START 2213495.2751

W0028-ITC-045

0045459

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYTICAL SERVICES

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SDLA

CERTIFICATE OF ANALYSIS

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

May 31, 1994

OCT 1996
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EDMC

Job Number: 353; 396

This is the Certificate of Analysis for the following samples:

SDG:	W0028
Client Project ID:	WHC SAF 94-088 200-UP-1 Groundwater Round 1
Date Received by Lab:	April 13, 1994; April 19, 1994
Number of Samples:	Nine (9)
Sample Type:	Water

I. Introduction

On April 13 and April 19, 1994, nine (9) water samples arrived at ITAS-Richland, Washington and were transferred to ITAS-Knoxville for chemical analysis. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results.

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

Reviewed and Approved:

Sheree A. Schneider

Sheree' A. Schneider
Project Manager

RECORD COPY

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

IT Corporation
May 31, 1994
Job Number: 353; 396
Client Project ID: WHC SAF 94-088 200-UP-1 Groundwater Round 1

II. Analytical Results/Methodology (Continued)

The samples were analyzed for Target Compound List (TCL) pesticides and PCBs by gas chromatography/electron capture detection (GC/ECD) in accordance with the EPA CLP 3/90 Statement of Work.

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

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

III. Quality Control

The volatiles analyses for work order #353 were performed on April 22, 1994 by purge and trap with a J & W DB-624 capillary column on a Finnigan INCOS 500 GC/MS/DS. A matrix spike and a matrix spike duplicate were analyzed using sample BOBKJ3. All QC results were within method specified limits. TIC's were not reported on forms 1E for samples BOBKJ3, BOBKJ4, BOBKJ5, BOBKJ6, BOBKJ9 and ~~BOBKJ0~~ BOBKK0 because the data tape contained errors when trying to re-load the data on 06/09/94. The tape had been verified and was readable previously. The TIC's were searched for manually on the chromatograms. No TIC's other than CO_2 were found in any of the samples.

The volatiles analyses for work order #396 were performed on April 26, 1994 by purge and trap with a J & W DB-624 capillary column on a Hewlett-Packard 5970 GC/MS/DS. All QC result were within method specified limits.

Data were reported with qualifiers as follows:

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

The samples were analyzed on April 18, 1994 for pesticides/PCBs using DB-608 and DB-1701 0.53mm ID megabore capillary columns. 1.0 μg was injected for each column. One laboratory control sample (LCS) was analyzed and reported with acceptable recoveries. Any samples that were manually integrated will be denoted by a +M and -M on the chromatogram.

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III. Quality Control

Data were reported using qualifiers as follows:

U - Compound analyzed for but not detected; value given is the quantitation limit.
D - Compound analyzed at a secondary dilution; DL was appended to the sample number.
X - A flag that FORMASTER III inserts when the data were entered manually.
Z - Compound's response was such that it exceeded the established linearity range. The value is estimated.
J - Compound detected but below the quantitation limit; value estimated.
P - The percent difference for the calculated values from the two analytical columns differed by 25.0% or more.

The samples were analyzed by EPA Method 300.0 for fluoride, chloride, nitrate, nitrite, phosphate and sulfate on May 19, 1994. A matrix spike and a matrix spike duplicate were analyzed using sample BOBKJ3. All QC results were within method specified limits.

The samples were analyzed for nitrate/nitrite on April 19, 1994. A matrix spike and a matrix spike duplicate were analyzed using sample BOBKJ9 with acceptable results.

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May 31, 1994
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III. Quality Control (Continued)

TABLE I

Knoxville ID	Richland ID	WHC ID	Matrix	Test
AA6295	W404202-01	BOBKJ3	WATER	VOC
AA6296	"	"	"	PEST/PCB
AA6298	"	"	"	ANIONS
AA6299	"	"	"	NO3NO2
AA6300	W404202-03	BOBKJ5	"	VOC
AA6301	"	"	"	PEST/PCB
AA6302	"	"	"	ANIONS
AA6303	"	"	"	NO3NO2
AA6304	W404202-05	BOBKJ9	"	VOC
AA6305	"	"	"	PEST/PCB
AA6306	"	"	"	ANIONS
AA6307	"	"	"	NO3NO2
AA6308	W404202-02	BOBKJ4	"	VOC
AA6309	W404202-04	BOBKJ6	"	VOC
AA6310	W404202-06	~~BOBKJ0~~ BOBKK0 J.C. 6/10/94	"	VOC
AA6311	W404202-07	TRIP BLANK	"	VOC
AA6944	W404318-01	BOBMN6	"	VOC
AA6945	"	"	"	ANIONS
AA6946	"	"	"	NO3NO2
AA6947	W404318-02	BOBMN7	"	VOC
AA6948	TRIP BLANK	TRIP BLANK	"	VOC

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KNOXVILLE, TN

IT Corporation
May 31, 1994
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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

Sheree' A. Schneider
Project Manager

9613495.2756

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
BOBKKO
~~BOBKK6~~
~~BOBKJ0~~
J.C 6/10/94

Lab Name: ITAS-KNOXVILLE Contract: _____

Lab Code: ITSTU Case No.: 353 SAS No.: _____ SDG No.: W0028

Matrix: (soil/water) WATER Lab Sample ID: AA6310

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: AA6310

Level: (low/med) LOW Date Received: 04/13/94

% Moisture: not dec. _____ Date Analyzed: 04/22/94

GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0

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

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

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBKJ3

Lab Name: ITAS-KNOXVILLE Contract: _____

Lab Code: ITSTU Case No.: 353 SAS No.: _____ SDG No.: W0028

Matrix: (soil/water) WATER Lab Sample ID: AA6295

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: AA6295

Level: (low/med) LOW Date Received: 04/13/94

% Moisture: not dec. ____ Date Analyzed: 04/22/94

GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	11	B
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	3	J
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	130	
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

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
BOBKJ4

Lab Name: ITAS-KNOXVILLE Contract: _____

Lab Code: ITSTU Case No.: 353 SAS No.: _____ SDG No.: W0028

Matrix: (soil/water) WATER Lab Sample ID: AA6308

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: AA6308

Level: (low/med) LOW Date Received: 04/13/94

% Moisture: not dec. ____ Date Analyzed: 04/22/94

GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0

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

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

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
BOBKJ5

Lab Name: ITAS-KNOXVILLE Contract: _____

Lab Code: ITSTU Case No.: 353 SAS No.: _____ SDG No.: W0028

Matrix: (soil/water) WATER Lab Sample ID: AA6300

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: AA6300

Level: (low/med) LOW Date Received: 04/13/94

% Moisture: not dec. ____ Date Analyzed: 04/22/94

GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	8	BJ
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	3	J
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	7	J
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	140	
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

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
BOBKJ6

Lab Name: ITAS-KNOXVILLE Contract: _____

Lab Code: ITSTU Case No.: 353 SAS No.: _____ SDG No.: W0028

Matrix: (soil/water) WATER Lab Sample ID: AA6309

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: AA6309

Level: (low/med) LOW Date Received: 04/13/94

% Moisture: not dec. _____ Date Analyzed: 04/22/94

GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0

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

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

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
BOBKJ9

Lab Name: ITAS-KNOXVILLE Contract: _____

Lab Code: ITSTU Case No.: 353 SAS No.: _____ SDG No.: W0028

Matrix: (soil/water) WATER Lab Sample ID: AA6304

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: AA6304

Level: (low/med) LOW Date Received: 04/13/94

% Moisture: not dec. ____ Date Analyzed: 04/22/94

GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0

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

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

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBMN6

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 396 SAS No.: _____ SDG No.: W0028

Matrix: (soil/water) WATER Lab Sample ID: AA6944

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: ADZ03

Level: (low/med) LOW Date Received: 04/19/94

% Moisture: not dec. _____ Date Analyzed: 04/26/94

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

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	3	BJ
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	4	J
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	3	J
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	48	
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	5	J
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

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBMN7

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 396 SAS No.: _____ SDG No.: W0028

Matrix: (soil/water) WATER Lab Sample ID: AA6947

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: ADZ04

Level: (low/med) LOW Date Received: 04/19/94

% Moisture: not dec. ____ Date Analyzed: 04/26/94

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

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	1	J
67-64-1	Acetone	6	BJ
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	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

9613195.2764

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBKJ3WATER

Lab Name: ITAS-KNOXVILLE Contract: _____

Lab Code: _____ Case No.: W0028 SAS No.: _____ SDG No.: W0028

Matrix: (soil/water) WATER Lab Sample ID: AA6296

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N) ___ Date Received: 04/13/94

Extraction: (SepF/Cont/Sonc) CONT Date Extracted: 04/14/94

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 04/18/94

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 7.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBKJ5WATER

Lab Name: ITAS-KNOXVILLE Contract: _____

Lab Code: _____ Case No.: W0028 SAS No.: _____ SDG No.: W0028

Matrix: (soil/water) WATER Lab Sample ID: AA6301

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N) ___ Date Received: 04/13/94

Extraction: (SepF/Cont/Sonc) CONT Date Extracted: 04/14/94

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 04/18/94

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 7.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

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1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBKJ9WATER

Lab Name: ITAS-KNOXVILLE Contract: _____

Lab Code: _____ Case No.: W0028 SAS No.: _____ SDG No.: W0028

Matrix: (soil/water) WATER Lab Sample ID: AA6305

Sample wt/vol: 972.0 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N) ___ Date Received: 04/13/94

Extraction: (SepF/Cont/Sonc) CONT Date Extracted: 04/14/94

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 04/18/94

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 7.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.052	U
319-85-7	beta-BHC	0.052	U
319-86-8	delta-BHC	0.052	U
58-89-9	gamma-BHC (Lindane)	0.052	U
76-44-8	Heptachlor	0.052	U
309-00-2	Aldrin	0.052	U
1024-57-3	Heptachlor epoxide	0.052	U
959-98-8	Endosulfan I	0.052	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.52	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.052	U
5103-74-2	gamma-Chlordane	0.052	U
8001-35-2	Toxaphene	5.2	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.1	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

9613495.2767

NITRATE/NITRITE ANALYSIS

Laboratory Name:	ITAS-KNOXVILLE	SDG Number:	W0028
Contract Name:	Westinghouse Hanford	Job Number:	353
Sample Matrix:	Water	Analysis Date:	04/19/94
Concentration Units:	mg/l		

Client Sample ID	Lab Sample ID	Result	Qualifiers
Method Blank	P6101	0.02	U
BOBKJ3	AA6299	6.2	+
BOBKJ5	AA6303	6.4	+
BOBJK9	AA6307	0.02	U

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

9613495.2768

NITRATE/NITRITE ANALYSIS

Laboratory Name:	ITAS-KNOXVILLE	SDG Number:	W0028
Contract Name:	Westinghouse Hanford	Job Number:	396
Sample Matrix:	Water	Extraction Date:	N/A
Concentration Units:	mg/l	Analysis Date:	05/11/94

Client Sample ID	Lab Sample ID	Result	Qualifiers
Method Blank	P6178	0.02	U
BOBMN6	AA6946	80	+

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

9613495.2769

ANION ANALYSIS

Laboratory Name:	ITAS-KNOXVILLE	SDG Number:	W0028
Contract Name:	Westinghouse Hanford	Job Number:	353
Client Sample ID:	BOBKJ3	Preparation Date:	05/19/94
Lab Sample ID:	AA6298	Analysis Date:	05/19/94
Sample Matrix:	Water	Concentration Units:	mg/l

Compound	Result	Qualifier	Detection Limit
fluoride	0.6	+	0.4
chloride	13	+	4.0
nitrite	0.4	U	0.4
nitrate	30	+	4.0
phosphate	1	U	1
sulfate	37	+	15

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

9613495.2770

ANION ANALYSIS

Laboratory Name:	ITAS-KNOXVILLE	SDG Number:	W0028
Contract Name:	Westinghouse Hanford	Job Number:	353
Client Sample ID:	BOBKJ5	Preparation Date:	05/19/94
Lab Sample ID:	AA6302	Analysis Date:	05/19/94
Sample Matrix:	Water	Concentration Units:	mg/l

Compound	Result	Qualifier	Detection Limit
fluoride	0.6	+	0.4
chloride	14	+	4.0
nitrite	0.4	U	0.4
nitrate	31	+	4.0
phosphate	1	U	1
sulfate	37	+	15

+ - 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:	W0028
Contract Name:	Westinghouse Hanford	Job Number:	353
Client Sample ID:	BOBKJ9	Preparation Date:	05/19/94
Lab Sample ID:	AA6306	Analysis Date:	05/19/94
Sample Matrix:	Water	Concentration Units:	mg/l

Compound	Result	Qualifier	Detection Limit
fluoride	0.4	U	0.4
chloride	0.4	U	0.4
nitrite	0.4	U	0.4
nitrate	0.4	U	0.4
phosphate	1	U	1
sulfate	1.5	U	1.5

+ - Positive result.

9613495.2772

ANION ANALYSIS

Laboratory Name:	ITAS-KNOXVILLE	SDG Number:	W0028
Contract Name:	Westinghouse Hanford	Job Number:	396
Client Sample ID:	~~BOBNM6~~ 60BMNL 6/6/96	Preparation Date:	05/13/94, 05/23/94
Lab Sample ID:	AA6945	Analysis Date:	05/13/94, 05/23/94
Sample Matrix:	Water	Concentration Units:	mg/l

Compound	Result	Qualifier	Detection Limit
fluoride	0.74	+	0.4
chloride	27	+	4.0
nitrite	0.4	U	0.4
nitrate	340	+	40
phosphate	1	U	1
sulfate	65	+	15

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

9615495.2775

WO#353

INTERNATIONAL TECHNOLOGY CORPORATION

Regional Office
2800 George Washington Way
Richland, Washington 99352

SAMPLE CHECK-IN LIST

Per Shipping Container

Date/Time Received 4/12/94 1290 Client Name WHC

Project/Client # 94-088 Batch or Case # N/A

Cooler ID (if noted on the outside of cooler) SmL118

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 ☑ all in 1 bag
7. Number of sample containers in cooler: 13
8. Samples have: ____ tape ____ hazard labels
   ✓ custody seals ✓ appropriate sample labels
9. Samples are: ____ in good condition ____ leaking
   ____ broken ____ have air bubbles
   ____ other
10. Coolant present? Yes ☐ No ☐

Sample temperature 4°C

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

Printed Name/Signature Tom Gilmore Date/Time 4/12/94 1230

FORM NO. LS-042, Rev.0 3 94

9618195.2774

WO#353

INTERNATIONAL TECHNOLOGY CORPORATION

Regional Office
3100 George Washington Way
Richland, Washington 99352

SAMPLE CHECK-IN LIST

Per Shipping Container

Date/Time Received 4/12/94 1230 Client Name WHC

Project/Client # 94-088 Batch or Case # N/A

Cooler ID (if noted on the outside of cooler) SML 421

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 ☑ all in 2 bags
7. Number of sample containers in cooler: 26
8. Samples have: ____ tape ____ hazard labels
   ✓ custody seals ✓ appropriate sample labels
9. Samples are: ✓ in good condition ____ leaking
   ____ broken ____ have air bubbles
   ____ other
10. Coolant present? Yes ☑ No ☐

Sample temperature 2°C

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

Printed Name/Signature Tom Gilmore Date/Time 4/12/94 1230

FORM NO. LS-042, Rev.0, 2.94

9613495.2275

WO# 396

INTERNATIONAL TECHNOLOGY CORPORATION

Regional Office
3350 George Washington Way
Richland, Washington 99352

SAMPLE CHECK-IN LIST

(Per Shipping Container)

Date/Time Received 4/18/94 1310 Client Name WHC

Project/Client # 94-088 Batch or Case # N/A

Cooler ID (if noted on the outside of cooler) ER-05

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 ☑ all in 1 bag
7. Number of sample containers in cooler: 14
8. Samples have: ____ tape ____ hazard labels
   ✓ custody seals ✓ appropriate sample labels
9. Samples are: ✓ in good condition ____ leaking
   ____ broken ____ have air bubbles
   ____ other
10. Coolant present? Yes ☑ No ☐

Sample temperature 2°C

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

Printed Name/Signature Tom Gilmore Date/Time 4/18/94 1310

FORM NO. LS-042, Rev.0, 2.94

9615195.2776

LVO #353

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator

Company Contact PH BUTCHER

Telephone (509) 376-5045

Project Designation/Sampling Locations 200-UP-1

Collection Date 4/8/94

Ice Chest No. SMC118

Field Logbook No. EFC-1124

Bill of Lading/Airbill No. none

Offsite Property No. WM-C-C336-36

Method of Shipment EMERY

Shipped to IT

Possible Sample Hazards/Remarks NONE DETECTED

Sample Identification

40420205
BOBKJ9
ABC 3; 40mL; Gs; WATER; VOA (HCl)
DEC ~~1; 2L~~; aG; WATER; PCB/PEST
F 1; 500mL; G; WATER; ANIONS (IC)-NO3
B 1; 500mL; P; WATER; NO3 (H2SO4)
40420303 2; 4L; P; WATER; TOTAL URANIUM, U-234/235/238, GROSS ALPHA/BETA, Sr-90 (HNO3)
1; 1L; P; WATER; Tc-99 (HCl)
40420206
BOBKK0
ABC 3; 40mL; Gs; WATER; VOA (HCl)

[] Field Transfer of Custody — Chain of Possession — (Sign and Print Names)

Relinquished By	Date	Time	Received By	Date	Time
[signature]	4/8/94	1150	J Sweeney / Sweeney	4-8-94	1730
J Sweeney / Sweeney	4-12-94	1230 est	[signature] / Tom Gamble/Inc.	4/12/94	1230

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:
Data Deliverable-Standalone Samples shipped on 4/8/94 via FEDEX # 3A [illegible] 4/8/94

WO#353

Westinghouse Hanford Company	SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector _____ Date Sampled 4/8/94 Time 1015 hours

Company Contact P. H. Butcher Telephone (509) 376-5045 ~~4/12/94~~

Sample Number	Number and Type of Sample Containers	Type of Sample*	Analysis Requested
B0BK57	3; 40mL; Gs	WATER	VOA (HCl)
21	~~1; 2L;~~ aG	WATER	PCB/PEST
58	1; 500mL; G	WATER	ANIONS (IC)-NO3
	1; 500mL; P	WATER	NO3 (H2SO4)
	2; 4L; P	WATER	TOTAL U, U-234/235/238, GROSS ALPHA/BETA,
			Sr-90 (HNO3)
	1; 1L; P	WATER	Tc-99 (HCl)
B0BK [illegible]	3; 40mL; P	WATER	VOA (HCl) 4/6/94 0900
			OPC: U-94-1-C536-36
			BOL: LOWE
			SAF: 94-088

Field Information** _____

Special Handling and/or Storage _____

Possible Sample Hazards _____

PART II: LABORATORY SECTION

Received by _____ Title _____ Date _____

Analysis Required _____

*Indicate whether sample is soil, sludge, water, etc.

**Use back of page for additional information relative to sample location.

9613495.2778

WO#353

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator

Company Contact PH BUTCHER

Telephone (509) 376-5045

Project Designation/Sampling Locations 200-UP-1

Collection Date 04/08/94

Ice Chest No. SMC421

Field Logbook No. EFL-1124

Bill of Lading/Airbill No. NONE

Offsite Property No. WC-94-C-0336-36

Method of Shipment EMERY

Shipped to IT

Possible Sample Hazards/Remarks NONE DETECTED

Sample Identification

40420201
BOBKJ3
ABC 3; 40mL; Gs; WATER; VOA (HCl)
DEF; 1L; 1-2L; aG; WATER; PCB/PEST
F 1; 500mL; G; WATER; ANIONS (IC)-NO3
G 1; 500mL; P; WATER; NO3 (H2SO4)
40420301 2; 4L; P; WATER; TOTAL URANIUM, U-234/235/238, GROSS ALPHA/BETA, Sr-90 (HNO3)
1; 1L; P; WATER; Tc-99 (HCl)
40420202
BOBKJ4
ABC 3; 40mL; Gs; WATER; VOA (HCl)

[] Field Transfer of Custody — Chain of Possession — (Sign and Print Names)

Relinquished By	Date	Time	Received By	Date	Time
P.H. Butcher / Courier	4/8/94	1130	T Sweeney I Sweeney	4-8-94	1130
T Sweeney I Sweeney	4-12-94	1200 1100 MST	B.A. Gilmore	4/12/94	1230

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:
Data Deliverable-Standalone Samples shipped on Ice # 2,3 by P.H. Butcher 04/08/94

A-6000-407 (12/92) WEF061

9615495.2774

WO#353

Westinghouse Hanford Company	SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector K. D. Lee Date Sampled 4/05/94 Time 0911 hours

Company Contact P. H. Butcher Telephone (509) 376-5045

Sample Number	Number and Type of Sample Containers	Type of Sample*	Analysis Requested
B0BK J3	3; 40mL; Gs	WATER	VOA (HCl)
	~~1; 2L; aG~~ 2; 1L; AG	WATER	PCB/PEST
	1; 500mL; G	WATER	ANIONS (IC)-NO3
	1; 500mL; P	WATER	NO3 (H2SO4)
	2; 4L; P	WATER	TOTAL U, U-234/235/238, GROSS ALPHA/BETA,
			Sr-90 (HNO3)
	1; 1L; P	WATER	Tc-99 (HCl)
B0BKJ4	3; 40mL; P	WATER	VOA (HCl) 4/5/94 0900
			OPC: LW94-0001336-36
			BOL: NONE
			SAF: 94-088

Field Information** _____

Special Handling and/or Storage _____

Possible Sample Hazards _____

PART II: LABORATORY SECTION

Received by _____ Title _____ Date _____

Analysis Required _____

*Indicate whether sample is soil, sludge, water, etc.

