator
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COC NO.



## ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD\*

W# #770  
R# #1037Reference Document No. 453566  
Page 1 of 1Project Name/No. 1 94-040  
Sample Team Members 2 \_\_\_\_\_  
Profit Center No. 3 4632  
Project Manager 4 Van Petray  
Purchase Order No. 6 \_\_\_\_\_  
Required Report Date 11 \_\_\_\_\_Samples Shipment Date 7 7/1/94  
Lab Destination 8 Middlebrook  
Lab Contact 9 \_\_\_\_\_  
Project Contact/Phone 12 \_\_\_\_\_  
Carrier/Waybill No. 13 262 0115 145Bill to: 5 Quanterra Rickland  
Report to: 10 Quanterra Rickland

## 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
40700701A	BOBXBI / soil	See WHC	COCSAR		4°C	See WHC COCSAR	6°C BPS 7/2/94	
B							FOR LAB USE ONLY	
C								
D								
E								
F								
④ 7/1/94								

Special Instructions: 23

Possible Hazard Identification: 24

Non-hazard  Flammable  Skin Irritant  Poison B  Unknown 

Sample Disposal: 25

Return to Client  Disposal by Lab  Archive \_\_\_\_\_ (mos.)

Turnaround Time Required: 26

Normal  Rush 

QC Level: 27

I.  II.  III.  Project Specific (specify): SDG W0118

1. Relinquished by 28

(Signature/Affiliation)

[Signature] QuanterraDate: 7/1/94Time: 1600

1. Received by 28

(Signature/Affiliation)

[Signature] QuanterraDate: 7/02/94Time: 9:30

2. Relinquished by

(Signature/Affiliation)

Date: \_\_\_\_\_

Time: \_\_\_\_\_

2. Received by

(Signature/Affiliation)

Date: \_\_\_\_\_

Time: \_\_\_\_\_

3. Relinquished by

(Signature/Affiliation)

Date: \_\_\_\_\_

Time: \_\_\_\_\_

3. Received by

(Signature/Affiliation)

Date: \_\_\_\_\_

Time: \_\_\_\_\_

Comments: 29

Write: To accompany samples

Yellow: Field copy

\* See back of form for special instructions.

9613490.0270

0000023

SCREENING CALCULATION SPREADSHEET

*W07770*

*All are Cat. I.  
PRM 1 July 94*

Cust Code	Received Date	Screening Prep Date	Count Date	Mnts. Cntd	BACKGROUND		
					Alpha	Beta	Mnts
WHC	7-1-94	7-1	7-1	10	14	263	240

Customer ID	pH <2	Residue Wght mG	Vol. Anal. mG mL	Sample Size Gm L	SMPL CNT DATA			Net Sample Counts/Minute		DPM / Aliquot		uCi per Sample		2 Sigma Error uCi per Sample		pCi/(Gm or L)		Category 1 Yes/No	Aliquot to Cat 1 Gm or L		
					Hldr Num.	Total Alpha	Counts Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta		Alpha	Beta	
BOC6P0		6.0	10	1.0	53	1	27	0.04	1.60	6.04E-02	3.36E+00	3.6E-06	1.5E-04	2.2E-06	8.0E-06	3.6E+00	1.5E+02	Yes	2.6E+03	6.8E+02	
BOC1M6		4.8	10	2.0	54	3	22	0.24	1.10	8.41E-01	2.17E+00	7.6E-05	2.0E-04	1.1E-07	1.3E-07	3.8E+01	9.8E+01	Yes	2.6E+02	1.0E+03	
BOC1L1		10.1	10	2.0	52	6	29	0.54	1.60	2.03E+00	3.48E+00	1.8E-04	3.1E-04	1.8E-07	2.9E-07	9.1E+01	1.6E+02	Yes	1.1E+02	6.4E+02	
BOC1M2		5.9	10	2.0	49	4	19	0.34	0.60	1.24E+00	1.48E+00	1.1E-04	1.3E-04	1.3E-07	1.3E-07	5.6E+01	6.7E+01	Yes	1.8E+02	1.5E+03	
TOTAL UCI																					

9613490.0271

9613490.0272

0000025

07/01/94 07:18 373 3178

2225 3B

009

wo\* 770

SAMPLE STATUS REPORT FOR E 7433. E-BLANK BOBXB1 TIME: 7/ 1/94 0:32  
 DISPATCHED: 5/13/94 7:54 SAMPLE HAS NOT BEEN SLURPED  
 RECEIVED: 6/30/94 16:11

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 B4B1

9613490.0273



Analytical Data Package Prepared For

# Westinghouse Hanford



Radiochemical Analysis By

IT Analytical Services  
*Richland Laboratory*

Sample Delivery Group Number: W0118

CLIENT IDENTIFICATION NUMBER

B0BXB1

ITAS RICHLAND ID NUMBER

40700801

RECORD COPY

0001



## CERTIFICATE OF ANALYSIS

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

August 29, 1994

Attention: J.A.Lerch

SAF Number	:	94-046
Date SDG Closed	:	July 15, 1994
Number of Samples	:	One (1)
Sample Type	:	Soil
SDG Number	:	W0118
Data Deliverable	:	Stand Alone

### I. Introduction

On July 1, 1994, one soil 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>
407008-01A	BOBXB1	Soil	7/1/94

### II. Analytical Results/Methodology

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

Westinghouse Hanford Company  
August 29, 1994  
Page 2

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The requested analyses were:

**Alpha Spectroscopy**

Americium-241, Curium-244 by method ITAS-RD-3302

Neptunium-237 by method ITAS-RD-3208

Plutonium-238, 239/40 by method ITAS-RD-3209

Uranium-234, 235, 238 by method ITAS-RD-3234

**Gamma Spectroscopy**

Gamma Scan by method ITAS-RD-3219

Iodine-129 by method ITAS-RD-3219

**Gas Proportional Counting**

Gross Alpha by method ITAS-RD-3222

Gross Beta by method ITAS-RD-3222

Strontium-90 by method ITAS-RD-3204

**Liquid Scintillation Counting**

Carbon-14 by method ITAS-RD-3247

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

**III. Quality Control**

The analytical results for each analysis performed under SDG W0118 include a minimum of one Laboratory Control Sample (LCS), one method (reagent) blank, and one duplicate.

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

**IV. Comments**

The initial radioactivity screening of the sample classified it as Category II.

The WHC COC/RFA form and WHC Off-Site Property Control form W94-0-0746-10 list sample ID number as B0B4B1. The bottle is labeled B0BXB1. The sample was logged and analyzed using sample ID number B0BXB1.

The WHC COC/RFA form lists the sample matrix as soil. The WHC Off-Site Property Control form W94-0-0746-10 describes the sample as groundwater. The sample was logged and analyzed as a soil.

Westinghouse Hanford Company  
August 29, 1994  
Page 3

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### **Alpha Spectroscopy**

#### Americium-241, Curium-244 by method ITAS-RD-3302

The batch was reanalyzed due to low tracer yields on the initial analysis. The reanalysis LCS, batch blank, sample and sample duplicate (duplicate of sample B0BXB1) results are within contractual requirements.

#### Neptunium-237 by method ITAS-RD-3208

The batch was reanalyzed due to low matrix spike recoveries. The reanalysis LCS, batch blank, sample and sample duplicate (duplicate of sample B0BXB1) results are within contractual requirements.

#### Plutonium-238, 239/40 by method ITAS-RD-3209

The batch was reanalyzed due to a low radiochemical recovery on the spike. The reanalysis blank tracer yield is less than 20%, however, the batch results are reported and the batch is accepted because the required detection limit was achieved for each result in the batch, the sample result was less than contractual detection limit, the sample was duplicated and the sample duplicate result is within the 3 sigma error around the sample result, and the reanalysis results for the sample and sample duplicate are within 3 sigma error around the original results. The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BXB1) results are accepted and reported.

#### Uranium-234, 235, 238 by method ITAS-RD-3234

The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BXB1) results are accepted and reported.

Westinghouse Hanford Company  
August 29, 1994  
Page 4

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## **Gamma Spectroscopy**

### Gamma Scan by method ITAS-RD-3219

The Fe-59 RDL was not met for sample B0BXB1 and the duplicate of sample B0BXB1. The RDLs were achieved for the batch blank, therefore, the sample MDAs are accepted. Cd-109 was detected in sample B0BXB1, the duplicate of B0BXB1, and the LCS. The Cd-109 results are not reported because they are suspected false positive results caused by x-ray lines produced by energy reflection from the detector shielding. Sample B0BXB1 and the duplicate of sample B0BXB1 agree within the 3 sigma control limit for Cs-137, K-40, Ra-226, and U-238DLP. The sample and duplicate do not agree within 3 sigma for Ra-224 and Ra-228. The duplicate data are accepted based on the acceptable Cs-137, K-40, Ra-226, and U-238DLP agreement. The LCS and batch blank results are within contractual requirements.

### Iodine-129 by method ITAS-RD-3219

The LCS spike recovery was biased high for the I-129 analysis. Using the detector efficiency for I-129 in soil (IS9) the reagent water LCS recovery was 153%. After a percent recovery correction using the water matrix, 50 ml geometry efficiency, the spike recovery was 124%, therefore, the LCS was recounted. The recount of the LCS indicated a high bias (155%) again, and again the correction was made for the difference between the sample and QC sample matrices and the recount LCS result was still biased high (126%). The original LCS value is accepted and reported. The Quanterra Technical Associate Group is developing a soil I-129 LCS for soil and "other" matrix samples as corrective action for the problem encountered when evaluating the I-129 activity of reagent water QC samples which have a specific gravity that is different from that of the soil and "other" matrix samples. The result for sample B0BXB1 and the duplicate of sample B0BXB1 are not with the three sigma control limit, however, the results are well below the RDL, therefore, the results are accepted. The batch blank result is within contractual limits.

## **Gas Proportional Counting**

### Gross Alpha by method ITAS-RD-3222

The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BXB1) results are within contractual requirements.

Westinghouse Hanford Company  
August 29, 1994  
Page 5

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Gross Beta by method ITAS-RD-3222

The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BXB1) results are within contractual requirements.

Strontium-90 by method ITAS-RD-3204

The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BXB1) results are within contractual requirements.

**Liquid Scintillation Counting**

Carbon-14 by method ITAS-RD-3247

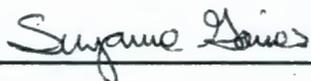
Carbon-14 results are not reportable for these samples due to an insufficient presence of carbon in the samples to perform the analysis. The carbon-14 method requires that 2 grams of carbon be present in each sample. The samples produced insufficient carbon dioxide during sample preparation. Two separate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

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

The matrix spike, LCS, batch blank, sample and sample duplicate (duplicate of sample B0BXB1) results are within contractual requirements.

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

Reviewed and approved:

  
\_\_\_\_\_

Suzanne Gaines  
Project Manager

## SAMPLE RESULTS

LAB NAME: ITAS-RICHLAND                      SDG: W0118  
 LAB SAMPLE ID: 40700801                      MATRIX: SOIL  
 CLIENT ID: B0BXB1                              DATE RECEIVED: 7/1/94

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
AM-241	1.54E-02	1.83E-02	1.85E-02	2.12E-02	pCi/g	68.70%	RD3302
CM-242	-5.26E-04	1.05E-03	1.06E-03	2.65E-02	pCi/g	68.70%	RD3302
CM-244	0.00E+00	0.00E+00	1.59E-02	1.44E-02	pCi/g	68.70%	RD3302
NP-237	-6.66E-04	9.42E-04	9.53E-04	1.90E-02	pCi/g	100.00%	RD3208
PU-238	0.00E+00	0.00E+00	1.78E-02	1.61E-02	pCi/g	70.20%	RD3209
PU239/40	4.74E-03	1.21E-02	1.21E-02	2.84E-02	pCi/g	70.20%	RD3209
U-234	6.80E-01	1.60E-01	1.92E-01	6.76E-02	pCi/g	44.80%	RD3234
U-235	2.72E-02	3.23E-02	3.26E-02	3.74E-02	pCi/g	44.80%	RD3234
U-238DA	8.98E-01	1.83E-01	2.30E-01	5.76E-02	pCi/g	44.80%	RD3234
CO-58	-3.99E-03	1.15E-02	1.15E-02	1.90E-02	pCi/g	N/A	RD3219
CO-60	6.31E-03	1.06E-02	1.06E-02	1.88E-02	pCi/g	N/A	RD3219
CS-137DA	-5.20E-03	1.04E-02	1.04E-02	1.64E-02	pCi/g	N/A	RD3219
EU-152	4.72E-03	2.29E-02	2.29E-02	3.84E-02	pCi/g	N/A	RD3219
EU-154	-2.09E-02	3.40E-02	3.40E-02	5.66E-02	pCi/g	N/A	RD3219
EU-155	2.07E-02	3.02E-02	3.03E-02	4.75E-02	pCi/g	N/A	RD3219
FE-59	9.58E-04	3.29E-02	3.29E-02	5.52E-02	pCi/g	N/A	RD3219
I-129LP	4.90E-01	4.94E-01	4.97E-01	9.11E-01	pCi/g	N/A	RD3219
K-40	1.41E+01	5.00E-01	1.50E+00	N/A	pCi/g	N/A	RD3219
RA-224DA	7.49E-01	3.25E-02	8.16E-02	N/A	pCi/g	N/A	RD3219
RA-226DA	4.46E-01	4.49E-02	6.32E-02	N/A	pCi/g	N/A	RD3219
RA-228DA	7.02E-01	8.64E-02	1.11E-01	N/A	pCi/g	N/A	RD3219
U-238DLP	7.58E-01	4.66E-01	4.72E-01	N/A	pCi/g	N/A	RD3219
ALPHA	1.72E+01	5.87E+00	6.16E+00	4.87E+00	pCi/g	100.00%	RD3214
BETA	2.84E+01	3.77E+00	4.21E+00	3.67E+00	pCi/g	100.00%	RD3214
STRONTIUM	3.45E-01	7.79E-02	1.16E-01	1.32E-01	pCi/g	90.10%	RD3204

## SAMPLE RESULTS

LAB NAME: ITAS-RICHLAND SDG: W0118  
LAB SAMPLE ID: 40700801 MATRIX: SOIL  
CLIENT ID: B0BXB1 DATE RECEIVED: 7/1/94

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
TC-99	3.40E-01	2.19E-01	9.85E-01	4.96E-01	pCi/g	100.00%	ITAS-IT-RS-0001

Number of Results: 26

TENNELEC #2

## SCREENING CALCULATION SPREADSHEET

Cust Code	Received Date	Screening Prep Date	Count Date	Mnts. Cntd	BACKGROUND		
WHC	7-1-94	7-1	7-1	10	Alpha	Beta	Mnts
					14	263	240

*Cat. II because of sample size only. Jkn 1 July 94*

Customer ID	pH <2 Rcvd/Relq	Residue Wght mG	Vol. Anal. mG mL	Sample Size Gm L	SMPL CNT DATA			Net Sample Counts/Minute		DPM / Aliquot		uCi per Sample		2 Sigma Error uCi per Sample		pCi/(Gm or L)		Category 1 Yes/No	Aliquot to Cat 1 Gm or L	
					Hldr Num	Total Alpha	Counts Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta		Alpha	Beta
BOBXB1		92.5	93	1400.0	1	7	33	0.64	2.20	4.52E+00	4.79E+00	3.1E-02	3.3E-02	2.8E-05	1.6E-05	2.2E+01	2.3E+01	No	4.5E+02	4.3E+03

407007 - Chem  
407008 - Rad.

