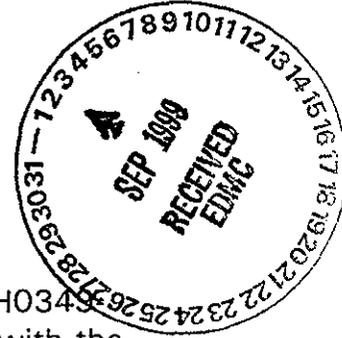


0051618

Date: 21 April 1999
 To: Bechtel Hanford Inc. (technical representative)
 From: TechLaw, Inc.
 Project: 100-D Areas - Full Protocol - Waste Site 116-DR-9
 Subject: Inorganics - Data Package No. H0349-RLN (SDG No. H0349)



INTRODUCTION

This memo presents the results of data validation on Data Package No. H0349-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
BOTV37	2/18/99	Soil	C	Total chromium & total lead
BOTV38	2/18/99	Soil	C	Total chromium & total lead
BOTV39	2/18/99	Soil	C	Total chromium & total lead
BOTV40	2/18/99	Soil	C	Total chromium & total lead
BOTV41	2/18/99	Soil	C	Total chromium & total lead
BOTV42	2/18/99	Soil	C	Total chromium & total lead
BOTV43	2/18/99	Soil	C	Total chromium & total lead
BOTV44	2/18/99	Soil	C	Total chromium & total lead
BOTV45	2/18/99	Soil	C	Total chromium & total lead
BOTV46	2/18/99	Soil	C	Total chromium & total lead
BOTV47	2/18/99	Soil	C	Total chromium & total lead
BOTV48	2/18/99	Soil	C	Total chromium & total lead
BOTV49	2/18/99	Soil	C	Total chromium & total lead
BOTV50	2/18/99	Soil	C	Total chromium & total lead
BOTVK8	2/18/99	Soil	C	Chromium VI

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:

000001

- 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 total lead & total chromium; and 30 days for chrome VI.

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.

Total lead and total chromium were detected in the laboratory blank, but the only sample result effected was the equipment blank (BOTV49), and since qualification with a "U" could potentially mask detects, no action was taken.

All other preparation blank results were acceptable.

Equipment Blank

One equipment blank (BOTV49) was submitted for analysis. Chromium (total) and lead (total) were 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 (B0TV37/B0TV50) 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 target detection limits (TDLs) or the CRDL if no TDL was specified, to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels met the analyte specific TDL or CRDL.

- **Completeness**

Data package No. H0349-RLN (SDG No. H0349) was submitted for validation and verified for completeness. The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

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: H0349	REVIEWER: TLI	DATE: 4/21/99	PAGE <u>1</u> OF <u>1</u>
COMMENTS: No qualifiers assigned			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

000009

Recre LabMet - Lionville

INORGANICS DATA SUMMARY REPORT 03/03/99

CLIENT: THU-HANFORD B99-005
 WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 9902L241

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-002	BOTV37	Chromium, Total	21.0	MG/KG	0.06	1.0
		Lead, Total	3.3	MG/KG	0.19	1.0
-003	BOTV38	Chromium, Total	24.8	MG/KG	0.06	1.0
		Lead, Total	3.2	MG/KG	0.18	1.0
-004	BOTV39	Chromium, Total	37.9	MG/KG	0.05	1.0
		Lead, Total	3.2	MG/KG	0.16	1.0
-005	BOTV49	Chromium, Total	0.13	MG/KG	0.05	1.0
		Lead, Total	0.33	MG/KG	0.16	1.0
-006	BOTV50	Chromium, Total	20.4	MG/KG	0.11	2.0
		Lead, Total	3.8	MG/KG	0.33	2.0
-007	BOTV40	Chromium, Total	9.6	MG/KG	0.12	2.0
		Lead, Total	2.5	MG/KG	0.36	2.0
-008	BOTV41	Chromium, Total	14.6	MG/KG	0.08	2.0
		Lead, Total	2.7	MG/KG	0.25	2.0
-009	BOTV42	Chromium, Total	11.9	MG/KG	0.11	2.0
		Lead, Total	3.5	MG/KG	0.32	2.0
-010	BOTV43	Chromium, Total	8.3	MG/KG	0.09	2.0
		Lead, Total	2.3	MG/KG	0.26	2.0
-011	BOTV44	Chromium, Total	13.2	MG/KG	0.12	2.0
		Lead, Total	2.5	MG/KG	0.35	2.0
-012	BOTV45	Chromium, Total	7.1	MG/KG	0.11	2.0
		Lead, Total	2.5	MG/KG	0.32	2.0
-013	BOTV46	Chromium, Total	9.2	MG/KG	0.12	2.0
		Lead, Total	2.7	MG/KG	0.36	2.0

gpc
 4/20/99

Recon LabFac - Elmhurst

INORGANICS DATA SUMMARY REPORT 03/03/99

CLIENT: TRU-HARTFORD B99-005
WORK ORDER: 10985-001-001-9999-00

REC'D LOT #: 99021241

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING	DILUTION
					LIMIT	FACTOR
-014	BOTV47	Chromium, Total	14.9	MG/KG	0.12	2.0
		Lead, Total	3.0	MG/KG	0.35	2.0
-015	BOTV48	Chromium, Total	6.8	MG/KG	0.11	2.0
		Lead, Total	2.2	MG/KG	0.33	2.0

RS
9/20/99

000013

DR

-- Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 03/16/99

CLIENT: TNU-HANFORD B99-005
WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 9902L241

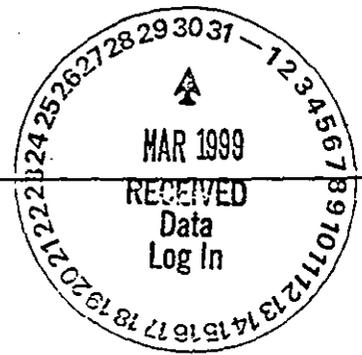
SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	BOTVKS	% Solids	95.3	%	0.01	1.0
		Chromium VI	7.8	MG/KG	0.84	1.0

pu
4/20/99

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

000015



**Recra LabNet Philadelphia
Analytical Report**

Client : TNU HANFORD B99-005
RFW# : 9902L241
SDG/SAF# : H0349/B99-005

W.O.# : 10985-001-001-9999-00
Date Received: 02-24-99

METALS CASE NARRATIVE

1. This narrative covers the analyses of 14 soil samples.
2. The 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.
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. The laboratory control sample (LCS) was 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. All duplicate analyses were within 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

mid/m02-241

3-1-99

Date

000017

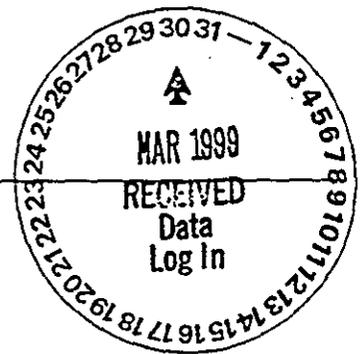
0000



**RECRA
LabNet**

a division of Recra Environmental, Inc.

Virtual Laboratories Everywhere



**Recra LabNet Philadelphia
Analytical Report**

Client : TNU-HANFORD B99-005

W.O. # : 10985-001-001-9999-00

RFW# : 9902L241

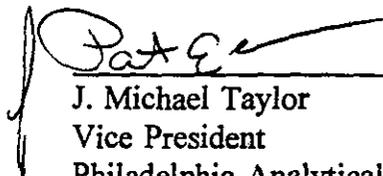
Date Received: 02-24-99

SDG# : H03489

Pages 3/30/99

INORGANIC CASE NARRATIVE

1. This narrative covers the analyses of 1 soil sample.
2. The sample was 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 temperatures were recorded on the chain-of-custody.
5. The method blank for Chromium VI was within method criteria.
6. The Laboratory Control Samples (LCS) were within the laboratory control limits.
7. The matrix spike recoveries for Chromium VI were within the 75-125% control limits.
8. The replicate analysis for Chromium VI was within the 20% Relative Percent Difference (RPD) control limit.
9. Results for solid samples are reported on a dry weight basis.



 J. Michael Taylor
 Vice President
 Philadelphia Analytical Laboratory

3-17-99
 Date

njpl02-241

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 11 pages.

000018

Collector Stankovich/Jacques / Nielson	Company Contact Mike Stankovich	Telephone No. (509) 531-7620	Project Coordinator Trent, SJ	Price Code	Data Turnaround 15 Days
Project Designation 100 D Areas - Full Protocol	Sampling Location 116-DR-9	Field Logbook No. EL-1339-5	SAF No. 899-005	Method of Shipment Fed Ex	
Ice Chest No. 3087, 7057	Offsite Property No.	Bill of Lading/Air B MPS 976 0694 614 4.5⁰⁰			
Shipped to -FMARICRA	COA				

POSSIBLE SAMPLE HAZARDS/REMARKS Possible Radioactive & PCB Contamination	Preservation	None	None	None	None	Cool 4C	None	None				
	Type of Container	P	aG	aG	aG	aG	aG	P				
	No. of Container(s)	1	1	1	1	1	1	1				
	Volume	20mL	60mL	60mL	60mL	250mL	250mL	1000mL				
Special Handling and/or Storage Cool 4C												

SAMPLE ANALYSIS				Activity Scan	Isotopic Plutonium	Nickel-63	Sr-90 - Total Sr	PCBs - 8080	ICP Metals - 6010A (Supertrace) (Chromium, Lead)	See item (1) in Special Instructions		
Sample No.	Matrix *	Sample Date	Sample Time									
30TV37	Soil	2/18/99	0910					X	X			A1
30TV38	Soil	2/18/99	0940					X	X			A2
0TV39	Soil	2/18/99	1010					X	X			A3

CHAIN OF POSSESSION	Sign/Print Names		SPECIAL INSTRUCTIONS COA - R116D9 2F00 Lab & R116D9 2600 Shippers				Matrix * Soil Water Vapor Other Solid Other Liquid
	Requested By <i>Mel Nielson</i>	Date/Time <i>2/23/99 1030</i>	Received By <i>Fed Ex</i>	Date/Time	(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Uranium-238)		
	Requested By <i>Fed Ex</i>	Date/Time <i>2-24-99/0930</i>	Received By <i>Mel Nielson</i>	Date/Time <i>2-24-99/0930</i>			
	Requested By	Date/Time	Received By	Date/Time			
LABORATORY FUNCTION	Received By <i>J. Dealman</i>	Date/Time <i>2-24-99/0930</i>	Disposal Method	Disposed By <i>Lab Tech</i>	Date/Time		

116-DR-9

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

199-005-015

Page 1 of 1

Collector Stankovich/Jacques / Nielson	Company Contact Mike Stankovich	Telephone No. (509) 531-7620	Project Coordinator JRENLSJ	Price Code	Data Turnaround 15 Days
Project Designation TMD Areas - Full Protocol	Sampling Location 116-DR-9	Field Logbook No. EL-1339-5	Method of Shipment Fed Ex	Bill of Lading/Air Bill	
Ice Chest No. 2 of 7, 4 of 7	Offsite Property No.	MPS [976] [0694] [623] 5.1^{ol}			
Shipped To RN 2/18/99 -TMD/RECURA	COA MPS [976] [0694] [641] 4.1^{ol}				

POSSIBLE SAMPLE HAZARDS/REMARKS Possible Radioactive & PCB Contamination	Preservation	None	None	None	None	Cool 4C	None	None		
	Type of Container	P	aG	aG	aG	aG	aG	P		
	No. of Container(s)	1	1	1	1	1	1	1		
Special Handling and/or Storage Cool 4C	Volume	20ml.	60ml.	60ml.	60ml.	250ml.	250ml.	1000ml.		

SAMPLE ANALYSIS				Actual Scan	Isotope Plutonium	Sample #1	Strontium (100% Total) Sr	Pb Bi - 200P	Pb Metals - alpha (Suppressed Bismuth, Lead)	See item (1) on Special Instructions		
Sample No	Matrix *	Sample Date	Sample Time									
10TV40	Soil	2/18/99	1040					X	X			B4
10TV41	Soil	2/18/99	1035					X	X			B5
10TV42	Soil	2/18/99	1025					X	X			B6

CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS COA - R116D9 2F00 Lab & R116D9 2600 Shippers				Matrix *	
Received By R Nielson	Date/Time 2/23/99	Received By Fed Ex	Date/Time 2/24/99	(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Uranium-238)				Soil Water Vapor Other Solid Other Liquid	
Received By Fed Ex	Date/Time 2/24/99	Received By J. Stankovich	Date/Time 2/29/99						
Received By	Date/Time	Received By	Date/Time						
Received By	Date/Time	Received By	Date/Time						
LABORATORY SECTION	Received By Jed	Date/Time 2/24/99	Title Lab Tech	Disposed By				Date/Time 2/24-99/0930	Date/Time

D99-003-010

FEDERAL GOVERNMENT ENVIRONMENTAL REQUEST

Collector Stankovich/Drequis / Nielson	Company Contact Mike Stankovich	Telephone No. (509) 531-7620	Project Coordinator TRINT, SJ	Price Code	Data Turnaround 15 Days
Project Designation TRI D Areas - Full Protocol	Sampling Location 116-DR-9	Field Logbook No. EL-1339-5	SAF No. B99-005		
Ice Chest No.	Offsite Property No.	Method of Shipment Fed Ex			
Shipped to 218199 RJN TMA/RECRA		Bill of Lading/AI MPS 976 0694 666 3.906			
4 OF 7, 5 OF 7			COA		

POSSIBLE SAMPLE HAZARDS/REMARKS Possible Radioactive & PCB Contamination	Preservation	None	None	None	None	Cool 4C	None	None			
	Type of Container	P	aG	aG	aG	aG	aG	P			
	No. of Container(s)	1	1	1	1	1	1	1			
Special Handling and/or Storage Cool 4C	Volume	20mL	60mL	60mL	60mL	250mL	250mL	1000mL			

SAMPLE ANALYSIS				Activity Scan	Isotopic Plutonium	Nickel-63	Strontium-89,90 - Total Sr	PCBs - 8080	ICP Metals - 6010A (Supertrace) (Chromium, Lead)	See Item (1) in Special Instructions		
Sample No.	Matrix *	Sample Date	Sample Time									
10TV43	Soil	2/18/99	0920					X	X			C7
10TV44	Soil	2/18/99	0945					X	X			C8
10TV45	Soil	2/18/99	1015					X	X			C9

