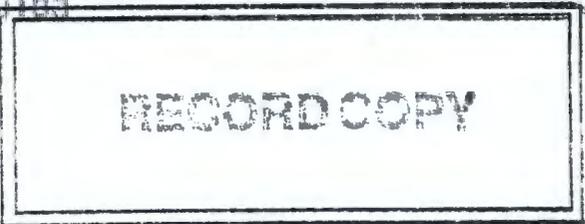


**START**

9713511.0165

W0006-1TC-004

0046058



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

Dear Mr. Lerch:

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

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

Your Data Summary Packet contains the following items:

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

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

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

Please contact me with any questions or suggestions.

Sincerely,

Wade H. Price  
Project Manager



Regional Office

13715 Rider Trail North • Earth City, Missouri 63045 • 314-298-8566

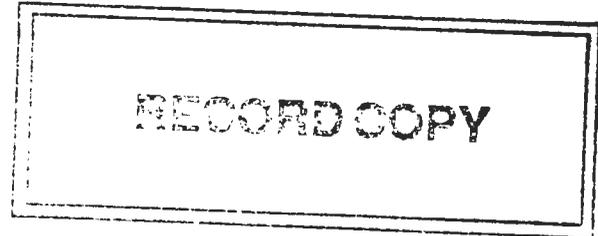
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*Jan 5-30-95*



## CERTIFICATE OF ANALYSIS

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



April 20, 1994

Attention: J. A. Lerch

Project number : 519.04  
Date Received by Lab : March 16, 1994  
Number of Samples : One (1)  
Sample Types : Soil  
SDG Number : W0006

### I. Introduction

On March 16, 1994, one (1) soil was received by ITAS-Richland and transferred to ITAS-St. Louis for chemical analysis. Upon receipt, the sample was given the following laboratory ID number to correspond with the specific client ID:

<u>St. Louis ID</u>	<u>WHC ID</u>	<u>Richland ID</u>	<u>Matrix</u>	<u>Date of Receipt</u>
4709-001	BOBFH3	40326801	Soil	03/16/94

### II. Analytical Results/ Methodology

The analytical results for this report are presented by analytical test. Each set of data includes sample identification information, analytical results, and the appropriate detection limits.

The analysis requested include:

VOA, BNA and Metals (including Titanium) and Cyanide using CLP/90 methodology. Chloride, Sulfate and Fluoride by EPA method 300.0. Nitrate/Nitrite by EPA method 353.1. Total Petroleum Hydrocarbons as Kerosene by method 8015.

Regional Office

13715 Rider Trail North • Earth City, Missouri 63045 • 314-298-8566

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Westinghouse Hanford Company  
April 20, 1994  
Project Number: 519.04  
page 2

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### III. Quality Control

A Laboratory Control Sample and Method Blank are routinely analyzed with each preparation batch. Matrix Spike and Matrix Spike Duplicate or Duplicate analyses were performed for all analytes in this SDG.

### IV. Definitions

The following codes are used to denote laboratory quality control samples and can be found in the data summary section of this report:

QCBLK- Quality Control Blank, Method Blank

QCSPK- Quality Control Laboratory Control Sample, Blank Spike

### V. Comments

The laboratory was unable to calculate a Relative Percent Difference (RPD) for Fluoride and Chloride on sample BOBFH3 (4709-001) due to values below the detection limit.

The Relative Percent Difference (RPD) for Cyanide sample BOBFH3 (4709-001) was calculated on values below the contract detection limit but above the instrument detection limit.

The sample concentration for Nitrate sample BOBFH3 (4709-001) greatly exceeded the spike level used for the matrix spike. Therefore, there was no matrix spike recovery.

Samples 4709-001, -001MS and -001MSD each gave a low response for acenaphthene-d10 internal standard. In addition, -001MS gave a low response for phenanthrene-d10 internal standard. Each of these samples also gave high recoveries for 2-fluorobiphenyl and terphenyl-d14 surrogates.

Samples 4709-001MS/MSD gave high recoveries of 4-nitrophenol at 292 and 197%, respectively (UCL=114%). In addition, high RPDs were obtained for 1,4-dichlorobenzene (30%, UCL=27%) and 1,2,4-trichlorobenzene (27%, UCL=23%).

Samples 4709-001, -001MS and -001MSD were extracted 6 days past the extraction hold-time of 14-days. These samples were received past the hold time. See NCM SL-94-0160.

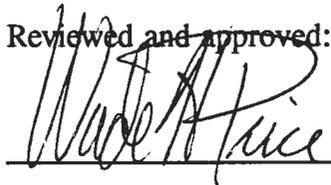
Westinghouse Hanford Company  
April 20, 1994  
Project Number: 519.04  
page 3

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Sample 4709-001MS gave low responses for all three internal standards. Sample 4709-001MSD gave low responses for 1,4-difluorobenzene and chlorobenzene-d5 internal standards. Per the CLP 3/90 SOW, MS/MSD samples need not meet the internal standard response criteria. In addition, all MS and surrogate recoveries were in-control.

I certify that this data package 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:



Wade H. Price

Wade H. Price  
Project Manager  
z:\annclars\hanw0006.nar

9713511.0165

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBFH3

Lab Name: ITAS-ST.LOUIS

Contract: 519-04

Lab Code: ITSL

Case No.: V70901

SAS No.:

SDG No.: W0006

Matrix: (soil/water) SOIL

Lab Sample ID: 4709-001

Sample wt/vol: 5.00 (g/mL) G

Lab File ID: E8279

Level: (low/med) LOW

Date Received: 03/16/94

% Moisture: not dec. 14

Date Analyzed: 03/18/94

GC Column: DB-624 ID: 0.530 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	-----Chloromethane	12	U
74-83-9	-----Bromomethane	12	U
75-01-4	-----Vinyl Chloride	12	U
75-00-3	-----Chloroethane	12	U
75-09-2	-----Methylene Chloride	12	U
67-64-1	-----Acetone	22	B
75-15-0	-----Carbon Disulfide	12	U
75-35-4	-----1,1-Dichloroethene	12	U
75-34-3	-----1,1-Dichloroethane	12	U
540-59-0	-----1,2-Dichloroethene (total)	12	U
67-66-3	-----Chloroform	12	U
107-06-2	-----1,2-Dichloroethane	12	U
78-93-3	-----2-Butanone	12	U
71-55-6	-----1,1,1-Trichloroethane	12	U
56-23-5	-----Carbon Tetrachloride	12	U
75-27-4	-----Bromodichloromethane	12	U
78-87-5	-----1,2-Dichloropropane	12	U
10061-01-5	-----cis-1,3-Dichloropropene	12	U
79-01-6	-----Trichloroethene	12	U
124-48-1	-----Dibromochloromethane	12	U
79-00-5	-----1,1,2-Trichloroethane	12	U
71-43-2	-----Benzene	12	U
10061-02-6	-----trans-1,3-Dichloropropene	12	U
75-25-2	-----Bromoform	12	U
108-10-1	-----4-Methyl-2-Pentanone	12	U
591-78-6	-----2-Hexanone	12	U
127-18-4	-----Tetrachloroethene	12	U
79-34-5	-----1,1,2,2-Tetrachloroethane	12	U
108-88-3	-----Toluene	12	U
108-90-7	-----Chlorobenzene	12	U
100-41-4	-----Ethylbenzene	12	U
100-42-5	-----Styrene	12	U
1330-20-7	-----Xylene (total)	12	U

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1E

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET  
TENTATIVELY IDENTIFIED COMPOUNDS

BOBFH3

Lab Name: ITAS-ST.LOUIS

Contract: 519-04

Lab Code: ITSL

Case No.: V70901

SAS No.:

SDG No.: W0006

Matrix: (soil/water) SOIL

Lab Sample ID: 4709-001

Sample wt/vol: 5.00 (g/mL) G

Lab File ID: E8279

Level: (low/med) LOW

Date Received: 03/16/94

% Moisture: not dec. 14

Date Analyzed: 03/18/94

GC Column: DB-624 ID: 0.530 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

Number TICs found: 10

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	19.35	160	J
2.	UNKNOWN	22.13	230	J
3.	Unknown Hydrocarbon	23.04	34	J
4.	Unknown Hydrocarbon	23.51	130	J
5.	Unknown Hydrocarbon	24.00	540	J
6.	Unknown Hydrocarbon	24.20	210	J
7.	Unknown Hydrocarbon	24.41	300	J
8.	Unknown Hydrocarbon	24.59	240	J
9.	UNKNOWN	24.79	20	J
10.	UNKNOWN	24.87	180	J

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1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBFH3

Lab Name: ITAS-ST.LOUIS Contract: 519-04

Lab Code: ITSL Case No.: S70901 SAS No.: SDG No.: W0006

Matrix: (soil/water) SOIL Lab Sample ID: 4709-001

Sample wt/vol: 30.10 (g/mL) G Lab File ID: A4371

Level: (low/med) LOW Date Received: 03/16/94

% Moisture: 14 decanted: (Y/N) N Date Extracted: 03/21/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 03/29/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 5.0

## CONCENTRATION UNITS:

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

108-95-2-----	Phenol	380	U
111-44-4-----	bis(2-Chloroethyl)Ether	380	U
95-57-8-----	2-Chlorophenol	380	U
541-73-1-----	1,3-Dichlorobenzene	380	U
106-46-7-----	1,4-Dichlorobenzene	380	U
95-50-1-----	1,2-Dichlorobenzene	380	U
95-48-7-----	2-Methylphenol	380	U
108-60-1-----	2,2'-oxybis(1-Chloropropane)	380	U
106-44-5-----	4-Methylphenol	380	U
621-64-7-----	N-Nitroso-Di-n-Propylamine	380	U
67-72-1-----	Hexachloroethane	380	U
98-95-3-----	Nitrobenzene	380	U
78-59-1-----	Isophorone	380	U
88-75-5-----	2-Nitrophenol	380	U
105-67-9-----	2,4-Dimethylphenol	380	U
111-91-1-----	bis(2-Chloroethoxy)Methane	380	U
120-83-2-----	2,4-Dichlorophenol	380	U
120-82-1-----	1,2,4-Trichlorobenzene	380	U
91-20-3-----	Naphthalene	380	U
106-47-8-----	4-Chloroaniline	380	U
87-68-3-----	Hexachlorobutadiene	380	U
59-50-7-----	4-Chloro-3-Methylphenol	380	U
91-57-6-----	2-Methylnaphthalene	380	U
77-47-4-----	Hexachlorocyclopentadiene	380	U
88-06-2-----	2,4,6-Trichlorophenol	380	U
95-95-4-----	2,4,5-Trichlorophenol	930	U
91-58-7-----	2-Chloronaphthalene	380	U
88-74-4-----	2-Nitroaniline	930	U
131-11-3-----	Dimethyl Phthalate	380	U
208-96-8-----	Acenaphthylene	380	U
606-20-2-----	2,6-Dinitrotoluene	380	U
99-09-2-----	3-Nitroaniline	930	U
83-32-9-----	Acenaphthene	380	U

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1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBFH3

Lab Name: ITAS-ST.LOUIS

Contract: 519-04

Lab Code: ITSL

Case No.: S70901

SAS No.:

SDG No.: W0006

Matrix: (soil/water) SOIL

Lab Sample ID: 4709-001

Sample wt/vol: 30.10 (g/mL) G

Lab File ID: A4371

Level: (low/med) LOW

Date Received: 03/16/94

% Moisture: 14 decanted: (Y/N) N

Date Extracted: 03/21/94

Concentrated Extract Volume: 500.0 (uL)

Date Analyzed: 03/29/94

Injection Volume: 2.0(uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y

pH: 5.0

CONCENTRATION UNITS:

CAS NO.

COMPOUND

(ug/L or ug/Kg) UG/KG

Q

51-28-5-----	2,4-Dinitrophenol	930	U
100-02-7-----	4-Nitrophenol	930	U
132-64-9-----	Dibenzofuran	380	U
121-14-2-----	2,4-Dinitrotoluene	380	U
84-66-2-----	Diethylphthalate	380	U
7005-72-3-----	4-Chlorophenyl-phenylether	380	U
86-73-7-----	Fluorene	380	U
100-01-6-----	4-Nitroaniline	930	U
534-52-1-----	4,6-Dinitro-2-Methylphenol	930	U
86-30-6-----	N-Nitrosodiphenylamine (1)	380	U
101-55-3-----	4-Bromophenyl-phenylether	380	U
118-74-1-----	Hexachlorobenzene	380	U
87-86-5-----	Pentachlorophenol	930	U
85-01-8-----	Phenanthrene	380	U
120-12-7-----	Anthracene	380	U
86-74-8-----	Carbazole	380	U
84-74-2-----	Di-n-Butylphthalate	380	U
206-44-0-----	Fluoranthene	380	U
129-00-0-----	Pyrene	380	U
85-68-7-----	Butylbenzylphthalate	380	U
91-94-1-----	3,3'-Dichlorobenzidine	380	U
56-55-3-----	Benzo(a)Anthracene	380	U
218-01-9-----	Chrysene	380	U
117-81-7-----	bis(2-Ethylhexyl)Phthalate	120	J
117-84-0-----	Di-n-Octyl Phthalate	380	U
205-99-2-----	Benzo(b)Fluoranthene	380	U
207-08-9-----	Benzo(k)Fluoranthene	380	U
50-32-8-----	Benzo(a)Pyrene	380	U
193-39-5-----	Indeno(1,2,3-cd)Pyrene	380	U
53-70-3-----	Dibenz(a,h)Anthracene	380	U
191-24-2-----	Benzo(g,h,i)Perylene	380	U

(1) - Cannot be separated from Diphenylamine

FORM I SV-2

3/90

016



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U.S. EPA - CLP

1  
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOBFH3

Lab Name: ITAS ST. LOUIS Contract: 519.04  
 Lab Code: ITMO Case No.: SAS No.: SDG No.: W0006  
 Matrix (soil/water): SOIL Lab Sample ID: 4709-001  
 Level (low/med): LOW Date Received: 03/16/94  
 % Solids: 86.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2370	-	*	P
7440-36-0	Antimony	7.1	U	N	P
7440-38-2	Arsenic	3.4	-	-	F
7440-39-3	Barium	16.3	B	-	P
7440-41-7	Beryllium	0.18	B	-	P
7440-43-9	Cadmium	0.30	U	-	P
7440-70-2	Calcium	2120	-	*	P
7440-47-3	Chromium	5.7	-	*	P
7440-48-4	Cobalt	4.3	B	-	P
7440-50-8	Copper	5.2	B	-	P
7439-89-6	Iron	10700	-	*	P
7439-92-1	Lead	0.77	-	-	F
7439-95-4	Magnesium	1530	-	*	P
7439-96-5	Manganese	104	-	N*	P
7439-97-6	Mercury	0.36	-	-	CV
7440-02-0	Nickel	10.1	-	-	P
7440-09-7	Potassium	607	B	-	P
7782-49-2	Selenium	0.32	U	-	F
7440-22-4	Silver	0.63	U	-	P
7440-23-5	Sodium	158	B	-	P
7440-28-0	Thallium	0.12	U	-	F
7440-62-2	Vanadium	21.8	-	-	P
7440-66-6	Zinc	36.3	-	*	P
	Cyanide	0.34	B	-	AS
7440-32-6	Titanium	821	-	N*	P

Color Before: BROWN Clarity Before: \_\_\_\_\_ Texture: MEDIUM  
 Color After: COLORLESS Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

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



# ITAS-ST. LOUIS

## NITRATE/NITRITE-N REPORT

Pg. 1 of 1

Analyst: Jr. Carrizo  
 Project No.: 579.04  
 Reviewed by: R. Patterson

Batch No.: 34512

Analysis Date: 03-28-94  
 Method No.: 353.1  
 Date: 03-31-94

RAW VALUES

LAB ID	STANDARD ID	RAW VALUE x	DILUTION +	SAMPLE VOLUME (L or g) =	NITRATE/NITRITE x	EXTRACT VOLUME (L) +	FRACTION SOLID =	<sup>NO<sub>3</sub> + NO<sub>2</sub></sup> FINAL CONCENTRATION (ug/L)-N (ug/g)-N	% RECOVERY	RPD
<del>ACAL3512-1</del>	<del>AL1106-94</del>	-3.990		5.043		0.05		<0.198		
ACCS2452-1	AL1106-94	579.3		5.039		↓		5.75	103	
4709-001		136.6	x50	5.006		↓	0.8616	79.2		
ODRP		129.3	x50	5.009		↓		74.9		6
001MS	AL1107-94	134.6	x50	5.009		↓		76.7		

9712010076

035

\* SAMPLE CONC. \*X7 SPIKE AMT.  
 \* CORRECTED FOR % RECOVERY

12 03-31-94

1D  
HBH ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBFH3

Lab Name: ITAS-St. Louis Contract: 519.04

Lab Code: ITSL Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: W0006

Matrix: (soil/water) SOIL Lab Sample ID: 4709-001

Sample wt/vol: 20.1 (g/ml) g Lab File ID: \_\_\_\_\_

Level: (low/med) LOW Date Sampled: 03-01-94

% Moisture: not dec. 14 dec. \_\_\_\_\_ Date Extracted: 03-22-94

Extraction: (SepF/Cont/Sonc/Shak) SHAK Date Analyzed: 03-25-94

GPC Cleanup: (Y/N) N pH: \_\_\_\_\_ Dilution Factor: 1

CAS NO.	Compound	CONCENTRATION UNITS:	
		(ug/L or ug/Kg) <u>mg/Kg</u>	Q
	<u>HBH (1)</u>	<u>1600</u>	

U: Concentration of analyte is less than the value given.

(1): High Boiling Hydrocarbon (HBH) is quantitated as if it is Fuel Oil #2.

Analytical Data Package Prepared For

Westinghouse Hanford

Chemical Analysis By

IT Analytical Services  
St. Louis Laboratory

Sample Delivery Group Number: W0006

WHC IDENTIFICATION NUMBER  
BOBFH3

ITAS-ST. LOUIS ID NUMBER  
4709-001

RECORD COPY



1000001

<b>Westinghouse Hanford Company</b>	<b>CHAIN OF CUSTODY</b>	<b>006251</b>
-------------------------------------	-------------------------	---------------

Custody Form Initiator DL EDWARDS

Company Contact C.A. Rowley Telephone 372-3293

Project Designation/Sampling Locations 216-U-8 Collection Date 3/1/94 1515  
Vitrified Clay Pipeline

Ice Chest No. \_\_\_\_\_ Field Logbook No. SAF 93-263

Bill of Lading/Airbill No. NA Offsite Property No. N/A

Method of Shipment TRUCK - HAND Delivered to PNL

Shipped to PNL IT D&E 3/15/94

Possible Sample Hazards/Remarks Analysis per SAF # 93-263

Sample Identification			
<u>BOBFH3</u>	<u>40326801</u>	A (1) 250mL Gs	VOA
		B (1) 250mL aG	Semi-VOA
		C (1) 250mL Poly	Metals
		D (1) 125mL G	Anions
		E (1) 125mL G	NO <sub>2</sub> /NO <sub>3</sub>
		F (1) 125mL G	Cyanide
		G (1) 125mL Gs	Kerosene
	<u>40326901</u>	(1) 1000mL Poly	Radionuclides
		<u>D&amp;E 3/10/94</u>	

Field Transfer of Custody

CHAIN OF POSSESSION						(Sign and Print Name)	
Relinquished By	Date	Time	Received By	Date	Time		
From C.O.C. # 006227 <u>DL Edwards</u>	<u>3/10/94</u>	<u>0820</u>	<u>DL Edwards</u>				
<u>DL Edwards</u>	<u>3/5/94</u>	<u>1320</u>	<u>John [Signature]</u>	<u>3/5/94</u>	<u>1455</u>		

**Final Sample Disposition**

Disposal Method: \_\_\_\_\_ Disposed by: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Comments: Sample transferred from C.O.C. # 006227. Change in lab due to radioactivity levels.

0000010

97135110190



Regional Office  
2300 George Washington Way  
Richland, Washington 99352

### SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

Date/Time Received 3/15/94 1455 Client Name WHC

Project/Client # SAF # 93-263 Batch or Case # \_\_\_\_\_

Cooler ID (if noted on the outside of cooler) GW5022

1. Condition of shipping container? ok

2. Custody Seals on cooler intact? Yes  No

3. Custody Seals dated and signed? Yes  No

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

5. Vermiculite/packing material is: Wet  Dry

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

7. Number of sample containers in cooler: 8

8. Samples have: \_\_\_\_\_ tape X hazard labels  
X custody seals X appropriate sample labels

9. Samples are: X in good condition \_\_\_\_\_ leaking  
\_\_\_\_\_ broken \_\_\_\_\_ have air bubbles  
\_\_\_\_\_ other

10. Coolant present? Yes  No

Sample temperature 11°C

11. The following paperwork should be accounted for (N/A if not applicable):

Chain of Custody #'(s) 006251

Request for analysis #(s) 006227

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 3/15/94 1455

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

110000



SAMPLE RECEIPT VARIANCE REPORT  
ITAS-RICHLAND LABORATORY

WORK ORDER NUMBER: 403268 DATE INITIATED: 3/15/94

INITIATED BY: T Gilmore

DATE/TIME OF SAMPLE (AND/OR RFA & COC) RECEIPT: 3/15/94 1455

CLIENT SAMPLE NUMBER	RFA/COC NUMBERS	ANALYSIS REQUESTED
BOBFH3	000251	Chemical

Samples were received with the following deficiencies:

- 1. Not enough sample received for proper analysis  7. Holding time exceeded at receipt.
- 2. Sample received without proper preservative.  8. Custody tape broken.
- 3. No sample received in container.  9. COC not relinquished by client.
- 4. Sample received without a RFA/COC form.  10. Sample information on container does not match sample information on the paper work (Explain below).
- 5. No sample ID on container.  11. All shipping containers (coolers) on waybill not received with shipment.
  - RFA/COC received
  - RFA/COC not received
- 6. Sample received broken or leaking.  12. Other (Explain below).

NOTES: 1) Temperature of samples at receipt was 11°C.

2) Samples show analysis followed by CPL - not CLP.

ie (VOA CPL)

SUPERVISOR REVIEW: \_\_\_\_\_

PROJECT MANAGER REVIEW: \_\_\_\_\_

TELEPHONED TO: \_\_\_\_\_ ON \_\_\_\_\_ BY \_\_\_\_\_

TELEFAXED TO: \_\_\_\_\_ ON \_\_\_\_\_ BY \_\_\_\_\_

SIGNED ORIGINAL MUST BE RETAINED IN WORK ORDER FILE

000000



CW# 510 R22C  
 U# 4709  
**ANALYSIS REQUEST AND  
 CHAIN OF CUSTODY RECORD\***

Temp 6°C  
 Temp Check Container is 10°C  
 Reference Document No. 340331  
 Page 1 of \_\_\_

Project Name/No. 1 SAP 93-263 Samples Shipment Date 7 3-15-94 Bill to: 5 IT  
 Sample Team Members 2 \_\_\_\_\_ Lab Destination 8 ST. Louis Richland  
 Profit Center No. 3 4632 Lab Contact 9 \_\_\_\_\_  
 Project Manager 4 YAN PETTEL Project Contact/Phone 12 \_\_\_\_\_ Report to: 10 IT  
 Purchase Order No. 6 \_\_\_\_\_ Carrier/Waybill No. 13 \_\_\_\_\_  
 Required Report Date 11 4-29-94 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
4-03-268-01A	BOBFH3 / soil	3-1-94 1515	glass	250ml	cool 40	VOA (soil)	1x 250ml Amber	100% Full
↓	BR ↓	↓	poly	250ml	↓	Metals (soil)	1x 250ml Poly	100% Full
	TH 3/10/94					(RUN ALL ANALYSIS ON WHC COC.)		
* 1x 500ml poly has (2) I.D. Labels on container - they are as follows								
① 4-03-268-01B ② W40326801C								
⊕ WE RCVD 2x 40ml Amber VIALS Labeled as TRIP BLANKS THAT DO NOT APPEAR ON THIS C.O.C.								
Special Instructions: 23 <u>As per WHC Contract</u>						CAT III <u>9003-17-94</u>		
Possible Hazard Identification: 24 <input type="checkbox"/> Non-hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown						Sample Disposal: 25 <input type="checkbox"/> Return to Client <input type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive (mos.)		
Turnaround Time Required: 26 <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Rush				QC Level: 27 <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> III Project Specific (specify): <u>SDG W0006</u>				
1. Relinquished by 28 (Signature/Affiliation) <u>Weidberg IT</u>			Date: <u>3-16-94</u> Time: <u>1600</u>		1. Received by 28 (Signature/Affiliation) <u>John Walker</u>			Date: <u>03-17-94</u> Time: <u>0900</u>
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								

0000014

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

971511003

Condition Upon Receipt/Variance Report  
ITAS - St. Louis Laboratory



Project Number: 519.04  
Receipt Date/Time: 03-17-94 0900  
Login Date and Time: 03-17-94 1420  
Login Release Date and Time: 03-21-94 11:41

Initiated By (signature): [Signature]  
RFA/COC Numbers: 340231  
Login Review Date/Time: 03-17-94 1800

Information Checklist (circle Y or N):

- |                                         |                                                |                                            |                                                                                                                                  |                                            |
|-----------------------------------------|------------------------------------------------|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| 1. Y <input checked="" type="radio"/> N | Air Bill included with shipment? <u>Fed-Ex</u> | 8. <input checked="" type="radio"/> Y N    | Custody seals on Sample Containers?                                                                                              |                                            |
| 2. Y <input checked="" type="radio"/> N | Damage to Shipping Containers?                 | 9. <input checked="" type="radio"/> Y N    | Temperature of Container(s) $4 \pm 2^\circ C$ ?<br>List temperature(s) <u>6°C</u> - <sup>TEMP</sup> CHECK BOTTLE = <u>10°C</u> . |                                            |
| 3. <input checked="" type="radio"/> Y N | Shipping Containers Rad Surveyed?              | 10. Y <input checked="" type="radio"/> N   | Broken/Leaking Containers?                                                                                                       |                                            |
| 4. <input checked="" type="radio"/> Y N | Custody Seals on Shipping Containers?          | * 11. Y <input checked="" type="radio"/> N | Do Sample Containers Match C of C?                                                                                               |                                            |
| 5. <input checked="" type="radio"/> Y N | Shipping Containers Opened in hood?            | SEE BELOW                                  | 12. <input checked="" type="radio"/> Y N                                                                                         | Are preservatives correct? <u>6°C</u>      |
| 6. <input checked="" type="radio"/> Y N | Client Chain of Custody included?              | NA                                         | <input checked="" type="radio"/> Y N                                                                                             | Is the pH < 2 for acid preserved samples?  |
| 7. Y <input checked="" type="radio"/> N | Headspace in VOA samples?                      |                                            | <input checked="" type="radio"/> Y N                                                                                             | Is the pH > 12 for base preserved samples? |

Notes: ① TEMP CHECK CONTAINER WAS 10°C. Cooler CONTAINER ITSELF WAS 6°C.

② \* 1x <sup>250</sup>500 ml poly has 2 I.D. LABELS ON CONTAINER - THEY ARE AS FOLLOWS - ① 4-03-268-01B + ② W40326801C; C is lined out on COC

③ ALSO - WE RCVD. 2-40 ml Amber vials labeled as TRIP BLANKS THAT DO NOT Appear ON C.O.C. ④ Additional analyses are

Corrective Action: required that do not appear on the COC - on jar 1 → VOA/BNA/Kerosene; on jar 2 → Metals, Anions, NO<sub>3</sub>, NO<sub>2</sub>, CN ✓  
 Client's Name: S. Gainer/ITAD/Bichlum Informed verbally on: 3/17/94 By: [Signature]  
 Client's Name: \_\_\_\_\_ Informed in writing on: \_\_\_\_\_ By: \_\_\_\_\_

Sample(s) processed "as is". Comments: \_\_\_\_\_

Sample(s) on hold until: \_\_\_\_\_ If released, notify: \_\_\_\_\_

Project Management Review: [Signature] Date: 3/17/94

TR's to be held for analysis. [Signature] 3/17/94  
SIGNED ORIGINAL MUST BE RETAINED IN THE PROJECT FILE

C.U.R. and C.O.C. ✓  
COPIED TO: W-Price  
DATE: 03-17-94  
TIME: 1200  
BY: [Signature]

SL-92-QA-0026, Rev.1  
[Signature]

5100000

Project Manager: W. Price

Draft: Final Entered and Reviewed by: John Walker PM Review: [Signature]

Sample Header Template:

Sample No.	Client ID	C-Matrix	Date: Collected	Received	Due	Shipper	Rad Category	Rad Sample No.
#	Container Type	Analysis	Class	Preservative	Anal. Due Date	Hold Date	Site	(Container Numbers: % Filled)
4709-001	BOBFH3	Soil	01-MAR-94 15:15	16-MAR-94 09:00	20-APR-94	FED-EX	3*	R2014-002
8015 KEROSENE;DO VOA FIRST ON THE ORGANICS CONTAINER								
1	AM - Amber Glass-250ML	BNA/CLP90/Q4	S	COLD	13-APR-94	15-MAR-94	109X	(71410:100)
1		TPH/8015/Q4	S	COLD	13-APR-94	15-MAR-94	109X	(71410:100)
1		VOA/CLP90/Q4	S	COLD	13-APR-94	15-MAR-94	109X	(71410:100)
1	PM - Plastic-250ml	AS/CLP90/Q4	S	COLD	13-APR-94	12-SEP-94	R22C	(71542:100)
1		CL/300.0/Q4	S	COLD	13-APR-94	29-MAR-94	R22C	(71542:100)
1		CN/CLP/Q4	S	COLD	13-APR-94	15-MAR-94	R22C	(71542:100)
1		FL/300.0/Q4	S	COLD	13-APR-94	29-MAR-94	R22C	(71542:100)
1		HG/CLP90/Q4	S	COLD	13-APR-94	11-APR-94	R22C	(71542:100)
1		ICAP/CLP90/Q4	S	COLD	13-APR-94	12-SEP-94	R22C	(71542:100)
1		NO3/353.1/Q4	S	COLD	13-APR-94	29-MAR-94	R22C	(71542:100)
1		PB/CLP90/Q4	S	COLD	13-APR-94	12-SEP-94	R22C	(71542:100)
1		PH/CLP/Q4	S	COLD	13-APR-94	30-MAR-94	R22C	(71542:100)
1		PM/IT/Q4	S	COLD	13-APR-94	28-AUG-94	R22C	(71542:100)
1		SE/CLP90/Q4	S	COLD	13-APR-94	12-SEP-94	R22C	(71542:100)
1		SO4/300.0/Q4	S	COLD	13-APR-94	29-MAR-94	R22C	(71542:100)
1		TL/CLP90/Q4	S	COLD	13-APR-94	12-SEP-94	R22C	(71542:100)

These Products have no assigned containers.

Sample No.	Client ID	C-Matrix	Date: Collected	Received	Due	Shipper	Rad Category	Rad Sample No.
#	Container Type	Analysis	Class	Preservative	Anal. Due Date	Hold Date	Site	(Container Numbers: % Filled)
4709-001DUP	BOBFH3	Soil	01-MAR-94 15:15	16-MAR-94 09:00	20-APR-94	FED-EX	3*	R2014-002
8015 KEROSENE;DO VOA FIRST ON THE ORGANICS CONTAINER								
1	PM - Plastic-250ml	AS/CLP90/Q4	S	COLD	13-APR-94	12-SEP-94	R22C	(71542:100)
1		CL/300.0/Q4	S	COLD	13-APR-94	29-MAR-94	R22C	(71542:100)
1		CN/CLP/Q4	S	COLD	13-APR-94	15-MAR-94	R22C	(71542:100)
1		FL/300.0/Q4	S	COLD	13-APR-94	29-MAR-94	R22C	(71542:100)
1		HG/CLP90/Q4	S	COLD	13-APR-94	11-APR-94	R22C	(71542:100)
1		ICAP/CLP90/Q4	S	COLD	13-APR-94	12-SEP-94	R22C	(71542:100)
1		NO3/353.1/Q4	S	COLD	13-APR-94	29-MAR-94	R22C	(71542:100)
1		PB/CLP90/Q4	S	COLD	13-APR-94	12-SEP-94	R22C	(71542:100)
1		SE/CLP90/Q4	S	COLD	13-APR-94	12-SEP-94	R22C	(71542:100)
1		SO4/300.0/Q4	S	COLD	13-APR-94	29-MAR-94	R22C	(71542:100)
1		TL/CLP90/Q4	S	COLD	13-APR-94	12-SEP-94	R22C	(71542:100)

Sample No.	Client ID	C-Matrix	Date: Collected	Received	Due	Shipper	Rad Category	Rad Sample No.
#	Container Type	Analysis	Class	Preservative	Anal. Due Date	Hold Date	Site	(Container Numbers: % Filled)
4709-001MS	BOBFH3	Soil	01-MAR-94 15:15	16-MAR-94 09:00	20-APR-94	FED-EX	3*	R2014-002
8015 KEROSENE;DO VOA FIRST ON THE ORGANICS CONTAINER								

1	AM - Amber Glass-250ML	BNA/CLP90/Q4	S	COLD	13-APR-94	15-MAR-94	109X	(71410:100)
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3\*=Sample has not been rad screened.