**Use back of page for additional information relative to sample location.

9615495.2780

WO#353

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator

Company Contact PH BUTCHER

Telephone (509) 376-5045

Project Designation/Sampling Locations 200-UP-1

Collection Date 4/6/8/94

Ice Chest No. SMC421

Field Logbook No. EFL-1124

Bill of Lading/Airbill No. NONE

Offsite Property No. WC94-CC336-36

Method of Shipment EMERY

Shipped to IT

Possible Sample Hazards/Remarks NONE DETECTED

Sample Identification

40420203
BOBKJ5
ABC 3; 40mL; Gs; WATER; VOA (HCl)
DE, IC ~~4; 2L~~; aG; WATER; PCB/PEST
F 1; 500mL; G; WATER; ANIONS (IC)-NO3
G 4/8/94 1; 500mL; P; WATER; NO3 (H2SO4)
40420302 2; 4L; P; WATER; TOTAL URANIUM, U-234/235/238, GROSS ALPHA/BETA, Sr-90 (HNO3)
1; 1L; P; WATER; Tc-99 (HCl)
40420204
BOBKJ6
ABC 3; 40mL; Gs; WATER; VOA (HCl)

[] Field Transfer of Custody — Chain of Possession — (Sign and Print Names)

Relinquished By	Date	Time	Received By	Date	Time
P.H. Butcher BUTCHER	4/8/94	1130	K Sweeney L Sweeney	4-8-94	1130
K Sweeney L Sweeney	4-12-94	~~1280~~ 1230	~~Tom~~ Tom Gilmore	4/12/94	1230

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:
Data Deliverable-Standalone samples stored in bldg 3B by KDCC 4/8/94

A-6000-407 (12/92) WEF061

9613155.2781

WO# 353

Westinghouse Hanford Company	SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector K. D. Lee Date Sampled 04/05/94 Time 0911 hours

Company Contact P. H. Butcher Telephone (509) 376-5045

Sample Number	Number and Type of Sample Containers	Type of Sample*	Analysis Requested
B0BKJ5	3; 40mL; Gs	WATER	VOA (HCl)
2nd	~~2; 1L~~; aG	WATER	PCB/PEST
	1; 500mL; G	WATER	ANIONS (IC)-NO3
	1; 500mL; P	WATER	NO3 (H2SO4)
	2; 4L; P	WATER	TOTAL U, U-234/235/238, GROSS ALPHA/BETA,
			Sr-90 (HNO3)
	1; 1L; P	WATER	Tc-99 (HCl)
B0BKJ6	3; 40mL; P	WATER	VOA (HCl) 4/5/94 0900
			OPC: U-94-C-C336-360
			BOL: NCWC
			SAF: 94-088

Field Information**

Special Handling and/or Storage

Possible Sample Hazards

PART II: LABORATORY SECTION

Received by Title Date

Analysis Required

*Indicate whether sample is soil, sludge, water, etc.

**Use back of page for additional information relative to sample location.

9615195.2782

WO #396

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator

Company Contact PH BUTCHER

Telephone (509) 376-5045

Project Designation/Sampling Locations 200-UP-1

Collection Date 04/15/94

Ice Chest No. ER-05

Field Logbook No. EFL-1125 pg 7

Bill of Lading/Airbill No. NONE

Offsite Property No. W74-0-0336-46

Method of Shipment EMERY

Shipped to IT

Possible Sample Hazards/Remarks NONE DETECTED

Sample Identification

~~BOBK~~ KT 3/29/94 404318

BOBMN6 3; 40mL; Gs; WATER; VOA (HCl)

01ABC 01; 500mL; G; WATER; ANIONS (IC)-NO3

E 1; 500mL; P; WATER; NO3 (H2SO4)

404319 01 { 1; 2L; P; WATER; TOTAL URANIUM (HNO3)
3; 1L; P; WATER; Sr-90 (HNO3)
1; 1L; P; WATER; Tc-99 (HCl)

~~BOBK~~ 1; 20mL; G; WATER; TOTAL ACTIVITY

BOBMN7 3; 40mL; Gs; WATER; VOA (HCl)

KT 3/29/94

02ABC

[] Field Transfer of Custody — Chain of Possession — (Sign and Print Names)

Relinquished By	Date	Time	Received By	Date	Time
Kathy D. Lee K D Lee	04/15/94	1157	Irene E. Rogers	4-15-94	1157
Irene E. Rogers	4-15-94	1206	P Sweeney P Sweeney	4-15-94	1206
P Sweeney P Sweeney	4-18-94	1310	~~J E Gilmore~~ J E Gilmore	4/18/94	1310

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:
Data Deliverable-Standalone

A-6000-407 (12/92) WEF061

9613195.2783

WO#396

Westinghouse Hanford Company	SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector _____ Date Sampled 04/15/94 Time 0850 hours

Company Contact P. H. Butcher Telephone (509) 376-5045

Sample Number	Number and Type of Sample Containers	Type of Sample*	Analysis Requested
~~B0BK~~ B0BMN6	1; 500mL; G	WATER	ANIONS (IC)-NO3
V.T. 7/29/94	1; 500mL; P	WATER	NO3 (H2SO4)
	1; 2L; P	WATER	TOTAL URANIUM (HNO3)
	1; 1L; P	WATER	Tc-99 (HCl)
	3; 1L; P	WATER	Sr-90 (HNO3)
	3; 40mL; P	WATER	VOA (HCl)
V.T. 7/28/94	1; 20mL; G	WATER	TOTAL ACTIVITY
~~B0BK~~ B0BMN7	3; 40mL; P	WATER	VOA (HCl)
			OPC: W94-0-0336-46
			BOL: NONE
			SAF: 94-088

Field Information** _____

Special Handling and/or Storage _____

Possible Sample Hazards _____

PART II: LABORATORY SECTION

Received by _____ Title _____ Date _____

Analysis Required _____

*Indicate whether sample is soil, sludge, water, etc.

**Use back of page for additional information relative to sample location.

9615196.2784

WO#396

Contractor	OFF-SITE PROPERTY CONTROL	CONTROL NUMBER (To be obtained from PROPERTY MANAGEMENT)
WHC		W91-0-0336-46

PART I – TO BE COMPLETED BY ORIGINATOR

Department	Section	Unit
Eng. Env. & Tech	EFS	ER Field Sampling

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

Routing ☒ Contractor ☐ Vendor

Shipped to	Off-site Custodian
IT Analytical Services 2800 GW WAY Richland, WA 99352	Full Title -

Quantity	Description (Include Serial and any Government Tag Numbers)	Original Cost
1	Sample No: BOBMN6, BOBMN7 Cooler ID: ER-05 Polycooler with groundwater samples LCS 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

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

RM Clearance for Public Release	RM Survey No.	Date
Julie Krotzer	157879	4-18-94

Location of Property (Area & Bldg.)	Contact	Phone
200-UP-1	PH Butcher	372 376-4388

Date Ready for Shipment	Cost Code to be Charged	Approximate Date This Property will be Returned
4-18-94	8B410 PTIFA	NA

Originated By	Date	Authorized By	Date
PH Butcher	4/18/94	PH Butcher	4/18/94
Signature and Name of Property Control	**Custodian Date**	**Property Management Approval**	**Date**
		JD Henkel	4/18/94

PART II – TO BE COMPLETED BY SHIPPING

Signature of Recipient	Return Order No.	Date Issued	Purchase Order No.	Date Issued
Date				

DISTRIBUTION

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

54-3000-479 (09/89)

9813495.2785

WO#353

SAMPLE STATUS REPORT FOR E 5681. E-BLANK 299W1918 TIME: 4/ 8/94 13:22
DISPATCHED: 3/14/94 9:20 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 4/ 8/94 13:13

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

BOBKJ3
BOBKJ4
LCS
4/12/94

BOBKJ5
BOBKJ6
LCS
4/12/94

BOBKJ7
BOBKJ8
AJS
4/12/94

9613495.2786

WO#353

SAMPLE STATUS REPORT FOR E 5693. E-BLANK EQIBLK1 TIME: 4/ 8/94 13:22
DISPATCHED: 3/14/94 9:26 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 4/ 8/94 13:13

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

BOBKJ9
BOBKK0
LCS
4-12-94

96135195.2787

WO#396

SAMPLE STATUS REPORT FOR E 5692. E-BLANK 69938-70 TIME: 4/18/94
DISPATCHED: 3/14/94 9:26 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 4/15/94 14:36

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

END OF REPORT

BOBMN6
BOBMN7
LCS
4/18/94

9613495.2788

INTERNATIONAL TECHNOLOGY CORPORATION

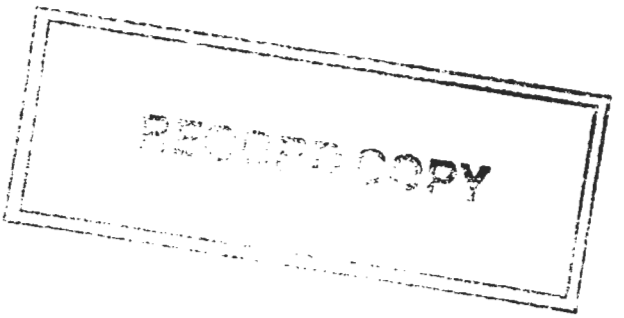
CERTIFICATE OF ANALYSIS

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

June 13, 1994

Attention: J.A.Lerch

SAF Number	:	94-088
Date SDG Closed	:	April 26, 1994
Number of Samples	:	Four (4)
Sample Type	:	Water
SDG Number	:	W0028
Data Deliverable	:	Stand Alone



I. Introduction

On April 12, and 18, 1994, four water samples were received by ITAS-Richland for radiochemical analysis. Upon receipt, the samples were assigned the following laboratory ID numbers to correspond with the WHC specific IDs:

ITAS-Richland ID	WHC ID	Matrix	Date of Receipt
404203-01A	B0BKJ3	Water	4/12/94
404203-02A	B0BKJ5	Water	4/12/94
404203-03A	B0BKJ9	Water	4/12/94
404319-01A	B0BMN6	Water	4/18/94

II. Analytical Results/Methodology

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

The requested analyses were:

Alpha Spectroscopy
Uranium-234, -235, -238 by method ITAS-RD-3234
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
Technetium-99 by method ITAS-IT-RS-0001
Total Uranium
Total Uranium by method ITAS-RD-4200

III. Quality Control

The analytical results for each analysis performed under SDG W0028 include a minimum of one Laboratory Control Sample (LCS), one method (reagent) blank, and one duplicate. Any exceptions have been noted in the "Comments" section.

Quality control sample results are reported in the same units as sample results.

IV. Comments

The initial radioactivity screening of the samples classified them as Category I samples.

Alpha Spectroscopy

Uranium-234, -235, -238 by method ITAS-RD-3234
The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BKJ5) results meet contractual requirements.

Gas Proportional Counting

Gross Alpha by method ITAS-RD-3222
The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BKJ9) results meet contractual requirements.

Gross Beta by method ITAS-RD-3222

The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BKJ9) results meet contractual requirements. The blank result was greater than one-half the contract limit (CL) and, as a result, the analyst requested a recount of the blank to rule out possible blank contamination problems. The recount result for the blank is also greater than one-half the CL. Both blank results are less than the CL (acceptable) and the recount result is accepted and reported.

Strontium-90 by method ITAS-RD-3204
The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BKJ9) results meet contractual requirements.

Liquid Scintillation Counting

Technetium-99 by method ITAS-IT-RS-0001
Two matrix spikes were analyzed with this SDG. The result for matrix spike W0431901 was below acceptable limits. Matrix spike W0420303 has an acceptable yield of 97.1%. Matrix spike W0431901 was reanalyzed with the associated sample (B0BMN6), LCS and blank. The reanalysis results are acceptable with the exception of the matrix spike. The reanalysis matrix spike result (149.8%) is above the contract limit. The reason for the low original result is unknown. The cause of the high spike recovery observed on the reanalysis of the matrix spike is attributed to the low activity of the spike in comparison to the intrinsic sample activity. The reanalysis results are reported. The sample results are not matrix spike yield corrected. The LCS, batch blank, sample and sample duplicate (original analysis duplicate of sample B0BKJ5, reanalysis duplicate of sample B0BMN6) results are within contractual requirements.

9613495.2791

Total Uranium

Total Uranium by method ITAS-RD-4200
Two matrix spikes were analyzed with this SDG. The samples chosen for the batch matrix spikes were B0BKJ3 and B0BKJ5. These samples had intrinsic total uranium activities of over 400 μg/L and were spiked with 0.09 μg of uranium. The results for the matrix spikes are not reported due to a matrix effect (high sample activity) causing indeterminate spike yield values. Actions to prevent a reoccurrence include using the sample screening data to estimate sample activity and therefore help determine an appropriate spike level when preparing matrix spike samples. The LCS, batch blank, sample and sample duplicate (duplicate of samples B0BKJ5 and B0BKJ9) 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

9615495.2292

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

SAMPLE RESULTS

LAB NAME: ITAS-RICHLAND
SDG NO.: W0028
LAB SAMPLE ID: 40420301
MATRIX: WATER
WHC ID: B0BKJ3
DATE RECEIVED: 4/12/94
REPORTING UNITS: pCi/L & ug/g

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	METHOD NUMBER
U-234	2.05E+02	6.73E+00	2.77E+01	3.70E-01	0.754	RD3234
U-235	5.74E+00	1.13E+00	1.36E+00	2.25E-01	0.754	RD3234
U-238DA	1.99E+02	6.64E+00	2.70E+01	3.35E-01	0.754	RD3234
ALPHA	3.27E+02	1.65E+01	4.16E+01	1.52E+00	1	RD3222
BETA	1.35E+02	8.14E+00	1.25E+01	3.21E+00	1	RD3222
TOTAL-SR	-2.14E-02	2.66E-01	2.66E-01	7.65E-01	0.951	RD3204
TC-99	2.91E+01	1.34E+00	6.77E+00	2.10E+00	0.951	ITAS-IT-RD-0001
URANIUM	4.90E+02	N/A	7.35E+01	3.54E-03	1	RD4200

LAB SAMPLE ID: 40420302
MATRIX: WATER
WHC ID: B0BKJ5
DATE RECEIVED: 4/12/94
REPORTING UNITS: pCi/L & ug/g

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	METHOD NUMBER
U-234	2.09E+02	6.19E+00	2.67E+01	2.96E-01	0.908	RD3234
U-235	2.89E+00	7.29E-01	8.13E-01	1.24E-01	0.908	RD3234
U-238DA	1.99E+02	6.04E+00	2.55E+01	2.24E-01	0.908	RD3234
ALPHA	3.64E+02	1.73E+01	4.62E+01	1.68E+00	1	RD3222
BETA	1.30E+02	8.01E+00	1.22E+01	3.39E+00	1	RD3222
TOTAL-SR	4.99E-02	2.59E-01	2.59E-01	7.24E-01	1	RD3204
TC-99	3.21E+01	1.40E+00	7.06E+00	2.10E+00	0.951	ITAS-IT-RD-0001
URANIUM	6.29E+02	N/A	9.43E+01	3.54E-03	1	RD4200

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

SAMPLE RESULTS

LAB NAME: ITAS-RICHLAND
SDG NO.: W0028
LAB SAMPLE ID: 40420303
MATRIX: WATER
WHC ID: B0BKJ9
DATE RECEIVED: 4/12/94
REPORTING UNITS: pCi/L & ug/g

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	METHOD NUMBER
U-234	3.58E-01	3.44E-01	3.48E-01	4.13E-01	0.597	RD3234
U-235	5.87E-02	1.41E-01	1.41E-01	2.84E-01	0.597	RD3234
U-238DA	2.10E-01	2.42E-01	2.44E-01	1.89E-01	0.597	RD3234
ALPHA	8.15E-01	6.34E-01	6.49E-01	7.29E-01	1	RD3222
BETA	1.45E+00	1.79E+00	1.79E+00	2.94E+00	1	RD3222
TOTAL-SR	-1.59E-01	2.71E-01	2.74E-01	8.22E-01	0.911	RD3204
TC-99	-3.98E-01	9.38E-01	4.18E+00	2.10E+00	0.951	ITAS-IT-RD-0001
URANIUM	3.00E-02	N/A	4.50E-03	3.54E-03	1	RD4200

LAB SAMPLE ID: 40431901
MATRIX: WATER
WHC ID: B0BMN6
DATE RECEIVED: 4/18/94
REPORTING UNITS: pCi/L & ug/g

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	METHOD NUMBER
TOTAL-SR	-3.42E-02	2.46E-01	2.46E-01	7.16E-01	0.957	RD3204
TC-99	3.31E+03	1.04E+01	3.63E+02	2.10E+00	0.951	ITAS-IT-RD-0001
URANIUM	8.75E+01	N/A	1.31E+01	3.54E-03	1	RD4200

9618495.2794

Los Alamos Technical Associates, Inc.

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

August 11, 1994

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

Dear Karl,

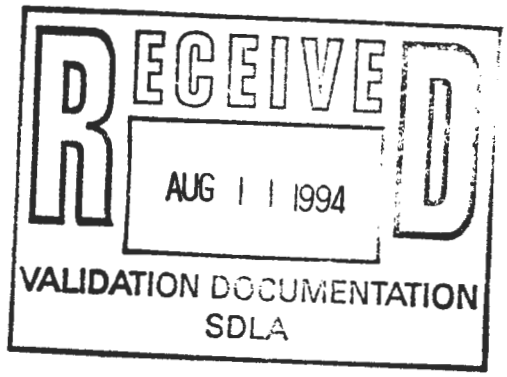
Attached is the data validation report for analytical results for 200-UP-1 (SDG W0028-ITC-045). The package was received by Los Alamos Technical Associates on June 30, 1994. Validation of this package began on July 22, and was completed on August 11, 1994.

If you have any questions, please let me know.

Sincerely,

Donald J. Smith
Senior Environmental Engineer

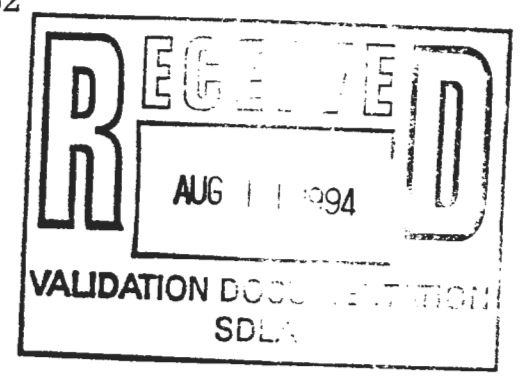
cc: Chris Haecker, LATA
Joan Kessner, WHC
VW401.92 file



9615495.2795

DATA VALIDATION REPORT
for
200-UP-1
SDG W0028-ITC-045
LATA VW401.92

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



August 11, 1994

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9613495.2796

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9613495.2797

200-UP-1
Data Validation Narrative

INTRODUCTION

All samples in Sample Delivery Group (SDG) W0028-ITC-045 were validated at level "D" as defined in the Data Validation Procedures for Chemical Analysis (WHC-SD-EN-SPP-002) and/or Data Validation Procedures for Radiochemical Analyses (WHC-SD-EN-SPP-001).

The data package was received by Los Alamos Technical Associates (LATA) on June 30, 1994. Validation began on July 22, 1994 and was completed on August 11, 1994.

The chemical analyses were performed by ITC-Knoxville. Samples requiring radiochemical analyses were analyzed by ITC-Richland.

ANALYSES REQUESTED

Eight (8) water samples were collected by WHC and transferred to ITC-Richland for analysis. ITC-Richland performed radiochemistry analyses on four (4) of the samples and transferred aliquots of all eight (8) samples to ITC-Knoxville for chemical analyses. Dates of collection and receipt, as well as the analyses requested per sample are shown on the following table.

WHC		IT Richland						IT Knoxville				
Sample ID	Date Collected	Date Received	U Total	Tc 99	U 234/35/38	Sr 90	Gross α/β	Date Received	VOA	Pest/ PCB	NO3	Anions (no NO3)
BOBK K0	8-Apr-94	12-Apr-94						13-Apr-94	x			
BOBK J9	8-Apr-94	12-Apr-94	x	x	x	x	x	13-Apr-94	x	x	x	x
BOBK J6	8-Apr-94	12-Apr-94						13-Apr-94	x			
BOBK J5	8-Apr-94	12-Apr-94	x	x	x	x	x	13-Apr-94	x	x	x	x
BOBK J4	8-Apr-94	12-Apr-94						13-Apr-94	x			
BOBK J3	8-Apr-94	12-Apr-94	x	x	x	x	x	13-Apr-94	x	x	x	x
BOBM N7	15-Apr-94	18-Apr-94						19-Apr-94	x			
BOBM N6	15-Apr-94	18-Apr-94	x	x		x	x	19-Apr-94	x		x	x

DATA QUALITY OBJECTIVES

The data quality objectives for 200-UP-1 are specified in the *Remedial Investigation/Feasibility Study Work Plan for the 200-UP-1, Groundwater Operable Unit.* DOE-RL-92-76 Rev. 0. Precision, accuracy, and detection limit requirements for the project have been derived from the Third Edition of SW-846 (EPA, 1992). Maximum holding times are listed in the 3rd Edition, Final Update I of SW-846 (EPA, July 1992).