CHAIN OF POSSESSION Transferred By: Nielson / R. Nielson 2/24/99 Received By: Fed Ex / [Signature] 2/24/99 Transferred By: Fed Ex / [Signature] 2/24/99 Received By: [Signature] / [Signature] 2/24/99 Transferred By: _____ Received By: _____	SPECIAL INSTRUCTIONS COA - R116D9 2F00 Lab & R116D9 2600 Shippers (1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Uranium-238)	Matrix * Soil Water Vapor Other Solid Other Liquid
LABORATORY ACCEPTANCE Received By: [Signature] Disposed Method: _____ Disposed By: _____	Title: Lab Tech Date/Time: 2/24/99/0930	

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-005-017

Page 1 of 1

Collector Stankovich/Jacques Nielson	Company Contact Mike Stankovich	Telephone No. (509) 531-7620	Project Coordinator TREN, S)	Price Code	Date Turnaround 15 Days
Project Designation 10012 Areas - Full Protocol	Sampling Location 116-DR-9	SAF No. 1199-005		Method of Shipment Fed Ex	
Ice Chest No. 1 of 7, 6 of 7	Field Logbook No. EL-1339-5	Bill of Lading/A MPS 976 0694 632 4.8°C			
Shipped to TMA/RECRA	Offsite Property No.	COA			

POSSIBLE SAMPLE HAZARDS/REMARKS Possible Radioactive & PCB Contamination	Preservation		None	None	None	None	Cool 4C	None	None			
	Type of Container		P	aG	aG	aG	aG	aG	P			
	No. of Container(s)	Volume	1	1	1	1	1	1	1			
Special Handling and/or Storage Cool 4C			20ml.	60ml.	60ml.	60ml.	250ml.	250ml.	1000ml.			
SAMPLE ANALYSIS			Activity Scan	Isotope Plutonium	Ni-63	Strontium Total Sr	Pb-210	Pb-210 Total Pb	See item 111 in Special Instructions			
Sample No	Matrix *	Sample Date	Sample Time									
DTV46	Soil	2/18/99	0950				X	X				D10
DTV47	Soil	2/18/99	0930				X	X				D1
ITV48	Soil	2/18/99	0915				X	X				D2

CHAIN OF POSSESSION	Sign/Print Names	SPECIAL INSTRUCTIONS COA - R116D9 2F00 Lab & R116D9 2600 Shippers	Matrix *
Acquired By <i>[Signature]</i>	Date/Time 2/23/99	Received By <i>[Signature]</i>	Date/Time 2/24/99
Acquired By <i>[Signature]</i>	Date/Time 2-24-99	Received By <i>[Signature]</i>	Date/Time 2-24-99
Acquired By	Date/Time	Received By	Date/Time
LABORATORY RECESSION	Received By <i>[Signature]</i>	Title Lab Tech	Date/Time 2/24/99
Disposal Method		Disposed By	Date/Time 2/24/99

220000

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

1199-005-018

Page 1 of 1

Collector Stankovich/Jacques <i>Nielson</i>	Company Contact Mike Stankovich	Telephone No. (509) 531-7620	Project Coordinator FRINT, SJ	Price Code	Data Turnaround 15 Days
Subject Designation 100 D Areas - Full Protocol	Sampling Location 116-DR-9	Field Logbook No. EL-1339-5	SAF No. 1199-005	Method of Shipment Fed Ex	
Field Chest No. 3 of 7, 6 of 7	Offsite Property No.	Bill of Lading/Air B E29 4690 9261 - 4.70			

POSSIBLE SAMPLE HAZARDS/REMARKS Possible Radioactive & PCB Contamination	Preservation	None	None	None	None	Cool 4C	None	None			
	Type of Container	P	aG	aG	aG	aG	aG	P			
	No. of Container(s)	1	1	1	1	1	1	1			
	Volume	20mL	60mL	60mL	60mL	250mL	250mL	1000mL			

SAMPLE ANALYSIS				Activity Scan	Isotopic Plutonium	Nickel-63	Strontium-89,90 - Total Sr	PCBs - 8080	ICP Metals - 6010A (Supertrace) (Chromium, Lead)	See Item (1) in Special Instructions
Sample No.	Matrix *	Sample Date	Sample Time							
TV49	Soil	2/18/99	0855					X	X	
TV50	Soil	2/18/99	0910					X	X	AI

CHAIN OF POSSESSION	1030 Sign/Print Names		SPECIAL INSTRUCTIONS COA - R116D9 2F00 Lab & R116D9 2600 Shippers				Matrix * Soil Water Vapor Other Solid Other Liquid
	Received By <i>Nielson</i>	Date/Time 2/23/99	Received By <i>Fed Ex</i>	Date/Time	(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Uranium-238)		
	Received By <i>Fed Ex</i>	Date/Time 2-24-99/0920	Received By <i>A. Williams</i>	Date/Time A-24-99/0920			
	Received By	Date/Time	Received By	Date/Time			
Received By	Date/Time	Received By	Date/Time				

LABORATORY SECTION	Received By <i>A. Williams</i>	Date/Time 2-24-99/0930
SAMPLE DESTRUCTION	Disposal Method	Date/Time
	Lab Tech	Disposed By

018

000023

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-005-024

Page 1 of 1

016

Collector Stankovich/Jacques / <i>Nielson</i>	Company Contact Mike Stankovich	Telephone No. (509) 531-7620	Project Coordinator Trent, SJ	Price Code	Data Turnaround 15 Days
Project Designation HDD Areas - Full Protocol	Sampling Location 116-DR-9	Field Logbook No. EL-1339-5	SAF No. B99-005		
Ice Chest No. <i>1 of 7</i>	Offsite Property No.	Method of Shipment Fed Ex			
Shipped To <i>R116D9</i> TMA/REURA		Bill of Ladt. <i>MPS 1976 0694 657 5.3⁰⁰</i>			
			COA		

POSSIBLE SAMPLE HAZARDS/REMARKS <i>Possible Radioactive & PCB Contamination</i>	Preservation	Cool 4C									
		Type of Container	2G								
	No. of Container(s)	1									
Special Handling and/or Storage Cool 4C	Volume	125ml.									
SAMPLE ANALYSIS		Chromium Hex - 7196									

Sample No.	Matrix *	Sample Date	Sample Time								
BOTVK8	Soil	<i>2/18/99</i>	<i>0910 X</i>								<i>A1</i>

CHAIN OF POSSESSION	Sign/Print Names		SPECIAL INSTRUCTIONS COA - R116D9 2F00 Lab & R116D9 2600 Shippers				Matrix * Soil Water Vapor Other Solid Other Liquid
	Relinquished By <i>Brent Nielson / R Nielson</i>	Date/Time <i>10:30 2/23/99</i>	Received By <i>Fed Ex</i>	Date/Time			
	Relinquished By <i>Fed Ex</i>	Date/Time <i>2-24-99/0930</i>	Received By <i>[Signature]</i>	Date/Time <i>2-24-99/0930</i>			
	Relinquished By	Date/Time	Received By	Date/Time			

LABORATORY SECTION	Received By <i>[Signature]</i>	Title <i>Lab Tech</i>	Date/Time <i>2-23-99-0930</i>
SAMPLE #	Disposal Method	Disposed By	Date/Time <i>0930</i>

000024

Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 100 Aven 116-DR-9			DATA PACKAGE: H0349		
VALIDATOR: TLI		LAB: Recy9		DATE: 4/12/99	
CASE:			SDG: H0349		
ANALYSES PERFORMED					
<input type="checkbox"/> CLP/CP	<input type="checkbox"/> CLP/GFAA	<input type="checkbox"/> CLP/Hg	<input type="checkbox"/> CLP/Cyanide	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> SW-846/CP	<input type="checkbox"/> SW-846/GFAA	<input type="checkbox"/> SW-846/Hg	<input type="checkbox"/> SW-846 Cyanide	<input checked="" type="checkbox"/> CR VI	<input type="checkbox"/>
SAMPLES/MATRIX lead + chromium (total) CR VII					
BOTV37 BOTV38 BOTV39 BOTV40 BOTV41 BOTV42					
BOTV43 BOTV44 BOTV45 BOTV46 BOTV47 BOTV48					
BOTV49 BOTV50 BOTVK8					
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: _____

A-19/r

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: Cr + pb (total) in ~~blank~~ blank - allow 5X but FB
Cr .6 49
Pb 1.2 49

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: _____

A-202

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: CR III over - detailed

ASL

Date: 21 April 1999
 To: Bechtel Hanford, Inc. (technical representative)
 From: TechLaw, Inc.
 Project: 100-D Areas - Full Protocol - Waste Site 116-DR-9
 Subject: Radiochemistry - Data Package No. H0349-TNU (SDG No. H0349)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H0349-TNU which was prepared by Thermo NUtec (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
BOTV37	2/18/99	Soil	C	See note 1
BOTV38	2/18/99	Soil	C	See note 1
BOTV39	2/18/99	Soil	C	See note 1
BOTV40	2/18/99	Soil	C	See note 1
BOTV41	2/18/99	Soil	C	See note 1
BOTV42	2/18/99	Soil	C	See note 1
BOTV43	2/18/99	Soil	C	See note 1
BOTV44	2/18/99	Soil	C	See note 1
BOTV45	2/18/99	Soil	C	See note 1
BOTV46	2/18/99	Soil	C	See note 1
BOTV47	2/18/99	Soil	C	See note 1
BOTV48	2/18/99	Soil	C	See note 1
BOTV49	2/18/99	Soil	C	See note 1
BOTV50	2/18/99	Soil	C	See note 1

1 - Gamma spectroscopy; isotopic plutonium; 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

000001

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.

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 elevated to the MDA and 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.

Equipment Blanks

One equipment blank (BOTV49) was submitted for analysis. Potassium-40, radium-226, radium-228, thorium-228 and thorium-232 were detected in the equipment blank. Under the BHI statement of work, no qualification is required.

- **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 70% to 130%. 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 laboratory error, a radiochemical tracer was used in place of a matrix spike for nickel-63. The tracer yield was compared to the 70-130% limit for a matrix spike and the nickel-63 results in samples BOTV40, BOTV44, and BOTV47 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 than 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 BOTV37/BOTV50) 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. All 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 was above the TDL/MDA for the following: europium-155 was over for all samples but BOTV49; americium-241 was over in samples BOTV38, BOTV40, BOTV42, BOTV44, BOTV46, BOTV47 and BOTV50; uranium-238 was over in all samples; uranium-235 was over in samples BOTV37, BOTV38, BOTV40, BOTV41, BOTV42, BOTV43, BOTV44, BOTV46, BOTV47 and BOTV50. 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. H0349 (SDG No. H0349) was submitted for validation and verified for completeness. The completion rate was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to a laboratory error, a radiochemical tracer was used in place of a matrix spike for nickel-63. The tracer yield was compared to the 70-130% limit for a matrix spike and the nickel-63 results in samples BOTV40, BOTV44, and BOTV47 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 was above the TDL/MDA for the following: europium-155 was over for all samples but BOTV49; americium-241 was over in samples BOTV38, BOTV40, BOTV42, BOTV44, BOTV46, BOTV47 and BOTV50; uranium-238 was over in all samples; uranium-235 was over in samples BOTV37, BOTV38, BOTV40, BOTV41, BOTV42, BOTV43, BOTV44, BOTV46, BOTV47 and BOTV50. 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

000005A

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

000007

DATA QUALIFICATION SUMMARY

SDG: H0349	REVIEWER: TLI	DATE: 4/21/99	PAGE <u>1</u> OF <u>1</u>
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Nickel-63	J	B0TV40, B0TV44, B0TV47	Tracer yield

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

000009

Project: BECHTEL-HANFORD																					
Laboratory: TNU																					
Case		SDG: H0349																			
Sample Number		B0TV37		B0TV38		B0TV39		B0TV40		B0TV41		B0TV42		B0TV43		B0TV44		B0TV45		B0TV46	
Location		A1		A2		A3		B4		B5		B6		C7		C8		C9		D10	
Remarks																					
Sample Date		02/18/99		02/18/99		02/18/99		02/18/99		02/18/99		02/18/99		02/18/99		02/18/99		02/18/99		02/18/99	
Radiochemistry	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Plutonium-238	0.1	0.004	U	0.023	U	-0.01	U	0.012	U	-0.01	U	0.009	U	0.022	U	0.017	U	0.032	U	0.014	U
Plutonium-239-40	0.1	0.307		0.162		0.326		0.252		0.272		0.356		0.4		0.213		0.024	U	0.129	
Nickel-63	30	63.5		49.3		53.5		25.6	J	28.3		31.5		56.2		16.4	J	2.99		18.6	
Strontium (total)	1	1.47		1.35		0.976		2.1		1.33		1.18		2.23		0.505		1.36		1.9	
Potassium 40	N/A	12.5		9.58		9.34		10.3		11.1		12		11.5		10.8		10.2		11.2	
Cobalt 60	0.05	1.8		1.09		0.728		0.733		0.65		0.997		1.02		0.493		0.086		0.578	
Cesium 137	0.05	18.4		9.64		15.4		7.88		5.88		8.68		5.44		4.59		0.784		2.99	
Europium 152	0.1	29.2		21.1		11		20.9		18.1		29		29.4		12.8		1.08		11.1	
Europium 154	0.1	3.35		2.45		1.24		2.34		2.24		3.6		3.7		1.53		0.115		1.64	
Europium 155	0.05	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Radium 226	0.1	0.339		0.298		0.315		0.415		0.578		0.397		0.415		0.422		0.392		0.42	
Radium 228	0.2	0.579		0.5		0.477		0.688		0.585		0.663		0.266		0.537		0.619		0.529	
Thorium 228	N/A	0.526		0.451		0.468		0.59		0.584		0.609		0.504		0.56		0.59		0.603	
Thorium 232	N/A	0.579		0.5		0.477		0.688		0.585		0.663		0.266		0.537		0.619		0.529	
Americium 241	0.1	U	U	U	U	U	U	U	U	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	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	U	U	U	U	U	U	U	U