0000016

9713511.0185

Project Manager: W. Price

Draft: Final: Entered and Reviewed by: PH Review:

Sample Header Template:

Sample No.	Client ID	C-Matrix	Date: Collected	Received	Due	Shipper	Rad Category	Rad Sample No.
#	Comments	Analysis	Class	Preservative	Anal. Due Date	Hold Date Site	(Container Numbers:% Filled)	
1		TPH/8015/Q4	S	COLD	13-APR-94	15-MAR-94 109X	(71410:100)	
1		VOA/CLP90/Q4	S	COLD	13-APR-94	15-MAR-94 109X	(71410:100)	
1	PN - Plastic-250ml	AS/CLP90/Q4	S	COLD	13-APR-94	12-SEP-94 R22C	(71542:100)	
1		CL/300.0/Q4	S	COLD	13-APR-94	29-MAR-94 R22C	(71542:100)	
1		CN/CLP/Q4	S	COLD	13-APR-94	15-MAR-94 R22C	(71542:100)	
1		FL/300.0/Q4	S	COLD	13-APR-94	29-MAR-94 R22C	(71542:100)	
1		HG/CLP90/Q4	S	COLD	13-APR-94	11-APR-94 R22C	(71542:100)	
1		ICAP/CLP90/Q4	S	COLD	13-APR-94	12-SEP-94 R22C	(71542:100)	
1		NO3/353.1/Q4	S	COLD	13-APR-94	29-MAR-94 R22C	(71542:100)	
1		PB/CLP90/Q4	S	COLD	13-APR-94	12-SEP-94 R22C	(71542:100)	
1		SE/CLP90/Q4	S	COLD	13-APR-94	12-SEP-94 R22C	(71542:100)	
1		SO4/300.0/Q4	S	COLD	13-APR-94	29-MAR-94 R22C	(71542:100)	
1		TL/CLP90/Q4	S	COLD	13-APR-94	12-SEP-94 R22C	(71542:100)	
4709-001MSD BOBFH3 Soil			01-MAR-94 15:15	16-MAR-94 09:00	20-APR-94	FED-EX	3*	R2014-002
8015 KEROSENE;DO VOA FIRST ON THE ORGANICS CONTAINER								
1	AN - Amber Glass-250ML	BNA/CLP90/Q4	S	COLD	13-APR-94	15-MAR-94 109X	(71410:100)	
1		TPH/8015/Q4	S	COLD	13-APR-94	15-MAR-94 109X	(71410:100)	
1		VOA/CLP90/Q4	S	COLD	13-APR-94	15-MAR-94 109X	(71410:100)	

9713510086

3\*=Sample has not been rad screened.

0000017



Analytical Data Package Prepared For

# Westinghouse Hanford

Radiochemical Analysis By

**IT Analytical Services**  
*Richland Laboratory*

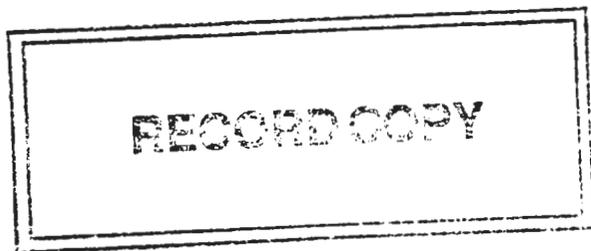
Sample Delivery Group Number: W0006

WHC IDENTIFICATION NUMBER

BOBFH3

ITAS RICHLAND ID NUMBER

4-03-269-01



Regional Office

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

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## CERTIFICATE OF ANALYSIS

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

May 2, 1994

Attention: J.A.Lerch

SAF Number	:	93-263
Date Received by Lab	:	March 16, 1994
Number of Samples	:	One (1)
Sample Type	:	Soil
SDG Number	:	W0006

### I. Introduction

On March 16, 1994, one soil sample was received by ITAS-Richland for radiochemical analysis. Upon receipt, the sample was given the following laboratory ID number to correspond with the WHC specific ID:

<u>ITAS-Richland ID</u>	<u>WHC ID</u>	<u>Matrix</u>	<u>Date of Receipt</u>
403268-01A	B0BFH3	Soil	3/16/94

### II. Analytical Results/Methodology

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

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0006

Westinghouse Hanford Company

May 2, 1994

Page 2

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The requested analyses were:

**Alpha Spectroscopy**

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

Neptunium-237 by method ITAS-RD-3208

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

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

**Gamma Spectroscopy**

Gamma Scan by method ITAS-RD-3219

Iodine-129 by method ITAS-RD-3219

**Gas Proportional Counting**

Gross Alpha by method ITAS-RD-3222

Gross Beta by method ITAS-RD-3222

Strontium-90 by method ITAS-RD-3204

**Liquid Scintillation Counting**

Selenium-79 by method ITAS-RD-3253

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

**Total Uranium**

Total Uranium by method ITAS-RD-4200

III. Quality Control

The analytical results for SDG W0006 include a minimum of one Laboratory Control Sample (LCS), one method (reagent) blank, and one duplicate.

IV. Comments

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

Westinghouse Hanford Company  
May 2, 1994  
Page 3

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### Alpha Spectroscopy

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

The contractual detection limit was not met for the sample and sample duplicate due to the reduced sample size analyzed. The analyzed sample size was the maximum allowable aliquot based on the screening results. The sample-size adjusted detection limit was met. The laboratory control sample and the batch blank were acceptable. The sample and duplicate sample results were outside of the 3 sigma control limit. The results were accepted due to the possibility of nonhomogeneity in the soil samples.

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

The contractual detection limit was not met for the sample and sample duplicate due to the reduced sample size analyzed. The analyzed sample size was the maximum allowable aliquot based on the screening results. The sample-size adjusted detection limit was met. The laboratory control sample and the batch blank were acceptable. The sample and sample duplicate results were within the 3 sigma control limit. Two matrix spikes were analyzed with the batch; only one was accepted (L032691M) and used for yield correction.

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

The contractual detection limit was not met for the sample and sample duplicate due to the reduced sample size analyzed. The analyzed sample size was the maximum allowable aliquot based on the screening results. The sample-size adjusted detection limit was met. The laboratory control sample and batch blank were acceptable. The sample duplicate result was declared lost due to low yield (15.7%).

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

The contractual detection limit was not met for the sample and sample duplicate due to the reduced sample size analyzed. The analyzed sample size was the maximum allowable aliquot based on the screening results. The sample-size adjusted detection limit was met. The laboratory control sample and batch blank were acceptable. The sample and sample duplicate results were within the 3 sigma control limit.

Westinghouse Hanford Company

May 2, 1994

Page 4

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## **Gamma Spectroscopy**

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

The contractual detection limit was not met for the sample and sample duplicate due to the reduced sample size analyzed. The analyzed sample size was the maximum allowable aliquot based on the screening results. The sample-size adjusted detection limit was met. The laboratory control sample and batch blank were acceptable. The sample duplicate was analyzed separately from the remainder of the batch due to a technician error. Since no chemistry is performed on the sample in preparation for gamma counting an aliquot could be prepared and analyzed at a later date. The sample and sample duplicate results were within the 3 sigma control limit.

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

The Iodine-129 results have been declared "lost" due to matrix effect. On the first count of the batch (100 minutes), the Cs-137 activity of the sample and sample duplicate caused a high background count and "dead time" on the detector. The samples were recounted for 1 minute with similar results and "dead time". It was determined that standard methodology would be unacceptable for this matrix with this level of Cs-137 activity.

## **Gas Proportional Counting**

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

The soil preparation procedure was modified due to the activity of the sample. A 0.12 gram aliquot of the sample and a 0.12 gram aliquot of the sample duplicate were dissolved by microwave bomb digestion and diluted to approximately 100 grams each. Aliquots of the digested and diluted soil samples were dried on planchets to reduce the possibility of lab contamination from hot particles falling from the planchet during handling and counting. The contractual detection limit was not met for the sample and sample duplicate due to the reduced sample size analyzed. The analyzed sample size was the maximum allowable aliquot based on the screening results. The sample-size adjusted detection limit was met. The laboratory control sample (LCS) was biased high with a 171% recovery. The LCS was recounted and the activity was verified. The data were accepted based on the acceptable batch blank and sample and duplicate sample agreement within the 3 sigma control limit.

Westinghouse Hanford Company

May 2, 1994

Page 5

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Gross Beta by method ITAS-RD-3222

The soil preparation procedure was modified due to the activity of the sample. A 0.12 gram aliquot of the sample and a 0.12 gram aliquot of the sample duplicate were dissolved by microwave bomb digestion and diluted to approximately 100 grams each. Aliquots of the digested and diluted soil samples were dried on planchets to reduce the possibility of lab contamination from hot particles falling from the planchet during handling and counting. The laboratory control sample and batch blank were acceptable. The sample and sample duplicate results were within the 3 sigma control limit.

Strontium-90 by method ITAS-RD-3204

The contractual detection limit was not met for the batch quality control samples, sample and sample duplicate due to the reduced sample size analyzed. The analyzed sample size was the maximum allowable aliquot based on the screening results. The sample-size adjusted detection limit was met. The laboratory control sample and batch blanks were acceptable. The sample and sample duplicate results were within the 3 sigma control limit.

**Liquid Scintillation Counting**

Selenium-79 by method ITAS-RD-3253

The contractual detection limit was not met for the sample and sample duplicate due to the reduced sample size analyzed. The analyzed sample size was the maximum allowable aliquot based on the screening results. The sample-size adjusted detection limit was met. The laboratory control sample and batch blanks were acceptable. The sample and sample duplicate results were within the 3 sigma control limit.

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

The laboratory control sample and batch blanks were acceptable. The sample and sample duplicate results were within 3 sigma control limits.

Westinghouse Hanford Company  
May 2, 1994  
Page 6

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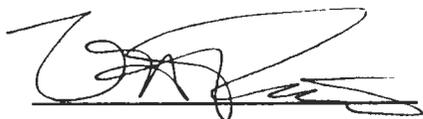
### **Total Uranium**

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

The total uranium analysis by laser phosphorimeter had suspected chloride interferences on the first analysis and therefore a reanalysis was performed. The reanalysis results were acceptable with the exception of the result for the duplicate. The duplicate of the sample had suspected chloride interferences on the reanalysis. The duplicate result has been declared "lost" and a nonconformance memo issued. The data for the batch were accepted based on the acceptable laboratory control sample and batch blanks.

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:



Van H. Pettey  
Project Manager



INTERNATIONAL  
TECHNOLOGY  
CORPORATION

SAMPLE RESULTS

LAB NAME: ITAS-RICHLAND SDG NO.: W0006  
 LAB SAMPLE ID: 4-03-269-01 MATRIX: SOIL  
 WHC ID: BOBFH3 DATE RECEIVED: 3/15/94  
 REPORTING UNITS: pCi/g

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	YIELD	METHOD NUMBER
AM-241	4.26E+02	4.96E+01	7.00E+01	0.382	RD3302
CM-242	0.00E+00	0.00E+00	5.42E+00	0.382	RD3302
CM-244	0.00E+00	0.00E+00	4.35E+00	0.382	RD3302
NP-237	1.87E+00	2.16E+00	2.20E+00	0.86	RD3208
PU239/40	7.06E+01	5.51E+01	5.69E+01	0.305	RD3209
PU-238	0.00E+00	0.00E+00	3.12E+01	0.305	RD3209
U-234	1.16E+01	1.65E+01	1.66E+01	0.687	RD3234
U-235	4.36E+00	9.51E+00	9.52E+00	0.687	RD3234
U-238DA	8.72E+00	1.34E+01	1.35E+01	0.687	RD3234
K-40	1.64E+01	1.98E+00	2.57E+00	N/A	RD3219
CO-60	1.13E-01	1.35E-01	1.36E-01	N/A	RD3219
EU-152	-6.40E-01	5.07E-01	5.11E-01	N/A	RD3219
CS-137DA	4.91E+04	4.91E+03	4.91E+03	N/A	RD3219
CS-134	-3.70E-01	1.16E+00	1.16E+00	N/A	RD3219
RU-106DA	-1.20E+01	1.24E+01	1.24E+01	N/A	RD3219
NA-22	9.42E-03	4.12E-01	4.12E-01	N/A	RD3219
EU-155	1.25E+00	2.71E+00	2.71E+00	N/A	RD3219
EU-154	2.58E-02	1.13E+00	1.13E+00	N/A	RD3219
ALPHA	7.08E+00	9.90E+00	9.97E+00	1	RD3222
BETA	7.48E+04	7.97E+02	5.10E+03	1	RD3222
TOTAL-SR	7.41E+00	1.75E+00	2.54E+00	0.881	RD3204
SE-79	1.01E+01	6.33E+00	3.55E+01	1	RD3253
TC-99	5.02E+01	2.77E+00	1.42E+01	0.9	ITAS-IT-RS-0001
URANIUM	2.54E+01	N/A	3.81E+00	0.925	RD4200

Westinghouse  
Hanford Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

006227

Collector R.T. Sickle  
SAF No. 93-263

Company Contact C.A. Rowley  
Project Designation 216-U-8 Vitriified Clay  
Pipeline

Telephone 372-3293  
Sampling Locations 216-U-8 Crib

Ice Chest No.  
Method of Shipment Air Overnight

Bill of Lading/Airbill No.

Offsite Property No.  
Field Logbook No.

Shipped to TMA

Possible Sample Hazards/Remarks None Detected

Special Handling and/or Storage Keep cool

SPECIAL INSTRUCTIONS

Sample Number	*	Date Collected	Time	Number and Type of Containers	Analysis Required	Preservative
BOBFH3	S	3-1-94	1515	(1) 250ml Gs	VOA	CLP
BOBFH3	S	↓	↓	(1) 250ml aG	Semi-VOA	CLP
BOBFH3	S			(1) 250ml Poly	Metals -CLP TAL Titanium Mercury	CPL
BOBFH3	S			(1) 125ml G	Anions F, Cl, SO <sub>4</sub>	EPA 300.0
BOBFH3	S			(1) 125ml P/G	NO <sub>2</sub> NO <sub>3</sub>	EPA 353.2
BOBFH3	S			(1) 250ml aGs	PCB/Pest <i>RIDE 2 23-94</i>	8080
BOBFH3	S			(1) 125ml G	Cyanide	CPL
BOBFH3	S			(1) 125ml Gs	Kerosene	8015M
BOBFH3	S			(1) 1000ml Poly	Gross Alpha/Beta EP-10; Gamma Spec. Cs-134/137, Co-60, K-40, Eu-152/154/155, Ru-106, Na-22 RC-30; Total Uranium EA-01C; U-235/234/238 EP-70, 71, 5; Np-237 RC-101A, 622, EP-5; Pu-238/239/240 EP-80, 81, 5; I-129 RC-25, 603; Sr-90 RC-306, 303, 309, 304; Tc-99 RC-24, 604; Am-241, Cm-244 EP-80, 91, 92, 93, 5; Se-79 Lab Specific	

Chain of Possession (Sign and Print Names)				*Matrix	
Relinquished By	Date	Time	Received By	A = Air	SE = Sediment
<i>R.T. Sickle</i> R.T. Sickle	3/7/94	0740	<i>D.J. Edwards</i>	DL = Drum Liquids	SL = Sludge
<i>D.J. Edwards</i>	3/10/94	0820	<i>to C.O.C. #006251 D.J. Edwards</i>	DS = Drum Solids	SO = Solid
				L = Liquid	T = Tissue
				O = Oil	W = Water
				S = Soil	WI = Wipe
					X = Other

LABORATORY SECTION	Received By	Title	Date/Time
Final Sample Disposition	Disposal Method:	Disposed by:	Date/Time:

0051

0051

Westinghouse Hanford Company	CHAIN OF CUSTODY	006251
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Custody Form Initiator DL EDWARDS

Company Contact CA Rowley Telephone 372-3293

Project Designation/Sampling Locations 216-U-8 Collection Date 3/1/94 515  
Veritified Clay Pipeline

Ice Chest No. \_\_\_\_\_ Field Logbook No. SAF 93-263

Bill of Lading/Airbill No. NA Offsite Property No. N/A

Method of Shipment TRUCK - HAND Delivered to PNL

Shipped to PNL IT ARE 3/15/94

Possible Sample Hazards/Remarks Analyses per SAF # 93-263

Sample Identification		
<u>DCBFH3</u>	<u>40326801</u>	A (1) 250ML G <sub>2</sub> VOA
		B (1) 250ML G <sub>2</sub> Semi-VOA
		C (1) 250ML Poly Metals
		D (1) 125ML G <sub>2</sub> Anions
		E (1) 125ML G <sub>2</sub> NO <sub>2</sub> /NO <sub>3</sub>
		F (1) 125ML G <sub>2</sub> Cyanide
		G (1) 125ML G <sub>2</sub> Kerosene
	<u>40326901</u>	(1) 100ML Poly Radionuclides

NA 3/10/94

3/10/94

Field Transfer of Custody		CHAIN OF POSSESSION			(Sign and Print Name)	
Relinquished By	Date	Time	Received By	Date	Time	
From C.O.C. # 006227 <u>DL Edwards</u>	<u>3/10/94</u>	<u>0820</u>	<u>DL Edwards</u>			
<u>DL Edwards</u>	<u>3/15/94</u>	<u>1520</u>	<u>John [Signature]</u> <small>2100 305 PM</small>	<u>3/15/94</u>	<u>1455</u>	

Final Sample Disposition

Disposal Method: \_\_\_\_\_ Disposed by: \_\_\_\_\_ Date/Time: 0052

Comments:  
Sample transferred from C.O.C. # 006227. Change in lab due to radioactivity levels.

SAMPLE STATUS REPORT FOR E 5329. E-BLANK BOBFH3 TIME: 3/ 8/94 8: 8  
DISPATCHED: 2/24/94 13:26 SAMPLE HAS NOT BEEN SLURPED  
RECEIVED: 3/ 2/94 7:49

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	*****	*****	***	***	*****
1210	TB MISC	3.21000E 04 pCi/G	N	Y	VOGEL
1211	AT MISC	1.36000E 01 pCi/G	N	Y	VOGEL
2172	GEA-SOIL	6.91999E 04 pCi/gWETwt Cs-137	N	Y	VOGEL
4271	TOT-ACT	9.42000E 03 pCi/G	N	Y	VOGEL

END OF REPORT

2250ul x 1.6 = 3600g

Beta 32,100 pCi/g x 3600g = 115560000 pCi

A<sub>2</sub> = 0.4 Ci     A<sub>2</sub> / 1000 = .0004Ci = 400000000 pCi

115560000 / 400000000 = .2889

32100 pCi/g

Alpha 13.6 pCi/g x 3600 = 48960 pCi

A<sub>2</sub> = .002Ci     A<sub>2</sub> / 1000 = .000002Ci = 2,000,000 pCi

48960 / 2,000,000 = .02448

Unit 1 = .2889 + .02448 + .0249 = .338

Cs-137

69,200 pCi/g x 3600g = 249120000 pCi

A<sub>2</sub> = 10     A<sub>2</sub> / 100 = .1Ci = 10000000000 pCi

249120000 / 10000000000 = .0249

364 uCi  
72 3  
75.5  
515 1

EMERGENCY CONTACT (509) 373-3800

ERG #61 Attached

**SHIP TO:**  
 Company IT Corporation  
 Address 2800 Geo. Washington Way  
 City, State, Zip Richland, WA 99352  
 Attention: SAMPLE RECEIVING DOCK

**OFFSITE RADIOACTIVE SHIPMENT RECORD**  
 - EXTERIOR INSPECTION PERMITTED - 19713

Contractor:  
 PNL  KEH  WHC

Site Carrier  
D. EDWARDS

PR No. 82800 Veh. No. 14-930

Ship:  Prepaid  Collect Via:  
 Motor-Rail  Air Psgr.  
 Excl. Use  Air Cargo  
 DOE Veh.  Mail  
 UPS Sur.

**Proper Shipping Name** Radioactive Material, Excepted package **UN Number** UN 2910

Material Form:  Special (A1)  Normal (A2)

Labels Applied:  
 Empty  
 Radioactive LSA  
 White I  
 Yellow II  
 Yellow III  
 None  
 Danger (Air Cargo)  
 Secondary

Material Category:  
 Empty  
 Low Specific Act. (LSA)  
 Limited Quantity  
 Type A Quantity  
 Type B Quantity  
 Highway Route  
 Controlled Quantity

For Normal Form Identify:  
 Physical Form:  Solid  Liquid  Gas  
 Chemical Form:  Metal  Oxide  Elemental  Nitrate  
 Other \_\_\_\_\_

**TYPE PACKAGE**  Strong Tight  Type A  Type B  Type B (U)  Type B (M)

**CONSTRUCTION**  Box, FB  Wood  Steel  Drum  Cask  Other Poly Cooler

**FISSILE CLASS**  Non Fissile  Fissile Exempt  Fissile I  Fissile II  Fissile III Grams Fissile \_\_\_\_\_

**SNM**  No  Yes  NA  Category I  Category II  Category III

**ACCOUNTABILITY/SECURITY CONTROL**  
 Classified  Unclassified  
 Consignee authorized to receive this qty   
 Sig. Security Svc. Reg.  NA   
 Pu, EU > 1g  NA  NU, DU > 1 Kg  NA  
 Security Escorts Req.  Not. Req.   
 External Cask Temperature (Max. 122° F LTL, 180° F Ex Use) N/A °F

Packaging conforms to appropriate packaging procedure  N/A  Yes  
 Complies with D. O. T. packaging marking and labeling requirements  N/A  Yes  
 Container acceptability documented (incl. 7A cert)  N/A  Yes

Container examined: No evidence of deterioration or damage  Yes  No  
 QA Inspection Current  N/A  Yes  No  Yes  
 Shipping Doc. REFR 173.42 Authorization No. NA

No. Pkgs.	Model Package	COC/Spec. No.	Serial No.	Seal No.	Isotopes	Curies/Pkg	T. I.	Gr. Wt.	
1	<u>Poly Cooler</u> <u>Strong Tight</u>	<u>NA</u>	<u>GRAMS 022</u>	<u>Tape Applied</u>	<u>Cs-137, Sr-90</u>	<u>364 uCi</u>	<u>NA</u>	<u>65 LBS</u>	
<u>Ltd. Qty. Statement in Cooler</u>									
<u>Cooler Contains: (3) 250ml bottles, (4) 125 mL bottles, (1) 1000mL Poly</u>									
<u>SAF 93-263 COC # 006251</u>									
(Shipper may describe package in detail on one of unused lines above)						<b>TOTAL</b>	<u>364 uCi</u>	<u>NA</u>	<u>65 LBS</u>

This is to certify that the above named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation, according to the applicable federal, state, local and international regulations for the transportation of hazardous materials.

Certifier's Signature: Anna J. Edwards Date: 3/15/94 Organization: Sampling & Abbiile Labs Complete Cost Code (inc. end function): 12910/PT2WA

**AREA MONITOR**

Surface Dose Rate of Package:  ≤ 0.5 or 5 mrem/hr (N + Bγ)  ≤ 0.5 or \_\_\_\_\_ mrem/hr (N + Bγ)

Dose Rate at 1 Meter from Surface of Package:  ≤ 0.5 or \_\_\_\_\_ mrem/hr (N + Bγ)

Smears of Outer Container:  ≤ 22 dpm Bγ/cm<sup>2</sup>  ≤ 2.2 dpm α/cm<sup>2</sup>

**TRUCK LOAD OR EXCLUSIVE USE**  
 Surface:  ≤ 200 mrem/hr (N + Bγ)  
 @ 6 feet:  ≤ 10 mrem/hr (N + Bγ)  
 @ Cab  ≤ 2.0 mrem/hr (N + Bγ) or Sleeper

Additional Data and Instructions (inc. Readings on Internal Packaging): \_\_\_\_\_

Signature: Anna J. Edwards Bldg. 202-5 Survey No. 167541 Date 3-15-94

**AUTHORIZATION FOR SHIPMENT**

**AIR TRANSPORT CERTIFICATION** Cargo Only:  Danger Labels Applied Passenger:  1. Ltd. Qty.  3. Research or Medical Diagnosis  2. ≤ 3 T.I.  4. Human Medical Research Pkg. Dimensions NA

Traffic has inspected and verified preshipment compliance to DOT regulations. 0054

Authorized Signature: M.A. SAMS Printed Name: M.A. SAMS Date: 3-15-94

**APPROVED FOR OFFSITE SHIPMENT**

**TRAFFIC** B. L. No. RMW 8532 Date Shipped 3-15-94 E. T. A. 3-15-94 Routing WHC VEHICLE  N/A  Yes  No

Placards  Yes  No  
 Route Plan  Yes  No

Surveyed By \_\_\_\_\_ Date \_\_\_\_\_ Approved for Shipment Anna J. Edwards Date 3-15-94  
 Westinghouse Hanford Company

9713511.0199



INTERNATIONAL  
TECHNOLOGY  
CORPORATION

Regional Office  
1300 George Washington Way  
Richland, Washington 99352

SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

Date/Time Received 3/15/94 1455 Client Name WHC

Project/Client # SAF # 73-263 Batch or Case # \_\_\_\_\_

Cooler ID (if noted on the outside of cooler) GWS027

1. Condition of shipping container? ok

2. Custody Seals on cooler intact? Yes  No

3. Custody Seals dated and signed? Yes  No

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

5. Vermiculite/packing material is: Wet  Dry

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

7. Number of sample containers in cooler: 8

8. Samples have: \_\_\_\_\_ tape  hazard labels

custody seals  appropriate sample labels

9. Samples are:  in good condition \_\_\_\_\_ leaking

\_\_\_\_\_ broken \_\_\_\_\_ have air bubbles

\_\_\_\_\_ other

10. Coolant present? Yes  No

Sample temperature 11°C

11. The following paperwork should be accounted for (N/A if not applicable):

Chain of Custody #'(s) 006251

Request for analysis #'(s) 006227

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 3/15/94 1455

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

0055

9713511.0200



Regional Office  
1800 George Washington Way  
Richiana, Washington 99352

SAMPLE CHECK-IN LIST			
SAMPLE NUMBER MATRIX			
WHC ID NUMBER	SAMPLE LABEL NUMBER	LABORATORY ID NUMBER	AGREEMENT OF INFORMATION
BOBFH3	same	40326801A-6 40326901	Chem Rad YLS

FORM NO. LS-043, Rev. 0, 2/94

TENNELEC #1

SCREENING CALCULATION SPREADSHEET

Client Code	Received Date	Time	Screening Date	Prep Time	Count Date	Mats Chgs	BACKGROUNDS	Net
WHC			31594		315	10	17 223	240

Customer Code	pH	Pinch Weight	Vol. Added	Sample Size	SAMPLE COUNT DATA		Net Sample		NPM / Aliquot		µCi per Sample		Sample Error	NCL/Dir. of C.	Category	Aliquot to Cat 1				
					Peak Num	Count	Alpha	Beta	Alpha	Beta	Alpha	Beta				Alpha	Beta			
WHC/SOIL								-0.07	-0.93	-2E-01	-2E+00	ERR	ERR	ERR	ERR	ERR	ERR	ERR		
BOBFH3		97.5	98	800.0	40	578	31465	57.73	*****	4.3E+02	7.9E+03	1.6E+00	2.9E+01	3.3E-04	1.1E-03	2.0E+03	3.6E+04	No	5.0E+00	2.8E+00

*Matt Lordey*

*3-16-94*

*Cal III*

0057

97135.020

\*\*\* AM/CMISO \*\*\*

Dup  
4-29-94

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

16-Mar-1994  
Page 1

CUSTOMER: WHC  
MATRIX : SOIL

SAF  
93-263

SAMPLE DELIVERY GROUP W0006  
BATCH NUMBER 3-269

ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
1082691 B	ESJ10352			
1032691 S	EQ0004			✓
1 ) 40326901	ESJ10343	WHC	BOBFH3	✓
F0326901	ESJ10344 Dup			✓

ACTIONS (Initial & Date)

- 1) INITIATED JH 3/17/94
- 2) PREP LAB RECEIVED BAB 4-14-94  
RD3221
- 3) SAMPLE REMAINDER STORED N/A
- 4) SEPARATION LAB RECEIVED 4-18-94 Susan  
4/20/94 JF
- 5) COUNTING/MEASUREMENT LAB KCN 2-94
- 6) DATA REVIEWED AND ANALYTICAL PREP STORED PK-4-29-94

*[Handwritten signature]*

\*\*\* NP-237 \*\*\*

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

16-Mar-1994

Page 1

Dup  
4-21-94  
19

CUSTOMER: WHC

SAF  
93-263

SAMPLE DELIVERY GROUP

W0006

MATRIX : SOIL

BATCH NUMBER

3-269

ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
L032691B				
L032691S	EQR013	25.056 E	3524	DPm
1 ) 40326901		WHC	BOBFH3	cut III
E0326901	Dup			cut III
L032691M	EQR014	25.048 E	3522	
L032692M	EQR015	25.079 E	3527	DPm

ACTIONS (Initial & Date)

1) INITIATED

JH 3/17/94

5) COUNTING/MEASUREMENT LAB

4-21-94  
KC 4-21-94 KC

2) PREP LAB RECEIVED BAB 4-14-94

6) DATA REVIEWED AND

4-21

3) SAMPLE REMAINDER STORED N/A

ANALYTICAL PREP STORED

MMW 4-22-94

4) SEPARATION LAB RECEIVED 4/19/94 JS

Do not use L032692M for  
batch spike recovery for  
tran

REP 4-21-94  
M

\*\*\* PUISO \*\*\*

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

16-Mar-1994  
Page 1

*Dup  
4-29-94*

CUSTOMER: WHC  
MATRIX : SOIL

*SAF  
03-263*

SAMPLE DELIVERY GROUP  
BATCH NUMBER

*Wood  
3-269*

ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
<del>L032691</del>	<del>B</del>	<del>ESH 15684</del>		
<del>L032691</del>	<del>S</del>	<del>IQHT 029</del>		
1 ) 40326901		ESH15685	WHC BOBFH3	<i>cont III</i>
<del>F0326901</del>	<del>E</del>	<del>ESH15686</del>		<i>cont III</i>

ACTIONS (Initial & Date)

- 1) INITIATED *JH 3/17/94*
- 2) PREP LAB RECEIVED *BAB 4-14-94*  
*NO 3221*
- 3) SAMPLE REMAINDER STORED *N/A*
- 4) SEPARATION LAB RECEIVED *JE 4/24/94*
- 5) COUNTING/MEASUREMENT LAB *KCH 20-94*
- 6) DATA REVIEWED AND ANALYTICAL PREP STORED *PK 4/29/94*

*ED 4-19-94/ M*

\*\*\* UISO \*\*\*

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

16-Mar-1994

Page 1

Dup  
4-29-94

CUSTOMER: WHC

SAF  
93-263

SAMPLE DELIVERY GROUP

W0006

MATRIX : SOIL

BATCH NUMBER

3-269

ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
<del>4032691B</del>	<del>ESI14915</del>			
<del>4032691E</del>	<del>FOIC 084</del>	<del>ECFC 086</del>		
1 ) 40326901	ESI14916	WHC	BOBFH3	cat II
<del>FO326901</del>	<del>ESI14917</del>			<del>cat II</del>

ACTIONS (Initial & Date)

1) INITIATED

JH 3/17/94

5) COUNTING/MEASUREMENT LAB

KC4-20-94

2) PREP LAB RECEIVED BAB 4-14-94  
RD3221 4/5/94

6) DATA REVIEWED AND ANALYTICAL PREP STORED  
MUNN 4-25-94

3) SAMPLE REMAINDER STORED N/A

4) SEPARATION LAB RECEIVED 4/18/94 EA

Extracted 4-18-94 AC  
ED 4.19.94 PM

Jul 94

\*\*\* GAMMA \*\*\*

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

16-Mar-1994  
Page 1

*DWA*  
*4-26-94*  
*93-263-94*

CUSTOMER: WHC  
MATRIX : SOIL

*SAF*  
*93-263*

SAMPLE DELIVERY GROUP  
BATCH NUMBER

*Wood*  
*3-269*

ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
<i>L032691B</i>				
<i>L032691S</i>				
1 ) 40326901		WHC	BOBFH3	

ACTIONS (Initial & Date)

- 1) INITIATED *JH 3/17/94*
- 2) PREP LAB RECEIVED *JMM 3-18-94*
- 3) SAMPLE REMAINDER STORED *JMM 3-20-94*
- 4) SEPARATION LAB RECEIVED *N/A*
- 5) COUNTING/MEASUREMENT LAB *AS 4-18-94*
- 6) DATA REVIEWED AND ANALYTICAL PREP STORED



INTERNATIONAL  
TECHNOLOGY  
CORPORATION

DUE DATE 4-19-99

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

ANALYSIS J

NAME/DATE JK 4-29-99

CUSTOMER WHC

SAMPLE DELIVERY GROUP \_\_\_\_\_

MATRIX Soil

BATCH NUMBER SDGW0006

ITAS ID	CUSTOMER ID	COMMENTS
1) F0326901		600min
2)		
3)		
4)		
5)		
6)		
7)		
8)		
9)		
10)		

**REANALYSIS**

\*REFERENCED QC\*

ITAS ID - BLANK NA

ITAS ID - SPIKE NA

CLIENT CODE WHC

ACTIONS (Initial & Date)

PREP LAB RECEIVED 4-29-99 JK

SAMPLE REMAINDER

RETURNED TO SCG  (CHECK ONE)

NO SAMPLE REMAINING

SEPARATION LAB NA

COUNTING/MEASUREMENT 429197

DATA REVIEWED JK 5-2-99

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

**RECOUNT**

ACTIONS (Initial & Date)

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

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

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

ADDITIONAL COMMENTS:

9713511.0209

\*\*\* I-129LP \*\*\*

Dup  
4-19-94

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

16-Apr-1994

Page 1

CUSTOMER: WHC

SAF  
93263

SAMPLE DELIVERY GROUP

W0006

MATRIX : SOIL

BATCH NUMBER

3-269

ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
LO32691B ✓				
LO326915 ✓		EQZK005	35.401	46665
1 ) 40326901		WHC	BOBFH3	
FO326901 ✓	DUP			

ACTIONS (Initial & Date)

1) INITIATED

JA 4/10/94

5) COUNTING/MEASUREMENT LAB

AS 4-20-94

2) PREP LAB RECEIVED

JN 4-19-94

6) DATA REVIEWED AND ANALYTICAL PREP STORED

JR 4-29-94

3) SAMPLE REMAINDER STORED

JN 4-20-94

4) SEPARATION LAB RECEIVED

NA

9713511.0209

\*\*\* ALPHA \*\*\*

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

16-Mar-1994

Page 1

DUP 11/14-14-91  
4-21-94  
19

CUSTOMER: WHC

SAF  
93-263

SAMPLE DELIVERY GROUP

Woodco

MATRIX : SOIL

BATCH NUMBER

3-269

ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
<del>L032691B</del>				
L032691S	EQEG-193		4.9883 ± .025798	
1 ) 40326901		WHC	BOBFH3	
F0326901	DUP			