0046



INTERNATIONAL  
TECHNOLOGY  
CORPORATION

DUE DATE 8-19

REANALYSIS / RECOUNT  
CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

ANALYSIS Am (only) NAME/DATE mmm 1 8-15-94  
 CUSTOMER WHL - SAMPLE DELIVERY GROUP WD 118  
 MATRIX soil BATCH NUMBER \_\_\_\_\_

ITAS ID	CUSTOMER ID	COMMENTS
1 ) 40700801 ✓	ESS11476 Pat II	1st part of Am fraction
2 ) F 01	↓ 11477 ↓	
3 )		
4 )		
5 )		
6 )		
7 )		
8 )		
9 )		
10)		

REANALYSIS

\*REFERENCED QC\*

ITAS ID - <sup>ESS11475</sup> BLANK L070082B  
 ITAS ID - <sup>IQ6 075</sup> SPIKE L070082S  
 CLIENT CODE WHL

ACTIONS (Initial & Date)

PREP LAB RECEIVED 8/15/94 Bm

SAMPLE REMAINDER Bm  
 RETURNED TO SCG  (CHECK ONE)

NO SAMPLE REMAINING   
RD 3221 8/16/94 Bm  
 SEPARATION LAB \_\_\_\_\_

COUNTING/MEASUREMENT Zm 8/21/94

DATA REVIEWED mmm 8-22-94

ANALYTICAL PREP STORED mmm 8-22-94

RECOUNT

ACTIONS (Initial & Date)

COUNTING/MEASUREMENT \_\_\_\_\_

DATA REVIEWED \_\_\_\_\_

ANALYTICAL PREP STORED \_\_\_\_\_

ADDITIONAL COMMENTS:

OX 8/17/94 JMH  
 OH- 8/18/94 JMH  
 Pa Col 8/18/94 JMH  
 Am Col 8/19/94 JMH

✓ indicates some red left in glass wool plug



DUE DATE 8-5

REANALYSIS / RECOUNT  
CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

ANALYSIS Np  
CUSTOMER WTC  
MATRIX Soil

NAME/DATE mm 1 8494  
SAMPLE DELIVERY GROUP \_\_\_\_\_  
BATCH NUMBER \_\_\_\_\_

ITAS ID	CUSTOMER ID	COMMENTS
1) .40700801		
2) F0700801		
3) W0700801	EQR098	25.642± .36059
4) W0700810	EQR099	25.033± .35203
5) 25	EQR097	25.642± .36059
6)		
7)		
8)		
9)		
10)		

REANALYSIS

RECOUNT

\*REFERENCED QC\*

ACTIONS (Initial & Date)

ITAS ID - BLANK L07008 2B ✓  
ITAS ID - SPIKE EQR097 07008 25 ✓  
CLIENT CODE WTC

COUNTING/MEASUREMENT \_\_\_\_\_  
DATA REVIEWED \_\_\_\_\_  
ANALYTICAL PREP STORED \_\_\_\_\_

ACTIONS (Initial & Date)

ADDITIONAL COMMENTS:

PREP LAB RECEIVED 8/5/94 Bm  
SAMPLE REMAINDER  
RETURNED TO SCG  (CHECK ONE)  
NO SAMPLE REMAINING   
RD 3221 8/6/94 Bm  
SEPARATION LAB 7-7-94 Susan  
COUNTING/MEASUREMENT RH 8/12/94  
DATA REVIEWED mm 8 7694  
ANALYTICAL PREP STORED mm 8 76 94

cept - 8/12-94 dk  
WTC transfer 8/16-94 mm

9613490.0284



INTERNATIONAL  
TECHNOLOGY  
CORPORATION

DUE DATE 8-19

REANALYSIS / RECOUNT  
CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

ANALYSIS Pu

NAME/DATE mmh 18-12-94

CUSTOMER ~~178-5-94~~ ~~ROP~~ WHC

SAMPLE DELIVERY GROUP W0118

MATRIX soil

BATCH NUMBER \_\_\_\_\_

ITAS ID	CUSTOMER ID	COMMENTS
1 ) 40700801	FSH 17383 nat II	sp. k recovery 16.9%
2 ) F 01	↓ 17384 ↓	
3 )		
4 )		
5 )		
6 )		
7 )		
8 )		
9 )		
10 )		

REANALYSIS

RECOUNT

\*REFERENCED QC\*

ACTIONS (Initial & Date)

ITAS ID - <sup>FSH 17382</sup> BLANK L670082B

COUNTING/MEASUREMENT \_\_\_\_\_

ITAS ID - <sup>I&H 128</sup> SPIKE L070082S

DATA REVIEWED \_\_\_\_\_

CLIENT CODE WHC

ANALYTICAL PREP STORED \_\_\_\_\_

ACTIONS (Initial & Date)

PREP LAB RECEIVED 8/15/94 mmh

SAMPLE REMAINDER

RETURNED TO SCG  mmh (CHECK ONE)

NO SAMPLE REMAINING

SEPARATION LAB RD 3221 8/16/94 mmh  
mmh 9-17-94

COUNTING/MEASUREMENT 24 8/20/94

DATA REVIEWED mmh 8-24-94

ANALYTICAL PREP STORED mmh 8-24-94

ADDITIONAL COMMENTS:

OX 8/17/94 mmh  
OH- 8/18/94  
Pu Col 8/18/94  
Cu 8/19/94 mmh

ED-AB 8-19-94 LB

OK to transfer 8-24-94 mmh

RC-048 12/92 REV 2

0052



REANALYSIS / RECOUNT  
CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

ANALYSIS I129LP

NAME/DATE (R3) 1 7/29/94

CUSTOMER WHC

SAMPLE DELIVERY GROUP W00118

MATRIX SOIL

BATCH NUMBER 7-008

ITAS ID	CUSTOMER ID	COMMENTS
1 ) <u>160700815</u>		<u>100 min</u>
2 )		
3 )		
4 )		
5 )		
6 )		
7 )		
8 )		
9 )		
10)		

REANALYSIS

\*REFERENCED QC\*

ITAS ID - BLANK \_\_\_\_\_

ITAS ID - SPIKE \_\_\_\_\_

CLIENT CODE \_\_\_\_\_

ACTIONS (Initial & Date)

PREP LAB RECEIVED \_\_\_\_\_

SAMPLE REMAINDER

RETURNED TO SCG \_\_\_\_\_  (CHECK ONE)

NO SAMPLE REMAINING \_\_\_\_\_

SEPARATION LAB \_\_\_\_\_

COUNTING/MEASUREMENT \_\_\_\_\_

DATA REVIEWED \_\_\_\_\_

ANALYTICAL PREP STORED \_\_\_\_\_

RECOUNT

ACTIONS (Initial & Date)

COUNTING/MEASUREMENT AS 7-29-94

DATA REVIEWED ATK-8-1-94

ANALYTICAL PREP STORED \_\_\_\_\_

ADDITIONAL COMMENTS:

## RECORD COPY

MEMORANDUM



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

December 8, 1994

FR: Diana Waterbury, Golder Associates Inc.

RE: VOLATILES DATA VALIDATION SUMMARY FOR  
DATA PACKAGE: W0118-QES-124, (943-1610.036, 124VOA.UP1)

## INTRODUCTION

This memo presents the results of data validation on data package W0118-QES-124 prepared by the International Technology Analytical Services. Sample information is provided in the following table.

SAMPLE ID	MEDIA	ANALYSIS	COMMENTS
B0BXB1*	SOIL	VOLATILES  SEE ATTACHMENT 4	NONE
* Indicates sample results which were 100% recalculated.			

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

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

## DATA QUALITY OBJECTIVES

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

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

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

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

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

**Completeness.** The data package was complete for all requested analyses. A total of one (1) sample was validated in this data package with a total of 33 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent which meets the work plan completeness objective of 90 percent.

*Revised  
12/8/94*

**MAJOR DEFICIENCIES**

No major deficiencies were identified during data validation which required qualification of data as unusable.

**MINOR DEFICIENCIES**

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

**Laboratory Blanks**

- Methylene chloride was detected in the laboratory blank. Attachments 2 and 5 provide a summary of samples affected, qualification applied and supporting documentation.

**REFERENCES**

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

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

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

## ATTACHMENT 1. GLOSSARY OF DATA REPORTING QUALIFIERS

- B - Indicates the constituent was analyzed for and detected in the associated laboratory blank. This qualifier is applied by the laboratory. During the process of data validation this qualifier may be replaced by other appropriate qualifiers as defined by the validation procedures. The associated data should be considered usable for decision making purposes.
- U - Indicates the constituent was analyzed for and not detected. The concentration reported is the sample quantitation limit corrected for aliquot size, dilution and percent solids (in the case of solid matrices) by the laboratory. The associated data should be considered usable for decision making purposes.
- UJ - Indicates the constituent was analyzed for and not detected. Due to a minor quality control deficiency identified during data validation the concentration reported may not accurately reflect the sample quantitation limit. The associated data should be considered usable for decision making purposes.
- J - Indicates the constituent was analyzed for and detected. This qualifier may be applied by the laboratory to indicate a concentration which is less than the contract required quantitation limit (CRQL) but greater than the instrument detection limit (IDL). During data validation this qualifier may be applied to indicate a minor quality control deficiency. However in either case, the associated data should be considered usable for decision making purposes.
- NJ - Indicates presumptive evidence of a constituent at an estimated value. This qualifier is normally applied to GC analysis data (such as organochlorine pesticide and PCB data). The associated data should be considered usable for decision making purposes.
- N - Indicates presumptive evidence of a constituent. This qualifier is normally applied to GC analysis data (such as organochlorine pesticide and PCB data). The associated data should be considered usable for decision making purposes.
- JN - Indicates a tentatively identified compound (TIC) whose concentration and identification have been determined to be valid as a result of data validation. The associated data should be considered usable for decision making purposes.
- UJN - Indicates a tentatively identified compound (TIC) that has been determined to be presumptive and valid (JN) in terms of identification and quantitation and has been qualified as undetected (U) due to associated blank contamination.
- UR - Indicates the constituent was analyzed for and not detected. The concentration reported has been qualified as unusable due to a major quality control deficiency identified during data validation. The associated data should be considered unusable for decision making purposes.
- R - Indicates the constituent was analyzed for and detected. The concentration reported has been qualified as unusable due to a major quality control deficiency identified during data validation. The associated data should be considered unusable for decision making purposes.

9613490.0290

WHC-SD-EN-SPP-002, REV.2

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS



9613490.0292

WHC-SD-EN-SPP-002, REV.2

ATTACHMENT 3

QUALIFIED DATA SUMMARY and ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: W0118-QES-124

Parameter	Samp#		BOBxB1	
	Units	Result	Q	
	Date	6-30-94		
	Location	299-W19-35		
	Depth	416.00 - 417.50		
	Type	SOIL		
	Comments			
CHLOROMETHANE	UG/KG	12.000	U	
BROMOMETHANE	UG/KG	12.000	U	
VINYL CHLORIDE	UG/KG	12.000	U	
CHLOROETHANE	UG/KG	12.000	U	
METHYLENE CHLORIDE	UG/KG	12.000	U	
ACETONE	UG/KG	5.000	J	
CARBON DISULFIDE	UG/KG	12.000	U	
1,1-DICHLOROETHENE	UG/KG	12.000	U	
1,1-DICHLOROETHANE	UG/KG	12.000	U	
1,2-DICHLOROETHENE (TOTAL)	UG/KG	12.000	U	
CHLOROFORM	UG/KG	12.000	U	
1,2-DICHLOROETHANE	UG/KG	12.000	U	
2-BUTANONE	UG/KG	12.000	U	
1,1,1-TRICHLOROETHANE	UG/KG	12.000	U	
CARBON TETRACHLORIDE	UG/KG	12.000	U	
BROMODICHLOROMETHANE	UG/KG	12.000	U	
1,2-DICHLOROPROPANE	UG/KG	12.000	U	
CIS-1,3-DICHLOROPROPENE	UG/KG	12.000	U	
TRICHLOROETHENE	UG/KG	12.000	U	
DIBROMOCHLOROMETHANE	UG/KG	12.000	U	
1,1,2-TRICHLOROETHANE	UG/KG	12.000	U	
BENZENE	UG/KG	12.000	U	
TRANS-1,3-DICHLOROPROPENE	UG/KG	12.000	U	
BROMOFORM	UG/KG	12.000	U	
4-METHYL-2-PENTANONE	UG/KG	12.000	U	
2-HEXANONE	UG/KG	12.000	U	
TETRACHLOROETHENE	UG/KG	12.000	U	
1,1,2,2-TETRACHLOROETHANE	UG/KG	12.000	U	
TOLUENE	UG/KG	12.000	U	
CHLOROBENZENE	UG/KG	12.000	U	
ETHYLBENZENE	UG/KG	12.000	U	
STYRENE	UG/KG	12.000	U	
XYLENES (TOTAL)	UG/KG	12.000	U	

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

96154971293

808

*Rev 1/2/94*



1E  
VOLATILE ORGANICS ANALYSIS DATA SHEET  
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBXB1

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 770 SAS No.: \_\_\_\_\_ SDG No.: W0118

Matrix: (soil/water) SOIL Lab Sample ID: AB2176

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AG13H

Level: (low/med) LOW Date Received: 07/02/94

% Moisture: not dec. 18 Date Analyzed: 07/13/94

GC Column: DB624 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/KG

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

*CSH*  
11-9-94

9613490.0296

WHC-SD-EN-SPP-002, REV.2

ATTACHMENT 4

LABORATORY NARRATIVE and CHAIN-OF-CUSTODY DOCUMENTATION



# ANALYTICAL SERVICES

## CERTIFICATE OF ANALYSIS

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



August 11, 1994

Job Number: 770

This is the Certificate of Analysis for the following sample:

SDG:	W0118
Client Project ID:	WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1
Received by Knoxville:	July 2, 1994
Number of Samples:	One (1)
Sample Type:	Soil

### I. Introduction

On July 1, 1994, one (1) soil sample 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 sample was analyzed for Target Compound List (TCL) volatiles and semivolatiles by gas chromatography/mass spectroscopy (GC/MS) in accordance with the EPA CLP OLM01.8 Statement of Work.

Reviewed and Approved:

*Sheree A. Schneider*

Sheree' A. Schneider  
Project Manager



IT Corporation  
August 11, 1994  
Job Number: 770

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

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## II. Analytical Results/Methodology (Continued)

The sample was analyzed for Target Analyte List (TAL) metals by cold vapor atomic absorption spectroscopy (CVAA), graphite furnace atomic absorption spectroscopy (GFAA), and inductively coupled plasma spectroscopy (ICP) in accordance with the EPA CLP ILM03.0 Statement of Work.

The sample was analyzed for total cyanide in accordance with the EPA CLP ILM03.0 Statement of Work.

The sample was analyzed for nitrate-nitrite based on EPA method 353.2.

The sample was analyzed for anions by ion chromatography using EPA method 300.0.

## III. Quality Control

The volatiles analyses were performed by purge and trap with a J & W DB-624 capillary column on a Finnigan INCOS 500 GC/MS/DS. A matrix spike and matrix spike duplicate were analyzed using sample BOBXB1. All QC results met method specified limits.

The semivolatiles analyses were performed by direct injection of sample extract on a Restek XTI-5 capillary column on a Finnigan INCOS XL GC/MS/DS. A matrix spike and matrix spike duplicate were analyzed using sample BOBXB1. 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.

IT Corporation  
August 11, 1994  
Job Number: 770  
Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

### III. Quality Control (Continued)

The sample was digested on July 22, 1994 for ICP and July 22 and 25, 1994 for GFAA. The CVAA analysis for mercury was performed on July 25, 1994; the GFAA analyses for arsenic, lead, selenium and thallium were performed July 22 and July 29, 1994; the remaining metals were analyzed by ICP on July 25, 1994. All run QC was acceptable. A duplicate/spike pair was prepared using sample number BOBXB1. Spike recovery (accuracy) results were within acceptance limits for all parameters except for antimony, chromium and manganese. A post digestion spike was performed as required per CLP protocol. Poor spike recovery for antimony is attributable to matrix interferences. Poor spike recovery for chromium and manganese is attributable to sample nonhomogeneity as exhibited by the duplicate RPD results for these analytes. Duplicate RPD (precision) results were within acceptance limits for all parameters except for aluminum, chromium, iron, magnesium, manganese, vanadium and zinc. Poor duplicate precision for these analytes is attributable to sample nonhomogeneity. Cadmium was not outside acceptance limits for spike recovery per CLP rounding rules.

Data were reported with qualifiers as follows:

#### "C" Qualifiers

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

#### "O" Qualifiers

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

#### "M" Qualifiers

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

IT Corporation  
August 11, 1994  
Job Number: 770

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

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### III. Quality Control (Continued)

#### Miscellaneous

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

The sample was analyzed for nitrate/nitrite on July 26, 1994. A matrix spike and matrix spike duplicate were analyzed using sample BOBXB1.

The sample was analyzed for fluoride, chloride, phosphate, nitrate, nitrite and sulfate by EPA method 300.0 on July 26, 1994. A matrix spike and matrix spike duplicate were analyzed using sample BOBXB1. All QC results were acceptable.

