

9613475.1315

W0060-ITC-063

START

0045249



**INTERNATIONAL
TECHNOLOGY
CORPORATION**

Analytical Data Package Prepared For

Westinghouse Hanford

Radiochemical Analysis By

IT Analytical Services
Richland Laboratory



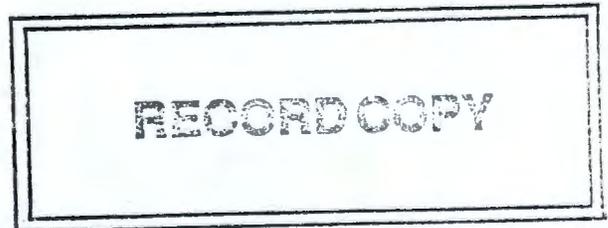
Sample Delivery Group Number: **W0060**

WHC IDENTIFICATION NUMBER

ITAS RICHLAND ID NUMBER

B0BS63

40520101



Regional Office

2800 George Washington Way • Richland, Washington 99352-1613 • 509-375-3131 • FAX: 509-375-5599

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CERTIFICATE OF ANALYSIS

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

June 30, 1994

Attention: J.A.Lerch

SAF Number	:	94-130
Date SDG Closed	:	May 17, 1994
Number of Samples	:	One (1)
Sample Type	:	Water
SDG Number	:	W0060
Data Deliverable	:	Stand Alone

I. Introduction

On May 17, 1994, one water sample was received by ITAS-Richland for radiochemical analysis. Upon receipt, the sample was assigned the following laboratory ID number to correspond with the WHC specific ID:

<u>ITAS-Richland ID</u>	<u>WHC ID</u>	<u>Matrix</u>	<u>Date of Receipt</u>
405201-01A	B0BS63	Water	5/10/94

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 30, 1994
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The requested analyses were:

- Gamma Spectroscopy**
Gamma Scan by method ITAS-RD-3219
- Liquid Scintillation Counting**
Technetium-99 by method ITAS-IT-RS-0001

III. Quality Control

The analytical results for each analysis performed under SDG W0060 include a minimum of one Laboratory Control Sample (LCS), one method (reagent) blank, and one duplicate. Any exceptions have been noted in the "Comments" section.

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

IV. Comments

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

Samples B0BS64 and B0BS63 were received in the same cooler on May 10, 1994, and share the same Off-Site Property Control Form W94-0-0518-37. Sample B0BS64 was assigned to workorder number 405200, SDG W0049, and sample B0BS63 was assigned to workorder number 405201, SDG W0060.

Gamma Spectroscopy

Gamma Scan by method ITAS-RD-3219

The Eu-152 radiochemical yield was low for the LCS (L052011S). The LCS was recounted and the recount results are acceptable and reported. The root cause of the low yield is insufficient Eu-152 in the LCS. The Calibration Control Group has been requested to prepare the gamma water vials with higher levels of Eu-152. The Eu-152 detection limit was not met for the duplicate of sample B0BS63. The Eu-152 detection limit was achieved in both the batch blank and the sample, therefore, the results are accepted and reported. The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BS63) results are within contractual limits, except as noted above.

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June 30, 1994
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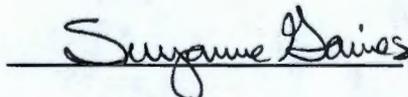
Liquid Scintillation Counting

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

The matrix spike, LCS, batch blank, sample and sample duplicate (duplicate of sample B0BS63) results are within contractual requirements.

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

Reviewed and approved:



Suzanne Gaines
Project Manager

SAMPLE RESULTS

LAB NAME: ITAS-RICHLAND SDG NO.: W0060
 LAB SAMPLE ID: 40520101 MATRIX: WATER
 WHC ID: B0BS63 DATE RECEIVED 5/10/94
 REPORTING UNITS pCi/L

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	METHOD NUMBER
CO-60	-8.16E+00	5.24E+00	5.30E+00	6.44E+00	N/A	RD3219
FE-59	-6.09E+00	1.44E+01	1.44E+01	2.55E+01	N/A	RD3219
EU-152	-1.68E+01	2.22E+01	2.22E+01	3.66E+01	N/A	RD3219
CO-58	4.89E+00	6.03E+00	6.05E+00	1.23E+01	N/A	RD3219
CS-137DA	0.00E+00	3.94E+00	3.94E+00	N/A	N/A	RD3219
RU-106DA	1.51E+01	3.14E+01	3.15E+01	6.26E+01	N/A	RD3219
EU-155	-3.02E+00	8.53E+00	8.53E+00	1.35E+01	N/A	RD3219
EU-154	-1.07E+01	1.41E+01	1.41E+01	2.18E+01	N/A	RD3219
TC-99	4.36E+01	1.49E+00	7.87E+00	2.07E+00	0.951	ITAS-IT-RS- 0001

DUPLICATE RESULTS

LAB NAME: ITAS-RICHLAND SDG NO.: W0060

LAB SAMPLE ID: F0520101

WHC ID: B0BS63

REPORTING UNITS pCi/L

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	METHOD NUMBER
CO-60	3.88E+00	4.39E+00	4.41E+00	1.04E+01	N/A	RD3219
FE-59	-8.89E+00	1.76E+01	1.76E+01	2.93E+01	N/A	RD3219
EU-152	2.15E+01	2.31E+01	2.32E+01	5.44E+01	N/A	RD3219
CO-58	6.69E+00	4.82E+00	4.86E+00	1.16E+01	N/A	RD3219
CS-137DA	3.16E-01	4.09E+00	4.09E+00	7.61E+00	N/A	RD3219
RU-106DA	1.06E+01	4.38E+01	4.38E+01	8.30E+01	N/A	RD3219
EU-155	9.90E+00	8.08E+00	8.14E+00	1.68E+01	N/A	RD3219
EU-154	1.61E+00	1.74E+01	1.74E+01	3.26E+01	N/A	RD3219
TC-99	4.43E+01	1.50E+00	7.94E+00	2.07E+00	0.951	ITAS-IT-RS-0001

RPD CALCULATIONS

ISOTOPE	SAMPLE RESULT	DUPLICATE RESULT	RPD
CO-60	-8.16E+00	3.88E+00	562.62
FE-59	-6.09E+00	-8.89E+00	37.38
EU-152	-1.68E+01	2.15E+01	1629.79
CO-58	4.89E+00	6.69E+00	31.09
CS-137DA	0.00E+00	3.16E-01	200.00
RU-106DA	1.51E+01	1.06E+01	35.02
EU-155	-3.02E+00	9.90E+00	375.58
EU-154	-1.07E+01	1.61E+00	270.85
TC-99	4.36E+01	4.43E+01	1.59

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PROJECT ID (Name/Number): WHC W0060

NCM INITIATED BY (Name/Date): Marshall Lane 6/16/94

PARAMETER(S): Gamma

SAMPLE NUMBER(S) AFFECTED: F0520101

MATRIX: WATER

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

NONCONFORMANCE [check appropriate item(s)]:

1. Not enough sample received for proper analysis.

2. Holding time exceeded by _____ days due to:

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

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

2.3. CATEGORY III: Laboratory Reruns

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

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

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

2.3.4. OTHER: (see #10)

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

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

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

6. Invalid instrument calibration. (See #10)

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

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

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

9. Other (specify): _____

10. Comments/Explanation: Ev-152 MDC Greater than CRDL

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): Sup Jones 6/30/94

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IT CORPORATION

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

CORRECTIVE ACTION

ROOT CAUSE:

INITIALS/DATE 6/16/94 ad

unknown. Fu-152 MOC was less than CRDL in both blank and original sample.