ACTIONS (Initial & Date)

1) INITIATED

JH 3/17/94

5) COUNTING/MEASUREMENT LAB

OD 20 Apr 94

2) PREP LAB RECEIVED

JN 4-20-94

6) DATA REVIEWED AND

ANALYTICAL PREP STORED

3) SAMPLE REMAINDER STORED

JN 4-20-94

4) SEPARATION LAB RECEIVED

NA



INTERNATIONAL TECHNOLOGY CORPORATION

DUE DATE 4-29-94

REANALYSIS / RECOUNT  
CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

ANALYSIS Alpha  
CUSTOMER WHC  
MATRIX Soil

NAME/DATE JTK 4-29-94  
SAMPLE DELIVERY GROUP \_\_\_\_\_  
BATCH NUMBER \_\_\_\_\_

ITAS ID	CUSTOMER ID	COMMENTS
1 ) <u>L032691S</u>		<u>50min</u>
2 )		
3 )		
4 )		
5 )		
6 )		
7 )		
8 )		
9 )		
10)		

REANALYSIS

\*REFERENCED QC\*

ITAS ID - BLANK \_\_\_\_\_  
ITAS ID - SPIKE \_\_\_\_\_  
CLIENT CODE \_\_\_\_\_

ACTIONS (Initial & Date)

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

SAMPLE REMAINDER  
RETURNED TO SCG  (CHECK ONE)  
NO SAMPLE REMAINING

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

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

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

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

RECOUNT

ACTIONS (Initial & Date)

COUNTING/MEASUREMENT Plus 4/29/94

DATA REVIEWED JTK 4-29-94

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

ADDITIONAL COMMENTS:

*2nd count did not calculate  
did verify high bias by  
raw counts. JTK 4-29-94*

0066

*Due 4-14-94  
H-29-94  
19*

\*\*\* BETA \*\*\*

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

16-Mar-1994  
Page 1

CUSTOMER: WHC

SAMPLE DELIVERY GROUP Wood

MATRIX : SOIL

BATCH NUMBER 3-269

*SAF  
93-263*

ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
<del>L0326901</del>				
L0326915	EQPA039	25.104 ± .35416		
1 ) 40326901		WHC	BOBFH3	
F0326901	PUP			

ACTIONS (Initial & Date)

- 1) INITIATED *JH 3/17/94*
- 2) PREP LAB RECEIVED *gn 4-20-94*
- 3) SAMPLE REMAINDER STORED *gn 4-20-94*
- 4) SEPARATION LAB RECEIVED *NA*
- 5) COUNTING/MEASUREMENT LAB *20 apr 94 OP*
- 6) DATA REVIEWED AND ANALYTICAL PREP STORED *TK 4-29-94*

*JH*

Dul  
4-29-94

\*\*\* ~~SR 90~~ \*\*\* Total Sr  
TK 4-11-94

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

16-Mar-1994  
Page 1

CUSTOMER: WHC

SAMPLE DELIVERY GROUP W0006

MATRIX : SOIL

BATCH NUMBER 3-269

SAT  
93-263

ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
---------	-----	---------	-------------	----------

=====				
L032691B			54.7261I	.7825 PCI
L032691X		EQL997	30.373F	4343 DPM
L032691M				
1 ) 40326901		WHC	BOBFH3	
E032690L				
=====				

ACTIONS (Initial & Date)

- 1) INITIATED JH 3/17/94
- 2) PREP LAB RECEIVED MM 3-28-94
- 3) SAMPLE REMAINDER STORED MM 3-30-94
- 4) SEPARATION LAB RECEIVED 4-11-94TK
- 5) COUNTING/MEASUREMENT LAB SK 4-28-94
- 6) DATA REVIEWED AND ANALYTICAL PREP STORED SK 4/29/94

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

16-Mar-1994

Page 1

Dbe  
4-29-94

CUSTOMER: WHC

SAF  
93-263

SAMPLE DELIVERY GROUP

Wood

MATRIX : SOIL

BATCH NUMBER

3-269

ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
---------	-----	---------	-------------	----------

=====				
L032691 B				
L032691 S		EQB5013		
1 ) 40326901		WHC	BOBFH3	cat III
F0326901				cat III
L032691 m		EQB5014		
L032692 m		EQB5015		
=====				

ACTIONS (Initial & Date)

- ) INITIATED JH 3/17/94
- ) PREF LAB RECEIVED BAB 4-14-94
- ) SAMPLE REMAINDER STORED N/A
- ) SEPARATION LAB RECEIVED Susi 4.1994
- ) COUNTING/MEASUREMENT LAB 19 apr 94 OS
- ) DATA REVIEWED AND ANALYTICAL PREP STORED MJ 4/29/94

0710511.0214



INTERNATIONAL  
TECHNOLOGY  
CORPORATION

DUE DATE 4-19-94

REANALYSIS / RECOUNT  
CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

ANALYSIS Se 79  
CUSTOMER WHC  
MATRIX Soil

NAME/DATE JRK 4-20-94  
SAMPLE DELIVERY GROUP \_\_\_\_\_  
BATCH NUMBER SD6W0006

ITAS ID	CUSTOMER ID	COMMENTS
1 ) 40326901	Cont III	0.025g
2 ) F0326901	Cont III	0.025g
3 ) <del>L032692M</del>	<del>4/20/94 Bm</del>	<del>Ottawa Sand 2g</del>
4 ) L032693 M	EQBS 009	Ottawa Sand 2g
5 ) L032694 M	EQBS 010	Ottawa Sand 2g
6 )		
7 )		
8 )		
9 )		
10)		

REANALYSIS

\*REFERENCED QC\*

ITAS ID - BLANK L032692B  
EQBS 008  
ITAS ID - SPIKE L032692S  
CLIENT CODE WHC

ACTIONS (Initial & Date)

PREP LAB RECEIVED 4/20/94 Bm

SAMPLE REMAINDER

RETURNED TO SCG  (CHECK ONE)

NO SAMPLE REMAINING

RD 3221 4/20/94 Bm  
SEPARATION LAB 4/20/94 JAN

COUNTING/MEASUREMENT RM 4/26/94

DATA REVIEWED 4/29/94 ml

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

RECOUNT

ACTIONS (Initial & Date)

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

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

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

ADDITIONAL COMMENTS:

0070

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

16-Mar-1994  
Page 1

*Dup  
4-24-94*

CUSTOMER: WHC

*SAF  
43-263*

SAMPLE DELIVERY GROUP

*W0006*

MATRIX: SOIL

BATCH NUMBER

*3-269*

ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
<del>L032691 B</del>	<del>W032692 M</del>	<del>W032691 X</del>		
<del>L032690 I</del>	<del>L032693 M</del>	<del>L032691 X</del>		
L0326901	WHC	BOBFH3		6CNT123 100.52 1.24
F0326901- dup				W032690 J 6CNT124 100.16 1.235 W032691 D 6CNT124 100.37 1.244 L032691 M FS01125 130.54 1.230

ACTIONS (Initial & Date)

- 1) INITIATED *JH 3/17/94*
- 2) PREP LAB RECEIVED *MM 3-30-94*
- 3) SAMPLE REMAINDER STORED *MM 3-30-94*
- 4) SEPARATION LAB RECEIVED *3/31/94 MM*
- 5) COUNTING/MEASUREMENT LAB *2/4/19/94*
- 6) DATA REVIEWED AND ANALYTICAL PREP STORED *5/27/94*

L032691 N instrument  
L032692 N Blanks

9715811.0216

\*\*\* URANIUM \*\*\*

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

16-Mar-1994  
Page 1

Dup  
4-29-94

CUSTOMER: WHC  
MATRIX : SOIL

SAF  
93-263

SAMPLE DELIVERY GROUP Wood6  
BATCH NUMBER 3-269

ITAS ID	DUF	ACCOUNT	CUSTOMER ID	COMMENTS
=====				
L032691 B				
L032691 S				EQIK067
L032691 X				
1 ) 40326901		WHC	BOBFH3	Set III
-----				
F0326901				Set III
L032691 m				EQIK068
=====				

ACTIONS (Initial & Date)

- 1) INITIATED JH 3/17/94
- 2) PREF LAB RECEIVED BAB 4-14-94  
RD 3221 4/15/94
- 3) SAMPLE REMAINDER STORED N/A
- 4) SEPARATION LAB RECEIVED NA
- 5) COUNTING/MEASUREMENT LAB M.U. 4/20/94
- 6) DATA REVIEWED AND ANALYTICAL PREF STORED PK 4/28/94

Samples reanalyzed UCU  
PK 4/28/94



INTERNATIONAL  
TECHNOLOGY  
CORPORATION

DUE DATE 4/29/94

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

ANALYSIS U-L

NAME/DATE \_\_\_\_\_ / \_\_\_\_\_

CUSTOMER WTC

SAMPLE DELIVERY GROUP WADP

MATRIX Soil

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

ITAS ID	CUSTOMER ID	COMMENTS
1) 40326901		1/10 g
2) F0326901		1/10 g
3) <del>W03269</del> 17K4-22-84		
4) L032692M	EDK	1 gram Ottawa sand
5) L032693M	EDK	1 gram Ottawa sand
6) L032692 X		1 gram Ottawa sand
7)		
8)		
9)		
10)		

**REANALYSIS**

**RECOUNT**

\*REFERENCED QC\*

ACTIONS (Initial & Date)

ITAS ID - BLANK L032692B

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

ITAS ID - SPIKE <sup>EDK 069</sup> L032692S

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

CLIENT CODE WTC

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

ACTIONS (Initial & Date)

PREP LAB RECEIVED 4/22/94 Bm

ADDITIONAL COMMENTS:

SAMPLE REMAINDER  
RETURNED TO SCG  (CHECK ONE)

NO SAMPLE REMAINING   
RD3221 4/23/94 Bm  
SEPARATION LAB \_\_\_\_\_

COUNTING/MEASUREMENT 4-2794

DATA REVIEWED P. Kennedy 4/28/94

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

9713511.0218

\*\*\* AM/CMISO \*\*\*

Dup  
4-29-94

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

16-Mar-1994  
Page 1

CUSTOMER: WHC  
MATRIX : SOIL

SAF  
93-263

SAMPLE DELIVERY GROUP W0006  
BATCH NUMBER 3-269

ITAS ID	IUF	ACCOUNT	CUSTOMER ID	COMMENTS
<del>L032691 B</del>	<del>ESJ10352</del>			
<del>L032691 S</del>	<del>EQ0004</del>			
1 ) 40326901	ESJ10343	WHC	BOBFH3	
<del>F0326901</del>	<del>ESJ10344</del>			

ACTIONS (Initial & Date)

- 1) INITIATED JH 3/17/94
- 2) PREF LAB RECEIVED BAB 4-14-94  
RD3221
- 3) SAMPLE REMAINDER STORED N/A
- 4) SEPARATION LAB RECEIVED 4-18-94 Susan  
4/20/94 JF
- 5) COUNTING/MEASUREMENT LAB KC 4-21-94
- 6) DATA REVIEWED AND ANALYTICAL PREP STORED PK 4-22-94

0077

*[Handwritten signature]*



ITAS Data Review Checklist  
RADIOCHEMISTRY

Work Order No(s): 403269

Lab Sample Numbers or SDG: NA

Method/Test/Parameter: Am-Cm

Review Item	Yes (✓)	No (✓)	N/A (✓)	2 <sup>nd</sup> Level review (✓)
<b>A. Calibration</b>				
1. Is the calibration documentation included where applicable?			✓	✓
<b>B. Sample Analysis</b>				
1. Are the sample Yields within acceptance criteria?	✓			—
2. Were all sample holding times met?	✓			✓
<b>C. QC Samples</b>				
1. Is the Blank Yield within acceptance criteria?	✓			✓
2. Is the Minimum Detectable Activity for the Blank result $\leq$ the Contract Detection Limit?	✓			✓
3. Is the Blank result $\leq$ the Contract Detection Limit?	✓			✓
4. Is the Blank result greater than the Contract Detection Limit but the Sample result less than the Contract Detection Limit?			✓	—
5. Is the LCS result within acceptance criteria?	✓			✓
6. Is the LCS yield within acceptance criteria?	✓			✓
7. Is the LCS Minimum Detectable Activity less than or equal to the Contract Detection Limit?	✓			—
8. MS/MSD results and yield meet acceptance criteria?			✓	✓
9. Duplicate sample results and yield meet acceptance criteria?		✓		—
<b>D. Other</b>				
1. Are all nonconformances included and noted?	✓			✓
2. Are all required forms filled out?	✓			✓
3. Correct methodology used?	✓			—
4. Transcription checked?	OK			PK
5. Were all calculations checked at a minimum frequency?	✓			—
6. Units checked?	✓			✓

Comments on any "No" response:

NCM on dup out (of 3σ limit)

Analyst: Pam Kunitz

Date: 4-29-94

Second Level Review: Shirley Davis

Date: 4/29/94

Form No: LS-038, 3/94, Rev 2

20.3

97135110220



INTERNATIONAL TECHNOLOGY CORPORATION

PROJECT ID (Name/Number): WHC

NCM INITIATED BY (Name/Date): P Kenitzer 4-29-94

PARAMETER(S): Am 241 WOODS

SAMPLE NUMBER(S) AFFECTED: 40326901

MATRIX: soil

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

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

1.  Not enough sample received for proper analysis.

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

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

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

2.3  CATEGORY III: Laboratory Reruns

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

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

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

2.3.4  OTHER: (see #10)

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

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

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

6.  Invalid instrument calibration. (See #10)

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

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

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

9.  Other (specify): dup out of 3σ limit.

10.  Comments/Explanation:

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

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

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

PROJECT MANAGER (signature & date): Suzanne Davies 4/29/94

**CORRECTIVE ACTION**

**ROOT CAUSE:** INITIALS/DATE PK 4/29/94  
soil - matrix  
non homogeneous material

**CORRECTIVE ACTION:** INITIALS/DATE \_\_\_\_\_

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

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

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

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

FIRST LEVEL SUPERVISOR: Pam K... DATE: 4-29-94  
 RESPONSIBLE MANAGER: W Mack... DATE: 4/29/94

**QC REVIEW**

NONCONFORMANCE  DEFICIENCY  RERUN

FURTHER ACTION REQUIRED:

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

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

QC COORDINATOR: [Signature] DATE: 4/29/94

**CORRECTIVE ACTION VERIFICATION**

VERIFIED  CANNOT VERIFY (specify reason)

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

\_\_\_\_\_

**NCM CLOSURE**

QC COORDINATOR: [Signature] DATE: 4/29/94

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

16-Mar-1994

Page 1

Dup  
4-2-94  
19

CUSTOMER: WHC

SAF  
93-263

SAMPLE DELIVERY GROUP

Wood6

MATRIX : SOIL

BATCH NUMBER

3-269

ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
LO32691B				
LO326913	ERR013	25.056 ± .3524	DPM	
1 ) 40326901		WHC	BOBFH3	cat II
EO326901	Dup			cat III
LO32691M	ERR014	25.048 ± .3522		
LO32692M	ERR015	25.079 ± .3527		DPM

ACTIONS (Initial & Date)

1) INITIATED

JH 3/17/94

5) COUNTING/MEASUREMENT LAB

4-21-94  
K...  
4-21-

2) PREP LAB RECEIVED BAB 4-14-94

6) DATA REVIEWED AND ANALYTICAL PREP STORED

M... 4-22-94

3) SAMPLE REMAINDER STORED N/A

4) SEPARATION LAB RECEIVED 4/19/94 JF

Do not use LO32692M for batch spike recovery for trace

RF 4-21-94



ITAS Data Review Checklist  
RADIOCHEMISTRY

Work Order No(s): 403029

Lab Sample Numbers or SDG: W0006 -

Method/Test/Parameter: R07209 Np

Review Item	Yes (✓)	No (✓)	N/A (✓)	2 <sup>nd</sup> Level review (✓)
<b>A. Calibration</b>				
1. Is the calibration documentation included where applicable?			✓	✓
<b>B. Sample Analysis</b>				
1. Are the sample Yields within acceptance criteria?	✓			✓
2. Were all sample holding times met?	✓			✓
<b>C. QC Samples</b>				
1. Is the Blank Yield within acceptance criteria?	✓			✓
2. Is the Minimum Detectable Activity for the Blank result $\leq$ the Contract Detection Limit?	✓			✓
3. Is the Blank result $\leq$ the Contract Detection Limit?	✓			✓
4. Is the Blank result greater than the Contract Detection Limit but the Sample result less than the Contract Detection Limit?			✓	✓
5. Is the LCS result within acceptance criteria?	✓			✓
6. Is the LCS yield within acceptance criteria?	✓			✓
7. Is the LCS Minimum Detectable Activity less than or equal to the Contract Detection Limit?	✓			✓
8. MS/MSD results and yield meet acceptance criteria?		✓		✓
9. Duplicate sample results and yield meet acceptance criteria?	✓			✓
<b>D. Other</b>				
1. Are all nonconformances included and noted?	✓			✓
2. Are all required forms filled out?	✓			✓
3. Correct methodology used?	✓			✓
4. Transcription checked?	✓			✓
5. Were all calculations checked at a minimum frequency?	✓			✓
6. Units checked?	✓			✓

Comments on any "No" response:

MDA not met due to small sample size based on screening results.

Matrix spike W032692M not accepted, NCM generated.

Matrix spike W032691M acceptable, used for yield correction.

Analyst: W. Kelly

Date: 4/22/94

Second Level Review: Sue Jones

Date: 4/29/94

Form No: LS-038, 3/94, Rev 2

OK to ship 4-22-94 W. Kelly

1.99

9713511.0224



INTERNATIONAL TECHNOLOGY CORPORATION

PROJECT ID (Name/Number): WHC

NCM INITIATED BY (Name/Date): Wm K 4-22-94

PARAMETER(S): Np

SAMPLE NUMBER(S) AFFECTED: 40326901 WOOD6

MATRIX: Soil

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

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

1.  Not enough sample received for proper analysis.

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

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

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

2.3  CATEGORY III: Laboratory Reruns

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

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

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

2.3.4  OTHER: (see #10)

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

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

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

6.  Invalid instrument calibration. (See #10)

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

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

9.  Other (specify): MDA not met

10.  Comments/Explanation:

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

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

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

PROJECT MANAGER (signature & date): Suzanne 4/29/94

**CORRECTIVE ACTION**

ROOT CAUSE:

INITIALS/DATE MMH 4-22-94

MDA not met due to sample size - screening activity resulted in a very small sample being analyzed.

CORRECTIVE ACTION:

INITIALS/DATE MMH 4-22-94

Revised MDA for sample analyzed was met

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

ACTIONS TO PREVENT RECURRENCE:

INITIALS/DATE \_\_\_\_\_

FIRST LEVEL SUPERVISOR: \_\_\_\_\_

DATE: 4-22-94

RESPONSIBLE MANAGER: \_\_\_\_\_

DATE: 4/29/94

**QC REVIEW**

NONCONFORMANCE

DEFICIENCY

RERUN

FURTHER ACTION REQUIRED:

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

QC COORDINATOR: \_\_\_\_\_

DATE: 4/29/94

**CORRECTIVE ACTION VERIFICATION**

VERIFIED

CANNOT VERIFY (specify reason)

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

**NCM CLOSURE**

QC COORDINATOR: \_\_\_\_\_

DATE: 4/29/94



PROJECT ID (Name/Number): WITC

NCM INITIATED BY (Name/Date): MMH 4-22-94

PARAMETER(S): Np

SAMPLE NUMBER(S) AFFECTED: 203269211 WOOD6

MATRIX: soil

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

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

1.  Not enough sample received for proper analysis.

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

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

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

2.3  CATEGORY III: Laboratory Reruns

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

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

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

2.3.4  OTHER: (see #10)

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

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

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

6.  Invalid instrument calibration. (See #10)

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

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

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

9.  Other (specify): matrix spike Np activity not resolvable

10.  Comments/Explanation:

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

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

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

PROJECT MANAGER (signature & date): Suzanne 4/29/94

**CORRECTIVE ACTION**

ROOT CAUSE: INITIALS/DATE MMW 4/22/94

matrix spike 2M unresolvable

CORRECTIVE ACTION: INITIALS/DATE MMW 4/22/94

matrix spike 1M is acceptable - use as the batch tracer recovery.

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

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

FIRST LEVEL SUPERVISOR: Don Kelly DATE: 4-22-94

RESPONSIBLE MANAGER: W. Macella DATE: 4/29/94

**QC REVIEW**

NONCONFORMANCE  DEFICIENCY  RERUN

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

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

QC COORDINATOR: Jodie Cr. DATE: 4/29/94

**CORRECTIVE ACTION VERIFICATION**

VERIFIED  CANNOT VERIFY (specify reason)

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

**NCM CLOSURE**

QC COORDINATOR: [Signature] DATE: 4/29/94

\*\*\* PUIISO \*\*\*

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

16-Mar-1994

Page 1

*Dup  
4-29-94*

CUSTOMER: WHC

*SAF  
03-263*

SAMPLE DELIVERY GROUP

*Woods*

MATRIX : SOIL

BATCH NUMBER

*3-269*

ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
=====				
L032691	<i>B</i>	<i>ESH 15684</i>		
L032691	<i>S</i>	<i>ICMI 029</i>		
1 ) 40326901		<i>ESH15685</i>	WHC	BOBFH3 <i>cut II</i>
F0326901		<i>ESH15686</i>		<i>cut II</i>
=====				

ACTIONS (Initial & Date)

1) INITIATED

*JH 3/17/94*

5) COUNTING/MEASUREMENT LAB

*KCH 20-94*

2) PREP LAB RECEIVED *BAB 4-14-94*  
*RD3221*

6) DATA REVIEWED AND

ANALYTICAL PREP STORED *PK 4/29/94*

3) SAMPLE REMAINDER STORED *N/A*

4) SEPARATION LAB RECEIVED *JF 4/5/94*

*ED 4-19-94/*



ITAS Data Review Checklist  
RADIOCHEMISTRY

Work Order No(s): 403269

Lab Sample Numbers or SDG: 40006

Method/Test/Parameter: Pu iso

Review Item	Yes (✓)	No (✓)	N/A (✓)	2 <sup>nd</sup> Level review (✓)
<b>A. Calibration</b>				
1. Is the calibration documentation included where applicable?			✓	✓
<b>B. Sample Analysis</b>				
1. Are the sample Yields within acceptance criteria?	✓			✓
2. Were all sample holding times met?	✓			✓
<b>C. QC Samples</b>				
1. Is the Blank Yield within acceptance criteria?	✓			—
2. Is the Minimum Detectable Activity for the Blank result $\leq$ the Contract Detection Limit?	✓			✓
3. Is the Blank result $\leq$ the Contract Detection Limit?	✓			✓
4. Is the Blank result greater than the Contract Detection Limit but the Sample result less than the Contract Detection Limit?			✓	✓
5. Is the LCS result within acceptance criteria?	✓			✓
6. Is the LCS yield within acceptance criteria?	✓			✓
7. Is the LCS Minimum Detectable Activity less than or equal to the Contract Detection Limit?	✓			—
8. MS/MSD results and yield meet acceptance criteria?			✓	✓
9. Duplicate sample results and yield meet acceptance criteria?		✓		—
<b>D. Other</b>				
1. Are all nonconformances included and noted?	✓			✓
2. Are all required forms filled out?	✓			✓
3. Correct methodology used?	✓			✓
4. Transcription checked?	CB			PK
5. Were all calculations checked at a minimum frequency?	✓			✓
6. Units checked?	✓			✓

Comments on any "No" response: NCM on last dup PK 4-29-94

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Analyst: Pam K... Date: 4-29-94

Second Level Review: Sue... Date: 4/29/94

Form No: LS-038, 3/94, Rev 2

201

9713511.0230



INTERNATIONAL TECHNOLOGY CORPORATION

PROJECT ID (Name/Number): WHC

NCM INITIATED BY (Name/Date): P Kenitzer 4-29-94

PARAMETER(S): Pu 150

SAMPLE NUMBER(S) AFFECTED: 40326901 E0326901 WOOD6

MATRIX: soil

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

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

1.  Not enough sample received for proper analysis.

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

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

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

2.3  CATEGORY III: Laboratory Reruns

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

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

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

2.3.4  OTHER: (see #10)

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

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

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

6.  Invalid instrument calibration. (See #10)

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

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

9.  Other (specify): pk 4/29/94  
dup E06 E0326901 lost due to low  
yield (15.7%)  
matrix effect

10.  Comments/Explanation:

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

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

in writing  by FAX  
 by phone  Other (explain)

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

PROJECT MANAGER (signature & date): Swig Lanes 4/29/94

**CORRECTIVE ACTION**

**ROOT CAUSE:** INITIALS/DATE PK 4/29/94  
 The result of the dup was well within 2σ of the sample but must be called lost because of low yield.  
 matrix effect

**CORRECTIVE ACTION:** INITIALS/DATE \_\_\_\_\_  
 DATA ACCEPTED BASED ON ACCEPTABLE SPIKE- AND BLANK RESULTS  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 RESPONSIBILITY FOR PERFORMING CORRECTIVE ACTION ASSIGNED TO: \_\_\_\_\_

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

FIRST LEVEL SUPERVISOR: Pam Kenney DATE: 4-29-94  
 RESPONSIBLE MANAGER: W MacCallister DATE: 4/29/94

**QC REVIEW**

NONCONFORMANCE  DEFICIENCY  RERUN  
 FURTHER ACTION REQUIRED: Recount  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 QC COORDINATOR: [Signature] DATE: 4/29/94

**CORRECTIVE ACTION VERIFICATION**

VERIFIED  CANNOT VERIFY (specify reason)  
 REASON: \_\_\_\_\_  
 \_\_\_\_\_

**NCM CLOSURE**

QC COORDINATOR: [Signature] DATE: 4/29/94

\*\*\* UIISO \*\*\*

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

16-Mar-1994

Page 1

Dup  
4-29-94

CUSTOMER: WHC

SAF  
93-263

SAMPLE DELIVERY GROUP

W0006

MATRIX : SOIL

BATCH NUMBER

3-269

ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
---------	-----	---------	-------------	----------

=====				
L032691B	ESI14915			
L032691E	FOIC 084	FOIC 086		
1 ) 40326901	ESI14916	WHC	BOBFH3	cat III
F0326901	ESI14917			cat III
=====				

ACTIONS (Initial & Date)

1) INITIATED

JH 3/7/94

5) COUNTING/MEASUREMENT LAB

KC 4-20-94

2) PREF LAB RECEIVED BAR 4-14-94  
RD3221 4/5/94

6) DATA REVIEWED AND ANALYTICAL PREF STORED  
MUNN 4-25-94

3) SAMPLE REMAINDER STORED N/A

4) SEPARATION LAB RECEIVED 4/12/94 Ecu

Extracted 4-18-94 AC  
ED 4.19.94 PM

Jul 29



ITAS Data Review Checklist  
RADIOCHEMISTRY

Work Order No(s): 403269

Lab Sample Numbers or SDG: W0006

Method/Test/Parameter: R03234 U100

Review Item	Yes (✓)	No (✓)	N/A (✓)	2 <sup>nd</sup> Level review (✓)
<b>A. Calibration</b>				
1. Is the calibration documentation included where applicable?			✓	✓
<b>B. Sample Analysis</b>				
1. Are the sample Yields within acceptance criteria?	✓			✓
2. Were all sample holding times met?	✓			✓
<b>C. QC Samples</b>				
1. Is the Blank Yield within acceptance criteria?	✓			✓
2. Is the Minimum Detectable Activity for the Blank result $\leq$ the Contract Detection Limit?	✓			✓
3. Is the Blank result $\leq$ the Contract Detection Limit?	✓			✓
4. Is the Blank result greater than the Contract Detection Limit but the Sample result less than the Contract Detection Limit?			✓	✓
5. Is the LCS result within acceptance criteria?	✓			✓
6. Is the LCS yield within acceptance criteria?	✓			✓
7. Is the LCS Minimum Detectable Activity less than or equal to the Contract Detection Limit?	✓			✓
8. MS/MSD results and yield meet acceptance criteria?			✓	✓
9. Duplicate sample results and yield meet acceptance criteria?	✓			✓
<b>D. Other</b>				
1. Are all nonconformances included and noted?	✓			✓
2. Are all required forms filled out?	✓			✓
3. Correct methodology used?	✓			✓
4. Transcription checked?	✓			✓
5. Were all calculations checked at a minimum frequency?	✓			✓
6. Units checked?	✓			✓

Comments on any "No" response:

MDA Not met - NCM.

Analyst: W. Kellon

Date: 4-25-94

Second Level Review: Sue Davis

Date: 4/29/94

Form No: LS-038, 3/94, Rev 2

OK to transfer 4-25-94 WKK

202

9713511.0234



INTERNATIONAL TECHNOLOGY CORPORATION

PROJECT ID (Name/Number): WHC

NCM INITIATED BY (Name/Date): Munk 4-25-94

PARAMETER(S): Uiso

SAMPLE NUMBER(S) AFFECTED: 40326401, F01 WOODS

MATRIX: Soil

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

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

1.  Not enough sample received for proper analysis.

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

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

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

2.3  CATEGORY III: Laboratory Reruns

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

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

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

2.3.4  OTHER: (see #10)

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

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

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

6.  Invalid instrument calibration. (See #10)

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

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

9.  Other (specify):  
 \_\_\_\_\_  
 \_\_\_\_\_

10.  Comments/Explanation:  
 \_\_\_\_\_  
 \_\_\_\_\_

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

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

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

PROJECT MANAGER (signature & date): Serg James 4/29/94

**CORRECTIVE ACTION**

ROOT CAUSE:

INITIALS/DATE MMH 4-25-94

- MDA not met due to small sample size based on screening results. Sample size is more than 100 times smaller than in CL.

CORRECTIVE ACTION:

INITIALS/DATE MMH 4-25-94

RESPONSIBILITY FOR PERFORMING CORRECTIVE ACTION ASSIGNED TO:

ACTIONS TO PREVENT RECURRENCE:

INITIALS/DATE \_\_\_\_\_

FIRST LEVEL SUPERVISOR:

Mr. Kelly

DATE: 4-25-94

RESPONSIBLE MANAGER:

W. Mackell

DATE: 4/29/94

**QC REVIEW**

NONCONFORMANCE

DEFICIENCY

RERUN

FURTHER ACTION REQUIRED

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

QC COORDINATOR:

[Signature]

DATE: 4/29/94

**CORRECTIVE ACTION VERIFICATION**

VERIFIED

CANNOT VERIFY (specify reason)

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

**NCM CLOSURE**

QC COORDINATOR:

[Signature]

DATE: 4/29/94

\*\*\* GAMMA \*\*\*

DWA  
4-26-94  
92414-94

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

16-Mar-1994  
Page 1

CUSTOMER: WHC  
MATRIX : SOIL

SAF  
93-263

SAMPLE DELIVERY GROUP  
BATCH NUMBER

Wood  
3-269

ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
40326901		WHC	BOBFH3	

ACTIONS (Initial & Date)

- 1) INITIATED JH 3/17/94
- 2) PREP LAB RECEIVED JMM 3-18-94
- 3) SAMPLE REMAINDER STORED JMM 3-20-94
- 4) SEPARATION LAB RECEIVED N/A
- 5) COUNTING/MEASUREMENT LAB AS 4-18-94
- 6) DATA REVIEWED AND ANALYTICAL PREP STORED



INTERNATIONAL  
TECHNOLOGY  
CORPORATION

DUE DATE 4-19-94

REANALYSIS / RECOUNT

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

ANALYSIS J

NAME/DATE JK 4-29-94

CUSTOMER WHC

SAMPLE DELIVERY GROUP \_\_\_\_\_

MATRIX Soil

BATCH NUMBER SDGW0006

ITAS ID	CUSTOMER ID	COMMENTS
1 ) F0326901		600min
2 )		
3 )		
4 )		
5 )		
6 )		
7 )		
8 )		
9 )		
10)		

REANALYSIS

\*REFERENCED QC\*

ITAS ID - BLANK NA

ITAS ID - SPIKE NA

CLIENT CODE WHC

ACTIONS (Initial & Date)

PREP LAB RECEIVED 4-29-94 JK

SAMPLE REMAINDER  
RETURNED TO SCG  (CHECK ONE)

NO SAMPLE REMAINING

SEPARATION LAB NA

COUNTING/MEASUREMENT Azalaq

DATA REVIEWED JK 5-2-94

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

RECOUNT

ACTIONS (Initial & Date)

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

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

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

ADDITIONAL COMMENTS:



**ITAS Data Review Checklist  
RADIOCHEMISTRY**

Work Order No(s): <u>403269</u>				
Lab Sample Numbers or SDG: <u>203269 LB - 203269 IS</u>				
Method/Test/Parameter: <u>Gamma</u>				
Review Item	Yes (✓)	No (✓)	N/A (✓)	2 <sup>nd</sup> Level review (✓)
<b>A. Calibration</b>			✓	—
1. Is the calibration documentation included where applicable?			✓	—
<b>B. Sample Analysis</b>			✓	✓
1. Are the sample Yields within acceptance criteria?			✓	✓
2. Were all sample holding times met?	✓			✓
<b>C. QC Samples</b>			✓	—
1. Is the Blank Yield within acceptance criteria?			✓	—
2. Is the Minimum Detectable Activity for the Blank result $\leq$ the Contract Detection Limit?		✓		—
3. Is the Blank result $\leq$ the Contract Detection Limit?	✓			✓
4. Is the Blank result greater than the Contract Detection Limit but the Sample result less than the Contract Detection Limit?			✓	—
5. Is the LCS result within acceptance criteria?	✓			—
6. Is the LCS yield within acceptance criteria?			✓	—
7. Is the LCS Minimum Detectable Activity less than or equal to the Contract Detection Limit?			✓	—
8. MS/MSD results and yield meet acceptance criteria?			✓	—
9. Duplicate sample results and yield meet acceptance criteria?			✓	—
<b>D. Other</b>				—
1. Are all nonconformances included and noted?	✓			—
2. Are all required forms filled out?	✓			—
3. Correct methodology used?	✓			—
4. Transcription checked?	✓			—
5. Were all calculations checked at a minimum frequency?	✓			—
6. Units checked?	✓			—

Comments on any "No" response:

MDAs for several isotopes not met NCM issued

Analyst: Jal Kempema

Date: 4-29-99

Second Level Review: Samir Larios

Date: 5/2/99

Form No: IS-038, 3/94, Rev 2

203



PROJECT ID (Name/Number): WHC

NCM INITIATED BY (Name/Date): Joel T Kempema 4-29-94

PARAMETER(S): Gamma

SAMPLE NUMBER(S) AFFECTED: 2032691B, 40326901

MATRIX: Soil

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

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

1.  Not enough sample received for proper analysis.

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

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

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

2.3  CATEGORY III: Laboratory Reruns

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

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

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

2.3.4  OTHER: (see #10)

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

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

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

6.  Invalid instrument calibration. (See #10)

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

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

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

9.  Other (specify): MDA not met Co 60, Eu 152, Eu 154 in blank  
MDAs for sample also not met

10.  Comments/Explanation: Sample size reduced due to high activity  
of sample and QC counted + aliquoted according  
to sample process.

