0053016

Date: 17 August 1999
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100-BC Areas - Full Protocol - Waste Site 116-B-6A
Subject: Inorganics - Data Package No. H0436-RLN (SDG No. H0436)

INTRODUCTION

This memo presents the results of data validation on Data Package No. H0436-RLN prepared by RECRA LabNet (RLN). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B0VFM7	06/09/99	Soil	C	See note 1
B0VLC4	06/09/99	Soil	C	See note 1
B0VLC5	06/09/99	Soil	C	See note 1
B0VLC6	06/09/99	Soil	C	See note 1
B0VLC7	06/09/99	Soil	C	See note 1
B0VLC8	06/09/99	Soil	C	See note 1

1 - ICP metals by 6010A (lead and total chromium); hexavalent chromium by 7196; mercury by 7471

Data validation was conducted in accordance with the BHI validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL, May 1998). Appendices 1 through 5 provide the following information as indicated below:

RECEIVED
APR 25 2000
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Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

- **Holding Times**

Analytical holding times for metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within six (6)

months for lead & total chromium; 30 days for chrommium VI; and 28 days for mercury.

All holding times were acceptable.

- **Blanks**

Preparation Blanks

At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "U". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

In the case of negative blank results, if the absolute value exceeds the Contract Required Detection Limit (CRDL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the IDL and less than or equal to the CRDL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

All preparation blank results were acceptable although the target detection limits (TDLs) for lead and chromium VI were exceeded.

Equipment Blank

One equipment blank (B0VLC5) was submitted for analysis. Chromium (total) was detected in the equipment blank. Under the BHI statement of work, no qualification is required.

- **Accuracy**

Matrix Spike

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike recoveries must fall within the range of 70% to 130%. Samples with a spike recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a spike recovery of

30% to 69% and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a spike recovery greater than 130% and a sample result less than the IDL, no qualification is required.

All matrix spike recovery results were acceptable.

- **Precision**

Laboratory Duplicate Samples

Laboratory duplicate sample analyses are used to measure laboratory precision and sample homogeneity. Results must be within RPD limits of plus or minus 30% for solid samples. If RPD values are out of specification and the sample concentration is greater than five times the CRDL, all associated sample results are qualified as estimated and flagged "J". If RPD values are plus or minus two times the CRDL and the sample concentration is less than five times the CRDL, all associated sample results are qualified as estimated and flagged "J/UJ". The performance criteria for aqueous laboratory duplicates are an RPD less than 30% for positive sample results greater than five times the CRDL or plus or minus the CRDL for positive sample results less than five times the CRDL. Sample results outside the criteria are qualified as estimates and flagged "J/UJ".

All laboratory duplicate results were acceptable.

Field Duplicates

One sample duplicate pair (B0VFM7/B0VLC4) was submitted for analysis. The samples were compared using the same criteria as for a laboratory duplicate. All field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the 100 Area Remedial Action Sampling and Analysis Plan TDLs or the CRDL if no TDL was specified, to ensure that laboratory detection levels meet the required criteria. The following had reported detection limits above their TDL: Chromium VI in all samples and lead in samples B0VFM7 and B0VLC5. Under the BHI statement of work, no qualification is required. All other reported laboratory detection levels met the analyte specific TDL or CRDL.

- **Completeness**

Data package No. H0436-RLN (SDG No. H0436) was submitted for validation and verified for completeness. The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

The following had reported detection limits above their TDL: Chromium VI in all samples and lead in samples B0VFM5 and B0VLC4. Under the BHI statement of work, no qualification is required.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-96-22, Rev. 1, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, May 1998.

Interoffice Memorandum 056910, Joan Kessner to Distribution, *Hexavalent Chromium Analytical Holding Time*, 4 March 1998.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with BHI validation SOW 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 the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a QC deficiency identified during the data validation, 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 is unusable due to an identified QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (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).

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H0436	REVIEWER: TLI	DATE: 8/17/99	PAGE 1 OF 1
COMMENTS: No qualifiers assigned			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

INORGANIC ANALYSIS, SOIL MATRIX, MG/KG

Project: BECHTEL-HANFORD																					
Laboratory: RECRA LabNet																					
Case	SDG: H0436																				
Sample Number		B0VFM7		B0VLC4		B0VLC5		B0VLC6		B0VLC7		B0VLC8									
Location		116-B-6A		116-B-6A		116-B-6A		116-B-6A		116-B-6A		116-B-6A									
Remarks		A1		Duplicate		Equip. Blank		A2		A3		A4									
Sample Date		6/9/99		6/9/99		6/9/99		6/9/99		6/9/99		6/9/99									
Inorganics	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chromium (total)	0.5	7.8		7.6		0.38		9.2		9.2		10.7									
Mercury	0.05	0.02	U	0.02	U	0.02	U	0.11		0.02	U	0.02									
Lead	2	4.0	U	5.2		3.8	U	11.1		4.8		7.8									
Chromium VI	0.1	0.41	U	0.42	U	0.40	U	0.41	U	0.41	U	0.41	U								

000010

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 06/16/99

CLIENT: TNU-HANFORD B99-002 RECRA LOT #: 9906L211

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B0VFM7	% Solids	97.0	%	0.01	1.0
		Chromium VI	0.41 u	MG/KG	0.41	1.0
-002	B0VLC4	% Solids	95.8	%	0.01	1.0
		Chromium VI	0.42 u	MG/KG	0.42	1.0
-003	B0VLC5	% Solids	99.9	%	0.01	1.0
		Chromium VI	0.40 u	MG/KG	0.40	1.0
-004	B0VLC6	% Solids	97.8	%	0.01	1.0
		Chromium VI	0.41 u	MG/KG	0.41	1.0
-005	B0VLC7	% Solids	98.5	%	0.01	1.0
		Chromium VI	0.41 u	MG/KG	0.41	1.0
-006	B0VLC8	% Solids	98.0	%	0.01	1.0
		Chromium VI	0.41 u	MG/KG	0.41	1.0

RW 8/4/99

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 06/25/99

LIENT: TMU-HANFORD B99-002 RECRA LOT #: 9906L211

ORK ORDER: 10985-001-001-9999-00

AMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
001	B0VFM7	Chromium, Total	7.8	MG/KG	0.34	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	4.0 u	MG/KG	4.0	1.0
-002	B0VLC4	Chromium, Total	7.6	MG/KG	0.30	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	5.2	MG/KG	3.5	1.0
-003	B0VLC5	Chromium, Total	0.38	MG/KG	0.33	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	3.8 u	MG/KG	3.8	1.0
-004	B0VLC6	Chromium, Total	9.2	MG/KG	0.36	1.0
		Mercury, Total	0.11	MG/KG	0.02	1.0
		Lead, Total	11.1	MG/KG	4.2	1.0
-005	B0VLC7	Chromium, Total	9.2	MG/KG	0.33	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	4.8	MG/KG	3.8	1.0
-006	B0VLC8	Chromium, Total	10.7	MG/KG	0.34	1.0
		Mercury, Total	0.02	MG/KG	0.02	1.0
		Lead, Total	7.8	MG/KG	4.0	1.0

PK 8/4/99

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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

RECRA ENVIRONMENTAL INC.

Chemical and Environmental Measurement Information

JUL 1999
RECEIVED
Data
Log In

Recra LabNet Philadelphia
Analytical Report

Client : TNU-HANFORD B99-002
RFW# : 9906L211
SDG/SAF# : H0436/B99-002

W.O.# : 10985-001-001-9999-00
Date Received: 06-11-99

METALS CASE NARRATIVE

1. This narrative covers the analyses of 6 soil samples.

2. Samples were prepared and analyzed in accordance with methods checked on the attached glossary.

3. All analyses were performed within the required holding times.

4. The cooler temperature has been recorded on the Chain of Custody.

5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits (80-120% for Mercury).

6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).

7. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL) or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.

8. All ICP Interference Check Standards were within control limits.

9. All laboratory control samples (LCS) were within the laboratory control limits. Refer to the Inorganics Laboratory Control Standards Report.

10. All matrix spike (MS) recoveries were within the 75-125% control limits. Refer to the Inorganics Accuracy Report.

11. The duplicate analysis for 1 analyte was outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 14 pages.

208 Welsh Pool Road • Lionville, PA 19341-1333 • (610) 280-3000 • Fax (610) 280-3041

12. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.

Pat E

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

6-29-99
Date

jjw/m06-211

RECRA LabNet
a division of Recra Environmental, Inc.
Virtual Laboratories Everywhere

JUL 1999
RECEIVED
Data
Log In

Recra LabNet Philadelphia
Analytical Report

Client : TNU-HANFORD B99-002
RFW# : 9906L211
SDG# : H0436
SAF# : B99-002

W.O. # : 10985-001-001-9999-00
Date Received: 06-11-99

INORGANIC CASE NARRATIVE

1. This narrative covers the analyses of 6 soil samples.
2. The samples were prepared and analyzed in accordance with the methods checked on the attached glossary.
3. Sample holding times as required by the method and/or contract were met.
4. The cooler temperature was recorded on the chain-of-custody.
5. The method blank For Chromium VI was within method criteria.
6. The Laboratory Control Samples (LCS) for Chromium VI were within the laboratory control limits.
7. The matrix spike recoveries for Chromium VI were within the 75-125% control limits.
8. The replicate analyses were within the 20% Relative Percent Difference (RPD) control limit.
9. Results for solid samples are reported on a dry weight basis.