CORRECTIVE ACTION:

INITIALS/DATE 6/16/94 ad

Report Result And Note in case Narrative

RESPONSIBILITY FOR PERFORMING CORRECTIVE ACTION ASSIGNED TO:

ACTIONS TO PREVENT RECURRENCE:

INITIALS/DATE _____

N/A

FIRST LEVEL SUPERVISOR:

[Signature]

DATE: 6/16/94

RESPONSIBLE MANAGER:

[Signature]

DATE: 6/22/94

QC REVIEW

NONCONFORMANCE

DEFICIENCY

RERUN

FURTHER ACTION REQUIRED:

ASSIGNED TO:

QC COORDINATOR:

[Signature]

DATE:

7/1/94

CORRECTIVE ACTION VERIFICATION

VERIFIED

CANNOT VERIFY (specify reason)

REASON:

NCM CLOSURE

QC COORDINATOR:

[Signature]

DATE:

7/1/94



PROJECT ID (Name/Number): WHC 40060

NCM INITIATED BY (Name/Date): Marshall Lane 6/17/94 ml

PARAMETER(S): Gamma

SAMPLE NUMBER(S) AFFECTED: L0520115

MATRIX: WATER

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

NONCONFORMANCE [check appropriate item(s)]:

1. Not enough sample received for proper analysis.

2. Holding time exceeded by _____ days due to:

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

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

2.3. CATEGORY III: Laboratory Reruns

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

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

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

2.3.4. OTHER: (see #10)

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

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

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

6. Invalid instrument calibration. (See #10)

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

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

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

9. Other (specify): _____

10. Comments/Explanation: Ev-152 spike yield 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): Spig Jones 6/20/94

CORRECTIVE ACTION

ROOT CAUSE: INITIALS/DATE 6/17/94 ml

INSUFFICIENT Ev-152 in spike

CORRECTIVE ACTION: INITIALS/DATE 6/17/94 ml

Recount spike. Ev-152 of Recount was Acceptable. Report Results

RESPONSIBILITY FOR PERFORMING CORRECTIVE ACTION ASSIGNED TO: _____

ACTIONS TO PREVENT RECURRENCE: INITIALS/DATE 6/17/94 ml

CCG has been notified to add more Ev-152 to this vial code.

FIRST LEVEL SUPERVISOR: Michael Morris DATE: 6/17/94

RESPONSIBLE MANAGER: W. Marshall DATE: 6/27/94

QC REVIEW

NONCONFORMANCE DEFICIENCY RERUN

FURTHER ACTION REQUIRED:

ASSIGNED TO: _____

QC COORDINATOR: Jodie Cor DATE: 7/1/94

CORRECTIVE ACTION VERIFICATION

VERIFIED CANNOT VERIFY (specify reason)

REASON: _____

NCM CLOSURE

QC COORDINATOR: Jodie Cor DATE: 7/1/94

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Surveyed: Yes No ? Less than 200 counts/minute: Yes No ? By (initials) MA

Pacific Northwest Laboratories
Battelle Boulevard
Richland, Washington 99352

CHAIN OF CUSTODY

Test User ID: BATTM1E729

C-of-C: B013D1 pg. 1 of 1
(505) 372-0000

Company Contact: BE OPITZ Telephone: _____
Samples Collected by: HANKEL / HARRISON Date: 5-6-94 Time: 830
ID/Sample No.: B0BS63
Ice Chest No.: ER-11 Field Logbook Page No.: 4/8EE
Remarks: SAF 94-130

Possible Sample Hazard Identification: _____ Contract No.: _____
Destination: DELIVER TO SIGMA 5 (WHC Contract) Carrier/Waybill No.: _____
Ground-Water Soil _____ Other _____

Shipping container internal temperature when sealed in it _____ Shipping container internal temperature when opened in laboratory _____

Sample Identification

B0BS63 -(8) 1000mIF-GAMM > 40520101
B0BS63 -(2) 1000mIF-TC99

*SDA
WOODCO*

Chain of Possession

Hankel Ave

Relinquished by: for TLV
OMueller PNL

Relinquished by: Sweeney L Sweeney WHC

Relinquished by: _____

Disposed by: _____

JN-ALP

Received by: Sweeney L Sweeney WHC

Received by: R. Boyd JT

Received by: _____

Disposal Method: _____

1220 5/6/94
Date/Time:

5-10-94 - 0700
Date/Time:

5-10-94 1145
Date/Time:

Date/Time: _____

Date/Time: _____

SAMPLE ANALYSIS ORDER
BATTELLE, PNL

ITAS

CONTRACT _____

CHAIN OF CUSTODY #: B013D1

SAMPLE ID(S): BOBS63

SAMPLE SCHEDULE DATE: 04/01/94

USER ID BATTM16229

SA F94-130

SAMPLE RECEIVER INITIAL / DATE:
_____/ DATE _____

WATER X SOIL ___ OTHER ___

INTERNAL TEMPERATURE OF SHIPPING CONTAINER
UPON OPENING IN LABORATORY _____

BOTT#	BOTT TYPE	BOTT SIZE	# of BOTT	PRESERVAT	NOTES	# of SAMP	ANA_1	ANA_2	ANA_3	ANA_4	ANA_5	ANA_6	Filtered
123	P	1000	1	HNO3		8 +	GAMM						
313	P	1000	1	HNO3		2 +	GAMMA SCAN TC99 TC-99						

98 4/19/94

SAMPLE STATUS REPORT FOR E 6028. E-BLANK 2-E33-30 TIME: 5/ 6/94 14:56
 DISPATCHED: 3/30/94 11:48 SAMPLE HAS NOT BEEN SLURPED
 RECEIVED: 5/ 6/94 12:41

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

END OF REPORT

BOBR73
 BOBR74
 BOBR75
 BOBR76

hes
 5/10/94

BOBS63
 hes
 5/10/94

Contractor WHC	OFF-SITE PROPERTY CONTROL	CONTROL NUMBER (To be obtained from PROPERTY MANAGEMENT) W94-0-0518-37
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PART I - TO BE COMPLETED BY ORIGINATOR

Department ER Eng Support	Section Field & Analytical Supp	Unit ER Field Sampling
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The following items are to be shipped from Contractor Vendor

