Date: 24 August 1999
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100-BC Areas - Full Protocol - Waste Site 116-C-2
Subject: Inorganics - Data Package No. H0445-RLN (SDG No. H0445)

INTRODUCTION

This memo presents the results of data validation on Data Package No. H0445-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
B0VHK5	06/16/99	Soil	C	See note 1
B0VHK6	06/16/99	Soil	C	See note 1
B0VHK7	06/16/99	Soil	C	See note 1
B0VHK8	06/16/99	Soil	C	See note 1

1 - ICP metals by 6010A (lead and total chromium); 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:

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

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EDMC

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 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 was exceeded.

- **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 (B0VHK6/B0VHK7) was submitted for analysis. The samples were compared using the same criteria as for a laboratory duplicate. The RPD for mercury was outside QC limits (>2x the TDL). Under the BHI statement of work, no qualification is required. All other 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: Lead in sample B0VHK8. 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. H0445-RLN (SDG No. H0445) 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: Lead in sample BOVHK8. 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: H0445	REVIEWER: TLI	DATE: 8/24/99	PAGE 1 OF 1
COMMENTS: No qualifiers assigned.			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: BECHTEL-HANFORD																					
Laboratory: RECRA LabNet																					
Case	SDG: H0445																				
Sample Number		B0VHK5		B0VHK6		B0VHK7		B0VHK8													
Location		116-C-2		116-C-2		116-C-2		116-C-2													
Remarks		A1		A2		Duplicate		A3													
Sample Date		6/16/99		6/16/99		6/16/99		6/16/99													
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	6.3		27.6		29.5		6.3													
Mercury	0.05	0.11		0.04		0.15		0.02	U												
Lead	2	4.2		11.7		14.0		4.1	U												

000010

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 07/01/99

CLIENT: TMU-HANFORD B99-002 RECRA LOT #: 9906L270

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

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B0VHK5	Chromium, Total	6.3	MG/KG	0.30	1.0
		Mercury, Total	0.11	MG/KG	0.02	1.0
		Lead, Total	4.2	MG/KG	3.5	1.0
-002	B0VHK6	Chromium, Total	27.6	MG/KG	0.32	1.0
		Mercury, Total	0.04	MG/KG	0.02	1.0
		Lead, Total	11.7	MG/KG	3.7	1.0
-003	B0VHK7	Chromium, Total	29.5	MG/KG	0.32	1.0
		Mercury, Total	0.15	MG/KG	0.02	1.0
		Lead, Total	14.0	MG/KG	3.7	1.0
-004	B0VHK8	Chromium, Total	6.3	MG/KG	0.35	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	4.1 u	MG/KG	4.1	1.0

8/24/99

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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

RECRA
ENVIRONMENTAL
INC.

Chemical and Environmental Measurement Information

JUL 1999
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Data
Log In

Recra LabNet Philadelphia
Analytical Report

Client : TNU-HANFORD B99-002
RFW# : 9906L270
SDG/SAF# : H0445/B99-002

W.O.# : 10985-001-001-9999-00
Date Received: 06-19-99

METALS CASE NARRATIVE

1. This narrative covers the analyses of 4 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 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.

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 13 pages.

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

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

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

7-1-99
Date

mld/m06-270

... SAMPLE ANALYSIS REQUEST

B99-002-112 | Page 1 of

Collector: R Fahlberg/R Kerkow	Company Contact: R Coffman	Telephone No.: 373-6425	Project Coordinator: TRENT, SJ
Price Code	Data Turnaroun: 15 Day:		
Project Designation: 100 BC Areas - Full Protocol	Sampling Location: 100 BC 116-C-2A	SAF No.: B99-002	
Ice Chest No.: ERC 99-004	Field Logbook No.: EL 1327-3	Method of Shipment: FED EX.	
Shipped To: State/RECRA RS 6/16/99	Offsite Property No.: A990170	Bill of Lading/Air Bill No.: 4235795 27065	
		COA: B16C2A 2600	

POSSIBLE SAMPLE HAZARDS/REMARKS											
	Preservation	None	None	Cool 4C	None	None					
	Type of Container	P	sG	sG	sG	sG					
	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										
B0VHK5	Soil	6·16·99	0742			X	X					Hold	BOTW13
B0VHK6	Soil	6·16·99	0805			X	X						BOTW14
B0VHK7	Soil	6·16·99	0805			X	X						BOTW14
B0VHK8	Soil	6·16·99	0832			X	X						BOTW15

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: R Fahlberg / R Fahlberg 6·16·99	Date/Time: 1400	Received By: Ref #1-C	Date/Time: 1400 6·16·99
Relinquished By: REF 1-C 61899	Date/Time: 1000	Received By: SIGALE	Date/Time: 61899 1000
Relinquished By: SIGALE 61899	Date/Time: 1000	Received By: FED EX	Date/Time:
Relinquished By: FED-EX	Date/Time: 6/19/99	Received By: [illegible]	Date/Time:

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

000015

Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 116-C-2			DATA PACKAGE: H0445		
VALIDATOR: TLI		LAB: RecRA		DATE: 8/23/97	
CASE:			SDG: H0445		
ANALYSES PERFORMED					
☐ CLP/ICP	☐ CLP/GFAA	☐ CLP/Hg	☐ CLP/Cyanide	☐	☐
☒ SW-846/ICP	☐ SW-846/GFAA	☒ SW-846/Hg	☐ SW-846 Cyanide	☐	☐
SAMPLES/MATRIX	B0V1K5	B0V1K6	B0V1K7	B0V1K8	
					Soil

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 over TDL

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: mercury - outside QC ± .1

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: load over for HKS

Recra LabNet - Lionville

INORGANICS METHOD BLANK DATA SUMMARY PAGE 07/01/99

CLIENT: TMU-HANFORD B99-002

RECRA LOT #: 9906L270

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

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	99L0433-MB1	Chromium, Total	0.35	u	MG/KG	0.35	1.0
		Lead, Total	4.1	u	MG/KG	4.1	1.0
BLANK1	99C0186-MB1	Mercury, Total	0.02	u	MG/KG	0.02	1.0

Reera LabNet - Lionville

INORGANICS ACCURACY REPORT 07/01/99

CLIENT: TMO-HANFORD B99-002

RECRA LOT #: 9906L270

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

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	BOVEK5	Chromium, Total	23.4	6.3	18.6	91.9	1.0
		Mercury, Total	0.25	0.11	0.17	81.9	1.0
		Lead, Total	46.4	4.2	46.6	90.6	1.0

~~007~~

Recra LabNet - Lionville

INORGANICS PRECISION REPORT 07/01/99

CLIENT: TNU-HANFORD B99-002 RECRA LOT #: 9906L270

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

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	B0VHK5	Chromium, Total	6.3	7.0	10.5	1.0
		Mercury, Total	0.11	0.1	16.3	1.0
		Lead, Total	4.2	3.8 u	~~NC~~ 200	1.0

Correction
[illegible] 7/1/99
[illegible] 7/1/99

Date: 24 August 1999
To: Bechtel Hanford, Inc. (technical representative)
From: TechLaw, Inc.
Project: 100-BC Areas - Full Protocol - Waste Site 116-C-2
Subject: Radiochemistry - Data Package No. H0445-TNU (SDG No. H0445)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H0445-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
B0VHK5	06/16/99	Soil	C	See note 1
B0VHK6	06/16/99	Soil	C	See note 1
B0VHK7	06/16/99	Soil	C	See note 1
B0VHK8	06/16/99	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 not being conducted with the SDG, all isotopic plutonium results in sample B0VHK5 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 the LCS not being analyzed with the SDG, all americium-241 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.