N/A = Not Applicable
 NA = Not Analyzed

Project: BECHTEL-HANFORD																			
Laboratory: TNU																			
Case		SDG: W02064																	
Sample Number		B0TV47			B0TV48			B0TV49			B0TV50								
Location		D1			D2			N/A			A1								
Remarks								Equip. Blank			Duplicate								
Sample Date		02/18/99			02/18/99			02/18/99			02/18/99								
Radiochemistry	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q		
Plutonium-238	0.1	0.039	U	0	U	0.032	U	0.006	U										
Plutonium-239-40	0.1	0.414		-0.008	U	0.013	U	0.428											
Nickel-63	30	104	J	2.69	U	-1.15	U	69.2											
Strontium (total)	1	1.83		0.452		-0.044	U	1.62											
Potassium 40	N/A	12.1		11		4.53		10.2											
Cobalt 60	0.05	3.54		0.083		U U		1.88											
Cesium 137	0.05	9.92		0.546		U U		19.5											
Europium 152	0.1	38.1		0.551		U U		37.5											
Europium 154	0.1	7.12		0.114		U U		4.04											
Europium 155	0.05	U U		U U		U U		U U											
Radium 226	0.1	0.431		0.455		0.159		0.385											
Radium 228	0.2	0.602		0.616		0.158		0.626											
Thorium 228	N/A	0.57		0.6		0.169		0.539											
Thorium 232	N/A	0.602		0.616		0.158		0.626											
Americium 241	0.1	U U		U U		U U		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											

000011

N/A = Not Applicable
 NA = Not Analyzed

TMA / RICHMOND
 SAMPLE DELIVERY GROUP H0349

N902094-01

B0TV37

DATA SHEET

SDG <u>7092</u>	Client/Case no <u>Hanford</u>	<u>SDG-H0349</u>
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N902094-01</u>	Client sample id <u>B0TV37</u>	
Dept sample id <u>7092-001</u>	Location/Matrix <u>116-DR-9</u>	<u>SOLID</u>
Received <u>02/26/99</u>	Collected <u>02/18/99 09:10</u>	
* solids <u>95.3</u>	Custody/SAF No <u>B99005-014</u>	<u>B99-005</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Plutonium 238	13981-16-3	0.004	0.024	0.045	0.050	U	PU
Plutonium 239/240	PU-239/240	0.307	0.075	0.039	0.050		PU
Nickel 63	13981-37-8	63.5	2.8	2.1	20		NI_L
Total Strontium	SR-RAD	1.47	0.17	0.15	1.0		SR
Potassium 40	13966-00-2	12.5	0.59	0.27			GAM
Cobalt 60	10198-40-0	1.80	0.082	0.060	0.050		GAM
Cesium 137	10045-97-3	18.4	0.18	0.12	0.050		GAM
Europium 152	14683-23-9	29.2	0.32	0.27	0.10		GAM
Europium 154	15585-10-1	3.35	0.27	0.23	0.10		GAM
Europium 155	14391-16-3	U		0.21	0.10	U	GAM
Radium 226	13982-63-3	0.339	0.12	0.15	0.10		GAM
Radium 228	15262-20-1	0.579	0.26	0.34	0.20		GAM
Thorium 228	14274-82-9	0.526	0.076	0.11			GAM
Thorium 232	TH-232	0.579	0.26	0.34			GAM
Americium 241	14596-10-2	U		0.098		U	GAM
Uranium 238	U-238	U		13		U	GAM
Uranium 235	15117-96-1	U		0.25		U	GAM

100 D Areas - Full Protocol

see
 4/20/99

000012

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>03/31/99</u>

TMA / RICHMOND
 SAMPLE DELIVERY GROUP H0349

N902094-02

B0TV38

DATA SHEET

SDG 7092 Client/Case no Hanford SDG-H0349
 Contact L.A. Johnson Case no TRB-SBB-207925

Lab sample id N902094-02 Client sample id B0TV38
 Dept sample id 7092-002 Location/Matrix 116-DR-9 SOLID
 Received 02/26/99 Collected 02/18/99 09:40
 % solids 94.6 Custody/SAF No B99005-014 B99-005

ANALYTE	CAS NO	RESULT pCi/g	2σ KRR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Plutonium 238	13981-16-3	0.023	0.037	0.057	0.050	U	PU
Plutonium 239/240	PU-239/240	0.162	0.066	0.057	0.050		PU
Nickel 63	13981-37-8	49.3	2.4	2.0	20		NI_L
Total Strontium	SR-RAD	1.35	0.16	0.14	1.0		SR
Potassium 40	13966-00-2	9.58	0.50	0.26			GAM
Cobalt 60	10198-40-0	1.09	0.063	0.050	0.050		GAM
Cesium 137	10045-97-3	9.64	0.11	0.072	0.050		GAM
Europium 152	14683-23-9	21.1	0.24	0.18	0.10		GAM
Europium 154	15585-10-1	2.45	0.21	0.20	0.10		GAM
Europium 155	14391-16-3	U		0.21	0.10	U	GAM
Radium 226	13982-63-3	0.298	0.11	0.14	0.10		GAM
Radium 228	15262-20-1	0.500	0.24	0.30	0.20		GAM
Thorium 228	14274-82-9	0.451	0.061	0.091			GAM
Thorium 232	TH-232	0.500	0.24	0.30			GAM
Americium 241	14596-10-2	U		0.24		U	GAM
Uranium 238	U-238	U		9.5		U	GAM
Uranium 235	15117-96-1	U		0.29		U	GAM

100 D Areas - Full Protocol

pc
 4/20/99

DATA SHEETS

Page 2

SUMMARY DATA SECTION

Page 11

000013

Lab id TMANC
 Protocol Hanford
 Version Ver 1.0
 Form DVD-DS
 Version 3.06
 Report date 03/31/99

TMA / RICHMOND
 SAMPLE DELIVERY GROUP H0349

N902094-03

B0TV39

DATA SHEET

SDG 7092 Client/Case no Hanford SDG-H0349
 Contact L.A. Johnson Case no TRB-SBB-207925

Lab sample id N902094-03 Client sample id B0TV39
 Dept sample id 7092-003 Location/Matrix 116-DR-9 SOLID
 Received 02/26/99 Collected 02/18/99 10:10
 ‡ solids 94.3 Custody/SAF No B99005-014 B99-005

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Plutonium 238	13981-16-3	0.010	0.039	0.082	0.050	U	PU
Plutonium 239/240	PU-239/240	0.326	0.081	0.047	0.050		PU
Nickel 63	13981-37-8	53.5	2.6	2.2	20		NI_L
Total Strontium	SR-RAD	0.976	0.16	0.17	1.0	J	SR
Potassium 40	13966-00-2	9.34	0.28	0.14			GAM
Cobalt 60	10198-40-0	0.728	0.034	0.025	0.050		GAM
Cesium 137	10045-97-3	15.4	0.090	0.045	0.050		GAM
Europium 152	14683-23-9	11.0	0.11	0.095	0.10		GAM
Europium 154	15585-10-1	1.24	0.095	0.089	0.10		GAM
Europium 155	14391-16-3	U		0.096	0.10	U	GAM
Radium 226	13982-63-3	0.315	0.057	0.059	0.10		GAM
Radium 228	15262-20-1	0.477	0.13	0.15	0.20		GAM
Thorium 228	14274-82-9	0.468	0.034	0.047			GAM
Thorium 232	TH-232	0.477	0.13	0.15			GAM
Americium 241	14596-10-2	U		0.038		U	GAM
Uranium 238	U-238	U		5.0		U	GAM
Uranium 235	15117-96-1	U		0.10		U	GAM

100 D Areas - Full Protocol

pu
 4/20/99

000014

Lab id TMANC
 Protocol Hanford
 Version Ver 1.0
 Form DVD-DS
 Version 3.06
 Report date 03/31/99

TMA / RICHMOND
SAMPLE DELIVERY GROUP H0349

N902094-04

B0TV40

DATA SHEET

SDG <u>7092</u>	Client/Case no <u>Hanford</u>	<u>SDG-H0349</u>
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N902094-04</u>	Client sample id <u>B0TV40</u>	
Dept sample id <u>7092-004</u>	Location/Matrix <u>116-DR-9</u>	<u>SOLID</u>
Received <u>02/26/99</u>	Collected <u>02/18/99 10:40</u>	
% solids <u>94.0</u>	Custody/SAF No <u>B99005-015</u>	<u>B99-005</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TRST
Plutonium 238	13981-16-3	0.012	0.033	0.054	0.050	U	PU
Plutonium 239/240	PU-239/240	0.252	0.067	0.045	0.050		PU
Nickel 63	13981-37-8	25.6	2.5	3.0	20	J	NI_L
Total Strontium	SR-RAD	2.10	0.19	0.15	1.0		SR
Potassium 40	13966-00-2	10.3	0.29	0.14			GAM
Cobalt 60	10198-40-0	0.733	0.034	0.029	0.050		GAM
Cesium 137	10045-97-3	7.88	0.073	0.058	0.050		GAM
Europium 152	14683-23-9	20.9	0.13	0.099	0.10		GAM
Europium 154	15585-10-1	2.34	0.12	0.11	0.10		GAM
Europium 155	14391-16-3	U		0.17	0.10	U	GAM
Radium 226	13982-63-3	0.415	0.061	0.080	0.10		GAM
Radium 228	15262-20-1	0.688	0.12	0.16	0.20		GAM
Thorium 228	14274-82-9	0.590	0.035	0.052			GAM
Thorium 232	TH-232	0.688	0.12	0.16			GAM
Americium 241	14596-10-2	U		0.14		U	GAM
Uranium 238	U-238	U		5.5		U	GAM
Uranium 235	15117-96-1	U		0.17		U	GAM

100 D Areas - Full Protocol

Handwritten:
JMS
4/20/99

DATA SHEETS

Page 4

SUMMARY DATA SECTION

Page 13

000015

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>03/31/99</u>

TMA / RICHMOND
 SAMPLE DELIVERY GROUP H0349

N902094-05

B0TV41

DATA SHEET

SDG 7092 Client/Case no Hanford SDG-H0349
 Contact L.A. Johnson Case no TRB-SBB-207925
 Lab sample id N902094-05 Client sample id B0TV41
 Dept sample id 7092-005 Location/Matrix 116-DR-9 SOLID
 Received 02/26/99 Collected 02/18/99 10:35
 † solids 94.4 Custody/SAF No B99005-015 B99-005

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Plutonium 238	13981-16-3	0.010	0.039	0.086	0.050	U	PU
Plutonium 239/240	PU-239/240	0.272	0.080	0.054	0.050		PU
Nickel 63	13981-37-8	28.3	2.1	2.2	20		NI_L
Total Strontium	SR-RAD	1.33	0.16	0.15	1.0		SR
Potassium 40	13966-00-2	11.1	0.47	0.26			GAM
Cobalt 60	10198-40-0	0.650	0.049	0.040	0.050		GAM
Cesium 137	10045-97-3	5.88	0.11	0.085	0.050		GAM
Europium 152	14683-23-9	18.1	0.19	0.14	0.10		GAM
Europium 154	15585-10-1	2.24	0.22	0.19	0.10		GAM
Europium 155	14391-16-3	U		0.14	0.10	U	GAM
Radium 226	13982-63-3	0.578	0.10	0.12	0.10		GAM
Radium 228	15262-20-1	0.585	0.22	0.26	0.20		GAM
Thorium 228	14274-82-9	0.584	0.052	0.072			GAM
Thorium 232	TH-232	0.585	0.22	0.26			GAM
Americium 241	14596-10-2	U		0.062		U	GAM
Uranium 238	U-238	U		9.2		U	GAM
Uranium 235	15117-96-1	U		0.17		U	GAM

100 D Areas - Full Protocol

pic
 4/20/99

Lab id TMANC
 Protocol Hanford
 Version Ver 1.0
 Form DVD-DS
 Version 3.06
 Report date 03/31/99

TMA / RICHMOND
SAMPLE DELIVERY GROUP H0349

N902094-06

B0TV42

DATA SHEET

SDG 7092 Client/Case no Hanford SDG-H0349
 Contact L.A. Johnson Case no TRB-SBB-207925
 Lab sample id N902094-06 Client sample id B0TV42
 Dept sample id 7092-006 Location/Matrix 116-DR-9 SOLID
 Received 02/26/99 Collected 02/18/99 10:25
 † solids 94.1 Custody/SAF No B99005-015 B99-005

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Plutonium 238	13981-16-3	0.009	0.026	0.048	0.050	U	PU
Plutonium 239/240	PU-239/240	0.356	0.081	0.033	0.050		PU
Nickel 63	13981-37-8	31.5	2.1	2.1	20		NI_L
Total Strontium	SR-RAD	1.18	0.15	0.14	1.0		SR
Potassium 40	13966-00-2	12.0	0.45	0.27			GAM
Cobalt 60	10198-40-0	0.997	0.050	0.046	0.050		GAM
Cesium 137	10045-97-3	8.68	0.089	0.064	0.050		GAM
Europium 152	14683-23-9	29.0	0.21	0.16	0.10		GAM
Europium 154	15585-10-1	3.60	0.16	0.15	0.10		GAM
Europium 155	14391-16-3	U		0.19	0.10	U	GAM
Radium 226	13982-63-3	0.397	0.086	0.12	0.10		GAM
Radium 228	15262-20-1	0.663	0.21	0.28	0.20		GAM
Thorium 228	14274-82-9	0.609	0.055	0.082			GAM
Thorium 232	TH-232	0.663	0.21	0.28			GAM
Americium 241	14596-10-2	U		0.22		U	GAM
Uranium 238	U-238	U		8.7		U	GAM
Uranium 235	15117-96-1	U		0.26		U	GAM

100 D Areas - Full Protocol

per
4/20/99

000017

Lab id TMANC
 Protocol Hanford
 Version Ver 1.0
 Form DVD-DS
 Version 3.06
 Report date 03/31/99

