

START 9613494.2775

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INTERNATIONAL
TECHNOLOGY
CORPORATION



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

Dear J.A. Lerch

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

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

Your Data Summary Packet contains the following items:

- Case Narrative: listing of sample identifications, analyses performed, explanation of any problem associated with samples, corrective action taken.
 - Quality control sample identifications and analyses performed.
 - Data summary.
2. A data package which meets the specific requirements you requested and is easy to use as well. The package is organized in accordance with the Table of Contents which you will find at the beginning of each section. Sections are separated by color-coded tabs, making it easy to find individual analytical parameters which may be of particular interest to you. The data package is custody-sealed at the laboratory - your assurance that parts of the package are not missing.

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

Please contact me with any questions or suggestions.

Sincerely,

Sheree Schneider

Sheree Schneider
Project Manager



Regional Office

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

IT Corporation is a wholly owned subsidiary of International Technology Corporation

W0033

HANFORD ANALYTICAL SERVICES MANAGEMENT

RECORD OF DISPOSITION

ROD-94-0083
Record of Disposition No.

DATE: April 4, 1994

LABORATORY: IT

PROJECT TITLE/NO.: 200-UP-2 SAF 94-065

NCR NO.: n/a

SAMPLE IDENTIFICATION NUMBERS:

all vegetation samples

DESCRIPTION OF EVENT:

It is anticipated that field sampling teams may not be able to collect sufficient sample volumes to meet the IT requirements for vegetation.

DISPOSITION OF SAMPLES:

In the event the inadequate vegetation sample volumes are provided to perform all requested analyses, IT is instructed to prioritize the requested analyses as listed below:

priority 1 - radiochemistry

priority 2 - metals

APPROVAL SIGNATURES:

J. A. Lerch

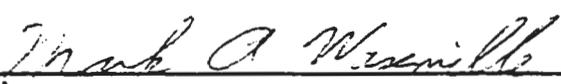


4/4/94

CAS Project Coordinator (Print/Sign Name)

Date

M. A. Wasemiller



4/11/94

Technical Representative (Print/Sign Name)

Date

N/A

Quality Assurance (Print/Sign Name)

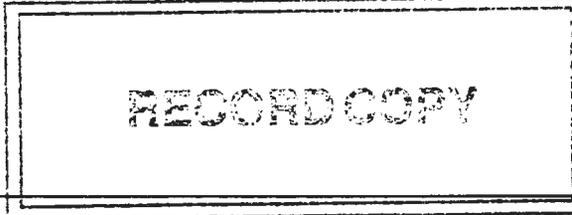
Date



ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

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



May 18, 1994

Job Number: 380

This is the Certificate of Analysis for the following sample:

SDG:	W0033
Client Project ID:	Westinghouse Hanford
Date Received by Lab:	April 16, 1994
Number of Samples:	One (1)
Sample Type:	Soil



I. Introduction

On April 16, 1994, one (1) soil sample arrived at ITAS-Knoxville from ITAS-Richland for chemical analysis. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Soil results are reported on a dry weight basis.

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

Reviewed and Approved:

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

Sheree A. Schneider
Project Manager

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

IT Corporation
May 18, 1994

Client Project ID: Westinghouse Hanford

Job Number: 380

III. Quality Control

The sample was digested on April 27, 1994 for ICP and April 20, 1994 for GFAA. The CVAA analysis for mercury was performed on May 2, 1994; the GFAA analyses for arsenic, lead, selenium and thallium were performed on April 21 and April 22, 1994; the remaining metals were analyzed by ICP on April 28, 1994. All run QC was acceptable. A duplicate/spike pair was prepared using sample number BOBP33. Spike recovery (accuracy) results were within acceptance limits for all parameters by ICP, GFAA and CVAA analyses. Duplicate RPD (precision) results were within acceptance limits for all parameters by ICP, GFAA and CVAA analyses except for calcium and potassium. These results indicate poor sample homogeneity.

Data were reported with qualifiers as follows:

"C" Qualifiers

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

"Q" Qualifiers

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

"M" Qualifiers

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

Miscellaneous

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

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IT Corporation
May 18, 1994

0000003
IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: Westinghouse Hanford

Job Number: 380

III. Quality Control (Continued)

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

TABLE I

<u>WHC ID</u>	<u>Richland ID</u>	<u>Knoxville ID</u>	<u>Test</u>
BOBP33	40427801	AA6719	METALS

9613494.2780

0000004
IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

IT Corporation
May 18, 1994

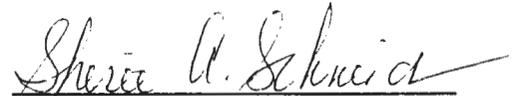
Client Project ID: Westinghouse Hanford

Job Number: 380

IV. Certification

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

Reviewed and Approved:



Sheree' A. Schneider
Project Manager

9613494.2782

Cul # 1478

Work Order No.: 380

Condition Upon Receipt Variance Report

ITAS - KNOXVILLE Laboratory

Client: Westinghouse hanford

Date: 4/19/54

Project No:

Initiated by: Bryan Blomquist

Analysis Requested: TAL metals

RFA/COC Numbers: 340377

Client Sample Numbers Affected: 40427801

Condition/Variance (Check all that apply):

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

Notes:

Corrective Action:

- Client's Name: _____ Informed verbally on: _____ By: _____
- Client's Name: _____ Informed in writing on: _____ By: _____
- Sample(s) processed "as is". Comments: _____
- Sample(s) on hold until: _____ If released, notify: _____

Sample Control Supervisor Review: _____ Date: _____

Project Management Review: _____ Date: _____

SIGNED ORIGINAL MUST BE RETAINED IN THE PROJECT FILE

Westinghouse Hanford Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		Page 1 of 1
			006269
Collector R.T. Sickle	Company Contact C.A. Rowley	Telephone 372-3293	
SAF No. 94-065	Project Designation 200-UP-2	Sampling Locations	
Ice Chest No.	Bill of Lading/Airbill No. N/A	Offsite Property No.	
Method of Shipment Government truck		Field Logbook No.	
Shipped to IT		SPECIAL INSTRUCTIONS <i>STANDALONE Deliverable</i>	
Possible Sample Hazards/Remarks None Detected			
Special Handling and/or Storage Keep cool			

Sample Number	*	Date Collected	Time	Number and Type of Containers	Analysis Required	Preservative
404278 01	V	4-5-94	1100	(1) 500 ml P	Metals -CLP TAL Titanium Mercury	4-6-94
40427901	V	4-5-94	1100	(1) PLASTIC BAG	Gross Alpha/Beta ITAS-RD-3322 Gamma Spec. Cs-134,137, I-129, Co-60, K-40, Eu-152/154/155, Ru-106, Na-22 ITAS-RD-3219; Total Uranium ITAS-RD-4200 OR 4201 U-235/234/238 ITAS-RD-3234 Np-237 ITAS-RD-3208; Pu-238/239/240 ITAS-RD-3209; Sr-90 ITAS-RD-3204; Tc-99 ITAS-RD-RS-0001; Am-241, Cm-244 ITAS-RD-3302; Se-79 ITAS-RD-3253	

Chain of Possession (Sign and Print Names)				*Matrix	
Relinquished By	Date	Time	Received By	A = Air	SE = Sediment
<i>R.T. Sickle</i>	4-14-94	1500	<i>Karen Stedman</i>	DL = Drum Liquids	SL = Sludge
				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:

0041



INTERNATIONAL
TECHNOLOGY
CORPORATION

COC NO.



0001478

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

Wo# 380
R# 493

Reference Document No. 340377
Page 1 of 1

Project Name/No. 1 SAF 94-065
Sample Team Members 2
Profit Center No. 3 4032
Project Manager 4 VANPETTEY
Purchase Order No. 6
Required Report Date 11

Samples Shipment Date 7 4-15-94
Lab Destination 8 Middlebrook
Lab Contact 9
Project Contact/Phone 12
Carrier/Waybill No. 13

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

ONE CONTAINER PER LINE

Sample Number ¹⁴	Sample Description/Type ¹⁵	Date/Time Collected ¹⁶	Container Type ¹⁷	Sample Volume ¹⁸	Pre-servative ¹⁹	Requested Testing Program ²⁰	Condition on Receipt ²¹	Disposal Record No. ²²
40427801	BOBP33/veg	4/5 1100	plastic	500ml	Cool 4°C	Metals-CHPTAL Ti, Hg.	FOR LAB USE ONLY	
PH 4/15/94								
FOR LAB USE ONLY								

Special Instructions: 23 As per WHC Contract

Possible Hazard Identification: ²⁴
 Non-hazard Flammable Skin Irritant Poison B Unknown
 Sample Disposal: ²⁵
 Return to Client Disposal by Lab Archive _____ (mos.)

Turnaround Time Required: ²⁶
 Normal Rush
 GC Level: ²⁷
 I II III Project Specific (specify): SDG-W0033

1. Relinquished by ²⁸ (Signature/Affiliation) <u>Hudenberg DL</u>	Date: <u>4-15-94</u> Time: <u>16:00</u>	1. Received by ²⁸ (Signature/Affiliation) <u>Ryan August ITASKN</u>	Date: <u>4/16/94</u> Time: <u>9:30</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
#1 = 8°C, #2 = 3°C

112 7681 527

White: To accompany samples

Yellow: Field copy

*See back of form for special instructions.

963494.2781

0000016



CERTIFICATE OF ANALYSIS

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

June 2, 1994

Attention: J.A.Lerch

SAF Number	:	94-065
Date SDG Closed	:	April 28, 1994
Number of Samples	:	One (1)
Sample Type	:	Vegetation
SDG Number	:	W0033
Data Deliverable	:	Stand Alone

I. Introduction

On April 14, 1994, one vegetation sample was received by ITAS-Richland for radiochemical analysis. Upon receipt, the sample was assigned the following laboratory ID number to correspond with the WHC specific ID:

<u>ITAS-Richland ID</u>	<u>WHC ID</u>	<u>Matrix</u>	<u>Date of Receipt</u>
404279-01A	B0BP33	Vegetation	4/14/94

II. Analytical Results/Methodology

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

Westinghouse Hanford Company
June 2, 1994
Page 2

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 each analysis performed under SDG W0033 include a minimum of one Laboratory Control Sample (LCS), one method (reagent) blank, and one duplicate.

Quality control sample results are reported in the same units as sample results except for gross alpha and gross beta quality control sample results which are reported in pCi/sample.

IV. Comments

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

Alpha Spectroscopy

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

The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BP33) results are within contractual requirements.

Westinghouse Hanford Company
June 2, 1994
Page 3

Neptunium-237 by method ITAS-RD-3208

The batch was reanalyzed due to low matrix spike recoveries on the initial analysis (the average matrix spike recovery was less than 60%). The reanalysis results verify the original analysis results with an average matrix spike recovery of less than 60%. The original results are accepted and reported. The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BP33) results are within contractual requirements.

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

Due to a technician error, plutonium was not eluted from the column during the initial preparation of the sample batch and the batch was reanalyzed. The reanalysis batch is acceptable with the exception of the reanalysis LCS and batch blank. The reanalysis LCS and blank have tracer yields of less than the 20% lower limit (tracer yields achieved are 15.0% and 19.0%, respectively). The reanalysis LCS, blank, sample and sample duplicate (duplicate of sample B0BP33) results meet the contractual detection limit, and the LCS recovery is 92.7%. The data are accepted and reported based on the acceptable MDAs achieved, the acceptable spike recovery, and the sample and sample duplicate results being within the 3 sigma control limit.

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

The batch was reanalyzed due to low tracer yields on the initial analysis. The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BP33) results are within contractual requirements and reported.

Gamma Spectroscopy

Gamma Scan by method ITAS-RD-3219

The sample and sample duplicate (duplicate of sample B0BP33) were recounted for an extended count time (1000 minutes) in order to meet the required detection limit for one or more isotopes. The achieved MDAs were lower than the required detection limits due to the low density of a vegetation matrix (matrix effect) compared with the density of a soil matrix. The reanalysis of the samples for the extended count time improved the achieved MDAs to within contractual requirements with the exception of the MDA required for Eu-155 which was not met. The reanalysis results are accepted and reported. The LCS, batch blank, sample and sample duplicate results are within contractual requirements with the exception of the MDAs achieved for Eu-155.

Westinghouse Hanford Company

June 2, 1994

Page 4

Iodine-129 by method ITAS-RD-3219

The detection limit was not met for sample B0BP33 and the duplicate of B0BP33 due to matrix interference. The blank meets the MDA for I-129 and the sample and its duplicate exhibit the same effect which verifies that the interference is a matrix effect without necessitating a reanalysis of the sample batch. The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BP33) results are accepted and reported.

Gas Proportional Counting

Gross Alpha by method ITAS-RD-3222

The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BP33) results are within contractual requirements.

Gross Beta by method ITAS-RD-3222

The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BP33) results are within contractual requirements.

Strontium-90 by method ITAS-RD-3204

The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BP33) results are within contractual requirements.

Liquid Scintillation Counting

Selenium-79 by method ITAS-RD-3253

The batch was reanalyzed due to a high LCS recovery (matrix spike corrected) on the initial analysis. The cause of the high recovery was a low matrix spike chemical yield. The sample batch was reanalyzed and produced acceptable results. The chemical yield for the matrix spike (W0427901) was used for the batch yield corrections. When the sample batch was reanalyzed, samples and quality control samples from SDGs W0032 and W0024 were inadvertently reanalyzed with SDG W0033. The extraneous sample data was not used for reporting this SDG. The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BP33) results are within contractual requirements.