DATA QUALITY OBJECTIVES (continued)

The primary objective of the data validation was to ensure these objectives for precision, accuracy, and detection limits were met, and that the data are usable and defensible. This was accomplished through a detailed examination of the data package to recreate the analytical process and verify that proper and acceptable analytical techniques had been applied. The data package was also checked for correct submission of required deliverables, correct transcription of raw data to the summary forms, and for proper calculation of a number of parameters. The following 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 matrix spike duplicate results as indicated below.
ACCURACY	Goals for accuracy were met with the exception of the matrix spike and calibration verification recoveries as indicated below.
DETECTION LIMITS	All goals for detection limits were met.
COMPLETENESS	The data package was 98% complete for the requested analyses.

MAJOR DEFICIENCIES (REJECTED DATA)

GENERAL CHEMISTRY

- The holding time for NO_2, NO_3, and PO_4 by IC was exceeded by greater than two times their required holding times. Non-detect results were qualified as unusable (UR).

MINOR DEFICIENCIES

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

VOLATILES

- Acetone was detected in laboratory blanks. Sample results for acetone were qualified non-detect(U) in samples B0BKK0, B0BKJ3, B0BKJ4, and BOBKJ9. Acetone results were raised to the CRQL (10) and qualified non-detect (U) for samples B0BKJ5, B0BKJ6, BOBMN6 and BOBMN7.

9613495.2799

MINOR DEFICIENCIES (continued)

PESTICIDES/PCBS

- The laboratory did not perform a matrix spike/matrix spike duplicate analysis. Even through the laboratory performed a LCS spiked with two of the six required pesticides, the results were estimated (UJ) due to failure to performed the required matrix spike.

GENERAL CHEMISTRY

- The holding time was exceeded by greater than two times for NO_2, NO_3, and PO_4 by IC. Positive results were qualified as estimated (J) for a large number of samples.

- The holding time was exceeded for F, Cl, and SO_4 by IC for samples B0BKJ9, B0BKJ3, and B0BKJ5. The results were qualified as estimated (J/UJ).

RADIOCHEMISTRY

- The Tc^{99} result for sample B0BMN6 was qualified as estimated (J) due to matrix spike recovery outside acceptance criteria.

- The Total Uranium result for sample B0BKJ9 was qualified as estimated (J) due to uranium detected in the method blank.

COMMENTS

GENERAL CHEMISTRY

- A matrix spike was not analyzed with the IC batch on 23-May-94. The results were not qualified.

RADIOCHEMISTRY

- Field QC: BOBKJ3 and BOBKJ5 are field duplicates. The RPDs for U^{235} and U total were greater than twenty percent. The results were not qualified.

9613495.2800

REFERENCES

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

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

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

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

961595_2801

DATA VALIDATION APPLIED QUALIFIERS

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

U- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ- Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during data validation, the associated quantitation limit is an estimate.

J- Indicates the compound or analyte was analyzed for and detected. The associated concentration is an estimate, but the data are usable for decision making purposes.

BJ- Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.

R- Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency the data are unusable.

UR- Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data are unusable due to an identified QC deficiency.

JN- Indicates a tentatively identified compound (TIC) that has been determined to be valid in terms of identification and quantitation.

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

NJ- Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific application (i.e., usable for decision making purposes).

N- Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision making purposes).

LABORATORY APPLIED QUALIFIERS

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

Organic Data Qualifiers

U- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

J- Indicates an estimated value. This flag is used when estimating concentrations of tentatively identified compounds (TICs) or when the presence of a TCL compound is confirmed at a concentration of less than the CRQL but greater than the IDL.

N- Indicates presumptive evidence of a compound. This flag is used only by the laboratory for TIC results when the identification is based on a mass spectral library search.

P- This flag is used for pesticide/Aroclor target analytes when there is greater than 25% difference for detected values between the quantitation and confirmation GC columns. The lower of the two concentrations is reported on the report form and the result is flagged with a "P".

C- This flag applies to pesticide results where the identification has been confirmed by GC/MS. This flag should not be used by the laboratory if GC/MS confirmation was attempted but unsuccessful, in which case, the laboratory should use an "X" flag as defined below. The "X" flag is then defined in the SDG narrative.

B- This flag applies to results in which the analyte was detected in both the sample and the associated blank. The combination of the "B" flag with the "U" flag ("BU" or "UB") is expressly prohibited in the analytical SOW.

E- This flag identifies compounds whose concentrations exceed the calibrated range of the GC/MS instrument.

D- This flag identifies compounds identified in an analysis at a secondary dilution factor.

A- Indicates a TIC which is a suspected aldol-condensate product.

X- This is a non-specific flag used to properly define the results. If used, this flag must be properly defined within the body of the SDG.

96195.2803

LABORATORY APPLIED QUALIFIERS

Inorganic Qualifiers

U- Indicates the analyte was analyzed for but not detected in the sample.

B- Indicates the analyte concentration is less than the CRDL but greater than the IDL.

E- Indicates the value reported is estimated due to the presence of interference.

M- Indicates duplicate injection precision criteria were not met during graphite furnace (GFAA) analysis.

N- Indicates spiked sample recovery was not within the control limits.

S- Indicates the reported value was determined by the Method of Standard Additions (MSA).

W- Indicates post-digestion spike for GFAA analysis is outside control limits and the sample absorbance is less than 50% of the spike absorbance.

*- Indicates duplicate analysis was not within control limits.

+- Indicates the correlation coefficient (r) for the MSA was less than 0.995.

9613195.2804

Data Qualification Summary

BM 10-7-94
000009
000008

9618195.2905

DATA QUALIFICATION SUMMARY

SDG:W0028-ITC-045			
Compound/Analyte	**Qualifier**	**Samples Affected**	**Reasons**
Total Uranium	J	B0BKJ9	Uranium was detected in the method blank.
Technetium-99	J	B0BMN6	Matrix Spike recovery was greater than 140%.
(α γ β δ)-BHC Heptachlor Aldrin Heptachlor epoxide Endosulfan I Dieldrin 4, 4'-DDE Endrin Endosulfan II 4, 4'-DDD Endosulfan Sulfate 4, 4'-DDT Methoxychlor Endrin Ketone Endrin Aldehyde (α γ)-chlordane	UJ	ALL	Matrix Spike was not performed.
Acetone	10U/U	ALL	Acetone was detected in the method blank.
Fluoride Chloride Sulfate	J/UJ	B0BKJ3 B0BKJ5 B0BKJ9	Holding time was exceeded.
Nitrate	J	B0BKJ3 B0BKJ5 B0BMN6	Holding time was exceeded.
Nitrate	UR	B0BKJ9	Holding time was exceeded.
Nitrite Phosphate	UR	All	Holding time was exceeded.

9613495.2806

Data Summary Tables

961495.2807

VOLATILE ORGANICS DATA SUMMARY

FILE #:VW401.92		HEIS #:	B0BKK0		B0BKJ3		B0BKJ4		B0BKJ5	
		Date:	8-Apr-94		8-Apr-94		8-Apr-94		8-Apr-94	
		Matrix:	WATER		WATER		WATER		WATER	
Constituent	CAS #	Units	Results	Q	Results	Q	Results	Q	Results	Q
Chloromethane	74-87-3	µg/L	10	U	10	U	10	U	10	U
Bromomethane	74-83-9	µg/L	10	U	10	U	10	U	10	U
Vinyl Chloride	75-01-4	µg/L	10	U	10	U	10	U	10	U
Chloroethane	75-00-3	µg/L	10	U	10	U	10	U	10	U
Methylene Chloride	75-09-2	µg/L	2	J	10	U	3	J	10	U
Acetone	67-64-1	µg/L	15	U	11	U	11	U	10	U
Carbon Disulfide	75-15-0	µg/L	10	U	10	U	10	U	10	U
1,1-Dichloroethene	75-35-4	µg/L	10	U	10	U	10	U	10	U
1,1-Dichloroethane	75-34-3	µg/L	10	U	10	U	10	U	10	U
1,2-Dichloroethene (total)	540-59-0	µg/L	10	U	10	U	10	U	10	U
Chloroform	67-66-3	µg/L	10	U	3	J	10	U	3	J
1,2-Dichloroethane	107-06-2	µg/L	10	U	10	U	10	U	10	U
2-Butanone	78-93-3	µg/L	10	U	10	U	10	U	7	J
1,1,1-Trichloroethane	71-55-6	µg/L	10	U	10	U	10	U	10	U
Carbon Tetrachloride	56-23-5	µg/L	10	U	130		10	U	140	
Bromodichloromethane	75-27-4	µg/L	10	U	10	U	10	U	10	U
1,2-Dichloropropane	78-87-5	µg/L	10	U	10	U	10	U	10	U
cis-1,3-Dichloropropene	10061-01-5	µg/L	10	U	10	U	10	U	10	U
Trichloroethene	79-01-6	µg/L	10	U	10	U	10	U	10	U
Dibromochloromethane	124-48-1	µg/L	10	U	10	U	10	U	10	U
1,1,2-Trichloroethane	79-00-5	µg/L	10	U	10	U	10	U	10	U
Benzene	71-43-2	µg/L	10	U	10	U	10	U	10	U
trans-1,3-Dichloropropene	10061-02-6	µg/L	10	U	10	U	10	U	10	U
2-Chloroethyl Vinyl Ether	110-75-8	µg/L	10	U	10	U	10	U	10	U
Bromoform	75-25-2	µg/L	10	U	10	U	10	U	10	U
4-Methyl-2-Pentanone	108-10-1	µg/L	10	U	10	U	10	U	10	U
2-Hexanone	591-78-6	µg/L	10	U	10	U	10	U	10	U
Tetrachloroethene	127-18-4	µg/L	10	U	10	U	10	U	10	U
1,1,2,2-Tetrachloroethane	79-34-5	µg/L	10	U	10	U	10	U	10	U
Toluene	108-88-3	µg/L	10	U	10	U	10	U	10	U
Chlorobenzene	108-90-7	µg/L	10	U	10	U	10	U	10	U
Ethylbenzene	100-41-4	µg/L	10	U	10	U	10	U	10	U
Styrene	100-42-5	µg/L	10	U	10	U	10	U	10	U
Xylene (Total)	1330-20-7	µg/L	10	U	10	U	10	U	10	U

entered by: NJC
date: 10-14-94

Shaded areas indicate changes by the validator.
40192TBL.XLS

checked by: AJ
date: 10/19/9

96139S_2808

VOLATILE ORGANICS DATA SUMMARY

FILE #:VW401.92		HEIS #:	B0BKJ6		B0BKJ9		B0BMN6		B0BMN7	
		Date:	8-Apr-94		8-Apr-94		15-Apr-94		15-Apr-94	
		Matrix:	WATER		WATER		WATER		WATER	
Constituent	CAS #	Units	Results	Q	Results	Q	Results	Q	Results	Q
Chloromethane	74-87-3	µg/L	10	U	10	U	10	U	10	U
Bromomethane	74-83-9	µg/L	10	U	10	U	10	U	10	U
Vinyl Chloride	75-01-4	µg/L	10	U	10	U	10	U	10	U
Chloroethane	75-00-3	µg/L	10	U	10	U	10	U	10	U
Methylene Chloride	75-09-2	µg/L	3	J	2	J	10	U	1	J
Acetone	67-64-1	µg/L	10	U	12	U	10	U	10	U
Carbon Disulfide	75-15-0	µg/L	10	U	10	U	10	U	10	U
1,1-Dichloroethene	75-35-4	µg/L	10	U	10	U	10	U	10	U
1,1-Dichloroethane	75-34-3	µg/L	10	U	10	U	10	U	10	U
1,2-Dichloroethene (total)	540-59-0	µg/L	10	U	10	U	10	U	10	U
Chloroform	67-66-3	µg/L	10	U	10	U	4	J	10	U
1,2-Dichloroethane	107-06-2	µg/L	10	U	10	U	10	U	10	U
2-Butanone	78-93-3	µg/L	10	U	10	U	3	J	10	U
1,1,1-Trichloroethane	71-55-6	µg/L	10	U	10	U	10	U	10	U
Carbon Tetrachloride	56-23-5	µg/L	10	U	10	U	48		10	U
Bromodichloromethane	75-27-4	µg/L	10	U	10	U	10	U	10	U
1,2-Dichloropropane	78-87-5	µg/L	10	U	10	U	10	U	10	U
cis-1,3-Dichloropropene	10061-01-5	µg/L	10	U	10	U	10	U	10	U
Trichloroethene	79-01-6	µg/L	10	U	10	U	5	J	10	U
Dibromochloromethane	124-48-1	µg/L	10	U	10	U	10	U	10	U
1,1,2-Trichloroethane	79-00-5	µg/L	10	U	10	U	10	U	10	U
Benzene	71-43-2	µg/L	10	U	10	U	10	U	10	U
trans-1,3-Dichloropropene	10061-02-6	µg/L	10	U	10	U	10	U	10	U
2-Chloroethyl Vinyl Ether	110-75-8	µg/L	10	U	10	U	10	U	10	U
Bromoform	75-25-2	µg/L	10	U	10	U	10	U	10	U
4-Methyl-2-Pentanone	108-10-1	µg/L	10	U	10	U	10	U	10	U
2-Hexanone	591-78-6	µg/L	10	U	10	U	10	U	10	U
Tetrachloroethene	127-18-4	µg/L	10	U	10	U	10	U	10	U
1,1,2,2-Tetrachloroethane	79-34-5	µg/L	10	U	10	U	10	U	10	U
Toluene	108-88-3	µg/L	10	U	10	U	10	U	10	U
Chlorobenzene	108-90-7	µg/L	10	U	10	U	10	U	10	U
Ethylbenzene	100-41-4	µg/L	10	U	10	U	10	U	10	U
Styrene	100-42-5	µg/L	10	U	10	U	10	U	10	U
Xylene (Total)	1330-20-7	µg/L	10	U	10	U	10	U	10	U

entered by: [illegible]
date: 10-19-94

Shaded areas indicate changes by the validator.
40192TBL.XLS

checked by: AT
date: 10/19/94

P. 000012

PESTICIDE/PCB DATA SUMMARY TABLE

FILE #:VW401.92		HEIS #:	B0BKJ3		B0BKJ5		B0BKJ9	
		Date:	8-Apr-94		8-Apr-94		8-Apr-94	
		Matrix:	WATER		WATER		WATER	
Constituent	CAS #	Units	Results	Q	Results	Q	Results	Q
alpha-BHC	319-84-6	µg/L	0.050	UJ	0.050	UJ	0.052	UJ
beta-BHC	319-85-7	µg/L	0.050	UJ	0.050	UJ	0.052	UJ
delta-BHC	319-86-8	µg/L	0.050	UJ	0.050	UJ	0.052	UJ
gamma-BHC (Lindane)	58-89-9	µg/L	0.050	UJ	0.050	UJ	0.052	UJ
Heptachlor	76-44-8	µg/L	0.050	UJ	0.050	UJ	0.052	UJ
Aldrin	309-00-2	µg/L	0.050	UJ	0.050	UJ	0.052	UJ
Heptachlor epoxide	1024-57-3	µg/L	0.050	UJ	0.050	UJ	0.052	UJ
Endosulfan I	959-98-8	µg/L	0.050	UJ	0.050	UJ	0.052	UJ
Dieldrin	60-57-1	µg/L	0.10	UJ	0.10	UJ	0.10	UJ
4,4'-DDE	72-55-9	µg/L	0.10	UJ	0.10	UJ	0.10	UJ
Endrin	72-20-8	µg/L	0.10	UJ	0.10	UJ	0.10	UJ
Endosulfan II	33213-65-9	µg/L	0.10	UJ	0.10	UJ	0.10	UJ
4,4'-DDD	72-54-8	µg/L	0.10	UJ	0.10	UJ	0.10	UJ
Endosulfan sulfate	1031-07-8	µg/L	0.10	UJ	0.10	UJ	0.10	UJ
4,4'-DDT	50-29-3	µg/L	0.10	UJ	0.10	UJ	0.10	UJ
Methoxychlor	72-43-5	µg/L	0.50	UJ	0.50	UJ	0.52	UJ
Endrin ketone	53494-70-5	µg/L	0.10	UJ	0.10	UJ	0.10	UJ
Endrin aldehyde	7421-93-4	µg/L	0.10	UJ	0.10	UJ	0.10	UJ
alpha-Chlordane	5103-71-9	µg/L	0.050	UJ	0.050	UJ	0.052	UJ
gamma-Chlordane	51003-74-2	µg/L	0.050	UJ	0.050	UJ	0.052	UJ
Toxaphene	8001-35-2	µg/L	5.0	U	5.0	U	5.2	U
Aroclor-1016	12674-11-2	µg/L	1.0	U	1.0	U	1.0	U
Aroclor-1221	11104-28-2	µg/L	2.0	U	2.0	U	2.1	U
Aroclor-1232	11141-16-5	µg/L	1.0	U	1.0	U	1.0	U
Aroclor-1242	53469-21-9	µg/L	1.0	U	1.0	U	1.0	U
Aroclor-1248	12672-29-6	µg/L	1.0	U	1.0	U	1.0	U
Aroclor-1254	11097-69-1	µg/L	1.0	U	1.0	U	1.0	U
Aroclor-1260	11096-82-5	µg/L	1.0	U	1.0	U	1.0	U

entered by: JH
date: 8/10/94

Shaded areas indicate changes by the validator.
ITC045.XLS

checked by: BH
date: 8/11/94

9613495.2810

GENERAL CHEMISTRY DATA SUMMARY TABLE

FILE #: VW 401.92		HEIS #:	B0BKJ3		B0BKJ5		B0BKJ9		B0BMN6	
		Date:	8-Apr-94		8-Apr-94		8-Apr-94		15-Apr-94	
		Matrix:	WATER		WATER		WATER		WATER	
Constituent	CAS #	Units	Results	Q	Results	Q	Results	Q	Results	Q
Fluoride	16984-48-8	mg/L	0.6	J	0.6	J	0.4	UJ	0.74	
Chloride	16884-00-6	mg/L	13	J	14	J	0.4	UJ	27	
Nitrite	14797-65-0	mg/L	0.4	UR	0.4	UR	0.4	UR	0.4	UR
Nitrate	14797-55-8	mg/L	30	J	31	J	0.4	UR	340	J
Nitrite+Nitrate	NO_2+NO_3-N	mg/L	6.2		6.4		0.02	U	80	
Phosphate	14265-44-2	mg/L	1	UR	1	UR	1	UR	1	UR
Sulfate	14808-79-8	mg/L	37	J	37	J	1.5	UJ	65	

entered by: BM
date: 10-7-94

Shaded areas indicate changes by the validator.
ITC045.XLS

checked by: LDW
date: 10-10-94

9613195.2811

RADIOCHEMISTRY DATA SUMMARY TABLE

FILE #:VW401.92		HEIS #:	B0BKJ3			B08KJ5			B0BKJ9			B0BMN6		
		Date:	8-Apr-94			8-Apr-94			8-Apr-94			15-Apr-94		
		Matrix:	WATER			WATER			WATER			WATER		
Constituent	CAS #	Units	Results	Q	MDA	Results	Q	MDA	Results	Q	MDA	Results	Q	MDA
Uranium 234	13966-29-5	pCi/L	205.00		0.37	209.00		0.30	0.36	U	0.41			
Uranium 235	15117-96-1	pCi/L	5.74		0.23	2.89		0.12	0.06	U	0.28			
Uranium 238DA	U-238	pCi/L	199.00		0.34	199.00		0.22	0.21		0.19			
Gross Alpha	ALPHA	pCi/L	327.00		1.52	364.00		1.68	0.82		0.73			
Gross Beta	BETA	pCi/L	135.00		3.21	130.00		3.39	1.45	U	2.94			
Strontium, Total	7440-24-6	pCi/L	-0.02	U	0.77	0.05	U	0.72	-0.16	U	0.82	-0.03	U	0.72
Technetium-99	14133-76-7	pCi/L	29.10		2.10	32.10		2.10	-0.40	U	2.10	3310.00		2.10
Uranium, Total	7440-61-1	µg/g	490.00		0.0035	629.00		0.0035	0.03	J	0.0035	87.50		0.0035

000015

entered by: WJC
date: 10-24-94

Shaded areas indicate changes by the validator.
40192DST.XLS

checked by:
date: 10-24-

9613495.2812

Sample Results (Form I's)

9615495.2813

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
BOBKKO
~~BOBKKO~~
~~BOBKJO~~
J.C 6/10/94

Lab Name: ITAS-KNOXVILLE Contract: _____

Lab Code: ITSTU Case No.: 353 SAS No.: _____ SDG No.: W0028

Matrix: (soil/water) WATER Lab Sample ID: AA6310

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: AA6310

Level: (low/med) LOW Date Received: 04/13/94

% Moisture: not dec. ____ Date Analyzed: 04/22/94

GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0

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

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

BM 9-28-94

BM 7-25-94

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
BOBKJ3

Lab Name: ITAS-KNOXVILLE Contract: _____

Lab Code: ITSTU Case No.: 353 SAS No.: _____ SDG No.: W0028

Matrix: (soil/water) WATER Lab Sample ID: AA6295

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: AA6295

Level: (low/med) LOW Date Received: 04/13/94

% Moisture: not dec. _____ Date Analyzed: 04/22/94

GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	~~U~~ U
75-01-4	Vinyl Chloride	10	~~U~~ U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	11	~~B~~ U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	3	J
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	130	
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