IT Corporation  
August 11, 1994  
Job Number: 770  
Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

III. Quality Control (Continued)

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

TABLE I

Knoxville ID	Richland ID	WHC ID	Test
AB2176	407007-01A	BOBXB1	VOC
AB2177	407007-01B	"	SVOC
AB2178	407007-01C	"	METALS-T
AB2179	407007-01D	"	CN
AB2180	407007-01E	"	ANIONS
AB2181	407007-01F	"	NO3NO2

IT Corporation  
August 11, 1994  
Job Number: 770  
Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

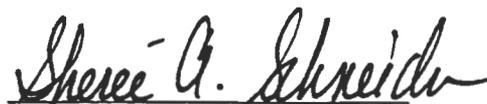
---

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

#### IV. Certification

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

Reviewed and Approved:



Sheree' A. Schneider  
Project Manager

Westinghouse Hanford Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

WO # 770

Page 1 of 1

Date Turnaround

Priority  
 Normal

Collector W. V. SETZER	Company Contact W. V. SETZER	Telephone No. (509) 376-2413
Project Designation 200 UP-1	Sampling Location 699-38-68A	SAF No. 94-046
Ice Chest No. ER-1D	Field Logbook No. EFL-1118	Method of Shipment BY DOE VEHICLE
Shipped To INTERNATIONAL TECHNOLOGIES	Offsite Property No. 194-0-0746-10	Bill of Lading/Air Bill No. N/A

Possible Sample Hazards/Remarks	Preservative	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	
	Type of Container	aGs	aG	G	G	G	G	P/G	P/G					aGs	aGs	
	No. of Container(s)	1	1	1	1	1	1	1	1					1	1	
Special Handling and/or Storage COOL TO 4 DEGREES CENTIGRADE	Volume	125ml	500ml	500ml	250ml	250ml	125ml	1000ml	500ml					125ml	250ml	
SAMPLE ANALYSIS 407007	VOA (CLP)	SEMIVOA (CLP)	ICP MTL GFAA METALS Hg (CLP)	Cn (CLP)	ANIONS NO2, NO3 IC-F, CL SO4, NO2, NO3, PO4	NO2, NO3 EPA(353 .2)								VOA TRIP	VOA FIELD	ACTIVITY SCAN
								*1	*1							500ml 6-30-94

Sample No.	Matrix*	Date Sampled	Time Sampled												
B034B1	S	6-30-94	1502	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

CHAIN OF POSSESSION	Sign/Print Names	SPECIAL INSTRUCTIONS	Matrix*		
Relinquished By <i>W.V. Setzer</i>	Date/Time 6-30-94 1710	Received By <i>J. Thompson</i>	Date/Time 6-30-94 1710		
Relinquished By <i>J. Thompson</i>	Date/Time 7-1-94 0800	Received By <i>W.H.C.</i>	Date/Time 7/1/94 0800		
Relinquished By <i>W.H.C.</i>	Date/Time 7/1/94 1145	Received By <i>[Signature]</i>	Date/Time 7/1/94 1145		
LABORATORY SECTION		Title		Date/Time	
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By	

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

LOWEST HOLDING TIME = 7DAYS

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

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WHC-SD-EN-SPP-002, REV.2

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	<b>D</b>	E
PROJECT:	200-UP-1		DATA PACKAGE: W0118- <del>0155</del> -124		
VALIDATOR:	WATERBURY	LAB:	<del>WATERBURY</del>	DATE: 11-8-94	
CASE:	IT		SDG: W0118		
ANALYSES PERFORMED					
<input checked="" type="checkbox"/> CLP Volatiles	<input type="checkbox"/> SW-846 8240 (cap column)	<input type="checkbox"/> SW-846 8260 (packed column)	<input type="checkbox"/> CLP Semivolatiles	<input type="checkbox"/> SW-846 8270 (cap column)	<input type="checkbox"/> SW-846 (packed column)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SAMPLES/MATRIX	BOBXBI - SOIL				

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

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

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

2. HOLDING TIMES

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

Comments: See attachment 5.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. INSTRUMENT TUNING AND CALIBRATION

- Is the GC/MS tuning/performance check acceptable? . . . . .  Yes No N/A
- Are initial calibrations acceptable? . . . . .  Yes No N/A
- Are continuing calibrations acceptable? . . . . .  Yes No N/A

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

4. BLANKS

- Were laboratory blanks analyzed? . . . . .  Yes No N/A
- Are laboratory blank results acceptable? . . . . .  Yes  No N/A *12/8/74*
- Were field/trip blanks analyzed? . . . . . Yes  No N/A
- Are field/trip blank results acceptable? . . . . . Yes No  N/A

Comments: *Methylene chloride detected in lab. blank. Associated results qualified non-detected (u)*  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

5. ACCURACY

- Were surrogates/System Monitoring Compounds analyzed? . . . . .  Yes No N/A
- Are surrogate/System Monitoring Compound recoveries acceptable?  Yes No N/A
- Were MS/MSD samples analyzed? . . . . .  Yes No N/A
- Are MS/MSD results acceptable? . . . . .  Yes No N/A

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

GC/MS ORGANIC DATA VALIDATION CHECKLIST

6. PRECISION

- Are MS/MSD RPD values acceptable? . . . . .  Yes No N/A
- Are field duplicate RPD values acceptable? . . . . .  Yes No  N/A
- Are field split RPD values acceptable? . . . . .  Yes No  N/A

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

7. SYSTEM PERFORMANCE

- Were internal standards analyzed? . . . . .  Yes No N/A
- Are internal standard areas acceptable? . . . . .  Yes No N/A
- Are internal standard retention times acceptable? . . . . .  Yes No N/A

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

8. COMPOUND IDENTIFICATION AND QUANTITATION

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

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

9. REPORTED RESULTS AND QUANTITATION LIMITS

- Are results reported for all requested analyses? . . . . .  Yes No N/A
- Are all results supported in the raw data? . . . . .  Yes No N/A
- Do results meet the CRQLs? . . . . .  Yes No N/A
- Has the laboratory properly identified and coded all TIC? . . .  Yes No N/A

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



1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKAB2756

Lab Name: ITAS-KNOXVILLE Contract: HANFORD  
 Lab Code: ITSTU Case No.: 770 SAS No.: \_\_\_\_\_ SDG No.: W0118  
 Matrix: (soil/water) SOIL Lab Sample ID: PB0713  
 Sample wt/vol: 5.0 (g/mL) G Lab File ID: AG13F  
 Level: (low/med) LOW Date Received: \_\_\_\_\_  
 % Moisture: not dec. \_\_\_\_\_ Date Analyzed: 07/13/94  
 GC Column: DB624 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) <u>UG/KG</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	17	
67-64-1	-----Acetone	10	U
75-15-0	-----Carbon Disulfide	10	U
75-35-4	-----1,1-Dichloroethene	10	U
75-34-3	-----1,1-Dichloroethane	10	U
540-59-0	-----1,2-Dichloroethene (total)	10	U
67-66-3	-----Chloroform	10	U
107-06-2	-----1,2-Dichloroethane	10	U
78-93-3	-----2-Butanone	10	U
71-55-6	-----1,1,1-Trichloroethane	10	U
56-23-5	-----Carbon Tetrachloride	10	U
75-27-4	-----Bromodichloromethane	10	U
78-87-5	-----1,2-Dichloropropane	10	U
10061-01-5	-----cis-1,3-Dichloropropene	10	U
79-01-6	-----Trichloroethene	10	U
124-48-1	-----Dibromochloromethane	10	U
79-00-5	-----1,1,2-Trichloroethane	10	U
71-43-2	-----Benzene	10	U
10061-02-6	-----trans-1,3-Dichloropropene	10	U
75-25-2	-----Bromoform	10	U
108-10-1	-----4-Methyl-2-Pentanone	10	U
591-78-6	-----2-Hexanone	10	U
127-18-4	-----Tetrachloroethene	10	U
79-34-5	-----1,1,2,2-Tetrachloroethane	10	U
108-88-3	-----Toluene	10	U
108-90-7	-----Chlorobenzene	10	U
100-41-4	-----Ethylbenzene	10	U
100-42-5	-----Styrene	10	U
1330-20-7	-----Xylene (total)	10	U

## MEMORANDUM

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

FR: Diana Waterbury, Golder Associates Inc. OSW

RE: SEMIVOLATILES DATA VALIDATION SUMMARY FOR  
DATA PACKAGE: W0118-QES-124, (943-1610.036, 124SVOA.UP1)



## INTRODUCTION

This memo presents the results of data validation on data package W0118-QES-124 prepared by the International Technology Analytical Services. Sample information is provided in the following table.

SAMPLE ID	MEDIA	ANALYSIS	COMMENTS
B0BXB1*	SOIL	SEMIVOLATILES SEE ATTACHMENT 4	

\* Indicates sample results which were 100% recalculated.

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

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

## DATA QUALITY OBJECTIVES

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

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

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

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

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

**Completeness.** The data package was complete for all requested analyses. A total of one (1) sample was validated in this data package with a total of 64 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent which meets the work plan completeness objective of 90 percent.

**MAJOR DEFICIENCIES**

No major deficiencies were identified during data validation which required qualification of data as unusable.

**MINOR DEFICIENCIES**

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

Laboratory Blanks

- Di-n-butylphthalate and bis(2-ethylhexyl)phthalate were detected in the laboratory blank. Attachments 2 and 5 provide a summary of samples affected, qualification applied and supporting documentation.

**TENTATIVELY IDENTIFIED COMPOUNDS**

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

- TICs were detected in the samples and associated laboratory blank and were common laboratory contaminants, resulting in qualification of the TICs as unusable (UR) as shown in Attachment 3.
- TICs were detected in the samples and associated laboratory blank and have been qualified due to associated blank contamination and have been determined to be presumptive and valid (UJN).
- TICs were detected in the samples and determined to be valid, resulting in qualification of the results as presumptive and valid (JN).

**REFERENCES**

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

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

*Revised  
12/9/94*

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

## ATTACHMENT 1. GLOSSARY OF DATA REPORTING QUALIFIERS

- B - Indicates the constituent was analyzed for and detected in the associated laboratory blank. This qualifier is applied by the laboratory. During the process of data validation this qualifier may be replaced by other appropriate qualifiers as defined by the validation procedures. The associated data should be considered usable for decision making purposes.
- U - Indicates the constituent was analyzed for and not detected. The concentration reported is the sample quantitation limit corrected for aliquot size, dilution and percent solids (in the case of solid matrices) by the laboratory. The associated data should be considered usable for decision making purposes.
- UJ - Indicates the constituent was analyzed for and not detected. Due to a minor quality control deficiency identified during data validation the concentration reported may not accurately reflect the sample quantitation limit. The associated data should be considered usable for decision making purposes.
- J - Indicates the constituent was analyzed for and detected. This qualifier may be applied by the laboratory to indicate a concentration which is less than the contract required quantitation limit (CRQL) but greater than the instrument detection limit (IDL). During data validation this qualifier may be applied to indicate a minor quality control deficiency. However in either case, the associated data should be considered usable for decision making purposes.
- NJ - Indicates presumptive evidence of a constituent at an estimated value. This qualifier is normally applied to GC analysis data (such as organochlorine pesticide and PCB data). The associated data should be considered usable for decision making purposes.
- N - Indicates presumptive evidence of a constituent. This qualifier is normally applied to GC analysis data (such as organochlorine pesticide and PCB data). The associated data should be considered usable for decision making purposes.
- JN - Indicates a tentatively identified compound (TIC) whose concentration and identification have been determined to be valid as a result of data validation. The associated data should be considered usable for decision making purposes.
- UJN - Indicates a tentatively identified compound (TIC) that has been determined to be presumptive and valid (JN) in terms of identification and quantitation and has been qualified as undetected (U) due to associated blank contamination.
- UR - Indicates the constituent was analyzed for and not detected. The concentration reported has been qualified as unusable due to a major quality control deficiency identified during data validation. The associated data should be considered unusable for decision making purposes.
- R - Indicates the constituent was analyzed for and detected. The concentration reported has been qualified as unusable due to a major quality control deficiency identified during data validation. The associated data should be considered unusable for decision making purposes.

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WHC-SD-EN-SPP-002, REV.2

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS



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WHC-SD-EN-SPP-002, REV.2

ATTACHMENT 3

QUALIFIED DATA SUMMARY and ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: W0118-QES-124

Parameter	Samp#		808XB1	
	Date	Location	Depth	Type
		299-W19-35	416.00 - 417.50	SOIL
	Units	Result	Q	
PHENOL	UG/KG	400.000	U	
BIS(2-CHLOROETHYL)ETHER	UG/KG	400.000	U	
2-CHLOROPHENOL	UG/KG	400.000	U	
1,3-DICHLOROBENZENE	UG/KG	400.000	U	
1,4-DICHLOROBENZENE	UG/KG	400.000	U	
1,2-DICHLOROBENZENE	UG/KG	400.000	U	
2-METHYLPHENOL	UG/KG	400.000	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	UG/KG	400.000	U	
4-METHYLPHENOL	UG/KG	400.000	U	
N-NITROSO-DI-N-PROPYLAMINE	UG/KG	400.000	U	
HEXACHLOROETHANE	UG/KG	400.000	U	
NITROBENZENE	UG/KG	400.000	U	
ISOPHORONE	UG/KG	400.000	U	
2-NITROPHENOL	UG/KG	400.000	U	
2,4-DIMETHYLPHENOL	UG/KG	400.000	U	
BIS(2-CHLOROETHOXY)METHANE	UG/KG	400.000	U	
2,4-DICHLOROPHENOL	UG/KG	400.000	U	
1,2,4-TRICHLOROBENZENE	UG/KG	400.000	U	
NAPHTHALENE	UG/KG	400.000	U	
4-CHLOROANILINE	UG/KG	400.000	U	
HEXACHLOROBUTADIENE	UG/KG	400.000	U	
4-CHLORO-3-METHYLPHENOL	UG/KG	400.000	U	
2-METHYLNAPHTHALENE	UG/KG	400.000	U	
HEXACHLOROCYCLOPENTADIENE	UG/KG	400.000	U	
2,4,6-TRICHLOROPHENOL	UG/KG	400.000	U	
2,4,5-TRICHLOROPHENOL	UG/KG	970.000	U	
2-CHLORONAPHTHALENE	UG/KG	400.000	U	
2-NITROANILINE	UG/KG	970.000	U	
DIMETHYLPHTHALATE	UG/KG	400.000	U	
ACENAPHTHYLENE	UG/KG	400.000	U	
2,6-DINITROTOLUENE	UG/KG	400.000	U	
3-NITROANILINE	UG/KG	970.000	U	
ACENAPHTHENE	UG/KG	400.000	U	

*DSW*  
11-9-94

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

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Validated Data Summary, Data Package: W0118-QES-124

Parameter	Samp#		BOBXB1	
	Date	6-30-94	Location	299-W19-35
	Depth	416.00 - 417.50		
	Type	SOIL		
	Comments			
Parameter	Units	Result	Q	
2,4-DINITROPHENOL	UG/KG	970.000	U	
4-NITROPHENOL	UG/KG	970.000	U	
DIBENZOFURAN	UG/KG	400.000	U	
2,4-DINITROTOLUENE	UG/KG	400.000	U	
DIETHYLPHTHALATE	UG/KG	400.000	U	
4-CHLOROPHENYL-PHENYLETHER	UG/KG	400.000	U	
FLUORENE	UG/KG	400.000	U	
4-NITROANILINE	UG/KG	970.000	U	
4,6-DINITRO-2-METHYLPHENOL	UG/KG	970.000	U	
N-NITROSODIPHENYLAMINE	UG/KG	400.000	U	
4-BROMOPHENYL-PHENYLETHER	UG/KG	400.000	U	
HEXACHLOROBENZENE	UG/KG	400.000	U	
PENTACHLOROPHENOL	UG/KG	970.000	U	
PHENANTHRENE	UG/KG	400.000	U	
ANTHRACENE	UG/KG	400.000	U	
CARBAZOLE	UG/KG	400.000	U	
DI-N-BUTYLPHTHALATE	UG/KG	400.000	U	
FLUORANTHENE	UG/KG	400.000	U	
PYRENE	UG/KG	400.000	U	
BUTYLBENZYLPHTHALATE	UG/KG	400.000	U	
3,3'-DICHLOROBENZIDINE	UG/KG	400.000	U	
BENZO(A)ANTHRACENE	UG/KG	400.000	U	
CHRYSENE	UG/KG	400.000	U	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	400.000	U	
DI-N-OCTYLPHTHALATE	UG/KG	400.000	U	
BENZO(B)FLUORANTHENE	UG/KG	400.000	U	
BENZO(K)FLUORANTHENE	UG/KG	400.000	U	
BENZO(A)PYRENE	UG/KG	400.000	U	
INDENO(1,2,3-CD)PYRENE	UG/KG	400.000	U	
DIBENZ(A,H)ANTHRACENE	UG/KG	400.000	U	
BENZO(G,H,I)PERYLENE	UG/KG	400.000	U	

*OSW*  
*11-9-94*

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

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1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBXB1

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 770 SAS No.: \_\_\_\_\_ SDG No.: W0118

Matrix: (soil/water) SOIL Lab Sample ID: AB2177R

Sample wt/vol: 30.2 (g/mL) G Lab File ID: AB2177R

Level: (low/med) LOW Date Received: 07/02/94

% Moisture: 18 decanted: (Y/N) N Date Extracted: 07/07/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/25/94