Westinghouse Hanford Company
June 2, 1994
Page 5

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

The initial analysis of the sample batch failed due to excessive quench. An error in sample batching caused the reanalysis of sample B0BP33 to be batched with SDGs W0022 and W0032. The reanalysis LCS, matrix spikes, batch blank, sample and sample duplicate (duplicate of sample B0BP32) results used for reporting this batch are also reported in those other SDGs. The LCS, one matrix spike (W0427701), the batch blank, the sample and sample duplicate results (used for reporting RPD values) reported with this SDG are also reported with SDG W0032. Another matrix spike (W0412001) result reported with this SDG is also reported with SDG W0022. Laboratory personnel have been reminded that SDGs are to be analyzed with their own batch QC. The LCS, batch blank, sample and sample duplicate results associated with this batch are acceptable and reported. The sample results were not yield corrected by the matrix spike recoveries.

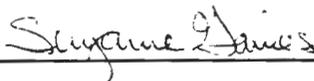
Total Uranium

Total Uranium by method ITAS-RD-4200

Two matrix spikes were analyzed with the batch and their average yield is used for yield correcting the sample and sample duplicate results. The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BP33) results meet contractual requirements.

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

Reviewed and approved:



Suzanne Gaines
Project Manager

9613494.2790

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

SAMPLE RESULTS

LAB NAME: ITAS-RICHLAND SDG NO.: W0033
 LAB SAMPLE ID: 40427901 MATRIX: VEGETATION
 WHC ID: BOBP33 DATE RECEIVED: 4/14/94
 REPORTING UNITS: pCi/g & ug/g

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	YIELD	METHOD NUMBER
AM-241	1.47E-02	1.80E-02	1.81E-02	0.706	RD3302
CM-242	0.00E+00	0.00E+00	1.86E-02	0.706	RD3302
CM-244	-4.16E-04	8.31E-04	8.34E-04	0.706	RD3302
NP-237	0.00E+00	0.00E+00	0.00E+00	1	RD3208
PU239/40	-3.97E-03	7.95E-03	8.00E-03	0.207	RD3209
PU-238	1.19E-02	4.13E-02	4.14E-02	0.207	RD3209
U-234	1.53E-01	8.04E-02	8.41E-02	0.39	RD3234
U-235	7.05E-03	2.10E-02	2.10E-02	0.39	RD3234
U-238DA	1.31E-01	7.49E-02	7.78E-02	0.39	RD3234
K-40	1.36E+01	5.84E-01	1.48E+00	N/A	RD3219
CO-60	-4.11E-03	1.30E-02	1.30E-02	N/A	RD3219
EU-152	2.40E-02	5.56E-02	5.56E-02	N/A	RD3219
CS-137DA	3.43E+00	6.55E-02	3.49E-01	N/A	RD3219
CS-134	1.13E-02	1.35E-02	1.36E-02	N/A	RD3219
RU-106DA	7.07E-02	1.36E-01	1.36E-01	N/A	RD3219
RA-224DA	8.18E-02	4.61E-02	4.68E-02	N/A	RD3219
NA-22	-7.74E-03	1.58E-02	1.58E-02	N/A	RD3219
EU-155	-8.96E-02	8.63E-02	8.67E-02	N/A	RD3219
BE-7	1.91E+00	4.35E-01	4.75E-01	N/A	RD3219
TL-208	3.29E-02	3.07E-02	3.08E-02	N/A	RD3219
PB-212	7.85E-02	4.42E-02	4.49E-02	N/A	RD3219
EU-154	-2.13E-02	4.34E-02	4.34E-02	N/A	RD3219
I-129LP	-4.66E-01	1.67E+00	1.67E+00	N/A	RD3219
ALPHA	9.61E+00	4.60E+00	4.72E+00	1	RD3222
BETA	1.90E+03	2.82E+01	1.28E+02	1	RD3222
TOTAL-SR	4.15E+02	5.66E+00	9.05E+01	0.415	RD3204
SE-79	1.60E+00	6.39E-01	1.80E+00	0.655	RD3253
TC-99	2.11E+01	6.09E-01	3.06E+00	0.951	ITAS-IT-RD-0001
URANIUM	4.86E-01	N/A	7.29E-02	0.609	RD4200

0009

9613494.2791



ITAS Data Review Checklist
RADIOCHEMISTRY

Work Order No(s): 704279

Lab Sample Numbers or SDG: W0033

Method/Test/Parameter: AD322 In

Review Item	Yes (✓)	No (✗)	N/A (N/A)	2 nd 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 ≤ the Contract Detection Limit?	✓			✓
3. Is the Blank result ≤ 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. Transaction checked?	✓			✓
5. Were all calculations checked at a minimum frequency?	✓			✓
6. Units checked?	✓			✓

Comments on any "No" response:

The yield on blk + spk is $\le 20\%$ but the blk + spike were within acceptable limits.

Analyst: Ma Kellon

Second Level Review: Steve Dames

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

Date: 5-29-94

Date: 5/30/94

0020

255



013494.2792

PROJECT ID (Name/Number): WHC

NCM INITIATED BY (Name/Date): mma 5-20-94

PARAMETER(S): Pb

SAMPLE NUMBER(S) AFFECTED: -042792B, 2S W0033

MATRIX: veg

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): RC tr yd < 20%

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 James 5/30/94

CORRECTIVE ACTION

ROOT CAUSE:

INITIALS/DATE mmk 5-20-94

To get on btk + csk < 20%

CORRECTIVE ACTION:

INITIALS/DATE mmk 5-20-94

btk + csk results are within acceptable limit
Technical Director advises data is reportable.

RESPONSIBILITY FOR PERFORMING CORRECTIVE ACTION ASSIGNED TO:

ACTIONS TO PREVENT RECURRENCE:

INITIALS/DATE _____

FIRST LEVEL SUPERVISOR:

m. Kelly

DATE: 5-24-94

RESPONSIBLE MANAGER:

J. MacKellan

DATE: 5/31/94

QC REVIEW

NONCONFORMANCE

DEFICIENCY

RERUN

FURTHER ACTION REQUIRED:

ASSIGNED TO: _____

QC COORDINATOR:

[Signature]

DATE: 5/31/94

CORRECTIVE ACTION VERIFICATION

VERIFIED

CANNOT VERIFY (specify reason)

REASON: _____

NCM CLOSURE

QC COORDINATOR:

[Signature]

DATE: 5/31/94

9615494.2794



ITAS Data Review Checklist
RADIOCHEMISTRY

Work Order No: 404279 rerun

Lab Sample Numbers or SOG: W0033

Method/Test/Parameter: RD3234 U₁₄

Review Item	Yes (Y)	No (N)	N/A (N/A)	2 nd Level review (Y)
A. Calibration 1. Are 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 ≤ the Contract Detection Limit?	✓			✓
3. Is the Blank result ≤ 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 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:

Analyst: M. Kallouzi
Second Level Review: Sung J. Kim
Form No: LS-038, 3/94, Rev 2

Date: 5-27-94
Date: 5/31/94

OK to Analyt 527-94 rerun

0023



PROJECT ID (Name/Number): WITC

NCM INITIATED BY (Name/Date): mmm 5-27-94

PARAMETER(S): UIC WOOD33

SAMPLE NUMBER(S) AFFECTED: 40427901 F01

MATRIX: ✓

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): tr yd < 30%

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 Davies 5/31/94

CORRECTIVE ACTION

ROOT CAUSE: INITIALS/DATE MMK 5-27-94

try < 30%

CORRECTIVE ACTION: INITIALS/DATE MMK 5-27-94

Rerun

recess were assignable 5-27-94 MMK

RESPONSIBILITY FOR PERFORMING CORRECTIVE ACTION ASSIGNED TO: _____

ACTIONS TO PREVENT RECURRENCE: INITIALS/DATE _____

FIRST LEVEL SUPERVISOR: M. Kellon

RESPONSIBLE MANAGER: W. MacKillop

DATE: 5-27-94

DATE: 6/1/94

QC REVIEW

- NONCONFORMANCE
- DEFICIENCY
- RERUN
- FURTHER ACTION REQUIRED:

ASSIGNED TO: _____

QC COORDINATOR: Jodie Orr

DATE: 6/1/94

CORRECTIVE ACTION VERIFICATION

- VERIFIED
- CANNOT VERIFY (specify reason)

REASON: _____

NCM CLOSURE

QC COORDINATOR: Jodie Orr

DATE: 6/1/94

9613494.2797



ITAS Data Review Checklist
RADIOCHEMISTRY

Work Order No(s): 404279

Lab Sample Numbers or SDG: SDG W0033

Method/Test/Parameter: Gamma

Review Item	Yes (✓)	No (✓)	N/A (✓)	2 nd 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. MSMSD 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 recount samples to meet MSDs

Analyst: Jed Kempner
 Second Level Review: Shirley Davies
 Form No: LS-038, 3/94, Rev 2

Date: 5-17-94
 Date: 5/20/94

Transfer Recount results for 40427901 & F0427901
 0026



PROJECT ID (Name/Number): WHC

NCM INITIATED BY (Name/Date): J601 TKampain 5-19-94

PARAMETER(S): Gainma

SAMPLE NUMBER(S) AFFECTED: 40427901 F0427901

MATRIX: Vegetation

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:

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 for more 130 types are greater than CL

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): Sung Hwang 5/20/94

9615491.2800



WHC SDG W0033
~~WHC~~ PK526-94

ITAS Data Review Checklist
RADIOCHEMISTRY

Work Order No(s): 404279

Lab Sample Numbers or SDG: L042791B - L042791S

Method/Test/Parameter: I129

Review item	Yes (✓)	No (✓)	N/A (✓)	2 nd 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 ≤ the Contract Detection Limit?	✓			✓
3. Is the Blank result ≤ 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 MDA

Analyst: Joel Kempene

Date: 5-20-94

Second Level Review: Ray Davis

Date: 5/23/94

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



037

PROJECT ID (Name/Number):

WHC

NCM INITIATED BY (Name/Date):

Joel T Kempina 5-19-94

PARAMETER(S):

124 Gamma

SAMPLE NUMBER(S) AFFECTED:

40427901, F0427901

W0033

MATRIX:

Vegetation

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:
- 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: (see #10)
- 10. Comments/Explanation:

9. Other (specify): 1124 > Contract 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):

Serg Lewis 5/23/94

CORRECTIVE ACTION

ROOT CAUSE: INITIALS/DATE JK 5-19-94

Matrix effect

CORRECTIVE ACTION: INITIALS/DATE 5-20-94

Blank meets MDA, in addition the sample and the duplicate exhibit the same effects.

Data Accepted

RESPONSIBILITY FOR PERFORMING CORRECTIVE ACTION ASSIGNED TO: _____

ACTIONS TO PREVENT RECURRENCE: INITIALS/DATE _____

FIRST LEVEL SUPERVISOR: Jed Thompson DATE: 5-20-94 ^{JK 5-20-94}

RESPONSIBLE MANAGER: W. Markella DATE: 5/23/94

QC REVIEW

NONCONFORMANCE DEFICIENCY **RERUN**

FURTHER ACTION REQUIRED:

ASSIGNED TO _____

QC COORDINATOR: [Signature] DATE: 5/24/94

CORRECTIVE ACTION VERIFICATION

VERIFIED CANNOT VERIFY (specify reason)

REASON: _____

NCM CLOSURE

QC COORDINATOR: [Signature] DATE: 5/24/94

0031

9613194.2803



ITAS Data Review Checklist
RADIOCHEMISTRY

Work Order No(s): WHC 40033

Lab Sample Numbers or SDG: 40427901

Method/Test/Parameter: 62-77

Review item	Yes (✓)	No (✓)	N/A (✓)	2 nd 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 ≤ the Contract Detection Limit?	✓			✓
3. Is the Blank result ≤ 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:

Analyst: [Signature]
Second Level Review: [Signature]
Form No: LS-038, 3/94, Rev 2

Date: 5/25/94
Date: 5/31/94

0035



357

PROJECT ID (Name/Number): WHC W0033

NCM INITIATED BY (Name/Date): Marshall Lane 5/25/94

PARAMETER(S): se-79

SAMPLE NUMBER(S) AFFECTED: 40427901

MATRIX: Vegetation

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: initial ^{5/25/94} LCS Result out of Limits

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): Sung Daines 5/31/94

SAMPLE STATUS REPORT FOR E 6316. E-BLANK BOBP33 TIME: 4/12/94 15:33
 DISPATCHED: 4/ 4/94 11:55 SAMPLE HAS NOT BEEN SLURPED
 RECEIVED: 4/ 6/94 7:47

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	*****	*****	***	***	*****
1210	TB MISC	1.15000E 03 pCi/G	N	Y	VOGEL
1211	AT MISC	< 9.14000E-01 pCi/G	N	Y	VOGEL
2183	GEA-MISC	< 1.14000E 01 pCi/G	N	Y	VOGEL
4271	TOT-ACT	6.11400E 02 pCi/G	N	Y	VOGEL

Cs-137

END OF REPORT

0.7 mr/hr contact, unground
 0.15 mr/hr " " metals
 GRN 14 Apr 94

4000g

Beta SF-90

$$1150 \text{ pCi/g} \times 4000\text{g} = 4600000 \text{ pCi}$$

$$A_2 = .4 \text{ Ci} \quad A_2/1000 = .004 = 4000000 \text{ pCi}$$

$$\frac{4600000}{4000000000} = \underline{.0115}$$

$$\underline{\underline{4.6 \mu\text{Ci}}}$$

Vegetation

7615494.2807

Contractor Westinohouse Hanford	OFF-SITE PROPERTY CONTROL	CONTROL NO. (To be obtained from PROPERTY MANAGEMENT) W94-0-0448-17
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PART I - TO BE COMPLETED BY ORIGINATOR

Department Analytical Services	Section Field Analytical Services	Unit Sampling & Mobile Labs
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The following items are to be shipped from Contractor Vendor

Routing Truck Prepaid Collect

Shipped to Company International Technology Corp. Address 2800 Geo. Washington Way City Richland State WA. Zip Code 99352 Country	Off-site Custodian Tami Heidelberg
	On-site Custodian J.G. Hogan
	Payroll No. 57783

Qty.	Property No.	Description (include Manufacture Name, Model, Serial No.)	Acquisition Cost
1		Polycooler: Environmental Samples packed on wet ice, double bagged. Sample #'s 94158-01.D12, 94158-02.D12 C.O.C. # 006812 006813 S.A.F. # 94-158 Ice Chest # <u>Rm 33</u> wt. <u>20</u> lbs.	