BM 9-28-94

BM 7-25-94

9613495.2815

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBKJ4

Lab Name: ITAS-KNOXVILLE Contract: _____

Lab Code: ITSTU Case No.: 353 SAS No.: _____ SDG No.: W0028

Matrix: (soil/water) WATER Lab Sample ID: AA6308

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: AA6308

Level: (low/med) LOW Date Received: 04/13/94

% Moisture: not dec. ____ Date Analyzed: 04/22/94

GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0

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

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

BM 9-28-94 U

BM 7-25-94 U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
BOBKJ5

Lab Name: ITAS-KNOXVILLE Contract: _____

Lab Code: ITSTU Case No.: 353 SAS No.: _____ SDG No.: W0028

Matrix: (soil/water) WATER Lab Sample ID: AA6300

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: AA6300

Level: (low/med) LOW Date Received: 04/13/94

% Moisture: not dec. ____ Date Analyzed: 04/22/94

GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	~~U~~ U
75-01-4	Vinyl Chloride	10	~~U~~ U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10 ~~8~~	~~BJ~~ U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	3	J
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	7	J
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	140	
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

BM 5-28-

U

DM 7-25-94

9613495.2817

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
BOBKJ6

Lab Name: ITAS-KNOXVILLE Contract: _____

Lab Code: ITSTU Case No.: 353 SAS No.: _____ SDG No.: W0028

Matrix: (soil/water) WATER Lab Sample ID: AA6309

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: AA6309

Level: (low/med) LOW Date Received: 04/13/94

% Moisture: not dec. ____ Date Analyzed: 04/22/94

GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0

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

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

BM 9-25-94

9613495.2818

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBKJ9

Lab Name: ITAS-KNOXVILLE Contract: _____

Lab Code: ITSTU Case No.: 353 SAS No.: _____ SDG No.: W0028

Matrix: (soil/water) WATER Lab Sample ID: AA6304

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: AA6304

Level: (low/med) LOW Date Received: 04/13/94

% Moisture: not dec. _____ Date Analyzed: 04/22/94

GC Column: DB-624 ID: 0.530 (mm) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q	
74-87-3	Chloromethane	10	U	
74-83-9	Bromomethane	10	~~U~~ U	BM 9-28-9
75-01-4	Vinyl Chloride	10	~~U~~ U	
75-00-3	Chloroethane	10	U	
75-09-2	Methylene Chloride	2	J	
67-64-1	Acetone	12	~~B~~	U
75-15-0	Carbon Disulfide	10	U	
75-35-4	1,1-Dichloroethene	10	U	
75-34-3	1,1-Dichloroethane	10	U	BM 7-25-94
540-59-0	1,2-Dichloroethene (total)	10	U	
67-66-3	Chloroform	10	U	
107-06-2	1,2-Dichloroethane	10	U	
78-93-3	2-Butanone	10	U	
71-55-6	1,1,1-Trichloroethane	10	U	
56-23-5	Carbon Tetrachloride	10	U	
75-27-4	Bromodichloromethane	10	U	
78-87-5	1,2-Dichloropropane	10	U	
10061-01-5	cis-1,3-Dichloropropene	10	U	
79-01-6	Trichloroethene	10	U	
124-48-1	Dibromochloromethane	10	U	
79-00-5	1,1,2-Trichloroethane	10	U	
71-43-2	Benzene	10	U	
10061-02-6	trans-1,3-Dichloropropene	10	U	
75-25-2	Bromoform	10	U	
108-10-1	4-Methyl-2-Pentanone	10	U	
591-78-6	2-Hexanone	10	U	
127-18-4	Tetrachloroethene	10	U	
79-34-5	1,1,2,2-Tetrachloroethane	10	U	
108-88-3	Toluene	10	U	
108-90-7	Chlorobenzene	10	U	
100-41-4	Ethylbenzene	10	U	
100-42-5	Styrene	10	U	
1330-20-7	Xylene (total)	10	U	

9613495.2819

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBMN6

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 396 SAS No.: _____ SDG No.: W0028

Matrix: (soil/water) WATER Lab Sample ID: AA6944

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: ADZ03

Level: (low/med) LOW Date Received: 04/19/94

% Moisture: not dec. ____ Date Analyzed: 04/26/94

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

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

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

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10 3	BJ
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	4	J
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	3	J
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	48	
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	Trichlorcethene	5	J
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

BM 7-25-94

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
BOBMN7

Lab Name: ITAS-KNOXVILLE Contract: HANFORD

Lab Code: ITSTU Case No.: 396 SAS No.: _____ SDG No.: W0028

Matrix: (soil/water) WATER Lab Sample ID: AA6947

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: ADZ04

Level: (low/med) LOW Date Received: 04/19/94

% Moisture: not dec. ____ Date Analyzed: 04/26/94

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

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

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

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BM 7-25-94

9613495.2821

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBKJ3WATER

Lab Name: ITAS-KNOXVILLE Contract: _____

Lab Code: _____ Case No.: W0028 SAS No.: _____ SDG No.: W0028

Matrix: (soil/water) WATER Lab Sample ID: AA6296

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N) ___ Date Received: 04/13/94

Extraction: (SepF/Cont/Sonc) CONT Date Extracted: 04/14/94

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 04/18/94

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 7.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBKJ5WATER

Lab Name: ITAS-KNOXVILLE Contract: _____

Lab Code: _____ Case No.: W0028 SAS No.: _____ SDG No.: W0028

Matrix: (soil/water) WATER Lab Sample ID: AA6301

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N) ___ Date Received: 04/13/94

Extraction: (SepF/Cont/Sonc) CONT Date Extracted: 04/14/94

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 04/18/94

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 7.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBKJ9WATER

Lab Name: ITAS-KNOXVILLE Contract: _____

Lab Code: _____ Case No.: W0028 SAS No.: _____ SDG No.: W0028

Matrix: (soil/water) WATER Lab Sample ID: AA6305

Sample wt/vol: 972.0 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N) ___ Date Received: 04/13/94

Extraction: (SepF/Cont/Sonc) CONT Date Extracted: 04/14/94

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 04/18/94

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 7.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.052	U
319-85-7	beta-BHC	0.052	U
319-86-8	delta-BHC	0.052	U
58-89-9	gamma-BHC (Lindane)	0.052	U
76-44-8	Heptachlor	0.052	U
309-00-2	Aldrin	0.052	U
1024-57-3	Heptachlor epoxide	0.052	U
959-98-8	Endosulfan I	0.052	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.52	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.052	U
5103-74-2	gamma-Chlordane	0.052	U
8001-35-2	Toxaphene	5.2	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.1	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

UJ

BM

9613495.2824

ANION ANALYSIS

Laboratory Name:	ITAS-KNOXVILLE	SDG Number:	W0028
Contract Name:	Westinghouse Hanford	Job Number:	353
Client Sample ID:	BOBKJ3	Preparation Date:	05/19/94
Lab Sample ID:	AA6298	Analysis Date:	05/19/94
Sample Matrix:	Water	Concentration Units:	mg/l

Compound	Result		Qualifier	Detection Limit
fluoride	0.6	J	~~+~~	0.4
chloride	13	J	~~+~~	4.0
nitrite	0.4	UR	~~U~~	0.4
nitrate	30	J	~~+~~	4.0
phosphate	1	UR	~~U~~	1
sulfate	37	J	~~+~~	15

MW
8-1-94

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

9613195.2825

ANION ANALYSIS

Laboratory Name:	ITAS-KNOXVILLE	SDG Number:	W0028
Contract Name:	Westinghouse Hanford	Job Number:	353
Client Sample ID:	BOBKJ5	Preparation Date:	05/19/94
Lab Sample ID:	AA6302	Analysis Date:	05/19/94
Sample Matrix:	Water	Concentration Units:	mg/l

Compound	Result		Qualifier	Detection Limit
fluoride	0.6	J	+	0.4
chloride	14	J	+	4.0
nitrite	0.4	UR	U	0.4
nitrate	31	J	+	4.0
phosphate	1	UR	U	1
sulfate	37	J	+	15

8-1-94

8-1-94

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

ANION ANALYSIS

Laboratory Name:	ITAS-KNOXVILLE	SDG Number:	W0028
Contract Name:	Westinghouse Hanford	Job Number:	353
Client Sample ID:	BOBKJ9	Preparation Date:	05/19/94
Lab Sample ID:	AA6306	Analysis Date:	05/19/94
Sample Matrix:	Water	Concentration Units:	mg/l

Compound	Result		Qualifier	Detection Limit
fluoride	0.4	UJ	~~U~~	0.4
chloride	0.4	UJ	~~U~~	0.4
nitrite	0.4	UR	~~U~~	0.4
nitrate	0.4	UR	~~U~~	0.4
phosphate	1	UR	~~U~~	1
sulfate	1.5	UJ	~~U~~	1.5

MW
8-1-94

+ - Positive result.

9613495.2827

ANION ANALYSIS

Laboratory Name:	ITAS-KNOXVILLE	SDG Number:	W0028
Contract Name:	Westinghouse Hanford	Job Number:	396
Client Sample ID:	~~BOBNM6~~ BOBMN6	Preparation Date:	05/13/94, 05/23/94
Lab Sample ID:	AA6945	Analysis Date:	05/13/94, 05/23/94
Sample Matrix:	Water	Concentration Units:	mg/l

Compound	Result		Qualifier	Detection Limit
fluoride	0.74		+	0.4
chloride	27		+	4.0
nitrite	0.4	UR	~~U~~	0.4
nitrate	340	J	+	40
phosphate	1	UR	~~U~~	1
sulfate	65		+	15

BM 10-7-94

8-1-94

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

9613495.2828

NITRATE/NITRITE ANALYSIS

Laboratory Name:	ITAS-KNOXVILLE	SDG Number:	W0028
Contract Name:	Westinghouse Hanford	Job Number:	353
Sample Matrix:	Water	Analysis Date:	04/19/94
Concentration Units:	mg/l		

Client Sample ID	Lab Sample ID	Result	Qualifiers
Method Blank	P6101	0.02	U
BOBKJ3	AA6299	6.2	+
BOBKJ5	AA6303	6.4	+
~~BOBIK9~~ BOBKJ9 mod.	AA6307	0.02	U

mw 8-1-94

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

9618195.2829

NITRATE/NITRITE ANALYSIS

Laboratory Name:	ITAS-KNOXVILLE	SDG Number:	W0028
Contract Name:	Westinghouse Hanford	Job Number:	396
Sample Matrix:	Water	Extraction Date:	N/A
Concentration Units:	mg/l	Analysis Date:	05/11/94

Client Sample ID	Lab Sample ID	Result	Qualifiers
Method Blank	P6178	0.02	U
BOBMN6	AA6946	80	+

8-1-94

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

9413495.2830

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

SAMPLE RESULTS

LAB NAME: ITAS-RICHLAND
SDG NO.: W0028
LAB SAMPLE ID: 40420301
MATRIX: WATER
WHC ID: B0BKJ3
DATE RECEIVED: 4/12/94
REPORTING UNITS: pCi/L & ug/g

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	METHOD NUMBER
U-234	2.05E+02	6.73E+00	2.77E+01	3.70E-01	0.754	RD3234
U-235	5.74E+00	1.13E+00	1.36E+00	2.25E-01	0.754	RD3234
U-238DA	1.99E+02	6.64E+00	2.70E+01	3.35E-01	0.754	RD3234
ALPHA	3.27E+02	1.65E+01	4.16E+01	1.52E+00	1	RD3222
BETA	1.35E+02	8.14E+00	1.25E+01	3.21E+00	1	RD3222
TOTAL-SR	-2.14E-02 (u)	2.66E-01	2.66E-01	7.65E-01	0.951	RD3204
TC-99	2.91E+01	1.34E+00	6.77E+00	2.10E+00	0.951	ITAS-IT-RD-0001
URANIUM	4.90E+02	N/A	7.35E+01	3.54E-03	1	RD4200

LAB SAMPLE ID: 40420302
MATRIX: WATER
WHC ID: B0BKJ5
DATE RECEIVED: 4/12/94
REPORTING UNITS: pCi/L & ug/g

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	METHOD NUMBER
U-234	2.09E+02	6.19E+00	2.67E+01	2.96E-01	0.908	RD3234
U-235	2.89E+00	7.29E-01	8.13E-01	1.24E-01	0.908	RD3234
U-238DA	1.99E+02	6.04E+00	2.55E+01	2.24E-01	0.908	RD3234
ALPHA	3.64E+02	1.73E+01	4.62E+01	1.68E+00	1	RD3222
BETA	1.30E+02	8.01E+00	1.22E+01	3.39E+00	1	RD3222
TOTAL-SR	4.99E-02 (u)	2.59E-01	2.59E-01	7.24E-01	1	RD3204
TC-99	3.21E+01	1.40E+00	7.06E+00	2.10E+00	0.951	ITAS-IT-RD-0001
URANIUM	6.29E+02	N/A	9.43E+01	3.54E-03	1	RD4200

mw 7-25-94

9613195.2851

Copy

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

SAMPLE RESULTS

LAB NAME: ITAS-RICHLAND SDG NO.: W0028

LAB SAMPLE ID: 40420303 MATRIX: WATER

WHC ID: B0BKJ9 DATE RECEIVED: 4/12/94

REPORTING UNITS: pCi/L & ug/g

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	METHOD NUMBER
U-234	3.58E-01 (U)	3.44E-01	3.48E-01	4.13E-01	0.597	RD3234
U-235	5.87E-02 (U)	1.41E-01	1.41E-01	2.84E-01	0.597	RD3234
U-238DA	2.10E-01	2.42E-01	2.44E-01	1.89E-01	0.597	RD3234
ALPHA	8.15E-01 (U)	6.34E-01	6.49E-01	7.29E-01	1	RD3222
BETA	1.45E+00 (U)	1.79E+00	1.79E+00	2.94E+00	1	RD3222
TOTAL-SR	-1.59E-01 (U)	2.71E-01	2.74E-01	8.22E-01	0.911	RD3204
TC-99	-3.98E-01 (U)	9.38E-01	4.18E+00	2.10E+00	0.951	ITAS-IT-RD-0001
URANIUM	3.00E-02	N/A	4.50E-03	3.54E-03	1	RD4200

10-24-94 WTC 10/24/94 VS 4-20-94

LAB SAMPLE ID: 40431901 MATRIX: WATER

WHC ID: B0BMN6 DATE RECEIVED: 4/18/94

REPORTING UNITS: pCi/L & ug/g

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	METHOD NUMBER
TOTAL-SR	-3.42E-02 (U)	2.46E-01	2.46E-01	7.16E-01	0.957	RD3204
TC-99	3.31E+03	1.04E+01	3.63E-02	2.10E+00	0.951	ITAS-IT-RD-0001
URANIUM	8.75E+01	N/A	1.31E-01	3.54E-03	1	RD4200

J

7-25-94 7-25-94 AQ10

96134952832

Checklists

9615195.2855

LATA GC/MS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	(D)	E
PROJECT: 200 UP - 1			SDG: W002B - ITC - 045		
VALIDATOR: B. MORRIS		LATA NO.: VW401. 92		DATE: 7-25-94	
SAF NO.: 94-088		LAB:		CASE:	
QAPP REFERENCE:			SAP REFERENCE:		

If there is no QAPP or SAP reference, contact the WHC Technical Representative.
If the document(s) are not provided, default to the Method acceptance criteria.

ANALYSES PERFORMED

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

SAMPLES/MATRIX

BOBKJ3(Water), BOBKJ4(WATER), BOBKJ5(WATER), BOBKJ6(WATER)
BOBKJ9(WATER), BOBKK0 (DUP) WATER, BOBMN6(WATER), BOBMN7(WATER)

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

9-22-94 (JSC)

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

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

Comments: _____

2. HOLDING TIMES *(see HOLDING TIME SUMMARY form)*

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

Comments: Sampled 4-8
Rec'd 4-12
Anal 4-22 4-26 ≤ 14

GH 9/11/94

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

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

★ **VOA:** Verify the calculation of the mass abundance percentages for the 95/96, 176/177 and 174/176 ratios.

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

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

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

★

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

Relative Response Factor

where:

A_x (V/S) = area of the characteristic ion measured for the sample
A_{is} (V/S) = area of the characteristic ion measured for the internal standard
C_x (V/S) = concentration [(VOA ng) (SVOA ng/µL)] of the compound of interest
C_{is} (V/S) = concentration [(VOA ng) (SVOA ng/µL)] of the associated internal standard

★

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

Relative Standard Deviation

where:

MEAN = mean of the initial five relative response factors
STDEV = standard deviation of the initial five RRFs per compound

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

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

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

★

$$\%\text{D} = \frac{(\text{RRF}_i - \text{RRF}_s)}{\text{RRF}_i} \times 100$$

Percent Difference

where:

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

Comments: No qualifier BM9-2894
~~%D values are off for Bromomethane and Vinylchloride~~ - US
IN WO# 353

8/4/94

LATA GC/MS DATA VALIDATION CHECKLIST

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

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

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

Comments: The laboratory blanks indicate 2-4 mg/L of Acetone. Sample results have been qualified as U since all are >CRQL and >10x the blank result. Samples BOBKK0, KJ3, KJ4 and KJ9 are qualified as undetected (U). Samples BOBKJ5, KJ6, MN6 and MN7 were raised to the CRQL and qualified as ~~estimated~~ undetected (U).

BM 9-19-94

5. ACCURACY *(see ACCURACY DATA SUMMARY form)*

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

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

★

Surrogate Recovery

$$\%R = \left(\frac{Q_d}{Q_a}\right) \times 100$$

where:
Q_d (V/S) = quantity of surrogate determined (analysis result)
Q_a (V/S) = quantity of surrogate added (true value)

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

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

★

Spike Recovery

$$MS\%R = \frac{MS - OS}{SA} \times 100 \quad \text{or} \quad MSD\%R = \frac{MSD - OS}{SA} \times 100$$

where:
MS/MSD (V/S) = spiked sample result
OS (V/S) = sample result
SA (V/S) = spike added

Comments: _____

BH 8/24/94

6. PRECISION *(see PRECISION DATA SUMMARY form)*

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

★

$$\text{RPD} = \frac{|\text{MS} - \text{MSD}|}{\left(\frac{\text{MS} + \text{MSD}}{2}\right)} \times 100$$

Relative Percent Difference

where =
MS = MS recovery
MSD = MSD recovery

Comments:

7. FIELD QC SAMPLES

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

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

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

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

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

Comments: ~~split~~ BOBKJ3 split with BOBKJ7
BOBKJ5 duplicate with BOBKJ3

8. SYSTEM PERFORMANCE

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

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

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

Comments:

BH 8/11/94

9. COMPOUND IDENTIFICATION AND QUANTITATION

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

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

★

Results Calculations for VOA water (VW) samples

$$\text{Concentration } (\mu g/L) = \frac{(A_x VW)\ (I_s VW)\ (D_f VW)}{(A_{is} VW)\ (RRFVW)\ (V_o VW)}$$

where:

$A_x VW$ = area of the quantitation ion (EICP) for the compound of interest
$A_{is} VW$ = area of the quantitation ion (EICP) for the specified internal standard
$I_s VW$ = amount of internal standard added (ng)
RRFVW = relative response factor (ambient temperature purge of the calibration standard)
$V_o VW$ = volume of water purged (ml)
$D_f VW$ = dilution factor

★

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

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

where:

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

★

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

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

where:

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

9. COMPOUND IDENTIFICATION AND QUANTITATION (continued)

★

Results Calculations for SVOA water (SW) samples

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

where:

$A_x SW$ = area of the quantitation ion (EICP) for the compound of interest
$A_{is} SW$ = area of the quantitation ion (EICP) for the specified internal standard
$I_s SW$ = amount of internal standard added (ng)
RRFSW = relative response factor for the daily calibration standard
$V_o SW$ = volume of water extracted (ml)
$V_i SW$ = volume of extract injected (µL)
$V_t SW$ = volume of concentrated extract (µL)
$D_f SW$ = dilution factor

★

Results Calculations for SVOA soil/sediment (SS) samples

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

where:

$A_x SS$ = area of the quantitation ion (EICP) for the compound of interest
$A_{is} SS$ = area of the quantitation ion (EICP) for the specified internal standard
$I_s SS$ = amount of internal standard added (ng)
RRFSS = relative response factor for the daily calibration standard
$W_s SS$ = weight of sample extracted (g)
$D_f SS$ = dilution factor
SSS = dry weight conversion factor [(100 - %moisture)/100]
$V_t SS$ = total volume of concentrated extract (µL)
$V_i SS$ = volume of the extract injected (µL)

Comments:_____

_____

_____

10. REPORTED RESULTS AND QUANTITATION LIMITS

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

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

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

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

Comments:_____

_____

_____

LATA GC/MS DATA VALIDATION CHECKLIST

VALIDATION SUMMARY

MAJOR DEFICIENCIES:

NO Qualifier BM 9-28-94

MINOR DEFICIENCIES: ~~The continuing calibration for Bromomethane and Vinyl Chloride showed a 25% difference compared to the initial calibration. Sample results for the two compounds are qualified UJ. BOBKK0, KJ4, KJ5, KJ6, KJ9 only~~

The Laboratory Qualifier for acetone was Changed from B to U. Acetone was found in the method and trip blanks, but ~~ace~~ it was not found in the samples to be greater than 10x the blank result. See S

COMMENTS: BOBKJ5 was a duplicate of BOBKJ3 ~~No RPD's were run since all compounds were~~ BM

The RPD was 7.4 %.