Pat E

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

6-29-99
Date

njp\i06-211

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 12 pages.

208 Welsh Pool Road • Lionville, PA 19341-1333 • (610) 280-3000 • Fax (610) 280-3041

Bechtel Hanford Inc.

Collector Fahlberg/Kerkow	Company Contact R Coffman	Telephone No. 373-6425	Project Coordinator TRENT, SJ	Price Code	Date Turnaround 15 Days
Project Designation 100 BC Areas - Full Protocol	Sampling Location 100 B/C 116-B-6A		SAF No. B99-002		
Ice Chest No. SML 136	Field Logbook No. EL 1327-3		Method of Shipment FED EX		
Shipped To ~~TMA~~/RECRA Ref 6.9.99	Offsite Property No. A990159		Bill of Lading/Air Bill No. 4235795Z6790		
			COA R16B6A 2F00		

POSSIBLE SAMPLE HAZARDS/REMARKS											
	Preservation	None	None	Cool 4C	None	None					
	Type of Container	P	aG	aG	aG	aG					
	No. of Container(s)	1	1	1	1	1					
Special Handling and/or Storage	Volume	20mL	60mL	125mL	250mL	1000mL					
SAMPLE ANALYSIS		Activity Scan	See item (1) in Special Instructions.	Chromium Hex - 7196	ICP Metals - 6010A (SW-846) (Chromium, Lead); Mercury - 7471 - (CV)	See item (2) in Special Instructions.					
Sample No.	Matrix * / Sample Date / Sample Time										
B0VLC7	Soil / 6.9.99 / 0930			X	X					tie to B0VFW	
B0VLC8	Soil / 6.9.99 / 0950			X	X					B0VFW	

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: R Fahlberg / R Fahlberg 6.9.99	Date/Time 1515	Received By: Ref 1-C	Date/Time 6.9.99 1515
Relinquished By: REF 1C 61099 1100	Date/Time	Received By: SJ GALE	Date/Time 61099 1100
Relinquished By: S.J GALE / SJ GALE	Date/Time 61099 1100	Received By: FED EX	Date/Time
Relinquished By: Fed Ex	Date/Time 6/11/99 0630	Received By:	Date/Time 6/11/99 0630

SPECIAL INSTRUCTIONS

(1) Americium-241; Isotopic Plutonium; Isotopic Uranium; Strontium-89,90 -- Total Sr; Nickel-63
(2) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Uranium-238)

COLLECTOR UNAVAILABLE TO SIGN COC.

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

000027

Collector Fahlberg/Kerkow	Company Contact R Coffman	Telephone No. 373-6425	Project Coordinator TRENT, SJ
Project Designation 100 BC Areas - Full Protocol	Sampling Location 100 B/C 116-B-6A		SAF No. B99-002
Ice Chest No. SML 136	Field Logbook No. EL 1327-3		Method of Shipment FED EX
Shipped To ~~TMA~~/RECRA R.F. 6.9.99	Offsite Property No. A990159		Bill of Lading/Air Bill No. 4235 7952 6790 -4.5
			COA R16B6A 2F00

Price Code

Data Turnaround: 15 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

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Special Handling and/or Storage

Preservation	None	None	Cool 4C	None	None						
Type of Container	P	sG	sG	sG	sG						
No. of Container(s)	1	1	1	1	1						
Volume	20mL	60mL	125mL	250mL	1000mL						
SAMPLE ANALYSIS	Activity Scan	See Item (1) in Special Instructions.	Chromium Hex - 7196	ICP Metals - 6010A (SW-846) (Chromium, Lead); Mercury - 7471 - (CV)	See Item (2) in Special Instructions.						

Sample No.	Matrix *	Sample Date	Sample Time										
B0VFM7	Soil	6.9.99	0830			X	X					trip BOVFT	
B0VLC4	Soil	6.9.99	0830			X	X						BOVFT7
B0VLC5	Soil	6.9.99	0720			X	X						E.B.
B0VLC6	Soil	6.9.99	0915	-		X	X						BOVFV6

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: R.Fahlberg / R.Fahlberg 6.9.99	Date/Time 1515	Received By: Ref. 1-C 6.9.99	Date/Time 1515
Relinquished By: REF 1-C 61099	Date/Time 1100	Received By: SJGALE 61099	Date/Time 1100
Relinquished By: SJGALE 61099	Date/Time 1100	Received By: FED EX	Date/Time
Relinquished By: Fed Ex 6/11/99	Date/Time 0930	Received By: [illegible] 6/11/99	Date/Time 0930

SPECIAL INSTRUCTIONS

(1) Americium-241; Isotopic Plutonium; Isotopic Uranium; Strontium-89,90 – Total Sr; Nickel-63
(2) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Uranium-238)

COLLECTOR UNAVAILABLE TO SIGN COC.

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

000048

Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 116-B-6A			DATA PACKAGE: H0436		
VALIDATOR: TLI		LAB: TNU		DATE: 7/26/95	
CASE:			SDG: H0436		
ANALYSES PERFORMED					
☐ CLP/ICP	☐ CLP/GFAA	☐ CLP/Hg	☐ CLP/Cyanide	☐	☐
☒ SW-846/ICP	☐ SW-846/GFAA	☒ SW-846/Hg	☐ SW-846 Cyanide	☒ CrVI	☐
SAMPLES/MATRIX	B0UFM7	B0ULC4	B0ULC5	B0ULC6	
	B0ULC7	B0ULC8			

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? . . . . . 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: Lead - CRQL - Iron + OC but U
EB - total chromium

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:

7. FURNACE AA QUALITY CONTROL

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

Comments:

8. REPORTED RESULTS AND DETECTION LIMITS

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

Comments: CrVI - all over
lead M7, cs

Recra LabNet - Lionville

INORGANICS PRECISION REPORT 06/16/99

CLIENT: TNU-HANFORD B99-002 RECRA LOT #: 9906L211

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-006REP	B0VLC8	% Solids	98.0	97.6	0.42	1.0
		Chromium VI	0.41u	0.41u	NC	1.0

Recra LabNet - Lionville

INORGANICS ACCURACY REPORT 06/16/99

IENT: TNU-HANFORD B99-002 RECRA LOT #: 9906L211

RK ORDER: 10985-001-001-9999-00

MPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
06	B0VLC8	Soluble Chromium VI	4.5	0.41u	4.1	112.8	1.0
		Insoluble Chromium VI	1020	0.41u	1190	85.9	100
ANK10	99LVI047-MB1	Soluble Chromium VI	4.4	0.40u	4.0	108.8	1.0
		Insoluble Chromium VI	987	0.40u	1160	84.7	100

Recra LabNet - Lionville

INORGANICS METHOD BLANK DATA SUMMARY PAGE 06/16/99

LIENT: TNU-HANFORD B99-002 RECRA LOT #: 9906L211

ORK ORDER: 10985-001-001-9999-00

AMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
LANK10	99LVI047-MB1	Chromium VI	0.40 u	MG/KG	0.40	1.0

Recra LabNet - Lionville

INORGANICS ACCURACY REPORT 06/25/99

:IENT: TMU-RANFORD B99-002 RECRA LOT #: 9906L211

)RK ORDER: 10985-001-001-9999-00

AMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
001	B0VFM7	Chromium, Total	22.4	7.8	17.3	84.4	1.0
		Mercury, Total	0.18	0.02u	0.17	108.4	1.0
		Lead, Total	41.6	4.0 u	43.3	96.1	1.0

Recra LabNet - Lionville

INORGANICS PRECISION REPORT 06/25/99

.IENT: TMU-HANFORD B99-002 RECRA LOT #: 9906L211

ORK ORDER: 10985-001-001-9999-00

MPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
01REP	BGVFM7	Chromium, Total	7.8	8.9	13.2	1.0
		Mercury, Total	0.02u	0.02u	NC	1.0
		Lead, Total	4.0 u	5.2	~~NC~~ 200	1.0

MW 6/25/99

~~008~~

Recra LabNet - Lionville

INORGANICS METHOD BLANK DATA SUMMARY PAGE 06/25/99

ENT: TMU-HANFORD B99-002 RECRA LOT #: 9906L211

K ORDER: 10985-001-001-9999-00

PLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
NK1	99L0416-MB1	Chromium, Total	0.35 u	MG/KG	0.35	1.0
		Lead, Total	4.1 u	MG/KG	4.1	1.0
NK1	99C0178-MB1	Mercury, Total	0.02 u	MG/KG	0.02	1.0

Date: 17 August 1999
To: Bechtel Hanford, Inc. (technical representative)
From: TechLaw, Inc.
Project: 100-BC Areas - Full Protocol - Waste Site 116-B-6A
Subject: Radiochemistry - Data Package No. H0436-TNU (SDG No. H0436)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H0436-TNU which was prepared by Thermo NUtech (TNU). A list of samples validated along with the analyses reported and the requested analytes is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B0VFM7	06/09/99	Soil	C	See note 1
B0VLC4	06/09/99	Soil	C	See note 1
B0VLC5	06/09/99	Soil	C	See note 1
B0VLC6	06/09/99	Soil	C	See note 1
B0VLC7	06/09/99	Soil	C	See note 1
B0VLC8	06/09/99	Soil	C	See note 1

1 - Gamma spectroscopy; alpha spectroscopy (isotopic uranium, isotopic plutonium and americium-241); total strontium; nickel-63.