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.2

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>UG/KG</u>	Q
108-95-2	Phenol	400	U
111-44-4	bis(2-Chloroethyl) Ether	400	U
95-57-8	2-Chlorophenol	400	U
541-73-1	1,3-Dichlorobenzene	400	U
106-46-7	1,4-Dichlorobenzene	400	U
95-50-1	1,2-Dichlorobenzene	400	U
95-48-7	2-Methylphenol	400	U
108-60-1	2,2'-Oxybis(1-Chloropropane)	400	U
106-44-5	4-Methylphenol	400	U
621-64-7	N-Nitroso-Di-n-Propylamine	400	U
67-72-1	Hexachloroethane	400	U
98-95-3	Nitrobenzene	400	U
78-59-1	Isophorone	400	U
88-75-5	2-Nitrophenol	400	U
105-67-9	2,4-Dimethylphenol	400	U
111-91-1	bis(2-Chloroethoxy) Methane	400	U
120-83-2	2,4-Dichlorophenol	400	U
120-82-1	1,2,4-Trichlorobenzene	400	U
91-20-3	Naphthalene	400	U
106-47-8	4-Chloroaniline	400	U
87-68-3	Hexachlorobutadiene	400	U
59-50-7	4-Chloro-3-Methylphenol	400	U
91-57-6	2-Methylnaphthalene	400	U
77-47-4	Hexachlorocyclopentadiene	400	U
88-06-2	2,4,6-Trichlorophenol	400	U
95-95-4	2,4,5-Trichlorophenol	970	U
91-58-7	2-Chloronaphthalene	400	U
88-74-4	2-Nitroaniline	970	U
131-11-3	Dimethylphthalate	400	U
208-96-8	Acenaphthylene	400	U
606-20-2	2,6-Dinitrotoluene	400	U
99-09-2	3-Nitroaniline	970	U
83-32-9	Acenaphthene	400	U

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3/90

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1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBXB1

Lab Name: ITAS-KNOXVILLE Contract: HANFORD  
 Lab Code: ITSTU Case No.: 770 SAS No.: \_\_\_\_\_ SDG No.: W0118  
 Matrix: (soil/water) SOIL Lab Sample ID: AB2177R  
 Sample wt/vol: 30.2 (g/mL) G Lab File ID: AB2177R  
 Level: (low/med) LOW Date Received: 07/02/94  
 % Moisture: 18 decanted: (Y/N) N Date Extracted: 07/07/94  
 Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/25/94  
 Injection Volume: 2.0 (uL) Dilution Factor: 1.0  
 GPC Cleanup: (Y/N) Y pH: 8.2

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>UG/KG</u>	Q
51-28-5	2,4-Dinitrophenol	970	U
100-02-7	4-Nitrophenol	970	U
132-64-9	Dibenzofuran	400	U
121-14-2	2,4-Dinitrotoluene	400	U
84-66-2	Diethylphthalate	400	U
7005-72-3	4-Chlorophenyl-phenylether	400	U
86-73-7	Fluorene	400	U
100-01-6	4-Nitroaniline	970	U
534-52-1	4,6-Dinitro-2-methylphenol	970	U
86-30-6	N-Nitrosodiphenylamine (1)	400	U
101-55-3	4-Bromophenyl-phenylether	400	U
118-74-1	Hexachlorobenzene	400	U
87-86-5	Pentachlorophenol	970	U
85-01-8	Phenanthrene	400	U
120-12-7	Anthracene	400	U
86-74-8	Carbazole	400	U
84-74-2	Di-n-Butylphthalate	400	U
206-44-0	Fluoranthene	400	U
129-00-0	Pyrene	400	U
85-68-7	Butylbenzylphthalate	400	U
91-94-1	3,3'-Dichlorobenzidine	400	U
56-55-3	Benzo(a)Anthracene	400	U
218-01-9	Chrysene	400	U
117-81-7	bis(2-Ethylhexyl) Phthalate	400	U
117-84-0	Di-n-Octyl Phthalate	400	U
205-99-2	Benzo(b)Fluoranthene	400	U
207-08-9	Benzo(k)Fluoranthene	400	U
50-32-8	Benzo(a)Pyrene	400	U
193-39-5	Indeno(1,2,3-cd)Pyrene	400	U
53-70-3	Dibenz(a,h)Anthracene	400	U
191-24-2	Benzo(g,h,i)Perylene	400	U

400-50 BJ U  
400-52 J U

(1) - Cannot be separated from Diphenylamine

11-9-94  
OSW

1F  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET  
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BOBXB1

Lab Name: ITAS-KNOXVILLE Contract: HANFORD  
 Lab Code: ITSTU Case No.: 770 SAS No.: \_\_\_\_\_ SDG No.: W0118  
 Matrix: (soil/water) SOIL Lab Sample ID: AB2177R  
 Sample wt/vol: 30.2 (g/mL) G Lab File ID: AB2177R  
 Level: (low/med) LOW Date Received: 07/02/94  
 % Moisture: 18 decanted: (Y/N) N Date Extracted: 07/07/94  
 Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/25/94  
 Injection Volume: 2.0 (uL) Dilution Factor: 1.0  
 GPC Cleanup: (Y/N) Y pH: 8.2

Number TICs found: 20

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q	
1.	UNKNOWN	4.20	250	J	JN
2. 123-42-2	2-PENTANONE, 4-HYDROXY-4-MET	4.87	9800	ABJN	UR
3.	UNKNOWN	8.07	120	J	USN
4.	UNKNOWN	8.27	260	J	JN
5.	UNKNOWN	16.68	500	J	JN
6.	UNKNOWN	18.37	89	J	JN
7.	UNKNOWN	18.53	140	J	JN
8.	UNKNOWN	18.72	530	J	JN
9.	UNKNOWN	18.80	120	J	JN
10.	UNKNOWN	18.87	140	J	JN
11.	UNKNOWN	19.48	230	J	JN
12.	UNKNOWN	20.05	450	J	JN
13.	UNKNOWN	20.72	440	J	JN
14.	UNKNOWN	20.82	1700	J	JN
15.	UNKNOWN	20.95	82	J	JN
16.	UNKNOWN	21.22	190	J	JN
17.	UNKNOWN	21.82	150	J	JN
18.	UNKNOWN	22.47	100	J	JN
19.	UNKNOWN	22.60	140	J	JN
20.	UNKNOWN	23.20	140	J	JN

9613490.0322

WHC-SD-EN-SPP-002, REV.2

ATTACHMENT 4

LABORATORY NARRATIVE and CHAIN-OF-CUSTODY DOCUMENTATION



# ANALYTICAL SERVICES

## CERTIFICATE OF ANALYSIS

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

**RECORD COPY**

August 11, 1994

Job Number: 770

This is the Certificate of Analysis for the following sample:

SDG:	W0118
Client Project ID:	WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1
Received by Knoxville:	July 2, 1994
Number of Samples:	One (1)
Sample Type:	Soil

### I. Introduction

On July 1, 1994, one (1) soil sample 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 sample was analyzed for Target Compound List (TCL) volatiles and semivolatiles by gas chromatography/mass spectroscopy (GC/MS) in accordance with the EPA CLP OLM01.8 Statement of Work.

Reviewed and Approved:

*Sheree A. Schneider*

Sheree' A. Schneider  
Project Manager



IT Corporation  
August 11, 1994  
Job Number: 770  
Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

## II. Analytical Results/Methodology (Continued)

The sample was analyzed for Target Analyte List (TAL) metals by cold vapor atomic absorption spectroscopy (CVAA), graphite furnace atomic absorption spectroscopy (GFAA), and inductively coupled plasma spectroscopy (ICP) in accordance with the EPA CLP ILM03.0 Statement of Work.

The sample was analyzed for total cyanide in accordance with the EPA CLP ILM03.0 Statement of Work.

The sample was analyzed for nitrate-nitrite based on EPA method 353.2.

The sample was analyzed for anions by ion chromatography using EPA method 300.0.

## III. Quality Control

The volatiles analyses were performed by purge and trap with a J & W DB-624 capillary column on a Finnigan INCOS 500 GC/MS/DS. A matrix spike and matrix spike duplicate were analyzed using sample BOBXB1. All QC results met method specified limits.

The semivolatiles analyses were performed by direct injection of sample extract on a Restek XTI-5 capillary column on a Finnigan INCOS XL GC/MS/DS. A matrix spike and matrix spike duplicate were analyzed using sample BOBXB1. 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.

IT Corporation  
August 11, 1994  
Job Number: 770  
Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

IT ANALYTICAL SERVICES  
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KNOXVILLE, TN

### III. Quality Control (Continued)

The sample was digested on July 22, 1994 for ICP and July 22 and 25, 1994 for GFAA. The CVAA analysis for mercury was performed on July 25, 1994; the GFAA analyses for arsenic, lead, selenium and thallium were performed July 22 and July 29, 1994; the remaining metals were analyzed by ICP on July 25, 1994. All run QC was acceptable. A duplicate/spike pair was prepared using sample number BOBXB1. Spike recovery (accuracy) results were within acceptance limits for all parameters except for antimony, chromium and manganese. A post digestion spike was performed as required per CLP protocol. Poor spike recovery for antimony is attributable to matrix interferences. Poor spike recovery for chromium and manganese is attributable to sample nonhomogeneity as exhibited by the duplicate RPD results for these analytes. Duplicate RPD (precision) results were within acceptance limits for all parameters except for aluminum, chromium, iron, magnesium, manganese, vanadium and zinc. Poor duplicate precision for these analytes is attributable to sample nonhomogeneity. Cadmium was not outside acceptance limits for spike recovery per CLP rounding rules.

Data were reported with qualifiers as follows:

#### "C" Qualifiers

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

#### "O" Qualifiers

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

#### "M" Qualifiers

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

IT Corporation  
August 11, 1994  
Job Number: 770  
Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

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IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

### III. Quality Control (Continued)

#### Miscellaneous

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

The sample was analyzed for nitrate/nitrite on July 26, 1994. A matrix spike and matrix spike duplicate were analyzed using sample BOBXB1.

The sample was analyzed for fluoride, chloride, phosphate, nitrate, nitrite and sulfate by EPA method 300.0 on July 26, 1994. A matrix spike and matrix spike duplicate were analyzed using sample BOBXB1. All QC results were acceptable.

IT Corporation  
 August 11, 1994  
 Job Number: 770

IT ANALYTICAL SERVICES  
 5815 MIDDLEBROOK PIKE  
 KNOXVILLE, TN

Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

### III. Quality Control (Continued)

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

**TABLE I**

<b>Knoxville ID</b>	<b>Richland ID</b>	<b>WHC ID</b>	<b>Test</b>
AB2176	407007-01A	BOBXB1	VOC
AB2177	407007-01B	"	SVOC
AB2178	407007-01C	"	METALS-T
AB2179	407007-01D	"	CN
AB2180	407007-01E	"	ANIONS
AB2181	407007-01F	"	NO3NO2

IT Corporation  
August 11, 1994  
Job Number: 770  
Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

---

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

#### IV. Certification

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

Reviewed and Approved:



Sheree' A. Schneider  
Project Manager



9613490.0330

WHC-SD-EN-SPP-002, REV.2

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	<b>D</b>	E
PROJECT:	200-UP-1		DATA PACKAGE: W0118- <del>855</del> -124		
VALIDATOR:	WATERBURY	LAB:	<del>DATA TERRA</del> IT	DATE: 11.9.94	
CASE:	SDG: W0118				
ANALYSES PERFORMED					
<input type="checkbox"/> CLP Volatiles	<input type="checkbox"/> SW-846 8240 (cap column)	<input type="checkbox"/> SW-846 8260 (packed column)	<input checked="" type="checkbox"/> CLP Semivolatiles	<input type="checkbox"/> SW-846 8270 (cap column)	<input type="checkbox"/> SW-846 (packed column)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SAMPLES/MATRIX	B0BxBI - SOIL				

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . . **Yes** No N/A  
 Is a case narrative present? . . . . . **Yes** No N/A

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

2. HOLDING TIMES

Are sample holding times acceptable? . . . . . **Yes** No N/A  
 Comments: See attachment 5.

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

GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. INSTRUMENT TUNING AND CALIBRATION

- Is the GC/MS tuning/performance check acceptable? . . . . .  Yes No N/A
- Are initial calibrations acceptable? . . . . .  Yes No N/A
- Are continuing calibrations acceptable? . . . . .  Yes No N/A

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4. BLANKS

- Were laboratory blanks analyzed? . . . . .  Yes No N/A
- Are laboratory blank results acceptable? . . . . .  Yes  No N/A <sup>12/14/94</sup>
- Were field/trip blanks analyzed? . . . . . Yes  No N/A
- Are field/trip blank results acceptable? . . . . . Yes No  N/A

Comments: *Di-N-Butylphthalate and bis-(2-ethylhexyl)phthalate detected in lab. blank. Associated detects are < 10x blank result qualified as non-detect (u).*

\_\_\_\_\_

\_\_\_\_\_

5. ACCURACY

- Were surrogates/System Monitoring Compounds analyzed? . . . . .  Yes No N/A
- Are surrogate/System Monitoring Compound recoveries acceptable?  Yes No N/A
- Were MS/MSD samples analyzed? . . . . .  Yes No N/A
- Are MS/MSD results acceptable? . . . . .  Yes No N/A

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

\_\_\_\_\_

\_\_\_\_\_

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\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

GC/MS ORGANIC DATA VALIDATION CHECKLIST

6. PRECISION

- Are MS/MSD RPD values acceptable? . . . . .  Yes No N/A
- Are field duplicate RPD values acceptable? . . . . . Yes No  N/A
- Are field split RPD values acceptable? . . . . . Yes No  N/A

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

7. SYSTEM PERFORMANCE

- Were internal standards analyzed? . . . . .  Yes No N/A
- Are internal standard areas acceptable? . . . . .  Yes No N/A
- Are internal standard retention times acceptable? . . . . .  Yes No N/A

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

8. COMPOUND IDENTIFICATION AND QUANTITATION

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

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

9. REPORTED RESULTS AND QUANTITATION LIMITS

- Are results reported for all requested analyses? . . . . .  Yes No N/A
- Are all results supported in the raw data? . . . . .  Yes No N/A
- Do results meet the CRQLs? . . . . .  Yes No N/A
- Has the laboratory properly identified and coded all TIC? . . .  Yes No N/A

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLKAB2360A

Lab Name: ITAS-KNOXVILLE Contract: HANFORD  
 Lab Code: ITSTU Case No.: 770 SAS No.: \_\_\_\_\_ SDG No.: W0118  
 Matrix: (soil/water) SOIL Lab Sample ID: AB2360  
 Sample wt/vol: 30.0 (g/mL) G Lab File ID: AB2360  
 Level: (low/med) LOW Date Received: \_\_\_\_\_  
 % Moisture: \_\_\_\_\_ decanted: (Y/N) N Date Extracted: 07/07/94  
 Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 07/20/94  
 Injection Volume: 2.0 (uL) Dilution Factor: 1.0  
 GPC Cleanup: (Y/N) Y pH: \_\_\_\_\_

CAS NO. COMPOUND CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG Q

51-28-5-----	2,4-Dinitrophenol	800	U
100-02-7-----	4-Nitrophenol	800	U
132-64-9-----	Dibenzofuran	330	U
121-14-2-----	2,4-Dinitrotoluene	330	U
84-66-2-----	Diethylphthalate	330	U
7005-72-3-----	4-Chlorophenyl-phenylether	330	U
86-73-7-----	Fluorene	330	U
100-01-6-----	4-Nitroaniline	800	U
534-52-1-----	4,6-Dinitro-2-methylphenol	800	U
86-30-6-----	N-Nitrosodiphenylamine (1)	330	U
101-55-3-----	4-Bromophenyl-phenylether	330	U
118-74-1-----	Hexachlorobenzene	330	U
87-86-5-----	Pentachlorophenol	800	U
85-01-8-----	Phenanthrene	330	U
120-12-7-----	Anthracene	330	U
86-74-8-----	Carbazole	330	U
84-74-2-----	Di-n-Butylphthalate	38	J
206-44-0-----	Fluoranthene	330	U
129-00-0-----	Pyrene	330	U
85-68-7-----	Butylbenzylphthalate	330	U
91-94-1-----	3,3'-Dichlorobenzidine	330	U
56-55-3-----	Benzo(a)Anthracene	330	U
218-01-9-----	Chrysene	330	U
117-81-7-----	bis(2-Ethylhexyl)Phthalate	330	U
117-84-0-----	Di-n-Octyl Phthalate	330	U
205-99-2-----	Benzo(b)Fluoranthene	330	U
207-08-9-----	Benzo(k)Fluoranthene	330	U
50-32-8-----	Benzo(a)Pyrene	330	U
193-39-5-----	Indeno(1,2,3-cd)Pyrene	330	U
53-70-3-----	Dibenz(a,h)Anthracene	330	U
191-24-2-----	Benzo(g,h,i)Perylene	330	U