Routing Contractor Vendor

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

Quantity	Description (Include Serial and any Government Tag Numbers)	Original Cost
74 1 lbs.	Sample #: PU BSL3, BCP SLY Cooler ID: E511 Polycooler with groundwater samples packed in wet ice and vermiculite	N/A
1 lbs.	Sample #: Cooler ID: NA Polycooler with groundwater samples packed in wet ice and vermiculite	N/A

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

Necessity for the Off-Site Use of this Property
Sampling supports RI/FS work in the ZOO AREA

Bill of lading # None

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

RM Clearance for Public Release <i>[Signature]</i>	RM Survey No 157992	Date 5/10/94
Location of Property (Area & Bldg.) ZOO-BP-5	Contact P. H. Butcher	Phone (509) 376-4388
Date Ready for Shipment 5-10-94	Cost Code to be Charged 88410 PLS3A	Approximate Date This Property will be Returned NA
Originated By P.H. Butcher	Date 5/10/94	Authorized By <i>[Signature]</i>
Signature and Name of Property Control <i>[Signature]</i>	Custodian Date 5/10/94	Property Management Approval <i>[Signature]</i>

PART II - TO BE COMPLETED BY SHIPPING

Signature of Recipient R. Boyd JT	Return Order No.	Date Issued	Purchase Order No.	Date Issued
Date 5-10-94 1145				

DISTRIBUTION

By Originator White, Green, Yellow, Pink - Property Management Goldenrod - Retain	Shipping Operation - Sign all Copies and Forward to: White - Property Management Green - Property Control Custodian (Issuing Office) Yellow - Retain Pink - Originator	0021
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INTERNATIONAL
TECHNOLOGY
CORPORATION

Regional Office
2800 George Washington Way
Richland, Washington 99352

SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

Date/Time Received 5-10-94 1145 Client Name WHC

Project/Client # SAF 94-130 Batch or Case # _____

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

1. Condition of shipping container? OK

2. Custody Seals on cooler intact? Yes No

3. Custody Seals dated and signed? Yes No

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

5. Vermiculite/packing material is: Wet Dry

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

7. Number of sample containers in cooler: 20

8. Samples have: _____ tape _____ hazard labels

custody seals appropriate sample labels

9. Samples are: in good condition _____ leaking

_____ broken _____ have air bubbles

_____ other

10. Coolant present? Yes No

Sample temperature 20

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

Chain of Custody #(s) 601301, 601302

Request for analysis #(s) N/A

Airbill # N/A Carrier N/A

12. Have any anomalies been identified above? Yes No

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

Printed Name/Signature R. Boyd R. Boyd Date/Time 5-10-94 1145

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

0022

SAMPLE RECEIPT VARIANCE REPORT
ITAS-RICHLAND LABORATORY

WORK ORDER NUMBER: _____ DATE INITIATED: 5-10-94

INITIATED BY: Heideberg

DATE/TIME OF SAMPLE (AND/OR RFA & COC) RECEIPT: _____

CLIENT SAMPLE NUMBER	RFA/COC NUMBERS	ANALYSIS REQUESTED
BOBS64	B013D2	γ, TC
BOBS63	B013D1	γ, TC

Samples were received with the following deficiencies:

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

NOTES: COC's came with test user ID of M16729 and SAF 94-130. Will log as WHC 94-130.

SUPERVISOR REVIEW: _____

PROJECT MANAGER REVIEW: _____

TELEPHONED TO: Joan Kessner ON 5/10 BY Van Pettey

TELEFAXED TO: _____ ON _____ BY _____

SIGNED ORIGINAL MUST BE RETAINED IN WORK ORDER FILE

*All are Category I.
JRM 11 May 94*

Customer Code	Received Date	Time	Screening Date	Prep Time	Count Date	Mnts. Cntd	BACKGROUND		
BAT			51094		510	10	Alpha 15	Beta 214	Mnts 240

Customer ID	pH <2	RESIDUE Wght (mGrms)	Vol. Anal. mG	Sample Size mL	SMPL CNT DATA			Net Sample		DPM / Aliquot		uCi per Sample		2 Sigma Error		pCi/(Gm or L)		Category 1 Yes/No	Aliquot to Cat 1 Gm or Ltr		
					Hldr Num.	Total Alpha	Counts Beta	Counts/Minute Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta		Alpha	Beta	
BOBS63		9.4	5	1.0	6	5	9	0.44	0.01	2.0E+00	-3E-01	1.8E-04	-3E-05	1.9E-07	-3E-08	1.8E+02	-3E+01	Yes	5.6E+01	-4E+03	
BOBS64		4.6	5	1.0	7	2	35	0.14	2.61	4.9E-01	5.5E+00	4.4E-05	5.0E-04	9.2E-08	2.1E-07	4.4E+01	5.0E+02	Yes	2.3E+02	2.0E+02	
BOBRQ5		4.1	5	1.0	8	0	13	-0.06	0.41	-3E-01	9.2E-01	-2E-05	8.3E-05	-6E-08	2.7E-07	-2E+01	8.3E+01	Yes	-4E+02	1.2E+03	
BOBRN7		8.1	5	1.0	9	0	14	-0.06	0.51	-3E-01	1.1E+00	-3E-05	1.0E-04	-7E-08	3.5E-07	-3E+01	1.0E+02	Yes	-4E+02	9.7E+02	
BOBRP9		7.0	5	1.0	10	1	8	0.04	-0.09	1.7E-01	-2E-01	1.5E-05	-2E-05	4.9E-08	-5E-08	1.5E+01	-2E+01	Yes	6.7E+02	-5E+03	
BOBWB1		7.1	5	1.0	11	0	10	-0.06	0.11	-3E-01	2.8E-01	-2E-05	2.5E-05	-6E-08	4.3E-08	-2E+01	2.5E+01	Yes	-4E+02	4.0E+03	
BOBW98		7.5	5	0.1	12	1	21	0.04	1.21	1.2E-01	2.6E+00	1.1E-08	2.3E-05	4.9E-09	2.8E-07	1.1E+01	2.3E+02	Yes	9.0E+02	4.3E+02	
BOBW59		1.4	5	0.1	13	1	15	0.04	0.61	1.3E-01	1.3E+00	1.2E-08	1.1E-05	4.5E-09	9.4E-08	1.2E+01	1.1E+02	Yes	8.6E+02	8.7E+02	
BOBW60		2.6	5	0.1	14	1	16	0.04	0.71	1.3E-01	1.5E+00	1.2E-08	1.3E-05	4.6E-09	1.2E-07	1.2E+01	1.3E+02	Yes	6.6E+02	7.4E+02	
BOBWH3		6.2	5	4.0	15	2	17	0.14	0.81	5.6E-01	1.6E+00	2.0E-04	5.9E-04	3.8E-07	1.3E-08	5.1E+01	1.5E+02	Yes	2.0E+02	6.7E+02	
BOBWJ0		1.6	5	4.0	16	1	16	0.04	0.71	1.3E-01	1.5E+00	4.5E-05	5.4E-04	1.8E-07	4.9E-08	1.1E+01	1.3E+02	Yes	8.8E+02	7.5E+02	
BOBWG8		4.4	5	4.0	17	0	14	-0.06	0.51	-3E-01	1.1E+00	-1E-04	4.1E-04	-2E-07	1.5E-08	-2E+01	1.0E+02	Yes	-4E+02	9.8E+02	
BOBWG6		1.2	5	4.0	18	0	9	-0.06	0.01	-2E-01	5.9E-02	-9E-05	2.1E-05	-2E-07	1.5E-08	-2E+01	5.3E+00	Yes	-5E+02	1.9E+04	
BOBWH4		2.7	5	1.0	19	1	9	0.04	0.01	1.5E-01	-7E-03	1.4E-05	-7E-07	4.6E-08	-7E-10	1.4E+01	-7E-01	Yes	7.3E+02	-2E+05	
BOBWH6		3.1	5	1.0	20	2	10	0.14	0.11	5.6E-01	1.4E-01	5.0E-05	1.3E-05	9.0E-08	1.1E-08	5.0E+01	1.3E+01	Yes	2.0E+02	8.0E+03	
TOTAL	uCi									-0.06	-0.89	-2E-01	-2E+00	2.9E-04	2.3E-03	ERR	ERR	ERR	ERR	ERR	ERR