All duplicate results were acceptable.

Field Duplicate Samples

One pair of field duplicate samples (samples B0VHK6/B0VHK7) 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 following RPDs were outside QC limits: strontium-90 (67%), radium-228 (31%) and thorium-232 (31%). 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 the following: uranium-238 (GEA) and europium-155 in all samples; plutonium-238 in sample B0VHK5; americium-241 (GEA) in sample B0VHK8; and uranium-235 (GEA) in sample B0VHK7. 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. H0445 (SDG No. H0445) was submitted for validation and verified for completeness. The completion rate was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to the analysis not being conducted with the SDG, all isotopic plutonium results in sample B0VHK5 were qualified as estimates and flagged "J". Due to the LCS not being analyzed with the SDG, all americium-241 results were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the BHI validation SOW, 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) and europium-155 in all samples; plutonium-238 in sample B0VHK5; uranium-235 in sample B0VHK8; and uranium-235 (GEA) in sample BOVHK7. 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: H0445	REVIEWER: TLI	DATE: 8/24/99	PAGE_1_OF_1_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Isotopic plutonium	J	BOVHK5	Not analyzed with the SDG
Americium-241	J	All	No associated LCS

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

RADIOCHEMISTRY ANALYSIS, SOIL MATRIX, (PCi/G)

Project: BECHTEL-HANFORD																					
Laboratory: TNU																					
Case	SDG: H0445																				
Sample Number		B0VHK5		B0VHK6		B0VHK7		B0VHK8													
Location		116-C-2		116-C-2		116-C-2		116-C-2													
Remarks		A1		A2		Duplicate		A3													
Sample Date		06/16/99		06/16/99		06/16/99		06/16/99													
Radiochemistry	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Uranium-234	0.1	0.344		0.445		0.418		0.446													
Uranium-235	0.1	0.040	U	0.031		0.029		0.036													
Uranium-238	0.1	0.411		0.475		0.415		0.431													
Plutonium-238	0.1	0.006	UJ	0.123		0.153		0	U												
Plutonium-239/40	0.1	0.030	UJ	1.30		1.49		0.145													
Nickel-63	30	30.0		465		540		53.5													
Americium-241	0.1	0.036	UJ	0.654	J	0.710	J	0.063	J												
Strontium (total)	1	0.182		6.18		3.07		1.98													
Potassium-40		11.9		12.0		13.2		11.2													
Cobalt 60	0.05	1.64		12.2		11.1		0.755													
Cesium 137	0.05	1.04		23.0		22.9		1.34													
Europium 152	0.1	U	U	29.6		25.5		2.19													
Europium 154	0.1	U	U	3.29		2.73		0.264													
Europium 155	0.05	U	U	U	U	U	U	U	U												
Radium-226		0.475		0.412		0.416		0.446													
Radium-228		0.607		0.449		0.615		0.542													
Thorium-228		0.614		0.727		0.686		0.594													
Thorium-232		0.607		0.449		0.615		0.542													
Americium-241 (GEA)	0.1	U	U	0.478		0.501		U	U												
Uranium-238 (GEA)	0.1	U	U	U	U	U	U	U	U												
Uranium-235 (GEA)	0.1	U	U	U	U	U	U	U	U												

000010

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0445

N906117-01 BOVHK5

DATA SHEET

SDG	7150	Client/Case no	Hanford SDG-H0445
Contact	Kevin C. Johnson	Contract	TRB-SBB-207925
Lab sample id	N906117-01	Client sample id	BOVHK5
Dept sample id	7150-001	Location/Matrix	100-BC 116-C-2A SOLID
Received	06/21/99	Collected	06/16/99 07:42
% solids	97.5	Custody/SAF No	B99-002-132 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	0.344	0.14	0.085	1.0	~~U~~	U
Uranium 235	15117-96-1	0.040	0.054	0.10	1.0	U	U
Uranium 238	U-238	0.411	0.14	0.085	1.0	~~U~~	U
Plutonium 238	13981-16-3	0.006	0.059	0.11	1.0	U J	PU
Plutonium 239/240	PU-239/240	0.030	0.036	0.066	1.0	U J	PU
Nickel 63	13981-37-8	30.0	1.9	1.9	30		NI_L
Americium 241	14596-10-2	0.036	0.041	0.074	1.0	U J	AM
Total Strontium	SR-RAD	0.182	0.11	0.13	1.0	~~U~~	SR
Potassium 40	13966-00-2	11.9	0.48	0.23			GAM
Cobalt 60	10198-40-0	1.64	0.061	0.034	0.050		GAM
Cesium 137	10045-97-3	1.04	0.049	0.040	0.10		GAM
Europium 152	14683-23-9	U		0.074	0.10	U	GAM
Europium 154	15585-10-1	U		0.094	0.10	U	GAM
Europium 155	14391-16-3	U		0.053	0.10	U	GAM
Radium 226	13982-63-3	0.475	0.060	0.061	0.10		GAM
Radium 228	15262-20-1	0.607	0.14	0.16	0.20		GAM
Thorium 228	14274-82-9	0.614	0.032	0.036			GAM
Thorium 232	TH-232	0.607	0.14	0.16			GAM
Americium 241	14596-10-2	U		0.033		U	GAM
Uranium 238	U-238	U		4.7		U	GAM
Uranium 235	15117-96-1	U		0.081		U	GAM

100 BC Areas- Full Protocol

9/13/99

DATA SHEETS
Page 1
SUMMARY DATA SECTION
Page 11

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	09/10/99

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SAMPLE DELIVERY GROUP H0445

N906117-02 BOVHK6

DATA SHEET

SDG	7150	Client/Case no	Hanford SDG-H0445
Contact	Kevin C. Johnson	Contract	TRB-SBR-207925
Lab sample id	N906117-02	Client sample id	BOVHK6
Dept sample id	7150-002	Location/Matrix	100-BC 116-C-2A SOLID
Received	06/21/99	Collected	06/16/99 08:05
% solids	97.7	Custody/SAF No	B99-002-112 B99-002

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	MDL pCi/g	QUALIFIERS	TEST
Uranium 233/234	U-233/234	0.445	0.056	0.018	1.0		U
Uranium 235	15117-96-1	0.031	0.015	0.015	1.0		U
Uranium 238	U-238	0.475	0.060	0.021	1.0		U
Plutonium 238	13981-16-3	0.123	0.042	0.045	1.0		PU
Plutonium 239/240	PU-239/240	1.30	0.14	0.042	1.0		PU
Nickel 63	13981-37-8	465	6.7	2.0	30		NI_L
Americium 241	14596-10-2	0.654	0.11	0.046	1.0	J	AM
Total Strontium	SR-RAD	6.18	0.24	0.12	1.0		SR
Potassium 40	13966-00-2	12.0	0.54	0.37			GAM
Cobalt 60	10198-40-0	12.2	0.15	0.076	0.050		GAM
Cesium 137	10045-97-3	23.0	0.18	0.13	0.10		GAM
Europium 152	14683-23-9	29.6	0.32	0.30	0.10		GAM
Europium 154	15585-10-1	3.29	0.25	0.25	0.10		GAM
Europium 155	14391-16-3	U		0.25	0.10	U	GAM
Radium 226	13982-63-3	0.412	0.13	0.18	0.20		GAM
Radium 228	15262-20-1	0.449	0.27	0.39	0.20		GAM
Thorium 228	14274-82-9	0.727	0.089	0.13			GAM
Thorium 232	TH-232	0.449	0.27	0.39			GAM
Americium 241	14596-10-2	0.478	0.18	0.28			GAM
Uranium 238	U-238	U		12		U	GAM
Uranium 235	15117-96-1	U		0.33		U	GAM