(1) - Cannot be separated from Diphenylamine

*Handwritten signature*  
12/9/94

~~BOBXT~~  
BOBXB1

No	m/z	Scan	Time	Ref	RRT	Meth	Area (Hght)	Amount	ZTot
61	NOT FOUND								
62	NOT FOUND								
63	178	923	15:23	4	1.003	A BB	340.	0.150 UG/ML	0.04
64	178	923	15:23	4	1.003	A BB	340.	0.150 UG/ML	0.04
65	149	1013	16:53	4	1.101	A BB	3926.	1.226 UG/ML	0.32
66	202	1101	18:21	4	1.197	A BB	204.	0.087 UG/ML	0.02
67	202	1130	18:50	5	0.893	A BB	262.	0.143 UG/ML	0.04
68	149	1204	20:04	5	0.951	A BB	406.	0.352 UG/ML	0.09
69	NOT FOUND								
70	228	1266	21:06	5	1.000	A BB	262.	0.169 UG/ML	0.04
71	149	1264	21:04	5	0.998	A BB	1971. BEHP	1.298 UG/ML	0.34
72	NOT FOUND								
73	149	1335	22:15	6	0.916	A BB	248.	0.111 UG/ML	0.03
74	252	1401	23:21	6	0.962	A BB	100.	0.060 UG/ML	0.02
75	252	1401	23:21	6	0.962	A BB	100.	0.066 UG/ML	0.02
76	NOT FOUND								
77	NOT FOUND								
78	NOT FOUND								
79	NOT FOUND								
80	77	803	13:23	3	1.133	A*BB	562.	0.133 UG/ML	0.03
81	NOT FOUND								
82	NOT FOUND								
83	167	954	15:54	4	1.037	A BB	108.	0.066 UG/ML	0.02

Prog

No	Ret(L)	Ratio	RRT(L)	Ratio	Amnt	Amnt(L)	R. Fac	R. Fac(L)	Ratio
51	12:15	1.00	1.037	1.00	0.12	25.00	0.006	1.383	0.00
52	12:17		1.039						
53	11:24	1.00	0.965	1.00	0.10	25.00	0.001	0.275	0.00
54	12:50	1.00	1.086	1.00	0.11	25.00	0.005	1.249	0.00
55	13:01	1.00	1.102	1.00	0.12	25.00	0.003	0.536	0.00
56	13:03	1.00	1.104	1.00	0.04	25.00	0.002	1.089	0.00
57	13:08		1.111						
58	13:15		0.864						
59	13:18	1.00	0.867	1.00	0.07	25.00	0.001	0.453	0.00
60	14:11		0.925						
61	14:35		0.951						
62	15:01		0.979						
63	15:24	1.00	1.004	1.00	0.15	25.00	0.006	1.035	0.01
64	15:24	1.00	1.004	1.00	0.15	25.00	0.006	1.035 <sup>21</sup>	0.01
65	16:53	1.00	1.101	1.00	1.23	25.00	0.072	1.461	0.05
66	18:21	1.00	1.197	1.00	0.09	25.00	0.004	1.069	0.00
67	18:50	1.00	0.893	1.00	0.14	25.00	0.007	1.165	0.01
68	20:04	1.00	0.951	1.00	0.35	25.00	0.010	0.731	0.01
69	21:00		0.995						
70	21:04	1.00	0.998	1.00	0.17	25.00	0.007	0.981	0.01
71	21:04	1.00	0.998	1.00	1.30	25.00	0.050	0.964	0.05
72	21:09		1.002						
73	22:12	1.00	0.914	1.00	0.11	25.00	0.007	1.531	0.00
74	23:18	1.00	0.960	1.00	0.06	25.00	0.003	1.149	0.00
75	23:22	1.00	0.962	1.00	0.07	25.00	0.003	1.041	0.00
76	24:08		0.994						
77	27:46		1.143						
78	27:47		1.144						
79	28:49		1.187						
80	13:24	1.00	1.134	1.00	0.13	25.00	0.015	2.839	0.01
81	4:32		0.747						

Prog

12/19/04

9613490.0337

0000375

SBLK

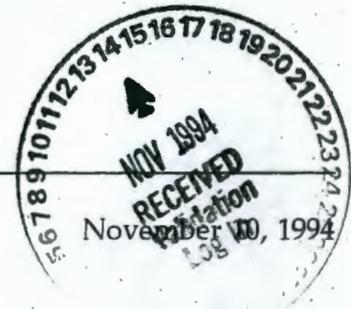
No	m/z	Scan	Time	Ref	RRT	Meth	Area(Hght)	Amount	%Tot
61	NOT FOUND								
62	NOT FOUND								
63	NOT FOUND								
64	NOT FOUND								
65	149	1003	16:43	4	1.100	A BB	1736.	1.132 UG/ML	0.24
66	NOT FOUND								
67	NOT FOUND								
68	NOT FOUND								
69	NOT FOUND								
70	NOT FOUND								
71	149	1253	20:53	5	0.997	A BB	404.13EHP	0.439 UG/ML	0.09
72	NOT FOUND								
73	NOT FOUND								
74	NOT FOUND								
75	NOT FOUND								
76	NOT FOUND								
77	NOT FOUND								
78	NOT FOUND								
79	NOT FOUND								
80	NOT FOUND								
81	NOT FOUND								
82	NOT FOUND								
83	NOT FOUND								

No	Ret(L)	Ratio	RRT(L)	Ratio	Amnt	Amnt(L)	R. Fac	R. Fac(L)	Ratio
51	12:08		1.036						
52	12:12		1.041						
53	11:19		0.966						
54	12:43		1.085						
55	12:53		1.100						
56	12:56		1.104						
57	13:05		1.117						
58	13:09		0.864						
59	13:12		0.867						
60	14:04		0.924						
61	14:28		0.951						
62	14:54		0.979						
63	15:17		1.004						
64	15:23		1.011						
65	16:44	1.00	1.100	1.00	1.13	25.00	0.059	1.314	0.05
66	18:14		1.198						
67	18:43		0.893						
68	19:56		0.951						
69	20:53		0.996						
70	20:56		0.998						
71	20:54	1.00	0.997	1.00	0.44	25.00	0.013	0.742	0.02
72	21:01		1.002						
73	22:00		0.913						
74	23:10		0.960						
75	23:11		0.962						
76	23:58		0.994						
77	27:32		1.142						
78	27:33		1.143						
79	28:34		1.185						
80	13:16		1.132						
81	4:32		0.747						

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## RECORD COPY

## MEMORANDUM



TO: 200-UP-1 Project QA Record

FR: Diana Waterbury, Golder Associates Inc. OSW

RE: GENERAL CHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE  
W0118-QES-124 (943-1610.036 124GEN.UP1)

## INTRODUCTION

This memo presents the results of data validation on data package W0118-QES-124 prepared by International Technology Analytical Services. A list of samples validated along with the analyses reported and the methods of analysis is provided in the following table.

SAMPLE ID	MEDIA	ANALYSIS	COMMENTS
B0BXB1*	SOIL	GENERAL CHEMISTRY SEE ATTACHMENT 4	NONE
* Indicates the sample results which were 100% recalculated.			

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

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

## DATA QUALITY OBJECTIVES

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

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

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

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

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

**Completeness.** The data package was complete for all requested analyses. A total of one (1) sample was validated in this data package with a total of two determinations

reported, all of which were deemed valid. This results in a completeness of 100 percent which meets the work plan completeness objective of 90 percent.

#### MAJOR DEFICIENCIES

There were no major deficiencies identified during data validation which required qualification of data as unusable.

#### MINOR DEFICIENCIES

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

#### REFERENCES

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

HGC 1993, Data Validation Procedures for Chemical Analyses, HGC-SD-ED-SPP-022, Rev. 2, 1993. Westinghouse Hanford Company, Richland, Washington.

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

**GLOSSARY OF INORGANIC DATA REPORTING QUALIFIERS**

- B -** Indicates the constituent was analyzed for and detected. The concentration reported is less than the contract required detection limit (CRDL) but greater than the instrument detection limit (IDL). The associated data should be considered usable for decision making purposes.
- U -** Indicates the constituent was analyzed for and not detected. The concentration reported is the sample detection limit corrected for sample aliquot size, dilution factors and percent solids (in the case of solid matrices) by the laboratory. The associated data should be considered usable for decision making purposes.
- UJ -** Indicates the constituent was analyzed for and was not detected. Due to a minor quality control deficiency identified during data validation, the concentration reported may not accurately reflect the sample detection limit. The associated data have been qualified as estimated but should be considered usable for decision making purposes.
- BJ -** Indicates the constituent was analyzed for and detected at a concentration less than the CRDL but greater than the IDL. Due to a minor quality control deficiency identified during data validation, The associated data have been qualified as estimated, but should be considered usable for decision making purposes.
- J -** Indicates the constituent was analyzed for and detected. Due to a minor quality control deficiency identified during data validation the associated data have been qualified as estimated, but should be considered usable for decision making purposes.
- UR -** Indicates the constituent was analyzed for and not detected. Due to a major quality control deficiency identified during data validation, the associated data have been qualified as unusable for decision making purposes.
- R -** Indicates the constituent was analyzed for and detected. Due to a major quality control deficiency identified during data validation, the associated data have been qualified as unusable for decision making purposes.

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WHC-SD-EN-SPP-002, REV.2

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS



9613490.0344

WHC-SD-EN-SPP-002, REV.2

ATTACHMENT 3

QUALIFIED DATA SUMMARY and ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: W0118-QES-124

Parameter	Samp#		BOBX81	
	Units	Result	Q	
	Date	6-30-94		
	Location	299-W19-348		
	Depth	416.00 - 417.50		
	Type	SOIL		
	Comments			
FLUORIDE	MG/KG	0.400		
CHLORIDE	MG/KG	2.800		
NITRITE	MG/KG	0.400		U
NITRATE	MG/KG	0.800		
PHOSPHATE	MG/KG	1.000		U
SULFATE	MG/KG	3.900		
NITRATE+NITRITE	MG/KG	0.700		

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

800

*Reviewed  
12/19/94  
P-1*

9613490.0345

## NITRATE/NITRITE ANALYSIS

Laboratory Name:	ITAS-KNOXVILLE	SDG Number:	W0118
Contract Name:	Westinghouse Hanford	Job Number:	770
Sample Matrix:	Soil	Extraction Date:	N/A
Concentration Units:	mg/kg	Analysis Date:	07/26/94

Client Sample ID	Lab Sample ID	Result	Qualifiers
Method Blank	AB4339	0.50	U
BOBXB1	AB2181	0.70	+

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

CSW  
 11-10-94

## ANION ANALYSIS

Laboratory Name:	ITAS-Knoxville	SDG Number:	W0118
Contract Name:	Westinghouse Hanford	Job Number:	770
Client Sample ID:	BOBXB1	Preparation Date:	07/25/94
Lab Sample ID:	AB2180	Analysis Date:	07/26/94
Sample Matrix:	Soil	Concentration Units:	mg/kg

Compound	Result	Qualifier	Detection Limit
fluoride	0.4	+	0.40
chloride	2.8	+	0.40
nitrite	0.4	U	0.40
nitrate	0.8	+	0.40
phosphate	1.0	U	1.0
sulfate	3.9	+	1.5

NSW  
11-10-94

+ - Positive result.

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

ATTACHMENT 4

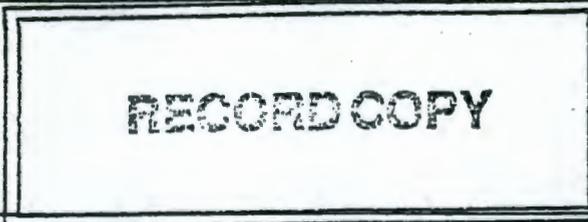
LABORATORY NARRATIVE and CHAIN-OF-CUSTODY DOCUMENTATION



# ANALYTICAL SERVICES

## CERTIFICATE OF ANALYSIS

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



August 11, 1994

Job Number: 770

This is the Certificate of Analysis for the following sample:

SDG:	W0118
Client Project ID:	WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1
Received by Knoxville:	July 2, 1994
Number of Samples:	One (1)
Sample Type:	Soil

### I. Introduction

On July 1, 1994, one (1) soil sample 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 sample was analyzed for Target Compound List (TCL) volatiles and semivolatiles by gas chromatography/mass spectroscopy (GC/MS) in accordance with the EPA CLP OLM01.8 Statement of Work.

Reviewed and Approved:

*Sheree A. Schneider*

Sheree' A. Schneider  
Project Manager



IT Corporation  
August 11, 1994  
Job Number: 770  
Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

## II. Analytical Results/Methodology (Continued)

The sample was analyzed for Target Analyte List (TAL) metals by cold vapor atomic absorption spectroscopy (CVAA), graphite furnace atomic absorption spectroscopy (GFAA), and inductively coupled plasma spectroscopy (ICP) in accordance with the EPA CLP ILM03.0 Statement of Work.

The sample was analyzed for total cyanide in accordance with the EPA CLP ILM03.0 Statement of Work.

The sample was analyzed for nitrate-nitrite based on EPA method 353.2.

The sample was analyzed for anions by ion chromatography using EPA method 300.0.

## III. Quality Control

The volatiles analyses were performed by purge and trap with a J & W DB-624 capillary column on a Finnigan INCOS 500 GC/MS/DS. A matrix spike and matrix spike duplicate were analyzed using sample BOBXB1. All QC results met method specified limits.

The semivolatiles analyses were performed by direct injection of sample extract on a Restek XTI-5 capillary column on a Finnigan INCOS XL GC/MS/DS. A matrix spike and matrix spike duplicate were analyzed using sample BOBXB1. 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.

IT Corporation  
August 11, 1994  
Job Number: 770

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

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### III. Quality Control (Continued)

The sample was digested on July 22, 1994 for ICP and July 22 and 25, 1994 for GFAA. The CVAA analysis for mercury was performed on July 25, 1994; the GFAA analyses for arsenic, lead, selenium and thallium were performed July 22 and July 29, 1994; the remaining metals were analyzed by ICP on July 25, 1994. All run QC was acceptable. A duplicate/spike pair was prepared using sample number BOBXB1. Spike recovery (accuracy) results were within acceptance limits for all parameters except for antimony, chromium and manganese. A post digestion spike was performed as required per CLP protocol. Poor spike recovery for antimony is attributable to matrix interferences. Poor spike recovery for chromium and manganese is attributable to sample nonhomogeneity as exhibited by the duplicate RPD results for these analytes. Duplicate RPD (precision) results were within acceptance limits for all parameters except for aluminum, chromium, iron, magnesium, manganese, vanadium and zinc. Poor duplicate precision for these analytes is attributable to sample nonhomogeneity. Cadmium was not outside acceptance limits for spike recovery per CLP rounding rules.

Data were reported with qualifiers as follows:

#### "C" Qualifiers

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

#### "O" Qualifiers

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

#### "M" Qualifiers

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

IT Corporation  
August 11, 1994  
Job Number: 770

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

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### III. Quality Control (Continued)

#### Miscellaneous

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

The sample was analyzed for nitrate/nitrite on July 26, 1994. A matrix spike and matrix spike duplicate were analyzed using sample BOBXB1.

The sample was analyzed for fluoride, chloride, phosphate, nitrate, nitrite and sulfate by EPA method 300.0 on July 26, 1994. A matrix spike and matrix spike duplicate were analyzed using sample BOBXB1. All QC results were acceptable.