WHL ←

9613475.1331

*** GAMMA ***

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

11-May-1994
Page 1

CUSTOMER: WHC

SAF
94-130

SAMPLE DELIVERY GROUP

W0060

MATRIX : WATER

BATCH NUMBER

5-201

ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
L052011B	✓			
L052011S	✓			
1) 40520101	✓	WHC	BOBS63	
F0520101	✓			

ACTIONS (Initial & Date)

) INITIATED

JH 5/12/94

5) COUNTING/MEASUREMENT LAB

OP 6/13/94

) PREP LAB RECEIVED

~~JA~~ 6-10-94

6) DATA REVIEWED AND

) SAMPLE REMAINDER STORED

~~JA~~ 6-13-94

ANALYTICAL PREP STORED

ml 6/17/94

) SEPARATION LAB RECEIVED

N/A



DUE DATE _____

REANALYSIS / RECOUNT CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

ANALYSIS Gamma
CUSTOMER WHC
MATRIX Water

NAME/DATE nd ^{6/15/84} ~~1-6~~ 6/15/84
SAMPLE DELIVERY GROUP W0060
BATCH NUMBER 5-201

ITAS ID	CUSTOMER ID	COMMENTS
1) L0520115	N/A	Reagent spike
2)		
3)		
4)		
5)		
6)		
7)		
8)		
9)		
10)		

REANALYSIS

REFERENCED QC

ITAS ID - BLANK _____
ITAS ID - SPIKE _____
CLIENT CODE _____

ACTIONS (Initial & Date)

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

RECOUNT

ACTIONS (Initial & Date)

COUNTING/MEASUREMENT: MC-1594
DATA REVIEWED _____
ANALYTICAL PREP STORED _____

ADDITIONAL COMMENTS:

9813475.1334

*** TC-99 ***

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

11-May-1994
Page 1

CUSTOMER: WHC SAF SAMPLE DELIVERY GROUP WOODCO
 MATRIX : WATER 94-130 BATCH NUMBER 5-201

ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
===== EQNT 232 - 300.12 ± 3.7085 DPM =====				
<u>L052011N</u>		<u>L052011B</u>	<u>L052011M</u>	<u>F0520101</u>
<u>L052012U</u>		<u>W0520101 - EQNT 231 - 300.58 ± 3.7141 DPM</u>		
1) 40520101		WHC	BOBS63	

ACTIONS (Initial & Date)

- 1) INITIATED JH 5/12/94
- 2) PREP LAB RECEIVED 6/14/94 MEM
- 3) SAMPLE REMAINDER STORED NA
- 4) SEPARATION LAB RECEIVED 6/14/94 MEM
- 5) COUNTING/MEASUREMENT LAB 17 Jun 94 OR
- 6) DATA REVIEWED AND ANALYTICAL PREP STORED 6/22/94

9613475.1335

LATA Los Alamos Technical Associates, Inc.

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

August 16, 1994

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



Dear Karl,

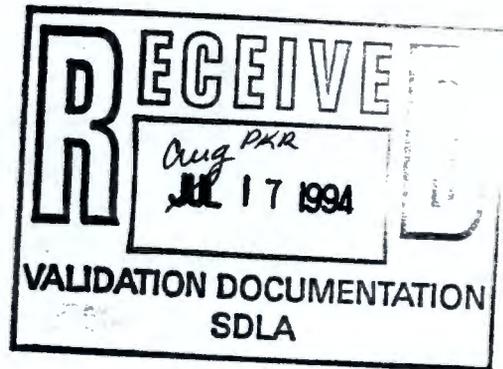
Attached is the data validation report for analytical results for 200BP-5 Groundwater Operable Unit (SDG W0060-ITC-063). The package was received by Los Alamos Technical Associates on July 26, 1994. Validation of this package began on August 15, and was completed on August 16, 1994.

If you have any questions, please let me know.

Sincerely,

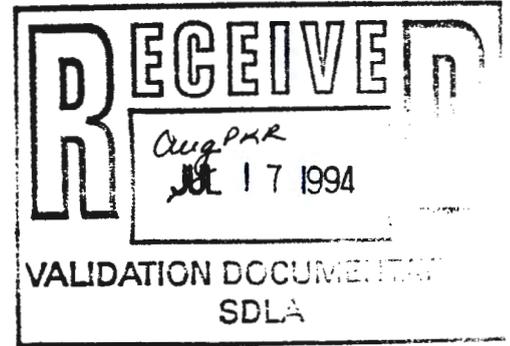
Janet Jones
Senior Environmental Engineer

cc: Chris Haecker, LATA
VW402.54 file





DATA VALIDATION REPORT
for
200-BP-5 Groundwater Operable Unit
SDG W0060-ITC-063
LATA VW402.54



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

August 16, 1994

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200-BP-5 Groundwater Operable Unit
Data Validation Narrative

INTRODUCTION

All samples in Sample Delivery Group (SDG) W0060-ITC-063 were validated at level "D" as defined in the Data Validation Procedures for Chemical Analysis (WHC-SD-EN-SPP-002) and Data Validation Procedures for Radiochemical Analyses (WHC-SD-EN-SPP-001).

The data package was received by Los Alamos Technical Associates (LATA) on July 26, 1994. Validation began on August 15, 1994 and was completed on August 16, 1994.

The radiochemical analyses were performed by International Technology Corporation, ITAS.

ANALYSES REQUESTED

One (1) water sample numbered BOBS63 was collected on May 6, 1994 by WHC and transferred to International Technology Corporation (ITC) for analysis. The following determinations were conducted on the sample in this SDG:

Technetium-99
Gamma Spectrometry

Method ITAS-IT-RS-0001
Method ITAS-RD-3219

DATA QUALITY OBJECTIVES

The data quality objectives for 200-BP-5 Groundwater Operable Unit are specified in the *Quality Assurance Program Plan for the 200-BP-5 Groundwater Operable Unit* (DOE/RL 88-32, Rev. 1). Precision, accuracy, and detection limit requirements for the project have been derived from *USEPA Contract Laboratory Program Statement of Work for Inorganic Analyses* (EPA 1989a).