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

Necessity for the off-site use of this property

Required for Project Work. List Project No. 94-158

Business Trip

Off-site Assignment

Shipment to Subcontractor. List Subcontract No. _____

Other (Please specify) Samples require analysis not presently available at this site.

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

RM Clearance for Public Release <i>[Signature]</i>	RM Survey No. 5167711	Date 4-14-94
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Location of and Contact for Property (Name/Phone No./Bldg./Area)
J.G. Hogan/ 373-4541/ 202-S Annex/ 200 West

Date Ready for Shipment 8-13-94	Cost Code to be Charged KP214 12911	Approximate Date This Property will be Returned N/A
------------------------------------	--	--

Originated By <i>[Signature]</i> J.G. Hogan	Date 4-13-94	Authorized By <i>[Signature]</i>	Date 13 Apr 94
--	-----------------	-------------------------------------	-------------------

Property Management Approval <i>[Signature]</i>	Date 4/14/94
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PART II - TO BE COMPLETED BY SHIPPING

Authorized Shipping Signature	Date
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DISTRIBUTION (AFTER FINAL SIGNATURES)

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

Road by 4/14/94 13.00 0043 54-3000-479 (05/93)

Emergency Contact (509) 373-3800

EKG # 61 Attached

SHIPPING INST.	SHIP TO:	OFFSITE RADIOACTIVE SHIPMENT RECORD		19740
	Company	- EXTERIOR INSPECTION PERMITTED -		
	Address	Contractor:	Ship:	Prepaid <input checked="" type="checkbox"/> Collect <input type="checkbox"/>
	City, State, Zip	Site Carrier	Motor Rail <input type="checkbox"/>	Air Psgr. <input type="checkbox"/>
Attention:	PR No.	Veh. No.	Excl. Use <input type="checkbox"/>	Air Cargo <input type="checkbox"/>
			DOE Veh. <input type="checkbox"/>	Mail <input type="checkbox"/>
			UPS Sur. <input type="checkbox"/>	<input checked="" type="checkbox"/> <u>Clasificación Vehicle</u>

Proper Shipping Name	UN Number	Material Form:	For Normal Form Identify:
Radioactive Material:		<input type="checkbox"/> Special (A1) <input checked="" type="checkbox"/> Normal (A2)	Physical Form
1. Empty Packages <input type="checkbox"/> UN 2908		Labels Applied	<input checked="" type="checkbox"/> Solid <input type="checkbox"/> Liquid <input type="checkbox"/> Gas
2. Low Specific Activity, n.o.s. <input type="checkbox"/> UN 2912		<input type="checkbox"/> Empty	Chemical Form
3. Limited quantity, n.o.s. <input type="checkbox"/> UN 2910		<input type="checkbox"/> Radioactive LSA	<input type="checkbox"/> Metal <input type="checkbox"/> Oxide
4. N.O.S. <input type="checkbox"/> UN 2982		<input type="checkbox"/> White I	<input checked="" type="checkbox"/> Elemental <input type="checkbox"/> Nitrate
5. Fissile n.o.s. <input type="checkbox"/> UN 2918		<input type="checkbox"/> Yellow II	Other <u>Vegetation</u>
6. Special Form, n.o.s. <input type="checkbox"/> UN 2974		<input type="checkbox"/> Yellow III	
7. Instruments & Articles <input type="checkbox"/> UN 2911		<input checked="" type="checkbox"/> None	
8. Limited Quantity <input checked="" type="checkbox"/> UN 2910		<input type="checkbox"/> Danger (Air Cargo)	
		<input type="checkbox"/> Secondary	
		Material Category	
		<input type="checkbox"/> Empty	
		<input type="checkbox"/> Low Specific Act. (LSA)	
		<input checked="" type="checkbox"/> Limited Quantity	
		<input type="checkbox"/> Type A Quantity	
		<input type="checkbox"/> Type B Quantity	
		<input type="checkbox"/> Highway Route	
		Controlled Quantity	

TYPE PACKAGE	CONSTRUCTION	FISSILE CLASS	SNM	ACCOUNTABILITY/SECURITY CONTROL
<input checked="" type="checkbox"/> Strong Tight	<input type="checkbox"/> Box, EB	<input checked="" type="checkbox"/> Non Fissile	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> Classified <input checked="" type="checkbox"/> Unclassified
<input type="checkbox"/> Type A	<input type="checkbox"/> Wood	<input type="checkbox"/> Fissile Exempt	<input type="checkbox"/> < 1gr	Consignee authorized to receive this qty <input checked="" type="checkbox"/>
<input type="checkbox"/> Type B	<input type="checkbox"/> Steel	<input type="checkbox"/> Fissile I	<input type="checkbox"/> Category I	Sig. Security Svc. Reg. <input type="checkbox"/> NA <input checked="" type="checkbox"/>
<input type="checkbox"/> Type B (U)	<input type="checkbox"/> Drum	<input type="checkbox"/> Fissile II	<input type="checkbox"/> Category II	Pu: EU > 1g <input type="checkbox"/> NA NU, DU > 1 Kg <input type="checkbox"/> NA
<input type="checkbox"/> Type B (M)	<input checked="" type="checkbox"/> Other <u>Poly Center</u>	<input type="checkbox"/> Fissile III	<input type="checkbox"/> Category III	Security Escorts Req. <input type="checkbox"/> Not Req. <input checked="" type="checkbox"/>
		Grams Fissile		External Cask Temperature <u>NA</u>
				(Max. 122°F FLT, 180°F Ex. Use)

Packaging conforms to appropriate packaging procedure N/A Yes

Complies with D. O. T. packaging marking and labeling requirements N/A Yes

Container examined: No evidence of deterioration or damage Yes

QA inspection Current Yes N/A Seals required No Yes

Container acceptability documented (incl. 7A cert.) N/A Yes

Shipping Doc # ACEP173.421 Authorization No. NA

No. Pkgs.	Model Package	COCSpec. No.	Serial No.	Seal No.	Isotopes	Curies/Pkg	T.I.	Gr. Wt.
1	Box 005/High	NA	612055	Tape Applied	Cs-137, Sr-90	189mCi	11	32 lbs
	AE 94-065 (30)	(2) 200ml bottles, (4) 100ml			Cs-137, Sr-90	93.14mCi		
* I.D. QTY STATEMENTS IN ALL 3 PACKAGES *								
2	Box 005/Drum	NA	612057	Tape Applied	Cs-137, Sr-90	88mCi		55 lbs
	AE 94-065 (30)	2 plastic bags	DEC-6209	6268		18.94mCi		49 lbs
(Shipper may describe package in detail on one of unused lines above):						TOTAL:		136 lbs

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: [Signature] Date: 4/14/94 Organization: Sam Shryver Mobile Labs Complete Cost Code (inc. end function): 12910/PT2WA

Surface Dose Rate of Package	Dose Rate at 1 Meter from Surface of Package	Smears of Outer Containers	TRUCK LOAD OR EXCLUSIVE USE
<input checked="" type="checkbox"/> ≤ 0.5 or mrem/hr (N + B)	<input checked="" type="checkbox"/> ≤ 0.5 or mrem/hr (N + B)	<input checked="" type="checkbox"/> ≤ 22 dpm/9cm ²	Surface: <input type="checkbox"/> ≤ 200 mrem/hr (N + B)
		<input checked="" type="checkbox"/> ≤ 2.2 dpm/cm ²	6 feet: <input type="checkbox"/> ≤ 10 mrem/hr (N + B)
Additional Data and Instructions (inc. Readings on Internal Packaging):			6 feet: <input checked="" type="checkbox"/> ≤ 2.0 mrem/hr (N + B)
Signature - Radiation Monitoring: <u>[Signature]</u>		Bldg: <u>202-S</u>	Survey No: <u>51107711</u>
			Date: <u>4-14-94</u>

AUTHORIZATION FOR SHIPMENT:

AIR TRANSPORT CERTIFICATION	Carriage Only: <input type="checkbox"/> Passenger: <input type="checkbox"/> Ltd. Qty: <input type="checkbox"/> Research or Medical Diagnosis: <input type="checkbox"/> Pkg. Dimensions: <u>N/A</u>
	Labels Applied: <u>N/A</u> <input type="checkbox"/> ≤ 3 T.I. <input type="checkbox"/> Human Medical Research: <input type="checkbox"/>
Traffic has inspected and verified preshipment compliance to DOT regulations.	
Authorized Signature: <u>[Signature]</u>	Printed Name: <u>Merrie C. Miller</u> Date: <u>4/14/94</u>

APPROVED FOR OFFSITE SHIPMENT:

B.T. No.:	Date Shipped:	ETA:	Routing:	Placards: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<u>PAW8595</u>	<u>4/14/94</u>	<u>4/14/94</u>	<u>with Vehicle - NO Bk issued</u>	Route Plan: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Surveyed By: <u>[Signature]</u>	Date: <u>4/14/94</u>	Approved for Shipment: <u>[Signature]</u>	Date: <u>4/14/94</u>	

*Oils are Category I.
BOBKN8 and BOBP33 are cat. II.
BOBP32 is Cat. III. YRN 15 apr 94*

Customer Code	Received Date	Time	Screening Date	Prep Time	Count Date	Mnts. Crtd	BACKGROUND		
WHC			41494		414	10	Alpha	Beta	Mnts
							7	59	60

Customer ID	pH <2 Rcvd/Relq	Pincht Wght (mGrms)	Vol. Anal. mG	Sample Size mL	SMPL CNT DATA Hldr Num.	Total Counts		Net Sample Counts/Minute		DPM / Aliquot		uCi per Sample		2 Sigma Error uCi per Sample		pCi/(Gm or L)		Category 1 Yes/No	Aliquot to Cat 1 Gm or Ltr	
						Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta		Alpha	Beta
BOBKN8		97.3	97	1300.0	50	11	517	0.98	50.72	7.5E+00	1.3E+02	4.5E-02	7.7E-01	4.4E-05	8.9E-05	3.5E+01	5.9E+02	No	2.9E+02	1.7E+02
WHC/VEG												0.0E+00	0.0E+00							
BOBP32		76.6	77	1000.0	51	8	788	0.68	77.82	2.2E+00	1.9E+02	1.3E-02	1.1E+00	2.9E-05	7.0E-03	1.3E+01	1.1E+03	No	7.9E+02	9.0E+01
BOBP33		95.4	95	1050.0	52	5	471	0.38	46.12	1.4E+00	1.2E+02	6.9E-03	5.8E-01	2.1E-05	4.5E-03	6.6E+00	5.5E+02	No	1.5E+03	1.8E+02
WHC/OIL												0.0E+00	0.0E+00							
94158-01.D12		6.5	7	200.0	53	0	12	-0.12	0.22	-5E-01	5.5E-01	-7E-03	7.6E-03	-1E-05	9.9E-06	-4E+01	3.8E+01	Yes	-3E+02	2.6E+03
94158-02.D12		8.9	9	200.0	54	3	10	0.18	0.02	8.2E-01	-9E-02	8.3E-03	-9E-04	1.3E-05	-3E-07	4.1E+01	-5E+00	Yes	2.4E+02	-2E+04
TOTAL	uCi									-0.12	-0.98	-4E-01	-2E+00	6.6E-02	2.5E+00	ERR	ERR	No	ERR	ERR

0046



DUE DATE 5-20-94

REANALYSIS / RECOUNT
CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

ANALYSIS NP

NAME/DATE TK 5-23-94

CUSTOMER WHC

SAMPLE DELIVERY GROUP W0033

MATRIX Vegetation

BATCH NUMBER _____

ITAS ID	CUSTOMER ID	COMMENTS
1) 40427901		2.09g
2) 40427901		2.09g
3) W0427901		2.00
4) W042791D		2.06
5)		
6)		
7)		
8)		
9)		
10)		

REANALYSIS

REFERENCED QC

ITAS ID - BLANK L042792B

ITAS ID - SPIKE L042792S

CLIENT CODE _____

ACTIONS (Initial & Date)

PREP LAB RECEIVED 5/20/94 CP

SAMPLE REMAINDER

RETURNED TO SCG (CHECK ONE)