TMA / RICHMOND
SAMPLE DELIVERY GROUP H0349

N902094-07

B0TV43

DATA SHEET

SDG <u>7092</u>	Client/Case no <u>Hanford</u>	SDG-H0349
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N902094-07</u>	Client sample id <u>B0TV43</u>	
Dept sample id <u>7092-007</u>	Location/Matrix <u>116-DR-9</u>	<u>SOLID</u>
Received <u>02/26/99</u>	Collected <u>02/18/99 09:20</u>	
% solids <u>95.3</u>	Custody/SAF No <u>B99005-016</u>	<u>B99-005</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Plutonium 238	13981-16-3	0.022	0.027	0.050	0.050	U	PU
Plutonium 239/240	PU-239/240	0.400	0.094	0.050	0.050		PU
Nickel 63	13981-37-8	56.2	2.8	2.4	20		NI_L
Total Strontium	SR-RAD	2.23	0.19	0.14	1.0		SR
Potassium 40	13966-00-2	11.5	0.47	0.26			GAM
Cobalt 60	10198-40-0	1.02	0.061	0.046	0.050		GAM
Cesium 137	10045-97-3	5.44	0.11	0.098	0.050		GAM
Europium 152	14683-23-9	29.4	0.25	0.20	0.10		GAM
Europium 154	15585-10-1	3.70	0.23	0.20	0.10		GAM
Europium 155	14391-16-3	U		0.27	0.10	U	GAM
Radium 226	13982-63-3	0.415	0.11	0.14	0.10		GAM
Radium 228	15262-20-1	0.266	0.24	0.31	0.20	U	GAM
Thorium 228	14274-82-9	0.504	0.058	0.083			GAM
Thorium 232	TH-232	0.266	0.24	0.31		U	GAM
Americium 241	14596-10-2	U		0.071		U	GAM
Uranium 238	U-238	U		11		U	GAM
Uranium 235	15117-96-1	U		0.19		U	GAM

100 D Areas - Full Protocol

pm
4/20/99

DATA SHEETS

Page 7

SUMMARY DATA SECTION

Page 16

000018

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>03/31/99</u>

TMA / RICHMOND
SAMPLE DELIVERY GROUP H0349

N902094-08

B0TV44

DATA SHEET

SDG <u>7092</u>	Client/Case no <u>Hanford</u>	SDG- <u>H0349</u>
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N902094-08</u>	Client sample id <u>B0TV44</u>	
Dept sample id <u>7092-008</u>	Location/Matrix <u>116-DR-9</u>	<u>SOLID</u>
Received <u>02/26/99</u>	Collected <u>02/18/99 09:45</u>	
% solids <u>95.8</u>	Custody/SAF No <u>B99005-016</u>	<u>B99-005</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Plutonium 238	13981-16-3	0.017	0.045	<u>0.090</u>	0.050	U	PU
Plutonium 239/240	PU-239/240	0.213	0.078	<u>0.075</u>	0.050		PU
Nickel 63	13981-37-8	16.4	2.2	<u>3.0</u>	20	<i>J</i>	NI_L
Total Strontium	SR-RAD	0.505	0.18	<u>0.23</u>	1.0	U	SR
Potassium 40	13966-00-2	10.8	0.43	<u>0.25</u>			GAM
Cobalt 60	10198-40-0	0.493	0.042	<u>0.037</u>	0.050		GAM
Cesium 137	10045-97-3	4.59	0.078	<u>0.064</u>	0.050		GAM
Europium 152	14683-23-9	12.8	0.15	<u>0.11</u>	0.10		GAM
Europium 154	15585-10-1	1.53	0.13	<u>0.13</u>	0.10		GAM
Europium 155	14391-16-3	U		<u>0.14</u>	0.10	U	GAM
Radium 226	13982-63-3	0.422	0.076	<u>0.095</u>	0.10		GAM
Radium 228	15262-20-1	0.537	0.15	<u>0.20</u>	0.20		GAM
Thorium 228	14274-82-9	0.560	0.041	<u>0.058</u>			GAM
Thorium 232	TH-232	0.537	0.15	<u>0.20</u>			GAM
Americium 241	14596-10-2	U		<u>0.16</u>		U	GAM
Uranium 238	U-238	U		<u>5.9</u>		U	GAM
Uranium 235	15117-96-1	U		<u>0.19</u>		U	GAM

100 D Areas - Full Protocol

me
4/20/99

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>03/31/99</u>

TMA / RICHMOND
SAMPLE DELIVERY GROUP H0349

N902094-09

B0TV45

DATA SHEET

SDG 7092 Client/Case no Hanford SDG-H0349
 Contact L.A. Johnson Case no TRB-SBB-207925
 Lab sample id N902094-09 Client sample id B0TV45
 Dept sample id 7092-009 Location/Matrix 116-DR-9 SOLID
 Received 02/26/99 Collected 02/18/99 10:15
 % solids 94.9 Custody/SAF No B99005-016 B99-005

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Plutonium 238	13981-16-3	0.032	0.032	0.062	0.050	U	PU
Plutonium 239/240	PU-239/240	0.024	0.032	0.062	0.050	U	PU
Nickel 63	13981-37-8	2.99	1.7	2.7	20	J	NI_L
Total Strontium	SR-RAD	1.36	0.19	0.20	1.0		SR
Potassium 40	13966-00-2	10.2	0.25	0.11			GAM
Cobalt 60	10198-40-0	0.086	0.013	0.014	0.050		GAM
Cesium 137	10045-97-3	0.784	0.017	0.011	0.050		GAM
Europium 152	14683-23-9	1.08	0.032	0.032	0.10		GAM
Europium 154	15585-10-1	0.115	0.038	0.044	0.10		GAM
Europium 155	14391-16-3	U		0.070	0.10	U	GAM
Radium 226	13982-63-3	0.392	0.024	0.024	0.10		GAM
Radium 228	15262-20-1	0.619	0.059	0.059	0.20		GAM
Thorium 228	14274-82-9	0.590	0.017	0.018			GAM
Thorium 232	TH-232	0.619	0.059	0.059			GAM
Americium 241	14596-10-2	U		0.040		U	GAM
Uranium 238	U-238	U		1.6		U	GAM
Uranium 235	15117-96-1	U		0.055		U	GAM

100 D Areas - Full Protocol

pm
4/20/99

000020

Lab id TMANC
 Protocol Hanford
 Version Ver 1.0
 Form DVD-DS
 Version 3.06
 Report date 03/31/99

TMA / RICHMOND
 SAMPLE DELIVERY GROUP H0349

N903006-01

B0TV46

DATA SHEET

SDG 7093 Client/Case no Hanford SDG-H0349
 Contact L.A. Johnson Case no TRB-SBB-207925

Lab sample id N903006-01 Client sample id B0TV46
 Dept sample id 7093-001 Location/Matrix 116-DR-9 SOLID
 Received 02/26/99 Collected 02/18/99 09:50
 % solids 94.4 Custody/SAF No B99-005-017 B99-005

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Plutonium 238	13981-16-3	0.014	0.027	0.052	0.050	U	PU
Plutonium 239/240	PU-239/240	0.129	0.054	0.052	0.050		PU
Nickel 63	13981-37-8	18.6	2.1	2.8	20	J	NI_L
Total Strontium	SR-RAD	1.90	0.21	0.18	1.0		SR
Potassium 40	13966-00-2	11.2	0.39	0.20			GAM
Cobalt 60	10198-40-0	0.578	0.039	0.034	0.050		GAM
Cesium 137	10045-97-3	2.99	0.063	0.056	0.050		GAM
Europium 152	14683-23-9	11.1	0.13	0.094	0.10		GAM
Europium 154	15585-10-1	1.64	0.11	0.11	0.10		GAM
Europium 155	14391-16-3	U		0.21	0.10	U	GAM
Radium 226	13982-63-3	0.420	0.071	0.086	0.10		GAM
Radium 228	15262-20-1	0.529	0.17	0.20	0.20		GAM
Thorium 228	14274-82-9	0.603	0.035	0.049			GAM
Thorium 232	TH-232	0.529	0.17	0.20			GAM
Americium 241	14596-10-2	U		0.14		U	GAM
Uranium 238	U-238	U		5.6		U	GAM
Uranium 235	15117-96-1	U		0.16		U	GAM

100 D Areas-Full Protocol

pu
 4/20/99

DATA SHEETS

Page 1

SUMMARY DATA SECTION

Page 11

000021

Lab id TMANC
 Protocol Hanford
 Version Ver 1.0
 Form DVD-DS
 Version 3.06
 Report date 03/31/99

TMA / RICHMOND
 SAMPLE DELIVERY GROUP H0349

N903006-02

B0TV47

DATA SHEET

SDG 7093 Client/Case no Hanford SDG-H0349
 Contact L.A. Johnson Case no TRB-SBB-207925

Lab sample id N903006-02 Client sample id B0TV47
 Dept sample id 7093-002 Location/Matrix 116-DR-9 SOLID
 Received 02/26/99 Collected 02/18/99 09:30
 † solids 94.6 Custody/SAF No B99-005-017 B99-005

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TRST
Plutonium 238	13981-16-3	0.039	0.059	0.094	0.050	U	PU
Plutonium 239/240	PU-239/240	0.414	0.14	0.075	0.050		PU
Nickel 63	13981-37-8	104	3.5	2.8	20	J	NI_L
Total Strontium	SR-RAD	1.83	0.22	0.21	1.0		SR
Potassium 40	13966-00-2	12.1	0.29	0.19			GAM
Cobalt 60	10198-40-0	3.54	0.044	0.027	0.050		GAM
Cesium 137	10045-97-3	9.92	0.067	0.055	0.050		GAM
Europium 152	14683-23-9	38.1	0.15	0.099	0.10		GAM
Europium 154	15585-10-1	7.12	0.12	0.10	0.10		GAM
Europium 155	14391-16-3	U		0.39	0.10	U	GAM
Radium 226	13982-63-3	0.431	0.057	0.075	0.10		GAM
Radium 228	15262-20-1	0.602	0.13	0.17	0.20		GAM
Thorium 228	14274-82-9	0.570	0.038	0.056			GAM
Thorium 232	TH-232	0.602	0.13	0.17			GAM
Americium 241	14596-10-2	U		0.11		U	GAM
Uranium 238	U-238	U		5.8		U	GAM
Uranium 235	15117-96-1	U		0.16		U	GAM

100 D Areas-Full Protocol

per
 4/10/99

Lab id TMANC
 Protocol Hanford
 Version Ver 1.0
 Form DVD-DS
 Version 3.06
 Report date 03/31/99

000022

TMA / RICHMOND
 SAMPLE DELIVERY GROUP H0349

N903006-03

B0TV48

DATA SHEET

SDG <u>7093</u>	Client/Case no <u>Hanford</u>	SDG-H0349
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N903006-03</u>	Client sample id <u>B0TV48</u>	
Dept sample id <u>7093-003</u>	Location/Matrix <u>116-DR-9</u>	<u>SOLID</u>
Received <u>02/26/99</u>	Collected <u>02/18/99 09:15</u>	
% solids <u>94.7</u>	Custody/SAF No <u>B99-005-017</u>	<u>B99-005</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Plutonium 238	13981-16-3	0	0.017	0.063	0.050	U	PU
Plutonium 239/240	PU-239/240	-0.008	0.017	0.063	0.050	U	PU
Nickel 63	13981-37-8	2.69	1.9	3.0	20	U	NI_L
Total Strontium	SR-RAD	0.452	0.17	0.24	1.0	J	SR
Potassium 40	13966-00-2	11.0	0.41	0.20			GAM
Cobalt 60	10198-40-0	0.083	0.023	0.023	0.050		GAM
Cesium 137	10045-97-3	0.546	0.030	0.025	0.050		GAM
Europium 152	14683-23-9	0.551	0.042	0.049	0.10		GAM
Europium 154	15585-10-1	0.114	0.061	0.071	0.10		GAM
Europium 155	14391-16-3	U		0.070	0.10	U	GAM
Radium 226	13982-63-3	0.455	0.038	0.038	0.10		GAM
Radium 228	15262-20-1	0.616	0.11	0.10	0.20		GAM
Thorium 228	14274-82-9	0.600	0.023	0.023			GAM
Thorium 232	TH-232	0.616	0.11	0.10			GAM
Americium 241	14596-10-2	U		0.025		U	GAM
Uranium 238	U-238	U		2.8		U	GAM
Uranium 235	15117-96-1	U		0.058		U	GAM

100 D Areas-Full Protocol

pu
4/20/99

DATA SHEETS

Page 3

SUMMARY DATA SECTION

Page 13

000023

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>03/31/99</u>

TMA / RICHMOND
SAMPLE DELIVERY GROUP H0349

N903006-04

B0TV49

DATA SHEET

SDG <u>7093</u>	Client/Case no <u>Hanford</u>	SDG- <u>H0349</u>
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N903006-04</u>	Client sample id <u>B0TV49</u>	
Dept sample id <u>7093-004</u>	Location/Matrix <u>116-DR-9</u>	<u>SOLID</u>
Received <u>02/26/99</u>	Collected <u>02/18/99 08:55</u>	
% solids <u>100.0</u>	Custody/SAF No <u>B99-005-018</u>	<u>B99-005</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TRST
Plutonium 238	13981-16-3	0.032	0.052	0.099	0.050	U	PU
Plutonium 239/240	PU-239/240	0.013	0.026	0.062	0.050	U	PU
Nickel 63	13981-37-8	-1.15	1.3	2.3	20	U	NI_L
Total Strontium	SR-RAD	-0.044	0.25	0.33	1.0	U	SR
Potassium 40	13966-00-2	4.53	0.25	0.10			GAM
Cobalt 60	10198-40-0	U		0.014	0.050	U	GAM
Cesium 137	10045-97-3	U		0.011	0.050	U	GAM
Europium 152	14683-23-9	U		0.025	0.10	U	GAM
Europium 154	15585-10-1	U		0.045	0.10	U	GAM
Europium 155	14391-16-3	U		0.023	0.10	U	GAM
Radium 226	13982-63-3	0.159	0.022	0.020	0.10		GAM
Radium 228	15262-20-1	0.158	0.052	0.055	0.20	J	GAM
Thorium 228	14274-82-9	0.169	0.013	0.013			GAM
Thorium 232	TH-232	0.158	0.052	0.055			GAM
Americium 241	14596-10-2	U		0.015		U	GAM
Uranium 238	U-238	U		1.7		U	GAM
Uranium 235	15117-96-1	U		0.033		U	GAM