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9/17/99

Lab id	TMAMC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	1.06
Report date	09/10/99

DATA SHEETS
Page 2
SUMMARY DATA SECTION
Page 12

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0445

N906117-03 BOVHK7

DATA SHEET

SDG	7150	Client/Case no	Hanford SDG-H0445
Contact	Kevin c. Johnson	Contract	TRB-SBB-207925
Lab sample id	N906117-03	Client sample id	BOVHK7
Dept sample id	7150-003	Location/Matrix	100-BC 116-C-2A SOLID
Received	06/21/99	Collected	06/16/99 08:05
% solids	97.7	Custody/SAF No	B99-002-112 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	0.418	0.047	0.015	1.0		U
Uranium 235	15117-96-1	0.029	0.014	0.011	1.0		U
Uranium 238	U-238	0.415	0.047	0.011	1.0		U
Plutonium 238	13981-16-3	0.153	0.052	0.035	1.0		PU
Plutonium 239/240	PU-239/240	1.49	0.17	0.035	1.0		PU
Nickel 63	13981-37-8	540	7.3	2.1	30		NI_L
Americium 241	14596-10-2	0.710	0.099	0.039	1.0	J	AM
Total Strontium	SR-RAD	3.07	0.18	0.12	1.0		SR
Potassium 40	13966-00-2	13.2	0.37	0.24			GAM
Cobalt 60	10198-40-0	11.1	0.090	0.038	0.050		GAM
Cesium 137	10045-97-3	22.9	0.11	0.070	0.10		GAM
Europium 152	14683-23-9	25.5	0.16	0.13	0.10		GAM
Europium 154	15585-10-1	2.73	0.13	0.13	0.10		GAM
Europium 155	14391-16-3	U		0.19	0.10	U	GAM
Radium 226	13982-63-3	0.416	0.070	0.091	0.10		GAM
Radium 228	15262-20-1	0.615	0.15	0.21	0.20		GAM
Thorium 228	14274-82-9	0.686	0.049	0.073			GAM
Thorium 232	TH-232	0.615	0.15	0.21			GAM
Americium 241	14596-10-2	0.501	0.097	0.15			GAM
Uranium 238	U-238	U		6.8		U	GAM
Uranium 235	15117-96-1	U		0.19		U	GAM

100 BC Areas- Full Protocol

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9/13/99

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	08/10/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0445

H906117-04 BOVHK8

DATA SHEET

SDG	7150	Client/Case no	Hanford SDG-H0445
Contact	Kevin C. Johnson	Contract	TRB-SRB-207925
Lab sample id	H906117-04	Client sample id	BOVHK8
Dept sample id	7150-004	Location/Matrix	100-BC 116-C-2A SOLID
Received	06/21/99	Collected	06/16/99 08:32
% solids	97.3	Custody/SAF No	B99-002-112 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	0.446	0.085	0.035	1.0	~~U~~	U
Uranium 235	15117-96-1	0.036	0.027	0.034	1.0	~~U~~	U
Uranium 238	U-238	0.431	0.084	0.028	1.0	~~U~~	U
Plutonium 238	13981-16-3	0	0.013	0.036	1.0	U	PU
Plutonium 239/240	PU-239/240	0.145	0.047	0.036	1.0	~~U~~	PU
Nickel 63	13981-37-8	53.5	2.7	2.2	30		NI_L
Americium 241	14596-10-2	0.063	0.028	0.021	1.0	~~U~~ J	AM
Total Strontium	SR-RAD	1.98	0.16	0.12	1.0		SR
Potassium 40	13966-00-2	11.2	0.35	0.16			GAM
Cobalt 60	10198-40-0	0.785	0.032	0.022	0.050		GAM
Cesium 137	10045-97-3	1.34	0.040	0.033	0.10		GAM
Europium 152	14683-23-9	2.19	0.062	0.061	0.10		GAM
Europium 154	15585-10-1	0.264	0.067	0.073	0.10		GAM
Europium 155	14391-16-3	U		0.090	0.10	U	GAM
Radium 226	13982-63-3	0.446	0.045	0.048	0.10		GAM
Radium 228	15262-20-1	0.542	0.090	0.11	0.20		GAM
Thorium 228	14274-82-9	0.594	0.029	0.035			GAM
Thorium 232	TH-232	0.542	0.090	0.11			GAM
Americium 241	14596-10-2	U		0.20		U	GAM
Uranium 238	U-238	U		3.3		U	GAM
Uranium 235	15117-96-1	U		0.10		U	GAM

100 BC Areas- Full Protocol

9/13/99

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	1.06
Report date	09/10/99

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Case Narrative

1.0 GENERAL

Bechtel Hanford Inc. Sample Delivery Group H0445 is composed of four 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 document. Any discrepancies are noted on the TNU Sample Receipt Checklist. A complete set of data was transmitted to Bechtel Hanford via fax on July 11, 1999.

2.0 ANALYSIS NOTES

2.1 Americiuim-241 Analyses

No problems were encountered during the course of the analyses.

2.2 Gamma Scan Analyses

No problems were encountered during the course of the analyses.

2.3 Total Strontium Analyses

No problems were encountered during the course of the analyses.

2.4 Isotopic Uranium Analyses

No problems were encountered during the course of the analyses.

2.5 Isotopic Plutonium Analyses

No problems were encountered during the course of the analyses.

2.6 Nickel-63 Analyses

No problems were encountered during the course of the analyses.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-002-112

Collector: R Fahlberg/R 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 BC 116-C-2A		SAF No.: B99-002
Ice Chest No.: ERC 99 003	Field Logbook No.: EL 1327-3		Method of Shipment: FED EX.
Shipped To: TMA/~~REGRA~~ RS 6-16-99	Offsite Property No.: A990169		Bill of Lading/Air Bill No.: 4235795 2 7076
			COA: R16C2A 2600

POSSIBLE SAMPLE HAZARDS/REMARKS

SDG H0445

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								
B0VHK5	Soil	6·16·99	0742	X	X			X		tite to	B0TW13
B0VHK6	Soil	6·16·99	0805	X	X			X			B0TW14
B0VHK7	Soil	6·16·99	0805	X	X			X			B0TW14
B0VHK8	Soil	6·16·99	0832	X	X			X			B0TW15

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
R Fahlberg R Fahlberg	6·16·99 1400	Ref 1-S	6·16·99 1400
REF 1C	61899 1000	S. Gale	61899 1000
S. Gale	61899 1000	FED EX	6-18-99
Fed Ex	6-19-99 10:15	JR Corse	6-19-99 10:15

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:

0001017

Appendix 5

Data Validation Supporting Documentation

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 116-C-2			DATA PACKAGE: ~~W06~~ H0445		
VALIDATOR: TLI		LAB: TNU		DATE: 8/20/99	
CASE:			SDG: H0445		