NO SAMPLE REMAINING

SEPARATION LAB DRM 5/24/94

COUNTING/MEASUREMENT AS 5/24/94

DATA REVIEWED mmh 5-27-94

ANALYTICAL PREP STORED mmh 5-27-94

RECOUNT

ACTIONS (Initial & Date)

COUNTING/MEASUREMENT _____

DATA REVIEWED _____

ANALYTICAL PREP STORED _____

ADDITIONAL COMMENTS:

TK 5-23-94
opt 5.26.94

9613494.2811



INTERNATIONAL TECHNOLOGY CORPORATION

DUE DATE 5/20/94

REANALYSIS / RECOUNT
CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

ANALYSIS Pa NAME/DATE JRK 5-17-94
CUSTOMER WHC SAMPLE DELIVERY GROUP scd33
MATRIX Vegetation BATCH NUMBER _____

ITAS ID	CUSTOMER ID	COMMENTS
1) <u>L0427901</u> ✓		<u>205</u>
2) <u>L0427901</u> <u>JRK 5-17-94</u>		
3) <u>L0427901</u> ✓		<u>210</u>
4)		
5)		
6)		
7)		
8)		
9)		
10)		

REANALYSIS

RECOUNT

REFERENCED QC
ITAS ID - BLANK L042792B'
ITAS ID - SPIKE L042792S1
CLIENT CODE WHC

ACTIONS (Initial & Date)
COUNTING/MEASUREMENT _____
DATA REVIEWED _____
ANALYTICAL PREP STORED _____

ACTIONS (Initial & Date)
PREP LAB RECEIVED JRK - 794
SAMPLE REMAINDER
RETURNED TO SCG CHECK ONE)
NO SAMPLE REMAINING
SEPARATION LAB mmwh 5-19-94
COUNTING/MEASUREMENT Edw 5/19/94
DATA REVIEWED mmwh 5-20-94
ANALYTICAL PREP STORED mmwh 5-20-94

ADDITIONAL COMMENTS:
mmwh 5-20-94
722001
JRK 5-17-94
ED 5-19-94
mmwh



INTERNATIONAL
TECHNOLOGY
CORPORATION

9415494.2812

DUE DATE

5/22/94

REANALYSIS / RECOUNT

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

ANALYSIS U₁₀₀

NAME/DATE mmh 15-10-94

CUSTOMER WHC

SAMPLE DELIVERY GROUP W0033

MATRIX 5 mmh
5/22/94

BATCH NUMBER _____

	ITAS ID	CUSTOMER ID	COMMENTS
1)	40427901	WHC	2.06 g
2)	F 01	WHC	2.06 g
3)			
4)			
5)			
6)			
7)			
8)			
9)			
10)			

REANALYSIS

~~*REFERENCED QC*~~

ITAS ID - BLANK L042792^B

ITAS ID - SPIKE 792^S

CLIENT CODE _____

ACTIONS (Initial & Date)

PREP LAB RECEIVED 5/20/94 *gpa*

SAMPLE REMAINDER
RETURNED TO SCG ✓ (CHECK ONE)

NO SAMPLE REMAINING

SEPARATION LAB 5/24/94 *Eve*

COUNTING/MEASUREMENT AS 5/26/94

DATA REVIEWED mmh 5-22-94

ANALYTICAL PREP STORED mmh 5-22-94

RECOUNT

ACTIONS (Initial & Date)

COUNTING/MEASUREMENT _____

DATA REVIEWED _____

ANALYTICAL PREP STORED _____

ADDITIONAL COMMENTS:

Ext. 5/25/94 CMS

RC-048 12/92 REV 2

0053

M

MEMORANDUM



TO: 200-UP-2 Project QA Record

June 7, 1994

FR: Susan Winter, Golder Associates Inc. *[Signature]*

RE: METALS DATA VALIDATION SUMMARY FOR DATA PACKAGE: W0033-ITC-030 (923-E418, Filename W0033M.UP2)

INTRODUCTION

This memo presents the results of data validation on data package W0033-ITC-030 prepared by the International Technology Corporation (ITC) laboratory. Information concerning the sample validated along with the analyses reported and the method of analysis is provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSIS
B0BP33	04/05/94	SOIL	SEE NOTE 1

Note 1. All samples were analyzed for CLP TAL metals 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 the deficiencies identified below.

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 24 determinations reported, all of

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

MAJOR DEFICIENCIES

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

MINOR DEFICIENCIES

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

Laboratory Duplicate

- Laboratory duplicate relative percent difference (RPD) for potassium was unacceptable. Attachments 2 and 5 provide a summary of the data qualification applied and supporting documentation.

GFAA Analytical Spikes

- GFAA analytical spike recoveries for lead and selenium were unacceptable. Attachments 2 and 5 provide a summary of the 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.

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ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

GLOSSARY OF INORGANIC DATA REPORTING QUALIFIERS

- B - Indicates the constituent was analyzed for and detected. The concentration reported is less than the contract required detection limit (CRDL) but greater than the instrument detection limit (IDL). The associated data should be considered usable for decision making purposes.
- U - Indicates the constituent was analyzed for and not detected. The concentration reported is the sample detection limit corrected for 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

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ATTACHMENT 3

QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: W0033-ITC-030

Parameter	Units	Samp#	
		Date	BOBP33
		4-5-94	
		Location	---
		Depth	---
		Type	SOIL
		Comments	---
Parameter	Units	Result	q
ALUMINUM	MG/KG	142.000	
ANTIMONY	MG/KG	11.100	U
ARSENIC	MG/KG	0.440	U
BARIUM	MG/KG	17.500	B
BERYLLIUM	MG/KG	0.220	U
CADMIUM	MG/KG	1.100	U
CALCIUM	MG/KG	10300.000	
CHROMIUM	MG/KG	2.200	U
COBALT	MG/KG	2.200	U
COPPER	MG/KG	8.500	
IRON	MG/KG	285.000	
LEAD	MG/KG	0.440	UJ
MAGNESIUM	MG/KG	4320.000	
MANGANESE	MG/KG	22.000	
MERCURY	MG/KG	0.110	U
NICKEL	MG/KG	4.400	U
POTASSIUM	MG/KG	11600.000	J
SELENIUM	MG/KG	0.440	UJ
SILVER	MG/KG	1.100	U
SODIUM	MG/KG	85.200	B
THALLIUM	MG/KG	0.440	U
VANADIUM	MG/KG	2.200	U
ZINC	MG/KG	36.000	
TITANIUM	MG/KG	18.900	

Verified
[Signature] 6/07/94

UN07

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ATTACHMENT 4

LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

0009



ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

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

May 18, 1994

Job Number: 380

This is the Certificate of Analysis for the following sample:

SDG:	W0033
Client Project ID:	Westinghouse Hanford
Date Received by Lab:	April 16, 1994
Number of Samples:	One (1)
Sample Type:	Soil

I. Introduction

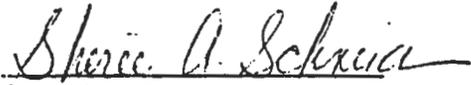
On April 16, 1994, one (1) soil sample arrived at ITAS-Knoxville from ITAS-Richland for chemical analysis. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Soil results are reported on a dry weight basis.

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

Reviewed and Approved:


 Sheree A. Schneider
 Project Manager

Un10

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

IT Corporation
May 18, 1994

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: Westinghouse Hanford

Job Number: 380

III. Quality Control

The sample was digested on April 27, 1994 for ICP and April 20, 1994 for GFAA. The CVAA analysis for mercury was performed on May 2, 1994; the GFAA analyses for arsenic, lead, selenium and thallium were performed on April 21 and April 22, 1994; the remaining metals were analyzed by ICP on April 28, 1994. All run QC was acceptable. A duplicate/spike pair was prepared using sample number BOBP33. Spike recovery (accuracy) results were within acceptance limits for all parameters by ICP, GFAA and CVAA analyses. Duplicate RPD (precision) results were within acceptance limits for all parameters by ICP, GFAA and CVAA analyses except for calcium and potassium. These results indicate poor sample homogeneity.

Data were reported with qualifiers as follows:

"C" Qualifiers

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

"O" Qualifiers

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

"M" Qualifiers

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

Miscellaneous

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

IT Corporation
May 18, 1994

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: Westinghouse Hanford

Job Number: 380

III. Quality Control (Continued)

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

TABLE I

<u>WHC ID</u>	<u>Richland ID</u>	<u>Knoxville ID</u>	<u>Test</u>
BOBP33	40427801	AA6719	METALS

6012

IT Corporation
May 18, 1994

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

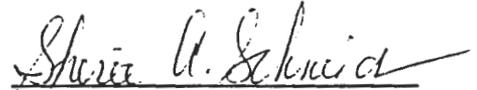
Client Project ID: Westinghouse Hanford

Job Number: 380

IV. Certification

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

Reviewed and Approved:



Sheree' A. Schneider
Project Manager

-- 6013

Westinghouse Hanford Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		Page 1 of 1
			006269
Collector R.T. Sickle	Company Contact C.A. Rowley	Telephone 372-3293	
SAF No. 94-065	Project Designation 200-UP-2	Sampling Locations	
Ice Chest No.	Bill of Lading/Airbill No. N/A	Offsite Property No.	
Method of Shipment Government truck		Field Logbook No.	
Shipped to IT		SPECIAL INSTRUCTIONS <i>STANDALONE Deliverable</i>	
Possible Sample Hazards/Remarks None Detected			
Special Handling and/or Storage Keep cool			

Sample Number	*	Date Collected	Time	Number and Type of Containers	Analysis Required	Preservative
404278 01	V	4-5-94	1100	(1) 500 ml P	Metals -CLP TAL Titanium Mercury	24 sept 4-6-94
40427901	V	4-5-94	1100	(1) Plastic bag	Gross Alpha/Beta ITAS-RD-3322 Gamma Spec. Cs-134, 137, I-129, Co-60, K-40, Eu-152/154/155, Ru-106, Na-22 ITAS-RD-3219; Total Uranium ITAS-RD-4200 OR 4201 U-235/234/238 ITAS-RD-3234 Np-237 ITAS-RD-3208; Pu-238/239/240 ITAS-RD-3209; Sr-90 ITAS-RD-3204; Tc-99 ITAS-RD-RS-0001; Am-241, Cm-244 ITAS-RD-3302; Se-79 ITAS-RD-3253	

Chain of Possession Relinquished By		(Sign and Print Names)		Date		Time		Received By		*Matrix	
<i>R.T. Sickle</i>		<i>R.T. Sickle</i>		4-14-94		1500		<i>Karen T. ...</i>		A = Air DL = Drum Liquids DS = Drum Solids L = Liquid O = Oil S = Soil SE = Sediment SL = Sludge SO = Solid T = Tissue W = Water WI = Wipe X = Other	
LABORATORY SECTION		Received By		Title		Date/Time					
Final Sample Disposition		Disposal Method:		Disposed by:		Date/Time:					

6014

6014

000015

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ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

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INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	<u>E</u>
PROJECT: 200-UP-2			DATA PACKAGE: W0033-TMA-030		
VALIDATOR: <i>Mintz</i>		LAB: IT		DATE: 06/06/94	
CASE:			SDG: W0033-TMA-030		
ANALYSES PERFORMED					
<input checked="" type="checkbox"/> CLP/ICP	<input checked="" type="checkbox"/> CLP/GFAA	<input checked="" type="checkbox"/> CLP/Hg	<input type="checkbox"/> CLP/Cyanide	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> SW-846/ICP	<input type="checkbox"/> SW-846/GFAA	<input type="checkbox"/> SW-846/Hg	<input type="checkbox"/> SW-846 Cyanide	<input type="checkbox"/>	<input type="checkbox"/>
SAMPLES/MATRIX <i>Soil</i>					
<i>B-8 P33</i>					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? Yes No N/A

Is a case narrative present? Yes No N/A

Comments: _____

2. HOLDING TIMES

Are sample holding times acceptable? Yes No N/A

Comments: _____

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? See. 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: *Mg is present in the ICB at -31 ug/L. However, all sample results > 2x ^{417/191} 12x-31. Therefore no qual. For Mg is required. Ca & Zn are present in the prep blank at 12.5 and 2.3 mg/kg, respectively. However, all sample results > 5x blank conc., therefore, no qualification is required.*

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: _____

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 narrative states that the RPD for Calcium and potassium are unacceptable. Potassium results ^{8/17/14} have been qualified as estimated (E), since the RPD is 56.7%. However, the Ca RPD is 25.2% which is acceptable according to the OI procedures. Therefore, no qual. for Ca is required.

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: The analytical spike recoveries for lead and selenium are 80.6% and 84.5%, respectively. The assoc. sample results have been qualified as estimated (E).

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: _____

MEMORANDUM



TO: 200-UP-2 Project QA Record

June 7, 1994

FR: Susan Winter, Golder Associates Inc. RE: METALS DATA VALIDATION SUMMARY FOR DATA PACKAGE: W0033-ITC-030
(923-E418, Filename W0033M.UP2)

INTRODUCTION

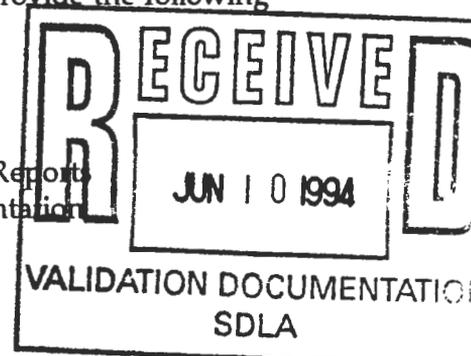
This memo presents the results of data validation on data package W0033-ITC-030 prepared by the International Technology Corporation (ITC) laboratory. Information concerning the sample validated along with the analyses reported and the method of analysis is provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSIS
B0BP33	04/05/94	SOIL	SEE NOTE 1

Note 1. All samples were analyzed for CLP TAL metals 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 the deficiencies identified below.