IT Corporation  
August 11, 1994  
Job Number: 770

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

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### III. Quality Control (Continued)

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

TABLE I

Knoxville ID	Richland ID	WHC ID	Test
AB2176	407007-01A	BOBXB1	VOC
AB2177	407007-01B	"	SVOC
AB2178	407007-01C	"	METALS-T
AB2179	407007-01D	"	CN
AB2180	407007-01E	"	ANIONS
AB2181	407007-01F	"	NO3NO2

IT Corporation  
August 11, 1994  
Job Number: 770

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

---

#### IV. Certification

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

Reviewed and Approved:



Sheree' A. Schneider  
Project Manager

Westinghouse Hanford Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 1

Date Turnaround

Priority  
 Normal

Collector: W. V. SETZER  
 Company Contact: W. V. SETZER  
 Telephone No.: (509) 376-2413  
 Project Designation: 200 UP-1  
 Sampling Location: 699-38-68A  
 SAF No.: 94-046  
 Ice Chest No.: ER-1D  
 Field Logbook No.: EFL-1118  
 Method of Shipment: BY DOE VEHICLE

Shipped To: INTERNATIONAL TECHNOLOGIES  
 Offsite Property No.: W94-0-0746-10  
 Bill of Lading/Air Bill No.: N/A

Preservative	COOL 4														
Type of Container	aGs	aG	G	G	G	G	P/G	P/G				aGs	aGs	P	
No. of Container(s)	1	1	1	1	1	1	1	1				1	1	1	
Special Handling and/or Storage	Volume	125ml	500ml	500ml	250ml	250ml	125ml	1000ml	500ml			125ml	250ml	500ml	

Sample No.	Matrix*	Date Sampled	Time Sampled	VOA (CLP)	SEMI VOA (CLP)	ICP MTL GFAA METALS Hg (CLP)	Cn (CLP)	ANIONS NO2, NO3 IC-F, CL EPA(353 SO4, NO2, NO3, PO4)	TRIP	FIELD	ACTIVITY SCAN
407007				OIA	B	C	D	E	F	40700801	

Sample No.	Matrix*	Date Sampled	Time Sampled	VOA (CLP)	SEMI VOA (CLP)	ICP MTL GFAA METALS Hg (CLP)	Cn (CLP)	ANIONS NO2, NO3 IC-F, CL EPA(353 SO4, NO2, NO3, PO4)	TRIP	FIELD	ACTIVITY SCAN
BARBA1	S	6-30-94	1502	✓	✓	✓	✓	✓	✓	✓	✓

CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS		Matrix*	
Relinquished By	Date/Time	Received By	Date/Time	*1- GROSS ALPHA, BETA (EP-60,070,170) Am-241, Cm 243/244 (EP-60,070,960) Np-237 (EP-60,070,930) Pu-238,239/240 (EP-60,070,940) U-234,235,238 (EP-60,070,901) GAMMA SPEC TO INCLUDE; Co-58,60,Cs-137, Eu-152,154,155 AND Fe-59 (EP-60,070,100) Sr-90 (EP-60,070,500,519,520) I-129 (EP-024,560) C-14 (EP-060,251) Tc-99 (EP-020,540)		S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air DS = Drum Solids DL = Drum Liquids T = Tissue WI = Wipe L = Liquid V = Vegetation X = Other	
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

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0000021

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WHC-SD-EN-SPP-002, REV.2

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	(D)	E
PROJECT:	200-UP-1		DATA PACKAGE: W0183- <del>053</del> -124		
VALIDATOR:	WATERBURY	LAB: <del>ADENDERRA</del>	DATE: 11.9.94		
CASE:	IT		SDG: W0183		
ANALYSES PERFORMED					
<input checked="" type="checkbox"/> Anions/IC	<input type="checkbox"/> TOC	<input type="checkbox"/> TOX	<input type="checkbox"/> TPH-418.1	Oil and Grease	Alkalinity
<input type="checkbox"/> Ammonia	<input type="checkbox"/> BOD/COD	<input type="checkbox"/> Chloride	<input type="checkbox"/> Chromium-VI	<input type="checkbox"/> pH	<input checked="" type="checkbox"/> NO <sub>2</sub> /NO <sub>3</sub>
<input type="checkbox"/> Sulfate	<input type="checkbox"/> TDS	<input type="checkbox"/> TKN	<input type="checkbox"/> Phosphate	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SAMPLES/MATRIX	BOBXB1 - SOIL				

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . .  Yes No N/A  
 Is a case narrative present? . . . . .  Yes No N/A

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

2. HOLDING TIMES

Are sample holding times acceptable? . . . . .  Yes No N/A  
 Comments: SEE ATTACHMENT 5.

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

**3. INSTRUMENT CALIBRATION**

- Was initial calibration performed for all applicable analyses?  Yes No N/A
- Are initial calibration results acceptable? . . . . .  Yes No N/A
- Was a calibration check performed for all applicable analyses?  Yes No N/A
- Are calibration check results acceptable? . . . . .  Yes No N/A

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

**4. BLANKS**

- Were laboratory blanks analyzed? . . . . .  Yes No N/A
- Are laboratory blank results acceptable? . . . . .  Yes No N/A
- Were field/trip blanks analyzed? . . . . . Yes  No N/A
- Are field/trip blank results acceptable? . . . . . Yes No  N/A

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

**5. ACCURACY**

- Were spike samples analyzed at the required frequency? . . .  Yes No N/A
- Are spike recoveries acceptable? . . . . .  Yes No N/A
- Were LCS analyses performed at the required frequency? . . .  Yes No N/A
- Are LCS recoveries acceptable? . . . . .  Yes No N/A

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

**6. PRECISION**

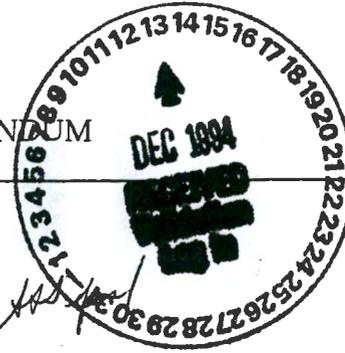
- Were laboratory duplicate samples analyzed at the required frequency? . . . . .  Yes No N/A
- Are laboratory duplicate sample RPD values acceptable? . . . .  Yes No N/A
- Are field duplicate RPD values acceptable? . . . . . Yes No  N/A
- Are field split RPD values acceptable? . . . . . Yes No  N/A





## RECORD COPY

MEMORANDUM



TO: 200-UP-1 Project QA Record

December 8, 1994

FR: Diana Waterbury, Golder Associates Inc.

RE: INORGANICS DATA VALIDATION SUMMARY FOR DATA PACKAGE  
W0118-QES-124 (943-1610.036 124MET.UP1)

## INTRODUCTION

This memo presents the results of data validation on data package W0118-QES-124 prepared by International Technology Analytical Services. Sample information is provided in the following table.

SAMPLE ID	MEDIA	ANALYSIS	COMMENTS
BOBXB1*	SOIL	METALS  SEE ATTACHMENT 4	NONE
* Indicates the sample results which were 100% recalculated.			

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

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

## DATA QUALITY OBJECTIVES

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

**Precision.** Goals for precision were met with the exception of the minor deficiencies identified below.

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

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

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

**Completeness.** The data package was complete for all requested analyses. A total of one (1) sample was validated in this data package with a total of 24 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent which meets the normal work plan completeness objectives of 90 percent.

Reviewed  
12/8/94  
001

## MAJOR DEFICIENCIES

No major deficiency was identified during data validation which required qualification of data as unusable.

## MINOR DEFICIENCIES

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

### Holding Times

The holding time for cyanide was unacceptable. Attachment 2 and 5 provide a summary of samples affected, qualification applied and supporting documentation.

### Matrix Spike Recovery

- The matrix spike recoveries for cadmium, chromium, manganese and antimony were unacceptable. Attachments 2 and 5 provide a summary of samples affected, qualification applied and supporting documentation.

### Laboratory Duplicate Samples

- The duplicate relative percent difference (RPD) for aluminum, chromium, manganese, magnesium and iron were unacceptable. Attachments 2 and 5 provide a summary of samples affected, qualifications applied and supporting documentation.

### Calibration Blank

- The calibration blanks for copper were unacceptable. Copper was detected in the method blanks at negative values. Attachments 2 and 5 provide a summary of the samples affected, data qualifications applied and supporting documentation.

## REFERENCES

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

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

Revised  
12/3/94

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

**GLOSSARY OF INORGANIC DATA REPORTING QUALIFIERS**

- B -** Indicates the constituent was analyzed for and detected. The concentration reported is less than the contract required detection limit (CRDL) but greater than the instrument detection limit (IDL). The associated data should be considered usable for decision making purposes.
- U -** Indicates the constituent was analyzed for and not detected. The concentration reported is the sample detection limit corrected for sample aliquot size, dilution factors and percent solids (in the case of solid matrices) by the laboratory. The associated data should be considered usable for decision making purposes.
- UJ -** Indicates the constituent was analyzed for and was not detected. Due to a minor quality control deficiency identified during data validation, the concentration reported may not accurately reflect the sample detection limit. The associated data have been qualified as estimated but should be considered usable for decision making purposes.
- BJ -** Indicates the constituent was analyzed for and detected at a concentration less than the CRDL but greater than the IDL. Due to a minor quality control deficiency identified during data validation, The associated data have been qualified as estimated, but should be considered usable for decision making purposes.
- J -** Indicates the constituent was analyzed for and detected. Due to a minor quality control deficiency identified during data validation the associated data have been qualified as estimated, but should be considered usable for decision making purposes.
- UR -** Indicates the constituent was analyzed for and not detected. Due to a major quality control deficiency identified during data validation, the associated data have been qualified as unusable for decision making purposes.
- R -** Indicates the constituent was analyzed for and detected. Due to a major quality control deficiency identified during data validation, the associated data have been qualified as unusable for decision making purposes.

9613490.0365

WHC-SD-EN-SPP-002, REV.2

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS



ATTACHMENT 3

QUALIFIED DATA SUMMARY and ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: W0118-QES-124

Parameter	Samp#		808XB1	
	Units	Result	Q	
	Date	6-30-94		
	Location	299-W19-348		
	Depth	416.00 - 417.50		
	Type	SOIL		
	Comments			
ALUMINUM	MG/KG	6920.000	J	
ANTIMONY	MG/KG	11.600	UJ	
ARSENIC	MG/KG	0.450	U	
BARIUM	MG/KG	61.500		
BERYLLIUM	MG/KG	0.260	B	
CADMIUM	MG/KG	1.200	UJ	
CALCIUM	MG/KG	2790.000		
CHROMIUM	MG/KG	23.700	J	
COBALT	MG/KG	5.600	B	
COPPER	MG/KG	3.800	BJ	
IRON	MG/KG	20900.000	J	
LEAD	MG/KG	2.700		
MAGNESIUM	MG/KG	4050.000	J	
MANGANESE	MG/KG	153.000	J	
MERCURY	MG/KG	0.120	U	
NICKEL	MG/KG	18.400		
POTASSIUM	MG/KG	907.000	B	
SELENIUM	MG/KG	0.450	U	
SILVER	MG/KG	1.200	U	
SODIUM	MG/KG	180.000	B	
THALLIUM	MG/KG	0.450	U	
VANADIUM	MG/KG	47.500		
ZINC	MG/KG	37.100		
CYANIDE	MG/KG	1.200	UJ	

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

008

*Reviewed*  
12/19/94

9613490.0368





9613490.0371

WHC-SD-EN-SPP-002, REV.2

ATTACHMENT 4

LABORATORY NARRATIVE and CHAIN-OF-CUSTODY DOCUMENTATION



# ANALYTICAL SERVICES

## CERTIFICATE OF ANALYSIS

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



August 11, 1994

Job Number: 770

This is the Certificate of Analysis for the following sample:

SDG:	W0118
Client Project ID:	WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1
Received by Knoxville:	July 2, 1994
Number of Samples:	One (1)
Sample Type:	Soil

### I. Introduction

On July 1, 1994, one (1) soil sample 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 sample was analyzed for Target Compound List (TCL) volatiles and semivolatiles by gas chromatography/mass spectroscopy (GC/MS) in accordance with the EPA CLP OLM01.8 Statement of Work.

Reviewed and Approved:

*Sheree A. Schneider*

Sheree' A. Schneider  
Project Manager



IT Corporation  
August 11, 1994  
Job Number: 770  
Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

## II. Analytical Results/Methodology (Continued)

The sample was analyzed for Target Analyte List (TAL) metals by cold vapor atomic absorption spectroscopy (CVAA), graphite furnace atomic absorption spectroscopy (GFAA), and inductively coupled plasma spectroscopy (ICP) in accordance with the EPA CLP ILM03.0 Statement of Work.

The sample was analyzed for total cyanide in accordance with the EPA CLP ILM03.0 Statement of Work.

The sample was analyzed for nitrate-nitrite based on EPA method 353.2.

The sample was analyzed for anions by ion chromatography using EPA method 300.0.

## III. Quality Control

The volatiles analyses were performed by purge and trap with a J & W DB-624 capillary column on a Finnigan INCOS 500 GC/MS/DS. A matrix spike and matrix spike duplicate were analyzed using sample BOBXB1. All QC results met method specified limits.

The semivolatiles analyses were performed by direct injection of sample extract on a Restek XTI-5 capillary column on a Finnigan INCOS XL GC/MS/DS. A matrix spike and matrix spike duplicate were analyzed using sample BOBXB1. 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.

IT Corporation  
August 11, 1994  
Job Number: 770  
Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

### III. Quality Control (Continued)

The sample was digested on July 22, 1994 for ICP and July 22 and 25, 1994 for GFAA. The CVAA analysis for mercury was performed on July 25, 1994; the GFAA analyses for arsenic, lead, selenium and thallium were performed July 22 and July 29, 1994; the remaining metals were analyzed by ICP on July 25, 1994. All run QC was acceptable. A duplicate/spike pair was prepared using sample number BOBXB1. Spike recovery (accuracy) results were within acceptance limits for all parameters except for antimony, chromium and manganese. A post digestion spike was performed as required per CLP protocol. Poor spike recovery for antimony is attributable to matrix interferences. Poor spike recovery for chromium and manganese is attributable to sample nonhomogeneity as exhibited by the duplicate RPD results for these analytes. Duplicate RPD (precision) results were within acceptance limits for all parameters except for aluminum, chromium, iron, magnesium, manganese, vanadium and zinc. Poor duplicate precision for these analytes is attributable to sample nonhomogeneity. Cadmium was not outside acceptance limits for spike recovery per CLP rounding rules.

Data were reported with qualifiers as follows:

#### "C" Qualifiers

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

#### "O" Qualifiers

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

#### "M" Qualifiers

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

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Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

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IT ANALYTICAL SERVICES  
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### III. Quality Control (Continued)

#### Miscellaneous

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

The sample was analyzed for nitrate/nitrite on July 26, 1994. A matrix spike and matrix spike duplicate were analyzed using sample BOBXB1.

The sample was analyzed for fluoride, chloride, phosphate, nitrate, nitrite and sulfate by EPA method 300.0 on July 26, 1994. A matrix spike and matrix spike duplicate were analyzed using sample BOBXB1. All QC results were acceptable.

IT Corporation  
August 11, 1994  
Job Number: 770  
Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

---

IT ANALYTICAL SERVICES  
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### III. Quality Control (Continued)

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

**TABLE I**

Knoxville ID	Richland ID	WHC ID	Test
AB2176	407007-01A	BOBXB1	VOC
AB2177	407007-01B	"	SVOC
AB2178	407007-01C	"	METALS-T
AB2179	407007-01D	"	CN
AB2180	407007-01E	"	ANIONS
AB2181	407007-01F	"	NO3NO2

IT Corporation  
August 11, 1994  
Job Number: 770

IT ANALYTICAL SERVICES  
5815 MIDDLEBROOK PIKE  
KNOXVILLE, TN

Client Project ID: WHC SAF 94-046 200-UP-1 Soil Sampling - Round 1

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**IV. Certification**

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

Reviewed and Approved:



Sheree' A. Schneider  
Project Manager



9613490.0379

WHC-SD-EN-SPP-002, REV.2

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	<u>D</u>	E
PROJECT: 200-UP-1			DATA PACKAGE: W0118-ITC-124		
VALIDATOR: WATERBURY		LAB: IT Corp.		DATE: 11.10.94	
CASE:			SDG: W0118		
ANALYSES PERFORMED					
<input checked="" type="checkbox"/> CLP/ICP	<input checked="" type="checkbox"/> CLP/GFAA	<input checked="" type="checkbox"/> CLP/Hg	<input checked="" type="checkbox"/> CLP/Cyanide	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> SW-846/ICP	<input type="checkbox"/> SW-846/GFAA	<input type="checkbox"/> SW-846/Hg	<input type="checkbox"/> SW-846 Cyanide	<input type="checkbox"/>	<input type="checkbox"/>
SAMPLES/MATRIX <u>BOB XB1 - SOIL</u>					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

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

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

2. HOLDING TIMES

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

Comments: (1) Cyanide holding time was unacceptable. (UJ)

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

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

- Were initial calibrations performed on all instruments? . . . .  Yes No N/A
- Are initial calibrations acceptable? . . . . .  Yes No N/A
- Are ICP interference checks acceptable? . . . . .  Yes No N/A
- Were ICV and CCV checks performed on all instruments? . . . .  Yes No N/A
- Are ICV and CCV checks acceptable? . . . . .  Yes No N/A

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

4. BLANKS

- Were ICB and CCB checks performed for all applicable analyses?  Yes No N/A
- Are ICB and CCB results acceptable? . . . . .  Yes  No<sup>1</sup> N/A
- Were preparation blanks analyzed? . . . . .  Yes No N/A
- Are preparation blank results acceptable? . . . . .  Yes No N/A
- Were field/trip blanks analyzed? . . . . . Yes  No N/A
- Are field/trip blank results acceptable? . . . . . Yes No  N/A

Comments: (1) The ICB & CCB for copper was unacceptable. (1)

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

5. ACCURACY

- Were spike samples analyzed? . . . . .  Yes No N/A
- Are spike sample recoveries acceptable? . . . . . Yes  No N/A
- Were laboratory control samples (LCS) analyzed? . . . . .  Yes No N/A
- Are LCS recoveries acceptable? . . . . .  Yes No N/A

Comments: (1) Sb, Cd, Cr, & Mn spike % rec. were unacceptable. See attachments 2 & 5 for qualifications.