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

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

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

PROJECT MANAGER (signature & date): Suzi Daines 5/2/94

**CORRECTIVE ACTION**

ROOT CAUSE: INITIALS/DATE: JTK 4-29-94  
high activity of sample

CORRECTIVE ACTION: INITIALS/DATE: JTK 4-29-94  
data accepted

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

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

FIRST LEVEL SUPERVISOR: Jed Thompson DATE: 4-29-94  
 RESPONSIBLE MANAGER: W. Malkin DATE: 5/2/94

**QC REVIEW**

NONCONFORMANCE  DEFICIENCY  RERUN

FURTHER ACTION REQUIRED:

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

QC COORDINATOR: Jodie Cor DATE: 5/2/94

**CORRECTIVE ACTION VERIFICATION**

VERIFIED  CANNOT VERIFY (specify reason)

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

**NCM CLOSURE**

QC COORDINATOR: Jodie Cor DATE: 5/2/94



93

ITAS-Notland  
LABORATORY NONCONFORMANCE MEMO (NCM)

PROJECT ID (Name/Number): WHC

NCM INITIATED BY (Name/Date): Joel TKempema 4-29-94

PARAMETER(S): Gamma

SAMPLE NUMBER(S) AFFECTED: F0326901

MATRIX: Soil

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

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

1.  Not enough sample received for proper analysis.

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

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

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

2.3  CATEGORY III: Laboratory Reruns

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

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

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

2.3.4  OTHER: (see #10)

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

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

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

6.  Invalid instrument calibration. (See #10)

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

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

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

9.  Other (specify): Initial sample & processing a duplicate was inadvertently not made

10.  Comments/Explanation: & processing involves placing an aliquot in appropriate sized container for counting and sealing container.

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

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

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

PROJECT MANAGER (signature & date): Suz Davis 5/2/94

**CORRECTIVE ACTION**

**ROOT CAUSE:** INITIALS/DATE TRK 5-2-94  
oversight of technicians & team leader

**CORRECTIVE ACTION:** INITIALS/DATE TRK 5-2-94  
duplicate memo for summary made upon 5-4-29-94  
and submitted for counting  
Duplicate analysis results accepted, TRK 5-2-94

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

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

FIRST LEVEL SUPERVISOR: Jael Kempman DATE: 5-2-94  
 RESPONSIBLE MANAGER: W Mackilla DATE: 5/2/94

**QC REVIEW**

NONCONFORMANCE  DEFICIENCY  RERUN

FURTHER ACTION REQUIRED:

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

QC COORDINATOR: Jodie Con DATE: 5/2/94

**CORRECTIVE ACTION VERIFICATION**

VERIFIED  CANNOT VERIFY (specify reason)

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

**NCM CLOSURE**

QC COORDINATOR: Jodie Con DATE: 5/2/94

<b>Westinghouse Hanford Company</b>	<b>CHAIN OF CUSTODY</b>	<b>006251</b>
Custody Form Initiator <u>DL EDWARDS</u>		
Company Contact <u>C.A. Rowley</u>	Telephone <u>372-3293</u>	
Project Designation/Sampling Locations <u>216-U-8</u>	Collection Date <u>3/1/94 1515</u>	
<u>Vitrified Clay Pipeline</u>		
Ice Chest No. _____	Field Logbook No. <u>SAF 93-263</u>	
Bill of Lading/Airbill No. <u>NA</u>	Offsite Property No. <u>N/A</u>	
Method of Shipment <u>TRUCK - HAND Delivered to PNL</u>		
Shipped to <u>AME IT ARE 3/15/94</u>		
Possible Sample Hazards/Remarks <u>Analysis per SAF # 93-263</u>		

Sample Identification

<u>BOBFH3</u>	<u>40326801</u>	A (1) 250ML Gs	VOA
		B (1) 250ML aG	Semi-VOA
		C (1) 250ML Poly	Metals
		D (1) 125ML G	Anions
		E (1) 125ML G	NO <sub>2</sub> /NO <sub>3</sub>
		F (1) 125ML G	Cyanide
		G (1) 125ML Gs	Kerosene
	<u>40326901</u>	(1) 1000ML Poly	Radionuclides

ARE 3/15/94

Field Transfer of Custody **CHAIN OF POSSESSION** (Sign and Print Name)

Relinquished By	Date	Time	Received By	Date	Time
<u>From C.O.C. # 006227</u> <u>DL Edwards</u>	<u>3/10/94</u>	<u>0820</u>	<u>DL Edwards</u>		
<u>DL Edwards</u>	<u>3/15/94</u>	<u>1320</u>	<u>Jon [Signature]</u> <small>&lt;100 00 [Signature]</small> <u>ITAF</u>	<u>3/15/94</u>	<u>1455</u>

Final Sample Disposition **0431**

Disposal Method: \_\_\_\_\_ Disposed by: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Comments: Sample transferred from C.O.C. # 006227. Change in lab due to radioactivity levels.

9713531.0244

\*\*\* I-129LP \*\*\*

Dup  
4-19-94

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

16-Apr-1994

Page 1

CUSTOMER: WHC

SAF  
93263

SAMPLE DELIVERY GROUP

W0006

MATRIX : SOIL

BATCH NUMBER

3-269

ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
LO326918 ✓				
LO326915 ✓		EQZK 005	35.401 ±	r.46665
1 ) 40326901		WHC	BOBFH3	
F0326901 ✓	DUP			

ACTIONS (Initial & Date)

- 1) INITIATED JA 4/10/94
- 2) PREP LAB RECEIVED JN 4-19-94
- 3) SAMPLE REMAINDER STORED JN 4-20-94
- 4) SEPARATION LAB RECEIVED NA
- 5) COUNTING/MEASUREMENT LAB AS 4-20-94
- 6) DATA REVIEWED AND ANALYTICAL PREP STORED JR 4-29-94



ITAS Data Review Checklist  
RADIOCHEMISTRY

Work Order No(s): 403269

Lab Sample Numbers or SDG: L0326918 - L0326915

Method/Test/Parameter: I129

Review Item	Yes (✓)	No (✓)	N/A (✓)	2 <sup>nd</sup> Level review (✓)
<b>A. Calibration</b>			✓	
1. Is the calibration documentation included where applicable?				
<b>B. Sample Analysis</b>			✓	
1. Are the sample Yields within acceptance criteria?				
2. Were all sample holding times met?	✓			
<b>C. QC Samples</b>			✓	
1. Is the Blank Yield within acceptance criteria?				
2. Is the Minimum Detectable Activity for the Blank result $\leq$ the Contract Detection Limit?	✓			
3. Is the Blank result $\leq$ the Contract Detection Limit?	✓			
4. Is the Blank result greater than the Contract Detection Limit but the Sample result less than the Contract Detection Limit?			✓	
5. Is the LCS result within acceptance criteria?	✓			
6. Is the LCS yield within acceptance criteria?			✓	
7. Is the LCS Minimum Detectable Activity less than or equal to the Contract Detection Limit?	✓			
8. MS/MSD results and yield meet acceptance criteria?			✓	
9. Duplicate sample results and yield meet acceptance criteria?		✓		
<b>D. Other</b>				
1. Are all nonconformances included and noted?	✓			
2. Are all required forms filled out?	✓			
3. Correct methodology used?	✓			
4. Transcription checked?	✓			
5. Were all calculations checked at a minimum frequency?	✓			
6. Units checked?	✓			

Comments on any "No" response:

NCM I129 results called lost for sample + Duplicate

Analyst: Jael Thompson

Date: 5-2-94

Second Level Review: Suzanne Davis

Date: 5/2/94

Form No: LS-038, 3/94, Rev 2

204

8715511.0246



INTERNATIONAL TECHNOLOGY CORPORATION

LOG #: RD-84- \_\_\_\_\_ page 1 of 2

ITAS-Rohland LABORATORY NONCONFORMANCE MEMO (NCM)

PROJECT ID (Name/Number): WHC

NCM INITIATED BY (Name/Date): Joe IT Kempema 5-2-99

PARAMETER(S): I129

SAMPLE NUMBER(S) AFFECTED: 40326901 F0326901

MATRIX: Soil

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

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

1.  Not enough sample received for proper analysis.

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

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

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

2.3  CATEGORY III: Laboratory Reruns

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

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

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

2.3.4  OTHER: (see #10)

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

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

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

6.  Invalid instrument calibration. (See #10)

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

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

9.  Other (specify): due to high Cs activity of sample I129 results by standard methodology are suspect and unreliable - activity may be greater than shown

10.  Comments/Explanation: high activity of sample causes a high background count and approximately 45% dead time during counting process.

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

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

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

PROJECT MANAGER (signature & date): Suz Laines 5/2/99

**CORRECTIVE ACTION**

ROOT CAUSE:

INITIALS/DATE JK 5-29/94

high Cs137 activity of sample

CORRECTIVE ACTION:

INITIALS/DATE JK 5-2-94

Notify project ~~manager~~ <sup>manager</sup> on 5-29-94  
JKS-2-94

Determine analysis lost due to matrix effect

RESPONSIBILITY FOR PERFORMING CORRECTIVE ACTION ASSIGNED TO:

ACTIONS TO PREVENT RECURRENCE:

INITIALS/DATE \_\_\_\_\_

FIRST LEVEL SUPERVISOR:

Joel T. Kinsman

DATE: 5-2-94

RESPONSIBLE MANAGER:

W. MacKellar

DATE: 5/2/94

**QC REVIEW**

NONCONFORMANCE

DEFICIENCY

RERUN

FURTHER ACTION REQUIRED

ASSIGNED TO

QC COORDINATOR:

Jodie Core

DATE: 5/2/94

**CORRECTIVE ACTION VERIFICATION**

VERIFIED

CANNOT VERIFY (specify reason)

REASON:

**NCM CLOSURE**

QC COORDINATOR:

Jodie Core

DATE: 5/2/94

Dup  
4-26-94  
19

97135110240

\*\*\* ALPHA \*\*\*

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

16-Mar-1994

Page 1

CUSTOMER: WHC  
MATRIX : SOIL

SAF  
93-263

SAMPLE DELIVERY GROUP Wood  
BATCH NUMBER 3-269

ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
<del>LC32691B</del>				
LC326915		EQEG-193	7.9883 ±	.025-798
1 ) 40326901		WHC	BOBFH3	
FC326901	DUP			

ACTIONS (Initial & Date)

- 1) INITIATED JH 3/17/94
- 2) PREP LAB RECEIVED JN 4-20-94
- 3) SAMPLE REMAINDER STORED JN 4-20-94
- 4) SEPARATION LAB RECEIVED NA
- 5) COUNTING/MEASUREMENT LAB OP 20 apr 94
- 6) DATA REVIEWED AND ANALYTICAL PREP STORED \_\_\_\_\_



DUE DATE 4-29-94

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

ANALYSIS Alpha  
CUSTOMER WHC  
MATRIX Soil

NAME/DATE JTK 4-29-94  
SAMPLE DELIVERY GROUP \_\_\_\_\_  
BATCH NUMBER \_\_\_\_\_

ITAS ID	CUSTOMER ID	COMMENTS
1 ) <u>L032691S</u>		<u>50min</u>
2 )		
3 )		
4 )		
5 )		
6 )		
7 )		
8 )		
9 )		
10)		

REANALYSIS

\*REFERENCED QC\*

ITAS ID - BLANK \_\_\_\_\_  
ITAS ID - SPIKE \_\_\_\_\_  
CLIENT CODE \_\_\_\_\_

ACTIONS (Initial & Date)

PREP LAB RECEIVED \_\_\_\_\_  
SAMPLE REMAINDER  
RETURNED TO SCG  (CHECK ONE)  
NO SAMPLE REMAINING   
SEPARATION LAB \_\_\_\_\_  
COUNTING/MEASUREMENT \_\_\_\_\_  
DATA REVIEWED \_\_\_\_\_  
ANALYTICAL PREP STORED \_\_\_\_\_

RECOUNT

ACTIONS (Initial & Date)

COUNTING/MEASUREMENT JTK 4/29/94  
DATA REVIEWED JTK 4-29-94  
ANALYTICAL PREP STORED \_\_\_\_\_

ADDITIONAL COMMENTS:  
2nd count did not calculate  
did verify high bias by  
raw counts. JTK 4-29-94



ITAS Data Review Checklist  
RADIOCHEMISTRY

Work Order No(s): 403269

Lab Sample Numbers or SDG: L032691 B - L032691 S

Method/Test/Parameter: Beta Alpha

Review Item	Yes (✓)	No (✓)	N/A (✓)	2 <sup>nd</sup> Level review (✓)
A. Calibration 1. Is the calibration documentation included where applicable?			✓	✓
B. Sample Analysis 1. Are the sample yields within acceptance criteria?			✓	✓
2. Were all sample holding times met?	✓			✓
C. QC Samples 1. Is the Blank yield within acceptance criteria?			✓	✓
2. Is the Minimum Detectable Activity for the Blank result $\leq$ the Contract Detection Limit?	✓			✓
3. Is the Blank result $\leq$ the Contract Detection Limit?	✓			✓
4. Is the Blank result greater than the Contract Detection Limit but the Sample result less than the Contract Detection Limit?			✓	✓
5. Is the LCS result within acceptance criteria?	✓			✓
6. Is the LCS yield within acceptance criteria?			✓	✓
7. Is the LCS Minimum Detectable Activity less than or equal to the Contract Detection Limit?	✓			✓
8. MS/MSD results and yield meet acceptance criteria?			✓	✓
9. Duplicate sample results and yield meet acceptance criteria?	✓			✓
D. Other 1. Are all nonconformances included and noted?	✓			✓
2. Are all required forms filled out?	✓			✓
3. Correct methodology used?	✓			✓
4. Transcription checked?	✓			✓
5. Were all calculations checked at a minimum frequency?	✓			✓
6. Units checked?	✓			✓

Comments on any "No" response: NCM issued deviation from procedure & spike

Analyst: Jed Kempner  
 Second Level Review: Sam Jones  
 Form No: IS-038, 3/94, Rev 2

Date: 5-2-94  
 Date: 5/2/94

OK to transfer



PROJECT ID (Name/Number):

WHC

NCM INITIATED BY (Name/Date):

Joel T Kempema 4-29-94

PARAMETER(S):

Alpha

SAMPLE NUMBER(S) AFFECTED:

40326901 L0326915

MATRIX:

A SOIL

AREA:

SHIP/REC

RADIOCHEM

COUNTING

BIOASSAY

DATA VERIF

REPORTING

OTHER:

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

- 1.  Not enough sample received for proper analysis.
- 2.  Holding time exceeded by \_\_\_\_\_ days due to:
- 2.1  CATEGORY I: Out of Laboratory Control
  - Holding time expired at receipt.
- 2.2  CATEGORY II: Laboratory Dependent
  - work backlog  instrument failure
  - communication  other (see #10)
- 2.3  CATEGORY III: Laboratory Reruns
  - 2.3.1  QA/QC:
    - surrogates  internal standards
    - spike recoveries  blank contamination
  - 2.3.2  CONFIRMATION:
    - second column  contamination check
    - other (see #10)
  - 2.3.3  DILUTION:
    - over calibration  under calibration
    - other (see #10)
  - 2.3.4  OTHER: (see #10)
- 3.  Sample lost during extraction/analysis; no re-prep or re-analysis possible.
- 4.  QC data reported to client outside of:
  - method limits  internal limits
  - QAPP limits  contract limits
  - regulatory limits  blank criteria
- 5.  Incorrect procedure(s) used. (See #10)
- 6.  Invalid instrument calibration. (See #10)
- 7.  Incorrect/incomplete data reported to client. (See #10)
- 8.  Reported detection limit(s) higher than:
  - method limits  QAPP limits
  - contract limits  other (see #10)
 Due to:
  - sample matrix  insufficient sample
  - instrumentation  other (see #10)

9.  Other (specify): <sup>2</sup> Spike recovery has 71% high bias - recounted

10.  Comments/Explanation: <sup>1</sup> Sample & Duplicate were prepared by evaporating 9ml of dilute 1754999 MBD solution on a planchet to reduce possibility of contaminating the detectors.

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

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

PROJECT MANAGER (signature & date):

Steve Davies 4/29/94

**CORRECTIVE ACTION**

**ROOT CAUSE:** INITIALS/DATE TK 4-29-94

- ① high activity of sample was reason for processing dissolved sample
- ② high bias for spike is uncertain

**CORRECTIVE ACTION:** INITIALS/DATE TK 4-29-94

data accepted spike falls within 3σ uncertainty

RESPONSIBILITY FOR PERFORMING CORRECTIVE ACTION ASSIGNED TO:

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

FIRST LEVEL SUPERVISOR: Paul Thompson DATE: 4-29-94  
 RESPONSIBLE MANAGER: J. Madelle DATE: 4/29/94

**QC REVIEW**

NONCONFORMANCE J.C. 4/29/94  DEFICIENCY  RERUN

FURTHER ACTION REQUIRED:

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

QC COORDINATOR: Jodie Cr DATE: 4/29/94

**CORRECTIVE ACTION VERIFICATION**

VERIFIED  CANNOT VERIFY (specify reason)

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

**NCM CLOSURE**

QC COORDINATOR: Jodie Cr DATE: 4/29/94

\*\*\* BETA \*\*\*

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

16-Mar-1994

Page 1

*Due 4-14-94  
H-29-94  
19*

CUSTOMER: WHC

SAMPLE DELIVERY GROUP Wood

MATRIX : SOIL

BATCH NUMBER 3-269

*SAF  
93-263*

ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
<del>L0326915</del>				
L0326915	EQBA	039	25.104 ± .35416	
1 ) 40326901		WHC	BOBFH3	
F0326901	PUP			

ACTIONS (Initial & Date)

- 1) INITIATED *JH 3/17/94*
- 2) PREP LAB RECEIVED *JN 4-20-94*
- 3) SAMPLE REMAINDER STORED *JN 4-20-94*
- 4) SEPARATION LAB RECEIVED *NA*
- 5) COUNTING/MEASUREMENT LAB *20 apr 94 OP*
- 6) DATA REVIEWED AND ANALYTICAL PREP STORED *JRK 4-29-94*

*JH  
9*



ITAS Data Review Checklist  
RADIOCHEMISTRY

Work Order No(s): 403269

Lab Sample Numbers or SDG: LC32691B - LC32691S

Method/Test/Parameter: Beta

Review Item	Yes (✓)	No (X)	N/A (✓)	2 <sup>nd</sup> Level review (✓)
<b>A. Calibration</b>			✓	✓
1. Is the calibration documentation included where applicable?			✓	✓
<b>B. Sample Analysis</b>			✓	✓
1. Are the sample yields within acceptance criteria?			✓	✓
2. Were all sample holding times met?	✓			✓
<b>C. QC Samples</b>			✓	✓
1. Is the Blank yield within acceptance criteria?			✓	✓
2. Is the Minimum Detectable Activity for the Blank result $\leq$ the Contract Detection Limit?	✓			✓
3. Is the Blank result $\leq$ the Contract Detection Limit?	✓			✓
4. Is the Blank result greater than the Contract Detection Limit but the Sample result less than the Contract Detection Limit?			✓	✓
5. Is the LCS result within acceptance criteria?	✓			✓
6. Is the LCS yield within acceptance criteria?			✓	✓
7. Is the LCS Minimum Detectable Activity less than or equal to the Contract Detection Limit?	✓			✓
8. MS/MSD results and yield meet acceptance criteria?			✓	✓
9. Duplicate sample results and yield meet acceptance criteria?	✓			✓
<b>D. Other</b>				✓
1. Are all nonconformances included and noted?	✓			✓
2. Are all required forms filed out?	✓			✓
3. Correct methodology used?	✓			✓
4. Transcription checked?	✓			✓
5. Were all calculations checked at a minimum frequency?	✓			✓
6. Units checked?	✓			✓

Comments on any "No" response:

NCM deviation from procedure

Analyst: Joel Kampman

Date: 5-2-94

Second Level Review: Subi Jones

Date: 5/2/94

Form No: LS-038, 3/94, Rev 2

OK Transfer  
5-2-94



PROJECT ID (Name/Number): WHC

NCM INITIATED BY (Name/Date): Joel T Kempema 4-29-94

PARAMETER(S): Beta

SAMPLE NUMBER(S) AFFECTED: 40326901 + Duplicate

MATRIX: Soil

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

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

1.  Not enough sample received for proper analysis.

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

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

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

2.3  CATEGORY III: Laboratory Reruns

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

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

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

2.3.4  OTHER: (see #10)  
Deviation from normal procedure.

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

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

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

6.  Invalid instrument calibration. (See #10)

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

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

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

9.  Other (specify): Due to the high activity of this sample the Beta analysis was prepared by taking 9 ml of the sample solution from MBP + Eyrington planchet

10.  Comments/Explanation: This was done as a precaution to not contaminate the detectors by the possibility of hot particles coming off the planchet. Normally the soil aliquot is taken before MSD.

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

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

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

PROJECT MANAGER (signature & date): Suey Davis 4/29/94

**CORRECTIVE ACTION**

**ROOT CAUSE:** INITIALS/DATE JTK 4-29-94

high sample activity -

---

**CORRECTIVE ACTION:** INITIALS/DATE JTK 4-29-94

data accepted - this sample processing was done post consultation with the operations manager and technical director

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

---

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

n/a

---

FIRST LEVEL SUPERVISOR: Jed Kempema DATE: 4-29-94

RESPONSIBLE MANAGER: W Markell DATE: 4/29/94

**QC REVIEW**

NONCONFORMANCE       DEFICIENCY       RERUN

FURTHER ACTION REQUIRED:

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

QC COORDINATOR: [Signature] DATE: 4/29/94

**CORRECTIVE ACTION VERIFICATION**

VERIFIED       CANNOT VERIFY (specify reason)

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

---

**NCM CLOSURE**

QC COORDINATOR: [Signature] DATE: 4/29/94

\*\*\* ~~SR 90~~ \*\*\* *Total Sr*  
*TK 4-11-94*

*Dul*  
*4-29-94*

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

16-Mar-1994  
Page 1

CUSTOMER: WHC

SAMPLE DELIVERY GROUP W0006

MATRIX : SOIL

BATCH NUMBER 3-269

*SAF*  
*93-263*

ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
---------	-----	---------	-------------	----------

=====				
L032691B			54.7261I .7825	PCI
L032691X				
L032691M	EGL937		30.373 ± .4343	DPM
1 ) 40326901		WHC	BOBFH3	
E032690L				
=====				

ACTIONS (Initial & Date)

- 1) INITIATED *JH 3/17/94*
- 2) PREP LAB RECEIVED *MM 3-29-94*
- 3) SAMPLE REMAINDER STORED *MM 3-30-94*
- 4) SEPARATION LAB RECEIVED *4-11-94 TK*
- 5) COUNTING/MEASUREMENT LAB *SK 4-28-94*
- 6) DATA REVIEWED AND ANALYTICAL PREP STORED *SK 4/29/94*



ITAS Data Review Checklist  
RADIOCHEMISTRY

Work Order No(s): 403269

Lab Sample Numbers or SDG: W0006 -

Method/Test/Parameter: SVTDT

Review Item	Yes (✓)	No (✓)	N/A (✓)	2 <sup>nd</sup> Level review (✓)
A. Calibration			X	✓
1. Is the calibration documentation included where applicable?			X	✓
B. Sample Analysis	X		X	✓
1. Are the sample Yields within acceptance criteria?	X		X	✓
2. Were all sample holding times met?			X	✓
C. QC Samples	X			✓
1. Is the Blank Yield within acceptance criteria?	X			✓
2. Is the Minimum Detectable Activity for the Blank result $\leq$ the Contract Detection Limit?	X			✓
3. Is the Blank result $\leq$ the Contract Detection Limit?	X			✓
4. Is the Blank result greater than the Contract Detection Limit but the Sample result less than the Contract Detection Limit?			X	✓
5. Is the LCS result within acceptance criteria?	X			✓
6. Is the LCS yield within acceptance criteria?			X	✓
7. Is the LCS Minimum Detectable Activity less than or equal to the Contract Detection Limit?	X			✓
8. MS/MSD results and yield meet acceptance criteria?			X	✓
9. Duplicate sample results and yield meet acceptance criteria?	X			✓
D. Other	X			✓
1. Are all nonconformances included and noted?	X			✓
2. Are all required forms filled out?	X			✓
3. Correct methodology used?	X			✓
4. Transcription checked?	X			✓
5. Were all calculations checked at a minimum frequency?	X			✓
6. Units checked?	X			✓

Comments on any "No" responses:

Analyst: William E. McInnis

Date: 4/29/94

Second Level Review: Suzi Davis

Date: 4/29/94

9713511.0259

\*\*\* SE-79 \*\*\*

DW  
4-29-94

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

16-Mar-1994

Page 1

CUSTOMER: WHC

SAF  
93-263

SAMPLE DELIVERY GROUP

Wood

MATRIX : SOIL

BATCH NUMBER

3-269

ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
===== L032691B				
L032691S		EQBS013		
1 ) 40326901		WHC	BOBFH3	cat III
F0326901				cat III
L032691M		EQBS014		
L032692M		EQBS015		
=====				

ACTIONS (Initial & Date)

- 1) INITIATED JA 3/17/94
- 2) PREF LAB RECEIVED BAB 4-14-94  
RD3221 4/15/94
- 3) SAMPLE REMAINDER STORED N/A
- 4) SEPARATION LAB RECEIVED Susan 4.1994
- 5) COUNTING/MEASUREMENT LAB 19 apr 94 OD
- 6) DATA REVIEWED AND ANALYTICAL PREP STORED Mad 4/29/94



DUE DATE 4-19-94

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

ANALYSIS Se 79  
 CUSTOMER WHC  
 MATRIX Soil

NAME/DATE JJK 4-20-94  
 SAMPLE DELIVERY GROUP \_\_\_\_\_  
 BATCH NUMBER SD6W0006

ITAS ID	CUSTOMER ID	COMMENTS
1 ) 40326901	cut III	0.025g
2 ) F0326901	cut III	0.025g
3 ) <del>L032692M</del>	<del>4/20/94 BSM</del>	<del>Ottawa Sand 2g</del>
4 ) L032693 M	EQBS 009	Ottawa Sand 2g
5 ) L032694 M	EQBS 010	Ottawa Sand 2g
6 )		
7 )		
8 )		
9 )		
10)		

**REANALYSIS**

\*REFERENCED QC\*

ITAS ID - BLANK L032692B  
 EQBS 008  
 ITAS ID - SPIKE L032692S  
 CLIENT CODE WHC

ACTIONS (Initial & Date)

PREP LAB RECEIVED 4/20/94 BSM

SAMPLE REMAINDER  
 RETURNED TO SCG  (CHECK ONE)

NO SAMPLE REMAINING   
 RD 3221 4/20/94 BSM  
 SEPARATION LAB 4/20/94 JJK

COUNTING/MEASUREMENT AS 4-25-94

DATA REVIEWED 4/29/94 JJK

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

**RECOUNT**

ACTIONS (Initial & Date)

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

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

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

ADDITIONAL COMMENTS:



ITAS Data Review Checklist  
RADIOCHEMISTRY

Work Order No(s): 403269

Lab Sample Numbers or SDG: W0006

Method/Test/Parameter: Se-79

Review Item	Yes (✓)	No (✓)	N/A (✓)	2 <sup>nd</sup> Level review (✓)
<b>A. Calibration</b>			✓	✓
1. Is the calibration documentation included where applicable?			✓	✓
<b>B. Sample Analysis</b>	✓			✓
1. Are the sample Yields within acceptance criteria?	✓			✓
2. Were all sample holding times met?				N/A
<b>C. QC Samples</b>	✓			✓
1. Is the Blank Yield within acceptance criteria?	✓			✓
2. Is the Minimum Detectable Activity for the Blank result $\leq$ the Contract Detection Limit?	✓			—
3. Is the Blank result $\leq$ the Contract Detection Limit?	✓			—
4. Is the Blank result greater than the Contract Detection Limit but the Sample result less than the Contract Detection Limit?				N/A
5. Is the LCS result within acceptance criteria?	✓			✓
6. Is the LCS yield within acceptance criteria?	✓			✓
7. Is the LCS Minimum Detectable Activity less than or equal to the Contract Detection Limit?				N/A
8. MS/MSD results and yield meet acceptance criteria?				N/A
9. Duplicate sample results and yield meet acceptance criteria?	✓			✓
<b>D. Other</b>				✓
1. Are all nonconformances included and noted?				✓
2. Are all required forms filled out?				—
3. Correct methodology used?				—
4. Transcription checked?	✓			—
5. Were all calculations checked at a minimum frequency?	✓			—
6. Units checked?	✓			—

Comments on any "No" response: Sample MDC Greater than Contract Detection Limit because of small sample size. A small sample was used for Radiation Safety reasons.