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 24 determinations reported, all of

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

MAJOR DEFICIENCIES

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

MINOR DEFICIENCIES

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

Laboratory Duplicate

- Laboratory duplicate relative percent difference (RPD) for potassium was unacceptable. Attachments 2 and 5 provide a summary of the data qualification applied and supporting documentation.

GFAA Analytical Spikes

- GFAA analytical spike recoveries for lead and selenium were unacceptable. Attachments 2 and 5 provide a summary of the 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.

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ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

GLOSSARY OF INORGANIC DATA REPORTING QUALIFIERS

- B - Indicates the constituent was analyzed for and detected. The concentration reported is less than the contract required detection limit (CRDL) but greater than the instrument detection limit (IDL). The associated data should be considered usable for decision making purposes.
- U - Indicates the constituent was analyzed for and not detected. The concentration reported is the sample detection limit corrected for 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

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ATTACHMENT 3

QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: W0033-ITC-030

Parameter	Samp#		Date		Location		Depth		Type		Comments	
	Units	Result	Q									
ALUMINUM	MG/KG	142.000										
ANTIMONY	MG/KG	11.100										U
ARSENIC	MG/KG	0.440										U
BARIUM	MG/KG	17.500										B
BERYLLIUM	MG/KG	0.220										U
CADMIUM	MG/KG	1.100										U
CALCIUM	MG/KG	10300.000										
CHROMIUM	MG/KG	2.200										U
COBALT	MG/KG	2.200										U
COPPER	MG/KG	8.500										
IRON	MG/KG	285.000										
LEAD	MG/KG	0.440										UJ
MAGNESIUM	MG/KG	4320.000										
MANGANESE	MG/KG	22.000										
MERCURY	MG/KG	0.110										U
NICKEL	MG/KG	4.400										U
POTASSIUM	MG/KG	11600.000										J
SELENIUM	MG/KG	0.440										UJ
SILVER	MG/KG	1.100										U
SODIUM	MG/KG	85.200										B
THALLIUM	MG/KG	0.440										U
VANADIUM	MG/KG	2.200										U
ZINC	MG/KG	36.000										
TITANIUM	MG/KG	18.900										

Verified
[Signature] 6/07/94

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U.S. EPA - CLP

1

EPA SAMPLE NO.

INORGANIC ANALYSES DATA SHEET

BOBP33

Lab Name: ITAS KNOXVILLE Contract: HANFORD/WE
 Lab Code: ITSTU Case No.: WO380 SAS No.: SDG No.: W0033
 Matrix (soil/water): SOIL Lab Sample ID: AA6719
 Level (low/med): LOW Date Received: 04/16/94
 % Solids: 88.5

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	142	-		P
7440-36-0	Antimony	11.1	U		P
7440-38-2	Arsenic	0.44	U		F
7440-39-3	Barium	17.5	B		P
7440-41-7	Beryllium	0.22	U		P
7440-43-9	Cadmium	1.1	U		P
7440-70-2	Calcium	10300		*	P
7440-47-3	Chromium	2.2	U		P
7440-48-4	Cobalt	2.2	U		P
7440-50-8	Copper	8.5			P
7439-89-6	Iron	285			P
7439-92-1	Lead	0.44	U		F
7439-95-4	Magnesium	4320			P
7439-96-5	Manganese	22.0			P
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	4.4	U		P
7440-09-7	Potassium	11600		*	P
7782-49-2	Selenium	0.44	U		F
7440-22-4	Silver	1.1	U		P
7440-23-5	Sodium	85.2	B		P
7440-28-0	Thallium	0.44	U		F
7440-62-2	Vanadium	2.2	U		P
7440-66-6	Zinc	36.0			P
	Titanium	18.9			P
5955-70-0	Cyanide				NR

Q
 B
 M

Color Before: BROWN Clarity Before: N/A Texture: COARSE
 Color After: COLORLESS Clarity After: CLEAR Artifacts: YES

Comments:
 ARTIFACTS INCLUDE TWIGS.

Verified
 Signature 6/07/94

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ATTACHMENT 4

LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION



ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

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

May 18, 1994

Job Number: 380

This is the Certificate of Analysis for the following sample:

SDG:	W0033
Client Project ID:	Westinghouse Hanford
Date Received by Lab:	April 16, 1994
Number of Samples:	One (1)
Sample Type:	Soil

I. Introduction

On April 16, 1994, one (1) soil sample arrived at ITAS-Knoxville from ITAS-Richland for chemical analysis. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Soil results are reported on a dry weight basis.

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

Reviewed and Approved:

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

Sheree' A. Schneider
Project Manager

U010

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

IT Corporation
May 18, 1994

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: Westinghouse Hanford

Job Number: 380

III. Quality Control

The sample was digested on April 27, 1994 for ICP and April 20, 1994 for GFAA. The CVAA analysis for mercury was performed on May 2, 1994; the GFAA analyses for arsenic, lead, selenium and thallium were performed on April 21 and April 22, 1994; the remaining metals were analyzed by ICP on April 28, 1994. All run QC was acceptable. A duplicate/spike pair was prepared using sample number BOBP33. Spike recovery (accuracy) results were within acceptance limits for all parameters by ICP, GFAA and CVAA analyses. Duplicate RPD (precision) results were within acceptance limits for all parameters by ICP, GFAA and CVAA analyses except for calcium and potassium. These results indicate poor sample homogeneity.

Data were reported with qualifiers as follows:

"C" Qualifiers

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

"O" Qualifiers

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

"M" Qualifiers

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

Miscellaneous

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

IT Corporation
May 18, 1994

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: Westinghouse Hanford

Job Number: 380

III. Quality Control (Continued)

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

TABLE I

<u>WHC ID</u>	<u>Richland ID</u>	<u>Knoxville ID</u>	<u>Test</u>
BOBP33	40427801	AA6719	METALS

6012

IT Corporation
May 18, 1994

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

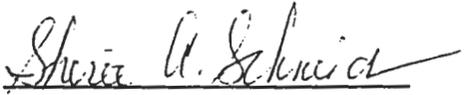
Client Project ID: Westinghouse Hanford

Job Number: 380

IV. Certification

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

Reviewed and Approved:


Sheree' A. Schneider
Project Manager

0013

Westinghouse Hanford Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		Page 1 of 1
			006269
Collector R.T. Sickie	Company Contact C.A. Rowley	Telephone 372-3293	
SAF No. 94-065	Project Designation 200-UP-2	Sampling Locations	
Ice Chest No.	Bill of Lading/Airbill No. N/A	Offsite Property No.	
Method of Shipment Government truck	Shipped to IT		Field Logbook No.
Possible Sample Hazards/Remarks None Detected	SPECIAL INSTRUCTIONS <i>Standard: Deliverable</i>		
Special Handling and/or Storage Keep cool			

Sample Number	*	Date Collected	Time	Number and Type of Containers	Analysis Required	Preservative
404278 01 BOBP33	V	4-5-44	1100	(1) 500 ml P	Metals -CLP TAL Titanium Mercury	24 SPT CLP 4-6-44
40427901 BOBP33	V	4-5-44	1100	(1) Plastic Bag	Gross Alpha/Beta ITAS-RD-3322 Gamma Spec. Cs-134,137, I-129, Co-60, K-40, Eu-152/154/155, Ru-106, Na-22 ITAS-RD-3219; Total Uranium ITAS-RD-4200 OR 4201 U-235/234/238 ITAS-RD-3234 Np-237 ITAS-RD-3208; Pu-238/239/240 ITAS-RD-3209; Sr-90 ITAS-RD-3204; Tc-99 ITAS-RD-RS-0001; Am-241, Cm-244 ITAS-RD-3302; Se-79 ITAS-RD-3253	

Chain of Possession Relinquished By		(Sign and Print Names)		Date		Time		Received By		*Matrix	
<i>R.T. Sickie</i>		<i>R.T. Sickie</i>		4-14-44		1500		<i>Robert F. ...</i>		A = Air DL = Drum Liquids DS = Drum Solids L = Liquid O = Oil S = Soil SE = Sediment SL = Sludge SO = Solid T = Tissue W = Water WI = Wipe X = Other	
LABORATORY SECTION		Received By		Title		Date/Time					
Final Sample Disposition		Disposal Method:		Disposed by:		Date/Time:					

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ATTACHMENT 5
DATA VALIDATION SUPPORTING DOCUMENTATION

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	<u>E</u>
PROJECT: 200-UR-2			DATA PACKAGE: W0033-TMA-030		
VALIDATOR: <i>[Signature]</i>		LAB: IT		DATE: 06/06/94	
CASE:			SDG: W0033-TMA-030		
ANALYSES PERFORMED					
<input checked="" type="checkbox"/> CLP/ICP	<input checked="" type="checkbox"/> CLP/GFAA	<input checked="" type="checkbox"/> CLP/Hg	<input type="checkbox"/> CLP/Cyanide	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> SW-846/ICP	<input type="checkbox"/> SW-846/GFAA	<input type="checkbox"/> SW-846/Hg	<input type="checkbox"/> SW-846 Cyanide	<input type="checkbox"/>	<input type="checkbox"/>
SAMPLES/MATRIX <i>Soil</i>					
<i>B0B P33</i>					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? Yes No N/A

Is a case narrative present? Yes No N/A

Comments: _____

2. HOLDING TIMES

Are sample holding times acceptable? Yes No N/A

Comments: _____

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? See. 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: Mg is present in the ICB at -31 ug/L. However, all sample results > ~~2x~~^{2x-10x} 12x-31l. Therefore no qual. for Mg is required. Ca & Zn are present in the prep blank at 12.5 and 2.3 mg/kg, respectively. However, all sample results > 5x blank conc. therefore, no
5. ACCURACY qualification is required.

- 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: _____

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 narrative states that the RPD for Calcium and potassium are unacceptable. Potassium results ^{2/17/14} have been qualified as estimated (U), since the RPD is 56.7%. However, the Ca RPD is 25.2% which is acceptable according to the OI procedures. Therefore, no qual. for Ca is required.

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: The analytical spike recoveries for lead and selenium are 80.6% and 84.5%, respectively. The assoc sample results have been qualified as estimated (U).

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

6
DUPLICATES

EPA SAMPLE NO.

BOBP33D

Lab Name: ITAS_KNOXVILLE

Contract: HANFORD/WE

Lab Code: ITSTU

Case No.: WO380

SAS No.:

SDG No.: W0033

Matrix (soil/water): SOIL

Level (low/med): LOW

% Solids for Sample: 88.5

% Solids for Duplicate: 88.5

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

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum	44.3	141.9231		142.0295		0.1		P
Antimony		11.0779	U	11.0779	U			P
Arsenic		0.4431	U	0.4431	U			F
Barium		17.4654	B	19.0539	B	8.7		P
Beryllium		0.2216	U	0.2216	U			P
Cadmium		1.1078	U	1.1078	U			P
Calcium		10322.1114		13297.6426		25.2	*	P
Chromium		2.2156	U	2.2156	U			P
Cobalt		2.2156	U	2.2156	U			P
Copper	5.5	8.5322		8.3217		2.5		P
Iron		285.3484		329.4871		14.4		P
Lead		0.4431	U	0.4431	U			F
Magnesium	1107.8	4323.8041		5176.0430		17.9		P
Manganese		21.9940		26.6512		19.1		P
Mercury		0.1076	U	0.1076	U			CV
Nickel		4.4312	U	4.4312	U			P
Potassium		11563.3322		6457.7645		56.7	*	P
Selenium		0.4431	U	0.4431	U			F
Silver		1.1078	U	1.1078	U			P
Sodium		85.2332	B	70.7145	B	18.6		P
Thallium		0.4431	U	0.4431	U			F
Vanadium		2.2156	U	2.2156	U			P
Zinc		35.9965		30.1097		17.8		P
Titanium		18.8922		20.6181		8.7		P
Cyanide								NR

Qualifying K results as estimated (S).

FORM VI - IN

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5/18/94

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MEMORANDUM



June 20, 1994

TO: 200-UP-2 Project QA Record

FR: Kent Angelos, Golder Associates Inc. *[Signature]*

RE: RADIOCHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE:
W0033-ITC-030, (923-E418, Filename W0033R.UP2)

INTRODUCTION

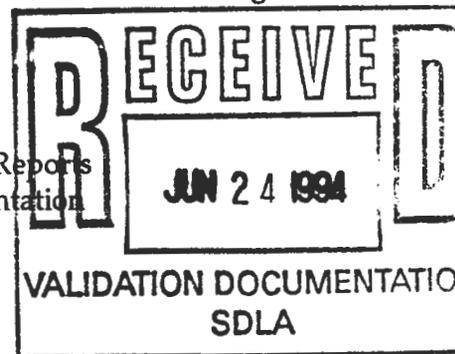
This memo presents the results of data validation on data package W0033-ITC-030 prepared by IT Analytical Services of Richland, Washington. A list of sample validated along with the analyses reported and the method of analysis is provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSIS
B0BP33	4/05/94	VEGETATION	SEE NOTE 1

Note 1. The sample were 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.

Accuracy. Goals for accuracy were met with the exception of the deficiencies identified under "Minor Deficiencies".