100 D Areas-Full Protocol

see
4/20/99

000024

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>03/31/99</u>

TMA / RICHMOND
SAMPLE DELIVERY GROUP H0349

N903006-05

B0TV50

DATA SHEET

SDG 7093 Client/Case no Hanford SDG-H0349
 Contact L.A. Johnson Case no TRB-SBB-207925

Lab sample id N903006-05 Client sample id B0TV50
 Dept sample id 7093-005 Location/Matrix 116-DR-9 SOLID
 Received 02/26/99 Collected 02/18/99 09:10
 † solids 95.2 Custody/SAF No B99-005-018 B99-005

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Plutonium 238	13981-16-3	0.006	0.036	0.074	0.050	U	PU
Plutonium 239/240	PU-239/240	0.428	0.11	0.058	0.050		PU
Nickel 63	13981-37-8	69.2	3.0	2.7	20		NI_L
Total Strontium	SR-RAD	1.62	0.24	0.26	1.0		SR
Potassium 40	13966-00-2	10.2	0.38	0.20			GAM
Cobalt 60	10198-40-0	1.88	0.062	0.050	0.050		GAM
Cesium 137	10045-97-3	19.5	0.14	0.098	0.050		GAM
Europium 152	14683-23-9	37.5	0.28	0.24	0.10		GAM
Europium 154	15585-10-1	4.04	0.18	0.17	0.10		GAM
Radium 226	13982-63-3	0.385	0.11	0.14	0.10		GAM
Radium 228	15262-20-1	0.626	0.20	0.28	0.20		GAM
Thorium 228	14274-82-9	0.539	0.060	0.091			GAM
Thorium 232	TH-232	0.626	0.20	0.28			GAM
Americium 241	14596-10-2	U		0.24		U	GAM
Uranium 238	U-238	U		9.5		U	GAM
Uranium 235	15117-96-1	U		0.28		U	GAM

100 D Areas-Full Protocol

4/20/99

DATA SHEETS

Page 5

SUMMARY DATA SECTION

Page 15

000025

Lab id TMANC
 Protocol Hanford
 Version Ver 1.0
 Form DVD-DS
 Version 3.06
 Report date 03/31/99

TMA / RICHMOND
SAMPLE DELIVERY GROUP H0349

N903006-05

BOTV50

DATA SHEET

SDG <u>7093</u>	Client/Case no <u>Hanford</u>	SDG- <u>H0349</u>
Contact <u>Larry A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N903006-05</u>	Client sample id <u>BOTV50</u>	
Dept sample id <u>7093-005</u>	Location/Matrix <u>116-DR-9</u>	<u>SOLID</u>
Received <u>02/26/99</u>	Collected <u>02/18/99 09:10</u>	
% solids <u>95.2</u>	Custody/SAP No <u>B99005-018</u>	<u>B99-005</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Potassium 40	13966-00-2	10.2	0.38	0.20			GAM
Cobalt 60	10198-40-0	1.88	0.062	0.050	0.050		GAM
Cesium 137	10045-97-3	19.5	0.14	<u>0.098</u>	0.050		GAM
Europium 152	14683-23-9	37.5	0.28	<u>0.24</u>	0.10		GAM
Europium 154	15585-10-1	4.04	0.18	<u>0.17</u>	0.10		GAM
Europium 155	14391-16-3	U		<u>0.24</u>	0.10	U	GAM
Radium 226	13982-63-3	0.385	0.11	<u>0.14</u>	0.10		GAM
Radium 228	15262-20-1	0.626	0.20	<u>0.28</u>	0.20		GAM
Thorium 228	14274-82-9	0.539	0.060	0.091			GAM
Thorium 232	TH-232	0.626	0.20	0.28			GAM
Americium 241	14596-10-2	U		0.24		U	GAM
Uranium 238	U-238	U		9.5		U	GAM
Uranium 235	15117-96-1	U		0.28		U	GAM

100 D Areas-Full Protocol

pkc 5/18/99

000025A

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>05/07/99</u>

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Case Narrative

1.0 GENERAL

Bechtel Hanford Inc. Sample Delivery Group H0349 is comprised of fourteen solid (soil) samples designated under SAF No. B99-005 with a Project Designation of: 100 D Area - Full Protocol.

The samples were received as stated on the Chain-of-Custody document. Any discrepancies are noted on the TNU Sample Receipt Checklist. Due to the number of bottles received the samples were split into two Thermo Nutech work orders, the samples, however were analyzed in common preparation batches.

2.0 ANALYSIS NOTES

2.1 Nickel-63 Analyses

No problems were encountered during the processing of the samples.

2.2 Total Strontium Analyses

No problems were encountered during the processing of the samples.

2.4 Isotopic Plutonium Analyses

The aliquot for the analysis was 0.5 g, less than the nominal 1.0 g. Most of the sample MDA's are greater than the RDL due to the reduced aliquot

2.6 Gamma Scan Analyses

No problems were encountered during the processing of the samples.



Collector Stankovich/Jacques / Nielson	Company Contact Mike Stankovich	Telephone No. (509) 531-7620	Project Coordinator TRENT, SJ	Price Code	Data Turnaround 15 Days
Project Designation 100 D Areas - Full Protocol	Sampling Location 116-DR-9	SAF No. B99-005			
Ice Chest No. EXC 96-043	Field Logbook No. EL-1339-5	Method of Shipment Fed Ex RJN 2/23/99 Truck freight			
Shipped To RJN 2/18/99 TMA/REBR	Offsite Property No. A990072	Bill of Lading/Air Bill No.			

COA

POSSIBLE SAMPLE HAZARDS/REMARKS Possible Radioactive & PCB Contamination	Preservation	None	None	None	None	Cool 4C	None	None			
	Type of Container	P	aG	aG	aG	aG	aG	P			
	No. of Container(s)	1	1	1	1	1	1	1			
Special Handling and/or Storage Cool 4C	Volume	20mL	60mL	60mL	60mL	250mL	250mL	1000mL			

SAMPLE ANALYSIS

Sample No.	Matrix *	Sample Date	Sample Time	Activity Scm	Isotopic Plutonium	Nickel-63	Strontium-89,90 - Total Sr	PCBs - 8080	ICP Metals - 6010A (Supertrace) (Chromium, Lead)	See item (1) in Special Instructions.		
B0TV37	Soil	2/18/99	0910	X	X	X	X			X		A1
B0TV38	Soil	2/18/99	0940	X	X	X	X			X		A2
B0TV39	Soil	2/18/99	1010	X	X	X	X			X		A3

008028

CHAIN OF POSSESSION	110D	Sign/Print Names	SPECIAL INSTRUCTIONS COA - R116D9 2F00 Lab & R116D9 2600 Shippers (1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Uranium-238)	Matrix * Soil Water Vapor Other Solid Other Liquid
Relinquished By <i>R. Nielson</i>	Date/Time 2/23/99	Received By <i>TRUCK FREIGHT</i>	Date/Time	
Relinquished By <i>Truck Freight</i>	Date/Time 2-26-99 11:22	Received By <i>JR Lewis</i>	Date/Time 2-26-99 11:22	
Relinquished By	Date/Time	Received By	Date/Time	
Relinquished By	Date/Time	Received By	Date/Time	

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

Collector Stankovich/Jacques / Nielson	Company Contact Mike Stankovich	Telephone No. (509) 331-7620	Project Coordinator TRENT, SJ	Price Code	Data Turnaround 15 Days
Project Designation 100 D Areas - Full Protocol	Sampling Location 116-DR-9	Field Logbook No. EL-1339-5	Method of Shipment Fed Ex RIN218/99 Truck Freight		
Ice Chest No. ERC96-043	Offsite Property No. A990072	Bill of Lading/Air Bill No.			
Shipped To TMA/REGRA RIN218/99	COA				

POSSIBLE SAMPLE HAZARDS/REMARKS Possible Radioactive & PCB Contamination	Preservation	None	None	None	None	Cool 4C	None	None			
	Type of Container	P	aG	aG	aG	aG	aG	P			
	No. of Container(s)	1	1	1	1	1	1	1			
	Special Handling and/or Storage Cool 4C	Volume	20mL	60mL	60mL	60mL	250mL	250mL	1000mL		

SAMPLE ANALYSIS				Activity Scan	Isotopic Plutonium	Nickel-63	Strontium-89,90 - Total Sr	PCBs - 8080	ICP Metals - 6010A (Supratrace) (Chromium, Lead)	See Item (1) in Special Instructions.	
-----------------	--	--	--	---------------	--------------------	-----------	----------------------------	-------------	--	---------------------------------------	--

Sample No.	Matrix *	Sample Date	Sample Time								
B0TV40	Soil	2/18/99	1040	X	X	X	X			X	B4
B0TV41	Soil	2/18/99	1035	X	X	X	X			X	B5
B0TV42	Soil	2/18/99	1025	X	X	X	X			X	B6

CHAIN OF POSSESSION	Sign/Print Names		SPECIAL INSTRUCTIONS COA - R116D9 2F00 Lab & R116D9 2600 Shippers				Matrix * Soil Water Vapor Other Solid Other Liquid
	Relinquished By R. Nielson	Date/Time 2/26/99	Received By TRUCK FREIGHT	Date/Time 11:00	(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Uranium-238)		
	Relinquished By Truck Freight	Date/Time 2-26-99 11:00	Received By AR... JR... 2-26-99	Date/Time 11:00			
	Relinquished By	Date/Time	Received By	Date/Time			
Relinquished By	Date/Time	Received By	Date/Time				

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

6200029

Collector Stankovich/Jacques / Nielson	Company Contact Mike Stankovich	Telephone No. (509) 531-7620	Project Coordinator TRENT, SJ	Price Code	Data Turnaround 15 Days
Project Designation 100 D Areas - Full Protocol	Sampling Location 116-DR-9	Field Logbook No. EL-1339-5	Method of Shipment Fed Ex RIN 2/23/99 Truck Freight		
Ice Chest No. ERC 96-043, ERC 96-010	Offsite Property No. A990072	SAF No. B99-005	Bill of Lading/Air Bill No.		
Shipped To TMA/RECRA RIN 2/18/99			COA		

POSSIBLE SAMPLE HAZARDS/REMARKS Possible Radioactive & PCB Contamination	Preservation	None	None	None	None	Cool 4C	None	None			
	Type of Container	P	aG	aG	aG	aG	aG	P			
	No. of Container(s)	1	1	1	1	1	1	1			
Special Handling and/or Storage Cool 4C	Volume	20mL	60mL	60mL	60mL	250mL	250mL	1000mL			
SAMPLE ANALYSIS				Activity Scan	Isotopic Phenolium	Nickel-63	Sr Strontium-89,90 - Total Sr	PCBs - 8080	ICP Metals - 6010A (Supertrace) (Chromium, Lead)	See Item (1) in Special Instructions.	
Sample No.	Matrix *	Sample Date	Sample Time								
B0TV43	Soil	2/18/99	0920	X	X	X	X			X	C7
B0TV44	Soil	2/18/99	0945	X	X	X	X			X	C8
B0TV45	Soil	2/18/99	1015	X	X	X	X			X	C9

CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS COA - R116D9 2F00 Lab & R116D9 2600 Shippers				Matrix *	
Relinquished By R. Nielson	Date/Time 2/23/99 11:00	Received By Truck Freight	Date/Time 2/23/99	(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Uranium-238)				Soil Water Vapor Other Solid Other Liquid	
Relinquished By Truck Freight	Date/Time 2-22-99 11:00	Received By J.R. Corso	Date/Time 2-22-99						
Relinquished By	Date/Time	Received By	Date/Time						
Relinquished By	Date/Time	Received By	Date/Time						
LABORATORY SECTION	Received By	Title						Date/Time	
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By						Date/Time	

Collector Stankovich/Jacques / NIELSON	Company Contact Mike Stankovich	Telephone No. (509) 531-7620	Project Coordinator TRENT, SJ	Price Code	Data Turnaround 15 Days
Project Designation 100 D Areas - Full Protocol	Sampling Location 116-DR-9	SAF No. B99-005			
Ice Chest No. ERC96-010	Field Logbook No. EL-1339-5	Method of Shipment Fed Ex 2/23/99 RN Truck freight			
Shipped To TMA/RECTA RJN 2/18/99	Offsite Property No. A990072	Bill of Lading/Air Bill No.			

COA

POSSIBLE SAMPLE HAZARDS/REMARKS Possible Radioactive & PCB Contamination Special Handling and/or Storage Cool 4C	Preservation	None	None	None	None	Cool 4C	None	None			
	Type of Container	P	aG	aG	aG	aG	aG	P			
	No. of Container(s)	1	1	1	1	1	1	1			
	Volume	20mL	60mL	60mL	60mL	250mL	250mL	1000mL			

SAMPLE ANALYSIS	Activity Scan	Isotopic Plutonium	Nickel-63	Strontium-89,90 - Total Sr	PCBs - 8080	ICP Metals - 6010A (Supertrace) (Chromium, Lead)	See Item (1) in Special Instructions.			
------------------------	---------------	--------------------	-----------	----------------------------	-------------	--	---------------------------------------	--	--	--

Sample No.	Matrix *	Sample Date	Sample Time								
B0TV46	Soil	2/18/99	0950	X	X	X	X			X	D10
B0TV47	Soil	2/18/99	0930	X	X	X	X			X	D1
B0TV48	Soil	2/18/99	0915	X	X	X	X			X	D2

1000031

CHAIN OF POSSESSION	Sign/Print Names		SPECIAL INSTRUCTIONS COA - R116D9 2F00 Lab & R116D9 2600 Shippers (1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Uranium-238)	Matrix * Soil Water Vapor Other Solid Other Liquid
	Relinquished By <i>[Signature]</i>	Received By <i>Truck freight</i>		
	Relinquished By <i>Truck Freight 2-26-99 11:00</i>	Received By <i>DR. [Signature] 2-26-99</i>		
	Relinquished By	Received By		

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

Collector Stankovich/Jacques / <i>Nielson</i>	Company Contact Mike Stankovich	Telephone No. (509) 531-7620	Project Coordinator TRENT, SJ	Price Code	Data Turnaround 15 Days
Project Designation 100 D Areas - Full Protocol	Sampling Location 116-DR-9	SAF No. B99-005			
Ice Chest No. <i>PRE 96-010</i>	Field Logbook No. EL-1339-5	Method of Shipment <i>Truck Freight</i>			
Shipped To TMA/REGRA- <i>RJN 2/18/99</i>	Offsite Property No. <i>A000072</i>	Bill of Lading/Air Bill No.			
COA					

POSSIBLE SAMPLE HAZARDS/REMARKS Possible Radioactive & PCB Contamination	Preservation	None	None	None	None	Cool 4C	None	None			
	Type of Container	P	aG	aG	aG	aG	aG	P			
	No. of Container(s)	1	1	1	1	1	1	1			
Special Handling and/or Storage Cool 4C	Volume	20mL	60mL	60mL	60mL	250mL	250mL	1000mL			

SAMPLE ANALYSIS	Activity Scan	Isotope Plutonium	Nickel-63	Strontium-89,90 - Total Sr	PCBs - 8080	ICP Metals - 6010A (Supertrace) (Chromium, Lead)	See item (1) in Special Instructions.			