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

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

6. PRECISION

- Were laboratory duplicates analyzed? . . . . .  Yes No N/A
- Are laboratory duplicate samples RPD values acceptable? . . . . . Yes  No N/A
- Were ICP serial dilution samples analyzed? . . . . .  Yes No N/A
- Are ICP serial dilution %D values acceptable? . . . . .  Yes No N/A
- Are field duplicate RPD values acceptable? . . . . . Yes No  N/A
- Are field split RPD values acceptable? . . . . . Yes No  N/A

Comments: (1) Al, Cr, Mn, & Fe duplicate RPD values were unacceptable. See attachments 2 & 5 for qualifications.

7. FURNACE AA QUALITY CONTROL

- Were duplicate injections performed as required? . . . . .  Yes No N/A
- Are duplicate injection %RSD values acceptable? . . . . .  Yes No N/A
- Were analytical spikes performed as required? . . . . .  Yes No N/A
- Are analytical spike recoveries acceptable? . . . . . Yes  No N/A
- Was MSA performed as required? . . . . .  Yes No N/A
- Are MSA results acceptable? . . . . .  Yes No N/A

Comments: (1) Pb analytical spike was unacceptable, however, the MSA was run and no further qualification was required.

8. REPORTED RESULTS AND DETECTION LIMITS

- Are results reported for all requested analyses? . . . . .  Yes No N/A
- Are all results supported in the raw data? . . . . .  Yes No N/A
- Are results calculated properly? . . . . .  Yes No N/A
- Do results meet the CRDLs? . . . . .  Yes No N/A

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



U.S. EPA - CLP

6  
DUPLICATES

EPA SAMPLE NO.

BOBXB1D

Lab Name: ITAS\_KNOXVILLE Contract: HANFORD/WE  
 Lab Code: ITSTU Case No.: WO770 SAS No.: SDG No.: WO118  
 Matrix (soil/water): SOIL Level (low/med): LOW  
 % Solids for Sample: 82.1 % Solids for Duplicate: 82.1

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

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum		6919.7564		4744.1819		37.3	*	P
Antimony		11.6003	U	11.6003	U			P
Arsenic		0.4511	U	0.4511	U			F
Barium	46.4	61.5370		31.4321	B	64.8		P
Beryllium		0.2575	B	0.2320	U	200.0		P
Cadmium		1.1600	U	1.1600	U			P
Calcium	1160.0	2790.3880		1977.9827		34.1		P
Chromium		23.6715		12.5028		61.7	*	P
Cobalt		5.6284	B	3.5706	B	44.7		P
Copper		3.7933	B	2.3201	U	200.0		P
Iron		20937.3006		10860.6090		63.4	*	P
Lead	0.7	2.6510		3.1525		17.3		F
Magnesium	1160.0	4048.6561		2819.9640		35.8	*	P
Manganese		152.9842		88.7675		53.1	*	P
Mercury		0.1160	U	0.1160	U			CV
Nickel	9.3	18.3702		9.6537		62.2		P
Potassium		907.1423	B	640.9721	B	34.4		P
Selenium		0.4511	U	0.4511	U			F
Silver		1.1600	U	1.1600	U			P
Sodium		179.5789	B	113.2858	B	45.3		P
Thallium		0.4511	U	0.4511	U			F
Vanadium	11.6	47.5448		34.5270		31.7	*	P
Zinc		37.0860		27.2490		30.6	*	P
Cyanide								NR

11-10-94  
KSN

## RECORD COPY

MEMORANDUM



TO: 200-UP-1 Round 1 Soil Project QA Record

December 12, 1994

FR: Thomas Stapp, Golder Associates Inc. *MSL for*RE: RADIOCHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE  
W0118-QES-124 (943-1610.036 124RAD.UP1)

## INTRODUCTION

This memo presents the results of data validation on data package W0118-QES-124 prepared by Quanterra Environmental Services. Sample information is provided in the following table.

SAMPLE ID	MEDIA	ANALYSIS	COMMENTS
BOBXB1*	SOIL	RADIOCHEMISTRY SEE ATTACHMENT 4	
* Indicates the sample results which were 100% recalculated.			

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

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

## DATA QUALITY OBJECTIVES

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

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

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

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

**Detection Limits.** Detection limit goals were met for all results with the exception of iron-59.

**Completeness.** The data package was complete for all requested analyses. A total of one sample was validated in this data package with a total of twenty-six (26) determinations

*Reviewed  
12/12/94*

reported, all of which were deemed valid. This results in a completeness of 100 percent, which meets normal work plan objectives of 90 percent.

#### MAJOR DEFICIENCIES

There were no major deficiencies identified during data validation which required qualification of data as unusable.

#### MINOR DEFICIENCIES

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

##### Laboratory Control Sample Recovery

- The laboratory control sample recovery for neptunium-237 was unacceptable. Attachments 2 and 5 provide a summary of the samples affected, qualification applied, and supporting documentation.

#### REFERENCES

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

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

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

## ATTACHMENT 1

## GLOSSARY OF RADIOCHEMISTRY DATA REPORTING QUALIFIERS

- U - Indicates the constituent was analyzed for, but was not detected at a concentration above the minimum detectable activity (MDA). The concentration reported is the MDA corrected for sample aliquot size, dilution factors and percent solids (in the case of solid matrices) by the laboratory. The associated data should be considered usable for decision making purposes.
- UJ - Indicates the constituent was analyzed for and was not detected at a concentration above the MDA. Due to a quality control deficiency identified during data validation, the concentration reported may not accurately reflect the sample MDA. The associated data should be considered usable for decision making purposes.
- J - Indicates the constituent was analyzed for and detected. The concentration reported is qualified as estimated due to a quality control deficiency identified during data validation. The associated data should be considered usable for decision making purposes.
- UR - Indicates the constituent was analyzed for and not detected. The concentration reported is qualified as unusable due to a quality control deficiency identified during data validation. The associated data should be considered unusable for decision making purposes.
- R - Indicates the constituent was analyzed for and detected. The concentration reported is qualified as unusable due to a quality control deficiency identified during data validation. The associated data should be considered unusable for decision making purposes.

ATTACHMENT 2  
SUMMARY OF DATA QUALIFICATIONS

WHC-SD-EN-SPP-002, REV.2

## DATA QUALIFICATION SUMMARY - FORM B-7

SDG: W0118-QES-124	REVIEWER: T. STAPP	DATE: 11-03-94	PAGE <u>1</u> OF <u>1</u>
COMMENTS: RADIOCHEMISTRY			
COMPOUND/ANALYTE	QUALIFIER	SAMPLES AFFECTED	REASON
NEPTUNIUM-237	UJ	B0BXB1	LABORATORY CONTROL SAMPLE RECOVERY <70% BUT >30%

ATTACHMENT 3

QUALIFIED DATA SUMMARY and ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: W0118-QES-124

Parameter	Samp#	808XB1	
	Date	6-30-94	
	Location	299-W19-35	
	Depth	416.00 - 417.50	
	Type	SOIL	
	Comments		
Parameter	Units	Result	Q
AMERICIUM-241	pCi/G	0.021	U
CURIUM-242	pCi/G	0.026	U
CURIUM-244	pCi/G	0.014	U
NEPTUNIUM-237	pCi/G	0.019	UJ
PLUTONIUM-238	pCi/G	0.016	U
PLUTONIUM-239/240	pCi/G	0.028	U
URANIUM-234	pCi/G	0.680	
URANIUM-235	pCi/G	0.037	U
URANIUM-238	pCi/G	0.898	
COBALT-58	pCi/G	0.019	U
COBALT-60	pCi/G	0.019	U
CESIUM-137	pCi/G	0.016	U
EUROPIUM-152	pCi/G	0.038	U
EUROPIUM-154	pCi/G	0.057	U
EUROPIUM-155	pCi/G	0.047	U
IRON-59	pCi/G	0.055	U
IODINE-129	pCi/G	0.911	U
POTASSIUM-40	pCi/G	14.100	
RADIUM-224	pCi/G	0.749	
RADIUM-226	pCi/G	0.446	
RADIUM-228	pCi/G	0.702	
URANIUM-238DLP	pCi/G	0.758	
GROSS ALPHA	pCi/G	17.200	
GROSS BETA	pCi/G	28.400	
STRONTIUM-90	pCi/G	0.345	
TECHNETIUM-99	pCi/G	0.496	U

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

Verified *[Signature]* 11-7-94

960319000392

## SAMPLE RESULTS

page 1 of 2

Borehole: 299-W19-34B

Interval: 416'-417.5'

LAB NAME: ITAS-RICHLAND  
 LAB SAMPLE ID: 40700801  
 CLIENT ID: B0BXB1

SDG: W0118  
 MATRIX: SOIL  
 DATE RECEIVED: 7/1/94

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
<del>FE-11-7-94</del> AM-241	<del>1.54E-02</del>	<del>1.83E-02</del>	<del>1.85E-02</del>	2.12E-02	<del>U</del> pCi/g	68.70%	RD3302
CM-242	<del>5.26E-04</del>	<del>1.05E-03</del>	<del>1.06E-03</del>	2.65E-02	U pCi/g	68.70%	RD3302
CM-244	<del>0.00E+00</del>	<del>0.00E+00</del>	<del>1.59E-02</del>	1.44E-02	U pCi/g	68.70%	RD3302
NP-237	<del>0.66E-04</del>	<del>9.42E-04</del>	<del>9.53E-04</del>	1.90E-02	UJ pCi/g	100.00%	RD3208
PU-238	<del>0.00E+00</del>	<del>0.00E+00</del>	<del>1.78E-02</del>	1.61E-02	U pCi/g	70.20%	RD3209
PU239/40	<del>4.74E-03</del>	<del>1.21E-02</del>	<del>1.21E-02</del>	2.84E-02	U pCi/g	70.20%	RD3209
U-234	6.80E-01	1.60E-01	1.92E-01	6.76E-02	pCi/g	44.80%	RD3234
<del>FE-11-7-94</del> U-235	<del>2.72E-02</del>	<del>3.23E-02</del>	<del>3.26E-02</del>	3.74E-02	<del>U</del> pCi/g	44.80%	RD3234
U-238DA	8.98E-01	1.83E-01	2.30E-01	5.76E-02	pCi/g	44.80%	RD3234
CO-58	<del>3.99E-03</del>	<del>1.15E-02</del>	<del>1.15E-02</del>	1.90E-02	U pCi/g	N/A	RD3219
CO-60	<del>6.31E-03</del>	<del>1.06E-02</del>	<del>1.06E-02</del>	1.88E-02	U pCi/g	N/A	RD3219
CS-137DA	<del>5.20E-03</del>	<del>1.04E-02</del>	<del>1.04E-02</del>	1.64E-02	U pCi/g	N/A	RD3219
EU-152	<del>4.72E-03</del>	<del>2.29E-02</del>	<del>2.29E-02</del>	3.84E-02	U pCi/g	N/A	RD3219
EU-154	<del>2.09E-02</del>	<del>3.40E-02</del>	<del>3.40E-02</del>	5.66E-02	U pCi/g	N/A	RD3219
EU-155	<del>2.07E-02</del>	<del>3.02E-02</del>	<del>3.03E-02</del>	4.75E-02	U pCi/g	N/A	RD3219
FE-59	<del>0.58E-04</del>	<del>3.29E-02</del>	<del>3.29E-02</del>	5.52E-02	U pCi/g	N/A	RD3219
I-129LP	<del>4.90E-01</del>	<del>4.94E-01</del>	<del>4.97E-01</del>	9.11E-01	U pCi/g	N/A	RD3219
K-40	1.41E+01	5.00E-01	1.50E+00	N/A	pCi/g	N/A	RD3219
RA-224DA	7.49E-01	3.25E-02	8.16E-02	N/A	pCi/g	N/A	RD3219
RA-226DA	4.46E-01	4.49E-02	6.32E-02	N/A	pCi/g	N/A	RD3219
RA-228DA	7.02E-01	8.64E-02	1.11E-01	N/A	pCi/g	N/A	RD3219
U-238DLP	7.58E-01	4.66E-01	4.72E-01	N/A	pCi/g	N/A	RD3219
ALPHA	1.72E+01	5.87E+00	6.16E+00	4.87E+00	pCi/g	100.00%	RD3214
BETA	2.84E+01	3.77E+00	4.21E+00	3.67E+00	pCi/g	100.00%	RD3214
STRONTIUM	3.45E-01	7.79E-02	1.16E-01	1.32E-01	pCi/g	90.10%	RD3204

Verified ~~FE-11-3-94~~~~0000~~

## SAMPLE RESULTS page 2 of 2

LAB NAME: ITAS-RICHLAND                      SDG: W0118  
 LAB SAMPLE ID: 40700801                      MATRIX: SOIL  
 CLIENT ID: BOBXB1                              DATE RECEIVED: 7/1/94

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
<del>TC-99</del>	<del>3.40E-01</del>	<del>2.19E-01</del>	<del>9.85E-01</del>	4.96E-01	<del>U</del> pCi/g	100.00%	ITAS-IT-RS-0001

 Number of Results: 26

 Verified ~~8~~ 11-3-94

ATTACHMENT 4

LABORATORY NARRATIVE and CHAIN-OF-CUSTODY DOCUMENTATION



INTERNATIONAL  
TECHNOLOGY  
CORPORATION

## CERTIFICATE OF ANALYSIS

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

August 29, 1994

Attention: J.A.Lerch

SAF Number	:	94-046
Date SDG Closed	:	July 15, 1994
Number of Samples	:	One (1)
Sample Type	:	Soil
SDG Number	:	W0118
Data Deliverable	:	Stand Alone

### I. Introduction

On July 1, 1994, one soil 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>
407008-01A	BOBXB1	Soil	7/1/94

### II. Analytical Results/Methodology

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

Regional Office  
2800 George Washington Way • Richland, Washington 99352 • 509-375-3131

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11-3-94  
~~0001~~

Westinghouse Hanford Company  
August 29, 1994  
Page 2

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The requested analyses were:

**Alpha Spectroscopy**

Americium-241, Curium-244 by method ITAS-RD-3302

Neptunium-237 by method ITAS-RD-3208

Plutonium-238, 239/40 by method ITAS-RD-3209

Uranium-234, 235, 238 by method ITAS-RD-3234

**Gamma Spectroscopy**

Gamma Scan by method ITAS-RD-3219

Iodine-129 by method ITAS-RD-3219

**Gas Proportional Counting**

Gross Alpha by method ITAS-RD-3222

Gross Beta by method ITAS-RD-3222

Strontium-90 by method ITAS-RD-3204

**Liquid Scintillation Counting**

Carbon-14 by method ITAS-RD-3247

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

### III. Quality Control

The analytical results for each analysis performed under SDG W0118 include a minimum of one Laboratory Control Sample (LCS), one method (reagent) blank, and one duplicate.

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

### IV. Comments

The initial radioactivity screening of the sample classified it as Category II.

The WHC COC/RFA form and WHC Off-Site Property Control form W94-0-0746-10 list sample ID number as B0B4B1. The bottle is labeled B0BXB1. The sample was logged and analyzed using sample ID number B0BXB1.

The WHC COC/RFA form lists the sample matrix as soil. The WHC Off-Site Property Control form W94-0-0746-10 describes the sample as groundwater. The sample was logged and analyzed as a soil.

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### Alpha Spectroscopy

#### Americium-241, Curium-244 by method ITAS-RD-3302

The batch was reanalyzed due to low tracer yields on the initial analysis. The reanalysis LCS, batch blank, sample and sample duplicate (duplicate of sample B0BXB1) results are within contractual requirements.

#### Neptunium-237 by method ITAS-RD-3208

The batch was reanalyzed due to low matrix spike recoveries. The reanalysis LCS, batch blank, sample and sample duplicate (duplicate of sample B0BXB1) results are within contractual requirements.

#### Plutonium-238, 239/40 by method ITAS-RD-3209

The batch was reanalyzed due to a low radiochemical recovery on the spike. The reanalysis blank tracer yield is less than 20%, however, the batch results are reported and the batch is accepted because the required detection limit was achieved for each result in the batch, the sample result was less than contractual detection limit, the sample was duplicated and the sample duplicate result is within the 3 sigma error around the sample result, and the reanalysis results for the sample and sample duplicate are within 3 sigma error around the original results. The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BXB1) results are accepted and reported.

#### Uranium-234, 235, 238 by method ITAS-RD-3234

The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BXB1) results are accepted and reported.

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### **Gamma Spectroscopy**

#### Gamma Scan by method ITAS-RD-3219

The Fe-59 RDL was not met for sample B0BXB1 and the duplicate of sample B0BXB1. The RDLs were achieved for the batch blank, therefore, the sample MDAs are accepted. Cd-109 was detected in sample B0BXB1, the duplicate of B0BXB1, and the LCS. The Cd-109 results are not reported because they are suspected false positive results caused by x-ray lines produced by energy reflection from the detector shielding. Sample B0BXB1 and the duplicate of sample B0BXB1 agree within the 3 sigma control limit for Cs-137, K-40, Ra-226, and U-238DLP. The sample and duplicate do not agree within 3 sigma for Ra-224 and Ra-228. The duplicate data are accepted based on the acceptable Cs-137, K-40, Ra-226, and U-238DLP agreement. The LCS and batch blank results are within contractual requirements.