The primary objective of the data validation effort was to ensure these data quality objectives were met, and that the data are usable and defensible. This was accomplished through a detailed examination of the data package to recreate the analytical process and verify that proper and acceptable analytical techniques had been applied. The data package was checked for correct submission of required deliverables, correct transcription of raw data to the summary forms, and for proper calculation of a number of parameters. Data qualifiers are assigned to any results that have been determined to be deficient. These are discussed below.

Precision. Goals for precision were met.

Accuracy. Goals for accuracy were met.

DATA QUALITY OBJECTIVES (cont.)

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

Detection Limits. Detection limit goals were met for all samples.

Completeness. No results were rejected, the data is 100% complete.

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

MAJOR DEFICIENCIES (REJECTED DATA)

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

MINOR DEFICIENCIES

- * No minor deficiencies were identified during validation which required qualification of data.

COMMENTS

- * There was no evidence that the pH is being checked before the analysis of the samples.
- * There is no VEDD (Validation Electronic Data Deliverable) included with this package due to the fact that no qualifications were made or changed by the validator.

REFERENCES

EPA USEPA Contract Laboratory Program Statement of Work for Inorganic Analyses, EPA 1989a, U.S. Environmental Protection Agency, Washington, D.C.

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

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

WHC 1994, *Quality Assurance Program Plan for the 200-BP-5 Groundwater Operable Unit*, DOE/RL 88-32, Rev. 1, Department of Energy-Hanford, Richland, Washington.

DATA VALIDATION APPLIED QUALIFIERS

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

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

LABORATORY APPLIED QUALIFIERS

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

Organic Data Qualifiers

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

LABORATORY APPLIED QUALIFIERS**Inorganic Qualifiers**

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

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Data Qualification Summary

000008

DATA QUALIFICATION SUMMARY TABLE
200-BP-5 GROUNDWATER OPERABLE UNIT
W0060-ITC-063

Qualifications Made by Validator

Constituent	Qualifier	Sample	Reason
Cobalt-60	none	N/A	N/A
Iron-59	none	N/A	N/A
Europium-152	none	N/A	N/A
Cobalt-58	none	N/A	N/A
Cesium-137DA	none	N/A	N/A
Ruthenium-106D	none	N/A	N/A
Europium-155	none	N/A	N/A
Europium-154	none	N/A	N/A
Technetium-99	none	N/A	N/A

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Data Summary Tables

000010

9613475.1347

RADCHEMISTRY DATA SUMMARY

FILE #:VW402.54		HEIS #:	BOBS63		
		Date:	6-May-94		
		Matrix:	WATER		
Constituent	CAS #	Units	Results	Q	MDA
Cobalt-60	10198-40-0	pCi/L	-8.16	U	6.44
Iron-59	14596-12-4	pCi/L	-6.09	U	25.5
Europium-152	14683-23-9	pCi/L	-16.8	U	36.6
Cobalt-58	13981-38-9	pCi/L	4.89	U	12.3
Cesium-137DA	10045-97-3	pCi/L	0	U	N/A
Ruthenium-106D	13967-48-1	pCi/L	15.1	U	62.6
Europium-155	14391-16-3	pCi/L	-3.02	U	13.5
Europium-154	15585-10-1	pCi/L	-10.7	U	21.8
Technetium-99	14133-76-7	pCi/L	43.6		2.07

entered by: C.S.
date: 8/16/94

Shaded areas indicate changes by the validator
ITC063

checked by: M4
date: 8/16/94

000011

9613475.1348

Sample Results (Form I's)

000012

9613475.1349

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

SAMPLE RESULTS

LAB NAME: ITAS-RICHLAND SDG NO.: W0060
 LAB SAMPLE ID: 40520101 MATRIX: WATER
 WHC ID: B0BS63 DATE RECEIVED 5/10/94
 REPORTING UNITS pCi/L

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	METHOD NUMBER
CO-60	-8.16E+00	5.24E+00	5.30E+00	6.44E+00	N/A	RD3219
FE-59	-6.09E+00	1.44E+01	1.44E+01	2.55E+01	N/A	RD3219
EU-152	-1.68E+01	2.22E+01	2.22E+01	3.66E+01	N/A	RD3219
CO-58	4.89E+00	6.03E+00	6.05E+00	1.23E+01	N/A	RD3219
CS-137DA	0.00E+00	3.94E+00	3.94E+00	N/A	N/A	RD3219
RU-106DA	1.51E+01	3.14E+01	3.15E+01	6.26E+01	N/A	RD3219
EU-155	-3.02E+00	8.53E+00	8.53E+00	1.35E+01	N/A	RD3219
EU-154	-1.07E+01	1.41E+01	1.41E+01	2.18E+01	N/A	RD3219
TC-99	4.36E+01	1.49E+00	7.87E+00	2.07E+00	0.951	ITAS-IT-RS- 0001

MW
4-15-94

0006

000013 682A-6-93

9613475.1350

Checklists

000014

LATA RADIOCHEMISTRY DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 200-BP-5			DATA PACKAGE: W0060-ITC-063		
VALIDATOR: M Webb		LAB: ITC		DATE: 8-15-94	
CASE: SAF 94-130			SDG:		
QAPP REFERENCE:			SAP REFERENCE:		
If there is no QAPP or SAP reference, contact the WHC Technical Representative. If the document(s) are not provided, default to the Method acceptance criteria.					
ANALYSES PERFORMED					
<input type="checkbox"/> Gross Alpha <input type="checkbox"/> Gross Beta	<input type="checkbox"/> Strontium-89 <input type="checkbox"/> Strontium-90	<input checked="" type="checkbox"/> Technetium-99	<input type="checkbox"/> Isotopic Anal. Alpha Spec.	<input checked="" type="checkbox"/> Gamma Spectroscopy	<input type="checkbox"/> Iodine-129
<input type="checkbox"/> Total Uranium (KPA)	<input type="checkbox"/> Radium-226 <input type="checkbox"/> Radium-228	<input type="checkbox"/> (LSC) Liquid Scintillation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SAMPLES/MATRIX <u>BUBS63 (Water)</u>					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

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

2. CHAIN-OF-CUSTODY/HOLDING TIMES

Are sample holding times acceptable? **Yes** No N/A
 Are samples preserved correctly? *according to COC* **Yes** No N/A
 Was the pH of the sample checked prior to analysis? Yes **No** N/A
 Comments: _____

No evidence of pH being checked before samples were analyzed.