Analyst: M. Wall  
 Second Level Review: S. Jones

Date: 4/29/94  
 Date: 4/29/94



PROJECT ID (Name/Number): WHC WOODS  
 NCM INITIATED BY (Name/Date): Marshall Lane 5/2/94  
 PARAMETER(S): Selenium  
 SAMPLE NUMBER(S) AFFECTED: SD6 3-296  
 MATRIX: Soil 403269

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

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

1.  Not enough sample received for proper analysis.  
 2.  Holding time exceeded by \_\_\_\_\_ days due to:  
 2.1  CATEGORY I: Out of Laboratory Control  
 Holding time expired at receipt.  
 2.2  CATEGORY II: Laboratory Dependent  
 work backlog  instrument failure  
 communication  other (see #10)  
 2.3  CATEGORY III: Laboratory Reruns  
 2.3.1  QA/QC:  
 surrogates  internal standards  
 spike recoveries  blank contamination  
 2.3.2  CONFIRMATION:  
 second column  contamination check  
 other (see #10)  
 2.3.3  DILUTION:  
 over calibration  under calibration  
 other (see #10)  
 2.3.4  OTHER: (see #10)

3.  Sample lost during extraction/analysis; no re-prep or re-analysis possible.  
 4.  QC data reported to client outside of:  
 method limits  internal limits  
 QAPP limits  contract limits  
 regulatory limits  blank criteria  
 5.  Incorrect procedure(s) used. (See #10)  
 6.  Invalid instrument calibration. (See #10)  
 7.  Incorrect/incomplete data reported to client. (See #10)  
 8.  Reported detection limit(s) higher than:  
 method limits  QAPP limits  
 contract limits  other (see #10)  
 Due to:  
 sample matrix  insufficient sample  
 instrumentation  other (see #10)

9.  Other (specify): Original ALIQUOT SIZE TOO SMALL

10.  Comments/Explanation:

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

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

PROJECT MANAGER (signature & date): Sue Davis 5/2/94

IT CORPORATION

LOG #: RD-94- 0118 page 2 of 2

**CORRECTIVE ACTION**

ROOT CAUSE:

INITIALS/DATE 5/2/94 md

INITIAL sample Aliquot sizes were too small  
TECH ERROR - D. Swanson 5/2/94

CORRECTIVE ACTION:

INITIALS/DATE 5/2/94 md

New sample Aliquots were Analyzed

RESPONSIBILITY FOR PERFORMING CORRECTIVE ACTION ASSIGNED TO:

ACTIONS TO PREVENT RECURRENCE:

INITIALS/DATE \_\_\_\_\_

N/A 5/2/94  
CAUTION TECH TO USE CARE when ALIQUOTING

FIRST LEVEL SUPERVISOR:

William Bruce

DATE: 5/2/94

RESPONSIBLE MANAGER:

W. Mitchell

DATE: 5/2/94

**QC REVIEW**

NONCONFORMANCE

DEFICIENCY

RERUN

FURTHER ACTION REQUIRED:

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

QC COORDINATOR:

[Signature]

DATE: 5/2/94

**CORRECTIVE ACTION VERIFICATION**

VERIFIED

CANNOT VERIFY (specify reason)

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

**NCM CLOSURE**

QC COORDINATOR:

[Signature]

DATE: 5/2/94

7/18/94  
4-24-94

9713511.0344 \*\*\* TC-99 \*\*\*

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

16-Mar-1994  
Page 1

CUSTOMER: WHC

SAF  
43-263

SAMPLE DELIVERY GROUP

W0006

MATRIX : SOIL

BATCH NUMBER

3-269

ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
<del>L032691 B</del>		<del>W032692 M</del>	<del>W032691 X</del>	
<del>W032690 I</del>		<del>L032693 M</del>	L032691 X	ECNT 123 100.52 1.243
W032691 M		W032691 D	BOBFH3	EA 3m 4/26/94 100.167 1.2358
F0326901 - Dup				L032691 M ECNT 125 100.374 1.2414 100.5465 1.2361

ACTIONS (Initial & Date)

- 1) INITIATED JH 3/17/94
- 2) PREP LAB RECEIVED MM 3-30-94
- 3) SAMPLE REMAINDER STORED MM 3-30-94
- 4) SEPARATION LAB RECEIVED 3/31/94 MM
- 5) COUNTING/MEASUREMENT LAB DM 4/19/94
- 6) DATA REVIEWED AND ANALYTICAL PREP STORED LR 4/27/94

L032691 N instrument  
L032692 N Blanks



ITAS Data Review Checklist  
RADIOCHEMISTRY

Work Order No(s): 403269

Lab Sample Numbers or SDG: W0006

Method/Test/Parameter: Tc99

Review Item	Yes (✓)	No (✓)	N/A (✓)	2 <sup>nd</sup> Level review (✓)
A. Calibration			X	✓
1. Is the calibration documentation included where applicable?			X	✓
B. Sample Analysis	X			✓
1. Are the sample Yields within acceptance criteria?	X			✓
2. Were all sample holding times met?			X	✓
C. QC Samples	X			✓
1. Is the Blank Yield within acceptance criteria?	X			✓
2. Is the Minimum Detectable Activity for the Blank result ≤ the Contract Detection Limit?	X			✓
3. Is the Blank result ≤ the Contract Detection Limit?	X			✓
4. Is the Blank result greater than the Contract Detection Limit but the Sample result less than the Contract Detection Limit?			X	✓
5. Is the LCS result within acceptance criteria?	X			✓
6. Is the LCS yield within acceptance criteria?	X			✓
7. Is the LCS Minimum Detectable Activity less than or equal to the Contract Detection Limit?	X			✓
8. MS/MSD results and yield meet acceptance criteria?	X			✓
9. Duplicate sample results and yield meet acceptance criteria?	X			✓
D. Other	X			✓
1. Are all nonconformances included and noted?	X			✓
2. Are all required forms filled out?	X			✓
3. Correct methodology used?	X			✓
4. Transcription checked?	Jm			✓
5. Were all calculations checked at a minimum frequency?	X			✓
6. Units checked?	X			✓

Comments on any "No" response:

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Analyst: Steve E. McLaughlin

Second Level Review: Steve Davies

Form No: LS-038, 3/94, Rev 2

Date: 4/27/94

Date: 4/28/94

9/13/94 10266

\*\*\* URANIUM \*\*\*

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

16-Mar-1994  
Page 1

Dup  
4-29-94

CUSTOMER: WHC  
MATRIX : SOIL

SAF  
93-263

SAMPLE DELIVERY GROUP  
BATCH NUMBER

Wood  
3-269

ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
<del>4032691 B</del>				
<del>4032691 S</del>				
<del>4032691 X</del>				
1 ) 40326901		WHC	BOBFH3	cat III
<del>40326901</del>				cat III
<del>4032691 m</del>				

ACTIONS (Initial & Date)

1) INITIATED

JH 3/17/94

5) COUNTING/MEASUREMENT LAB

M.V. 4/20/94

2) PREP LAB RECEIVED

BAB 4-14-94

6) DATA REVIEWED AND

ANALYTICAL PREP STORED

PK 4/28/94

3) SAMPLE REMAINDER STORED

N/A

4) SEPARATION LAB RECEIVED

NA

Samples reanalyzed UCV  
PK 4/28/94



DUE DATE 4/29/94

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

ANALYSIS U-L  
CUSTOMER WTC  
MATRIX Soil

NAME/DATE \_\_\_\_\_ / \_\_\_\_\_  
SAMPLE DELIVERY GROUP work  
BATCH NUMBER \_\_\_\_\_

ITAS ID	CUSTOMER ID	COMMENTS
1) <u>40326901</u>		<u>1/10 g</u>
2) <u>F0326901</u>		<u>1/10 g</u>
3) <u><del>W03269</del> 1R4-22-84</u>		
4) <u>L032692M</u>	<u>EQJK 071</u>	<u>1 gram ottawa sand</u>
5) <u>L032693M</u>	<u>EQJK 071</u>	<u>1 gram ottawa sand</u>
6) <u>L032692 X</u>		<u>1 gram ottawa sand</u>
7)		
8)		
9)		
10)		

**REANALYSIS**

**RECOUNT**

\*REFERENCED QC\*

ACTIONS (Initial & Date)

ITAS ID - BLANK L032692B  
ITAS ID - SPIKE <sup>EQJK 069</sup> L032692S  
CLIENT CODE WTC

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

ACTIONS (Initial & Date)

PREP LAB RECEIVED 4/22/94 Bm

ADDITIONAL COMMENTS:

SAMPLE REMAINDER  
RETURNED TO SCG  (CHECK ONE)

NO SAMPLE REMAINING   
RD3221 4/23/94 Bm  
SEPARATION LAB \_\_\_\_\_

COUNTING/MEASUREMENT 4-27-94

DATA REVIEWED P Kenitzy 4/28/94

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



ITAS Data Review Checklist  
RADIOCHEMISTRY

Work Order No(s): 40326901

Lab Sample Numbers or SDG: W0006

Method/Test/Parameter: u nat

Review Item	Yes (✓)	No (✓)	N/A (✓)	2 <sup>nd</sup> Level review (✓)
<b>A. Calibration</b>				
1. Is the calibration documentation included where applicable?	✓			✓
<b>B. Sample Analysis</b>				
1. Are the sample Yields within acceptance criteria?			✓	—
2. Were all sample holding times met?	✓			—
<b>C. QC Samples</b>				
1. Is the Blank Yield within acceptance criteria?			✓	—
2. Is the Minimum-Detectable Activity for the Blank result $\leq$ the Contract Detection Limit?			✓	—
3. Is the Blank result $\leq$ the Contract Detection Limit?	✓			—
4. Is the Blank result greater than the Contract Detection Limit but the Sample result less than the Contract Detection Limit?			✓	—
5. Is the LCS result within acceptance criteria?	✓			—
6. Is the LCS yield within acceptance criteria?			✓	—
7. Is the LCS Minimum Detectable Activity less than or equal to the Contract Detection Limit?			✓	—
8. MS/MSD results and yield meet acceptance criteria?			✓	—
9. Duplicate sample results and yield meet acceptance criteria?		✓		—
<b>D. Other</b>				
1. Are all nonconformances included and noted?	✓		4/15/94	—
2. Are all required forms filled out?	✓			—
3. Correct methodology used?	✓			—
4. Transcription checked?	✓			PK
5. Were all calculations checked at a minimum frequency?	✓			—
6. Units checked?	✓			—

Comments on any "No" response:

NCM on reanalysis DAD FO326901 lost.

Analyst: Pam Kerithen

Date: 4/29/94

Second Level Review: Suz Davies

Date: 4/29/94

Form No: LS-038, 3/94, Rev 2



PROJECT ID (Name/Number): WHC

NCM INITIATED BY (Name/Date): P Kenitzer 4/29/94

PARAMETER(S): U nat

SAMPLE NUMBER(S) AFFECTED: 403269 F0326901 WOOD6

MATRIX: soil

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

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

1.  Not enough sample received for proper analysis.

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

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

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

2.3  CATEGORY III: Laboratory Reruns

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

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

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

2.3.4  OTHER: (see #10)

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

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

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

6.  Invalid instrument calibration. (See #10)

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

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

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

9.  Other (specify): Samples reanalyzed when spikes, samples & blanks all came out 0. Reanalysis F0326901 was 0 but all other QC good.

10.  Comments/Explanation:

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

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

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

PROJECT MANAGER (signature & date): Steve James 4/29/94

**CORRECTIVE ACTION**

**ROOT CAUSE:** INITIALS/DATE PK 4/29/94  
 when all spikes read 0 the problem is usually something that has caused quenching. Chloride is a quencher that is often suspected because it is in use frequently and could easily be picked up by mistake.

**CORRECTIVE ACTION:** INITIALS/DATE 4/29/94 PK.  
 Samples reanalyzed

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

**ACTIONS TO PREVENT RECURRENCE:** INITIALS/DATE PK 4/29/94  
 Have warned techs to be especially careful to keep away from chlorides  
 Will watch for trends

FIRST LEVEL SUPERVISOR: Pam Kenitzer DATE: 4/29/94  
 RESPONSIBLE MANAGER: W Mackell DATE: 4/29/94

**QC REVIEW**

NONCONFORMANCE  DEFICIENCY  RERUN  
 FURTHER ACTION REQUIRED:  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 QC COORDINATOR: Jodie Corn ASSIGNED TO: \_\_\_\_\_  
 DATE: 4/29/94

**CORRECTIVE ACTION VERIFICATION**

VERIFIED  CANNOT VERIFY (specify reason)  
 REASON: \_\_\_\_\_  
 \_\_\_\_\_

**NCM CLOSURE**

QC COORDINATOR: \_\_\_\_\_ DATE: 4/29/94

9713511.0271

**Golder Associates Inc.**

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



June 1, 1994

Our ref: 923-E418  
S/O/3118

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

ATTENTION: Jeanette Duncan

RE: TRANSMITTAL OF DATA VALIDATION PACKAGES, 200-UP-2 DATA VALIDATION PROJECT, TASK ORDER S94-18, CONTRACT MJK-SVV-M073750

Dear Ms. Duncan:

Enclosed are data validation packages for the 200-UP-2 data validation project. The following provides a summary of the data packages included in this shipment:

- W0006-ITC-004

Please call if you have questions concerning the above at 206/883-0777.

Sincerely,

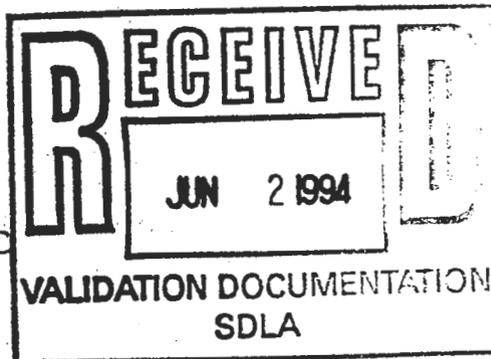
GOLDER ASSOCIATES INC.

*Christina I. Jensen*  
Christina I. Jensen  
Task Manager

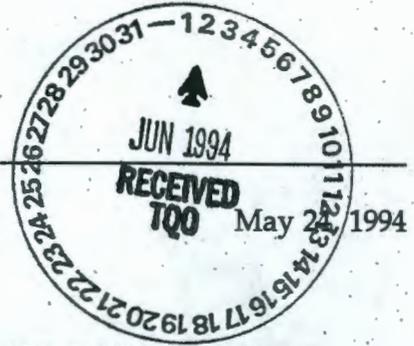
*Kent M. Angelos*  
Kent M. Angelos  
Project Manager



cc: P.K. Brockman, SAIC



## MEMORANDUM



TO: 200-UP-2 Project QA Record

FR: Christina Jensen, Golder Associates Inc. 4

RE: VOLATILE ORGANIC DATA VALIDATION SUMMARY FOR DATA PACKAGE:  
W0006-ITC-004 (923-E418 ITC004V.UP2)

## INTRODUCTION

This memorandum presents the results of data validation on data package W0006-ITC-004 prepared by International Technology Corporation (IT) laboratory. A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSIS
B0BFH3	03/01/94	SOIL	SEE NOTE 1

Notes: 1. The sample was analyzed for CLP target compound list (TCL) volatile organics.

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

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

## DATA QUALITY OBJECTIVES

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

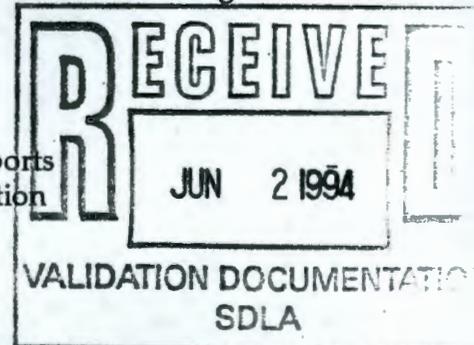
**Precision.** Goals for precision were met.

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

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

**Detection Limits.** Detection limit goals were met for all sample results as specified in the reference analytical method.

**Completeness.** The data package was complete for all requested analyses. A total of one sample was validated in this data package with a total of 33 determinations reported, all of



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

### MAJOR DEFICIENCIES

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

### MINOR DEFICIENCIES

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

#### Holding Times

- The holding time from sample collection to analysis for sample BOBFH3 was not met. Attachments 2 and 5 provide a summary of the samples affected, data qualifications applied and supporting documentation.

#### Laboratory Blanks

- Acetone was detected in the laboratory blank. Attachments 2 and 5 provide a summary of the samples affected, data qualifications applied and supporting documentation.

### TENTATIVELY IDENTIFIED COMPOUND EVALUATION

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

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

### REFERENCES

WHC 1993a, Validation of 200-UP-2 Data, Statement of Work, Analytical Laboratory Data Validation, Task Order S-94-18, December 14, 1993, Purchase Order M073750. Westinghouse Hanford Company, Richland, Washington.

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

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**Attachment 1**

**Glossary of Data Reporting Qualifiers**

## GLOSSARY OF ORGANIC DATA REPORTING QUALIFIERS

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

9713511.0276

**Attachment 2**

**Summary of Data Qualifications**



9713511.0278

**Attachment 3**

**Qualified Data Summary and Annotated Laboratory Reports**

Validated Data Summary, Data Package: W0006-ITC-004

Parameter	Samp#		BOBFH3	
	Units	Result	Q	
	Samp#	3/01/94		
	Date			
	Location	---		
	Depth	---		
	Type	SOIL		
	Comments	---		
Parameter	Units	Result	Q	
CHLOROMETHANE	UG/KG	12.000	UJ	
BROMOMETHANE	UG/KG	12.000	UJ	
VINYL CHLORIDE	UG/KG	12.000	UJ	
CHLOROETHANE	UG/KG	12.000	UJ	
METHYLENE CHLORIDE	UG/KG	12.000	UJ	
ACETONE	UG/KG	22.000	UJ	
CARBON DISULFIDE	UG/KG	12.000	UJ	
1,1-DICHLOROETHENE	UG/KG	12.000	UJ	
1,1-DICHLOROETHANE	UG/KG	12.000	UJ	
1,2-DICHLOROETHENE (TOTAL)	UG/KG	12.000	UJ	
CHLOROFORM	UG/KG	12.000	UJ	
1,2-DICHLOROETHANE	UG/KG	12.000	UJ	
2-BUTANONE	UG/KG	12.000	UJ	
1,1,1-TRICHLOROETHANE	UG/KG	12.000	UJ	
CARBON TETRACHLORIDE	UG/KG	12.000	UJ	
BROMODICHLOROMETHANE	UG/KG	12.000	UJ	
1,2-DICHLOROPROPANE	UG/KG	12.000	UJ	
CIS-1,3-DICHLOROPROPENE	UG/KG	12.000	UJ	
TRICHLOROETHENE	UG/KG	12.000	UJ	
DIBROMOCHLOROMETHANE	UG/KG	12.000	UJ	
1,1,2-TRICHLOROETHANE	UG/KG	12.000	UJ	
BENZENE	UG/KG	12.000	UJ	
TRANS-1,3-DICHLOROPROPENE	UG/KG	12.000	UJ	
BROMOFORM	UG/KG	12.000	UJ	
4-METHYL-2-PENTANONE	UG/KG	12.000	UJ	
2-HEXANONE	UG/KG	12.000	UJ	
TETRACHLOROETHENE	UG/KG	12.000	UJ	
1,1,2,2-TETRACHLOROETHANE	UG/KG	12.000	UJ	
TOLUENE	UG/KG	12.000	UJ	
CHLOROBENZENE	UG/KG	12.000	UJ	
ETHYLBENZENE	UG/KG	12.000	UJ	
STYRENE	UG/KG	12.000	UJ	
XYLENES (TOTAL)	UG/KG	12.000	UJ	

9/5/27/94  
Verified

8007

9713511.0279





9713511.0282

**Attachment 4**

**Laboratory Narrative and Chain-of-Custody Documentation**

Westinghouse Hanford Company	CHAIN OF CUSTODY	006251
------------------------------	------------------	--------

Custody Form Initiator DL EDWARDS

Company Contact C.A. Rowley Telephone 372-3293

Project Designation/Sampling Locations 216-U-8 Collection Date 3/1/94 1515  
Vitrified Clay Pipeline

Ice Chest No. \_\_\_\_\_ Field Logbook No. SAF 93-263

Bill of Lading/Airbill No. NA Offsite Property No. N/A

Method of Shipment TRUCK - HAND Delivered to PNL

Shipped to ONE IT ARE 3/15/94

Possible Sample Hazards/Remarks Analysis per SAF # 93-263

Sample Identification		
<u>BOBFH3</u>	<u>40326801 A</u>	<u>(1) 250ML Gs VOA</u>
	<u>B</u>	<u>(1) 250ML aG Semi-VOA</u>
	<u>C</u>	<u>(1) 250ML Poly Metals</u>
	<u>D</u>	<u>(1) 125ML G Anions</u>
	<u>E</u>	<u>(1) 125ML G NO<sub>2</sub>/NO<sub>3</sub></u>
	<u>F</u>	<u>(1) 125ML G Cyanide</u>
	<u>G</u>	<u>(1) 125ML Gs Kerosene</u>
	<u>40326901</u>	<u>(1) 1000ML Poly Radionuclides</u>

ARE 3/15/94

Field Transfer of Custody		CHAIN OF POSSESSION			(Sign and Print Name)	
Relinquished By	Date	Time	Received By	Date	Time	
<u>From C.O.C. # 006227</u> <u>DL Edwards</u>	<u>3/10/94</u>	<u>0820</u>	<u>DL Edwards</u>			
<u>DL Edwards</u>	<u>3/15/94</u>	<u>1320</u>	<u>John [Signature]</u> <u>ITAC</u>	<u>3/15/94</u>	<u>1455</u>	

Final Sample Disposition

Disposal Method: \_\_\_\_\_ Disposed by: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Comments: Sample transferred from C.O.C. # 006227. Change in lab due to radioactivity levels.

0000010



## CERTIFICATE OF ANALYSIS

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

April 20, 1994

Attention: J. A. Lerch

Project number : 519.04  
Date Received by Lab : March 16, 1994  
Number of Samples : One (1)  
Sample Types : Soil  
SDG Number : W0006

### I. Introduction

On March 16, 1994, one (1) soil was received by ITAS-Richland and transferred to ITAS-St. - Louis for chemical analysis. Upon receipt, the sample was given the following laboratory ID number to correspond with the specific client ID:

<u>St. Louis ID</u>	<u>WHC ID</u>	<u>Richland ID</u>	<u>Matrix</u>	<u>Date of Receipt</u>
4709-001	BOBFH3	40326801	Soil	03/16/94

### II. Analytical Results/ Methodology

The analytical results for this report are presented by analytical test. Each set of data includes sample identification information, analytical results, and the appropriate detection limits.

The analysis requested include: VOA, BNA and Metals (including Titanium) and Cyanide using CLP/90 methodology. Chloride, Sulfate and Fluoride by EPA method 300.0. Nitrate/Nitrite by EPA method 353.1. Total Petroleum Hydrocarbons as Kerosene by method 8015.

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### III. Quality Control

A Laboratory Control Sample and Method Blank are routinely analyzed with each preparation batch. Matrix Spike and Matrix Spike Duplicate or Duplicate analyses were performed for all analytes in this SDG.

### IV. Definitions

The following codes are used to denote laboratory quality control samples and can be found in the data summary section of this report:

QCBLK- Quality Control Blank, Method Blank

QCSPK- Quality Control Laboratory Control Sample, Blank Spike

### V. Comments

The laboratory was unable to calculate a Relative Percent Difference (RPD) for Fluoride and Chloride on sample BOBFH3 (4709-001) due to values below the detection limit.

The Relative Percent Difference (RPD) for Cyanide sample BOBFH3 (4709-001) was calculated on values below the contract detection limit but above the instrument detection limit.

The sample concentration for Nitrate sample BOBFH3 (4709-001) greatly exceeded the spike level used for the matrix spike. Therefore, there was no matrix spike recovery.

Samples 4709-001, -001MS and -001MSD each gave a low response for acenaphthene-d10 internal standard. In addition, -001MS gave a low response for phenanthrene-d10 internal standard. Each of these samples also gave high recoveries for 2-fluorobiphenyl and terphenyl-d14 surrogates.

Samples 4709-001MS/MSD gave high recoveries of 4-nitrophenol at 292 and 197%, respectively (UCL=114%). In addition, high RPDs were obtained for 1,4-dichlorobenzene (30%, UCL=27%) and 1,2,4-trichlorobenzene (27%, UCL=23%).

Samples 4709-001, -001MS and -001MSD were extracted 6 days past the extraction hold-time of 14-days. These samples were received past the hold time. See NCM SL-94-0160.

0000349

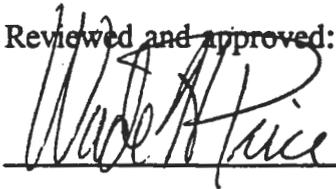
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April 20, 1994  
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Sample 4709-001MS gave low responses for all three internal standards. Sample 4709-001MSD gave low responses for 1,4-difluorobenzene and chlorobenzene-d5 internal standards. Per the CLP 3/90 SOW, MS/MSD samples need not meet the internal standard response criteria. In addition, all MS and surrogate recoveries were in-control.

I certify that this data package 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:



Wade H. Price  
Project Manager  
z:\annclara\hanw0006.nar

0000349A

9713511.0287

**Attachment 5**

**Data Validation Supporting Documentation**

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	<u>E</u>
PROJECT:	200-UP-2		DATA PACKAGE: W0006-ITC-004		
VALIDATOR:	LAB: IT		DATE: 5/24/94		
CASE:	SDG:				
ANALYSES PERFORMED					
<input checked="" type="checkbox"/> CLP Volatiles	<input type="checkbox"/> SW-846 8240 (cap column)	<input type="checkbox"/> SW-846 8260 (packed column)	<input type="checkbox"/> CLP Semivolatiles	<input type="checkbox"/> SW-846 8270 (cap column)	<input type="checkbox"/> SW-846 (packed column)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SAMPLES/MATRIX	SOIL BOBPH3				

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: verification performed by WHC

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. HOLDING TIMES

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

Comments: Analyzed 15 days after collection, qualified by IT, UT

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. INSTRUMENT TUNING AND CALIBRATION

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

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

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

4. BLANKS

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

Comments: Acetone was detected in the laboratory

blank, sample. PVPFH3 result for acetone  
qualified as N

5. ACCURACY

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

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

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

GC/MS ORGANIC DATA VALIDATION CHECKLIST

6. PRECISION

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

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

\_\_\_\_\_

\_\_\_\_\_

7. SYSTEM PERFORMANCE

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

Comments: The areas for BDBFH3 MS and MSD were  
low, however the retention times were  
acceptable, and no qualification will be  
made on these QC samples.

8. COMPOUND IDENTIFICATION AND QUANTITATION

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

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

\_\_\_\_\_

\_\_\_\_\_

9. REPORTED RESULTS AND QUANTITATION LIMITS

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

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

TICS were not detected in the associated  
blank.

\_\_\_\_\_

\_\_\_\_\_



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1A

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

VBLK01

Lab Name: ITAS-ST.LOUIS

Contract: 519-04

Lab Code: ITSL

Case No.: V70901

SAS No.:

SDG No.: W0006

Matrix: (soil/water) SOIL

Lab Sample ID: QCBLK34121

Sample wt/vol: 5.00 (g/mL) G

Lab File ID: E8274

Level: (low/med) LOW

Date Received:

% Moisture: not dec.

Date Analyzed: 03/18/94

GC Column: DB-624 ID: 0.530 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

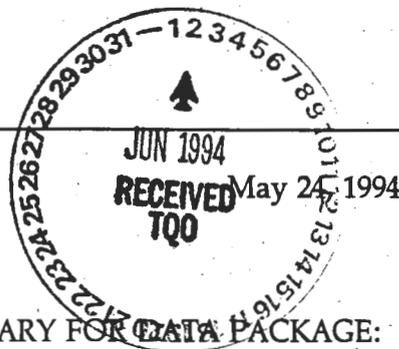
CAS NO. COMPOUND CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG Q

74-87-3	-----Chloromethane	10	U
74-83-9	-----Bromomethane	10	U
75-01-4	-----Vinyl Chloride	10	U
75-00-3	-----Chloroethane	10	U
75-09-2	-----Methylene Chloride	10	U
67-64-1	-----Acetone	20	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

X10 = 20x

0000115

## MEMORANDUM



TO: 200-UP-2 Project QA Record

FR: Christina Jensen, Golder Associates Inc. *cf*

RE: SEMIVOLATILE ORGANIC DATA VALIDATION SUMMARY FOR DATA PACKAGE:  
W0006-ITC-004 (923-E418 ITC004S.UP2)

## INTRODUCTION

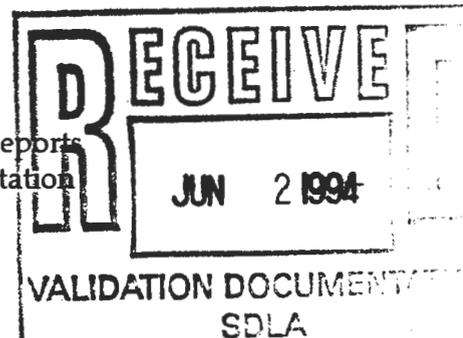
This memorandum presents the results of data validation on data package W0006-ITC-004 prepared by International Technology Corporation (IT) laboratory. A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSIS
BOBFH3	03/01/94	SOIL	SEE NOTE 1

Notes: 1. The sample was analyzed for CLP target compound list (TCL) semivolatle organics.

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

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



## DATA QUALITY OBJECTIVES

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

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

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

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

**Detection Limits.** Detection limit goals were met for all sample results as specified in the reference analytical method.

Data Package ID: W0006-ITC-004

Analysis: Semivolatiles

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

#### MAJOR DEFICIENCIES

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

#### MINOR DEFICIENCIES

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

##### Holding Times

- The holding time from sample collection to preparation was not met for sample BOBFH3. Attachments 2 and 5 provide a summary of the samples affected, data qualifications applied and supporting documentation.

##### Calibrations

- The continuing calibration percent differences for pentachlorophenol and pyrene were exceeded. Attachments 2 and 5 provide a summary of the samples affected, data qualifications applied and supporting documentation.

##### Internal Standards

- The internal area limit for acenaphthene-d10 was below the lower control limit. Attachments 2 and 5 provide a summary of the samples affected, data qualifications applied and supporting documentation.

#### TENTATIVELY IDENTIFIED COMPOUND EVALUATION

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

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

- TICs were detected in the sample(s) and identified as common laboratory contaminants, resulting in qualification of the results as unusable (R) as shown in Attachment 3.
- A TIC identified as an unknown PCB isomer was provided in the raw data but not included on Form 1F for sample B0BFH3. The TIC has been included on the form.

## REFERENCES

WHC 1993a, Validation of 200-UP-2 Data, Statement of Work, Analytical Laboratory Data Validation, Task Order S-94-18, December 14, 1993, Purchase Order M073750. Westinghouse Hanford Company, Richland, Washington.

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

Attachment 1

Glossary of Data Reporting Qualifiers

## GLOSSARY OF ORGANIC DATA REPORTING QUALIFIERS

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

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**Attachment 2**

**Summary of Data Qualifications**

DATA QUALIFICATION SUMMARY

SDG:	VALIDATOR: <i>CJensen</i>	DATE: <i>5/24/94</i>	PAGE <i>1</i> OF <i>1</i>
------	---------------------------	----------------------	---------------------------

COMMENTS: *NOA W0006-ITC-004*

COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
<i>All</i>	<i>UT</i>	<i>60BFH3</i>	<i>holding time</i>
<i>pentachlorophenol</i>	<i>UT</i>	<i>60BFH3</i>	<i>continuing cal.</i>
<i>pyrene</i>	<i>UT</i>	<i>60BFH3</i>	<i>continuing cal.</i>
<i>Hexachlorocyclopentadiene</i>	<i>UT</i>	<i>60BFH3</i>	<i>IS actual concentration - d.p. area limit. below limit</i>
<i>2,4,6-Trichlorophenol</i>			
<i>2,4,5-Trichlorophenol</i>			
<i>2-Chloronaphthalene</i>			
<i>2-Nitroaniline</i>			
<i>Dimethyl Phthalate</i>			
<i>Acenaphthylene</i>			
<i>3-Nitroaniline</i>			
<i>Acenaphthene</i>			
<i>2,4-Dinitrobenzene</i>			
<i>4-Nitrophenol</i>			
<i>Dibenzofuran</i>			
<i>2,4-Dinitrotoluene</i>			
<i>2,4-Dinitrophenol</i>			
<i>Diethyl Phthalate</i>			
<i>4-chlorophenyl-phenylether</i>			
<i>Fluorene</i>			
<i>4-Nitroaniline</i>	<i>4</i>	<i>4</i>	<i>4</i>

*5/26/94*  
*5/15/94*

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**Attachment 3**

**Qualified Data Summary and Annotated Laboratory Reports**



Validated Data Summary, Data Package: W0006-ITC-004

Parameter	Samp#	80BFH3	
	Date	3-1-94	
	Location	---	
	Depth	---	
	Type	SOIL	
	Comments	---	
	Units	Result	Q
2,4-DINITROPHENOL	UG/KG	930.000	UJ
4-NITROPHENOL	UG/KG	930.000	UJ
DIBENZOFURAN	UG/KG	380.000	UJ
2,4-DINITROTOLUENE	UG/KG	380.000	UJ
2,6-DINITROTOLUENE	UG/KG	380.000	UJ
DIETHYLPHTHALATE	UG/KG	380.000	UJ
4-CHLOROPHENYL-PHENYLETHER	UG/KG	380.000	UJ
FLUORENE	UG/KG	380.000	UJ
4-NITROANILINE	UG/KG	930.000	UJ
4,6-DINITRO-2-METHYLPHENOL	UG/KG	930.000	UJ
N-NITROSODIPHENYLAMINE	UG/KG	380.000	UJ
4-BROMOPHENYL-PHENYLETHER	UG/KG	380.000	UJ
HEXACHLOROBENZENE	UG/KG	380.000	UJ
PENTACHLOROPHENOL	UG/KG	930.000	UJ
PHENANTHRENE	UG/KG	380.000	UJ
ANTHRACENE	UG/KG	380.000	UJ
CARBAZOLE	UG/KG	380.000	UJ
DI-N-BUTYLPHTHALATE	UG/KG	380.000	UJ
FLUORANTHENE	UG/KG	380.000	UJ
PYRENE	UG/KG	380.000	UJ
BUTYLBENZYLPHTHALATE	UG/KG	380.000	UJ
3,3'-DICHLOROBENZIDINE	UG/KG	380.000	UJ
BENZO(A)ANTHRACENE	UG/KG	380.000	UJ
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	120.000	J
CHRYSENE	UG/KG	380.000	UJ
DI-N-OCTYLPHTHALATE	UG/KG	380.000	UJ
BENZO(B)FLUORANTHENE	UG/KG	380.000	UJ
BENZO(K)FLUORANTHENE	UG/KG	380.000	UJ
BENZO(A)PYRENE	UG/KG	380.000	UJ
INDENO(1,2,3-CD)PYRENE	UG/KG	380.000	UJ
DIBENZ(A,H)ANTHRACENE	UG/KG	380.000	UJ
BENZO(G,H,I)PERYLENE	UG/KG	380.000	UJ

4/10/94  
 Verified  
 2/5/2014

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1B

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

BOBFH3

Lab Name: ITAS-ST.LOUIS

Contract: 519-04

Lab Code: ITSL

Case No.: S70901

SAS No.:

SDG No.: W0006

Matrix: (soil/water) SOIL

Lab Sample ID: 4709-001

Sample wt/vol: 30.10 (g/mL) G

Lab File ID: A4371

Level: (low/med) LOW

Date Received: 03/16/94

% Moisture: 14 decanted: (Y/N) N

Date Extracted: 03/21/94

Concentrated Extract Volume: 500.0 (uL)

Date Analyzed: 03/29/94

Injection Volume: 2.0(uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 5.0

CONCENTRATION UNITS:

CAS NO.

COMPOUND

(ug/L or ug/Kg) UG/KG

Q

108-95-2-----	Phenol	380	U
111-44-4-----	bis(2-Chloroethyl)Ether	380	U
95-57-8-----	2-Chlorophenol	380	U
541-73-1-----	1,3-Dichlorobenzene	380	U
106-46-7-----	1,4-Dichlorobenzene	380	U
95-50-1-----	1,2-Dichlorobenzene	380	U
95-48-7-----	2-Methylphenol	380	U
108-60-1-----	2,2'-oxybis(1-Chloropropane)	380	U
106-44-5-----	4-Methylphenol	380	U
621-64-7-----	N-Nitroso-Di-n-Propylamine	380	U
67-72-1-----	Hexachloroethane	380	U
98-95-3-----	Nitrobenzene	380	U
78-59-1-----	Isophorone	380	U
88-75-5-----	2-Nitrophenol	380	U
105-67-9-----	2,4-Dimethylphenol	380	U
111-91-1-----	bis(2-Chloroethoxy)Methane	380	U
120-83-2-----	2,4-Dichlorophenol	380	U
120-82-1-----	1,2,4-Trichlorobenzene	380	U
91-20-3-----	Naphthalene	380	U
106-47-8-----	4-Chloroaniline	380	U
87-68-3-----	Hexachlorobutadiene	380	U
59-50-7-----	4-Chloro-3-Methylphenol	380	U
91-57-6-----	2-Methylnaphthalene	380	U
77-47-4-----	Hexachlorocyclopentadiene	380	U
88-06-2-----	2,4,6-Trichlorophenol	380	U
95-95-4-----	2,4,5-Trichlorophenol	930	U
91-58-7-----	2-Chloronaphthalene	380	U
88-74-4-----	2-Nitroaniline	930	U
131-11-3-----	Dimethyl Phthalate	380	U
208-96-8-----	Acenaphthylene	380	U
606-20-2-----	2,6-Dinitrotoluene	380	U
99-09-2-----	3-Nitroaniline	930	U
83-32-9-----	Acenaphthene	380	U

Handwritten notes on the right margin, including a vertical list of 'U' characters and the number '000201'.