ANALYSES PERFORMED

☐ Gross Alpha/Beta	☒ Strontium-90	☐ Technetium-99	☒ Alpha Spectroscopy	☒ Gamma Spectroscopy	
☐ Total Uranium	☐ Radium-22	☐ Tritium	☒ Ni63		

SAMPLES/MATRIX				
	B0VHK5	B0VHK6	B0VHK7	B0VHK8

Soil

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: U 233/34 + U238 (spec no qual req)
~~gamma blank not run w/ 5,6&7 - J 8 - ok~~
~~SR-907~~ -

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 was [illegible]

6. Laboratory Control Samples . . . . . ☐ N/A

LCS analyzed? . . . . . ~~Yes~~ ~~No~~ N/A (NO)
LCS recoveries acceptable? . . . . . Yes No N/A
LCS traceable? . . . . . Yes No N/A
Transcription/Calculation Errors? . . . . . Yes No N/A

Comments: ~~gamma No LCS w 5/6+7 — J — & ok~~
Am241 LCS 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:

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: ~~gamma — no dup w 5/6+7 J all & ok~~

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: 6+7 SP-90 – 67% ra228 + th232 (31%)

10. Holding Times

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

Comments: BOUHKS – not run w/SDG I
(isotopic PU)

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: PU238 (5) ~~Eu-60~~ EU-155 (6) EU-155 (7) U238 (8)
U238 gen | ~~[illegible]~~ U238 gen U238 gen ~~U235~~ AM241
EU155 U235 gen EU-155

A-4

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0445

N906117-07

BOVHES

DUPLICATE

SDG 7150		Client/Case no Hanford	SDG-H0445
Contact Kevin C. Johnson		Case no TRB-SBB-207926	
DUPLICATE	ORIGINAL		
Lab sample id N906117-07	Lab sample id N906117-01	Client sample id BOVHES	
Dept sample id 7150-007	Dept sample id 7150-001	Location/Matrix 100-BC 116-C-2A	SOLID
	Received 06/21/99	Collected 06/16/99 07:42	
% solids 97.5	% solids 97.5	Custody/SAF No B99-002-112	B99-002

ANALYTE	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
Uranium 233/234	0.361	0.15	0.11	1.0	J	U	0.344	0.14	0.085	J	5	88	
Uranium 235	0.018	0.035	0.13	1.0	U	U	0.040	0.054	0.10	U	-		
Uranium 238	0.318	0.15	0.11	1.0	J	U	0.411	0.14	0.085	J	26	85	
Plutonium 238	-0.007	0.013	0.051	1.0	U	PU	0.006	0.059	0.11	U	-		
Plutonium 239/240	0.020	0.040	0.064	1.0	U	PU	0.030	0.036	0.066	U	-		
Nickel 63	31.1	2.0	2.0	30		NI_L	30.0	1.9	1.9		4	28	
Americium 241	0.031	0.023	0.031	1.0	J	AM	0.036	0.041	0.074	U	15	211	
Total Strontium	0.096	0.10	0.10	1.0	U	SR	0.182	0.11	0.13	J	62	162	
Potassium 40	11.0	0.26	0.10			GAM	11.9	0.48	0.23		8	33	
Cobalt 60	1.58	0.030	0.020	0.050		GAM	1.64	0.061	0.034		9	33	
Cesium 137	1.08	0.024	0.020	0.10		GAM	1.04	0.049	0.040		4	33	
Europium 152	0.065	0.019	0.020	0.10	J	GAM	U		0.074	U	13	168	
Europium 154	U		0.040	0.10	U	GAM	U		0.094	U	-		
Europium 155	U		0.060	0.10	U	GAM	U		0.053	U	-		
Radium 226	0.410	0.026	0.030	0.10		GAM	0.475	0.060	0.061		15	39	
Radium 228	0.580	0.072	0.080	0.20		GAM	0.607	0.14	0.16		5	51	
Thorium 228	0.600	0.017	0.020			GAM	0.614	0.032	0.036		2	33	
Thorium 232	0.580	0.072	0.080			GAM	0.607	0.14	0.16		5	51	
Americium 241	U		0.040		U	GAM	U		0.033	U	-		
Uranium 238	U		2.0		U	GAM	U		4.7	U	-		
Uranium 235	U		0.050		U	GAM	U		0.081	U	-		

100 BC Areas- Full Protocol

QC-DUP#1 31125

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DUP
Version	3.06
Report date	09/10/99

DUPLICATES
Page 1
SUMMARY DATA SECTION
Page 10

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0445

H906117-05

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7150

Contact Kevin c. Johnson

Client/Case no Hanford SDG-H0445

Case no TRS-SRD-207925

Lab sample id H906117-05

Client sample id Lab Control Sample

Depc sample id 7150-005

Material/Matrix SOLID

SAF No B99-002

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LIMS (TOTAL)	PROTOCOL LIMITS
Uranium 233/234	4.66	0.22	0.10	1.0		U	4.83	0.29	96	88-112	80-120
Uranium 235	3.82	0.19	0.011	1.0		U	3.92	0.16	97	88-112	80-120
Uranium 238	5.07	0.23	0.096	1.0		U	5.24	0.21	97	88-112	80-120
Plutonium 238	11.7	0.81	0.040	1.0		PU	11.3	0.45	104	85-115	80-120
Plutonium 239/240	12.4	0.85	0.047	1.0		PU	11.9	0.48	104	85-115	80-120
Nickel 63	170	4.0	1.9	30		NI_L	168	6.7	101	83-117	
Americium 241	9.41	0.52	0.025	1.0		AM	10.5	0.42	90	87-113	80-120
Total Strontium	14.0	0.37	0.10	1.0		SR	12.5	0.50	112	82-118	
Cobalt 60	0.210	0.010	0.010	0.050		GAM	0.203	0.006	103	73-127	80-120
Cesium 137	0.250	0.017	0.010	0.10		GAM	0.231	0.005	108	73-127	80-120

100 BC Areas- Full Protocol

QC-LCS 31123

Lab id TMHC

Protocol Hanford

Version Ver 1.0

Form DVD-LCS

Version 3.06

Report date 08/18/99

LAB CONTROL SAMPLES

Page 1

SUMMARY DATA SECTION

Page 9

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0445

H906117-06 Method Blank

METHOD BLANK

SDG 7150		Client/Case no Hanford	SDG-H0445
Contract Kevin c. Johnson		Contract TRB-SBB-207925	
Lab sample id H906117-06		Client sample id Method Blank	
Dept sample id 7150-006		Material/Matrix	SOLID
		SAF No 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	0.014	0.010	0.014	1.0	J	U
Uranium 235	15117-96-1	0.009	0.009	0.012	1.0	U	U
Uranium 238	U-238	0.012	0.008	0.010	1.0	J	U
Plutonium 238	13981-16-3	0.003	0.006	0.024	1.0	U	PU
Plutonium 239/240	PU-239/240	0.003	0.006	0.024	1.0	U	PU
Nickel 63	13981-37-8	0.449	1.2	2.0	30	U	NI_L
Americium 241	14596-10-2	-0.013	0.016	0.036	1.0	U	AM
Total Strontium	SR-RAD	-0.051	0.10	0.10	1.0	U	SR
Potassium 40	13966-00-2	U		0.10		U	GAM
Cobalt 60	10198-40-0	U		0.007	0.050	U	GAM
Cesium 137	10045-97-3	U		0.007	0.10	U	GAM
Europium 152	14683-23-9	U		0.020	0.10	U	GAM
Europium 154	15585-10-1	U		0.020	0.10	U	GAM
Europium 155	14391-16-3	U		0.020	0.10	U	GAM
Radium 226	13982-63-3	U		0.010	0.10	U	GAM
Radium 228	15262-20-1	U		0.030	0.20	U	GAM
Thorium 228	14274-82-9	U		0.009		U	GAM
Thorium 232	TH-232	U		0.030		U	GAM
Americium 241	14596-10-2	U		0.020		U	GAM
Uranium 238	U-238	U		0.80		U	GAM
Uranium 235	15117-96-1	U		0.030		U	GAM