8/16/94 MWF
Page 1 of 9

LATA RADIOCHEMISTRY DATA VALIDATION CHECKLIST

3. INITIAL CALIBRATION

Instruments/detectors calibrated within one year of sample analysis? Yes No N/A
 Initial calibration acceptable? Yes No N/A
 Standards NIST traceable? Yes No N/A
 Standards Expired? Yes No N/A

Comments: *Cont. Calibration accepted. No fact that the detector has not re-calibrated w/1 one year has no effect on the date. 9-7-94*

4. CONTINUING CALIBRATION

Background checked at proper frequency? Yes No N/A
 Background check acceptable? Yes No N/A
 Efficiency checked at proper frequency? Yes No N/A
 Efficiency check acceptable? Yes No N/A
 Calibration check standards NIST traceable? Yes No N/A
 Calibration check standards expired? Yes No N/A

Comments: _____

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

Method blank analyzed? Yes No N/A
 Method blank results acceptable? Yes No N/A
 Analytes detected in method blank? Yes No N/A
 Transcription/Calculation Errors? Yes No N/A

Comments: _____

LATA RADIOCHEMISTRY DATA VALIDATION CHECKLIST

8. CHEMICAL RECOVERY (see ACCURACY DATA SUMMARY form)

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

★

Alpha Spec Tracer Recovery

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

where:

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

Comments: _____

9. DUPLICATES (see PRECISION DATA SUMMARY form)

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

★

Relative Percent Difference

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

where:

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

Comments: _____

8/16/94
 Page 4 of 9

LATA RADIOCHEMISTRY DATA VALIDATION CHECKLIST

10. FIELD QC SAMPLES

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

Comments: _____

11. DETECTION LIMITS (LEVELS D & E)

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

*

Minimum Detectable Activity (MDA)

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

where:

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

Comments: MDA of EU152 not met for dup gamma scan

LATA RADIOCHEMISTRY DATA VALIDATION CHECKLIST

Results Calculation EquationsGross α/β and Tritium

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

where:

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

Strontium (total)

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

where:

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

Strontium-90 (corrected for Sr-89)

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

where:

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

LATA RADIOCHEMISTRY DATA VALIDATION CHECKLIST

Results Calculation Equations, continuedTechnetium-99

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

where:

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

Alpha Spec Isotopes

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

where:

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

Gamma Spec Isotopes

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

where:

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

LATA RADIOCHEMISTRY DATA VALIDATION CHECKLIST

Results Calculation Equations, continuedTotal Uranium by Laser Fluorometry

$$\frac{(WF - I)(R)(D)}{WU - WF}$$

where:

WF = sample reading with Fluran

I = initial sample reading

R = concentration of uranium standard
after dilution with sample ($\mu\text{g/L}$)

D = dilution factor

WU = sample reading with uranium standard

Radium-226 by Radon Emanation

$$D = \frac{C}{(2.22)(E)(V)} \times \frac{1}{1 - e^{-\lambda t_1}} \times \frac{1}{e^{-\lambda t_2}} \times \frac{t_3}{1 - e^{-\lambda t_3}}$$

where:

C = net count rate, cpm

E = calibration constant of the de-emanation system
and the scintillation cell in counts per
minutes/disintegrations per minute of radon-222

V = sample aliquot in liters

*t*₁ = the elapsed time in days between the first
and second de-emanations, and λ is the
decay constant for radon-222 (0.181 d^{-1})

*t*₂ = the time interval in hours between the second
de-emanation and counting, and λ is the
decay constant of radon-222 (0.00755 hr^{-1})

*t*₃ = the counting time in minutes, and λ is the
decay constant of radon-222 ($1.26 \times 10^{-4} \text{ min}^{-1}$)

2.22 = conversion factor, dpm/pCi

9613475.1359

Validator
MC Webb

Date
8-16-94

SDG
W0060-ITC-063

DATA VALIDATION SUMMARY

MAJOR DEFICIENCIES:

1. None

MINOR DEFICIENCIES:

1. None

COMMENTS:

1. There is no evidence that the pH is being checked before the analysis of the samples.

000023

MINIMUM DETECTABLE ACTIVITY (MDA)

Analysis: Radiochemistry
 SDG: WOO60-ITC-063

Date: 16-Aug-94
 Validator: MC Webb

Constituent	Background counts per minute (cpm) or Standard Deviation of background (cpm)	Counting time for associated sample	Detector Efficiency	Ingrowth correction factor	Carrier recovery factor	Decay factor	Chemical yield factor	Sample volume (L or g)	MDA
	B.2	T.2	E.2	I.2	R.2	D.2	Y.2	V.2	
<u>Tc99 BOBS63</u>	<u>24.250</u>	<u>125.000</u>	<u>1.054</u>	<u>1.000</u>	<u>0.951</u>	<u>1.000</u>	<u>1.000</u>	<u>0.500</u>	2.067
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Laboratory Case Narratives

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INTERNATIONAL
TECHNOLOGY
CORPORATION

CERTIFICATE OF ANALYSIS

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

June 30, 1994

Attention: J.A.Lerch

SAF Number : 94-130
Date SDG Closed : May 17, 1994
Number of Samples : One (1)
Sample Type : Water
SDG Number : W0060
Data Deliverable : Stand Alone

I. Introduction

On May 17, 1994, one water sample was received by ITAS-Richland for radiochemical analysis. Upon receipt, the sample was assigned the following laboratory ID number to correspond with the WHC specific ID:

<u>ITAS-Richland ID</u>	<u>WHC ID</u>	<u>Matrix</u>	<u>Date of Receipt</u>
405201-01A	B0BS63	Water	5/10/94

II. Analytical Results/Methodology

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

Regional Office

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

IT Corporation is a wholly owned subsidiary of International Technology Corporation

000030

Westinghouse Hanford Company
June 30, 1994
Page 3

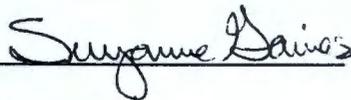
Liquid Scintillation Counting

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

The matrix spike, LCS, batch blank, sample and sample duplicate (duplicate of sample BOBS63) results are within contractual requirements.

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

Reviewed and approved:



Suzanne Gaines
Project Manager

8/16/94/mj
~~0005~~

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Chain-of-Custody Information

9613475.1370

Surveyed: Yes No ? Less than 200 counts/minute: Yes No ? By (initials) AMS

Pacific Northwest Laboratories Battelle Boulevard Richland, Washington 99352	CHAIN OF CUSTODY	Test User ID: BATTM16729
		C-of-C: B013D1 pg. 1 of 1 (505) 372-0065

Company Contact: BE OPITZ Telephone: _____
 Samples Collected by: HANKEL / HARRISON Date: 5-6-94 Time: 830
 ID/Sample No.: B0BS63
 Ice Chest No.: ER-11 Field Logbook Page No.: 4/865
 Remarks: SAF 94-130

Possible Sample Hazard Identification: _____ Contract No.: _____
 Destination: DELIVER TO SIGMA 5 (WHC Contract) Carrier/Waybill No.: _____
 Ground-Water Soil _____ Other _____

Shipping container internal temperature when sealed in it _____ Shipping container internal temperature when opened in laboratory _____