Sample No.	Matrix *	Sample Date	Sample Time	Activity Scan	Isotope Plutonium	Nickel-63	Strontium-89,90 - Total Sr	PCBs - 8080	ICP Metals - 6010A (Supertrace) (Chromium, Lead)	See item (1) in Special Instructions.		
B0TV49	Soil	<i>2/18/99</i>	<i>0855</i>	X	X	X	X			X		E
B0TV50	Soil	<i>2/18/99</i>	<i>0910</i>	X	X	X	X			X		A1

CHAIN OF POSSESSION	Sign/Print Names		SPECIAL INSTRUCTIONS				Matrix * Soil Water Vapor Other Solid Other Liquid		
	COA - R116D9 2F00 Lab & R116D9 2600 Shippers		(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Uranium-238)						
	Relinquished By <i>R. Nielson</i>	Date/Time <i>2/18/99</i>						Received By <i>Truck Freight</i>	Date/Time <i>2/18/99</i>
	Relinquished By <i>Truck Freight</i>	Date/Time <i>2-26-99</i>						Received By <i>W. J. Cross</i>	Date/Time <i>2-26-99</i>
Relinquished By	Date/Time	Received By					Date/Time		

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

Appendix 5

Data Validation Supporting Documentation

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 100 Area 116-DR-9			DATA PACKAGE: H0349		
VALIDATOR: FLI		LAB: TNU		DATE: 4/12/99	
CASE:			SDG: H0349		
ANALYSES PERFORMED					
<input type="checkbox"/> Gross Alpha/Beta	<input checked="" type="checkbox"/> Strontium-90	<input type="checkbox"/> Technetium-99	<input type="checkbox"/> Alpha Spectroscopy	<input checked="" type="checkbox"/> Gamma Spectroscopy	
<input type="checkbox"/> Total Uranium	<input type="checkbox"/> Radium-22	<input type="checkbox"/> Tritium	<input checked="" type="checkbox"/> Plutonium	<input checked="" type="checkbox"/> Nickel 63	
SAMPLES/MATRIX					
BOTV37 BOTV38 BOTV39 BOTV40 BOTV41					
BOTV42 BOTV43 BOTV44 BOTV45 BOTV46					
BOTV47 BOTV48 BOTV49 BOTV50					
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: K-40 RA-224 RA-228 Th-228 Th-232

in FB

~~Gamma Blk run 2 days after J/UJ (37-45)~~

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: N=63 J/UJ all no MS

Used a tracer for MS 'J' 40, 44 + 47

AAZ

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: _____

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: dup 2 days after 5/05/02 *JK*

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: PU 239/40 not (EU-155 not running 50) 5/10/97
no qual req

10. Holding Times

Are sample holding times acceptable? Yes No N/A

Comments: _____

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: BOTUSO NO EU-155 report 5/10/97
Eu-155 all but 49 over TDL
AM241 - 38, 40, 42, 44, 46, 47, 50 over TDL
0236- 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50
0235- 37, 38, 40, 41, 42, 43, 44, 46, 47, 50

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0349

Test NI L Matrix SOLID
SDG 7092
Contact L.A. Johnson

METHOD SUMMARY
NICKEL 63 IN SOIL
LIQUID SCINTILLATION COUNTERS

Client Hanford
Contract TRE-SDB-207925
Case no SDG-H0349

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUP- TEST FIX	PLANCHET	Nickel 63
Preparation batch 2857-166				
B0TV37	N902094-01		7092-001	63.5
B0TV38	N902094-02		7092-002	49.3
B0TV39	N902094-03		7092-003	53.5
B0TV40	N902094-04		7092-004	35.6
B0TV41	N902094-05		7092-005	28.2
B0TV42	N902094-06		7092-006	31.6
B0TV43	N902094-07		7092-007	56.2
B0TV44	N902094-08		7092-008	16.4 J
B0TV45	N902094-09		7092-009	2.98 J

Nominal values and limits from method
100 D Area - Full Protocol

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUP- TEST FIX	MDA pCi/g	ALIQ g	PREP FAC	DILD- TION	YIELD %	EFF %	COUNT min	FROM keV	DRIFT ReV	DAYS HELD	PREPARED	ANAL- Y280	DETECTOR
Preparation batch 2857-166 2s prep error 10.0 % Reference Lab Notebook #2857 pg. 166															
B0TV37	N902094-01		2.1	0.500			83	100				20	03/09/99	03/10	LSC-005
B0TV38	N902094-02		2.0	0.500			85	100				20	03/09/99	03/10	LSC-005
B0TV39	N902094-03		2.2	0.500			81	100				20	03/09/99	03/10	LSC-005
B0TV40	N902094-04		3.0	0.500			60	100				21	03/09/99	03/11	LSC-005
B0TV41	N902094-05		2.2	0.500			82	100				21	03/09/99	03/11	LSC-005
B0TV42	N902094-06		2.3	0.500			85	100				21	03/09/99	03/11	LSC-005
B0TV43	N902094-07		2.4	0.500			74	100				21	03/09/99	03/11	LSC-005
B0TV44	N902094-08		3.0	0.500			69	100				21	03/10/99	03/11	LSC-004
B0TV45	N902094-09		2.7	0.500			76	100				21	03/10/99	03/11	LSC-004

Nominal values and limits from method 20 0.500 10 100

Lab id TMA/C
Protocol Hanford
Version Ver 1.0
Form DVD-QMS
Version 1.06
Report date 05/17/99

TMA / RICHMOND
SAMPLE DELIVERY GROUP H0349

N903006-05

BOTV50

DATA SHEET

SDG <u>7093</u>	Client/Case no <u>Hanford</u>	SDG- <u>H0349</u>
Contact <u>Larry A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N903006-05</u>	Client sample id <u>BOTV50</u>	
Dept sample id <u>7093-005</u>	Location/Matrix <u>116-DR-9</u>	<u>SOLID</u>
Received <u>02/26/99</u>	Collected <u>02/18/99 09:10</u>	
‡ solids <u>95.2</u>	Custody/SAP No <u>B99005-018</u>	<u>B99-005</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Potassium 40	13966-00-2	10.2	0.38	0.20			GAM
Cobalt 60	10198-40-0	1.88	0.062	0.050	0.050		GAM
Cesium 137	10045-97-3	19.5	0.14	<u>0.098</u>	0.050		GAM
Europium 152	14683-23-9	37.5	0.28	<u>0.24</u>	0.10		GAM
Europium 154	15585-10-1	4.04	0.18	<u>0.17</u>	0.10		GAM
Europium 155	14391-16-3	U		<u>0.24</u>	0.10	U	GAM
Radium 226	13982-63-3	0.385	0.11	<u>0.14</u>	0.10		GAM
Radium 228	15262-20-1	0.626	0.20	<u>0.28</u>	0.20		GAM
Thorium 228	14274-82-9	0.539	0.060	0.091			GAM
Thorium 232	TH-232	0.626	0.20	0.28			GAM
Americium 241	14596-10-2	U		0.24		U	GAM
Uranium 238	U-238	U		9.5		U	GAM
Uranium 235	15117-96-1	U		0.28		U	GAM

100 D Areas-Full Protocol

DATA SHEETS

Page 1

SUMMARY DATA SECTION

Page 10

000039

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>05/07/99</u>

Date: 21 April 1999
 To: Bechtel Hanford Inc. (technical representative)
 From: TechLaw, Inc.
 Project: 100-D Areas - Full Protocol - Waste Site 116-DR-9
 Subject: PCB - Data Package No. H0349-RLN (SDG No. H0349)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H0349-RLN prepared by Recra LabNet (RLN). A list of the 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
B0TV37	2/18/99	Soil	C	PCBs by 8081 *
B0TV38	2/18/99	Soil	C	PCBs by 8081 *
B0TV39	2/18/99	Soil	C	PCBs by 8081 *
B0TV40	2/18/99	Soil	C	PCBs by 8081 *
B0TV41	2/18/99	Soil	C	PCBs by 8081 *
B0TV42	2/18/99	Soil	C	PCBs by 8081 *
B0TV43	2/18/99	Soil	C	PCBs by 8081 *
B0TV44	2/18/99	Soil	C	PCBs by 8081 *
B0TV45	2/18/99	Soil	C	PCBs by 8081 *
B0TV46	2/18/99	Soil	C	PCBs by 8081 *
B0TV47	2/18/99	Soil	C	PCBs by 8081 *
B0TV48	2/18/99	Soil	C	PCBs by 8081 *
B0TV49	2/18/99	Soil	C	PCBs by 8081 *
B0TV50	2/18/99	Soil	C	PCBs by 8081 *

* - EPA 8080 was requested but an equivalent method (EPA 8081) was used by the laboratory

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**

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded by less than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detected sample results are qualified as estimates and flagged "J" and all nondetects are rejected and flagged "UR".

Holding times were met for all samples.

- **Blanks**

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation or analysis. At least one method blank analysis must be conducted for every 20 samples. Method blanks should not contain target compounds at a concentration greater than CRQL. If target compounds are present, sample results less than five times the blank concentration are qualified as undetected and flagged "U". If the sample result is less than five times the blank concentration and less than CRQL, the result is qualified as undetected and elevated to the CRQL.

All method blank target compound results were acceptable, although the detection limit for aroclor-1221 was above the target detection limit (TDL).

Equipment Blanks

One equipment blank (BOTV49) was submitted for analysis. No analytes were detected in the equipment blank, although the detection limit for aroclor-1221 was above the TDL.

- **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 analyses are performed in duplicate and must be within control limits of 70% to 130%. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Nondetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

All matrix spike/matrix spike duplicate results were acceptable.

Surrogate Recovery

The analysis of surrogate compounds provides a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the laboratory. When a surrogate compound recovery is outside the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Nondetected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Nondetected compounds with surrogate recoveries above the upper control limit require no qualification.

All surrogate recovery results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed as the RPD between the recoveries of duplicate matrix spike analyses

performed on a sample. For soil samples, results must be within RPD limits of plus/minus 30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All precision results were acceptable.

Field Duplicates

One sample duplicate pair (BOTV37/BOTV50) 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 reported detection limit for aroclor-1221 was above the TDL in all samples. 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. H0349-RLN (SDG No. H0349) was submitted for validation and verified for completeness. The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

The reported detection limit for aroclor-1221 was above the TDL in all samples. 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 procedures herein are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J - Indicates the compound or analyte was analyzed for and detected. The associated concentration is an estimate, but the data are usable for decision-making purposes.
- 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: H0349	REVIEWER: TLI	DATE: 4/21/99	PAGE <u>1</u> OF <u>1</u>
COMMENTS: No qualifiers assigned			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

000010

004

Sample Information	Cust ID:	BOTV37	BOTV37	BOTV37	BOTV38	BOTV39	BOTV49
	RFW#:	002	002 MS	002 MSD	003	004	005
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate:	Tetrachloro-m-xylene	108 %	102 %	95 %	92 %	88 %	108 %
	Decachlorobiphenyl	121 %	107 %	100 %	97 %	92 %	108 %
=====fl=====fl=====fl=====fl=====fl=====fl=====fl=====							
Aroclor-1016		35 U	35 U	35 U	35 U	35 U	33 U
Aroclor-1221		70 U	70 U	70 U	70 U	70 U	67 U
Aroclor-1232		35 U	35 U	35 U	35 U	35 U	33 U
Aroclor-1242		58	55	50	68	73	33 U
Aroclor-1248		35 U	35 U	35 U	35 U	35 U	33 U
Aroclor-1254		35 U	59 %	57 %	35 U	35 U	33 U
Aroclor-1260		150	190	200	180	160	33 U

Sample Information	Cust ID:	BOTV50	BOTV40	BOTV41	BOTV42	BOTV43	BOTV44
	RFW#:	006	007	008	009	010	011
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate:	Tetrachloro-m-xylene	85 %	75 %	80 %	65 %	78 %	85 %
	Decachlorobiphenyl	95 %	75 %	80 %	71 %	85 %	91 %
=====fl=====fl=====fl=====fl=====fl=====fl=====fl=====							
Aroclor-1016		35 U	35 U	35 U	35 U	36 U	35 U
Aroclor-1221		70 U	71 U	70 U	71 U	72 U	70 U
Aroclor-1232		35 U	35 U	35 U	35 U	36 U	35 U
Aroclor-1242		43	110	35 U	60	36 U	35 U
Aroclor-1248		35 U	35 U	35 U	35 U	36 U	35 U
Aroclor-1254		35 U	35 U	35 U	35 U	36 U	35 U
Aroclor-1260		130	77	36	140	36 U	35 U

0000013

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked.
 %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

Handwritten signature
 Res 4/20/99

Sample Information	Cust ID:	BOTV45	BOTV46	BOTV47	BOTV48	PBLKEC	PBLKEC BS
RFW#:		012	013	014	015	99LE0248-MB1	99LE0248-MB1
Matrix:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
D.F.:		1.00	1.00	1.00	1.00	1.00	1.00
Units:		UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG

Surrogate:	Tetrachloro-m-xylene	62 %	85 %	80 %	88 %	90 %	98 %
	Decachlorobiphenyl	71 %	90 %	75 %	98 %	97 %	99 %
-----fl-----fl-----fl-----fl-----fl-----fl-----fl-----							
Aroclor-1016	35 U	35 U	35 U	35 U	33 U	33 U	33 U
Aroclor-1221	70 U	71 U	70 U	70 U	67 U	67 U	67 U
Aroclor-1232	35 U	35 U	35 U	35 U	33 U	33 U	33 U
Aroclor-1242	35 U	35 U	35 U	35 U	33 U	33 U	33 U
Aroclor-1248	35 U	35 U	35 U	35 U	33 U	33 U	33 U
Aroclor-1254	35 U	35 U	35 U	35 U	33 U	33 U	73 %
Aroclor-1260	35 U	35 U	120	36	33 U	33 U	33 U

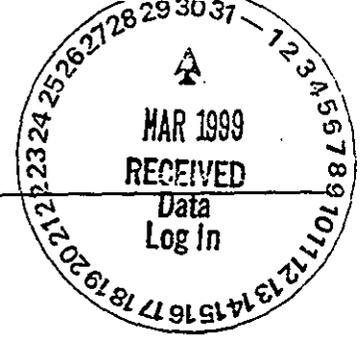
Quadrant
see 4/20/99

000014

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. % = Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation



**Recra LabNet Philadelphia
Analytical Report**

Client: TNU-HANFORD B99-005
RFW#: 9902L241
SDG/SAF#: H0349/B99-005

W.O.#: 10985-001-001-9999-00
Date Received: 02-24-99

PCB

The set of samples consisted of fourteen (14) soil samples collected on 02-18-99.