BH 8/11/94

HOLDING TIME SUMMARY

SDG: W0028 - ITC - 045	VALIDATOR: B. MORRIS	DATE: 7-25-94	PAGE __ OF __
COMMENTS: GC/MS			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
BOBKKO	VOA	4-8-94	4-13-94	4-22-94	5	9	NONE
BOBKJ3	VOA						
BOBKJ4	VOA						
BOBKJ5	VOA						
BOBKJ6	VOA						
BOBKJ9	VOA						
BOBMN6	VOA	4-15-94	4-19-94	4-26-94	4	7	NONE
BOBMN7	VOA	4-15-94	4-19-94	4-26-94	4	7	NONE

96 JUL 29 PM 2:40

CALIBRATION DATA SUMMARY

SDG: W0028-ITC-045	VALIDATOR: B. Morris	DATE: 7-25-94	PAGE__OF__
COMMENTS: GC/MS			
CALIB. TYPE: INITIAL (CONT.)	INSTRUMENT:		

CALIB. DATE	COMPOUND	RF/CF	RSD/%D/%R	SAMPLES AFFECTED	QUALIFIER
4-22-94	~~BROMOMETHANE~~		% D 25.6	W0 E 353 BOBKJ3 BOBKJ4, BOBKJ5 BOBKJ6, BOBKJ9 BOBKK0	~~UJ~~
4-22-94	~~VINYL CHLORIDE~~		28.8		~~UJ~~
				ALL of these Samples	BM 9-28-94
	NO qualifier BM 9-28-94			FOR EACH Compound	

PNO-DVF-017, R1

000045

BLANK AND SAMPLE DATA SUMMARY

SDG: W0028 - ITC - 045	VALIDATOR: B. Morris	DATE: 7-25-94	PAGE__OF__
COMMENTS: GC/MS			

FIELD SAMPLE ID	COMPOUND	RESULT 200	Q	RT	UNITS	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
TripBlank	Acetone	~~130~~ ppm	B		ug/L	1000	2000	ALL	none

000046

PNO-DVF-017, R1

2187/2188/2189

RELATIVE RESPONSE FACTOR

Analysis: GC/MS VOA
SDG: WOO28-ITC-045
Sample ID:

Date: 25-Jul-94
Validator: B.MORRIS

Constituent	Response for Analyte of Interest AxV	Concentration of Internal Standard CisV	Area of Internal Standard AisV	Concentration of Analyte of Interest CxV	RRF
BROMOMETHANE	10739.00	50.00	33540.00	10.00	1.601
					#DIV/0!
					#DIV/0!
					#DIV/0!
					#DIV/0!
					#DIV/0!
					#DIV/0!
					#DIV/0!
					#DIV/0!
					#DIV/0!

RELATIVE RESPONSE FACTOR

Analysis: GC/MS SVOA
SDG: 0
Sample ID:

Date: 25-Jul-94
Validator: B.MORRIS

Target Constituent	Response for Analyte of Interest AxS	Concentration of Internal Standard ClsS	Area of Internal Standard AlsS	Concentration of Analyte of Interest CxS	RRF
					#DIV/0!
					#DIV/0!
					#DIV/0!
					#DIV/0!
					#DIV/0!
					#DIV/0!
					#DIV/0!
					#DIV/0!
					#DIV/0!
					#DIV/0!

000047

RELATIVE STANDARD DEVIATION

Analysis: GC/MS VOA
SDG: 0
Sample ID:
Date: 25-Jul-94
Validator: B.MORRIS

RRF1 | Constituent: BROMOMETH

RRF1
1.601
1.405
1.434
1.322
1.27

MEAN	STDEV	RSD
1.406	0.1268	9.0

RELATIVE STANDARD DEVIATION

Analysis: GC/MS VOA
SDG: 0
Sample ID:
Date: 25-Jul-94
Validator: B.MORRIS

RRF2 | Constituent: ACETONE

RRF2
0.42
0.332
0.317
0.331
0.317

MEAN	STDEV	RSD
0.343	0.0434	12.6

RELATIVE STANDARD DEVIATION

Analysis: GC/MS SVOA
SDG: 0
Sample ID:
Date: 25-Jul-94
Validator: B.MORRIS

RRF3 | Constituent:

MEAN	STDEV	RSD
#DIV/0!	#DIV/0!	#DIV/0!

RELATIVE STANDARD DEVIATION

Analysis: GC/MS SVOA
SDG: 0
Sample ID:
Date: 25-Jul-94
Validator: B.MORRIS

RRF4 | Constituent:

MEAN	STDEV	RSD
#DIV/0!	#DIV/0!	#DIV/0!

9/13/94 2:44 PM

000048

PERCENT DIFFERENCE

Analysis: GC/MS VOA
SDG: 0
Sample ID:

Date: 25-Jul-94
Validator: B.MORRIS

Constituent	Initial Calibration Average RRF RRFiV	Continuing Calibration Average RRF RRFsV	%D
CHLOROMETHANE	1.245	0.857	31.2%
BROMOMETHANE	1.406	1.046	25.6%
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!

PERCENT DIFFERENCE

Analysis: GC/MS SVOA
SDG: 0
Sample ID:

Date: 25-Jul-94
Validator: B.MORRIS

Constituent	Initial Calibration Average RRF RRFiS	Continuing Calibration Average RRF RRFsS	%D
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
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SW846 2015 6/6/95

000079

SURROGATE RECOVERY

Analysis: GC/MS VOA
SDG: 0
Sample ID:

Date: 25-Jul-94
Validator: B.MORRIS

Constituent	quantity of surrogate determined QdV	quantity of surrogate added QaV	%RV
TOLUENE	48.50	50.00	97.0%
			#VALUE!
			#DIV/0!
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			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!

SURROGATE RECOVERY

Analysis: GC/MS SVOA
SDG: 0
Sample ID:

Date: 25-Jul-94
Validator: B.MORRIS

Constituent	quantity of surrogate determined QdS	quantity of surrogate added QaS	%RS
			#DIV/0!
			#DIV/0!
			#DIV/0!
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			#DIV/0!
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			#DIV/0!
			#DIV/0!
			#DIV/0!

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050000

PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (MS/MSD)

Analysis: GC/MS VOA
SDG: 0
Sample ID:

Date: 25-Jul-94
Validator: B.MORRIS

Constituent	MS Result MSV	MSD Result MSDV	Sample Result OSV	Spike Added SAV	MSV %R	MSDV %R	RPDV
BENZENE	45.05	46.82	0.08	50.00	89.9%	93.5%	3.9%
					#DIV/0!	#DIV/0!	#DIV/0!
					#DIV/0!	#DIV/0!	#DIV/0!
					#DIV/0!	#DIV/0!	#DIV/0!
					#DIV/0!	#DIV/0!	#DIV/0!
					#DIV/0!	#DIV/0!	#DIV/0!
					#DIV/0!	#DIV/0!	#DIV/0!
					#DIV/0!	#DIV/0!	#DIV/0!
					#DIV/0!	#DIV/0!	#DIV/0!
					#DIV/0!	#DIV/0!	#DIV/0!

PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (MS/MSD)

Analysis: GC/MS SVOA
SDG: 0
Sample ID:

Date: 25-Jul-94
Validator: B.MORRIS

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

000051

RESULTS CALCULATIONS FOR VOA WATER SAMPLES

Analysis: GC/MS VOA
SDG: 0
Sample ID:

Date: 25-Jul-94
Validator: B.MORRIS

Constituent	Area of the Quant Ion for the Constituent of Interest	Area of the Quant Ion for the Internal Standard	Amount of Internal Standard added (ng)	Relative Response Factor	Volume of Water Purged (ml)	Dilution Factor	Conc (µg/L)
	AxVW	AisVW	IsVW	RRFVW	VoVW	DfVW	
CCl4-BOBKJ3	155492.00	115458.00	250.00	0.51	5.00	1.00	131.26
CCL4-BOBKJ5	153053.00	110266.00	250.00	0.51	5.00	1.00	135.29
							#DIV/0!
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							#DIV/0!
							#DIV/0!
							#DIV/0!
							#DIV/0!
							#DIV/0!
							#DIV/0!

SAS 6105 7918

250052

LATA PESTICIDE/PCB DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E

PROJECT: 200-UP-1	SDG: W0028-ITC-045	
VALIDATOR: B. MORRIS	LATA NO.: VW401.92	DATE: July 22 '94
SAF NO.: 94-088	LAB: IT	CASE:
QAPP REFERENCE:	SAP REFERENCE:	

If there is no QAPP or SAP reference, contact the WHC Technical Representative.
If the document(s) are not provided, default to the Method acceptance criteria.

ANALYSES PERFORMED

☒ CLP 3/90	☐ SW-846 8080	☐ SW-846 8081	☐	☐	☐

SAMPLES/MATRIX
BOBKJ3 (water)
BOBKJ5 (water)
BOBKJ9 (water)

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

7.22.94 WJC

Is technical verification documentation present? ..... Yes

Is a case narrative present? ..... Yes No

Comments:

2. HOLDING TIMES *(see HOLDING TIME SUMMARY form)*

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

Comments: Sample: 4-8-94
R'ed: 4-12-94
Extract: 4-14-94
Analy: 4-18-94

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS *(see CALIBRATION DATA SUMMARY form)*

3.1 INSTRUMENT PERFORMANCE (METHOD 8080 AND 8081)

Are DDT retention times acceptable . . . . . Yes No N/A

Are DBC retention times acceptable? . . . . . Yes No N/A

★

DBC Retention Time Percent Difference

$$\%D = \frac{(RT_i - RT_s)}{RT_i} \times 100$$

where:
RT_i = absolute retention time of DBC (initial standard)
RT_s = absolute retention time of DBC (subsequent standards/samples)

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

★ Recalculate the retention time windows for at least two pesticide compounds. For CLP, see the table in Section 8.4 for retention time windows from the mean retention time value. For SW-846, calculate the mean plus or minus three times the standard deviation as described in Method 8000A.

Are DDT and endrin breakdowns acceptable? . . . . . Yes No N/A

★

Percent Breakdown

$$\%breakdown = \frac{TDA}{TPA} \times 100$$

where:
(TDA) total degradation peak area = the total peak areas of DDE + DDD or endrin aldehyde + endrin ketone
(TPA) total peak area = the total of all associated peak areas for DDE, DDE + DDT or endrin aldehyde, endrin ketone + endrin

For confirmation by GC/MS; is the GC/MS tuning/performance check acceptable (use GC/MS checklist)? . . . . . Yes No N/A

Comments:_____

3.2 CALIBRATIONS (METHOD 8080 AND 8081)

Are all EVAL standard calibration factors and %RSD values acceptable? . . . . . Yes No N/A

Are all quantitation column calibration factor %RSD values acceptable? . . . . . Yes No N/A

★

Relative Standard Deviation

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

where:
MEAN = mean of the initial five response (calibration) factors
STDEV = standard deviation of the initial five RFs/CFs per compound

$$= \sqrt{\sum_{i=1}^{n} \frac{(RF_i - \overline{RF})^2}{n-1}}$$

Were the analytical sequence requirements met? . . . . . Yes No N/A

Are all continuing calibration %D values acceptable? . . . . . Yes No N/A

★ Recalculate at least two of the %D values from the raw data and compare to the reported results.

★

Percent Difference

$$\%D = \frac{(RF_i - RF_s)}{RF_i} \times 100$$

where:
RF_i = initial calibration response (calibration) factor
RF_s = continuing calibration response (calibration) factor

Comments: _____

3.3 INSTRUMENT PERFORMANCE AND INITIAL CALIBRATION (3/90 SOW)

Was the initial calibration sequence performed? ..... (Yes) No N/A

Was the resolution acceptable in the resolution check mix? ..... (Yes) No N/A

Is resolution acceptable in the PEM, INDA and INDB? ..... (Yes) No N/A

★

$$\text{resolution} = \frac{\text{Resolution}}{P_v / P_h} \times 100$$

where:

P_v = the peak height of the valley of the larger peak

P_h = the peak height of the smaller peak being resolved

Are DDT and Endrin breakdowns acceptable? ..... (Yes) No N/A

Are all retention times in PEMs and calibration mixes acceptable? ..... (Yes) No N/A

Are all RPD values in the PEMs acceptable? ..... (Yes) No N/A

Are all %RSD values acceptable? ..... Yes (No) N/A

Comments: DDT/Endrin Calc.'s are wrong - but still within limits
Several of the Calibration Components are above the limits
but no qualifier is nec. Since sample is nondetect.

3.4 CALIBRATION VERIFICATION (3/90 SOW)

Were the analytical sequence requirements met? ..... (Yes) No N/A

Is resolution acceptable in the PEMs? ..... (Yes) No N/A

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

Are all retention times acceptable in the PEMs, INDA and INDB mixes? ..... (Yes) No N/A

Are all RPD values in the PEMs acceptable? ..... (Yes) No N/A

Are the DDT and endrin breakdowns acceptable? ..... (Yes) No N/A

Was GPC cleanup performed? ..... Yes No (N/A)

Is the GPC calibration check acceptable? ..... Yes No (N/A)

Was Florisil cleanup performed? ..... (Yes) No N/A

Is the Florisil performance check acceptable? ..... (Yes) No N/A

Comments:

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

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

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

Comments:_____

_____

_____

_____

_____

5. ACCURACY *(see ACCURACY DATA SUMMARY form)*

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

Are all surrogate recoveries acceptable? . . . . . (Yes) No N/A

★

Surrogate Recovery

$$\%R = \left(\frac{Q_d}{Q_a}\right) \times 100$$

where:
Q_d = quantity of surrogate determined (analysis result)
Q_a = quantity of surrogate added (true value)

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

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

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

Are all LCS results acceptable? . . . . . Yes (No) N/A

★

Spike Recovery

$$\%R = \frac{MS - OS}{SA} \times 100$$

where:
MS or MSD = spiked sample result
OS = sample result
SA = spike added

Comments: LCS did not have the right number of spiking pesticides

_____

_____

_____

_____

8/11/94

6. PRECISION *(see PRECISION DATA SUMMARY form)*

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

★

$$\text{RPD} = \frac{\text{Relative Percent Difference}}{\left(\frac{|\text{MS} - \text{MSD}|}{\frac{\text{MS} + \text{MSD}}{2}}\right)} \times 100$$

where:
MS = MS recovery
MSD = MSD recovery

Comments:_____

7. FIELD QC SAMPLES

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

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

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

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

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

Comments: BOBKJ3 was split ~~to BOBKJ8~~ with BOBKJ7
9-27-94 (JJC)

8. SYSTEM PERFORMANCE

Is chromatographic performance acceptable? . . . . . Yes No N/A

Are all positive results resolved acceptably? . . . . . Yes No N/A

Comments:_____

BH 8/11/94

9. COMPOUND IDENTIFICATION AND QUANTITATION

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

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

★ Recalculate the valid detected results of at least two samples.

★

External Standard Calibration, Aqueous (EW) Samples

$$\text{Concentration } (\mu g/L) = \frac{(A_xEW)(AEW)(V_tEW)(DEW)}{(A_sEW)(V_iEW)(V_sEW)}$$

where:

A_xEW = response for sample (area counts/peak height)
AEW = amount of standard (ng)
A_sEW = response for external standard (area counts/peak height)
V_iEW = volume of extract injected (µL)
DEW = dilution factor
V_tEW = volume of total extract (µL)
V_sEW = volume of sample extracted (ml)

★

External Standard Calibration, Nonaqueous (ES) Samples

$$\text{Concentration } (\mu g/Kg) = \frac{(A_xES)(AES)(V_tES)(DES)}{(A_sES)(V_iES)(WES)(SES)}$$

where:

A_xES = response for sample (area counts/peak height)
AES = amount of standard (ng)
A_sES = response for external standard (area counts/peak height)
V_iES = volume of extract injected (µL)
DES = dilution factor
V_tES = volume of total extract (µL)
WES = weight of sample (g)
SES = dry weight conversion factor [(100 - %moisture)/100]

Comments: _____

BH 8/11/94

9. COMPOUND IDENTIFICATION AND QUANTITATION (continued)

★

Internal Standard Calibration, Aqueous (IW) Samples

$$\text{Concentration } (\mu g/L) = \frac{(A_x IW)(C_{is} IW)(DIW)}{(A_{is} IW)(RFIW)(V_s IW)}$$

where:
$A_x IW$ = response for sample (area counts/peak height)
$C_{is} IW$ = amount of internal standard added (ng)
$A_{is} IW$ = response for internal standard (area counts/peak height)
DIW = dilution factor
RFIW = response factor for the analyte
$V_s IW$ = volume of sample extracted (ml)

★

Internal Standard Calibration, Nonaqueous (IS) Samples

$$\text{Concentration } (\mu g/Kg) = \frac{(A_x IS)(C_{is} IS)(DIS)}{(A_{is} IS)(RFIS)(W_s IS)(SIS)}$$

where:
$A_x IS$ = response for sample (area counts/peak height)
$C_{is} IS$ = amount of internal standard added (ng)
$A_{is} IS$ = response for internal standard (area counts/peak height)
DIS = dilution factor
RFIS = response factor for the analyte
$W_s IS$ = weight of sample extracted (g)
SIS = dry weight conversion factor [(100 - %moisture)/100]

Comments:_____

10. REPORTED RESULTS AND QUANTITATION LIMITS

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

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

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

Comments:_____

9613495.2857

VALIDATION SUMMARY

MAJOR DEFICIENCIES:

MINOR DEFICIENCIES: There were no MS/MSD analysis done on the Sample matrix, instead an LCS was spiked with 2 of the 6 required ~~Spike~~ Pesticides.

COMMENTS:

BH 8/11/94

HOLDING TIME SUMMARY

SDG: W0028-ITC-045	VALIDATOR: B. Morris	DATE: 7-22-94	PAGE __ OF __

COMMENTS: PESTICIDES/PCBS

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
BOBKJ3	PEST/PCB	4-8-94	4-14-94	4-18-94	4	10	none
BOBKJ5	PEST/PCB	4-8-94	4-14-94	4-18-94	4	10	NONE
BOBKJ9	PEST/PCB	4-8-94	4-14-94	4-18-94	4	10	NONE

8987 5494 2858

PNO-DVF-019, R1

290000

PERCENT BREAKDOWN

Analysis: Pesticides/PCBs
SDG: W0028-ITC-045

Date: 22-Jul-94
Validator: B.Morris

Constituent	Total Degradation Peak Area of DDE+DDD or endrin aldehyde +endrin ketone TDA	Total Peak Area of DDE, DDE+DDT or endrin aldehyde, endrin ketone+endrin TPA	% Breakdown
DDT --PEMBT DB608	32063.00	506186.00	6.3%
Endrin --PEMBT DB608	8576.00	306911.00	2.8%
DDT--PEMBW DB608	31752.00	509375.00	6.2%
Endrin--PEMBW DB608	9154.00	319474.00	2.9%
			#DIV/0!
			#DIV/0!
			#DIV/0!
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			#DIV/0!

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030063

RELATIVE STANDARD DEVIATION

Analysis: Pesticides/PCBs
SDG: W0028-ITC-045
Standard ID:
Date: 22-Jul-94
Validator: B.Morris

Constituent: Heptachlor

RF1
7880000
7050000
6350000

MEAN	STDEV	RSD
7093333.333	765919.9262	10.8

RELATIVE STANDARD DEVIATION

Analysis: Pesticides/PCBs
SDG: W0028-ITC-045
Standard ID:
Date: 22-Jul-94
Validator: B.Morris

Constituent: Endrin aldehyde

RF2
4550000
4190000
3690000

MEAN	STDEV	RSD
4143333.333	431895.0490	10.4

RELATIVE STANDARD DEVIATION

Analysis: Pesticides/PCBs
SDG: W0028-ITC-045
Standard ID:
Date: 22-Jul-94
Validator: B.Morris

Constituent: alpha-BHC

RF3
1120000
1250000
1570000

MEAN	STDEV	RSD
1313333.333	231588.7159	17.6

RELATIVE STANDARD DEVIATION

Analysis: Pesticides/PCBs
SDG: W0028-ITC-045
Standard ID:
Date: 22-Jul-94
Validator: B.Morris

Constituent: DDE

RF4
1270000
1410000
1650000

MEAN	STDEV	RSD
1443333.333	192180.4707	13.3

SURROGATE RECOVERY

Analysis: Pesticides/PCBs
SDG: W0028-ITC-045
Sample ID: see below

Date: 22-Jul-94
Validator: B.Morris

Constituent	quantity of surrogate determined Qd	quantity of surrogate added Qa	%R
TCX PBLK1 DB608	1.79E-02	0.02	89.5%
TCX PBLK1 DB1701	1.75E-02	0.02	87.5%
DCB BOBKJ5 DB608	1.95E-02	0.02	97.5%
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!