100 BC Areas- Full Protocol

QC-BLANK 31124

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	09/10/99

METHOD BLANKS
Page 1
SUMMARY DATA SECTION
Page 8

TRANSMISSION RESULT REPORT (SEP 13 '99 03:23PM)

BHI S&D MANAGEMENT 509 372 9487

(AUTO)

THE FOLLOWING FILE(S) ERASED

FILE	FILE TYPE	OPTION	TEL NO.	PAGE	RESULT
001	MEMORY TX		3729447	03/03	OK

ERRORS

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

Bechtel Hanford, Inc.
3350 George Washington Way
Richland, WA 99352

Attn: BHI Sample Management
3190 George Washington Way
MSIN: H9-03
Phone: 375-9439
FAX: 372-9487

BHI Sample Management

Fax

To:	Claude Stacey	**From:**	Jeanette Duncan
Fax:	372-9447	**Pages:**	3
Phone:		**Date:**	9/13
Re:		**CC:**	

☐ Urgent ☒ For Review ☐ Please Comment ☐ Please Reply ☐ Please Recycle

Bechtel Hanford, Inc.
3350 George Washington Way
Richland, WA 99352

Attn: BHI Sample Management
3190 George Washington Way
MSIN: H9-03
Phone: 375-9439
FAX: 372-9487

BHI Sample Management

Fax

To: Claude Stacey **From:** Jeanette Duncan

Fax: 372-9447 **Pages:** 3

Phone: **Date:** 9/13

Re: **CC:**

☐ Urgent ☒ For Review ☐ Please Comment ☐ Please Reply ☐ Please Recycle

• **Comments:**

Claude - here is the validators disposition of your comment in radiochemistry section of validation report for SDG H0445 (116-C-2) - Jeanette

Review Comment Record (RCR)

1. Date	2. Review No.
8/31/99	BHI/QA99018
3. Project	**4. Page**
Waste Site 116-C-2	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
H0445-TNU&RLN (SDG No. H0445)	100-BC Areas – Full Protocol – Waste Site 116-C-2	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 _____ Date _____

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: OK -No Comments.			
2	Radiochemistry: Page 10, the CRDL for, and Cs-137 should be 0.05 not 0.1.		correct	
3				

SEP 13 '99 09:40AM BHI S&U MANAGEMENT 509 372 9287 P.12/13

Review Comment Record (RCR)

1. Date	2. Review No.
8/31/99	BHI/QA99018
3. Project	**4. Page**
Waste Site 116-C-2	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
H0445-TNU&RLN (SDG No. H0445)	100-BC Areas – Full Protocol – Waste Site 116-C-2	Claude Stacey	BHI/QA	H0-16/372-9208

11. CLOSED

Organization Manager (Optional) — Date — Reviewer/Point of Contact — Author/Originator

9/13/99 Date — 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: OK -No Comments.			
2	Radiochemistry: Page 10, the CRDL for, and Cs-137 should be 0.05 not 0.1.		corrected	
3				

Post-it® Fax Note 7671

To Jeanette Duncan	Date 9/13/99 # of pages ▶ 1
Co./Dept.	From C. Stacey
Phone # 375-9439	Co.
Fax # 372-9487	Phone # 372-9208
	Fax #

SDG H0445 VALIDATION REVIEW – RLW

Chem – No Comments

Rad – After the gamma energy analyses for these samples were recounted and submitted to the validator as replacements, the final rad validation package – no comments.

R L Weir

Duncan, Jeanette M

From: Routt, Tina/RLO [troutt@CH2M.com]
Sent: Friday, August 27, 1999 9:51 AM
To: Duncan, Jeanette/RLO-HAN
Subject: Review of Validation Report H0445 (C-2 A, B, C)

Jeanette -

I have the same problem with this validation report (H0445). Bruce needs to add some analytes to his list of those with detection limits greater than TDL.

Co-60 in B0VHK6
Cs-137 in B0VHK6, B0VHK7
Eu-152 in B0VHK6, B0VHK7
Eu-154 B0VHK6, B0VHK7

all samples were detected

No other problems.

Thanks,

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

Review Comment Record (RCR)

1. Date	2. Review No.
8/31/99	BHI/QA99018
3. Project	4. Page
Waste Site 116-C-2	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
H0445-TNU&RLN (SDG No. H0445)	100-BC Areas – Full Protocol – Waste Site 116-C-2	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 _____ Date _____

Author/Originator _____

11. CLOSED

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: OK -No Comments.			
2	Radiochemistry: Page 10, the CRDL for, and Cs-137 should be 0.05 not 0.1.			
3				

Duncan, Jeanette M

From: Routt, Tina/RLO [troutt@CH2M.com]
Sent: Friday, August 27, 1999 9:51 AM
To: Duncan, Jeanette/RLO-HAN
Subject: Review of Validation Report H0445 (C-2 A, B, C)

Jeanette -

I have the same problem with this validation report (H0445). Bruce needs to add some analytes to his list of those with detection limits greater than TDL.

Co-60 in B0VHK6
Cs-137 in B0VHK6, B0VHK7
Eu-152 in B0VHK6, B0VHK7
Eu-154 B0VHK6, B0VHK7

No other problems.

Thanks,

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

SEP 10 '99 05:55PM

2030 Wright Avenue
P.O. Box 4040
Richmond, CA 94804-0040
(510) 235-2633 • FAX (510) 235-0438

Facsimile Cover Sheet

Date: 9-10-99

TO: Company Name: BHI

Individual: JOAN KESSNER

Fax Number:

Telephone #:

FROM: KEVIN JOHNSON

COPY

Number of pages being sent (including this page): 11

This facsimile may contain CONFIDENTIAL INFORMATION which also may be legally PRIVILEGED and which is intended only for the use of the addresses(s) named above. If you are not the intended recipient of this facsimile, or the employee or agent responsible for delivering it to the intended recipient, you are hereby notified that any dissemination or copying of this facsimile may be strictly prohibited.

If you have received this facsimile in error, please immediately notify us by telephone and return the original facsimile to us at the above address via the United States Postal Service. Thank you.

IF YOU DO NOT RECEIVE ALL OF THIS TRANSMISSION, PLEASE CALL THE FACSIMILE OPERATOR AT (510) 235-2633.

Operator Name: KØ

Comments: JOAN,
HERE ARE REVISED RESULTS FOR SDG H0445, SAF B99-002 WHICH INCORPORATES RECOUNTED DATA FOR GSP.