Data validation was conducted in accordance with the BHI validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL May 1998). Appendices 1 through 5 provide the following information as indicated below:

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

DATA QUALITY OBJECTIVES

- **Holding Times**

  Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 6 months with liquid scintillation requiring analysis within 7 days of distillation.

  Due to the analysis being conducted 8 days after the other samples in the SDG, all isotopic uranium results in sample B0VLC4 were qualified as estimates and flagged "J".

  Due to the analysis being conducted 5 days after the other samples in the SDG, all isotopic plutonium results in sample B0VLC8 were qualified as estimates and flagged "J".

  All holding times were acceptable.

- **Blanks**

  Laboratory Blanks

  Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the MDA, the following qualifiers are applied: All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"; sample results below the MDA are qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the highest blank concentration are not qualified.

  All blank results were acceptable although the detection limit for uranium-238 (GEA) exceeded the target detection limit (TDL).

- **Accuracy**

  Accuracy is evaluated by analyzing distilled water or field samples spiked with known amounts of radionuclides. The sample activity as determined by analysis is compared to the known activity to assess accuracy. The acceptable laboratory control sample and matrix spike recovery range is either 70-130% or ±3 sigma. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in

associated sample results being qualified as estimates, rejected, or not qualified, depending on the activity of the individual sample.

Due to a radiochemical yield of 3%, the americium-241 (aspec) result in sample B0VFM7 was rejected and flagged "R".

Due to the LCS not being analyzed with the SDG, all americium-241 (aspec) results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

- **Precision**

Analytical precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. Precision may also be assessed using unspiked duplicate sample analyses. If both sample and replicate activities are greater than five times the CRDL and the RPD is less than 30 percent, the results are acceptable. If either activities are less then five times the CRDL, a control limit of less than or equal to two times the CRDL is used for soil samples and less than or equal to the CRDL for water samples. If either the original or replicate value is below the CRDL, the applicable control limits are less than or equal to the CRDL for water samples and less than or equal to two times the CRDL for soil samples. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

Due to an RPD of 44%, all uranium-233/234 results were qualified as estimates and flagged "J".

All other duplicate results were acceptable.

<u>Field Duplicate Samples</u>

One pair of field duplicate samples (samples B0VFM7/B0VLC4) were submitted to TNU for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. The RPD for uranium-233/234 was outside QC limits (77%). Under the BHI statement of work, no qualification is required. All other field duplicate results were acceptable.

- **Detection Levels**

Reported analytical detection levels are compared against the 100 Area Remedial Action Sampling and Analysis Plan target detection limits (TDLs) or the

contract specified MDA if no TDL was specified, to ensure that laboratory detection levels meet the required criteria. The reported detection limit exceeded the TDL for uranium-238 (GEA) in all samples; europium-155 in samples B0VCL4, B0VCL6, and B0VCL8; americium-241 (aspec) in samples B0VFM7 and B0VLC4; and europium-152, americium-241 (GEA) and uranium-235 (GEA) in sample B0VLC8. Under the BHI statement of work, no qualification is required. All other reported laboratory MDAs were at or below the analyte-specific TDL or contract specified MDA.

- **Completeness**

  Data Package No. H0436 (SDG No. H0436) was submitted for validation and verified for completeness. The completion rate was 99%.

MAJOR DEFICIENCIES

Due to a radiochemical yield of 3%, the americium-241 (aspec) result in sample B0VFM7 was rejected and flagged "R". Rejected data is unusable and should not be reported.

MINOR DEFICIENCIES

Due to an RPD of 44%, all uranium-233/234 results were qualified as estimates and flagged "J". Due to the LCS not being analyzed with the SDG, all americium-241(aspec) results were qualified as estimates and flagged "J". Due to the analysis being conducted 8 days after the other samples in the SDG, all isotopic uranium results in sample B0VLC4 were qualified as estimates and flagged "J". Due to the analysis being conducted 5 days after the other samples in the SDG, all isotopic plutonium results in sample B0VLC8 were qualified as estimates and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under BHI guidelines, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

The reported detection limit exceeded the TDL for uranium-238 (GEA) in all samples; europium-155 in samples B0VCL4, B0VCL6, and B0VCL8; americium-241 (aspec) in samples B0VFM7 and B0VLC4; and europium-152, americium-241 (GEA) and uranium-235 (GEA) in sample B0VLC8. Under the BHI statement of work, no qualification is required.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-96-22, Rev. 1, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, May 1998.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI statement of work are as follows:

U - Indicates the compound or analyte was analyzed for and not detected above the minimum detectable activity (MDA) in the sample. The value reported is the sample result corrected for sample dilution and moisture content by the laboratory. The data is usable for decision making purposes.

UJ - Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate, but is usable for decision making purposes.

J - Indicates the compound or analyte was analyzed for and detected. Due to a QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.

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 is unusable due to an identified QC deficiency.

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H0436	REVIEWER: TLI	DATE: 8/17/99	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Americium-241(aspec)	R	B0VFM7	Yield outside QC limits
Uranium-233/234	J	All	RDP outside QC limits
Americium-241 (aspec)	J	All	LCS not analyzed with the SDG
Isotopic uranium (aspec)	J	B0VLC4	Not analyzed with the SDG
Isotopic plutonium (aspec)	J	B0VLC8	Not analyzed with the SDG

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

RADIOCHEMISTRY ANALYSIS, SOIL MATRIX, (PCi/G)

Project: BECHTEL-HANFORD																					
Laboratory: TNU																					
Case	SDG: H0436																				
Sample Number		B0VFM7		B0VLC4		B0VLC5		B0VLC6		B0VLC7		B0VLC8									
Location		116-B-6A		116-B-6A		116-B-6A		116-B-6A		116-B-6A		116-B-6A									
Remarks		A1		Duplicate		Equip. Blank		A2		A3		A4									
Sample Date		06/09/99		06/09/99		06/09/99		06/09/99		06/09/99		06/09/99									
Radiochemistry	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Uranium-233/234	0.1	0.607	J	1.38	J	0.239	J	0.715	J	0.456	J	0.396	J								
Uranium-235	0.1	0.060	U	0.281	UJ	0.018	U	0.062	U	0.024	U	0.053	U								
Uranium-238	0.1	0.482		0.554	J	0.187		0.504		0.403		0.352									
Plutonium-238	0.1	0	U	-0.006	U	0.026	U	-0.012	U	0	U	0.016	UJ								
Plutonium-239/40	0.1	-0.004	U	0.003	U	0.052		-0.006	U	0.057		0.231	J								
Nickel-63	30	0.656	U	0.495	U	1.23	U	0.430	U	0.226	U	0.194	U								
Americium-241	0.1	0.387	UR	-0.053	UJ	0.034	UJ	0.014	UJ	0.024	UJ	0.012	UJ								
Strontium (total)	1	0.017	U	0.018	U	-0.024	U	0.055	U	0.518		3.30									
Potassium-40		12.6		12.6		16.3		13.0		12.0		12.8									
Cobalt 60	0.05	U	U	U	U	U	U	U	U	U	U	U	U								
Cesium 137	0.05	U	U	U	U	U	U	0.115		0.971		37.1									
Europium 152	0.1	U	U	U	U	U	U	U	U	U	U	U	U								
Europium 154	0.1	U	U	U	U	U	U	U	U	U	U	U	U								
Europium 155	0.05	U	U	U	U	U	U	U	U	U	U	U	U								
Radium-226		0.424		0.474		0.202		0.478		0.422		0.511									
Radium-228		0.720		0.653		0.272		0.802		0.648		0.726									
Thorium-228		0.642		0.666		0.240		0.671		0.574		0.564									
Thorium-232		0.720		0.653		0.272		0.802		0.648		0.726									
Americium-241 (GEA)	0.1	U	U	U	U	U	U	U	U	U	U	U	U								
Uranium-238 (GEA)	0.1	U	U	U	U	U	U	U	U	U	U	U	U								
Uranium-235 (GEA)	0.1	U	U	U	U	U	U	U	U	U	U	U	U								

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0436

N906067-01 B0VFM7

DATA SHEET

SDG 7144 Client/Case no Hanford SDG-H0436
Contact L.A. Johnson Case no TRB-SBB-207925