Sample Result Verification. All sample results were supported in the raw data. Minimum detectable activities (MDA) could not be verified by recalculation for neptunium-237, strontium-90 and selenium-79. Attachments 2 and 5 provide a summary of the qualifications applied.

Detection Limits. Detection limit goals were met for all analytes except europium-155 and iodine-129. The europium-155 detection limit was elevated due to matrix effects stemming from the low density of the vegetation matrix compared to the density of a soil matrix. The required detection limit for iodine-129 could not be achieved due to interferences from cesium-137.

Completeness. The data package was complete for all requested analyses. One sample was validated in this data package with a total of 29 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent, which meets normal work plan objectives of 90%.

MAJOR DEFICIENCIES

No major deficiencies were identified which resulted in qualification of sample results as unusable.

MINOR DEFICIENCIES

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

Continuing Calibration Checks

- Calibration checks were not conducted weekly for plutonium, therefore associated sample results have been qualified as estimated. Attachments 2 and 5 provide a summary of the sample results affected and qualifications applied.

Spike Sample Recovery

- Spike sample recovery for neptunium-237 was unacceptable. Attachments 2 and 5 provide a summary of the sample results affected and qualifications applied.

DATA REPORTING

- Results reported at a concentration of less than the minimum detectable activity (MDA) have been qualified as undetected (U) and the MDA is reported in 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: W0033-ITC-030	VALIDATOR: KA	DATE: June 20, 1994	PAGE <u>1</u> OF <u>1</u>
COMMENTS: RADIOCHEMISTRY			
ANALYTE	QUALIFIER	SAMPLES AFFECTED	REASON
NEPTUNIUM-237	UJ	B0BP33 and B0BP33 DUPLICATE	MATRIX SPIKE RECOVERY <60% BUT GREATER THAN 10%
PLUTONIUM-238/239/240	UJ	B0BP33 AND B0BP33 DUPLICATE	CALIBRATION CHECKS NOT CONDUCTED WEEKLY
NEPTUNIUM-237	UJ	B0BP33 AND B0BP33 DUPLICATE	MINIMUM DETECTABLE ACTIVITIES CAN NOT BE VERIFIED BY RECALCULATION

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ATTACHMENT 3

QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: W0033-ITC-030

Parameter	Samp#	BOBP33	
	Date	4-5-94	
	Location	---	
	Depth	---	
	Type	VEGETATION	
	Comments	---	
Parameter	Units	Result	Q
AMERICIUM-241	PCI/G	0.024	U
CURIUM-242	PCI/G	0.017	U
CURIUM-244	PCI/G	0.021	U
NEPTUNIUM-237	PCI/G	0.011	UJ
PLUTONIUM-239/240	PCI/G	0.095	UJ
PLUTONIUM-238	PCI/G	0.112	UJ
URANIUM-234	PCI/G	0.153	
URANIUM-235	PCI/G	0.055	U
URANIUM-238	PCI/G	0.131	
POTASSIUM-40	PCI/G	13.600	
COBALT-60	PCI/G	0.021	U
EUROPIUM-152	PCI/G	0.097	U
CESIUM-137	PCI/G	3.430	
CESIUM-134	PCI/G	0.023	U
RUTHENIUM-106	PCI/G	0.230	U
RADIUM-224	PCI/G	0.082	
SODIUM-22	PCI/G	0.026	U
EUROPIUM-155	PCI/G	0.141	U
BERYLLIUM-7	PCI/G	1.910	
THALLIUM-208	PCI/G	0.033	
LEAD-212	PCI/G	0.079	
EUROPIUM-154	PCI/G	0.072	U
IODINE-129	PCI/G	2.790	U
ALPHA	PCI/G	9.610	
BETA	PCI/G	1900.000	
TOTAL STRONTIUM	PCI/G	415.000	
SELENIUM-79	PCI/G	1.600	
TECHNETIUM-99	PCI/G	21.100	
URANIUM	UG/G	0.486	

*Verified and
6/22/94*

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

W0033-ITC-030

SAMPLE RESULTS

LAB NAME: ITAS-RICHLAND

SDG NO.: W0033

LAB SAMPLE ID: 40427901

MATRIX: VEGETATION

WHC ID: BOBP33

DATE RECEIVED: 4/14/94

REPORTING UNITS pCi/g & ug/g (uranium)

sampled on 4/5/94

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	METHOD NUMBER
AM-241	1.47E-02	1.80E-02	1.81E-02	2.36E-02 <i>u</i>	0.706	RD3302
CM-242	0.00E+00	0.00E+00	1.86E-02	1.68E-02 <i>u</i>	0.706	RD3302
CM-244	-4.16E-04	8.31E-04	8.34E-04	2.09E-02 <i>u</i>	0.706	RD3302
NP-237	0.00E+00	0.00E+00	0.00E+00	1.11E-02 <i>u</i>	<i>J</i> 1	RD3208
PU239/40	-3.97E-03	7.95E-03	8.00E-03	9.51E-02 <i>u</i>	<i>J</i> 0.207	RD3209
PU-238	1.19E-02	4.13E-02	4.14E-02	1.12E-01 <i>u</i>	<i>J</i> 0.207	RD3209
U-234	1.53E-01	8.04E-02	8.41E-02	5.17E-02	0.39	RD3234
U-235	7.05E-03	2.10E-02	2.10E-02	5.54E-02 <i>u</i>	0.39	RD3234
U-238DA	1.31E-01	7.49E-02	7.78E-02	5.86E-02	0.39	RD3234
K-40	1.36E+01	5.84E-01	1.48E+00	N/A	N/A	RD3219
CO-60	-4.11E-03	1.30E-02	1.30E-02	2.13E-02 <i>u</i>	N/A	RD3219
EU-152	2.40E-02	5.56E-02	5.56E-02	9.73E-02 <i>u</i>	N/A	RD3219
CS-137DA	3.43E+00	6.55E-02	3.49E-01	N/A	N/A	RD3219
CS-134	1.13E-02	1.35E-02	1.36E-02	2.32E-02 <i>u</i>	N/A	RD3219
RU-106DA	7.07E-02	1.36E-01	1.36E-01	2.30E-01 <i>u</i>	N/A	RD3219
RA-224DA	8.18E-02	4.61E-02	4.68E-02	N/A	N/A	RD3219
NA-22	-7.74E-03	1.58E-02	1.58E-02	2.63E-02 <i>u</i>	N/A	RD3219
EU-155	-8.96E-02	8.63E-02	8.67E-02	1.41E-01 <i>u</i>	N/A	RD3219
BE-7	1.91E+00	4.35E-01	4.75E-01	N/A	N/A	RD3219
TL-208	3.29E-02	3.07E-02	3.08E-02	N/A	N/A	RD3219
PB-212	7.85E-02	4.42E-02	4.49E-02	N/A	N/A	RD3219
EU-154	-2.13E-02	4.34E-02	4.34E-02	7.24E-02 <i>u</i>	N/A	RD3219
I-129LP	-4.66E-01	1.67E+00	1.67E+00	2.79E+00 <i>u</i>	N/A	RD3219
ALPHA	9.61E+00	4.60E+00	4.72E+00	4.41E+00	1	RD3222
BETA	1.90E+03	2.82E+01	1.28E+02	2.87E+00	1	RD3222
TOTAL-SR	4.15E+02	5.66E+00	9.05E+01	4.29E-01	0.415	RD3204
SE-79	1.60E+00	6.39E-01	1.80E+00	1.30E+00	0.655	RD3253
TC-99	2.11E+01	6.09E-01	3.06E+00	6.90E-01	0.951	ITAS-IT-RD-0001
URANIUM	4.86E-01	N/A	7.29E-02	5.00E-03	0.609	RD4200

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verified 6/19/93 MWA~~0000~~

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ATTACHMENT 4

LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

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CERTIFICATE OF ANALYSIS

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

June 2, 1994

Attention: J.A.Lerch

SAF Number	:	94-065
Date SDG Closed	:	April 28, 1994
Number of Samples	:	One (1)
Sample Type	:	Vegetation
SDG Number	:	W0033
Data Deliverable	:	Stand Alone

I. Introduction

On April 14, 1994, one vegetation sample was received by ITAS-Richland for radiochemical analysis. Upon receipt, the sample was assigned the following laboratory ID number to correspond with the WHC specific ID:

<u>ITAS-Richland ID</u>	<u>WHC ID</u>	<u>Matrix</u>	<u>Date of Receipt</u>
404279-01A	BOBP33	Vegetation	4/14/94

II. Analytical Results/Methodology

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

Westinghouse Hanford Company
June 2, 1994
Page 2

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 each analysis performed under SDG W0033 include a minimum of one Laboratory Control Sample (LCS), one method (reagent) blank, and one duplicate.

Quality control sample results are reported in the same units as sample results except for gross alpha and gross beta quality control sample results which are reported in pCi/sample.

IV. Comments

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

Alpha Spectroscopy

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

The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BP33) results are within contractual requirements.

Westinghouse Hanford Company

June 2, 1994

Page 3

Neptunium-237 by method ITAS-RD-3208

The batch was reanalyzed due to low matrix spike recoveries on the initial analysis (the average matrix spike recovery was less than 60%). The reanalysis results verify the original analysis results with an average matrix spike recovery of less than 60%. The original results are accepted and reported. The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BP33) results are within contractual requirements.

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

Due to a technician error, plutonium was not eluted from the column during the initial preparation of the sample batch and the batch was reanalyzed. The reanalysis batch is acceptable with the exception of the reanalysis LCS and batch blank. The reanalysis LCS and blank have tracer yields of less than the 20% lower limit (tracer yields achieved are 15.0% and 19.0%, respectively). The reanalysis LCS, blank, sample and sample duplicate (duplicate of sample B0BP33) results meet the contractual detection limit, and the LCS recovery is 92.7%. The data are accepted and reported based on the acceptable MDAs achieved, the acceptable spike recovery, and the sample and sample duplicate results being within the 3 sigma control limit.

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

The batch was reanalyzed due to low tracer yields on the initial analysis. The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BP33) results are within contractual requirements and reported.

Gamma Spectroscopy

Gamma Scan by method ITAS-RD-3219

The sample and sample duplicate (duplicate of sample B0BP33) were recounted for an extended count time (1000 minutes) in order to meet the required detection limit for one or more isotopes. The achieved MDAs were lower than the required detection limits due to the low density of a vegetation matrix (matrix effect) compared with the density of a soil matrix. The reanalysis of the samples for the extended count time improved the achieved MDAs to within contractual requirements with the exception of the MDA required for Eu-155 which was not met. The reanalysis results are accepted and reported. The LCS, batch blank, sample and sample duplicate results are within contractual requirements with the exception of the MDAs achieved for Eu-155.

Westinghouse Hanford Company
June 2, 1994
Page 4

Iodine-129 by method ITAS-RD-3219

The detection limit was not met for sample B0BP33 and the duplicate of B0BP33 due to matrix interference. The blank meets the MDA for I-129 and the sample and its duplicate exhibit the same effect which verifies that the interference is a matrix effect without necessitating a reanalysis of the sample batch. The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BP33) results are accepted and reported.

Gas Proportional Counting

Gross Alpha by method ITAS-RD-3222

The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BP33) results are within contractual requirements.

Gross Beta by method ITAS-RD-3222

The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BP33) results are within contractual requirements.

Strontium-90 by method ITAS-RD-3204

The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BP33) results are within contractual requirements.

Liquid Scintillation Counting

Selenium-79 by method ITAS-RD-3253

The batch was reanalyzed due to a high LCS recovery (matrix spike corrected) on the initial analysis. The cause of the high recovery was a low matrix spike chemical yield. The sample batch was reanalyzed and produced acceptable results. The chemical yield for the matrix spike (W0427901) was used for the batch yield corrections. When the sample batch was reanalyzed, samples and quality control samples from SDGs W0032 and W0024 were inadvertently reanalyzed with SDG W0033. The extraneous sample data was not used for reporting this SDG. The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BP33) results are within contractual requirements.

Westinghouse Hanford Company
June 2, 1994
Page 5

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

The initial analysis of the sample batch failed due to excessive quench. An error in sample batching caused the reanalysis of sample B0BP33 to be batched with SDGs W0022 and W0032. The reanalysis LCS, matrix spikes, batch blank, sample and sample duplicate (duplicate of sample B0BP32) results used for reporting this batch are also reported in those other SDGs. The LCS, one matrix spike (W0427701), the batch blank, the sample and sample duplicate results (used for reporting RPD values) reported with this SDG are also reported with SDG W0032. Another matrix spike (W0412001) result reported with this SDG is also reported with SDG W0022. Laboratory personnel have been reminded that SDGs are to be analyzed with their own batch QC. The LCS, batch blank, sample and sample duplicate results associated with this batch are acceptable and reported. The sample results were not yield corrected by the matrix spike recoveries.

Total Uranium

Total Uranium by method ITAS-RD-4200

Two matrix spikes were analyzed with the batch and their average yield is used for yield correcting the sample and sample duplicate results. The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BP33) results meet contractual requirements.