KEVIN

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0445

WORK SUMMARY

SDG 7150
Contact Kevin c. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0445

CLIENT SAMPLE ID / LOCATION / CUSTODY	SAF No	MATRIX	LAB SAMPLE ID / COLLECTED / RECEIVED	PLANCHET	TEST	SUF-FIX	ANALYZED	REVIEWED	BY	METHOD
BOVHK5			N906117-01	7150-001	AM		07/06/99	07/09/99	TAH	Americium 241 in Soil
100-BC 116-C-2A		SOLID	06/16/99	7150-001	GAM		09/09/99	09/10/99	NJV	Gamma Scan
B99-002-112	B99-002		06/21/99	7150-001	NI_L		06/28/99	07/09/99	TAH	Nickel 63 in Soil
				7150-001	PU		07/09/99	07/09/99	TAH	Plutonium, Isotopic in Solids
				7150-001	SR		06/30/99	07/09/99	TAH	Total Strontium in Soil
				7150-001	U		07/03/99	07/09/99	TAH	Uranium, Isotopic in Soil
BOVHK6			N906117-02	7150-002	AM		07/06/99	07/09/99	TAH	Americium 241 in Soil
100-BC 116-C-2A		SOLID	06/16/99	7150-002	GAM		09/09/99	09/10/99	NJV	Gamma Scan
B99-002-112	B99-002		06/21/99	7150-002	NI_L		06/28/99	07/09/99	TAH	Nickel 63 in Soil
				7150-002	PU		07/05/99	07/09/99	TAH	Plutonium, Isotopic in Solids
				7150-002	SR		07/03/99	07/09/99	TAH	Total Strontium in Soil
				7150-002	U		07/05/99	07/09/99	TAH	Uranium, Isotopic in Soil
BOVHK7			N906117-03	7150-003	AM		07/06/99	07/09/99	TAH	Americium 241 in Soil
100-BC 116-C-2A		SOLID	06/16/99	7150-003	GAM		09/09/99	09/10/99	NJV	Gamma Scan
B99-002-112	B99-002		06/21/99	7150-003	NI_L		06/28/99	07/09/99	TAH	Nickel 63 in Soil
				7150-003	PU		07/05/99	07/09/99	TAH	Plutonium, Isotopic in Solids
				7150-003	SR		07/01/99	07/09/99	TAH	Total Strontium in Soil
				7150-003	U		07/05/99	07/09/99	TAH	Uranium, Isotopic in Soil
BOVHK8			N906117-04	7150-004	AM		07/06/99	07/09/99	TAH	Americium 241 in Soil
100-BC 116-C-2A		SOLID	06/16/99	7150-004	GAM		09/09/99	09/10/99	NJV	Gamma Scan
B99-002-112	B99-002		06/21/99	7150-004	NI_L		06/28/99	07/09/99	TAH	Nickel 63 in Soil
				7150-004	PU		07/06/99	07/09/99	TAH	Plutonium, Isotopic in Solids
				7150-004	SR		06/30/99	07/09/99	TAH	Total Strontium in Soil
				7150-004	U		07/02/99	07/09/99	TAH	Uranium, Isotopic in Soil
Method Blank			N906117-06	7150-006	AM		07/06/99	07/09/99	TAH	Americium 241 in Soil
		SOLID		7150-006	GAM		09/09/99	09/10/99	NJV	Gamma Scan
	B99-002			7150-006	NI_L		06/29/99	07/09/99	TAH	Nickel 63 in Soil
				7150-006	PU		07/05/99	07/09/99	TAH	Plutonium, Isotopic in Solids
				7150-006	SR		06/29/99	07/09/99	TAH	Total Strontium in Soil
				7150-006	U		07/05/99	07/09/99	TAH	Uranium, Isotopic in Soil

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 09/10/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0445

SDG 7150
Contact Kevin c. Johnson

WORK SUMMARY, cont.

Client Hanford
Contract TRB-SBB-207925
Case no SDG-H0445

CLIENT SAMPLE ID / LOCATION / CUSTODY	SAF No	MATRIX	LAB SAMPLE ID / COLLECTED / RECEIVED	PLANCHET	TEST	SUF-FIX	ANALYZED	REVIEWED	BY	METHOD
Lab Control Sample			N906117-05	7150-005	AM		07/02/99	07/09/99	TAH	Americium 241 in Soil
		SOLID		7150-005	GAM		09/09/99	09/10/99	NJV	Gamma Scan
	B99-002			7150-005	NI_L		06/29/99	07/09/99	TAH	Nickel 63 in Soil
				7150-005	PU		07/05/99	07/09/99	TAH	Plutonium, Isotopic in Solids
				7150-005	SR		07/02/99	07/09/99	TAH	Total Strontium in Soil
				7150-005	U		07/05/99	07/09/99	TAH	Uranium, Isotopic in Soil
Duplicate (N906117-01)			N906117-07	7150-007	AM		07/06/99	07/09/99	TAH	Americium 241 in Soil
100-BC 116-C-2A		SOLID	06/16/99	7150-007	GAM		09/09/99	09/10/99	NJV	Gamma Scan
	B99-002		06/21/99	7150-007	NI_L		06/29/99	07/09/99	TAH	Nickel 63 in Soil
				7150-007	PU		07/02/99	07/09/99	TAH	Plutonium, Isotopic in Solids
				7150-007	SR		06/29/99	07/09/99	TAH	Total Strontium in Soil
				7150-007	U		07/07/99	07/09/99	TAH	Uranium, Isotopic in Soil

COUNTS OF TESTS BY SAMPLE TYPE

TEST	SAF No	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP SPIKE	TOTAL
AM	B99-002	Americium 241 in Soil	AM/CMPLATE	4			1	1	1	7
GAM	B99-002	Gamma Scan	GAMMAHI	4			1	1	1	7
NI_L	B99-002	Nickel 63 in Soil	NI63LSC	4			1	1	1	7
PU	B99-002	Plutonium, Isotopic in Solids	PUPLATE	4			1	1	1	7
SR	B99-002	Total Strontium in Soil	SRTOTAL	4			1	1	1	7
U	B99-002	Uranium, Isotopic in Soil	UPLATE	4			1	1	1	7
TOTALS				24			6	6	6	42

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 09/10/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0445

N906117-06 Method Blank

METHOD BLANK

SDG	7150	Client/Case no	Hanford SDG-H0445
Contact	Kevin c. Johnson	Contract	TRB-SBB-207925
Lab sample id	N906117-06	Client sample id	Method Blank
Dept sample id	7150-006	Material/Matrix	SOLID
		SAF No	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	0.014	0.010	0.014	1.0	J	U
Uranium 235	15117-96-1	0.009	0.009	0.012	1.0	U	U
Uranium 238	U-238	0.011	0.008	0.010	1.0	J	U
Plutonium 238	13981-16-3	0.003	0.006	0.024	1.0	U	PU
Plutonium 239/240	PU-239/240	0.003	0.006	0.024	1.0	U	PU
Nickel 63	13981-37-8	0.449	1.2	2.0	30	U	NI_L
Americium 241	14596-10-2	-0.013	0.016	0.036	1.0	U	AM
Total Strontium	SR-RAD	-0.051	0.10	0.10	1.0	U	SR
Potassium 40	13966-00-2	U		0.10		U	GAM
Cobalt 60	10198-40-0	U		0.007	0.050	U	GAM
Cesium 137	10045-97-3	U		0.007	0.10	U	GAM
Europium 152	14683-23-9	U		0.020	0.10	U	GAM
Europium 154	15585-10-1	U		0.020	0.10	U	GAM
Europium 155	14391-16-3	U		0.020	0.10	U	GAM
Radium 226	13982-63-3	U		0.010	0.10	U	GAM
Radium 228	15262-20-1	U		0.030	0.20	U	GAM
Thorium 228	14274-82-9	U		0.009		U	GAM
Thorium 232	TH-232	U		0.030		U	GAM
Americium 241	14596-10-2	U		0.020		U	GAM
Uranium 238	U-238	U		0.80		U	GAM
Uranium 235	15117-96-1	U		0.030		U	GAM