Lab sample id N906067-01 Client sample id B0VFM7
Dept sample id 7144-001 Location/Matrix SOLID
Received 06/11/99 Collected 06/09/99 08:30
Custody/SAF No B99-002-114 B99-002

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Uranium 233/234	U-233/234	0.607	0.16	0.080	1.0	~~U~~ J	U
Uranium 235	15117-96-1	0.060	0.041	0.077	1.0	U	U
Uranium 238	U-238	0.482	0.14	0.080	1.0	~~U~~	U
Plutonium 238	13981-16-3	0	0.016	0.043	1.0	U	PU
Plutonium 239/240	PU-239/240	-0.004	0.016	0.043	1.0	U	PU
Nickel 63	13981-37-8	0.656	1.4	2.3	30	U	NI_L
Americium 241	14596-10-2	0.387	0.78	1.4	1.0	U R	AM
Total Strontium	SR-RAD	0.017	0.14	0.19	1.0	U	SR
Potassium 40	13966-00-2	12.6	0.29	0.13			GAM
Cobalt 60	10198-40-0	U		0.012	0.050	U	GAM
Cesium 137	10045-97-3	U		0.012	0.10	U	GAM
Europium 152	14683-23-9	U		0.030	0.10	U	GAM
Europium 154	15585-10-1	U		0.041	0.10	U	GAM
Europium 155	14391-16-3	U		0.039	0.10	U	GAM
Radium 226	13982-63-3	0.424	0.022	0.021	0.10		GAM
Radium 228	15262-20-1	0.720	0.060	0.054	0.20		GAM
Thorium 228	14274-82-9	0.642	0.017	0.016			GAM
Thorium 232	TH-232	0.720	0.060	0.054			GAM
Americium 241	14596-10-2	U		0.040		U	GAM
Uranium 238	U-238	U		1.5		U	GAM
Uranium 235	15117-96-1	U		0.053		U	GAM

100BC Areas - Full Protocol

8/14/99

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 07/22/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0436

N906067-02 B0VLC4

DATA SHEET

SDG 7144 Client/Case no Hanford SDG-H0436
Contact L.A. Johnson Case no TRB-SBB-207925

Lab sample id N906067-02 Client sample id B0VLC4
Dept sample id 7144-002 Location/Matrix SOLID
Received 06/11/99 Collected 06/09/99 08:30
Custody/SAF No B99-002-114 B99-002

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Uranium 233/234	U-233/234	1.38	0.32	0.12	1.0	J	U
Uranium 235	15117-96-1	0.281	0.13	0.12	1.0	~~U~~ J	U
Uranium 238	U-238	0.554	0.19	0.12	1.0	~~U~~ J	U
Plutonium 238	13981-16-3	-0.006	0.012	0.038	1.0	U	PU
Plutonium 239/240	PU-239/240	0.003	0.012	0.024	1.0	U	PU
Nickel 63	13981-37-8	0.495	1.6	2.7	30	U	NI_L
Americium 241	14596-10-2	-0.053	0.080	0.18	1.0	U J	AM
Total Strontium	SR-RAD	0.018	0.12	0.17	1.0	U	SR
Potassium 40	13966-00-2	12.6	0.49	0.24			GAM
Cobalt 60	10198-40-0	U		0.023	0.050	U	GAM
Cesium 137	10045-97-3	U		0.020	0.10	U	GAM
Europium 152	14683-23-9	U		0.055	0.10	U	GAM
Europium 154	15585-10-1	U		0.067	0.10	U	GAM
Europium 155	14391-16-3	U		0.058	0.10	U	GAM
Radium 226	13982-63-3	0.474	0.046	0.045	0.10		GAM
Radium 228	15262-20-1	0.653	0.095	0.098	0.20		GAM
Thorium 228	14274-82-9	0.666	0.027	0.026			GAM
Thorium 232	TH-232	0.653	0.095	0.098			GAM
Americium 241	14596-10-2	U		0.092		U	GAM
Uranium 238	U-238	U		2.6		U	GAM
Uranium 235	15117-96-1	U		0.092		U	GAM

100BC Areas - Full Protocol

8/16/99

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 07/22/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0436

N906067-03 B0VLC5

DATA SHEET

SDG	7144	Client/Case no	Hanford SDG-H0436
Contact	L.A. Johnson	Case no	TRB-SBB-207925
Lab sample id	N906067-03	Client sample id	B0VLC5
Dept sample id	7144-003	Location/Matrix	SOLID
Received	06/11/99	Collected	06/09/99 07:20
		Custody/SAF No	B99-002-114 B99-002

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Uranium 233/234	U-233/234	0.239	0.092	0.057	1.0	~~U~~ J	U
Uranium 235	15117-96-1	0.018	0.018	0.069	1.0	U	U
Uranium 238	U-238	0.187	0.076	0.057	1.0	~~U~~	U
Plutonium 238	13981-16-3	0.026	0.035	0.058	1.0	U	PU
Plutonium 239/240	PU-239/240	0.052	0.035	0.033	1.0	~~U~~	PU
Nickel 63	13981-37-8	1.23	1.2	1.9	30	U	NI_L
Americium 241	14596-10-2	0.034	0.042	0.071	1.0	U J	AM
Total Strontium	SR-RAD	-0.024	0.13	0.18	1.0	U	SR
Potassium 40	13966-00-2	16.3	0.55	0.20			GAM
Cobalt 60	10198-40-0	U		0.026	0.050	U	GAM
Cesium 137	10045-97-3	U		0.019	0.10	U	GAM
Europium 152	14683-23-9	U		0.039	0.10	U	GAM
Europium 154	15585-10-1	U		0.088	0.10	U	GAM
Europium 155	14391-16-3	U		0.037	0.10	U	GAM
Radium 226	13982-63-3	0.202	0.037	0.038	0.10		GAM
Radium 228	15262-20-1	0.272	0.13	0.12	0.20		GAM
Thorium 228	14274-82-9	0.240	0.020	0.021			GAM
Thorium 232	TH-232	0.272	0.13	0.12			GAM
Americium 241	14596-10-2	U		0.024		U	GAM
Uranium 238	U-238	U		3.0		U	GAM
Uranium 235	15117-96-1	U		0.060		U	GAM

100BC Areas - Full Protocol

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	07/22/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0436

N906067-04 B0VLC6

DATA SHEET

SDG 7144 Client/Case no Hanford SDG-H0436
Contact L.A. Johnson Case no TRB-SBB-207925

Lab sample id N906067-04 Client sample id B0VLC6
Dept sample id 7144-004 Location/Matrix SOLID
Received 06/11/99 Collected 06/09/99 09:15
Custody/SAF No B99-002-114 B99-002

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Uranium 233/234	U-233/234	0.715	0.16	0.056	1.0	~~U~~ J	U
Uranium 235	15117-96-1	0.062	0.053	0.068	1.0	U	U
Uranium 238	U-238	0.504	0.12	0.056	1.0	~~U~~	U
Plutonium 238	13981-16-3	-0.012	0.012	0.039	1.0	U	PU
Plutonium 239/240	PU-239/240	-0.006	0.018	0.045	1.0	U	PU
Nickel 63	13981-37-8	0.430	1.3	2.1	30	U	NI_L
Americium 241	14596-10-2	0.014	0.046	0.084	1.0	U J	AM
Total Strontium	SR-RAD	0.055	0.097	0.13	1.0	U	SR
Potassium 40	13966-00-2	13.0	0.49	0.25			GAM
Cobalt 60	10198-40-0	U		0.023	0.050	U	GAM
Cesium 137	10045-97-3	0.115	0.022	0.025	0.10		GAM
Europium 152	14683-23-9	U		0.056	0.10	U	GAM
Europium 154	15585-10-1	U		0.067	0.10	U	GAM
Europium 155	14391-16-3	U		0.086	0.10	U	GAM
Radium 226	13982-63-3	0.478	0.040	0.040	0.10		GAM
Radium 228	15262-20-1	0.802	0.094	0.092	0.20		GAM
Thorium 228	14274-82-9	0.671	0.027	0.026			GAM
Thorium 232	TH-232	0.802	0.094	0.092			GAM
Americium 241	14596-10-2	U		0.093		U	GAM
Uranium 238	U-238	U		2.5		U	GAM
Uranium 235	15117-96-1	U		0.093		U	GAM

100BC Areas - Full Protocol

8/16/99

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 07/22/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0436

N906067-05 B0VLC7

DATA SHEET

SDG 7144 Client/Case no Hanford SDG-H0436
Contact L.A. Johnson Case no TRB-SBB-207925

Lab sample id N906067-05 Client sample id B0VLC7
Dept sample id 7144-005 Location/Matrix SOLID
Received 06/11/99 Collected 06/09/99 09:30
Custody/SAF No B99-002-115 B99-002