Handwritten signature and date: 5/20/94





9713511.0306

**Attachment 4**

**Laboratory Narrative and Chain-of-Custody Documentation**



## CERTIFICATE OF ANALYSIS

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

April 20, 1994

Attention: J. A. Lerch

Project number	:	519.04	
Date Received by Lab	:	March 16, 1994	.
Number of Samples	:	One (1)	.
Sample Types	:	Soil	
SDG Number	:	W0006	

### I. Introduction

On March 16, 1994, one (1) soil was received by ITAS-Richland and transferred to ITAS-St. Louis for chemical analysis. Upon receipt, the sample was given the following laboratory ID number to correspond with the specific client ID:

<u>St. Louis ID</u>	<u>WHC ID</u>	<u>Richland ID</u>	<u>Matrix</u>	<u>Date of Receipt</u>
4709-001	BOBFH3	40326801	Soil	03/16/94

### II. Analytical Results/ Methodology

The analytical results for this report are presented by analytical test. Each set of data includes sample identification information, analytical results, and the appropriate detection limits.

The analysis requested include:

VOA, BNA and Metals (including Titanium) and Cyanide using CLP/90 methodology. Chloride, Sulfate and Fluoride by EPA method 300.0. Nitrate/Nitrite by EPA method 353.1. Total Petroleum Hydrocarbons as Kerosene by method 8015.

Regional Office

13715 Rider Trail North • Earth City, Missouri 63045 • 314-298-8566

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- 015

181000

Westinghouse Hanford Company  
April 20, 1994  
Project Number: 519.04  
page 2

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### III. Quality Control

A Laboratory Control Sample and Method Blank are routinely analyzed with each preparation batch. Matrix Spike and Matrix Spike Duplicate or Duplicate analyses were performed for all analytes in this SDG.

### IV. Definitions

The following codes are used to denote laboratory quality control samples and can be found in the data summary section of this report:

QCBLK- Quality Control Blank, Method Blank  
QCSPK- Quality Control Laboratory Control Sample, Blank Spike

### V. Comments

The laboratory was unable to calculate a Relative Percent Difference (RPD) for Fluoride and Chloride on sample BOBFH3 (4709-001) due to values below the detection limit.

The Relative Percent Difference (RPD) for Cyanide sample BOBFH3 (4709-001) was calculated on values below the contract detection limit but above the instrument detection limit.

The sample concentration for Nitrate sample BOBFH3 (4709-001) greatly exceeded the spike level used for the matrix spike. Therefore, there was no matrix spike recovery.

Samples 4709-001, -001MS and -001MSD each gave a low response for acenaphthene-d10 internal standard. In addition, -001MS gave a low response for phenanthrene-d10 internal standard. Each of these samples also gave high recoveries for 2-fluorobiphenyl and terphenyl-d14 surrogates.

Samples 4709-001MS/MSD gave high recoveries of 4-nitrophenol at 292 and 197%, respectively (UCL=114%). In addition, high RPDs were obtained for 1,4-dichlorobenzene (30%, UCL=27%) and 1,2,4-trichlorobenzene (27%, UCL=23%).

Samples 4709-001, -001MS and -001MSD were extracted 6 days past the extraction hold-time of 14-days. These samples were received past the hold time. See NCM SL-94-0160.

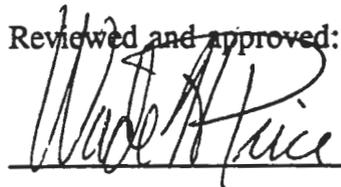
Westinghouse Hanford Company  
April 20, 1994  
Project Number: 519.04  
page 3

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Sample 4709-001MS gave low responses for all three internal standards. Sample 4709-001MSD gave low responses for 1,4-difluorobenzene and chlorobenzene-d5 internal standards. Per the CLP 3/90 SOW, MS/MSD samples need not meet the internal standard response criteria. In addition, all MS and surrogate recoveries were in-control.

I certify that this data package 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:



Wade H. Price  
Project Manager  
z:\annelars\hanw\0006.nar

4881000

Westinghouse Hanford Company CHAIN OF CUSTODY 006251

Custody Form Initiator DL EDWARDS  
 Company Contact C.A. Rowley Telephone 372-3293  
 Project Designation/Sampling Locations 216-U-8 Collection Date 3/1/94 1515  
Vitrified Clay Pipeline  
 Ice Chest No. \_\_\_\_\_ Field Logbook No. SAF 93-263  
 Bill of Lading/Airbill No. NA Offsite Property No. N/A  
 Method of Shipment TRUCK - HAND Delivered to PNL  
 Shipped to AME IT ARE 3/15/94  
 Possible Sample Hazards/Remarks Analysis per SAF # 93-263

Sample Identification

<u>BOBFH3</u>	<u>40326801</u>	<u>A</u>	<u>(1) 250mL G3</u>	<u>VOA</u>
		<u>B</u>	<u>(1) 250mL aG</u>	<u>Semi-VOA</u>
		<u>C</u>	<u>(1) 250mL Poly</u>	<u>Metals</u>
		<u>D</u>	<u>(1) 125mL G</u>	<u>Anions</u>
		<u>E</u>	<u>(1) 125mL G</u>	<u>NO<sub>2</sub>/NO<sub>3</sub></u>
		<u>F</u>	<u>(1) 125mL G</u>	<u>Cyanide</u>
		<u>G</u>	<u>(1) 125mL G3</u>	<u>Kerosene</u>
	<u>40326901</u>		<u>(1) 1000mL Poly</u>	<u>Radionuclides</u>

ARE 3/10/94

Field Transfer of Custody CHAIN OF POSSESSION (Sign and Print Name)

Relinquished By	Date	Time	Received By	Date	Time
<u>From C.O.C. # 006227</u> <u>DL Edwards</u>	<u>3/10/94</u>	<u>0820</u>	<u>DL Edwards</u>		
<u>DL Edwards</u>	<u>3/15/94</u>	<u>1320</u>	<u>John [Signature]</u> <u>ITAC</u>	<u>3/15/94</u>	<u>1455</u>

Final Sample Disposition

Disposal Method: \_\_\_\_\_ Disposed by: \_\_\_\_\_ Date/Time: 018

Comments: Sample transferred from C.O.C. # 006227. Change in lab due to radioactivity levels.

000010

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**Attachment 5**

**Data Validation Supporting Documentation**

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	(E)
PROJECT:	200-7UP-2		DATA PACKAGE: W0006-ITC-004		
VALIDATOR:	Q Jensen	LAB: IT	DATE: 5/24/94		
CASE:			SDG:		
ANALYSES PERFORMED					
<input type="checkbox"/> CLP Volatiles	<input type="checkbox"/> SW-846 8240 (cap column)	<input type="checkbox"/> SW-846 8280 (packed column)	<input checked="" type="checkbox"/> CLP Semivolatiles	<input type="checkbox"/> SW-846 8270 (cap column)	<input type="checkbox"/> SW-846 (packed column)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SAMPLES/MATRIX	soil BOBPH3				

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: verification was performed by WHC.

2. HOLDING TIMES

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

Comments: preparation time unacceptable, sample BOBPH3 qualified. N.T

## GC/MS ORGANIC DATA VALIDATION CHECKLIST

## 3. INSTRUMENT TUNING AND CALIBRATION

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

Comments: pentachlorophenol and pinene containing  
calibration check %D are  $> 25$ . Sample results  
for these two compounds will be qualified as  
estimated, etc.

## 4. BLANKS

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

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

## 5. ACCURACY

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

Comments: FOR sample BOBFH3, surrogates 2-fluorobenzyl and  
2,4,6-trimethylphenyl were  $> UCL$  and results  $< CRL$   
therefore no qualification is required.  
Same for the MS+MSD.  
recovery

MS/MSD recovery for 4-nitrophenol was  $> UCL$   
and surrogates were  $> UCL$ . In accordance with  
the dV procedures, no qualification is required  
for undetected results. Detects qual. 5.  
All results are undetected for compounds  
associated with 4-nitrophenol. no qualification  
was applied.

GC/MS ORGANIC DATA VALIDATION CHECKLIST

6. PRECISION

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

Comments: The RPD for 1,4-Dichlorobenzene and 1,2,4-trichlorobenzene are > limit, no qualification is required since the sample results are ND

7. SYSTEM PERFORMANCE

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

Comments: The naphthalene-d10 for PCB#13, MS and MSD were ~~> 90%~~ also phenanthrene-d10 for PCB#13 MS was < area requirement. The RTs are within limits, therefore, the associated results will be qualified J, UT for associated compounds. The MS/MSD results will not be qualified

8. COMPOUND IDENTIFICATION AND QUANTITATION *Since they are DC samples*

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

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

9. REPORTED RESULTS AND QUANTITATION LIMITS

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

Has the laboratory properly identified and coded all TIC? *5/20/94*  Yes  No  N/A

Comments: There were no TICs detected in the blank. A few of the TICs have been identified as reaction products, and corrected on Form IF. An additional TIC (PCB Isomer) was reported in the raw data but not reported on form IF, added on form (22.32 min).



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7C

## SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ITAS-ST.LOUIS

Contract: 519-04

Lab Code: ITSL

Case No.: S70901

SAS No.:

SDG No.: W0006

Instrument ID: MSA

Calibration date: 03/29/94 Time: 0834

Lab File ID: A4362

Init. Calib. Date(s): 03/23/94 03/23/94

Init. Calib. Times: 1511 1804

COMPOUND	RRF	RRF50	MIN RRF	%D	MAX %D
Diethylphthalate	1.402	1.224		12.7	
4-Chlorophenyl-phenylether	0.605	0.525	0.400	13.2	25.0
Fluorene	1.181	1.119	0.900	5.2	25.0
4-Nitroaniline	0.446	0.368		17.5	
4,6-Dinitro-2-Methylphenol	0.178	0.155		12.9	
N-Nitrosodiphenylamine (1)	0.432	0.380		12.0	25.0
4-Bromophenyl-phenylether	0.214	0.188	0.100	12.2	25.0
Hexachlorobenzene	0.266	0.236	0.100	11.3	25.0
Pentachlorophenol	0.172	0.121	0.050	29.6	25.0
Phenanthrene	0.993	0.952	0.700	4.1	25.0
Anthracene	1.002	0.936	0.700	6.6	25.0
Carbazole	1.018	0.889		12.7	
Di-n-Butylphthalate	1.398	1.276		8.7	
Fluoranthene	0.972	0.942	0.600	3.1	25.0
Pyrene	1.655	1.180	0.600	28.7	25.0
Butylbenzylphthalate	0.924	0.658		28.8	
3,3'-Dichlorobenzidine	0.472	0.298		36.9	
Benzo(a)Anthracene	1.302	1.025	0.800	21.3	25.0
Chrysene	1.203	0.943	0.700	21.6	25.0
bis(2-Ethylhexyl)Phthalate	1.255	0.922		26.5	
Di-n-Octyl Phthalate	1.917	1.767		7.8	
Benzo(b)Fluoranthene	1.191	1.014	0.700	14.9	25.0
Benzo(k)Fluoranthene	0.998	0.955	0.700	4.3	25.0
Benzo(a)Pyrene	1.002	0.935	0.700	6.7	25.0
Indeno(1,2,3-cd)Pyrene	0.982	0.868	0.500	11.6	25.0
Dibenz(a,h)Anthracene	0.836	0.846	0.400	-1.2	25.0
Benzo(g,h,i)Perylene	0.920	0.834	0.500	9.3	25.0
Nitrobenzene-d5	0.484	0.384	0.200	20.7	25.0
2-Fluorobiphenyl	1.304	1.145	0.700	12.2	25.0
Terphenyl-d14	1.107	0.794	0.500	28.3	25.0
Phenol-d5	1.603	1.611	0.800	-0.5	25.0
2-Fluorophenol	1.265	1.146	0.600	9.4	25.0
2,4,6-Tribromophenol	0.229	0.185		19.2	
2-Chlorophenol-d4	1.216	1.261	0.800	-3.7	25.0
1,2-Dichlorobenzene-d4	0.842	0.846	0.400	-0.5	25.0

(1) Cannot be separated from Diphenylamine  
All other compounds must meet a minimum RRF of 0.010.

6/5/25/94

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8B

## SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ITAS-ST.LOUIS

Contract: 519-04

Lab Code: ITSL

Case No.: S70901

SAS No.:

SDG No.: W0006

Lab File ID (Standard): A4362

Date Analyzed: 03/29/94

Instrument ID: MSA

Time Analyzed: 0834

	IS1(DCB) AREA #	RT #	IS2(NPT) AREA #	RT #	IS3(ANT) AREA #	RT #
12 HOUR STD	49221	6.50	183759	9.42	88793	13.80
UPPER LIMIT	98442	7.00	367518	9.92	177586	14.30
LOWER LIMIT	24610	6.00	91880	8.92	44396	13.30
EPA SAMPLE NO.						
01 BOBFH3	46793	6.54	168196	9.46	18792 *	13.97
02 SSPK01	51324	6.54	185909	9.45	90628	13.82
03 BOBFH3MS	45497	6.54	165883	9.46	12499 *	14.00
04 BOBFH3MSD	46951	6.55	173286	9.46	16385 *	13.98
05 SBLK01	49827	6.53	175509	9.43	85077	13.81

IS1 (DCB) = 1,4-Dichlorobenzene-d4

IS2 (NPT) = Naphthalene-d8

IS3 (ANT) = Acenaphthene-d10

AREA UPPER LIMIT = + 100% of internal standard area.

AREA LOWER LIMIT = - 50% of internal standard area.

RT UPPER LIMIT = +0.50 minutes of internal standard RT.

RT LOWER LIMIT = -0.50 minutes of internal standard RT.

# Column used to flag internal standard area values with an asterisk.

\* Values outside of QC limits.

0000195

CJ 5/26/94



## MEMORANDUM

TO: 200-UP-2 Project QA Record

May 31, 1994

FR: Christina Jensen, Golder Associates Inc. *4*RE: GENERAL GC DATA VALIDATION SUMMARY FOR DATA PACKAGE:  
W0006-ITC-004 (923-E418 ITC004G.UP2)**INTRODUCTION**

This memorandum presents the results of data validation on data package W0006-ITC-004 prepared by International Technology Corporation (IT) laboratory. A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSIS
BOBFH3	03/01/94	SOIL	SEE NOTE 1

Notes: 1. The sample was analyzed for high boiling hydrocarbons using 8015M.

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

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

**DATA QUALITY OBJECTIVES**

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

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

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

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

**Detection Limits.** Detection limit goals were met for all sample results as specified in the reference analytical method.

**Completeness.** The data package was complete for all requested analyses. A total of one sample was validated in this data package with a total of one determination reported, which

*revised page  
5/6/15/94*

*201*

was deemed valid. This results in a completeness of 100 percent, which meets the normal work plan objectives of 90 percent.

### MAJOR DEFICIENCIES

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

### MINOR DEFICIENCIES

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

#### Holding Times

- The holding time from sample collection to preparation for sample B0BFH3 was not met. Attachments 2 and 5 provide a summary of the samples affected, data qualifications applied and supporting documentation.

### REFERENCES

WHC 1993a, Validation of 200-UP-2 Data, Statement of Work, Analytical Laboratory Data Validation, Task Order S-94-18, December 14, 1993, Purchase Order M073750. Westinghouse Hanford Company, Richland, Washington.

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

**Attachment 1**

**Glossary of Data Reporting Qualifiers**

## GLOSSARY OF ORGANIC DATA REPORTING QUALIFIERS

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

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**Attachment 2**

**Summary of Data Qualifications**



9713511.0324

**Attachment 3**

**Qualified Data Summary and Annotated Laboratory Reports**

Validated Data Summary, Data Package: W0006-ITC-004

	Samp# Date Location Depth Type Comments	808FH3 3-1-94 --- --- SOIL ---
	Parameter	Units      Result      Q
HIGH BOILING HYDROCARBONS	MG/KG	1600.000      J

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8/5/94  
 verified

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1D  
HBH ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOBFH3

Lab Name: ITAS-St. Louis Contract: 519.04

Lab Code: ITSL Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: W0006

Matrix : (soil/water) SOIL Lab Sample ID: 4709-001

Sample wt/vol: 20.1 (g/ml) g Lab File ID: \_\_\_\_\_

Level: (low/med) LOW Date Sampled: 03-01-94

% Moisture: not dec. 14 dec. \_\_\_\_\_ Date Extracted: 03-22-94

Extraction: (SepF/Cont/Sonc/Shak) SHAK Date Analyzed: 03-25-94

GPC Cleanup: (Y/N) N pH: \_\_\_\_\_ Dilution Factor: 1

CAS NO.	Compound	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>mg/Kg</u>	Q	
	<u>HBH (1)</u>	<u>1600</u>		<u>4</u>

U: Concentration of analyte is less than the value given.

(1): High Boiling Hydrocarbon (HBH) is quantitated as if it is Fuel Oil #2.

0000735

*Verified  
5/31/94*

9713511.0327

**Attachment 4**

**Laboratory Narrative and Chain-of-Custody Documentation**



## CERTIFICATE OF ANALYSIS

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

April 20, 1994

Attention: J. A. Lerch

Project number : 519.04  
 Date Received by Lab : March 16, 1994  
 Number of Samples : One (1)  
 Sample Types : Soil  
 SDG Number : W0006

### I. Introduction

On March 16, 1994, one (1) soil was received by ITAS-Richland and transferred to ITAS-St. Louis for chemical analysis. Upon receipt, the sample was given the following laboratory ID number to correspond with the specific client ID:

<u>St. Louis ID</u>	<u>WHC ID</u>	<u>Richland ID</u>	<u>Matrix</u>	<u>Date of Receipt</u>
4709-001	BOBFH3	40326801	Soil	03/16/94

### II. Analytical Results/ Methodology

The analytical results for this report are presented by analytical test. Each set of data includes sample identification information, analytical results, and the appropriate detection limits.

The analysis requested include:

VOA, BNA and Metals (including Titanium) and Cyanide using CLP/90 methodology. Chloride, Sulfate and Fluoride by EPA method 300.0. Nitrate/Nitrite by EPA method 353.1. Total Petroleum Hydrocarbons as Kerosene by method 8015.

Regional Office

13715 Rider Trail North • Earth City, Missouri 63045 • 314-298-8566

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

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Westinghouse Hanford Company

April 20, 1994

Project Number: 519.04

page 2

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### III. Quality Control

A Laboratory Control Sample and Method Blank are routinely analyzed with each preparation batch. Matrix Spike and Matrix Spike Duplicate or Duplicate analyses were performed for all analytes in this SDG.

### IV. Definitions

The following codes are used to denote laboratory quality control samples and can be found in the data summary section of this report:

QCBLK- Quality Control Blank, Method Blank

QCSPK- Quality Control Laboratory Control Sample, Blank Spike

### V. Comments

The laboratory was unable to calculate a Relative Percent Difference (RPD) for Fluoride and Chloride on sample BOBFH3 (4709-001) due to values below the detection limit.

The Relative Percent Difference (RPD) for Cyanide sample BOBFH3 (4709-001) was calculated on values below the contract detection limit but above the instrument detection limit.

The sample concentration for Nitrate sample BOBFH3 (4709-001) greatly exceeded the spike level used for the matrix spike. Therefore, there was no matrix spike recovery.

Samples 4709-001, -001MS and -001MSD each gave a low response for acenaphthene-d10 internal standard. In addition, -001MS gave a low response for phenanthrene-d10 internal standard. Each of these samples also gave high recoveries for 2-fluorobiphenyl and terphenyl-d14 surrogates.

Samples 4709-001MS/MSD gave high recoveries of 4-nitrophenol at 292 and 197%, respectively (UCL=114%). In addition, high RPDs were obtained for 1,4-dichlorobenzene (30%, UCL=27%) and 1,2,4-trichlorobenzene (27%, UCL=23%).

Samples 4709-001, -001MS and -001MSD were extracted 6 days past the extraction hold-time of 14-days. These samples were received past the hold time. See NCM SL-94-0160.

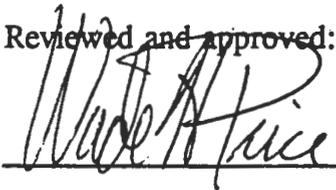
Westinghouse Hanford Company  
April 20, 1994  
Project Number: 519.04  
page 3

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Sample 4709-001MS gave low responses for all three internal standards. Sample 4709-001MSD gave low responses for 1,4-difluorobenzene and chlorobenzene-d5 internal standards. Per the CLP 3/90 SOW, MS/MSD samples need not meet the internal standard response criteria. In addition, all MS and surrogate recoveries were in-control.

I certify that this data package 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:



Wade H. Price  
Project Manager  
z:\annclars\hanw0006.nar

000026A

Westinghouse Hanford Company CHAIN OF CUSTODY 006251

Custody Form Initiator DL EDWARDS  
 Company Contact C.A. Rowley Telephone 372-3293  
 Project Designation/Sampling Locations 216-U-8 Collection Date 3/1/94 1515  
Vitrified Clay Pipeline  
 Ice Chest No. \_\_\_\_\_ Field Logbook No. SAF 93-263  
 Bill of Lading/Airbill No. NA Offsite Property No. N/A  
 Method of Shipment TRUCK - HAND DELIVERED TO PNL  
 Shipped to PNL IT ARE 3/15/94  
 Possible Sample Hazards/Remarks Analysis per SAF # 93-263

Sample Identification		
<u>BOBEH3</u>	<u>40326801 A</u>	<u>(1) 250ML Gs VOA</u>
	<u>B</u>	<u>(1) 250ML aG Semi-VOA</u>
	<u>C</u>	<u>(1) 250ML Poly Metals</u>
	<u>D</u>	<u>(1) 125ML G Anions</u>
	<u>E</u>	<u>(1) 125ML G NO<sub>2</sub>/NO<sub>3</sub></u>
	<u>F</u>	<u>(1) 125ML G Cyanide</u>
	<u>G</u>	<u>(1) 125ML Gs Kerosene</u>
	<u>40326901</u>	<u>(1) 1000ML Poly Radionuclides</u>
		<u>ARE 3/15/94</u>

Field Transfer of Custody		CHAIN OF POSSESSION			(Sign and Print Name)	
Relinquished By	Date	Time	Received By	Date	Time	
<u>From C.O.C. # 006227</u> <u>DL Edwards</u>	<u>3/10/94</u>	<u>0820</u>	<u>DL Edwards</u>			
<u>DL Edwards</u>	<u>3/15/94</u>	<u>1320</u>	<u>John [Signature]</u> <u>ITRS</u>	<u>3/15/94</u>	<u>1455</u>	

Final Sample Disposition  
 Disposal Method: \_\_\_\_\_ Disposed by: \_\_\_\_\_ Date/Time: 014

Comments: Sample transferred from C.O.C. # 006227. Change in lab due to radioactivity levels.

000010

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**Attachment 5**

**Data Validation Supporting Documentation**

GENERAL GC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	(E)
PROJECT: 200 WP 2			DATA PACKAGE: W0006-ITC-004		
VALIDATOR: C Jensen		LAB:		DATE: 5/31/94	
CASE:			SDG:		
ANALYSES PERFORMED					
<input type="checkbox"/> 8010	<input checked="" type="checkbox"/> 8015 M	<input type="checkbox"/> 8020	<input type="checkbox"/> 8021	8140	8141
<input type="checkbox"/> 8150	<input type="checkbox"/> 8151	<input type="checkbox"/> WTPH-HCID	<input type="checkbox"/> WTPH-G	<input type="checkbox"/> WTPH-D	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SAMPLES/MATRIX: Soil BUBPH 3					
Kerosene					

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: Verification performed by WHC

2. HOLDING TIMES

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

Comments: Extraction holding time of 14 days exceeded, extracted 21 days after collection.

GENERAL GC DATA VALIDATION CHECKLIST

3. INSTRUMENT CALIBRATION

3.1 INITIAL CALIBRATION

Was an initial calibration performed? . . . . .  Yes No N/A

Are %RSD values for calibration or response factors acceptable? . . . . .  Yes No N/A

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

\_\_\_\_\_

\_\_\_\_\_

3.2 CONTINUING CALIBRATION

Was a continuing calibration check performed? . . . . .  Yes No N/A

Are %D values for calibration or response factors acceptable? .  Yes No N/A

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

\_\_\_\_\_

\_\_\_\_\_

4. BLANKS

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

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

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

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

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

\_\_\_\_\_

\_\_\_\_\_

5. ACCURACY

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

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

Were MS/MSD samples analyzed? . . . . . *See note 1*  Yes No N/A

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

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

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

GENERAL GC DATA VALIDATION CHECKLIST

Comments: 1. The sample concentration was > 4x the spike concentration, therefore the ToR reported was 0% of the LCS analyzed was acceptable. For the MS. The MSD was within limits.

6. PRECISION

- Are MS/MSD sample RPD values acceptable? . See comment 2. Yes No (N/A)
Are field duplicate RPD values acceptable? . . . . . Yes No (N/A)
Are field split RPD values acceptable? . . . . . Yes No (N/A)

Comments: 2. The RPD was not evaluated due to the low spike concentration & high sample results.

7. COMPOUND IDENTIFICATION AND QUANTITATION

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

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

8. REPORTED RESULTS AND DETECTION LIMITS

- Are results reported for all requested analyses? ① . . . . . (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: The request on the chain of custody is kerosene. The laboratory reported high boiling hydrocarbons as stated on the laboratory result form.



## MEMORANDUM



TO: 200-UP-2 Project QA Record

FR: Christina Jensen, Golder Associates Inc. 4

RE: GENERAL CHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE:  
W0006-ITC-004 (923-E418 ITC004W.UP2)

## INTRODUCTION

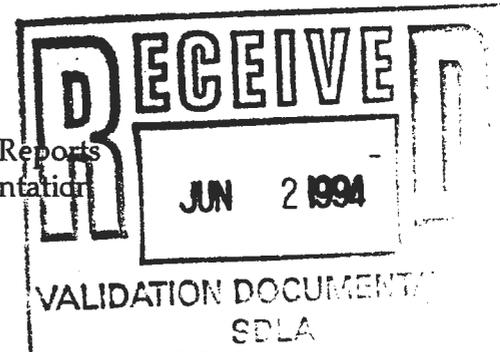
This memorandum presents the results of data validation on data package W0006-ITC-004 prepared by International Technology Corporation (IT) laboratory. A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSIS
BOBFH3	03/01/94	SOIL	SEE NOTE 1

Notes: 1. The sample was analyzed for IC anions (chloride, fluoride and sulfate) and nitrate/nitrite.

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

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



## DATA QUALITY OBJECTIVES

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

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

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

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

**Detection Limits.** Detection limit goals were met for all sample results as specified in the reference analytical method.

**Completeness.** The data package was complete for all requested analyses. A total of one sample was validated in this data package with a total of four determinations reported, all of

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

#### **MAJOR DEFICIENCIES**

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

#### **MINOR DEFICIENCIES**

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

#### **REFERENCES**

WHC 1993a, Validation of 200-UP-2 Data, Statement of Work, Analytical Laboratory Data Validation, Task Order S-94-18, December 14, 1993, Purchase Order M073750. Westinghouse Hanford Company, Richland, Washington.

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

**Attachment 1**

**Glossary of Data Reporting Qualifiers**

## GLOSSARY OF INORGANIC DATA REPORTING QUALIFIERS

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

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**Attachment 2**

**Summary of Data Qualifications**



9713511.0343

**Attachment 3**

**Qualified Data Summary and Annotated Laboratory Reports**

Validated Data Summary, Data Package: W0006-ITC-004

Parameter	Units	Result	Q
	CHLORIDE	MG/KG	2.900
FLUORIDE	MG/KG	1.160	U
SULFATE	MG/KG	15.000	
NITRATE+NITRITE	MG-N/KG	79.200	

Samp# BOBFH3  
 Date 3-1-94  
 Location ---  
 Depth ---  
 Type SOIL  
 Comments ---

verified  
 3/4/94

808

9713511.0344





9713511.0347

**Attachment 4**

**Laboratory Narrative and Chain-of-Custody Documentation**



## CERTIFICATE OF ANALYSIS

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

April 20, 1994

Attention: J. A. Lerch

Project number	:	519.04	.
Date Received by Lab	:	March 16, 1994	.
Number of Samples	:	One (1)	.
Sample Types	:	Soil	.
SDG Number	:	W0006	.

### I. Introduction

On March 16, 1994, one (1) soil was received by ITAS-Richland and transferred to ITAS-St. Louis for chemical analysis. Upon receipt, the sample was given the following laboratory ID number to correspond with the specific client ID:

<u>St. Louis ID</u>	<u>WHC ID</u>	<u>Richland ID</u>	<u>Matrix</u>	<u>Date of Receipt</u>
4709-001	BOBFH3	40326801	Soil	03/16/94

### II. Analytical Results/ Methodology

The analytical results for this report are presented by analytical test. Each set of data includes sample identification information, analytical results, and the appropriate detection limits.

The analysis requested include:

VOA, BNA and Metals (including Titanium) and Cyanide using CLP/90 methodology. Chloride, Sulfate and Fluoride by EPA method 300.0. Nitrate/Nitrite by EPA method 353.1. Total Petroleum Hydrocarbons as Kerosene by method 8015.

Regional Office

13715 Rider Trail North • Earth City, Missouri 63045 • 314-298-8566

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 JAL  
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Westinghouse Hanford Company  
April 20, 1994  
Project Number: 519.04  
page 2

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### III. Quality Control

A Laboratory Control Sample and Method Blank are routinely analyzed with each preparation batch. Matrix Spike and Matrix Spike Duplicate or Duplicate analyses were performed for all analytes in this SDG.

### IV. Definitions

The following codes are used to denote laboratory quality control samples and can be found in the data summary section of this report:

QCBLK- Quality Control Blank, Method Blank

QCSPK- Quality Control Laboratory Control Sample, Blank Spike

### V. Comments

The laboratory was unable to calculate a Relative Percent Difference (RPD) for Fluoride and Chloride on sample BOBFH3 (4709-001) due to values below the detection limit.

The Relative Percent Difference (RPD) for Cyanide sample BOBFH3 (4709-001) was calculated on values below the contract detection limit but above the instrument detection limit.

The sample concentration for Nitrate sample BOBFH3 (4709-001) greatly exceeded the spike level used for the matrix spike. Therefore, there was no matrix spike recovery.

Samples 4709-001, -001MS and -001MSD each gave a low response for acenaphthene-d10 internal standard. In addition, -001MS gave a low response for phenanthrene-d10 internal standard. Each of these samples also gave high recoveries for 2-fluorobiphenyl and terphenyl-d14 surrogates.

Samples 4709-001MS/MSD gave high recoveries of 4-nitrophenol at 292 and 197%, respectively (UCL=114%). In addition, high RPDs were obtained for 1,4-dichlorobenzene (30%, UCL=27%) and 1,2,4-trichlorobenzene (27%, UCL=23%).

Samples 4709-001, -001MS and -001MSD were extracted 6 days past the extraction hold-time of 14-days. These samples were received past the hold time. See NCM SL-94-0160.

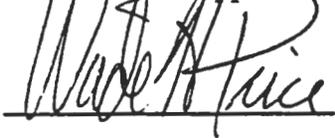
Westinghouse Hanford Company  
April 20, 1994  
Project Number: 519.04  
page 3

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Sample 4709-001MS gave low responses for all three internal standards. Sample 4709-001MSD gave low responses for 1,4-difluorobenzene and chlorobenzene-d5 internal standards. Per the CLP 3/90 SOW, MS/MSD samples need not meet the internal standard response criteria. In addition, all MS and surrogate recoveries were in-control.

I certify that this data package 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:



Wade H. Price  
Project Manager  
z:\annclars\hanw0006.nar

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9713511.0351

Westinghouse Hanford Company CHAIN OF CUSTODY 006251

Custody Form Initiator DL EDWARDS  
 Company Contact C.A. Rowley Telephone 372-3293  
 Project Designation/Sampling Locations 216-U-8 Collection Date 3/1/94 1515  
Vitrified Clay Pipeline  
 Ice Chest No. \_\_\_\_\_ Field Logbook No. JAF 93-263  
 Bill of Lading/Airbill No. NA Offsite Property No. N/A  
 Method of Shipment TRUCK - HAND DELIVERED TO PNL  
 Shipped to PNL IT ARE 3/15/94  
 Possible Sample Hazards/Remarks ANALYSIS PER JAF # 93-263

Sample Identification			
<u>BOBFH3</u>	<u>40326801</u>	<u>A (1) 250ML G3</u>	<u>VOA</u>
		<u>B (1) 250ML aG</u>	<u>Semi-VOA</u>
		<u>C (1) 250ML Poly</u>	<u>Metals</u>
		<u>D (1) 125ML G</u>	<u>Anions</u>
		<u>E (1) 125ML G</u>	<u>NO<sub>2</sub>/NO<sub>3</sub></u>
		<u>F (1) 125ML G</u>	<u>Cyanide</u>
		<u>G (1) 125ML G3</u>	<u>Kerosene</u>
	<u>40326901</u>	<u>(1) 1000ML Poly</u>	<u>Radionuclides</u>

ARE 3/15/94

CHAIN OF POSSESSION (Sign and Print Name)					
Relinquished By		Date	Time	Received By	
<u>From C.O.C. # 006227</u> <u>DL Edwards</u>		<u>3/10/94</u>	<u>0820</u>	<u>DL Edwards</u>	
<u>DL Edwards</u>		<u>3/15/94</u>	<u>1320</u>	<u>Tom [Signature] ITAS</u>	

Final Sample Disposition  
 Disposal Method: \_\_\_\_\_ Disposed by: \_\_\_\_\_ Date/Time: 015

Comments: Sample transferred from C.O.C. # 006227. Change in lab due to radioactivity levels.