100 BC Areas- Full Protocol

QC-BLANK 31124

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	09/10/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0445

N906117-05

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7150
Contact Kevin c. Johnson

Client/Case no Hanford SDG-H0445
Case no TRB-SBB-207925

Lab sample id N906117-05
Dept sample id 7150-005

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	4.66	0.22	0.10	1.0		U	4.83	0.19	96	88-112	80-120
Uranium 235	3.82	0.19	0.011	1.0		U	3.92	0.16	97	88-112	80-120
Uranium 238	5.07	0.23	0.095	1.0		U	5.24	0.21	97	88-112	80-120
Plutonium 238	11.7	0.81	0.040	1.0		PU	11.3	0.45	104	85-115	80-120
Plutonium 239/240	12.4	0.85	0.047	1.0		PU	11.9	0.48	104	85-115	80-120
Nickel 63	170	4.0	1.9	30		NI_L	168	6.7	101	83-117	
Americium 241	9.41	0.62	0.025	1.0		AM	10.5	0.42	90	87-113	80-120
Total Strontium	14.0	0.37	0.10	1.0		SR	12.5	0.50	112	82-118	
Cobalt 60	0.210	0.018	0.010	0.050		GAM	0.203	0.008	103	73-127	80-120
Cesium 137	0.250	0.017	0.010	0.10		GAM	0.231	0.009	108	73-127	80-120

100 BC Areas- Full Protocol

QC-LCS 31123

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 09/10/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0445

N906117-07

BOVHK5

DUPLICATE

SDG	7150			Client/Case no	Hanford SDG-H0445
Contact	Kevin c. Johnson			Case no	TRB-SBR-207925
	DUPLICATE		ORIGINAL		
Lab sample id	N906117-07	Lab sample id	N906117-01	Client sample id	BOVHK5
Dept sample id	7150-007	Dept sample id	7150-001	Location/Matrix	100-BC 116-C-2A SOLID
		Received	06/21/99	Collected	06/16/99 07:42
% solids	97.5	% solids	97.5	Custody/SAF No	B99-002-112 B99-002

ANALYTE	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
Uranium 233/234	0.361	0.15	0.11	1.0	J	U	0.344	0.14	0.085	J	5	88	
Uranium 235	0.018	0.035	0.13	1.0	U	U	0.040	0.054	0.10	U	-		
Uranium 238	0.318	0.15	0.11	1.0	J	U	0.411	0.14	0.085	J	26	85	
Plutonium 238	-0.007	0.013	0.051	1.0	U	PU	0.006	0.059	0.11	U	-		
Plutonium 239/240	0.020	0.040	0.064	1.0	U	PU	0.030	0.036	0.066	U	-		
Nickel 63	31.1	2.0	2.0	30		NI_L	30.0	1.9	1.9		4	25	
Americium 241	0.031	0.023	0.031	1.0	J	AM	0.036	0.041	0.074	U	15	211	
Total Strontium	0.096	0.10	0.10	1.0	U	SR	0.182	0.11	0.13	J	62	162	
Potassium 40	11.0	0.26	0.10			GAM	11.9	0.48	0.23		8	33	
Cobalt 60	1.50	0.030	0.020	0.060		GAM	1.64	0.061	0.034		9	33	
Cesium 137	1.00	0.024	0.020	0.10		GAM	1.04	0.049	0.040		4	33	
Europium 152	0.065	0.019	0.030	0.10	J	GAM	U		0.074	U	13	168	
Europium 154	U		0.040	0.10	U	GAM	U		0.094	U	-		
Europium 155	U		0.060	0.10	U	GAM	U		0.053	U	-		
Radium 226	0.410	0.026	0.030	0.10		GAM	0.475	0.060	0.061		15	39	
Radium 228	0.580	0.073	0.080	0.20		GAM	0.607	0.14	0.16		5	51	
Thorium 228	0.600	0.017	0.020			GAM	0.614	0.032	0.036		2	33	
Thorium 232	0.580	0.073	0.080			GAM	0.607	0.14	0.16		5	51	
Americium 241	U		0.040		U	GAM	U		0.033	U	-		
Uranium 238	U		2.0		U	GAM	U		4.7	U	-		
Uranium 235	U		0.050		U	GAM	U		0.081	U	-		

100 BC Areas- Full Protocol

QC-DUP#1 31125

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DUP
Version	3.06
Report date	09/10/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0445

N906117-01 BOVHK5

DATA SHEET

SDG	7150	Client/Case no	Hanford SDG-H0445
Contact	Kevin c. Johnson	Contract	TRB-SBB-207925
Lab sample id	N906117-01	Client sample id	BOVHK5
Dept sample id	7150-001	Location/Matrix	100-BC 116-C-2A SOLID
Received	06/21/99	Collected	06/16/99 07:42
% solids	97.5	Custody/SAF No	B99-002-112 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	0.344	0.14	0.085	1.0	J	U
Uranium 235	15117-96-1	0.040	0.054	0.10	1.0	U	U
Uranium 238	U-238	0.411	0.14	0.085	1.0	J	U
Plutonium 238	13981-16-3	0.006	0.059	0.11	1.0	U	PU
Plutonium 239/240	PU-239/240	0.030	0.036	0.066	1.0	U	PU
Nickel 63	13981-37-8	30.0	1.9	1.9	30		NI_L
Americium 241	14596-10-2	0.036	0.041	0.074	1.0	U	AM
Total Strontium	SR-RAD	0.182	0.11	0.13	1.0	J	SR
Potassium 40	13966-00-2	11.9	0.48	0.23			GAM
Cobalt 60	10198-40-0	1.64	0.061	0.034	0.050		GAM
Cesium 137	10045-97-3	1.04	0.049	0.040	0.10		GAM
Europium 152	14683-23-9	U		0.074	0.10	U	GAM
Europium 154	15585-10-1	U		0.094	0.10	U	GAM
Europium 155	14391-16-3	U		0.053	0.10	U	GAM
Radium 226	13982-63-3	0.475	0.060	0.061	0.10		GAM
Radium 228	15262-20-1	0.607	0.14	0.16	0.20		GAM
Thorium 228	14274-82-9	0.614	0.032	0.036			GAM
Thorium 232	TH-232	0.607	0.14	0.16			GAM
Americium 241	14596-10-2	U		0.033		U	GAM
Uranium 238	U-238	U		4.7		U	GAM
Uranium 235	15117-96-1	U		0.081		U	GAM

100 BC Areas- Full Protocol

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	09/10/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0445

N906117-02 BOVHK6

DATA SHEET

SDG 7150 Client/Case no Hanford SDG-H0445
Contact Kevin c. Johnson Contract TRB-SBB-207925