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Uranium 233/234	U-233/234	0.456	0.11	0.050	1.0	~~U~~ J	U
Uranium 235	15117-96-1	0.024	0.032	0.061	1.0	U	U
Uranium 238	U-238	0.403	0.11	0.050	1.0	~~U~~	U
Plutonium 238	13981-16-3	0	0.010	0.029	1.0	U	PU
Plutonium 239/240	PU-239/240	0.057	0.026	0.032	1.0	~~U~~	PU
Nickel 63	13981-37-8	0.226	1.2	2.1	30	U	NI_L
Americium 241	14596-10-2	0.024	0.041	0.065	1.0	U J	AM
Total Strontium	SR-RAD	0.518	0.12	0.15	1.0	~~U~~	SR
Potassium 40	13966-00-2	12.0	0.28	0.12			GAM
Cobalt 60	10198-40-0	U		0.012	0.050	U	GAM
Cesium 137	10045-97-3	0.971	0.023	0.015	0.10		GAM
Europium 152	14683-23-9	U		0.033	0.10	U	GAM
Europium 154	15585-10-1	U		0.038	0.10	U	GAM
Europium 155	14391-16-3	U		0.037	0.10	U	GAM
Radium 226	13982-63-3	0.422	0.023	0.022	0.10		GAM
Radium 228	15262-20-1	0.648	0.058	0.055	0.20		GAM
Thorium 228	14274-82-9	0.574	0.017	0.017			GAM
Thorium 232	TH-232	0.648	0.058	0.055			GAM
Americium 241	14596-10-2	U		0.041		U	GAM
Uranium 238	U-238	U		1.4		U	GAM
Uranium 235	15117-96-1	U		0.054		U	GAM

100BC Areas - Full Protocol

8/16/99

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 07/22/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0436

N906067-06

B0VLC8

DATA SHEET

SDG 7144 Client/Case no Hanford SDG-H0436
Contact L.A. Johnson Case no TRB-SBB-207925

Lab sample id N906067-06 Client sample id B0VLC8
Dept sample id 7144-006 Location/Matrix SOLID
Received 06/11/99 Collected 06/09/99 09:50
Custody/SAF No B99-002-115 B99-002

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Uranium 233/234	U-233/234	0.396	0.11	0.056	1.0	~~U~~ J	U
Uranium 235	15117-96-1	0.053	0.036	0.068	1.0	U	U
Uranium 238	U-238	0.352	0.11	0.056	1.0	~~U~~	U
Plutonium 238	13981-16-3	0.016	0.016	0.030	1.0	U J	PU
Plutonium 239/240	PU-239/240	0.231	0.064	0.043	1.0	~~U~~ J	PU
Nickel 63	13981-37-8	0.194	1.4	2.4	30	U	NI_L
Americium 241	14596-10-2	0.012	0.033	0.056	1.0	U J	AM
Total Strontium	SR-RAD	3.30	0.22	0.13	1.0		SR
Potassium 40	13966-00-2	12.8	0.43	0.19			GAM
Cobalt 60	10198-40-0	U		0.020	0.050	U	GAM
Cesium 137	10045-97-3	37.1	0.17	0.063	0.10		GAM
Europium 152	14683-23-9	U		0.19	0.10	U	GAM
Europium 154	15585-10-1	U		0.067	0.10	U	GAM
Europium 155	14391-16-3	U		0.16	0.10	U	GAM
Radium 226	13982-63-3	0.511	0.090	0.11	0.10		GAM
Radium 228	15262-20-1	0.726	0.089	0.088	0.20		GAM
Thorium 228	14274-82-9	0.564	0.071	0.098			GAM
Thorium 232	TH-232	0.726	0.089	0.088			GAM
Americium 241	14596-10-2	U		0.22		U	GAM
Uranium 238	U-238	U		2.4		U	GAM
Uranium 235	15117-96-1	U		0.25		U	GAM

100BC Areas - Full Protocol

8/16/99

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 07/22/99

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Thermo Nutech
W.O. No. N9-06-067-7144

Bechtel Hanford Inc.
SDG H0436

Case Narrative

1.0 GENERAL

Bechtel Hanford Inc. Sample Delivery Group H0436 is composed of six solid (soil) samples designated under SAF No. B99-002 with a Project Designation of: 100 BC Areas-Full Protocol.

The samples were received as stated on the Chain-of-Custody documents. Any discrepancies are noted on the TNU Sample Receipt Checklist.

2.0 ANALYSIS NOTES

2.1 Gamma Scan Analyses
No problems were encountered during the course of the analysis.

2.2 Isotopic Uranium Analyses
No problems were encountered during the course of the analysis though a recount was taken on sample BOVLC4.

2.3 Isotopic Plutonium Scan Analyses
No problems were encountered during the course of the analysis though a recount was taken on sample BOVLC8.

2.4 Nickel-63 Analyses
No problems were encountered during the course of the analysis.

2.5 Total Strontium Analyses
No problems were encountered during the course of the analysis.

2.6 Americium-241 Analyses
No problems were encountered during the course of the analysis though a recount was taken for the LCS.

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-002-115

Page 1 of 1

Collector: Fahlberg/Kerkow	Company Contact: R Coffman	Telephone No.: 373-6425	Project Coordinator: TRENT, SJ
Price Code:	Data Turnaround: 15 Days		
Project Designation: 100 BC Areas - Full Protocol	Sampling Location: 100 B/C 116-B-6A		SAF No.: B99-002
Ice Chest No.: SML 223	Field Logbook No.: EL 1327-3		Method of Shipment: FED EX
Shipped To: TMA/~~RECRA~~ R5 6-9-99	Offsite Property No.: A990160		Bill of Lading/Air Bill No.: 4235 7952 6805
			COA R16 B6A 2F00

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None	Cool 4C	None	None						
Type of Container	P	aG	aG	aG	aG						
No. of Container(s)	1	1	1	1	1						
Volume	20mL	60mL	125mL	250mL	1000mL						
SAMPLE ANALYSIS	Activity Scan	See item (1) in Special Instructions.	Chromium Hex - 7196	ICP Metals - 6010A (SW-846) (Chromium, Lead); Mercury - 7471 - (CV)	See item (2) in Special Instructions.						
Sample No.	Matrix *	Sample Date	Sample Time								
B0VLC7	Soil	6-9-99	0930	X	X			X			tie to B0VFV
B0VLC8	Soil	6-9-99	0950	X	X			X			B0VFW

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: R Fahlberg / R Fahlberg 6-9-99	Date/Time: 1515	Received By: Ref I-C 6-9-99	Date/Time: 1515
Relinquished By: REF I C 6/09/99	Date/Time: 1100	Received By: SJ Gale 6/09/99	Date/Time: 1100
Relinquished By: SJ Gale 6/09/99	Date/Time: 1100	Received By: FED EX	Date/Time: 6-10-99
Relinquished By: Fed EX	Date/Time: 6-11-99 10:30	Received By: TNL M. Goldenberg	Date/Time: 6-11-99 10:30

SPECIAL INSTRUCTIONS

(1) Americium-241; Isotopic Plutonium; Isotopic Uranium; Strontium-89,90 -- Total Sr; Nickel-63

(2) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Uranium-238)

COLLECTOR UNAVAILABLE TO SIGN COC.

Matrix *: Soil, Water, Vapor, Other Solid, Other Liquid

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

000030

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-002-114

Collector: Fahlberg/Kerkow	Company Contact: R Coffman	Telephone No.: 373-6425	Project Coordinator: TRENT, SJ
Price Code	Data Turnarou: 15 Day		
Project Designation: 100 BC Areas - Full Protocol	Sampling Location: 100 B/C 116-B-6A		SAF No.: B99-002
Ice Chest No.: SML 223	Field Logbook No.: EL 1327-3		Method of Shipment: FED EX
Shipped To: TMA/~~REGRA~~ RSF 6-9-99	Offsite Property No.: A990160		Bill of Lading/Air Bill No.: 4235 7952 6805
			COA: R16B6A 2F00

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None	Cool 4C	None	None						
Type of Container	P	aG	aG	aG	aG						
No. of Container(s)	1	1	1	1	1						
Volume	20mL	60mL	125mL	250mL	1000mL						
SAMPLE ANALYSIS	Activity Scan	See item (1) in Special Instructions.	Chromium Hex - 7196	ICP Metals - 6010A (SW-846) (Chromium, Lead); Mercury - 7471 - (CV)	See item (2) in Special Instructions.						