#### Iodine-129 by method ITAS-RD-3219

The LCS spike recovery was biased high for the I-129 analysis. Using the detector efficiency for I-129 in soil (IS9) the reagent water LCS recovery was 153%. After a percent recovery correction using the water matrix, 50 ml geometry efficiency, the spike recovery was 124%, therefore, the LCS was recounted. The recount of the LCS indicated a high bias (155%) again, and again the correction was made for the difference between the sample and QC sample matrices and the recount LCS result was still biased high (126%). The original LCS value is accepted and reported. The Quanterra Technical Associate Group is developing a soil I-129 LCS for soil and "other" matrix samples as corrective action for the problem encountered when evaluating the I-129 activity of reagent water QC samples which have a specific gravity that is different from that of the soil and "other" matrix samples. The result for sample B0BXB1 and the duplicate of sample B0BXB1 are not with the three sigma control limit, however, the results are well below the RDL, therefore, the results are accepted. The batch blank result is within contractual limits.

### **Gas Proportional Counting**

#### Gross Alpha by method ITAS-RD-3222

The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BXB1) results are within contractual requirements.

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Gross Beta by method ITAS-RD-3222

The LCS, batch blank, sample and sample duplicate (duplicate of sample BOBXB1) results are within contractual requirements.

Strontium-90 by method ITAS-RD-3204

The LCS, batch blank, sample and sample duplicate (duplicate of sample BOBXB1) results are within contractual requirements.

**Liquid Scintillation Counting**

Carbon-14 by method ITAS-RD-3247

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

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

The matrix spike, LCS, batch blank, sample and sample duplicate (duplicate of sample BOBXB1) results are within contractual requirements.

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

Reviewed and approved:

Suzanne Gaines

Suzanne Gaines  
Project Manager

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Westinghouse Hanford Company

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Data Turnaround

Priority  
 Normal

Collector W. V. SETZER	Company Contact W. V. SETZER	Telephone No. (509) 376-2413
Project Designation 200 UP-1	Sampling Location 699-38-68A	SAF No. 94-046
Ice Chest No. ER-1D	Field Logbook No. EFL-1118	Method of Shipment BY DOE VEHICLE
Shipped To INTERNATIONAL TECHNOLOGIES	Offsite Property No. W94-0-0746-10	Bill of Lading/Air Bill No. N/A

Possible Sample Hazards/Remarks	Preservative	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4	COOL 4
	Type of Container	aGs	aG	G	G	G	G	P/G	P/G	aGs	aGs	aGs	aGs	aGs
No. of Container(s)	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Special Handling and/or Storage	Volume	125ml	500ml	500ml	250ml	250ml	125ml	1000ml	500ml	125ml	250ml	500ml	500ml	500ml
SAMPLE ANALYSIS 407007	VOA (CLP)	SEMIVOA (CLP)	ICP MTL GFAA METALS Hg (CLP)	Cn (CLP)	ANIONS IC-F, CL EPA(353 SO4, NO2, NO3, PO4)	NO2, NO3								
	TRIP	VOA	FIELD											
	01 A	B	C	D	E	F	40700801							

Sample No.	Matrix*	Date Sampled	Time Sampled											
B004B1	S	6-30-94	1502	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

<b>CHAIN OF POSSESSION</b>	<b>Sign/Print Names</b>	<b>SPECIAL INSTRUCTIONS</b>	<b>Matrix*</b>
Relinquished By <i>W.V. Setzer</i>	Date/Time 6-30-94 1710	Received By <i>J.S. Thompson</i>	Date/Time 6-30-94 1710
Relinquished By <i>J.S. Thompson</i>	Date/Time 7-1-94 0800	Received By <i>M. Simpson</i>	Date/Time 7/1/94 0800
Relinquished By <i>M. Simpson</i>	Date/Time 7/1/94 1145	Received By <i>[Signature]</i>	Date/Time 7/1/94 1145
Relinquished By	Date/Time	Received By	Date/Time
LABORATORY SECTION		Received By	Title
FINAL SAMPLE DISPOSITION		Disposal Method	Disposed By

LOWEST HOLDING TIME = 7DAYS

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

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

LABORATORY SECTION: Received By \_\_\_\_\_ Title \_\_\_\_\_ Date/Time \_\_\_\_\_

FINAL SAMPLE DISPOSITION: Disposal Method \_\_\_\_\_ Disposed By \_\_\_\_\_ Date/Time \_\_\_\_\_

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	<b>D</b>	E
PROJECT:	200-UP-1 ROUND 1 SOIL		DATA PACKAGE: W0118-QES-124		
VALIDATOR:	T. Stapp	LAB: QUANTERRA	DATE: 11-3-94		
CASE:	SDG:				
ANALYSES PERFORMED					
<input checked="" type="checkbox"/> Gross Alpha/Beta	<input checked="" type="checkbox"/> Strontium-90	<input checked="" type="checkbox"/> Technetium-99	<input checked="" type="checkbox"/> Alpha Spectroscopy	<input checked="" type="checkbox"/> Gamma Spectroscopy	
<input type="checkbox"/> Total Uranium	<input type="checkbox"/> Radium-22	<input type="checkbox"/> Tritium	<input checked="" type="checkbox"/> I-129		
SAMPLES/MATRIX					
BOBXB1 / SOIL					

1. Completeness . . . . .  N/A

Technical verification forms present? . . . . .  Yes No N/A

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

2. Initial Calibration . . . . .  N/A

Instruments/detectors calibrated within one year of sample analysis? . . . . . NOTE ① . . . . . Yes  No N/A

Initial calibration acceptable? . . . . .  Yes No N/A 12/18/94

Standards NIST traceable? . . . . .  Yes No N/A

Standards Expired? . . . . . Yes  No N/A

Comments: ① Detectors not calibrated within one year of sample analysis for Np-237, Pu 238/239, Am 241, Cm 244, Isotopic Uranium, I-129, Sr-90, and Gross  $\alpha/\beta$ , however continuing calibration criteria is acceptable and no qualification is applied.

Revised 12/18/94

3. Continuing Calibration . . . . .  N/A

Calibration checked within one week of sample analysis? . . . Yes No N/A

Calibration check acceptable? . . . Yes No N/A

Calibration check standards NIST traceable? . . . Yes No N/A

Calibration check standards expired? . . . Yes No N/A

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4. Blanks . . . . .  N/A

Method blank analyzed? . . . Yes No N/A

Method blank results acceptable? . . . Yes No N/A

Analytes detected in method blank? . . . Yes No N/A

Field blank(s) analyzed? . . . NOTE ① Yes No N/A

Field blank results acceptable? . . . Yes No N/A

Analytes detected in field blank(s)? . . . Yes No N/A

Transcription/Calculation Errors? . . . Yes No N/A

Comments: ① Field QC was not included in this SDG.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

5. Matrix Spikes . . . . .  N/A

Matrix spike analyzed? . . . Yes No N/A

Spike recoveries acceptable? . . . Yes No N/A

Spike source traceable? . . . Yes No N/A

Spike source expired? . . . Yes No N/A

Transcription/Calculation Errors? . . . Yes No N/A

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

6. Laboratory Control Samples . . . . .  N/A

LCS analyzed? . . . . .  Yes No N/A

LCS recoveries acceptable? . . . . . NOTE ①  Yes  No N/A

LCS traceable? . . . . .  Yes No N/A

Transcription/Calculation Errors? . . . . . Yes  No N/A

Comments: ① See LCS Summary page.

7. Chemical Recovery . . . . .  N/A

Chemical carrier added? . . . . .  Yes No N/A

Chemical recovery acceptable? . . . . .  Yes No N/A

Chemical carrier traceable? . . . . .  Yes No N/A

Chemical carrier expired? . . . . . Yes  No N/A

Transcription/Calculation errors? . . . . . Yes  No N/A

Comments:

8. Duplicates . . . . .  N/A

Duplicates Analyzed? . . . . .  Yes No N/A

RPD Values Acceptable? . . . . .  Yes No N/A

Transcription/Calculation Errors? . . . . . Yes  No N/A

Comments:

9. Field QC Samples . . . . .  N/A

- Field duplicate sample(s) analyzed? . . . . . Yes No  N/A
- Field duplicate RPD values acceptable? . . . . . Yes No  N/A
- Field split sample(s) analyzed? . . . . . Yes No  N/A
- Field split RPD values acceptable? . . . . . Yes No  N/A
- Performance audit sample(s) analyzed? . . . . . Yes No  N/A
- Performance audit sample results acceptable? . . . . . Yes No  N/A

Comments: Field QC was not included in this SDO.

10. Holding Times

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

Comments: Collected

	<u>Cross</u>	<u>Cross</u>	<u>Te-99</u>	<u>Sr-90</u>	<u>GAMMA</u>	<u>I-129</u>	<u>U-234</u>	<u>U-235</u>	<u>U-238</u>	<u>Am-241</u>	<u>Cm-244</u>	<u>Pu-238</u>	<u>Pu-239</u>	<u>Np-237</u>	<u>C-14</u>
<u>BOB X B1 (6-30-94)</u>	<u>8-01</u>	<u>8-09</u>	<u>8-04</u>	<u>8-03</u>	<u>7-28</u>	<u>7-27</u>	<u>8-11</u>	<u>94</u>	<u>→</u>	<u>8-22</u>	<u>8-22</u>	<u>8-20</u>	<u>8-20</u>	<u>8-15</u>	<u>N/A</u>
<u>DAYS ≤ 180</u>															

N/A - Not Analyzed.

11. Results and Detection Limits (Levels D & E) . . . . .  N/A

- Results reported for all required sample analyses? NOTE ① Yes  No  N/A
- Results supported in raw data? . . . . .  Yes  No  N/A
- Results Acceptable? . . . . .  Yes  No  N/A
- Transcription/Calculation errors? . . . . . Yes  No  N/A
- MDA's meet required detection limits? . . . . .  Yes  No  N/A <sup>12/8/94</sup>
- Transcription/calculation errors? . . . . . NOTE ②  Yes  No  N/A <sup>11-7-94</sup>

Comments: ① Carbon-14 results were not reported due to insufficient carbon present in the sample as stated in the lab narrative. Detection limit for iron-59 exceeded, no qualification required.  
② Recalculated MDA's do not match reported MDA's for Am-241, U-234/235/238, Cross α/β, Sr-90 and Te-99 and non-detect results for the associated analytes will be qualified as estimated (U). 11-7-94

*Revised 12/8/94*

**LABORATORY CONTROL SAMPLE  
SUMMARY**

LAB NAME: ITAS-RICHLAND SDG: W0118  
LAB SAMPLE ID: L070082S MATRIX: SOIL

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	REPORT UNIT	YIELD	EXPECTED	RECOVERY
AM-241	4.57E+00	2.95E-01	7.61E-01	2.69E-02	pCi/g	76.30%	4.51E+00	101.33% ✓
CM-242	3.46E-03	1.03E-02	1.03E-02	2.72E-02	pCi/g	76.30%	1.00E-02	34.60%
CM-244	3.24E-03	9.66E-03	9.67E-03	2.55E-02	pCi/g	76.30%	1.00E-02	32.40%
NP-237	3.68E+00	2.48E-01	8.30E-01	1.68E-02	pCi/g	100.00%	5.78E+00	63.67%
PU239/40	3.56E+00	3.95E-01	6.97E-01	6.17E-02	pCi/g	38.10%	3.38E+00	105.33% ✓

Number of Results:

The recovery circled is below the 70% limit and qualifies associated sample results for the analyte indicated as estimated (J/US).

RS 11-3-94

W0118-QES-124

Americium/Curium	
HEIS No.:	BOBXB1
Lab ID:	40700801
Aliquot:	2.01E+00
Am241 net cpm:	0.0146
Am241 bkg cpm:	0.0004
Spl count time:	200
Bkg count time:	2500
Eff d/c:	3.225
Decay:	1
Yield:	0.687
Am241 calc:	1.54E-02
Am241 rptd:	1.54E-02
Am241 MDA calc:	2.12E-02
Am241 MDA rptd:	2.12E-02
Cm244 net cpm:	0.0000
Cm244 bkg cpm:	0.0000
Cm244 decay:	1.005
Cm244 calc:	0.00E+00
Cm244 rptd:	0.00E+00
Cm244 MDA calc:	1.44E-02
Cm244 MDA rptd:	1.43E-02
Cm242 net cpm:	-0.0004
Cm242 bkg cpm:	0.0004
Cm242 decay:	1.247
Cm242 calc.:	-5.26E-04
Cm242 rptd:	-5.26E-04
Cm242 MDA calc:	2.65E-02
Cm242 MDA rptd:	2.65E-02

Neptunium	
HEIS No.:	BOBXB1
Lab ID:	40700801
Aliquot:	2.00E+00
Np237 net cpm:	-0.0008
Np237 bkg cpm:	0.0008
Spl count time:	200
Bkg count time:	2500
Eff d/c:	3.7
Decay:	1
Yield:	1
Np237 calc:	-6.66E-04
Np237 rptd:	-6.66E-04
Np237 MDA calc:	1.90E-02
Np237 MDA rptd:	1.90E-02

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Plutonium	
HEIS No.:	B08XB1
Lab ID:	40700801
Aliquot:	2.00E+00
Pu238 net cpm:	0
Pu238 bkg cpm:	0
Spl count time:	200
Bkg count time:	1000
Pu238 Eff d/c:	3.703
Decay:	1.001
Yield:	0.702
Pu238 calc:	0.00E+00
Pu238 rptd:	0.00E+00
Pu238 MDA calc:	1.61E-02
Pu238 MDA rptd:	1.61E-02
Pu239 net cpm:	0.004
Pu239 bkg cpm:	0.001
Pu239 d/c:	3.7
Pu239 decay:	1
Pu239 calc:	4.74E-03
Pu239 rptd:	4.74E-03
Pu239 MDA calc:	2.84E-02
Pu239 MDA rptd:	2.84E-02

Uranium	
HEIS No.:	B08XB1
Lab ID:	40700801
Aliquot:	2.00E+00
U-234 net cpm:	0.3652
U-234 bkg cpm:	0.0048
Spl count time:	200
Bkg count time:	2500
Eff d/c:	3.7
Decay:	1
Yield:	0.448
U-234 calc:	6.79E-01
U-234 rptd:	6.80E-01
U-234 MDA calc:	6.76E-02
U-234 MDA rptd:	6.76E-02
U-235 net cpm:	0.0146
U-235 bkg cpm:	0.0004
U-235 decay:	1
U-235 calc:	2.72E-02
U-235 rptd:	2.72E-02
U-235 MDA calc:	3.74E-02
U-235 MDA rptd:	3.74E-02
U-238 net cpm:	0.4822
U-238 bkg cpm:	0.0028
U-238 decay:	1
U-238 calc.:	8.97E-01
U-238 rptd:	8.98E-01
U-238 MDA calc:	5.76E-02
U-238 MDA rptd:	5.76E-02

W0118-QES-124

Gross Alpha	
HEIS No.:	BOBXB1
Lab ID:	40700801
Aliquot:	4.99E-02
Net counts:	0.38
Bkg counts:	0.03
Spl count time:	100
Bkg count time:	300
d/c:	5.016
Calc.:	1.72E+01
Rptd:	1.72E+01
MDA calc:	4.87E+00
MDA rptd:	4.87E+00

Gross Beta	
HEIS No.:	BOBXB1
Lab ID:	40700801
Aliquot:	2.50E-01
Net counts:	5.446
Bkg counts:	0.974
Spl count time:	50
Bkg count time:	500
d/c:	2.898
Calc.:	2.84E+01
Rptd:	2.84E+01
MDA calc:	3.67E+00
MDA rptd:	3.67E+00

W0118-QES-124

Strontium 90	
HEIS No.:	BOBX81
Sample:	40700801
Sep date:	8/02/94
Sep time:	15:10
Count date:	8/03/94
Count time:	17:50
Hours:	26.666666
Sample amt:	6.09E+00
Net, cpm:	2.395
Count time:	50
Bkg, cpm:	1.005
Count time:	200
D/C 1:	2.246
D/C 2:	1.861
D/C 3:	2.013
Yield:	0.901
Calc:	3.45E-01
Rptd:	3.45E-01
MDA, Calc:	1.32E-01
MDA, rptd:	1.32E-01

Technetium-99	
HEIS No.:	BOBX81
Sample:	40700801
Bkg cpm:	24.84
Spl, amt:	2.00E+00
Spl cpm:	25.78
Count time:	125
Spl dpm:	27.59
d/c:	1.07
Yield:	1
Blk, dpm:	2.61E+01
Blk, d/c:	1.057
Calc:	3.40E-01
Rptd:	3.40E-01
MDA, calc:	4.99E-01
MDA, rptd:	4.96E-01