000010

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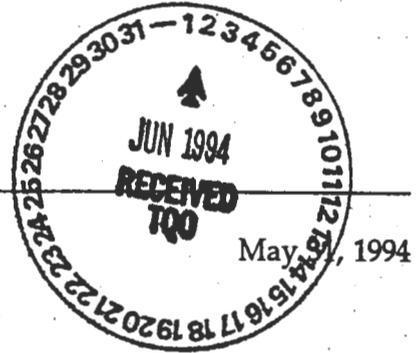
**Attachment 5**

**Data Validation Supporting Documentation**



97

<b>RECEIVED</b> JUN 2 1994 MEMORANDUM VALIDATION DOCUMENTATION SDLA
---------------------------------------------------------------------------------



TO: 200-UP-2 Project QA Record

FR: Christina Jensen, Golder Associates Inc. *g*

RE: INORGANIC DATA VALIDATION SUMMARY FOR DATA PACKAGE:  
W0006-ITC-004 (923-E418 ITC004M.UP2)

## INTRODUCTION

This memorandum presents the results of data validation on data package W0006-ITC-004 prepared by International Technology Corporation (IT) laboratory. A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSIS
BOBFH3	03/01/94	SOIL	SEE NOTE 1

Notes: 1. The sample was analyzed for CLP target analyte list (TAL) metals, cyanide and titanium.

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

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

## DATA QUALITY OBJECTIVES

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

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

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

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

**Detection Limits.** Detection limit goals were met for all sample results as specified in the reference analytical method.

**Completeness.** The data package was complete for all requested analyses. A total of one sample was validated in this data package with a total of 25 determinations reported, all of

**Completeness.** The data package was complete for all requested analyses. A total of one sample was validated in this data package with a total of 25 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent, which meets the normal work plan objectives of 90 percent.

### **MAJOR DEFICIENCIES**

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

### **MINOR DEFICIENCIES**

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

#### Holding Times

- The holding time from sample collection to analysis for sample B0BFH3 was not met for the cyanide analysis. Attachments 2 and 5 provide a summary of the samples affected, data qualifications applied and supporting documentation.

#### Laboratory Blanks

- Beryllium, cobalt and cyanide were detected in the calibration and preparation blanks. Attachments 2 and 5 provide a summary of the samples affected, data qualifications applied and supporting documentation.
- Thallium was detected at a negative concentration in the initial calibration blank. Attachments 2 and 5 provide a summary of the samples affected, data qualifications applied and supporting documentation.

#### Spike Sample Recovery

- Spike sample recoveries for antimony, manganese and titanium were unacceptable. Attachments 2 and 5 provide a summary of the samples affected, data qualifications applied and supporting documentation.

#### Laboratory Duplicates

- The laboratory duplicate relative percent differences for aluminum, iron, manganese, zinc and titanium were unacceptable. Attachments 2 and 5 provide a summary of the samples affected, data qualifications applied and supporting documentation.

**REFERENCES**

WHC 1993a, Validation of 200-UP-2 Data, Statement of Work, Analytical Laboratory Data Validation, Task Order S-94-18, December 14, 1993, Purchase Order M073750. Westinghouse Hanford Company, Richland, Washington.

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

9713511.0357

**Attachment 1**

**Glossary of Data Reporting Qualifiers**

## GLOSSARY OF INORGANIC DATA REPORTING QUALIFIERS

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

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**Attachment 2**

**Summary of Data Qualifications**



9713511.0361

Attachment 3

Qualified Data Summary and Annotated Laboratory Reports



9713511.0363

U.S. EPA - CLP

1  
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BOBFH3

Lab Name: ITAS ST. LOUIS  
 Lab Code: ITMO Case No.:  
 Matrix (soil/water): SOIL  
 Level (low/med): LOW  
 % Solids: 86.2

Contract: 519.04  
 SAS No.: SDG No.: W0006  
 Lab Sample ID: 4709-001  
 Date Received: 03/16/94

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2370	-	*	P J
7440-36-0	Antimony	7.1	U	N	P UJ
7440-38-2	Arsenic	3.4	-	-	F
7440-39-3	Barium	16.3	B	-	P
7440-41-7	Beryllium	0.18	B	-	P U
7440-43-9	Cadmium	0.30	U	-	P
7440-70-2	Calcium	2120	-	*	P see 5/11/94
7440-47-3	Chromium	5.7	-	*	P see 5/11/94
7440-48-4	Cobalt	4.3	B	-	P U
7440-50-8	Copper	5.2	B	-	P
7439-89-6	Iron	10700	-	*	P J
7439-92-1	Lead	0.77	-	-	F
7439-95-4	Magnesium	1530	-	*	P see 5/11/94
7439-96-5	Manganese	104	-	N*	P J
7439-97-6	Mercury	0.36	-	-	CV
7440-02-0	Nickel	10.1	-	-	P
7440-09-7	Potassium	607	B	-	P
7782-49-2	Selenium	0.32	U	-	F
7440-22-4	Silver	0.63	U	-	P
7440-23-5	Sodium	158	B	-	P
7440-28-0	Thallium	0.12	U	-	F UJ
7440-62-2	Vanadium	21.8	-	-	P
7440-66-6	Zinc	36.3	-	*	P J
	Cyanide	0.34	B	-	AS UJ
7440-32-6	Titanium	821	-	N*	P J

0000352

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

Comments:

Verified  
 5/31/94  
 revised  
 page 5/11/94

9713511.0364

Attachment 4

Laboratory Narrative and Chain-of-Custody Documentation



**INTERNATIONAL  
TECHNOLOGY  
CORPORATION**

## CERTIFICATE OF ANALYSIS

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

April 20, 1994

Attention: J. A. Lerch

Project number : 519.04  
Date Received by Lab : March 16, 1994  
Number of Samples : One (1)  
Sample Types : Soil  
SDG Number : W0006

### I. Introduction

On March 16, 1994, one (1) soil was received by ITAS-Richland and transferred to ITAS-St. Louis for chemical analysis. Upon receipt, the sample was given the following laboratory ID number to correspond with the specific client ID:

<u>St. Louis ID</u>	<u>WHC ID</u>	<u>Richland ID</u>	<u>Matrix</u>	<u>Date of Receipt</u>
4709-001	BOBFH3	40326801	Soil	03/16/94

### II. Analytical Results/ Methodology

The analytical results for this report are presented by analytical test. Each set of data includes sample identification information, analytical results, and the appropriate detection limits.

The analysis requested include:

VOA, BNA and Metals (including Titanium) and Cyanide using CLP/90 methodology. Chloride, Sulfate and Fluoride by EPA method 300.0. Nitrate/Nitrite by EPA method 353.1. Total Petroleum Hydrocarbons as Kerosene by method 8015.

Regional Office

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Westinghouse Hanford Company  
April 20, 1994  
Project Number: 519.04  
page 2

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### III. Quality Control

A Laboratory Control Sample and Method Blank are routinely analyzed with each preparation batch. Matrix Spike and Matrix Spike Duplicate or Duplicate analyses were performed for all analytes in this SDG.

### IV. Definitions

The following codes are used to denote laboratory quality control samples and can be found in the data summary section of this report:

QCBLK- Quality Control Blank, Method Blank  
QCSPK- Quality Control Laboratory Control Sample, Blank Spike

### V. Comments

The laboratory was unable to calculate a Relative Percent Difference (RPD) for Fluoride and Chloride on sample BOBFH3 (4709-001) due to values below the detection limit.

The Relative Percent Difference (RPD) for Cyanide sample BOBFH3 (4709-001) was calculated on values below the contract detection limit but above the instrument detection limit.

The sample concentration for Nitrate sample BOBFH3 (4709-001) greatly exceeded the spike level used for the matrix spike. Therefore, there was no matrix spike recovery.

Samples 4709-001, -001MS and -001MSD each gave a low response for acenaphthene-d10 internal standard. In addition, -001MS gave a low response for phenanthrene-d10 internal standard. Each of these samples also gave high recoveries for 2-fluorobiphenyl and terphenyl-d14 surrogates.

Samples 4709-001MS/MSD gave high recoveries of 4-nitrophenol at 292 and 197%, respectively (UCL=114%). In addition, high RPDs were obtained for 1,4-dichlorobenzene (30%, UCL=27%) and 1,2,4-trichlorobenzene (27%, UCL=23%).

Samples 4709-001, -001MS and -001MSD were extracted 6 days past the extraction hold-time of 14-days. These samples were received past the hold time. See NCM SL-94-0160.

0000657

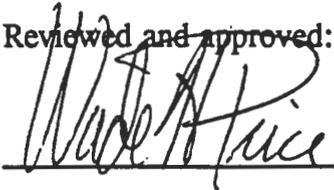
Westinghouse Hanford Company  
April 20, 1994  
Project Number: 519.04  
page 3

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Sample 4709-001MS gave low responses for all three internal standards. Sample 4709-001MSD gave low responses for 1,4-difluorobenzene and chlorobenzene-d5 internal standards. Per the CLP 3/90 SOW, MS/MSD samples need not meet the internal standard response criteria. In addition, all MS and surrogate recoveries were in-control.

I certify that this data package 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:



Wade H. Price  
Project Manager  
z:\annclars\hanw0006.nar

0006657A

<b>Westinghouse Hanford Company</b>	<b>CHAIN OF CUSTODY</b>	<b>006251</b>
Custody Form Initiator <u>DL EDWARDS</u>		
Company Contact <u>C.A. Rowley</u>	Telephone <u>372-3293</u>	
Project Designation/Sampling Locations <u>216-U-8</u>	Collection Date <u>3/1/94 1515</u>	
<u>Vitrified Clay Pipeline</u>		
Ice Chest No. _____	Field Logbook No. <u>SAF 93-263</u>	
Bill of Lading/Airbill No. <u>NA</u>	Offsite Property No. <u>N/A</u>	
Method of Shipment <u>TRUCK - HAND DELIVERED TO PNL</u>		
Shipped to <u>PNL IT ARE 3/15/94</u>		
Possible Sample Hazards/Remarks <u>Analysis per SAF # 93-263</u>		

Sample Identification		
<u>BOBFH3</u>	<u>40326801 A</u>	<u>(1) 250ML G3 VOA</u>
	<u>B</u>	<u>(1) 250ML aG Semi-VOA</u>
	<u>C</u>	<u>(1) 250ML Poly Metals</u>
	<u>D</u>	<u>(1) 125ML G Anions</u>
	<u>E</u>	<u>(1) 125ML G NO<sub>2</sub>/NO<sub>3</sub></u>
	<u>F</u>	<u>(1) 125ML G Cyanide</u>
	<u>G</u>	<u>(1) 125ML G3 Kerosene</u>
	<u>40326901</u>	<u>(1) 100ML Poly Radionuclides</u>
		<u>D&amp;P 3/10/94</u>

CHAIN OF POSSESSION					
Relinquished By			Received By		
Date	Time		Date	Time	
From C.O.C. # 006227 <u>DL Edwards</u>					
<u>3/10/94</u>	<u>0820</u>		<u>DL Edwards</u>		
<u>3/15/94</u>	<u>1320</u>		<u>Tom [Signature]</u>	<u>2100 0000 PM</u>	<u>1455</u>
			<u>ITAC</u>	<u>3/15/94</u>	

**Final Sample Disposition**

Disposal Method: \_\_\_\_\_ Disposed by: \_\_\_\_\_ Date/Time: 1115

Comments: Sample transferred from C.O.C. # 006227. Change in lab due to radioactivity levels.

000010

9713511.0369

Attachment 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	(E)
PROJECT:	200 WP2		DATA PACKAGE: W0006-ITC-004		
VALIDATOR:	C Jensen	LAB:	JAC	DATE: 5/27/94	
CASE:			SDG:		
ANALYSES PERFORMED					
<input checked="" type="checkbox"/> CLP/ICP	<input type="checkbox"/> CLP/GFAA	<input type="checkbox"/> CLP/Hg	<input checked="" type="checkbox"/> CLP/Cyanide	<input checked="" type="checkbox"/> Ti	<input type="checkbox"/>
<input type="checkbox"/> SW-846/ICP	<input type="checkbox"/> SW-846/GFAA	<input type="checkbox"/> SW-846/Hg	<input type="checkbox"/> SW-846 Cyanide	<input type="checkbox"/>	<input type="checkbox"/>
SAMPLES/MATRIX	soil BOBFA3				

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: Verification performed by WHC

2. HOLDING TIMES

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

Comments: Can holding time was exceeded, BOBFA3  
Qualified BT.

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

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

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

4. BLANKS

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

Comments: See qualification summary for blank results  
and qualifications.  
 \_\_\_\_\_  
 \_\_\_\_\_

5. ACCURACY

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

Comments: On Ti trace values not shown on  
Form 7, requested through WIC. 4/5/94  
 \_\_\_\_\_  
 \_\_\_\_\_

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

6. PRECISION

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

Comments: The laboratory marked Cr, Cu and Mg as \* for duplicate results that were unacceptable. However a range of + 2x RPD was used for soil samples in the duplicate evaluation and the results were acceptable.

7. FURNACE AA QUALITY CONTROL

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

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

8. REPORTED RESULTS AND DETECTION LIMITS

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

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



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U.S. EPA - CLP

3  
BLANKS

Lab Name: ITAS\_ST.\_LOUIS \_\_\_\_\_ Contract: 519.04 \_\_\_\_\_

Lab Code: ITMO Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: W0006 \_\_\_\_\_

Preparation Blank Matrix (soil/water): SOIL\_

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L)						Preparation Blank	C	M
			1	C	2	C	3	C			
Aluminum	29.5	U	29.5	U	29.5	U	29.5	U	5.900	U	P
Antimony	30.5	U	30.5	U	30.5	U	30.5	U	6.100	U	P
Arsenic	0.8	U	0.8	U	0.8	U	0.8	U	0.160	U	F
Barium	4.2	U	4.2	U	4.2	U	4.2	U	0.840	U	P
Beryllium	0.7	U	1.5	B	2.2	B	2.0	B	0.140	U	P
Cadmium	1.3	U	1.3	B	1.9	B	2.5	B	0.260	U	P
Calcium	31.1	U	31.1	U	31.1	U	105.1	B	8.422	B	P
Chromium	4.3	U	4.3	U	4.3	U	4.3	U	0.860	U	P
Cobalt	3.7	U	3.7	U	5.0	B	4.2	B	0.740	U	P
Copper	3.6	U	3.6	U	3.6	U	3.6	U	0.720	U	P
Iron	6.2	U	20.0	B	21.1	B	25.9	B	4.694	B	P
Lead	0.6	U	-0.7	B	0.6	U	-0.6	B	0.120	U	F
Magnesium	42.0	U	42.0	U	42.0	U	42.0	U	8.400	U	P
Manganese	1.0	U	2.2	B	3.1	B	2.7	B	0.292	B	P
Mercury	0.1	U	0.1	U	0.1	U	0.1	U	0.050	U	CV
Nickel	5.0	U	5.0	U	5.0	U	5.0	U	1.000	U	P
Potassium	370.6	U	370.6	U	370.6	U	370.6	U	74.120	U	P
Selenium	1.4	U	1.4	U	1.4	U	1.4	U	0.280	U	F
Silver	2.7	U	2.7	U	2.7	U	2.7	U	0.540	U	P
Sodium	55.4	U	55.4	U	55.4	U	55.4	U	11.394	B	P
Thallium	-0.6	B	0.5	U	0.5	U	-0.5	B	0.100	U	F
Vanadium	6.2	B	11.1	B	4.0	U	4.0	U	1.240	B	P
Zinc	13.3	U	13.3	U	13.3	U	13.3	U	2.660	U	P
Cyanide	2.4	B	2.0	B	1.0	U			0.106	B	AS
Titanium	3.0	U	3.0	U	4.4	B	3.8	B	1.076	B	P

FORM III - IN

ILM03.0

*5/5/194*

*5013FH3 Pb blank ok*

*Can qualified due to PBLK - 721*

*5/5/194*

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U.S. EPA - CLP

3  
BLANKS

Lab Name: ITAS\_ST.\_LOUIS \_\_\_\_\_

Contract: 519.04 \_\_\_\_\_

Lab Code: ITMO Case No.: \_\_\_\_\_

SAS No.: \_\_\_\_\_

SDG No.: W0006 \_\_\_\_\_

Preparation Blank Matrix (soil/water): \_\_\_\_\_

Preparation Blank Concentration Units (ug/L or mg/kg): \_\_\_\_\_

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L)						Preparation Blank	C	M
			①	②	C	2	C	3			
Aluminum	59.9	B	29.5	U	29.5	U				P	
Antimony	30.5	U	30.5	U	30.5	U				P	
Arsenic										NR	
Barium	4.2	U	4.2	U	4.2	U				P	
Beryllium	2.6	B	2.0	B	1.4	B				P	
Cadmium	2.2	B	1.8	B	1.3	U				P	
Calcium	97.9	B	31.1	U	48.6	B				P	
Chromium	4.3	U	4.3	U	4.3	U				P	
Cobalt	5.6	B	4.6	B	3.7	U				P	
Copper	3.6	U	3.6	U	3.6	U				P	
Iron	49.4	B	23.8	B	23.5	B				P	
Lead	0.6	U								F	
Magnesium	79.0	B	42.0	U	42.0	U				P	
Manganese	4.0	B	2.7	B	2.4	B				P	
Mercury	0.1	U								CV	
Nickel	5.0	U	5.0	U	5.0	U				P	
Potassium	370.6	U	370.6	U	370.6	U				P	
Selenium										NR	
Silver	2.7	U	2.7	U	2.7	U				P	
Sodium	57.0	B	55.4	U	55.4	U				P	
Thallium										NR	
Vanadium	5.0	B	7.4	B	4.0	U				P	
Zinc	13.3	U	13.3	U	13.3	U				P	
Cyanide										NR	
Titanium	6.2	B	6.0	B	6.0	B				P	

0000359

*800FH3 ICP metals*  
FORM III - IN

ILM03.0

*5/31/94*

9713511.0376

U.S. EPA - CLP

5A  
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

BOBFH3S

Lab Name: ITAS\_ST.\_LOUIS

Contract: 519.04

Lab Code: ITMO Case No.:

SAS No.:

SDG No.: W0006

Matrix (soil/water): SOIL

Level (low/med): LOW

% Solids for Sample: 86.2

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

Analyte	Control Limit %R	Spiked Sample Result (SSR) C	Sample Result (SR) C	Spike Added (SA)	%R	Q	M
Aluminum							NR
Antimony	75-125	74.8979	7.0766 U	116.01	64.6	N	P
Arsenic	75-125	11.9791	3.3759	9.28	92.7		F
Barium	75-125	457.7842	16.2668 B	464.04	95.1		P
Beryllium	75-125	11.8399	0.1787 B	11.60	100.5		P
Cadmium	75-125	12.1508	0.3016 U	11.60	104.7		P
Calcium							NR
Chromium	75-125	48.5615	5.7007	46.40	92.4		P
Cobalt	75-125	119.7053	4.3155 B	116.01	99.5		P
Copper	75-125	58.4571	5.2459 B	58.00	91.7		P
Iron							NR
Lead	75-125	5.8747	0.7726	4.64	110.0		F
Magnesium							NR
Manganese	75-125	147.6404	104.2691	116.01	37.4	N	P
Mercury	75-125	0.8759	0.3573	0.58	89.4		CV
Nickel	75-125	120.4617	10.1253	116.01	95.1		P
Potassium							NR
Selenium	75-125	1.9977	0.3248 U	2.32	86.1		F
Silver	75-125	11.2761	0.6265 U	11.60	97.2		P
Sodium							NR
Thallium	75-125	10.8910	0.1160 U	11.60	93.9		F
Vanadium	75-125	129.9954	21.7981	116.01	93.3		P
Zinc	75-125	125.2854	36.3248	116.01	76.7		P
Cyanide	75-125	27.6063	0.3406 B	28.65	95.2		AS
Titanium	75-125	664.7981	820.7262	232.02	-67.2	N	P

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Comments:

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95/3/194

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U.S. EPA - CLP

6  
DUPLICATES

EPA SAMPLE NO.

BOBFH3D

Lab Name: ITAS\_ST\_LOUIS

Contract: 519.04

Lab Code: ITMO

Case No.

SAS No.

SDG No.: W0006

Matrix (soil/water): SOIL

Level (low/med): LOW

% Solids for Sample: 86.2

% Solids for Duplicate: 86.2

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

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum		2365.1555		702.5522		108.4	*	P
Antimony		7.0766	U	7.0766	U			P
Arsenic	2.3	3.3759		3.6984		9.1		F
Barium		16.2668	B	5.2691	B	102.1		P
Beryllium		0.1787	B	0.1624	U	200.0		P
Cadmium		0.3016	U	0.3016	U			P
Calcium	1160.1	2122.5452		635.5800	B	107.8	*	P
Chromium	2.3	5.7007		1.7077	B	107.8	*	P
Cobalt		4.3155	B	1.2251	B	111.6		P
Copper		5.2459	B	1.6381	B	104.8		P
Iron		10682.8306		3926.6497		92.5	*	P
Lead	0.7	0.7726		0.5336	B	36.6		F
Magnesium	1160.1	1529.5220		217.8770	B	150.1	*	P
Manganese		104.2691		22.5638		128.8	*	P
Mercury	0.1	0.3573		0.3776		5.5		CV
Nickel	9.3	10.1253		3.0209	B	108.1		P
Potassium		606.9954	B	447.3643	B	30.3		P
Selenium		0.3248	U	0.3248	U			F
Silver		0.6265	U	0.6265	U			P
Sodium		158.3991	B	164.7842	B	4.0		P
Thallium		0.1160	U	0.1160	U			F
Vanadium	11.6	21.7981		11.7517		59.9		P
Zinc	4.6	36.3248		7.9327		128.3	*	P
Cyanide		0.3406	B	0.1726	B	65.5		AS
Titanium		820.7262		418.0928		65.0	*	P

6/14/94  
OK  
6/16/94

6/14/94

0000364

FORM VI - IN

ILM03.0

cf 5/31/94

-024

rev. 3/24/94  
5/21/94

## MEMORANDUM



June 20, 1994

TO: 200-UP-2 Project QA Record

FR: Kent Angelos, Golder Associates Inc. *MA*RE: RADIOCHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE:  
W0006-ITC-004, (923-E418, Filename W0006R.UP2)

## INTRODUCTION

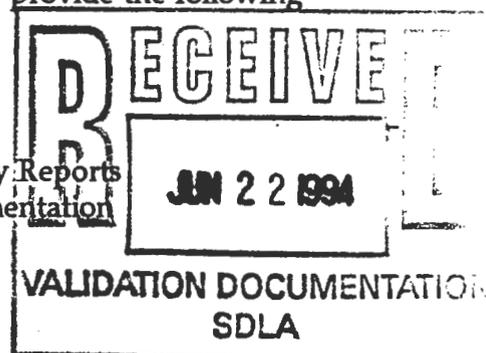
This memo presents the results of data validation on data package W0006-ITC-004 prepared by IT Analytical Services of Richland, Washington. The sample validated along with the analyses reported and the method of analysis is listed in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSIS
BOBFH3	3/1/94	SOIL	SEE NOTE 1

Note 1. The sample was analyzed for americium-241, neptunium-237, plutonium-238, 239/240 and uranium-234, 235 and 238 by alpha spectroscopy; iodine-129 and selected radionuclides by gamma spectroscopy; gross alpha, gross beta and strontium-90 by gas proportional counting; selenium-79 and technetium-99 by liquid scintillation counting and total uranium by kinetic phosphorimetry.

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

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



## DATA QUALITY OBJECTIVES

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

**Precision.** Goals for precision were met with the exception the deficiencies identified under "Minor Deficiencies".

**Accuracy.** Goals for accuracy were met with the exception of the deficiencies identified under "Major Deficiencies".

**Sample Result Verification.** All sample results were supported in the raw data. Results and minimum detectable activities (MDAs) for selenium-79 and MDAs for neptunium-237, plutonium-239/240 and technetium-99 could not be verified by recalculation using the

formulae provided by IT. Only results for selenium-79 were qualified as estimated (U) since the remaining analytes were reported as detects.

**Detection Limits.** Detection limit goals were met for all analytes except curium-244, plutonium-238, uranium-234/235/238, cobalt-60, europium-152/154/155, gross alpha and selenium-79 because the laboratory used a smaller than normal amount of sample for analysis.

**Completeness.** The data package was complete for all requested analyses with the exception that results for iodine-129 were not reported due to an identified matrix interference from cesium-137. One sample was validated in this data package with a total of 24 determinations reported, of which 23 were deemed valid. This results in a completeness of 96 percent, which meets normal work plan objectives of 90%.

### MAJOR DEFICIENCIES

The following major deficiencies were identified requiring rejection of data.

#### Laboratory Control Samples

- Plutonium-238 recovery in the LCS was less than 30% requiring qualification of all sample results as unusable (UR for nondetects). Attachments 2 and 5 provide supporting documentation.

### MINOR DEFICIENCIES

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

#### Laboratory Control Samples (LCS)

- LCS recovery was unacceptable for uranium-235. Attachments 2 and 5 provide a summary of the qualifications and supporting documentation.

#### Laboratory Duplicates

- Duplicate sample relative percent differences were unacceptable for neptunium-237 and plutonium-239/240. Attachments 2 and 5 provide a summary of the qualifications and supporting documentation.
- A duplicate analysis was not performed for uranium, therefore the sample result was qualified as estimated (J). Attachments 2 and 5 provide a summary of the qualifications and supporting documentation.

**DATA REPORTING**

- Results reported at a concentration of less than the minimum detectable activity (MDA) have been crossed out on the report form and the MDA has been written with a qualifier of undetected (U) and reported on the validated data summary in Attachment 3.

**REFERENCES**

WHC 1993a, Validation of 200-UP-2 Data, Statement of Work, Analytical Laboratory Data Validation, Task Order S-94-18, December 14, 1993, Purchase Order M073750. Westinghouse Hanford Company, Richland, Washington.

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

## ATTACHMENT 1

## GLOSSARY OF RADIOCHEMISTRY DATA REPORTING QUALIFIERS

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

## ATTACHMENT 2

## SUMMARY OF DATA QUALIFICATIONS

SDG: W0006-ITC-004	VALIDATOR: KA	DATE: June 20, 1994	PAGE <u>1</u> OF <u>1</u>
COMMENTS: RADIOCHEMISTRY			
ANALYTE	QUALIFIER	SAMPLES AFFECTED	REASON
PLUTONIUM-238	UR	B0BFH3	LCS RECOVERY <30%.
NEPTUNIUM-237 PLUTONIUM-239/240	J DETECTS UJ NONDETECTS	B0BFH3	DUPLICATE RPD >35% FOR SAMPLE RESULTS >5X RDL OR >2xRDL FOR SAMPLE RESULTS <5xRDL.
URANIUM-235	UJ	B0BFH3	LCS RECOVERY <70% BUT >30%.
SE-79	UJ	B0BFH3	MDA COULD NOT BE VERIFIED BY RECALCULATION USING THE FORMULAE PROVIDED BY IT.
URANIUM (TOTAL)	J	B0BFH3	NO DUPLICATE ANALYZED.

*Revised*  
*Wet*  
*6/24/94*

9713511.0383

ATTACHMENT 3

QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: W0006-ITC-004

Parameter	Samp#	BOBFH3	
	Date	3-1-94	
	Location	---	
	Depth	---	
	Type	SOIL	
	Comments	---	
	Units	Result	Q
AMERICIUM-241	PCI/G	426.000	
CURIUM-242	PCI/G	4.890	U
CURIUM-244	PCI/G	3.930	U
NEPTUNIUM-237	PCI/G	1.870	J
PLUTONIUM-239/240	PCI/G	70.600	J
PLUTONIUM-238	PCI/G	28.100	UR
URANIUM-234	PCI/G	24.900	U
URANIUM-235	PCI/G	17.400	UJ
URANIUM-238	PCI/G	19.300	U
POTASSIUM-40	PCI/G	16.400	
COBALT-60	PCI/G	0.232	U
EUROPIUM-152	PCI/G	0.781	U
CESIUM-137	PCI/G	49100.000	
CESIUM-134	PCI/G	1.880	U
RUTHENIUM-106	PCI/G	20.000	U
SODIUM-22	PCI/G	0.677	U
EUROPIUM-155	PCI/G	4.420	U
EUROPIUM-154	PCI/G	1.860	U
IODINE-129	PCI/G	NOT REPORTED	
ALPHA	PCI/G	15.500	U
BETA	PCI/G	74800.000	
TOTAL STRONTIUM	PCI/G	7.410	
SELENIUM-79	PCI/G	13.200	UJ
TECHNETIUM-99	PCI/G	50.200	
URANIUM	UG/G	25.400	J

*Verified  
Mud  
6/24/94*

*Revised  
Mud  
6/24/94*

9713511.0384



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## SAMPLE RESULTS

LAB NAME: ITAS-RICHLAND SDG NO.: W0006  
 LAB SAMPLE ID: 4-03-269-01 MATRIX: SOIL  
 WHC ID: BOBFH3 DATE RECEIVED: 3/15/94  
 REPORTING UNITS: pCi/g

ISOTOPE	* RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	Q YIELD	METHOD NUMBER
AM-241	4.26E+02	4.96E+01	7.00E+01	0.382	RD3302
CM-242 4.89	<del>0.00E+00</del>	0.00E+00	5.42E+00	U 0.382	RD3302
CM-244 3.93	<del>0.00E+00</del>	0.00E+00	4.35E+00	U 0.382	RD3302
NP-237	1.87E+00	2.16E+00	2.20E+00	J 0.86	RD3208
PU239/40	7.06E+01	5.51E+01	5.69E+01	J 0.305	RD3209
PU-238 28.1	<del>0.00E+00</del>	0.00E+00	3.12E+01	UR 0.305	RD3209
U-234 24.9	<del>1.16E+01</del>	1.65E+01	1.66E+01	U 0.687	RD3234
U-235 17.4	<del>4.36E+00</del>	9.51E+00	9.52E+00	UJ 0.687	RD3234
U-238DA 19.3	<del>8.72E+00</del>	1.34E+01	1.35E+01	U 0.687	RD3234
K-40	1.64E+01	1.98E+00	2.57E+00	N/A	RD3219
CO-60 0.232	<del>1.13E-01</del>	1.35E-01	1.36E-01	U N/A	RD3219
EU-152 0.781	<del>8.40E-01</del>	5.07E-01	5.11E-01	U N/A	RD3219
CS-137DA	4.91E+04	4.91E+03	4.91E+03	N/A	RD3219
CS-134 1.88	<del>3.70E-01</del>	1.16E+00	1.16E+00	U N/A	RD3219
RU-106DA 20	<del>1.20E+01</del>	1.24E+01	1.24E+01	U N/A	RD3219
NA-22 0.677	<del>9.42E-03</del>	4.12E-01	4.12E-01	U N/A	RD3219
EU-155 4.42	<del>1.25E+00</del>	2.71E+00	2.71E+00	U N/A	RD3219
EU-154 1.86	<del>2.58E-02</del>	1.13E+00	1.13E+00	U N/A	RD3219
ALPHA 18.5	<del>7.08E+00</del>	9.90E+00	9.97E+00	U 1	RD3222
BETA	7.48E+04	7.97E+02	5.10E+03	1	RD3222
TOTAL-SR	7.41E+00	1.75E+00	2.54E+00	0.881	RD3204
SE-79 13.2	<del>1.01E+01</del>	6.33E+00	3.55E+01	UJ 1	RD3253
TC-99	5.02E+01	2.77E+00	1.42E+01	0.9	ITAS-IT-RS-0001
URANIUM	2.54E+01	N/A	3.81E+00	J 0.925	RD4200

\* non-detect  
 results have been changed to the  
 MDA and qualified non-detect "U".

CAS  
 6/27/94

Revised  
 6/24/94

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ATTACHMENT 4

LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION



## CERTIFICATE OF ANALYSIS

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

May 2, 1994

Attention: J.A.Lerch

SAF Number : 93-263  
Date Received by Lab : March 16, 1994  
Number of Samples : One (1)  
Sample Type : Soil  
SDG Number : W0006

### I. Introduction

On March 16, 1994, one soil sample was received by ITAS-Richland for radiochemical analysis. Upon receipt, the sample was given the following laboratory ID number to correspond with the WHC specific ID:

<u>ITAS-Richland ID</u>	<u>WHC ID</u>	<u>Matrix</u>	<u>Date of Receipt</u>
403268-01A	B0BFH3	Soil	3/16/94

### II. Analytical Results/Methodology

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

Westinghouse Hanford Company  
May 2, 1994  
Page 2

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The requested analyses were:

**Alpha Spectroscopy**

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

Neptunium-237 by method ITAS-RD-3208

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

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

**Gamma Spectroscopy**

Gamma Scan by method ITAS-RD-3219

Iodine-129 by method ITAS-RD-3219

**Gas Proportional Counting**

Gross Alpha by method ITAS-RD-3222

Gross Beta by method ITAS-RD-3222

Strontium-90 by method ITAS-RD-3204

**Liquid Scintillation Counting**

Selenium-79 by method ITAS-RD-3253

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

**Total Uranium**

Total Uranium by method ITAS-RD-4200

III. Quality Control

The analytical results for SDG W0006 include a minimum of one Laboratory Control Sample (LCS), one method (reagent) blank, and one duplicate.

IV. Comments

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

Westinghouse Hanford Company

May 2, 1994

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### Alpha Spectroscopy

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

The contractual detection limit was not met for the sample and sample duplicate due to the reduced sample size analyzed. The analyzed sample size was the maximum allowable aliquot based on the screening results. The sample-size adjusted detection limit was met. The laboratory control sample and the batch blank were acceptable. The sample and duplicate sample results were outside of the 3 sigma control limit. The results were accepted due to the possibility of nonhomogeneity in the soil samples.