The samples and their associated QC samples were extracted on 02-25-99 and analyzed based on SW846, 3rd Edition on 03-02,03-99. The extraction procedure was based on method 3540 and the extracts were analyzed based on method 8081.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All cooler temperatures have been recorded on the chain-of-custodies.
2. All required holding times for extraction and analysis have been met.
3. The samples and their associated QC samples received a sulfuric acid and sulfur cleanup.
4. The method blank was below the reporting limits for all target compounds.
5. All surrogate recoveries were within acceptance criteria.
6. The blank spike recovery was within acceptance criteria.
7. All matrix spike recoveries were within acceptance criteria.
8. All initial calibrations associated with this data set were within acceptance criteria.
9. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

Pat E
J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

3-8-99
Date

pefr:\group\data\pcb\02L241.pcb

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.

001

Collector Stankovich/Jacques / Nielson	Company Contact Mike Stankovich	Telephone No. (509) 531-7620	Project Coordinator IRENT, SJ	Price Code	Data Turnaround 15 Days
Project Designation 100 D Areas - Full Protocol	Sampling Location 116-DR-9	SAF No. B99-005	Method of Shipment Fed Ex		
Ice Chest No. 3087, 7057	Field Logbook No. EL-1339-5	Bill of Lading/Air B			
Shipped To EJN 2/18/99 -TMA/RECRA	Offsite Property No.	COA			

MPS 976 0694 614 4.5^{rel}

POSSIBLE SAMPLE HAZARDS/REMARKS Possible Radioactive & PCB Contamination	Preservation	None	None	None	None	Cool 4C	None	None			
	Type of Container	P	aG	aG	aG	aG	aG	P			
Special Handling and/or Storage Cool 4C	No. of Container(s)	1	1	1	1	1	1	1			
	Volume	20mL	60mL	60mL	60mL	250mL	250mL	1000mL			
SAMPLE ANALYSIS		Activity Scan	Isotopic Photochem	Nickel-63	Strontium-89,90 - Total Sr	PCBs - 8080	ICP Metals - 6010A (Supernova) (Chromium, Lead)	See item (1) in Special Instructions			
Sample No.	Matrix *	Sample Date	Sample Time								
B0TV37	Soil	2/18/99	0910				X	X			A1
B0TV38	Soil	2/18/99	0940				X	X			A2
B0TV39	Soil	2/18/99	1010				X	X			A3

CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS COA - R116199 2100 Lab & R116199 2600 Shippers			Matrix *	
Relinquished By R. Nielson	Date/Time 2/23/99	Received By Fed Ex	Date/Time	(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Uranium-238)			Soil Water Vapor Other Solid Other Liquid	
Relinquished By Fed Ex	Date/Time 2-24-99/0930	Received By Nielson	Date/Time 2-24-99/0930					
Relinquished By	Date/Time	Received By	Date/Time					
Relinquished By	Date/Time	Received By	Date/Time					
LABORATORY SECTION	Received By J. Dealoria	Title Lab Tech		Disposed By			Date/Time 2-24-99/0930	
FINAL SAMPLE DISPOSITION	Disposal Method			Disposed By			Date/Time	

Collector Stankovich/Jacques / Nielson	Company Contact Mike Stankovich	Telephone No. (509) 531-7620	Project Coordinator IRENT, SJ	Price Code	Data Turnaround 15 Days
Project Designation 100 D Areas - Full Protocol	Sampling Location 116-DR-9	SAF No. 1399-005			
Ice Chest No. 2 OF 7, 4 OF 7	Field Logbook No. EL-1339-5	Method of Shipment Fed Ex			
Shipped To RN 2/18/99 FM/RECRA	Offsite Property No.	Bill of Lading/Air Bill MPS 976 0694 623 5.1^{ol}			
4 OF 7,		COA MPS 976 0694 641 4.1^{ol}			

POSSIBLE SAMPLE HAZARDS/REMARKS Possible Radioactive & PCB Contamination	Preservation	None	None	None	None	Cool 4C	None	None			
	Type of Container	P	sG	sG	sG	sG	sG	P			
	No. of Container(s)	1	1	1	1	1	1	1			
Special Handling and/or Storage Cool 4C	Volume	20mL	60mL	60mL	60mL	250mL	250mL	1000mL			
SAMPLE ANALYSIS		Activity Scan	Isotopic Plutonium	Pa/U/Th	Strontium-90 Total Sr	Pb/Bi-209	Hg/P Metals - 6010A (Supertrace) (Chromium, Lead)	See item (1) in Special Instructions			
Sample No	Matrix *	Sample Date	Sample Time								
B0TV40	Soil	2/18/99	1040				X	X			B4
B0TV41	Soil	2/18/99	1035				X	X			B5
B0TV42	Soil	2/18/99	1025				X	X			B6

CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS COA - R116D9 2F00 Lab & R116D9 2600 Shippers				Matrix *	
Relinquished By R Nielson	Date/Time 2/23/99	Received By Fed Ex	Date/Time 2/24/99	(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Uranium-238)				Soil Water Vapor Other Solid Other Liquid	
Relinquished By Fed Ex	Date/Time 2/24/99/0930	Received By R Nielson	Date/Time 2/24/99/0930						
Relinquished By	Date/Time	Received By	Date/Time						
LABORATORY SECTION	Received By Fed Ex	Title Lab. Tech						Date/Time 2-24-99/0930	
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By				Date/Time			

Stankovich/Jacques / Nielson	Company Contact Mike Stankovich	Telephone No. (509) 531-7620	Project Coordinator IRENT, SJ	Price Code	Data Turnaround 15 Days
Project Designation 100 D Areas - Full Protocol	Sampling Location 116-DR-9	Field Logbook No. EL-1339-5	SAF No. 899-005		
Ice Chest No.	Offsite Property No.	Method of Shipment Fed Ex			
Shipped To 218/99 RJN FMA/RECRA	Bill of Lading/AI MPS 976 0694 666 3.90c		COA		

4 OF 7, 5 OF 7

POSSIBLE SAMPLE HAZARDS/REMARKS Possible Radioactive & PCB Contamination	Preservation	None	None	None	None	Cool 4C	None	None			
	Type of Container	P	aG	aG	aG	aG	aG	P			
	No. of Container(s)	1	1	1	1	1	1	1			
Special Handling and/or Storage Cool 4C	Volume	20mL	60mL	60mL	60mL	250mL	250mL	1000mL			

SAMPLE ANALYSIS				Activity Scan	Isotopic Plutonium	Nickel-63	Sr-90 - Total Sr	PCBs - 8080	ICP Metals - 6010A (Supertrace) (Chromium, Lead)	See item (1) in Special Instructions		
				Sample No.	Matrix *	Sample Date	Sample Time					
	B0TV43	Soil	2/18/99	0920				Y	Y			C7
	B0TV44	Soil	2/18/99	0945				Y	X			C8
	B0TV45	Soil	2/18/99	1015				Y	Y			C9

CHAIN OF POSSESSION	Sign/Print Names	SPECIAL INSTRUCTIONS COA - R116D9 JF00 Lab & R116D9 2600 Shippers (1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Uranium-238)	Matrix * Soil Water Vapor Other Solid Other Liquid
Relinquished By <i>R. Nielson</i>	Date/Time 2/24/99	Received By <i>Fed Ex</i>	Date/Time 2/24/99
Relinquished By <i>Fed Ex</i>	Date/Time 2/24/99	Received By <i>J. Adriano</i>	Date/Time 2/24/99
Relinquished By	Date/Time	Received By	Date/Time

LABORATORY SECTION	Received By <i>J. Adriano</i>	Title <i>Lab Tech</i>	Date/Time 2/24/99
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

Collector Stankovich/Jacques Nielson	Company Contact Mike Stankovich	Telephone No. (509) 531-7620	Project Coordinator IRENT, SJ	Price Code	Data Turnaround 15 Days
Project Designation 100 D Areas - Full Protocol	Sampling Location 116-DR-9	Field Logbook No. EL-1339-5	SAF No. B99-005		
Ice Chest No. 1 of 7, 6 of 7	Offsite Property No.	Method of Shipment Fed Ex			
Shipped To 2/18/99 NW -TMA/RECRA	Bill of Lading/A		MPS 976 0694 632 4.800		
COA					

POSSIBLE SAMPLE HAZARDS/REMARKS Possible Radioactive & PCB Contamination	Preservation	None	None	None	None	Cool 4C	None	None		
	Type of Container	P	aG	aG	aG	aG	aG	P		
Special Handling and/or Storage Cool 4C	No. of Container(s)	1	1	1	1	1	1	1		
	Volume	20ml.	60ml.	60ml.	60ml.	250ml.	250ml.	1000ml.		
SAMPLE ANALYSIS		Activity Scan	Isotopic Plutonium	Nucleid 61	Strontium-89/90 - Total %	PF Hex - R2/R3	RF Metals - cobalt (Supertrace) (Cesium, Lead)	See item 111 for Special Instructions		
		Sample No.	Matrix *	Sample Date	Sample Time					
	B0TV46	Soil	2/18/99	0950		X	X			D10
	B0TV47	Soil	2/18/99	0930		X	X			D1
	B0TV48	Soil	2/18/99	0915		X	X			D2

CHAIN OF POSSESSION	Sign/Print Names		Date/Time		SPECIAL INSTRUCTIONS COA - R116D9 2F00 Lab & R116D9 2600 Shippers (1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Uranium-238)	Matrix * Soil Water Vapor Other Solid Other Liquid
	Relinquished By <i>R Nielson</i>	Date/Time 1030 2/18/99	Received By <i>Fed Ex</i>	Date/Time 2-21-99		
	Relinquished By <i>Fed Ex</i>	Date/Time 2-21-99	Received By <i>J. Williams</i>	Date/Time 2-24-99		
	Relinquished By	Date/Time	Received By	Date/Time		
LABORATORY SECTION	Received By <i>J. Williams</i>	Title <i>Lab Tech</i>	Date/Time 2-21-99/093			
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By		Date/Time		

Collector Stankovich/Jacques / Nielson	Company Contact Mike Stankovich	Telephone No. (509) 531-7620	Project Coordinator IRENT, SJ	Price Code	Data Turnaround 15 Days
Project Designation 100 D Areas - Full Protocol	Sampling Location 116-DR-9	SAF No. B99-005			
Ice Chest No. 3 of 7, 6 of 7	Field Logbook No. EL-1339-S	Method of Shipment Fed Ex			
Shipped To TMA/RECRA	Offsite Property No.	Bill of Lading/Air B E29 4690 9261 - 4.70			
COA					

POSSIBLE SAMPLE HAZARDS/REMARKS Possible Radioactive & PCB Contamination	Preservation	None	None	None	None	Cool 4C	None	None			
	Type of Container	P	aG	aG	aG	aG	aG	P			
	No. of Container(s)	1	1	1	1	1	1	1			
Special Handling and/or Storage Cool 4C	Volume	20mL	60mL	60mL	60mL	250mL	250mL	1000mL			
SAMPLE ANALYSIS	Activity Scan										
	Isotopic Plutonium			Nickel-63		Sr	PCBs - 8080	ICP Metals - 6010A (Supertrace) (Chromium, Lead)	See item (1) in Special Instructions		
Sample No.	Matrix *	Sample Date	Sample Time								
80TV49	Soil	2/18/99	0855				X	X			E
80TV50	Soil	2/18/99	0910				X	X			AI

CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS COA - R116D9 2F00 Lab & R116D9 2600 Shippers				Matrix *	
Relinquished By Rene Nielsen / R Nielson	Date/Time 2/23/99	Received By Fed Ex	Date/Time	(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Uranium-238)				Soil Water Vapor Other Solid Other Liquid	
Relinquished By Fed Ex	Date/Time 2-24-99/99	Received By A. Williams	Date/Time 2-24-99/99						
Relinquished By	Date/Time	Received By	Date/Time						
Relinquished By	Date/Time	Received By	Date/Time						
LABORATORY SECTION	Received By A. Williams	Title Lab Tech		Date/Time 2-24-99/0930					
FINAL SAMPLE DISPOSITION	Disposal Method		Disposed By				Date/Time		

Appendix 5

Data Validation Supporting Documentation

PESTICIDE/PCB DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	<u>C</u>	D	E
PROJECT: 100 Area		116-DR-9	DATA PACKAGE: H0349		
VALIDATOR: TLI		LAB: Recog	DATE: 4/12/99		
CASE:			SDG: H0349		
ANALYSES PERFORMED					
<input type="checkbox"/> CLP3/90	<input type="checkbox"/> SW-846 8080	<input checked="" type="checkbox"/> SW-846 8081	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SAMPLES/MATRIX : BOTV37 BOTV38 BOTV39 BOTV40					
BOTV41 BOTV42 BOTV43 BOTV44 BOTV45					
BOTV46 BOTV47 BOTV48 BOTV49 BOTV50					
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: _____