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

Reviewed and approved:

Suzanne Gaines

Suzanne Gaines
Project Manager

Westinghouse Hanford Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		Page 1 of 1
			006269
Collector R.T. Sickie	Company Contact C.A. Rowley	Telephone 372-3293	
SAF No. 94-065	Project Designation 200-UP-2	Sampling Locations	
Ice Chest No.	Bill of Lading/Airbill No. N/A	Offsite Property No.	
Method of Shipment Government truck		Field Logbook No.	
Shipped to IT		SPECIAL INSTRUCTIONS <i>STANDALONE Deliverable</i>	
Possible Sample Hazards/Remarks None Detected			
Special Handling and/or Storage Keep cool			

Sample Number	*	Date Collected	Time	Number and Type of Containers	Analysis Required	Preservative
<i>404278</i> 01 BOBP33	V	4-5-94	1100	(1) 500 ml P	Metals -CLP TAL Titanium Mercury	<i>74 CLP</i> 4-6-94
<i>40427901</i> BOBP33	V	4-5-94	1100	(1) PLASTIC BAG	Gross Alpha/Beta ITAS-RD-3322 Gamma Spec. Cs-134,137, I-129, Co-60, K-40, Eu-152/154/155, Ru-106, Na-22 ITAS-RD-3219; Total Uranium ITAS-RD-4200 OR 4201 U-235/234/238 ITAS-RD-3234 Np-237 ITAS-RD-3208; Pu-238/239/240 ITAS-RD-3209; Sr-90 ITAS-RD-3204; Tc-99 ITAS-RD-RS-0001; Am-241, Cm-244 ITAS-RD-3302; Se-79 ITAS-RD-3253	

Chain of Possession (Sign and Print Names)				*Matrix	
Relinquished By	Date	Time	Received By		
<i>R.T. Sickie</i>	4-14-94	1500	<i>Karen [Signature]</i>	SEAS 4-14-94	15:00

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

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ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

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RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	<u>D</u>	E
PROJECT:	200 UP 2		DATA PACKAGE: W0033-ITC-030		
VALIDATOR:	K.A.	LAB:	IT	DATE: 6/22/94	
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 type="checkbox"/> Gamma Spectroscopy	
<input checked="" type="checkbox"/> Total Uranium	<input type="checkbox"/> Radium-22	<input type="checkbox"/> Tritium	<input type="checkbox"/>		
SAMPLES/MATRIX	BOBP33 / Soil				

1. Completeness N/A
 Technical verification forms present? Yes No N/A
 Comments: Performed by WHC

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

Handwritten signature/initials

Comments: Cal. check for plutonium not performed within a week. Qualify
5/11/15

- 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: K-40 detected in blank but sample results are well above 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: Spike recovery <60 but >10 for NP237 qualify I/UT.

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: +129 %R > 130% but all results are U so no qualification necessary

7. Chemical Recovery N/A

Chemical carrier added? Yes No N/A

Chemical recovery acceptable? Yes No N/A

Chemical carrier traceable? Yes No N/A

Chemical carrier expired? Yes No N/A

Transcription/Calculation errors? Yes No N/A

Comments: _____

8. Duplicates N/A

Duplicates Analyzed? Yes No N/A

RPD Values Acceptable? Yes No N/A

Transcription/Calculation Errors? Yes No N/A

Comments: _____

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

Comments: Evaluation of field QC will be conducted at a later date.

10. Holding Times

Are sample holding times acceptable? Yes No N/A

Comments: Samples collected on 4/5/94 all analysis completed by 5/26/94 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

Handwritten notes:
 u/a
 6/22/94

Comments: MDA's do not meet RDL's for Eu155 and I-129. MDA's cannot be verified by recalculation for Np237, Sr90, Se79. Results for Np237 qualified N/A.

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

DUPLICATE RESULTS

LAB NAME: ITAS-RICHLAND

SDG NO.: W0033

LAB SAMPLE ID: F0427901

WHC ID: B0BP33

REPORTING UNIT pCi/g & ug/g (uranium)

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	METHOD NUMBER
AM-241	5.22E-03	1.04E-02	1.05E-02	1.41E-02	U 0.696	RD3302
CM-242	0.00E+00	0.00E+00	1.88E-02	1.70E-02	U 0.696	RD3302
CM-244	0.00E+00	0.00E+00	1.57E-02	1.42E-02	U 0.696	RD3302
NP-237	0.00E+00	0.00E+00	0.00E+00	1.11E-02	UJ 1	RD3208
PU239/40	3.61E-02	5.11E-02	5.18E-02	4.89E-02	UJ 0.22	RD3209
PU-238	1.81E-02	3.61E-02	3.64E-02	4.89E-02	UJ 0.22	RD3209
U-234	1.57E-01	8.30E-02	8.67E-02	7.32E-02	0.391	RD3234
U-235	1.74E-02	2.95E-02	2.96E-02	5.53E-02	U 0.391	RD3234
U-238DA	1.81E-01	8.79E-02	9.26E-02	6.14E-02	0.391	RD3234
K-40	1.43E+01	6.15E-01	1.56E+00	N/A	N/A	RD3219
CO-60	1.32E-02	1.45E-02	1.45E-02	2.59E-02	U N/A	RD3219
EU-152	-5.71E-03	6.53E-02	6.53E-02	1.11E-01	U N/A	RD3219
CS-137DA	3.57E+00	7.69E-02	3.65E-01	N/A	N/A	RD3219
CS-134	3.92E-03	1.71E-02	1.72E-02	2.76E-02	U N/A	RD3219
RU-106DA	-1.77E-02	1.72E-01	1.72E-01	2.75E-01	U N/A	RD3219
NA-22	4.02E-03	1.62E-02	1.63E-02	2.78E-02	U N/A	RD3219
EU-155	4.58E-02	1.01E-01	1.02E-01	1.57E-01	U N/A	RD3219
EU-154	1.11E-02	4.47E-02	4.47E-02	7.67E-02	U N/A	RD3219
I-129LP	6.45E-02	1.60E+00	1.60E+00	2.67E+00	U N/A	RD3219
ALPHA	7.69E+00	4.11E+00	4.19E+00	4.05E+00	1	RD3222
BETA	1.88E+03	2.81E+01	1.27E+02	2.95E+00	1	RD3222
TOTAL-SR	3.55E+02	4.10E+00	8.45E+01	2.80E-01	0.73	RD3204
SE-79	1.43E+00	6.00E-01	1.68E+00	1.22E+00	0.655	RD3253
URANIUM	3.92E-01	N/A	5.88E-02	5.00E-03	0.609	RD4200

Verified
 not
 4/19/94

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

RPD CALCULATIONS

LAB NAME: ITAS-RICHLAND SDG NO.: W0033
 LAB SAMPLE ID: 40427901
 WHC ID: BOBP33
 REPORTING UNIT pCi/g & ug/g (*uranium*)

ISOTOPE	SAMPLE RESULT	DUPLICATE RESULT	RPD
AM-241	1.47E-02	5.22E-03	9.52E + 01
CM-242	0.00E - 00	0.00E + 00	N/A
CM-244	-4.16E-04	0.00E + 00	2.00E + 02
NP-237	0.00E - 00	0.00E + 00	N/A
PU239/40	-3.97E-03	3.61E-02	2.49E + 02
PU-238	1.19E-02	1.81E-02	4.13E + 01
U-234	1.53E-01	1.57E-01	2.58E + 00
U-235	7.05E-03	1.74E-02	8.47E + 01
U-238DA	1.31E-01	1.81E-01	3.21E + 01
K-40	1.36E + 01	1.43E + 01	5.02E + 00
CO-60	-4.11E-03	1.32E-02	3.81E + 02
EU-152	2.40E-02	-5.71E-03	3.25E + 02
CS-137DA	3.43E + 00	3.57E + 00	4.00E + 00
CS-134	1.13E-02	3.92E-03	9.70E + 01
RU-106DA	7.07E-02	-1.77E-02	3.34E + 02
NA-22	-7.74E-03	4.02E-03	6.32E + 02
EU-155	-8.96E-02	4.58E-02	6.18E + 02
EU-154	-2.13E-02	1.11E-02	6.35E + 02
I-129LP	-4.66E-01	6.45E-02	2.64E + 02
ALPHA	9.61E + 00	7.69E + 00	2.22E + 01
BETA	1.90E + 03	1.88E + 03	1.06E + 00
TOTAL-SR	4.15E + 02	3.55E + 02	1.56E + 01
SE-79	1.60E + 00	1.43E + 00	1.12E + 01
URANIUM	4.86E-01	3.92E-01	2.14E + 01

*verified
 and
 6/19/94*

~~0011~~

**Golder
Associates**

SUBJECT

W8033-ITC-030

Job No.

923-648

Made by

Checked

Reviewed

Date

Sheet

of

Duplicates

Analyte	Result pCi/g	Duplicate Result pCi/g	RPD	Qualifier
Am 241	0.0236	0.0141	50	none < 2xRDL
Cm 244	0.0209	0.0142	38	none < 2xRDL
Pu 239/240	0.0951	0.0489	64	none < 2xRDL
Pu 238	0.112	0.0489	78	none < 2xRDL
U-235	0.0554	0.0553	0.2	none
Co 60	0.0213	0.0259	19	none
Eu 152	0.0973	0.111	13	none
Cs 134	0.0232	0.0276	17	none
Ru 106	0.230	0.275	18	none
Na 22	0.0263	0.0278	6	none
Eu 155	0.141	0.157	11	none
Eu 154	0.0724	0.0767	6	none
I-129	2.79	2.67	4	none

RPD's on previous page that are > 35% or
> 2x RDL as reported are evaluated on
this sheet against their MDA's.

Wut
6/19/94

9613494.2879

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

DUPLICATE RESULTS

LAB NAME: ITAS-RICHLAND SDG NO.: W0033
LAB SAMPLE ID: F0427701
WHC ID: B0BP32
REPORTING UNIT pCi/g

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	METHOD NUMBER
TC-99	3.13E+01	7.11E-01	4.13E+00	6.90E-01	0.951	ITAS-IT-RD-0001

RPD CALCULATIONS

LAB NAME: ITAS-RICHLAND SDG NO.: W0033
LAB SAMPLE ID: 40427701
WHC ID: B0BP32
REPORTING UNIT pCi/g

ISOTOPE	SAMPLE RESULT	DUPLICATE RESULT	RPD
TC-99	3.00E+01	3.13E+01	4.24E+00

*verified
not
6/19/94*

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BLANK RESULTS

LAB NAME: ITAS-RICHLAND SDG NO.: W0033

LAB SAMPLE ID: L042791B

REPORTING UNITS: pCi/g & ug/g (*uranium*)

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	METHOD NUMBER
AM-241	4.76E-03	9.51E-03	9.54E-03	1.29E-02 U	0.764	RD3202
CM-242	0.00E+00	0.00E+00	1.48E-02	1.33E-02 U	0.764	RD3202
CM-244	0.00E+00	0.00E+00	1.43E-02	1.29E-02 U	0.764	DR3202
NP-237	0.00E+00	0.00E+00	0.00E+00	1.13E-02 U	1	RD3208
K-40	3.46E-01	9.03E-02	9.67E-02	2.08E-01	N/A	RD3219
CO-60	1.55E-03	4.72E-03	4.72E-03	9.41E-03 U	N/A	RD3219
EU-152	2.34E-02	2.66E-02	2.67E-02	5.48E-02 U	N/A	RD3219
CS-137DA	-3.63E-03	4.72E-03	4.74E-03	7.57E-03 U	N/A	RD3219
CS-134	-2.10E-03	5.61E-03	5.62E-03	9.22E-03 U	N/A	RD3219
RU-106DA	-2.44E-02	4.43E-02	4.43E-02	7.36E-02 U	N/A	RD3219
NA-22	1.56E-03	4.99E-03	4.99E-03	9.83E-03 U	N/A	RD3219
EU-155	-3.39E-04	1.30E-02	1.30E-02	2.08E-02 U	N/A	RD3219
EU-154	4.39E-03	1.40E-02	1.41E-02	2.76E-02 U	N/A	RD3219
I-129LP	1.24E-01	2.67E-01	2.67E-01	5.09E-01 U	N/A	RD3219
ALPHA	6.03E-02	6.23E-02	6.31E-02	8.99E-02 U	1	RD3222
BETA	4.72E-01	3.84E-01	3.86E-01	5.95E-01 U	1	RD3222
TOTAL-SR	7.37E-02	6.51E-02	6.75E-02	1.43E-01 U	0.803	RD3204
URANIUM	0.00E+00	N/A	5.00E-03	5.00E-03 U	1	RD4200

LAB SAMPLE ID: L042792B

REPORTING UNITS: pCi/g

No qualification necessary since K40 is > 5x Blank result.