Sample No.	Matrix *	Sample Date	Sample Time										
B0VFM7	Soil	6-9-99	0830	X	X			X				tie to B0VF7	
B0VLC4	Soil	6-9-99	0830	X	X			X				B0VF7	
B0VLC5	Soil	6-9-99	0720	X	X			X				E.B.	
B0VLC6	Soil	6-9-99	0915	X	X			X				B0VF7	

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
RFahlberg/R. Fahlberg	6-9-99 1915	Ref I-C	6-9-99 1515
REF I-C	61099 1100	SJGALE	61099 1100
SJGALE	61099 1100	FED EX	6-10-99
FedEx	6-11-99 10:30	TNV M. Goldenberg	6-11-99 10:30

SPECIAL INSTRUCTIONS

(1) Americium-241; Isotopic Plutonium; Isotopic Uranium; Strontium-89,90 -- Total Sr; Nickel-63

(2) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Uranium-238)

COLLECTOR UNAVAILABLE TO SIGN COC

Matrix *: Soil, Water, Vapor, Other Solid, Other Liquid

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

000234

Appendix 5

Data Validation Supporting Documentation

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 116-B-6A			DATA PACKAGE: H0436		
VALIDATOR: TLA		LAB: TNU		DATE: 7/26/99	
CASE:			SDG: H0436		

ANALYSES PERFORMED

☐ Gross Alpha/Beta	☒ Strontium-90	☐ Technetium-99	☒ Alpha Spectroscopy	☒ Gamma Spectroscopy	
☐ Total Uranium	☐ Radium-22	☐ Tritium	☒ Ni-63		

SAMPLES/MATRIX BOUF47 BOULC4 BOULC5
BOULC6 BOULC7 BOULC8
solid

1. Completeness . . . . . ☐ N/A

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

Comments:

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

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

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

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

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

Comments:

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

Calibration checked within one week of sample analysis? . . . Yes No N/A
Calibration check acceptable? . . . . . Yes No N/A
Calibration check standards NIST traceable? . . . . . Yes No N/A
Calibration check standards expired? . . . . . Yes No N/A

Comments:

4. Blanks . . . . . ☐ N/A

Method blank analyzed? . . . . . Yes No N/A
Method blank results acceptable? . . . . . Yes No N/A
Analytes detected in method blank? . . . . . Yes No N/A
Field blank(s) analyzed? . . . . . Yes No N/A
Field blank results acceptable? . . . . . Yes No N/A
Analytes detected in field blank(s)? . . . . . Yes No N/A
Transcription/Calculation Errors? . . . . . Yes No N/A

Comments:

BOULCS - FB U233/34, U238, pU239/40, K40 Radium Thorium
(U238 gen over TDL
U238 MB over TDL

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: Ni-63 - use yield

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: LCS Am241 - not run w/SDG -J

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: Am241 (3%) - R MJ

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: U233/234 (44%)

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: M7 C4 dup
U233/34 (77%) ~~U238 (129%)~~

10. Holding Times

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

Comments: Isotopic U - BOVCL84 8 days after SM I
ISO pU - BOVCL8 I

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

Results reported for all required sample analyses? . . . . Yes No N/A
Results supported in raw data? . . . . . Yes No N/A
Results Acceptable? . . . . . Yes No N/A
Transcription/Calculation errors? . . . . . Yes No N/A
MDA's meet required detection limits? . . . . . Yes No N/A
Transcription/calculation errors? . . . . . Yes No N/A

Comments: M7 - Am241 U238 (gea) ~~CS-137C~~
C4 am241 U238
C5 U238
C6 U238
Eu-155 ~~C4, C6 & C8~~
CL4, CL6, CL8

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0436

N906067-08 Method Blank

METHOD BLANK

SDG 7144 Client/Case no Hanford SDG-H0436
Contact L.A. Johnson Case no TRB-SBB-207925

Lab sample id N906067-08 Client sample id Method Blank
Dept sample id 7144-008 Material/Matrix SOLID
SAF No B99-002

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Uranium 233/234	U-233/234	0.032	0.032	0.062	1.0	U	U
Uranium 235	15117-96-1	-0.010	0.020	0.075	1.0	U	U
Uranium 238	U-238	0.016	0.016	0.062	1.0	U	U
Plutonium 238	13981-16-3	-0.005	0.011	0.033	1.0	U	PU
Plutonium 239/240	PU-239/240	0.005	0.011	0.026	1.0	U	PU
Nickel 63	13981-37-8	0.582	1.2	2.1	30	U	NI_L
Americium 241	14596-10-2	0.007	0.058	0.10	1.0	U	AM
Total Strontium	SR-RAD	-0.025	0.15	0.20	1.0	U	SR
Potassium 40	13966-00-2	U		0.094		U	GAM
Cobalt 60	10198-40-0	U		0.011	0.050	U	GAM
Cesium 137	10045-97-3	U		0.008	0.10	U	GAM
Europium 152	14683-23-9	U		0.020	0.10	U	GAM
Europium 154	15585-10-1	U		0.025	0.10	U	GAM
Europium 155	14391-16-3	U		0.013	0.10	U	GAM
Radium 226	13982-63-3	U		0.016	0.10	U	GAM
Radium 228	15262-20-1	U		0.039	0.20	U	GAM
Thorium 228	14274-82-9	U		0.010		U	GAM
Thorium 232	TH-232	U		0.039		U	GAM
Americium 241	14596-10-2	U		0.006		U	GAM
Uranium 238	U-238	U		1.2		U	GAM
Uranium 235	15117-96-1	U		0.024		U	GAM

100BC Areas - Full Protocol

QC-BLANK 31055

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 07/22/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0436

N906067-07

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7144
Contact L.A. Johnson

Client/Case no Hanford SDG-H0436
Case no TRB-SBB-207925

Lab sample id N906067-07
Dept sample id 7144-007

Client sample id Lab Control Sample
Material/Matrix SOLID
SAF No B99-002

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Uranium 233/234	5.47	0.67	0.31	1.0		U	4.83	0.19	113	77-123	80-120
Uranium 235	4.48	0.59	0.084	1.0		U	3.92	0.16	114	75-125	80-120
Uranium 238	5.67	0.69	0.30	1.0		U	5.24	0.21	108	78-122	80-120
Plutonium 238	10.5	0.78	0.035	1.0		PU	11.3	0.45	93	86-114	80-120
Plutonium 239/240	11.5	0.84	0.028	1.0		PU	11.9	0.48	97	86-114	80-120
Nickel 63	179	3.9	2.1	30		NI_L	168	6.7	106	83-117	
Americium 241	9.58	2.1	0.27	1.0		AM	10.5	0.42	91	69-131	80-120
Total Strontium	14.9	0.47	0.20	1.0		SR	12.5	0.50	119	80-120	
Potassium 40	U		0.062		U	GAM					
Cobalt 60	0.241	0.013	0.007	0.050		GAM	0.248	0.010	97	76-124	80-120
Cesium 137	0.267	0.011	0.007	0.10		GAM	0.276	0.011	97	77-123	80-120
Europium 152	U		0.017	0.10	U	GAM					
Europium 154	U		0.014	0.10	U	GAM					
Europium 155	U		0.013	0.10	U	GAM					
Radium 226	U		0.010	0.10	U	GAM					
Radium 228	U		0.028	0.20	U	GAM					
Thorium 228	U		0.012		U	GAM					
Thorium 232	U		0.028		U	GAM					
Americium 241	U		0.012		U	GAM					
Uranium 238	U		0.88		U	GAM					
Uranium 235	U		0.020		U	GAM					

100BC Areas - Full Protocol

QC-LCS 31054

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 07/22/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0436

N906067-09 B0VFM7

DUPLICATE

SDG 7144
Contact L.A. Johnson

Client/Case no Hanford SDG-H0436
Case no TRB-SBB-207925

DUPLICATE
ab sample id N906067-09
pt sample id 7144-009

ORIGINAL
Lab sample id N906067-01
Dept sample id 7144-001
Received 06/11/99

Client sample id B0VFM7
Location/Matrix SOLID
Collected 06/09/99 08:30
Custody/SAF No B99-002-114 B99-002

ALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI-FIERS	RPD %	3σ TOT	PROT LIMIT
anium 233/234	0.387	0.11	0.076	1.0	J	U	0.607	0.16	0.080	J	44	60	
anium 235	0.076	0.058	0.073	1.0	J	U	0.060	0.041	0.077	U	24	157	
anium 238	0.402	0.12	0.060	1.0	J	U	0.482	0.14	0.080	J	18	64	
utonium 238	-0.004	0.016	0.033	1.0	U	PU	0	0.016	0.043	U	-		
utonium 239/240	-0.008	0.016	0.035	1.0	U	PU	-0.004	0.016	0.043	U	-		
ckel 63	0.796	1.3	2.2	30	U	NI_L	0.656	1.4	2.3	U	-		
ericium 241	0.016	0.031	0.064	1.0	U	AM	0.387	0.78	1.4	U	-		
tal Strontium	-0.006	0.12	0.16	1.0	U	SR	0.017	0.14	0.19	U	-		
tassium 40	12.8	0.44	0.19			GAM	12.6	0.29	0.13		2	32	
balt 60	U		0.021	0.050	U	GAM	U		0.012	U	-		
sium 137	U		0.019	0.10	U	GAM	U		0.012	U	-		
ropium 152	U		0.048	0.10	U	GAM	U		0.030	U	-		
ropium 154	U		0.063	0.10	U	GAM	U		0.041	U	-		
ropium 155	U		0.071	0.10	U	GAM	U		0.039	U	-		
lium 226	0.518	0.040	0.038	0.10		GAM	0.424	0.022	0.021		20	35	
lium 228	0.691	0.080	0.081	0.20		GAM	0.720	0.060	0.054		4	38	
orium 228	0.639	0.025	0.023			GAM	0.642	0.017	0.016		0	33	
orium 232	0.691	0.080	0.081			GAM	0.720	0.060	0.054		4	38	
ericium 241	U		0.084		U	GAM	U		0.040	U	-		
anium 238	U		2.4		U	GAM	U		1.5	U	-		
anium 235	U		0.14		U	GAM	U		0.053	U	-		

BC Areas - Full Protocol

DUP#1 31056

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 07/22/99

BHI Sample Management
Phone: (509) 372-9346
FAX: (509) 372-9487

facsimile transmittal

To: B. Christian Fax: 375-5151

From: R. Weiss Date: 8-5-99

Re: IRs For 377 + 436 Pages: 6

CC:

☐ ~~Quick Turn~~ / Priority Data ☐ ~~Final Data Package~~

Brace,

You probably have these already.