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

3.1 INSTRUMENT PERFORMANCE (METHOD 8080 AND 8081)

Are DDT retention times acceptable Yes No N/A
 Are calibration standard retention times acceptable? Yes No N/A
 Are DDT and endrin breakdowns acceptable? Yes No N/A

PESTICIDE/PCB DATA VALIDATION CHECKLIST

Are DBC retention times acceptable? Yes No **N/A**
Is the GC/MS tuning/performance check acceptable? Yes No **N/A**

Comments: _____

3.2 CALIBRATIONS (METHOD 8080 AND 8081)

Are EVAL standard calibration factors and %RSD values acceptable? Yes No **N/A**
Are quantitation column calibration factor %RSD values acceptable? Yes No **N/A**
Were the analytical sequence requirements met? Yes No **N/A**
Are continuing calibration %D values acceptable? Yes No **N/A**

Comments: _____

3.3 INSTRUMENT PERFORMANCE AND INITIAL CALIBRATION (3/90 SOW)

Was the initial calibration sequence performed? Yes No **N/A**
Was the resolution acceptable in the resolution check mix? Yes No **N/A**
Is resolution acceptable in the PEM, INDA and INDB? Yes No **N/A**
Are DDT and Endrin breakdowns acceptable? Yes No **N/A**
Are retention times in PEMs and calibration mixes acceptable? Yes No **N/A**
Are RPD values in the PEMs acceptable? Yes No **N/A**
Are %RSD values acceptable? Yes No **N/A**

Comments: _____

3.4 CALIBRATION VERIFICATION (3/90 SOW)

Were the analytical sequence requirements met? Yes No **N/A**
Is resolution acceptable in the PEMs? Yes No **N/A**
Are initial calibrations acceptable? Yes No **N/A**

PESTICIDE/PCB DATA VALIDATION CHECKLIST

Are retention times acceptable in the PEMS, INDA and INDB mixes?	Yes	No	N/A
Are RPD values in the PEMS acceptable?	Yes	No	N/A
Are the DDT and endrin breakdowns acceptable?	Yes	No	N/A
Was GPC cleanup performed?	Yes	No	N/A
Is the GPC calibration check acceptable?	Yes	No	N/A
Was Florisil cleanup performed?	Yes	No	N/A
Is the Florisil performance check acceptable?	Yes	No	N/A

Comments: _____

4. BLANKS

Were laboratory blanks analyzed?	<input checked="" type="radio"/> Yes	No	N/A
Are laboratory blank results acceptable?	<input checked="" type="radio"/> Yes	No	N/A
Were field/trip blanks analyzed?	<input checked="" type="radio"/> Yes	No	N/A
Are field/trip blank results acceptable?	<input checked="" type="radio"/> Yes	No	N/A

Comments: * Arachlor 1221 - ~~FD~~ ~~over~~ ~~QL~~ over TDL

5. ACCURACY

Were surrogates analyzed?	<input checked="" type="radio"/> Yes	No	N/A
Are surrogate recoveries acceptable?	<input checked="" type="radio"/> Yes	No	N/A
Were MS/MSD samples analyzed?	<input checked="" type="radio"/> Yes	No	N/A
Are MS/MSD results acceptable?	<input checked="" type="radio"/> Yes	No	N/A
Were LCS samples analyzed?	Yes	No	<input checked="" type="radio"/> N/A
Are LCS results acceptable?	Yes	No	<input checked="" type="radio"/> N/A

Comments: _____

PESTICIDE/PCB DATA VALIDATION CHECKLIST

6. PRECISION

- Are MS/MSD RPD values acceptable? Yes No N/A
- Are laboratory duplicate results 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: 1042 - 29.7 - ok

7. SYSTEM PERFORMANCE

- Is chromatographic performance acceptable? Yes No N/A
- Are positive results resolved acceptably? Yes No N/A

Comments: _____

8. COMPOUND IDENTIFICATION AND QUANTITATION

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

Comments: _____

9. REPORTED RESULTS AND QUANTITATION LIMITS

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

Comments: 1221 over TDL

Duncan, Jeanette M

From: Blumenkranz, David B
Sent: Wednesday, May 26, 1999 2:22 PM
To: Duncan, Jeanette M
Subject: DR-9 Validation Package

Jeanette,

It looks good to me (Validation package for H0349), but I'll need to get all the MS/MSD results for my work (in addition to the validation results).

Dave Blumenkranz
2-9658

Duncan, Jeanette M

From: Blumenkranz, David B
Sent: Thursday, May 06, 1999 9:39 AM
To: Duncan, Jeanette M
Cc: Weiss, Richard L; Sturges, Mark H; Fancher, Jonathan D (Jon)
Subject: Validation Package H0349 for 116-DR-9

Jeanette,

I have finally had time to review the Validation Package for H0349 and have the following comments:

Inorganics - Validation Package No. H0349-RLN:

- For package completeness, can the validator please assign the following locations to their corresponding samples in App. 3?

Sample #	Location
B0TV37	A1
B0TV38	A2
B0TV39	A3
B0TV40	B4
B0TV41	B5
B0TV42	B6
B0TV43	C7
B0TV44	C8
B0TV45	C9
B0TV46	D10
B0TV47	D1
B0TV48	D2
B0TV49	NA
B0TV50	A1
B0TVK8	A1

→ the sample was detected well above the TDly
This has the effect of raising the reporting
limit but is not an issue since the sample
is detected.

- The reporting limit for B0TVK8 (Cr+6) is 0.84. If this is the same as the detection limit for that analysis, then it is above the TDL of 0.1 and the validation report should indicate this. ~~Also, I do not see the lab blank, LCS, %rec and MS/MSD (including RPDs) data sheets in the back of the report. We should include this data for package completeness (I'll need all this stuff to verify validator conclusions and perform the required calculations).~~

PCB - Validation Package No. H0349-RLN:

- For package completeness, can the validator please assign the locations (see above) to their corresponding samples in App. 3?

Radiochemistry - Validation Package No. H0349-TNU:

- For package completeness, can the validator please assign the locations (see above) to their corresponding samples in App. 3?
- Looks like the gamma scan COC MDAs for several samples are above the TDLs. Although no qualification is required, discussion was omitted from the "Detection Levels" of the validation. ~~Also, the lab reports that the MDAs for the Iso Pu analysis are higher than the RDL due to a small sample aliquot. This should be mentioned in the "Detection Levels" discussion, but it should be indicated that the TDL for Iso Pu was not exceeded in any analysis.~~
- ~~Also, I do not see the lab blank, LCS, %rec and MS/MSD (including RPDs) data sheets in the back of the report. We should include this data for package completeness (I'll need all this stuff to verify validator conclusions and perform the require calculations).~~

Thanx,
Dave

Bruce - Rich reviewed these comments -
please do not respond to lined out items -
Jeanette

Duncan, Jeanette M

From: Weiss, Richard L
Sent: Wednesday, June 16, 1999 11:27 AM
To: Stacey, Claude; Stacey, Claude
Cc: Duncan, Jeanette M
Subject: Use of 3sigma vrs "%" on Rad Validation of SDG H0349

Claude,

The 100 Area SAP does specify accuracy requirements for GEE analysis as +/- 3sigma not 70-130% as used by the validator. I've checked the package and 3sigma data is available for this SDG. The 3sigma values are very close to 70-130% (77-124%) and the samples meet either set of criteria. I'll "educate" the validator on this for future validations, but I see no need to revise SDG H0349.

Let me know if you need anything else.

Rich

Sorry for the delay on this, other things seem to have intruded lately.

Review Comment Record (RCR)

1. Date

5/03/99

2. Review No.

BHI/QA99006

3. Project

116-DR-9

4. Page

Page 1 of 1

5. Document Number(s)/Title(s)

H0349 - TNU (SDG No. H0349)

6. Program/Project/
Building Number

100-D Areas - Full
Protocol - 116-DR-9
Waste Site Soil Samples

7. Reviewer

Claude Stacey

8. Organization/Group

BHI/QA

9. Location/Phone

H0-16/372-9208

17. Comment Submittal Approval:

10. Agreement with indicated comment disposition(s)

11. CLOSED

Organization Manager (Optional)

Date

Reviewer/Point of Contact

16 June 99
Date

Claude Stacey
Reviewer/Point of Contact

Author/Originator

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	Radiochemistry: Page 003, Accuracy, states, "The acceptable laboratory control sample and matrix spike recovery range is 70% to 130%." The referenced SAP, DOE/RL-96-22, Rev. 1, page II-5 has the accuracy criteria as $\pm 3 \sigma$ with a couple exceptions.		The information is provided in a 070 format. therefore I have been using 70-130. See attached	✓
2	Radiochemistry: Page 004, Detection Limits, states, "All reported laboratory MDAs were at or below the analyte-specific TDL or contract specified MDA." On most samples the laboratory MDAs for U-238, U235, Am-241, and Eu-155 are higher then the RDLs.		correct	
3	Radiochemistry: Page 010, The CRDL listed for Cs-137 and Eu-155 are different then those specified in the SAP. If the RDLs were revised it should be noted in the validation report.		correct	

CS
5/18/99

Stacey, Claude

From: Weiss, Richard L
Sent: Wednesday, June 16, 1999 11:27 AM
To: Stacey, Claude; Stacey, Claude
Cc: Duncan, Jeanette M
Subject: Use of 3sigma vrs "%" on Rad Validation of SDG H0349

Claude,

The 100 Area SAP does specify accuracy requirements for GEE analysis as +/- 3sigma not 70-130% as used by the validator. I've checked the package and 3sigma data is available for this SDG. The 3sigma values are very close to 70-130% (77-124%) and the samples meet either set of criteria. I'll "educate" the validator on this for future validations, but I see no need to revise SDG H0349.

Let me know if you need anything else.

Rich

Sorry for the delay on this, other things seem to have intruded lately.

Validation Review Comments H0349 – R. L. Weiss – 5/04/99

All comments listed below apply to the radiochemistry subset.

1. Have Joan check with Thermo – Should Thermo have run a matrix spike for Ni-63 or is there an alternate yeild monitor?
2. Have Joan check with Thermo – last sample in the delivery group (B0TV50) did not report Eu-155 – can we get a revised result sheet with this reported?
3. Bruce – double check that you are using the 100 Area detection limits. Found one error – Eu-155 – CRDL should be changed from .1 to .05. Also, change text on page 4 in the Detection Levels section to “MDAs were not made for Eu-155”....

Review Comment Record (RCR)

1. Date
5/03/99

2. Review No.
BHI/QA99006

3. Project
116-DR-9

4. Page
Page 1 of 1

5. Document Number(s)/Title(s)

H0349 -TNU (SDG No. H0349)

6. Program/Project/
Building Number

100-D Areas - Full
Protocol - 116-DR-9
Waste Site Soil Samples

7. Reviewer

Claude Stacey

8. Organization/Group

BHI/QA

9. Location/Phone

H0-16/372-9208

17. Comment Submittal Approval:

10. Agreement with indicated comment disposition(s)

11. CLOSED

Organization Manager (Optional)

Date

Reviewer/Point of Contact

Date

Reviewer/Point of Contact

Author/Originator

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	Radiochemistry: Page 003, Accuracy, states, "The acceptable laboratory control sample and matrix spike recovery range is 70% to 130%." The referenced SAP, DOE/RL-96-22, Rev. 1, page II-5 has the accuracy criteria as $\pm 3 \sigma$ with a couple exceptions.		The information is provided in a 070 format, therefore I have been using 70-130.	✓
2	Radiochemistry: Page 004, Detection Limits, states, "All reported laboratory MDAs were at or below the analyte-specific TDL or contract specified MDA." On most samples the laboratory MDAs for U-238, U235, Am-241, and Eu-155 are higher than the RDLs.		correct	
3	Radiochemistry: Page 010, The CRDL listed for Cs-137 and Eu-155 are different than those specified in the SAP. If the RDLs were revised it should be noted in the validation report.		correct	

PS
5/18/99

Duncan, Jeanette M

From: Blumenkranz, David B
Sent: Thursday, May 06, 1999 9:39 AM
To: Duncan, Jeanette M
Cc: Weiss, Richard L; Sturges, Mark H; Fancher, Jonathan D (Jon)
Subject: Validation Package H0349 for 116-DR-9

Jeanette,

I have finally had time to review the Validation Package for H0349 and have the following comments:

Inorganics - Validation Package No. H0349-RLN:

- For package completeness, can the validator please assign the following locations to their corresponding samples in App. 3?

Sample #	Location
B0TV37	A1
B0TV38	A2
B0TV39	A3
B0TV40	B4
B0TV41	B5
B0TV42	B6
B0TV43	C7
B0TV44	C8
B0TV45	C9
B0TV46	D10
B0TV47	D1
B0TV48	D2
B0TV49	NA
B0TV50	A1
B0TVK8	A1

→ the sample was detected well above the TDh
This has the effect of raising the reporting
limit but is not an issue since the sample
is detected.

- The reporting limit for B0TVK8 (Cr+6) is 0.84. If this is the same as the detection limit for that analysis, then it is above the TDL of 0.1 and the validation report should indicate this. ~~Also, I do not see the lab blank, LCS, %rec and MS/MSD (including RPDs) data sheets in the back of the report. We should include this data for package completeness (I'll need all this stuff to verify validator conclusions and perform the required calculations).~~

PCB - Validation Package No. H0349-RLN:

- For package completeness, can the validator please assign the locations (see above) to their corresponding samples in App. 3?

Radiochemistry - Validation Package No. H0349-TNU:

- For package completeness, can the validator please assign the locations (see above) to their corresponding samples in App. 3?
- Looks like the gamma scan COC MDAs for several samples are above the TDLs. Although no qualification is required, discussion was omitted from the "Detection Levels" of the validation. ~~Also, the lab reports that the MDAs for the Iso Pu analysis are higher than the RDL due to a small sample aliquot. This should be mentioned in the "Detection Levels" discussion, but it should be indicated that the TDL for Iso Pu was not exceeded in any analysis.~~
- ~~Also, I do not see the lab blank, LCS, %rec and MS/MSD (including RPDs) data sheets in the back of the report. We should include this data for package completeness (I'll need all this stuff to verify validator conclusions and perform the require calculations).~~

Thanx,
Dave

Bruce - Rich reviewed these comments -
please do not respond to lined out items -
Jeanette