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	METHOD NUMBER
PU239/40	0.00E+00	0.00E+00	6.57E-02	5.93E-02 U	0.19	RD3209
PU-238	0.00E+00	0.00E+00	6.57E-02	5.93E-02 U	0.19	RD3209
U-234	1.26E-02	2.24E-02	2.25E-02	4.44E-02 U	0.531	RD3234
U-235	-2.51E-03	2.51E-03	2.54E-03	4.19E-02 U	0.531	RD3234
U-238DA	1.38E-02	2.23E-02	2.24E-02	3.91E-02 U	0.531	RD3234
SE-79	1.40E+00	7.02E-01	1.96E+00	1.44E+00 U	0.655	RD3253

*Verified
 MAB
 6/19/04*

9613494.2881

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

BLANK RESULTS

LAB NAME: ITAS-RICHLAND

SDG NO.: W0033

LAB SAMPLE ID: L042771X

REPORTING UNITS pCi/g

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	METHOD NUMBER
TC-99	3.41E-01	3.01E-01	1.06E+00	6.90E-01 <i>u</i>	0.951	ITAS-IT-RD-0001

LAB SAMPLE ID: L042771B

REPORTING UNITS pCi/g

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	METHOD NUMBER
TC-99	1.78E-01	2.98E-01	1.05E+00	6.90E-01 <i>u</i>	0.951	ITAS-IT-RD-0001

*Verified
MS
6/19/94*

~~0014~~ 025

LABORATORY CONTROL SAMPLES

LAB NAME: ITAS-RICHLAND

SDG NO.: W0033

LAB SAMPLE ID: L042791S

REPORTING UNIT pCi/g & ug/g (*uranium*)

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	EXPECTED	% RECOVERY
AM-241	5.55E+00	3.24E-01	9.09E-01	1.91E-02	0.766	4.52E+00	122.79
NP-237	4.83E+00	2.84E-01	1.08E+00	1.13E-02	1	5.65E+00	85.49
K-40	1.82E+01	7.39E-01	1.96E+00	N/A	N/A	1.95E+01	93.33
CS-137DA	4.46E-01	4.95E-02	6.66E-02	N/A	N/A	4.80E-01	92.92
RA-226DA	1.11E+00	6.69E-02	1.29E-01	N/A	N/A	1.16E+00	95.69
I-129LP	1.30E+01	1.05E+00	1.67E+00	2.35E+00	N/A	9.03E+00	143.96
ALPHA	4.33E+00	4.23E-01	8.41E-01	9.93E-02	1	4.51E+00	96.01
BETA	1.16E+01	1.06E+00	1.35E+00	6.10E-01	1	1.13E+01	102.65
TOTAL-SR	5.31E+00	2.68E-01	1.37E+00	1.29E-01	0.93	6.09E+00	87.19
URANIUM	9.47E+00	N/A	1.42E+00	5.00E-03	1	1.00E+01	94.70

*Verified
 MDA
 6/19/04*

*I-129 > 130% all
 detects to be qualified as I
 No qualification necessary since
 I-129 is < MDA*

026

~~0015~~

9613494.2883

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

LABORATORY CONTROL SAMPLES

LAB NAME: ITAS-RICHLAND SDG NO.: W0033

LAB SAMPLE ID: L042792S

REPORTING UNIT pCi/g

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	EXPECTED	% RECOVERY
PU239/40	3.14E+00	5.92E-01	9.51E-01	7.53E-02	0.15	3.39E+00	92.63
U-234	1.58E+00	2.15E-01	3.09E-01	3.63E-02	0.57	1.62E+00	97.53
U-235	8.45E-02	5.05E-02	5.19E-02	4.11E-02	0.57	7.37E-02	114.65
U-238DA	1.89E+00	2.34E-01	3.54E-01	1.97E-02	0.57	1.69E+00	111.83
SE-79	5.16E+01	1.30E+01	1.30E+01	N/A	0.66	45.2	114.16

LAB SAMPLE ID: L042771M

REPORTING UNIT pCi/g

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	EXPECTED	% RECOVERY
TC-99	1.91E+01	5.86E-01	2.86E+00	6.90E-01	0.95	2.26E+01	84.51

*Verified
MS
cell 9/94*

MATRIX SPIKE RESULTS

LAB NAME: ITAS-RICHLAND SDG NO.: W0033

LAB SAMPLE ID: W0427901

REPORTING UNITS: pCi/g & ug/g (*uranium*)

ISOTOPE	SPIKE RESULT*	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	SAMPLE RESULT	EXPECTED	% RECOVERY
NP-237	3.31E+00	2.35E-01	7.52E-01	1.13E-02	0.00E+00	5.64	58.69
SE-79	2.96E+01	4.68E+00	5.53E+00	N/A	1.60E-00	45.2	65.49
URANIUM	9.41E+00	N/A	1.41E+00	5.00E-03	4.86E-01	10	94.10

*NP237 %R < 60 but > 10
 results qualified as US*

LAB SAMPLE ID: W042791D

REPORTING UNITS: pCi/g & ug/g

ISOTOPE	SPIKE RESULT*	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	SAMPLE RESULT	EXPECTED	% RECOVERY
NP-237	2.89E+00	2.18E-01	6.59E-01	1.88E-02	0.00E+00	5.6	51.61
URANIUM	1.00E+01	N/A	1.00E+01	5.00E-03	1.60E+00	10	100.00

LAB SAMPLE ID: W0427701

REPORTING UNITS: pCi/g

ISOTOPE	SPIKE RESULT*	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	SAMPLE RESULT	EXPECTED	% RECOVERY
TC-99	1.92E+01	8.67E-01	6.01E+00	N/A	30.10	22.6	84.96

LAB SAMPLE ID: W0412001

REPORTING UNITS: pCi/g

ISOTOPE	SPIKE RESULT*	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	SAMPLE RESULT	EXPECTED	% RECOVERY
TC-99	1.74E+01	8.00E-01	5.13E+00	N/A	23.50	22.6	76.99

Verified as 6/19/94

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W0033-ITC-030

Americium/Curium		
HEIS No.:	BOBP33	
Lab ID:	40427901	
Aliquot:	1.99E+00	
Am241 net cpm:	0.0142	
Am241 bkg cpm:	0.0008	
Spl count time:	200	
Bkg count time:	2500	
Eff d/c:	3.225	
Decay:	1	
Yield:	0.706	
Am241 calc:	1.47E-02	OKAY
Am241 rptd:	1.47E-02	
Am241 MDA calc:	2.36E-02	OKAY
Am241 MDA rptd:	2.36E-02	
Cm244 net cpm:	-0.0004	
Cm244 bkg cpm:	0.0004	
Cm244 decay:	1.005	
Cm244 calc:	-4.16E-04	OKAY
Cm244 rptd:	-4.16E-04	
Cm244 MDA calc:	2.09E-02	OKAY
Cm244 MDA rptd:	2.09E-02	
Cm242 net cpm:	0.0000	
Cm242 bkg cpm:	0.0000	
Cm242 decay:	1.248	
Cm242 calc.:	0.00E+00	OKAY
Cm242 rptd:	0.00E+00	
Cm242 MDA calc:	1.75E-02	OKAY
Cm242 MDA rptd:	1.74E-02	
Neptunium		
HEIS No.:	BOBP33	
Lab ID:	40427901	
Aliquot:	2.03E+00	
Np237 net cpm:	0	
Np237 bkg cpm:	0	
Spl count time:	200	
Bkg count time:	2500	
Eff d/c:	3.7	
Decay:	1	
Yield:	1	
Np237 calc:	0.00E+00	OKAY
Np237 rptd:	0.00E+00	
Np237 MDA calc:	1.11E-02	UJ
Np237 MDA rptd:	1.67E-02	

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Plutonium		
HEIS No.:	BOBP33	
Lab ID:	40427901	
Aliquot:	2.03E+00	
Pu238 net cpm:	0.003	
Pu238 bkg cpm:	0.002	
Spl count time:	200	
Bkg count time:	1000	
Pu238 Eff d/c:	3.703	
Decay:	1	
Yield:	0.207	
Pu238 calc:	1.19E-02	OKAY
Pu238 rptd:	1.19E-02	
Pu238 MDA calc:	1.12E-01	OKAY
Pu238 MDA rptd:	1.12E-01	
Pu239 net cpm:	-0.001	
Pu239 bkg cpm:	0.001	
Pu239 d/c:	3.7	
Pu239 decay:	1	
Pu239 calc:	-3.97E-03	OKAY
Pu239 rptd:	-3.97E-03	
Pu239 MDA calc:	9.50E-02	OKAY
Pu239 MDA rptd:	9.51E-02	
Uranium		
HEIS No.:	BOBP33	
Lab ID:	40427901	
Aliquot:	2.06E+00	
U-234 net cpm:	0.0738	
U-234 bkg cpm:	0.0012	
Spl count time:	200	
Bkg count time:	2500	
Eff d/c:	3.7	
Decay:	1	
Yield:	0.39	
U-234 calc:	1.53E-01	OKAY
U-234 rptd:	1.53E-01	
U-234 MDA calc:	5.17E-02	OKAY
U-234 MDA rptd:	5.17E-02	
U-235 net cpm:	0.0034	
U-235 bkg cpm:	0.0016	
U-235 decay:	1	
U-235 calc:	7.05E-03	OKAY
U-235 rptd:	7.05E-03	
U-235 MDA calc:	5.54E-02	OKAY
U-235 MDA rptd:	5.54E-02	
U-238 net cpm:	0.063	
U-238 bkg cpm:	0.002	
U-238 decay:	1	
U-238 calc.:	1.31E-01	OKAY
U-238 rptd:	1.31E-01	
U-238 MDA calc:	5.86E-02	OKAY
U-238 MDA rptd:	5.86E-02	

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Gross Alpha		
HEIS No.:	BOBP33	
Lab ID:	40427901	
Aliquot:	4.97E-02	
Net counts:	0.212	
Bkg counts:	0.038	
Spl count time:	100	
Bkg count time:	500	
d/c:	5	
Calc.:	9.61E+00	OKAY
Rptd:	9.61E+00	
MDA calc:	4.43E+00	OKAY
MDA rptd:	4.41E+00	
Gross Beta		
HEIS No.:	BOBP33	
Lab ID:	40427901	
Aliquot:	2.50E-01	
Net counts:	363.27	
Bkg counts:	1.032	
Spl count time:	50	
Bkg count time:	500	
d/c:	2.898	
Calc.:	1.90E+03	OKAY
Rptd:	1.90E+03	
MDA calc:	2.87E+00	OKAY
MDA rptd:	2.87E+00	
Strontium 90		
HEIS No.:	BOBP33	
Sample:	40427901	
Sep date:	5/19/94	
Sep time:	18:00	
Count date:	5/20/94	
Count time:	05:05	
Hours:	11.083333	
Sample amt:	6.08E+00	
Net, cpm:	1297.78	
Count time:	50	
Bkg, cpm:	0.92	
Count time:	200	
D/C 1:	2.03	
D/C 2:	1.787	
D/C 3:	1.775	
Yield:	0.415	
Calc:	4.16E+02	OKAY
Rptd:	4.15E+02	
MDA, Calc:	2.48E-01	UJ
MDA, rptd:	4.29E-01	

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Selenium 79		
HEIS No.:	BOBP33	
Sample:	40427901	
Bkg cpm:	19.99	
Spl, amt:	1.11E+00	
Spl cpm:	22.28	
Count time:	100	
Spl dpm:	24.32	
d/c:	1.092	
Yield:	0.655	
Blk, dpm:	3.32E+01	
Calc:	1.59E+00	OKAY
Rptd:	1.60E+00	
MDA, calc:	1.42E+00	UJ
MDA, rptd:	1.30E+00	
Technetium-99		
HEIS No.:	BOBP33	
Sample:	40427901	
Bkg cpm:	24.97	
Spl, amt:	2.00E+00	
Spl cpm:	108.84	
Count time:	75	
Spl dpm:	116.15	
d/c:	1.067	
Yield:	0.951	
Blk, dpm:	2.84E+01	
Calc:	2.11E+01	OKAY
Rptd:	2.11E+01	
MDA, calc:	6.87E-01	OKAY
MDA, rptd:	6.90E-01	
Total Uranium		
HEIS No.:	BOBP33	
Lab ID:	40427901	
ng, raw:	2.96E+02	
g, sample:	1.00E+00	
Dil. vol:	100	
Yield, corr:	0.609	
Calc.:	4.86E-01	OKAY
Rptd:	4.86E-01	

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W0033-ITC-030

SAMP_NUM	PARAM	RESULT	Q	UNITS	RDL	COMMENTS
BOBP33	AM-241	0.0236	U	PCI/G	0.05	OKAY
	CM-242	0.0168	U	PCI/G	NO RDL	OKAY
	CM-244	0.0209	U	PCI/G	0.05	OKAY
	NP-237	0.0111	UJ	PCI/G	0.2	OKAY
	PU3940	0.0951	U	PCI/G	0.05	OKAY
	PU-238	0.112	U	PCI/G	0.05	OKAY
	U-234	0.153		PCI/G	0.3	OKAY
	U-235	0.0554	U	PCI/G	0.3	OKAY
	U-238	0.131		PCI/G	0.3	OKAY
	K-40	13.6		PCI/G	NO RDL	OKAY
	CO-60	0.0213	U	PCI/G	0.05	OKAY
	EU-152	0.0973	U	PCI/G	0.1	OKAY
	CS-137	3.43		PCI/G	0.05	OKAY
	CS-134	0.0232	U	PCI/G	NO RDL	OKAY
	RU-106	0.23	U	PCI/G	NO RDL	OKAY
	RA-224	0.0818		PCI/G	NO RDL	OKAY
	NA-22	0.0262	U	PCI/G	NO RDL	OKAY
	EU-155	0.141	U	PCI/G	0.1	MDA>RDL I
	BE-7	1.91		PCI/G	NO RDL	OKAY
	TL-208	0.0329		PCI/G	NO RDL	OKAY
	PB-212	0.0785		PCI/G	NO RDL	OKAY
	EU-154	0.0724	U	PCI/G	0.1	OKAY
	I-129	2.79	U	PCI/G	2	MDA>RDL I
	ALPHA	9.61		PCI/G	10	OKAY
	BETA	1900		PCI/G	10	OKAY
	TOTAL-SR	415		PCI/G	1	OKAY
	SE-79	1.6		PCI/G	10	OKAY
	TC-99	21.1		PCI/G	0.5	OKAY
	URANIUM	0.486		UG/G	0.1	OKAY

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