Lab sample id N906117-02 Client sample id BOVHK6
Dept sample id 7150-002 Location/Matrix 100-BC 116-C-2A SOLID
Received 06/21/99 Collected 06/16/99 08:05
% solids 97.7 Custody/SAF No B99-002-112 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	0.445	0.056	0.018	1.0	J	U
Uranium 235	15117-96-1	0.031	0.015	0.015	1.0	J	U
Uranium 238	U-238	0.475	0.060	0.021	1.0	J	U
Plutonium 238	13981-16-3	0.123	0.042	0.045	1.0	J	PU
Plutonium 239/240	PU-239/240	1.30	0.14	0.042	1.0		PU
Nickel 63	13981-37-8	465	6.7	2.0	30		NI_L
Americium 241	14596-10-2	0.654	0.11	0.046	1.0	J	AM
Total Strontium	SR-RAD	6.18	0.24	0.12	1.0		SR
Potassium 40	13966-00-2	12.0	0.54	0.37			GAM
Cobalt 60	10198-40-0	12.2	0.15	0.076	0.050		GAM
Cesium 137	10045-97-3	23.0	0.18	0.13	0.10		GAM
Europium 152	14683-23-9	29.6	0.32	0.30	0.10		GAM
Europium 154	15585-10-1	3.29	0.25	0.25	0.10		GAM
Europium 155	14391-16-3	U		0.25	0.10	U	GAM
Radium 226	13982-63-3	0.412	0.13	0.18	0.10		GAM
Radium 228	15262-20-1	0.449	0.27	0.39	0.20		GAM
Thorium 228	14274-82-9	0.727	0.089	0.13			GAM
Thorium 232	TH-232	0.449	0.27	0.39			GAM
Americium 241	14596-10-2	0.478	0.18	0.28			GAM
Uranium 238	U-238	U		12		U	GAM
Uranium 235	15117-96-1	U		0.33		U	GAM

100 BC Areas- Full Protocol

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 09/10/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0445

N906117-03 BOVHK7

DATA SHEET

SDG	7150	Client/Case no	Hanford SDG-H0445
Contact	Kevin c. Johnson	Contract	TRB-SBB-207925
Lab sample id	N906117-03	Client sample id	BOVHK7
Dept sample id	7150-003	Location/Matrix	100-BC 116-C-2A SOLID
Received	06/21/99	Collected	06/16/99 08:05
% solids	97.7	Custody/SAF No	B99-002-112 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	0.418	0.047	0.015	1.0	J	U
Uranium 235	15117-96-1	0.029	0.014	0.011	1.0	J	U
Uranium 238	U-238	0.415	0.047	0.011	1.0	JB	U
Plutonium 238	13981-16-3	0.153	0.052	0.035	1.0	J	PU
Plutonium 239/240	PU-239/240	1.49	0.17	0.035	1.0		PU
Nickel 63	13981-37-8	540	7.3	2.1	30		NI_L
Americium 241	14596-10-2	0.710	0.099	0.039	1.0	J	AM
Total Strontium	SR-RAD	3.07	0.18	0.12	1.0		SR
Potassium 40	13966-00-2	13.2	0.37	0.24			GAM
Cobalt 60	10198-40-0	11.1	0.090	0.038	0.050		GAM
Cesium 137	10045-97-3	22.9	0.11	0.070	0.10		GAM
Europium 152	14683-23-9	25.5	0.16	0.13	0.10		GAM
Europium 154	15585-10-1	2.73	0.13	0.13	0.10		GAM
Europium 155	14391-16-3	U		0.19	0.10	U	GAM
Radium 226	13982-63-3	0.416	0.070	0.091	0.10		GAM
Radium 228	15262-20-1	0.615	0.15	0.21	0.20		GAM
Thorium 228	14274-82-9	0.686	0.049	0.073			GAM
Thorium 232	TH-232	0.615	0.15	0.21			GAM
Americium 241	14596-10-2	0.501	0.097	0.15			GAM
Uranium 238	U-238	U		6.8		U	GAM
Uranium 235	15117-96-1	U		0.19		U	GAM

100 BC Areas- Full Protocol

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	09/10/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0445

N906117-04 BOVHK8

DATA SHEET

SDG	7150	Client/Case no	Hanford SDG-H0445
Contact	Kevin c. Johnson	Contract	TRB-SBB-207925
Lab sample id	N906117-04	Client sample id	BOVHK8
Dept sample id	7150-004	Location/Matrix	100-BC 116-C-2A SOLID
Received	06/21/99	Collected	06/16/99 08:32
% solids	97.3	Custody/SAF No	B99-002-112 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	0.446	0.085	0.035	1.0	J	U
Uranium 235	15117-96-1	0.036	0.027	0.034	1.0	J	U
Uranium 238	U-238	0.431	0.084	0.028	1.0	J	U
Plutonium 238	13981-16-3	0	0.013	0.036	1.0	U	PU
Plutonium 239/240	PU-239/240	0.145	0.047	0.036	1.0	J	PU
Nickel 63	13981-37-8	53.5	2.7	2.2	30		NI_L
Americium 241	14596-10-2	0.063	0.028	0.021	1.0	J	AM
Total Strontium	SR-RAD	1.98	0.16	0.12	1.0		SR
Potassium 40	13966-00-2	11.2	0.35	0.16			GAM
Cobalt 60	10198-40-0	0.755	0.032	0.022	0.050		GAM
Cesium 137	10045-97-3	1.34	0.040	0.033	0.10		GAM
Europium 152	14683-23-9	2.19	0.062	0.061	0.10		GAM
Europium 154	15585-10-1	0.264	0.067	0.073	0.10		GAM
Europium 155	14391-16-3	U		0.090	0.10	U	GAM
Radium 226	13982-63-3	0.446	0.045	0.048	0.10		GAM
Radium 228	15262-20-1	0.542	0.090	0.11	0.20		GAM
Thorium 228	14274-82-9	0.594	0.029	0.035			GAM
Thorium 232	TH-232	0.542	0.090	0.11			GAM
Americium 241	14596-10-2	U		0.20		U	GAM
Uranium 238	U-238	U		3.3		U	GAM
Uranium 235	15117-96-1	U		0.10		U	GAM

100 BC Areas- Full Protocol

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	09/10/99

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-002-112

Collector: R Fahlberg/R Kerkow	Company Contact: R Coffman	Telephone No.: 373-6425	Project Coordinator: TRENT, SJ
Project Designation: 100 BC Areas - Full Protocol	Sampling Location: 100 BC 116-C-2A		SAF No.: B99-002
Ice Chest No.: ERC 99 003	Field Logbook No.: EL 1327-3		Method of Shipment: FED EX.
Shipped To: TMA/~~RECRA~~ RF 6-16-99	Offsite Property No.: A990169		Bill of Lading/Air Bill No.: 423579527076
			COA: R16C2A 2600

Price Code:

Data Turnaround: 15 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

SDG H0445

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									
✓ B0VHK5	Soil	6.16.99	0742	X	X			X		tie to		BOTW13
✓ B0VHK6	Soil	6.16.99	0805	X	X			X				BOTW14
✓ B0VHK7	Soil	6.16.99	0805	X	X			X				BOTW14
✓ B0VHK8	Soil	6.16.99	0832	X	X			X				BOTW15

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
R Fahlberg / R Fahlberg	6.16.99 1400	Ref 1-C	6.16.99 1400
REF 1C	61899 1000	SJGALE [illegible]	61899 1000
SJGALE [illegible]	61899 1000	FED EX	6-18-99
Fed Ex	6-19-99 10:15	[illegible] JR Gerse	6-19-99 10:15

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