Please call me when you can. I want to make sure there are no additional "holes" to fill.

Rick

FAX

TECHLAW, INC.

451 Hills, Suite 23
Richland, WA 99352
509-375-5667
509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 23 July 1999

Information Request

H0436 - Radiochemistry

- Page 05 of the data package (isotopic uranium - method summary) indicates that sample B0VLC4 was run 8 days later than the other samples.

- Page 03 of the data package (isotopic plutonium - method summary) indicates that sample B0VLC8 was run 5 days later than the other samples.

- Page 01 of the data package (americium 241 - method summary) indicates that the LCS was run six days after the last sample.

- Page 01 of the data package (americium 241 - method summaries) indicates that sample B0VFM7 was analyzed before preparation.

Revised sheet attached

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0436

Test AM Matrix SOLID
SDG 7144
Contact L.A. Johnson

METHOD SUMMARY

AMERICIUM 241 IN SOIL
ALPHA SPECTROSCOPY

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0436

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Americium 241	
Preparation batch 6880-149						
B0VFM7	N906067-01			7144-001	U	
B0VLC4	N906067-02			7144-002	U	
B0VLC5	N906067-03			7144-003	U	
B0VLC6	N906067-04			7144-004	U	
B0VLC7	N906067-05			7144-005	U	
B0VLC8	N906067-06			7144-006	U	
BLK (QC ID=31055)	N906067-08			7144-008	U	
LCS (QC ID=31054)	N906067-07			7144-007	ok	
Duplicate (N906067-01)	N906067-09			7144-009	-	U
Nominal values and limits from method				RDLs (pCi/g)	1.0	

100BC Areas - Full Protocol

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6880-149	2σ prep error 5.0 %			Reference Lab Notebook 6880 pg.149												
B0VFM7	N906067-01			1.4	0.500			3		22			20	06/26/99	06/29	SS-035
B0VLC4	N906067-02			0.18	0.500			27		681			20	06/26/99	06/29	SS-035
B0VLC5	N906067-03			0.071	0.500			85		681			20	06/26/99	06/29	SS-036
B0VLC6	N906067-04			0.084	0.500			77		681			20	06/26/99	06/29	SS-039
B0VLC7	N906067-05			0.065	0.500			85		681			20	06/26/99	06/29	SS-044
B0VLC8	N906067-06			0.056	0.500			84		681			20	06/26/99	06/29	SS-045
BLK (QC ID=31055)	N906067-08			0.10	0.500			62		520				06/26/99	06/30	SS-044
LCS (QC ID=31054)	N906067-07			0.27	0.500			77		884				06/26/99	07/06	SS-051
Duplicate (N906067-01) (QC ID=31056)	N906067-09			0.064	0.500			88		520			21	06/26/99	06/30	SS-045
Nominal values and limits from method				1.0	0.500			20-105		700	100		180			

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 07/22/99

TRANSMISSION RESULT REPORT (AUG 05 '99 10:24AM)

BHI S&D MANAGEMENT 509 372 9487

(AUTO)

THE FOLLOWING FILE(S) ERASED

FILE	FILE TYPE	OPTION	TEL NO.	PAGE	RESULT
076	MEMORY TX		3755151	06/06	OK

ERRORS

1) HANG UP OR LINE FAIL 2) BUSY 3) NO ANSWER 4) NO FACSIMILE CONNECTION

BHI Sample Management
Phone: (509) 372-9346
FAX: (509) 372-9487

facsimile transmittal

To: B. Christian Fax: 375-5151

From: R. Weiss Date: 8-5-99

Re: IRs For 377 + 436 Pages: 6

CC:

☐ ~~Quick Turn / Priority Data~~ ☐ ~~Final Data Package~~

Brace,

FAX

TECHLAW, INC.

451 Hills, Suite 23
Richland, WA 99352
509-375-5667
509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 22 July 1999

Information Request

H0436 - Radiochemistry

Page 05 of the data package (method summaries) indicates that sample B0VLC4 was run 8 days later than the other samples.

Superceded by IR
dated 7/23/99

FAX

TECHLAW, INC.

451 Hills, Suite 23
Richland, WA 99352
509-375-5667
509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 22 July 1999

Information Request

H0436 - Radiochemistry

Page 03 of the data package (method summaries) indicates that sample B0VLC8 was run 5 days later than the other samples.

FAX

TECHLAW, INC.

451 Hills, Suite 23
Richland, WA 99352
509-375-5667
509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 22 July 1999

Information Request

H0436 - Radiochemistry

Page 01 of the data package (method summaries) indicates that sample B0VFM7 was run before preparation.

FAX

TECHLAW, INC.

451 Hills, Suite 23
Richland, WA 99352
509-375-5667
509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 22 July 1999

Information Request

H0436 - Radiochemistry

Page 01 of the data package (method summaries) indicates that the LCS was run six days after the last sample. Is this accurate?

Review Comment Record (RCR)

1. Date	2. Review No.
8/23/99	BHI/QA99015
3. Project	**4. Page**
116-B-6A	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
H0436-TNU&RLN (SDG No. H0436)	100-BC Areas – Full Protocol - 116-B-6A	Claude Stacey	BHI/QA	H0-16/372-9208

17. Comment Submittal Approval:

Organization Manager (Optional) _____ Date _____

10. Agreement with indicated comment disposition(s)

Reviewer/Point of Contact _____

Author/Originator _____

11. CLOSED

8/31/99 Date

C. Stacey Reviewer/Point of Contact

Author/Originator _____

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
1	Inorganic: Page 2, Holding Times, first line has "... 30 days for chrome VI; ..." The "chrome" should be "chromium".		Corrected 8/25/99	
2	Radiochemistry: Page 2, 1st paragraph under Blanks states "... sample results below the MDA are elevated to the MDA and qualified as undetected ..." This is not what's being done and the sentence needs to be changed to "... sample results below the MDA are qualified as undetected ..."		Corrected 8/25/99	
3				
4				

AUG 24 '99 10:28AM BHI SQU MANAGEMENT 509 372 9487 P.1/1

SDG H0393 Inorganic – No comments.

SDG H0393 Rad

- 100-BC TDL for Eu-155 is 0.05 pCi/g. Sample numbers B0VD36, B0VD39, B0VB3 failed. Correct summary table and narrative.

SDG H0436 Inorganic – No comments.

SDG H0436 Rad

B0VLC8

- 100-BC TDL for Eu-155 is 0.05 pCi/g. Sample numbers B0VLC4, B0VLC6 failed. Correct summary table and narrative.

Correct
8/25/99

SDG H0409 Inorganic – No comments.

SDG H0409 Rad

- 100-BC TDL for Eu-155 is 0.05 pCi/g. Sample numbers B0VFL1, B0VFL2, B0VFL3, B0VFL4, B0VFL6, B0VFM3, B0VFM6 failed. Correct summary table and narrative.

Duncan, Jeanette M

From: Routt, Tina/RLO [troutt@CH2M.com]
Sent: Friday, August 20, 1999 11:47 AM
To: Duncan, Jeanette/RLO-HAN
Subject: Review of Validation Report for H0436

Jeanette -

I have a correction to Validation Report H0436 - Radiochemistry.

Under section Detection Levels he indicates certain analytes whose reported detection limits exceeded the TDL. I found a couple of others not mentioned that also exceed their TDL.