Sample Identification

B0BS63 -(8) 1000mlP-GAMM
B0BS63 -(2) 1000mlP-TC99 > 40520101

SDA
WOODCO

Chain of Possession

<u>Hankel AM</u> Relinquished by:	<u>JN-AM Pyl</u> Received by:	<u>1220 5/6/94</u> Date/Time:
<u>OMueller PNL</u> Relinquished by:	<u>L Sweeney WHC</u> Received by:	<u>5-10-94 - 0700</u> Date/Time:
<u>L Sweeney WHC</u> Relinquished by:	<u>R. Boyd IT</u> Received by:	<u>5-10-94 1145</u> Date/Time:
_____ Relinquished by:	_____ Received by:	_____ Date/Time:
_____ Disposed by:	_____ Disposal Method:	_____ Date/Time:

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SAMPLE ANALYSIS ORDER
BATTELLE, PNL

ITAS

CONTRACT _____

SAMPLE RECEIVER INITIAL / DATE:
_____ / DATE _____

CHAIN OF CUSTODY #: B013D1

SAMPLE ID(S): BOBS63

SA F94-130

SAMPLE SCHEDULE DATE: 04/01/94

USER ID BATTM16729

WATER X SOIL ___ OTHER ___

INTERNAL TEMPERATURE OF SHIPPING CONTAINER
UPON OPENING IN LABORATORY _____

BOTT#	BOTT TYPE	BOTT SIZE	# of BOTT	PRESERVAT	NOTES	# of SAMP	ANA_1	ANA_2	ANA_3	ANA_4	ANA_5	ANA_6	Filtered
123	P	1000	1	HNO3		8 +	GAMM						
313	P	1000	1	HNO3		2 +	GAMMA SCAN TC99 TC-99	98	4/19/94				

Handwritten signature
0019
000035

SAMPLE STATUS REPORT FOR E 6028. E-BLANK 2-E33-30 TIME: 5/ 6/94 14:56
DISPATCHED: 3/30/94 11:48 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 5/ 6/94 12:41

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

END OF REPORT

BOBR73
BOBR74
BOBR75
BOBR76

has
5/10/94

BOBS63
has
5/10/94

8/16/94
0020

Contractor WHC	OFF-SITE PROPERTY CONTROL	CONTROL NUMBER (To be obtained from PROPERTY MANAGEMENT) W94-6-6518-37
--------------------------	--------------------------------------	---

PART I - TO BE COMPLETED BY ORIGINATOR

Department ER Eng Support	Section Field & Analytical Supp	Unit ER Field Sampling
----------------------------------	--	-------------------------------

The following items are to be shipped from Contractor Vendor

Routing Contractor Vendor

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

Quantity	Description (Include Serial and any Government Tag Numbers)	Original Cost
1 74 lbs.	Sample #: PUBSL3, PUPSL4 Cooler ID: E2-11 Polycooler with groundwater samples packed in wet ice and vermiculite	N/A
1 1 lbs.	Sample #: NA Cooler ID: NA Polycooler with groundwater samples packed in wet ice and vermiculite	N/A

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

Necessity for the Off-Site Use of this Property

Sampling supports RI/FS work in the **DOOAKER**

Bill of lading # **NGIVE**

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 157792	Date 5/10/94
Location of Property (Area & Bldg.) DOO-BP-5	Contact P. H. Butcher	Phone (509) 376-4388
Date Ready for Shipment 5-10-94	Cost Code to be Charged 8B410 PLS3A	Approximate Date This Property will be Returned NA
Originated By P.H. Butcher	Date 5/10/94	Authorized By <i>[Signature]</i>
Signature and Name of Property Control <i>[Signature]</i>	Custodian Date 5/10/94	Property Management Approval <i>[Signature]</i>

PART II - TO BE COMPLETED BY SHIPPING

Signature of Recipient R. Boyd LT	Return Order No.	Date Issued	Purchase Order No.	Date Issued
Date 5-10-94 1145				

DISTRIBUTION

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

Regional Office
1800 George Washington Way
Richland, Washington 99352

SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

Date/Time Received 5-10-94 1145 Client Name WHC

Project/Client # SAF 94-130 Batch or Case # _____

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

- 1. Condition of shipping container? OK
- 2. Custody Seals on cooler intact? Yes No
- 3. Custody Seals dated and signed? Yes No
- 4. Chain of Custody record is taped on inside of cooler lid? Yes No
- 5. Vermiculite/packing material is: Wet Dry
- 6. Each sample is in a plastic bag? Yes No
- 7. Number of sample containers in cooler: 20
- 8. Samples have: _____ tape _____ hazard labels
 custody seals appropriate sample labels

- 9. Samples are: in good condition _____ leaking
_____ broken _____ have air bubbles
_____ other

10. Coolant present? Yes No
Sample temperature 20

11. The following paperwork should be accounted for (N/A if not applicable):
Chain of Custody #(s) 601301, 601302
Request for analysis #(s) N/A
Airbill # N/A Carrier N/A

- 12. Have any anomalies been identified above? Yes No
- 13. Memos have been initiated for all anomalies identified above? Yes

Printed Name/Signature R. Boyd R. Boyd Date/Time 5-10-94 1145

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

8/16/94
~~0022~~
000038

SAMPLE RECEIPT VARIANCE REPORT
ITAS-RICHLAND LABORATORY

WORK ORDER NUMBER: _____ DATE INITIATED: 5-10-94

INITIATED BY: Heidelberg

DATE/TIME OF SAMPLE (AND/OR RFA & COC) RECEIPT: _____

CLIENT SAMPLE NUMBER	RFA/COC NUMBERS	ANALYSIS REQUESTED
<u>BOBS64</u>	<u>B013D2</u>	<u>γ, TC</u>
<u>BOBS63</u>	<u>B013D1</u>	<u>γ, TC</u>

Samples were received with the following deficiencies:

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

NOTES: COC's came with Inst user ID of M16729 and SAF 94-130. Will log as WHC 94-130.

SUPERVISOR REVIEW: _____

PROJECT MANAGER REVIEW: _____

TELEPHONED TO: Joan Kessner ON 5/10 BY Van Pettey

TELEFAXED TO: _____ ON _____ BY _____

SIGNED ORIGINAL MUST BE RETAINED IN WORK ORDER FILE

Handwritten signatures and stamps
0023
000339

Allyson
0024

07C000

*all are category 1.
JKR 11 May 94*

Customer Code	Received Date	Time	Screening Prep Date	Time	Count Date	Mnts. Cntd	BACKGROUND		
BAT			51094		510	10	Alpha	Beta	Mnts
							15	214	240