9/15/94 2861

0000044

EXTERNAL STANDARD CALIBRATION, AQUEOUS SAMPLES

Analysis: Pesticides/PCBs
SDG: W0028-ITC-045
Sample ID: Calibration Verification BM 7-22-94

Date: ~~34537~~ 7-22-94 BM
Validator: B.Morris

Constituent	Response for sample (area counts or peak height) AxEW	Amount of standard (ng) AEW	Response for external standard (area counts or peak height) AsEW	Volume of extract injected (µL) ViEW	Dilution Factor DEW	Volume of Total Extract (µL) VtEW	Volume of Sample Extracted (mL) VsEW	Conc (µg/L)
alpha-BHC	171877.00	0.02	8420000.00	1.00	5.00	10000.00	1000.00	2.04E-02
								#DIV/0!
								#DIV/0!
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LATA GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	(D)	E
PROJECT: 200-UR-1			SDG: W0028-ITC-045		
VALIDATOR: MWebb		LATA NO: VW401.92		DATE: 8-1-94	
SAF NO.: 94-088		LAB: ITC		CASE:	
QAPP REFERENCE:			SAP REFERENCE:		

If there is no QAPP or SAP reference, contact the WHC Technical Representative.
If the document(s) are not provided, default to the Method acceptance criteria.

ANALYSES PERFORMED

☐ Alkalinity 310.1	☐ Chloride 325.3	☐ pH 9040/150.1	☐ TOC 9060/415.1	☐ TDS 160.1 ☐ TSS 160.2	☐
☒ Anions 300.0	☐ Chromium+6 7196	☐ Phenols 9065/420.1	☐ TOX 9020/9022	☐ Sulfate 375.4	☐
☐ Ammonia 350.3	☐ COD 410.1	☐ Phosphorus 365.2	☐ TKN 351.3	☐ Sulfide 9030/376.1	☐
☐ BOD 405.1	☒ Nitrate+Nitrite 353.2	☐ Oil & Grease 413.1	☐ TPH 9070/418.1	☐	☐

SAMPLES/MATRIX	
	B0BKJ3 (W)
	B0BKJ5 (W)
	B0BKJ9 (W)
	B0BMN6 (W)

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

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

Comments: _____

2. HOLDING TIMES *(see HOLDING TIME SUMMARY form)*

Are sample holding times acceptable? . . NO_2, PO_4 . . . . . Yes (No) N/A

Comments: The holding Time for NO_3 by IC was grossly exceeded the results are qualified estimate J (B0BNN6) and (UR) B0BKJ3, 5, 9 number

3. INSTRUMENT CALIBRATION *(see CALIBRATION DATA SUMMARY form)*

Was initial calibration performed for all applicable analyses? . . . . . (Yes) No N/A

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

Was a calibration check performed for all applicable analyses? . . . . . (Yes) No N/A

Are calibration check results acceptable? . . . . . (Yes) No N/A

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

Correlation Coefficient (r)

$$r = \frac{N \sum x_i y_i - \sum x_i \sum y_i}{[N \sum x_i^2 - (\sum x_i)^2]^{1/2} \; [N \sum y_i^2 - (\sum y_i)^2]^{1/2}}$$

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

Recovery

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

Comments:_____

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

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

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

Comments: _____

5. ACCURACY *(see ACCURACY DATA SUMMARY form)*

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

Are all spike recoveries acceptable? . . . . . (Yes) No N/A

★

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

$$\text{SA}$$

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

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

Are all LCS recoveries acceptable? . . . . . (Yes) No N/A

★

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

$$\text{true value}$$

Comments: AMS & MSD were not run with the batch on 5-23-94 NO3 (IC) analyses of BOBAIN6

BH 6/11/94

6. PRECISION *(see PRECISION DATA SUMMARY form)*

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

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

★

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

Relative Percent Difference

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

Comments:

7. FIELD QC SAMPLES

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

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

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

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

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

Comments:

BOBKJ9 (equip blk) are non-defects.

BOBKJ3 BOBKJ5 (dups.) RPD

all RPD's on IR analysis OK NO2 NO3 3.2%

BH 8/11/94

8. ANALYTE QUANTITATION

Was analyte quantitation performed properly? . . . . . (Yes) No N/A

Are results calculated properly? . . . . . (Yes) No N/A

★ For methods with calibration curves:

General Chemistry Results Calculation, water sample

Concentration (µg/L) = CONCW × DfW

where:

CONCW = concentration off calibration curve (µg/L)

DfW = dilution factor (if any)

or

General Chemistry Results Calculation, soil sample

$$\text{Concentration (mg/Kg)} = \frac{(\text{CONCS} \times \text{DfS} \times \text{VOL})}{(\text{WS} \times \text{SS})}$$

where:

CONCS = concentration off calibration curve (mg/L)

VOL = volume of final extract (ml)

WS = weight of sample (g)

DfS = dilution factor (if any)

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

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

Comments: _____

9. REPORTED RESULTS AND DETECTION LIMITS

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

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

Do results meet the CRDLs? . . . . . (Yes) No N/A

Comments: The WHC COC requests NO3 by IC. The lab reported NO2+NO3. Lab. reported NO2, NO3 by IC and NO2 + NO3 as requested on the COC MW 5-20-94

9613495.2868

Validator	Date	SDG
MC Webb	8-1-94	WO028-ITC-045

GENERAL CHEMISTRY VALIDATION SUMMARY

MAJOR DEFICIENCIES

None

MINOR DEFICIENCIES

1. The holding time was grossly exceeded for NO2, NO3, and PO4 by IC. The results are qualified as estimated (J) and unusable (UR).

2. The holding time was exceeded for F, Cl, and SO4 by IC. The results were qualified as estimated (J/UJ).

COMMENTS

1. A MS MSD was not run for the batch analyzed on 5-23-94 (IC). No qualifier necessary.

2. The WHC COC requested NO3. The laboratory reported NO2+NO3 results.

Additional Note:

The laboratory reported all analyses requested on the COC (NO2, NO3 by IC and NO2+NO3) MCW 9-22-94

00071

9/28/94

HOLDING TIME SUMMARY

SDG: W0028-ITC-045	VALIDATOR: MLWebb	DATE: 8-1-94	PAGE 1 OF 1

COMMENTS: GENERAL CHEMISTRY ANALYSES

Rcd	FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE ~~PREPARED~~ analyzed	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER	H.T
4-13-94	B0BKJ9	NO_2/NO_3	4-8-94	4-19-94		11		none	28
	(eq blk)	Anion F, Cl, SO_4	"	5-19-94		41	~~UJ~~	J/UJ	28
		Anion NO_2, NO_3, PO_4	"	"		41		J/UR	48 hrs
4-13-94	B0BKJ3	NO_2/NO_3	4-8-93	4-19-94		11		none	28
		Anion F, Cl, SO_4	"	5-19-94		41		J/UJ	28
		" NO_2, NO_3 PO_4	"	"		41		J/UR	48 hrs
4-13-94	B0BKJ5	NO_2, NO_3	4-8-94	4-19-94		11		none	28
	dup of KJ3	Anion F, Cl, SO_4	"	5-19-94		41		J/UJ	28
		Anion NO_2, NO_3, PO_4	"	"		41		J/UR	48 hrs
4-15-94	B0BMN6	NO_2, NO_3	4-15-94	5-11-94		26		none	28
		Anion F, Cl, SO_4		5-13-94		28		~~J~~ none	28
		Anion PO_4, Wet		5-13-94		28		UR	48 hrs
		Anion NO_3		5-23-94		38		J	48 hrs

LINEAR REGRESSION ANALYSIS

Analysis: General Chemistry
Constituent: NO2 + NO3
SDG: WOO28-ITC-045

Calibration Date: 19-Apr-94

Date: 1-Aug-94
Validator: MC Webb

Concentration	Absorbance
2.00	1549.000
1.00	757.000
0.40	298.000
0.10	72.000
0.04	28.000
0.02	14.000
0.00	-2.000

r	r^2
0.9999	0.9999

slope	x intercept
0.0013	0.0073

1/slope	y intercept
774.0144	-5.5934

LINEAR REGRESSION ANALYSIS

Analysis: General Chemistry
Constituent: Anions NO3
SDG: WOO28-ITC-045

Calibration Date: 12-May-94

Date: 1-Aug-94
Validator: MC Webb

Concentration	Absorbance
0.00	0.000
0.40	151662.000
2.50	1004237.000
5.00	2148966.000

r	r^2
0.9994	0.9989

slope	x intercept
0.0000	0.0534

1/slope	y intercept
429963.7764	-22003.4797

PERCENT RECOVERY (ICV/CCV)

Analysis: General Chemistry
SDG: WOO28-ITC-045

Date: 1-Aug-94
Validator: MC Webb

Constituent	Observed Value	True Value	%R
	O	A	
NO2 + NO3	0.972	1.00	97.2%
NO3 5-13-94	2.479	2.50	99.2%
NO3 5-19-94	2.385	2.50	95.4%
			#DIV/0!
			#DIV/0!
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MATRIX SPIKE RECOVERY (MS)

Analysis: General Chemistry
SDG: WOO28-ITC-045
Sample ID: see below

Date: 1-Aug-94
Validator: MC Webb

Constituent	Spike Sample Result SSR	Sample Result SR	Spike Added SA	%R
NO2NO3 MS	0.926	0.00	1.00	92.6%
NO2NO3 MSD	0.923	0.00	1.00	92.3%
NO3 Anion MS	50.00	30.00	25.00	80.0%
NO3 Anion MSD	49.00	30.00	25.00	76.0%
				#DIV/0!
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PERCENT RECOVERY (LCS)

Analysis: General Chemistry
SDG: WOO28-ITC-045

Date: 1-Aug-94
Validator: MC Webb

Constituent	Observed value	True value	%R
	OLCS	ALCS	
NO2NO3	0.96	1.00	96.0%
NO3	2.60	2.50	104.0%
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
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RELATIVE PERCENT DIFFERENCE

Analysis: General Chemistry
SDG: WOO28-ITC-045
Sample ID:

Date: 1-Aug-94
Validator: MC Webb

Constituent	Original (Sample) concentration OS	Duplicate concentration D	RPD
NO2NO3 B0BKJ9	92.60	92.30	0.3%
NO3 B0BKJ9	80.00	76.00	5.1%
			#DIV/0!
			#DIV/0!
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			#DIV/0!
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8-10-94

GENERAL CHEMISTRY RESULTS CALCULATION, WATER

Analysis: General Chemistry
SDG: WOO28-ITC-045
Sample ID: See below

Date: 1-Aug-94
Validator: MC Webb

Constituent	Concentration from curve	Dilution Factor	Concentration (µg/L)
	CONCW	DfW	
NO2NO3 BOBKJ3	6.21	1	6.2
NO3 BOBMN6	3.37	100	337.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0

9615196.2876

LATA RADIOCHEMISTRY DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	(D)	E

PROJECT: 200-UP-1	SDG: W0028 ITC-045	
VALIDATOR: MWebb	LATA NO.: VW401.92	DATE: 7-25-94
SAF NO.: 94-088	LAB: ITC	CASE: 200-UP-1
QAPP REFERENCE:	SAP REFERENCE:	

If there is no QAPP or SAP reference, contact the WHC Technical Representative.
If the document(s) are not provided, default to the Method acceptance criteria.

ANALYSES PERFORMED

☒ Gross Alpha ☒ Gross Beta	☐ Strontium-89 ☒ Strontium-90 (Total)	☒ Technetium-99	☒ Isotopic Anal. Alpha Spec.	☐ Gamma Spectroscopy	☐ Iodine-129
☒ Total Uranium (KPA)	☐ Radium-226 ☐ Radium-228	☐ (LSC) Liquid Scintillation	☐	☐	☐

SAMPLES/MATRIX	
	B0BKJ3 (W)
	B0BKJ5 (W)
	B0BKJ9 (W)
	B0BMN9 (W)

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification forms present?	(Yes)	No	N/A
Compliance screening form present?	(Yes)	No	N/A
Is a case narrative present?	(Yes)	No	N/A
Were all analyses requested reported?	(Yes)	~~No~~	N/A pw 7-25-94
Are all results supported in the raw data?	(Yes)	No	N/A

Comments:

Sr-90 was requested; Total Sr was reported

2. CHAIN-OF-CUSTODY/HOLDING TIMES

Are sample holding times acceptable?	(Yes)	No	N/A
Are samples preserved correctly?	(Yes)	No	N/A
Was the pH of the sample checked prior to analysis?	Yes	(No)	N/A

Comments:

There is no evidence of the screening sheet that pH was checked before the samples went to the lab. (pg 0042)

BH 8/11/94

LATA RADIOCHEMISTRY DATA VALIDATION CHECKLIST Copy

3. INITIAL CALIBRATION

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

Initial calibration acceptable? . . . . . (Yes) No N/A

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

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

Comments: Not all 8 detectors were calibrated w/i 12 month. No initial calibration is accepted based on the continuing calibration. There is no effect on the data

MW 9-20-94

4. CONTINUING CALIBRATION

Background checked at proper frequency? . . . . . (Yes) No N/A

Background check acceptable? . . . . . (Yes) No N/A

Efficiency checked at proper frequency? . . . . . (Yes) No N/A

Efficiency check acceptable? . . . . . (Yes) No N/A

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

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

Comments:

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

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

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

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

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

Comments: Eqq detected in MB no qualifier necessary (SA25*MB3)

Uranium detected in the method blank (.028 ug/L) 10-19-94 WJS

5* blank = .140 ug/L

BOBKJ9 < 5* blank and is qualified ~~non-detect~~ as estimated (J)

MW 9-20-94

MW 9.27.94 (2nd comment added to this pg.)

BH 8/11/94

LATA RADIOCHEMISTRY DATA VALIDATION CHECKLIST

6. MATRIX SPIKES *(see ACCURACY DATA SUMMARY form)*

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

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

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

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

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

★

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

Spike Recovery

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

Comments: MS Tc99 %R = 149.8% Tc99 results qualified as estimated (J) (BOBMN16 only)

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

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

LCS recoveries acceptable? . . . . . (Yes) No N/A

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

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

★

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

Recovery

Comments:

8. CHEMICAL RECOVERY *(see ACCURACY DATA SUMMARY form)*

Chemical carrier added? Sr. Carrier acceptable per [illegible] 9-27-94	(Yes)	No	(N/A)
Chemical recovery acceptable?	(Yes)	No	(N/A)
Tracer added?	(Yes)	No	N/A
Tracer recovery acceptable?	(Yes)	No	N/A
Standards traceable?	(Yes)	No	N/A
Standards expired?	Yes	(No)	N/A
Transcription/Calculation errors?	Yes	(No)	N/A

★

Alpha Spec Tracer Recovery

$$\frac{A.1 - B.1}{(2.22)(E.1)(T.1)}$$

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

Comments: _____

_____

9. DUPLICATES *(see PRECISION DATA SUMMARY form)*

Duplicates Analyzed?	(Yes)	No	N/A
RPD Values Acceptable?	(Yes)	No	N/A
Transcription/Calculation Errors?	Yes	(No)	N/A

★

Relative Percent Difference

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

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

Comments: _____

_____

LATA RADIOCHEMISTRY DATA VALIDATION CHECKLIST

10. FIELD QC SAMPLES

Field blank(s) identified? ~~BOBJFK9~~ BOBKJ9 (equip bkl) (Yes) No N/A

Field blank results acceptable? (Yes) No N/A

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

Field duplicate sample(s) identified? ~~BOBJFK5~~ BOBKJ5 & BOBKJ3 dups (Yes) No N/A

Field duplicate RPD values acceptable? Yes (No) N/A

Field split sample(s) identified? Yes (No) N/A

Field split RPD values acceptable? Yes No (N/A)

Performance audit sample(s) identified? Yes (No) N/A

Performance audit sample results acceptable? Yes No (N/A)

Comments: U_{238} detected in field blank (.210 MDA = .189)
Cross α detected in blank (.815 MDA .729)
Total U detected in blank (.030 MDA .004)
RPD for field dups > 20% U_{235}, U_{TOTAL}. No qualifiers assigned due to field QC. Note in narrative

11. DETECTION LIMITS (LEVELS D & E)

MDA's meet required detection limits? (Yes) ~~No~~ N/A

Transcription/calculation errors? Yes (No) N/A

★

$$\frac{\text{Minimum Detectable Activity (MDA)}}{\dfrac{4.66 \times \sqrt{(B.2)(T.2)}}{2.22(E.2)(I.2)(R.2)(D.2)(V.2)(Y.2)(T.2)}}$$

where:

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

Comments:

BH 8/11/94

Results Calculation Equations

Gross α/β and Tritium

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

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

Strontium (total)

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

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

Strontium-90 (corrected for Sr-89)

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

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

BH 8/11/94

Results Calculation Equations, continued

Technetium-99

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

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

Alpha Spec Isotopes

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

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

Gamma Spec Isotopes

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

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

BH 8/11/94

Results Calculation Equations, continued

Total Uranium by Laser Fluorometry

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

where:

W.9 = sample reading with Fluran
I.9 = initial sample reading
R.9 = concentration of uranium standard after dilution with sample (µg/L)
D.9 = dilution factor
U.9 = sample reading with uranium standard

Radium-226 by Radon Emanation

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

where:

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

BH 8/11/94

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LATA RADIOCHEMISTRY DATA VALIDATION CHECKLIST SW 401.92 rad.

VALIDATION SUMMARY

MAJOR DEFICIENCIES:

None

MINOR DEFICIENCIES:

404315C1 (BOBMN6) qualified J (estimated) MS > 140% R

COMMENTS:

Field QC trip blank

U238, α, Total U detected at a positive concentration (No qualifiers due to field QC)

BOBKJ3, BOBKJ5 were dups

RPD > 20% U235 is U Total. No qualifiers assigned for field QC.

BH 8/11/94

ACCURACY DATA SUMMARY

SDG: W0028-ITC-045	VALIDATOR: MWebb	DATE: 7-25-94	PAGE 1 OF 1

COMMENTS: RADIOCHEMICAL ANALYSES

FIELD SAMPLE ID	CONSTITUENT	% RECOVERY	SAMPLE(S) AFFECTED	QUALIFIER
	Tc 99	149.8	BOBMN6	J

880000

PNO-DVF-015, R1

9/26/94 2:39 PM

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

DUPLICATE RESULTS

LAB NAME: ITAS-RICHLAND SDG NO.: W0028

LAB SAMPLE ID: F0420302

WHC ID: B0BKJ5

REPORTING UNITS: pCi/L & ug/g

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	METHOD NUMBER
U-234	2.47E+02	1.13E-01	4.50E+01	8.77E-01	0.324	RD3234
U-235	2.57E+00	1.15E-00	1.24E+00	4.73E-01	0.324	RD3234
U-238DA	2.30E+02	1.09E-01	4.20E+01	7.80E-01	0.324	RD3234
TC-99	3.04E+01	1.37E-00	6.89E+00	2.10E+00	0.951	ITAS-IT-RS-0001
URANIUM	5.68E+02	N/A	8.52E+01	3.54E-03	1	RD4200

RPD CALCULATIONS

LAB SAMPLE ID: 40420302

WHC ID: B0BKJ5

REPORTING UNITS: pCi/L & ug/g

ISOTOPE	SAMPLE RESULT	DUPLICATE RESULT	RPD
U-234	2.09E+02	2.47E+02	16.67
U-235	2.89E+00	2.57E+00	11.72
U-238DA	1.99E+02	2.30E+02	14.45
TC-99	3.21E+01	3.04E+01	5.44
URANIUM	6.29E+02	5.68E+02	10.19

MWO 7-25-94

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IT ANALYTICAL SERVICES
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(509) 375-3131

DUPLICATE RESULTS

LAB NAME: ITAS-RICHLAND SDG NO.: W0028

LAB SAMPLE ID: F0420303

WHC ID: B0BKJ9

REPORTING UNITS: pCi/L & ug/g

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	METHOD NUMBER
ALPHA	4.31E-01	4.97E-01	5.03E-01	7.21E-01	1	RD3222
BETA	9.20E-01	1.74E+00	1.74E+00	2.96E+00	1	RD3222
TOTAL-SR	2.89E-01	2.95E-01	3.04E-01	7.38E-01	0.922	RD3204
URANIUM	3.40E-02	N/A	5.10E-03	3.54E-03	1	RD4200

RPD CALCULATIONS

LAB SAMPLE ID: 40420303

WHC ID: B0BKJ9

REPORTING UNITS: pCi/L & ug/g

ISOTOPE	SAMPLE RESULT	DUPLICATE RESULT	RPD	
ALPHA	8.15E-01(U)	4.31E-01(U)	61.64	OK
BETA	1.45E+00(U)	9.20E-01 (U)	44.73	OK
TOTAL-SR	-1.59E-01(U)	2.89E-01 (U)	689.23	OK
URANIUM	3.00E-02	3.40E-02	12.50	

MW 7-25-94

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IT ANALYTICAL SERVICES
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DUPLICATE RESULTS

LAB NAME: ITAS-RICHLAND SDG NO.: W0028

LAB SAMPLE ID: F0431901

WHC ID: B0BMN6

REPORTING UNITS: pCi/L

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	METHOD NUMBER
TC-99	3.22E+03	1.03E+01	3.54E+02	2.10E+00	0.951	ITAS-IT-RD-0001

RPD CALCULATIONS

LAB SAMPLE ID: 40431901

WHC ID: B0BMN6

REPORTING UNITS: pCi/L

ISOTOPE	SAMPLE RESULT	DUPLICATE RESULT	RPD
TC-99	3.31E+03	3.22E+03	2.76

MW 7-25-94

~~0013~~

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IT ANALYTICAL SERVICES
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(509) 375-3131