* cesium-137 in sample B0VLC8 – sample was detected
* uranium-238 (non GEA) and uranium 233/234 in sample B0VLC4. – sample detected

Thanks,

JLD
8/20/99

Tina Routt
CH2M Hill Richland Office
(509) 375-3444, ext. 211
(509) 375-5566 fax

Matrix SOLID
[illegible]
Analyst L.A. Johnson

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0436

METHOD SUMMARY

PLUTONIUM, ISOTOPIC IN SOLIDS

ALPHA SPECTROSCOPY

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0436

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUP-FIX	PLANCHET	Plutonium 238	Plutonium 239/240
Preparation batch 6880-149						
B0VFM7	N906067-01			7144-001	U	U
B0VLC4	N906067-02			7144-002	U	U
B0VLC5	N906067-03			7144-003	U	0.052 J
B0VLC6	N906067-04			7144-004	U	U
B0VLC7	N906067-05			7144-005	U	0.057 J
B0VLC8	N906067-06			7144-006	U	0.231 J
BLK (QC ID=31055)	N906067-08			7144-008	U	U
LCS (QC ID=31054)	N906067-07			7144-007	ok	ok
Duplicate (N906067-01)	N906067-09			7144-009	- U	- U
Nominal values and limits from method				RDLs (pCi/g)	1.0	1.0

100BC Areas - Full Protocol

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUP-FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6880-149 *2σ prep error 5.0 %* *Reference Lab Notebook 6880 pg.149*																
B0VFM7	N906067-01			0.043	0.500			59		1042			14	06/23/99	06/23	SS-012
B0VLC4	N906067-02			0.038	0.500			74		1042			14	06/23/99	06/23	SS-013
B0VLC5	N906067-03			0.058	0.500			46		1256			15	06/23/99	06/24	SS-004
B0VLC6	N906067-04			0.045	0.500			65		1256			15	06/23/99	06/24	SS-005
B0VLC7	N906067-05			0.032	0.500			72		1256			15	06/23/99	06/24	SS-006
B0VLC8	N906067-06			0.043	0.500			93		668			20	06/23/99	06/29	SS-050
BLK (QC ID=31055)	N906067-08			0.033	0.500			71		1256				06/23/99	06/24	SS-008
LCS (QC ID=31054)	N906067-07			0.035	0.500			75		836				06/23/99	06/23	SS-056
Duplicate (N906067-01) (QC ID=31056)	N906067-09			0.035	0.500			88		1256			15	06/23/99	06/24	SS-010
Nominal values and limits from method				1.0	0.500			20-105		10	100		180			

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 07/22/99

Matrix SOLID
7144
Contact L.A. Johnson

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0436

METHOD SUMMARY

URANIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0436

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	1: Uranium 233/234	2: Uranium 235	3: Uranium 238	RESULT RATIOS (%) 1÷3	2σ	2÷3	2σ
Preparation batch 6880-149											
B0VFM7	N906067-01			7144-001	0.607 J	U	0.482 J	126	49	12	9
B0VLC4	N906067-02			7144-002	1.38	0.281 J	0.554 J	249	103	51	29
B0VLC5	N906067-03			7144-003	0.239 J	U	0.187 J	128	72	10	10
B0VLC6	N906067-04			7144-004	0.715 J	U	0.504 J	142	46	12	11
B0VLC7	N906067-05			7144-005	0.456 J	U	0.403 J	113	41	6	8
B0VLC8	N906067-06			7144-006	0.396 J	U	0.352 J	112	47	15	11
BLK (QC ID=31055)	N906067-08			7144-008	U	U	U				
LCS (QC ID=31054)	N906067-07			7144-007	ok	ok	ok				
Duplicate (N906067-01)	N906067-09			7144-009	ok J	ok J	ok J	96	40	19	15
Nominal values and limits from method				RDLs (pCi/g)	1.0	1.0	1.0	100		4	
100BC Areas - Full Protocol								Averages 138		18	

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6880-149 2σ prep error 5.0 % Reference Lab Notebook 6880 pg.149																
B0VFM7	N906067-01			0.080	1.00			76		187			14	06/22/99	06/23	SS-031
B0VLC4	N906067-02			0.12	1.00			57		160			21	06/22/99	06/30	SS-045
B0VLC5	N906067-03			0.069	1.00			87		187			14	06/22/99	06/23	SS-033
B0VLC6	N906067-04			0.068	1.00			87		187			14	06/22/99	06/23	SS-034
B0VLC7	N906067-05			0.061	1.00			101		187			14	06/22/99	06/23	SS-035
B0VLC8	N906067-06			0.068	1.00			90		187			14	06/22/99	06/23	SS-039
BLK (QC ID=31055)	N906067-08			0.075	1.00			87		169				06/22/99	06/24	SS-049
LCS (QC ID=31054)	N906067-07			0.31	1.00			70		187				06/22/99	06/23	SS-040
Duplicate (N906067-01) (QC ID=31056)	N906067-09			0.076	1.00			89		169			15	06/22/99	06/24	SS-050
Nominal values and limits from method				1.0	1.00			30-105		150	100		180			

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 07/22/99

FAX

TECHLAW, INC.

451 Hills, Suite 23
Richland, WA 99352
509-375-5667
509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 23 July 1999

Information Request

H0436 - Radiochemistry

- Page 05 of the data package (isotopic uranium - method summary) indicates that sample B0VLC4 was run 8 days later than the other samples.

- Page 03 of the data package (isotopic plutonium - method summary) indicates that sample B0VLC8 was run 5 days later than the other samples.

- Page 01 of the data package (americium 241 - method summary) indicates that the LCS was run six days after the last sample.

- Page 01 of the data package (americium 241 - method summaries) indicates that sample B0VFM7 was analyzed before preparation.

Review Comment Record (RCR)

1. Date	2. Review No.
8/23/99	BHI/QA99015
3. Project	4. Page
116-B-6A	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
H0436-TNU&RLN (SDG No. H0436)	100-BC Areas – Full Protocol - 116-B-6A	Claude Stacey	BHI/QA	H0-16/372-9208

17. Comment Submittal Approval:

Organization Manager (Optional) _____ Date _____

10. Agreement with indicated comment disposition(s)

Reviewer/Point of Contact _____ Author/Originator _____

11. CLOSED

Reviewer/Point of Contact _____ Date _____ Author/Originator _____

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
1	Inorganic: Page 2, Holding Times, first line has " . . . 30 days for chrome VI; . . ." The "chrome" should be "chromium".			
2	Radiochemistry: Page 2, 1st paragraph under Blanks states ". . . sample results below the MDA are elevated to the MDA and qualified as undetected . . ." This is not what's being done and the sentence needs to be changed to ". . . sample results below the MDA are qualified as undetected . . ."			
3				
4				

Duncan, Jeanette M

From: Routt, Tina/RLO [troutt@CH2M.com]
Sent: Friday, August 20, 1999 11:47 AM
To: Duncan, Jeanette/RLO-HAN
Subject: Review of Validation Report for H0436

Jeanette -

I have a correction to Validation Report H0436 - Radiochemistry.

Under section Detection Levels he indicates certain analytes whose reported detection limits exceeded the TDL. I found a couple of others not mentioned that also exceed their TDL.

* cesium-137 in sample B0VLC8
* uranium-238 (non GEA) and uranium 233/234 in sample B0VLC4.

Thanks,

Tina Routt
CH2M Hill Richland Office
(509) 375-3444, ext. 211
(509) 375-5566 fax

Comments – RL Weiss

SDG H0399 Rad

- 100-BC TDL for Eu-155 is 0.05 pCi/g. Sample numbers B0VD41, B0VD43, B0VD44 failed. Correct summary table and narrative.

- Minor Deficiencies - Remove 1st paragraph (does not reflect earlier statement in PRECISION and no "J" were applied to the data.

SDG H0434 Inorganic – No comments

SDG H0434 Rad

- 100-BC TDL for Eu-155 is 0.05 pCi/g. Sample numbers B0VF69, B0VF70, B0VF71, B0V72, failed. Correct summary table and narrative.

- Need to apply "J" flag to Am-241 results on pg. 14 (B0VF72).

SDG H0387 Inorganic – No comments

SDG H0387 Rad

- 100-BC TDL for Eu-155 is 0.05 pCi/g. Sample number B0V6N8 failed. Correct summary table and narrative.

SDG H0377 Inorganic – No comments.

SDG H0377 Rad

- 100-BC TDL for Eu-155 is 0.05 pCi/g. Sample number B0V1X0 failed. Correct summary table and narrative.

SDG H0437 Inorganic

- ACCURACY – MS failure was for Hg not Pb. Correct narrative, tables, and annotated results.

SDG H0437 Rad

- 100-BC TDL for Eu-155 is 0.05 pCi/g. Sample numbers B0VFK2, B0VFK4, B0VFK5 failed. Correct summary table and narrative.

- The package has 2 narrative sections. The one with the "wrong" waste site (116-B6A) appears to be more correct except for waste site identity.

SDG H0393 Inorganic – No comments.

SDG H0393 Rad

- 100-BC TDL for Eu-155 is 0.05 pCi/g. Sample numbers B0VD36, B0VD39, B0VB3 failed. Correct summary table and narrative.

SDG H0436 Inorganic – No comments.

SDG H0436 Rad

- 100-BC TDL for Eu-155 is 0.05 pCi/g. Sample numbers B0VLC4, B0VLC6 failed. Correct summary table and narrative.

SDG H0409 Inorganic – No comments.

SDG H0409 Rad

- 100-BC TDL for Eu-155 is 0.05 pCi/g. Sample numbers B0VFL1, B0VFL2, B0VFL3, B0VFL4, B0VFL6, B0VFM3, B0VFM6 failed. Correct summary table and narrative.