WHC

Customer ID	pH <2	RESIDUE Wght (mGrms)	Vol. Anal. mG mL	Sample Size Gm L	SMPL CNT DATA			Net Sample		DPM / Aliquot		uCi per Sample		2 Sigma Error		pCi/(Gm or L)		Category 1 Yes/No	Aliquot to Cat 1 Gm or Ltr	
					Hldr Num.	Total Alpha	Counts Beta	Counts/Minute Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta		Alpha	Beta
BOBS63		9.4	5	1.0	8	5	9	0.44	0.01	2.0E+00	-3E-01	1.8E-04	-3E-05	1.9E-07	-3E-08	1.8E+02	-3E+01	Yes	5.6E+01	-4E+03
BOBS64		4.6	5	1.0	7	2	35	0.14	2.61	4.9E-01	5.5E+00	4.4E-05	5.0E-04	9.2E-08	2.1E-07	4.4E+01	5.0E+02	Yes	2.3E+02	2.0E+02
BOBRQ5		4.1	5	1.0	8	0	13	-0.08	0.41	-3E-01	9.2E-01	-2E-05	8.3E-05	-6E-08	2.7E-07	-2E+01	8.3E+01	Yes	-4E+02	1.2E+03
BOBRN7		8.1	5	1.0	9	0	14	-0.06	0.51	-3E-01	1.1E+00	-3E-05	1.0E-04	-7E-08	3.5E-07	-3E+01	1.0E+02	Yes	-4E+02	9.7E+02
BOBRP9		7.0	5	1.0	10	1	8	0.04	-0.09	1.7E-01	-2E-01	1.5E-05	-2E-05	4.9E-08	-5E-08	1.5E+01	-2E+01	Yes	6.7E+02	-5E+03
BOBWB1		7.1	5	1.0	11	0	10	-0.06	0.11	-3E-01	2.8E-01	-2E-05	2.5E-05	-6E-08	4.3E-08	-2E+01	2.5E+01	Yes	-4E+02	4.0E+03
BOBW98		7.5	5	0.1	12	1	21	0.04	1.21	1.2E-01	2.6E+00	1.1E-06	2.3E-05	4.9E-09	2.8E-07	1.1E+01	2.3E+02	Yes	9.0E+02	4.3E+02
BOBW59		1.4	5	0.1	13	1	15	0.04	0.61	1.3E-01	1.3E+00	1.2E-06	1.1E-05	4.5E-09	9.4E-08	1.2E+01	1.1E+02	Yes	6.6E+02	8.7E+02
BOBW60		2.6	5	0.1	14	1	16	0.04	0.71	1.3E-01	1.5E+00	1.2E-06	1.3E-05	4.6E-09	1.2E-07	1.2E+01	1.3E+02	Yes	8.6E+02	7.4E+02
BOBWH3		6.2	5	4.0	15	2	17	0.14	0.81	5.6E-01	1.6E+00	2.0E-04	5.9E-04	3.8E-07	1.3E-06	5.1E+01	1.5E+02	Yes	2.0E+02	6.7E+02
BOBWJ0		1.8	5	4.0	16	1	16	0.04	0.71	1.3E-01	1.5E+00	4.5E-05	5.4E-04	1.8E-07	4.9E-06	1.1E+01	1.3E+02	Yes	8.8E+02	7.5E+02
BOBWG8		4.4	5	4.0	17	0	14	-0.08	0.51	-3E-01	1.1E+00	-1E-04	4.1E-04	1.2E-07	1.5E-06	-2E+01	1.0E+02	Yes	-4E+02	9.8E+02
BOBWG6		1.2	5	4.0	18	0	9	-0.06	0.01	-2E-01	5.9E-02	-9E-05	2.1E-05	-2E-07	1.5E-08	-2E+01	5.3E+00	Yes	-5E+02	1.9E+04
BOBWH4		2.7	5	1.0	19	1	9	0.04	0.01	1.5E-01	-7E-03	1.4E-05	-7E-07	4.8E-08	-7E-10	1.4E+01	-7E-01	Yes	7.3E+02	-2E+05
BOBWH6		3.1	5	1.0	20	2	10	0.14	0.11	5.6E-01	1.4E-01	5.0E-05	1.3E-05	9.0E-08	1.1E-08	5.0E+01	1.3E+01	Yes	2.0E+02	8.0E+03
TOTAL	uCi							-0.06	-0.89	-2E-01	-2E+00	2.9E-04	2.3E-03	ERR	ERR	ERR	ERR	Yes	ERR	ERR

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*** GAMMA ***

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

11-May-1994
Page 1

CUSTOMER: WHC

SAF

SAMPLE DELIVERY GROUP

W0060

MATRIX : WATER

94-130

BATCH NUMBER

5-201

ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
L052011B	✓			
L052011S	✓			
1) 40520101	✓	WHC	BOBS63	
F0520101	✓			

ACTIONS (Initial & Date)

1) INITIATED

JH 5/12/94

5) COUNTING/MEASUREMENT LAB

OP 6/13/94

2) PREP LAB RECEIVED

JA 6-10-94

6) DATA REVIEWED AND ANALYTICAL PREP STORED

ml 6/17/94

3) SAMPLE REMAINDER STORED

JA 6-13-94

4) SEPARATION LAB RECEIVED

N/A

8/16/94
0025

000041



INTERNATIONAL
TECHNOLOGY
CORPORATION

DUE DATE _____

REANALYSIS / RECOUNT
CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

ANALYSIS Gamma

NAME/DATE nd ^{with} 1-6/15/94

CUSTOMER WHC

SAMPLE DELIVERY GROUP W0060

MATRIX Water

BATCH NUMBER 5-201

ITAS ID	CUSTOMER ID	COMMENTS
1) L0520115	N/A	Reagent spike
2)		
3)		
4)		
5)		
6)		
7)		
8)		
9)		
10)		

REANALYSIS

REFERENCED QC

ITAS ID - BLANK _____

ITAS ID - SPIKE _____

CLIENT CODE _____

ACTIONS (Initial & Date)

PREP LAB RECEIVED _____

SAMPLE REMAINDER

RETURNED TO SCG (CHECK ONE)

NO SAMPLE REMAINING

SEPARATION LAB _____

COUNTING/MEASUREMENT _____

DATA REVIEWED _____

ANALYTICAL PREP STORED _____

RECOUNT

ACTIONS (Initial & Date)

COUNTING/MEASUREMENT AL 6-15-94

DATA REVIEWED _____

ANALYTICAL PREP STORED _____

ADDITIONAL COMMENTS:

9613475.1379

*** TC-99 ***

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

11-May-1994

Page 1

CUSTOMER: WHC

SAF

SAMPLE DELIVERY GROUP

W0060

MATRIX : WATER

94-130

BATCH NUMBER

5-201

ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
=====				
EQNI 232 - 300.12 ± 3.7085 DPM				
L052011N	L052011B	L052011M	F0520101	
L052012U	W0520101 - EQNI 231 - 300.58 ± 3.7141 DPM			
1)	40520101	WHC	BOBS63	
=====				

ACTIONS (Initial & Date)

1) INITIATED

JH 5/12/94

5) COUNTING/MEASUREMENT LAB

17 Jun 94 OA

2) PREP LAB RECEIVED

6/14/94 MM

6) DATA REVIEWED AND ANALYTICAL PREP STORED

GR 6/22/94

3) SAMPLE REMAINDER STORED

NA

4) SEPARATION LAB RECEIVED

6/14/94 MM

JH 0027

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END OF PACKAGE

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