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

The contractual detection limit was not met for the sample and sample duplicate due to the reduced sample size analyzed. The analyzed sample size was the maximum allowable aliquot based on the screening results. The sample-size adjusted detection limit was met. The laboratory control sample and the batch blank were acceptable. The sample and sample duplicate results were within the 3 sigma control limit. Two matrix spikes were analyzed with the batch; only one was accepted (L032691M) and used for yield correction.

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

The contractual detection limit was not met for the sample and sample duplicate due to the reduced sample size analyzed. The analyzed sample size was the maximum allowable aliquot based on the screening results. The sample-size adjusted detection limit was met. The laboratory control sample and batch blank were acceptable. The sample duplicate result was declared lost due to low yield (15.7%).

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

The contractual detection limit was not met for the sample and sample duplicate due to the reduced sample size analyzed. The analyzed sample size was the maximum allowable aliquot based on the screening results. The sample-size adjusted detection limit was met. The laboratory control sample and batch blank were acceptable. The sample and sample duplicate results were within the 3 sigma control limit.

Westinghouse Hanford Company  
May 2, 1994  
Page 4

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### Gamma Spectroscopy

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

The contractual detection limit was not met for the sample and sample duplicate due to the reduced sample size analyzed. The analyzed sample size was the maximum allowable aliquot based on the screening results. The sample-size adjusted detection limit was met. The laboratory control sample and batch blank were acceptable. The sample duplicate was analyzed separately from the remainder of the batch due to a technician error. Since no chemistry is performed on the sample in preparation for gamma counting an aliquot could be prepared and analyzed at a later date. The sample and sample duplicate results were within the 3 sigma control limit.

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

The Iodine-129 results have been declared "lost" due to matrix effect. On the first count of the batch (100 minutes), the Cs-137 activity of the sample and sample duplicate caused a high background count and "dead time" on the detector. The samples were recounted for 1 minute with similar results and "dead time". It was determined that standard methodology would be unacceptable for this matrix with this level of Cs-137 activity.

### Gas Proportional Counting

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

The soil preparation procedure was modified due to the activity of the sample. A 0.12 gram aliquot of the sample and a 0.12 gram aliquot of the sample duplicate were dissolved by microwave bomb digestion and diluted to approximately 100 grams each. Aliquots of the digested and diluted soil samples were dried on planchets to reduce the possibility of lab contamination from hot particles falling from the planchet during handling and counting. The contractual detection limit was not met for the sample and sample duplicate due to the reduced sample size analyzed. The analyzed sample size was the maximum allowable aliquot based on the screening results. The sample-size adjusted detection limit was met. The laboratory control sample (LCS) was biased high with a 171% recovery. The LCS was recounted and the activity was verified. The data were accepted based on the acceptable batch blank and sample and duplicate sample agreement within the 3 sigma control limit.

Westinghouse Hanford Company  
May 2, 1994  
Page 5

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Gross Beta by method ITAS-RD-3222

The soil preparation procedure was modified due to the activity of the sample. A 0.12 gram aliquot of the sample and a 0.12 gram aliquot of the sample duplicate were dissolved by microwave bomb digestion and diluted to approximately 100 grams each. Aliquots of the digested and diluted soil samples were dried on planchets to reduce the possibility of lab contamination from hot particles falling from the planchet during handling and counting. The laboratory control sample and batch blank were acceptable. The sample and sample duplicate results were within the 3 sigma control limit.

Strontium-90 by method ITAS-RD-3204

The contractual detection limit was not met for the batch quality control samples, sample and sample duplicate due to the reduced sample size analyzed. The analyzed sample size was the maximum allowable aliquot based on the screening results. The sample-size adjusted detection limit was met. The laboratory control sample and batch blanks were acceptable. The sample and sample duplicate results were within the 3 sigma control limit.

**Liquid Scintillation Counting**

Selenium-79 by method ITAS-RD-3253

The contractual detection limit was not met for the sample and sample duplicate due to the reduced sample size analyzed. The analyzed sample size was the maximum allowable aliquot based on the screening results. The sample-size adjusted detection limit was met. The laboratory control sample and batch blanks were acceptable. The sample and sample duplicate results were within the 3 sigma control limit.

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

The laboratory control sample and batch blanks were acceptable. The sample and sample duplicate results were within 3 sigma control limits.

Westinghouse Hanford Company  
May 2, 1994  
Page 6

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### Total Uranium

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

The total uranium analysis by laser phosphorimeter had suspected chloride interferences on the first analysis and therefore a reanalysis was performed. The reanalysis results were acceptable with the exception of the result for the duplicate. The duplicate of the sample had suspected chloride interferences on the reanalysis. The duplicate result has been declared "lost" and a nonconformance memo issued. The data for the batch were accepted based on the acceptable laboratory control sample and batch blanks.

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:



Van H. Pettey  
Project Manager

<b>Westinghouse Hanford Company</b>	<b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b>	Page 1 of 1
<b>006227</b>		
Collector <b>R.T. Sickie</b>	Company Contact <b>C.A. Rowley</b>	Telephone <b>372-3293</b>
SAF No. <b>93-263</b>	Project Designation <b>216-U-8 Vitrified Clay Pipeline</b>	Sampling Locations <b>216-U-8 Crib</b>
Ice Chest No.	Bill of Lading/Airbill No.	Offsite Property No.
Method of Shipment <b>Air Overnight</b>		Field Logbook No.
Shipped to <b>TMA</b>		<b>SPECIAL INSTRUCTIONS</b>
Possible Sample Hazards/Remarks <b>None Detected</b>		
Special Handling and/or Storage <b>Keep cool</b>		

Sample Number	*	Date Collected	Time	Number and Type of Containers	Analysis Required	Preservative
BOBFH3	S	3-1-94	1515	(1) 250ml Gs	VOA	CLP
BOBFH3	S	↓	↓	(1) 250ml aG	Semi-VOA	CLP
BOBFH3	S			(1) 250ml Poly	Metals -CLP TAL Titanium Mercury	CPL
BOBFH3	S			(1) 125ml G	Anions F, Cl, SO <sub>4</sub>	EPA 300.0
BOBFH3	S			(1) 125ml P/G	NO <sub>2</sub> NO <sub>3</sub>	EPA 353.2
BOBFH3	S			(1) 250ml aGs	PCB/Pest <i>RIIL 2 23 94</i>	8880
BOBFH3	S			(1) 125ml G	Cyanide	CPL
BOBFH3	S			(1) 125ml Gs	Kerosene	8015M
BOBFH3	S			(1) 1000ml Poly	Gross Alpha/Beta EP-10; Gamma Spec. Cs-134/137, Co-60, K-40, Eu-152/154/155, Ru-106, Na-22 RC-30; Total Uranium EA-01C; U-235/234/238 EP-70, 71, 5; Np-237 RC-101A, 622, EP-5; Pu-238/239/240 EP-80, 81, 5; I-129 RC-25, 603; Sr-90 RC-306, 303, 309, 304; Tc-99 RC-24, 604; Am-241, Cm-244 EP-80, 91, 92, 93, 5; Se-79 Lab Specific	

Chain of Possession (Sign and Print Names)				*Matrix	
Relinquished By	Date	Time	Received By	A = Air	SE = Sediment
<i>R.T. Sickie</i>	3/7/94	0740	<i>Dr Edwards</i>	DL = Drum Liquids	SL = Sludge
<i>Dr Edwards</i>	3/10/94	0820	<i>to C.O.C. #006251 Dr Edwards</i>	DS = Drum Solids	SO = Solid
				L = Liquid	T = Tissue
				O = Oil	W = Water
				S = Soil	WI = Wipe
					X = Other

LABORATORY SECTION	Received By	Title	Date/Time
Final Sample Disposition	Disposal Method:	Disposed by:	Date/Time:

1500

97151 0303

9713511.0394

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	<u>D</u>	E
PROJECT:	200 UP 2		DATA PACKAGE: W0006-ITC 704		
VALIDATOR:	KA.	LAB:	IT	DATE: 6/17/94	
CASE:			SDG:		
ANALYSES PERFORMED					
<input checked="" type="checkbox"/> Gross Alpha/Beta	<input checked="" type="checkbox"/> Strontium-90	<input checked="" type="checkbox"/> Technetium-99	<input checked="" type="checkbox"/> Alpha Spectroscopy	<input checked="" type="checkbox"/> Gamma Spectroscopy	
<input checked="" type="checkbox"/> Total Uranium	<input type="checkbox"/> Radium-22	<input type="checkbox"/> Tritium	<input checked="" type="checkbox"/> I-129		
SAMPLES/MATRIX	ROBFH3/soil				

1. Completeness . . . . .  N/A

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

Comments: performed by WAC

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

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

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

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

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

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

- 3. Continuing Calibration . . . . .  N/A
- Calibration checked within one week of sample analysis? . . .  Yes No N/A
- Calibration check acceptable? . . . . .  Yes No N/A
- Calibration check standards NIST traceable? . . . . .  Yes No N/A
- Calibration check standards expired? . . . . . Yes  No N/A

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

- 4. Blanks . . . . .  N/A
- Method blank analyzed? . . . . .  Yes No N/A
- Method blank results acceptable? . . . . .  Yes No N/A
- Analytes detected in method blank? . . . . .  Yes No N/A
- Field blank(s) analyzed? . . . . . Yes No  N/A
- Field blank results acceptable? . . . . . Yes No  N/A
- Analytes detected in field blank(s)? . . . . . Yes No  N/A
- Transcription/Calculation Errors? . . . . . Yes  No N/A

Comments: Low concentrations of analytes detected in method blank but sample results are greater than five times the blank results.

- 5. Matrix Spikes . . . . .  N/A
- Matrix spike analyzed? . . . . .  Yes No N/A
- Spike recoveries acceptable? . . . . .  Yes No N/A
- Spike source traceable? . . . . .  Yes No N/A
- Spike source expired? . . . . . Yes  No N/A
- Transcription/Calculation Errors? . . . . . Yes  No N/A

Comments: matrix spikes analyzed for Tc99 and Np237 %R were 86-92%.

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

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

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

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

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

Comments: Recoveries unacceptable for Pu 238,  
U-235 and alpha. see attached.  
Pu238 qualified UK U235 qualified UT  
No qualifier necessary for alpha.

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

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

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

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

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

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

Comments: Tracer and chemical yields were  
all within validation limits.

8. Duplicates . . . . .  N/A

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

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

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

Comments: No duplicate analyzed for uranium  
results I/UT RPD's out for Cm 244, Pu 237  
Cm 242, Pu 239/40, U 234, U 235, Eu 154, results  
qualified I/UT see attached RPD's exceeded  
for Np 237 and Pu 239/240 results qualified I/UT.

*WUT*  
*6/24/94*  
*Eu 152*  
*WUT 6/20/94*  
*Revised*  
*WUT*  
*6/23/94*

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

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

10. Holding Times

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

Comments: Samples collected between on 3/1/94,  
all analysis's completed by 4/29/94  
which is < 180 days.

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

- Results reported for all required sample analyses? . . . . . Yes  No  N/A
- Results supported in raw data? . . . . .  Yes  No  N/A
- Results Acceptable? . . . . .  Yes  No  N/A
- Transcription/Calculation errors? . . . . .  Yes  No  N/A
- MDA's meet required detection limits? . . . . . Yes  No  N/A
- Transcription/calculation errors? . . . . .  Yes  No  N/A

Comments: I-129 not reported due to matrix interference.  
Results/MDA's could not be verified by recalculation  
for U-237(MDA), Pu-239(MDA), Sr-90(MDA), Se-79  
(result and MDA), Tc-99(MDA not reported). Results  
and/or detection limits have been qualified  
as estimated I/US as appropriate. Only Se-79  
was qualified since it was reported as undetected and all  
other analytes are detected.

*not*  
 4/21/94

## Comments:

MRA's do not meet ROL's for the following

not 6/17/94  
Cm 244, Pa 238, Pa 239/40, U234, U235,  
U238, Co 60, Eu 152, Eu 155, Eu 154,  
Alpha and Se 79. See attached.

Case narrative explains that  
the contractual detection limits  
were not met because reduced  
sample size was taken for  
analysis.



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## DUPLICATE RESULTS

LAB NAME: ITAS-RICHLAND

SDG NO.: W0006

LAB SAMPLE ID: F-03-269-01

WHC ID: BOBFH3

REPORTING UNITS: pCi/g

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	YIELD	METHOD NUMBER
AM-241	3.00E+02	3.77E+01	5.20E+01	0.347	RD3302
CM-242 7.67	<del>2.38E+00</del>	4.36E+00	4.37E+00	U 0.347	RD3302
CM-244 8.31	<del>1.43E+00</del>	1.65E+00	1.66E+00	U 0.347	RD3302
NP-237 1.69	<del>7.24E-01</del>	1.45E+00	1.46E+00	U 0.86	RD3208
PU239/40 6.7	<del>4.20E+01</del>	5.23E+01	5.35E+01	U 0.157	RD3209
PU-238	<del>0.00E+00</del>	0.00E+00	4.50E+01	U 0.157	RD3209
U-234 17.8	<del>1.47E+00</del>	1.31E+00	1.32E+00	U 0.841	RD3234
U-235	3.08E+00	7.37E+00	7.38E+00	0.841	RD3234
U-238DA 14.9	<del>2.20E+00</del>	7.44E+00	7.45E+00	U 0.841	RD3234
K-40	1.74E+01	2.43E+00	2.99E+00	N/A	RD3219
CO-60 17.8	<del>2.64E-02</del>	2.26E-01	2.26E-01	U N/A	RD3219
EU-152 1.412	<del>3.41E-01</del>	8.65E-01	8.66E-01	U N/A	RD3219
<sup>602</sup> CS-137DA 1.87	4.92E+04	4.92E+03	4.92E+03	N/A	RD3219
CS-134 1.87	<del>1.32E+00</del>	1.16E+00	1.17E+00	U N/A	RD3219
RU-106DA 19.87	<del>3.37E+00</del>	1.22E+01	1.22E+01	U N/A	RD3219
NA-22 0.9203	<del>3.12E-01</del>	5.59E-01	5.60E-01	U N/A	RD3219
EU-155	1.47E+00	2.58E+00	2.58E+00	N/A	RD3219
EU-154 2.510	<del>8.52E-01</del>	1.53E+00	1.53E+00	U N/A	RD3219
ALPHA	9.02E+00	1.07E+01	1.08E+01	1	RD3222
BETA	7.28E+04	7.62E+02	4.96E+03	1	RD3222
TOTAL-SR	7.23E+00	1.67E+00	2.47E+00	0.91	RD3204
SE-79	1.24E+01	6.31E+00	3.56E+01	1	RD3253
TC-99	5.28E+01	2.82E+00	1.45E+01	0.9	ITAS-IT-RS-0001

Uranium not analyzed results 5/95

Revised  
not  
6/27/94

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0013



W0006-ITC-004

## DUPLICATE SAMPLE EVALUATION

ANALYTE	RESULT	MDA	Q	RESULT	MDA	Q	2XRDL	RPD	COMMENTS
CM242	0.00E+00	4.89E+00	U	-1.43E+00	7.67E+00	U	---	44	NO EVALUATION BOTH RESULTS ND
CM244	0.00E+00	3.93E+00	U	2.38E+00	8.31E+00	U	0.1	72	NO EVALUATION BOTH RESULTS ND
NP237	1.87E+00	1.45E+00		7.24E-01	1.69E+00	U	0.4	88	J/UJ SAMPLE RESULTS
PU239/40	7.06E+01	4.48E+01		4.20E+01	6.47E+01	U	0.1	51	J/UJ SAMPLE RESULTS
U234	1.16E+01	2.49E+01	U	-1.47E+00	1.78E+01	U	0.6	33	NO EVALUATION BOTH RESULTS ND
U238	8.72E+00	1.93E+01	U	3.08E+00	1.49E+01	U	0.6	26	NO EVALUATION BOTH RESULTS ND
CO60	1.13E-01	2.32E-01	U	2.20E+00	1.78E+01	U	0.1	195	NO EVALUATION BOTH RESULTS ND
EU152	-6.40E-01	7.81E-01	U	3.41E-01	1.41E+00	U	0.2	58	NO EVALUATION BOTH RESULTS ND
CS134	3.70E-01	1.88E+00	U	-1.32E+00	1.89E+00	U	---	1	NO EVALUATION BOTH RESULTS ND
RU106	1.20E+01	2.00E+01	U	-3.37E+00	1.99E+01	U	---	1	NO EVALUATION BOTH RESULTS ND
NA22	9.42E-03	6.77E-01	U	-3.12E-01	9.20E-01	U	---	30	NO EVALUATION BOTH RESULTS ND
EU154	2.58E-02	1.86E+00	U	-8.52E-01	2.51E+00	U	0.2	30	NO EVALUATION BOTH RESULTS ND

Revised  
 MS  
 6/24/94



## BLANK RESULTS

LAB NAME: ITAS-RICHLAND

SDG NO.: W0006

LAB SAMPLE ID: L-03-269-1B

REPORTING UNITS: dpm/sample

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	YIELD	METHOD NUMBER
AM-241	5.27E-07	4.75E-02	7.20E-02	0.679	RD3302
CM-242	-4.45E-04	8.91E-04	8.92E-04	0.679	RD3302
CM-244	1.07E-03	2.14E-03	2.14E-03	0.679	RD3302
NP-237	7.75E-04	3.05E-03	3.06E-03	0.86	RD3208
PU239/40	0.00E+00	0.00E+00	1.95E-02	0.64	RD3209
PU-238	-3.91E-03	4.51E-03	4.55E-03	0.64	RD3209
U-234	3.87E-02	4.22E-02	4.24E-02	0.793	RD3234
U-235	-2.52E-03	2.91E-03	2.93E-03	0.793	RD3234
U-238DA	-1.68E-03	2.38E-03	2.39E-03	0.793	RD3234
K-40	5.49E+00	8.74E-01	1.03E+00	N/A	RD3219
CO-60	3.76E-02	4.74E-02	4.76E-02	N/A	RD3219
EU-152	-2.70E-01	2.65E-01	2.66E-01	N/A	RD3219
CS-137DA	2.29E-03	4.43E-02	4.43E-02	N/A	RD3219
CS-134	-3.10E-03	3.98E-02	3.98E-02	N/A	RD3219
RU-106DA	-1.90E-01	3.84E-01	3.85E-01	N/A	RD3219
NA-22	-7.20E-02	4.77E-02	4.82E-02	N/A	RD3219
EU-155	3.43E-02	8.05E-02	8.06E-02	N/A	RD3219
EU-154	-1.60E-01	1.28E-01	1.28E-01	N/A	RD3219
ALPHA	-1.41E-02	4.35E-02	4.36E-02	1	RD3222
BETA	3.31E-02	3.39E-01	3.39E-01	1	RD3222
TOTAL-SR	-3.28E-01	8.94E-01	8.98E-01	0.887	RD3204
TC-99	-9.21E-01	2.02E+00	9.68E+00	0.9	ITAS-IT-RS-0001

LAB SAMPLE ID: L-03-269-1X

REPORTING UNITS: dpm/sample

*All our results are > 5x blanks  
 Nov 6/2004*

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	YIELD	METHOD NUMBER
TOTAL-SR	1.12E+00	1.13E+00	1.17E+00	0.883	RD3204
TC-99	5.60E-01	2.04E+00	9.79E+00	0.9	ITAS-IT-RS-0001



## BLANK RESULTS

LAB NAME: ITAS-RICHLAND SDG NO.: W0006

LAB SAMPLE ID: L-03-269-2B

REPORTING UNITS: dpm/sample

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	YIELD	METHOD NUMBER
SE-79	-1.95E-02	7.71E-02	4.28E-01	1	RD3253
URANIUM	3.93E-03	N/A	5.89E-04	0.925	RD4200

LAB SAMPLE ID: L-03-269-2X

REPORTING UNITS: dpm/sample

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	YIELD	METHOD NUMBER
URANIUM	2.67E-01	4.01E-02	4.01E-02	0.925	RD4200

*All results are 75X  
blanks  
MWA  
6/20/94*

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LABORATORY CONTROL SAMPLES

LAB NAME: ITAS-RICHLAND SDG NO.: W0006

LAB SAMPLE ID: L-03-269-1M

REPORTING UNITS: pCi/g

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	YIELD	EXPECTED	% RECOVERY
TOTAL-SR	5.07E+01	3.80E+00	1.32E+01	0.893	5.47E+01	92.7
TC-99	1.83E+02	4.08E+00	2.81E+01	0.9	1.81E+02	101.1

LAB SAMPLE ID: L-03-269-2M

REPORTING UNITS: pCi/g

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	YIELD	EXPECTED	% RECOVERY
URANIUM	1.01E+01	1.59E+00	1.59E+00	0.925	1.01E+01	100

LAB SAMPLE ID: L-03-269-3M

REPORTING UNITS: pCi/g

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	YIELD	EXPECTED	% RECOVERY
URANIUM	1.01E+01	1.51E+00	1.51E+00	0.925	1.01E+01	100.00
SE-79	2.26E+01	3.31E+00	3.31E+00	N/A	2.71E+01	83.39

*Verified  
GMA  
6/17/94*

0017



INTERNATIONAL  
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CORPORATION

LABORATORY CONTROL SAMPLES

LAB NAME: ITAS-RICHLAND SDG NO.: W0006

LAB SAMPLE ID: L-03-269-4M

REPORTING UNITS: pCi/g

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	YIELD	EXPECTED	% RECOVERY
SE-79	1.98E+01	3.07E+00	3.07E+00	0	2.70E+01	73.33

LAB SAMPLE ID: L-03-269-1S

REPORTING UNITS: pCi/g

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	YIELD	EXPECTED	% RECOVERY
AM-241	5.90E+00	1.37E-01	5.96E-01	0.91	4.58E+00	128.82
NP-237	6.59E+00	1.60E-01	1.43E+00	0.86	5.64E+00	116.84
PU-238	7.04E-03	1.80E-02	1.80E-02	0.473	1.00E+00	0.70
PU239/40	3.87E-01	1.17E-01	1.30E-01	0.473	4.68E-01	82.69
U-234	3.54E+00	5.21E-01	6.81E-01	0.435	3.46E+00	102.31
U-235	9.11E-02	8.58E-02	8.65E-02	0.435	1.58E-01	57.66
U-238DA	4.04E+00	5.56E-01	7.48E-01	0.435	3.63E+00	111.29
CS-137DA	1.25E+00	1.45E-01	1.91E-01	N/A	1.45E+00	86.21
RA-226DA	1.72E+00	1.82E-01	2.51E-01	N/A	2.16E+00	79.63
ALPHA	3.84E+00	5.57E-01	8.53E-01	1	2.25E+00	170.67
BETA	1.02E+01	9.99E-01	1.23E+00	1	1.13E+01	90.27

LAB SAMPLE ID: L-03-269-2S

REPORTING UNITS: pCi/g

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	YIELD	EXPECTED	% RECOVERY
URANIUM	8.47E+00	1.27E+00	1.27E+00	0.925	1.01E+01	83.86

*Verified  
MWA  
6/17/04*

~~0018~~



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MATRIX SPIKE RESULTS

LAB NAME: ITAS-RICHLAND SDG NO.: W0006

LAB SAMPLE ID: W-03-269-01 & W-03-269-1D

REPORTING UNITS: pCi/g

ISOTOPE	SPIKE RESULT*	COUNTING ERROR (2s)	TOTAL ERROR (2s)	SAMPLE RESULT	EXPECTED	% RECOVERY
TC-99	8.87E+01	6.93E+00	1.00E+00	5.02E+01	1.01E+02	88
TC-99	9.20E+01	7.11E+00	1.03E+00	5.02E+01	1.00E+02	92

LAB SAMPLE ID: L032691M

REPORTING UNITS: pCi/g

ISOTOPE	SPIKE RESULT*	COUNTING ERROR (2s)	TOTAL ERROR (2s)	SAMPLE RESULT	EXPECTED	% RECOVERY
NP-237	2.15E+01	2.35E+00	2.82E-01	1.87E+00	2.50E+01	86

\*SPIKE RESULT CORRECTED FOR SAMPLE RESULT

*Verified  
out  
6/17/04*

~~0013~~

**Golder  
Associates**

SUBJECT <i>W0006-ITC-004</i>		
Job No. <i>923-848</i>	Made by <i>SWA</i>	Date <i>6/17/94</i>
Ref.	Checked	Sheet of
	Reviewed	

*Detected analytes in method blank*

<i>Analyte</i>	<i>dpm</i>	<i>pCi/gd</i>	<i>Sample Result</i>	<i>Qualifier</i>
<i>Am-241</i>	<i>0.527</i>	<i>0.237</i>	<i>426</i>	<i>none</i>
<i>Cm-244</i>	<i>0.0011</i>	<i>0.0005</i>	<i>0</i>	<i>—</i>
<i>Np 237</i>	<i>0.0008</i>	<i>0.0004</i>	<i>1.87</i>	<i>—</i>
<i>U-234</i>	<i>0.0387</i>	<i>0.0174</i>	<i>11.6</i>	<i>—</i>
<i>K-40</i>	<i>5.49</i>	<i>2.473</i>	<i>16.4</i>	<i>—</i>
<i>Co-60</i>	<i>0.0376</i>	<i>0.0169</i>	<i>0.113</i>	<i>—</i>
<i>Cs1370A</i>	<i>0.0023</i>	<i>0.0010</i>	<i>49100</i>	<i>—</i>
<i>Eu155</i>	<i>0.0343</i>	<i>0.0155</i>	<i>1.25</i>	<i>—</i>
<i>Beta</i>	<i>0.0331</i>	<i>0.0149</i>	<i>74800</i>	<i>—</i>
<i>Sr</i>	<i>1.12</i>	<i>0.5045</i>	<i>7.41</i>	<i>—</i>
<i>Tc99</i>	<i>0.56</i>	<i>0.2523</i>	<i>50.2</i>	<i>—</i>
<i>Uranium</i>	<i>0.00393</i>	<i>0.0018</i>	<i>25.4</i>	<i>—</i>
<i>Uranium</i>	<i>0.267</i>	<i>0.1203</i>	<i>"</i>	<i>—</i>

*no qualification necessary for method  
blank results*

*SWA  
6/17/94*

W0006-ITC-004

Americium/Curium	
HEIS No.:	BOBFH3
Lab ID:	40326901
Aliquot:	2.64E-03
Am241 net cpm:	0.2950
Am241 bkg cpm:	0.0000
Spl count time:	1000
Bkg count time:	2500
Eff d/c:	3.225
Decay:	1
Yield:	0.382
Am241 calc:	4.26E+02
Am241 rptd:	4.26E+02
Am241 MDA calc:	3.91E+00
Am241 MDA rptd:	3.90E+00
Cm244 net cpm:	0.0000
Cm244 bkg cpm:	0.0000
Cm244 decay:	1.006
Cm244 calc:	0.00E+00
Cm244 rptd:	0.00E+00
Cm244 MDA calc:	3.93E+00
Cm244 MDA rptd:	3.90E+00
Cm242 net cpm:	0.0000
Cm242 bkg cpm:	0.0000
Cm242 decay:	1.252
Cm242 calc.:	0.00E+00
Cm242 rptd:	0.00E+00
Cm242 MDA calc:	4.90E+00
Cm242 MDA rptd:	4.89E+00
Neptunium	
HEIS No.:	BOBFH3
Lab ID:	40326901
Aliquot:	3.11E-03
Np237 net cpm:	0.003
Np237 bkg cpm:	0
Spl count time:	1000
Bkg count time:	2500
Eff d/c:	3.7
Decay:	1
Yield:	0.86
Np237 calc:	1.87E+00
Np237 rptd:	1.87E+00
Np237 MDA calc:	1.69E+00
Np237 MDA rptd:	1.45E+00

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W0006-ITC-004

Plutonium	
HEIS No.:	80BFH3
Lab ID:	40326901
Aliquot:	2.64E-03
Pu238 net cpm:	0
Pu238 bkg cpm:	0
Spl count time:	200
Bkg count time:	1000
Pu238 Eff d/c:	3.7
Decay:	1
Yield:	0.305
Pu238 calc:	0.00E+00
Pu238 rptd:	0.00E+00
Pu238 MDA calc:	2.81E+01
Pu238 MDA rptd:	2.81E+01
Pu239 net cpm:	0.034
Pu239 bkg cpm:	0.001
Pu239 d/c:	3.7
Pu239 decay:	1
Pu239 calc:	7.05E+01
Pu239 rptd:	7.06E+01
Pu239 MDA calc:	4.97E+01
Pu239 MDA rptd:	4.48E+01
Uranium	
HEIS No.:	80BFH3
Lab ID:	40326901
Aliquot:	2.56E-03
U-234 net cpm:	0.0122
U-234 bkg cpm:	0.0028
Spl count time:	200
Bkg count time:	2500
Eff d/c:	3.7
Decay:	1
Yield:	0.687
U-234 calc:	1.16E+01
U-234 rptd:	1.16E+01
U-234 MDA calc:	2.50E+01
U-234 MDA rptd:	2.49E+01
U-235 net cpm:	0.0046
U-235 bkg cpm:	0.0004
U-235 decay:	1
U-235 calc:	4.36E+00
U-235 rptd:	4.36E+00
U-235 MDA calc:	1.74E+01
U-235 MDA rptd:	1.74E+01
U-238 net cpm:	0.0092
U-238 bkg cpm:	0.0008
U-238 decay:	1
U-238 calc.:	8.72E+00
U-238 rptd:	8.72E+00
U-238 MDA calc:	1.93E+01
U-238 MDA rptd:	1.93E+01

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W0006-ITC-004

<b>Gross Alpha</b>	
HEIS No.:	80BFH3
Lab ID:	40326901
Aliquot:	1.04E-02
Net counts:	0.058
Bkg counts:	0.022
Spl count time:	50
Bkg count time:	500
d/c:	2.831
Calc.:	7.08E+00
Rptd:	7.08E+00
MDA calc:	1.55E+01
MDA rptd:	1.55E+01
<b>Gross Beta</b>	
HEIS No.:	80BFH3
Lab ID:	40326901
Aliquot:	1.04E-02
Net counts:	705.864
Bkg counts:	1.036
Spl count time:	50
Bkg count time:	500
d/c:	2.457
Calc.:	7.48E+04
Rptd:	7.48E+04
MDA calc:	5.84E+01
MDA rptd:	5.84E+01
<b>Strontium 90</b>	
HEIS No.:	80BFH3
Sample:	40326901
Sep date:	4/27/94
Sep time:	20:00
Count date:	4/29/94
Count time:	07:30
Hours:	35.5
Sample amt:	2.50E-01
Net, cpm:	2.2
Count time:	50
Bkg, cpm:	1.08
Count time:	500
D/C 1:	2.232
D/C 2:	1.856
D/C 3:	2.007
Yield:	0.881
Calc:	7.41E+00
Rptd:	7.41E+00
MDA, Calc:	2.56E+00
MDA, rptd:	2.56E+00

W0006-ITC-004

Selenium 79	
HEIS No.:	BOBFH3
Sample:	40326901
Bkg cpm:	19.91
Spl, amt:	2.50E-02
Spl cpm:	20.29
Count time:	500
Spl dpm:	22.54
d/c:	1.111
Yield:	1
Blk, dpm:	2.18E+01
Calc:	1.28E+01
Rptd:	1.00E+01
MDA, calc:	1.87E+01
MDA, rptd:	1.32E+01
Technetium-99	
HEIS No.:	BOBFH3
Sample:	40326901
Bkg cpm:	28.57
Spl, amt:	2.50E-01
Spl cpm:	50.74
Count time:	125
Spl dpm:	55.15
d/c:	1.087
Yield:	0.9
Blk, dpm:	3.34E+01
Calc:	5.03E+01
Rptd:	5.02E+01
MDA, calc:	4.88E+00
MDA, rptd:	not rptd
Total Uranium	
HEIS No.:	BOBFH3
Lab ID:	40326901
ng, raw:	5.91E-01
g, sample:	2.51E-03
Dil. vol:	100
Yield, corr:	0.925
Calc.:	2.54E+01
Rptd:	2.54E+01

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W0006-ITC-004

SAMPLE				MDA		RDL
ID	ISOTOPE	REPORTED	MDA	FLAG	RDL	FLAG
BOBFN3	AM-241	4.26E+02	3.90E+00	DETECT	0.05	OKAY
	CM-242	0.00E+00	4.89E+00	U	NO RDL	
	CM-244	0.00E+00	3.93E+00	U	0.05	MDA>RDL I
	NP-237	1.87E+00	1.45E+00	DETECT	0.2	OKAY
	PU239/240	7.06E+01	4.48E+01	DETECT	0.05	OKAY
	PU-238	0.00E+00	2.81E+01	U	0.05	MDA>RDL I
	U-234	1.16E+01	2.49E+01	U	0.3	MDA>RDL I
	U-235	4.36E+00	1.74E+01	U	0.3	MDA>RDL I
	U-238DA	8.72E+00	1.93E+01	U	0.3	MDA>RDL I
	K-40	1.64E+01	---	DETECT	NO RDL	
	CO-60	1.13E-01	2.32E-01	U	0.05	MDA>RDL I
	EU-152	-6.40E-01	7.81E-01	U	0.1	MDA>RDL I
	CS-137DA	4.91E+04	---	DETECT	0.05	OKAY
	CS-134	-3.70E-01	1.88E+00	U	NO RDL	
	RU-106DA	-1.20E+01	2.00E+01	U	NO RDL	
	NA-22	9.42E+03	6.77E-01	DETECT	NO RDL	
	EU-155	1.25E+00	4.42E+00	U	0.1	MDA>RDL I
	EU-154	2.58E-02	1.86E+00	U	0.1	MDA>RDL I
	ALPHA	7.08E+00	1.55E+01	U	10	MDA>RDL I
	BETA	7.48E+04	5.84E+01	DETECT	10	OKAY
	TOTAL-SR	7.41E+00	2.56E+00	DETECT	1	OKAY
	SE-79	1.01E+01	1.32E+01	U	10	MDA>RDL I
	TC-99	5.02E+01	---	DETECT	0.5	OKAY
	URANIUM	2.54E+01	---	DETECT	0.1	OKAY