BLANK RESULTS

LAB NAME: ITAS - RICHLAND SDG NO.: W0028

LAB SAMPLE ID: L042031B

REPORTING UNITS: pCi/L & ug/g

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	METHOD NUMBER
U-234	7.86E-02 (U)	1.56E-01	1.56E-01	2.87E-01	0.764	RD3234
U-235	3.27E-02 (U)	1.11E-01	1.11E-01	2.66E-01	0.764	RD3234
U-238DA	2.40E-02 (U)	1.12E-01	1.12E-01	2.87E-01	0.764	RD3234
ALPHA	9.85E-02 (U)	3.53E-01	3.53E-01	7.48E-01	1	RD3222
BETA	2.18E+00 (U)	1.87E+00	1.87E+00	2.92E+00	1	RD3222
TOTAL-SR	1.12E-01 (U)	2.38E-01	2.90E-01	7.73E-01	0.858	RD3204
TC-99	4.83E-01 (U)	9.47E-01	4.25E+00	2.10E+00	0.951	ITAS-IT-RD-0001
URANIUM	2.80E-02 (U)	N/A	4.20E-03	3.54E-03	1	RD4200

10-11-94 WJC

.028 blank (MDA = .00354) detected
X 5
.140 = 5x Blan. BOBKJ9 < 5x Blan.
Qual as ~~Non-detect~~ Estimated (J) 10-14-94 WJC

LAB SAMPLE ID: L043192B

REPORTING UNITS: pCi/L

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	METHOD NUMBER
TC-99	2.28E+00	9.49E-01	4.15E+00	2.10E+00	0.951	ITAS-IT-RD-0001

404319C1 > 5x Blk No qualifier MW 9-20-94

MW 9-21-94

~~0014~~
000092

6R2A-6-93

9613495.2890

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

LABORATORY CONTROL SAMPLES

LAB NAME: ITAS-RICHLAND SDG NO.: W0028

LAB SAMPLE ID: L042031S

REPORTING UNITS: pCi/L & ug/g

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	EXPECTED	% RECOVERY
U-234	9.34E+00	1.82E+00	2.31E+00	4.62E-01	0.475	8.67E+00	107.73
U-235	3.37E-01	3.51E-01	3.55E-01	3.57E-01	0.475	3.95E-01	85.32
U-238DA	9.82E+00	1.86E+00	2.39E+00	2.37E-01	0.475	9.08E+00	108.15
ALPHA	1.99E+01	2.83E+00	4.38E+00	7.57E-01	1	2.25E+01	88.44
BETA	2.45E+01	3.63E+00	4.02E+00	2.88E+00	1	2.27E+01	107.93
TOTAL-SR	1.44E+01	1.04E+00	3.78E+00	7.71E-01	0.921	1.35E+01	106.67
URANIUM	4.64E-01	N/A	6.96E-02	3.54E-03	1	4.51E-01	102.88

LAB SAMPLE ID: L042031M

REPORTING UNITS: pCi/L

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	EXPECTED	% RECOVERY
TC-99	2.54E+02	3.04E+00	3.07E+01	2.10E+00	0.951	2.71E+02	93.73

LAB SAMPLE ID: L042032M

REPORTING UNITS: pCi/L

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	EXPECTED	% RECOVERY
TC-99	2.50E+02	3.06E+00	3.02E+01	2.10E+00	0.951	2.70E+02	92.59

7-25-96

~~0015~~

000093

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

LABORATORY CONTROL SAMPLES

LAB NAME: ITAS-RICHLAND SDG NO.: W0028

LAB SAMPLE ID: L042033M

REPORTING UNITS: pCi/L

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	EXPECTED	% RECOVERY
TC-99	2.33E+02	2.94E+00	2.84E+01	2.10E+00	0.951	2.71E+02	85.98

LAB SAMPLE ID: L043191M

REPORTING UNITS: pCi/L

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	EXPECTED	% RECOVERY
TC-99	2.74E+02	3.24E+00	3.27E+01	2.10E+00	0.951	2.70E+02	101.48

9-25-96

0016

000094

9613495.2892

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

MATRIX SPIKE RESULTS

LAB NAME: ITAS-RICHLAND SDG NO.: W0028

LAB SAMPLE ID: W0420303

REPORTING UNITS: pCi/L

ISOTOPE	SPIKE RESULT*	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	SAMPLE RESULT	EXPECTED	% RECOVERY
TC-99	2.63E+02	3.07E+00	3.16E+01	2.10E+00	-3.98E-01	2.71E+02	97.05

MATRIX SPIKE RESULTS

LAB NAME: ITAS-RICHLAND SDG NO.: W0028

LAB SAMPLE ID: W0431901

REPORTING UNITS: pCi/L

ISOTOPE	SPIKE RESULT*	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	SAMPLE RESULT	EXPECTED	% RECOVERY
TC-99	3.72E+03	1.11E+01	4.08E+02	2.10E+00	3.31E+03	2.70E+02	1377.78

405

149.8%

This was not spike corrected.

*SPIKE RESULT CORRECTED FOR SAMPLE RESULT

40431901 Tc 99 qualified as J
MS > 140%

MW 7-25-94

0017

9613495_2895

Laboratory Case Narratives

9613495.2894

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

JUN 1994 RECEIVED SDLA

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

May 31, 1994

Job Number: 353; 396

This is the Certificate of Analysis for the following samples:

SDG:	W0028
Client Project ID:	WHC SAF 94-088 200-UP-1 Groundwater Round 1
Date Received by Lab:	April 13, 1994; April 19, 1994
Number of Samples:	Nine (9)
Sample Type:	Water

I. Introduction

On April 13 and April 19, 1994, nine (9) water samples arrived at ITAS-Richland, Washington and were transferred to ITAS-Knoxville for chemical analysis. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results.

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

Reviewed and Approved:

Sheree A. Schneider

Sheree' A. Schneider
Project Manager

RECORD COPY

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

IT Corporation
May 31, 1994
Job Number: 353; 396
Client Project ID: WHC SAF 94-088 200-UP-1 Groundwater Round 1

II. Analytical Results/Methodology (Continued)

The samples were analyzed for Target Compound List (TCL) pesticides and PCBs by gas chromatography/electron capture detection (GC/ECD) in accordance with the EPA CLP 3/90 Statement of Work.

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

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

III. Quality Control

The volatiles analyses for work order #353 were performed on April 22, 1994 by purge and trap with a J & W DB-624 capillary column on a Finnigan INCOS 500 GC/MS/DS. A matrix spike and a matrix spike duplicate were analyzed using sample BOBKJ3. All QC results were within method specified limits. TIC's were not reported on forms 1E for samples BOBKJ3, BOBKJ4, BOBKJ5, BOBKJ6, BOBKJ9 and ~~BOBKJ0~~ because the data tape contained errors when trying to re-load the data on 06/09/94. The tape had been verified and was readable previously. The TIC's were searched for manually on the chromatograms. No TIC's other than CO_2 were found in any of the samples.

The volatiles analyses for work order #396 were performed on April 26, 1994 by purge and trap with a J & W DB-624 capillary column on a Hewlett-Packard 5970 GC/MS/DS. All QC result were within method specified limits.

Data were reported with qualifiers as follows:

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

The samples were analyzed on April 18, 1994 for pesticides/PCBs using DB-608 and DB-1701 0.53mm ID megabore capillary columns. 1.0 μg was injected for each column. One laboratory control sample (LCS) was analyzed and reported with acceptable recoveries. Any samples that were manually integrated will be denoted by a +M and -M on the chromatogram.

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

IT Corporation
May 31, 1994
Job Number: 353; 396
Client Project ID: WHC SAF 94-088 200-UP-1 Groundwater Round 1

III. Quality Control

Data were reported using qualifiers as follows:

U - Compound analyzed for but not detected; value given is the quantitation limit.
D - Compound analyzed at a secondary dilution; DL was appended to the sample number.
X - A flag that FORMASTER III inserts when the data were entered manually.
Z - Compound's response was such that it exceeded the established linearity range. The value is estimated.
J - Compound detected but below the quantitation limit; value estimated.
P - The percent difference for the calculated values from the two analytical columns differed by 25.0% or more.

The samples were analyzed by EPA Method 300.0 for fluoride, chloride, nitrate, nitrite, phosphate and sulfate on May 19, 1994. A matrix spike and a matrix spike duplicate were analyzed using sample BOBKJ3. All QC results were within method specified limits.

The samples were analyzed for nitrate/nitrite on April 19, 1994. A matrix spike and a matrix spike duplicate were analyzed using sample BOBKJ9 with acceptable results.

IT Corporation
May 31, 1994
Job Number: 353; 396
Client Project ID: WHC SAF 94-088 200-UP-1 Groundwater Round 1

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

III. Quality Control (Continued)

TABLE I

Knoxville ID	Richland ID	WHC ID	Matrix	Test
AA6295	W404202-01	BOBKJ3	WATER	VOC
AA6296	"	"	"	PEST/PCB
AA6298	"	"	"	ANIONS
AA6299	"	"	"	NO3NO2
AA6300	W404202-03	BOBKJ5	"	VOC
AA6301	"	"	"	PEST/PCB
AA6302	"	"	"	ANIONS
AA6303	"	"	"	NO3NO2
AA6304	W404202-05	BOBKJ9	"	VOC
AA6305	"	"	"	PEST/PCB
AA6306	"	"	"	ANIONS
AA6307	"	"	"	NO3NO2
AA6308	W404202-02	BOBKJ4	"	VOC
AA6309	W404202-04	BOBKJ6	"	VOC
AA6310	W404202-06	~~BOBKJ0~~ BOBKK0 J.C. 6/10/94	"	VOC
AA6311	W404202-07	TRIP BLANK	"	VOC
AA6944	W404318-01	BOBMN6	"	VOC
AA6945	"	"	"	ANIONS
AA6946	"	"	"	NO3NO2
AA6947	W404318-02	BOBMN7	"	VOC
AA6948	TRIP BLANK	TRIP BLANK	"	VOC

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

IT Corporation
May 31, 1994
Job Number: 353; 396
Client Project ID: WHC SAF 94-088 200-UP-1 Groundwater Round 1

IV. Certification

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

Reviewed and Approved:

Sheree' A. Schneider
Project Manager

9613495.2899

INTERNATIONAL TECHNOLOGY CORPORATION

CERTIFICATE OF ANALYSIS

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

June 13, 1994

Attention: J.A.Lerch

SAF Number	:	94-088
Date SDG Closed	:	April 26, 1994
Number of Samples	:	Four (4)
Sample Type	:	Water
SDG Number	:	W0028
Data Deliverable	:	Stand Alone

I. Introduction

On April 12, and 18, 1994, four water samples were received by ITAS-Richland for radiochemical analysis. Upon receipt, the samples were assigned the following laboratory ID numbers to correspond with the WHC specific IDs:

ITAS-Richland ID	WHC ID	Matrix	Date of Receipt
404203-01A	B0BKJ3	Water	4/12/94
404203-02A	B0BKJ5	Water	4/12/94
404203-03A	B0BKJ9	Water	4/12/94
404319-01A	B0BMN6	Water	4/18/94

II. Analytical Results/Methodology

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

BH 8/11/94
04
000102

The requested analyses were:

Alpha Spectroscopy
Uranium-234, -235, -238 by method ITAS-RD-3234
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
Technetium-99 by method ITAS-IT-RS-0001
Total Uranium
Total Uranium by method ITAS-RD-4200

III. Quality Control

The analytical results for each analysis performed under SDG W0028 include a minimum of one Laboratory Control Sample (LCS), one method (reagent) blank, and one duplicate. Any exceptions have been noted in the "Comments" section.

Quality control sample results are reported in the same units as sample results.

IV. Comments

The initial radioactivity screening of the samples classified them as Category I samples.

Alpha Spectroscopy

Uranium-234, -235, -238 by method ITAS-RD-3234
The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BKJ5) results meet contractual requirements.

Gas Proportional Counting

Gross Alpha by method ITAS-RD-3222
The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BKJ9) results meet contractual requirements.

BH 8/11/94

Gross Beta by method ITAS-RD-3222

The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BKJ9) results meet contractual requirements. The blank result was greater than one-half the contract limit (CL) and, as a result, the analyst requested a recount of the blank to rule out possible blank contamination problems. The recount result for the blank is also greater than one-half the CL. Both blank results are less than the CL (acceptable) and the recount result is accepted and reported.

Strontium-90 by method ITAS-RD-3204
The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BKJ9) results meet contractual requirements.

Liquid Scintillation Counting

Technetium-99 by method ITAS-IT-RS-0001
Two matrix spikes were analyzed with this SDG. The result for matrix spike W0431901 was below acceptable limits. Matrix spike W0420303 has an acceptable yield of 97.1%. Matrix spike W0431901 was reanalyzed with the associated sample (B0BMN6), LCS and blank. The reanalysis results are acceptable with the exception of the matrix spike. The reanalysis matrix spike result (149.8%) is above the contract limit. The reason for the low original result is unknown. The cause of the high spike recovery observed on the reanalysis of the matrix spike is attributed to the low activity of the spike in comparison to the intrinsic sample activity. The reanalysis results are reported. The sample results are not matrix spike yield corrected. The LCS, batch blank, sample and sample duplicate (original analysis duplicate of sample B0BKJ5, reanalysis duplicate of sample B0BMN6) results are within contractual requirements.

Total Uranium

Total Uranium by method ITAS-RD-4200
Two matrix spikes were analyzed with this SDG. The samples chosen for the batch matrix spikes were B0BKJ3 and B0BKJ5. These samples had intrinsic total uranium activities of over 400 μg/L and were spiked with 0.09 μg of uranium. The results for the matrix spikes are not reported due to a matrix effect (high sample activity) causing indeterminate spike yield values. Actions to prevent a reoccurrence include using the sample screening data to estimate sample activity and therefore help determine an appropriate spike level when preparing matrix spike samples. The LCS, batch blank, sample and sample duplicate (duplicate of samples B0BKJ5 and B0BKJ9) 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

9613495.2903

INTERNATIONAL TECHNOLOGY CORPORATION

Analytical Data Package Prepared For

Westinghouse Hanford

Radiochemical Analysis By

IT Analytical Services
Richland Laboratory

Sample Delivery Group Number: W0028

WHC IDENTIFICATION NUMBER	ITAS RICHLAND ID NUMBER
BOBKJ3	404203-01
BOBKJ5	404203-02
BOBKJ9	404203-03
BOBMN6	404319-01

~~0001~~ BH 8/14/96

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

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9613495.2904

Chain-of-Custody Information

LVO #353

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator

Company Contact PH BUTCHER

Telephone (509) 376-5045

Project Designation/Sampling Locations 200-UP-1

Collection Date 4/8/94

Ice Chest No. SMC118

Field Logbook No. EFC-1124

Bill of Lading/Airbill No. none

Offsite Property No. WHC-C-C336-36

Method of Shipment EMERY

Shipped to IT

Possible Sample Hazards/Remarks NONE DETECTED

Sample Identification

40420205
BOBKJ9
ABC 3; 40mL; Gs; WATER; VOA (HCl)
DEC ~~1; 2L~~; aG; WATER; PCB/PEST
F 1; 500mL; G; WATER; ANIONS (IC)-NO3
B 1; 500mL; P; WATER; NO3 (H2SO4)
2; 4L; P; WATER; TOTAL URANIUM, U-234/235/238, GROSS ALPHA/BETA, Sr-90 (HNO3)
40420303 1; 1L; P; WATER; Tc-99 (HCl)
40420206
BOBKK0
ABC 3; 40mL; Gs; WATER; VOA (HCl)

[] Field Transfer of Custody — Chain of Possession — (Sign and Print Names)

Relinquished By	Date	Time	Received By	Date	Time
[illegible]	4/8/94	1120	J Sweeney / Sweeney	4-8-94	1130
J Sweeney / Sweeney	4-12-94	1230	[illegible]	4/12/94	1230

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:
Data Deliverable-Standalone Samples shared on T-S #3A / [illegible] 4/8/94

A-6000-407 (12/92) WEF061

WO#353

Westinghouse Hanford Company	SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector _____ Date Sampled 4/8/94 Time 1015 hours

Company Contact P. H. Butcher Telephone (509) 376-5045 ~~4/12/94~~

Sample Number	Number and Type of Sample Containers	Type of Sample*	Analysis Requested
B0BKJ7	3; 40mL; Gs	WATER	VOA (HCl)
2K	~~1; 2L;~~ aG	WATER	PCB/PEST
M7	1; 500mL; G	WATER	ANIONS (IC)-NO3
	1; 500mL; P	WATER	NO3 (H2SO4)
	2; 4L; P	WATER	TOTAL U, U-234/235/238, GROSS ALPHA/BETA,
			Sr-90 (HNO3)
	1; 1L; P	WATER	Tc-99 (HCl)
B0BK	3; 40mL; P	WATER	VOA (HCl) 4/8/94 0900
			OPC: [illegible]
			BOL: [illegible]
			SAF: 94-088

Field Information** _____

Special Handling and/or Storage _____

Possible Sample Hazards _____

PART II: LABORATORY SECTION

Received by _____ Title _____ Date _____

Analysis Required _____

*Indicate whether sample is soil, sludge, water, etc.

**Use back of page for additional information relative to sample location.

A-6000-406(05/90)

WO#353

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator

Company Contact PH BUTCHER

Telephone (509) 376-5045

Project Designation/Sampling Locations 200-UP-1

Collection Date 04/08/94

Ice Chest No. SMC421

Field Logbook No. EFL-1124

Bill of Lading/Airbill No. NONE

Offsite Property No. WL 94-C-0336-36

Method of Shipment EMERY

Shipped to IT

Possible Sample Hazards/Remarks NONE DETECTED

Sample Identification

40420201
BOBKJ3
ABC 3; 40mL; Gs; WATER; VOA (HCl)
DE2; 1L; 1-2L; aG; WATER; PCB/PEST
F 1; 500mL; G; WATER; ANIONS (IC)-NO3
G 1; 500mL; P; WATER; NO3 (H2SO4)
40420301 2; 4L; P; WATER; TOTAL URANIUM, U-234/235/238, GROSS ALPHA/BETA, Sr-90 (HNO3)
1; 1L; P; WATER; Tc-99 (HCl)
40420202
BOBKJ4
ABC 3; 40mL; Gs; WATER; VOA (HCl)

[] Field Transfer of Custody — Chain of Possession — (Sign and Print Names)

Relinquished By	Date	Time	Received By	Date	Time
P.H. Butcher / C. Guthrie	4/8/94	1130	J. Sweeney / J. Sweeney	4-8-94	1130
J. Sweeney / J. Sweeney	4-12-94	1230 ~~1100~~	~~Brenda Gilmore~~	4/12/94	1230

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:
Data Deliverable-Standalone Samples shipped on 4/13 by P.D. Lee 4/08/94

A-6000-407 (12/92) WEF061

9613495.2908

WO#353

Westinghouse Hanford Company	SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector K. D. Lee Date Sampled 4/6/94 Time 0911 hours

Company Contact P. H. Butcher Telephone (509) 376-5045

Sample Number	Number and Type of Sample Containers	Type of Sample*	Analysis Requested
B0BKJ3	3; 40mL; Gs	WATER	VOA (HCl)
	~~1; 2L; aG~~ 2; 1L; AG	WATER	PCB/PEST
	1; 500mL; G	WATER	ANIONS (IC)-NO3
	1; 500mL; P	WATER	NO3 (H2SO4)
	2; 4L; P	WATER	TOTAL U, U-234/235/238, GROSS ALPHA/BETA,
			Sr-90 (HNO3)
	1; 1L; P	WATER	Tc-99 (HCl)
B0BKJ4	3; 40mL; P	WATER	VOA (HCl) 4/8/94 0720
			OPC: LWP-C-C 336-36
			BOL: None
			SAF: 94-088

Field Information**

Special Handling and/or Storage

Possible Sample Hazards

PART II: LABORATORY SECTION

Received by Title Date

Analysis Required

*Indicate whether sample is soil, sludge, water, etc.

**Use back of page for additional information relative to sample location.

A-6000-406(05/90)

WO#353

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator

Company Contact PH BUTCHER

Telephone (509) 376-5045

Project Designation/Sampling Locations 200-UP-1

Collection Date 4/4/5/94

Ice Chest No. SMC 421

Field Logbook No. EFL-1124

Bill of Lading/Airbill No. NONE

Offsite Property No. WC94-C-C336-36

Method of Shipment EMERY

Shipped to IT

Possible Sample Hazards/Remarks NONE DETECTED

Sample Identification

40420203
BOBK J5
ABC 3; 40mL; Gs; WATER; VOA (HCl)
DE 2, IX ~~4, 21~~; aG; WATER; PCB/PEST
F 1; 500mL; G; WATER; ANIONS (IC)-NO3
G 1; 500mL; P; WATER; NO3 (H2SO4)
40420302 2; 4L; P; WATER; TOTAL URANIUM, U-234/235/238, GROSS ALPHA/BETA, Sr-90 (HNO3)
1; 1L; P; WATER; Tc-99 (HCl)
40420204
BOBK J6
ABC 3; 40mL; Gs; WATER; VOA (HCl)

[] Field Transfer of Custody — Chain of Possession — (Sign and Print Names)

Relinquished By	Date	Time	Received By	Date	Time
P.H. Butcher BUTCHER	4/8/94	1130	L Sweeney L Sweeney	4-8-94	1130
L Sweeney L Sweeney	4-12-94	1280 ~~1000~~	Tom Gilmore	4/12/94	1230

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:
Data Deliverable-Standalone samples shared in bag # 3B by KDC 4/8/94

A-6000-407 (12/92) WEF061

WO# 353

Westinghouse Hanford Company	SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector K. D. Lee Date Sampled 04/08/94 Time 0911 hours

Company Contact P. H. Butcher Telephone (509) 376-5045

Sample Number	Number and Type of Sample Containers	Type of Sample*	Analysis Requested
B0BKJ5	3; 40mL; Gs	WATER	VOA (HCl)
2.1.1	~~3; 1L~~; aG	WATER	PCB/PEST
5104	1; 500mL; G	WATER	ANIONS (IC)-NO3
	1; 500mL; P	WATER	NO3 (H2SO4)
	2; 4L; P	WATER	TOTAL U, U-234/235/238, GROSS ALPHA/BETA,
			Sr-90 (HNO3)
	1; 1L; P	WATER	Tc-99 (HCl)
B0BKJ6	3; 40mL; P	WATER	VOA (HCl) 4/8/94 0900
			OPC: 4-34-C-C336-310
			BOL: NCWC?
			SAF: 94-088

Field Information**

Special Handling and/or Storage

Possible Sample Hazards

PART II: LABORATORY SECTION

Received by Title Date

Analysis Required

* Indicate whether sample is soil, sludge, water, etc.

** Use back of page for additional information relative to sample location.

A-6000-406(05/90)

WO #396

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator

Company Contact PH BUTCHER

Telephone (509) 376-5045

Project Designation/Sampling Locations 200-UP-1

Collection Date 04/15/94

Ice Chest No. ER-05

Field Logbook No. EFL-1125 pg 7

Bill of Lading/Airbill No. NONE

Offsite Property No. W74-0-0336-46

Method of Shipment EMERY

Shipped to IT

Possible Sample Hazards/Remarks NONE DETECTED

Sample Identification

~~BOBK~~ KT 3/29/94 404318

EOBMN6 3; 40mL; Gs; WATER; VOA (HCl)

01ABC 01; 500mL; G; WATER; ANIONS (IC)-NO3

E 1; 500mL; P; WATER; NO3 (H2SO4)

404319 01 { 1; 2L; P; WATER; TOTAL URANIUM (HNO3)
3; 1L; P; WATER; Sr-90 (HNO3)
1; 1L; P; WATER; Tc-99 (HCl)

~~BOBK~~ 1; 20mL; G; WATER; TOTAL ACTIVITY

EOBMN7 3; 40mL; Gs; WATER; VOA (HCl)

KT 3/29/94

02ABC

[] Field Transfer of Custody — Chain of Possession — (Sign and Print Names)

Relinquished By	Date	Time	Received By	Date	Time
Kathy D. Greek D Lee	04/15/94	1151	Irene E. Rogers	4-15-94	1151
Irene E. Rogers	4-15-94	1206	K Sweeney K Sweeney	4-15-94	1206
K Sweeney K Sweeney	4-18-94	1310	~~Jan E. Gilmore~~	4/18/94	1310

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:
Data Deliverable-Standalone

A-6000-407 (12/92) WEF061

WO#396

Westinghouse Hanford Company	SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector _____ Date Sampled 04/15/94 Time 0850 hours

Company Contact P. H. Butcher Telephone (509) 376-5045

Sample Number	Number and Type of Sample Containers	Type of Sample*	Analysis Requested
~~B0BK~~ B0BMN6	1; 500mL; G	WATER	ANIONS (IC)-NO3
K.T 3/29/94	1; 500mL; P	WATER	NO3 (H2SO4)
	1; 2L; P	WATER	TOTAL URANIUM (HNO3)
	1; 1L; P	WATER	Tc-99 (HCl)
	3; 1L; P	WATER	Sr-90 (HNO3)
	3; 40mL; P	WATER	VOA (HCl)
K.T 3/29/94	1; 20mL; G	WATER	TOTAL ACTIVITY
~~B0BK~~ B0BMN7	3; 40mL; P	WATER	VOA (HCl)
			OPC: W94-6-0336-46
			BOL: ~~NONE~~
			SAF: 94-088

Field Information** _____

Special Handling and/or Storage _____

Possible Sample Hazards _____

PART II: LABORATORY SECTION

Received by _____ Title _____ Date _____

Analysis Required _____

*Indicate whether sample is soil, sludge, water, etc.

**Use back of page for additional information relative to sample location.

A-6000-406(05/90)

INTERNATIONAL TECHNOLOGY CORPORATION

COC NO. *0001450*

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

WO# 353 RL# 460 Reference Document No. 340370 Page 1 of 3

Project Name/No.[1] 94-088
Sample Team Members[2]
Profit Center No.[3] 4632
Project Manager[4] Van Petley
Purchase Order No.[6]
Required Report Date[11]

Samples Shipment Date[7] 4/12/94
Lab Destination[8] Middleboro
Lab Contact[9]
Project Contact/Phone[12]
Carrier/Waybill No.[13] 887557604 3

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

ONE CONTAINER PER LINE

Sample Number[14]	Sample Description/Type[15]	Date/Time Collected[16]	Container Type[17]	Sample Volume[18]	Pre-servative[19]	Requested Testing Program[20]	Condition on Receipt[21]	Disposal Record No.[22]
W4042020 1 A	BOBKJ3 / H_2O	4/8/94 0911	Glass	40 ml	HCl 4°C	Voa	2°C KMC 4-13-94	
B							FOR LAB USE ONLY	
C								
D				1000 ml		PCB/Pest		
E								
F				500 ml		Anion	FOR LAB USE ONLY	
G			Poly		H_2SO_4	NO_3 pH<2		
W4042020 2 A	BOBKJ4 / H_2O	4/8/94 0900	Glass	40 ml	HCl	Voa		

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 W0028

1. Relinquished by[28] (Signature/Affiliation) Jennifer ITAS	Date: 4/12/94 Time: 1600	1. Received by[28] (Signature/Affiliation) Kenneth Kemm ITAS KN	Date: 04-13-94 Time: 09:05
2. Relinquished by (Signature/Affiliation)	Date: Time:	2. Received by (Signature/Affiliation)	Date: Time:
3. Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: Time:

Comments:[29]

MCA 3/15/91

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

000116

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INTERNATIONAL TECHNOLOGY CORPORATION

WO#353

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD (cont.)*

Reference Document No.[30] 340370

Page 2 of 3

Project Name _____ Project No. 94-088 Samples Shipment Date 4/12/94

ONE CONTAINER PER LINE

Sample[14] Number	Sample[15] Description/Type	Date/Time[16] Collected	Container[17] Type	Sample[18] Volume	Pre-[19] servative	Requested Testing[20] Program	Condition on[21] Receipt	Disposal[22] Record No.
W40420202 B	BOBKJ4 / H2O	4/8/94 0900	Glass	40ml	HCL 4°C	Voa	2°C KAK 4-13-94	
C	"	"	"	"	"	"	FOR LAB	LAB
W40420203A	BOBKJ5 / H2O	4/8/94 0911					USE ONLY	ONLY
B	"	"	"	"	"	"		
C	"	"	"	"	"	"		
D	"	"	"	1000 ml		PCB/Pest		
E	"	"	"	"		"		
F	"	"	"	500 ml		Anions		
G	"	"	Poly	"	H2SO4	NO3 pH<2		
W40420204A	BOBKJ6 / H2O	4/8/94 0900	Glass	40ml	HCl	Voa		
B	"	"	"	"	"	"		
C	"	"	"	"	"	"	FOR LAB	LAB
W40420205A	BOBKJ9 / H2O	4/8/94 1015	Glass	40ml		Voa	USE ONLY	ONLY
B	"	"	"	"	"	"		
C	"	"	"	"	"	"		
D	"	"	"	1000ml		PCB/Pest		
E	"	"	"	"		@4/12/94 Anions	FOR LAB	LAB
F	"	"	"	500 ml		Anions	USE ONLY	ONLY
G	"	"	Poly	"	H2SO4	NO2/NO3 pH<2		
W40420206A	BOBKJ0	4/8/94 0900	Glass	40ml	HCl	Voa		

MCA 3/15/91

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

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INTERNATIONAL TECHNOLOGY CORPORATION

WO#353

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD (cont.)*

Reference Document No.[30] 340370

Page 3 of 3

Project Name

Project No. 94-088

Samples Shipment Date 4/12/94

ONE CONTAINER PER LINE

Sample[14] Number	Sample[15] Description/Type	Date/Time[16] Collected	Container[17] Type	Sample[18] Volume	Pre-[19] servative	Requested Testing[20] Program	Condition on[21] Receipt	Disposal[22] Record No.
W0420206 B	~~BOBKSO~~ BORKKON Lucky /H2O	4/8/94 0900	Glass	40ml	HCl 4°C	Voa	20c KMK 4-13-94	
C	"	"	"	"	"	"	↓	
W0420207 A	Trip Blank /H2O	4/12/94			4°C			
B	"	"			"		Broken in transition KMK 4-23-94 Sample Login	
	4/12/94							

White: To accompany samples Yellow: Field copy

*See back of form for special instructions.

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96395295

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INTERNATIONAL TECHNOLOGY CORPORATION

COC NO. *0001494*

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

WO #396 EL #509

Reference Document No. 340386
Page 1 of 1

Project Name/No.[1] 94-088
Sample Team Members[2]
Profit Center No.[3] 4632
Project Manager[4] Van Petley
Purchase Order No.[6]
Required Report Date[11]

Samples Shipment Date[7] 4/18/94
Lab Destination[8] Middlebrook
Lab Contact[9]
Project Contact/Phone[12]
Carrier/Waybill No.[13]

Bill to:[5] ITAS Richland

Report to:[10] ITAS Richland

ONE CONTAINER PER LINE

Sample Number[14]	Sample Description/Type[15]	Date/Time Collected[16]	Container Type[17]	Sample Volume[18]	Preservative[19]	Requested Testing Program[20]	Condition on Receipt[21]	Disposal Record No.[22]
W4043801A	BOBMN6 / H_2O	4/15/94 085	Glass	40ml	HCl 4°C	VOA	2°C BPB 4/19/94	
B	|	4/18/94	|	|	| |	|	FOR LAB USE ONLY	
C	|	|	|	|	| |	|		
D	|	|	Poly	500ml		Anions		
E	|	|	|	|	H_2SO_4	NO3 42		
02A	BOBMN7 / H_2O	|	Glass	40ml	HCl	VOA	FOR LAB USE ONLY	
B	|	|	|	|	| |	|		
C	|	|	|	|	| |	↓		

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 W0028

1. Relinquished by[28] (Signature/Affiliation) ITAS — Date: 4/18/94 Time: 1600	1. Received by[28] (Signature/Affiliation) Bryn Blanquet ITABKM — Date: 4/19/94 Time: 08:55
2. Relinquished by (Signature/Affiliation) — Date: Time:	2. Received by (Signature/Affiliation) — Date: Time:
3. Relinquished by (Signature/Affiliation) — Date: Time:	3. Received by (Signature/Affiliation) — Date: Time:

Comments:[29]

MCA 3/15/91

White: To accompany samples Yellow: Field copy

*See back of form for special instructions.

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9613495.2917

VEDD Printout

VEDD

HEIS-SN	Form	FormNr	LabCode	ConstID	Media	Value	ConcFlag	Qual	CountErr	Units
B0BKJ3	NCLP	NA	ITC	319-84-6	SW			UJ		
B0BKJ5	NCLP	NA	ITC	319-84-6	SW			UJ		
B0BKJ9	NCLP	NA	ITC	319-84-6	SW			UJ		
B0BKJ3	NCLP	NA	ITC	319-85-7	SW			UJ		
B0BKJ5	NCLP	NA	ITC	319-85-7	SW			UJ		
B0BKJ9	NCLP	NA	ITC	319-85-7	SW			UJ		
B0BKJ3	NCLP	NA	ITC	319-86-8	SW			UJ		
B0BKJ5	NCLP	NA	ITC	319-86-8	SW			UJ		
B0BKJ9	NCLP	NA	ITC	319-86-8	SW			UJ		
B0BKJ3	NCLP	NA	ITC	58-89-9	SW			UJ		
B0BKJ5	NCLP	NA	ITC	58-89-9	SW			UJ		
B0BKJ9	NCLP	NA	ITC	58-89-9	SW			UJ		
B0BKJ3	NCLP	NA	ITC	76-44-8	SW			UJ		
B0BKJ5	NCLP	NA	ITC	76-44-8	SW			UJ		
B0BKJ9	NCLP	NA	ITC	76-44-8	SW			UJ		
B0BKJ3	NCLP	NA	ITC	309-00-2	SW			UJ		
B0BKJ5	NCLP	NA	ITC	309-00-2	SW			UJ		
B0BKJ9	NCLP	NA	ITC	309-00-2	SW			UJ		
B0BKJ3	NCLP	NA	ITC	1024-57-3	SW			UJ		
B0BKJ5	NCLP	NA	ITC	1024-57-3	SW			UJ		
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B0BKJ9	NCLP	NA	ITC	60-57-1	SW			UJ		
B0BKJ3	NCLP	NA	ITC	72-55-9	SW			UJ		
B0BKJ5	NCLP	NA	ITC	72-55-9	SW			UJ		
B0BKJ9	NCLP	NA	ITC	72-55-9	SW			UJ		
B0BKJ3	NCLP	NA	ITC	72-20-8	SW			UJ		
B0BKJ5	NCLP	NA	ITC	72-20-8	SW			UJ		
B0BKJ9	NCLP	NA	ITC	72-20-8	SW			UJ		
B0BKJ3	NCLP	NA	ITC	33213-65-9	SW			UJ		
B0BKJ5	NCLP	NA	ITC	33213-65-9	SW			UJ		
B0BKJ9	NCLP	NA	ITC	33213-65-9	SW			UJ		
B0BKJ3	NCLP	NA	ITC	72-54-8	SW			UJ		
B0BKJ5	NCLP	NA	ITC	72-54-8	SW			UJ		
B0BKJ9	NCLP	NA	ITC	72-54-8	SW			UJ		
B0BKJ3	NCLP	NA	ITC	1031-07-8	SW			UJ		
B0BKJ5	NCLP	NA	ITC	1031-07-8	SW			UJ		
B0BKJ9	NCLP	NA	ITC	1031-07-8	SW			UJ		
B0BKJ3	NCLP	NA	ITC	50-29-3	SW			UJ		
B0BKJ5	NCLP	NA	ITC	50-29-3	SW			UJ		
B0BKJ9	NCLP	NA	ITC	50-29-3	SW			UJ		
B0BKJ3	NCLP	NA	ITC	72-43-5	SW			UJ		
B0BKJ5	NCLP	NA	ITC	72-43-5	SW			UJ		
B0BKJ9	NCLP	NA	ITC	72-43-5	SW			UJ		

HEIS-SN	Form	FormNr	LabCode	ConstID	Media	Value	ConcFlag	Qual	CountErr	Units
B0BKJ3	NCLP	NA	ITC	53494-70-5	SW			UJ		
B0BKJ5	NCLP	NA	ITC	53494-70-5	SW			UJ		
B0BKJ9	NCLP	NA	ITC	53494-70-5	SW			UJ		
B0BKJ3	NCLP	NA	ITC	7421-93-4	SW			UJ		
B0BKJ5	NCLP	NA	ITC	7421-93-4	SW			UJ		
B0BKJ9	NCLP	NA	ITC	7421-93-4	SW			UJ		
B0BKJ3	NCLP	NA	ITC	5103-71-9	SW			UJ		
B0BKJ5	NCLP	NA	ITC	5103-71-9	SW			UJ		
B0BKJ9	NCLP	NA	ITC	5103-71-9	SW			UJ		
B0BKJ3	NCLP	NA	ITC	51003-74-2	SW			UJ		
B0BKJ5	NCLP	NA	ITC	51003-74-2	SW			UJ		
B0BKJ9	NCLP	NA	ITC	51003-74-2	SW			UJ		
B0BKK0	NCLP	NA	ITC	67-64-1	SW			U		
B0BKJ3	NCLP	NA	ITC	67-64-1	SW			U		
B0BKJ4	NCLP	NA	ITC	67-64-1	SW			U		
B0BKJ5	NCLP	NA	ITC	67-64-1	SW	10		U		UG/L
B0BKJ6	NCLP	NA	ITC	67-64-1	SW	10		U		UG/L
B0BKJ9	NCLP	NA	ITC	67-64-1	SW			U		
B0BMN6	NCLP	NA	ITC	67-64-1	SW	10		U		UG/L
B0BMN7	NCLP	NA	ITC	67-64-1	SW	10		U		UG/L
B0BMN6	NCLP	NA	ITC	14133-76-7	SW			J		
B0BKJ3	NCLP	NA	ITC	16984-48-8	SW			J		
B0BKJ5	NCLP	NA	ITC	16984-48-8	SW			J		
B0BKJ9	NCLP	NA	ITC	16984-48-8	SW			UJ		
B0BKJ3	NCLP	NA	ITC	16884-00-6	SW			J		
B0BKJ5	NCLP	NA	ITC	16884-00-6	SW			J		
B0BKJ9	NCLP	NA	ITC	16884-00-6	SW			UJ		
B0BKJ3	NCLP	NA	ITC	14797-65-0	SW			UR		
B0BKJ5	NCLP	NA	ITC	14797-65-0	SW			UR		
B0BKJ9	NCLP	NA	ITC	14797-65-0	SW			UR		
B0BMN6	NCLP	NA	ITC	14797-65-0	SW			UR		
B0BKJ3	NCLP	NA	ITC	14797-55-8	SW			J		
B0BKJ5	NCLP	NA	ITC	14797-55-8	SW			J		
B0BKJ9	NCLP	NA	ITC	14797-55-8	SW			UR		
B0BKJ3	NCLP	NA	ITC	14265-44-2	SW			UR		
B0BKJ5	NCLP	NA	ITC	14265-44-2	SW			UR		
B0BKJ9	NCLP	NA	ITC	14265-44-2	SW			UR		
B0BMN6	NCLP	NA	ITC	14265-44-2	SW			UR		
B0BKJ3	NCLP	NA	ITC	14808-79-8	SW			J		
B0BKJ5	NCLP	NA	ITC	14808-79-8	SW			J		
B0BKJ9	NCLP	NA	ITC	14808-79-8	SW			UJ		
B0BKJ9	NCLP	NA	ITC	7440-61-1	SW			U		

HEIS-SN	Form	FormNr	LabCode	ConstID	Media	Value	ConcFlag	Qual	CountErr	Units
B0BKJ9	NCLP	NA	ITC	75-01-4	SW			UJ		
B0BKK0	NCLP	NA	ITC	67-64-1	SW			U		
B0BKJ3	NCLP	NA	ITC	67-64-1	SW			U		
B0BKJ4	NCLP	NA	ITC	67-64-1	SW			U		
B0BKJ5	NCLP	NA	ITC	67-64-1	SW			U		
B0BKJ6	NCLP	NA	ITC	67-64-1	SW			U		
B0BKJ9	NCLP	NA	ITC	67-64-1	SW			U		
B0BMN6	NCLP	NA	ITC	67-64-1	SW			U		
B0BMN7	NCLP	NA	ITC	67-64-1	SW			U		
B0BMN6	NCLP	NA	ITC	14133-76-7	SW			J		
B0BKJ3	NCLP	NA	ITC	16984-48-8	SW			J		
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B0BMN6	NCLP	NA	ITC	16984-48-8	SW			J		
B0BKJ3	NCLP	NA	ITC	16884-00-6	SW			J		
B0BKJ5	NCLP	NA	ITC	16884-00-6	SW			J		
B0BKJ9	NCLP	NA	ITC	16884-00-6	SW			UJ		
B0BMN6	NCLP	NA	ITC	16884-00-6	SW			J		
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B0BKJ5	NCLP	NA	ITC	14797-65-0	SW			UR		
B0BKJ9	NCLP	NA	ITC	14797-65-0	SW			UR		
B0BMN6	NCLP	NA	ITC	14797-65-0	SW			UR		
B0BKJ3	NCLP	NA	ITC	14797-55-8	SW			J		
B0BKJ5	NCLP	NA	ITC	14797-55-8	SW			J		
B0BKJ9	NCLP	NA	ITC	14797-55-8	SW			UR		
B0BMN6	NCLP	NA	ITC	14797-55-8	SW			J		
B0BKJ3	NCLP	NA	ITC	14265-44-2	SW			UR		
B0BKJ5	NCLP	NA	ITC	14265-44-2	SW			UR		
B0BKJ9	NCLP	NA	ITC	14265-44-2	SW			UR		
B0BMN6	NCLP	NA	ITC	14265-44-2	SW			UR		
B0BKJ3	NCLP	NA	ITC	14808-79-8	SW			J		
B0BKJ5	NCLP	NA	ITC	14808-79-8	SW			J		
B0BKJ9	NCLP	NA	ITC	14808-79-8	SW			UJ		
B0BMN6	NCLP	NA	ITC	14808-79-8	SW			J		

000123

Entered by: BH 8/11/94

Checked by: JJD 8/10/94

2/3/95 2721

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END OF PACKAGE